IBM Engineering Specification 46G3772

Baseline Environmental Requirements For Supplier Deliverables to IBM

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1 Scope

1.1 Objectives

IBM Engineering Specification (ES) 46G3772 establishes baseline environmental requirements for all Deliverables where this specification is referenced in a Statement of Work, print, contract or other procurement documents. ES 46G3772 implements IBM's environmental policy objectives and contains some, but not all, environmental legal requirements for Deliverables. Supplier shall ensure Deliverables comply with the requirements provided in ES 46G3772. ES 46G3772 contains restrictions on Materials, certain chemicals used in manufacturing and includes other requirements, e.g., battery collection programs, labeling of batteries, energy efficiency, and marking of plastic Parts. If the Deliverable does not contain certain types of parts, then the section of 46G3772 referring to those parts would not apply, e.g., if there are no batteries in the Deliverable, then the battery requirements would not apply. ES 46G3772 requires Suppliers to disclose information about the content of certain substances in their Deliverables. This specification also applies to chemical Deliverables used for Field Use Materials, Chemical Product Supplies and chemicals contained in hardware Deliverables, Parts, or Products.

Compliance with the requirements in ES 46G3772 alone may not satisfy the Supplier's responsibilities to IBM because ES 46G3772 does not encompass all environmental legal requirements for Deliverables worldwide. In addition to ES 46G3772, Supplier shall ensure the Deliverables comply with all "Environmental Laws" and are ready for import, export, sale, or other distribution of the Deliverable in all jurisdictions worldwide, regardless of where they are sold to IBM. "Environmental Laws" include laws, rules and regulations at local, state, provincial, national, or international level that relate to environmental matters, including without limitation, material restrictions, material bans, labeling, availability of product environmental information, energy efficiency, end-of-life take back, battery requirements, and other similar requirements.

It is important to note that in addition to ES 46G3772; IBM maintains environmental and / or related requirements in other specifications, contracts, or procurement documents. Most notably, full compliance requirements for the European Union (EU) Directive 2011/65/EU on the Restriction on the use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) are not solely a part of ES 46G3772 but are rather applied through the combination of ES 46G3772, other applicable contract provisions, and IBM engineering specifications, such as 53P6233, 97P3864, and/ or 873444. In circumstances where multiple documents contain restrictions on the same chemical or substance in the same application, the most restrictive requirements apply.

1.2 Definitions

Additional definitions can be found in the applicable sections and/or regulations.

Agglomerate - a collection of weakly bound particles or aggregates where the resulting external surface area is similar to the sum of the surface areas of the individual components. [Source: EU Commission Recommendation 2011/696/EU on the definition of nanomaterial]

Aggregate - a particle comprising of strongly bound or fused particles. [Source: EU Commission Recommendation 2011/696/EU on the definition of nanomaterial]

Article - an object which during production is given a special shape, surface, or design which determines its function to a greater degree than does its chemical composition. [Source: EU Regulation 1907/2006 concerning the Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH)]. In reference to EU REACH Substances of Very High Concern (SVHC), when a product is made up of more than one constituent Article, the SVHC concentration above 0.1% weight by weight applies to each constituent Article making up the product. [Source: The Court of Justice of the European Union Judgement Case C-106/14 on September 10, 2015 for EU Regulation 1907/2006 (REACH) Articles 7(2) and 33, 10 September 2015]

Battery - means any device delivering electrical energy generated by direct conversion of chemical energy, having internal or external storage, and consisting of one or more non-rechargeable or rechargeable battery cells, modules or of packs of them, and includes a battery that has been subject to preparation for re-use, preparation for repurposing, repurposing, or remanufacturing. [Source: EU REGULATION (EU) 2023/1542 concerning batteries and waste batteries]

Chemical - a substance, whether by itself or in a mixture, or a mixture, whether manufactured or obtained from nature, but does not include living organisms, which belongs to either of the following categories:
(a) Pesticides, including severely hazardous pesticide formulations;
(b) Industrial chemicals.
[Source: EU Regulation 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of hazardous chemicals]

Chemical Product Supply - a chemical used as part of the operation of a hardware product which is consumed during the operation of the product and/or which must be periodically replaced to maintain the product.

Covered Electronic Device – video display device containing a screen greater than 4 inches, measured diagonally, such as computer monitors containing cathode ray tubes, laptop computers with a liquid crystal display, liquid crystal display containing monitors. [Source: California Electronic Waste Recycling Act, SB 20, 2003, and SB 50, 2004]

Deliverable(s) - any tangible item(s) delivered by or for a Supplier to IBM in accordance with a purchase contract or other agreement with IBM. Deliverables include, but are not limited to, components, Materials, Parts, Products, and tools.

Electrical and Electronic Equipment (EEE) - means equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields and designed for use with a voltage rating not exceeding 1000 volts for alternating current and 1500 volts for direct current. [Source: EU Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) and EU Directive 2011/65/EU on the Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (RoHS)]

Electronic Display – means a display screen and associated electronics that, as its primary function, displays visual information from wired or wireless sources. [Source: EU Regulation 2019/2021 of 1 October 2019 laying down ecodesign requirements for electronic displays pursuant to Directive 2009/125/EC of the European Parliament and of the Council]

European Union (EU) – A list of the European Union Member States can be found at https://europa.eu/european-union/about-eu/countries_en.

European Free Trade Association (EFTA) –Member States are Iceland, Liechtenstein, Norway and Switzerland http://www.efta.int/about-efta.

Field Use Material (FUM) - a chemical used to maintain and/or service hardware products.

Frequently Handled Cables - cables and cords which are readily accessible to the consumer during ordinary use**,** e.g., computer mouse cords, computer peripheral wires and cables designed to plug into the front of system (e.g., USB cords), computer peripheral AC adapter cord and I/F cable for portable computers or portable peripheral devices, computer peripheral PCMCIA card cord for portable computers, computer peripheral wires and cables for portable computers, computer speaker cords used with portable computers, desktop computer power/patch/pin cords designed to plug into the front of a computer, external CD/DVD and tape drives for portable computers, mobile PC computer cords, computer joystick, audio or video adapter cords for portable products, audio or video cable for portable products, audio/video/computer/telecommunications cables, packaged individually for retail sales, portable digital imaging equipment, portable DVD player, portable power adapters, AC adapters for foreign outlets and other voltage converters, portable ZIP drives, scanners for portable computers, USB and firewire cords.

Homogeneous Material – means one material of uniform composition throughout or a material, consisting of a combination of materials that cannot be disjointed or separated into different materials by mechanical actions such

as unscrewing, cutting, crushing, grinding and abrasive processes. [Source: EU Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment].

Industrial monitoring and control instruments - means monitoring and control instruments designed for exclusively industrial or professional use [Source: EU Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment]; Examples of Monitoring and Control Instruments include: Smoke detector, Heating regulators, Thermostats, Measuring, weighing or adjusting for household or as laboratory equipment, Other monitoring and control instruments used in industrial installations (e.g. in control panels). [Source: EU Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on Waste Electrical and Electronic Equipment (WEEE)].

Intentionally Added or Intentional Addition - a substance is deliberately utilized in the production of a Deliverable.

***In vitro* diagnostic medical device** - means any medical device which is a reagent, reagent product, calibrator, control material, kit, instrument, apparatus, piece of equipment, software or system, whether used alone or in combination, intended by the manufacturer to be used *in vitro* for the examination of specimens, including blood and tissue donations, derived from the human body, solely or principally for the purpose of providing information on one or more of the following: (a) concerning a physiological or pathological process or state; (b) concerning congenital physical or mental impairments; (c) concerning the predisposition to a medical condition or a disease; (d) to determine the safety and compatibility with potential recipients; (e) to predict treatment response or reactions; (f) to define or monitoring therapeutic measures. Specimen receptacles shall also be deemed to be *in vitro* diagnostic medical devices. [Source: EU Regulation 2017/746 of the European Parliament and of the Council of 5 April 2017 on *in vitro* diagnostic medical devices.]

Materials - chemical substances and preparations that are supplied for the production of Parts, Products and other items (e.g., structural plastics, metals, coatings, paints, and adhesives) and chemical substances or preparations that are shipped with Parts or Products (e.g., toners, cleaners, lubricants, oils, and refrigerants).

Medical Devices – Note: this definition is for RoHS and WEEE purposes only. Please see further definitions for requirements for Medical Devices. Medical Devices means a medical device within the meaning of point (a) of Article 1(2) of Directive 93/42/EEC and which is also EEE [Source: EU Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment]; medical device - means any instrument, apparatus, appliance, material or other article, whether used alone or in combination, including the software necessary for its proper application intended by the manufacturer to be used for human beings for the purpose of:
— Diagnosis, prevention, monitoring, treatment or alleviation of disease
— Diagnosis, monitoring, treatment, alleviation of or compensation for an injury or handicap,
— Investigation, replacement or modification of the anatomy or of a physiological process,
— Control of conception,
And which does not achieve its principal intended action in or on the human body by pharmacological, immunological or metabolic means, but which may be assisted in its function by such means. [Source: EU Council Directive 93/42/EEC of 14 June 1993 concerning medical devices].
Examples of Medical Devices include: Radiotherapy equipment, Cardiology equipment, Dialysis equipment, Pulmonary ventilators, Nuclear medicine equipment, Laboratory equipment for *in vitro* diagnosis, Analyzers, Freezers, Fertilization tests, Other appliances for detecting, preventing, monitoring, treating, alleviating illness, injury or disability [Source: EU Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on Waste Electrical and Electronic Equipment (WEEE)].

Medical Device – means any instrument, apparatus, appliance, software, implant, reagent, material or other article intended by the manufacturer to be used, alone or in combination, for human beings for one or more of the following specific medical purposes:
- diagnosis, prevention, monitoring, prediction, prognosis, treatment or alleviation of disease,
- diagnosis, monitoring, treatment, alleviation of, or compensation for, an injury or disability,
- investigation, replacement or modification of the anatomy or of a physiological or pathological process or state,

- providing information by means of *in vitro* examination of specimens derived from the human body, including organ, blood and tissue donations,

and which does not achieve its principal intended action by pharmacological, immunological or metabolic means, in or on the human body, but which may be assisted in its function by such means.
The following products shall also be deemed to be medical devices:
- devices for the control or support of conception;
- Products specifically intended for the cleaning, disinfection or sterilization of devices as referred to in Article 1(4) and of those referred to in the first paragraph of this point.

[Source: EU Regulation 2017/745 of the European Parliament and of the Council of 5 April 2017 on medical devices.]

Medical Device - A medical device is any instrument, apparatus, appliance, material or other article (whether used alone or in combination, and including the software necessary for its proper application) intended, by the person under whose name it is or is to be supplied, to be used for human beings for the purpose of one or more of the following:

a. diagnosis, prevention, monitoring, treatment or alleviation of disease;
b. diagnosis, monitoring, treatment, alleviation of or compensation for an injury or handicap;
c. investigation, replacement or modification of the anatomy or of a physiological process;
d. control of conception;

and that does not achieve its principal intended action in or on the human body by pharmacological, immunological or metabolic means, but that may be assisted in its function by such means; or

a. an accessory to such an instrument, apparatus, appliance, material or other article.

[Source: Australia Therapeutic Goods Act 1989.]

Mixture – a mixture or solution composed of two or more substances. [Source: EU Regulation No 1272/2008 on classification, labeling, and packaging of substances and mixtures]

Not Detected - below the detection limit of established test standards or appropriate industry wide test methods. In general, these test standards/ methods should achieve trace level detection or at the lowest detection capabilities of the specific sample matrix.

Particle - a minute piece of matter with defined physical boundaries. [Source: EU Commission Recommendation 2011/696/EU on the definition of nanomaterial]

Parts - fabricated Materials, components, devices, and assemblies.

Placing on the market - means making a product available for the first time on the Community market with a view to its distribution or use within the Community, whether for reward or free of charge and irrespective of the selling technique. [Source: EU Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products]

Postconsumer recycled material: Material generated by households or by commercial, industrial and institutional facilities, which can no longer be used for its intended purpose. This includes returns of material from the distribution chain. [Source: NSF/ANSI 426-2017 Environmental Leadership and Corporate Social Responsibility Assessment of Servers]

Preparation - a mixture or solution composed of two or more substances, for example paint, lubricant or ink. [Source: EU Regulation 1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)]

Products - stand alone, final assemblies including complete machines supplied by an original equipment manufacturer (OEM).

Putting into service - means the first use of a product for its intended purpose by an end-user in the Community. [Source: EU Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products]

RoHS - an acronym for EU Directive 2011/65/EU on the Restriction of the use of certain Hazardous Substances in electrical and electronic equipment and subsequent amendments.

RoHS substances - substances regulated by EU Directive 2011/65/EU on RoHS and amendments. These substances (as of the last revision date of this specification) are mercury, lead, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers, bis (2-ethylhexyl) phthalate, butyl benzyl phthalate, dibutyl phthalate and diisobutyl phthalate.

REACH - an acronym for European Commission Regulation Number 1907/2006 concerning the Registration, Evaluation, Authorization, and Restriction of CHemicals and amendments.

Substance - a chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition. [Source: EU Regulation 1907/2006 concerning the Registration, Evaluation, Authorization, and Restriction of CHemicals (REACH)] Substance includes such examples as ethanol and metals. Note: metals are included here not in the form of a part or product such as a heat sink or sheet metal cover but as a metal such as aluminum or aluminum alloy. Substance goes beyond a pure chemical compound defined by a single molecular structure. The definition of Substance includes different constituents such as impurities.

Substance(s) of Very High Concern (SVHC)

1. Substances meeting the criteria for classification in accordance with EU Directive 67/548/EEC:
   - Carcinogenic category 1 or 2
   - Mutagenic category 1 or 2
   - Toxic for reproduction category 1 or 2;
2. Substances which are persistent, bioaccumulative and toxic (PBT) or very persistent and very bioaccumulative (vPvB) in accordance with the criteria set out in Annex XIII of the EU REACH Regulation;
3. Substances- such as those having endocrine disrupting properties or those having PBT properties or vPvB properties which do not fulfill the criteria of 2 above - for which there is scientific evidence of probable serious effects to human health or the environment which give rise to an equivalent level of concern to those of other Substances listed in 1 or 2 and which are identified on a case-by-case basis in accordance with the procedure set out in Article 59 of REACH. [Source: EU REACH Regulation, Article 57]

Unintentional trace contamination - The level for unintentional trace contamination corresponds to a level below which the substance cannot be meaningfully used but above the detection limit of existing detection methods, and which has been reduced to the lowest possible technically and economically feasible level. The substance is not intentionally introduced into the manufacturing process. The level of the unintentional trace contamination must have no potential to be hazardous to human health and does not impair the life or growth of flora or fauna through environmental pollution. [Reference: UN Information unintentional trace contaminants and low POPs content for waste. July 2012]

WEEE - an acronym for European Union (EU) Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on Waste Electrical and Electronic Equipment (WEEE).

1.3 Application

ES 46G3772 applies to all Deliverables supplied to IBM that reference this specification in a Statement of Work, print, contract, or other IBM document.

Suppliers are responsible for compliance with ES 46G3772 in their own operations, in their subcontracted operations, and in the Materials, they procure for the manufacture of Deliverables for IBM as described herein.

In the event of conflict between ES 46G3772 and any IBM part drawing requirement, Suppliers shall immediately notify their IBM procurement representative. **Any deviation from the requirements of ES 46G3772 must have prior written approval by IBM's procurement representative. IBM Procurement shall obtain consent from**

the appropriate IBM representatives. IBM Procurement must contact the author of this document for details on the requirements for deviations.

1.4 Document Administration

This document is maintained and controlled by IBM Systems.

1.5 IBM Documents

ES 46G3772 and the following documents referenced herein can be accessed from the environmental requirements section of this website: https://www.ibm.com/procurement/ossi

- **Product Content Declaration for IBM Suppliers**, IBM Part Number 46C3484.
- **Engineering Specification 53P6233** Compliance Requirements for the European Union Directive (and other jurisdictions) on the Restriction of the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment for IBM Products. This specification reference here is informational only. The IBM print, Statement of Work or other procurement documentation must reference this specification as applicable to the specific Deliverable.
- **Engineering Specification 97P3864** Compliance Requirements for the European Union Directive (and other jurisdictions) on the Restriction of the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment for IBM Products. This specification does not allow for use of the EU RoHS exemption for "Lead in solders for servers, storage and storage array systems." This specification reference here is informational only. The IBM print, Statement of Work or other procurement documentation must reference this specification as applicable to the specific Deliverable.
- **873444** Product Quality Addendum (PQA) for Purchased Electronic Components. This specification reference here is for informational purposes only. The IBM print, Statement of Work or other procurement documentation must reference this specification as applicable to the specific Deliverable.
- **Engineering Specification 92F6933** Packaging Requirements for Dangerous Goods.
- **Engineering Specification 5897660** Packaging Materials, Essential Requirements.

2 Requirements

2.1 Prohibited From Use

2.1.1 Restrictions for Hardware Deliverables, Parts, Products, Chemicals, Substances, and Preparations

Table 1a lists restrictions for categories of substances which must not be contained in Deliverables, Parts, Products, Chemicals, Substances, and Preparations. Table 1b lists restrictions for categories for substances which must not be contained in Medical Devices. The scope of restrictions varies by substance category. Details of the restrictions for each category are provided in the respective tables along with some applicable regulatory references. Please note the regulatory references are only examples and are not intended to impact or alter the IBM restrictions set forth in this specification. Expanded listings of relevant substances in each of the categories are available in the Annexes referenced in Table 1a and 1b. **If a substance is found in several entries (Tables 1a, 1b, 2, 3, 4a, 4b, 4c, 5a, 5b, and/or the Annexes) due to multiple laws and chemical classifications, verify the stated requirements for the application of concern and use the more restrictive level.**

Please note certain substances subject to EU RoHS Directive 2011/65/EU are already restricted by other regulations at concentration levels that are more stringent than those associated with EU RoHS compliance. Table 1 presents the requirements for these substances as defined by certain existing legislation and/or IBM requirements.

Compliance of Deliverables to all the criteria of the EU Directive on RoHS is not solely governed by ES 46G3772. Only those restrictions on RoHS substances which must be met in ES 46G3772 are listed in Table 1a. Other IBM

specifications are used to apply EU RoHS compliance requirements to Deliverables. See print notes, Part specifications, purchase contracts, purchase orders, or contact your IBM procurement representative to determine if IBM's RoHS specifications apply in addition to ES 46G3772.

Notes for Tables 1a and 1b

A list of representative regulatory references is included after Table 1a. This list is not all-inclusive; it is provided for example purposes only. Where the reference of "IBM Requirement" is made, this means the requirement in that line is required by IBM and may or may not be also required by a regulation or law.

The referenced Annexes include lists of example compounds and Chemical Abstracts Service (CAS) numbers. The Annexes are not all inclusive unless stated.

For more details about the restrictions listed below, e.g., exemptions and definitions, please refer to the cited regulatory reference.

Table 1a. Prohibited from Use in Hardware Deliverables, Parts, Products, Chemicals, Mixtures, Substances, and Preparations

Chemical Substance Category	Details of Restriction	Sample Regulatory References
Acrylamide (CAS 79-06-1)	Shall not be used as a Substance or constituent of Mixtures in a concentration equal to or greater than 0.1% by weight for grouting applications.	1, 2, 73
Arsenic and compounds (Annex U)	Prohibited in wood products and paints. Applications other than for wood or paint are reportable on the PCD; see Table 4 for reporting details for other applications.	1, 2, 73
Asbestos (Annex A)	Prohibited.	1, 2, 3, 12, 26, 65, 66, 73, IBM Requirement
Azo colorants (Annex B)	Azodyes which may release one or more aromatic amines (listed in Annex B (1)) are prohibited in detectable concentrations, e.g., above 30 mg/kg (ppm) in textile and leather articles which may come into direct and prolonged contact with human skin. (Please note Benzidine has further restrictions, see entry in this Table for Benzidine.) Azodyes (listed in Annex B (2)) are prohibited in concentrations above 0.1% by weight in colorants for textile and leather articles (e.g., fabrics for headphones and wrist straps).	1, 2, 73
Benzidine (CAS 92-87-5), and compounds (Annex QQ)	Prohibited. (Note benzidine is also listed in Annex B. The more restrictive level applies, which is this entry.)	1, 2, 12, 15, 43, 73
Benzo[*a*]pyrene; benzo[*def*] chrysene (CAS 50-32-8)	Prohibited in wood-based materials in excess of 0.5 milligrams per kilogram of dry matter.	2
Benzyl butyl phthalate (or Butyl benzyl phthalate) (BBP) (CAS 85-68-7)	Prohibited at or above 0.1% by weight (or 1000ppm) in homogeneous materials. The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021. For all other equipment the restriction is in effect.	44, 61, 86
Bis (2-ethylhexyl) phthalate (DEHP) (CAS 117-81-7)	Prohibited at or above 0.1% by weight (or 1000ppm) in homogeneous materials. The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021. For all other equipment the restriction is in effect.	44, 61, 86
Bisphenol A (BPA) (CAS 80-05-7)	Prohibited in Frequently Handled Cables and frequently handled parts and products, e.g., mice, mouse pads, and keyboards. This prohibition applies to dermal exposure levels at or above 3 micrograms/day. Prohibited in thermal receipt paper and cash register receipt paper. Prohibited in thermal receipt paper in a concentration equal to or greater than 0.02% by weight.	14 55 1, 73
2-(2-butoxyethoxy)ethanol (DEGBE) (CAS 112-34-5)	Prohibited in spray paints, paints intended to be sprayed or in spray cleaners in concentrations equal to or greater than 3% by weight.	1, 2, 73

Table 1a. Prohibited from Use in Hardware Deliverables, Parts, Products, Chemicals, Mixtures, Substances, and Preparations		
Chemical Substance Category	**Details of Restriction**	**Sample Regulatory References**
2-benzotriazol-2-yl-4,6-di-tert-pentylphenol (UV-328) (CAS 25973-55-1)	Prohibited	84
Cadmium/Cadmium Compounds (Annex C) *	Cadmium is prohibited in concentrations above 100 ppm or 0.01% by weight when used in a paint, varnish, color pigment, dye, stabilizer, plastic, resins, or in epoxy resins applications or Articles treated with such paints and varnishes. Shall not be used in brazing fillers in concentrations equal to or greater than 0.01% by weight. All cadmium uses in plating or in a surface coating containing cadmium is prohibited. Prohibited in zinc plated Articles at or above 0.025% by mass. Articles shall not be painted if the concentration of cadmium (expressed as cadmium metal) is equal to or greater than 0.1% by weight of the paint on the painted article. For restrictions in battery applications, see Table 8. Cadmium is prohibited in wood-based materials in excess of 2 milligrams per kilogram of dry matter. Prohibited in Chemicals, Substances and Preparations	1, 2, 12, 28, 73 1, 73 40
Creosote, coal tar, tar oils, and anthracene substances (Annex FF)	Prohibited for the treatment of wood.	1, 2, 73
Decabromo diphenyl ether, another name - Bis(pentabromophenyl)ether (CAS 1163-19-5) *	Prohibited.	10, 19, 23, 31 1, 22, 33, 61, 80, IBM Requirement
1,6,7,8,9,14,15,16,17,17,18,18-Dodecachloropentacyclo [12.2.1.16,9.02,13.05,10] octadeca-7,15-diene ("Dechlorane Plus"™) [covering any of its individual anti- and syn-isomers or any combination thereof] (CAS 13560-89-9)	Prohibited	84
Dibutyl phthalate (DBP) (CAS 84-74-2)	Prohibited at or above 0.1% by weight (or 1000ppm) in homogeneous materials. The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021. For all other equipment the restriction is in effect.	1, 44, 61, 73, 86
Dibutyltin (DBT) compounds (Annex KK)	Prohibited in Chemicals, Mixtures, Preparations, and Articles where the concentration in the Mixture, Preparation, or Article, or part thereof, is greater than the equivalent of 0.1% by weight of tin.	1, 2, 40, 73
Diisobutyl phthalate (DIBP) (CAS 84-69-5)	Prohibited at or above 0.1% by weight (or 1000ppm) in homogeneous materials. The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021. For all other equipment the restriction is in effect.	44, 61, 86
Dimethylfumarate (CAS 624-49-7)	Prohibited in Articles, Products, Parts, and Deliverable greater than 0.1 mg/kg of the weight of the Article, Product, Part or Deliverable. Prohibited in pouches (e.g., desiccants) and in chemicals, Substances, and Preparations.	1, 30, 73

Table 1a. Prohibited from Use in Hardware Deliverables, Parts, Products, Chemicals, Mixtures, Substances, and Preparations		
Chemical Substance Category	**Details of Restriction**	**Sample Regulatory References**
Dioctylin (DOT) compounds (e.g., dioctyltin oxide CAS 870-08-6 and dioctyltin dilaurate CAS 3648-18-8)	Prohibited in concentrations greater than the equivalent of 0.1% by weight of tin in: Two-component room temperature vulcanization molding kits (RTV-2 molding kits). Prohibited in Chemicals.	1, 73 40
Fluorinated ethers and alcohols (Annex SS)	Prohibited.	32
Formaldehyde (CAS 50-00-0)	1.Materials capable of releasing formaldehyde into the air, under reasonably foreseeable conditions of use at concentrations reaching or exceeding 0.1 ppm are prohibited. 2.The use of formaldehyde in textiles intended for skin contact is prohibited (e.g., Wrist straps and headphones) above 75 mg/kg formaldehyde. The use of formaldehyde in textiles not intended for skin contact is prohibited above 300 mg/kg. 3.The use of formaldehyde in wood applications may not be used if the formaldehyde emission caused by the wooden materials exceeds 0.062 mg/m^3 in the air of a test chamber. Formaldehyde emission standards in Composite Wood must not exceed the following limits (see Section 2.11 for more details): Hardwood Plywood Veneer Core - 0.05 ppm Hardwood Plywood Composite Core - 0.05 ppm Particleboard - 0.09 ppm Medium Density Fiberboard - 0.11 ppm Thin Medium Density Fiberboard - 0.13 ppm. 4.The use of formaldehyde in articles other than furniture and wood-based articles may not be used if the formaldehyde emission caused by these materials exceeds 0.080 mg/m^3 (ppm) in the air of a test chamber.	25 11, 29 1, 20, 21 24 1, 73
Halogenated aromatic substances (Annex D)	Prohibited from use in capacitors and transformers above 500 ppm for monohalogenated or 50 ppm for polyhalogenated aromatic substances in materials of the component. (Please note PCBs have further restrictions, see entry in this Table for PCBs.)	1, 2, 73
Halogenated diphenyl methanes (Annex E)	Prohibited from use and in Preparations and products containing it.	1, 12, 73
Halogenated Flame Retardants	The use of halogenated flame retardants is not allowed in the enclosure and stand of Electronic Displays.	74
Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (alpha HBCDD, beta HBCDD, gamma HBCDD) (CAS 25637-99-4, 3194-55-6, 134237-50-6, 134237-51-7, 134237-52-8)	Prohibited except as Unintentional Trace Contamination in Articles, Substance, and Preparations, not exceeding 75 mg/kg (0.0075% by weight) of the Article.	1, 2**, 15**, 37 40, 63**, 67, 73**, 87
Hexachlorobenzene (CAS 118-74-1	Prohibited except as Unintentional Trace Contamination.	2, 15, 37, 40
Hexachlorobutadiene (CAS 87-68-3)	Prohibited.	2, 10, 15, 36, 37, 63, 80
Hexavalent Chromium/ Hexavalent Chromium Compounds (Annex G) *	Intentional Addition is prohibited by IBM in paints and plastic resins. Prohibited in leather articles or articles containing leather parts coming into contact with skin in concentrations equal to or greater than 3 mg/kg (0.0003% by weight) of the total dry weight of the leather.	IBM Requirement 1, 73
Hydrofluorocarbons (Annex JJ)	Prohibited in non-refillable containers, foams, and non-confined, direct evaporation systems containing refrigerants. Prohibited in new products and applications from October 2014.	32, 69, 72

Table 1a. Prohibited from Use in Hardware Deliverables, Parts, Products, Chemicals, Mixtures, Substances, and Preparations		
Chemical Substance Category	**Details of Restriction**	**Sample Regulatory References**
Inorganic ammonium salts	Prohibited in cellulose insulation mixtures or cellulose insulation articles unless the emission of ammonia results in a concentration of less than 3 ppm by volume (2.12 mg/ m^3) under test conditions cited in Annex XVII to EU Regulation No 1907/20006 (REACH).	1, 73
Lead/ Lead Compounds (Annex H) *	1. Lead carbonates (CAS 598-63-0 and 1319-46-6) and lead sulfates (CAS 7446-14-2 and 15739-80-7) may not be used as Substances, Mixtures, and constituents of Preparations intended for use as paints. 2. Paints and varnishes shall not have lead or lead compounds with a lead content of 0.01% or more by mass. The prohibition is also for Articles treated with such paints and varnishes. 3. Lead is prohibited in wood-based materials in excess of 90 milligrams per kilogram of dry matter. 4. The lead content of the surface layer of cables and cords for Frequently Handled Cables (e.g., Mouse cables) must be below 300 ppm. See Definitions Section for examples of Frequently Handled Cables. A lab analysis will be required to document the lead content for these types of cables. See Section 2.3.1 for details about the analysis. 5. For restrictions in battery applications see Table 8. 6. Lead as an ingredient in the manufacturing of paints, enamels, coatings and inks is prohibited when the total lead content of 600 ppm or greater in the non-volatile part of the product or a dry film of the product (more restrictive level for paint below). 7. Prohibited in Chemicals 8. Lead is prohibited in paints or similar surface coating material in excess of 0.009 percent (90 ppm) of the weight of the total non-volatile content of the weight of the dried paints film.	1, 12, 73 2 14 39, 42 40 50, 54
Medium chain chlorinated paraffins (C_{14-17} alkyl chain) (MCCPs) (e.g., CAS 85535-85-9) (also referred to as Medium-chain chlorinated alkanes)	At Any Detectable Level	90
Mercury/ Mercury Compounds (Annex I) *	Prohibited in Deliverables, including Articles, Parts, Products, Substances, Materials, Mixtures, Preparations, Chemicals, and Chemical Product Supplies, except as unavoidable impurity at levels below 10ppm. Please note, there may be existing products with cold cathode fluorescent lamps (CCFLs), released prior to October 2014. No new products may use mercury containing CCFLs as of October 2014. Mercury use in cold cathode fluorescent lamps, for previously released parts, has multiple requirements including labeling (see section 2.6). When present in an approved application, IBM must be supplied with a data sheet on mercury content. For additional mercury restrictions in batteries, see Table 8.	1, 2, 8, 9, 12, 13, 15, 17, 18, 40, 45, 47, 54, 57, 58, 70, 73, 75, 76
2-methoxyethanol (CAS 109-86-4) (See Table 2 for more restrictive requirements for ethylene-based glycol ethers for IBM Field Use Materials and Chemical Product Supplies.)	Prohibited in substances, mixtures, preparations and in products unless the substance is incidentally present.	15
2-(2-methoxyethoxy)ethanol (DEGME) (CAS 111-77-3)	Prohibited in paints, paint strippers, varnishes, cleaning agents, and self-shining emulsions in concentrations equal to or greater than 0.1% by weight.	1, 2, 73

Table 1a. Prohibited from Use in Hardware Deliverables, Parts, Products, Chemicals, Mixtures, Substances, and Preparations		
Chemical Substance Category	**Details of Restriction**	**Sample Regulatory References**
N-methyl-2-pyrrolidone; 1-methyl-2-pyrrolidone (NMP) (CAS 872-50-4)	1. Prohibited in Substances. Prohibited in Mixtures in a concentration equal to or greater than 0.~~0~~3% by weight. 2. Prohibited for use as a solvent or reactant in the process of coating wires.	1, 73 85
4-methoxy-*m*-phenylene diammonium sulphate; 2,4-diaminoanisole sulphate (CAS 39156-41-7)	Prohibited in clothing or related accessories, and textiles which under normal or reasonably foreseeable conditions of use come into contact with human skin - concentration limit of 30 mg/kg. Disposable textiles, not for clothing, are exempt.	1, 73
Monomethyl- dibromo-diphenyl methane bromobenzylbromo-toluene, mixture of isomers (Trade name DBBT) (CAS 99688-47-8)	Prohibited in Chemicals, Substances, Mixtures, Preparations and Articles.	1, 2, 40, 73, IBM Requirement
Monomethyl-dichloro- diphenyl methane (Trade names Ugilec 121 and Ugilec 21) (CAS 81161-70-8)	Prohibited in Chemicals, Substances, Mixtures, Preparations and Articles	1, 2, 40, 73, IBM Requirement
Monomethyl-tetrachlorodiphenyl methane (Trade name Ugilec 141) (CAS 76253-60-6)	Prohibited in Chemicals, Substances, Mixtures, Preparations, and Articles.	1, 2, 40, 73, IBM Requirement
Monomer tetrabromobisphenol-A (TBBA) (CAS 79-94-7)	Prohibited by IBM for use as an additive flame retardant in system enclosures for IBM designed and OEM system enclosures. System enclosures include housing parts enclosing an entire product such as monitors, servers, workstations, storage systems and kiosks. This does not include mice, keyboards, and bezels for subcomponents such as tape and DVD drives. The non-reactive form only is prohibited. (Note: TBBA used in polycarbonate resin is generally in a reactive form, not additive.)	
Nanomaterials. Substance produced in nanoparticular state: a substance containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for 50 % or more of the particles in the number size distribution, one or more external dimensions is in the size range of 1 nanometer (nm) to 100 nm, with the exception of natural, non-chemically modified substances and the substances of which the fraction between one nanometer and one hundred nanometers is a by-product of human activity. Fullerenes, graphene flakes and single and multi-walled carbon nanotubes with one or more external dimensions below 1 nm shall be deemed to be substances produced in nanoparticular state. Other common nanomaterials include silver nanoparticles, iron nanoparticles, titanium dioxide, aluminum oxide, cerium oxide, zinc oxide, silicon dioxide and dendrimers with external dimensions listed above.	Prohibited in Articles and complex objects (an object consisting of a set of Articles) where a fraction of at least one of the substances produced in nanoparticular state exceeding 0.1 % of the mass originally contained in the Article or complex object is released. An exemption to this requirement is for Pigments, when placed on the market in a mixture, an article or a complex object. Pigment is defined as a substance that is insoluble in the standard suspension media and is used for its optical properties [Source: Belgium Royal Decree concerning the placing on the market of substances produced in nanoparticular state.]	48

Table 1a. Prohibited from Use in Hardware Deliverables, Parts, Products, Chemicals, Mixtures, Substances, and Preparations		
Chemical Substance Category	**Details of Restriction**	**Sample Regulatory References**
Nickel and compounds (Annex J)	Nickel finishes are prohibited on surfaces that are designed to be in prolonged contact with skin. Examples of relevant applications in the electronics industry include wrist straps, mice, mouse pads, keyboards, headphones, and portable electronic products designed to be frequently handled. Contact your IBM representative for questions about use of the Deliverable in an IBM application which may or may not be in prolonged contact with skin.	1, 73
Nitrogen trifluoride (CAS 7783-54-2)	Prohibited in Preparations and Articles.	2, 32
Nonylphenol ethoxylates (Annex VV)	Prohibited in Chemicals, Substances, Mixtures, and Preparations.	40
Ozone-Depleting Substances (CFCs, HCFCs, HBFCs, carbon tetrachloride, etc.) (Annex K)	Prohibited in Deliverables and Deliverables may not be manufactured with these substances.	2, 5, 6, 7, 12, 65, 69, 72, IBM Requirement
Pentachlorobenzene (CAS 608-93-5)	Prohibited.	2, 10, 15, 37, 40, 63
Pentachlorophenol (CAS 87-86-5) and its salts and esters (Annex HH)	Prohibited in Substances and Chemicals. Prohibited in Substances. Prohibited in Mixtures in a concentration equal to or greater than 0.1% by weight. Prohibited in the treatment of wood. Prohibited in wood-based materials in excess of 3 milligrams per kilogram of dry matter.	1, 2, 10, 73, 37 36, 63
Pentachlorothiophenol (PCTP) (CAS 133– 49–3)	Prohibited in an Article, or any part thereof, in a concentration equal to or greater than 1% by weight.	80
Perfluorinated compounds (Annex TT has a complete list of regulated substances)	Prohibited	32
Perfluorocarbons (PFC) (Annex L)	Must not be contained in Products or Parts as a gas. Prohibited in non-refillable containers, foams, and non-confined direct evaporation systems containing refrigerants.	4, 27, 32

Table 1a. Prohibited from Use in Hardware Deliverables, Parts, Products, Chemicals, Mixtures, Substances, and Preparations		
Chemical Substance Category	**Details of Restriction**	**Sample Regulatory References**
Perfluorooctane sulfonate (PFOS), its salts, precursors, and related substances. Perfluorooctane sulfonate (PFOS) refers to a molecule with the following molecular formula: C8F17SO2X [X=OH, metal salt, halide (F/Cl/Br/I), amide and other derivatives including polymers]. For a list of CAS numbers see category codes 201, 202, 203, 203.01, 203.02, 203.03, 203.04, 203.05, 204, 204.01, 204.02, 204.03, and 205 in the OECD Comprehensive Database of Per- and polyfluoroalkyl substances*(This list of category codes is intended to be used as a general guideline for restricted PFOS/PFOA compounds. It is not intended to be a complete list of all restricted compounds)*: https://ibm.biz/oecd-PFAS Note: This grouping also includes Perfluorohexane (CAS 355-42-0) and Perfluorhexane sulfonic acid-related substances in the form of linear or branched isomers and their salts (PFHxS)	1. Prohibited in Substances, in Mixtures or as a constituent of Preparations in a concentration higher than-10mg/kg (0.001% by weight). 2. Prohibited in deliverables, products, parts and articles, except as Unintentional Trace Contaminations, not exceeding 0.1% by weight. 3. Prohibited in textiles, except as Unintentional Trace Contaminations, not exceeding 1 ug/m^2. 4. PFHxS - Prohibited in Substances, Mixtures, constituents of Preparations and Articles, except as Unintentional Trace Contamination, not exceeding 25 ppb (0.025 mg/kg or 0.0000025 % by weight) or not exceeding 0.0001% (100 ppb) total content of PFHxS- related substances. (See Table 2 – PFAS requirements for more restrictive requirements for IBM Field Use Materials and Chemical Product Supplies)	1, 2, 10, 15, 36, 37, 40, 73 77 67, 83

Table 1a. Prohibited from Use in Hardware Deliverables, Parts, Products, Chemicals, Mixtures, Substances, and Preparations		
Chemical Substance Category	**Details of Restriction**	**Sample Regulatory References**
Perfluorooctanoic acid (PFOA), its salts, precursors, and related substances. Perfluorooctanoic acid (PFOA) refers to a fully fluorinated, eight-carbon chain carboxylic acid ($C_nF_{2n+1}COOH$, n = 7; 7 carbons in the perfluoroalkyl chain) and its derivative. For a list of CAS numbers see category codes 102, 103, 103.01, 103.02, and 104, in the OECD Comprehensive Database of Per- and polyfluoroalkyl substances*(This list of category codes is intended to be used as a general guideline for restricted PFOS/PFOA compounds. It is not intended to be used a complete list of all restricted compounds)*: https://ibm.biz/oecd-PFAS Note: This grouping also includes Long Chain (C8-C20) Perfluorocarboxylic acids (LC-PFCAs), its salts, precursors, and related substances.	1.Prohibited in Substances, Constituents of Substances, Mixtures and Articles, except as Unintentional Trace Contaminations, not exceeding 25 ppb (0.025 mg/kg or 0.0000025 % by weight) or not exceeding 260 ppb for a combination of PFOA-related substances. 2.Prohibited in mixtures and Articles, except as Unintentional Trace Contaminants, not exceeding1 mg/kg (0,0001 % by weight) for industrial and professional uses containing PTFE (aka Teflon) micropowders of PFOA and its salts. The manufacturing, placing on the market and use of PFOA, its salts and PFOA-related compounds shall be allowed for the following purposes: (a) photolithography or etch processes in semiconductor manufacturing, until 4 July 2025; (b) photographic coatings applied to films, until 4 July 2025. 3. Long Chain (C8-C20) Perfluorocarboxylic acids (LCPFCAs), its salts, precursors, and related substances prohibited at any level. (See Table 2 – PFAS requirements for more restrictive requirements for IBM Field Use Materials and Chemical Product Supplies)	67, 73, 78, 79, 81 90
Phenol, 2- (2H-benzotriazol -2-yl) - 4,6-bis (1,1-dimethylethyl) (CAS 3846-71-7)	Prohibited in decorative laminate, adhesives, paints, printing inks, inked ribbon, and molded plastic products.	10
PIP (3:1) - phenol, isopropylated phosphate (3:1), also known as tris(4-isopropylphenyl) phosphate (CAS 68937–41–7)	Prohibited.	80
Polybrominated Diphenyl ethers (PBDEs); also known as Polybrominated Biphenyl ethers (PBBEs) or Polybrominated Biphenyl Oxides (PBBOs); except Decabromo diphenyl ether (see this substance in separate entry) (See Annex N and Annex M for a limited list.) *	Prohibited in Deliverables, including Chemicals.	2, 10, 15, 16, 36, 40, 51, 63, 73, IBM Requirement
Polychlorinated biphenyls (PCBs) (Annex O)	Prohibited except as an Unintentional Trace Contamination not exceeding 0.2 ppm. (Please note PCBs are prohibited by other regulations; see halogenated aromatic substances in Table 1 and Annex O.)	1, 2, 10, 12, 36, 37, 40, 63, 65, 67, 68, 71, 73, 78, 79, IBM Requirement
Polychlorinated naphthalenes, $C_{10}H_{8-n}Cl_n$ where "n" is greater than 1 (Annex R)	Prohibited including in Field Use Materials, Substances, Preparations, Mixtures, and Chemical Product Supplies.	2, 10, 15, 37, 64

Table 1a. Prohibited from Use in Hardware Deliverables, Parts, Products, Chemicals, Mixtures, Substances, and Preparations		
Chemical Substance Category	**Details of Restriction**	**Sample Regulatory References**
Polychlorinated terphenyls (PCTs) (e.g., CAS 61788-33-8)	Prohibited, including Chemicals.	1, 12, 15, 40, 65, 73
Polycyclic aromatic hydrocarbons (PAHs) (Annex LL)	Prohibited in Articles at and above 1 mg/kg by weight, if any rubber or plastic component comes in to direct and prolonged or short-term repetitive contact with skin or oral cavity under normal or reasonable foreseeable conditions of use. Examples include, but are not limited to wrist straps, mice, mouse pads and keyboards.	1, 2, 73
Polyvinyl chloride (CAS 9002-86-2)	Prohibited for use in system enclosures for IBM designed and OEM Products. System enclosures include cover sets enclosing an entire product, including enclosures for monitors, servers, workstations, storage systems, and kiosks. This does not include mice, keyboards, cables, or bezels for subcomponents. Bezels for Storage products (e.g., Tape libraries, tape and CD/DVD drives) must meet this requirement and not use PVC. This prohibition includes blends of resins which include PVC in whole or part of the composition.	
Radioactive substances (Annex CC)	Prohibited above background radiation.	14, 52, 53, 65
Short chain Chlorinated Paraffins (C_{10-13}) (also referred to as Short-chain Chlorinated Alkanes) (Annex P)	Prohibited except as Unintentional Trace Contamination in products, Substances, Mixtures, and Preparations, not exceeding 0.1% by weight. Prohibited in Chemicals.	1, 2, 10, 12, 15, 37, 64, 73,81 40
Substances which are classified as carcinogenic, mutagenic or toxic for reproduction, category 1A or 1B. For a full list of substances refer to Appendix 12 located **here.**	Prohibited in clothing or related accessories, and textiles which under normal or reasonably foreseeable conditions of use come into contact with human skin. Disposable textiles, not for clothing, are exempt	1, 73
Sulphur hexafluoride (CAS 2551-62-4)	Prohibited in Preparations and Articles. Prohibited in foams and non-refillable containers.	2, 27, 32, 65
Tetrachlorobenzene (CAS numbers included in Annex D)	Prohibited	2, 15
Tris (1,3-dichloro-2-propyl) phosphate (TDCPP) (CAS 13674-87-8)	Prohibited above 0.1% by mass in any product component. Exempt from this requirement are cables (except cables for mice), adaptors and other similar connecting devices and storage media, such as compact discs, for interactive software, such as computer games. This substance is prohibited in cables for mice. If a replacement flame retardant for this substance is used, it cannot be a substance classified as a "known to be a human carcinogen" or "reasonably anticipated to be a human carcinogen" as listed by the US National Toxicology Program in the US Department of Health and Human Services; classified as "carcinogenic to humans" or "likely to be carcinogenic to humans" by the US Environmental Protection Agency; or identified by the US Environmental Protection Agency or the US National Institutes of Health as causing birth defects, hormone disruption, neurotoxicity, or harm to reproduction or development.	14, 49
Tris-(aziridinyl) – phosphine oxide (CAS 545-55-1)	Prohibited from use in textile articles intended to come into contact with skin, e.g., Wrist straps, mouse pads, and headphones. Prohibited in Substances and Preparations.	1, 2, 12, 73 40
Tris (2,3 dibromopropyl) phosphate (CAS 126-72-7)	Prohibited from use in textile articles intended to come into contact with skin, e.g., Wrist straps, mouse pads, and headphones. Prohibited in Chemicals, Substances and Preparations.	1, 2, 12, 35, 73 40

Table 1a. Prohibited from Use in Hardware Deliverables, Parts, Products, Chemicals, Mixtures, Substances, and Preparations		
Chemical Substance Category	**Details of Restriction**	**Sample Regulatory References**
Tris(2-chloroethyl) phosphate (CAS 115-96-8)	Prohibited at or above 0.1% by mass in any product component. This restriction does not apply to desktop and laptop computers, audio and video equipment, calculators, wireless telephones, game consoles, handheld devices incorporating a screen that are used to access interactive software and their associated peripherals, and cables, adaptors and other similar connecting devices (except cables for mice). This substance is prohibited in cables for mice. (Note: If a replacement flame retardant for this substance is used, it cannot be a substance classified as a "known to be a human carcinogen" or "reasonably anticipated to be a human carcinogen" as listed by the US National Toxicology Program in the US Department of Health and Human Services; classified as "carcinogenic to humans" or "likely to be carcinogenic to humans" by the US Environmental Protection Agency; or identified by the US Environmental Protection Agency or the US National Institutes of Health as causing birth defects, hormone disruption, neurotoxicity, or harm to reproduction or development.)	14, 49
Tri-substituted organostannic compounds, e.g., tributyltin (TBT) (Annex EE) and triphenyltin (TPT) (Annex EE)	Prohibited in Articles, or part thereof, where the concentration in the article is greater than the equivalent of 0.1% by weight of tin.	1, 2, 15, 73

* For further IBM EU RoHS requirements, see specifications 53P6233 or 97P3864. These two specifications ban the use of RoHS substances (exemptions allowed), including hexavalent chromium and compounds in finishing processes for sheet steel, aluminized, electroless nickel and die cast parts, fasteners and heat sinks. Hexavalent chromium and its compounds must not be used prior to painting or in other surface treatments for metal parts. These specifications apply to Deliverables where the specifications are cited on the print, contract, Statement of Work or other procurement documentation.
** Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (alpha HBCDD, beta HBCDD, gamma HBCDD) is Prohibited except as Unintentional Trace Contamination in Articles, Substance, and Preparations, not exceeding 100 mg/kg (0.01% by weight) of the Article for the following jurisdictions: Switzerland, India, Canada, and Turkey.

For questions regarding the regulatory references for Table 1a and Table 1b please email Prodinfo@us.ibm.com.

Sample regulatory references for Table 1a

1) EU Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).
2) Switzerland Ordinance on Risk Reduction related to the Use of certain particularly dangerous Substances, Preparations and Articles (Ordinance on Risk Reduction related to Chemical Products) of 18 May 2005 and amendments.
3) USA Occupational Safety and Health 29 CFR 1910.1001 Asbestos.
4) Statutory Order no. 552 of 2 July 2002 Regulating Certain Industrial Greenhouse Gasses (Denmark).
5) EU Regulation (EC) No. 1005/2009 on Substances that deplete the ozone layer.
6) USA Clean Air Act Section 611 of the 1990 amendments; 40 CFR Part 82.
7) Law Concerning the Protection of the Ozone Layer through the Control of Specified Substances and Other Measures (Law No. 53 of May 20, 1988) (Japan).
8) No. 553 Decree of 9 September 1998, comprising regulations regarding products containing mercury (Decree on Product Containing Mercury, 1998 Environmentally Hazardous Substances Act) Netherlands.
9) The Mercury-containing Products (Certain) Ordinance (SFS 1991:1290) Sweden.
10) Japan Act on the Evaluation of chemical substances and Regulation of Their Manufacture, etc. and amendments.
11) The Netherlands 178 Besluit van 22 maart 2001, houdende vaststelling van het Warenwetbesluit formaldehyde in textiel.
12) Norway Product Control Regulation Chapter 2. Restricted Substances and Preparations.
13) Connecticut Public Law 02-90, the Mercury Education and Reduction Act.
14) California Safe Drinking Water and Toxic Enforcement Act of 1986.
15) Canada Environmental Protection Act, 1999. Prohibition of Certain Toxic Substances Regulations and amendments.
16) State of Washington Title 70 RCW an act relating to phasing out the use of polybrominated diphenyl ethers.
17) Louisiana Mercury Risk Reduction Act of 2006.
18) Rhode Island Mercury Education and Reduction Act.
19) Maine Public Law Chapter 296 Section 1. 38 MRSA 1609, with 2009 amendment Public Law Chap 121 Section 17 38 MRSA 1609 Sub 5.
20) Austria - BGB I 1990/194: Formaldehydeverordnung, 2, 12/2/1990.
21) Germany: LMBG B 82.02-1 Untersuchungen von Bedarfsgegenständen; Bestimmung der Formaldehydabgabe aus textilen Bedarfsgegenständen; Ausgabe: 1985-06.
22) Norway Regulation amending regulation of 1 June 2004 No 922 relating to restrictions on the use of chemicals dangerous to health and environment and other products.

23) Minnesota 325E.387 Ban on deca-BDE in computer enclosures.
24) California Regulation 93120 Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products.
25) USA Occupational Safety and Health 29 CFR 1910.1048 Formaldehyde.
26) USA Toxic Substances Control Act 40 CFR Part 721.2800 Erionite fiber.
27) Austria Ordinance on bans and restrictions of partly fluorinated and fully fluorinated hydrocarbons and of sulfur hexafluoride 447/2002, with amendments 246/2005, 86/2006 and 139/2007.
28) Sweden. The Chemical Products Ordinance 1998:944 to 2009:14.
29) Lithuanian Hygiene Norm HN 96:2000.
30) EU Commission Decision 2009/251/EC Products containing the biocide dimethyl fumarate.
31) Oregon SB 596 Relating to decabrominated diphenyl ether amending ORS 453.005, 453.025 and 453.085.
32) EU Regulation (EC) No 517/2014 on fluorinated greenhouse gases
33) Maryland Act concerning Environment – Decabrominated Diphenyl Ether – Prohibitions.
34) Canadian Environmental Protection Act, 2-butoxyethanol regulations SOR/2006-347.
35) Canada Hazardous Products Act.
36) EU Commission Regulation 757/2010 of 24 August 2010 amending Regulation No 850/2004 of the European Parliament and of the Council on persistent organic pollutants as regards Annexes I and III.
37) EU Regulation 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants (recast).
38) France Decree no. 2012-232 concerning the annual declaration of substances with nanoparticle status.
39) NORMA Official Mexicana NOM-004-SSA1-2013 Environmental Health. Limitations and sanitation specification for the use of lead compounds.
40) EU Regulation No 649/2012 of 4 July 2012 concerning the export and import of hazardous chemicals.
41) EU Regulation No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products.
42) NOM-003-SSA1-2006 Health Environmental. Health requirement to be met by the labeling of paints, inks, varnishes, lacquers and enamels.
43) USA Toxic Substances Control Act 40 CFR Part 721.1660 Benzidene-based chemical substances.
44) EU Commission Delegated Directive 2015/863 amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances (RoHS).
45) Canada Products Containing Mercury SOR/2014-1244.
46) California Consumer Products Regulations - Regulation for Reducing Emissions from Consumer Products.
47) Japan Act on Preventing Environmental Pollution of Mercury.
48) Belgium Royal Decree concerning the placing on the market of substances produced in nanoparticular state.
49) Washington DC Carcinogenic Flame-Retardant Prohibition Amendment Act of 2016.
50) Philippines Chemical Control Order for lead and lead compounds.
51) Minnesota 325E.386 Products containing certain polybrominated diphenyl ethers banned
52) EU Directive 2013/59/EURATOM laying down basic safety standards for protection against the dangers arising from exposure to ionizing radiation.
53) New Zealand Radiation Safety Act 2016.
54) Canada Consumer Product Safety Act.
55) Connecticut Public Act No 11-222 An Act Prohibiting the Use of Bisphenol-A in Thermal Receipt Paper.
56) Connecticut Regulation Concerning Consumer Products and Architectural and Industrial Maintenance Coatings.
57) Columbia Decree 2133-2016 Control measures for the importation and commercialization of mercury and the products that contain it.
58) EU Regulation 2017/852 of the European Parliament and of the Council of 17 May 2017 on mercury, repealing Regulation (EC) No 1102/3008.
59) EU Regulation 2017/746 of the European Parliament and of the Council of 5 April 2017 on *in vitro* diagnostic medical devices.
60) EU Regulation 2017/745 of the European Parliament and of the Council of 5 April 2017 on medical devices.
61) United Arab Emirates: Restrictions on the Use of Hazardous Materials in Electronic and Electrical Devices Control Scheme, Regulation No. 10, 2017.
62) EU Directive 93/42/EEC of 14 June 1993 concerning medical devices.
63) India Regulation of Persistent Organic Pollutants Rules, 2018.
64) Singapore Environmental Protection and Management Act Chapter 94A, Environmental Protection and Management Regulations.
65) Australia Customs (Prohibited Imports) Regulations
66) Canada Prohibition of Asbestos and Products Containing Asbestos Regulations SOR/2018-196
67) Stockholm Convention on Persistent Organic Pollutants
68) USA 21 CFR 109 Unavoidable contaminants in food for human consumption and food-packaging material.
69) Washington An Act Relating to reducing greenhouse gas emissions from1 hydrofluorocarbons and amendments
70) Argentina Resolution 75 2019 Products with added mercury
71) Argentina Resolution 4443 2019 Importation of PCBs and products or equipment that contain them.
72) Vermont No 65 An Act relating to the regulation of hydrofluorocarbons.
73) Turkey Regulation Concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).
74) EU Regulation 2019/2021 of 1 October 2019 laying down eco-design requirements for electronic displays pursuant to Directive 2009/125/EC of the European Parliament and of the Council.
75) USA Toxic Substances Control Act 40 CFR Part 721.10068 Elemental mercury
76) Massachusetts 310 CMR 75.00 Collection, Recycling, Labeling and sales ban of mercury added products.
77) Maine Chapter 06-890 Designation of PFOS and its salts as priority chemicals
78) Japan National Implementation Plan of Japan under the Stockholm Convention on Persistent Organic Pollutants
79) Japan Export Trade Control Ordinance and Import Trade Control Ordinance
80) USA Toxic Substances Control Act 40 CFR Part 751. DecaBDE, PIP (3:1), HCBD, PCTP
81) South Korea List of Persistent Organic Pollutants (POPs), Notice No. 2020-191
82) EU Regulation 2020/1021 of the European Parliament and of the Council ad regards the listing of perfluorooctanoic acid (PFOA), its salts and PFOA related compounds

83) Switzerland: Reduction of Risks Linked to Use of Dangerous Substances, Preparations and Articles, Ordinance, May 2005 - Amendment - (on adaptation to various EU Regulations) Ordinance, February 2022
84) Singapore National Environment Agency, Management of Hazardous Substances under the Stockholm Convention on Persistent Organic Pollutants
85) EU Commission Regulation 2018/588 of 18 April 2018 amending Annex XVII to Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as regards 1-methyl-2-pyrrolidone
86) China: GB/T 26572-2011 Requirements of Concentration Limits for Certain Restricted Substances for Electronic and Electrical Products, 2011
87) EU: Persistent Organic Pollutants (POPs), Regulation (EU) 2019/1021 - Amendment - (on exemptions and UTC limit value of HBCDD in Annex I) Regulation (EU) 2024/2555
88) Environmental Protection Agency 40 CFR Parts 9 and 721 [EPA-HQ-OPPT-2022-0867; FRL 9655-02-OCSPP] RIN 2070-AL10 Per- and Poly- Fluooalkyl Chemical Substances Designated as Inactive on the TSCA Inventory; Significant New Use Rule
89) Serbia: Restrictions on Production, Marketing and Use of Dangerous Chemicals, Regulation, October 2013 - Amendment - (on updating the list of restricted substances) Pravilnik No. 1501, 2024
90) Singapore Environmental Protection and Management Act 1999 (Amendment of Second Schedule) Order 2025

Table 1b. Prohibited from Medical Devices

Chemical Substance Category	Details of Restriction	Sample Regulatory References
Carcinogenic, mutagenic or toxic to reproduction (CMR) in accordance with Part 3 of Annex VI to EU Regulation 1272/2008 Classification, Labeling and Packaging	***In Vitro* Medical Devices** must be designed and manufactured to reduce the risks posed by these substances to a level as low as reasonably practicable, including wear debris, degradation products and processing residues. **Medical Devices** must be designed and manufactured to reduce the risks posed by these substances to a level as low as reasonably practicable, including wear debris, degradation products and processing residues. Substances must be below 0.1% weight by weight.	59, 60, 62
Substances having endocrine disrupting properties which are identified by EU REACH Regulation 1907/2006 Article 59 for Annex XIV Authorized substances	***In Vitro* Medical Devices** must be designed and manufactured to reduce the risks posed by these substances to a level as low as reasonably practicable, including wear debris, degradation products and processing residues. **Medical Devices** must be designed and manufactured to reduce the risks posed by these substances to a level as low as reasonably practicable, including wear debris, degradation products and processing residues. Substances must be below 0.1% weight by weight.	59, 60, 62

2.1.2 Additional Restrictions and Requirements for Substances, Mixtures, Preparations, Field Use Materials, and Chemical Product Supplies

Substances, Preparations, IBM Field Use Materials (FUMs), and Chemical Product Supplies must meet the applicable restrictions in Section 2.1.1 and Table 1 as well as the additional requirements in this section. This section applies to:

- Substances or Preparations used on or in a Deliverable or to maintain or service hardware Deliverables, Parts or Products, e.g., adhesives, cleaning solvents or solutions, lubricants, water cooling solutions, and refrigerant gas.
- Substances or Preparations used to operate a hardware Part or Product, and which is consumed during the operation of the Part or Product and/or must be periodically replaced to maintain the Part or Product. Examples include toner, toner cartridges, ink, and ribbon cartridges.
- Substances or Preparations contained in a Part, Product, or assembly which is not normally consumed but may require replacement of the chemical to maintain operation of a Part, Product or assembly. Examples include refrigerants, lubricants, biocides, or corrosion inhibitors in a closed looped water-cooling system.

The individual container or individual protective packaging of the Substance, Preparation, Field Use Material, or Chemical Product Supply must be labeled with:

- The chemical name as it appears on the associated Material Safety Data Sheet(s),
- The name and address of the appropriate chemical manufacturer, Supplier or other responsible party, (in some cases, IBM may designate the responsible party), and
- Appropriate hazard warnings as applicable.

The label must be provided in English at a minimum. The label must have text in other languages and format as required by law or regulation in countries outside the U.S. For example, the label must meet requirements for content, format, and language translation for the EU Classification, Labeling, and Packaging Regulation. In some cases, IBM may specify the label and its contents.

A Safety Data Sheet (SDS) must be supplied to the IBM procurement representative or other IBM designated representative. The SDS must be provided in English at a minimum and comply with legal requirements for information content and format. For example, SDSs must be provided which meet the requirements of the EU REACH Regulation for format, content, and language translation. The SDS may be required in other languages and formats as required by law or regulation in countries outside the U.S. The Supplier shall work with the appropriate IBM chemical representative through the IBM procurement representative to ensure proper format, information content, and translation requirements. In some cases, IBM may specify the language and format of an SDS. Full chemical disclosure for all Substances and Preparations is required.

Substances, Mixtures, Preparations, Field Use Materials, and Chemical Product Supplies must comply with chemical registration and premanufacture notification requirements in countries which require this type of notification in order to permit import, export, and sale of the Deliverable in that country.

The following are prohibited in Substances, Mixtures, Preparations, Field Use Materials, and Chemical Product Supplies. The applicable restriction is listed in the column entitled "Details of Restriction." The cited regulation can be found after Table 1.

Table 2. Prohibited in Substances, Mixtures, Preparations, Field Use Materials, and Chemical Product Supplies

Substance	Details of Restriction	Example legal citations (See Table 1)
4-aminobiphenyl xenylamine and its salts (e.g., CAS 92-67-1, 2113-61-3)	Prohibited from use in concentrations equal to or greater than 0.1% by mass in Substances or Preparations.	1, 2, 12, 40
Benzene (CAS 71-43-2)	Prohibited in concentrations equal to or greater than 0.1% by mass in Substances or Preparations.	1, 2, 12, 40
2-Butoxyethanol (CAS 111-76-2)	Prohibited in paint stripper or thinner at 0.5 % (w/w). Prohibited in aerosol cleaners at 5 % (w/w). Prohibited in non-aerosol cleaners at 6 % (w/w). Prohibited in aerosol paint and coating at 0.1% (w/w). Prohibited in non-aerosol paint or coating at 0.5% (w/w).	34
Chlorinated Solvents (see specific list in Annex Q)	Prohibited in concentrations equal to or greater than 0.1% by weight in Substances and Preparations. Prohibited in Chemicals.	1, 2, 12 40
Cyclohexane (CAS 110-82-7)	Prohibited as a constituent of neoprene-based contact adhesives in concentrations equal to or greater than 0.1% by weight in package sizes greater than 350 g. If the package size is less than 350 g, then the package must be labeled in accordance to the EU REACH Regulation.	1, 2
Dichloromethane (Methylene chloride) (CAS 75-09-2)	Prohibited in Substances, Mixtures, Preparations, Field Use Materials, and Chemical Product Supplies. Prohibited in paint strippers in a concentration of 0.1% or more by mass.	IBM requirement, 28 1, 2
N,N-dimethylformamide (CAS 68-12-2)	Prohibited as to produce or use the substance as such, as a component of or as an integral part of another substance or in mixtures in a concentration equal to or greater than 0.3%.	89

Table 2. Prohibited in Substances, Mixtures, Preparations, Field Use Materials, and Chemical Product Supplies		
Substance	**Details of Restriction**	**Example legal citations (See Table 1)**
Ethylene based glycol ethers (Annex GG)	Prohibited in Field Use Materials and Chemical Product Supplies.	IBM requirement
Formaldehyde (CAS 50-00-0)	Mixtures or solutions composed of greater than 0.1% formaldehyde are prohibited.	25
Hazardous chemicals subject to export notification, chemicals qualifying for Prior Informed Consent (PIC) notification, and/ or chemicals subject to the PIC procedure. Chemical list located at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:201:0060:0106:en:PDF (and all follow-on amendments)	Prohibited.	40
Isopropyl alcohol (CAS 67-63-0)	Prohibited in concentrations above 75% volatile organic compounds content in electronic cleaners. This includes cleaning wipes.	46, 56
Methylenediphenyl diisocyanate (MDI) (Annex PP)	Prohibited as a constituent in a Mixture in concentrations equal to or greater than 0.1% by weight.	1
78-872-naphthylamine and its salts (e.g., CAS 91-59-8, 553-00-4, 612-52-2)	Prohibited in concentrations equal to or greater than 0.1% by weight in Substances and Preparations.	1, 2, 12, 40
4-nitrobiphenyl (CAS 92 -93-3)	Prohibited in concentrations equal to or greater than 0.1% by mass in Substances or Preparations.	1, 2, 12, 40
Nonylphenols (Annex RR)	Prohibited in Substances and Preparations	40
Per- and polyfluoroalkyl substances (PFAS) and PFAS-related substances with **5 or more carbon atoms in a perfluorinated carbon chain are banned**. (e.g., –CnF2n–, n ≥ 5; or CF3–CnF2n– , n≥4). PFAS is defined as fluorinated substances that contain at least one **fully fluorinated methyl or methylene carbon atom (without any H/Cl/Br/I atom attached to it)**, i.e. with a few noted exceptions, any chemical with at least a perfluorinated methyl group (–CF3) or a perfluorinated methylene group (–CF2–) is a PFAS**.** For a list of possible CAS numbers refer OECD Comprehensive Database of Per- and polyfluoroalkyl substances https://www.oecd.org/content/dam/oecd/en/topics/policy-sub-issues/risk-management-risk-reduction-and-sustainable-chemistry2/pfas-report-support-materials/global%20database%20of%20per%20and%20polyfluoroalkyl%20substances.xlsx	Prohibited in Field Use Materials and Chemical Product Supplies (Note: See Table 1 for additional prohibited usages of PFOS and PFOA)	IBM requirement, 2, 10, 40
Per- and polyfluoroalkyl substances (PFAS) and PFAS-related substance with **4 or less carbon atoms in a perfluorinated carbon chain are restricted** (e.g., –CnF2n–, n ≤ 4; or CF3–CnF2n– , n≤3) For a list of possible CAS numbers refer OECD Comprehensive Database of Per- and polyfluoroalkyl substances https://www.oecd.org/content/dam/oecd/en/topics/policy-sub-issues/risk-management-risk-reduction-and-sustainable-chemistry2/pfas-report-support-materials/global%20database%20of%20per%20and%20polyfluoroalkyl%20substances.xlsx	Restricted in Field Use Materials and Chemical Product Supplies (Note: See Table 1 for additional prohibited usages of PFOS and PFOA)	IBM Requirement

Table 2. Prohibited in Substances, Mixtures, Preparations, Field Use Materials, and Chemical Product Supplies		
Substance	**Details of Restriction**	**Example legal citations (See Table 1)**
Per- and polyfluoroalkyl substances (PFAS) and PFAS-related substance that meet the following definition: • R-(CF2)-CF(R′)R″, where both the CF2 and CF moieties are saturated carbons; • R-CF2OCF2-R′, where R and R′ can either be F, O, or saturated carbons; or • CF3C(CF3)R′R″, where R′ and R″ can either be F or saturated carbons.	Prohibited in Substances, Mixtures, Preparations, Field Use Materials, and Chemical Product Supplies.	87
Substances subject to REACH Authorization found in Annex XIV of REACH regulation and amendments (Annex OO in this specification lists current authorized substances as of date of this specification)	Prohibited in Substances, constituents of Substances, Preparations or in Mixtures.	1
Substances which are classified (in Part 3 of Annex VI to EU Regulation 1272/2008 on Classification, Labeling, and Packaging of Substances and Mixtures) as: i)Carcinogen Category 1A or 1B or carcinogen category 1 or 2; ii)Germ cell mutagen category 1A or 1B or mutagen category 1 or 2; iii)Toxic to reproduction category 1A or 1B or toxic to reproduction category 1 or 2. For more information about this restriction see EU REACH Regulation Annex XVII and all amendments.	Prohibited in Substances, constituents of Substances, or in Mixtures.	1, 2
Substances with nanoparticle status (intentionally manufactured on a nanometric scale and containing particles, unbound or as an aggregate or agglomerate, of which a minimum proportion, in the number sizes distribution, has one or more external dimensions in the size range 1 nm and 100 nm); Substance produced in nanoparticular state: a substance containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for 50 % or more of the particles in the number size distribution, one or more external dimensions is in the size range of one nanometer to one hundred nanometers, with the exception of natural, non-chemically modified substances and the substances of which the fraction between one nanometer and one hundred nanometers is a by-product of human activity. Fullerenes, graphene flakes and single wall carbon nanotubes with one or more external dimensions below one nanometer shall be deemed to be substances produced in nanoparticular state.	Prohibited in Field Use Materials, Substances, Mixtures, Preparations, and Chemical Products	38, 48
Tetrachloroethylene (perchloroethylene) CAS 127-18-4	Prohibited in Field Use Materials, Substances, Mixture, Preparations, and Chemical Product Supplies, including but not limited to adhesives, paints, and cleaning agents.	IBM requirement, 10, 28
Tetraethyl lead (CAS 78-00-2)	Prohibited in Substances and Preparations	40
Tetramethyl lead (CAS 75-74-1)	Prohibited in Substances and Preparations	40

Table 2. Prohibited in Substances, Mixtures, Preparations, Field Use Materials, and Chemical Product Supplies		
Substance	**Details of Restriction**	**Example legal citations (See Table 1)**
Toluene (CAS 108-88-3)	Prohibited as a Substance or in Mixtures in concentrations equal to or greater than 0.1% by mass in adhesives and spray paints. Spray paint includes paint designed or intended to be sprayed on.	1, 2
Tributyl tin oxide (TBTO) (Annex S)	Prohibited in Field Use Materials, Substances, Preparations, Mixtures, and Chemical Product Supplies.	10, 40
Trichlorobenzene (CAS 120-82-1)	Prohibited as a Substance or in Mixtures in concentrations equal to or greater than 0.1% by weight. Exemptions allowed: as intermediate of synthesis, process solvent in closed chemical applications for chlorination reactions and manufacture of TATB. See EU Regulation for details. Prohibited in Chemicals.	1, 2 40
Trichloroethylene (CAS 79-01-6)	Prohibited in Substances, Mixtures, Preparations, Field Use Materials, and Chemical Product Supplies, including but not limited to adhesives, paints, and cleaning agents.	IBM requirement, 10, 28
2,4,6-Tri-tert-butylphenol (CAS 732-26-3)	Prohibited in lubricating oils.	10
Vinyl chloride (CAS 75-01-4)	Prohibited in aerosol dispensers	1, 2

Chemicals regulated by transportation regulations must be packaged and labeled according to IBM Engineering Specification P/N 92F6933 "Packaging Requirements for Dangerous Goods." Contact the IBM Hazardous Materials Transportation Coordinator for more details on packaging requirements.

2.2 Product Content Declarations

IBM documents the presence of certain categories of substances in Deliverables to meet regulatory reporting requirements and customer requirements for Product content disclosures. Suppliers are required to complete a Product Content Declaration (PCD), IBM Part Number 46C3484, for Deliverables sold to IBM. Some parts, commodities and Products, such as batteries, cables, connectors, Medical Devices, Monitoring and Control instruments, and Vendor Logo Products may require additional information. The PCDs must be completed and forwarded to IBM upon request or by the submission deadline indicated by an IBM Procurement representative or IBM contracted vendor. IBM Procurement or vendor will supply details for completion of the declaration. Suppliers are required to keep documentation and/or test data that demonstrates procedures and actions taken by the supplier and the results to verify compliance of the Deliverable for 10 years from the end of production and make available to IBM upon request. This includes documentation and data maintained by the supplier from their respective supply chain and supplier's own records on the material content of the product. See Section 2.14 for additional documentation requirements. The IBM PCD is routinely updated to reflect new legal regulations and requirements. It is necessary for the IBM Supply Chain to resubmit an updated PCD upon request or if the part or product supplied to IBM is impacted by a new reporting requirement and the information on the PCD needs to be updated. The latest release of the PCD can be found at: https://www.ibm.com/ibm/environment/products/ecpquest.shtml.

If and when a supplier states on a PCD or Full Material Disclosure that the substances that make up a material is proprietary, the supplier is required to declare on the PCD or Full Material Disclosure any regulated substances contained within the proprietary material. (i.e., If a proprietary material contains a restricted, RoHS, REACH or reportable substance, then that substance, as regulated, must be declared on the PCD and/or the Full Material Disclosure.)

When laboratory sampling is completed for testing the RoHS substances in Table 3, the test method must be in accordance with the latest version of IEC 62321 Electrotechnical products - Determination of levels of six regulated substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers) as referred to in EN IEC 63000:2018 Technical Documentation for the Assessment of Electrical and Electronic Products with Respect to the Restriction of Hazardous Substances (IEC 63000:2016).

2.2.1 RoHS Reporting

For certain markets and products, the presence of RoHS substances in Deliverables must be quantified and reported (e.g., California Electronic Waste Recycling Act). To meet this and other reporting obligations and requests, IBM requires that RoHS substances in the Supplier's Deliverables must be quantified and reported to IBM when such substances are present in permissible applications (such permissible applications do not include those listed in Table 1) and when they exceed the concentrations listed in Table 3 in any Homogeneous Materials. If the Supplier determines that substances in Table 3 are present above their respective specified thresholds, then **the absolute weight in grams of the substance (e.g., cadmium) present in the Deliverable shall be reported to IBM**. Absolute weights, rather than weight percentages or ppm, shall be reported. Suppliers shall contact their IBM representative to verify the reporting process for material content (e.g., declaration) data. PCDs are available at https://www.ibm.com/procurement/ossi, and https://www.ibm.com/ibm/environment/products/ecpquest.shtml

Table 3. Thresholds for reporting of RoHS substances

RoHS substance	Maximum Threshold for reporting in non-restricted applications* (ppm of the substance in any Homogeneous Material)
Cadmium use in plating and surface coating applications.	Any detectable level must be reported. *
Cadmium, all applications except plating and surface coating applications.	100
Hexavalent chromium (Cr^{VI}) **	1,000
Lead ***	1,000
Mercury	Any detectable level must be reported, except unavoidable impurities at levels below 10ppm.
Polybrominated biphenyl (PBB) flame retardants	Any detectable level must be reported. ****
Polybrominated diphenyl ether (PBDE) flame retardants. Note this reporting category includes Deca BDE.	Any detectable level must be reported. ****
Bis (2-ethylhexyl) phthalate (DEHP)*****	1,000
Butyl benzyl phthalate (BBP) *****	1,000
Dibutyl phthalate (DBP) *****	1,000
Diisobutyl phthalate (DIBP) *****	1,000

***** Restricted applications are defined in Table 1. Concentrations of these substances above the levels referenced in Table 1a are prohibited.
** IBM prohibits intentional addition of hexavalent chromium in paints and plastic resins. See Table 1. For EU RoHS requirements, see specifications 53P6233 or 97P3864. These two IBM EU RoHS specifications ban the use of hexavalent chromium and compounds in finishing processes for sheet steel, aluminized, electroless nickel and die cast parts, fasteners and heatsinks. Hexavalent chromium and its compounds must not be used prior to painting or in other surface treatments for metal parts. These two RoHS specifications apply to Deliverables where the specifications are cited on the print, contract, Statement of Work or other procurement documentation.
*** There are restrictions for lead use at levels lower than 1000ppm. See Table 1a for details.
****While listed here for completeness of the list of RoHS substances, PBB and PBDE flame retardants are banned by IBM per Section 2.1.1 and Table 1a of this specification. There are no permissible applications which can be reported.
***** While listed here for completeness of the list of RoHS substances, Table 1a has more restrictive levels for these 4 phthalates than the levels cited on this table.

2.2.2 Other Reportable Substances

IBM requires additional substances be quantified and reported by Suppliers if they are present at any detectable level in a Supplier's Deliverable per Table 4a or are present in a Supplier's Deliverables at concentrations greater than the specified thresholds per Table 4b in any individual part in the Deliverable supplied to IBM. If the Supplier determines that substances in Table 4a or Table 4b are present in any constituent parts of the Deliverable above their respective specified thresholds, **then the absolute weight in grams of the substance present in each** p**art of the Deliverable supplied to IBM shall be reported to IBM**. Absolute weights, rather than weight percentages or ppm, shall be reported to allow aggregation of the data with that from other parts in other Deliverables that comprise a final Product. Please note, the underlined text above emphasizes the need to report on the PCD substances and their weights present in the Deliverable to IBM, which may be different from the weight of the substances in the raw material used.

For example, if the Deliverable supplied to IBM is a power supply, then the substances in Table 4 should be reported to IBM if they occur above the specified thresholds in any of the constituent parts of the power supply.
Example #1: If a device or part in a power supply contains a tin-antimony solder and the concentration of antimony is above the threshold limit of 1000 ppm in the device or part, then the total weight of the antimony must be reported on the PCD for the power supply.
Example #2: If antimony trioxide is used as part of the flame-retardant system of several devices and plastic components in a power supply and the amount of antimony trioxide is above 1000 ppm in its respective homogeneous material (e.g., resin), then the weight of antimony trioxide used in each material in the power supply must be totaled and stated on the PCD.

Note: for products qualifying for the EPEAT Standard for Computer Servers, the test methodology in IEC 62321-3-1 and IEC 62321-3-2 should be used to determine the bromine and chlorine levels if the product contains any plastic parts exceeding 25 grams with greater than 1000 ppm chlorine or greater than 1000 ppm bromine.

Suppliers shall contact their IBM representative to verify the reporting process for material content data. PCDs are available at the https://www.ibm.com/procurement/ossi or https://www.ibm.com/ibm/environment/products/ecpquest.shtml.

Table 4a. Any detectable level Reporting Requirements - Substances

Reportable Substance	Threshold for Reporting is at the "Part" level unless otherwise noted	Examples of Industry Uses / Comments
Cadmium and Cadmium Compound impurities in plating and surface coating applications (Annex C) Please note this substance has a restricted application in Table 1 under Cadmium restrictions and RoHS. Reporting for this table is only for impurities from during plating and surface applications.	Any detectable level	Tin plating
Cobalt (CAS 7440-48-4) and cobalt substances in **batteries** (only report use of cobalt and cobalt substances in batteries for this entry).	Any level of cobalt and cobalt substances	Batteries
Critical Raw Materials (Annex YY)	Any level of these raw materials must be reported	Semiconductors, Photovoltaic cells, alloys, and capacitors.
Decabromodiphenyl ethane (DBDPE) (CAS 84852-53-9); synonyms e.g., Benzene, 1,1'-(1,2-ethanediyl)bis [2,3,4,5,6pentabromo-; Please note this substance is not to be included in the Brominated Flame-Retardant entry in this table, but rather as its own separate entry here.	Any level of DBDPE must be reported	Adhesives and sealants Plastic and rubber materials Polymers used for electronic and electrical applications
Lead/ Lead compounds Please note, lead /lead compounds are restricted on Tables 1 and 3, **this entry is for reporting of levels of lead in batteries only**.	All **batteries** containing lead and/or lead compounds.	Lead acid batteries
Lead/ Lead compounds Please note, lead /lead compounds are restricted on Tables 1 and 3 and reportable for cables and batteries elsewhere on this table. This entry is for lead use in products or parts **which are not in scope of EU RoHS**.	Lead and lead compounds used in parts or products that are not within scope of EU RoHS, e.g., **non – electrical equipment, such as mechanical tools.**	Stabilizer, brass applications
4-Methyl-2-pentanone (CAS 108-10-1)	Any level in an article	Paints and Solvents in Manufacturing Processes
Neodymium (CAS 7440-00-8) and compounds **in hard disk drives** only.	Any level of neodymium and compounds present in hard disk drives.	Hard disk drives
Organophosphate Compounds (Annex ZZ)	Any level of these aryl organophosphate compounds	Flame retardant
Perfluoroalkyl substances or Polyfluoroalkyl substances (PFASs) which can include perflouroakyl	Any Level -intentionally added or known to be present	Water, oil and grease repellant Surfactant Spreading/ wetting agent.

sulfonates (PFAS) and Perfluoro carboxylic acid and related compounds (PFCAs). This includes PFASs which have at least 1 fully fluorinated carbon atom (moiety). For a list of potential CAS Numbers A see OECD Comprehensive Database of Per- and polyfluoroalkyl substances https://www.oecd.org/content/dam/oecd/en/topics/policy-sub-issues/risk-management-risk-reduction-and-sustainable-chemistry2/pfas-report-support-materials/global%20database%20of%20per%20and%20polyfluoroalkyl%20substances.xlsx This entry is for reporting of all other non-restricted. *Please note: PFASs are defined as fluorinated substances that contain at least one fully fluorinated methyl or methylene carbon atom (without any H/Cl/Br/I atom attached to it), i.e. any chemical with at least one perfluorinated methyl group (-CF_3) or at least one perfluorinated methylenegroup (-CF_2 -), including branched fluoroalkyl groups and substances containing ether linkages, fluoropolymers and side chain fluorinated polymers.* Note: some of these PFASs substances are restricted please refer to Table 1 and 2 for these specific restrictions Please report any substance on the PCD which has at least one perfluorinated methyl group (-CF3).		Semiconductor applications Flame retardant in resins
Phthalates (Annex AA) Please note several phthalates have separate entries on this Table and should not be included for reporting in this general phthalate category. Several phthalates are restricted, see Table 1a.	Any Level -intentionally added or known to be present	Plasticizer in plastics (e.g., PVC), PVC electrical cables, Solder paste, Sealants, varnishes, paper coating, inks, resins, and adhesives.
Tributyltin (TBT) and tributyltin compounds (Annex EE) Please note this substance has restrictions in Table 1 under the entry for tri-substituted organostannic compounds. This reporting is for lower concentration levels.	Any Intentional Addition in chemical products	Antibacterial and antifungal agents, antifoulant Paint, pigment, and stabilizer
Triphenyltin (TPT) and triphenyltin compounds (Annex EE) Please note this substance has restrictions in Table 1 under the entry for "Tri-substituted organostannic compounds". This reporting is for lower concentration levels.	Any Intentional Addition in chemical products	Antiseptic and antifungal agent Paint, pigment, and stabilizer

Table 4b. Other Reporting Requirements - Substances

Reportable Substance	Threshold for Reporting is at the "Part" level unless otherwise noted	Examples of Industry Uses / Comments
Antimony/Antimony Compounds (Annex T) Please note antimony trioxide should not be reported in this category, antimony trioxide has a separate entry on this table.	1000 ppm (0.1%)	Solder alloy, CRT glass, Any application

Table 4b. Other Reporting Requirements - Substances		
Reportable Substance	**Threshold for Reporting is at the "Part" level unless otherwise noted**	**Examples of Industry Uses / Comments**
Antimony trioxide (CAS 1309-64-4)	1000 ppm (0.1%) in a homogeneous material	Flame retardant, e.g., in plastic housings and chip encapsulant. Often used in combination with brominated flame retardants. Opacifying agent for glass, ceramics and enamels, Pigments, Catalyst for polyethylene terephthalate and vulcanization of rubber.
Arsenic/Arsenic Compounds (Annex U) Please note some applications of arsenic are prohibited in Table 1 and reportable in Table 5 as an SVHC. Reporting here is for other applications and/or concentrations.	1000 ppm (0.1%)	Dopant in semiconductor manufacture Gallium arsenide is used as semiconductor substrate.
Beryllium metal (CAS 7440-41-7) Please note, this substance should not be reported under the entry of Beryllium compounds in this Table but rather here in this entry.	1000 ppm (0.1%) in a homogeneous material	Heat transport and heat sinking applications, gears, and cogs.
Beryllium Compounds (Annex V) Please note this entry does not include beryllium, beryllium oxide and beryllium copper alloys. These beryllium substances have their own entry for reporting on this table.	200 ppm (0.02%)	Substrate for integrated circuits, Lightweight housings.
Beryllium copper alloys. Please note, this substance should not be reported under the entry of Beryllium compounds in this Table but rather here in this entry.	1000 ppm (0.1%) in a homogeneous material	Connectors Electrical contacts and springs
Beryllium oxide (CAS 1304-56-9)	1000 ppm (0.1%)	Insulator, Structural ceramic
Bismuth/Bismuth Compounds (also alloys) (Annex W)	1000 ppm (0.1%)	Solder alloy
Bromine and Brominated Flame Retardants (other than PBBs, PBDEs or other brominated flame retardants specifically called out in this Table) in all applications except printed wiring board laminates. Please provide CAS #on the PCD. (Annex X)	1000 ppm (0.1%) in a homogeneous material	Flame retardant
Brominated Flame Retardants (other than PBBs or PBDEs) in printed wiring board laminates. Please provide CAS # on the PCD.	900 ppm (0.09%) in a homogeneous material in printed wiring board laminate	Flame retardant
2-Butanone oxime (CAS 96-29-7)	1000 ppm (0.1%) in a homogeneous material	Paints, varnishes, stains and coatings Wood preservatives Adhesives, silicone sealants, printing inks Corrosion inhibitors Urethane polymers
n-Butyl glycidyl ether (CAS 2426-08-6)	1000 ppm (0.1%) in a homogeneous material	Epoxy resin formulations for coatings, adhesives, binders, sealants, fillers and resins
Chlorine and Chlorinated Flame Retardants in all applications except printed wiring board laminates (Please provide CAS # on the PCD.)	1000 ppm (0.1%) in a homogeneous material	Flame retardant
Chlorinated Flame Retardants in printed wiring board laminates only (Please provide CAS number on the PCD.)	900 ppm (0.09%) in a homogeneous material in printed wiring board laminate	Flame retardant

Table 4b. Other Reporting Requirements - Substances		
Reportable Substance	**Threshold for Reporting is at the "Part" level unless otherwise noted**	**Examples of Industry Uses / Comments**
Cobalt dichloride (CAS 7646-79-9) Please note this substance is also listed in Table 5 for reporting. This entry requires reporting of a lower concentration level than Table 5.	1000 ppm (0.1%) in a homogeneous material	Cobalt plating and cobalt based pigments and drier compounds (desiccants). Pneumatic panels for indicating water contamination.
Cobalt (CAS 7440-48-4) and cobalt substances (not otherwise specified in this Table)	1000 ppm (0.1%) in a homogeneous material	Electroplating, Lithium ion batteries, Any application, and lithium polymer batteries
Cobalt sulfate (CAS 10124-43-3; 13455-64-0 monohydrate; 10026-24-1 heptahydrate)	1000 ppm (0.1%) in a homogeneous material	Preparation of pigments for glass and porcelain, storage batteries, electroplating baths and sympathetic ink
2, 3-Dibromo-1-propanol (CAS 96-13-9) Please note, this substance should not be reported under the entry of Brominated Flame Retardants in this Table but rather here in this entry.	1000 ppm (0.1%) in a homogeneous material	Flame retardant
Dibromoneopentyl glycol (CAS 3296-90-0) Please note this substance is not to be included in the Brominated Flame-Retardant entry in this table, but rather as its own separate entry here.	1000 ppm (0.1%) in a homogeneous material	Flame retardant in unsaturated polyester resins, in molded products, and in rigid polyurethane foam.
P-Dichlorobenzene (CAS 106-46-7) Please note this substance has a restricted application in Table 1 under Halogenated aromatic substances and Annex D. Reporting for this table is for applications which are not restricted.	1000 ppm (0.1%) in a homogeneous material	Precursor to the high-performance polymer poly (p-phenylene sulfide). Disinfectant
Dioctyltin (DOT) compounds (e.g., dioctyltin oxide CAS 870-08-6 and dioctyltin dilaurate CAS 3648-18-8) Please note Table 1 prohibits DOT in some applications. This entry is for reporting of all other non-restricted applications.	Reportable in Articles where the concentration in the Article, or a part thereof, is greater than 0.1% by weight of tin.	Textiles Vulcanization molding kits
Dysprosium (CAS 7429-91-6) and compounds	1000 ppm (0.1%) in a homogeneous material	Magnets, lasers, and hard disk drives,
2-Ethylhexyl-2,3,4,5-tetrabromobenzoate (TBB) (CAS 183658-27-7) Please note TBB is not to be included in the Brominated Flame-Retardant entry in this table, but rather as its own separate entry here.	1000 ppm (0.1%) in a homogeneous material	Flame retardant in polyurethane foam
Formaldehyde (CAS 50-00-0) Please note this substance has prohibited applications listed in Table 1. This entry is for reporting of all other non-restricted applications.	1000 ppm (0.1%) in a homogeneous material	Wood Textiles
Hexabromocyclododecane (HBCDD), (e.g., CAS 25637-99-4, 3194-55-6, 134237-50-6, 134237-51-7, 134237-52-8.) Please note this substance has a restricted level listed in Table 1. This entry is for reporting at lower levels.	50 ppm (0.005%) in a homogeneous material	Flame retardant in extruded and expanded polystyrene and flexible polyurethane foam
n-Hexane (CAS 110-54-3)	1000 ppm (0.1%) in a homogeneous material	Solvents in cleaning agents in the printing and textile industry. Glues for the leather industry. Quick-drying glues and rubber cement.
Indium phosphide (CAS 22398-80-7)	1000 ppm (0.1%) in a homogeneous material	Semiconductor
Lead/ Lead compounds Please note, lead /lead compound are restricted on Tables 1 and 3, this entry is for levels of lead below 1000 ppm in **cables**	300ppm to 1000ppm **in surface coating materials for cables/ cords** with thermoset or thermoplastic coatings	Stabilizer

Table 4b. Other Reporting Requirements - Substances		
Reportable Substance	**Threshold for Reporting is at the "Part" level unless otherwise noted**	**Examples of Industry Uses / Comments**
Long chain chlorinated paraffins (LCCP; generally, C_{18-28}) (also referred to as Long-chain chlorinated alkanes) Annex WW	1000 ppm (0.1%) in a homogeneous material	Metal working applications Plasticizer, Leather, Paints and coatings Sealants, Rubber applications
Magnesium/Magnesium Alloys and Magnesium compounds (Annex Y)	1000 ppm (0.1%)	Surface coating, computer casings, hard disk drives and any application
Nickel sulfamate (CAS 13770-89-3)	1000 ppm (0.1%) in a homogeneous material	Nickel plating
Nickel sulphate CAS 7786-81-4 (anhydrous), 10101-97-0 (hexahydrate), 10101-98-1 (heptahydrate)	1000 ppm (0.1%) in a homogeneous material	Nickel plating
N,N'-mixed phenyl and tolyl derivatives of 1,4-benzenediamine (CAS 68953-84-4)	1000 ppm (0.1%) in a Deliverable	Additive in rubber.
Nonylphenols (Annex RR) (Note: Table 2 prohibits these substances in Preparations and Substances. This entry is for noting the presence in Articles.)	1000 ppm (0.1%) in a homogeneous material	Lubrication oil additive, Emulsifier Wetting and dispersing agent, Antistatic agent, Demulsifier and solubilizer
Perchlorates (Annex MM)	6ppb in a material	Coin cell batteries, Acoustic foam
Polycyclic aromatic hydrocarbons (PAHs (Annex LL) Please note this substance grouping has prohibited applications listed in Table 1. This entry is for reporting of all other non-restricted applications or levels below the restricted amount.	1000 ppm (0.1%) in a homogeneous material	Dyes, plastics, coal tars, and creosote.
Polyvinyl chloride (PVC) (Annex BB)	1000 ppm (0.1%) in a homogeneous material	Plastic, Insulator, Windows on cell phones Housings for IT equipment, Electrical cables, Flexible CD jackets
Praseodymium (CAS 7440-10-0) and compounds	1000 ppm (0.1%) in a homogeneous material	Hard disk drives, lasers, colorant in glasses and enamels, and magnets
Refractory Ceramic Fibers; Special Purpose Fibers, [Man-made vitreous (silicate) fibers with random orientation with alkaline oxide and alkali earth oxide ($Na_2O+K_2O+CaO+ MgO+ BaO$) (e.g., CAS 142844-00-6)	Content less than or equal to 18% by weight	Insulation material in high temperature applications
Selenium/Selenium Compounds (Annex DD)	1000 ppm (0.1%)	Diodes and light detectors (lead selenide) Historically used as photoelectric coating
Small brominated alkyl alcohols (Annex XX)	1000 ppm (0.1%)	In flame retardants, resins, epoxy resins, polyurethane foams.
Terbium (CAS 7440-27-9) and compounds	1000 ppm (0.1%) in a homogeneous material	Hard disk drives, lasers, green phosphors, and magnets
Tetrabromobisphenol A (CAS 79-94-7) Please note TBBA is not to be included in the Brominated Flame-Retardant entry in this table, but rather as its own entry here.	1000 ppm (0.1%) in a homogeneous material	Flame retardant Epoxy resins in printed circuit boards
Tetrabutyltin (TTBT) (CAS 1461-25-2)	1000 ppm (0.1%) in a homogeneous material	Stabilizer for PVC
Toluene (CAS 108-88-3)	1000 ppm (Please note in Table 2 toluene is prohibited as a Substance or constituent of Preparations in concentrations equal to or greater than 0.1% by mass in adhesives and spray paints.)	Adhesive Paints/varnishes Coatings Silicon sealants
Toluene Diisocyanates (see Annex UU for all-inclusive list of CAS numbers)	1000 ppm (0.1%) in a homogeneous material	Chemical intermediate in the production of polyurethane

Table 4b. Other Reporting Requirements - Substances		
Reportable Substance	**Threshold for Reporting is at the "Part" level unless otherwise noted**	**Examples of Industry Uses / Comments**
1, 2, 3-Trichlorobenzene (CAS 87-61-6) Please note this entry has a prohibited application listed in Table 1 for Halogenated aromatic substances. This entry is for reporting of all other non-restricted uses.	1000 ppm (0.1%) in a homogeneous material	Solvent Dye carrier Heat transfer medium
1, 2, 4-Trichlorobenzene (CAS 120-82-1) Please note this entry has a prohibited application in Table 1 for Halogenated aromatic substances. This entry is for reporting of all other non-restricted uses.	1000 ppm (0.1%) in a homogeneous material	Solvent, Dielectric fluid, Dye carrier Synthetic transformer oil, Lubricant Heat transfer medium Wood preservatives
Tris (1,3-dichloro-2-propyl) phosphate TDCPP (CAS 13674-87-8) Please note this substance has restrictions in Table 1. This reporting is only for cables, adaptors and other connecting devices, storage media such as compact discs, for interactive software, with the following exception this substance is prohibited in cables for mice and in all other product components.	1000 ppm (0.1%) in a homogeneous material	Flame retardant
Tris (2-chloro-1-methylethyl) phosphate (TCPP) (CAS 13674-84-5)	1000 ppm (0.1%) in a homogeneous material	Flame retardant, e.g., for polyurethane
2,4,6-tris(tert-butyl)phenol (2,4,6-TTBP) (CAS 732–26–3)	1000 ppm (0.1%) in a homogeneous material	Antioxidant that can be used as a fuel additive or lubricant additive
Vinyl chloride (CAS 75-01-4)	1000 ppm (0.1%) in a homogeneous material	Chemical intermediate used in production of polyvinyl chloride

Table 4c Other Reporting Requirements - Parts, Products, Components, Commodities		
Reportable Parts, Products, Components, Commodities	**Reporting Requirements**	**Examples of Industry Uses / Comments**
Gas discharge lamps, e.g., fluorescent lamps, mercury vapor lamps, metal halide lamps, sodium lamps, xenon lamp and other light sources where the light is created as a result of electrical-brush discharge and gas, vapor of metal or in a mixture of gas and vapor	Any gas discharge lamp must be reported.	Fluorescent lamps, mercury vapor lamps, metal halide lamps, sodium lamps, xenon lamp
Postconsumer recycled material - Plastic (see definitions in Section 1.2)	Report only the amount of postconsumer recycled material - plastic (not the amount of pre-consumer or new plastic) in grams for parts equal to or greater than 25 grams.	Bezels, fillers, enclosure covers
Pressurized gas - components with pressurized gas which need special attention (pressure must be > 1.5 bar)	Any part or product with pressurized gas meeting the definition.	Refrigerant gas, power lifts, and pneumatics.
Recyclable Materials – glass in Covered Electronic Devices only, e.g., monitors with a screen size greater than 4 inches (measured diagonally) with a liquid crystal display or cathode ray tube, as defined by California Electronic Waste Recycling Act	Report the amount of glass (in grams) in a Covered Electronic Devices which are recyclable.	In Covered Electronic Devices, as defined by the California Electronic Waste Recycling Act: http://www.dtsc.ca.gov/
Recyclable Materials – metals in Covered Electronic Devices only, e.g., monitors with a screen size greater than 4 inches (measured diagonally) with a liquid crystal display or cathode ray tube, as defined by California Electronic Waste Recycling Act	Report the amount of metals (in grams) in a Covered Electronic Devices which are recyclable.	In Covered Electronic Devices, as defined by the California Electronic Waste Recycling Act: http://www.dtsc.ca.gov/

Table 4c Other Reporting Requirements - Parts, Products, Components, Commodities		
Reportable Parts, Products, Components, Commodities	**Reporting Requirements**	**Examples of Industry Uses / Comments**
Recyclable Materials – plastics in Covered Electronic Devices only, e.g., monitors with a screen size greater than 4 inches (measured diagonally) with a liquid crystal display or cathode ray tube, as defined by California Electronic Waste Recycling Act	Report the amount of plastics (in grams) in a Covered Electronic Devices which are recyclable.	In Covered Electronic Devices, as defined by the California Electronic Waste Recycling Act: http://www.dtsc.ca.gov/
Springs - mechanical components that store mechanical energy (e.g., springs) which need special attention (diameter must be >10 mm and height >25 mm or proportionally similar volume). Special attention means that the spring may cause physical harm during disassembly of the product.	Location of any spring meeting the definition.	Latches

2.2.3 Substances of Very High Concern (SVHC) in Articles - Requirements

The current candidate list of REACH SVHC as published by the European Chemicals Agency is located at: https://echa.europa.eu/candidate-list-table. Please check the web site for updates since this list is subject to change. Annex OO is the list of substances subject to REACH Authorization (current as of the date of this specification).

IBM requires suppliers to identify if any substances on the SVHC Candidate list are present in an Article at or above the 0.1% weight by weight (w/w) concentration and report the name and CAS number of the SVHC candidate and the quantity on the Product Content Declaration (PCD) for the Deliverable. The Court of Justice of the European Union provided Judgement in Case C-106/14 on September 10, 2015 that a complex Article can have one or more constituent Articles and that the 0.1% weight by weight of SVHCs applies to the constituent Articles of a more complex Article. The table in this section has a list of SVHC Candidate substances which may potentially be present in Information Technology (IT) equipment. Some of the SVHC substances are not included on this table for various reasons such as they are already restricted by other laws or are unlikely to be present in IT equipment. Please note, the underlined text above emphasizes the need to report on the PCD substances and their weights present in the Article to IBM, which may be different from the weight of the substances in the raw material used. Web links to Court Judgement and guidance information –
http://curia.europa.eu/juris/document/document.jsf?docid=167286&mode=req&pageIndex=1&dir=&occ=first&part=1&text=&doclang=EN&cid=644081
http://curia.europa.eu/jcms/upload/docs/application/pdf/2015-09/cp150100en.pdf
The latest version of the European Chemicals Agency (ECHA) Guidance on requirements for substances in articles:
https://echa.europa.eu/guidance-documents/guidance-on-reach?panel=guidance-on-requirements-for-substances-in-articles#guidance-on-requirements-for-substances-in-articles

If an SVHC is present in an Article at or above the reporting concentrations (at or above the 0.1% weight by weight (w/w) concentration), report it on the PCD. The drop-down screen on the PCD will have the chemicals found in on ECHA's SVHC Candidate list. There is a row in the drop-down menu of the PCD for "Other" which can be used for reporting SVHC substances not on the Candidate list. Table 5a are for new substances added to ECHA's SVHC Candidate listing and Table 5b are for SVHCs typically found in electronics deliverables.

IBM may request, from the part or product supplier, their identification number for the part or product as registered in the EU **S**ubstances of **C**oncern **I**n articles or in complex objects (**P**roducts) (SCIP) database. See the EU SCIP database for more details at https://echa.europa.eu/scip-database.

If an SVHC in Table 5a or 5b or in the full list of SVHCs is present in an Article at or above the reporting concentrations (at or above the 0.1% weight by weight (w/w) concentration) the Supplier must provide a customer communication to IBM meeting the requirements of Article 33 of the EU REACH Regulation when the Article is procured by IBM in the European Union. Please provide a copy of this communication to the author of this specification. Information about REACH can be found at the European Chemicals Agency website www.echa.europa.eu.

For a full list of SVHCs at the time of this release of 46G3772 please refer to https://echa.europa.eu/candidate-list-table

Table 5a. New Reporting of Substances of Very High Concern (all reporting concentrations are at or above 0.1% weight by weigh of the Article)		
SVHC (from proposed Candidate List)	**CAS Number**	**Examples of industry uses**
6-[(C10-C13)-alkyl-(branched, unsaturated)-2,5-dioxopyrrolidin-1-yl] hexanoic acid	2156592-54-8	Surfactant and emulsifying agent in hydraulic fluids, lubricants, greases, mould release agents and metal working fluids
Bis(α,α-dimethylbenzyl) peroxide	80-43-3	Used in polymerization process
Octamethyltrisiloxane	107-51-7	Used as an intermediate in silicone polymer production and as a solvent, surface tension modifier and heat transfer medium in the manufacture of many products such as coatings, surface treatments, sealants and adhesives
O,O,O-triphenyl phosphorothioate	597-82-0	used in hydraulic fluids, metalworking fluids, lubricants and greases. Due to its high boiling point, it is often used in high temperature applications.
Perfluamine	338-83-0	The compound is a per- and polyfluoroalkyl substances(PFAS). Is used as a heat transfer fluid, solvent and manufacturing fluid for applications where particular electrical conductivity properties are required (such as semiconductor manufacture). It is also used in the manufacture of electrical, electronic and optical equipment and machinery and vehicles
Reaction mixture of triphenylthiophosphate and tertiary butylated phenyl derivatives	192268-65-8	There are no uses registered under REACH for this mixture, so its use in the EU is extremely limited and under 1 tonne per annum. Whilst some phosphate esters are used as plasticisers, the mixture appears to be only used in lubricants and hydraulic fluids (often up to 1.0 % w/w as judged from safety data sheets available on the internet)
Triphenyl phosphate	115-86-6	Flame retardant in electronic equipment

Table 5b. Reporting of Substances of Very High Concern (all reporting concentrations are at or above 0.1% weight by weigh of the Article)		
SVHC (from proposed Candidate List)	**CAS Number**	**Examples of industry uses**
1,2-Benzenedicarboxylic acid, di-C_{6-8}- branched alkyl esters, C_7-rich (Diisoheptyl phthalate) (DIHP)	71888-89-6	Plasticizer in PVC, sealants, and printing inks.
1,2-Benzenedicarboxylic acid, di-C_{7-11}- branched and linear alkyl esters (Di(heptyl, nonyl, undecyl) phthalate - DHNUP)	68515-42-4	Plasticizer
2-(2H-benzotriazol-2-yl)-4-(1,1,3,3-tetramethylbutyl)phenol	3147-75-9	Air care products, coating products, adhesives and sealants, lubricants and greases, polishes and waxes and washing and cleaning products.
2-benzyl-2-dimethylamino-4'-morpholinobutyrophenone	119313-12-1	Used in polymer production. Used as a photo-initiator which is added to UV curable inks, toners, adhesives, resins, paints and other coatings
2-(dimethylamino)-2-[(4-methylphenyl)methyl]-1-[4-(morpholin-4-yl)phenyl]butan-1-one	119344-86-4	Inks and toners, coating products.
Bis(2-ethylhexyl) tetrabromophthalate	26040-51-7	Plasticizer and flame retardants.
Bis(α,α-dimethylbenzyl) peroxide	80-43-3	This substance is used in the following products: polymers.
Bis(2-methoxyethyl) phthalate	117-82-8	Plasticizer for nitrocellulose, acetyl cellulose, polyvinyl acetate, polyvinyl chloride and polyvinylidene chloride. Enameled wire, film, high-strength varnish and adhesive.
Boric acid	10043-35-3, 11113-50-1	Applications include electrolytic capacitors, glass, ceramics, rubber, flame retardants, paints, industrial fluids, soldering products, wood veneers, pressed wood panels, and film developers.
Bumetrizole (UV-326)	3896-11-5	Coating products, adhesives and sealants and washing and cleaning products.

Table 5b. Reporting of Substances of Very High Concern (all reporting concentrations are at or above 0.1% weight by weigh of the Article)		
SVHC (from proposed Candidate List)	**CAS Number**	**Examples of industry uses**
cis-cyclohexane-1,2-dicarboxylic anhydride	13149-00-3	Manufacture of polyester and alkyd resins and plasticizers for thermoplastic polymers, hardener for epoxy resins
Cyclohexane-1,2-dicarboxylic anhydride	85-42-7	Manufacture of polyester and alkyd resins and plasticizers for thermoplastic polymers, hardener for epoxy resins
Diarsenic pentaoxide	1303-28-2	Hardener for copper, lead or gold in alloys. Used in production of dyes and glass. Wood preservative. Glass.
Diboron trioxide (Please note, report this substance only if it is present in a Deliverable in its pure original form, do not report if the substance is incorporated into a glass or bonded chemical structure).	1303-86-2	Glass
Dicyclohexyl phthalate (DCHP)	84-61-7	Plasticizer in plastisol, PVC, rubber and plastics.
Di-n-hexyl phthalate (DNHP) (synonym - dihexyl phthalate)	84-75-3	Plasticizer
1,2-dimethoxyethane; ethylene glycol dimethyl ether (EGDME)	110-71-4	Possible use in batteries.
Dipentyl phthalate (DPP)	131-18-0	Plasticizer in polyvinyl chloride
diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide	75980-60-8	Paint additives and coating additives, Photosensitive agent, Photosensitizers, Pigments and Polymerization promoters
Dodecamethylcyclotetrasiloxane (D6)	540-97-6	Chemical intermediates for the production of silicone rubbers, gels and resins.
Hexahydromethylphthalic anhydride	25550-51-0	Manufacture of polyester and alkyd resins and plasticizers for thermoplastic polymers, hardeners for epoxy resins
Imidazolidine-2-thione; (2-imidazoline-2-thiol)	96-45-7	Vulcanization agent in and neoprene and polyacrylate rubber articles.
4,4'-isopropylidenediphenol (**bisphenol A**) (Please note this substance has restrictions listed in Table 1, reporting here is for non-restricted applications.)	80-05-7	Used in synthesis of epoxy and plastic resins, e.g., polycarbonate, polyesters. Antioxidant in some plasticizers. Polymerization inhibitor in PVC. Precursor for the flame retardant tetrabromobisphenol A. Color developer in thermal paper. Carbonless paper.
Lead	7439-92-1	Used in metals, welding and soldering products, metal surface treatment products and polymers. Lead acid batteries. Alloying element in steel, aluminum and copper. Used in piezoelectronic devices, glass or ceramic matrix compounds, dielectric ceramic in capacitors, and glass for optical applications, filter and reflectance.
Lead monoxide (lead oxide) trioxide (Please note, report this substance only if it is present in a Deliverable in its pure original form, do not report if the substance is incorporated into a glass or bonded chemical structure).	1317-36-8	Potential use in lead acid batteries Glass
Lead titanium trioxide	12060-00-3	Ceramics
Lead titanium zirconium oxide	12626-81-2	Piezo ceramic compounds, processing into electro-ceramic components, ultrasonic spray films in a humidifier
Medium-chain chlorinated paraffins (MCCP) (UVCB substances consisting of more than or equal to 80% linear chloroalkanes with carbon chain lengths within the range from C14 to C17)	1372804-76-6 85535-85-9 198840-65-2	Flame retardants, plasticising additives in plastics, sealants, rubber and textiles.

Table 5b. Reporting of Substances of Very High Concern (all reporting concentrations are at or above 0.1% weight by weigh of the Article)		
SVHC (from proposed Candidate List)	**CAS Number**	**Examples of industry uses**
Melamine	108-78-1	Flame retardant, used in the manufacture of high pressure resins, molding compounds, and surface coating resins.
2-methyl-1-(4-methylthiophenyl)-2-morpholinopropan-1-one	71868-10-5	Used in polymer production. Used as a photo-initiator added to UV curable inks, toners, lacquers, paints and resins. May be used in solder masks and etch resists in glass fiber composites.
1-Methyl-2-pyrrolidone	872-50-4	High temperature coating, urethane dispersions, acrylic and styrene latexes. Paint remover, industrial degreaser, and injection head and cast-molding equipment cleaner. Cleaning, de-fluxing, edge bead removal and photoresist stripping.
N,N-dimethylacetamide (DMAC)	127-19-5	Solvent in coatings e.g. polyamide-imide (PAI) enamels (varnishes) used for electrical wire insulation, Process solvent in production of polyimide and polysulphone films; Process solvent for spinning fibers of various polymers including acrylic, polyurethane polyurea copolymer (Elastane, Spandex) and poly(m-phenylene isophthalamide) (PMIA, meta-aramid)
N,N-dimethylformamide	68-12-2	Used in synthetic/artificial leather of polyurethane. Manufacture of printed circuit boards. Cleaning solvent in the leather or artificial leather industry. Solvent.
1,1,2,2,3,3,4,4,4-nonafluorobutane-1-sulphonic acid	375-73-5	This substance is used in the following products: polymers.
4-Nonylphenol, branched and linear, ethoxylated	104-35-8, 7311-27-5, 14409-72-4, 20427-84-3, 26027-38-3, 27942-27-4, 34166-38-6, 37205-87-1, 127087-87-0, 156609-10-8	power supplies or power distribution units, containing certain electrical contacts such as insulators and EMI gasket
Octamethylcyclotetrasiloxane	556-67-2	Chemical intermediates for the production of silicone rubbers, gels and resins.
Orange lead (lead tetroxide)	1314-41-6	Potential use in lead acid batteries.
Perfluoroheptanoic acid and its salts: Sodium perfluoroheptanoate Ammonium perfluoroheptanoate potassium perfluoroheptanoate Perfluoroheptanoic acid Please note these substances have restrictions listed in Tables 1 and 2.	 20109-59-5 6130-43-4 21049-36-5 375-85-9	Processing aid for copolymers of vinyl chloride, processing aid for plastics and rubber, Surfactant in emulsion polymerization of fluoropolymers
Pentadecafluorooctanoic acid (PFOA). Please note these substances have restrictions listed in Tables 1 and 2.	335-67-1	Surfactant in emulsion polymerization of fluoropolymers
Perfluorononan-1-oic-acid and its sodium and ammonium salts Ammonium salts of perfluorononan-1-oic-acid Perfluorononan-1-oic-acid Sodium salts of perfluorononan-1-oic-acid	 4149-60-4 375-95-1 21049-39-8	Lubricating oil additive, cleaning agent, liquid crystal display panels, polishing surfactant, waterproofing agents and textile antifouling finishing agent

Table 5b. Reporting of Substances of Very High Concern (all reporting concentrations are at or above 0.1% weight by weigh of the Article)		
SVHC (from proposed Candidate List)	**CAS Number**	**Examples of industry uses**
Perfluorobutane sulfonic acid (PFBS) and its salts: N,N,N,-triethylethanaminium 1,1,2,2,3,3,4,4,4-nonafluorobutane-1-sulfonate; Magnesium perfluorobutane sulfonate PFBS; 1-Butanesulfonic acid, 1,1,2,2,3,3,4,4,4-nonafluoro-, lithium salt (1:1); Morpholinium perfluorobutane sulfonate; PFBS; Ammonium 1,1,2,2,3,3,4,4,4-nonafluorobutane-1-sulphonate; Sulfonium, dimethylphenyl-, salt with 1,1,2,2,3,3,4,4,4-nonafluoro-1-butanesulfonic acid(1:1); Sulfonium, triphenyl-, salt with 1,1,2,2,3,3,4,4,4-nonafluoro-1-butanesulfonic acid(1:1); Potassium 1,1,2,2,3,3,4,4,4-nonafluorobutane-1-sulphonate; Tetrabutyl-phosphonium nonafluoro-butane-1-sulfonate	25628-08-4 507453-86-3 131651-65-5 503155-89-3 68259-10-9 220133-51-7 144317-44-2 29420-49-3 220689-12-3	Catalyst/additive/reactant in polymer manufacturing and in chemical synthesis. Used as a flame retardant in polycarbonate.
Potassium perfluoroheptanoate Please note these substances have restrictions listed in Tables 1 and 2.	21049-36-5	Surfactant and flame retardant
Potassium 1,1,2,2,3,3,4,4,4-nonafluorobutane-1-sulphonate	29420-49-3	Surfactant and flame retardant
reaction mass of 2,2,3,3,5,5,6,6-octafluoro-4-(1,1,1,2,3,3,3-heptafluoropropan-2-yl)morpholine and 2,2,3,3,5,5,6,6-octafluoro-4-(heptafluoropropyl)morpholine	Not Available	Used in the manufacture of flame retardants, surfactants, and polymers.
Silicic acid, lead salt	11120-22-2	Lead crystal ware
bis(4-chlorophenyl) sulphone	80-07-9	Epoxy hardener, intermediates, monomers, and processing aids
2,2',6,6'-tetrabromo-4,4'-isopropylidenediphenol (TBBA) Please note this substance is restricted in enclosures.	79-94-7	Flame retardant Epoxy resins in printed circuit boards
Trans-cyclohexane-1,2-dicarboxylic anhydride	14166-21-3	Manufacture of polyester and alkyd resins and plasticizers for thermoplastic polymers, hardener for epoxy resins
Triphenyl phosphate	115-86-6	This substance is used in the following products: polymers.
1,3,5-Tris(oxiran-2-ylmethyl)-1,3,5-triazinane-2,4,6-trione (TGIC)	2451-62-9	Hardener in resins and coatings; used in inks for the printed circuit board industry, electrical insulation material, resin molding systems, laminated sheeting, silk screen printing coatings, tools, adhesives, lining materials and stabilizers for plastics

Requirements for IBM suppliers of Articles produced within the European Union or the European Free Trade Association

Articles (e.g., Parts, Products, Deliverables, and components thereof) containing SVHCs listed in EU Regulation 1907/2006 REACH Annex XIV "List of Substances Subject to Authorization" and supplied to IBM from suppliers who produce the Articles within the European Union or the European Free Trade Association must have any use of these SVHCs Authorized in accordance with Title VII of EU Regulation 1907/2006. Annex OO of this specification lists the Substances of Very High Concern subject to Authorization as of the date of this specification. The European Chemicals Agency maintains a current list of approved authorizations. IBM suppliers producing Articles containing an Authorized SVHC within the European Union or the European Economic Area must have an Authorization for this use. The Authorization number must be provided to IBM.

2.3 Marking of Products and Parts

2.3.1 Product/Part

Logo and Compliance Identification Number

A mark, such as a logo, identifying the producer of a Product must be permanently affixed and clearly displayed on the Product. Examples of Products requiring a logo include, but are not limited to printers, servers, workstations, storage products, external drives, Uninterruptible Power Supplies, monitors including both standalone and monitors embedded in a system, laptops including those embedded in a system, keyboards, mice, kiosks, external power supplies, racks, power distribution units, and modems.

Products must have a compliance identification number, e.g., batch or serial number allowing identification of the product. Examples of this identification include machine type, machine type model, feature code, or part number. This information must be located on the product. It may be located on the agency label. Where the size or nature of the product does not allow it, the required information must be provided on the packaging or in a document accompanying the EEE. The compliance identification number must match the Declaration of Conformity (DoC) required for RoHS and EU Energy Related Products (ERP) regulations. See Sections 2.12 and 2.14 for additional details about DoCs.

California Safe Drinking Water and Toxic Enforcement Act

A warning, compliant to the requirements of California Title 27 California Code of Regulations Article 6 Clear and Reasonable Warnings, must be placed on Deliverables containing a substance listed on the California list of Chemicals Known to the State to Cause Cancer or Reproductive Toxicity when these substances are incorporated in a manner to expose any individual to the chemical. The list of substances and warning information can be found at:
https://www.p65warnings.ca.gov/
https://www.p65warnings.ca.gov/chemicals

For use of lead in Frequently Handled Cables, see Table 1. Lead concentrations below 300 ppm in Frequently Handled Cables do not require a warning label as described above. IBM Procurement will request a laboratory analysis to document the level of lead in the cable jacketing of Frequently Handled Cables. The test report must use a method of sufficient sensitivity to establish a limit of quantification of less than 300 ppm. Frequently handled cables include but are not limited to:

- Computer mouse cords,
- Computer peripheral wires and cables designed to plug into front of system (e.g. USB cords),
- Computer peripheral AC adapter cord and I/F cable for portable computers or portable peripheral devices,
- Computer peripheral PCMCIA card cord for portable computers,
- Computer peripheral wires and cables for portable computers,
- Computer speaker cords used with portable computers,
- Desktop computer power/patch/pin cords designed to plug into front of computer,
- External CD/DVD and tape drives for portable computers,
- Mobile PC computer cords,
- Computer joystick,
- Audio or video adapter cords for portable products,
- Audio or video cable for portable products,

- Audio/Video/Computer/telecommunications cables packaged individually for retail sales,
- Portable digital imaging equipment,
- Portable DVD player,
- Portable power adapters, AC adapters for foreign outlets and other voltage converters,
- Portable ZIP drives,
- Scanners for portable computers, and
- USB, firewire cords.

California Best Management Practices for Perchlorate Materials

Deliverables with 6 parts per billion (ppb) or greater of perchlorate materials (see Annex MM for a list of some perchlorate substances) must include the following information with the Deliverable when shipping to a customer:

"For California: Perchlorate Material - special handling may apply. See http://www.dtsc.ca.gov/hazardouswaste/perchlorate. The foregoing notice is provided in accordance with California Code of Regulations Title 22, Division 4.5 Chapter 33 Best Management Practices for Perchlorate Materials."
This requirement may be fulfilled by IBM via customer notices, please contact your IBM representative for more information. The following may be used to fulfill this requirement:

a. IBM label part number 15R7482, or
b. IBM flyer part number 42R6959, or
c. IBM Environmental Notices and User Guide, either hardcopy, DVD, or CD, pdf file located at: ftp://public.dhe.ibm.com/systems/support/warranty/envnotices/environmental_notices_and_user_guide.pdf

CE Mark for European Union and other jurisdictions

See Sections 2.12 and 2.14 for CE marking requirements for Energy Related Products (ERP) and RoHS regulations.

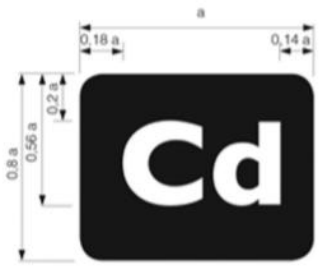
Engineering prototypes, which are put on display at trade fairs, exhibitions and demonstrations in the EU or other jurisdictions requiring a CE mark to indicate compliance to RoHS or ERP requirements, must be visibly labeled stating that the product may not be placed on the market and/or put into service until conformity is obtained. Please contact the author of this document for more information. Example wording for the label applied on the product may include "This device is an engineering prototype that has not obtained required agency authorizations. This device is not, and may not be offered for sale or lease, or sold or leased until authorization has been obtained. This device is the property of IBM and is not for resale."

The CE marking is the only marking that may be placed on the product to indicate the product or part is in conformance with an EU CE marking legislation. Other marks may be present on the part or product, but they must have a different function from that of demonstrating conformity to an EU CE marking legislation.

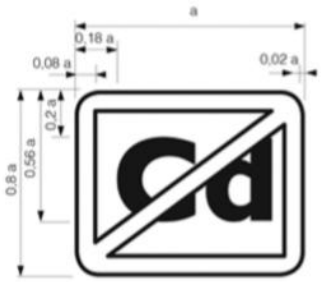
C Mark for the Republic of Srpska
See Section 2.14 for details.

Cadmium labeling
Electronic Displays with a screen panel in which concentration values of Cadmium (Cd) by weight in homogeneous materials exceed 0.01 % as defined in Directive 2011/65/EU on the restriction of the use of certain hazardous substances (RoHS) in electrical and electronic equipment, shall be labeled with the 'Cadmium inside' logo. The logo shall be clearly visible durable, legible and indelible. The logo shall be in the form of the following graphic:

Cadmium inside



Cadmium free



The dimension of 'a' shall be greater than 9 mm and the typeface to be used is 'Gill Sans'.
An additional 'Cadmium inside' logo shall be firmly attached internally on the display panel or molded in a position clearly visible to workers once the external back cover bearing the external logo is removed.
A 'Cadmium free' logo shall be used if concentration values of Cadmium (Cd) by weight in any homogeneous material part of the display do not exceed 0.01 % as defined in Directive 2011/65/EU(RoHS).

Labeling for Devices that contain natural rubber
Reference
US Code of Federal Regulations Title 21 Food and Drugs Subchapter H Medical Devices Part 801 Labeling Section 801.437 User Labeling for devices that contain natural rubber

Requirements
This section applies to medical devices composed of or containing natural rubber that contacts humans. The term "natural rubber" includes natural rubber latex, dry natural rubber, and synthetic latex or synthetic rubber that contains natural rubber in its formulation.

Devices containing natural rubber latex that contacts humans shall be labeled prominently and legibly in bold print with:
"Caution: This Product Contains Natural Rubber Latex Which May Cause Allergic Reactions."
This statement shall appear on all device labels, and other labeling, and shall appear on the principal display panel of the device packaging, the outside package, container or wrapper, and the immediate device package.

Devices containing dry natural rubber that contacts humans shall bear the following in bold print on the device:
"This Product Contains Dry Natural Rubber."
This statement shall appear on all device labels, and other labeling, and shall appear on the principal display panel of the device packaging, the outside package, container or wrapper, and the immediate device package.

Devices that contain natural rubber that contacts humans shall not contain the term "hypoallergenic" on their labeling.

See the regulation for more details and definitions.

2.3.2 Plastic Part Marking

This section applies to IBM logo Products and to Deliverables when those Deliverables are incorporated or integrated within an IBM logo Product. This section also applies to Electronic Displays, irrespective of the brand or logo. If a supplier has questions about whether this section applies to a particular Deliverable, they should consult their IBM Procurement representative. Electronic Displays, irrespective of the brand logo, must have plastic components marked in accordance with EU Regulation 2019/2021 laying down ecodesign requirements for electronic displays pursuant to Directive 2009/125/EC of the European Parliament and of the Council. See Section 2.12.1 in this specification or the regulation for definitions and more requirement details.

Plastic Parts molded and/or fabricated from thermoplastic materials and weighing 25 grams or more must be marked in accordance with the International Organization for Standardization's international standard ISO 11469 "Plastics-Generic identification and marking of plastics products." Examples of the marking convention of ISO 11469 are listed in the following sections. Please see the standards for more details. Marking is optional for plastic Parts

weighing less than 25 grams, however, all plastic Parts having adequate surface area for coding should be marked. **Marking requirements do not apply to cable and cable assemblies, experimental tooling or to plastic Parts without adequate surface area for coding.** Marking of protective packaging materials is not in the scope of this specification. See Section 1.5 for information concerning the location of packaging specifications.

For Electronic Displays (with a logo on it other than IBM), plastic components heavier than 50 grams must be marked by specifying the type of polymer with the appropriate standard symbols or abbreviated terms set between the punctuation marks '>' and '<' as specified in available standards. The marking shall be legible.

The following plastic components are exempt from marking requirements in the following circumstances:
(i) the marking is not possible because of the shape or size;
(ii) the marking would impact on the performance or functionality of the plastic component; and
(iii) marking is technically not possible because of the molding method.

For the following plastic components in Electronic Displays no marking is required for:
(i) packaging, tape, labels and stretch wraps;
(ii) wiring, cables and connectors, rubber parts and anywhere not enough appropriate surface area is available for the marking to be of a legible size;
(iii) PCB assemblies, PMMA boards, optical components, electrostatic discharge components, electromagnetic interference components, speakers;
(iv) transparent parts where the marking would obstruct the function of the part in question.

Components containing flame retardants shall additionally be marked with the abbreviated term of the polymer followed by hyphen, then the symbol 'FR' followed by the code number of the flame retardant in parentheses. The marking on the enclosure and stand components shall be clearly visible and readable.

Coding Method
The marking shall be made by injection molding, stamping, or other means of permanently affixing the information in a readily visible area on non-decorative or nonfunctional surfaces. Marking in a readily visible area means that the marking can be seen on the disassembled plastic Parts. Use of labels with adhesives for coding Parts is not allowed.
Notes:
1) When two or more resins may be used for production of a plastic Part, identification of the actual resin used for fabrication is required.
2) If the plastic Parts must be plated or painted on the internal surface, it may not be possible to have a readily visible injection molded-in marking. In such cases, it may be necessary to code the Parts with a stamp or other means of permanently affixing the information. If the Parts must be painted with a decorative paint, it must be indicated on the internal surface with an appropriate means (for example, stamp) that the Part has been painted.

Symbol to Signify Recyclability
To indicate that the plastic Material used for the fabrication of the Part is recyclable, the two symbols ">" and "<" (normally used to indicate *greater than* and *less than*) will be used. Marking with these symbols indicates that the Material which makes up the Part is recyclable. Note: The size of the symbol is optional as long as it is clearly legible.

Resin Generic Identification
Resin identification will be marked on plastic Parts using the symbol for polymer type in between the symbols > and < as shown in the example of polycarbonate/ABS blend below.

> PC+ABS <

The symbols for the plastic Materials shall be selected from Part 1 of international standard ISO 1043, *Plastics-Symbols and abbreviated terms*. Symbols of plastics not appearing in ISO 1043-1 shall be selected from ASTM D 4000, *Classification System for Specifying Plastic Materials*; and ASTM D 1600, *Terminology Relating to Abbreviations, Acronyms and Codes for Terms Relating to Plastics*. See table entitled "Commonly Used Resins" for typical examples.

Table 6. Commonly Used Resins	
Generic Family Name	**Polymer Symbol**
Polyamide	PA
Polycarbonate	PC
Poly(phenylene ether)	PPE
Polymethylmethacrylate	PMMA
Polystyrene	PS
Polyvinyl chloride	PVC
Acrylonitrile/Butadiene/Styrene	ABS
Polycarbonate + Acrylonitrile/Butadiene/Styrene	PC +ABS
Polycarbonate with 10% glass fiber	PC - GF10

When two or more resins may be used for production of a Part, identification of the actual resin used for fabrication can be displayed by arrows. See table below for examples.

Table 7. Examples of Completed Plastic Part Markings	
Example	**Marking**
Single material used in production of Part	> ABS-FR(17) <
Two or more generically different materials allowed for production of Part	Arrow points to actual material used in production. > ABS-FR(17) < → > PC + ABS – FR(40) <

Additives identification shall be marked on plastic Parts using the generic symbols from the series of international standards ISO 1043-2, 1043-3 and 1043-4. For example, a blend of polycarbonate/ABS with halogen-free organic phosphate flame retardant compounds is marked with the following code:

> PC+ABS-FR (40) <

2.4 Additional Requirements for Batteries

2.4.1 Battery Content Restrictions

All batteries contained in Deliverables covered by ES 46G3772 shall meet the requirements of the table below.

Table 8. Battery Content Restrictions	
Battery Type	**Restrictions**
All Battery Types, including accumulators. (Some battery types have more restrictive substance levels; see following entries on this table.)	• No intentionally introduced mercury • ≤ 0.0005% mercury by weight in homogeneous materials[1, 5, 11, 13, 15] • ≤ 0.001% cadmium by weight (Note the lower cadmium restrictions for some battery types below.)[1, 13] • Only battery types which are exempted from all dangerous goods transport regulations (surface and air), i.e., not classified as a dangerous good (for purposes of transport) can be used. Large lithium ion batteries (> 100 Wh) can be used for back-up power to servers. Refer to IBM Engineering Specification 92F6933 for these requirements or contact the IBM Hazardous Materials Transportation Coordinator.
Nonremovable batteries or accumulators, unless the battery is nonremovable due to user safety or other principal purpose of the Deliverable	• ≤ 0.0005% cadmium by weight [5] • ≤ 0.1% lead by weight [5] • ≤ 0.0005% mercury by weight [5]
Alkaline batteries	• ≤ 0.01% lead by weight [1, 16] • ≤ 0.001% cadmium by weight [16] • ≤ 0.0001% mercury by weight [16]
Alkaline zinc manganese dioxide	• ≤ 0.001% cadmium [4, 6] • ≤ 0.004% lead [2, 6, 9] • ≤ 0.0001% mercury [2, 6, 9]
Alkaline manganese button cell battery with mercury added	Prohibited. [7]
Lead Acid Sealed	Must be classified as non-spillable and meet the requirements of US Code of Federal Regulation, 49 CFR 173.159a and IATA Special Provision A67.

Table 8. Battery Content Restrictions	
Mercuric oxide batteries	Prohibited [7]
Nickel Cadmium (Ni-Cd)	Prohibited. [1]
Silver oxide mercury added button cell batteries, including silver oxide button cell batteries designated SR357, SR364, R371, SR377 and SR395	Prohibited. [7]
Zinc-air button cell battery with mercury added	Prohibited. [7, 8]
Zinc carbon	• ≤ 0.01% lead by weight [1, 2] • ≤ 0.001% cadmium by weight [4, 16] • ≤ 0.0001% mercury by weight [3]
Zinc silver oxide, zinc air and zinc manganese dioxide button batteries	• Prohibited [12] • < 0.005 mg/g mercury [10] • ≤ 0.01% lead [1, 2, 6]
Non-alkaline zinc manganese dioxide	• ≤ 0.001% cadmium [4, 6, 9] • ≤ 0.01% lead [1, 2, 6] • ≤ 0.0001% mercury [2, 6]

Note - the regulations cited below are only a sample of the regulations pertaining to batteries. They are provided for example purposes only.
[1] EU Directive 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries.
[2] Argentina National Legislature Act 26.184 on the manufacturing, assembly and importing of batteries.
[3] New York Battery Reduction and Elimination. New York State Consolidated Laws. Environmental Conservation
[4] Austrian Battery Ordinances 514/1990, as amended by BGB1 No. 3/1991(4 January 1991) and BGB1.II Nol. 495/1999 (28 December 1999) of the Ordinance of Federal Ministry for Environment, Youth and Family.
[5] Switzerland Ordinance on Risk Reduction related to the Use of certain particularly dangerous Substances, Preparations and Articles.
[6] Brazil Resolution Number 401 of November 4, 2008 Batteries.
[7] Maine Act Concerning Mercury-added Button Cell Batteries.
[8] 2011 Wisconsin Act 201 relating to zinc air button cell batteries
[9] GB 24427-2009 Limitation of mercury, cadmium and lead contents for alkaline and non-alkaline zinc manganese dioxide batteries. National Standards of the People's Republic of China
[10] GB 24428-2009 Limitation of mercury contents for zinc silver oxide, zinc air and zinc manganese dioxide button batteries. National Standards of the People's Republic of China
[11] Canada Products Containing Mercury Regulations SOR/2014-254
[12] Japan Act on Preventing Environmental Pollution of Mercury
[13] Ecuador Technical Regulations RTE INEN 105 (1R) Cells and Batteries, Primary and Secondary
[14] Columbia Decree 2133-2016 Control measures for the importation and commercialization of mercury and the products that contain it
[15] EU Regulation 2017/852 of 17 May 2017 on mercury
[16] Columbia Resolution Number 0172 Technical Regulation No 0172 of January 23, 2012.

2.4.2 Product Design, Management Plans, and Labeling Requirements for Batteries

All batteries contained in Deliverables covered by ES 46G3772 shall be designed for easy identification and removal. Data (safety data sheets for all batteries, plus UN38.3 test reports for lithium batteries) used to classify batteries as nonhazardous in transport must be supplied to IBM as specified in 92F6933. For further information on this, please contact the IBM Hazardous Materials Transportation Coordinator.

Limit all batteries to no more than 2kWh capacity. If more than 2kWh capacity is required, contact your IBM procurement representative.

Suppliers of Deliverables with lead acid batteries must provide IBM with a Material Safety Data Sheet (MSDS) which is current, e.g., less than 3 years old, and conforms to US Occupational Safety and Health Administration requirements in 29 Code of Federal Register 1910. A copy of this MSDS must accompany lead acid batteries which ship to an IBM customer, including end use customers, Business Partners, and OEM customers. The MSDS must also be available upon request in Spanish.

Battery manufacturers must comply with Battery Management Plans as required by multiple jurisdictions, including, but not limited to those listed in the Table below. These jurisdictions may require test reports or certificates of conformance confirming substance restriction compliance, including certificate that no additional mercury has been added. IBM Procurement may request written documentation from a Supplier verifying compliance and upon such

request; Supplier must provide this compliance documentation within two business days. The table below briefly outlines some battery management plan requirements by jurisdiction for batteries sold for commercial, industrial or business applications. The list is not all-inclusive.

Table 9. Limited Summary of Battery Management Plan Requirements by Jurisdiction

Jurisdiction	**Battery type requiring management plan**
Brazil	Lead acid, nickel cadmium, mercury oxide, alkaline manganese and zinc manganese.
Costa Rica	Lead acid, nickel cadmium, batteries with mercury
Ecuador	Primary batteries: mercury –oxide batteries Secondary batteries: nickel-cadmium, nickel-metal hydride, nickel-iron, and lithium-ion batteries
EU Countries, Israel, Norway, Switzerland, Taiwan, and Turkey	All.
Florida	Rechargeable nickel-cadmium or sealed lead-acid batteries, weighing less than 25 pounds excluding those used for memory backup.
Maine	Mercuric oxide, nickel-cadmium or sealed lead acid battery.
Maryland	Nickel-cadmium or lead acid batteries.
Minnesota	Rechargeable batteries. Mercuric oxide, silver oxide, nickel cadmium or sealed lead acid batteries.
New Jersey	Mercuric oxide, nickel cadmium, sealed lead rechargeable, alkaline manganese, lithium, silver oxide, zinc-air, and zinc-carbon batteries. Any button, coin, cylindrical, rectangular or other shaped battery consisting of two or more cells composed of lead, lithium, manganese, mercury, mercuric oxide, silver oxide, cadmium, zinc, copper, or other metals.
Vermont	Mercuric oxide, nickel-cadmium, or sealed lead acid.

Note: The list of requirements in this table is not all inclusive of all legally mandated Battery Management Plan requirements.

All Batteries shall have appropriate labels affixed, including but not limited to:

1. Battery type and chemistry (IEC standard name is acceptable for button cells, e.g., CR2032, BR1225, see IEC 60086-2),
2. Manufacturer name,
3. Registered trade name or registered trade mark,
4. Postal address indicating a single contact point,
5. Web address and email address if available,
6. Batch or serial number, or product number or another element allowing their identification,
7. Capacity rating on all batteries with the exception of coin cell
   a. All batteries must have capacity displayed in Ah on a label with a minimum label size of 1 mm x 5 mm,
   b. Lithium-ion batteries also require the specific marking format of Wh, see IBM ES 92F6933, and
8. Other markings, hazard warnings, and information as required by applicable laws and regulations.

Battery labels or markings must be printed visibly, legibly and indelibly. The battery marking shall be located on or adjacent to each battery unless otherwise noted in this Section. Deliverables containing batteries that are not readily identifiable must be clearly labeled on the exterior to indicate the presence of a battery inside. In battery packs, individual cells may be labeled (in cases where multiple manufacturers or chemistries cannot clearly be identified using a single label for the pack) or one label may be used for the pack.

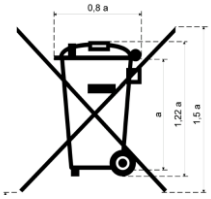
Batteries and batteries in Deliverables must meet the requirements in this and the following sections. These requirements must be met irrespective of the jurisdiction where the Deliverable is transferred to IBM.

Requirements for the EU, Brazil, Macedonian, Turkey, and multiple other jurisdictions

Instructions must be provided in the Product or Part hardware publications, showing how batteries can be removed safely by either the customer or a qualified professional and informing the customer of the type of battery in the Deliverable. These instructions must accompany the product, if not, a reference to the web location of the removal instructions must accompany the product.

A mark indicating separate collection must be printed on all batteries or accumulators see the figure in this section. The mark must (1) consist of a crossed-out wheeled bin container; (2) cover at least 3% of the area of the largest side of the battery, accumulator or battery pack, up to a maximum size of 5 cm x 5 cm; (3) for cylindrical cells, the symbol should cover at least 1.5% of the surface area of the battery or accumulator, and shall have a maximum size of 5 cm x 5 cm; and (4) where the mark would be smaller than 0.5 cm x 0.5 cm, the battery, accumulator or battery pack need not be marked but a symbol measuring at least 1 cm x 1 cm must be printed on the package. Refer to IBM Engineering Specification 5897661 "Recyclable Packaging Materials" for more details about the marking on the packaging if required.

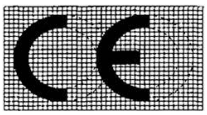
In addition to the above, batteries and accumulators containing heavy metals must be marked with specific symbols for heavy metal content: Hg for mercury; Cd for cadmium; Pb for lead. These symbols must be printed beneath the separate collection mark and must cover an area at least 1/4 of the size of the symbol.



Pb

Figure 1. Collection and heavy metal content marking for a lead acid battery.

The CE marking shall be affixed visibly, legibly, and indelibly to the battery. Where that is not possible or not warranted due to the nature of the battery, it shall be affixed to the packaging and to the documents accompanying the battery. Articles 19-20 EU 2023/1542. The CE marking shall be subject to the general principles set out in Article 30 of Regulation (EC) No 765/2008.



A Declaration of Conformity shall be provided in accordance with EU 2023/1542 Article 18 and Annexes VIII & IX.
Technical documentation shall be provided as part of the Declaration of Conformity per EU Regulation 2023/1542 Article 38 & Annex VIII.
Test reports shall be provided showing compliance with substance restrictions per EU Regulation 2023/1542 Article 6 and Annex I.

See previous section for capacity rating labeling requirements.

Batteries shall be tested as required in Turkey Announcement 2009/15 by a Turkey accredited laboratory. The analysis shall show compliance of the battery to the substance restrictions in the Turkey Regulation for Used Batteries and Accumulators, Number 25569 for mercury and cadmium. The analysis shall be completed and dated within six months of submittal to IBM.

Starting 18 August 2025, EU regulation 2023/1542 concerning batteries and waste batteries, articles 48,49,50 & 52 list Due Diligence requirements.

- Ensure third-party verification of battery due diligence policies
- Keep documentation for 10 years after the last battery manufactured under the relevant battery due diligence policy has been placed on the market
- Adopt and communicate to suppliers and the public a company battery due diligence policy
- Identify and assess the risk of adverse impacts in the supply chain and design and implement a strategy to respond to the identified risks

· Make available to IBM all relevant information gained and maintained pursuant to its battery due diligence policy, with due regard for business confidentiality and other competitive concerns
· On an annual basis review and make publicly available, including on the internet, a report on the due diligence policy.

Requirements for the United States

In the United States, the Mercury-Containing and Rechargeable Battery Management Act (Public Law 104-142) establishes national, uniform labeling requirements for rechargeable batteries, such as nickel-cadmium, nickel metal hydride, lithium ion, small sealed lead acid batteries, and products containing these regulated batteries as a primary energy supply. Products that include an internal uninterrupted power supply (UPS) device are exempt. Regulated batteries must display three chasing arrows, or a comparable recycling symbol and the text indicated in the table below for the respective regulated items. No size or color requirements for the recycling symbol are specified in the regulation. EPA publication EPA530-K-97-009, "Implementation of the Mercury-Containing and Rechargeable Battery Management Act" depicts the three chasing arrows symbol shown in figure below.

Figure 2. Three chasing arrows symbol from the U.S. Battery Management Act

The required labeling must appear on the packaging of the Products containing regulated batteries that are not easily removable, and on the packaging of regulated batteries that are sold separately from such Products, if the labeling on the Product or battery is not visible through the packaging.

Table 10. Text for Battery Marking for the U.S. Battery Management Act

Regulated Item	Text
Nickel-cadmium batteries*	Nickel-cadmium or Ni-Cd with the phrase "BATTERY MUST BE RECYCLED OR DISPOSED OF PROPERLY"
Lead acid batteries	Pb or the words "LEAD," "RETURN," and "RECYCLE", and if the batteries are sealed, the phrase "BATTERY MUST BE RECYCLED."
Products containing regulated lead-acid batteries that are not easily removable	"CONTAINS SEALED LEAD BATTERY. BATTERY MUST BE RECYCLED."
Product containing Ni-Cd batteries that are not easily removable	"CONTAINS NICKEL-CADMIUM BATTERY. BATTERY MUST BE RECYCLED OR DISPOSED OF PROPERLY."

* Nickel cadmium batteries are prohibited from use in Deliverables covered by this specification. See Table 8.

California - In California, certain coin or button cell lithium manganese dioxide batteries may require a label or flyer. Lithium manganese dioxide batteries containing perchlorate substances must either be:
1. Clearly labeled on the exterior of the shipping package, or
2. Have included with the Deliverable a shipping document or package insert.

The label or the insert must have the following statements, "Perchlorate Material - special handling may apply. See http://www.dtsc.ca.gov/hazardouswaste/perchlorate/." The following must also be included on the label or insert for IBM logo Products or Deliverables incorporated within an IBM logo Product, "The foregoing notice is provided in accordance with California Code of Regulations Title 22, Division 4.5 Chapter 33. Best Management Practices for Perchlorate Materials. This product/part includes a lithium manganese dioxide battery which contains a perchlorate substance."

Wisconsin – Manufacturers of zinc air button cell batteries must certify to the State of Wisconsin that the battery contains no mercury that was intentionally introduced.

Requirements for China

The China Regulation on Mercury Content Limitation for Batteries requires all domestically manufactured and imported alkaline zinc-manganese and zinc-manganese batteries sold in China to be marked to indicate mercury content using Chinese characters equivalent to "low mercury" (if the mercury content is less than 0.025% of the weight of the battery) or "mercury free" (if the mercury content is less than 0.0001% of the weight of the battery).

China Management Methods for Controlling Pollution by Electronic Information Products, Ministry of Information Industry (MII) Order #39 requires a Mark logo on all batteries except lead acid batteries and on batteries where due to size and function the battery may not be able to be labeled. Button and coin cell batteries are examples of batteries which may not be able to be labeled with a Mark logo. See Section 2.9 for more information in regard to labeling batteries with a China Mark logo. In the case where batteries cannot be labeled due to size or function restrictions, the battery must be listed on the Hazardous Substance Table, see Section 2.9 for details. An example China Mark logo for a battery can be found in the following Figure.

Figure 3. Example of China Mark Logo for batteries.

Requirements for Taiwan

All dry cell batteries sold in Taiwan are required to have the "Four-in-One" recycling symbol and the words, in Chinese characters, which interpreted mean "Please recycle batteries." See Figure below. The "Four-in-One" recycling symbol must be printed in any solid color (monotone), must be square in shape with each side not smaller than 0.5 cm in packaging and 1.5 cm in user manuals and product literature. The recycle symbol and words should be placed in one of the following locations only, using this order of priority: 1) on the battery, 2) as close to the battery as possible, 3) on the cardboard packaging of the field replaceable unit (FRU), 4) on a flyer that goes with the battery, 5) on the Product containing the battery, or 6) the symbol and words should appear in hardware manuals.

Figure 4. Four-in-One recycling symbol and words for Taiwan

Requirements for Japan

Rechargeable sealed lead acid, nickel cadmium, nickel metal hydride, and lithium ion batteries sold inside Japan shall be labeled according to Ordinance No. 95 of the Ministry of Economy, Trade, and Industry under the Law for the Promotion of the Effective Utilization of Resources (Law No. 48, 1993 as amended, 2001). These requirements are summarized in the Tables and Forms below. Sealed lead acid batteries with greater than 234,000 coulombs charge and small coin type rechargeable batteries that are contained inside Products are exempted from the special Japanese labeling requirements of this section.

Table 11. Battery Label Requirements for Japan

Class of the Specified Labeled Product	*Form**
Sealed lead storage batteries not covered by using plastic or other materials and sealed lead storage batteries covered by using plastic or other materials with height of less than 10mm	Form 1
Sealed lead storage batteries covered by using plastic or other materials with height of 10mm or more	Form 2
Sealed alkaline storage batteries (limited to sealed nickel-cadmium storage batteries. The same will apply in this item and the next item.) not covered by using plastic or other materials and sealed alkaline storage batteries covered by using plastic or other materials with height of less than 10mm	Form 3
Sealed alkaline storage batteries covered by using plastic or other materials with height of 10mm or more	Form 4
Sealed alkaline storage batteries (limited to sealed nickel-hydrogen storage batteries. The same will apply in this item and the next item.) not covered by using plastic or other materials and sealed alkaline storage batteries covered by using plastic or other materials with height of less than 10mm	Form 5
Sealed alkaline storage batteries covered by using plastic or other materials with height of 10mm or more	Form 6
Lithium storage batteries not covered by using plastic or other materials and lithium storage batteries covered by using plastic or other materials with height of less than 10mm	Form 7
Sealed lithium storage batteries covered by using plastic or other materials with height of 10mm or more	Form 8

* Forms appear below.

Form 1

Characters

Pb

(Remarks)

The letter size shall be 4.5 point type or bigger as provided in Japanese Industrial Standard (JIS) Z 8305.

Form 3

Characters

Ni-Cd

(Remarks)

The letter size shall be 4.5 point type or bigger as provided in Japanese Industrial Standard (JIS) Z 8305.

Form 5

Characters

Ni-MH

(Remarks)

The letter size shall be 4.5 point type or bigger as provided in Japanese Industrial Standard (JIS) Z 8305.

Form 7

Characters

Li-ion

(Remarks)

The letter size shall be 4.5 point type or bigger as provided in Japanese Industrial Standard (JIS) Z 8305.

Form 2

Characters

Pb

Symbols

(Remarks)

a: Length of one side of symbol

s: Surface area of symbol (a x a)

w: Width of line (0.1 mm or more)

b: Height of character (1/5 of a or more)

Surface area (S) of labeled symbol shall be 9 square millimeters or more, and 3 % or more of surface area of labeling surface of the said sealed storage batteries or 25 square centimeters or more.

The letter size shall be 6 point type or bigger as provided in Japanese Industrial Standard (JIS) Z 8305.

Form 4

Characters

Ni-Cd

Symbols

(Remarks)

a: Length of one side of symbol

s: Surface area of symbol (a x a)

w: Width of line (0.1 mm or more)

b: Height of character (1/5 of a or more)

Surface area (S) of labeled symbol shall be 9 square millimeters or more, and 3 % or more of surface area of labeling surface of the said sealed storage batteries or 25 square centimeters or more.

The letter size shall be 6 point type or bigger as provided in Japanese Industrial Standard (JIS) Z 8305.

Form 6

Characters

Ni-MH

Symbols

(Remarks)

a: Length of one side of symbol

s: Surface area of symbol (a x a)

w: Width of line (0.1 mm or more)

b: Height of character (1/5 of a or more)

Surface area (S) of labeled symbol shall be 9 square millimeters or more, and 3 % or more of surface area of labeling surface of the said sealed storage batteries or 25 square centimeters or more.

The letter size shall be 6 point type or bigger as provided in Japanese Industrial Standard (JIS) Z 8305.

Form 8

Characters

Li-ion

Symbols

(Remarks)

a: Length of one side of symbol

s: Surface area of symbol (a x a)

w: Width of line (0.1 mm or more)

b: Height of character (1/5 of a or more)

Surface area (S) of labeled symbol shall be 9 square millimeters or more, and 3 % or more of surface area of labeling surface of the said sealed storage batteries or 25 square centimeters or more.

The letter size shall be 6 point type or bigger as provided in Japanese Industrial Standard (JIS) Z 8305.

Requirements for Brazil

Lead acid, nickel cadmium, mercury oxide, alkaline manganese, and zinc manganese batteries or accumulators shall be labeled in accordance to the requirements for the European Union, see previous section for the EU. In addition, these batteries must be clearly and indelibly labeled in Brazilian Portuguese with the following information:

- Identification of the importer and manufacturer,
- Warning about risks to human health and the environment, and
- Requirement to return the battery, after use, to the reseller, manufacturer, or importer.

IBM logo products may use label part number 46T8771 for this requirement. If there is insufficient space on the batteries to put the above information, then this information must be on the packaging and in the product manual. Shipping the latest version of the IBM Environmental Notices and User Guide (ENUG), Z125-5823, with the product or part with the battery will meet the product manual requirements. See Section 2.10 for additional information about the ENUG.

The manufacturer of these batteries must:

- Register in the Brazil Federal Technical Register of Activities that are Potentially Contaminating or that Use Environmental Resources.
- Test the batteries in accordance to Chapter 1, Section 3 of Brazil Resolution Number 401 of November 4, 2008 (and Article 3 of Brazil Normative Instruction (NI) No. 8) at an in-country (Brazil) INMETRO accredited laboratory. The testing results must be submitted annually to IBM, the Brazil National Institute of Metrology and Standards (INMETRO), and the Brazil Institute of the Environment and Renewable Natural Resources (IBAMS). Please note this testing requirement applies only to lead acid, zinc manganese and alkaline manganese batteries and accumulators only. (This testing also applies to nickel cadmium and mercury oxide batteries which are not allowed in IBM products.)
- Submit a battery management plan to the required Brazil environmental agency (IBAMA).
- Include in the packaging, in Brazilian Portuguese, information about the symbols, warnings on the risks to human health and the environment, and the necessity to return the battery after use to the reseller, manufacturer or importer.

Requirements for Ecuador

Mercuric-oxide, nickel-cadmium, nickel-metal hydride and nickel-iron batteries shipping individually, not incorporated into a product or part, must be labeled with the following:
"ADVERTENCIA
La pila usada es un desecho peligroso para la salud y el ambiente.
La pilas usadas deberán devolverse al momento de adquirir una nueva."

This translates to "WARNING Waste batteries are a hazardous waste for the health and environment. Waste batteries shall be returned at the time to buy new ones." IBM may request usage of IBM label part number 00FX701 for this warning. The label may be on the battery itself or on the packaging.

Requirements for alkaline and non-alkaline zinc manganese dioxide batteries

Requirements for the People's Republic of China
Reference
GB 24427-2009 National Standards of the People's Republic of China. Limitation of mercury, cadmium, and lead contents for alkaline and non-alkaline zinc manganese dioxide batteries.

Alkaline and non-alkaline zinc manganese dioxide batteries (excluding button batteries) must be labeled with the following:

a. Model type;
b. Production year and month and validation, or recommended time of expiration;
c. Positive and negative contact;
d. Nominal voltage;
e. Name and address of the manufacturer or supplier;
f. Trademark;
g. Code number of the standard followed;
h. Notification of safe use (warning notice);
i. Mercury content ("low mercury" or "mercury free"), in Chinese characters.

B, e, g, h and i above can be marked on the package.

Method GB/T 20155-2006 is used to determine mercury, cadmium, and lead content in these batteries.

Reference
GB 24427-2009 National Standards of the People's Republic of China. Limitation of mercury contents for zinc silver oxide, zinc air and zinc manganese dioxide button batteries.

Zinc silver oxide, zinc air and zinc manganese dioxide button batteries must be labeled with the following:

a. Model type;
b. Production year and month and validation, or recommended time of expiration;
c. Positive and negative contact;
d. Nominal voltage;
e. Name and address of the manufacturer or supplier;
f. Trademark;
g. Code number of the standard followed;
h. Notification of safe use (warning notice);
i. Caution of preventing accidental swallowing;
j. Mercury content ("low mercury" or "mercury free"), in Chinese characters.

A and c above must be marked on the battery. B, d, e, g, h, i and j above can be marked on the package.

Method GB/T 20155-2006 is used to determine mercury, cadmium, and lead content in these batteries.

2.5 Requirement for Decorative Metal Finishing

This section applies only to IBM logo Products and Deliverables when those Deliverables are incorporated or integrated within an IBM logo Product. If a Supplier has questions about whether this section applies to a particular Deliverable, they should consult their IBM Procurement representative.

The decorative metal finishing of IBM logo hardware Products is required to be achieved using powder coatings. Decorative metal Parts and OEM Products with decorative metal housings must use powder coating. Exceptions to this requirement are applications where production volumes do not justify using the powder coating process; a unique color, texture, or "feel" (e.g., soft-touch) is specified; or conductive (e.g., electrostatic discharge (ESD), electromagnetic compatibility (EMC)) functional coatings are required.

2.6 Requirements for Parts and Products Containing Mercury

Mercury containing components are prohibited in IBM Deliverables. New parts or products releasing after October 2014 can no longer have mercury containing Cold Cathode Fluorescent Lamps (CCFLs) (e.g., in Liquid Crystal Displays (LCDs)). For parts or products released before that date, the use of a mercury-containing CCFL must be reported to your IBM procurement representative to ensure that the applicable legal requirements are met for Products containing mercury in CCFLs. IBM Procurement will request information about the length of the fluorescent tube, as this determines the level of mercury allowed. All Parts or Products containing mercury and the packaging for the Part or Product must be labeled in English and/or French Canadian for certain U.S. State and Canada laws which require appropriate text indicating that mercury is present in the Part or Product and that the item must be disposed of in accordance with local regulations and requirements. This label must also be on any replacement parts and the packaging for the replacement parts which contain these mercury-containing components. Additionally, appropriate text must be added to user and service manuals for mercury-added Products indicating which Product components contain mercury and directing the Product owner to dispose of the Product per local regulations.

The table below provides a list of Information Technology Product categories that were known to contain mercury, and provides requirements for label wording, font size, and user manual text. Labels and manual text for Product categories not listed in the table below must be reviewed and approved by the IBM procurement representative.

Table 12. Mercury Added Product Labeling Information - US

Product Type	Mercury Location	Mercury Amount	Product and Part Label Requirements *	Product and Replacement Part Package Label Requirements *	User / Service Manual Requirements
Flat Panel Display	Fluorescent lamp in display module	Displays range from 15 to 20 inches. Varies with the number of bulbs. Each bulb has ≤ 3.5 mg of mercury. Mercury amount per product ranges from less than 10 mg to less than 30 mg. See Table 1 for mercury restrictions per lamp.	Label Wording - “This product contains a cathode fluorescent lamp which contains mercury. Please refer to user manual or follow local ordinances or regulations for disposal of this machine.” Label Location - rear panel of product. Label Construction - Per requirements of UL 969 Standard, “Marking and Labeling Systems.” Minimum Capital Letter Text Height - 3.53mm.**	Label Wording - This product contains a cathode fluorescent lamp which contains mercury. Please refer to user manual or follow local ordinances or regulations for disposal of this machine (or product). Label Construction - Per requirements of UL 969 Standard, “Marking and Labeling Systems.” Minimum Capital Letter Text Height - 3.53mm. **	Statement Wording - “The fluorescent lamp in the liquid crystal display contains mercury. Dispose of it as required by local ordinances and regulations.”

Table 12. Mercury Added Product Labeling Information - US					
Product Type	**Mercury Location**	**Mercury Amount**	**Product and Part Label Requirements ***	**Product and Replacement Part Package Label Requirements ***	**User / Service Manual Requirements**
Tape Library	Fluorescent lamp in display module	Less than 4.0 mg per product. See Table 1 for mercury restrictions per lamp.	Label Wording - "This product contains a cathode fluorescent lamp which contains mercury. Please refer to user manual or follow local ordinances or regulations for disposal of this machine." Label Location - rear panel of product Label Construction - Per requirements of UL 969 Standard, "Marking and Labeling Systems." Minimum Capital Letter Text Height - 3.53mm.**	Label Wording - This product contains a cathode fluorescent lamp which contains mercury. Please refer to user manual or follow local ordinances or regulations for disposal of this machine (or product). Label Construction - Per requirements of UL 969 Standard, "Marking and Labeling Systems." Minimum Capital Letter Text Height - 3.53mm. **	Statement Wording - "The fluorescent lamp in the liquid crystal display contains mercury. Dispose of it as required by local ordinances and regulations."

* The labels must also be on the replacement part or product, such as a service part and the packaging for the replacement part.
**The State of Vermont requires a 10 point font which equates to a height of 3.53mm. If the text on the Product or Part label is not able to meet this height requirement, then an Alternative Labeling Plan must be submitted to and approved by the State of Vermont. IBM may request documentation from Supplier of an approved Alternative Labeling Plan. The label for the packaging must meet the 10-point font requirement.

For Canada, the following information is required in a readily visible location on the product and package:

a. The statement "Contains mercury / Contient du mercure"
b. Safe handling procedures and the measures to be taken in case of accidental breakage, the address of a website where that information is available, or contact information for a person who can provide that information;
c. The options available for the disposal and recycling of the product in accordance with the laws of the jurisdiction where the disposal or recycling is to take place, the address of a website where that information is available, or contact information for a person who can provide that information;
d. A statement that the product should be disposed of or recycled in accordance with the applicable laws; and
e. Symbol "Hg" in a font size of at least 10 points with characters that are at least 3 mm in height or within a pictogram of a least 7 mm in height.

The above information for Canada, must be in both English and French Canadian; in a font size of at least 10 points with characters that are at least 3mm in height, that are legible and indelible and that are impressed, embossed or in a color that contrasts with the label's background or the color of the product; be enclosed by a border, and be easily distinguishable from other graphic material on the product or its package. See the Canada regulation for further details if the product or package is too small, or there is no package to accommodate the information. Annual reporting and a permit is required to import mercury containing products into Canada after November 7, 2015.

In some jurisdictions, at the point of sale of a Product containing mercury, notification must be given to the customer that the product contains mercury. Contact your IBM representative for more details or requirements.

In the United States, mercury manufacturing, including importing, must be reported. See 40 CFR part 713 Reporting requirements for the TSCA Inventory of Mercury supply, use, and trade for details.

2.7 Product Chemical Emissions

Chemical emissions analyses shall be performed on Products and supplies (e.g., toner), but are not necessary for Parts or subassemblies of IBM logo hardware Products. Products covered by this specification shall not emit chemicals during normal use conditions which exceed the threshold values or requirements listed in U.S. 29 CFR 1910 (tables Z 1-3)) or the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Product chemical emissions requirements are delineated in ECMA 328: Detection and Measurement of Chemical Emissions from Electronic Equipment.

2.8 WEEE Marking

2.8.1 Affected Products and Jurisdictions

References
EU Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) (recast) and amendments.
European Standard EN 50419 Marking of electrical and electronic equipment.

Electrical and electronic equipment (EEE) which is put on the market in the European Union after August 13, 2005 and is listed in Annex II of EU Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE) is subject to the requirements for product markings in accordance with the Directive. In addition to the products specified in this Annex of the WEEE Directive, stand-alone options that operate external to the products listed (e.g., keyboards, monitors, external power supplies, mice, external drives, racks, power distribution units) should also be marked. Components and internal parts of the stand-alone equipment listed in Annex II do not need to be marked. Please note that external power supplies, adapters and electronic tools require a WEEE label. This requirement is also required for several other jurisdictions outside of the EU, e.g., Buenos Aires, Argentina, Bosnia-Herzegovina, India, Jordan, Macedonia, Nigeria, Peru (recommended for Peru, not required), Serbia, and Turkey (this list is not all inclusive).

2.8.2 WEEE Marking Elements, including Date of Manufacture

The marking of EEE, in order to meet requirements in all jurisdictions, must have the following:
1. The crossed-out wheeled bin symbol, including the black bar, in accordance with Annex IX of the WEEE Directive per Article 14(4). (Please note, the symbol of the crossed-out wheeled bin, without the underlying black bar, is the same as required for the battery collection mark in the EU, see Figure 5.)
2. A unique identification of the producer such as a brand name, trademark, company registration number or other suitable means recorded in EU member state's register of producers per Article 12(1) of the Directive,
3. The date of manufacture/put on the market, and
4. A product identification number (compliance ID number) and serial number (for Nigeria).

The date of manufacture or date put on the market must be in un-coded text in accordance with EN 28601 (this European standard is equivalent to ISO 8601) or other coded text. If coded text is used, the code definition must be made available for treatment facilities and must be provided to IBM. The preferred DOM format is YYYYMMDD. See Section 2.9.2 for additional DOM requirements for China requirements. The specific placement of these markings is not prescribed other than for the relationship of the solid bar to the crossed-out wheeled bin.

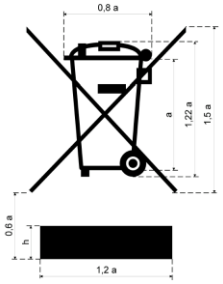


Figure 5. The WEEE Mark

The markings must be visible, accessible, durable, legible, and indelible. The height of the solid bar shall be the greater of 0.3a or 1mm. Each marking element must be located on a permanent portion of the EEE such as a frame member or chassis that cannot be removed or exchanged. Markings can be located behind a door or cover but must be viewable without the use of a tool by a customer or operator. When the size or function of the product does not allow a label, the marking shall be printed on the packaging, on the instructions for use, and in the warranty of the product.

European Standard 50419:2005 prescribes that the marking must meet minimum marking durability requirements. The marking must remain legible after rubbing by hand for 15 seconds with a piece of cloth soaked with water and again for 15 seconds with a piece of cloth soaked with aliphatic solvent hexane. If marking plates or labels are used, then after this test they shall not show curling.

2.9 Electrical and Electronic Products and Electronics Information Products Mark and Table

2.9.1 People's Republic of China

Scope

This section specifies the requirements for the People's Republic of China Management Methods for Restricted Use of Hazardous Substances in Electrical and Electronic Products Order # 32 and Management Methods for Controlling Pollution by Electronic Information Products, Ministry of Information Industry Order #39 and Standard SJ/T 11364-2014 Marking for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products (EEP).

Deliverables for which this section applies to include but may not be limited to:

1. Systems, e.g., servers, printers, and storage products including racks.
2. Standalone products which are located external to an IBM system, e.g., monitors/displays, laptops, keyboards, mice, tape autoloaders, bridge boxes, modems, routers, uninterruptible power supplies, and external disk drives. Refer to the People's Republic of China Ministry of Information Industry (MII) List of Electronic Information Products Classification and Explanations for a comprehensive list of EIP and/or EEP.
3. Parts, assemblies, or products which are sold commercially not for use in IBM equipment or IBM designed OEM equipment, e.g., hard disk drives, switches, circuit cards, and storage media. Refer to the MII List of Electronic Information Products Classification and Explanations for a comprehensive list of EIP and/or EEP.
4. Electronic measuring equipment, e.g., Voltage measuring apparatus, oscillographs, frequency measuring instruments, testers, voltage power supplies, and power meters. Refer to the MII List of Electronic Information Products Classification and Explanations for a comprehensive list of EIP and/or EEP.

This section does not apply to:

1. Non-electrical tools (e.g., hammers, screwdrivers, ladders),
2. Electrical tools for use with IBM equipment, e.g., Power hand tools such as drills, (note - electrical tools which are used in the production of mold and gear as specified in MII's EIP and/or EEP List are included in the MII's regulations for EIP and/or EEP),
3. Customer instruction manuals and publications, both hardcopy and softcopy (Note: this section does apply to manuals and publications on floppy disks),
4. Software and firmware updates, this includes recorded storage media such as CDs and DVDs (Note: this section does apply to software and firmware updates on floppy disks), and
5. Product packaging materials (e.g., cardboard and wood pallets). IBM packaging requirements are located in IBM Engineering Specification 5897661 - Recyclable Packaging Materials, Selection and Identification.

Section 2.9.2 on EEP Pollution Control Logos does not apply to the following, but these parts must be included in the Toxic and Hazardous Substance Table outlined in Section 2.9.2:

1. Production parts and assemblies internal to IBM systems, including line cords,
2. Spare parts, parts for upgrade, maintenance or repair when the parts are used internal to an IBM system, and
3. Coin cell batteries where there is no functional space to place an EEP Pollution Control logo.

Definitions

Contain – Per SJ/T 11364-2014 – Refers to cases that the content of hazardous substances is in excess of the concentration limits specified in GB/T 26572-2011 Requirements for Concentration Limits for Certain Restricted Substances in Electronic and Electrical Products or the product contains one of these substances to an exemption allowed pursuant to the EU RoHS Directive. See reference table below for applicable Concentration Limits (CL).

Table 13. Hazardous Substances and Concentration Limits for China EEP Regulation	
Hazardous Substance	**CLs in a Homogeneous Material- % by weight or (ppm) (Maximum level)**

Table 13. Hazardous Substances and Concentration Limits for China EEP Regulation	
Hazardous Substance	**CLs in a Homogeneous Material- % by weight or (ppm) (Maximum level)**
Lead (Pb)	0.1% or 1,000 ppm
Mercury (Hg)	0.1% or 1,000 ppm
Cadmium (Cd)	0.01% or 100 ppm
Hexavalent chromium (Cr^{VI})	0.1% or 1,000 ppm
Polybrominated biphenyl (PBB) flame retardants *	0.1% or 1,000 ppm
Polybrominated diphenyl ether (PBDE) flame retardants*	0.1% or 1,000 ppm
Diisobutyl phthalate (DIBP)	0.1%
Di-n-butyl phthalate (DBP)	0.1%
Butylbenzyl phthalate (BBP)	0.1%
Di(2-ethylhexyl) phthalate (DEHP)	0.1%

* See Annexes for limited lists of PBBs and PBDEs.

Electronic Information Products (EIP) - Per MII Order No. 39 - Products and their accessories that are manufactured by utilizing electronic information technologies including:

1. Electronic radar products
2. Electronic communications products
3. Radio and television products
4. Computer products
5. Home electronic products
6. Electronic instrument measuring products
7. Specialized electronic products
8. Electronic components and parts
9. Electronic applications
10. Electronic materials
11. Software products and their accessories

Electrical and Electronic Product (EEP) - Per SJ/T 11364-2014 - Refers to equipment and supportive products which rely on electric current or electromagnetic field to operate, or are intended to generate, transmit and measure electric current or electromagnetic field, with the rated operating voltage not exceeding 1500V for DC, or 1000V for AC.
Environmental Protection Use Period (EPUP) - A period of time measured in years defined in SJ/T 11364-2014 as the period when hazardous substances contained in electrical and electronic products, will not lead or change abruptly, the use of such products will not cause severe environmental pollution or cause severe harm to the life or property of the users. The EPUP starts with the Date of Manufacture of the product.
Homogeneous Materials - For purposes of this section, this is defined in Standard GB/T 26572-2011 as materials formed of one or more substances, which are homogeneous throughout its various parts.
Hazardous Substances - Per SJ/T 11364-2014 - Lead and its compounds, mercury and its compounds, cadmium and its compounds, hexavalent chromium and its compounds, polybrominated biphenyl (PBB), and polybrominated diphenylether (PBDE) contained in electrical and electronic products. (See Table 1 for restrictions on these substances and applicable RoHS specification.)

Requirements

EEP Pollution Control Logos

Electrical and electronic products shall be marked with either a Mark I or a Mark II logo, also referred to as the EEP pollution control logo. The logos must meet the requirements in standard SJ/T 11364 2014 - Marking for the Restriction of Hazardous Substances in electrical and Electronic Products.

The logo shall be clear, distinguishable, visible, resistant to color fading, and difficult to remove. The logo shall not be smaller than 5 mm x 5 mm. The logo may be applied on the product by molding, spray coating, sticking, or printing. The “e” in Mark I is an image, not a character. The font of the EPUP number in the Mark II logo is “Impact”.

If it is not possible to mark the EEP because of size, irregular shape or function restrictions, then the Mark logo shall be included in the product hardware instructions or in a flyer or insert, which must accompany the EEP. Cables are an example of an irregular shaped product. If the EEP has a maximum surface area less than $5x10^3$ mm^2, then the Mark logo must be included in the product hardware instructions, in a flyer or insert or included with the Toxic and

Hazardous Substance Table, see details further in this section. If the operating instructions and the packaging of the product are integrated then the mark may be placed on the packaging.

The pollution control logo is to be marked in a prominent location on the EEP, such as the front, side or back of the product where function keys are located. If restricted by function and appearance, the logo shall be located at another visible location easily visible by consumers. The logo may be placed on the chassis.

Mark I
A Mark I logo (see Figure below) must be used if the product does not contain toxic and hazardous substances or elements above the CLs in any material or application including those exempt from the requirements of the EU RoHS Directive. It is suggested by the standard that the logo be colored green and color match to - C: 85, M: 30, Y: 85, K: 20. If the marking does not look sufficiently clear because the color of the EEP is close to the suggested color, the color may be altered to any other prominent color. Molded in marking can be the same color as that of the product. IBM Procurement or Development may direct or authorize use of IBM part number 42R7561 which is the Mark I label.

Figure 6. Mark I

This symbol is included as reference only. For the actual image refer either to the China Labeling Standard or the MII web site.

Mark II
A Mark II logo (see Figure below) must be placed on products which have one or more toxic and hazardous substances exceeding the CLs regardless of whether the toxic or hazardous substance is used in an application which is exempt from the EU RoHS Directive. See IBM Engineering Specifications 97P3864 for a list of EU RoHS Directive exemptions which may apply to IBM products.

Figure 7. Example of Mark II.

This symbol is included as reference only. For the actual image refer to the China Labeling Standard or the MII web site.

It is suggested by the Chinese standard that the Mark II label be orange. The SJ/T 11364-2014 standard references the color match as C: 0, M: 75, Y: 100, K: 0. If the logo does not look sufficiently clear because the color of the EEP is close to the suggested color, the color may be altered to any other prominent color. Molded in marking can be the same color as that of the product.

IBM Procurement or Development may direct or authorize use of IBM part numbers which are the Mark II labels. While the Supplier is responsible for determining the EPUP for its parts and products, IBM intends to use the following EPUPs for IBM logo parts and products manufactured by IBM. The corresponding IBM label part number is listed.

Table 14. Sample IBM EPUPs and Corresponding Label Part Numbers

EEP	EPUP	IBM Label Part Number
Professional computers, including servers, racks, high performance workstations (Unix based), high end storage systems and high-end printers	30	42R7646
Workstations (Intel based) and mid to low end General Office Printers	15	42R7645
Displays, Input/ Output devices, (e.g., keyboards, mice), low end external drives (e.g., floppy disk drives, CD drives, low end storage drives), compact discs, storage media*, cables, and LCDs with fluorescent lamps.	10	42R7644
Batteries** (except lead acid)	5	42R7643
Electronic measurement instrument products	40	None available at this time.

Please note while the Supplier is responsible for determining the appropriate EPUP for its parts and products, (a) if the Supplier of an IBM logo product intends to use a different EPUP number for an IBM logo product, then the Supplier must inform IBM in writing of its intent, and such EPUP number must be approved by the IBM product environmental focal point in IBM Systems for the product brand, and (b) if the Supplier of a non-IBM logo product intends to use a different EPUP number for a non-IBM logo product to be distributed by IBM, then the Supplier must inform IBM in writing of its intent.
*Storage media, such as CDs, DVDs, and tape cartridges when sold commercially or at retail for use in non-IBM logo systems, must have a Mark logo. If a Mark II logo is used, then a Toxic and Hazardous Substances or Elements Table must accompany the parts or products. This applies to blank storage media. Note: CDs, DVDS and tape cartridges with IBM software and firmware for IBM Products do not require a Mark logo, whereas floppy disks with IBM software and firmware do require a Mark logo and HST table.
** IBM does not require a Mark symbol for coin and button cell batteries, if located inside another product. Battery packs, such as nickel metal hydride battery packs and lithium ion batteries must be labeled with a Mark logo. Batteries and battery packs must be listed in the Toxic and Hazardous Substance Table, (see Section 2.9.2) if the product is labeled with a Mark II logo. Note: lead acid batteries do not require a Mark label.

As required by the China Regulations on Product Marking and Labeling, products labeled with Mark II must also be labeled with a Date of Manufacturing (DOM). The DOM may be on the product or the packaging. The DOM may be in any of the following formats: YY, WW-YY, MM-YY, DD-MM-YY or by way of other widely accepted product marking method containing manufacture date such as product serial number and bar code. See Section 2.8 for other DOM requirements. Labeling methods such as serial numbers and bar codes that contain the date of the products may also be used, but the manufacturer or importer must provide necessary manufacturing date identification services for consumers and regulatory authorities.

Toxic and Hazardous Substances or Elements Table (HST)

When a Mark II symbol is used on a Product a Toxic and Hazardous Substance Table must accompany the shipment of the Product. The table below outlines the format IBM requires for the HST table and provides examples of completed lines. All text must be translated into Simplified Chinese. English may remain on the table next to the Simplified Chinese text. When electronic versions (e.g., removable laser disk) of product instructions or descriptions are shipped with the product rather than hardcopy paper versions, then the HST Table may be included on the electronic version of the product information rather than in hardcopy version. The latest version of IBM Environmental Notices and User Guide, Z125-5823, has the required China HST table in it and may be used to fulfill this notification requirement.

Table 15. Format and Example of a Toxic and Hazardous Substances or Elements Table

Names and Contents of Hazardous Substances in the Product						
Part Name	**Hazardous Substance**					
	Lead (Pb)	**Mercury (Hg)**	**Cadmium (Cd)**	**Hexavalent Chromium (Cr(VI))**	**Polybrominated biphenyl (PBB)**	**Polybrominated diphenylether (PBDE)**
Server	×	O	O	O	O	O
Chassis	O	O	O	O	O	O
Power Supply	×	O	O	O	O	O
Battery Pack	×	O	O	O	O	O

This table is prepared according to SJ/T 11364.
○: Indicates that this hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.
×: Indicates that this hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572.

Note in the table above, the "×" is a cross (the two lines are perpendicular) and the "O" is a circle. The height of the Chinese characters must not be less than 1.8mm.

The first column must be completed with the part names found in the product or part. The columns under the Toxic and Hazardous Substances or Elements must be filled in with either a cross or a circle to indicate the presence or absence of the Toxic and Hazardous Substances or Elements in the part. Presence of a substance is determined if the concentration of the substance is above the CL including when used in an application which is exempt from the EU RoHS Directive. Absence is determined if the concentration of the substance is below the CL and is not used in an application which is allowed under an EU RoHS Directive exemption. See IBM Specification 53P6233 or 97P 3864

for a list of EU RoHS Directive exemptions which may apply to IBM Products and Parts for a listing of allowable exemptions. For IBM logo Products or Parts, see table below for a list of Part names which can be used for the column in the table listing Part names.

Table 16. Part Names for use in a Toxic and Hazardous Substances or Elements Table for IBM Logo Products and Parts.				
Accessor control	Drum	LCD Monitor	Oiler roll	Sensor
Acousto-optic modulator	Duplex unit	LCD Touch screen	Operator interface unit	Server
Air moving devices	ECAT assemblies	LED display panel	Optical cable	Signature capture device
Batteries	Emergency power off switch	LED Monitor	Other mechanical parts	Speaker
Battery pack assembly	External covers	Light	Paper drawer	Stacker unit
Cable assemblies	Fiber Optic Transceiver	Light bulb	Payment device	Static brush
Cages or enclosures	Filter	Line cord	Pinion shaft	Storage device
Cash-handling device	Fluorescent lamp	Logic modules	Point of sale device	Tape drive
Casters	Frame assemblies	Mechanical assemblies	Power Distribution Unit	Toner cartridge
Chassis	Fuser unit	Memory modules	Power supply	UPS
Circuit card with mechanicals	Grid	MICR head	Printer	Urge unit
Circuit card without mechanicals	Ground strap	Mirror motor assembly	Printer cartridge	Vacuum plenum
Conveyor	IO station	Modem	Printhead	Water cooling assembly
Cooling assembly	JAG I/O station	Monitor	Processor modules	Wrap plug
Corona housing	Keyboard	Mouse	Refrigeration assembly	X axis assembly
Corona wire	Lamp	Multi-function printer	Roll	X Rail assembly
Developer unit	Laser	Oil damper	Scale	Y axis assembly
Disk drive	Laser spot size tool	Oiler belt	Scanner	

IBM requires that the following additional text, in Simplified Chinese, be added to the bottom of the table for IBM logo Products or Parts:
"Environmental Protection Use Period (EPUP) Disclaimer: The number provided as the EPUP is provided solely to comply with applicable laws of the People's Republic of China. It does not create any warranties or liabilities on behalf of IBM to customers. The EPUP assumes that the product will be used under normal conditions in accordance with the IBM operating manual. Certain assemblies inside this product (for example, assemblies that contain a battery) may have an EPUP which is lower than the EPUP on this product."

Example of China HST for IBM Logo Products
The HST below is provided in English for reference, the table must be translated into Simplified Chinese.

For China: Names and Contents of Hazardous Substances in the Product

	Hazardous Substance					
Part Name	Pb	Hg	Cd	Cr (VI)	PBB	PBDE
frame assemblies	x	o	o	o	o	o
external covers	x	o	o	o	o	o
mechanical assemblies	x	o	o	o	o	o
cooling assembly	x	o	o	o	o	o
air moving devices	x	o	o	o	o	o
battery pack assembly	x	o	o	o	o	o
batteries	x	o	o	o	o	o
cable assemblies	x	o	o	o	o	o
wrap plug	x	o	o	o	o	o
fiber optic transceiver	x	o	o	o	o	o
keyboard	x	o	o	o	o	o
mouse	x	o	o	o	o	o
modem	x	o	o	o	o	o
LED Display Panel	x	o	o	o	o	o
LCD monitor - CCFL	x	x	o	o	o	o
LED monitor	x	o	o	o	o	o
storage device	x	o	o	o	o	o
ECAT assemblies	x	o	o	o	o	o
emergency power off switch	x	o	x	o	o	o
power supply	x	o	x	o	o	o
power distribution unit	x	o	x	o	o	o
uninterruptible power supply	x	o	x	o	o	o

This table is prepared according to SJ/T 11364.

o Indicates that this hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.

x Indicates that this hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572.

Environmental Protection Use Period (EPUP) Disclaimer: The number provided as the EPUP is provided solely to comply with applicable laws of the People's Republic of China. It does not create any warranties or liabilities on behalf of IBM to customers. The EPUP assumes that the product will be used under normal conditions in accordance with the IBM operating manual. Certain assemblies inside this product (for example, assemblies that contain a battery) may have an EPUP which is lower than the EPUP on this product.

2.9.2 Taiwan

References

National Standard of Republic of China CNS 15663 Guidance to reduction of the restricted chemical substances in electrical and electronic equipment.
Inspection requirements including marking of the presence conditions of the restricted substances on the legal inspection for 92 items of electrical and electronic products
Inspection requirements including marking of the presence conditions of the restricted substance on the legal inspection for 6 kinds of IT/ AV products, Bureau of Standards, Metrology and Inspection (BSMI), Ministry of Economic Affairs (MOEA)
Amendment to the legal inspection regulation for 8 items of electrical products
Amendment to legal inspection requirements for 7 items of electrical and electronic products

Scope

This requirement is applicable for electrical and electronic equipment (EEE) with a voltage rating less than 1000 volts for alternating current and 1500 volts for direct current, and dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields. For examples of the equipment this is applicable for, refer to Annexes B and C of CNS 15663.

BMI inspection requirements, including marking of the presence of restricted chemical substances, apply to the following products with the related Customs Commodity Code Number (CCCN) codes. The list included here is a

subset of the products in scope of this requirement. This subset is for products applicable for IBM Systems and Appliances and includes mainframes, minicomputers, printers, personal computers, mice, keyboards, laptop computers, notebook computers, notepad computers, and other products and equipment for the collection, storage, processing, presentation or communication of information by electronic means.

Description of Goods	Inspection Standards	C.C.C. Code (the first 6 digits are the same as HS Code)(reference)	Conformity Assessment Procedures
Automatic data processing machines	CNS 13438 (2006.6) CNS 14336-1 (2010.9), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8471.30.00.00-8 8471.41.00.00-5 8471.49.00.00-7 8471.50.00.00-3 8471.60.10.00-9 8471.90.10.00-3 8471.90.90.00-6	RPC Scheme (Module II+III) or TABI Scheme
Monitors	CNS 13439 (2004.9) (Multimedia products can select CNS 13438 (2006.6)) CNS 14408 (2004.10) (Multimedia products can select CNS 14336-1 (2010.10)) Section 5 "Marking of presence" of CNS 15663 (2013.7)	8528.59.10.00-5 8528.49.10.00-8 8528.49.20.00-6 8528.59.20.00-3	RPC Scheme (Module II + IV or II+V or II+VII) or TABI Scheme
Monitors used in an automatic data processing	CNS 13438 (2006.6) CNS 14336-1 (2010.9), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8528.41.00.00-8 8528.51.00.00-5	RPC Scheme (Module II+III) or TABI Scheme
Radio keyboard	CNS 13438 (2006.6) CNS 14336-1 (2010.9), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8471.60.30.10-3	RPC Scheme (Module II+III) or TABI Scheme
Image scanners	CNS 13438 (2006.6) CNS 14336-1 (2010.9), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8471.60.90.10-0	RPC Scheme (Module II+III) or TABI Scheme
Radio mouse	CNS 13438 (2006.6) CNS 14336-1 (2010.9), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8471.60.90.20-8	RPC Scheme (Module II+III) or TABI Scheme
Other input or output units, whether or not presented with the rest of a system and whether or not containing storage units in the same housing	CNS 13438 (2006.6) CNS 14336-1 (2010.9), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8471.60.90.90-3	RPC Scheme (Module II+III) or TABI Scheme
Other uninterruptible power supply, having a power handling capacity not exceeding 10KVA	CNS 14757-2 (2010.12) CNS 14843-1 (2004.7) CNS 14843-2 (2004.7), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8504.40.92.00-6	RPC Scheme (Module II+III) or TABI Scheme
Other uninterruptible power supply(Output current exceeds 400A except)	CNS 14757-2 (2010.12) CNS 14843-1 (2004.7) CNS 14843-2 (2004.7), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8504.40.93.00-5	RPC Scheme (Module II+III) or TABI Scheme

Other keyboard	CNS 13438 (2006.6) CNS 14336-1 (2010.9), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8471.60.30.90.6	Declaration of Conformity
Hard disc devices(external use only)	CNS 13438 (2006.6) CNS 14336-1 (2010.9), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8471.70.10.10-5A	Declaration of Conformity
Hard disc devices(internal use only)	CNS 13438 (2006.6), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8471.70.10.10-5B	Declaration of Conformity
Soft disc devices(external use only)	CNS 13438 (2006.6) CNS 14336-1 (2010.9), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8471.70.10.20-3A	Declaration of Conformity
Soft disc devices(internal use only)	CNS 13438 (2006.6), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8471.70.10.20-3B	Declaration of Conformity
Optical disc devices(external use only)	CNS 13438 (2006.6) CNS 14336-1 (2010.9), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8471.70.10.30-1A	Declaration of Conformity
Optical disc devices(internal use only)	CNS 13438 (2006.6), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8471.70.10.30-1B	Declaration of Conformity
Other magnetic disc devices(external use only)	CNS 13438 (2006.6) CNS 14336-1 (2010.9), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8471.70.10.90-8A	Declaration of Conformity
Other magnetic disc devices(internal use only)	CNS 13438 (2006.6), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8471.70.10.90-8B	Declaration of Conformity
Other storage units(external use only)	CNS 13438 (2006.6) CNS 14336-1 (2010.9), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8471.70.90.00-0A	Declaration of Conformity
Other storage units(internal use only)	CNS 13438 (2006.6), Section 5 "Marking of presence" of CNS 15663 (2013.7)	8471.70.90.00-0B	Declaration of Conformity
Plugs and socket-outlets for fixed wiring (Inspection scope: Voltage not exceeding 250 Vac with types and dimensions same or consistent with the national standard CNS 690).	CNS 690(2016-03), CNS 15767-1(2014-10), Section 5 "Marking of Presence" of CNS 15663(2013-07)	8536.69.90.00.6A	RPC Scheme (Module II+III) or TABI Scheme
Adapters (Inspection scope : Voltage not exceeding 250 Vac with types and dimensions same or consistent with the national standard CNS 690, excluding the type of plug-end conforms to figure 16 of CNS 690)	CNS 690(2016-03), CNS 15767-1(2014-10), CNS 15767-2-5(2014-10) Section 5 "Marking of Presence" of CNS 15663(2013-07)	8536.69.90.00.6C	RPC Scheme (Module II+III) or TABI Scheme

Cord extension sets (Inspection scope: Voltage not exceeding 250 Vac)	CNS 690(2016-03), CNS 15767-1(2014-10), CNS 15767-2-7(2016-03) Section 5 "Marking of Presence" of CNS 15663(2013-07)	8544.42.90.90.9A	RPC Scheme (Module II+III) or TABI Scheme
Non-detachable cord sets(Inspection scope：Voltage not exceeding 250 Vac)	CNS 690(2016-03), CNS 15767-1(2014-10), Section 5 "Marking of Presence" of CNS 15663(2013-07)	8544.42.90.90.9B	RPC Scheme (Module II+III) or TABI Scheme
Detachable cord sets(Inspection scope：Voltage not exceeding 250 Vac)	CNS 690(2016-03), CNS 15872(2016-03), CNS 6797(1991-11), Section 5 "Marking of Presence" of CNS 15663(2013-07)	8544.42.90.90.9C	RPC Scheme (Module II+III) or TABI Scheme
Cord sets (Inspection scope: Voltage not exceeding 250 Vac)	CNS 690(2016-03), CNS 60799(2016-03), IEC 60320-1(2001-06), Section 5 "Marking of Presence" of CNS 15663(2013-07)	8544.42.90.90.9D	RPC Scheme (Module II+III) or TABI Scheme
Cable reels (Inspection scope: Voltage not exceeding 250 Vac)	CNS 690(2016-03), CNS 61242(2016-03), Section 5 "Marking of Presence" of CNS 15663(2013-07)	8544.42.90.90.9E	RPC Scheme (Module II+III) or TABI Scheme
Static converters for automatic data processing machines and units thereof, and telecommunication apparatus (inspection scope: 1.only adapters convertible from AC to DC 2.chargers for electrical motorcycles)	1.adapters (1)CNS 14336-1 (2010) or CNS 14408 (2004) (2)CNS 13438 (2006) (3)CNS 15663 (2013) Section 5"Marking of Presence" 2.chargers (1)CNS 15425-1(2015) (2)CNS 13438 (2006) (3)CNS 15663 (2013) Section 5"Marking of Presence"	8504.40.20.00.3A 8504.40.20.00.3B	
Other power supply, exchangeable type (inspection scope: 1.only adapters convertible from AC to DC 2.chargers for electrical motorcycles)	1.adapters (1)CNS 14336-1 (2010) or CNS 14408 (2004) (2)CNS 13438 (2006) (3)CNS 15663 (2013) Section 5"Marking of Presence" 2.chargers (1)CNS 15425-1(2015) (2)CNS 13438 (2006) (3)CNS 15663 (2013) Section 5"Marking of Presence"	8504.40.91.00.7A 8504.40.91.00.7B	
Other static converters (inspection scope: 1.only adapters convertible from AC to DC 2.chargers for electrical motorcycles)	1.adapters (1)IEC 61558-1(2009) (2)CNS 15663 (2013) Section 5"Marking of Presence" 2.chargers (1)CNS 15425-1(2015) (2)CNS 13438 (2006) (3)CNS 15663 (2013) Section 5"Marking of Presence"	8504.40.99.90.0A 8504.40.99.90.0B	
Battery charger for computer, communication and consumer electronics	1. (1)CNS 14336-1 (2010) or CNS 14408 (2004) (2)CNS 13438 (2006) or (1)CNS 60335-1(2014) (2)CNS 60335-2-29 (2016) (3)CNS 13783 (2013) 2. CNS 15663 (2013) Section 5 "Marking of Presence"	8504.40.20.00.3C 8504.40.91.00.7C 8504.40.94.00.4B 8504.40.99.90.0C	

Requirements

Please refer to CNS 15663 for details related to definitions, substances, exemptions and calculations for creation of a product marking table as shown in this section.

Marking Tables

EEE shall be marked with a table showing the presence or absence of restricted chemical substances by product unit: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls and polybrominated diphenyl ethers. See example table in this section. The table must be translated into Traditional Chinese for Taiwan.

When the presence of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls and polybrominated diphenyl ethers exceed the maximum concentration value (MCV) in Table 1 of CNS 15663 (Lead, mercury, and hexavalent chromium are each 0.1%, cadmium is 0.01%, PBB and PBDE are each 0.1%) and the application is entitled to an exemption, enter "-"on the marking table. In the case where the presence does not exceed the MCV, enter "O", or the words "Not exceeding the reference percentage presence". When the presence of the substance exceeds the MCV and no exemption applies, the numerical value of the percentage presence shall be indicated, e.g., "Exceeding 0.1 wt.%" or "Exceeding 0.01 wt.%" as applicable.

Examples of Taiwan marking tables

Equipment name: Television receiver, Type designation: YYY						
Unit	Restricted substances and its chemical symbols					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chromium (Cr^{+6})	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Printed circuit board	○	○	○	○	○	○
Cabinet	○	○	○	○	○	○
Glass panel	−	○	○	○	○	○
Speaker	○	○	○	○	○	○
Accessory (example: remote controller)	−	○	○	○	○	○
Note 1: "○" indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.						
Note 2: The "−" indicates that the restricted substance corresponds to the exemption.						

Equipment name: Television receiver, Type designation: XXX						
Unit	Restricted substances and its chemical symbols					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chromium (Cr^{+6})	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Printed circuit board	Exceeding 0.1 wt %	○	○	○	○	○
Cabinet	○	○	Exceeding 0.01 wt %	○	○	Exceeding 0.1 wt %
Glass panel	−	○	○	○	○	○
Speaker	○	○	○	Exceeding 0.1 wt %	○	○
Accessory (example: remote controller)	−	○	○	○	○	○
Note 1: "Exceeding 0.1 wt %" and "exceeding 0.01 wt %" indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.						
Note 2: "○" indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.						
Note 3: The "−" indicates that the restricted substance corresponds to the exemption.						

Product marking

The Finished Product BSMI marking shall show compliance to CNS 15663 by including "RoHS" or "RoHS (xx, xx)" under or beside the existing safety / EMC compliance mark. XX refers to any of the six hazardous substances listed on the marking table that is above the maximum concentration limit and has no viable RoHS exemption. For example, if lead is present in the product above 0.1 wt. % and there is no exemption applicable for this use, then the BSMI mark must include "RoHS (Pb)". Examples of the label are included below. The "xx" would be replaced with the corresponding substance if present.

2.10 Environmental Notifications for Customer Hardware Publications

The latest release of Environmental Notices and User Guide, must ship with products, as well as some repair or spare parts (e.g., whole unit replacement parts, parts with batteries, LCDs, and chemical cooling systems) including beta systems, prototypes, etc. Whole unit replacement parts include products which stand-alone outside the server or storage product, such as monitors, keyboards, mice, laptops, external power supplies, racks, power distribution units, smart card readers, switches (e.g., with an incorporated power supply), routers (e.g., with an incorporated power supply), battery chargers, fill and drain tools, and external drives. The requirement for repair or spare parts also applies for vendor-logo repair or spare parts and whole unit replacement parts. For parts and / or products coming from a supplier, IBM will direct supplier to include these notices where needed, e.g., via an Engineering Change or print notice.

2.11 Removed

2.12 Product Energy Requirements

The following sections summarize requirements for selected jurisdictions. The relevant Deliverables must meet all of these requirements irrespective of the jurisdiction where the Deliverable is transferred to IBM.

2.12.1 Monitors, Electronic Displays, Control Panels, Status Displays, etc.

Requirements for China

References

National Standards of the People's Republic of China GB 21520-2015
Rules for Implementation of China Energy Labels for Computer Monitors CEL 014-2016

Computer monitors shall meet the energy efficiency requirements of the National Standard of the People's Republic of China GB 215202015, Section 4. The scope of this standard includes liquid crystal display monitors used for computers and display equipment with modulator/receivers mainly used for computers. This standard does not apply to professional monitors in engineering, medical treatment and industrial equipment. Rack mounted displays are out of scope of this regulation. This regulation only applies to AC voltage displays.

Requirements

Monitors shall be tested, and the testing reported and registered in accordance with the GB 21520 2015 and the China Rules for Implementation of China Energy Labels for Computer Monitors CEL 014-2016.

Monitors shall be labeled with the China Energy Label in accordance with the China Rules for Implementation of China Energy Labels for Computer Monitors CEL 014-2016.
The label shall include:
(1) Name of Manufacturer (or Abbreviation);
(2) Product Model
(3) Energy Efficiency Grade
(4) Energy Efficiency (cd/w)
(5) Off mode power consumption
(6) Sleep mode power consumption
(7) Category of Product (Standard display or Enhanced performance display)
(8) Reference number of National Standard on Energy Efficiency
(9) Energy efficiency information code
(10) "Top runner" mark (only applicable for product in national energy efficiency "Top runner" program).

The label must be on 80g or above copper plate paper. It must be 66mm long and 45mm wide or enlarged proportionally in accordance with the Rule. It shall be in color with blue and white background. The label can be on the product, or an obvious place on its minimum packaging, or displayed on the screen during start-up for at least two seconds. If the label is used in exterior packaging, product manual, webpage or brochure, it can be printed in monochrome, but the text should be clearly legible.

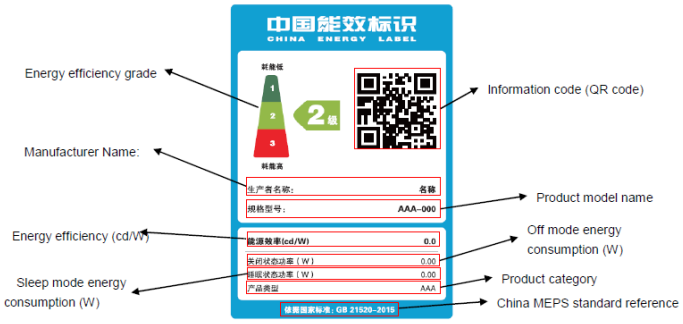


Figure 8. Example of a China Energy Efficiency Label for Computer Monitors

Requirements for Korea

Reference

Korea Regulation on Standby Power Reduction Program MKE Notification No 2012-57

Definitions

Monitor - Commercially available, electronic product with a display screen and its associated electronics encased in a single housing that is capable of displaying output information from a computer via one or more inputs, such as VGA and DVI with nameplate output power of power supply less than or equal to 1,000W. Includes computer monitors (i.e., focusing on computer monitor as the primary function) or as dual function computer monitors and televisions. Excludes monitor – main body integrated computers, network computers, monitors with VoIP and other special embedded functions, monitors for broadcasting and medical purposes. Monitors used for a rack mounted monitoring system installed in a rack system used in conjunction with other highly specialized equipment, rated Class A for EMC purposes, are not in scope of this definition.

Requirements

Monitors must be labeled according to Annex V of the Korean e-Standby Program Application Regulation, August 28, 2008 with a warning logo if the monitors do not meet the requirements in the following table:

Monitor low power mode performance				
Classification	**Product Type**	**On Mode Power consumption**	**Sleep Mode Power Consumption**	**Off Mode Power Consumption**
Products without Automatic Brightness Control	Diagonal Screen Size <76cm ≤ 1.1MP screen resolution	Po=6×(MP)+0.00775×(A)+3	≤ 2.0W	≤ 0.5W
	Diagonal Screen Size <76cm Screen resolution> 1.1MP	Po=9×(MP)+0.00775×(A)+3		
	Diagonal Screen Size 76 ~ 153 cm; All screen resolutions	Po=0.04185×(A)+8		
Products with Automatic Brightness Control	Each screen size and screen resolution	Po1=(0.8×Ph)+(0.2×Pl)		

(Note) Po = on mode power consumption
MP = the screen resolution (megapixels)
A = viewable screen area (cm ²)
Po1 = on mode average value of power consumption
Ph = on mode power consumption of high ambient lighting conditions.
Pl = on mode power consumption of the low ambient lighting conditions

The figure below has an example warning logo. The minimum diameter of the logo is 2.5cm. The logo is to be labeled on the front or top side of the product or on the nameplate of the product where it is visually easy to find.

The logo may be monochrome, the predominant color of the product's surface, or in the colors suggested by the Korean e-Standby Regulation. English is provided in the Figure below only as a reference.

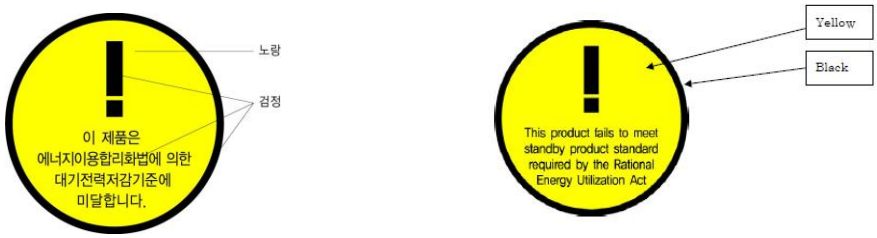


Figure 9. Example of a warning logo

The manufacturer of the monitor shall provide IBM with a test report issued by one of the designated testing institutes in Annex IV of the regulation (e.g., Korea Testing Laboratory, Korea Electric Testing Institute, Korea Electrotechnology Research Institute, EMC Research Institute, Telecommunications Technology Association, and/or Korea Electronics Technology Institute) in order for IBM to submit Form A (found in the regulation) along with the issued test report to the Korea Energy Management Corporation (KEMCO).

Requirements for the EU and other jurisdictions which transpose EU directives

References

EU Commission Regulation No 801/2013 of 22 August 2013 amending Regulation (EC) No 1275/2008 with regard to ecodesign requirements for standby, off mode electric power consumption of electrical and electronic household and office equipment. (repealed in the EU)

EU Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products.

Israel: Energy Sources Law, 1989 - Amendment - (on import of energy efficient electrical appliances compliant with EU Declaration of Conformity), Law, November 2021

EN 45552:2020 General method for the assessment of the durability of energy-related products

EN 45553:2020 General method for the assessment of the ability to remanufacture energy- related products

EN 45554:2020 General methods for the assessment of the ability to repair, reuse and upgrade energy-related products

EN 45555:2019 General methods for assessing the recyclability and recoverability of energy- related products

EN 45556:2019 General method for assessing the proportion of reused components in energy- related products

EN 45557:2020 General method for assessing the proportion of recycled material content in energy-related products

EN 45558:2019 General method to declare the use of critical raw materials in energy-related products

EN 45559:2019 Methods for providing information relating to material efficiency aspects of energy-related products

EU Regulation 2021/341 of 23 February 2021 amending Regulations (EU) 2019/424, (EU) 2019/1781, (EU) 2019/2019, (EU) 2019/2020, (EU) 2019/2021, (EU) 2019/2022, (EU) 2019/2023 and (EU) 2019/2024 with regard to ecodesign requirements for servers and data storage products, electric motors and variable speed drives, refrigerating appliances, light sources and separate control gears, electronic displays, household dishwashers, household washing machines and household washer-dryers and refrigerating appliances with a direct sales function.

EU Regulation 2019/2021 laying down ecodesign requirements for electronic displays pursuant to Directive 2009/125/EC of the European Parliament and of the Council, amending Commission Regulation (EC) No 1275/2008 and repealing Commission Regulation (EC) No 642/2009.

EU Regulation 2019/2013 of 11 March 2019 supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of electronic displays and repealing Commission Delegated Regulation (EU) No 1062/2010.

EU Regulation 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU.

Israel Energy Sources (Maximum Electric Power in Standby Mode for Home and Office Appliances), 5771-2011 Regulations

Jordan JSNO 2109/2013 Technical Regulation on eco-design requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment

Turkey: Ecodesign for Electronic Displays, Communiqué, (2019/2021/EU) SGM: (2021/5)

Turkey: Ecodesign Requirements for Standby, Off and Networked Standby Mode Electric Power Consumption of Electrical and Electronic Household and Office Equipment, Communiqué (2008/1275/EC) (SGM: 2021/13)
United Kingdom Ecodesign for Energy-Related Products Regulations 2010, SI 2010/2617
United Kingdom: Ecodesign for Energy-Related Products and Energy Information Regulations 2021, SI 2021/745
Switzerland: Energy Efficiency Requirements for Installations, Vehicles and Equipment, Ordinance, November 2017
Switzerland: Energy Efficiency Requirements for Installations, Vehicles and Equipment, Ordinance, November 2017 - Amendment - (on stricter minimum energy performance standards (MEPS); transition periods for compliance with ecodesign requirements) Ordinance, 2022

Requirements
For EU Regulation 2019/2021 ecodesign requirements for Electronic Displays, see below. Refer to the regulation for more definitions and specific requirements including testing.

Definitions
Electronic Display means a display screen and associated electronics that, as its primary function, displays visual information from wired or wireless sources;
Monitor or **computer monitor,** or **computer display** means an Electronic Display intended for one person for close viewing such as in a desk-based environment;
Components and sub-assemblies means parts intended to be incorporated into products which are not placed on the market and/or put into service as individual parts for end-users or the environmental performance of which cannot be assessed independently;
Status display means a display used to show simple but changing information such as selected channel, time or power consumption. A simple light indicator is not considered a status display;
Control panel means an electronic display whose main function is to display images associated with product operational status; it may provide user interaction by touch or other means to control the product operation. It may be integrated into products or specifically designed and marketed to be used exclusively with the product;
Professional display means an electronic display designed and marketed for professional use for editing video and graphic images. Its specification shall include all of the following features:
(a) a contrast ratio of at least 1000:1 measured at a perpendicular to the vertical plane of the screen and at least 60:1 measured at a horizontal viewing angle of at least 85° relative to that perpendicular and at least 83° from the perpendicular on a curved screen, with or without a screen cover glass;
(b) a native resolution of at least 2,3 mega pixels;
(c) colour Gamut support greater or equal to 38,4 % of CIE LUV;
(d) colour and luminance uniformity as specified for grade 1, 2 or 3 monitors in EBU Tech. 3320, as applicable to the professional application of the display.

Security display means an electronic display whose specification shall include all of the following features:
A - self-monitoring function capable of communicating at least one of the following information to a remote server:
— power status;
— internal temperature from anti-overload thermal sensing;
— video source;
— audio source and audio status (volume/mute);
— model and firmware version;
B - user-specified specialist form factor facilitating the installation of the display into professional housings or consoles;
Integrated referring to a display which is part of another product as a functional component, means an electronic display that is not able to be operated independently from the product and that depends on it for providing its functions, including power;
Medical display means an electronic display covered by the scope of:
(a) Council Directive 93/42/EEC (16) concerning medical devices; or
(b) Regulation (EU) 2017/745 of the European Parliament and of the Council (17) on medical devices; or
(c) Council Directive 90/385/EEC (18) on the approximation of the laws of the Member States relating to active implantable medical devices; or
(d) Directive 98/79/EC of the European Parliament and of the Council (19) on in vitro diagnostic medical devices; or

(e) Regulation (EU) 2017/746 of the European Parliament and of the Council (20) on in vitro diagnostic medical devices;

This regulation applies to electronic displays, including televisions, **monitors** and digital signage displays

This Regulation shall not apply to the following:
(a) any Electronic Display with a screen area smaller than or equal to 100 square centimeters;
(b) projectors;
(c) all-in-one video conference systems;
(d) medical displays;
(e) virtual reality headsets;
(f) displays integrated or to be integrated into products listed into Article 2, point 3(a) and point 4 of Directive 2012/19/EU (WEEE) (equipment which is necessary for the protection of the essential interests of the security of Member States, including arms, munitions and war material intended for specifically military purposes; equipment designed to be sent into space; large-scale stationary industrial tools; large-scale fixed installations, except any equipment which is not specifically designed and installed as part of those installations; means of transport for persons or goods, excluding electric two-wheel vehicles which are not type-approved; non-road mobile machinery made available exclusively for professional use; equipment specifically designed solely for the purposes of research and development that is only made available on a business-to-business basis; medical devices and in vitro diagnostic medical devices, where such devices are expected to be infective prior to end of life, and active implantable medical devices.)
(g) electronic displays that are components or sub-assemblies as defined in point 2 of Article 2 of Directive 2009/125/EC;
(h) industrial displays.

Requirements
The requirements in points A (Energy Efficiency Requirements) and B (Allowances and Adjustments for the purpose of the EEI Calculation and functional requirements) of Annex II of this regulation shall not apply to the following displays:
(a) broadcast displays;
(b) professional displays;
(c) security displays;
(d) digital interactive whiteboards;
(e) digital photo frames;
(f) digital signage displays.
For the displays above, points C (Off mode, standby and networked standby mode requirements), D (Material Efficiency Requirements) and E (Information Availability Requirements) of Annex II of this regulation do apply.

The requirements in points A, B and C (Off mode, standby and networked standby mode requirements) of Annex II of this regulation shall not apply to the following displays:
(a) status displays;
(b) control panels.
For status displays and control panels, the requirements in points D (Material Efficiency Requirements) and E (Information Availability Requirements) of Annex II of the regulation do apply.

These requirements are effective from 1 March 2021, except for the requirements in this paragraph only which are in effect currently. The Electronic Display must not be designed to be able to detect they are being tested (e.g. by recognizing the test conditions or test cycle) and to react specifically by automatically altering their performance during the test with the aim of reaching a more favorable level, for any of the parameters required. The energy consumption of the product and any of the other declared parameters shall not deteriorate after a software or firmware update when measured with the same test standard originally used for the declaration of conformity, except with explicit consent of the end-user prior to the update. No performance change shall occur as a result of rejecting the update. A software update shall never have the effect of changing the product's performance in a way that makes it non-compliant with the ecodesign requirements applicable for the declaration of conformity.

The Electronic Display must meet all the energy efficiency and ecodesign requirements as outlined in Annex II of the regulation. Control panels must meet the Material Efficiency requirements in Point D and Information availability requirements in Point E of Annex II of the regulation only.

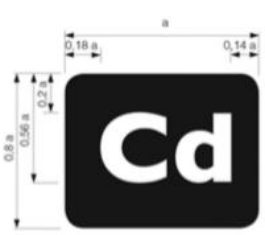
Manufacturers shall ensure that joining, fastening, or sealing techniques do not prevent the removal, using commonly available tools, of the components indicated in point 1 of Annex VII of Directive 2012/19/EU (WEEE) or in Article 11 of Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators. The derogations indicated in Article 11 of Directive 2006/66/EC about permanent connection between the electronic display and the battery or accumulator apply.

Manufacturers and importers shall make available, on a free-access website, the dismantling information needed to access the components referred to in point 1 of Annex VII of Directive 2012/19/EU (WEEE). This dismantling information shall include the sequence of dismantling steps, tools or technologies needed to access the targeted components. The end-of-life information shall be available until at least 15 years after the placing on the market of the last unit of a product model.

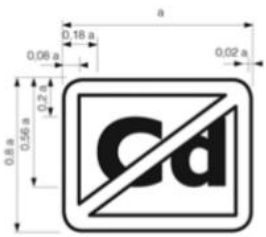
Plastic components > 50 grams shall be marked in accordance with Annex II of the regulation. See Section 2.3.2 of this specification or the regulation for more detail.

Electronic Displays which have concentration values of Cadmium (Cd) by weight in homogeneous materials exceeding 0.01 % as defined in Directive 2011/65/EU (RoHS) on the restriction of the use of certain hazardous substances in electrical and electronic equipment, shall be labeled with the 'Cadmium inside' logo. The logo shall be clearly visible durable, legible and indelible. The logo shall be in the form of the following graphic:

Cadmium inside



Cadmium free



The dimension of 'a' shall be greater than 9 mm and the typeface to be used is 'Gill Sans'. An additional 'Cadmium inside' logo shall be firmly attached internally on the display panel or molded in a position clearly visible to workers once the external back cover bearing the external logo is removed. A 'Cadmium free' logo shall be used if concentration values of Cadmium (Cd) by weight in any homogeneous material part of the display do not exceed 0.01 % as defined in Directive 2011/65/EU (RoHS).

The use of halogenated flame retardants is not allowed in the enclosure and stand of Electronic Displays.

Spare parts shall be made available according to the requirements in Annex II of the regulation.

Access to repair and maintenance information
After a period of two years after the placing on the market of the first unit of a model or of an equivalent model, and until the end of the period mentioned under (a), the manufacturer shall provide access to the appliance repair and maintenance information to professional repairers. See the regulation for specific details such as registration, technical competence of the repairer, insurance coverage, and fees.

From 1 March 2021, the manufacturer shall make available the information below. The information shall be provided free of charge to third parties dealing with professional repair and reuse of Electronic Displays.
1. Availability of software and firmware updates.
(a) The latest available version of the firmware shall be made available for a minimum period of eight years after the placing on the market of the last unit of a certain product model, free of charge or at a fair, transparent and nondiscriminatory cost. The latest available security update to the firmware shall be made available until at least eight years after the placing on the market of the last product of a certain product model, free of charge.
(b) Information on the minimum guaranteed availability of software and firmware updates, availability of spare parts and product support shall be indicated in the product information sheet as from Annex V of Regulation (EU) 2019/2013.

The manufacturer of the electronic display must provide this information to IBM upon request including a Declaration of Conformity and Technical Documentation.

For EU Regulation 2019/2013 energy labeling of Electronic Displays see below. Refer to the regulation for more definitions and specific requirements.
Definitions
Electronic Display means a display screen and associated electronics that, as its primary function, displays visual information from wired or wireless sources;
Monitor or **computer monitor,** or **computer display** means an electronic display intended for one person for close viewing such as in a desk based environment;
Status display means a display used to show simple but changing information such as selected channel, time or power consumption. A simple light indicator is not considered a status display
Control panel means an electronic display whose main function is to display images associated with product operational status; it may provide user interaction by touch or other means to control the product operation. It may be integrated into products or specifically designed and marketed to be used exclusively with the product;
'security display' means an electronic display whose specification shall include all of the following features:
(a) self-monitoring function capable of communicating at least one of the following information to a remote server:
— power status;
— internal temperature from anti-overload thermal sensing;
— video source;
— audio source and audio status (volume/mute);
— model and firmware version;
(b) user-specified specialist form factor facilitating the installation of the display into professional housings or consoles;
Medical display means an electronic display covered by the scope of:
(a) Council Directive 93/42/EEC (10) concerning medical devices; or
(b) Regulation (EU) 2017/745 of the European Parliament and of the Council (11) on medical devices; or
(c) Council Directive 90/385/EEC (12) on the approximation of the laws of the Member States relating to active implantable medical devices; or
(d) Directive 98/79/EC of the European Parliament and of the Council (13) on in vitro diagnostic medical devices; or
(e) Regulation (EU) 2017/746 of the European Parliament and of the Council (14) on in vitro diagnostic medical devices.

Requirements – see Regulation for more details and requirements
This regulation applies to electronic displays, including televisions, monitors and digital signage displays.

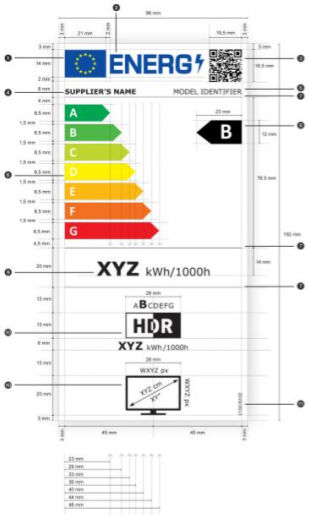
This Regulation shall not apply to the following:
(a) any Electronic Display with a screen area smaller than or equal to 100 square centimeters;
(b) projectors;
(c) all-in-one video conference systems;
(d) medical displays;
(e) virtual reality headsets;
(f) displays integrated or to be integrated into products listed in points 3(a) and 4 of Article 2 of Directive 2012/19/EU of the European Parliament and of the Council (8);
(g) electronic displays that are components or subassemblies of products covered by implementing measures adopted under Directive 2009/125/EC;
(h) broadcast displays;
(i) security displays;
(j) digital interactive whiteboards;
(k) digital photo frames;
(l) digital signage displays which meet any of the following characteristics:
(1) designed and constructed as a display module to be integrated as a partial image area of a larger display screen area and not intended for use as a standalone display device;
(2) distributed self-contained in an enclosure for permanent outdoor use;
(3) distributed self-contained in an enclosure with a screen area less than 30 dm2 or greater than 130 dm2;

(4) the display has a pixel density less than 230 pixels/cm2 or more than 3 025 pixels/cm2;
(5) a peak white luminance in standard dynamic range (SDR) operating mode of greater than or equal to 1 000 cd/m2;
(6) no video signal input interface and display drive allowing the correct display of a standardized dynamic video test sequence for power measurement purposes;
(m) status displays;
(n) control panels.

Supplier shall ensure that:
Electronic Displays are labeled in a printed form in the format and containing the information set out in Annex III of this regulation. This label shall also be printed on the packaging or adhered to the packaging.
The parameters of the product information sheet, found in Annex V of the regulation must be entered into the product database.
The content of the technical documentation, found in Annex VI of the regulation, must be entered into the product database.

The following information shall be included in the label for Electronic Displays:
I. QR code;
II. supplier's name or trademark;
III. supplier's model identifier;
IV. scale of energy efficiency classes from A to G;
V. the energy efficiency class determined in accordance with point B of Annex II when using $Pmeasured_{SDR}$;
VI. on mode energy consumption in kWh per 1 000 h, when playing SDR content, rounded to the nearest integer;
VII. the energy efficiency class determined in accordance with point B of Annex II when using $Pmeasured_{HDR}$;
VIII. the on mode energy consumption in kWh per 1 000 h, when playing HDR content, rounded to the nearest integer;
IX. visible screen diagonal in centimeters and inches and horizontal and vertical resolution in pixels;
X. the number of this Regulation, that is '2019/2013'.

The label design must follow the format below (see regulation for dimensions, coloration, typeface, etc.)



The product information sheet must include the following:

Table 4

Information, order and format of the product information sheet

	Information	Value and precision	Unit	Notes
1.	Supplier's name or trade mark	TEXT		
2.	Supplier's model identifier	TEXT		
3.	Energy efficiency class for standard Dynamic Range (SDR)	[A/B/C/D/E/F/G]		If the product database automatically generates the definitive content of this cell, the supplier shall not enter this data.
4.	On mode power demand for Standard Dynamic Range (SDR)	X,X	W	Rounded to the first decimal place for power values below 100 W, and rounded to the first integer for power values from 100 W.
5.	Energy efficiency class (HDR)	[A/B/C/D/E/F/G] or n.a.		If the product database automatically generates the definitive content of this cell, the supplier shall not enter this data. Value set to 'n.a.' (not applicable) if HDR not implemented.
6.	On mode power demand in High Dynamic Range (HDR) mode	X,X	W	Rounded to the first decimal place for power values below 100 W, and rounded to the first integer for power values from 100 W (value set to 0 (zero) if 'not applicable').
7.	Off mode, power demand	X,X	W	
8.	Standby mode power demand	X,X	W	

	Information	Value and precision			Unit	Notes
9.	Networked standby mode power demand	X,X			W	
10.	Electronic display category	[television/monitor/signage/other]				Select one.
11.	Size ratio	X	:	Y	integer	E.g. 16:9, 21:9, etc.
12.	Screen resolution (pixels)	X	x	Y	pixels	Horizontal and vertical pixels
13.	Screen diagonal	X,X			cm	In cm according to the International System of Units (SI), rounded to the nearest decimal place.
14.	Screen diagonal	X			inches	Optional, in inches rounded to the nearest integer place.
15.	Visible screen area	X,X			cm^2	Rounded to the one decimal place
16.	Panel technology used	TEXT				E.g. LCD/LED LCD/QLED LCD/OLED/MicroLED/QDLED/SED/FED/EPD, etc.
17.	Automatic Brightness Control (ABC) available	[YES/NO]				Must be activated as default (if YES).
18.	Voice recognition sensor available	[YES/NO]				
19.	Room presence sensor available	[YES/NO]				Must be activated as default (if YES).
20.	Image refresh frequency rate	X			Hz	
21.	Minimum guaranteed availability of software and firmware updates (until):	GG MM AAAA			date	As from Annex II E, point 1 of Commission Regulation (EU) 2019/2021 (1).
22.	Minimum guaranteed availability of spare parts (until):	GG MM AAAA			date	As from Annex II D, point 5 of Regulation (EU) 2019/2021.
23.	Minimum guaranteed product support (until):	GG MM AAAA			date	

	Information		Value and precision	Unit	Notes
24.	Power supply type:		Internal/External/ Standardised external		Select one.
i	External standardised power supply (included in the product box)	Standard name	TEXT		
		Input voltage	X	V	
		Output voltage	X	V	
ii	External standardised suitable power supply (if not included in the product box)	Standard name	TEXT		Mandatory only if EPS not included in the box, non-mandatory otherwise.
		Required output voltage	X,X	V	Mandatory only if EPS not included in the box, non-mandatory otherwise.
		Required delivered current	X,X	A	Mandatory only if EPS not included in the box, non-mandatory otherwise.
		Required current frequency	X	Hz	Mandatory only if EPS not included in the box, non-mandatory otherwise.

The technical documentation shall include:
(1) identification data (general description of the model):
(a) trademark and model identifier;
(b) supplier's name, address, registered trade name;
(2) references to the harmonized standards applied, other measurement standards and specifications used in measuring the technical parameters and calculations performed;
(3) specific precautions to be taken when the model is assembled, installed and tested;
(4) a list of all equivalent models, including model identifiers;
(5) measured technical parameters of the model and calculations performed with the measured parameters as listed below;

Measured technical parameters

		Value and precision	Unit	Notes
	General			
1.	Ambient temperature	XX,XX	°C	
2.	Test voltage	X	V	
3.	Frequency	X,X	Hz	
4.	Total harmonic distortion (THD) of the electricity supply system	X	%	
	For On-mode			
5.	Peak white luminance of the brightest on mode configuration	X	cd/m²	
6.	Peak white luminance of the normal configuration	X	cd/m²	
7.	Peak white luminance ratio (calculated)	X,X	%	Value row 6 above divided by value row 5 above times 100
	For APD			
8.	Duration of the on mode condition, before the electronic display reaches automatically standby, or off mode, or another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode.	mm:ss		

		Value and precision	Unit	Notes
	For televisions: the measured value of the time before the television automatically reaches standby, or off-mode, or another condition which does not exceed the applicable power consumption requirements for off-mode and/or standby-mode following the last user interaction;	mm:ss		
	For televisions equipped with room presence sensor: the measured value of the time before the television automatically reaches standby, or off-mode, or another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode when no presence is detected;	mm:ss		
	Other electronic displays than televisions and broadcast displays: The measured value of the time before the electronic display automatically reaches standby, or off-mode, or another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode when no input is detected;	mm:ss		
	For ABC			If available and activated by default (as from Annex V, Table 4)
9.	Average on mode power demand of the electronic display at an ambient light intensity, measured at the ABC sensor of the electronic display, of 100 lux and 12 lux.	X,X	W	
10.	Percentage of power reduction due to ABC action between the 100 lux and 12 lux ambient light conditions.	X,X	%	
11.	Display peak white luminance at each of the following ambient light intensities measured at the ABC sensor of the electronic display, 100 lux, 60 lux, 35 lux, 12 lux.	x	cd/m²	
	Measured on mode power at 100 lux ambient light at the ABC sensor	X,X	W	
	Measured on mode power at 12 lux ambient light at the ABC sensor	X,X	W	
	The measured screen luminance at 60 lux ambient light at the ABC sensor	X	cd/m²	
	The measured screen luminance at 35 lux ambient at the ABC sensor	X	cd/m²	
	The measured screen luminance at 12 lux ambient light at the ABC sensor	X	cd/m²	

(6) Additional information requirements:
(a) input terminal for the audio and video test signals used for testing;
(b) information and documentation on the instrumentation, set-up and circuits used for electrical testing;
(c) any other testing condition not described or determined in point (b);
(d) for on mode:
(i) the characteristics of the dynamic broadcast-content video signal representing typical broadcast TV content; for the HDR dynamic broadcast content video signal the electronic display must be automatically switched to HDR mode by the HDR metadata of that signal;
(ii) the sequence of steps for achieving a stable condition with respect to power demand level; and
(iii) the picture settings used for the brightest peak white luminance measurement and the test pattern for the video signal used for the measurement.
(e) For standby and off mode:
(i) the measurement method used;
(ii) description of how the mode was selected or programmed including any enhanced reactivation functions; and
(iii) sequence of events to reach the condition where the electronic display automatically changes mode.
(f) For electronic displays with a designated computer signal interface:
(i) confirmation that the electronic display prioritizes the computer display power management protocols set out in point 6.2.3 of Annex II of Commission Regulation (EU) No 617/2013 (1). Any deviation from the protocols should be reported;
(g) For the networked electronic displays only:

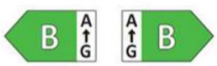
(i) number and type of network interfaces and, except for wireless network interfaces, their position in the electronic display;
(ii) whether the electronic display qualifies as electronic display with HiNA functionality; if no information is provided the electronic display is considered not to be HiNA display or display with HiNA functionality; and
(iii) information whether networked electronic display provides functionality allowing the power management function and/or the end-user to switch the electronic display being in a condition providing networked standby into standby mode, or off mode or another condition which does not exceed the applicable power demand requirements for off mode and/or standby mode including enhanced reactivation function power allowance where applicable.
(h) For each type of network port:
(i) the default time (mm:ss) after which the power management function, switches the display into a condition providing networked standby; and
(ii) the trigger to be used to reactivate the electronic display.
(7) where the information included in the technical documentation file for a particular electronic display model has been obtained:
(a) from a model that has the same technical characteristics relevant for the technical information to be provided but is produced by a different manufacturer or
(b) by calculation on the basis of design or by extrapolation from another model of the same or of a different supplier, or both;
the technical documentation shall include, as appropriate, the details of such calculation, the assessment undertaken by suppliers to verify the accuracy of the calculation and, where appropriate, the declaration of identity between the models of different suppliers; and
(8) the contact details of the person empowered to bind the supplier, if not included in the technical information uploaded into the database, shall be made available, on request, to market surveillance authorities or to the Commission for carrying out their tasks under this Regulation.

See the regulation for complete details of the information required to be provided in visual advertisements, in technical promotional material in distance selling and in telemarketing, except distance selling on the internet

Information to be provided for distance selling through the internet:
1. The appropriate label made available according to 1(g) of Article 3 of the regulation shall be shown on the display mechanism in proximity to the price of the product. The size shall be such that the label is clearly visible and legible and shall be proportionate to the size specified in 2(a) of Annex III of the regulation. The label may be displayed using a nested display, in which case the image used for accessing the label shall comply with the specifications laid down in point 3 of this Annex. If a nested display is applied, the label shall appear on the first mouse click, mouse rollover or tactile screen expansion on the image.
2. The image used for accessing the label in the case of nested display, as indicated in Figure 2 below, shall:
(a) be an arrow in the color corresponding to the energy efficiency class of the product on the label;
(b) indicate the energy efficiency class of the product on the arrow in 100 % white, Calibri Bold and in a font size equivalent to that of the price;
(c) have the range of available energy efficiency classes in 100 % black; and,
(d) have one of the following two formats, and its size shall be such that the arrow is clearly visible and legible. The letter in the energy efficiency class arrow shall be positioned in the center of the rectangular part of the arrow, with a visible border in 100 % black placed around the arrow and the letter of the energy efficiency class:

Figure 2

Coloured left/right arrow, with range of energy efficiency classes indicated



3. In the case of nested display, the sequence of display of the label shall be as follows:
(a) the image referred to in point 2 of this Annex shall be shown on the display mechanism in proximity to the price of the product;
(b) the image shall link to the label set out in Annex III;
(c) the label shall be displayed after a mouse click, mouse roll-over or tactile screen expansion on the image;
(d) the label shall be displayed by pop up, new tab, new page or inset screen display;
(e) for magnification of the label on tactile screens, the device conventions for tactile magnification shall apply;
(f) the label shall cease to be displayed by means of a close option or other standard closing mechanism; and
(g) the alternative text for the graphic, to be displayed on failure to display the label, shall be the energy efficiency class of the product in a font size equivalent to that of the price.

4. The appropriate product information sheet made available by suppliers in accordance 1(h) of Article 3 of the regulation shall be shown on the display mechanism in proximity to the price of the product. The size shall be such that the product information sheet is clearly visible and legible. The product information sheet may be displayed using a nested display or by referring to the product database in which case the link used for accessing the product information sheet shall clearly and legibly indicate 'Product information sheet'. If a nested display is used, the product information sheet shall appear on the first mouse click, mouse roll-over or tactile screen expansion on the link.

The manufacturer of the electronic display must provide this information to IBM upon request including a Declaration of Conformity and Technical Documentation

Requirements for Australia and New Zealand

References

Australia Greenhouse and Energy Minimum Standards Act 2012
Australia Greenhouse and Energy Minimum Standards (Computer Monitors) Determination 2013
Computer Monitors Information Sheet from the New Zealand Energy Efficiency and Conservation Authority September 2019
Additional information for this program can be found at http://www.energyrating.gov.au/ and https://www.eeca.govt.nz/standards-ratings-and-labels/equipment-energy-efficiency-programme/about-the-e3-programme/#meps

Definitions

Computer monitor – A commercially available product with a display screen and associated electronics, encased in a single housing that as its primary function displays visual information from a computer, workstation or server, including via a wireless connection. This includes LCD, LED, CRT, and plasma display panels (PDP).

Requirements

Computer monitors must meet the minimum energy performance standards (MEPS) and energy rating label requirements as found in AS/NZS 5815.1:2013 and AS/NZS 5815.2:2013. There are multiple displays which these standards do not apply to, for example, specialized electronic displays intended for use primarily in commercial and professional fields, not intended for sale to the general public. Also excluded are displays which are built-in or have integrated networking functionality, the circuitry for which cannot be physically separated or switched independently from the electronic display component. Rack mount monitors are excluded from these requirements.

Computer monitors are required to have the six star, or ten star label affixed to the product, as outlined in Section 26 of the Greenhouse and Energy Minimum Standards Act 2012 and section 7 of the Greenhouse and Energy Minimum Standards (Computer Monitors) determination 2013. The label may also be placed on the packaging. The format of the labels is in Schedule 1 and Schedule 2 of the Greenhouse and Energy Minimum Standards (Computer Monitors) Determination 2013.

Suppliers are required to supply IBM a copy of the test report and a confirmation the product has been registered in Australia and New Zealand.

Requirements for Vietnam

References

Vietnam Decision 51/2011/QD-TTg List of Vehicles and Equipment subject to Energy Labeling and Minimum Energy Performance Regulations and a Road Map for Implementing Regulations.
Vietnam Standard TCVN 9508: 2012 Computer monitor energy efficiency.
Vietnam Circular No 36/2016/TT-BCT on Energy labeling for means and equipment using energy under management of the Ministry of Industry and Trade.
Vietnam No 04/2017/QD-TTg Decision on promulgating the list of devices and equipment subject to energy labeling, application of minimum energy efficiency and the implementation roadmap.

Definitions

High performance monitors: Electronic monitors that use In-Plane Switching (IPS) or Vertical Alignment technologies and achieve:
•Actual resolution is greater or equal to 2.3 (1920 x 1200) MP; and

•View angle is wider or equal to 1780 (the minimum contrast ratio 1:10); and
•The width of color stripe is greater or equal to 72% NTSC; and
•Diagonal size is greater or equal to 61 cm (24 inch).

Dedicated monitors: used in specialized fields, trades, techniques, medicine, graphics, etc. and the ones that are not sold to public such as:
•The products are defined as professional ones in the scope of vi EN 55103.
•The medical products are regulated in the standard TCVN 7303 (IEC 60601).
•The products are in accordance with Digital Imaging and Communications in Medicine (DICOM) standard (for electronic monitors used in medical industry). The products are used in diagnostic applications in medicine with the power condition inappropriate with the definition of Active Standby Mode (Sleep), (e.g. the specifications of FDA for medical equipment requires to maintain the brightness during using process of electronic equipment, together with other requirements which does not allow such electronic equipment to function power control).
•The products can display content through Serial Digital Interface (SDI) including equipment in medicine produced to diagnose, treat or monitor patients' condition.

Some of monitors with other special functions: The products have the function of electronically displaying video and other functions including one or more functions below:
•The built-in or integrated networking function, the circuit cannot be physically split or separated from electronic display equipment. Examples for this function include but not limited to video conference, VoIP and PcoIP capabilities
•The 3D integrated PC, tablets, eBooks, smart phones and Personal Digital Assistant.

Requirements
Computer monitors must meet the minimum energy performance standard as required in Vietnam Decision 51/2011/QD-TTg and Vietnam standard TCVN 9508: 2012 Computer monitor energy efficiency, which requires a sleep/standby mode of less than or equal to 2.0W and an off mode power draw of less than or equal to 1.0W. Labeling monitors as outlined by this regulation is voluntary.

Vietnam Standard TCVN 9508: 2012 Computer monitor energy efficiency does not apply to High performance monitors, dedicated monitors or some monitors with special functions (see definitions).

Requirements for California, Hawaii, Nevada, Oregon, Vermont, Washington, and Colorado
References
California Appliance Efficiency (CEC) Regulations – Appliance Efficiency Rulemaking for Computers, Computer Monitors, and Signage Displays. Regulation and details are located at: http://www.energy.ca.gov/
Washington Appliance Efficiency Standards Chapter 286, Laws of 2019
Colorado Revised Statutes Article 7.5 Water and Energy Efficiency Standards
Hawaii: Adoption of Water and Energy Efficiency Standards, House Bill 556, Act 141, 2019
Nevada: Minimum Standards of Energy Efficiency for Regulated Appliances, Regulation R168-22, November 2022
Oregon: State-Regulated Appliance Efficiency Standards, OAR 330-092, Amendment (on efficiency standards, product definitions, conformance and certification), Final Rule, OAR 330-92-010-020, August 2020
Vermont: Energy Efficiency Standards For Appliances, 9 V.S.A. 2791 -2798 - Amendment - (on standards for electronics, lighting and water appliances), House Bill 410, Act 139, 2018

Definitions
Computer monitor means an analog or digital device of diagonal screen size greater than or equal to 17 inches and less than or equal to 61 inches, that has a pixel density of greater than 5000 pixels per square inch, and that is designed primarily for the display of computer generated signals not marketed for use as a television for viewing by one person in a desk-based environment. A computer monitor is composed of a display screen and associated electronics.
A computer monitor does not include:
(1) Displays with integrated or replaceable batteries designed to support primary operation without AC mains or external DC power, (e.g., electronic readers, mobile phones, portable tablets, battery-powered digital picture frames), or
(2) A television or a signage display.

Keyboard, video, and mouse (KVM) or keyboard, mouse, and monitor (KMM) means a computer monitor that can operate with a KVM switch and is designed to be used in a server rack for use solely in a data center.
Medical computer monitor means a computer monitor that meets the definition of a device contained in Section 210(h) of the US Federal Food, Drug, and Cosmetic Act (21 U.S.C. § 321(h)) and is listed and approved as such by the U.S. Food and Drug Administration.
See the CEC Regulations for additional definitions, test methods, and details.

Requirements
Computer monitors manufactured on or after July 1, 2019, shall comply with the energy efficiency standards in CEC Appliance Efficiency Rulemaking for Computers, Computer Monitors, and Signage Displays in Section 1605.3 including Table V-4. Medical computer monitors are not required to comply with Section 1605.3(v)(4) or the test procedures in Section 1604(v)(4).

Manufacturers of Computer monitors, and Medical computer monitors must comply with the certification requirements in Section 1606 of Title 20 of the CEC Appliance Efficiency Regulation (Filing by Manufacturers with the State of California) for each of the products sold or offered for sale in California as well as the marking requirements in Section 1607 of Title 20 of the CEC Appliance Efficiency Regulation (manufacturer's name, model number and date of manufacture).

Exceptions to the California regulation section 1605.3(v)(4): The following computer monitors are not required to comply with section 1605.3(v)(4) but shall comply with the test procedures in section 1604(v)(3), the certification requirements in section 1606, and the marking requirements in section 1607 of this Article:
1. KVMs.
2. KMMs.
3. Very high performance monitors.

Exception to California regulation section 1605.3(v)(4): Medical computer monitors are not required to comply with section 1605.3(v)(4) or the test procedures in section 1604(v)(3) but shall comply with the certification requirements in section 1606 and the marking requirements in section 1607.

Requirements for British Columbia
References
British Columbia Energy Efficiency Standards Regulation, 14/2015
B.C. Reg. 35/2021 amending Energy Efficiency Standards Regulation B.C. Reg. 14/2015

Definitions (British Columbia)
Computer monitor means an analog or digital device that
(a) is designed primarily to display computer-generated signals for viewing by one person in a desk-based environment,
(b) has a diagonal screen size of (i) not less than 17 inches, and (ii) not more than 61 inches,
(c) has a pixel density of greater than 5000 pixels per square inch, and
(d) is composed of a display screen and associated electronics;

For the purpose of the definition of "computer monitor" above, the following are excluded:
(a) a monitor that
  (i) can operate with a keyboard, video and mouse switch, and
  (ii) is designed to be used in a server rack for use solely in a data centre;
(b) a medical computer monitor;
(c) an analog or digital device designed primarily for the display of computer-generated signals that is not marketed for use as a computer monitor or a television;
(d) a television;
(e) a display with integrated or replaceable batteries, including an electronic reader, a mobile phone, a tablet, or a digital picture frame, that is designed to support primary operation without alternating current electrical power or external direct current electrical power

Requirements (British Columbia)

Computer monitors manufactured on or after July 1, 2021, shall meet the efficiency values in the table listed under section 69, and the Max on-mode power consumption under section 70 of Division 4 of Part 9 of B.C. Reg No. 14/2015. An energy efficiency verification label is not required if the product is listed in California Energy Commission Modernized Appliance Efficiency Database System. For specific definitions, requirements, implementation dates and exemptions, see Part 9 of B.C. Reg No. 14/2015.

Requirements for Mexico

Reference

Mexico Catalog of the Equipment and Apparatus for which the manufacturers, importers, distributors and sellers should provide information about power consumption and forms for providing information

Requirements

Stand-alone monitors must have a label, in Spanish, with the following information:

- Power Consumption by unit of time in operation;
- The type of energy or power used, which should indicate the measurement units, unless by its operational nature, the type of power or energy is evidently identifiable, in which case it will not be necessary to include this requirement on the labeling;
- Quantity of the good, product or service offered by the equipment per unit of energy consumed when applicable.

The manufacturer must submit the forms found in the Mexico Catalog of the Equipment and Apparatus for which the manufacturers, importers, distributors and sellers should provide information about power consumption and forms for providing information to the Mexico National Commission for Efficient Energy Use (CONUEE). A copy of these forms must be supplied to IBM.

2.12.2 External Power Supplies and Adapters

References

Australia/New Zealand Minimum Energy Performance Requirements for External Power Supplies

Canada Energy Efficiency Act and Energy Efficiency Regulations

Canada NRCAN guidelines for EPSs

European Union, Turkey and other jurisdictions transposing EU regulations Commission Regulation (EU) 2019/1782 of 1 October 2019 laying down ecodesign requirements for external power supplies pursuant to Directive 2009/125/EC.

Jordan JSNO 2111/2013 Technical Regulation on eco-design requirements for no-load condition electric power consumption and average active efficiency of external power supplies; JSNO 2090/2013 Technical Regulation on eco-design requirements for energy related Products

Korea Regulation on Energy Efficiency Labeling and Standards, July 31, 2008

Mexico Official Standard NOM-029-ENER-2017 Energy efficiency of external power supplies. Limits, test methods, marks and labels.

New Zealand External Power Supplies Information sheet from the Energy Efficiency and Conservation Authority September 2019.

Norway Environmentally Friendly Design of Energy-Related Products, Regulation No. 190, 2011 - Amendment - (on implementing ecodesign requirements for electric motors, transformers, and external power supplies) Regulation No. 1977, 2020

Turkey Ecodesign Requirements of External Power Supplies, Communiqué, (2019/1782/EU) (SGM:2020/5)

United Kingdom Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations 2020, SI 2020/1528

United Kingdom Ecodesign for Energy-Related Products Regulations 2010, SI 2010/2617

United States Federal Energy Conservation Program: Energy Conservation Standards for External Power Supplies Standards: http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx?productid=23.

United States Energy Conservation Program for Consumer Products, Rules, 10 CFR 430, 1989 - Amendment - (on test procedure for external power supplies, providing additional instructions, etc.), Final Rule, 87 FR 51200, August 2022

United States Energy Conservation Program for Consumer Products, 10 CFR 429 & 431 - Amendment - (on certification, labelling and enforcement for Consumer Products and Commercial Equipment) Final Rule, 89 FR 81994, October 2024
United States Department of Energy Guidance Document – Definitions and scope of coverage for EPSs. December 20, 2017.
United States CA Code of Regulations, Title 20 Section 1601-1608
United States Oregon Minimum Energy Efficiency Standards for State-regulated appliances and equipment
United States Washington DC Energy Efficiency Standards DC **§** Code 8-1771

Definitions
Australia/ New Zealand
"**Single output external power supply**" means an appliance that is designed to supply power to other appliances and that:

(a) has an input from **mains** supply; *Note:* This input is usually 110 volts, 60 hertz; 230 volts, 50 hertz; 240 volts, 50 hertz or a range including some or all of these input conditions.
(b) has one extra low voltage output (either alternating current or direct current) that is either at a fixed voltage or a user selectable voltage through a selector switch;
(c) is sold with, or intended to be used with, a separate end-use product that constitutes the primary load on the power supply; *Note:* These units are often used to power/re-charge laptop computers, mobile telephones, portable stereo units and other portable household devices. It is immaterial whether or not the power supply and end use product are packaged separately or together.
(d) Is contained in a separate physical enclosure from the end-use product; *Note* these units cannot be built into the equipment being powered and hence are 'external' to the device being powered. The housings of the EPS and its associated end use product are different. Designs covered include units with an integral mains plug, 'in-line' units and units with provision for equipment to sit in a cradle whilst being used.
(e) is connected to the end-use product via a hard-wired or removable male/female electrical connection, cable, cord or other wiring;
(f) Does not have batteries, or battery packs, that physically attach directly to the power supply unit (either permanently or only for the purpose of charging); *Note* this includes batteries that are removable from the power supply unit. For example, a battery pack for a portable electric drill; and
(g) Does not have either: a battery chemistry, or type selector, switch; or an indicator light or state of charge meter.

For Australia/New Zealand, external power supplies used only internal to a rack system are out of scope.

United States - Federal and California
External power supply – means an external power supply circuit that is used to convert household electric current into DC current or lower-voltage AC current to operate a consumer product. However, the term does not include any "commercial and industrial power supply" as defined in this section, or a power supply circuit, driver, or device that is designed exclusively to be connected to, and power -

(1) Light-emitting diodes providing illumination.
(2) Organic light-emitting diodes providing illumination; or
(3) Ceiling fans using direct current motors.

Class A external power supply – a device that:

(1) is designed to convert line voltage AC input into lower voltage AC or DC output;
(2) is able to convert to only 1 AC or DC output voltage at a time;
(3) is sold with, or intended to be used with, a separate end-use product that constitutes the primary load;
(4) is contained in a separate physical enclosure from the end-use product;
(5) is connected to the end-use product via a removable or hard-wired male/female electrical connection, cable, cord, or other wiring; and
(6) Has nameplate output power that is less than or equal to 250 watts.

Class A EPS does not include any device that –

- Requires Federal Food and Drug Administration listing and approval as a medical device in accordance with section 513 of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 360c); or
- Powers the charge of a detachable battery pack or charges the battery or a product that is fully or primarily motor operated.

Commercial and industrial power supply – means a power supply that is used to convert electric current into DC or lower-voltage AC current, is not distributed in commerce for use with a consumer product, and may include any of the following characteristics:

(1) A power supply that requires 3-phase input power and that is incapable of operating on household mains electricity.

(2) A DC-DC-only power supply that is incapable of operating on household mains electricity.

(3) A power supply with a fixed, non-removable connection to an end-use device that is not a consumer product as defined under the Act;

(4) A power supply whose output connector is uniquely shaped to fit only an end-use device that is not a consumer product;

(5) A power supply that cannot be readily connected to an end-use device that is a consumer product without significant modification or customization of the power supply itself or the end-use device;

(6) A power supply packaged with an end-use device that is not a consumer product, as evidenced by either:

(i) Such device being certified as, or declared to be in conformance with, a specific standard applicable only to non-consumer products. For example, a power supply model intended for use with an end-use device that is certified to the following standards would not meet the EPCA definition of an EPS:

(A) CISPR 11 (Class A Equipment), "Industrial, scientific and medical equipment - Radio-frequency disturbance - Limits and methods of measurement";

(B) UL 1480A, "Standard for Speakers for Commercial and Professional Use";

(C) UL 813, "Standard for Commercial Audio Equipment"; and

(D) UL 1727, "Standard for Commercial Electric Personal Grooming Appliances"; or

(ii) Such device being excluded or exempted from inclusion within, or conformance with, a law, regulation, or broadly-accepted industry standard where such exclusion or exemption applies only to non-consumer products;

(7) A power supply distributed in commerce for use with an end-use device where:

(i) The end-use device is not a consumer product, as evidenced by either the circumstances in paragraph (6)(i) or (ii) of this definition; and

(ii) The end-use device for which the power supply is distributed in commerce is reasonably disclosed to the public, such as by identification of the end-use device on the packaging for the power supply, documentation physically present with the power supply, or on the manufacturer's or private labeler's public website; or

(8) A power supply that is not marketed for residential or consumer use, and that is clearly marked (or, alternatively, the packaging of the individual power supply, the shipping container of multiple such power supplies, or associated documentation physically present with the power supply when distributed in commerce is clearly marked) "FOR USE WITH COMMERCIAL OR INDUSTRIAL EQUIPMENT ONLY" or "NOT FOR RESIDENTIAL OR CONSUMER USE," with the marking designed and applied so that the marking will be visible and legible during customary conditions for the item on which the marking is placed.

See Exemption entry in this section for additional exemption information.

Single-voltage external AC-DC power supply means an external power supply that is designed to convert line voltage AC into lower-voltage DC output and is able to convert to only one DC output voltage at a time.

Single-voltage external AC-AC power supply means an external power supply that is designed to convert line voltage AC into lower-voltage AC output and is able to convert to only one AC output voltage at a time.

Multiple-voltage external power supply means an external power supply that is designed to convert line voltage AC input into more than one simultaneous lower-voltage output.

Low-voltage external power supply means an external power supply with a nameplate output voltage less than 6 volts and nameplate output current greater than or equal to 550 milliamps. Basic-voltage external power supply means an external power supply that is not a low-voltage power supply.

Basic-voltage external power supply means an external power supply that is not a low-voltage external power supply.

Direct operation external power supply means an external power supply that can operate a consumer product that is not a battery charger without the assistance of a battery.

Indirect operation external power supply means an external power supply that cannot operate a consumer product that is not a battery charger without the assistance of a battery.

California

Consumer product means any article, other than an automobile, as defined in 49 U.S.C. section 32901(a) (3):
(1) of a type which in operation consumes, or is designed to consume, energy or, with respect to showerheads, faucets, water closets, and urinals, water; and which, to any significant extent, is distributed in commerce for personal use or consumption by individuals;
(2) Without regard to whether such article of such type is in fact distributed in commerce for personal use or consumption by an individual, except that such term includes fluorescent lamp ballasts, general service fluorescent lamps, incandescent reflector lamps, showerheads, faucets, water closets, and urinals distributed in commerce for personal or commercial use or consumption.

As listed in the US Department of Energy EPS Frequently Asked Questions, any external power supply that is of a type capable of operating a consumer product would be considered a covered product, without regard to whether that external power supply was in fact distributed in U.S. commerce to operate a consumer product. Only external power supplies that have identifiable design characteristics that would make them incapable of operating a consumer product would be considered to not meet EPCA's definition of external power supply. For IBM Systems' Products, an EPS offered with a NEMA 5-15P or 5-20P wall plug would be considered a consumer product.

United States - California, Oregon, Rhode Island, New York, Arizona, Washington, Connecticut
"**State-regulated external power supply**" or "**single voltage external AC to DC power supply**" means a single-voltage external AC to DC or AC to AC power supply that:

(1) Is designed to convert line voltage AC input into lower voltage DC or AC output;
(2) Is able to convert to only one DC or AC output voltage at a time;
(3) Is sold with, or intended to be used with, a separate end-use product that constitutes the primary load;
(4) Is contained within a separate physical enclosure from the end-use product;
(5) Is connected to the end-use product via a removable or hard-wired male/female electrical connection, cable, cord, or other wiring;
(6) Does not have batteries or battery packs that physically attach directly (including those that are removable) to the power supply unit;
(7) does not have a battery chemistry or type selector switch and an indicator light; or, does not have a battery chemistry or type selector switch and a state of charge meter;
(8) Has a nameplate output power less than or equal to 250 watts.

Canada
External power supply means a single-voltage external power supply or a multiple-voltage external power supply that is designed to be used with a household or office end-use product that constitutes the primary load. **It does not include**
(a) a direct operation external power supply that has a nominal output voltage of less than 3 V and a nominal output current of 1000 mA or more and that charges the battery of an end use product that is fully or primarily motor-operated;
(b) an indirect operation external power supply that has a nominal output power of greater than 250 W;
(c) a device that powers the charger of a detachable battery pack of an end-use product;
(d) a device that is an accessory to a medical device; or
(e) a device that is solely designed to power solid-state lighting or a ceiling fan that has a direct current motor.

Replacement external power supply means an external power supply that is marked as a replacement to be used with a specific end-use product that was manufactured before July 1, 2017.

Direct operation external power supply means a power supply device that is capable of operating an end-use product, other than a battery charger, without the assistance of a battery.

Indirect operation external power supply means a power supply device that can only operate an end-use product with the assistance of a battery.

Multiple-voltage external power supply means a device that is designed to convert line voltage AC input into more than one simultaneous lower voltage AC or DC outputs.

Single-voltage external power supply means a device that is designed to convert line voltage AC input into only one lower AC or DC voltage output at a time.

The following products are not energy-using products if at the time of importation into Canada, they are incorporated into another product. This only applies for reporting at importation, not the energy efficiency requirements.

(a) a battery charger;
(b) an external power supply;
(c) a fluorescent lamp ballast;
(d) an electric motor; and
(e) a small electric motor.

This scope is limited to EPSs designed for household and office end use. External power supplies used only internal to a rack system and designed for an end-use product that is not intended for use in a home would fall out of the scope of the Canada Regulation. If the EPS is available for household or office use, irrespective of how IBM markets it, then it is in scope.

Korea
Adapter - A single voltage external power supply (AC-DC or AC-AC) under 150 W (nameplate output power) without any charging function.
Charger - Single voltage external power supply (AC-DC) with charging function to charge a lithium ion battery and has an input of 20W.

Excluding adapters/chargers specifically used for broadcasting, medical, lighting, measurement, and monitoring purposes.

EU, Turkey, and other jurisdictions transposing EU regulations.
External power supply means a device which meets all of the following criteria:
(a) it is designed to convert alternating current (AC) power input from the mains power source input into one or more lower voltage direct current (DC) or AC outputs;
(b) it is used with one or more separate devices that constitute the primary load;
(c) it is contained in a physical enclosure separate from the device or devices that constitute the primary load;
(d) it is connected to the device or devices that constitute the primary load with removable or hard-wired male/ female electrical connections, cables, cords or other wirings;
(e) it has nameplate output power not exceeding 250 watts; and
(f) it is used with electrical and electronic household and office equipment included in Annex I; such as Information technology equipment, including copying and printing equipment, and set-top boxes, intended primarily for use in the domestic environment. See EU regulation for more definitions, details and product scope information.

Domestic environment means an environment where the use of broadcast radio and television receivers may be expected within a distance of 10 m of the equipment concerned.

Information technology equipment means any equipment which has a primary function of either entry, storage, display, retrieval, transmission, processing, switching, or control, of data or of telecommunication messages or a combination of these functions and may be equipped with one or more terminal ports typically operated for information transfer.

Mains means the electricity supply from the grid of 230 (± 10 %) volts of alternating current at 50 Hz.

For the countries listed above, external power supplies used only internal to a rack system are out of scope.

Mexico
External Power Supply - Apparatus capable of supplying and controlling intensity of electrical current, electrical voltage, or electrical power, within its design limits; that meets the following conditions:
a. - It has been designed to convert the AC voltage of the supply line to a lower level and direct current;
b. - It is capable of converting a single electrical voltage into a direct current at the same time;
c. - It is a product provided separately or as a part of a set, intended for use with an independent end-use product (for example: laptop, cell phone, alarm system, among others), which constitutes its primary load.
d. - housed in a physically separate enclosure of the end-use product;

e. - it is connected to the end-use product by means of an electrical connection through a cable, power cord, or other similar type of wiring and usually using a mechanical male/female type coupling system.
f. - able to supply an output power less than or equal to 250.0 W.
The EPSs are also normally known as “AC / DC adapters.” or “battery eliminators,” among the commonly used names. NOTE: The “physically separated” concept refers to the enclosing boxes or cabinets of the products themselves, and not to the way in which they are packaged for sale or distribution.
See the standard for more definitions.

Requirements by Jurisdiction

Jurisdiction	Marking	Efficiency[1] Requirements	Test Method[2]	Certification	Information required by IBM
Australia and New Zealand	Manufacturer name Model Number Date of Manufacture International Efficiency Marking Protocol, IV or higher, on product and packaging	Tier 2	AS/NZS 4665.2 and 4665.1 Performance of external power supplies MEPs requirements and Test method and energy performance mark	Registration with government	A/NZ Test Report Copy of registration with government at https://reg.energyrating.gov.au /comparator/product types/
United States, Federal regulations	Manufacturer name Model number Date of manufacture International Efficiency Marking Protocol on product, packaging or accompanying documentation Output voltage	Tier 2 Beginning February 10, 2016 for Direct Operation External Power Supply: See efficiency section. Starting on February 15, 2023, manufacturers must make any representations regarding the energy efficiency or power consumption of external power supplies based upon results generated under Appendix Z to Subpart B of Part 430. Prior to that date, manufacturers must make any representations regarding the energy efficiency or power consumption of external power supplies based upon results generated under appendix Z as it appeared at 10 CFR part 430, subpart B revised as of January 1, 2021	10 Code of Federal Register Part 430 Subpart B Appendix Z	Certified by manufacturer to US Department of Energy with test results, number of exempt EPSs sold in the previous year, and compliance statement	US Test Report (Beginning May 7, 2025 the test report must include the effective wire gauge and length of the output cord shipped) Copy of certification
United States, state regulations	Manufacturer name Model number Date of Manufacture International Efficiency	Tier 2 Beginning Feb 10, 2016 for Direct Operation External Power Supply: See efficiency section.	For State regulated EPSs - US EPA	Requirements vary by state, but typically include registration with the energy efficiency test report to verify	Energy Efficiency Test Report

	Marking Protocol (see Marking section) on product, packaging or accompanying documentation[5].			International Efficiency Mark.	
Canada	Model number Date of Manufacture Mark of a Standards Council of Canada (SCC) accredited certification body or International Efficiency Marking Protocol VI or higher	See Efficiency Requirements section. EPS must be registered with Natural Resources Canada at http://oee.nrcan.gc.ca/pml-lmp/index.cfm?action=app.search-recherche&appliance=EPS	See table under efficiency requirements	Certification by accredited certification body[3]	Certification statement from accredited certification body Test results
Korea	Unique to Korea; see Marking section below	See Efficiency Requirements section	Unique to Korea; see Test Method section	Certification by accredited certification body[4]	Test report issued by one of the designated independent testing laboratories listed for Adapter/ Charger in Annex 4 of the regulation
Mexico	Unique to Mexico, see Marking section below.	See Efficiency Requirements section	Not specified	Not applicable	Test report showing compliance to the energy requirements of this standard.
EU, Jordan and Turkey	CE mark, at least 5 mm high on the product, see Figure 10 Brand name Single Point of Contact address	See Efficiency Requirements section	EN 50563:2011 /A1: 2013	Self-certification	Technical documentation (dated and signed EPS test report) Declaration of Conformity See Required Documentation section below for more information
United Kingdom	UKCA mark, at least 5 mm high on the product, see Figure 11 Brand name Single Point of Contact address	See Efficiency Requirements section	EN 50563:2011 /A1: 2013	Self-certification	Technical documentation (dated and signed EPS test report) Declaration of Conformity See Required Documentation section below for more information

[1] See Efficiency Requirements section for more information.
[2] See Test Method section for more information.
[3] The manufacturer or the dealer of the External Power Supply must submit to Natural Resources Canada an energy efficiency report, which must include: product name, manufacturer name, brand name, model number, nominal output, in volts, at highest and lowest output setting, nominal output, in watts, at highest and lowest output setting, if applicable, whether the output is AC or DC, the average efficiency at highest and lowest output setting, no load power in watts, whether it is a replacement external power supply or a security EPS, if a replacement EPS or a security EPS, the end-use equipment and the brand and model number of that equipment, roman numeral mark, if applicable, whether the product bears a verification mark, name of the certification body associated with verifying the Roman numeral mark or that authorized the verification mark that appears on the product.
[4] e.g., Korea Testing Laboratory, EMC Research Institute, Telecommunications Technology Association or Korea Electric Testing Institute.

[5] Some states may require the mark to be on the product, with no allowance for the mark to be on the packaging. IBM recommends the mark be placed on the EPS product.

Efficiency Requirements

Tier 2 Efficiency requirements see above table under Requirements by Jurisdiction

External Power Supply Requirements	
Active Mode	
Nameplate Output	**Required Efficiency (decimal equivalent of a percentage)**
Less than 1 watt	0.5 times the Nameplate Output
From 1 watt to not more than 51 watts	The sum of 0.09 times the Natural Logarithm of the Nameplate Output and 0.5
Greater than 51 watts	0.85
No-Load Mode	
Nameplate Output	**Maximum Consumption**
Not more than 250 watts	0.5 watts

Korea

Adapters (external power supply without charging)

Minimum Energy Performance Standards for Adapters			
Minimum Energy Performance Standards (MEPS)			
Output power on name plate (P_{no})	**Running Efficiency (On mode energy efficiency)**	**Output power on name plate (P_{no})**	**Maximum Standby Power (Power consumption on No-Load Mode)**
$0<P_{no}\leq 1W$	$\geq 0.49 \times P_{no}$	$0<P_{no}<10W$	$\leq 0.5W$
$1W<P_{no}\leq 49W$	$\geq [0.09 \times Ln(P_{no})] + 0.49$		
$49W<P_{no}\leq 150W$	≥ 0.84	$10W\leq P_{no}<150W$	$\leq 0.75W$

Chargers (external power supply with charging function to charge Li Ion Battery)

Minimum Energy Performance Standards for Chargers	
Minimum Energy Performance Standards (MEPS)	
Measured Input Power(P_{in})	**Maximum Standby Power Power consumption on No-Load Mode**
$0<P_{in}<10W$	$\leq 0.5W$
$10W\leq P_{in}\leq 20W$	$\leq 0.75W$

Canada

TABLE

Item	Column 1 Energy-using Product	Column 2 Standard	Column 3 Energy Efficiency Standard	Column 4 Period of Manufacture
1	External power supplies, other than replacement external power supplies	CSA C381.1 or 10 C.F.R. Appendix Z	10 C.F.R. §430.32(w)(1)(i) for efficiency in active mode and, if product is not a security external power supply, power in no-load mode ≤ 0.5 W	On or after July 1, 2010 and before July 1, 2017
2	Direct operation external power supplies other than replacement external power supplies	CSA C381.1-17 or 10 C.F.R. Appendix Z	CSA C381.1-17, Table D.1, for efficiency in active mode and power in no-load mode	On or after July 1, 2017
3	Indirect operation external power supplies other than replacement external power supplies	CSA C381.1 or 10 C.F.R. Appendix Z	10 C.F.R. §430.32(w)(1)(i) for efficiency in active mode and, if product is not a security external power supply, power in no-load mode ≤ 0.5 W	On or after July 1, 2017
4	Replacement external power supplies	CSA C381.1 or 10 C.F.R. Appendix Z	10 C.F.R. §430.32(w)(1)(i) for efficiency in active mode and, if product is not a security external power supply, power in no-load mode ≤ 0.5 W	On or after July 1, 2013 and before February 10, 2020
5	Replacement external power supplies	CSA C381.1-17 or 10 C.F.R. Appendix Z	CSA C381.1-17, Table D.1, for efficiency in active mode and power in no-load mode	On or after February 10, 2020

Information, as listed in the Canada Energy Regulation must be submitted to the respective Canadian minister –
(a) information that indicates whether the product is a single-voltage external power supply or a multiple-voltage external power supply;

(b) for each voltage output, its nominal output voltage at the highest and lowest settings and information that indicates whether that voltage is AC or DC;
(c) its nominal output power, expressed in watts, at the highest and lowest power settings, if applicable;
(d) its average efficiency at the highest and lowest power settings, if applicable;
(e) its power in no-load mode, expressed in watts;
(f) the Roman numeral mark, if applicable;
(g) information that indicates whether the product bears a verification mark; and
(h) information that indicates whether the product is a replacement external power supply or a security external power supply and, if it is one of those power supplies, the end-use product or equipment, as applicable, and the model number and brand of that end-use product or equipment.

European Union, United Kingdom and other jurisdictions implementing EU regulations

Requirements effective until April 1, 2020:
Newly releasing external power supplies (and previously released EPSs by April 6, 2011) must meet the following requirements:
1.The no-load condition power consumption shall not exceed the following limits:

	AC-AC EPSs, except low voltage EPSs	**AC-DC EPSs except low voltage EPSs**	**Low voltage EPSs**
$P_O \leq 51.0$ W	0.50 W	0.30 W	0.30 W
$P_O > 51.0$ W	0.50 W	0.50 W	Not applicable

2.The average active efficiency shall be not less than the following limits:

	AC-AC and AC-DC EPSs, except low voltage EPSs	**Low voltage EPSs**
$P_O \leq 1.0$ W	$0.480 \cdot P_O + 0.140$	$0.497 \cdot P_O + 0.067$
$1.0 \text{ W} < P_O \leq 51.0$ W	$0.063 \cdot \ln(P_O) + 0.622$	$0.075 \cdot \ln(P_O) + 0.561$
$P_O > 51.0$ W	0.870	0.860

Requirements effective after April 1, 2020:

1. Energy efficiency requirements:

(a) from 1 April 2020, the no-load condition power consumption shall not exceed the following values:

	AC-AC external power supplies, except low voltage and multiple voltage output external power supplies	AC-DC external power supplies, except low voltage and multiple voltage output external power supplies	Low voltage external power supplies	Multiple voltage output external power supplies
$P_O \leq 49{,}0$ W	0,21 W	0,10 W	0,10 W	0,30 W
$P_O > 49{,}0$ W	0,21 W	0,21 W	0,21 W	0,30 W

(b) from 1 April 2020, the average active efficiency shall be not less than the following values:

	AC-AC external power supplies, except low voltage and multiple voltage output external power supplies	AC-DC external power supplies, except low voltage and multiple voltage output external power supplies	Low voltage external power supplies	Multiple voltage output external power supplies
$P_O \leq 1{,}0$ W	$0{,}5 \times P_O/1\text{W} + 0{,}160$	$0{,}5 \times P_O/1\text{W} + 0{,}160$	$0{,}517 \times P_O/1\text{W} + 0{,}087$	$0{,}497 \times P_O/1\text{W} + 0{,}067$
$1 \text{ W} < P_O \leq 49{,}0$ W	$0{,}071 \times \ln(P_O/1\text{W}) - 0{,}0014 \times P_O/1\text{W} + 0{,}67$	$0{,}071 \times \ln(P_O/1\text{W}) - 0{,}0014 \times P_O/1\text{W} + 0{,}67$	$0{,}0834 \times \ln(P_O/1\text{W}) - 0{,}0014 \times P_O/1\text{W} + 0{,}609$	$0{,}075 \times \ln(P_O/1\text{W}) + 0{,}561$
$P_O > 49{,}0$ W	0,880	0,880	0,870	0,860

United States – Federal and California
Beginning February 10, 2016: for **Direct Operation External Power Supply** Efficiency Standards

Single-voltage External AC-DC Power Supply, Basic Voltage		
Nameplate Output Power (Pout)	**Minimum Average Efficiency in Active Mode** ***(expressed as a decimal)***	**Maximum Power in No-Load Mode [W**
$P_{out} \leq 1$ W	$\geq 0.5 \times P_{out} + 0.16$	≤ 0.100
1 W < $P_{out} \leq$ 49 W	$\geq 0.071 \times \ln(P_{out}) - 0.0014 \times P_{out} + 0.67$	≤ 0.100
49 W < $P_{out} \leq$ 250 W	≥ 0.880	≤ 0.210
P_{out} > 250 W	≥ 0.875	≤ 0.500
Single-Voltage External AC-DC Power Supply, Low-Voltage		
Nameplate Output Power (Pout)	**Minimum Average Efficiency in Active Mode** ***(expressed as a decimal)***	**Maximum Power in No-Load Mode [W]**
$P_{out} \leq 1$ W	$\geq 0.517 \times P_{out} + 0.087$	≤ 0.100
1 W < $P_{out} \leq$ 49 W	$\geq 0.0834 \times \ln(P_{out}) - 0.0014 \times P_{out} + 0.609$	≤ 0.100
49 W < $P_{out} \leq$ 250 W	≥ 0.870	≤ 0.210
P_{out} > 250 W	≥ 0.875	≤ 0.500
Single-Voltage External AC-AC Power Supply, Basic-Voltage		
Nameplate Output Power (Pout)	**Minimum Average Efficiency in Active Mode** ***(expressed as a decimal)***	**Maximum Power in No-Load Mode [W**
$P_{out} \leq 1$ W	$\geq 0.5 \times P_{out} + 0.16$	≤ 0.100
1 W < $P_{out} \leq$ 49 W	$\geq 0.071 \times \ln(P_{out}) - 0.0014 \times P_{out} + 0.67$	≤ 0.100
49 W < $P_{out} \leq$ 250 W	≥ 0.880	≤ 0.210
P_{out} > 250 W	≥ 0.875	≤ 0.500
Single-Voltage External AC-AC Power Supply, Low-Voltage		
Nameplate Output Power (Pout)	**Minimum Average Efficiency in Active Mode** ***(expressed as a decimal)***	**Maximum Power in No-Load Mode [W**
$P_{out} \leq 1$ W	$\geq 0.517 \times P_{out} + 0.087$	≤ 0.100
1 W < $P_{out} \leq$ 49 W	$\geq 0.0834 \times \ln(P_{out}) - 0.0014 \times P_{out} + 0.609$	≤ 0.100
49 W < $P_{out} \leq$ 250 W	≥ 0.870	≤ 0.210
P_{out} > 250 W	≥ 0.875	≤ 0.500
Multiple-Voltage External Power Supply		
Nameplate Output Power (Pout)	**Minimum Average Efficiency in Active Mode** ***(expressed as a decimal)***	**Maximum Power in No-Load Mode [W**
$P_{out} \leq 1$ W	$\geq 0.497 \times P_{out} + 0.067$	≤ 0.300
1 W < $P_{out} \leq$ 49 W	$\geq 0.075 \times \ln(P_{out}) + 0.561$	≤ 0.300
$P_{out} \geq$ 49 W	≥ 0.860	≤ 0.300

Mexico

External Power Supplies that fall under the field of application of the Mexico NOM 029-ENER-2017 standard must comply with the energy efficiency values for the active power mode and not surpass the power values in no-load mode, as indicated in the table below.

Classification according to the level of its output voltage.	Nominal output voltage in DC	With an output power (Po)	Efficiency level	Minimum energy efficiency level in active mode, greater than or equal to:	The maximum power limit in no-load mode, lesser or equal to:
USB output voltage	5.0 V ± 0.25 V	Less or equal to 1.0 W	V	0.497 x Po + 0.067	0.30
			VI	0.517 x Po + 0.087	0.10
		Greater than 1.0 W and less than or equal to 49.0 W	V	0.075 x [Ln (Po)] + 0.561	0.30
			VI	0.0834 x [Ln (Po)] - 0.0014 x Po + 0.609	0.10
		Greater than 49.0 W and less than or equal to 250.0 W	V	0.86	0.50
			VI	0.87	0.21
Low output voltage	Less than 6.0 V	Less or equal to 1.0 W	V	0.497 x Po + 0.067	0.30
			VI	0.517 x Po + 0.087	0.10
		Greater than 1.0 W and less than or equal to 49.0 W	V	0.075 x [Ln (Po)] + 0.561	0.30
			VI	0.0834 x [Ln (Po)] - 0.0014 x Po + 0.609	0.10
		Less than or equal to 250.0 W			
			VI	0.87	0.21
Generic output voltage	Greater than or equal to 6.0 V	Less or equal to 1.0 W	V	0.480 x Po + 0.140	0.30
			VI	0.5 x Po + 0.16	0.10
		Greater than 1.0 W and less than or equal to 49.0 W	V	0.0626 x [Ln (Po)] + 0.622	0.30
			VI	0.071 x (Ln (Po)) - 0.0014 x Po + 0.67	0.10
		Greater than 49.0 W and less than or equal to 250.0 W	V	0.87	0.50
VI	0.88	0.21			

See standard for more details of the requirements and testing methodology. A test report must be submitted to IBM showing compliance to the energy requirements of this standard.

Marking

United States Federal and California

Through February 9, 2016: Class A EPSs must have IV mark or higher, see International Efficiency Marking Protocol below.

Beginning February 10, 2016: US Federal EPS Marking Requirements by Product Class are:

Class ID	Product Class	Marking Requirement
B	Direct Operation, AC-DC, Basic-Voltage	Roman numeral VI
C	Direct Operation, AC-DC, Low-Voltage	Roman numeral VI
D	Direct Operation, AC-AC, Basic-Voltage	Roman numeral VI
E	Direct Operation, AC-AC, Low-Voltage	Roman numeral VI
X	Direct Operation, Multiple-Voltage	Roman numeral VI
H	Direct Operation, High-Power	Roman numeral VI
N	Indirect Operation	Class A: Roman numeral IV or higher. Non-Class A: No marking requirement.

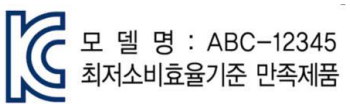
International Efficiency Marking Protocol

The marking is determined by comparing the unit's active and no load test data with the performance requirements of the International Efficiency Marking Protocol scale. The marking shall be permanently shown on the nameplate of the power supply. The font should be a plain serif font such as Times Roman. The size must be legible and indelible in a color that contrasts with the nameplate background. The label must include the manufacturer's name, model number, and Date of Manufacture. See International Efficiency Marking Protocol for further information: http://www.regulations.gov/#!documentDetail;D=EERE-2008-BT-STD-0005-0218.

Korea

Adapters and Chargers must be tested and labeled in accordance with the Korean Regulation on Energy Efficiency Labeling and Standards, July 31, 2008. The required label is in the Figure below. The label shall be on the front or

top of the product. Please note that “ABC-12345” represents the model number of the external power supply. If the model number is already shown on the unit, then the line text with the model number can be eliminated on this label. The KC mark does not need to be right next to the Korean text but does need to be on the front or top of the unit.



Korea Energy Label for Adapters and Chargers

Mexico

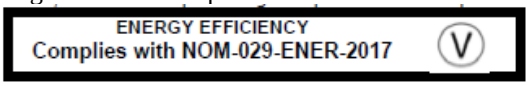
All external power supplies in scope of the Mexican Official Standard must be marked on the body of the product or with a legible and indelible data plate with the data listed below. It must be adhered or mechanically attached to the enclosure or housing on the main body of the external power supply in a visible place. The minimum information that the marking of the external power supply must have is:

• Name of the manufacturer or distributor, or a logo or registered trademark;
• Model or commercial identification designated by the manufacturer or distributor and used for commercial identification;
• Electrical data, nominal input voltage, and frequency.
• Marking of energy efficiency level V or VI, in roman numbers; (as appropriate);
• Nominal electrical data of the electrical output voltage, electrical power and/or the electric current output intensity.

The mark must be indelible and legible after manual rubbing of the mark for fifteen seconds with a rag soaked in water. The data plate must be made of a material that permanently guarantees the legibility of the information, and that does not become degraded over time under normal environmental conditions.

External power supplies in scope of this Mexican Official Standard that are directly sold to the public, individually, that is, not as a piece or accessory of a product for end-use, must bear the information as listed below. This label is additional to the marking that must be done as listed above. The information can be imprinted or affixed, or placed on the product, or packaging or instructions or user manuals, or in the regulatory information included with the product. The energy efficiency information must contain the following, as a minimum, in a legible and indelible manner. (Please see Exemption entry in this Section for additional exempted EPS information.)
Label information:
ENERGY EFFICIENCY, in capital letters.
Complies with **NOM-029-ENER-2017**
Level of energy efficiency V or VI, in Roman numbers.
Below is an example of a label in accordance with this standard. The label must be written in Spanish.

English translation provided below for reference only.



Canada

A verification mark must be readily visible on the surface of the external power supply or on the exterior of the product’s packaging. The verification mark must be issued by a certification body accredited by the Standards Council of Canada.

European Union

(a) from 1 April 2020, the nameplate shall include the following information:

Nameplate information	Value and precision	Unit	Notes
Output power	X,X	W	In cases where more than one physical output or more than one output voltage at load condition 1 are measured, the sets of available Output voltage — Output current – Output power shall be given.
Output voltage	X,X	V	In cases where more than one physical output or more than one output voltage at load condition 1 are measured, the sets of available Output voltage — Output current – Output power shall be given.
Output current	X,X	A	In cases where more than one physical output or more than one output voltage at load condition 1 are measured, the sets of available Output voltage — Output current – Output power shall be given.

Test Methods

10 Code of Federal Register Part 430 Subpart B Appendix Z - Uniform Test Method for Measuring the Energy Consumption of External Power Supplies.
Canadian Standards Association (CSA) C381.1-17 Energy performance of external ac-dc and ac-ac power supplies.
US EPA "Test Method for Calculating the Energy Efficiency of Single-Voltage External AC-DC and AC-AC Power Supplies" dated August 11, 2004, except that the test voltage specified in Section 4(d) of the test method shall be only 115 volts, 60 Hz.
Korea Regulation on Energy Efficiency Labeling and Standards, Annex I, section 13.
EU Regulation EC No 278/2009, Annex I
AS/NZS 4665.2:2005: Performance of external power supplies— Minimum energy performance standard (MEPS) requirements.
AS/NZS 4665.1:2005: Performance of external power supplies—Test method and energy performance mark.

Additional required documentation
EU-and other jurisdictions which have transposed the EU regulation.
Requirements up to April 1, 2020.
The following documents must be provided to IBM in English as well as other available languages:
1. Declaration of Conformity (DoC) to EU Regulations 1275/2008 and 278/2009 as required by EU Directive 2009/125/EC and Declaration of Conformity as required by JSNO 2111/2013 Technical Regulation on eco-design requirements for no-load condition electric power consumption and average active efficiency of external power supplies. The DoC must include:
   (1)Name and address of the manufacturer or of its authorized representative;
   (2)A description of the model sufficient for unambiguous identification;
   (3)Where appropriate, the references of the harmonized standards applied;
   (4)Where appropriate, the other technical standards and specifications used;
   (5)Where appropriate, the reference to other EU Community legislation providing for the affixing of the CE mark that is applied; and
   (6)Identification and signature of the person empowered to bind the manufacturer or its authorized representative.
2. The technical documentation (including a dated and signed test report) showing efficiency data must be provided. The technical documentation must meet the requirements of Annexes I and II of EU Commission Regulation No 278/2009 and Switzerland Energy Regulation Appendix 2:11. This documentation must include a general description of the product and its intended use. In addition, the following is an example of the format of the technical documentation specifically for EPSs, from EU Commission Regulation No 278/2009:

Reported Quantity	Description
Root mean square (Rms) output current (mA)	Measured at load conditions 1-4
Rms output voltage (V)	
Active output power (W)	

Rms input voltage (V)	Measured at load conditions 1-5
Rms input power (W)	
Total harmonic distortion (THD)	
True power factor	
Power consumed (W)	Calculated at load condition 1-4, measured at load condition 5
Efficiency	Calculated at load conditions 1-4
Average efficiency	Arithmetic average of efficiency at load conditions 1-4
Percentage of nameplate output current	
Load condition 1	100 % ± 2 %
Load condition 2	75 % ± 2 %
Load condition 3	50 % ± 2 %
Load condition 4	25 % ± 2 %
Load condition 5	0 % (no-load condition)

Requirements effective on and after April 1, 2020

The following documents must be provided to IBM in English as well as other available languages:

1. **Declaration of Conformity (DoC)** The DoC must follow the format of Annex VI of EU Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products. The format is:

EC declaration of conformity

(referred to in Article 5(3))

The EC declaration of conformity must contain the following elements:

1. the name and address of the manufacturer or of its authorised representative;
2. a description of the model sufficient for its unambiguous identification;
3. where appropriate, the references of the harmonised standards applied;
4. where appropriate, the other technical standards and specifications used;
5. where appropriate, the reference to other Community legislation providing for the affixing of the CE mark that is applied; and
6. the identification and signature of the person empowered to bind the manufacturer or its authorised representative.

UK Declaration of Conformity must follow the format of Schedule 1 of Ecodesign for Energy-Related Products Regulations 2010. The format is:

2. **Technical Documentation**. The Technical Documentation shall have the following elements:

(c) from 1 April 2020, the technical documentation for the purposes of conformity assessment pursuant to Article 4 shall contain the following elements:

(1) for external power supplies with a nameplate output power greater than 10 watts:

Reported Quantity	Description
Root mean square output current (mA)	Measured at load conditions 1-5
Root mean square output voltage (V)	
Active output power (W)	
Root mean square input voltage (V)	Measured at load conditions 1-6
Root mean square input power (W)	
Total harmonic distortion of the input current	
True power factor	
Power consumed (W)	Calculated at load conditions 1-5, measured at load condition 6
Active mode efficiency	Calculated at load conditions 1-5
Average active efficiency	Arithmetical mean of efficiency at load conditions 1-4

In cases where more than one physical output or more than one output voltage at load condition 1 are measured, the relevant reported quantities shall be specified for each measurement.

The relevant load conditions are set out in point 2(b):

(2) for external power supplies with a nameplate output power of 10 watts or less:

Reported Quantity	Description
Root mean square output current (mA)	Measured at load conditions 1-4
Root mean square output voltage (V)	
Active output power (W)	
Root mean square input voltage (V)	Measured at load conditions 1-4 and 6
Root mean square input power (W)	
Total harmonic distortion of the input current	
True power factor	
Power consumed (W)	Calculated at load conditions 1-4, measured at load condition 6
Active mode efficiency	Calculated at load conditions 1-4

Reported Quantity	Description
Average active efficiency	Arithmetical mean of efficiency at load conditions 1-4

(b) from 1 April 2020, instruction manuals for end-users (where applicable), and free access websites of manufacturers, importers or authorised representatives shall include the following information, in the order as set out below:

Information published	Value and precision	Unit	Notes
Manufacturer's name or trade mark, commercial registration number and address	-	-	-
Model identifier	-	-	-
Input voltage	X	V	Specified by the manufacturer. Shall be a value or a range.
Input AC frequency	X	Hz	Specified by the manufacturer. Shall be a value or a range.
Output voltage	X,X	V	Nameplate output voltage. Shall indicate whether is AC or DC. In cases where more than one physical output or more than one output voltage at load condition 1 are measured, the sets of available Output voltage — Output current – Output power shall be published.
Output current	X,X	A	Nameplate output current. In cases where more than one physical output or more than one output voltage at load condition 1 are measured, the sets of available Output voltage — Output current – Output power shall be published.
Output power	X,X	W	Nameplate output power. In cases where more than one physical output or more than one output voltage at load condition 1 are measured, the sets of available Output voltage — Output current – Output power shall be published.
Average active efficiency	X,X	%	Declared by the manufacturer based on the value calculated as arithmetical mean of efficiency at load conditions 1-4. In cases where multiple average active efficiencies are declared for multiple output voltages available at load condition 1, the value published shall be the average active efficiency declared for the lowest output voltage.
Efficiency at low load (10 %)	X,X	%	Declared by the manufacturer based on the value calculated at load condition 5. External power supplies with a nameplate output power of 10 W or less shall be exempted from this requirement. In cases where multiple average active efficiencies are declared for multiple output voltages available at load condition 1, the value published shall be the value declared for the lowest output voltage.
No-load power consumption	X,XX	W	Declared by the manufacturer based on the value measured for load condition 6.

Exemptions

Australia/New Zealand

An external power supply made available by a manufacturer directly to a consumer or service or repair facility after and separate from the original sale of the product requiring the EPS as a service part of spare part shall be exempt from meeting EMSP requirements until 5 years after implementation of the MEPS requirements.

European Union, United Kingdom and other jurisdictions implementing EU regulations

This Regulation shall not apply to:
(a) voltage converters;
(b) uninterruptible power supplies;
(c) battery chargers without power supply function
(d) lighting converters;
(e) external power supplies for medical devices;
(f) active power over Ethernet injectors;
(g) docking stations for autonomous appliances;

(h) external power supplies placed on the market before 1 April 2025 solely as a service part or spare part for replacing an identical external power supply placed on the market before 1 April 2020, under the condition that the service part or spare part, or its packaging, clearly indicate 'External power supply to be used exclusively as spare part for' and the primary load product(s) it is intended to be used with.

United States
Class A EPSs must meet the energy requirements in the Tier 2 table above. Exceptions to this include EPSs which were:

- Manufactured during the period beginning on July 1, 2008, and ending on June 30, 2015; and
- Made available by the manufacturer as a service part or a spare part for an end-use product –
    - That constitutes the primary load; and
    - Was manufactured before July 1, 2008.

United States
US Department of Energy will not consider a power supply with any one of the following characteristics to meet the definition of an "external power supply" under US Energy Policy and Conservation Act, so long as the power supply is not, in fact, distributed in commerce for use with a consumer product:
1. a power supply requiring 3-phase input power, which is incapable of operating on household current;
2. a DC-DC only power supply, which is incapable of operating on household current;
3. a power supply with a fixed, non-removable connection to an end-use device that is not a consumer product;
4. a power supply whose output connector is uniquely shaped to fit only an end-use device that is not a consumer product;
5. a power supply that cannot be readily connected to an end-use device that is a consumer product without significant modification or customization of the power supply itself or the end-use device;
6. a power supply packaged with an end-use device that is not a consumer product, as evidenced by either:
a.) such device being certified as, or declared to be in conformance with, a specific standard applicable only to non-consumer products; or
b.) such device being excluded or exempted from inclusion within, or conformance with, a law, regulation, or broadly-accepted industry standard where such exclusion or exemption applies only to non-consumer products; or
7. a power supply distributed in commerce for use with an end-use device where:
a.) the end-use device is not a consumer product, as evidenced by either the circumstances in (6)(a) or (6)(b) above; and
b.) the end-use device for which the power supply is distributed in commerce is reasonably disclosed to the public, such as by identification of the end-use device on the packaging for the power supply, documentation physically present with the power supply, or on the manufacturer's or private labeler's public website; or
8. a power supply that is not marketed for residential or consumer use, and that is clearly marked (or, alternatively, the packaging of the individual power supply, the shipping container of multiple such power supplies, or associated documentation physically present with the power supply when distributed in commerce is clearly marked) "FOR USE WITH COMMERCIAL OR INDUSTRIAL EQUIPMENT ONLY" or "NOT FOR RESIDENTIAL OR CONSUMER USE," with the marking designed and applied so that the marking will be visible and legible during customary conditions for the item on which the marking is placed.

Mexico
This Mexican Official Standard NOM 029-ENER-2017 does not apply to external power supplies:
a) That are designed to deliver an output AC electrical voltage;
b) That are equipped with some type of battery or battery pack (including removable ones) that is physically connected to the power supply;
c) That are equipped with switch for choosing the battery type (or chemical) and an indicator light or meter that shows a battery's charge status (a product with a built-in selector switch for battery types and a meter that shows the status of the battery charge);
d) Designed for special uses that are part of the equipment and apparatus that are not sold directly to the public, and that are marketed towards business users or institutions that install or operate the equipment directly, or share responsibility with the supplier, in accordance with the technical features and specifications that have been presented and authorized by the Department that issues this standard.

2.12.3 Laptops, Notebooks

Requirements for the EU, Switzerland, Liechtenstein, Norway, Jordan, Turkey, and other jurisdictions as applicable

References

EU Commission Regulation No 617/2013 of 26 June 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for computers and computer servers
EU Regulation 1275/2008 for ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment (repealed in the EU)
EU Commission Regulation No 801/2013 of 22 August 2013 amending Regulation (EC) No 1275/2008 with regard to ecodesign requirements for standby, off mode electric power consumption of electrical and electronic household and office equipment
EU Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products
Israel: Energy Sources Law, 1989 - Amendment - (on import of energy efficient electrical appliances compliant with EU Declaration of Conformity), Law, November 2021
Israel Energy Sources (Maximum Electric Power in Standby Mode for Home and Office Appliances), 5771-2011 Regulations
Jordan JSNO 2090/2013 Technical Regulation on eco-design requirements for energy related products
Jordan JSNO 2109/2013 Technical Regulation on eco-design requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment
Turkey: Ecodesign Requirements for Standby, Off and Networked Standby Mode Electric Power Consumption of Electrical and Electronic Household and Office Equipment, Communiqué (2008/1275/EC) (SGM: 2021/13)

Requirements

See Section 2.12.14 for energy requirements for EMC Class B (in accordance with EN55022:2006+A1:2007 or EN55022:2010) equipment including external laptops.
See section 2.12.12 for EU Ecodesign requirements

Requirements for Vietnam

References

Vietnam No 04/2017/QD-TTg Decision on promulgating the list of devices and equipment subject to energy labeling, application of minimum energy efficiency and the implementation roadmap.
Vietnam No 36/2016/TT-BCT Circular on energy labeling for means and equipment using energy under management of the ministry of industry and trade.
Vietnam No 14/2023/QD-TTg Decision on promulgating a list and roadmap of energy-using vehicles and equipment that must be eliminated and low-efficiency generating sets that must not be built.
Vietnam TCVN 11847:2017 Desktop and Notebook Computers – Measuring energy consumption
Vietnam TCVN 11848:2017 Notebook Computer – Energy Efficiency

Requirements

Laptops must be tested and meet the energy requirements in Vietnam Circular No 36/2016/TT-BCT. The laptop must be registered with the Vietnam Ministry of Industry and Trade and be labeled in accordance with Vietnam Decision No 04/2017/QD-TTg and Vietnam Circular No 36/2016/TT-BCT. The labeling is required starting January 1, 2020.

Notebook computers must be tested and meet the energy requirements in Vietnam standard TCVN 11848:2017 until March 31, 2025 and TCVN 11848:2021 from April 1, 2025

Requirements for British Columbia, California, Colorado, Nevada, and Washington

References

California Appliance Efficiency (CEC) Regulations – Appliance Efficiency Rulemaking for Computers, Computer Monitors, and Signage Displays. Regulation and details are located at: http://www.energy.ca.gov/
Colorado Revised Statutes Article 7.5 Water and Energy Efficiency Standards
Nevada: Minimum Standards of Energy Efficiency for Regulated Appliances, Regulation R168-22, November 2022
Washington Appliance Efficiency Standards Chapter 286 Laws of 2019
British Columbia Energy Efficiency Standards Regulation, 14/2015

B.C. Reg. 35/2021 amending Energy Efficiency Standards Regulation B.C. Reg. 14/2015

Definitions (British Columbia)
2-in-one notebook means a notebook computer (a) with a clam shell form factor and a detachable keyboard, and (b) whose keyboard and display portions are shipped as an integrated unit;
Notebook computer means a 2-in-one notebook, mobile thin client, notebook computer with touch-sensitive screen or any other computer, other than a mobile gaming system or mobile workstation, that (a) is designed specifically for portability and to be operated for extended periods with or without a direct connection to an alternating current mains power source, and (b) is sold or offered for sale with an integrated display and physical keyboard.

Requirements (British Columbia)
Notebook computers manufactured on or after July 1, 2021, shall meet the efficiency values in the table listed under section 63, and the power management settings under section 65 of Division 3 of Part 9 of B.C. Reg No. 14/2015. An energy efficiency verification label is not required if the product is listed in California Energy Commission Modernized Appliance Efficiency Database System. For specific definitions, requirements, implementation dates and exemptions, see Part 9 of B.C. Reg No. 14/2015.

Definitions (California, Washington, Colorado)
Notebook computer means a computer designed specifically for portability and to be operated for extended periods both with and without a direct connection to an AC mains power source. A notebook computer is sold with an integrated display and a physical keyboard. The term "notebook computer" includes two-in-one notebooks, mobile thin clients, multi-screen notebooks, and notebook computer models with touch-sensitive screens. Notebook computer does not include mobile workstations or mobile gaming systems.

Requirements (California, Washington, Colorado)
See section 2.12.12 for requirements.

Requirements for South Korea
Reference
South Korea: Regulation on Energy Efficiency Labeling and Standards, MKE Notice No. 1992-71 - Amendment - (on expanding products subject to energy efficiency grade labelling, strengthening efficiency standards) Notice No. 2024-001

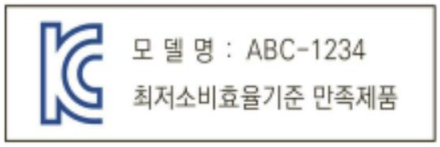
Definitions
Computer means a device that performs logical operations and processes data. A computer can use input devices and displays, but these devices do not have to be included with the computer when shipped. A computer consists of at least the following:

a. A central processing unit (CPU) that performs tasks. In the absence of a CPU, the device must act as a client gateway to a server acting as a computational CPU.
b. User input devices such as keyboard, mouse, or touchpad.
c. An integrated display screen or the ability to support an external display screen to output information.

Laptop means a is a computer designed with an emphasis on portability and can be used for a certain period of time by connecting directly to or disconnecting from an external power supply (EPS) or AC mains power. A laptop computer includes a built-in display, a non-removable physical keyboard, and a pointing device.

Requirements
Beginning on Jan 1, 2025, desktop computers must comply with the minimum energy efficiency standards as set out in the Korean Regulation on Energy Efficiency Labeling and Standards, Schedule 1, section 49 (computers) January 2, 2024, and be tested in accordance with these standards. A copy of the Korean energy test report must be supplied to IBM.

Label
Computers must be tested and labeled in accordance with the Korean Regulation on Energy Efficiency Labeling and Standards, January 2, 2024. The required label is in the Figure below. The label shall be on the front, top, or rear of the product. Please note that "ABC-1234" represents the model number of the computer.



2.12.4 Workstations

Requirements for the EU, Switzerland, Liechtenstein, Norway, Jordan, Turkey, and other jurisdictions as applicable

References

EU Commission Regulation No 617/2013 of 26 June 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for computers and computer servers
EU Regulation 1275/2008 for ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment (repealed in the EU)
EU Commission Regulation No 801/2013 of 22 August 2013 amending Regulation (EC) No 1275/2008 with regard to ecodesign requirements for standby, off mode electric power consumption of electrical and electronic household and office equipment
EU Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products
Israel Energy Sources (Maximum Electric Power in Standby Mode for Home and Office Appliances), 5771-2011 Regulations
Jordan JSNO 2090/2013 Technical Regulation on eco-design requirements for energy related products
Jordan JSNO 2109/2013 Technical Regulation on eco-design requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment
Turkey: Ecodesign Requirements for Standby, Off and Networked Standby Mode Electric Power Consumption of Electrical and Electronic Household and Office Equipment, Communiqué (2008/1275/EC) (SGM: 2021/13)

Requirements

See Section 2.12.14 for energy requirements for EMC Class B (in accordance with EN55022:2006+A1:2007 or EN55022:2010) equipment including workstations.
See section 2.12.12 for EU Ecodesign requirements

Requirements for British Columbia, California, Colorado, Nevada, and Washington

References

California Appliance Efficiency (CEC) Regulations – Appliance Efficiency Rulemaking for Computers, Computer Monitors, and Signage Displays. Regulation and details are located at: http://www.energy.ca.gov/
Colorado Revised Statutes Article 7.5 Water and Energy Efficiency Standards
Nevada: Minimum Standards of Energy Efficiency for Regulated Appliances, Regulation R168-22, November 2022
Washington Appliance Efficiency Standards Chapter 286 Laws of 2019
British Columbia Energy Efficiency Standards Regulation, 14/2015
B.C. Reg. 35/2021 amending Energy Efficiency Standards Regulation B.C. Reg. 14/2015

Definitions (British Columbia)

Workstation means a computer that
(a) is used for computation-intensive tasks, including graphics, computer-aided design, software development and financial or scientific applications,
(b) in its as-shipped configuration, does not support altering frequency or voltage beyond the CPU and the manufacturer's operating specifications for the GPU,
(c) has system hardware that supports error-correcting code that detects and corrects errors with dedicated circuitry on and across the CPU, interconnect and system memory, and
(d) meets 2 or more of the following criteria:
(i) the computer supports one or more discrete GPUs or discrete compute accelerators;

(ii) the computer supports 4 or more lanes of peripheral component interconnect-express, other than discrete GPUs, connected to accessory expansion slots or ports where each lane has a bandwidth of 8 gigabits per second or more;
(iii) the computer provides multi-processor support for 2 or more physically separate processor packages or sockets;
(iv) the computer has received 2 or more independent software vendor product certifications or is being reviewed for 2 or more certifications.

Requirements (British Columbia)
Workstations manufactured on or after July 1, 2021, shall meet the efficiency values in the table listed under section 74, and the power management settings under section 76 of Division 5 of Part 9 of B.C. Reg No. 14/2015. An energy efficiency verification label is not required if the product is listed in California Energy Commission Modernized Appliance Efficiency Database System. For specific definitions, requirements, implementation dates and exemptions, see Part 9 of B.C. Reg No. 14/2015.

Definitions (California, Washington, Colorado)
Workstation means a computer used for graphics, computer-aided design (CAD), software development, financial, or scientific applications, among other computation intensive tasks. A workstation covered by this specification must meet the following criteria:
(1) Product as shipped does not support altering frequency or voltage beyond the computer processing unit and GPU manufacturers' operating specifications;
(2) Has system hardware that supports error-correcting code (ECC) that detects and corrects errors with dedicated circuitry on and across the CPU, interconnect, and system memory; and
(3) Meets two or more of the following criteria:
(A) Supports one or more discrete GPU or discrete compute accelerators.
(B) Supports four or more lanes of PCI-express, other than discrete GPU, connected to accessory expansion slots or ports where each lane has a bandwidth of 8 gigabits per second (Gb/s) or more.
(C) Provides multi-processor support for two or more physically separate processor packages or sockets. This requirement cannot be met with support for a single multi-core processor.
(D) Has qualified or is currently being reviewed for qualification by two or more independent software vendor (ISV) product certifications.

Requirements (California, Washington, Colorado)
See section 2.12.12 for requirements.

2.12.5 Switches

Requirements for Japan
These requirements are from Japan Ordinance No. 39 of the Ministry of Economy, Trade and Industry (METI) amending the Japan Enforcement Regulation of the Law Concerning the Rational Use of Energy.

Definitions
Switch – Switching apparatus specified by a Cabinet Order set forth in Paragraph 1 of Article 78 of the Law shall be defined in Article 21 in Enforcement Ordinance of the Law Concerning the Rational Use of Energy as below:
(xxiii) Switching apparatus (referring to apparatus which transmit and receive telecommunication signals and are capable of selecting, in the transmission of telecommunication signals, such a path as is provided for in the preceding item (i) for each destination from among a plurality of paths through which the said apparatus may transmit telecommunication signals and of transmitting telecommunication signals to each destination through the said path selected (limited to such apparatus used exclusively for telecommunications via the Internet, excluding those capable of wireless communications and other matters specified by an Ordinance of the METI)).

The exclusion from application for switching apparatus prescribed by an Ordinance of the METI as set forth in Article 21, item (xxiii) of the Enforcement Order shall be as follows:
(i) Those which do not transmit or exchange any Ethernet frames;
(ii) Those which transmit and exchange Internet Protocol packets;
(iii) Those with connection ports for transmitting and/or receiving telecommunications signals, half or more of which use a two-wire connection mode;
(iv) Those designed to be capable of being incorporated into items such as a housing or computer;

(v) Those intended to control a device that wirelessly relays telecommunication signals;
(vi) Those intended mainly for use as a power supply, as specified by the Minister of Economy, Trade and Industry.

Requirements
Switch suppliers must provide to IBM the following information with respect to the energy efficiency ratio of an applicable Switch in order to meet the Japanese Energy Savings law:
(a) Product names, including manufacturer's name,
(b) Category letter and the Standard Energy Efficiency Ration,
(c) Line speed for a port during measurement and the number of ports per line speed,
(d) Maximum effective transmission speed at a frame length of 1,518 bytes,
(e) Maximum supply capability achieved by Power over Ethernet (limited to Switches with the Power over Ethernet function), and
(f) Energy efficiency ratio.
The above information must be included in a prominent location in a product catalog where either the performance of the Switch is indicated or in a document used for the selection of a Switch.

Requirements for the EU and other CE Marking jurisdictions
References
EU Commission Regulation 2023/826 ecodesign requirements for off mode, standby mode, and networked standby energy consumption of electrical and electronic household and office equipment pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulations (EC) No 1275/2008 and (EC) No 107/2009
EU Regulation 1275/2008 for ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment (repealed in the EU)
EU Commission Regulation No 801/2013 of 22 August 2013 amending Regulation (EC) No 1275/2008 with regard to ecodesign requirements for standby, off mode electric power consumption of electrical and electronic household and office equipment
EU Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products
Israel Energy Sources (Maximum Electric Power in Standby Mode for Home and Office Appliances), 5771-2011 Regulations
Jordan JSNO 2090/2013 Technical Regulation on eco-design requirements for energy related products
Jordan JSNO 2109/2013 Technical Regulation on eco-design requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment
Turkey: Ecodesign Requirements for Standby, Off and Networked Standby Mode Electric Power Consumption of Electrical and Electronic Household and Office Equipment, Communiqué (2008/1275/EC) (SGM: 2021/13)

Requirements
See Section 2.12.14 for further requirements for EMC Class B switches and routers which are not rack mounted.

2.12.6 Routers

Requirements for Japan
These requirements are from Japan Ordinance No. 39 of the METI amending the Japan Enforcement Regulation of the Law Concerning the Rational Use of Energy. English translation is not yet available from the Japan Ministry.

Definitions
Router – Router apparatus specified by a Cabinet Order set forth in Paragraph 1 of Article 78 of the Law shall be defined in Article 21 in Enforcement Ordinance of the Law Concerning the Rational Use of Energy as below:
(xxii) Routing apparatus (referring to apparatus which transmit and receive telecommunication signals and are capable of identifying, in the transmission of telecommunication signals, the path that is the most appropriate of the existing plurality of paths to the destination apparatus according to circumstances such as the conditions of the said paths, and of transmitting the said telecommunication signals through the said path identified as being the most appropriate (limited to such apparatus used exclusively for telecommunications transmission via the Internet, excluding those used for connecting a communication terminal to the Internet via a telephone line for the purpose of telephoning an Internet-access service provider to connect the said communication terminal to the Internet, and other matters specified by an Ordinance of the METI.))

Exclusions from application for the Routing apparatus prescribed by an Enforcement Regulation of the METI as set forth in Article 48, item (20) of the Enforcement regulations shall be as follows:
(i) Those which do not transmit or exchange Internet Protocol packets;
(ii) Those which transmit Internet Protocol packets at a speed, in terms of the maximum sum of signal bits of the said packets transmitted per unit time, in excess of 200 megabits per second (excluding those listed in item (vi));
(iii) Those equipped with a device intended for the use of Asynchronous Transfer Mode that cannot be easily removed;
(iv) Those with the capability to superimpose a high-frequency current of 10 kilohertz or higher upon a power line;
(v) Those with connection ports for transmitting and/or receiving telecommunication signals, at least three of which (excluding such connection ports which use Internet Protocol) are intended for transmitting and/or receiving audio signals;
(vi) Those which wirelessly transmit Internet Protocol packets at a speed, in terms of the maximum sum of signal bits of the said packets transmitted per unit time, in excess of 100 megabits per second;
(vii) Those with the capability to use an artificial satellite;
(viii) Those with the capability to multiplex and then transmit 53 subcarriers or more by an orthogonal frequency division multiplex system;
(ix) Those with the capability to set up a virtual closed network;
(x) Those designed to be capable of being incorporated into items such as a computer.

Requirements
Router suppliers must provide IBM the following information with respect to the energy efficiency ratio of an applicable Router to meet the Japanese Energy Savings law:
(a) Product names, including manufacturer's name,
(b) Category letter and the Standard Energy Efficiency Ratio,
(c) Availability of 2.4 GHz band wireless output power (for Routers falling under category C, limited to cases of 2.4 GHz band wireless transmission only or of simultaneous transmission of waves of the two frequency bands),
(d) Availability of 5 GHz band wireless output power (for Routers falling under Category C, limited to cases of 5 GHz band wireless transmission only or of simultaneous transmission of waves of the two frequency bands), and
(e) Energy efficiency ratio.
The above information must be included in a prominent location in a product catalog where either the performance of the Router is indicated or in a document used for the selection of a Router.

Requirements for the EU and other CE Marking jurisdictions
References
EU Commission Regulation 2023/826 ecodesign requirements for off mode, standby mode, and networked standby energy consumption of electrical and electronic household and office equipment pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulations (EC) No 1275/2008 and (EC) No 107/2009
EU Regulation 1275/2008 for ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment (repealed in the EU)
EU Commission Regulation No 801/2013 of 22 August 2013 amending Regulation (EC) No 1275/2008 with regard to ecodesign requirements for standby, off mode electric power consumption of electrical and electronic household and office equipment
EU Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products
Israel Energy Sources (Maximum Electric Power in Standby Mode for Home and Office Appliances), 5771-2011 Regulations
Jordan JSNO 2090/2013 Technical Regulation on eco-design requirements for energy related products
Jordan JSNO 2109/2013 Technical Regulation on eco-design requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment
Turkey: Ecodesign Requirements for Standby, Off and Networked Standby Mode Electric Power Consumption of Electrical and Electronic Household and Office Equipment, Communiqué (2008/1275/EC) (SGM: 2021/13)

Requirements
See Section 2.12.14 for further requirements for EMC Class B switches and routers which are not rack mounted.

2.12.7 Motors

Requirements for the USA
References
USA: Energy Efficiency Program for Certain Commercial and Industrial Equipment, Rules, 10 CFR 431, 1999 - Amendment - (on Energy Conservation Standards for Electric Motors) Direct Final Rule, 88 FR 36066, June 2023

Electric Motors as defined in the US Code of Federal Regulations (CFR), "electric motor" means a machine that converts electrical power to rotational mechanical power. The scope of an electric motor only includes the subset of electric motors regulated in 10 CFR 431, Subpart B

Small Electric Motors as defined in the US Code of Federal Regulations (CFR), "small electric motor" means a National Electrical Manufacturers Association (NEMA) general purpose alternating current single-speed induction motor built in a two-digit frame series in accordance with NEMA Standards Publication MG1-1987, including International Electrotechnical Commission (IEC) metric equivalent motors. The scope of a small electric motor only includes the small electric motors regulated in 10 CFR 431, Subpart X and does not include those electric motors regulated in 10 CFR 431, Subpart B.

Manufacturer of the motor must supply IBM with a copy of the tested motor's certification document from the certified testing agency.

Definitions
Electric motor means a machine that converts electrical power to rotational mechanical power.
Additionally, DOE regulates motors that meet all the following requirements:

(1) Is a single-speed, induction motor,
(2) Is rated for continuous duty (MG 1) operation or for duty type S1 (IEC),
(3) Contains a squirrel-cage (MG 1) or cage (IEC) rotor,
(4) Operates on polyphase alternating current 60-hertz sinusoidal line power,
(5) Is rated 600 volts or less,
(6) Has a 2-, 4-, 6-, or 8-pole configuration,
(7) Is built in a three-digit or four-digit NEMA frame size (or IEC metric equivalent), including those designs between two consecutive NEMA frame sizes (or IEC metric equivalent), or an enclosed 56 NEMA frame size (or IEC metric equivalent),
(8) Produces at least 1 horsepower (0.746 kW) but not greater than 750 horsepower (559 kW), and
(9) Meet all of the performance requirements of one of the following motor types: A NEMA Design A, B, or C motor or an IEC Design N, NE, NEY, NY or H, HE, HEY, HY motor.

For more definitions of electric motors, see 10 CFR 431.12 Definitions.

Small electric motor means a National Electrical Manufacturers Association (NEMA) general purpose alternating current single-speed induction motor, built in a two-digit frame number series in accordance with NEMA Standards Publication MG1-1987 including IEC metric equivalent motors.

For more definitions of small electric motors, see 10 CFR 431.422 Definitions.

Energy Efficiency Standards
For effective dates and standards see Annexx AAA.

Testing procedures
Test procedures for electric motors and small electric motors can be found at 10 CFR 431.18 and 10 CFR 431.44 respectively.
Nameplate Marking
Nameplate marking requirements for electric motors can be found at 10 CFR 431.31.

Requirements for the EU and other jurisdictions

References

EU Regulation 2019/1781 of 1 October 2019 laying down ecodesign requirements for electric motors and variable speed drives pursuant to Directive 2009/125/EC of the European Parliament and of the Council, amending Regulation (EC) No 641/2009 with regard to ecodesign requirements for glandless standalone circulators and glandless circulators integrated in products and repealing Commission Regulation (EC) No 640/2009.

EU Regulation 2021/341 of 23 February 2021 amending Regulations (EU) 2019/424, (EU) 2019/1781, (EU) 2019/2019, (EU) 2019/2020, (EU) 2019/2021, (EU) 2019/2022, (EU) 2019/2023 and (EU) 2019/2024 with regard to ecodesign requirements for servers and data storage products, electric motors and variable speed drives, refrigerating appliances, light sources and separate control gears, electronic displays, household dishwashers, household washing machines and household washer-dryers and refrigerating appliances with a direct sales function

Israel: Energy Sources Law, 1989 - Amendment - (on import of energy efficient electrical appliances compliant with EU Declaration of Conformity), Law, November 2021

Norway: Environmentally Friendly Design of Energy-Related Products, Regulation No. 190, 2011 - Amendment - (on implementing ecodesign requirements for electric motors, transformers, and external power supplies) Regulation No. 1977, 2020.

Iceland Regulation 949/2020 on the entry into force of Commission Regulation (EU) 2019/1781 on requirements regarding ecological design of electric motors and rotational speed controls according to Directive 2009/125 / EC of the European Parliament and of the Council amending Regulation (EC)no. 641/2009 with regard to requirements regarding eco-design of independent non-capacitive circulating pumps and non-capacitive circulating pumps incorporated into products.

Turkey Ecodesign Requirements for Electric Motors and Variable Speed Drives, Communique SGM: 2021/16

United Kingdom Ecodesign for Energy-Related Products Regulations 2010, SI 2010/2617

United Kingdom Ecodesign for Energy-Related Products and Energy Information Regulations 2021, SI 2021/745

Definitions

Electric motor or motor means a device that converts electrical input power into mechanical output power in the form of a rotation with a rotational speed and torque that depends on factors including the frequency of the supply voltage and number of poles of the motor;

Mains or electric mains means the electricity supply from the grid.

Variable speed drive (VSD) means an electronic power converter that continuously adapts the electrical power supplied to a single motor to control the motor's mechanical power output according to the torque-speed characteristic of the load driven by the motor, by adjusting the power supply to a variable frequency and voltage supplied to the motor. It includes all protection devices and auxiliaries which are integrated in the VSD.

See the regulation for more definitions, a complete outline of requirements, efficiency levels and test methodology.

Scope

This Regulation applies to the following products:

(a) induction electric motors without brushes, commutators, slip rings or electrical connections to the rotor, rated for operation on a 50 Hz, 60 Hz or 50/60 Hz sinusoidal voltage, that:

(i) have two, four, six or eight poles;

(ii) have a rated voltage UN above 50 V and up to and including 1 000 V;

(iii) have a rated power output PN from 0,12 kW up to and including 1 000 kW;

(iv) are rated on the basis of continuous duty operation; and

(v) are rated for direct on-line operation;

(b) variable speed drives with 3 phases input that:

(i) are rated for operating with one motor referred to in point (a), within the 0,12 kW-1 000 kW motor rated output range;

(ii) have a rated voltage above 100 V and up to and including 1 000 V AC;

(iii) have only one AC voltage output.

The requirements in section 1, and points (1), (2), (5) to (11), and (13) of section 2 of Annex I of the EU Regulation 2019/1781 shall not apply to the following motors: *Please note that Section points 3, 4 and 12 do apply to the motors listed below.*

(a) **motors completely integrated into a product** (for example into a gear, **pump, fan or compressor**) **and whose energy performance cannot be tested independently from the product**, even with the provision of a temporary

end-shield and drive-end bearing; the motor must share common components (apart from connectors such as bolts) with the driven unit (for example, a shaft or housing) and shall not be designed in such a way that the motor can be separated in its entirety from the driven unit and operate independently. The process of separation shall have the consequence of rendering the motor inoperative;
(b) motors with an integrated variable speed drive (compact drives) whose energy performance cannot be tested independently from the variable speed drive;
(c) motors with an integrated brake which forms an integral part of the inner motor construction and can neither be removed nor powered by a separate power source during the testing of the motor efficiency;
(d) motors specifically designed and specified to operate exclusively: (i) at altitudes exceeding 4 000 meters above sea-level; (ii) where ambient air temperatures exceed 60 °C; (iii) in maximum operating temperature above 400 °C; (iv) where ambient air temperatures are less than – 30 °C; or (v) where the water coolant temperature at the inlet to a product is below 0 °C or above 32 °C;
(e) motors specifically designed and specified to operate wholly immersed in a liquid;
(f) motors specifically qualified for the safety of nuclear installations, as defined in Article 3 of Council Directive 2009/71/Euratom (8);
(g) explosion-protected motors specifically designed and certified for mining, as defined in Annex I, point 1 of Directive 2014/34/EU of the European Parliament and of the Council (9);
(h) motors in cordless or battery-operated equipment;
(i) motors in hand-held equipment whose weight is supported by hand during operation;
(j) motors in hand-guided mobile equipment moved while in operation;
(k) motors with mechanical commutators; (l) Totally Enclosed Non-Ventilated (TENV) motors;
(m) motors placed on the market before 1 July 2029 as substitutes for identical motors integrated in products placed on the market before 1 July 2021 for motors referred to in Annex I.1 (a), and before 1 July 2023 for motors referred to in Annex I.1 (b), and specifically marketed as such;
(n) multi-speed motors, i.e. motors with multiple windings or with a switchable winding, providing a different number of poles and speeds;
(o) motors designed specifically for the traction of electric vehicles.

The requirements in section 3, and points (1), (2), and (5) to (10) of section 4 of Annex I of the EU Regulation 2019/1781 shall not apply to the following VSDs: *Please note that points 3, 4 and 11 of section 4 do apply to the VSDs listed below.*
(a) VSDs integrated into a product and whose energy performance cannot be tested independently from the product, that is to say that an attempt to do so would render the VSD or the product inoperative;
(b) VSDs qualified specifically for the safety of nuclear installations, as defined Article 3 of Directive 2009/71/Euratom;
(c) regenerative drives;
(d) drives with sinusoidal input current.
(e) VSDs consisting of a single cabinet, comprising VSDs which are all in conformity with this Regulation.

Requirements
Motors, within scope of this regulation shall not be designed to be able to detect they are being tested (e.g. by recognizing the test conditions or test cycle), and to react specifically by automatically altering their performance during the test with the aim of reaching a more favorable level for any of the parameters specified in this Regulation or declared by the manufacturer in the technical documentation or included in any of the documentation provided. The energy consumption of the motors within scope of this regulation and any of the other declared parameters shall not deteriorate after a software or firmware update when measured with the same test standard originally used for the declaration of conformity. No deterioration of performance shall occur as result of rejecting the update. A software update shall never have the effect of changing the product's performance in a way that makes it non-compliant with the ecodesign requirements applicable for the declaration of conformity.

These requirements shall apply starting July 1, 2021 except for the paragraph above in regard to deterioration of performance, these requirements are effective November 14, 2019.

Energy efficiency requirements for motors shall apply according to the following timetable:
(a) from 1 July 2021:

(i) the energy efficiency of three-phase motors with a rated output equal to or above 0,75 kW and equal to or below 1 000 kW, with 2, 4, 6 or 8 poles, which are not Ex eb increased safety motors, shall correspond to at least the IE3 efficiency level set out in Table 2 or in Table 3b as appropriate (of the regulation);
(ii) the energy efficiency of three-phase motors with a rated output equal to or above 0,12 kW and below 0,75 kW, with 2, 4, 6 or 8 poles, which are not Ex eb increased safety motors, shall correspond to at least the IE2 efficiency level set out in Table 1 or in Table 3a as appropriate (of the regulation);

(b) from 1 July 2023:
(i) the energy efficiency of Ex eb increased safety motors with a rated output equal to or above 0,12 kW and equal to or below 1 000 kW, with 2, 4, 6 or 8 poles, and single-phase motors with a rated output equal to or above 0,12 kW shall correspond to at least the IE2 efficiency level set out in Table 1 or in Table 3a as appropriate (of the regulation);
(ii) the energy efficiency of three-phase motors which are not brake motors, Ex eb increased safety motors, or other explosion-protected motors, with a rated output equal to or above 75 kW and equal to or below 200 kW, with 2, 4, or 6 poles, shall correspond to at least the IE4 efficiency level set out in Table 3 or in Table 3c as appropriate (of the regulation).

Energy efficiency of motors, expressed in International Energy efficiency classes (IE), is set out in Tables 1 to 3c for different values of the motor rated output power PN, at 50 Hz or 60 Hz. IE classes are determined at rated output power (PN), rated voltage (UN), and based on 25 °C ambient reference temperature. For 50/60 Hz motors, the requirements above shall be met at both 50 Hz and 60 Hz at the rated output power specified for 50 Hz. For 50Hz or 60Hz motors the requirements above shall be met at respectively 50Hz or 60Hz at the rated output power specified respectively for 50 Hz or 60 Hz.

Product Information Requirements for Motors
The product information requirements set out in points (1) to (13) below shall be visibly displayed on:
(a) the technical data sheet or user manual supplied with the motor unless an internet link to that information is supplied with the product. A QR code may in addition be supplied with a link to the information;
(b) the technical documentation for the purposes of conformity assessment pursuant to Article 5;
(c) free access websites of the manufacturer of the motor, its authorized representative or the importer, and;
(d) the technical data sheet supplied with products in which the motor is incorporated.
As regards to the technical documentation, the information shall be provided in the order as set out in points (1) to (13). The exact wording used in the list does not need to be repeated. The information may be displayed using clearly understandable graphs figures or symbols rather than text.

From 1 July 2021 for motors referred to in Annex I.1 (a) (of the regulation), and from 1 July 2023 for motors referred to in Annex I.1 (b) (i) (of the regulation):
(1) rated efficiency (ηN) at the full, 75 % and 50 % rated load, and rated voltage(s) (UN), determined based on 25 °C ambient reference temperature, rounded to one decimal place;
(2) efficiency level: 'IE2' 'IE3' or 'IE4', as determined in the first section of this Annex;
(3) manufacturer's name or trademark, commercial registration number and address;
(4) product's model identifier;
(5) number of poles of the motor;
(6) the rated power output(s) PN or range of rated power output (kW);
(7) the rated input frequency(s) of the motor (Hz);
(8) the rated voltage(s) or range of rated voltage (V);
(9) the rated speed(s) or range of rated speed (rpm);
(10) whether single-phase or three-phase;
(11) information on the range of operating conditions for which the motor is designed:
    (a) altitudes above sea-level;
    (b) minimum and maximum ambient air temperatures including for motors with air cooling;
    (c) water coolant temperature at the inlet to the product, where applicable;
    (d) maximum operating temperature;
    (e) potentially explosive atmospheres;
(12) if the motor is considered exempt from efficiency requirement in accordance with Article 2(2) of this Regulation, the specific reason why it is considered exempt. From 1 July 2022:

(13) The power losses expressed in percentage (%) of the rated output power at the following different operating points for speed versus torque: (25;25) (25;100) (50;25) (50;50) (50;100) (90;50) (90;100) determined based on 25 °C ambient reference temperature, rounded to one decimal place; if the motor is not suited for operation at any of the operating points for speed versus torque above, then 'N.A.' or 'Not Applicable' should be indicated for such points.

The information referred to in points (1) and (2) as well as the year of manufacture shall be durably marked on or near the rating plate of the motor. Where the size of the rating plate makes it impossible to mark all the information referred to in point (1) only the rated efficiency at full rated load and voltage shall be marked. The information listed in points (1) to (13) does not need to be published on free access websites for tailor-made motors with a special mechanical and electrical design manufactured on the basis of a specific client request if this information is included in the commercial offers provided to the clients. Manufacturers shall provide information in the technical data sheet or user manual supplied with the motor on any specific precautions that must be taken when motors are assembled, installed, maintained or used with variable speed drives. For motors exempt from the efficiency requirements in accordance with point 2(m) of Article 2 of this Regulation, the motor or its packaging and the documentation must clearly indicate "Motor to be used exclusively as spare part for" and the unique model identification of the product(s) for which it is intended. For 50 Hz and 60 Hz motors, the data set out above is provided at the applicable frequency, while for 50/60 Hz motors it is sufficient to provide the data at 50 Hz, except for the rated efficiency at full load, which shall be specified at both 50Hz and 60Hz.

Efficiency Requirements for Variable Speed Drives
Efficiency requirements for variable speed drives shall apply as follows:

From 1 July 2021, the power losses of variable speed drives rated for operating with motors with a rated output power equal to or above 0,12 kW and equal to or below 1 000 kW shall not exceed the maximum power losses corresponding to the IE2 efficiency level.

Energy efficiency for VSDs, expressed in International Energy efficiency classes (IE), is determined based on the power losses as follows:

The maximum power losses of the IE2 class are 25 % lower than the reference value referred to in Table 6 (of the regulation).

Product Information Requirements for Variable Speed Drives
From 1 July 2021, the product information on variable speed drives set out in points (1) to (11) shall be visibly displayed on:
(a) the technical data sheet or user manual supplied with the VSD, unless an internet link to that information is supplied with the product. A QR code may in addition be supplied with a link to the information;
(b) the technical documentation for the purposes of conformity assessment pursuant to Article 5;
(c) free access websites of the manufacturer, its authorized representative or the importer and;
(d) the technical data sheet supplied with products in which the VSD is incorporated.

As regards to the technical documentation, the information shall be provided in the order as listed in points (1) to (11). The exact wording used in the list does not need to be repeated. It may be displayed using clearly understandable graphs figures or symbols rather than text:
(1) power losses in % of the rated apparent output power at the following different operating points for relative motor stator frequency versus relative torque-producing current (0;25) (0;50) (0;100) (50;25) (50;50) (50;100) (90;50) (90;100), as well as standby losses, generated when the VSD is powered up but is not providing current to the load, rounded to one decimal place;
(2) efficiency level: 'IE2' as determined in the third section of this annex;
(3) manufacturer's name or trademark, commercial registration number and address;
(4) product's model identifier;
(5) apparent output power or range of apparent output power (kVA);
(6) indicative motor rated power output(s) PN or range of rated power output (kW);
(7) rated output current (A);
(8) maximum operating temperature (°C);
(9) rated supply frequency(s) (Hz);

(10) rated supply voltage(s) or range of rated supply voltage (V);
(11) if the VSD is considered exempt from the efficiency requirements in accordance with Article 2(3) of this Regulation the specific reason why it is considered exempt.

The information listed above in points (1) to (11) does not need to be published on free access websites for tailor-made VSDs with special electrical design manufactured on the basis of a specific client request if this information is included in the commercial offers provided to the clients.

Nameplate Marking
The information referred to in points (1) and (2) as well as the year of manufacture shall be durably marked on or near the rating plate of the VSD. Where the size of the rating plate makes it impossible to mark all the information referred to in point (1) only the power losses in % of the rated apparent output power at (90;100), rounded to one decimal place, shall be marked.

2.12.8 Water Pumps

Requirements for the EU, Norway, Turkey, and other jurisdictions as applicable
References
EU Commission Regulation (EC) No 547/2012 (implementing Directive 2009/125/EC of the European Parliament and of the Council) with regard to ecodesign requirements for water pumps.
EU Commission communication 2012/C 402/07.
EU Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products
EU Commission Regulation 2019/1781 of 1 October 2019 laying down ecodesign requirements for electric motors and variable speed drives pursuant to Directive 2009/125/EC of the European Parliament and of the Council, amending Regulation (EC) No 641/2009 with regard to ecodesign requirements for glandless standalone circulators and glandless circulators integrated in products and repealing Commission Regulation (EC) No 640/2009.
Norway: Environmentally Friendly Design of Energy-Related Products, Regulation No. 190, 2011 - Amendment - (on implementing ecodesign requirements for electric motors, transformers, and external power supplies) Regulation No. 1977, 2020.
Iceland Regulation 949/2020 on the entry into force of Commission Regulation (EU) 2019/1781 on requirements regarding ecological design of electric motors and rotational speed controls according to Directive 2009/125 / EC of the European Parliament and of the Council amending Regulation (EC)no. 641/2009 with regard to requirements regarding eco-design of independent non-capacitive circulating pumps and non-capacitive circulating pumps incorporated into products.
United Kingdom Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations 2019, SI 2019/539
United Kingdom Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations 2020, SI 2020/1528
United Kingdom Ecodesign for Energy-Related Products and Energy Information Regulations 2021, SI 2021/745
United Kingdom Ecodesign for Energy-Related Products Regulations 2010, SI 2010/2617
EU Regulation 547/2012 establishes requirements for rotodynamic water pumps for pumping clean water, including where integrated in other products.

Definitions
Water pump is the hydraulic part of a device that moves clean water by physical or mechanical action and is of one of the following designs:

- End suction own bearing (ESOB),
- End suction close coupled (ESCC),
- End suction close coupled inline (ESCCi),
- Vertical multistage (MS-V),
- Submersible multistage (MSS).

Clean water means water with a maximum non-absorbent free solid content of 0.25 kg/m ^{3}, and with a maximum dissolved solid content of 50 kg/m ^{3}, provided that the total gas content of the water does not exceed the saturation volume. Any additives that are needed to avoid water freezing down to – 10 °C shall not be taken into account.
Rotodynamic water pump means a water pump that moves clean water by means of hydrodynamic forces.

Requirements
Annex II of this Regulation sets out the efficiency and information requirements for **rotodynamic** water pumps. Manufacturers of rotodynamic water pumps must have a conformity assessment procedure and technical documentation as set out in the regulation. Manufacturers must place the technical documentation on a free access website. These pumps must be labeled in accordance with CE or UKCA Marking requirements and a CE or UK Declaration of Conformity (DoC) certificate must be provided to IBM in accordance with Annex VI of EU Directive 2009/125/EC of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products and a schedule 1 of the Ecodesign for Energy-Related Products Regulations 2010, UKSI 2010/2617.

Where a rotodynamic water pump has a motor or variable speed drives, as defined by EU Commission Regulation 2019/1781 of 1 October 2019 laying down ecodesign requirements for electric motors and variable speed drives, the motor must meet the requirements as outlined in Section 12.2.7 in this specification for this EU regulation. Note that several of the requirements are not applicable to motors completely integrated into a product.

Requirements for Canada
Reference
Canada Energy Efficiency Regulations Amendment 16

Definitions
Clean water means water that has a maximum non-absorbent solid content of 0.25 kg/m3(0.016 lb/ft3), a maximum dissolved solid content of 50 kg/m3 (3.1 lb/ft3) and a total gas content that does not exceed the saturation volume and that may include additives necessary to prevent the water from freezing down to -10°C (14°F)

Clean water pump means a pump – with or without mechanical equipment, driver and controls, that is designed for pumping clean water – other than a fire pump, a self-priming pump, a prime-assist pump, a magnet-driven pump, a pump designed to be used in a nuclear facility, a pump designed to Canadian or United States military specifications or a pump designed and marketed for use as a pool pump, that
(a) is one of the following types:
o (i) an end suction close-coupled pump with a maximum specific speed of 5000 RPM,
o (ii) an end suction frame mounted pump with its own bearings and with a specific speed not more than 5000 RPM,
o (iii) an in-line pump, o (iv) a radially split, multi-stage, vertical, in-line diffuser casing pump, or
o (v) a submersible turbine pump with a bowl diameter not greater than 152 mm (6 in),
(b) has a shaft input power not less than 0.75 kW (1 horsepower) and not greater than 150 kW (200 horsepower) at best efficiency point and full impeller diameter;
(c) has a flow rate of 5.68 m3/h (25 US gallons/min) or greater at best efficiency point and full impeller diameter;
(d) has a maximum head of 139.9 m (459 ft) at best efficiency point and full impeller diameter;
(e) has a design temperature range that lies within -10 and 120°C (14 and 248°F); and
(f) is designed to operate with either a 2-pole or 4-pole induction motor or a non-induction motor with a nominal speed of rotation of either 1800 RPM or 3600 RPM, as determined in accordance with 10 C.F.R. Appendix A to Subpart Y of part 431, and in which the driver and impeller rotate at the same speed.

Requirements
These regulations apply to clean water pumps manufactured on or after January 27, 2020.

The energy efficiency standard that applies to a clean water pump is the maximum pump energy index set out for the applicable equipment class in USA 10 Code of Federal Register 431.465(b)(4). A clean water pump complies with the energy efficiency standard if it meets that standard when tested in accordance with testing procedures established by USA 10 Code of Federal Register Appendix A to Subpart Y of part 431 that apply to a clean water pump.
The following information must be provided to the Canadian authorities in respect of a clean water pump:
• (a) its nominal power in kilowatts;
• (b) the impeller diameter in millimeters;
• (c) its type, namely, end suction close-coupled pump, end suction frame mounted with own bearings pump, in-line pump, radially split multi-stage, vertical, in-line diffuser casing pump or submersible turbine pump;
• (d) its nominal speed of rotation collected in accordance with 10 C.F.R. Appendix A to Subpart Y of part 431;
• (e) its mode of operation, namely, constant load or variable load; and

• (f) its pump energy index value collected in accordance with 10 C.F.R. Appendix A to Subpart Y of part 431.

Requirements for United States

Reference

USA: Energy Efficiency Program for Commercial and Industrial Equipment, 10 CFR 429 and 431 - Amendment - (on standards for commercial and industrial pumps) Final Rule, 10 CFR 429.59, 10 CFR 431.465, January 2016
USA: Energy Efficiency Program for Commercial and Industrial Equipment, 10 CFR 429 and 431 - Amendment - (on test procedure for commercial and industrial pumps), Final Rule, 88 FR 17934, March 2023
USA: Energy Efficiency Program for Certain Commercial and Industrial Equipment, Rules, 10 CFR 431, 1999 and Other - Amendment - (on test procedures for circulator pumps) Final Rule, 87 FR 57264, 2022
USA: Energy Efficiency Program for Certain Commercial and Industrial Equipment, Rules, 10 CFR 431, 1999 - Amendment - (on energy efficiency standards for circulator pumps) Final Rule, 89 FR 44464, May 2024

Definitions

Clean water pump means a pump that is designed for use in pumping water with a maximum non-absorbent free solid content of 0.016 pounds per cubic foot, and with a maximum dissolved solid content of 3.1 pounds per cubic foot, provided that the total gas content of the water does not exceed the saturation volume, and disregarding any additives necessary to prevent the water from freezing at a minimum of 14 °F.

Circulator pump means is a pump that is either a wet rotor circulator pumps; a dry rotor, two-piece circulator pump; or a dry rotor, three-piece circulator pump. A circulator pump may be distributed in commerce with or without a volute.

Wet rotor circulator pump means a single stage, rotodynamic, close-coupled, wet rotor pump. Examples include, but are not limited to, pumps generally referred to in industry as CP1.

Dry rotor pump means a pump in which the motor rotor is not immersed in the pumped fluid.

Dry rotor, three-piece circulator pump means:
(1) A single stage, rotodynamic, single-axis flow, mechanically-coupled, dry rotor pump that:
(i) Has a rated hydraulic power less than or equal to 5 hp at the best efficiency point at full impeller diameter,
(ii) Is distributed in commerce with a horizontal motor, and
(iii) Discharges the pumped liquid through a volute in a plane perpendicular to the shaft.
(2) Examples include, but are not limited to, pumps generally referred to in industry as CP3.

Dry rotor, two-piece circulator pump means:
(1) A single stage, rotodynamic, single-axis flow, close-coupled, dry rotor pump that:
(i) Has a rated hydraulic power less than or equal to 5 hp at best efficiency point at full impeller diameter,
(ii) Is distributed in commerce with a horizontal motor, and
(iii) Discharges the pumped liquid through a volute in a plane perpendicular to the shaft.
(2) Examples include, but are not limited to, pumps generally referred to in industry as CP2.

Scope

The following categories of clean water pumps are in scope:
(A) End suction close-coupled (ESCC);
(B) End suction frame mounted/own bearings (ESFM);
(C) In-line (IL);
(D) Radially split, multi-stage, vertical, in-line casing diffuser (RSV);
(E) Submersible turbine (ST) pumps;
(F) Radially-split, multi-stage, horizontal, end-suction diffuser casing (RSHES);
(G) Radially-split, multi-stage, horizontal, in-line diffuser casing (RSHIL);
(H) Small vertical in-line (SVIL); and
(I) Vertical Turbine (VT).
With the following characteristics:
(A) Flow rate of 25 gpm or greater at BEP and full impeller diameter;

(B) Maximum head of 459 feet at BEP and full impeller diameter and the number of stages required for testing (see section 1.2.2 of appendix A of this subpart);
(C) Design temperature range from 15 to 250 °F;
(D) Designed to operate with either:
(1) A 2- or 4-pole induction motor; or
(2) A non-induction motor with a speed of rotation operating range that includes speeds of rotation between 2,880 and 4,320 revolutions per minute (rpm) and/or 1,440 and 2,160 rpm, and in either case, the driver and impeller must rotate at the same speed;
(E) For ST, and VT pumps, a 6-inch or smaller bowl diameter; and
(F) For ESCC and ESFM pumps, a specific speed less than or equal to 5,000 when calculated using U.S. customary units.
The following categories of circulator pumps are in scope:
Circulator pumps that are also clean water pumps, including on-demand circulator pumps and circulators-less-volute, and excluding submersible pumps and header pumps.

Requirements
The following requirements apply to clean water pumps manufactured on or after January 27, 2020.
The energy efficiency standard that applies to a clean water pump is the maximum pump energy index set out for the applicable equipment class in USA 10 Code of Federal Register 431.465(b)(4). A clean water pump complies with the energy efficiency standard if it meets that standard when tested in accordance with testing procedures established by USA 10 Code of Federal Register Appendix A to Subpart Y of part 431 that apply to a clean water pump.

Each circulator pump that is manufactured starting on May 22, 2028 and that meets the criteria in paragraphs (i)(1) through (i)(2) of this section must have a circulator energy index ("CEI") rating (as determined in accordance with the test procedure in § 431.464(c)(2)) of not more than 1.00 using the instructions in paragraph (i)(3) of this section and with a control mode as specified in paragraph (i)(4) of this section. Beginning March 20, 2023 a circulator pump complies with the energy efficiency standard if it meets that standard when tested in accordance with testing procedures established by USA 10 Code of Federal Register Appendix D to Subpart Y of part 431.

In-scope clean water pumps and circulator pumps must comply with the pump labelling requirements established by USA 10 Code of Federal Register section 431.466 to Subpart Y of part 431

2.12.9 Fans

Requirements for the EU, Jordan, Norway, Turkey, and other jurisdictions as applicable
References
EU Commission Regulation No 2024/1834 (implementing Directive 2009/125/EC of the European Parliament and of the Council) with regard to ecodesign requirements **for fans driven by motors with an electric input power between 125 W and 500 kW** and repealing Commission Regulation (EU) No 327/2011
EU Commission Regulation (EC) No 327/2011 (implementing Directive 2009/125/EC of the European Parliament and of the Council) with regard to ecodesign requirements **for fans driven by motors with an electric input power between 125 W and 500 kW.**
EU Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products
EU Commission Regulation 2019/1781 of 1 October 2019 laying down ecodesign requirements for electric motors and variable speed drives pursuant to Directive 2009/125/EC of the European Parliament and of the Council, amending Regulation (EC) No 641/2009 with regard to ecodesign requirements for glandless standalone circulators and glandless circulators integrated in products and repealing Commission Regulation (EC) No 640/2009.
These regulations must be referenced to clarify details such as definitions, product information, measurements and calculations and methodology for calculating the target energy efficiency.
Norway: Environmentally Friendly Design of Energy-Related Products, Regulation No. 190, 2011 - Amendment - (on implementing ecodesign requirements for electric motors, transformers, and external power supplies) Regulation No. 1977, 2020.
Iceland Regulation 949/2020 on the entry into force of Commission Regulation (EU) 2019/1781 on requirements regarding ecological design of electric motors and rotational speed controls according to Directive 2009/125 / EC of the European Parliament and of the Council amending Regulation (EC)no. 641/2009 with regard to requirements

regarding eco-design of independent non-capacitive circulating pumps and non-capacitive circulating pumps incorporated into products.
Jordan JSNO 2090/2013 Technical Regulation on eco-design requirements for energy related products.
Jordan JSNO 2112/2013 Technical Regulation on eco-design requirements on eco-design requirements for fans.
Turkey: Communiqué 2019/15 Eco-design Requirements for Fans Driven by Motors with an Electric Input Power Between 125 W and 500 kW.
United Kingdom Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations 2019, SI 2019/539
United Kingdom Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations 2020, SI 2020/1528
United Kingdom Ecodesign for Energy-Related Products and Energy Information Regulations 2021, SI 2021/745
United Kingdom Ecodesign for Energy-Related Products Regulations 2010, SI 2010/2617

Definitions
EU 2024/1834 definition
Fan - means a rotary-bladed machine that receives energy and utilises it by means of one or more impellers to maintain a continuous flow of air or other gas passing through it and, with a specific ratio lower than 1,1 and an output air velocity lower than 65 m/s, which can be of the following categories: axial, centrifugal, cross-flow, mixed-flow or jet, and made of at least an impeller, a motor and a stator, and includes any other significant elements that are supplied with the fan;

EU 327/2011 definition
Fan - means a rotary bladed machine that is used to maintain a continuous flow of gas, typically air, passing through it and whose work per unit mass does not exceed 25 kJ/kg, and which:
1. is designed for use with or equipped with an electrical motor with an electric input power between 125W and 500 kW ($\geq$ 125 W and $\leq$ 500 kW) to drive the impeller at its optimum energy efficiency point,
2. is an axial fan, centrifugal fan, cross flow fan or mixed flow fan,
3. May or may not be equipped with a motor when placed on the market or put into service.

More definitions, including those defining the fan type, can be found in the Regulations cited above. The regulations also further describes fans which are out of scope.

Requirements
Regulation (EU) No 327/2011 is repealed with effect from 24 July 2026. However, Annexes I, II and III to that Regulation, shall continue to apply until 24 July 2037, in relation to fans integrated into other products and in relation to spare part fans.
Units of models placed on the market between 24 July 2024 and 24 July 2026 which comply with the provisions of Regulation (EU) 2024/1834 shall be considered to comply with the requirements of Regulation (EU) No 327/2011

EU 2024/1834 requirements
Fans shall comply with the ecodesign requirements set out in points 1 to 5, Annex II of EU 2024/1834, except for fans that meet all the following criteria:
a) are integrated or placed on the market exclusively to be integrated into other products;
b) are placed on the market within the first year after the date of application of this Regulation (EU 2024/1834);
c) meet the requirements of Annex I to Regulation (EU) No 327/2011, using the calculation methods in Annex II to that Regulation, and verifiable by market surveillance authorities in accordance with Annex III to that Regulation, in line with the fan's declaration of conformity;
d) the first unit of the concerned model is placed on the market before 24 July 2026.

However, until 24 July 2037, spare part fans replacing fans placed on the market before 24 July 2026, or until the date of the last placing on the market of the last unit of the model for fans that meet the criteria (a) to (d) above, and integrated into a product, are exempt from the requirements set out in points 1 to 5, Annex II of EU 2024/1834 provided that:
a) in the range of products offered by the manufacturer /importer/authorised representative, there is no replacement fan that is fit to be integrated into the product in question which is compliant with this Regulation;
b) they comply with the information requirements set out in point 6, Annex II of EU 2024/1834;

c) they meet the requirements set out in point 2 of Annex I to Regulation (EU) No 327/2011 that were applicable at the date of placing on the market of the fan it is intended to replace, using the calculation methods in Annex II to that Regulation, and verifiable by market surveillance authorities in accordance with Annex III to that Regulation.

For complete Ecodesign requirements and applicable dates on minimum fan efficiency, product information requirements, information requirements on partial load or at specified duty, resource efficiency requirements, material efficiency product information requirements, and product information requirements for spare part fans, see points 1-6, Annex II of EU 2024/1834.

A copy of the product information sheet set out in point 2, Annex II of EU 2024/1834 and the free-access website that houses the product information sheet must be provided to IBM.

Fans in scope of this regulation and in conformance must bear the CE mark, as shown in Annex III of Directive 2009/125/EC (example in Figure 10 of this specification). This includes the manufacturers name, address, single point of contact, product identification number, and year of manufacture. The manufacture must provide IBM a Declaration of Conformity and maintain Technical Documentation in accordance with Annex IV thru VI of EU Directive 2009/125/EC

EU 327/2011 requirements

Fans placed on the market before January 1, 2015 as replacement for identical fans integrated into products which were placed on the market before January 1, 2013 are exempt. The packaging, product information, and technical documentation as required by the Regulation must clearly indicate this. Information must accompany these fans indicating that the fan shall only be used for the purpose for which it is intended.

Fans in scope of this regulation must meet the energy efficiency requirements in the table below. The efficiency requirements in the table below do not apply to fans which are designed to operate with an optimum energy efficiency at 8000 rotations per minute or more, or in applications in which the 'specific ratio' is over 1.11.

Minimum energy efficiency requirements for fans

Fan Types	Measurement category (A-D)	Efficiency category (static or total)	Power range P in kW	Target energy efficiency	Efficiency grade (N)
Axial Fan	A, C	Static	$0.125 \leq P \leq 10$	$H\ target = 2.74 \cdot \ln(P) - 6.33 + N$	40
			$10 < P \leq 500$	$H\ target = 0.78 \cdot \ln(P) - 1.88 + N$	
	B, D	Total	$0.125 \leq P \leq 10$	$H\ target = 2.74 \cdot \ln(P) - 6.33 + N$	58
			$10 < P \leq 500$	$H\ target = 0.78 \cdot \ln(P) - 1.88 + N$	
Centrifugal forward curved fan and centrifugal radial bladed fan	A, C	Static	$0.125 \leq P \leq 10$	$H\ target = 2.74 \cdot \ln(P) - 6.33 + N$	44
			$10 < P \leq 500$	$H\ target = 0.78 \cdot \ln(P) - 1.88 + N$	
	B, D	Total	$0.125 \leq P \leq 10$	$H\ target = 2.74 \cdot \ln(P) - 6.33 + N$	49
			$10 < P \leq 500$	$\eta\ target = 0.78 \cdot \ln(P) - 1.88 + N$	
Centrifugal backward curved fan without housing	A, C	Static	$0.125 \leq P \leq 10$	$\eta\ target = 4.56 \cdot \ln(P) - 10.5 + N$	62
			$10 < P \leq 500$	$\eta\ target = 1.1 \cdot \ln(P) - 2.6 + N$	
Centrifugal backward curved fan with housing	A, C	Static	$0.125 \leq P \leq 10$	$\eta\ target = 4.56 \cdot \ln(P) - 10.5 + N$	61
			$10 < P \leq 500$	$\eta\ target = 1.1 \cdot \ln(P) - 2.6 + N$	
	B, D	Total	$0.125 \leq P \leq 10$	$\eta\ target = 4.56 \cdot \ln(P) - 10.5 + N$	64
			$10 < P \leq 500$	$\eta\ target = 1.1 \cdot \ln(P) - 2.6 + N$	
Mixed flow fan	A, C	Static	$0.125 \leq P \leq 10$	$\eta\ target = 4.56 \cdot \ln(P) - 10.5 + N$	50
			$10 < P \leq 500$	$\eta\ target = 1.1 \cdot \ln(P) - 2.6 + N$	
	B, D	Total	$0.125 \leq P \leq 10$	$\eta\ target = 4.56 \cdot \ln(P) - 10.5 + N$	62
			$10 < P \leq 500$	$\eta\ target = 1.1 \cdot \ln(P) - 2.6 + N$	

Cross flow fan	B, D	Total	$0.125 \leq P \leq 10$	η target = $1.14 \cdot \ln(P) - 2.6 + N$	21
			$10 < P \leq 500$	η target = N	

Fans in scope of this regulation must have the following information visibly displayed in the technical documentation of the fan (in the order as below) and at a free access manufacturer's website:

1. overall efficiency (η), rounded to 1 decimal place,
2. measurement category used to determine the energy efficiency (A-D),
3. efficiency category (static or total),
4. efficiency grade at optimum energy efficiency point,
5. whether the calculation of fan efficiency assumed use of a variable speed drive (VSD) and if so, whether the VSD is integrated within the fan or the VSD must be installed with the fan,
6. year of manufacture,
7. manufacturer's name or trademark, commercial registration number and place of manufacturer,
8. product's model number,
9. the rated motor power input(s) (kW), flow rate(s) and pressure(s) at optimum energy efficiency,
10. rotations per minute at the optimum energy efficiency point,
11. the 'specific ratio',
12. information relevant for facilitating disassembly, recycling or disposal at end-of-life,
13. information relevant to minimize impact on the environment and ensure optimal life expectancy as regards installation, use and maintenance of the fan, and
14. Description of additional items used when determining the fan energy efficiency such as ducts that are not described in the measurement category and not supplied with the fan.

A copy of the technical documentation must be provided to IBM.

Information from numbers 1, 2, 3, 4, and 5 above, must be durably marked on or near the rating plate of the fan. For number 5, the following forms of words must be used where applicable:

1. 'A variable speed drive must be installed with this fan'
2. 'A variable speed drive is integrated within the fan'.

Manufacturers will provide information in the manual of instruction on specific precautions to be taken when fans are assembled, installed or maintained. If number 5 above indicates that a VSD must be installed with the fan, manufacturers must provide details on the characteristics of the VSD to ensure optimal use.

Fans in scope of this regulation and in conformance must bear the CE mark, as shown in Annex III of Directive 2009/125/EC (example in Figure 10 of this specification). This includes the manufacturers name, address, single point of contact, product identification number, and year of manufacture. The manufacture must provide IBM a Declaration of Conformity and maintain Technical Documentation in accordance with

- Annex VI of EU Directive 2009/125/EC and
- Jordan Technical Regulation on eco-design requirements for energy related Products JSNO 2090 and Technical Regulation on Ecodesign Requirements for Fans JSNO 10152
- Schedule 1 of Ecodesign for Energy-Related Products Regulations 2010, UKSI 2010/2617

Where a fan has a motor or variable speed drives, as defined by EU Commission Regulation 2019/1781 of 1 October 2019 laying down ecodesign requirements for electric motors and variable speed drives, the motor must meet the requirements as outlined in Section 12.2.7 in this specification for this EU regulation. Note that several of the requirements are not applicable to motors completely integrated into a product.

2.12.10 Modems

Requirements for Korea

Definitions

Modem – Modulator-demodulator. Device with nameplate output power of power supply less than or equal to 150W, that enables data transmission from computers or terminals of communication devices over cable lines. The application scope is limited to **external modems** with their own power supply device, separated from computer or communication terminals.

Requirements

The manufacturer of the modem shall provide IBM with a test report issued by one of the designated testing institutes in Annex IV of the regulation (e.g., Korea Testing Certification, Korea Electric Testing Institute, Korea Electrotechnology Research Institute, Telecommunications Technology Association) in order for IBM to submit Form A (found in the regulation) along with the issued test report to the Korea Energy Management Corporation (KEMCO).

Modems must be labeled according to Annex V of the Korean Regulation on Standby Power Reduction Program with a warning logo if they do not meet the requirements in the following table:

Low Power Mode Performance Requirements

Category	Standby Power mode (W)	Off mode(W)
xDSL Modem	≤2.0W	≤ 0.75W
Cable Modem	≤5.0W	≤ 0.75W

Peripheral device (excluding basic Modem components)	Allowable Standby Power mode (W)	Off mode(W)
Multi-port Modem	≤1.0W	-
Wireless LAN AP	≤5.0W	-

Figure 9 has an example warning logo. The minimum diameter of the logo is 2.5cm. The logo is to be labeled on the front or top side of the product or the nameplate of the product where it is visually easy to find. The logo may be monochrome, the predominant color of the product's surface, or in the colors suggested by the Korean e-Standby Regulation.

Requirements for the EU and other jurisdictions as applicable

References

EU Commission Regulation 2023/826 ecodesign requirements for off mode, standby mode, and networked standby energy consumption of electrical and electronic household and office equipment pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulations (EC) No 1275/2008 and (EC) No 107/2009

EU Regulation 1275/2008 for ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment (repealed in the EU)

EU Commission Regulation No 801/2013 of 22 August 2013 amending Regulation (EC) No 1275/2008 with regard to ecodesign requirements for standby, off mode electric power consumption of electrical and electronic household and office equipment

EU Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products

Israel Energy Sources (Maximum Electric Power in Standby Mode for Home and Office Appliances), 5771-2011 Regulations

Jordan JSNO 2090/2013 Technical Regulation on eco-design requirements for energy related products

Jordan JSNO 2109/2013 Technical Regulation on eco-design requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment

Turkey: Ecodesign Requirements for Standby, Off and Networked Standby Mode Electric Power Consumption of Electrical and Electronic Household and Office Equipment, Communiqué (2008/1275/EC) (SGM: 2021/13)

Requirements

See Section 2.12.14 for energy requirements for EMC Class B (in accordance with EN55022:2006+A1:2007 or EN55022:2010) equipment including modems.

2.12.11 Battery Chargers (including Battery Back-up Units and Uninterruptible Power Supplies)

Requirements for California, Oregon, Canada and British Columbia

References

California Energy Commission (CEC) Appliance Efficiency Regulations.

California Regulatory Advisory Backup Battery Charger Systems October 31, 2018

Oregon Act relating to minimum energy efficiency standards

Oregon House Bill 3025 Enrolled Relating to energy efficiency standards for battery charger systems, amending Oregon Revised Statutes (ORS) 469.229
US CFR Part 430.32 Energy and water conservation standards and their compliance dates
Canada Energy Efficiency Regulations 2016, Amendment SOR/2018-201
Canada Standards Association (CSA) C381.2-17 Energy performance of battery-charging systems and uninterruptible power supplies
Notice from NRCan for Energy Efficiency Regulations
British Columbia Energy Efficiency Act, Standards for Small Battery Charging Systems
British Columbia Regulatory Bulletin Energy Efficiency Standards Regulation Amendment March 2018
British Columbia Energy Efficiency Standards Regulation No. 14/2015
B.C. Reg. No. 35/2021 amending Energy Efficiency Standards Regulation B.C. Reg. No. 14/2015
Information in this section contains a subset of definitions and requirements that typically apply to IBM products. See regulations for additional definitions, requirements, effective dates, and updates.

Definitions (California, Oregon, British Columbia)
Battery or **battery pack** means an assembly of one or more rechargeable cells intended to provide electrical energy to a product, and may be in one of the following forms: (a) detachable battery: a battery that is contained in a separate enclosure from the product and is intended to be removed or disconnected from the product for recharging; or (b) integral battery: a battery that is contained within the product and is not removed from the product for charging purposes.
Battery backup or **uninterruptible power supply charger (UPS)** means a small battery charger system that is voltage and frequency dependent **(VFD**) and designed to provide power to an end use product in the event of a power outage, and includes a UPS as defined in IEC 62040-3 ed.2.0.
Battery charger system (BCS) means a battery charger coupled with its batteries or battery chargers coupled with their batteries, which together are referred to as battery charger systems. This term covers all rechargeable batteries or devices incorporating a rechargeable battery and the chargers used with them. BCS **does not include**
1. BCS that are voltage independent (VI) or voltage and frequency independent (VFI) uninterruptible power supplies (UPS) as defined by IEC 62040-3.
2. BCS that are contained completely within a larger product and that:
   (a) Provide power for data storage or for continuity within volatile cache or memory systems;
   (b) Maintain information for system use; and
   (c) The battery is not capable of powering full operation of the product when AC mains power is removed.

See regulations for additional inclusions and exclusions.

Small battery charger system means a battery charger system with a rated input power of 2 kW or less
Large battery charger system means a battery charger system with a rated input power of more than 2 kW.
Efficiency Requirements
Large Battery Charger Systems manufactured on or after January 1, 2014 shall meet the performance values in:
1. Table W-1 of the CEC Appliance Energy Regulation.
2. ORS 469.233 Section 10, chapter 418, 19(a), updated 2015.

Definitions (British Columbia)
Consumer battery charging system means a battery charging system, including a battery charging system built into another product, that (a) has an input capacity of less than 2 kW, and (b) is distributed primarily for personal use by individuals.

Excluded consumer battery charging systems
(a) an inductive battery charging system that uses (i) less than one watt in maintenance mode, (ii) less than one watt in no-battery mode, and (iii) an average of one watt or less over the duration of the charge and maintenance mode test as determined under section 5.8 of CAN/CSA C381.2-14;
(b) a battery charging system incorporated into an uninterruptible power supply system that uses no more than 0.8 + 0.0021 × Eb watts in maintenance mode;
(c) a battery analyzer or battery charging system for use in medical devices and exit signs;
(d) a battery charging system built into another product, if the other product is an energy device;
(e) a battery charging system that relies on solar energy or winding-up as its sole source of power.

Definitions (Canada)
Backup battery charger means a device that (a) is incorporated into an end-use product, including a device that is incorporated into an uninterruptible power supply or that uses an external power supply, that is designed to operate continuously using mains power; and (b) recharges a battery that is used to maintain the continuity of electrical power to the end use product such that the product can continue its full or partial operation in the event of a failure of mains power.
Battery charger means a device that charges the battery of a wheelchair, golf cart, low speed vehicle or any other end-use product. It does not include any of the following:
(a) a device that charges the battery of a vehicle other than a wheelchair, golf cart or low speed vehicle;
(b) a device that charges the battery of a medical device;
(c) a wireless battery charger, other than a wireless battery charger that is inductive and designed for wet environments; or
(d) a backup battery charger.
Battery Charger is a device that charges batteries for consumer products, including battery chargers embedded in other consumer products. [Source: CSA C381.2-17 Energy Performance of battery-charging systems and uninterruptible power supplies]

Requirements
Small Battery Charger Systems shall meet the performance values in Table W-2 of the CEC Appliance Energy Regulation. For specific requirements, implementation dates and exemptions, see CEC Appliance Energy Regulation Section 1605.3(w) (2) and ORS 469.233 Section 10, chapter 418, 19(b).

Battery backup and uninterruptible power supplies manufactured on or after February 1, 2013, for consumer products and January 1, 2017, for products that are not consumer products/products not sold at retail shall consume no more than $0.8+0.0021 \times E_b$ watts in maintenance mode where E_b is the battery capacity in watt-hours.

Battery chargers in scope of these requirements must be certified in the California Energy Commission's Modernized Appliance Efficiency Database System (MAEDBS). The battery charger must be labeled with the manufacturer's name or brand name or trademark; model number; and date of manufacture, indicating year and month or smaller (e.g. week) increment. If the date is in a code that is not readily understandable to the layperson, the manufacturer shall provide IBM the code to determine the date of manufacture.

The California Energy Commission (CEC) published an advisory that some backup battery charger systems cannot be tested in accordance with the test method. This is because they are contained within larger products and neither the backup battery charger systems' electricity consumption, nor their functions and features related to battery charging, can be separated from the larger products that contain them. In these cases, design approaches to allow separate measurements of the backup battery charger systems' energy consumption (such as employing switches to isolate the battery charger systems for testing purposes) are not possible. In recognition of this, Energy Commission staff will not refer such products to the Commission's Office of Compliance Assistance and Enforcement.

For British Columbia (BC): Products manufactured on or after June 2, 2018, are exempt from the energy efficiency verification label requirement including verification by the designated tester that the product meets the efficiency standard. The label exemption allows products which are compliant with the US Department of Energy (DOE) standards to be imported into BC without additional third-party testing. The BC energy device categories (product classes) and corresponding efficiency standard (maximum Unit Energy Consumption) are aligned with the US DOE battery charger standard (10 CFR 430.32 (z)). The testing procedure for all product categories is CSA C381.2-17 which is aligned with the U.S. DOE test standard (US CFR Title 10, Part 430, Subpart B, Appendix Y).

For Canada (requirements apply to battery chargers manufactured on or after June 13, 2019):
A battery charger must have a unit energy consumption (UEC) that is less than or equal to that set out for the battery charger's product class in Table C.1 of CSA C381.2-17. Canada has adopted the definition for battery chargers as listed in CSA C381.2-17. See definition above.

Information, as listed in the Canada Energy Regulation must be submitted to the respective Canadian minister –
a.its product class;
b.its rated battery energy (E), expressed in watt-hours;
c.its unit energy consumption expressed in kilowatt-hours per year;

d.its power, expressed in watts, when it is in active mode, maintenance mode and standby mode, respectively; and
e. if an external power supply was used to test the battery charger, the power supply's model number and the name of its manufacturer

Documentation
Proof of manufacturer statement of compliance filed with the CEC must be given to IBM prior to product shipment.

Marking
Each battery charger system must be marked with a "BC" inside a circle to meet California requirements. The marking shall be legible and permanently affixed to: (A) the product nameplate that houses the battery charging terminals or; (B) the retail packaging and, if included, the cover page of the instructions.

Examples of the compliance label:

For Canada, battery chargers must bear an energy efficiency verification mark from a certification body accredited for energy efficiency verification by the Standards Council of Canada.

Requirements for Battery Chargers for USA
References
US 10 CFR Part 430 Energy Conservation Standards for Battery Chargers
See regulations for additional definitions, requirements, effective dates, and updates.

Definitions
Battery charger means a device that charges batteries for consumer products, including battery chargers embedded in other consumer products.
Consumer product means any article (other than an automobile, as defined in Section 501(1) of the Motor Vehicle Information and Cost Savings Act):
(1) Of a type—
(i) Which in operation consumes, or is designed to consume, energy or, with respect to showerheads, faucets, water closets, and urinals, water; and
(ii) Which, to any significant extent, is distributed in commerce for personal use or consumption by individuals;
(2) Without regard to whether such article of such type is in fact distributed in commerce for personal use or consumption by an individual, except that such term includes fluorescent lamp ballasts, general service fluorescent lamps, incandescent reflector lamps, showerheads, faucets, water closets, and urinals distributed in commerce for personal or commercial use or consumption.

Requirements
Battery chargers manufactured on or after June 13, 2018, must have a unit energy consumption (UEC) less than or equal to the prescribed ''Maximum UEC'' standard when using the equations for the appropriate product class and corresponding rated battery energy as shown in the following table:

Product class	Product class description	Rated battery energy (Ebatt**)	Special characteristic or battery voltage	Maximum UEC (kWh/yr) (as a function of Ebatt**)
1	Low-Energy	≤5 Wh	Inductive Connection*	3.04
2	Low-Energy, Low-Voltage	<100 Wh	<4 V	0.1440 * E_{batt} + 2.95
3	Low-Energy, Medium-Voltage		4–10 V	For E_{batt} <10 Wh, 1.42 kWh/y E_{batt} ≥10 Wh, 0.0255 * E_{batt} + 1.16
4	Low-Energy, High-Voltage		>10 V	0.11 * E_{batt} + 3.18
5	Medium-Energy, Low-Voltage	100–3000 Wh	<20 V	0.0257 * E_{batt} + .815
6	Medium-Energy, High-Voltage		≥20 V	0.0778 * E_{batt} + 2.4
7	High-Energy	>3000 Wh		0.0502 * E_{batt} + 4.53

* Inductive connection and designed for use in a wet environment (*e.g.* electric toothbrushes).
** E_{batt} = Rated battery energy as determined in 10 CFR part 429.39(a).

TABLE V–24—APPLICATIONS IN PRODUCT CLASS 1

Product class 1
Rechargeable Toothbrushes
Rechargeable Water Jets

TABLE V–28—APPLICATIONS IN PRODUCT CLASSES 2, 3, AND 4

Product class 2	Product class 3	Product class 4
Answering Machines	Air Mattress Pumps	DIY Power Tools (External).
Baby Monitors	Blenders	Flashlights/Lanterns.
Beard and Moustache Trimmers	Camcorders	Handheld Vacuums.
Bluetooth Headsets	DIY Power Tools (External)	Netbooks.
Can Openers	DIY Power Tools (Integral)	Notebooks.
Consumer Two-Way Radios	Handheld Vacuums	Portable Printers.
Cordless Phones	LAN Equipment	Professional Power Tools.
Digital Cameras	Mixers	Rechargeable Garden Care Products.
DIY Power Tools (Integral)	Portable DVD Players	Robotic Vacuums.
E-Books	Portable Printers	Stick Vacuums.
Hair Clippers	RC Toys	Universal Battery Chargers.
Handheld GPS	Stick Vacuums	
Home Security Systems	Toy Ride-On Vehicles	
In-Vehicle GPS	Universal Battery Chargers	
Media Tablets	Wireless Speakers	
Mobile Internet Hotspots		
Mobile Phones		
MP3 Players		
MP3 Speaker Docks		
Personal Digital Assistants		
Portable Video Game Systems		
Shavers		
Smartphone		
Universal Battery Chargers		
Video Game Consoles		
Wireless Headphones		

A battery charger if it is a device that requires Federal Food and Drug Administration (FDA) listing and approval as a life-sustaining or life supporting device in accordance with section 513 of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 360(c)) is not required to meet these requirements.

Requirements for Uninterruptible Power Supplies for Colorado and Washington

References

Colorado Revised Statutes Article 7.5 Water and Energy Efficiency Standards
Washington An Act relating to appliance efficiency standards
US 10 CFR Part 430 Subpart B Appendix Y Uniform Test Method for Measuring the Energy Consumption of Battery Chargers
US 10 CFR Part 430 Energy Conservation Standards for Uninterruptible Power Supplies (prepublication final rule)
See regulations for additional definitions, requirements, effective dates, and updates.

Definitions

Uninterruptible Power Supply (UPS) means a battery charger consisting of a combination of convertors, switches and energy storage devices (such as batteries), constituting a power system for maintaining continuity of load power in case of input power failure.
Voltage and frequency dependent UPS or VFD UPS means a UPS that produces an AC output where the output voltage and frequency are dependent on the input voltage and frequency. This UPS architecture does not provide corrective functions like those in voltage independent and voltage and frequency independent systems.
Voltage and frequency independent UPS or VFI UPS means a UPS where the device remains in normal mode producing an AC output voltage and frequency that is independent of input voltage and frequency variations and protects the load against adverse effects from such variations without depleting the stored energy source.
Voltage independent UPS or VI UPS means a UPS that produces an AC output within a specific tolerance band that is independent of under-voltage or over-voltage variations in the input voltage without depleting the stored energy source. The output frequency of a VI UPS is dependent on the input frequency, similar to a voltage and frequency dependent system.

Requirements

UPSs that utilize a National Electrical Manufacturer Association (NEMA) 1-15P or 5-15P input plug and have an AC output shall have an average load adjusted efficiency that meets or exceeds the values shown in the table below based on the rated output power (P_{rated}) of the UPS, as measured in accordance with test procedures prescribed in

Appendix Y to Subpart B of Part 430 of Title 10 of the Code of Federal Regulations "Uniform Test Method for Measuring the Energy Consumption of Battery Chargers" in effect as of January 11, 2017.

Battery Charger Product Class	Rated Output Power	Minimum Efficiency
10a (VFD UPSs)	$0\ W < P_{rated} \leq 300\ W$	$-1.20E\text{-}06 * P_{rated}^2 + 7.17E\text{-}04 * P_{rated} + 0.862$
	$300\ W < P_{rated} \leq 700\ W$	$-7.85E\text{-}08 * P_{rated}^2 + 1.01E\text{-}04 * P_{rated} + 0.946$
	$P_{rated} > 700\ W$	$-7.23E\text{-}09 * P_{rated}^2 + 7.52E\text{-}06 * P_{rated} + 0.977$
10b (VI UPSs)	$0\ W < P_{rated} \leq 300\ W$	$-1.20E\text{-}06 * P_{rated}^2 + 7.19E\text{-}04 * P_{rated} + 0.863$
	$300\ W < P_{rated} \leq 700\ W$	$-7.67E\text{-}08 * P_{rated}^2 + 1.05E\text{-}04 * P_{rated} + 0.947$
	$P_{rated} > 700\ W$	$-4.62E\text{-}09 * P_{rated}^2 + 8.54E\text{-}06 * P_{rated} + 0.979$
10c (VFI UPSs)	$0\ W < P_{rated} \leq 300\ W$	$-3.13E\text{-}06 * P_{rated}^2 + 1.96E\text{-}03 * P_{rated} + 0.543$
	$300\ W < P_{rated} \leq 700\ W$	$-2.60E\text{-}07 * P_{rated}^2 + 3.65E\text{-}04 * P_{rated} + 0.764$
	$P_{rated} > 700\ W$	$-1.70E\text{-}08 * P_{rated}^2 + 3.85E\text{-}05 * P_{rated} + 0.876$

Requirements for Uninterruptible Power Supplies for the US

References

US CFR Part 430.32 Energy and water conservation standards and their compliance dates

Requirements

Uninterruptible power supplies (UPS) manufactured on and after January 10, 2022, that utilize a NEMA 1–15P or 5–15P input plug and have an AC output shall have an average load adjusted efficiency that meets or exceeds the values shown in the table below based on the rated output power (Prated) of the UPS.

Battery charger product class	Rated output power	Minimum efficiency
10a (VFD UPSs)	$0W < P_{rated} \leq 300\ W$	$-1.20E\text{–}06 * P^2_{rated} + 7.17E\text{–}04 * P_{rated} + 0.862.$
	$300\ W < P_{rated} \leq 700\ W$	$-7.85E\text{–}08 * P^2_{rated} + 1.01E\text{–}04 * P_{rated} + 0.946.$
	$P_{rated} > 700\ W$	$-7.23E\text{–}09 * P^2_{rated} + 7.52E\text{–}06 * P_{rated} + 0.977.$
10b (VI UPSs)	$0W < P_{rated} \leq 300\ W$	$-1.20E\text{–}06 * P^2_{rated} + 7.19E\text{–}04 * P_{rated} + 0.863.$
	$300\ W < P_{rated} \leq 700\ W$	$-7.67E\text{–}08 * P^2_{rated} + 1.05E\text{–}04 * P_{rated} + 0.947.$
	$P_{rated} > 700\ W$	$-4.62E\text{–}09 * P^2_{rated} + 8.54E\text{–}06 * P_{rated} + 0.979.$
10c (VFI UPSs)	$0W < P_{rated} \leq 300\ W$	$-3.13E\text{–}06 * P^2_{rated} + 1.96E\text{–}03 * P_{rated} + 0.543.$
	$300\ W < P_{rated} \leq 700\ W$	$-2.60E\text{–}07 * P^2_{rated} + 3.65E\text{–}04 * P_{rated} + 0.764.$
	$P_{rated} > 700\ W$	$-1.70E\text{–}08 * P^2_{rated} + 3.85E\text{–}05 * P_{rated} + 0.876.$

2.12.12 Computers, Small Scale Servers, Servers, Storage Products, and peripherals

Requirements for Australia and New Zealand

References

Australia Greenhouse and Energy Minimum Standards Act 2012

Australia Greenhouse and Energy Minimum Standards (Computers) Determination 2013

AS/NZS 5813.1 - Information technology equipment –Energy performance of computers Part 1: Methods of measurement of energy performance.

AS/NZS 5813.2– Information technology equipment –Energy performance of computers Part 2: Minimum energy performance standards (MEPS) for computers.

Additional details are located at: https://www.energyrating.gov.au/

Definitions

Computer means a device which performs logical operations and processes data and which, at a minimum, is composed of a central processing unit to perform operations; support for user input devices such as a keyboard, mouse, digitizer or game controller; and an integrated display screen or the ability to support an external display screen to output information or both. This includes desktop computers, integrated desktop computers, notebook computers, tablet computers, and small-scale servers which are designed to be connected to 230 or 240 volts mains voltage via:

(a) A direct connection; or

(b) An external power supply permanently connected to the product; or

(c) An external power supply that can be disconnected from the product.

Products not covered by this requirement include hand-held computing devices, game consoles, handheld gaming devices, blade personal computers, workstations, mobile workstations, computer servers that are not small-scale servers, slate computers, thin client computers, and high-end Category D computers (which include computers with four or more physical processor cores; and a discrete GPU greater than or equal to category G5 with a data width greater than or equal to 192 bits; and system memory greater than or equal to 6 gigabytes; and greater than or equal to two channels of memory; and greater than or equal to 2 PICEs slot single-ended points of x8 or x16 configuration; and a power supply unit of greater than or equal to 500W nameplate output rating.
Small-scale server is a computer which is designed to be a storage host for other computers; is marketed for home or small office use; uses a desktop computer form factor and includes all data processing, storage and network components in the one form factor; is designed to be operational at all times and to have little or no unscheduled downtime; and is capable of operating in a simultaneous multi-user environment serving several users through networked client units.

Requirements
Computers must comply with the Minimum Energy Performance Standards (MEPS) as set out in AS/NZS 5813.1 and 5813.2 and be tested in accordance with these standards. These computers must be registered in Australia and New Zealand.

Requirements for the EU and other CE Marking jurisdictions
References
EU Commission Regulation No 617/2013 of 26 June 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for computers and computer servers (Note: These requirements are no longer in effect for computer servers for the European Union.)
EU Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products
EU Guidelines accompanying Commission Regulation (EU) No 617/2013 June 2014
Ukraine Approving Technical Regulation on ecodesign requirements for computers and computer servers, Resolution No. 737, 2019
Turkey: Ecodesign Requirements for Computers and Computer Servers, Communiqué (617/2013/EU) (SGM: 2021/14)
United Kingdom Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations 2019(S.I. 2019/539)
United Kingdom Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations 2020, SI 2020/1528
United Kingdom Ecodesign for Energy-Related Products Regulations 2010, SI 2010/2617
Israel: Energy Sources Law, 1989 - Amendment - (on import of energy efficient electrical appliances compliant with EU Declaration of Conformity), Law, November 2021

Definitions
Computer servers: a computing product that provides services and manages networked resources for client devices, such as desktop computers, notebooks computers, desktop thin clients, internet protocol (IP) telephones, or other computer servers. A computer server is typically placed on the market for use in data centers and office/corporate environments. A computer server is primarily accessed via network connections, and not through direct user input devices such as a keyboard or a mouse. A computer server has the following characteristics:
a. is a designed to support computer server operating systems (OS) and/or hypervisors, and targeted to run user-installed enterprise applications;
b. supports error-correcting code (ECC) and/or buffered memory (including both buffered dual in-line memory modules (DIMMS) and buffered on board (BOB) configurations)
c. is placed on the market with one or more AC-DC power supplies
d. All processors have access to shared system memory and are independently visible to a single OS hypervisor.
Small-scale server: a type of computer that **typically uses desktop computer components in a desktop form factor** but is designed primarily to be a storage host for other computers and to perform functions such as providing network infrastructure services and hosting data/ media, and which has the following characteristics:
(a) Is designed in a pedestal, tower, or other form factor similar to those of desktop computers such that all data processing, storage, and network interfacing is contained within one box;
(b) Is designed to be operational 24 hours per day and 7 days per week;

(c) Is primarily designed to operate in a simultaneous multi-user environment serving several users through networked client units;
(d) Where placed on the market with an operating system, the operating system is designed for home server or low-end server applications;
(e) Is not placed on the market with a discrete graphics card (dGfx) meeting any classification other than G1;

The Regulation **shall not apply** to control units which are not designed and not sold to be used as standalone or terminal computers, but are designed to be incorporated into or to be permanently connected to industrial machines/products/solutions. An example includes computer integrated into medical equipment, is not in scope of the Regulation, unless it is a computer without specific customization and just bundled with the medical equipment. Another example includes Notebook-computers and similar mobile devices with special cases, sold for configuring and diagnosing industrial machines and equipped for that purpose with special non standardized computer interfaces and cards for industrial field buses, for measurement or analysis, acquisition cards, software configurations customized by a vendor, etc. and these are not in scope of this EU Regulation.

See EU Regulation No 617/2013, Turkey Ecodesign Regulation, United Kingdom SI 2019/539 and Ukraine Technical Regulation with regard to ecodesign requirements for computers and computer servers and the accompanying Guidelines for additional definitions and information.

This Regulation shall apply to the following product that can be powered directly from the **mains** alternating current **(AC)** including via an external or internal power supply:
(a) Desktop computers;
(b) Integrated desktop computers ;
(c) Notebook computers (including tablet computers, slate computers and mobile thin clients) ;
(d) Desktop thin clients;
(e) Workstations;
(f) Mobile workstations:
(g) Small-scale servers;
(h) Computer servers.
This Regulation **shall not apply** to the following product groups:
(a) Blade system and components;
(b) Server appliances ;
(c) Multi-node servers ;
(d) **Computer servers with more than four processor sockets**;
(e) Game consoles;
(f) Docking stations.

(Note: These requirements are no longer in effect for computer servers for the European Union, United Kingdom, and Turkey, but are still in effect for the Ukraine.)

Requirements
Beginning-February 21, 2023 (Ukraine), computer server power supplies must meet the following efficiency requirements. These requirements are similar to 80Plus Silver. These requirements are no longer in effect for computer servers for the European Union, United Kingdom, and Turkey, but are still in effect for the Ukraine regulations.

Single Output AC-DC power supply	<500W		500W - 1000W		>1000W	
Load	Efficiency	Power Factor	Efficiency	Power Factor	Efficiency	Power Factor
10%	70%	-	75%	0.65	80%	0.8
20%	82%	0.8	85%	0.8	88%	0.9
50%	89%	0.9	89%	0.9	92%	0.9
100%	85%	0.95	85%	0.95	88%	0.95

Multi-output (AC-DC) power supplies shall not perform at less than:
(a) 85% efficiency at 50 % of rated output;
(b) 82% efficiency at 20 % and 100 % of rated output, and

(a) Power factor 0.8 at 20 % of rated output;

(b) Power factor 0.9 at 50 % of rated output;
(c) Power factor 0.95 at 100 % of rated output.

Additionally, beginning February 21, 2021 (Ukraine), the following information will need to be **provided by the manufacturer and publicly available on a free-access website**: (Note: These requirements are no longer in effect for computer servers for the European Union, United Kingdom and Turkey but are still in effect for the Ukraine Regulations.)

a. Product type (such as computer server);
b. manufacturer's name and address at which they can be contacted;
c. product model number;
d. year of manufacture;
e. internal/external power supply efficiency;
f. test parameters for measurements:
   - test voltage in V and frequency in Hz,
   - total harmonic distortion of the electricity supply system,
   - Information and documentation on the instruments, set-up and circuits used for electrical testing.
g. maximum power (Watts);
h. idle state power (Watts);
i. sleep mode power (Watts);
j. off mode power (Watts);
k. noise levels (the declared A-weighted sound power level of the computer);
l. The measurement methodology used to determine information mentioned in points (e) to (k).

If a product model is placed on the market in multiple configurations the product information required above may be reported once per product category, for the highest power-demanding configuration available within that product category. A list of all model configurations that are represented by the model for which the information is reported shall be included in the information provided.

Computer servers shall be labeled in accordance with CE marking requirements in EU Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products. This marking includes the CE mark (minimum height of 5mm), manufacturer's name, single point of contact, and date of manufacture in a human readable format. An EC Declaration of Conformity must be provided to IBM by the manufacturer of the computer server in accordance to the above Directive. The manufacturer must maintain the Technical Documentation per the requirements in the above Directive.

Requirements for British Columbia, California, Colorado, Hawaii, Nevada, Oregon, Vermont, and Washington

References

British Columbia Energy Efficiency Standards Regulation No. 14/2015
B.C. Reg. No. 35/2021 amending Energy Efficiency Standards Regulation B.C. Reg. No. 14/2015
California Appliance Efficiency (CEC) Regulations – Appliance Efficiency Rulemaking for Computers, Computer Monitors, and Signage Displays. Regulation and details are located at: http://www.energy.ca.gov/
Colorado Revised Statutes Article 7.5 Water and Energy Efficiency Standards
Hawaii: Adoption of Water and Energy Efficiency Standards, House Bill 556, Act 141, 2019
Nevada: Minimum Standards of Energy Efficiency for Regulated Appliances, Regulation R168-22, November 2022
Oregon: State-Regulated Appliance Efficiency Standards, OAR 330-092, Amendment (on efficiency standards, product definitions, conformance and certification), Final Rule, OAR 330-92-010-020, August 2020
Vermont: Energy Efficiency Standards For Appliances, 9 V.S.A. 2791 -2798 - Amendment - (on standards for electronics, lighting and water appliances), House Bill 410, Act 139, 2018

Washington Appliance Efficiency Standards Chapter 286 Laws of 2019

Definitions

Computer means a device that performs logical operations and processes data. A computer includes both stationary and portable units and includes a desktop computer, a portable all-in-one, a notebook computer, a mobile gaming

system, a high expandability computer, a small-scale server, a thin client, and a workstation. Although a computer is capable of using input devices and displays, such devices are not required to be included with the computer when the computer is shipped. A computer is composed of, at a minimum:
(1) A central processing unit (CPU) to perform operations or, if no CPU is present, then the device must function as a client gateway to a server and the server acts as a computational CPU;
(2) Ability to support user input devices such as a keyboard, mouse, or touchpad; and
(3) An integrated display screen or the ability to support an external display screen to output information.
The term "computer" does not include a tablet, a game console, a television, a small computer device, a server other than a small-scale server, or an industrial computer.
Industrial computer means any of the following:
(1) A process controller that is designed specifically to automate an industrial, medical, or laboratory process.
(2) A computer that is integrated into the chassis of industrial, medical, or laboratory equipment that contains more than a computer, and that is designed specifically to perform logical operations and process data for an industrial, medical, or laboratory product using product-specific software.
Small-scale server means a computer that **uses desktop components** in a desktop form factor but that is designed to be a storage host for other computers. A small-scale server is designed to perform functions such as providing network infrastructure services (for example, archiving) and hosting data and media. This product is not designed to process information for other systems or run Web servers as a primary function. A small-scale server has all the following characteristics:
(1) Designed in a pedestal, tower, or other form factor similar to those of desktop computers such that all data processing, storage, and network interfacing is contained within one box or product;
(2) Designed to operate continuously, except for maintenance;
(3) Capable of operating in a simultaneous multi-user environment serving several users through networked client units; and
(4) Designed for an industry-accepted operating system for home or low-end server applications (e.g., Windows Home Server, Mac OS X Server, Linux, UNIX, Solaris).
See the CEC Regulations for additional definitions and details.

Requirements
Desktop computers, thin clients, mobile gaming systems, portable all-in-ones, and notebook (laptop) computers manufactured on or after January 1, 2019, shall:
(A) Comply with Table V-7 in the California Appliance Efficiency Regulations; and
(B) Be shipped with power management settings that do both of the following:
1. Transition the computer into either the computer sleep mode or computer off mode within 30 minutes of User inactivity. If the transition is to a computer sleep mode, that sleep mode shall either:
i. Be a computer sleep mode as described in ACPI as S3; or
ii. Consume power less than or equal to the values shown in Table V-6.
2. Transition connected displays into sleep mode within 15 minutes of user inactivity.
(C) If the model is shipped at the purchaser's request with either a limited capability operating system or without an operating system, or if the model is not capable of having an operating system, the model is not required to comply with (B) above.
(D) Desktop computers and thin clients assembled before July 1, 2021, entirely from parts manufactured before September 1, 2018 are not required to comply with (A) above.

Small-scale servers, high expandability computers, mobile workstations, and workstations manufactured on or after January 1, 2018, shall:
(A) Be powered by an internal power supply that meets or exceeds the standards in Table V-9 in the California Appliance Efficiency Regulations, or an external power supply that meets the level VI of efficiency described in the *International Efficiency Marking Protocol for External Power Supplies Version 3.0* (Sept. 2013);
(B) Incorporate Energy-Efficient Ethernet functionality;
(C) Transition connected displays into sleep mode within 15 minutes of user inactivity; and
(D) Transition the computer into either the computer sleep mode or computer off mode within 30 minutes of user inactivity. If the transition is to a computer sleep mode, that sleep mode shall either:
1. Be a computer sleep mode as described in ACPI as S3; or
2. Consume power less than or equal to the values shown in Table V-6.
Small-scale servers and rack-mounted workstations are not required to comply with (D) above.

These products must be labeled with the manufacturer's name, model number and date of manufacture. Manufacturers of these products must file a statement and applicable data with the State of California for each of the above products sold or offered for sale in California.

See California Appliance Efficiency (CEC) Regulations – Appliance Efficiency Rulemaking for Computers, Computer Monitors, and Signage Displays for additional definitions, test methods and details.

Note: California enforcement dates precede those of British Columbia, Colorado, Hawaii, Oregon, Vermont, and Washington.

Additional Requirements for Original Equipment Manufacturer (OEM) designed servers with an IBM logo

References

ENERGY STAR® Program Requirements for Computer Servers Version 2.1 at https://www.energystar.gov/products/spec/enterprise_servers_specification_version_2_1_pd

80 PLUS® performance specification

American Society of Heating, Refrigerating, and Air-conditioning Engineers (ASHRAE) Thermal Guidelines for Data Processing Environments, 3rd Edition.

National Sanitation Foundation International Standard/ American National Standard NSF/ANSI 426-2017 Environmental Leadership and Corporate Social Responsibility Assessment of Servers

Definitions

Computer server: Hardware system providing services and manage networked resources for client devices (e.g., desktop computers, notebook computers, thin clients, wireless devices, PDAs, IP telephones, other computer servers or other network devices). The definition of computer server aligns with ENERGY STAR Program Requirements for Computer Servers 2.1. A computer server:

- Is sold through enterprise channels for use in data centers and office/corporate environments;
- Is primarily accessed via network connections, versus directly-connected user input devices such as a keyboard or mouse;
- Is marketed and sold as a computer server;
- Is designed for and listed as supporting one or more computer server operating systems (OS) and, or hypervisors;
- Is targeted to run user-installed applications typically, but not exclusively, enterprise in nature;
- Provides support for error-correcting code (ECC) and, or buffered memory (including both buffered dual in-line memory modules (DIMMs) and buffered on board (BOB) configurations);
- Is packaged and sold with one or more AC-DC or DC-DC power supplies; and
- Is designed such that all processors have access to shared system memory and are visible to a single OS or hypervisor.

The following products are excluded from the requirements in this section:

- Fully Fault Tolerant Servers,
- Server Appliances,
- High Performance Computing Systems,
- Large Servers,
- Storage Products including Blade Storage, and
- Network Equipment.

See ENERGY STAR Program Requirements for Computer Servers Version 2.1 for definitions of the above product types.

Server Appliance: A computer server that is bundled with a pre-installed OS and application software that is used to perform a dedicated function or set of tightly coupled functions. Server appliances deliver services through one or more networks (e.g., IP or SAN), and are typically managed through a web or command line interface. Server appliance hardware and software configurations are customized by the vendor to perform a specific task (e.g., name services, firewall services, authentication services, encryption services, and voice-over-IP (VoIP) services), and are not intended to execute user-supplied software.

Requirements

Computer servers designed by an OEM which will have an IBM logo, or a logo owned by IBM must design the product to conform to the latest level of the ENERGY STAR® Program Requirements for Computer Servers. As of

the time of publication of this specification the latest level is Version 2.1. Note: Server Appliances are exempt from this requirement.

The power supplies in the product must be rated through the 80 Plus program and listed in the 80 Plus Program and on the 80 Plus® website http://www.plugloadsolutions.com/80PlusPowerSupplies.aspx. A test report from an independent, third-party laboratory demonstrating conformance with 80 PLUS® Gold requirements or higher is required.

2.12.13 Removed

2.12.14 EMC Class B Equipment

Requirements for the EU and other jurisdictions

References

EU Commission Regulation 2023/826 ecodesign requirements for off mode, standby mode, and networked standby energy consumption of electrical and electronic household and office equipment pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulations (EC) No 1275/2008 and (EC) No 107/2009

EU Regulation 1275/2008 for ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment (repealed in the EU)

EU Commission Regulation No 801/2013 of 22 August 2013 amending Regulation (EC) No 1275/2008 with regard to ecodesign requirements for standby, off mode electric power consumption of electrical and electronic household and office equipment,

EU Regulation 2019/2021 laying down ecodesign requirements for electronic displays pursuant to Directive 2009/125/EC, amending Commission Regulation No 1275/2008.

EU Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products

EU Guidelines accompanying Commission Regulation (EU) No 617/2013 June 2014

Israel Energy Sources (Maximum Electric Power in Standby Mode for Home and Office Appliances), 5771-2011 Regulations

Jordan JSNO 2090/2013 Technical Regulation on eco-design requirements for energy related products

Jordan JSNO 2109/2013 Technical Regulation on eco-design requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment

Turkey: Ecodesign Requirements for Standby, Off and Networked Standby Mode Electric Power Consumption of Electrical and Electronic Household and Office Equipment, Communiqué (2008/1275/EC) (SGM: 2021/13)

See each regulation above for more details and definitions.

This section applies to Energy Related Products (ERP) including information technology equipment intended primarily for use in the domestic environment, but excluding desktop computers, integrated desktop computers and notebook computers as defined in Commission Regulation (EU) No 617/2013, as well as electronic displays covered by Regulation (EU) 2019/2021. Products in Annex I of EU 1275/2008 and Annex II of EU 2023/826 include information technology equipment intended primarily for use in the domestic environment which means products classified as EMC Class B per EN 55022:2010 and EN 55032:2012 in EU Directive 2014/30/EU Electromagnetic Compatibility (EMC).

Definitions

Electrical and electronic household and office equipment (EU 1275/2008) - means any energy-using product which:

1.is made commercially available as a single functional unit and is intended for the end-user;
2.falls under the list of energy-using products of Annex I (in EU Regulation (EC) No 1275/2008);
3.is dependent on energy input from the **mains** power source in order to work as intended; and
4.Is designed for use with a nominal voltage rating of 250 V or below.

Electrical and electronic household and office equipment or equipment (EU 2023/826) means any energy-related product listed in Annex II in EU 2023/826, which fulfils the following conditions:

1. it is dependent on energy input from the mains power source in order to work as intended;

2. it is designed for use with a nominal voltage rating of 250 V or below.
Networked equipment means equipment that can connect to a network and has one or more network ports.
Networked equipment with high network availability (HiNA equipment) means equipment with one or more of the following functionalities, but no other, as the main function(s): those of a router, network switch, wireless network access point, hub, modem, VoIP telephone, video phone.
Networked equipment with high network availability (HiNA) functionality means equipment with the functionality of a router, network switch, wireless network access point or combination thereof included, but not being HiNA equipment.
Router means a network device whose primary function is to determine the optimal path along which network traffic should be forwarded. Routers forward packets from one network to another, based on network layer information (L3).
Network switch means a network device whose primary function is to filter, forward and distribute frames based on the destination address of each frame. All switches operate at least at the data link layer (L2).

For a complete list of definitions, please refer to the EU Regulation and Guideline documents cited above.

For this regulation, the terms 'router' and 'switch' do not apply to products mounted in a rack for use in a data center.

Requirements
EU 1275/2008 Requirements (Repealed in the EU)
Electrical and electronic household and office equipment must meet the requirements related to standby and off mode, and networked standby, electric power consumption as stated in Annex II of EU Regulation 1275/2008 for ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment (consolidated to Jan 9, 2017). This Regulation shall not apply to electrical and electronic household and office equipment placed on the market with a low voltage external power supply to work as intended**.**

See the EU Regulation for more details, definitions and requirements.

Electronic equipment, which are EMC Class B Information Technology equipment as defined in EN 55022:2006+A1:2007 or EN 55022:2010 and newly releasing must meet the following requirements:
1. Power consumption in off-mode shall not exceed 0.50 W,
2. Power consumption in standby mode with a reactivation function shall not exceed 0.50 W,
3. Power consumption in standby mode providing only information or status display shall not exceed 1.00 W, and
4. When equipment is not providing the main function, or when other energy-using product(s) are not dependent on its functions, equipment shall, unless inappropriate for the intended use, offer a power management function that switches equipment after the shortest possible period of time into standby mode, or off mode, or another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode when the equipment is connected to the mains power supply. The power management function shall be activated before delivery to IBM.

In addition, as of January 1, 2015,
2.Any Class B networked equipment shall offer a power management function, unless the Class B networked equipment is intended for data center use.
3.Specifically, any Class B HiNA equipment or equipment with HiNA functionality's power consumption in a condition providing networked standby into which the equipment is switched by the power management function shall not exceed 12W.

As of January 1, 2017, those pieces of equipment that apply to the requirements of Jan 1 2015 above must also
1.comply with the standby requirements when all wired network ports are disconnected and when all wireless network ports are deactivated
2.any equipment with HiNA functionality in networked standby shall not exceed 8W
3.all other networked equipment networked standby power shall not exceed 3W.

As of 1 January 2019, the power consumption of networked equipment other than HiNA equipment or other than equipment with HiNA functionality, in a condition providing networked standby into which the equipment is switched by the power management function, or a similar function, shall not exceed 2.00 W.

EU 2023/826 requirements
Electrical and electronic household and office equipment must meet the requirements related to off and standby mode, and networked standby energy consumption stated in Annex II of EU Regulation 1275/2008 for ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment.

See the EU Regulation 2023/826 for more details, definitions and ecodesign requirements including implementation dates, energy efficiency requirements, functional requirements, and information requirements.

Labeling and Documentation
The product must be marked with the CE conformity marking. See example in the following Figure. The CE mark must have a height of at least 5 mm. The CE marking must be affixed to the ERP. Where this is not possible, it must be affixed to the packaging and to the accompanying documents.

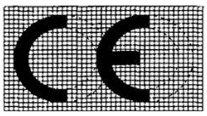


Figure 10. Example of CE conformity marking.

EU 1275/2008 technical document requirements (repealed in the EU)
The following technical documents must be provided to IBM:
A. Declaration of Conformity (DoC) to EU Regulation 1275/2008 in accordance with Annex VI of EU Directive 2009/125/EC of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products and a Declaration of Conformity for compliance with Jordan JSNO 2090/2013 Technical Regulation on eco-design requirements for energy related products and Jordan JSNO 2109/2013 Technical Regulation on eco-design requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment. The DoC must include:

i. Name and address of the manufacturer or of its authorized representative;
ii. A description of the model sufficient for unambiguous identification;
iii. Where appropriate, the references of the harmonized standards applied;
iv. Where appropriate, the other technical standards and specifications used;
v. Where appropriate, the reference to other EU Community legislation providing for the affixing of the CE mark that is applied; and
vi. Identification and signature of the person empowered to bind the manufacturer or its authorized representative.

B. Statement indicating which energy efficiency tier (or both) the DoC applies to (see the first two paragraphs of this section for energy efficiency tier information), and
C. The technical documentation showing efficiency data must be provided. The technical documentation must meet the requirements of Annex II of EU Commission Regulation No 1275/2008.
The above DoC and technical documentation must be provided in English, and other available languages such as Romanian, Turkish and Hebrew.

As of Jan 1, 2015, the following information for **networked equipment** shall be visibly displayed on the manufacturer's website:

- for each standby and/or off mode and the condition providing networked standby into which the equipment is switched by the power management function or similar function
  - the power consumption data in Watts rounded to the first decimal place
  - the period of time after which the power management function, or a similar function, switches the equipment automatically into standby and/or off mode and/or the conditions providing networked standby
- the power consumption of the product in networked standby if all wired network ports are connected and all wireless network ports are activated
- guidance on how to activate and deactivate wireless network ports

EU 2023/826 technical document requirements

The following technical documents must be provided to IBM:
A Declaration of Conformity (DoC) to EU Regulation 2023/826 in accordance with Annex VI of EU Directive 2009/125/EC of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products. Technical documentation containing the information set out in points 3(a) and (b) of Annex III to EU Regulation 2023/826 and the details and results of the calculations made in accordance with Annex IV to EU Regulation 2023/826. Manufacturers shall also provide the free-access website where the technical documentation is housed.

2.12.15 Desktop computers

Requirements for EU

References
EU Commission Regulation No 617/2013 of 26 June 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for computers and computer servers

See section 2.12.12 for EU Ecodesign requirements

Requirements for British Columbia, California, Colorado, Nevada, and Washington

References
California Appliance Efficiency (CEC) Regulations – Appliance Efficiency Rulemaking for Computers, Computer Monitors, and Signage Displays. Regulation and details are located at: http://www.energy.ca.gov/
Colorado Revised Statutes Article 7.5 Water and Energy Efficiency Standards
Nevada: Minimum Standards of Energy Efficiency for Regulated Appliances, Regulation R168-22, November 2022
Washington Appliance Efficiency Standards Chapter 286 Laws of 2019
British Columbia Energy Efficiency Standards Regulation, 14/2015
B.C. Reg. 35/2021 amending Energy Efficiency Standards Regulation B.C. Reg. 14/2015

Definitions (British Columbia)
Computer means a stationary or portable device that performs logical operations and processes data and, at a minimum, has the following components:
(a) a CPU or the ability to function as a client gateway to a server that acts as a computational CPU;
(b) the ability to support a keyboard, mouse, touchpad or other user input device, whether or not the device is included with the computer when the computer is shipped;
(c) an integrated display screen or the ability to support an external display screen to output information, whether or not an external display screen is included with the computer when the computer is shipped.
For the purpose of the definition of "computer", the following are excluded:
(a) a game console;
(b) an industrial computer;
(c) a server, other than small-scale server;
(d) a small computer device;
(e) a small-volume computer model;
(f) a tablet;
(g) a television
Desktop computer means a computer, including an integrated desktop computer, that has a main unit that is designed to be in a fixed location, but does not include any of the following as defined in British Columbia Energy Efficiency Standards Regulation, 14/2015:
(a) a high-expandability computer;
(b) a small-scale server;
(c) a workstation.

Requirements (British Columbia)
Desktop computers manufactured on or after July 1, 2021, shall meet the efficiency values in the table listed under section 54, and the power management settings under section 60 of Division 2 of Part 9 of B.C. Reg No. 14/2015. An energy efficiency verification label is not required if the product is listed in California Energy Commission Modernized Appliance Efficiency Database System. For specific definitions, requirements, implementation dates and exemptions, see Part 9 of B.C. Reg No. 14/2015.

Definitions (California, Washington, Colorado)
Desktop computer means a computer whose main unit is designed to be located in a fixed location, often on a desk or on the floor. A desktop computer includes an integrated desktop computer. A workstation, a high expandability computer, or a small-scale server is not a desktop computer

Requirements (California, Washington, Colorado)
See section 2.12.12 for requirements.

Requirements for South Korea
Reference
South Korea: Regulation on Energy Efficiency Labeling and Standards, MKE Notice No. 1992-71 - Amendment - (on expanding products subject to energy efficiency grade labelling, strengthening efficiency standards) Notice No. 2024-001

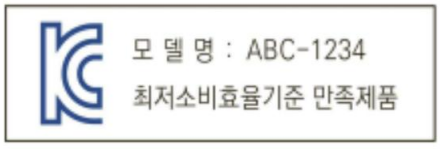
Definitions
Computer means a device that performs logical operations and processes data. A computer can use input devices and displays, but these devices do not have to be included with the computer when shipped. A computer consists of at least the following:

a. A central processing unit (CPU) that performs tasks. In the absence of a CPU, the device must act as a client gateway to a server acting as a computational CPU.
b. User input devices such as keyboard, mouse, or touchpad.
c. An integrated display screen or the ability to support an external display screen to output information.

Desktop computer means a computer whose main unit is designed to be located in a permanent location, often on a desk or on the floor. Desktop computers are not designed for portability and are designed for use with an external display, keyboard, and mouse. Desktop computers are intended for a broad range of home and office applications, including point of sale applications.

Requirements
Beginning on Jan 1, 2025, desktop computers must comply with the minimum energy efficiency standards as set out in the Korean Regulation on Energy Efficiency Labeling and Standards, Schedule 1, section 49 (computers) January 2, 2024, and be tested in accordance with these standards. A copy of the Korean energy test report must be supplied to IBM.

Label
Computers must be tested and labeled in accordance with the Korean Regulation on Energy Efficiency Labeling and Standards, January 2, 2024. The required label is in the Figure below. The label shall be on the front, top, or rear of the product. Please note that “ABC-1234” represents the model number of the computer.



Requirements for Mexico
Reference
Mexico Catalog of the Equipment and Apparatus for which the manufacturers, importers, distributors and sellers should provide information about power consumption and forms for providing information

Requirements
Desktop computers must have a label, in Spanish, with the following information:
- Power Consumption by unit of time in operation;
- The type of energy or power used, which should indicate the measurement units, unless by its operational nature, the type of power or energy is evidently identifiable, in which case it will not be necessary to include this requirement on the labeling;

- Quantity of the good, product or service offered by the equipment per unit of energy consumed when applicable.

The manufacturer must submit the forms found in the Mexico Catalog of the Equipment and Apparatus for which the manufacturers, importers, distributors and sellers should provide information about power consumption and forms for providing information to the Mexico National Commission for Efficient Energy Use (CONUEE). A copy of this form must be supplied to IBM.

2.12.16 Servers and Data Storage Products

Requirements for the EU

References

EU Regulation 2019/424 laying down ecodesign requirements for servers and data storage products.
EU Regulation 2021/341 of 23 February 2021 amending Regulations (EU) 2019/424, (EU) 2019/1781, (EU) 2019/2019, (EU) 2019/2020, (EU) 2019/2021, (EU) 2019/2022, (EU) 2019/2023 and (EU) 2019/2024 with regard to ecodesign requirements for servers and data storage products, electric motors and variable speed drives, refrigerating appliances, light sources and separate control gears, electronic displays, household dishwashers, household washing machines and household washer-dryers and refrigerating appliances with a direct sales function
Norway: Environmentally Friendly Design of Energy-Related Products, Regulation No. 190, 2011 - Amendment - (on implementation of Regulation (EU) 2019/2022, Regulation (EU) 2021/341 and Regulation (EU) 2019/2023) Regulation No. 231, 2025
Turkey: Ecodesign Requirements for Servers and Data Storage Products, Communiqué (2019/424/EU) (SGM: 2021/15)
United Kingdom Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations 2020 SI 2020/1528United Kingdom Ecodesign for Energy-Related Products Regulations 2010, SI 2010/2617
EN 303 470:2019 Energy Efficiency measurement methodology and metrics for servers.
Generalized Test Protocol for Calculating the Energy Efficiency of Internal AC-DC and DC-DC Power Supplies (80 Plus program – EPRI and Ecova).
Guidelines for Media Sanitation NIST Special Publication 800-88.
EN 45558:2019 General Method to declare the use of critical raw materials in energy-related products.

This regulation does not apply to the following products:
(a) Servers intended for embedded applications;
(b) Servers classified as small scale servers in terms of Regulation (EU) No 617/2013;
(c) Servers with more than four processor sockets;
(d) Server appliances;
(e) Large servers;
(f) Fully fault tolerant servers;
(g) Network servers;
(h) Small data storage products;
(i) Large data storage products.

Definitions

Server - means a computing product that provides services and manages networked resources for client devices, such as desktop computers, notebook computers, desktop thin clients, internet protocol telephones, smart phones, tablets, telecommunication, automated systems or other servers primarily accessed via network connections, and not through direct user input devices, such as a keyboard or a mouse and with the following characteristics:
(a) Is designed to support server operating systems (OS) and/or hypervisors, and targeted to run user-installed enterprise applications;
(b) Supports error-correcting code (ECC) and/or buffered memory (including both buffered dual in-line memory modules (DIMMs) and buffered on board (BOB) configurations);
(c) All processors have access to shared system memory and are independently visible to a single OS or hypervisor.
Data storage product - means a fully-functional storage system that supplies data storage services to clients and devices attached directly or through a network. Components and subsystems that are an integral part of the data storage product architecture (e.g., to provide internal communications between controllers and disks) are considered to be part of the data storage product. In contrast, components that are normally associated with a storage

environment at the data center level (e.g. devices required for operation of an external storage area network) are not considered to be part of the data storage product. A data storage product may be composed of integrated storage controllers, data storage devices, embedded network elements, software, and other devices.
Auxiliary Processing Accelerator (APA) means a specialized processor and associated subsystem that provide an increase in computing capacity such as graphical processing units or field programmable gate arrays. An APA cannot operate in a server without a CPU. APAs can be installed in a server either on Graphics or Extension add-in cards installed in general-purpose add-in expansion slots or integrated into a server component such as the motherboard;
Blade server means a server that is designed for use in a blade chassis. A blade server is a high-density device that functions as an independent server and includes at least one processor and system memory, but is dependent upon shared blade chassis resources (e.g., power supply units, cooling) for operation. A processor or memory module will not be considered a blade server when the technical documentation for the product does not indicate that it scales up a standalone server.
High Performance Computing (HPC) server means a server which is designed and optimized to execute highly parallel applications, for higher performance computing or deep learning artificial intelligence applications. HPC servers must meet all the following criteria:
(a) They consist of multiple computing nodes, clustered primarily to increase computational capability;
(b) They include high speed inter-processing interconnections between nodes.
Direct current server means a server that is designed solely to operate on a DC power source.
Direct current data storage product means a data storage product that is designed solely to operate on a DC power source.
Online data storage product means a data storage product designed for online, random-access of data, accessible in a random or sequential pattern, with a maximum time to first data of an online data storage product less than 80 milliseconds.
Small data storage product means a data storage product containing a maximum of three data storage devices.
Large data storage product means a high end or mainframe data storage product that supports more than 400 data storage devices in its maximum configuration and with the following required attributes: no single point of failure, non-disruptive serviceability and integrated storage controller.
Server appliance means a server that is not intended to execute user-supplied software, delivers services through one or more networks, is typically managed through a web or command line interface and is bundled with a pre-installed OS and application software that is used to perform a dedicated function or set of tightly coupled functions.
Resilient server means a server designed with extensive reliability, availability, serviceability and scalability features integrated in the micro architecture of the system, central processing unit (CPU) and chipset.
Large server means a resilient server which ships as a pre-integrated/pre-tested system housed in one or more full frame racks and that includes a high connectivity input/output subsystem with a minimum of 32 dedicated input/output slots.
Fully fault tolerant server means a server that is designed with complete hardware redundancy (to simultaneously and repetitively run a single workload for continuous availability in mission critical applications), in which every computing component is replicated between two nodes running identical and concurrent workloads (i.e., if one node fails or needs repair, the second node can run the workload alone to avoid downtime).
Network server means a network product which contains the same components as a server in addition to more than 11 network port with a total line rate throughput of 12 Gb/s or more, the capability to dynamically reconfigure ports and speed and support for a virtualized network environment through a software defined network.

Please refer to the regulation for more definitions and details.

Requirements
From March 1, 2020 and March 25, 2021(Turkey), the following are requirements:

Power Supply Unit (PSU) efficiency and power factor requirements
From 1 March 2020 and March 25, 2021(Turkey), for servers and online data storage products, with the exception of direct current servers and of direct current data storage products, the PSU efficiency at 10%, 20%, 50% and 100% of the rated load level and the power factor at 50% of the rated load level shall not be less than the values reported in the table below.

Minimum PSU efficiency and power factor requirements from 1 March 2020

	Minimum PSU efficiency				Minimum power factor
% of rated load	10%	20%	50%	100%	50%
Multi output	-	88%	92%	88%	0.90
Single output	-	90%	94%	91%	0.95

From 1 January 2023, for servers and online data storage products, with the exception of direct current servers and of direct current data storage products, the PSU efficiency at 10%, 20%, 50% and 100% of the rated load level and the power factor at 50% of the rated load level shall not be less than the values reported in the table below. EU, UK, and Switzerland have delayed enforcement for the 1 January 2023 PSU requirements until 1 January 2024.

Minimum PSU efficiency and power factor requirements from 1 January 2023

	Minimum PSU efficiency				Minimum power factor
% of rated load	10%	20%	50%	100%	50%
Multi output	-	90%	94%	91%	0.95
Single output	90%	94%	96%	91%	0.95

Idle State Power

From 1 March 2020 and March 25, 2021(Turkey), the idle state power (P_{idle}) of servers with the exception of resilient servers, HPC servers and servers with integrated APA, shall not exceed the value calculated using the following equation:

$P_{idle} = P_{base} + \sum P_{add\_i}$

Where P_{base} is the basic idle state power allowance in the first Table below, and $\sum P_{add\_i}$ is the sum of the idle state power allowances for applicable, additional components, as determined in the second Table below. For blade servers, P_{idle} is calculated as the total measured power divided by the number of installed blade servers in the tested blade chassis. For multi-node servers, the number of sockets are counted per node while P_{idle} is calculated as the total measured power divided by the number of installed nodes in the tested enclosure.

Base idle state power allowances

Product type	Base idle state power allowance, P_{base} (W)
1-socket servers (neither blade nor multi-node servers)	25
2-socket servers (neither blade nor multi-node servers)	38
Blade or multi-node servers	40

Additional Idle Power Allowances for Extra Components

System characteristics	Applies to	Additional idle power allowance
CPU Performance	All servers	1 socket: 10 × $Perf_{CPU}$ W 2 socket: 7 × $Perf_{CPU}$ W
Additional PSU	PSU installed explicitly for power redundancy	10 W per PSU
HDD or SSD	Per installed HDD or SSD	5,0 W per HDD or SSD
Additional memory	Installed memory greater than 4 GB	0,18 W per GB
Additional buffered DDR channel	Installed buffered DDR channels greater than 8 channels	4,0 W per buffered DDR channel

System characteristics	Applies to	Additional idle power allowance
Additional I/O devices	Installed devices greater than two ports of ≥ 1 Gbit, on-board Ethernet	< 1 Gb/s: No Allowance
		= 1 Gb/s: 2,0 W/Active Port
		> 1 Gb/s and < 10 Gb/s: 4,0 W/Active Port
		≥ 10 Gb/s and < 25Gb/s: 15,0 W/Active Port
		≥ 25 Gb/s and < 50Gb/s: 20,0 W/Active Port
		≥ 50 Gb/s 26,0 W/Active Port

From 1 March 2020 and March 25, 2021(Turkey), the active state efficiency (Eff_{server}) of servers, with the exception of resilient servers, HPC servers and servers with integrated APA, shall not be lower than the values in Table 5.

Active state efficiency requirements

Product type	Minimum active state efficiency
1-socket servers	9,0
2-socket servers	9,5
Blade or multi-node servers	8,0

Material efficiency requirements

From 1 March 2020 and March 25, 2021(Turkey), manufacturers shall ensure that joining, fastening or sealing techniques do not prevent the disassembly for repair or reuse purposes of the following components, when present:
(a) Data storage devices
(b) Memory
(c) Processor (CPUs)
(d) Motherboard
(e) Expansion card/graphic card
(f) Power supply unit
(g) chassis
(h) batteries.

From 1 March 2020 and March 25, 2021(Turkey), a functionality for secure data deletion shall be made available for the deletion of data contained in all the data storage devices of the product.

From 1 March 2021 and March 25, 2021(Turkey), the latest available version of the firmware shall be made available from two years after the placing on the market of the first product of a certain product model for a minimum period of eight years after the placing on the market of the last product of a certain product model, free of charge or at a fair, transparent and non-discriminatory cost. The latest available security update to the firmware shall be made available from the time a product model is placed on the market until at least eight years after the placing on the market of the last product of a certain product model, free of charge.

Information to be provided by manufacturers of OEM designed servers and online data storage products

From 1 March 2020 and March 25, 2021(Turkey), with the exception of custom made servers, made on a one-off basis, the following product information on servers shall be provided in the instruction manuals for installers and end-users (when present with the product), and on the free-access websites of manufacturers, their authorised representatives and importers from the time a product model is placed on the market until at least eight years after the placing on the market of the last product of a certain product model:
(1) product type;
(2) manufacturer's name, registered trade name and registered trade address at which they can be contacted;
(3) product model number, and if applicable the low-end performance configuration and the high-end performance configuration model numbers;
(4) year of manufacture;

(5) PSU efficiency at 10% (if applicable), 20%, 50% and 100% of rated output power, with the exception of direct current servers, expressed in % and rounded to the first decimal place;
(6) power factor at 50% of the rated load level, with the exception of direct current servers, rounded to three decimal places;
(7) PSU rated power output (Watts), rounded to the nearest integer. If a product model is part of a server product family, all PSUs offered in a server product family shall be reported with the information specified in (5) and (6);
(8) idle state power expressed in Watts and rounded to the first decimal place;
(9) list of all components for additional idle power allowances, if any (additional PSU, HDDs or SSDs, additional memory, additional buffered DDR channels, additional I/O devices);
(10) maximum power expressed in Watts and rounded to the first decimal place;
(11) declared operating condition class;
(12) idle state power (Watts) at the higher boundary temperature of the declared operating condition class;
(13) the active state efficiency and the performance in active state of the server;
(14) information on the secure data deletion functionality, including instructions on how to use the functionality, the techniques used and the supported secure data deletion standard(s), if any;
(15) for blade servers, a list of recommended combinations with compatible chassis;
(16) if a product model is part of a server product family, a list of all model configurations that are represented by the model shall be supplied.

The manufacturers of OEM designed servers and online data storage products shall provide instruction on the disassembly operations for the product, including type of operation, type and number of fastening techniques to be unlocked and tools required.

From 1 March 2020 and March 25, 2021(Turkey), with the exception of custom made data storage products, made on a one-off basis, the following product information on online data storage products shall be provided in the instruction manuals for installers and end-users (when present with the product), and on the free-access websites of manufacturers, their authorised representatives and importers from the time a product model is placed on the market until at least eight years after the placing on the market of the last product of a certain product model:
(1) product type;
(2) manufacturer’s name, registered trade name and registered trade address at which they can be contacted;
(1) product model number,
(2) year of manufacture;
(3) PSU efficiency at 10% (if applicable), 20%, 50% and 100% of rated output power, with the exception of direct current online data storage products, expressed in % and rounded to the first decimal place;
(4) power factor at 50% of the rated load level, with the exception of direct current online data storage products, rounded to three decimal places;
(5) declared operating condition class; it shall also be indicated that 'This product has been tested in order to verify that it will function within the boundaries (such as temperature and humidity) of the declared operating condition class';
(6) information on the data deletions tool(s), including instructions on how to use the functionality, the techniques used and the supported secure data deletion standard(s), if any

2.12.17 Compressors

Requirements for the USA
Compressors, as defined by US Code of Federal Regulations 10 CFR Part 431 Subpart T must have a Minimum Package Isentropic Efficiency as specified in 10 CFR 431.345.

Manufacturer of the compressor must supply IBM with a copy of the tested compressor's certification document as specified in 10 CFR 429.12(b)

Definitions
Compressor means a machine or apparatus that converts different types of energy into the potential energy of gas pressure for displacement and compression of gaseous media to any higher pressure values above atmospheric pressure and has a pressure ratio at full-load operating pressure greater than 1.3.

For more definitions of compressors, see 10 CFR 431.342 Definitions.

Additionally, DOE regulates compressors that meet all the following requirements:
(1) Is an air compressor,
(2) Is a rotary compressor,
(3) Is not a liquid ring compressor,
(4) Is driven by a brushless electric motor,
(5) Is a lubricated compressor,
(6) Has a full-load operating pressure greater than or equal to 75 pounds per square inch gauge (psig) and less than or equal to 200 psig,
(7) Is not designed and tested to the requirements of The American Petroleum Institute standard 619, "Rotary-Type Positive-Displacement Compressors for Petroleum, Petrochemical, and Natural Gas Industries,"
(8) Has full-load actual volume flow rate greater than or equal to 35 cubic feet per minute (cfm), or is distributed in commerce with a compressor motor nominal horsepower greater than or equal to 10 horsepower (hp),
(9) Has a full-load actual volume flow rate less than or equal to 1,250 cfm, or is distributed in commerce with a compressor motor nominal horsepower less than or equal to 200 hp,
(10) Is driven by a three-phase electric motor,
(11) Is manufactured alone or as a component of another piece of equipment; and
(12) Is in one of the equipment classes listed in the Table 1, must have a full-load package isentropic efficiency or part-load package isentropic efficiency that is not less than the appropriate "Minimum Package Isentropic Efficiency" value listed in Table 1 of this section.

Minimum Package Isentropic Efficiency Requirements for compressors:

Table 1 - Energy Conservation Standards for Certain Compressors

Equipment class	Minimum package isentropic efficiency	η_{Regr} (package isentropic efficiency reference curve)	d (percentage loss reduction)
Rotary, lubricated, air-cooled, fixed-speed compressor	$\eta_{Regr} + (1 - \eta_{Regr}) * (d/100)$	$-0.00928 * \ln^2(.4719 * V_1) + 0.13911 * \ln(.4719 * V_1) + 0.27110$	−15
Rotary, lubricated, air-cooled, variable-speed compressor	$\eta_{Regr} + (1 - \eta_{Regr}) * (d/100)$	$-0.01549 * \ln^2(.4719 * V_1) + 0.21573 * \ln(.4719 * V_1) + 0.00905$	−10
Rotary, lubricated, liquid-cooled, fixed-speed compressor	$.02349 + \eta_{Regr} + (1 - \eta_{Regr}) * (d/100)$	$-0.00928 * \ln^2(.4719 * V_1) + 0.13911 * \ln(.4719 * V_1) + 0.27110$	−15
Rotary, lubricated, liquid-cooled, variable-speed compressor	$.02349 + \eta_{Regr} + (1 - \eta_{Regr}) * (d/100)$	$-0.01549 * \ln^2(.4719 * V_1) + 0.21573 * \ln(.4719 * V_1) + 0.00905$	−15

The isentropic efficiency requirements take effect for any compressor manufactured in or imported into the United States on or after January 10, 2025.

Energy efficiency requirements for compressors meeting the above twelve requirements can be found in 10 CFR Part 431 Subpart T Energy Conservation Standards for Air Compressors; Final Rule

These regulations do not apply to scroll compressors.

2.12.18 Transformers

Requirements for the EU
References
Commission Regulation (EU) 2019/1783 of 1 October 2019 amending Regulation (EU) No 548/2014 on implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to small, medium and large power transformers
Commission Regulation (EU) No 548/2014 of 21 May 2014 on implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to small, medium and large power transformers

Definitions
Power transformer means a static piece of apparatus with two or more windings which, by electromagnetic induction, transforms a system of alternating voltage and current into another system of alternating voltage and current usually of different values and at the same frequency for the purpose of transmitting electrical power.
Small power transformer means a power transformer with a highest voltage for equipment not exceeding 1.1 kV.
Medium power transformer means a power transformer with all windings having rated power lower than or equal to 3,150 kVA, and highest voltage for equipment greater than 1.1 kV and lower than or equal to 36 kV.
Large power transformer means a power transformer with at least one winding having either rated power greater than 3,150 kVA or highest voltage for equipment greater than 36 kV.

Requirements
Product information requirements From 1 July 2015, the following product information requirements for transformers included in the scope of this Regulation (Article 1) shall be included in any related product documentation, including free access websites of manufacturers:
(a) information on rated power, load loss and no-load loss and the electrical power of any cooling system required at no load;
(b) for medium power (where applicable) and large power transformers, the value of the Peak Efficiency Index and the power at which it occurs;
(c) for dual voltage transformers, the maximum rated power at the lower voltage, according to Table I.3;
(d) information on the weight of all the main components of a power transformer (including at least the conductor, the nature of the conductor and the core material);
(e) For medium power pole mounted transformers, a visible display 'For pole-mounted operation only'.
For medium and large power transformers only, the information under (a); (c) and (d) shall also be included on the rating plate of the transformer.
Technical documentation The following information shall be included in the technical documentation of power transformers:
(a) manufacturer's name and address;
(b) model identifier, the alphanumeric code to distinguish one model from other models of the same manufacturer;
(c) the information required under point 3;
(d) the specific reason(s) why transformers are considered to be exempted from the Regulation in accordance with Article 1.2.

2.13 Requirements for Product Take-Back

This section applies to Products which have a logo or brand other than IBM and are not included inside an IBM branded product. For example, this section applies to monitors and laptops, which do not have an IBM logo, but rather a vendor logo. Products, such as these, must have product take-back programs in place in the jurisdictions where required, financed, and maintained by the vendor whose logo appears on the Product. Contact your IBM representative with questions and details about applicability.

2.14 Requirements for Plastic Resins Reporting

References
Canada: Reporting of Certain Plastic Resins and Products for the Federal Plastics Registry for 2024, 2025 and 2026, Notice, April 2024

Definitions
electric and electronic equipment (EEE) means products made wholly or in part from plastics that operate with a battery or include a cord to connect to an electrical outlet, or that otherwise requires an electric current to operate, and/or that contains any electronic component.

information technology equipment
means devices or systems that generate and/or use timing signals or pulses having a rate of at least 9 kHz and employ digital techniques for purposes such as computation, display, control, data processing and storage.

audio-visual equipment means electric and electronic equipment (EEE) of which the primary purpose is collecting, storing, processing, presenting or communicating information, including sounds and images, recording or reproducing sounds and images, but does not include equipment or products that fall into the category of lighting equipment, parts, bulbs, and signs.

accessories in respect of Electric and Electronic Equipment, includes, but not limited to, cables, adaptors, cords, and chargers.

Requirements
Beginning Jan1, 2025, suppliers must provide to IBM the plastic resin type of those listed in the table below for all plastic parts. Along with the resin type, the weight and number of plastic parts must also be reported on the resins tab of the PCD.

NAPCS CODE	NAPCS TITLE
2811211	Polyethylene terephthalate (PET) resins
2811219	Other thermoplastic polyester resins
2811221	Low-density polyethylene (LDPE) resins
2811222	Linear low-density polyethylene (LLDPE) resins
2811223	High-density polyethylene (HDPE) resins
2811229	Other polyethylene resins
2811231	Polystyrene (PS) resins
2811291	Acrylonitrile-butadiene-styrene (ABS) resins
2811292	Polyvinyl chloride (PVC) resins
2811293	Polypropylene (PP) resins
2811294	Thermoplastic polyurethane (TPU) resins
2811295	Polyamide (PA, nylon) resins
2811299	All other thermoplastic resins, n.e.c.
2811411	Bio-based thermoplastic resins
2811412	Petroleum-based biodegradable thermoplastic resins
2811311	Phenolic (PF) resins
2811312	Urea formaldehyde (UF) resins
2811319	All other formaldehyde-based resins
2811391	Thermosetting unsaturated polyester (UPR) resins
2811392	Thermosetting polyurethane (PU) resins
2811399	Other thermosetting resins, n.e.c.
2811413	Bio-based thermoset resins
2811414	Petroleum-based biodegradable thermoset resins

Other resins that do not fall into the above classification.

Categories of EEE covered by the Canada Reporting of Certain Plastic Resins and Products for the Federal Plastics Registry
Category 1: Electronic and Electrical Equipment (EEE), within the following subcategories:
(1) Electronic or electrical information technology or telecommunication devices or equipment
(2) Electronic or electrical audiovisual and consumer equipment or media
(3) Electronic or electrical appliances
(4) Electronic or electrical tools, other than large-scale stationary industrial tools
(5) Electronic or electrical lighting equipment
. . .
(11) Electronic or electrical medical devices or equipment
(12) Accessories for use with any products referred to in Category 1

2.15 Requirements for RoHS

References (limited list of jurisdictions requiring RoHS compliance)
EU Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (recast) and amendments.
EU Decision No 768/2008/EC of the European Parliament and of the Council of 9 July 2008 on a common framework for the marketing of products.
EN IEC 63000:2018 Technical Documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances (IEC 63000:2016).
Republic of Srpska Rulebook on the Restriction of the use of certain hazardous substances in electrical and electronic equipment.
Eurasian Economic Commission Technical Regulation On the restriction of the use of hazardous substances in electrical and radioelectronic equipment Decision No 113 (TR EEU/037/2016).
Eurasian Economic Commission Technical Regulation On the restriction of the use of hazardous substances in electrical and radioelectronic equipment List of products Decision No 167
Ukraine - On Approval of the Technical Regulations on the Restriction of the Use Certain Hazardous Substances in Electrical and Electronic Equipment #139 March 10, 2017.
China Implementation Arrangements of the RoHS Conformity Assessment System for Electrical and Electronic Products May 16, 2019.
Announcement of People's Republic of China Ministry of Industry and Information Technology No. 15 (2018)
Annex 1. Catalog of Electrical and Electronic Products subject to RoHS Compliance Management (Batch 1)
Annex 2. List of Exceptions to RoHS Compliance Management Catalog.

Restrictions
See IBM Product specifications 97P3864 for details about material restrictions, allowable finishes and exemptions.
See Table 1 in this specification for additional details about material restrictions.

Definitions
Electrical and electronic equipment (EEE) means equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields and designed for use with a voltage rating not exceeding 1000 volts for alternating current and 1500 volts for direct current. [Source: EU Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances (RoHS) in electrical and electronic equipment (recast)]
Electrical and radioelectronic equipment (products) – products, qualified functioning of which is determined by the presence, usage, production, transformation, transition and distribution of electrical currents and (or) electromagnetic fields, which are qualified for direct use or incorporated into machines, mechanisms, apparatus, devices and other equipment. [Source: Eurasian Economic Commission Technical Regulation On the restriction of the use of hazardous substances in electrical and radioelectronic equipment (TR EEU/037/2016). See regulation for a listing of applicable products.]
Finished Product, for the purposes of this specification, Finished Product means any stand alone, final assembly in any form factor, including standalone, rack-mount and tower. Examples of stand-alone, final assemblies include, but are not limited to:

Displays/ Monitors	Mice	Storage products
Electrical tools	Power distribution units	Switches
External storage drives	Printers	Workstations
External memory keys/flash drives	Racks	Medical Devices
External modems	Routers	Uninterruptible Power Supplies
External power supplies	Servers	
Keyboards	Smart Card Readers	

Industrial monitoring and control instruments – See definition in Section 1.2 Definitions
Manufacturer means any natural or legal person who manufactures an EEE or who has an EEE designed or manufactured and markets it under his name or trademark. [Source: EU Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (recast)]

Medical Device – See definition in Section 1.2 Definitions.

Categories of EEE covered by the EU RoHS Directive [Source: EU Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (recast)]

Category number	Name of Category
1	Large household appliances
2	Small household appliances
3	Information Technology (IT) and telecommunications equipment
4	Consumer equipment
5	Lighting equipment
6	Electrical and electronic tools
7	Toys, leisure and sports equipment
8	Medical devices
9	Monitoring and control instruments including industrial monitoring and control instruments
10	Automatic dispensers
11	Other EEE not covered by any of the categories above

Examples of EEE by relevant category [Source: EU Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on Waste Electrical and Electronic Equipment]. This listing of examples may not be all-inclusive.

Category 3. IT and telecommunications equipment
Centralized data processing:
Mainframes
Minicomputers
Printer units
Personal computing:
Personal computers (CPU, mouse, screen and keyboard included)
Laptop computers (CPU, mouse, screen and keyboard included)
Notebook computers
Notepad computers
Printers
Copying equipment
Electrical and electronic typewriters
Pocket and desk calculators
And other products and equipment for the collection, storage, processing, presentation or communication of information by electronic means
User terminals and systems
Facsimile machine (fax)
Telex
Telephones
Pay telephones
Cordless telephones
Cellular telephones
Answering systems
and other products or equipment of transmitting sound, images or other information by telecommunications

Category 4. Consumer equipment
Radio sets
Television sets
Video cameras
Video recorders
Hi-fi recorders
Audio amplifiers
Musical instruments
and other products or equipment for the purpose of recording or reproducing sound or images, including signals or other technologies for the distribution of sound and image than by telecommunications
Photovoltaic panels

Category 5. Lighting equipment
Luminaires for fluorescent lamps with the exception of luminaires in households
Straight fluorescent lamps
Compact fluorescent lamps
High intensity discharge lamps, including pressure sodium lamps and metal halide lamps
Low pressure sodium lamps
Other lighting or equipment for the purpose of spreading or controlling light with the exception of filament bulbs

Category 6. Electrical and electronic tools
Drills
Saws
Sewing machines
Equipment for turning, milling, sanding, grinding, sawing, cutting, shearing, drilling, making holes, punching, folding, bending or similar processing of wood, metal and other materials
Tools for riveting, nailing or screwing or removing rivets, nails, screws or similar uses
Tools for welding, soldering or similar use
Equipment for spraying, spreading, dispersing or other treatment of liquid or gaseous substances by other means
Tools for mowing or other gardening activities

Category 8. Medical devices
Radiotherapy equipment
Cardiology equipment
Dialysis equipment
Pulmonary ventilators
Nuclear medicine equipment
Laboratory equipment for *in vitro* diagnosis
Analyzers
Freezers
Fertilization tests
Other appliances for detecting, preventing, monitoring, treating, alleviating illness, injury or disability

Category 9. Monitoring and control instruments including industrial monitoring and control instruments
Smoke detector
Heating regulators
Thermostats
Measuring, weighing or adjusting appliances for household or as laboratory equipment
Other monitoring and control instruments used in industrial installations (e.g. in control panels)

Requirements for Finished Products
All EEE (in all Categories listed above) must meet Article 7 of EU Directive 2011/65/EU RoHS. Refer to the Directive for further details. Categories 1 to 7 and 10 are allowed to use the substances (see Table 3 of this specification for a listing of the substances) in applications listed in Annex III of the EU Directive 2011/65/EU RoHS. Categories 8 and 9 are allowed to use the substances in applications listed in both Annex III and Annex IV. Please be aware that many of these exemptions have expiration dates which have passed, and they are no longer allowed for use. IBM Engineering specification 97P3864 lists the exemptions with expiration dates as listed in the consolidated version of EU Directive 2011/65/EU RoHS and amendments available on the date of release of specification 97P3864. Please see the Directive for the latest exemptions and expiration dates.

Finished Products must meet Eurasian Economic Commission Technical Regulation On the restriction of the use of hazardous substances in electrical and radioelectronic equipment (TR EEU/037/2016), starting by year end 2018 or before as certification becomes available in-country. TR EEU/037/2016 does not apply to Measuring equipment and Medical products.

Documentation requirements for the European Union and other CE marking jurisdictions.
Manufacturers must have in place technical documentation as required by Article 7 and carry out the internal production control procedure in line with module A of Annex II to Decision No 768/2008/EC. Manufacturers must

ensure that procedures are in place for series production to remain in conformity. Changes in product design or characteristics and changes in the harmonized standards or in technical specifications by reference to which conformity of EEE is declared shall be adequately taken into account. Technical Documentation must be in accordance with the latest version of EN IEC 63000:2018, Technical Documentation for the Assessment of Electrical and Electronic Products with Respect to the Restriction of Hazardous Substances (IEC 63000:2016).

Manufacturers must keep the technical documentation and the Declaration of Conformities (DoCs) for 10 years after the EEE has been placed on the market. This documentation must be readily available to IBM and provided within two business days upon request.

When laboratory sampling is completed and used as part of the technical documentation, the test method must be in accordance with the latest version of IEC 62321 Electrotechnical products - Determination of levels of six regulated substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers) as referred to in EN IEC 63000:2018, Technical Documentation for the Assessment of Electrical and Electronic Products with Respect to the Restriction of Hazardous Substances (IEC 63000:2016).

Manufacturers must keep a register of non-conforming EEE and product recalls, and keep distributors, including IBM, informed thereof.

Manufacturers, when requested by a competent national authority or IBM, must provide all the information and documentation necessary to demonstrate the conformity of the EEE with the RoHS Directive, in a language which can be easily understood by the authority, and that they cooperate with the authority, at its request, on actions taken to ensure compliance with the Directive for the EEE which they have placed on the market or provided to IBM for placing on the market.

Manufacturers must draw up a DoC which must have the following:
1. It shall state that it has been demonstrated that the requirements specified in Article 4 of the EU Directive have been met as well as conformity with the Republic of Srpska Rulebook on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
2. It shall have the model structure and contain the elements specified in Annex VI of the Directive and Attachment 5 of the Srpska Rulebook, including:

- Number, which is the unique identification of the EEE.
- Name and address of the manufacturer or authorized representative.
- Wording “This declaration of conformity is issued under the sole responsibility of the manufacturer (or installer)”.
- Object of the declaration (identification of EEE allowing traceability, e.g., a photograph).
- The object of the declaration described above is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment and in conformity with the Republic of Srpska Rulebook on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
- Where applicable, references to the relevant harmonized standards used or references to the technical specifications in relation to which conformity is declared.
- Signature block including:
    - Signed for and on behalf of:
    - Place and date of issue, and
    - Name, function and signature.

By drawing up the EU DoC, the manufacturer shall assume responsibility for the compliance of the EEE with the EU RoHS Recast Directive. Manufacturers of Finished Products must provide IBM a DoC in as many languages as available, for example Czech and Slovenian. A single DoC must be provided which references all EU CE marking legislation applicable to the product in accordance with EU Decision 768/2008/EC on a common framework for the marketing of products, Article 5. The product name or number identifier on the product must match the name or number on the DoC and the name or number on the Technical Documentation.

The above requirements for a DoC and technical documentation also applies to other jurisdictions such as the Republic of Srpska referencing their specific decrees, regulations or laws.

Documentation requirements for the Eurasian Economic Union
The manufacturer of the Finished Product shall provide IBM, upon request, a copy of the Declaration of conformity, a certification of registration, and/or a copy of the Technical Documentation. This documentation must be in Russian. The following Products in the table below require this certification. Please see Eurasian Economic Commission Decision No 167 for a full listing of products in scope of the RoHS requirements.
Electronic computing machines and connected devices which are in scope of this requirement include:

Products	EEU FEACN code
servers and system units of personal computers	8471 41 000 0; 8471 49 000 0; 8471 50
laptops	8471 30 000 0
tablet/pocket/handheld computers and other small sized computers	8471 30 000 0
keyboards, manipulators, trackers and other input-output controllers (computer mice, joysticks, helmets and glasses)	8471 9504 50 000
removable storage devices	8471 70 8523
monitors	8528 42 100 0; 8528 52 100 0; 8528 52 900 9; 8528 59 900 9
printers	8443 31; 8443 32 100 9
scanners	8471 60 700 0
speakers and headphones	8518 21 000 0; 8518 22 000; 8518 29 8518 30
multimedia projectors	8528 62 100 0
biometric readers	8471; 9031 49 900 0; 9031 80 380 0
web cameras	8525 80
modems	8517 62 000
uninterruptible power supply units	8504 40 300 2; 8504 40 300 9

Labeling requirements for the European Union and other CE marking jurisdictions
The CE marking must be placed on all Finished Products, including IBM logo and non-IBM logo products. Figure 10 has an example CE Mark. The CE Mark must be at least 5 mm in height. The Manufacturer of the Finished Product must place the CE mark on the product. The CE marking shall be affixed visibly, legibly and indelibly to the finished EEE or to its data plate. Where that is not possible because of the nature of the EEE, it shall be affixed to the packaging and to the accompanying documents. The CE Mark shall be the only marking which establishes the conformity of a product to the EU RoHS Recast Directive. No other markings indicating compliance to EU RoHS requirements shall be used.

EEE must have a type, batch or serial number or other element allowing its identification, or, where the size or nature of the EEE does not allow it, that the required information is provided on the packaging or in a document accompanying the EEE. This must be completed by the manufacturer of the EEE. Examples of this include, but are not limited to machine type, machine type model number or part number. This marking shall be affixed visibly, legibly and indelibly to the finished EEE or packaging.

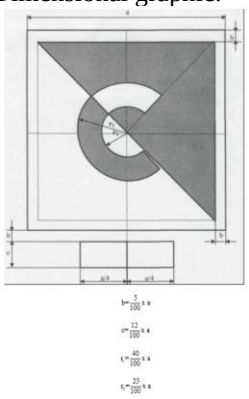
Manufacturers must indicate their name, registered trade name or registered trademark and the address at which they can be contacted on the EEE or, where that is not possible, on its packaging or in a document accompanying the EEE. The address must indicate a single point at which the manufacturer can be contacted.

Irrespective of the company logo on the product, when IBM is referenced on the product as the manufacturer, the IBM single point of contact information must be included. This information must include:
International Business Machines
New Orchard Road
Armonk, New York 10504
http://www.ibm.com/customersupport/

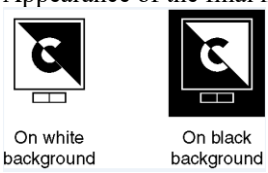
Labeling requirements for the Republic of Srpska
Effective June 1, 2016, the marking below is required by the Republic of Srpska (administrative unit of Bosnia-Herzegovina) on Finished Products. The marking is in the form of a square, with minimum length of side “a” to be 5 mm, with a styled Latin letter “C” in the middle. The marking must be placed immediately adjacent to the registered trade name, i.e. name of the manufacturer or authorized representative. If the marking is increased or decreased, the

proportions shown in the drawing below shall be maintained. IBM label part number 01AF466 may be used on the product to meet this requirement.

Dimensional graphic:



Appearance of the final marking:



If it is not possible to affix the conformity marking to the equipment due to its nature, the conformity marking shall be affixed to its packaging or accompanying documentation.

Labeling requirements for the Eurasian Economic Union

Effective March 1, 2020:

A Finished Product must be labeled with:

1.Name and/or designation of electrical and radioelectronic equipment (product) (type, brand name, model (if any);
2.The product's main parameters and characteristics;
3.Name and (or) trademark of the manufacturer;
4.Name of the jurisdiction where the Finished Product has been manufactured.
5.Date of Manufacturing.

The packaging of the Finished Product must include the following information:

1.Name and (or) designation of electrical and radioelectronic equipment (product)(type, brand name, model (if any),
2.Name and (or) trademark of the manufacturer.

The Finished Product label should be clear and legible and should be on the Finished Product, reachable without disassembling with tools. When the information required above is impossible to be indicated on electrical and radioelectronic equipment (Finished Product), it can be indicated only in operational documents attached to the product.

Product operational documents should contain the following, in Russian:

1.Name and/or designation of electrical and radioelectronic equipment (product)(type, brand name, model (if any);
2.Name and (or) trademark of the manufacturer
3.Parameters and characteristics of the product;
4.Name of the jurisdiction where the Finished Product has been manufactured
5.Rules for operation and use, mounting, storage, transportation, purchasing and utilization of the product;
6.Information about measures to take in case of product malfunction;
7.Name and address of the manufacturer (person, authorized by the manufacturer), importer, their contact details;
8.Information about month and year of production and (or) about place of indicating of such information or about the way of definition of production year.

Finished Products must be labeled with the following mark to verify compliance – EAC notification.

If the product has insufficient space for this label, then the packaging for the product must be labeled.

Notification
Manufacturers who have reason to believe that EEE which they have delivered to IBM is not in conformity with the EU RoHS Directive must immediately take the necessary corrective measures to bring that EEE into conformity, to withdraw it or recall it, as well as immediately notify IBM.

Requirements for Parts
EEE, parts and Deliverables provided to IBM must meet EU Directive 2011/65/EU RoHS. Refer to the Directive for further details.

Suppliers must have in place documentation as required by Article 7 and carry out the internal production control procedure in line with module A of Annex II to Decision No 768/2008/EC. Suppliers must ensure that procedures are in place for series production to remain in conformity. Changes in product design or characteristics and changes in the harmonized standards or in technical specifications by reference to which conformity of EEE is declared shall be adequately taken into account. Suppliers must keep the documentation for 10 years after the EEE has been placed on the market. This documentation must be readily available to IBM and provided within two business days upon request in English.

When laboratory sampling is completed and used as part of the documentation, the test method must be in accordance with the latest version of IEC 62321 Electrotechnical products - Determination of levels of six regulated substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers) as referred to in EN IEC 63000:2018, Technical Documentation for the Assessment of Electrical and Electronic Products with Respect to the Restriction of Hazardous Substances. Manufacturers (IEC 63000:2016), when requested by IBM, must provide all the information and documentation necessary to demonstrate the conformity of the EEE with the RoHS Directive in English.

Suppliers who have reason to believe that EEE which they have delivered to IBM is not in conformity with the EU RoHS Directive must immediately take the necessary corrective measures to bring that EEE into conformity, as well as immediately notify IBM.

China RoHS Requirements
This requirement is effective on November 1, 2019.

Products listed in the China “Management Catalogue of Electrical and Electronic Products that should meet the RoHS Standards (first batch)” must complete the RoHS conformity assessment process either by meeting the State-introduced voluntary certification process or the Declaration of Conformity process. The testing standard as of 1 March 2024 the GB/T 39560 series of standards for the determination of substances.

Manufacturers must complete a China RoHS II conformity assessment and then choose either:
Option 1 - a third party certification or
Option 2 - the supplier’s declaration of conformity (SDoC).

The twelve categories of products listed in the China RoHS II Catalogue manufactured or imported after November 1, 2019 must comply with these implementation measures. The relevant categories for this product specification requiring this conformance assessment are:

Monitors Scope and definition - Image output equipment that converts video signals into photo-image signals and then displays the processed data via diagrams, including the image output equipment (not including tuner) with display device as main component, such as cathode ray tube (black & white, color) monitors, and LCD monitors. Description of scope - By material, monitors fall into CRT, DLP, LCD, LED, OLED, etc.; by use, monitors fall into monitors for safety purpose, monitors for monitoring purpose, radio & TV monitors, and computer monitors.

Note: In the case that any product listed in this Catalog is used as part of the products beyond the Catalog, such product is not governed by the Catalog. Should the products in question, however, have no definite end uses and be sold individually, the Catalog shall apply.

Microcomputers Scope and definition - An entity formed when necessary peripherals and software are configured on the microcomputer hardware system, suitable for single users, including desktops (including all-in-one computers), laptops, tablets and PDAs.
Description of scope - Microcomputers include desktops (including all-in-one computers), laptops, tablets and PDAs, of which, 1) desktop refers to microcomputer suitable for use on stationary desktop in offices or homes, not including computer servers and workstations designed exclusively for use in computer rooms, or other microcomputers having distinct differences from desktops, such as industrial computers for purpose of industrial control; 2) Laptop is a microcomputer characterized by its portability, with in-built input & output devices (e.g. display, keypad, etc.) and battery module; 3) Tablet refers to a hand-held microcomputer adopting a tablet structure, with the touch screen as the main input and output device; 4) PDA is a compact, lightweight, easy-to-carry, useful and low-cost hand-held computing equipment running on the embedded operating system and in-built software.

For both options, the manufacturer of the product must submit the conformity information to the China public service platform within 30 days of putting the product on the market.

For the second option, an SDoC must be provided to IBM. The required format is below.

Supplier' s Declaration of RoHS Conformity for Electrical and Electronic Products

1. Supplier: _____

2. Contact information (address, zip, mobile and email)_____

3. Declared products and specifications/type

S/N	Product name	Spec/type	No. of supporting technical document	Type of supporting technical document
1				
2				
3				
……				

We solemnly declare as follows: The moment the above products are put on market, the hazardous substances contained in such products conform to the concentration limit provisions of the *Administrative Measures for Restriction of Hazardous Substances in Electrical and Electronic Products* and the *Management Catalogue of Electrical and Electronic Products that Should Meet the RoHS Standards*. We are responsible for the authenticity, completeness and consistency of the content of the above declaration and relevant supporting technical documents.

Legal representative or authorized representative
Name_____Position_____
Signature: Date:

(Company seal)

The label must conform to one of these two options based on the conformity assessment procedure. The label must be on the product, packaging, manual, or in the operational system. For reference only, the English versions are:

Design I

Design II

Requirements for the Great Britain (England, Scotland, Wales)

References
UK Statutory Instrument 2019 No. 539 Exiting the European Union Energy Conservation The Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations 2019.

UK Statutory Instrument 2010 No. 2617 Energy Conservation, The Ecodesign for Energy-Related Products Regulations 2010.

UK Statutory Instruments 2012 No. 3032 The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations.

UK: Product Safety and Metrology etc. (Amendment) Regulations, SI No. 2024/696

Further information is located at: https://www.gov.uk/guidance/placing-manufactured-goods-on-the-market-in-great-britain

https://www.gov.uk/guidance/ukca-marking-conformity-assessment-and-documentation#full-publication-update-history

Labeling and Documentation

IBM logo products

Products with an IBM logo should be labeled with the UK Conformity Assessment mark. See graphic below.

The UKCA marking must be at least 5mm in height. IBM label part number 03FP033 may be used to meet this requirement. The expiry of the CE marking recognition will no longer expire on Dec 31, 2024. UK SI 2024/696 allows businesses the flexibility to choose the EU CE marking or the UKCA marking requirements.

Vendor logo products

Products with another manufacturer's logo may be labeled with the UK Conformity Assessment mark. If a product or part is marked with the UK CA mark, then IBM will request the manufacturer's UK Declaration of Conformity for that product.

2.16 Requirements for modular refrigeration units

References

EU Regulation (EC) No 842/2006 of the European Parliament and of the Council of 17 May 2006 on certain fluorinated greenhouse gases and amendments.

EU Regulation (EC) No 1494/2007 of 17 December 2007 establishing the form of labels and additional labeling requirements as regards products and equipment containing certain fluorinated greenhouse gases

EU Regulation No 517/2014 of the European Parliament and of the Council on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006

Canada Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems

Requirements

Refrigeration units must be designed in accordance to the guidelines for commercial and industrial systems found in the latest version of the Canada Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems. Refrigeration units must also meet requirements in EU Regulations 842/2006, 1494/2007, and 517/2014. Fluorocarbons can no longer be used in newly releasing products or parts.

Additional standards may be relevant other than environmental standards such as UL, ASHRAE, and ARI standards. All refrigeration units must be designed as hermetically sealed systems. A hermetically sealed system means a system in which all parts that contain fluorinated greenhouse gases have been hermetically sealed during their manufacturing by welding, brazing or otherwise making them tight by permanently connecting them and for which the refrigerant circuit does not need to be opened for placing the system into operation. The design of the refrigeration units must encompass the need to disallow the gas to release to the atmosphere. The level of refrigerant gas in a hermetically sealed system cannot exceed 6 kilograms per computer product.

At a minimum, the following must be labeled on the units:

- Notice that the product or equipment contains fluorinated greenhouse gases covered by the Kyoto Protocol
- Refrigerant type, e.g. HFC
- ASHRAE Refrigerant Number
- Refrigerant quantity
- Refrigerant oil type, and quantity,
- Ozone-depleting potential,
- Global warming potential,
- System is hermetically sealed, and
- As of 1 January 2017, the quantity of greenhouse gases contained in the product or equipment, expressed in weight and in CO_2 equivalent.

The above label must be clearly and indelibly on the product adjacent to the service points for charging or recovering the gas or on that part of the product which contains the fluorinated greenhouse gas. The above label must be translated, at a minimum, in the following languages:

- English
- Bulgarian
- Czech
- Danish
- Dutch
- Estonian
- Finnish
- French
- French Canadian
- German
- Greek
- Hungarian
- Italian
- Japanese
- Latvian
- Lithuanian
- Polish
- Croatian
- Portuguese
- Romanian
- Slovakian
- Slovenian
- Spanish
- Albanian
- Bosnian
- Icelandic
- Macedonian
- Maltese
- Montenegrin
- Norwegian
- Serbian
- Swedish
- Turkish
- Ukrainian

Other labels may be required in additional languages.

The latest version of the IBM Environmental Notices and User Guide must accompany the modular refrigeration units when shipped as parts, e.g., spare parts, field replaceable units. If the equipment contains fluorinated greenhouse gases with a global warming potential of 150 or more, this information shall also be included in descriptions used for advertising.

2.17 Requirements for Original Equipment Manufacturer designed Computer Servers

References
ENERGY STAR® Program Requirements for Computer Servers Version 2.1.
National Sanitation Foundation Standard/ American National Standard NSF/ANSI 426-2019 Environmental Leadership and Corporate Social Responsibility Assessment of Servers.
American Society of Heating, Refrigerating, and Air-conditioning Engineers (ASHRA) Thermal Guidelines for Data Processing Environments, 4th Edition.

Definitions (see NSF/ANSI 426-2019 for a complete listing of definitions)
Computer server: Hardware system providing services and manage networked resources for client devices) e.g., desktop computers, notebook computers, thin clients, wireless devices, PDAs, IP telephones, other computer servers, or other network devices). A computer server:
− is sold through enterprise channels for use in data centers and office/corporate environments;
- is primarily accessed via network connections, versus directly-connected user input devices such as a keyboard or mouse;
- is marketed and sold as a computer server;

− is designed for and listed as supporting one or more computer server operating systems (OS) and, or hypervisors;
− is targeted to run user-installed applications typically, but not exclusively, enterprise in nature;
− provides support for error-correcting code (ECC) and, or buffered memory (including both buffered dual in-line memory modules (DIMMs) and buffered on board (BOB) configurations);
− is packaged and sold with one or more AC-DC or DC-DC power supplies; and
− is designed such that all processors have access to shared system memory and are visible to a single OS or hypervisor.
In addition to the above, the definition of Computer servers, for the purposes of this section, is given in the ENERGY STAR Program Requirements for Computer Servers Version 2.1: blade, multi-node, rack-mounted, or pedestal form factor computer servers are included with no more than four processor sockets in the computer server (or per blade or node in the case of blade or multi-node servers).
Commonly available tools: A hand operated tool which is readily available for purchase by any individual or business without restrictions.
Server Appliance: A computer server that is bundled with a pre-installed OS and application software that is used to perform a dedicated function or set of tightly coupled functions. Server appliances deliver services through one or more networks (e.g., IP or SAN), and are typically managed through a web or command line interface. Server appliance hardware and software configurations are customized by the vendor to perform a specific task (e.g., name services, firewall services, authentication services, encryption services, and voice-over-IP (VoIP) services), and are not intended to execute user-supplied software. [Source: ENERGY STAR® Program Requirements for Computer Servers Version 2.1]

Requirements
The following products are excluded from the requirements in this section:
Fully Fault Tolerant Servers
Server Appliances
High Performance Computing Systems
Large Servers
Storage Products including Blade Storage, and
Network Equipment.
See the latest version of the ENERGY STAR Program Requirements for Computer Servers for definitions of the above product types.

Computer servers designed by an Original Equipment Manufacturer (OEM) which will have an IBM logo, or a logo owned by IBM must meet the following criteria:

- Product shall conform to the most current version of the ENERGY STAR Computer Servers program if applicable.
- Product shall support Class A2 allowable environmental operating range published in *the American Society of Heating, Refrigerating, and Air-conditioning Engineers (ASHRAE) Thermal Guidelines for Data Processing Environments, 4th Edition* in Table 2.1.
- Plastic parts exceeding 25 grams shall not contain greater than 1000 ppm chlorine or greater than 1000 ppm bromine. Parts that exceed 25% postconsumer recycled content shall contain a maximum of 5000 ppm chlorine and 5000 ppm bromine. This specific requirement does not apply to printed circuit boards, cables and wiring, fans and electronic components.
- OEM shall provide a listing of plastic part numbers with part number weight, an indication as to whether or not the plastic resin used has postconsumer recycled resin and if so, the percentage of postconsumer recycled plastic content.
- External enclosure of the server (excludes bezels, latches, brand badges, labels, mounting brackets and parts < 100 grams) shall consist of a minimum 10% postconsumer (PCR) plastic content. If the sum of all the plastic parts for the external enclosure weighs less than 10% of the total weight of all external enclosure parts, then this is not applicable.
- The product shall be designed with the following features:
    - External enclosures, or those portions of the enclosures that must be removed to accomplish repair, reuse, recycling or safe handling, shall be removable by hand or with commonly available tools, without destruction of the enclosure.

- Components requiring selective treatment shall be identified (please note, many of these are prohibited from use by this specification in Table 1) and removable by hand or commonly available tools. These components include:
  - Polychlorinated biphenyls (PCB) containing capacitors,
  - Mercury containing components,
  - Batteries,
  - Printed circuit boards if the surface is greater than 10 square centimeters,
  - Toner cartridges,
  - Plastic containing brominated flame retardants,
  - Asbestos,
  - Cathode ray tubes,
  - chlorofluorocarbons(CFC), hydrochlorofluorocarbons(HCFC) or hydrofluorocarbons (HFC), hydrocarbons (HC),
  - Gas discharge lamps,
  - Liquid crystal displays with a surface greater than 100 square centimeters and all back-lights with gas discharge lamps,
  - External electric cables,
  - Components containing refractory ceramic fibers,
  - Components containing radioactive substances,
  - Electrolytic capacitors containing substances of concern (height > 25 mm, diameter > 25 mm or proportionately similar volume).

- All plastic parts > 100 grams shall meet the following requirements:
  - Clearly marked with material type in accordance with ISO 11469/1043,
  - A photo of each plastic part showing the material type marking is required,
  - Separable by hand or with commonly available tools, such that plastic parts can be separated into compatible or compatible with limitations material types.
  - A description of procedures for separating the plastic parts by hand or with commonly available tools is required.
  - Printed circuit boards, connectors, wire and cables are excluded from this requirement.

The supplier is requested to use Postconsumer Recycled Content (PCR) resin as much as possible. If PCR resin is present, report it on the resin tab on PCD. IBM has two approved PCR resins with applicable IBM Material Codes:
23-931J (13) PC/ABS Bayblend FR630 GR (30% recycle) Covestro Standard and Raven black
23-931J (17) PC/ABS Sabic Lexan RCX7243 (30% recycle) Standard and Raven black.
Other resins that may be used are:
Polycarbonate/ Acrylonitrile butadiene styrene (PC/ABS blend) Echo Tech PCABSFR401e with 30% PCR
Polycarbonate/ Acrylonitrile butadiene styrene (PC/ABS blend) Sabic Cycoloy RCX7233 with 30% PCR.

3 Notification Procedures

If the Deliverable being supplied to IBM does not meet one or more of the applicable requirements in ES 46G3772, the Supplier must immediately notify their IBM procurement representative. This also applies if the Supplier or a subcontractor(s) makes changes in their operations that will cause a Deliverable to no longer comply with ES 46G3772. If any Deliverable contains a substance in applications restricted by this specification, Suppliers must immediately report such information to their IBM procurement representative.

4 Removed

5 Revision History

Date	EC Level	Change Summary
2025-05-27	P51511	Table 1a. Corrected *N*-methyl-2-pyrrolidone; 1-methyl-2-pyrrolidone (NMP) (CAS 872-50-4) prohibition from 0.03% by weight to 0.3% by weight. Removed Medium chain chlorinated paraffins from table 4b and added to table 1a. Added Long chain Perflourocarboxylic acids. Added reference to Singapore Environmental Protection

Date	EC Level	Change Summary
		and Management Act 1999 (Amendment of 2nd Schedule) Order 2025. Table 2. Added an entry for PFAS that meet certain definitions and their prohibition. Added reference to Environmental Protection Agency and their requirements for PFAS. Added an entry for N,N-dimethylformamide prohibited as a substance. Added reference to Serbia: Restrictions on Production, Marketing and Use of Dangerous Chemicals, Regulation, October 2013 - Amendment - (on updating the list of restricted substances) Pravilnik No. 1501, 2024 Table 5a. Added 7 entries to the SVHC candidate list Table 5b. Added 9 entries to the SVHC list typically used in electronic equipment Section 2.12.2 Added reference to USA: Energy Conservation Program for Consumer Products, 10 CFR 429 & 431 - Amendment - (on certification, labelling and enforcement for Consumer Products and Commercial Equipment) Final Rule, 89 FR 81994, October 2024 Sections 2.12.(1, 3, 4, 12, and 15) Added reference to Nevada (USA): Minimum Standards of Energy Efficiency for Regulated Appliances, Regulation R168-22, November 2024 Sections 2.12.(5, 6, 10, and 14) Added reference to EU 2023/826 ecodesign requirements for off mode, standby mode, and networked standby energy consumption of electrical and electronic household and office equipment Section 2.12.9 Added reference to EU 2024/1834 ecodesign requirements for fans driven by motors with an electric input power between 125 W and 500 kW Section 2.12.16 Added reference to Norway: Environmentally Friendly Design of Energy-Related Products, Regulation No. 190, 2011 - Amendment - (on implementation of Regulation (EU) 2019/2022, Regulation (EU) 2021/341 and Regulation (EU) 2019/2023) Regulation No. 231, 2025
2024-10-11	P24296	Table 1a. Added reference to China: GB/T 26572-2011 Requirements of Concentration Limits for Certain Restricted Substances for Electronic and Electrical Products, 2011 for Diisobutyl phthalate (DIBP), Di-n-butyl phthalate (DBP), Butylbenzyl phthalate (BBP), and Di(2-ethylhexyl) phthalate (DEHP). Updated Organisation for Economic Co-operation and Development weblink for global database of per and polyfluoroalkyl substances throughout table 1a. Updated footnote reference for CAS # 13560-89-9 ("Dechlorane Plus"™) from '83' (Switzerland) to '84' Singapore). Added reference to EU: Persistent Organic Pollutants (POPs), Regulation (EU) 2019/1021 - Amendment - (on exemptions and UTC limit value of HBCDD in Annex I) Regulation (EU) 2024/2555. New prohibited limit for Hexabromocyclododecane (HBCDD) in the EU. Section 2.4.2. Added Due Diligence requirements (Batteries) from EU 2023/1542. Section 2.9 Updated table 13 per China: GB/T 26572-2011 Requirements of Concentration Limits for Certain Restricted Substances for Electronic and Electrical Products, 2011 for Diisobutyl phthalate (DIBP), Di-n-butyl phthalate (DBP), Butylbenzyl phthalate (BBP), and Di(2-ethylhexyl) phthalate (DEHP). Section 2.12.8. Added reference to USA: Energy Efficiency Program for Commercial and Industrial Equipment, 10 CFR 429 and 431 - Amendment - (on test procedure for commercial and industrial pumps), Final Rule, 88 FR 17934, March 2023 USA: Energy Efficiency Program for Certain Commercial and Industrial Equipment, Rules, 10 CFR 431, 1999 and Other - Amendment - (on test procedures for circulator pumps) Final Rule, 87 FR 57264, 2022 USA: Energy Efficiency Program for Certain Commercial and Industrial Equipment, Rules, 10 CFR 431, 1999 - Amendment - (on energy efficiency standards for circulator pumps) Final Rule, 89 FR 44464, May 2024 Added new definitions for circulator pumps, expanded the scope, and laid out new requirements for circulator pumps manufactured on or after May 22, 2028. Section 2.14. Added new section on Plastic resins reporting. Added reference to Canada: Reporting of Certain Plastic Resins and Products for the Federal Plastics Registry for 2024, 2025 and 2026, Notice, April 2024. Section 2.16 Added reference to UK: Product Safety and Metrology etc. (Amendment) Regulations, SI No. 2024/696. Revocation of the Dec 31, 2024 expiry date of the CE marking in the UK. Annex Z. Updated Organisation for Economic Co-operation and Development weblink for global database of per and polyfluoroalkyl substances.
2024-04-30	P24263	Table 1a. Added 1-methyl-2-pyrrolidone (NMP) prohibited for use as a solvent or reactant in the process of coating wires. Table 4a. Added 4-Methyl-2-pentanone to the reportable listing. Added general phthalates category to reportable listing. Moved Phthalates entry from Table 4b to 4a and changed reportable limit to Any Detectable Limit. Table 4b. Removed Bis(2-ethylhexyl) tetrabromophthalate (TBPH or BEHTBP), Diethyl phthalate (DEP), Diisodecyl phthalate (DIDP), Diisononyl phthalate (DINP), Di-n-hexyl phthalate (DNHP), Di-n-octyl phthalate (DnOP), Di-n-pentyl phthalate (DnPP) Table 5a. Added 6 entries to the SVHC candidate list Annex AA. Added Bis(2-ethylhexyl) tetrabromophthalate (TBPH or BEHTBP), Diisodecyl phthalate (DIDP), Diisononyl phthalate (DINP), Di-n-hexyl phthalate (DNHP), Di-n-octyl phthalate (DnOP), Di-n-pentyl phthalate (DnPP) Section 2.4.2 Added new EU requirements for Battery labeling Table 8 Added reference to EU Directive 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries. Section 2.12.1 Added reference to Switzerland: Energy Efficiency Requirements for Installations, Vehicles and Equipment, Ordinance, November 2017, and Amendments (2022) Section 2.12.3 Added reference to Vietnam No 14/2023/QD-TTg Decision on promulgating a list and roadmap of energy-using vehicles and equipment that must be eliminated and low-efficiency generating sets that must not be built and Vietnam standard 11848:2021 Notebook Computers – Energy Efficiency. Added requirements,

Date	EC Level	Change Summary
		definitions, labelling, and reference to South Korea: Regulation on Energy Efficiency Labeling and Standards, MKE Notice No. 1992-71 - Amendment - (on expanding products subject to energy efficiency grade labelling, strengthening efficiency standards) Notice No. 2024-001. Section 2.12.15 Added requirements, definitions, labelling, and reference to South Korea: Regulation on Energy Efficiency Labeling and Standards, MKE Notice No. 1992-71 - Amendment - (on expanding products subject to energy efficiency grade labelling, strengthening efficiency standards) Notice No. 2024-001. Section 2.14 Updated UKCA marking dates: Jan 1, 2025 effective date, Until Jan 1, 2028 on packaging and on product after that date. Added reference to Chinese GB/T 39560 series of standards
2023-11-01	P24204	Section 2.1.1 Referenced the new tables 1a and 1b for prohibited substances. Table 1a Added UVB 328 and Decachlorane Plus to the Prohibited listing. Adding Perfluorinated compounds back to the prohibited substances listing. Removed all individual references for prohibited substances for just textiles and incorporated them into one list for Substances meeting carcinogenic and mutagenic etc. Table 1b. Created and greyed out for substances pertaining only to medical devices. Removed the sample regulatory listing and adding a statement to contact prodinfo for this listing when needed. Table 4a created for substances requiring reporting for any detectable level Table 4 was renamed 4B for all other reportable substances not at detectable levels but other levels.. Section 2.23 added a reference to the link for the full listing of SVHCs. Table 5 was removed. Table 5a created for new SVHCs Table 5b created for SVHCs associated with electronics Section 2.12.1 – Added definition of 'components and sub-assemblies' as defined in point 2 of Article 2 of Directive 2009/125/EC. Section 2.12.7– Added reference to USA: Energy Efficiency Program for Certain Commercial and Industrial Equipment, Rules, 10 CFR 431, 1999 - Amendment - (on Energy Conservation Standards for Electric Motors) Direct Final Rule, 88 FR 36066, June 2023 Annex NN was removed since we have a link for the full REACH SVHC listing Annex AAA – Added table for US DoE energy conservation standards for electric motors in reference to section 2.12.7
2023-04-07	P24131	Table 4 – Added Cadmium and Cadmium impurities for plating and surface applications Table 5 -. 13 new SVHCs added – Reaction mass of 2,2,3,3,5,5,6,6-octafluoro-4-(1,1,1,2,3,3,3 heptafluoropropan-2-yl)morpholine and 2,2,3,3,5,5,6,6-octafluoro-4-(heptafluoropropyl)morpholine, ammonium perfluoroheptanoate, potassium perfluoroheptanoate, perfluoro heptanoic acid, sodium perfluoroheptanoate, melamine, bis(2-ethylhexyl) tetrabromophthalate, 4,4-sulphonyldiphenol, 2,2',6,6'-tetrabromo-4,4'-isopropylidenediphenol. 1,1'-[ethane-1,2-diylbisoxy]bis[2,4,6-tribromobenzene], N-(hydroxymethyl)acrylamide, Tris(2-methoxyethoxy)vinylsilane, an 6,6'-di-tert-butyl-2,2'-methylenedi-p-cresol Section 2.12.2 – Added reference to new US DOE test requirements starting Feb 15, 2023 Section 2.12.8– Added reference to USA: Energy Efficiency Program for Commercial and Industrial Equipment Section 2.12.16 – Added reference to EU, UK, and Switzerland delaying enforcement of PSU requirements until Jan 1, 2024 Section 2.12.18 – Added new section on transformers including reference to EU regulations Annex NN – Added 4 new SVHCs – isobutyl 4-hydroxybenzoate, barium diboron tetraoxide, S-(tricyclo(5.2.1.0'2,6)deca-3-en-8(or 9)-yl O-(isopropyl or isobutyl or 2-ethylhexyl) O-(isopropyl or isobutyl or 2-ethylhexyl) phosphorodithioate and (±)-1,7,7-trimethyl-3-[(4-methylphenyl)methylene]bicyclo[2.2.1]heptan-2-one covering any of the individual isomers and/or combinations thereof (4-MBC)

ANNEXES: Chemical Lists with CAS Numbers

Unless specifically indicated as complete for the chemicals affected, these annex listings are examples only, except where noted.

Annex A. Asbestos

Asbestos	1332-21-4
Actinolite	77536-66-4; 77536-66-4
Amosite (Grunerite)	12172-73-5
Anthophyllite	77536-67-5
Chrysotile	12001-29-5; 132207-32-0
Crocidolite	12001-28-4
Cummingtonite	17499-08-0
Fibrous erionite	66733-21-9, 12510-42-8
Tremolite	77536-68-6, 14567-73-8

Annex B. Azo colorants -

Note: The EC azo dyes ban applies to 1.) Certain azo colorants that by reductive cleavage of azo groups may release one of the following 22 aromatic amines and 2.) The Azodye compound listed in the second table of this annex.

1. List of regulated aromatic amines	
biphenyl-4-ylamine	92-67-1
Benzidine (Note: benzidine is also listed as prohibited in Table 1, which is more restrictive than the requirements for azo colorants.)	92-87-5
4-chloro-o-toluidine	95-69-2
2-naphthylamine	91-59-8

o-aminoazotoluene	97-56-3
5-nitro-o-toluidine	99-55-8
4-chloroaniline	106-47-8
4-methoxy-m-phenylenediamine	615-05-4
4,4'-methylenedianiline	101-77-9
3,3'-dichlorobenzidine	91-94-1
3,3'-dimethoxybenzidine	119-90-4
3,3'-dimethylbenzidine	119-93-7
4,4'-methylenedi-o-toluidine	838-88-0
6-methoxy-m-toluidine	120-71-8
4,4'-methylene-bis(2-chloroaniline)	101-14-4
4,4'-oxydianiline	101-80-4
4,4'-thiodianiline	139-65-1
o-toluidine	95-53-4
4-methyl-m-phenylenediamine	95-80-7
2,4,5-trimethylaniline	137-17-7
o-anisidine	90-04-0
4-amino azobenzene	60-09-3
2. List of regulated Azodyes	
A mixture of Disodium- (6- (4- anisidino) -3- sulfonato -2- (3,5- dinitro- 2-oxidophenylazo) -1-naphtholato) (1- (5-chloro -2-oxidophenylazo) -2-naphtholato) chromate (1-); (molecular formula $C_{39}H_{23}ClCrN_7O_{12}S.2Na$); Trisodium bis (6- (4-anisidino) -3- sulfonato -2- (3,5- dinitro-2- oxidophenylazo) -1- naphtholato) chromate(1-) (molecular formula $C_{46}H_{30}CrN_{10}O_{20}S_2.3Na$)	118685-33-9 Not available

Annex C. Cadmium/Cadmium Compounds

Cadmium	7440-43-9
Cadmium oxide	1306-19-0
Cadmium sulfide	1306-23-6
Cadmium chloride	10108-64-2
Cadmium sulfate	10124-36-4
Cadmium chromate	14312-00-6
Other cadmium compounds	-

Annex D. Halogenated aromatic substances

Polychlorinated biphenyls (PCB)(Note: PCBs are prohibited by other regulations, see PCBs in Table 1 and Annex O)	See Annex O
Halogenated diarylalkanes -	
Monomethyltetrachlorodiphenylmethane (Trade name: Ugilec 141)	76253-60-6
Monomethyldichlorodiphenylmethane (Trade name: Ugilec 121)	81161-70-8
Monomethyldibromodiphenylmethane (Trade name: DBBT)	99688-47-8
Halogenated benzenes -	
Chlorobenzene (Monochlorobenzene, MCB)	108-90-7
Dichlorobenzene, 1,2- (ortho-DCB)	95-50-1
Dichlorobenzene, 1,4- (para-DCB)	106-46-7
Pentachlorobenzene	608-93-5
Tetrachlorobenzene, 1, 2, 4, 5-	95-94-3
Tetrachlorobenzene, 1, 2, 3, 5-	634-90-2
Tetrachlorobenzene, 1, 2, 3, 4-	634-66-2
Trichlorobenzene, 1, 2,4 -	120-82-1
Trichlorobenzene, 1, 2, 3-	87-61-6
Hexachlorobenzene	118-74-1

Annex E. Halogenated diphenyl methanes

Monomethyl tetrachloro diphenyl methane; Trade name: Ugilec 141	76253-60-6
Monomethyl dichloro diphenyl methane; Trade name: Ugilec 121, Ugilec 21	81161-70-8
Monomethyl dibromo dipenyl methane (DBBT)	99688-47-8

Annex F. Removed

Annex G. Hexavalent Chromium/Hexavalent Chromium Compounds

Ammonium dichromate	7789-09-5
Chromium (VI) oxide	1333-82-0
Barium chromate	10294-40-3
Calcium chromate	13765-19-0
Chromic acetate	1066-30-4
Chromium trioxide	1333-82-0
Lead (II) chromate	7758-97-6
Lead chromate molybdate sulphate red	12656-85-8
Lead sulfochromate yellow	1344-37-2
Potassium chlorochromate	16037-50-6
Potassium chromate	7789-00-6

Potassium dichromate	7778-50-9
Silver chromate	7784-01-2
Sodium chromate	7775-11-3
Sodium chromate, dihydrate	7789-12-0
Sodium dichromate	10588-01-9
Strontium chromate	7789-06-2
Zinc chromate	13530-65-9
Chromic acid (H_2CrO_4), bis (triphenylsilyl) ester Bis(triphenylsilyl) chromate	1624-02-8
Hexanoic acid, 2-ethyl-, chromium salt	7329-33-1
Chromic acid	7738-94-5, 13530-68-2
Chromate (1-), hydroxyoctaoxodizincatedi-, potassium	11103-86-9
Chromic acid (H_2CrO_4), magnesium (1:1)	13423-61-5
Chromic acid (H_2CrO_4), cobalt (2++) salt (1:1)	13455-25-9
Chromic acid ($H_2Cr_2O_7$), calcium salt (1:1)	14307-33-6
Chromic acid ($H_2Cr_2O_7$), dilithium salt	14307-35-8
Lead chromate oxide	18454-12-1
Chromic acid ($H_2Cr_2O_7$), compd. with pyridine (1:2)	20039-37-6
Octanoic acid, chromium salt	20195-23-7
Zinc chromate hydroxide ($Zn_5(CrO_4)(OH)_8$)	49663-84-5
Phenazinium, 3-[[7-[(4-aminophenyl)amino]-5-phenylphenazinium-3-yl]amino]-5-phenyl-7-[[5-phenyl-7 -(phenylamino) phenazinium-3-yl] amino]-, salt with chromic acid ($H_2Cr_2O_7$) (2:3)	75578-75-5
Other hexavalent chromium compounds	-

Annex H. Lead/Lead Compounds

Lead	7439-92-1
Lead (II) sulfate	7446-14-2
Lead (II) carbonate	598-63-0
Lead hydrocarbonate	1319-46-6
Lead acetate	301-04-2
Lead (II) acetate, trihydrate	6080-56-4
Lead phosphate;	7446-27-7
Lead (II) phosphate	7446-27-7
Lead selenide	12069-00-0
Lead (IV) oxide	1309-60-0
Lead (II,IV) oxide	1314-41-6
Lead (II) sulfide	1314-87-0
Lead (II) oxide	1317-36-8
Lead (II) carbonate basic	1319-46-6
Lead hydroxidcarbonate	1344-36-1
Lead (II) chromate	7758-97-6
Lead (II) titanate	12060-00-3
Lead sulfate, sulphuric acid, lead salt	15739-80-7
Lead sulphate, tribasic	12202-17-4
Lead stearate	1072-35-1
Lead arsenite	10031-13-7
Lead azide	13424-46-9
Lead hexafluorosilicate	25808-74-6
Lead (II) methanesulphonate	17570-76-2
Lead naphthenate	61790-14-5
Lead dinitrate	10099-74-8
Lead chromate molybdate sulphate red	12656-85-8
Lead sulfochromate yellow	1344-37-2
Tetraethyl lead	78-00-2
Tetramethyl lead	75-74-1
Other lead compounds	-

Annex I. Mercury /Mercury Compounds
An extensive list of mercury compounds can be found at
http://www.pic.int/en/CasNumbers/mercury%20compounds%20CAS%20numbers.pdf

Mercury	7439-97-6
Phenylmercury acetate	62-38-4
Phenylmercury propionate	103-27-5
Phenylmercury 2-ethylhexanoate	13302-00-6
Phenylmercuric octanoate	13864-38-5
Phenylmercury neodecanoate	26545-49-3

Mercuric chloride	33631-63-9
Mercury (II) chloride	7487-94-7
Mercuric sulfate	7783-35-9
Mercuric nitrate	10045-94-0
Mercuric (II) oxide	21908-53-2
Mercuric sulfide	1344-48-5
Other mercury compounds	-

Annex J. Nickel

Nickel	7440-02-0
Nickelacetate	373-02-4
Nickelcarbonate	3333-67-3
Nickelcarbonyl	13463-39-3
Nickelhydroxide	12054-48-7, 11113-74-9
Nickelocene	1271-28-9
Nickeloxide	1313-99-1
Nickel sulfide (Ni_3S_2)	12035-72-2
Nickel chloride	7718-54-9
Nickel sulfate	7786-81-4
Nickel sulfate hexahydrate	10101-97-0
Nickel sulfide (NiS)	11113-75-0
Nickel nitrate hexahydrate	13478-00-7
Nickel carbonate hydroxide	12607-70-4
Other nickel compounds	-

Annex K. Ozone Depleting Substances

Chlorofluorocarbons (CFCs):	
Trichlorofluoromethane (CFC-11) and its isomers	75-69-4 DR [2] 62185-70-0 DR [2] 79620-41-0 DR [2] 83589-40-6 DR [2] 91315-61-6
Dichlorodifluoromethane (CFC-12) and its isomers	75-71-8 DR [2] 185009-39-6 DR [2] 62185-71-1
Trichlorotrifluoroethane (CFC-113) and its isomers	76-13-1 DR [2] 39349-94-5 DR [2] 56996-61-3 DR [2] 57762-34-2
Dichlorotetrafluoroethane (CFC-114) and its isomers	76-14-2
Monochloropentafluoroethane (CFC-115) and its isomers	76-15-3, DR [2] 12770-91-1
Chlorotrifluoromethane (CFC-13) and its isomers	75-72-9, 185009-43-2
Pentachlorofluoroethane (CFC-111) and its isomers	354-56-3, 29756-45-4
Tetrachlorodifluoroethane (CFC-112) and its isomers	76-12-0, 76-11-9
Heptachlorofluoropropane (CFC-211) and its isomers	422-78-6, 135401-87-5
Hexachlorodifluoropropane (CFC-212) and its isomers	3182-26-1
Pentachlorotrifluoropropane (CFC-213) and its isomers	2354-06-5 134237-31-3
Tetrachlorotetrafluoropropane (CFC-214) and its isomers	29255-31-0, 2268-46-4
Trichloropentafluoropropane (CFC-215) and its isomers	1599-41-3 4259-43-2 76-17-5
Dichlorohexafluoropropane (CFC-216) and its isomers	661-97-2
Chloroheptafluoropropane (CFC-217) and its isomers	422-86-6, 76-18-6
Halons:	
Dibromodifluoromethane (Halon-1202)	75-61-6
Bromochlorodifluoromethane (Halon-1211) and its isomers	353-59-3, 11104-73-7
Bromotrifluoromethane (Halon-1301) and its isomers	75-63-8, 62395-25-9
Dibromotetrafluoroethane (Halon-2402) and its isomers	124-73-2, DR [2] 76199-55-8
Tribromofluoromethane (Halon 1103)	353-54-8
Dibromochlorofluoromethane (Halon 1112)	353-55-9
Tetrabromodifluoroethane (Halon 2204)	Not available
Bromodichlorofluoromethane (Halon 1121)	Not available
Pentabromofluoroethane (Halon 2105)	Not available
Tribromotrifluoroethane (Halon 2303)	Not available
Bromopentafluoroethane (Halon 2501)	Not available
Tribromopentafluoropropane (Halon 3503)	Not available
Dibromohexafluoropropane (Halon 3602)	Not available

Bromoheptafluoropropane (Halon 3701)	Not available
Other:	
Carbon tetrachloride	56-23-5
1,1,1-trichloroethane (methyl chloroform) and its isomers except 1,1,2-trichloroethane	71-55-6 DR [2] 74552-83-3
Bromomethane (methyl bromide)	74-83-9
1-Bromopropane (n-propyl bromide)	106-94-5
Bromoethane (ethyl bromide)	74-96-4
Chlorobromomethane	74-97-5
Trifluoroiodomethane (trifluoromethyl iodide)	2314-97-8
Chloromethane (methyl chloride)	74-87-3
Hydrobromofluorocarbons (HBFCs) and their isomers:	
Bromodifluoromethane and its isomers	1511-62-2
HBFC-22B1 (FM-100)	1511-62-2
CHFBr2	1868-53-7
CH_2FBr	373-52-4
C_2HFBr_4	Not available
$C_2HF_2Br_3$	Not available
$C_2HF_3Br_2$	354-04-1, DR [2] 66542-88-9
C_2HF_4Br	Not available
$C_2H_2FBr_3$	Not available
$C_2H_2F_2Br_2$	75-82-1
$C_2H_2F_3Br$	421-06-7
$C_2H_3FBr_2$	358-97-4
$C_2H_3F_2Br$	Not available
C_2H_4FBr	762-49-2
C_3HFBr_6	Not available
$C_3HF_2Br_5$	Not available
$C_3HF_3Br_4$	Not available
$C_3HF_4Br_3$	Not available
$C_3HF_5Br_2$	Not available
C_3HF_6Br	Not available
$C_3H_2FBr_5$	Not available
$C_3H_2F_2Br_4$	Not available
$C_3H_2F_3Br_3$	Not available
$C_3H_2F_4Br_2$	Not available
$C_3H_2F_5Br$	Not available
$C_3H_3FBr_4$	Not available
$C_3H_3F_2Br_3$	Not available
$C_3H_3F_3Br_2$	Not available
$C_3H_3F_4Br$	Not available
$C_3H_4FBr_3$	Not available
$C_3H_4F_2Br_2$	Not available
$C_3H_4F_3Br$	Not available
$C_3H_5FBr_2$	Not available
$C_3H_5F_2Br$	Not available
C_3H_6FBr	Not available
Hydrochlorofluorocarbons (HCFCs) and their isomers:	
Dichlorofluoromethane (HCFC-21)	75-43-4, DR[2] 39289-28-6
Chlorodifluoromethane (HCFC-22)	75-45-6 DR[2] 73666-77-0 DR [2] 134191-96-1
Chlorofluoromethane (HCFC-31)	593-70-4
Tetrachlorofluoroethane (HCFC-121) 1,1,1,2-tetrachloro-2-fluoroethane 1,1,2,2-tetrachloro-1-fluoroethane	134237-32-4 130879-71-9 DR [2] 134237-32-4[3] 354-11-0 354-14-3
Trichlorodifluoroethane (HCFC-122) Trichloro-1,1-difluoroethane 1,2,2-trichloro-1,1-difluoroethane 1,2,2-trichloro-1,2-difluoroethane 1,1,1-trichloro-2,2-difluoroethane 1,1,2-trichloro-2,2-difluoroethane	41834-16-6 55949-46-7 354-21-2 DR [2] 134237-33-5[3] DR[2] 62549-18-2 354-15-4 354-12-1 Not available

Dichlorotrifluoroethane (HCFC-123)	34077-87-7
Dichloro-1,1,2-trifluoroethane	90454-18-5
2,2-dichloro-1,1,1-trifluoroethane	306-83-2
1,2-dichloro-1,1,2-trifluoroethane (HCFC-123a)	354-23-4
1,1-dichloro-1,2,2-trifluoroethane	812-04-4
2,2-dichloro-1,1,2-trifluoroethane	Not available
Chlorotetrafluoroethane (HCFC-124)	63938-10-3
2-chloro-1,1,1,2-tetrafluoroethane	2837-89-0
1-chloro-1,1,2,2-tetrafluoroethane (HCFC-124a)	354-25-6
Trichlorofluoroethane (HCFC-131)	27154-33-2
	134237-34-6[3]
1,1,2-trichloro-2-fluoroethane	359-28-4
1,1,2-trichloro-1 (or 2)-fluoroethane	90134-98-8
1,1,2-trichloro-1-fluoroethane (HCFC-131a)	811-95-0
1,1,1-trichloro-2-fluoroethane (HCFC-131b)	2366-36-1
Dichlorodifluoroethane (HCFC-132)	25915-78-0
Dichloro-1,1-difluoroethane	55494-45-6
1,1-dichlorodifluoroethane	31153-51-2
(meso) 1,2-dichloro-1,2-difluoroethane	33579-37-2
(R,R)-(+-).1,2-dichloro-1,2-difluoroethane	33489-30-4
1,2-dichloro-1,1-difluoroethane (HCFC-132b)	1649-08-7
1,1-dichloro-1,2-difluoroethane	1842-05-3
1,1-dichloro-2,2-difluoroethane	471-43-2
1,2-dichloro-1,2-difluoroethane	431-06-1
Chlorotrifluoroethane (HCFC-133)	1330-45-6
	DR[2] 38097-47-1
1-chloro-1,2,2-trifluoroethane	431-07-2
1-chloro-1,1,2-trifluoroethane	421-04-5
2chloro-1,1,1-trifluoroethane (HCFC-133a)	75-88-7
Dichlorofluoroethane (HCFC-141)	25167-88-8
1,1-dichloro-1-fluoroethane (HCFC-141b)	1717-00-6
1,2-dichloro-1-fluoroethane	430-57-9
1,1-dichloro-2-fluoroethane	430-53-5
Chlorodifluoroethane (HCFC-142)	25497-29-4
	DR[2] 58561-84-5
	DR[2] 27175-71-9
Chloro-1,1-difluoroethane	55949-44-5
2-chloro-1,1-difluoroethane	338-65-8
1-chloro-1,1-difluoroethane (HCFC-142b)	75-68-3
	DR[2] 65762-25-6
1-chloro-1,2-difluoroethane (HCFC-142a)	338-64-7
Hexachlorofluoropropane (HCFC-221)	29470-94-8
	134237-35-7[3]
1,1,1,2,3,3-hexachloro-3-fluoropropane	431-79-8
1,1,1,2,3,3-hexachloro-2-fluoropropane	422-40-2
1,1,1,2,2,3-hexachloro-1-fluoropropane	422-26-4
1,1,2,2,3,3-hexachloro-1-fluoropropane	422-28-6
1,1,1,3,3,3-hexachloro-2-fluoropropane	Not available
Pentachlorodifluoropropane (HCFC-222)	116867-32-4
	134237-36-8[3]
1,1,2,3,3-pentachloro-1,3-difluoropropane	431-82-3
1,1,1,2,3-pentachloro-3,3-difluoropropane	431-80-1
1,1,1,3,3-pentachloro-2,2-difluoropropane	422-49-1
1,2,2,3,3-pentachloro-1,1-difluoropropane	422-30-0
1,1,1,2,2-pentachloro-3,3-difluoropropane	422-27-5
1,1,1,2,3-pentachloro-2,3-difluoropropane	Not available
1,1,1,3,3-pentachloro-2,3-difluoropropane	Not available
(1,1,3,3,3-pentachloro-1,2-difluoropropane)	
1,1,2,2,3-pentachloro-1,3-difluoropropane	Not available
1,1,2,3,3-pentachloro-1,2-difluoropropane	Not available
Tetrachlorotrifluoropropane (HCFC-223)	29470-95-9
	134237-37-9[3]
1,1,1,3-tetrachloro-2,3,3-trifluoropropane	54002-59-4
1,1,2,3-tetrachloro-1,3,3-trifluoropropane	431-83-4
1,1,1,2-tetrachloro-3,3,3-trifluoropropane	431-81-2
1,1,3,3-tetrachloro-1,2,2-trifluoropropane	422-52-6
1,1,1,3-tetrachloro-2,2,3-trifluoropropane	422-50-4
1,2,3,3-tetrachloro-1,1,2-trifluoropropane	422-41-3
2,2,3,3-tetrachloro-1,1,1-trifluoropropane	422-35-5

1,1,2,2-tetrachloro-1,3,3-trifluoropropane	422-29-7
1,1,1,2-tetrachloro-2,3,3-trifluoropropane	Not available
1,1,3,3-tetrachloro-1,2,3-trifluoropropane	Not available
1,2,2,3-tetrachloro-1,1,3-trifluoropropane	Not available
1,1,2,3-tetrachloro-1,2,3-trifluoropropane	Not available
Trichlorotetrafluoropropane (HCFC-224)	127564-91-4
	134237-38-0[3]
1,1,3-trichloro-1,2,3,3-tetrafluoropropane	53063-53-9
1,1,1-trichloro-2,3,3,3-tetrafluoropropane	53063-52-8
1,1,2-trichloro-1,3,3,3-tetrafluoropropane	431-84-5
1,3,3-trichloro-1,1,2,2-tetrafluoropropane	422-54-8
1,1,3-trichloro-1,2,2,3-tetrafluoropropane	422-53-7
1,1,1-trichloro-2,2,3,3-tetrafluoropropane	422-51-5
2,3,3-trichloro-1,1,1,2-tetrafluoropropane	422-47-9
1,2,3-trichloro-1,1,2,3-tetrafluoropropane	422-42-4
1,2,2-trichloro-1,1,3,3-tetrafluoropropane	422-32-2
2,2,3-trichloro-1,1,1,3-tetrafluoropropane	Not available
1,1,2-trichloro-1,2,3,3-tetrafluoropropane	Not available
Dichloropentafluoropropane (HCFC-225)	127564-92-5
1,3-dichloro-1,1,2,3,3-pentafluoropropane	136013-79-1
3,3-dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca)	422-56-0
1,3-dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb)	507-55-1
2,2-dichloro-1,1,1,3,3-pentafluoropropane (HCFC-225aa)	128903-21-9
1,1-dichloro-1,2,3,3,3-pentafluoropropane	111512-56-2
(R,S)2,3-dichloro-1,1,1,2,3-pentafluoropropane	111512-55-1
(R,R)2,3-dichloro-1,1,1,2,3-pentafluoropropane	111512-51-7
1,1-dichloro-1,2,2,3,3-pentafluoropropane	13474-88-9
1,2-dichloro-1,1,3,3,3-pentafluoropropane (HCFC-225da)	431-86-7
2,3-dichloro-1,1,1,2,3-pentafluoropropane (HCFC-225ba)	422-48-0
1,2-dichloro-1,1,2,3,3-pentafluoropropane	422-44-6
Chlorohexafluoropropane (HCFC-226)	28987-04-4
	134308-72-8[3]
2-chloro-1,1,1,2,3,3-hexafluoropropane (HCFC-226ba)	51346-64-6
2-chloro-1,1,1,3,3,3-hexafluoropropane (HCFC-226da)	431-87-8
3-chloro-1,1,1,2,2,3-hexafluoropropane (HCFC-226ca)	422-57-1
1-chloro-1,1,2,2,3,3-hexafluoropropane (HCFC-226cb)	422-55-9
1-chloro-1,1,2,3,3,3-hexafluoropropane (HCFC-226ea)	359-58-0
Pentachlorofluoropropane (HCFC-231)	134190-48-0[3]
1,1,1,2,3-pentachloro-2-fluoropropane	421-94-3
1,1,2,3,3-pentachloro-2-fluoropropane	Not available
1,1,1,3,3-pentachloro-3-fluoropropane	Not available
1,1,2,2,3-pentachloro-1-fluoropropane	Not available
1,1,1,2,2-pentachloro-3-fluoropropane	Not available
1,1,1,2,3-pentachloro-3-fluoropropane	Not available
1,1,1,3,3-pentachloro-2-fluoropropane	Not available
1,1,2,2,3-pentachloro-3-fluoropropane	Not available
1,1,2,3,3-pentachloro-1-fluoropropane	Not available
Tetrachlorodifluoropropane (HCFC-232)	127564-82-3
1,2,3,3,-tetrachloro-1,1-difluoropropane	67879-59-8
1,1,3,3,-tetrachloro-2,2-difluoropropane	1112-14-7
1,1,1,3,-tetrachloro-2,2-difluoropropane	677-54-3
1,1,1,3,-tetrachloro-3,3-difluoropropane	460-89-9
1,1,1,3,-tetrachloro-2,3-difluoropropane	Not available
1,1,1,2,-tetrachloro-2,3-difluoropropane	Not available
1,1,1,2,-tetrachloro-3,3-difluoropropane	Not available
1,1,2,3,-tetrachloro-1,2-difluoropropane	Not available
1,1,2,3,-tetrachloro-1,3-difluoropropane	Not available
1,2,3,3,-tetrachloro-1,2-difluoropropane	Not available
(1,1,2,3,-tetrachloro-2,3-difluoropropane)	
1,2,2,3,-tetrachloro-1,1-difluoropropane	Not available
1,2,2,3,-tetrachloro-1,3-difluoropropane	Not available
1,1,3,3,-tetrachloro-1,3-difluoropropane	Not available
1,1,2,2,-tetrachloro-3,3-difluoropropane	Not available
(2,2,3,3,-tetrachloro-1,1-difluoropropane)	
1,1,2,2,-tetrachloro-1,3-difluoropropane	Not available
Trichlorotrifluoropropane (HCFC-233)	61623-04-9
	134237-40-4[3]
1,1,3-trichloro-2,2,3-trifluoropropane	131221-36-8
1,1,1-trichloro-2,2,3-trifluoropropane	131211-71-7

1,1,3-trichloro-1,2,3-trifluoropropane	54377-32-1
1,1,1-trichloro-2,3,3-trifluoropropane	54306-56-8
1,1,2-trichloro-2,3,3-trifluoropropane	13058-99-6
1,1,1-trichloro-3,3,3-trifluoropropane	7125-84-0
2,2,3-trichloro-1,1,1-trifluoropropane	7125-83-9
2,3,3-trichloro-1,1,1-trifluoropropane	431-51-6
1,1,3-trichloro-1,2,2-trifluoropropane	421-99-8
1,2,3-trichloro-1,1,2-trifluoropropane	421-95-4
1,1,3-trichloro-1,3,3-trifluoropropane	333-26-6
1,1,2-trichloro-1,2,3-trifluoropropane	Not available
1,2,3-trichloro-1,2,3-trifluoropropane	Not available
1,1,2-trichloro-1,3,3-trifluoropropane	Not available
1,3,3-trichloro-1,1,2-trifluoropropane	Not available
2,2,3-trichloro-1,1,3-trifluoropropane	Not available
1,2,3-trichloro-1,1,3-trifluoropropane	Not available
1,2,2-trichloro-1,1,3-trifluoropropane	Not available
Dichlorotetrafluoropropane (HCFC-234)	127564-83-4
1,3-dichloro-1,1,3,3-tetrafluoropropane (HCFC-234fa)	76140-39-1
1,3-dichloro-1,2,2,3-tetrafluoropropane	70341-81-0
1,1-dichloro-1,2,2,3-tetrafluoropropane	70192-63-1
1,1-dichloro-1,3,3,3-tetrafluoropropane	64712-27-2
(R,R) 1,3-dichloro-1,1,2,3-tetrafluoropropane	53149-65-8
3,3-dichloro-1,1,1,2-tetrafluoropropane	53063-54-0
2,2-dichloro-1,1,3,3-tetrafluoropropane	17705-30-5
1,1-dichloro-2,2,3,3-tetrafluoropropane	4071-01-6
1,2-dichloro-1,2,3,3-tetrafluoropropane	425-94-5
1,3-dichloro-1,1,2,2-tetrafluoropropane (HCFC-234cc)	422-00-4
2,3-dichloro-1,1,1,3-tetrafluoropropane (HCFC-234da)	Not available
1,1-dichloro-1,2,3,3-tetrafluoropropane	Not available
1,2-dichloro-1,1,3,3-tetrafluoropropane	Not available
2,3-dichloro-1,1,1,2-tetrafluoropropane	Not available
2,2-dichloro-1,1,1,3-tetrafluoropropane	Not available
1,2-dichloro-1,1,2,3-tetrafluoropropane	Not available
1,3-dichloro-1,1,2,3-tetrafluoropropane	Not available
Chloropentafluoropropane (HCFC-235)	108662-83-5
	134237-83-5[3]
3-chloro-1,1,1,2,3-pentafluoropropane	134237-41-5
2-chloro-1,1,1,3,3-pentafluoropropane (HCFC-235da)	134251-06-2
1-chloro-1,2,2,3,3-pentafluoropropane (HCFC-235ca)	28103-66-4
1-chloro-1,1,2,2,3-pentafluoropropane (HCFC-235cc)	679-99-2
1-chloro-1,1,3,3,3-pentafluoropropane (HCFC-235fa)	677-55-4
3-chloro-1,1,1,2,2-pentafluoropropane (HCFC-235cb)	460-92-4
2-chloro-1,1,1,2,3-pentafluoropropane	422-02-6
1-chloro-1,1,2,3,3-pentafluoropropane	Not available
2-chloro-1,1,2,3,3-pentafluoropropane	Not available
Tetrachlorofluoropropane (HCFC-241)	134190-49-1[3]
1,1,1,2-tetrachloro-3-fluoropropane	84816-05-7
1,1,1,3-tetrachloro-3-fluoropropane	23153-22-2
1,1,2,3-tetrachloro-3-fluoropropane	21981-25-9
1,1,2,2-tetrachloro-1-fluoropropane	7126-06-9
1,1,2,3-tetrachloro-2-fluoropropane	3175-26-6
1,1,1,2-tetrachloro-2-fluoropropane	3175-25-5
1,1,2,3-tetrachloro-1-fluoropropane	666-27-3
1,1,1,3-tetrachloro-2-fluoropropane	Not available
1,1,2,2-tetrachloro-3-fluoropropane	Not available
1,2,2,3-tetrachloro-1-fluoropropane	Not available
1,1,3,3-tetrachloro-1-fluoropropane	Not available
1,1,3,3-tetrachloro-2-fluoropropane	Not available
Trichlorodifluoropropane (HCFC-242)	127564-90-3
	134237-42-6[3]
1,3,3-trichloro-1,1-difluoropropane	460-63-9
1,2,3-trichloro-1,2-difluoropropane	7164-14-9
1,1,3-trichloro-2,2-difluoropropane	1112-13-6
1,2,3-trichloro-1,1-difluoropropane	431-24-3
1,1,1-trichloro-2,2-difluoropropane	1112-05-6
1,2,2-trichloro-1,1-difluoropropane	7126-05-8
1,1,2-trichloro-1,2-difluoropropane	7126-04-7
1,1,1-trichloro-2,3-difluoropropane	Not available
1,1,2-trichloro-1,3-difluoropropane	Not available

1,1,3-trichloro-1,2-difluoropropane	Not available
1,1,2-trichloro-2,3-difluoropropane	Not available
1,2,2-trichloro-1,3-difluoropropane	Not available
2,2,3-trichloro-1,1-difluoropropane	Not available
1,1,1-trichloro-3,3-difluoropropane	Not available
1,1,3-trichloro-1,3-difluoropropane	Not available
1,1,2-trichloro-3,3-difluoropropane	Not available
1,1,3-trichloro-2,3-difluoropropane	Not available
1,2,3-trichloro-1,3-difluoropropane	Not available
Dichlorotrifluoropropane (HCFC-243)	116890-51-8
	134237-43-7[3]
2,2-dichloro-1,1,1-trifluoropropane	7126-01-4
1,1-dichloro-1,2,2-trifluoropropane	7125-99-7
1,2-dichloro-1,1,2-trifluoropropane	7126-00-3
2,3-dichloro-1,1,1-trifluoropropane (HCFC-243da)	338-75-0
1,3-dichloro-1,2,2-trifluoropropane	67406-68-2
1,1-dichloro-2,2,3-trifluoropropane	70192-70-0
3,3-dichloro-1,1,1-trifluoropropane	460-69-5
1,3-dichloro-1,1,2-trifluoropropane	Not available
1,2-dichloro-1,1,3-trifluoropropane	Not available
1,1-dichloro-1,2,3-trifluoropropane	Not available
2,3-dichloro-1,1,2-trifluoropropane	Not available
2,2-dichloro-1,1,3-trifluoropropane	Not available
1,2-dichloro-1,2,3-trifluoropropane	Not available
1,3-dichloro-1,1,3-trifluoropropane	Not available
1,1-dichloro-1,3,3-trifluoropropane	Not available
3,3-dichloro-1,1,2-trifluoropropane	Not available
2,3-dichloro-1,1,3-trifluoropropane	Not available
1,3-dichloro-1,2,3-trifluoropropane	Not available
Chlorotetrafluoropropane (HCFC-244)	134190-50-4[3]
2-chloro-1,1,1,3-tetrafluoropropane (HCFC-244db)	117970-90-8
3-chloro-1,1,2,2-tetrafluoropropane	679-85-6
1-chloro-1,2,2,3-tetrafluoropropane	67406-66-0
1-chloro-1,1,3,3-tetrafluoropropane (HCFC-244fb)	2730-64-5
2-chloro-1,1,3,3-tetrafluoropropane (HCFC-244da)	19041-02-2
2-chloro-1,1,1,2-tetrafluoropropane (HCFC-244ba)	421-73-8
1-chloro-1,1,2,2-tetrafluoropropane	421-75-0
1-chloro-1,1,2,3-tetrafluoropropane	Not available
3-chloro-1,1,1,2-tetrafluoropropane	Not available
2-chloro-1,1,2,3-tetrafluoropropane	Not available
3-chloro-1,1,1,3-tetrafluoropropane	Not available
3-chloro-1,1,2,3-tetrafluoropropane	Not available
Trichlorofluoropropane (HCFC-251)	134190-51-5[3]
(R,S)-(.+-.) 1,2,3-trichloro-1-fluoropropane	84847-80-3
(R,R)-(.+-.)	84847-79-0
[R(R,S)]	76985-34-7
[R(R,R)]	76985-33-6
(R,S)	67832-50-2
(R,R)	67832-44-4
1,2,3-trichloro-2-fluoropropane	7126-16-1
1,2,2-trichloro-3-fluoropropane	70192-89-1
1,1,3-trichloro-1-fluoropropane	818-99-5
1,1,3-trichloro-2-fluoropropane	76937-36-5
1,1,2-trichloro-1-fluoropropane	421-41-0
1,1,2-trichloro-2-fluoropropane	3175-24-4
1,1,1-trichloro-2-fluoropropane	Not available
1,1,1-trichloro-3-fluoropropane	Not available
1,1,2-trichloro-3-fluoropropane	Not available
1,1,3-trichloro-3-fluoropropane	Not available
1,2,2-trichloro-1-fluoropropane	Not available
1,2,3-trichloro-1-fluoropropane	Not available
Dichlorodifluoropropane (HCFC-252)	134190-52-6[3]
1,1-dichloro-2,2-difluoropropane	1112-01-2
1,1-dichloro-3,3-difluoropropane	131404-17-6
1,1-dichloro-1,3-difluoropropane	121612-64-4
1,2-dichloro-1,1-difluoropropane	7126-15-0
1,2-dichloro-2,3-difluoropropane	70192-74-4
2,3-dichloro-1,1-difluoropropane	82578-00-5
1,3-dichloro-1,1-difluoropropane	819-00-1

1,3-dichloro-1,2-difluoropropane	111483-26-2
1,3-dichloro-2,2-difluoropropane	1112-36-3
1,1-dichloro-1,2-difluoropropane	Not available
1,1-dichloro-2,3-difluoropropane	Not available
1,2-dichloro-1,2-difluoropropane	Not available
1,2-dichloro-1,3-difluoropropane	Not available
1,3-dichloro-1,3-difluoropropane	Not available
2,2-dichloro-1,1-difluoropropane	Not available
2,2-dichloro-1,3-difluoropropane	Not available
Chlorotrifluoropropane (HCFC-253)	26588-23-8
	134237-44-8[3]
2-chloro-1,1,1-trifluoropropane	421-47-6
3-chloro-1,1,1-trifluoropropane	460-35-5
1-chloro-1,1,2-trifluoropropane	134251-05-1
2-chloro-1,1,2-trifluoropropane	69202-10-4
3-chloro-1,1,2-trifluoropropane	121612-65-5
1-chloro-1,1,3-trifluoropropane	83124-56-5
1-chloro-1,2,2-trifluoropropane	70192-76-6
1-chloro-2,2,3-trifluoropropane	56758-54-4
2-chloro-1,1,3-trifluoropropane	Not available
3-chloro-1,1,3-trifluoropropane (1-chloro-1,3,3-trifluoropropane)	Not available
1-chloro-1,2,3-trifluoropropane	Not available
2-chloro-1,2,3-trifluoropropane	Not available
Dichlorofluoropropane (HCFC-261)	127404-11-9
	134237-45-9[3]
1,1-dichloro-1-fluoropropane	7799-56-6
1,1-dichloro-2-fluoropropane	53074-31-0
1,1-dichloro-3-fluoropropane	53074-30-9
1,2-dichloro-1-fluoropropane	7799-56-5
1,2-dichloro-2-fluoropropane	420-97-3
1,2-dichloro-3-fluoropropane	453-01-0
1,3-dichloro-1-fluoropropane	83124-60-1
1,3-dichloro-2-fluoropropane	816-38-6
2,2-dichloro-1-fluoropropane	Not available
Chlorodifluoropropane (HCFC-262)	134190-53-7[3]
1-chloro-1,1-difluoropropane	421-02-3
2-chloro-1,1-difluoropropane	430-93-3
3-chloro-1,1-difluoropropane	83124-57-6
1-chloro-1,2-difluoropropane	430-96-6
1-chloro-2,3-difluoropropane	37161-81-2
2-chloro-1,3-difluoropropane	102738-79-4
1-chloro-2,2-difluoropropane	420-99-5
2-chloro-1,2-difluoropropane	Not available
1-chloro-1,3-difluoropropane	Not available
Chlorofluoropropane (HCFC-271)	134190-54-8[3]
1-chloro-1-fluoropropane	430-55-7
1-chloro-2-fluoropropane	430-46-6
1-chloro-3-fluoropropane	462-38-4
2-chloro-1-fluoropropane	20372-78-5
2-chloro-2-fluoropropane	420-44-0
Chlorofluoroethane (HCFC-151)	762-50-5

Notes:
[1] Manufacturing processes do not include facilities equipment or systems such as chillers and fire suppression systems.
[2] DR denotes a deleted registry number that was replaced with another registry number.
[3] Chemical to which Chemical Abstract Service (CAS) assigned registry number based on premise that it was a trade name, although chemical may be the same as another one already listed.

Annex L. Perfluorocarbons (PFC)

Carbon tetrafluoride (Perfluoromethane, tetrafluoromethane) (PFC-14)	75-73-0
Perfluoroethane (Hexafluoroethane) (PFC-116)	76-16-4
Perfluoropropane (Octafluoropropane) (PFC-218)	76-19-7
Perfluorobutane (Decafluorobutane) (PFC-3-1-10; R-31-10)	355-25-9
Perfluoropentane (Dodecafluoropentane) (PFC-4-1-12; R-41-12)	678-26-2
Perfluorohexane (Tetradecafluorohexane) (PFC-5-1-14; R-51-14)	355-42-0
Perfluorocyclobutane (Octafluorocyclobutane) (PFC-c-318)	115-25-3
Perfluoroheptane	335-57-9
Perfluorooctane	307-34-6

Annex M. Polybrominated biphenyls (PBBs) including all congeners and isomers

2-Bromobiphenyl	2052-07-5
3-Bromobiphenyl	2113-57-7
4-Bromobiphenyl	92-66-0
Decabromobiphenyl	13654-09-6
Dibromobiphenyl	92-86-4
Heptabromobiphenyl	35194-78-6
Hexabromobiphenyl	59080-40-9
Hexabromo-1,1-biphenyl	36355-01-8
Nonabromobiphenyl	27753-52-2
Octabromobiphenyl	61288-13-9, 27858-07-7
Pentabromobiphenyl	56307-79-0
Polybrominated Biphenyl	59536-65-1
Tetrabromobiphenyl	40088-45-7
Tribromobiphenyl	59080-34-1
Firemaster FF-1	67774-32-7

Annex N. Polybrominated diphenyl ethers (PBDEs) including all congeners and isomers

Bromobiphenyl Ether	101-55-3
Decabromobiphenyl Ether	1163-19-5
Dibromobiphenyl Ether	2050-47-7
Heptabromobiphenyl Ether	68928-80-3
Hexabromobiphenyl Ether	36483-60-0
Nonabromobiphenyl Ether	63936-56-1
Octabromobiphenyl Ether	32536-52-0
Pentabromobiphenyl Ether	32534-81-9
Tetrabromobiphenyl Ether	40088-47-9
Tribromobiphenyl Ether	49690-94-0

Annex O. Polychlorinated biphenyls (PCBs)

Polychlorinated Biphenyls	1336-36-3
Aroclor	12767-79-2
Chlorodiphenyl (Aroclor 1260)	11096-82-5
Kanechlor 500	27323-18-8
Aroclor 1254	11097-69-1
Terphenyls	26140-60-3

Annex P. Shortchain Chlorinated Paraffins (also known as Shortchain chlorinated alkanes)

Only short-chain chlorinated paraffins with carbon length of 10-13 atoms are covered.

Chlorinated paraffins (C_{10-13}) (also known as Alkanes, C_{10-13}, chloro)	85535-84-8
Alkanes, C_{10-12}, chloro	108171-26-2
Alkanes, C_{12-13}, chloro	71011-12-6
Alkanes, C_{10-14}, chloro	85681-73-8
Alkanes, C_{6-18}, chloro	68920-70-7
Alkanes, C_{12-14}, chloro	85536-22-7
Other Short Chain Chlorinated Paraffins (SCCPs)	-
Synonyms for SCCPs	Alkanes, chlorinated; alkanes (C10-C13), chloro (60%); alkanes (C10-C13), chloro (50-70%); chlorinated alkanes; chlorinated alkanes, chlorinated paraffins; chloroalkanes; chlorocarbons; paraffin, chlorinated; paraffins, chloro; paroils, chlorinated; polychlorinated alkanes; polychloroalkanes

Annex Q. Chlorinated Solvents (complete list)

Chloroform	67-66-3
1,1,2-trichloroethane	79-00-5
1,1,2,2-tetrachloroethane	79-34-5
1,1,1,2-tetrachloroethane	630-20-6
Pentachloroethane	76-01-7
1,1-dichloroethylene	75-35-4
1,1,1 Trichloroethane (note - this substance is also included in the Annex for ozone depleting substances)	71-55-6
Carbon tetrachloride (note - this substance is also included in the Annex for ozone depleting substances)	56-23-5

Annex R. Polychlorinated naphthalenes

Polychlorinated Naphthalenes	70776-03-3
Dichloronaphthalene	28699-88-9
Trichloronaphthalene	1321-65-9
Tetrachloronaphthalene	1335-88-2
Pentachloronaphthalene	1321-64-8
Hexachloronaphthalene	1335-87-1
Heptachloronaphthalene	32241-08-0

Octachloronaphthalene	2234-13-1
Other polychlorinated naphthalenes	-

Annex S. Tributyl tin oxide (TBTO)

Bis(tri-n-butyltin) oxide	56-35-9

Annex T. Antimony/Antimony Compounds

Antimony (metallic)	7440-36-0
Antimony pentoxide	1314-60-9
Antimony trichloride	10025-91-9
Sodium antimonate	15432-85-6
Other antimony compounds	-

Annex U. Arsenic/Arsenic Compounds

Arsenic	7440-38-2
Gallium arsenide	1303-00-0
Calcium arsenate	7778-44-1
Calcium arsenite	27152-57-4
Potassium arsenite	10124-50-2
Potassium arsenate	7784-41-0
Lead arsenate	3687-31-8
Sodium arsenate	10048-95-0
Copper arsenate	10103-61-4
Ammonium arsenate	7784-44-3
Lead arsenate	7784-40-9
Arsenic acid, magnesium salt	10103-50-1
Arsenic trichloride	7784-34-1
Arsine	7784-42-1
Copper arsenite	10290-12-7
Arsenic acid	7778-39-4
Other arsenic compounds, not including arsenic pentoxide and arsenic trioxide, as these substances have a separate entry on the reportable table)	-

Annex V. Beryllium/Beryllium Compounds

Beryllium-aluminum alloy	12770-50-2
Beryllium chloride	7787-47-5
Beryllium fluoride	7787-49-7
Beryllium hydroxide	13327-32-7
Beryllium phosphate	13598-15-7
Beryllium sulfate	13510-49-1
Beryllium sulfate tetrahydrate	7787-56-6
Beryl ore	1302-52-9
Beryllium carbonate	66104-24-3, 13106-47-3
Beryllium nitrate	13597-99-4
Other beryllium compounds (This does not include beryllium, beryllium oxide and beryllium copper alloys. These substances have a separate entry on the reportable table.)	-

Annex W. Bismuth/Bismuth Compounds and Alloys

Bismuth	7440-69-9
Bismuth trioxide	1304-76-3
Bismuth nitrate	10361-44-1
Other bismuth compounds	-

Annex X. Brominated Flame Retardants (other than PBB or PBDE)

Poly(2,6-dibromo-phenylene oxide)	69882-11-7
Tetra-decabromo-diphenoxy-benzene	58965-66-5
1,2-Bis(2,4,6-tribromo-phenoxy) ethane	37853-59-1
TBBA, unspecified	30496-13-0
TBBA-epichlorhydrin oligomer	40039-93-8
TBBA-TBBA-diglycidyl-ether oligomer	70682-74-5
TBBA carbonate oligomer	28906-13-0
TBBA carbonate oligomer, phenoxy end capped	94334-64-2
TBBA carbonate oligomer, 2,4,6-tribromo-phenol terminated	71342-77-3
Brominated epoxy resin end-capped with tribromophenol	139638-58-7
Brominated epoxy resin end-capped with tribromophenol	135229-48-0
TBBA-(2,3-dibromo-propyl-ether)	21850-44-2
TBBA bis-(2-hydroxy-ethyl-ether)	4162-45-2
TBBA-bis-(allyl-ether)	25327-89-3
TBBA-dimethyl-ether	37853-61-5
Tetrabromo-bisphenol S	39635-79-5
TBBS-bis-(2,3-dibromo-propyl-ether)	42757-55-1

2,4-Dibromo-phenol	615-58-7
2,4,6-tribromo-phenol	118-79-6
Pentabromo-phenol	608-71-9
2,4,6-Tribromo-phenyl-alltl-ether	3278-89-5
Tribromo-phenyl-allyl-ether, unspecified	26762-91-4
Bis(methyl)tetrabromo-phthalate	55481-60-2
Bis(2-ethlhexyl)tetrabromo-phtalate	26040-51-7
2-Hydroxy-propyl-2-(2-hydroxy-ethoxy)-ethyl-TBP	20566-35-2
TBPA, glycol-and propylene-oxide esters	75790-69-1
N,N'-Ethylene –bis-(tetrabromo-phthalimide)	32588-76-4
Ethylene-bis(5,6-dibromo-norbornane-2,3-dicarboximide)	52907-07-0
2,3-Dibromo-2-butene-1,4-diol	3234-02-4
Dibromo-neopentyl-glycol	3296-90-0
Dibromo-propanol	96-13-9
Tribromo-neopentyl-alcohol	36483-57-5
Poly tribromo-styrene	57137-10-7
Tribromo-styrene	61368-34-1
Dibromo-styrene grafted PP	171091-06-8
Poly-dibromo-styrene	31780-26-4
Bromo-/Chloro-paraffins	68955-41-9
Bromo-/Chloro-alpha-olefin	82600-56-4
Vinylbromide	593-60-2
Tris-(2,3-dibromo-propyl)-isocyanurate	52434-90-9
Tris(2,4-Dibromo-phenyl) phosphate	49690-63-3
Tris(tribromo-neopentyl) phosphate	19186-97-1
Chlorinated and brominated phosphate esther	125997-20-8
Pentabromo-toluene	87-83-2
Pentabromo-benzyl bromide	38521-51-6
1,3-Butadiene homopolymer,brominated	68441-46-3
Pentabromo-benzyl-acrylate, monomer	59447-55-1
Pentabromo-benzyl-acrylate, polymer	59447-57-3
Decabromo-diphenyl-ethane	84852-53-9
Tribromo-bisphenyl-maleinimide	59789-51-4
Brominated trimethylphenyl-ɨindane	
Hexabromo-cyclo-dodecane (HBCD), unspecified	3194-55-6, 25637-99-4
Tetrabromo-chyclo-octane	31454-48-5
1,2-Dibromo-4-(1,2 dibromo-methyl)-cyclo-hexane	3322-93-8
TBPA Na salt	25357-79-3
Tetrabromo phthalic-anhydride	632-79-1
TBBA-bisphenol A-phosgene polymer	32844-27-2
Bis(methyl)tetrabromo-phthalate	55481-60-2
Formaldehyde, polymer with bromophenol and 2-(chloromethyl)oxirane	68541-56-0
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR (14) [Aliphatic/alicyclic brominated compounds]	-
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR (15) [Aliphatic/alicyclic brominated compounds in combination with antimony compounds]	-
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR (16) [Aromatic brominated compounds excluding brominated diphenyl ether and biphenyls]	-
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR (17) [Aromatic brominated compounds excluding brominated diphenyl ether and biphenyls) in combination with antimony compounds]	-
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR (22) [Aliphatic/alicyclic chlorinated and brominated compounds]	-
Brominated flame retardant which comes under notation of ISO 1043-4 code number FR (42) [Brominated organic phosphorus compounds]	-

Annex Y. Magnesium/Magnesium Alloys and Magnesium compounds

Magnesium	7439-95-4
Magnesium hydroxide	1309-42-8
Magnesium oxide	1309-48-4
Magnesium carbonate	546-93-0
Magnesium sulfate	7487-88-9
Magnesium chloride	7786-30-3

Other magnesium alloys	-

Annex Z. Perfluorooctyl acid (PFOA) and salts (for a more comprehensive list of PFOA CAS numbers see OECD https://ibm.biz/oecd-PFAS

Pentadecafluorooctanoic acid	335-67-1
2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-penta¬deca¬fluoro-octanoic acid, sodium salt	335-95-5
2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-penta¬deca¬fluoro-octanoic acid, potassium salt	2395-00-8
2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-penta¬deca¬fluoro-octanoic acid, silver salt	335-93-3
Acid Fluoride of PFOA	335-66-0
Methyl ester of PFOA	376-27-2
Ethyl ester of PFOA	3108-24-5
2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-penta¬deca¬fluoro-octanoic acid, ammonium salt	3825-26-1
Octanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluoro-, chromium(3+)	68141-02-6
Ethanaminium, N,N,N-triethyl-, salt with pentadecafluorooctanoic acid (1:1)	98241-25-9

Annex AA. Phthalates

Benzyl 3-isobutyryloxy-1-isopropyl-2,2-dimethylpropyl phthalate	16883-83-3
Benzyl octyl phthalate	68515-40-2
Bis(2-ethylhexyl) tetrabromophthalate (TBPH or BEHTBP)	26040-51-7
Di (2-methoxyethyl) phthalate	117-82-8
Dimethyl phthalate (DMP)	131-11-3
Diethyl phthalate (DEP)	84-66-2
Diallyl phthalate (DAP)	131-17-9
Di-n-propyl phthalate (DPP)	131-16-8
Butyl cyclohexyl phthalate (BCP)	84-64-0
Dicyclohexyl phthalate	84-61-7
Diisohexyl phthalate (DiHxP)	146-50-9
Diisoheptyl phthalate (DiHpP)	41451-28-9
Butyl decyl phthalate (BDP)	89-19-0
Diisooctyl phthalate (DIOP)	27554-26-3
N-Octyl n-decyl phthalate (ODP)	119-07-3
Diundecyl phthalate (DUP)	3648-20-2
Diisoundecyl phthalate (DIUP)	85507-79-5
Ditridecyl phthalate (DTDP)	119-06-2
Diisotridecyl phthalate (DIUP)	68515-47-9
Diisodecyl phthalate (DIDP)	26761-40-0 and 68515-49-1
Diisononyl phthalate (DINP)	28553-12-0 and 68515-48-0
Di-n-hexyl phthalate (DNHP)	84-75-3
Di-n-octyl phthalate (DnOP)	117-84-0
Di-n-pentyl phthalate (DnPP)	131-18-0

Annex BB. Polyvinyl Chloride

Polyvinyl chloride (PVC)	9002-86-2

Annex CC. Radioactive Substances

Uranium – 238	7440-61-1
Plutonium	7440-07-5
Radon	10043-92-2
Americium – 241	14596-10-2; 7440-35-9
Thorium – 232	7440-29-1
Cesium	7440-46-2
Cesium – 137	10045-97-3
Strontium	7440-24-6
Strontium-90	10098-97-2
Other radioactive substances	-

Annex DD. Selenium/Selenium Compounds

Selenium	7782-49-2
Hydrogen selenide	7783-07-5
Sodium selenide	1313-85-5
Selenium dioxide	7446-08-4
Sodium selenate	13410-01-0
Dimethyl selenide	593-79-3
Selenium oxide	12640-89-0
Other selenium compounds	-

Annex EE. Tributyl Tin, Triphenyl Tin

Tributyltin	688-73-3
Tributyltin oxide	56-35-9
Tributyltin benzoate	4342-36-3
Tributyl tin bromide	1461-23-0
Tributyltin linoleate	24124-25-2

Tributyltin methacrylate	2155-70-6
Triphenyl tin	668-34-8
Triphenyltin N,N'-dimethyldithiocarbamate	1803-12-9
Triphenyltin fluoride	379-52-2
Triphenyltin acetate	900-95-8
Triphenyltin chloride	639-58-7
Triphenyltin hydroxide	76-87-9
Triphenyltin fatty acid salts (C=9-11)	47672-31-1
Triphenyltin chloroacetate	7094-94-2
Tributyltin methacrylate	2155-70-6
Bis(tributyltin) fumarate	6454-35-9
Tributyltin fluoride	1983-10-4
Bis(tributyltin) 2,3-dibromosuccinate	31732-71-5
Tributyltin acetate	56-36-0
Tributyltin laurate	3090-36-6
Bis(tributyltin) phthalate	4782-29-0
Copolymer of alkyl acrylate, methyl methacrylate and tributyltin methacrylate(alkyl; C=8)	67772-01-4
Tributyltin sulfamate	6517-25-5
Bis(tributyltin) maleate	14275-57-1
Tributyltin chloride	1461-22-9, 7342-38-3
Mixture of tributyltin cyclopentanecarboxylate and its analogs (Tributyltin naphthenate)	-
Tributyltin cyclopentane carbonate=mixture	5409-17-2
Triphenyltin fatty acid ((9-11) salt)	18380-71-7, 18380-72-8, 47672-31-1, 94850-90-5
Mixture of tributyltin 1,2,3,4,4a,4b,5,6,10,10a-decahydro -7-isopropyl- 1,4a- dimethyl-1-phenanthlenecarboxylate and its analogs (Tributyltin rosin salt)	26239-64-5
Tributyltin naphthenate	85409-17-2
Other Tributyl Tins & Triphenyl Tins	-

Annex FF. Creosote, Coal Tar, Anthracene Etc. (This list of substances is complete)

Cresote; wash oil	8001-58-9
Creosote Oil; wash oil	61789-28-4
Distillates (coal tar), naphthalene oils; naphthalene oil	84650-04-4
Creosote oil, acenaphthene fraction; wash oil	90640-84-9
Distillates (coal tar), upper; heavy anthracene oil	65996-91-0
Anthracene oil	90640-80-5
Tar acids, coal, crude; crude phenols	65996-85-2
Cresote, wood	8021-39-4
Low temperature tar oil, alkaline; extract residues (coal), low temperature coal tar alkaline	122384-78-5
Coal tar	8007-45-2

Annex GG. Ethylene based Glycol Ethers

2-Methoxyethanol	109-86-4
Methoxyethanol	32718-54-0
Methoxyethanol acetate	110-49-6
2-Ethoxyethanol	110-80-5
Ethoxyethanol acetate	111-15-9
Diethylene glycol dimethyl ether	111-96-6
Ethylene glycol dimethyl ether	110-71-4
Methoxyacetic acid	625-45-6
Ethoxyacetic acid	627-03-2

Annex HH. Pentachlorophenol (PCP) and its salts and esters

Pentachlorophenol	87-86-5
Sodium pentachlorophenol	131-52-2

Annex II. Lead sulfochromate yellow (C.I. Pigment Yellow 34). Please note these CAS numbers have been deleted from the CA index, but still may be in use.

Chrome orange	8012-76-8
Chrome Orange Pigment	61513-05-1
Chrome Orange Pigment	61513-06-2
C.I. Pigment Yellow 34	61513-07-3
C.I. Pigment Yellow 34	81209-53-2

Annex JJ. Hydrofluorocarbons (HFCs)

Trifluoromethane (HFC-23)	75-46-7
Difluoromethane (HFC-32)	75-10-5

Fluoromethane (HFC-41)	593-53-3
1,1,1,2,3,4,4,5,5,5-decafluoropentane (HFC-43-10)	138495-42-8
2H, 3H-Decafluoropentane (HFC-43-10mee)	138495-42-8
Pentafluoroethane (HFC–125)	354-33-6
1,1,2,2-tetrafluoroethane (HFC-134)	359-35-3
1,1,1,2-tetrafluoroethane (HFC-134a)	811-97-2
1,1,2-trifluoroethane (HFC-143)	430-66-0
1,1,1-trifluoroethane (HFC-143a)	420-46-2
1,2-Difluoroethane (HFC-152)	624-72-6
1,1-Difluoroethane (HFC-152a)	75-37-6
Monofluoroethane (Ethyl fluoride) (HFC-161)	353-36-6
1,1,1,2,3,3,3-heptafluoropropane (HFC-227ca)	431-89-0
1,1,1,2,2,3,3-heptafluoropropane (HFC-227ca)	2252-84-8
1,1,2,2,3,3-hexafluoropropane (HFC-236ca)	27070-61-7
1,1,1,2,2,3-hexafluoropropane (HFC-236cb)	677-56-5
1,1,1,2,3,3-hexafluoropropane (HFC-236ea)	431-63-0
1,1,1,3,3,3-hexafluoropropane (HFC-236fa)	690-39-1
1,1,2,2,3-pentafluoropropane (HFC-245ce and HFC245ca)	679-86-7
1,1,1,3,3-pentafluoropropane (HFC-245fa)	460-73-1
1,1,1,3,3-pentafluorobutane (HFC-365mfc)	406-58-6
Heptafluorocyclopentane (HFC-c-447ef)	15290-77-4
1,1,1,2,2,3,4,5,5,5,-decafluoropentane (HFC-43-10 mee)	138495-42-8
HFC-1234yf	Not available
HFC-1234ze	Not available
HFC-1336mzz	Not available
HFC-1233zd	Not available
HFC-1233xf	Not available

Annex KK. Dibutyltin Compounds (DBT)

Dibutyltin oxide	818-08-6
Dibutyltin chloride	683-18-1
Dibutyltin diacetate	1067-33-0
Dibutyltin dilaurate	77-58-7
Dibutyltin hydrogen borate	75113-37-0
Dibutyltin maleate	78-04-6
Other dibutyltin compounds	-

Annex LL. Polycyclic aromatic hydrocarbons (PAHs)

Acenaphthene	83-32-9
Acenaphthylene	208-96-8
Anthanthrene	191-26-4
Anthracene (Please note this substance is also a REACH SVHC required to be reported on the PCD if present in the referenced concentration as cited in Section 2.2.3.)	120-12-7
Benz[*a*]anthracene	56-55-3
Benzo[*b*]fluoranthene	205-99-2
Benzo[*j*]fluoranthene	205-82-3
Benzo[*k*]fluoranthene	207-08-9
Benzo[*ghi*]fluoranthene	203-12-3
Benzo[*a*]fluorene	238-84-6
Benzo[*b*]fluorene	243-17-4
Benzo[*ghi*]perylene	191-24-2
Benzo[*c*]phenanthrene	195-19-7
Benzo[*a*]pyrene	50-32-8
Benzo[*e*]pyrene	192-97-2
Chrysene	218-01-9
Coronene	191-07-1
Cyclopenta[*cd*]pyrene	27208-37-3
Dibenz[*a,h*]anthracene	53-70-3
Dibenzo[*a,e*]pyrene	192-64-0
Dibenzo[*ah*]pyrene	189-64-0
Dibenzo[*a,i*]pyrene	189-55-9
Dibenzo[*a,l*]pyrene	191-30-0
Fluoranthene	206-44-0
Fluorene	86-73-7
Indeno[1,2,3-*cd*]pyrene	193-39-5
5-methylchrysene	3697-24-3
1-methylphenathrene	832-69-9

Naphthalene	91-20-3
Perylene	198-55-0
Phenanthrene	85-01-8
Pyrene	129-00-0
Triphenylene	217-59-4
Dibenz[a, c]anthracene	215-58-7
Dibenz[a, j]anthracene	224-41-9

Annex MM. Perchlorates

Ammonium perchlorate	7790-98-9
Lithium perchlorate	7791-03-9
Potassium perchlorate	7778-74-7
Sodium perchlorate	7601-89-0
Barium perchlorate	13465-95-7
Lead perchlorate	13637-76-8
Magnesium perchlorate	10034-81-8
Nickel perchlorate	13637-71-3

Annex NN. REMOVED

Annex OO. List of substances subject to REACH Authorization (current as of the date of this specification, current list maintained in the latest REACH regulation and its amendments)

2-benzotriazol-2-yl-4,6-di-tert-butylphenol (UV-320)	3846-71-7
2-(2H-benzotriazol-2-yl)-4-(tert-butyl)-6-(sec-butyl) phenol (UV-350)	36437-37-3
2-4-di-tert-butyl-6-(5-chlorobenzotriazol-2-yl)phenol (UV-327)	3864-99-1
5-sec-butyl-2-(2,4-dimethylcyclohex-3-en-1-yl)-5-methyl-1,3-dioxane [1], 5-sec-butyl-2-(4,6-dimethylcyclohex-3-en-1-yl)-5-methyl-1,3-dioxane [2]; [covering any of the individual stereoisomers of [1] and [2] or any combination thereof]	117933-89-8 676367-06-9 186309-28-4 117933-89-8 676367-05-8 343934-04-3 676367-02-5 676367-07-0 676367-03-6 676367-08-1 676367-04-7
Sodium peroxometaborate	7632-04-4
Sodium perborate; perboric acid, sodium salt	15120-21-5; 11138-47-9
1,2-benzenedicarboxylic acid, di-C6-10-alkyl esters; 1,2-Benzenedicarboxylic acid, mixed decyl and hexyl and octyl diesters with ≥ 0.3% of dihexyl phthalate	68648-93-1 68515-51-5
Dihexyl phthalate	84-75-3
1,2-Benzenedicarboxylic acid, dihexyl ester, branched and linear	68515-50-4
2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol (UV-328)	25973-55-1
Trixylyl phosphate	25155-23-1
1-Bromopropane (n-propyl bromide	106-94-5
Diisopentylphthalate	605-50-5
1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7 rich	71888-89-6
1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters	68515-42-4
1,2-Benzenedicarboxylic acid, dipentylester, branched and linear	84777-06-0
Bis(2-methoxyethyl) phthalate	117-82-8
Dipentyl phthalate	131-18-0
N-pentyl-isopentylphthalate	776297-69-9
Anthracene oil	90640-80-5
Pitch, coal tar, high temp.	65996-93-2
4-(1,1,3,3-Tetramethylbutyl) phenol, ethoxylated	Not available
4-Nonylphenol, branched and linear, ethoxylated [substances with a linear and/or branched alkyl chain with a carbon number of 9 covalently bound in position 4 to phenol, ethoxylated covering UVCB- and well-defined substances, polymers and homologues, which include any of the individual isomers and/or combinations thereof]	7311-27-5, 27942-27-4, 26027-38-3, 68412-54-4, 9016-45-9, 20427-84-3, 14409-72-4, 26571-11-9, 127087-87-0, 1119449-38-5, 9016-45-9, 37205-87-1, 1119449-37-4
Acids generated from chromium trioxide and their oligomers. Group containing: Chromic acid Dichromic acid Oligomers of chromic acid and dichromic acid	 13530-68-2 7738-94-5 Not available

Ammonium dichromate	7789-09-5
Arsenic acid	7778-39-4
Benzyl butyl phthalate (BBP) Please note a more restrictive level is listed in Table 1 for this substance.	85-68-7
Bis (2-ethylhexyl) phthalate (DEHP) Please note a more restrictive level is listed in Table 1 for this substance.	117-81-7
Bis(2-methoxyethyl) ether (Diglyme)	111-96-6
Chromium trioxide	1333-82-0
Diarsenic trioxide	1327-53-3
4,4'-Diaminodiphenylmethane (MDA)	101-77-9
Diarsenic pentaoxide	1303-28-2
Dibutyl phthalate (DBP) Please note a more restrictive level is listed in Table 1 for this substance.	84-74-2
1,2-dichloroethane	107-06-2
2,2'-dichloro-4,4'-methylenedianiline	101-14-4
Dichromium tris(chromate)	24613-89-6
Diisobutyl phthalate (DIBP) Please note a more restrictive level is listed in Table 1 for this substance.	84-69-5
2,4-Dinitrotoluene (2,4-DNT)	121-14-2
Formaldehyde, oligomeric reaction products with aniline	25214-70-4
Hexabromocyclododecane (HBCDD) alpha-hexabromocyclododecane beta-hexabromocyclododecane gamma-hexabromocyclododecane	3194-55-6, 25637-99-4 134237-50-6 134237-51-7 134237-52-8
Lead chromate	7758-97-6
Lead sulfochromate yellow (C.I. Pigment Yellow 34)	1344-37-2
Lead chromate molybdate sulphate red (C.I. Pigment Red 104)	12656-85-8
Pentazinc chromate octahydroxide	49663-84-5
Potassium chromate	7789-00-6
Potassium dichromate	7778-50-9
Potassium hydroxyoctaoxodizincatedichromate	11103-86-9
Sodium chromate	7775-11-3
Sodium dichromate	7789-12-0, 10588-01-9
Strontium chromate	7789-06-2
5-tert-butyl-2,4,6-trinitro- m-xylene (Musk xylene)	81-15-2
Trichloroethylene	79-01-6
Tris (2-chloroethyl) phosphate (TCEP)	115-96-8

Annex PP. Methylenediphenyl diisocyanate (MDI)

Methylenediphenyl diisocyanate (MDI)	26447-40-5
4,4'-Methylenediphenyl diisocyanate	101-68-8
2,4'-Methylenediphenyl diisocyanate	5873-54-1
2,2'-Methylenediphenyl diisocyanate	2536-05-2

Annex QQ. Benzidine-based substances

1,3-Naphthalenedi-sulfonic acid, 7-hydroxy-8-[2-[4′-[2-(4-hydroxyphenyl)diazenyl][1,1′-biphenyl]-4-yl]diazenyl]-	117-33-9
1,3,6-Naphthalenetri-sulfonic acid, 8-hydroxy-7-[2-[4′-[2-(2-hydroxy-1-naphthalenyl)diazenyl][1,1′-biphenyl]-4-yl]diazenyl]-, lithium salt (1:3)	65150-87-0
2,7-Naphthalenedi-sulfonic acid, 5-amino-3-[2-[4′-[2-(7-amino-1-hydroxy-3-sulfo-2-naphthalenyl)diazenyl][1,1′-biphenyl]-4-yl]diazenyl]-4-hydroxy-, sodium salt (1:2)	68214-82-4
2,7-Naphthalenedi-sulfonic acid, 4-amino-5-hydroxy-3-[2-[4′-[2-[2-hydroxy-4-[(2-methylphenyl)amino] phenyl]diazenyl][1,1′-biphenyl]-4-yl]diazenyl]-6-(2-phenyldiazenyl)-	72379-45-4
2,7-Naphthalenedi-sulfonic acid, 4-amino-5-hydroxy [[[(substituted phenylamino)] substituted phenylazo] diphenyl]azo-, phenylazo-, disodium salt.	Accession No. 21808 CAS No. CBI (NA)
4-(Substituted naphthalenyl)azo diphenylyl azo-substituted carbopolycycle azo benzene-sulfonic acid, sodium salt	Accession No. 24921 CAS No. CBI (NA)
4-(Substituted phenyl)azo biphenylyl azo-substituted carbopolycycloazo benzene-sulfonic acid, sodium salt	Accession No. 26256 CAS No. CBI (NA)
4-(Substituted phenyl)azo biphenylyl azo—substituted carbo-polycycle azo benzene-sulfonic acid, sodium salt	Accession No. 26267 CAS No. CBI (NA)
Phenylazoamino-hydroxynaphthalenylazobiphenylazo substituted benzene sodium sulfonate	Accession No. 26701 CAS No. CBI (NA)
[1,1′-Biphenyl]-4,4′-diamine	92-87-5
[1,1′-Biphenyl]-4,4′-diamine, dihydrochloride	531-85-1
1-Naphthalenesulfonic acid, 3,3′-[[1,1′-biphenyl]-4,4′-diylbis(azo)]bis[4-amino-, disodium salt (C.I. Direct Red 28)	573-58-0
2,7-Naphthalenedisulfonic acid, 4-amino-3-[[4′-[(2,4-diaminophenyl) azo][1,1′-biphenyl]-4-	1937-37-7

yl]azo]-5-hydroxy-6-(phenylazo)-, disodium salt (C.I. Direct Black 38)	
1-Naphthalenesulfonic acid, 8,8′-[[1,1′-biphenyl]-4,4′-diylbis(azo)]bis[7-hydroxy-,disodium salt (C.I. Direct Red 44)	2302-97-8
2,7-Naphthalenedisulfonic acid, 5-amino-3-[[4′-[(7-amino-1-hydroxy-3-sulfo-2-naphthalenyl)azo][1,1′-biphenyl]-4-yl]azo]-4-hydroxy-, trisodium salt (C.I. Direct Blue 2)	2429-73-4
Benzoic acid, 5-[[4′-[(1-amino-4-sulfo-2-naphthalenyl) azo][1,1′-biphenyl]-4-yl]azo]-2-hydroxy-,disodium salt (C.I. Direct Orange 8)	2429-79-0
Benzoic acid, 5-[[4′-[[2,6-diamino-3-[[8-hydroxy-3,6-disulfo-7-[(4-sulfo-1-naphthalenyl)azo]-2-naphthalenyl]azo]-5-methylphenyl]azo][1,1′-biphenyl]-4-yl]azo]-2-hydroxy-, tetrasodium salt (C.I. Direct Brown 31)	2429-81-4
Benzoic acid, 5-[[4′-[(7-amino-1-hydroxy-3-sulfo-2-naphthalenyl) azo][1,1′-biphenyl]-4-yl]azo]-2-hydroxy-, disodium salt (C.I. Direct Brown 2)	2429-82-5
2,7-Naphthalenedisulfonic acid, 4-amino-3-[[4′-[(2,4-diamino-5-methylphenyl)azo][1,1′-biphenyl]-4-yl]azo]-5-hydroxy-6-(phenylazo)-, disodium salt (Direct Black 4)	2429-83-6
Benzoic acid, 5-[[4′-[(2-amino-8-hydroxy-6-sulfo-1-naphthalenyl)azo][1,1′-biphenyl]-4-yl]azo]-2-hydroxy-, disodium salt (C.I. Direct Red 1)	2429-84-7
Benzoic acid, 5-[[4′-[[2,6-diamino-3-methyl-5-[(4-sulfophenyl)azo]phenyl]azo][1,1′-biphenyl]-4-yl]azo]-2-hydroxy-, disodium salt (C.I. Direct Brown 1:2)	2586-58-5
2,7-Naphthalenedisulfonic acid, 3,3′-[[1,1′-biphenyl]-4,4′-diylbis(azo)]bis[5-amino-4-hydroxy-, tetrasodium salt (C.I. Direct Blue 6]	2602-46-2
Benzoic acid, 5-[[4′-[[2,4-dihydroxy-3-[(4-sulfophenyl) azo]phenyl]azo][1,1′-biphenyl]-4-yl]azo]-2-hydroxy-, disodium salt (C.I. Direct Brown 6)	2893-80-3
1,3-Naphthalenedisulfonic acid, 8-[[4′-[(4-ethoxyphenyl) azo][1,1′-biphenyl]-4-yl]azo]-7-hydroxy-,disodium salt (C.I. Direct Red 37)	3530-19-6
1,3-Naphthalenedisulfonic acid, 7-hydroxy-8-[[4′-[[4-[[(4-methylphenyl) sulfonyl]oxy]phenyl]azo][1,1′-biphenyl]-4-yl]azo]-, disodium salt (C.I. Acid Red 85)	3567-65-5
2,7-Naphthalenedisulfonic acid, 4-amino-5-hydroxy-3-[[4′-[(4-hydroxyphenyl)azo][1,1′-biphenyl]-4- yl]azo]-6-(phenylazo)-, disodium salt (C.I. Direct Green 1)	3626-28-6
Benzoic acid, 5-[[4′-[[2,4-diamino-5-[(4-sulfophenyl) azo]phenyl]azo][1,1′-biphenyl]-4-yl]azo]-2-hydroxy-, disodium salt (C.I. Direct Brown 1)	3811-71-0
2,7-Naphthalenedisulfonic acid, 4-amino-5-hydroxy-6-[[4′-[(4-hydroxyphenyl)azo][1,1′-biphenyl]-4-yl] azo]-3-[(4-nitrophenyl)azo]-, disodium salt (C.I. Direct Green 6)	4335-09-5
2,7-Naphthalenedisulfonic acid, 4-amino-5-hydroxy-3-[[4′-[[4-hydroxy-2-[(2-methylphenyl)amino]phenyl]azo] [1,1′- biphenyl]-4-yl]azo]-6-[(4-sulfophenyl) azo]-, trisodium salt (C.I. Acid Black 94)	6358-80-1
Benzoic acid, 5-[[4′-[[4-[(4-amino-7-sulfo-1-naphthalenyl)azo]-6-sulfo-1-naphthalenyl]azo][1,1′-biphenyl]-4-yl] azo]-2-hydroxy-, trisodium salt (C.I. Direct Brown 27)	6360-29-8
Benzoic acid, 5-[[4′-[[2,6-diamino-3-methyl-5-[(4-sulfophenyl)azo]phenyl] azo][1,1′-biphenyl]-4-yl]azo]-2- hydroxy-3-methyl-, disodium salt (C.I. Direct Brown 154)	6360-54-9
Benzoic acid, 3,3′-[(3,7-disulfo-1,5-naphthalenediyl)bis [azo(6-hydroxy-3,1-phenylene)azo[6(or7)-sulfo-4,1-naphthalenediyl]azo[1,1′-biphenyl]-4,4′-diylazo]]bis[6-hydroxy-, hexasodium salt (C.I. Direct Brown 74)	8014-91-3
Cuprate(2-), [5-[[4′-[[2,6-dihydroxy-3-[(2-hydroxy-5-sulfophenyl)azo]phenyl] azo][1,1′-biphenyl]-4-yl]azo]-2-hydroxybenzoato(4-)]-, disodium salt (C.I. Direct Brown 95)	16071-86-6

Annex RR. Nonylphenols

Nonylphenol	25154-52-3
p-nonyl-phenol	104-40-5
4-nonyl-phenol, branched=	84852-15-3
Nonylphenol, branched	90481-04-2
Isononylphenol	11066-49-2
p-Isononylphenol	26543-97-5
p-(Nonan-2-yl))phenol	17404-66-9
p-(2-Methyloctan-2-yl) phenol	30784-30-6
4-(3-Methyloctan-3-yl) phenol	52427-13-1
o-Nonylphenol	136-83-4
o-Isononylphenol	27938-31-4
Phenol, 2-nonyl-, branched	91672-41-2
m-Nonylphenol	139-84-4
Neononylphenol	1196678-78-0
4-(3,5-Dimethylheptan-3-yl) phenol	186825-36-5
4-(3,6-Dimethylheptan-3-yl)phenol	142731-63-3
2-(Nonan-2-yl) phenol	17404-45-4
Phenol, 2-tert-nonyl-	89585-68-2
Phenol, sec-nonyl-	97372-03-7
Phenol, 4-tert-nonyl-	58865-77-3
Phenol, o-sec-nonyl-	27214-48-8
Phenol, p-sec-nonyl-	27072-91-9

Annex SS. Fluorinated ethers and alcohols

HFE-125	Not available
HFE-134 (HG-00)	Not available
HFE-143a	Not available
HCFE-235da2 (isofluorane)	Not available
HFE-245cb2	Not available
HFE-245fa2	Not available
HFE-254cb2	Not available
HFE-347 mcc3 (HFE-7000)	Not available
HFE-347pcf2	Not available
HFE-356pcc3	Not available
HFE-449sl (HFE-7100)	Not available
HFE-569sf2 (HFE-7200)	Not available
HFE-43-10pccc124 (H-Galden 1040x) HG-11	Not available
HFE-236ca12 (HG-10)	Not available
HFE-338pcc13 (HG-01)	Not available
HFE-347mmy1	Not available
2,2,3,3,3-pentafluoropropanol	Not available
Bis(trifluoromethyl)-methanol	Not available
HFE-227ea	Not available
HFE-2236ea2 (desfluoran)	Not available
HFE-236fa	Not available
HFE-245fa1	Not available
HFE-263fb2	Not available
HFE-329 mcc2	Not available
HFE-338 mcf2	Not available
HFE-338mmz1	Not available
HFE-347 mcf2	Not available
HFE-356 mec3	Not available
HFE-356mm1	Not available
HFE-356pcf2	Not available
HFE-356pcf3	Not available
HFE-365 mcf3	Not available
HFE-347pc2	Not available

Annex TT. Perfluorinated compounds

Perfluoropolymethylisopropyl-ether (PFPMIE)	69991-67-9
Trifluoromethyl sulphur pentafluoride	373-80-8
Nitrogen trifluoride	7783-54-2
Perfluorocyclopropane	Not available

Annex UU. Toluene Diisocyanate (this list is all inclusive)

Toluene diisocyanate trimer	9019–85–6
Poly(toluene diisocyanate)	9017–01–0
Toluene diisocyanate dimer	26747–90–0
Toluene diisocyanate ‘‘cyclic’’ trimer	26603–40–7
2,6-Toluene diisocyanate Note - reportable except for use in coatings, adhesives, elastomers, binders, and sealants at less than or equal to 0.1% in a Consumer Product (defined as a chemical substance that is directly, or as part of a mixture, sold or made available to consumers for their use in or around a permanent or temporary household or residence, in or around a school, or in recreation. [Source: US Code of Federal Regulations Title 40 Part 721.3 Subpart A])	91–08–7
2, 4-Toluene diisocyanate. Note - reportable except for use in coatings, adhesives, elastomers, binders, and sealants at less than or equal to 0.1% in a Consumer Product (defined as a chemical substance that is directly, or as part of a mixture, sold or made available to consumers for their use in or around a permanent or temporary household or residence, in or around a school, or in recreation. [Source: US Code of Federal Regulations Title 40 Part 721.3 Subpart A])	584–84–9
Toluene diisocyanate unspecified isomer Note - reportable except for use in coatings, adhesives, elastomers, binders, and sealants at less than or equal to 0.1% in a Consumer Product (defined as a chemical substance that is directly, or as part of a mixture, sold or made available to consumers for their use in or around a permanent or temporary household or residence, in or around a school, or in recreation. [Source: US Code of Federal Regulations Title 40 Part 721.3 Subpart A])	26471–62–5

Annex VV. Nonylphenol Ethoxylates

Ethanol, 2-[2-(4-nonylphenoxy)ethoxy]-	20427-84-3
Poly(oxy-1,2-ethanediyl), α-(4-nonylphenyl)- ω-hydroxy-	26027-38-3
3,6,9,12,15,18,21-Heptaoxatricosan-1-ol, 23- (nonylphenoxy)-	27177-05-5
3,6,9,12,15,18,21,24,27-Nonaoxanonacosan-1- ol, 29-(nonylphenoxy)-	27177-08-8
Ethanol, 2-(nonylphenoxy)-	27986-36-3

Ethanol, 2-[2-[2-[2-(4- nonylphenoxy)ethoxy] ethoxy]ethoxy]-	7311-27-5
Poly(oxy-1,2-ethanediyl), α(nonylphenyl)- ω-hydroxy-	9016-45-9
Ethanol, 2-[2-(nonylphenoxy)ethoxy]-	27176-93-8
Poly(oxy-1,2-ethanediyl), α-(2- nonylphenyl)-ω-hydroxy-	51938-25-1
Poly(oxy-1,2-ethanediyl), α-(isononylphenyl)- ω-hydroxy-	37205-87-1
3,6,9,12,15,18,21,24-Octaoxahexacosan-1-ol, 26-(nonylphenoxy)-	26571-11-9

Annex WW. Long-chained chlorinated paraffins

Alkanes, C_{18-28}, chloro	85535-86-0
Paraffin oils, chloro	85422-92-0
Paraffin waxes and hydrocarbon waxes, chloro	63449-39-8
Alkanes, chloro	61788-76-9
Alkanes, C_{6-18}, chloro	68920-70-7
Alkanes, C_{10-21}, chloro	84082-38-2
Alkanes, C_{10-32}, chloro	84776-06-7
Alkanes, C_{16-27}, chloro	84776-07-8
Alkanes, C_{16-35}, chloro	85049-26-9
Alkanes, C_{10-26}, chloro	97659-46-6
Paraffins (petroleum), normal $C_{>10}$, chloro	97553-43-0
Alkanes, C_{18-20}, chloro	106232-85-3
Alkanes, C_{22-40}, chloro	106232-86-4
Alkanes, C_{22-26}, chloro	108171-27-3

Annex XX. Small brominated alkyl alcohols

2,3-Dibromo-1-propanol	96-13-9
1,3-dibromopropan- 2-ol	96-21-9
1,4-dibromobutan-2-ol	19398-47-1
1,4-Dibromo-2,3-butanediol	14396-65-7
2,2-bis(bromomethyl)propane-1,3-diol	3296-90-0
3-Bromo-2,2-bis(bromomethyl)-1-propanol	1522-92-5
2,2-dimethylpropan-1-ol (TBNPA)	36483-57-5
3-Bromo-2-(bromomethyl)-1-propanol	106023-63-6
2,3-dibromobutan-1-ol	4021-75-4
2,3,4-Tribromo-1-butanol	855236-37-2
1,2,4-Tribromo-3-butanol	87018-38-0
2,2-Bis(bromomethyl)-1-propanol	105100-80-9
4,5-Dibromo-2-pentanol	213821-22-8
1,2-Dibromo-3-pentanol	408319-76-6
1,4-dibromo-(R*,R*)-(9CI)-3-pentanol	159475-15-7
2,4-Dibromo-3-pentanol	343268-04-2
3,4-Dibromo-(2R*,3S*,4S*)-(9CI)-2-pentanol	76377-07-6
4,5-Dibromo-1-pentanol	59287-66-0
2,5-Dibromo-1-pentanol	856991-78-1
2-Pentanol, 1,5-dibromo-	100606-66-4
2,5-Dibromo-2-pentanol	213821-20-6
4-Bromo-2-(bromomethyl)-1-butanol	98069-26-2
4-Bromo-2-(bromomethyl)-1,3-butanediol	44804-46-8
3,4-Dibromo-2-butanol	79033-40-2
3,4-Dibromo-1-butanol	87018-30-2
3,4-Dibromo-1,2-butanediol	35330-59-7

Annex YY. Critical Raw Materials

Cerium	7440-45-1
Gallium	7440-55-3
Germanium	7440-56-3
Iridium	7439-88-5
Lanthanum	7439-91-0
Niobium	7440-03-1
Osmium	7440-04-2
Palladium	7440-05-3
Platinum	7440-06-4
Rhodium	7440-16-6
Ruthenium	7440-18-8
Samarium	7440-19-9
Scandium	7440-20-2
Tantalum	7440-25-7

Titanium	7440-32-6
Yttrium	7440-65-5

Annex ZZ. Organophosphate Compounds

Triphenyl phosphate (TPHP)	115-86-6
Tert-Butylphenyl diphenyl phosphate	56803-37-3
bis(2-tert-butylphenyl) phenyl phosphate	65652-41-7
Isodecyl diphenyl phosphate	29761-21-5
Triethyl phosphate	78-40-0

Annex AAA. United States Department of Energy electric motor energy efficiency standards

Electric motors

Starting on June 1, 2027, each NEMA Design A motor, NEMA Design B motor, and IEC Design N (including NE, NEY, or NY variants) motor with a power rating from 1 horsepower through 750 horsepower, but excluding fire pump electric motors and air-over electric motors, manufactured (alone or as a component of another piece of equipment) shall have a nominal full-load efficiency of not less than the following:

TABLE 8 TO PARAGRAPH (n)—NOMINAL FULL-LOAD EFFICIENCIES OF NEMA DESIGN A, NEMA DESIGN B AND IEC DESIGN N, NE, NEY OR NY MOTORS (EXCLUDING FIRE PUMP ELECTRIC MOTORS AND AIR-OVER ELECTRIC MOTORS) AT 60 Hz

Motor horsepower/standard kilowatt equivalent	Nominal full-load efficiency (%)							
	2 Pole		4 Pole		6 Pole		8 Pole	
	Enclosed	Open	Enclosed	Open	Enclosed	Open	Enclosed	Open
1/.75	77.0	77.0	85.5	85.5	82.5	82.5	75.5	75.5
1.5/1.1	84.0	84.0	86.5	86.5	87.5	86.5	78.5	77.0
2/1.5	85.5	85.5	86.5	86.5	88.5	87.5	84.0	86.5
3/2.2	86.5	85.5	89.5	89.5	89.5	88.5	85.5	87.5
5/3.7	88.5	86.5	89.5	89.5	89.5	89.5	86.5	88.5
7.5/5.5	89.5	88.5	91.7	91.0	91.0	90.2	86.5	89.5
10/7.5	90.2	89.5	91.7	91.7	91.0	91.7	89.5	90.2
15/11	91.0	90.2	92.4	93.0	91.7	91.7	89.5	90.2
20/15	91.0	91.0	93.0	93.0	91.7	92.4	90.2	91.0
25/18.5	91.7	91.7	93.6	93.6	93.0	93.0	90.2	91.0
30/22	91.7	91.7	93.6	94.1	93.0	93.6	91.7	91.7
40/30	92.4	92.4	94.1	94.1	94.1	94.1	91.7	91.7
50/37	93.0	93.0	94.5	94.5	94.1	94.1	92.4	92.4
60/45	93.6	93.6	95.0	95.0	94.5	94.5	92.4	93.0
75/55	93.6	93.6	95.4	95.0	94.5	94.5	93.6	94.1
100/75	95.0	94.5	96.2	96.2	95.8	95.8	94.5	95.0
125/90	95.4	94.5	96.2	96.2	95.8	95.8	95.0	95.0
150/110	95.4	94.5	96.2	96.2	96.2	95.8	95.0	95.0
200/150	95.8	95.4	96.5	96.2	96.2	95.8	95.4	95.0
250/186	96.2	95.4	96.5	96.2	96.2	96.2	95.4	95.4
300/224	95.8	95.4	96.2	95.8	95.8	95.8	.....	.....
350/261	95.8	95.4	96.2	95.8	95.8	95.8	.....	.....
400/298	95.8	95.8	96.2	95.8	.....	.....	.....	.....
450/336	95.8	96.2	96.2	96.2	.....	.....	.....	.....
500/373	95.8	96.2	96.2	96.2	.....	.....	.....	.....
550/410	95.8	96.2	96.2	96.2	.....	.....	.....	.....
600/447	95.8	96.2	96.2	96.2	.....	.....	.....	.....
650/485	95.8	96.2	96.2	96.2	.....	.....	.....	.....
700/522	95.8	96.2	96.2	96.2	.....	.....	.....	.....
750/559	95.8	96.2	96.2	96.2	.....	.....	.....	.....

Starting on June 1, 2027, each NEMA Design A motor, NEMA Design B motor, and IEC Design N (including NE, NEY, or NY variants) motor with a power rating from 1 horsepower through 250 horsepower, built in a standard frame size, but excluding fire pump electric motors, manufactured (alone or as a component of another piece of equipment) shall have a nominal full-load efficiency of not less than the following:

TABLE 9 TO PARAGRAPH (o)—NOMINAL FULL-LOAD EFFICIENCIES OF NEMA DESIGN A, NEMA DESIGN B AND IEC DESIGN N, NE, NEY OR NY STANDARD FRAME SIZE AIR-OVER ELECTRIC MOTORS (EXCLUDING FIRE PUMP ELECTRIC MOTORS) AT 60 Hz

Motor horsepower/standard kilowatt equivalent	Nominal full-load efficiency (%)							
	2 Pole		4 Pole		6 Pole		8 Pole	
	Enclosed	Open	Enclosed	Open	Enclosed	Open	Enclosed	Open
1/.75	77.0	77.0	85.5	85.5	82.5	82.5	75.5	75.5
1.5/1.1	84.0	84.0	86.5	86.5	87.5	86.5	78.5	77.0
2/1.5	85.5	85.5	86.5	86.5	88.5	87.5	84.0	86.5
3/2.2	86.5	85.5	89.5	89.5	89.5	88.5	85.5	87.5
5/3.7	88.5	86.5	89.5	89.5	89.5	89.5	86.5	88.5
7.5/5.5	89.5	88.5	91.7	91.0	91.0	90.2	86.5	89.5
10/7.5	90.2	89.5	91.7	91.7	91.0	91.7	89.5	90.2
15/11	91.0	90.2	92.4	93.0	91.7	91.7	89.5	90.2
20/15	91.0	91.0	93.0	93.0	91.7	92.4	90.2	91.0
25/18.5	91.7	91.7	93.6	93.6	93.0	93.0	90.2	91.0
30/22	91.7	91.7	93.6	94.1	93.0	93.6	91.7	91.7
40/30	92.4	92.4	94.1	94.1	94.1	94.1	91.7	91.7
50/37	93.0	93.0	94.5	94.5	94.1	94.1	92.4	92.4
60/45	93.6	93.6	95.0	95.0	94.5	94.5	92.4	93.0
75/55	93.6	93.6	95.4	95.0	94.5	94.5	93.6	94.1
100/75	95.0	94.5	96.2	96.2	95.8	95.8	94.5	95.0
125/90	95.4	94.5	96.2	96.2	95.8	95.8	95.0	95.0
150/110	95.4	94.5	96.2	96.2	96.2	95.8	95.0	95.0
200/150	95.8	95.4	96.5	96.2	96.2	95.8	95.4	95.0
250/186	96.2	95.4	96.5	96.2	96.2	96.2	95.4	95.4

Starting on June 1, 2027, each NEMA Design A motor, NEMA Design B motor, and IEC Design N (including NE, NEY, or NY variants) motor with a power rating from 1 horsepower through 20 horsepower, built in a specialized frame size, but excluding fire pump electric motors, manufactured (alone or as a component of another piece of equipment) shall have a nominal full-load efficiency of not less than the following:

TABLE 10 TO PARAGRAPH (p)—NOMINAL FULL-LOAD EFFICIENCIES OF NEMA DESIGN A, NEMA DESIGN B AND IEC DESIGN N, NE, NEY OR NY SPECIALIZED FRAME SIZE AIR-OVER ELECTRIC MOTORS (EXCLUDING FIRE PUMP ELECTRIC MOTORS) AT 60 Hz

Motor horsepower/standard kilowatt equivalent	Nominal full-load efficiency (%)							
	2 Pole		4 Pole		6 Pole		8 Pole	
	Enclosed	Open	Enclosed	Open	Enclosed	Open	Enclosed	Open
1/.75	74.0	.....	82.5	82.5	80.0	80.0	74.0	74.0
1.5/1.1	82.5	82.5	84.0	84.0	85.5	84.0	77.0	75.5
2/1.5	84.0	84.0	84.0	84.0	86.5	85.5	82.5	85.5
3/2.2	85.5	84.0	87.5	86.5	87.5	86.5	84.0	86.5
5/3.7	87.5	85.5	87.5	87.5	87.5	87.5	85.5	87.5
7.5/5.5	88.5	87.5	89.5	88.5	89.5	88.5	85.5	88.5
10/7.5	89.5	88.5	89.5	89.5	89.5	90.2	.....	.....
15/11	90.2	89.5	91.0	91.0	.....	.....	.....	.....
20/15	90.2	90.2	91.0	91.0	.....	.....	.....	.....

Small electric motors

The energy efficiency requirements take affect beginning March 9, 2015 and apply to small single phase and polyphase electric motors with a rating from ¼ to 3 horsepower (180 - 2.2kW). The regulatory requirements are effective on March 9th, 2017 for small electric motors which require listing or certification by a nationally recognized safety testing laboratory.

Motor horsepower/standard kilowatt equivalent	**Average full load efficiency**		
	Polyphase		
	Open motors (number of poles)		
	6	**4**	**2**
0.25/0.18	67.5	69.5	65.6
0.33/0.25	71.4	73.4	69.5
0.5/0.37	75.3	78.2	73.4
0.75/0.55	81.7	81.1	76.8
1/0.75	82.5	83.5	77.0
1.5/1.1	83.8	86.5	84.0
2/1.5	N/A	86.5	85.5
3/2.2	N/A	86.9	85.5

Motor horsepower/standard kilowatt equivalent	**Average full load efficiency**		
	Capacitor-start capacitor-run and capacitor-start induction-run		
	Open motors (number of poles)		
	6	**4**	**2**
0.25/0.18	62.2	68.5	66.6
0.33/0.25	66.6	72.4	70.5
0.5/0.37	76.2	76.2	72.4

Motor horsepower/standard kilowatt equivalent	Average full load efficiency		
	Polyphase		
	Open motors (number of poles)		
	6	4	2
0.75/0.55	80.2	81.8	76.2
1/0.75	81.1	82.6	80.4
1.5/1.1	N/A	83.8	81.5
2/1.5	N/A	84.5	82.9
3/2.2	N/A	N/A	84.1