Status of Lead Exemptions in the European Union's Directive on the Restriction of Hazardous Substances

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Motivation for this document

The European Union's Directive on the Restriction of Hazardous Substances has evolved since its first iteration in 2003. Producers of electrical and electronic equipment (EEE) must comply with the legislation in order to have their products eligible for availability in EU markets. Annexes III and IV list the exemptions of the hazardous substance restrictions for certain applications. However, while exemptions are listed in the directive itself, commission delegated directives regularly introduce new, renewed or expiring exemptions and are published separately. Available on the EUR-Lex website is a consolidated text, a document that "updates" the directive with exemption changes, but it is not as straightforward as it could be displaying all exemption expiration dates. Furthermore, no document is available that ties these new or renewed exemptions to the evaluations of applications submitted by EEE producers. This document aims to fill these two gaps in clarity for lead-related applications with tables that use publicly available information.

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Table 1: RoHS 2.0 Duration Limits on Exemptions Based on Product Category

Category (Annex I)	Maximum Duration of Exemptions Listed in Annex III
1. Large household appliances	5 years from July 21, 2011
2. Small household appliances	5 years from July 21, 2011
3. IT and telecommunications equipment	5 years from July 21, 2011
4. Consumer equipment	5 years from July 21, 2011
5. Lighting equipment	5 years from July 21, 2011
6. Electrical and electronic tools	5 years from July 21, 2011
7. Toys, leisure and sports equipment	5 years from July 21, 2011
8. Medical Devices	7 years from July 22, 2014 (7 years from July 22, 2016 for in vitro diagnostic medical devices)
9. Monitoring and control instruments including industrial monitoring and control instruments	7 years from July 22, 2014 (7 years from July 22, 2017 for industrial monitoring and control instruments)
10. Automatic Dispensers	5 years from July 21, 2011
11. Other EEE not covered by any of the categories above	5 years from July 21, 2011 ***5 years from July 22, 2019 in RoHS 2.1 [a]**

The timeframe and scope for reusing spare parts with hazardous substances to repair, reuse, or upgrade an EEE is shown in Table 2, with the stipulation that these parts must be tracked, notified to the consumer, and continuously reused. The use (not reuse) of cables and spare parts for the categories listed in that table follow the dates listed in its second column.

Table 2: RoHS 2.1 Duration Limits on the Reuse of Spare Parts

Recovered from	Placed on the market before	Used in EEE placed on the market before
EEE	July 1, 2006	July 1, 2016
Medical devices or monitoring and control instruments	July 22, 2014	July 22, 2024
In vitro diagnostic medical devices	July 22, 2016	July 22, 2026
Industrial monitoring and control instruments	July 22, 2017	July 22, 2027
All other EEE outside RoHS 1's Scope	July 22, 2019	July 22, 2029

Table 3 lists the applications evaluated by the Oeko Institut to either grant or renew exemptions that involve lead. The first column covers references and the identifier and dates of stakeholder consultation, where parties interested in the exemption requests being evaluated can give their input or impart their knowledge. It begins with the first consultation held in 2012 (shortly after the recast, RoHS 2, was announced) and currently ends with a 2018 evaluation. This will be updated in future versions of this document. The second column includes the applicant(s) of the exemption request. Lastly, the third column identifies the evaluated exemption, followed by the recommendation (wording and expiration dates) of the Oeko Institut for the Commission. Note that the dates listed in the third column are suggestions, as the Commission has the final say of exemption approval, wording and expiration date(s). The main function of this table is to maintain a record of lead-related exemptions. Those interested in learning more about each application can find its reference and trace it back to the same reports submitted to the Commission, found on the CIRCABC website and the website dedicated to Oeko Institut RoHS evaluations.

Table 3: Periods of Evaluation, Applicants, and Recommendations of Lead-Related Exemption Requests

Stakeholder Consultation / Period Held / References	Applicant	Exemption Request #, Recommendation for Wording in Directive **Recommendation for Expiration**
2012 (1) 1/24 to 3/20 2012 [1][2]	COCIR	4) Lead acetate marker for use in stereotactic head frames for use with CT and MRI and in positioning systems for gamma beam and particle therapy equipment. **Expires July 2021**
	COCIR	5) Lead as an alloying element for bearings and wear surfaces in medical equipment exposed to ionizing radiation. **Expires July 2021**
	COCIR	6) Lead enabling vacuum tight connections between aluminum and steel in X-ray image intensifiers. **Expires December 31, 2019**
	COCIR	7) Lead in the surface coatings of pin connector systems requiring non-magnetic connectors which are used durably at a temperature below -20°C under normal operating and storage conditions. **Expires July 2021**
	COCIR	8) Lead in ● solders on printed circuit boards, ● termination coatings of electrical and electronic components and coatings of printed circuit boards ● solders for connecting wires and cables, ● solders connecting transducers and sensors, that are used durably at a temperature below -20°C under normal operating and storage conditions. **Expires July 2021**

Stakeholder Consultation / Period Held / References	Applicant	Exemption Request #, Recommendation for Wording in Directive **Recommendation for Expiration**
	COCIR	9) Lead in ● solders, ● termination coatings of electrical and electronic components and printed circuit boards, ● connections of electrical wires, shields and enclosed connectors which are used ● a) in magnetic fields within the sphere of 1 m radius around the isocenter of the magnet in medical magnetic resonance imaging equipment, including patient monitors designed to be used within this sphere. ● b) in magnetic fields within 1 m distance from the external surfaces of cyclotron magnets, magnets for beam transport and beam direction control applied for particle therapy **Expires June 30, 2020**
	COCIR	10) Lead in solders for mounting cadmium telluride and cadmium zinc telluride digital array detectors to printed circuit boards. **Expires June 30, 2020**
	TMC	12) "Lead and cadmium in optical and filter glass in monitoring and control instruments (Category 9.)" **Withdrawn**
	TMC	13) Lead and cadmium in metallic bonds creating superconducting magnetic circuits in MRI, SQUID, NMR, FTMS detectors **Expires July 2021**
	TMC	14) Lead in alloys, as a superconductor or as a thermal conductor, used in cryo-cooler cold heads and/or in cryo-cooled cold probes and/or in cryo-cooled equipotential bonding systems, in medical devices (category 8) and /or in industrial monitoring and control instruments. **Expires July 2021**
	TMC	15) "Lead not exceeding 20% in bronze bearings and bushes in monitoring and control instruments (Category 9.)" **Withdrawn**
	TMC	16) "Lead in solders consisting of more than two elements for the connection between the pins and the package of microprocessors with a lead content of more than 80% and less than 85% by weight used in monitoring and control instruments (Category 9)" **Withdrawn**
	TMC	17) "Lead in glass of electronic components and fluorescent tubes, or in electronic ceramic parts (including dielectric ceramic capacitors) used in monitoring and control instruments (Category 9.)" **Evaluation temporarily suspended due to reformulation**

Stakeholder Consultation / Period Held / References	Applicant	Exemption Request #, Recommendation for Wording in Directive **Recommendation for Expiration**
	TMC	18) "Lead used in compliant pin connector systems for use in monitoring and control instruments (Category 9)" **Evaluation temporarily suspended due to reformulation**
2012 (2) 6/26 to 9/4 2012 [3][4]	COCIR	2) Lead, cadmium and hexavalent chromium in reused spare parts, recovered from medical devices placed on the market before 22 July 2014 and used in category 8 equipment placed on the market before July 22 2021, provided that reuse takes place in auditable closed-loop business-to-business return systems, and that the reuse of parts is notified to the consumer **Expires July 21, 2021**
	COCIR	3) Lead in solders on printed circuit boards of detectors and data acquisition units for Positron Emission Tomographs which are integrated into Magnetic Resonance Imaging equipment. **Expires December 31, 2019**
	COCIR	4) Lead in solders on populated printed circuit boards used in Directive 93/42/EEC class IIa and IIb mobile medical devices others than portable emergency defibrillators: - used in Class IIa – mobile medical devices – - used in Class IIb – mobile medical devices – Where mobile medical devices are defined as medical devices which are designed and approved by a notified body, according to Directive 93/42/EEC, to be hand carried, or to be transported on own wheels, on a cart or trolley or in a vehicle, aircraft or vessel during and/or between operations. **Class IIa: Expires June 30, 2016** **Class IIb: Expires December 31, 2020**
	CELMA	5) "Decorative ceramic lamp bases or other ceramic components of luminaires containing lead and/or cadmium in the glaze/colouring" **Denied**
	CELMA	6) "Decorative lamp shades and bases (luminaires) containing lead in the solder used to join/coat the copper foil mounting strips for the glass/shell/other material used in tiffany (like stained glass windows), capiz shell and similar products" **Denied**
	JBCE	10) Lead in micro-channel plates (MCPs) used in equipment where at least one of the following properties is required: a) A compact size of the detector for electrons or ions where the space for the detector is limited to ● to a maximum of 3 mm/MCP (detector thickness + space for the installation of the MCP); and ● to a maximum of 6 mm in total; and an alternative design yielding more space for the detector is scientifically and technically impracticable. b) A two-dimensional spatial resolution for detecting electrons or ions ● Where a response time shorter than 25 ns is required; or

Stakeholder Consultation / Period Held / References	Applicant	Exemption Request #, Recommendation for Wording in Directive **Recommendation for Expiration**
		● Where a sample detection area larger than 149 mm2 is required; or ● Where a multiplication factor larger than 1.3 x 103 is required. c) A response time shorter than 5 ns for detecting electrons or ions d) A sample detection area larger than 314 mm2 for detecting electrons or ions e) A multiplication factor larger than 4.0 x 107 This exemption does not cover the uses of micro-channel plates in exemption 3 of Annex IV. **Expires July 21, 2021 for medical equipment (cat. 8) and for monitoring and control instruments (cat. 9), July 21, 2023 for invitro diagnostics (cat. 8), and July 21, 2024 for industrial monitoring and control instruments (cat. 9)**
	Therakos Photopheresis	11) "Lead as an activator in the fluorescent powder of discharge lamps when used for extracorporeal photopheresis lamps containing BSP (BaSi2O5:Pb) phosphors" **Expires July 22, 2021**
2012 (3) 11/9/2012 to 2/1/2013 [5][6]	General Electric Healthcare	12) "Lead in solder in one interface of large area stacked die elements with more than 500 interconnects per interface which are used in x-ray detectors of CT and X-ray systems" **Expires January 1, 2020**
	Japanese Business Council in Europe (JBCE)	13) "Lead in platinized platinum electrodes used for conductivity measurements where at least one of the following conditions applies: a) Wide Range Measurements with a conductivity range covering more than 1 order of magnitude (e.g. range between 0.1mS/m and 5 mS/m) in laboratory applications for unknown concentrations b) Measurements of solutions where an accuracy of +/- 1% of the sample range and where high corrosion resistance of the electrode are required for: I. Solutions with an acidity < pH 1; or II. Solutions with an alkalinity >pH 13; or III. Corrosive solutions containing halogen gas c) Measurements of conductivities above 100 mS/m that must be performed with portable instruments" Or; Lead in platinized platinum electrodes for measurement instruments **Expires December 31, 2018 (5 years after exemption is granted)**
	ANDREAS STIHL AG & Co. KG	14) Lead in solders and termination finishes of electrical and electronic components and finishes of printed circuit boards used in ignition modules and other electrical and electronic engine control systems, which for technical reasons, must be mounted directly on or in the crankcase or cylinder of hand-held combustion engines (classes SH: 1, SH: 2, SH: 3 of 2002/88/EC) **Expires December 31, 2018 (5 years after exemption is granted)**
2012 (4) 12/21/2012 to 2/15/2013 [7][8]	TMC	17a) Lead in dielectric ceramic in capacitors for a rated voltage of less than 125 V AC or 250 V DC for industrial monitoring and control instruments (cat. 9). **Expires on January 1, 2021 (alternatively: January 1, 2023), and after that date may be used in spare parts for industrial monitoring and control instruments placed on the market before January 1, 2021 (alternatively January 1, 2023)**
	TMC	18a) Lead used in other than C-press compliant pin connector systems for industrial

Stakeholder Consultation / Period Held / References	Applicant	Exemption Request #, Recommendation for Wording in Directive **Recommendation for Expiration**
		monitoring and control instruments (cat. 9) **Expires on January 1, 2021 (alternatively: January 1, 2024), and after that date may be used in spare parts for industrial monitoring and control instruments placed on the market before January 1, 2021 (alternatively January 1, 2024)**
2013 (1) 8/19 to 11/11 2013 [9][10]	Instrumentation Laboratory Inc. MAQUET Cardiopulmonary AG	2013-1) Lead as thermal stabilizer in Polyvinyl Chloride (PVC) used as base material in amperometric, potentiometric and conductometric electrochemical sensors used for analysis of blood and other body fluids and body gases in subcategory 8 in-vitro diagnostic devices. **Expires December 31, 2018** 2013-3) “Lead in solders used in boards of heart-lung machines" exemption to expire in 2017 **Withdrawn**
2013 (2) 12/20/2013 to 4/11/2014 [11][12]	FEI Company	2013-6) The use of substances listed in Annex II of the Directive, in reused spare parts, recovered from CE marked EEE, placed on the global market, and used in equipment to be made available on the market: a) provided that reuse takes place in auditable closed-loop business-to-business return systems; and b) that the reuse of parts is notified to the consumer; and c) provided that spare parts comply with Regulation (EC) No 1907/2006. Where “placed on the global market” means making available for the first time globally; and where spare parts are to be used in repair and or refurbishment activities of EEE falling under: i. Annex I Category 8: Medical devices **Expires July 22, 2021** ii. Annex I Sub-Category 8: In-vitro diagnostic medical devices **Expires July 22, 2023** iii. Electron microscopes and instruments used as accessories and/or as parts of electron microscopes which fall under Annex I Sub-Category 9: Industrial monitoring and control devices **Expires July 22, 2024**
2014 (3) 10/31/2014 to 1/9/2015 [13][14]	Lake Shore Cryotronics	2014-2) Lead in solders of electrical connections to temperature measurement sensors in devices which are designed to be used periodically at temperatures below -150°C **Expires June 30, 2021**
2015 (1) 4/24 to 6/19 2015 [15][16][17]	Applicant Withdrawn Emerson Climate Technologies	7b) Lead in solders for RF switching matrices and associated RF signal distribution equipment for telecommunications **Request Withdrawn** 9b) Lead in bearing shells and bushes for refrigerant-containing hermetic scroll compressors with a stated electrical power input equal or below 9kW for heating, ventilation, air conditioning and refrigeration (HVACR) applications **Expires July 21, 2019 (cat. 1)**

Stakeholder Consultation / Period Held / References	Applicant	Exemption Request #, Recommendation for Wording in Directive **Recommendation for Expiration**
	SDI	13a) Lead in White Glasses Used for Optical Applications **Expires July 21, 2021 (cats. 1-7 & 10), July 21, 2021 (cats. 8-9), July 21, 2023 (subcat. 8, in-vitro), and July 21, 2024 (subcat. 9, industrial)**
	SDI	13b) Lead in ion coloured optical filter glass types, or cadmium in striking optical filter glass types or lead and cadmium in glazes used for reflectance standards - excluding applications falling under Ex. point 39 of Annex III. **Expires July 21, 2021 (cats. 1-7 & 10)** Cadmium and lead in filter glasses and glasses used for reflectance standards **Expires July 21, 2021 (cats. 8-9), July 21, 2023 (subcat. 8, in-vitro) and July 21, 2024 (subcat. 9, industrial)**
	Pyreos Ltd	2015-1) "Lead in thin film electronic sensor elements such as pyroelectric sensors or piezoelectric sensors" **Exemption Suspended**
	FEI	2015-2) "Lead in high voltage cables and cable assemblies for a rated voltage higher than 250kV DC, containing up to 4% lead by weight" (for industrial monitoring and control instruments, Annex IV) **Exemption Suspended**
	LightingEurope	2015-3) Alternative A: (1) Lead as activator in the fluorescent powder (1% lead by weight or less) of discharge lamps containing phosphors such as BSP (BaSi2O5 :Pb), when used: I. in tanning equipment; or II. in category 8 medical phototherapy equipment – excluding applications falling under point 34 of Annex IV **Expires July 21, 2021 (cat. 5)** (2) Lead as activator in the fluorescent powder (1% lead by weight or less) of discharge lamps when used as sun tanning lamps containing phosphors such as BSP (BaSi2O5: Pb) **Expires July 21, 2021 (cats. 8-9), July 21, 2023 (subcat. 8, in-vitro) and July 21, 2024 (subcat. 9, industrial)** Alternative B: Lead as activator in the fluorescent powder (1% lead by weight or less) of discharge lamps containing phosphors such as BSP (BaSi2O5 :Pb), when used in Annex I category 8 medical phototherapy equipment – excluding applications falling under point 34 of Annex IV **Expires July 21, 2021 (cat. 5)**
2015 (2) 8/21 to 10/16/2015 [18][19]	LightingEurope	5b) Lead in glass of fluorescent tubes not exceeding 0.2 % by weight **For Cat. 5: July 21, 2021; For Cat. 8 and Cat. 9: July 21, 2021; For Sub-Cat. 8 in-vitro: July 21, 2023; For Sub-Cat. 9 industrial: July 21, 2024**
	Dunkermotoren; The European Steel	6a) I) Lead as an alloying element in steel for machining purposes containing up to 0.35 % lead by weight

Stakeholder Consultation / Period Held / References	Applicant	Exemption Request #, Recommendation for Wording in Directive **Recommendation for Expiration**
	Association (EUROFER) and European General Galvanizers Association (EGGA) Sensata Technologies	**For Cat. 1-7 and 10 and 11: July 21, 2019** II) Lead in batch hot dip galvanized steel components containing up to 0.2% lead by weight **For Cat. 1-7 and 10 and 11: July 21, 2021** III) Lead as an alloying element in steel for machining purposes and in galvanized steel containing up to 0.35 % lead by weight **For Cat. 8 and 9: July 21, 2021; For Sub-Cat. 8 in-vitro: July 21, 2023; For Sub-Cat. 9 industrial: July 21, 2024**
	AISBL - EAA Sensata Technologies Dunkermotoren	6b) Lead as an alloying element in aluminium: I) with a lead content up to 0.4 % by weight, used for the production of parts not machined with shape cutting chipping technologies **For Cat. 1-7 and 10 and 11: July 21, 2021** II) for machining purposes with a lead content up to 0.4 % by weight **For Cat. 1-11: July 21, 2021** III) Lead as an alloying element in aluminium containing up to 0,4 % lead by weight **For Cat. 8 and 9: July 21, 2021; For Sub-Cat. 8 in-vitro: July 21, 2023; For Sub-Cat. 9 industrial: July 21, 2024**
	Bourns Inc. Dunkermotoren Framo Morat Group Sensata Technologies Phoenix Contact GmbH & Co KG; Harting KGaA LightingEurope	6c) Copper alloy containing up to 4% lead by weight **For Cat. 1-7 and 10 and 11: July 21, 2019; For Cat. 8 and 9: July 21, 2021; For Sub-Cat. 8 in-vitro: July 21, 2023; For Sub-Cat. 9 industrial: July 21, 2024**
	Bourns Inc. IXYS Semiconductor GmbH Chenmko Enterprise Co., Ltd Yeashin Technology Co., Ltd Freescale Semiconductor Formosa Microsemi Co., Ltd.	7a) I) Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead) **For Cat. 8 and 9: July 21, 2021; For Sub-Cat. 8 in-vitro: July 21, 2023; For Sub-Cat. 9 industrial: July 21, 2024** II) in all applications not addressed in items III and IV, but excluding applications in the scope of exemption 24 **For categories 1 to 7 and 10: July 21, 2021** III) for die attach **For categories 1 to 7 and 10: July 21, 2019**

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		IV) for electrical connections on or near the voice coil in power transducers **For categories 1 to 7 and 10: July 21, 2019**
	Bourns Inc. Sensata Technologies YAGEO Corporation RALEC TECHNOLOGY (KUNSHAN) CO. BANDELN electronic GmbH&;Co.KG RALEC TECHNOLOGY (KUNSHAN) CO. Japan Electronics & Information Technology Industries Association Murata Elektronik GmbH EPCOS AG VISHAY BC components BEYSCHLAG GmbH SCHOTT AG	7c - I) Electrical and electronic components containing lead in a ceramic other than dielectric ceramic in discrete capacitor components, e.g. piezoelectronic devices **For categories 1-7 and 10: July 21, 2019** 7c - V) Electrical and electronic components containing lead in a glass or in a glass or ceramic matrix compound. This exemption does not cover the use of lead in the scope of exemption 34 (cermet-based trimmer potentiometers). **For categories 1-7 and 10: July 21, 2021** 7(d): Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound **For Cat. 8 and 9: July 21, 2021; For Sub-Cat. 8 in-vitro: July 21, 2023; For Sub-Cat. 9 industrial: July 21, 2024**
	Murata Elektronik GmbH EPCOS AG VISHAY BC components BEYSCHLAG GmbH JEITA(Japan Electronics & Information Technology Industries Association)	7c - II) a) Lead in dielectric ceramic in capacitors for a rated voltage of 125 V AC or 250 V DC or higher **For Cat. 8 and 9: July 21, 2021** **For Sub-Cat 8 in-vitro: July 21, 2023** **For Sub-Cat 9 industrial: July 21, 2024** b) Lead in dielectric ceramic in discrete capacitor components for a rated voltage of 125 V AC or higher, or for a rated voltage of 250 V DC or higher **For Cat. 1-7 and 10: July 21, 2019**

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	No Applicant Given	7c - III) Lead in dielectric ceramic in discrete capacitor components for a rated voltage of less than 125 V AC, or for a rated voltage of less than 250 V DC **January 1, 2013 and after that date may be used in spare parts for EEE placed on the market before January 1, 2013**
	ST Microelectronics	7c - IV) Lead in PZT-based dielectric ceramic materials of capacitors being part of integrated circuits or discrete semiconductors **For Cat. 1-7 and 10: July 21, 2019; For Cat. 8 and 9: July 21, 2021; For Sub-Cat. 8 in-vitro: July 21, 2023; For Sub-Cat. 9 industrial: July 21, 2024**
	Intel Corporation	15) I) Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit flip chip packages **For Cat. 8 and 9: July 21, 2021; For Sub-Cat. 8 in-vitro: July 21, 2023; For Sub-Cat. 9 industrial: July 21, 2024** II) Lead in solders to complete a viable electrical connection between semiconductor die and the carrier within integrated circuit flip chip packages where one of the below criteria applies: a) A semiconductor technology node of 90 nm or larger **For categories 1-7 and 10: July 21, 2019** b) A single die of 300 mm2 or larger in any semiconductor technology node **For categories 1-7 and 10: July 21, 2021** c) Stacked die packages with dies of 300 mm² or larger, or silicon interposers of 300 mm2 or larger **For categories 1-7 and 10: July 21, 2021** d) Flip chip on lead frame (FCOL) packages with a rated current of 3 A or higher and dies smaller than 300 mm² **The exemption cannot be recommended but is added here in case the Commission would decide that it should be granted**
	NARVA Lichtquellen GmbH + Co. KG LightingEurope	18b) Lead as activator in the fluorescent powder (1 % lead by weight or less) of discharge lamps containing phosphors such as BSP (BaSi2O5 :Pb), when used: I. in tanning equipment; or II. in Annex I category 8 medical phototherapy equipment - excluding applications falling under point 34 of Annex IV **For Cat. 5: July 21, 2021**
	LightingEurope	21) Lead and cadmium in printing inks for the application of enamels on glasses, such as borosilicate and soda lime glasses:

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		III. Lead in printing inks for the application of enamels on other than borosilicate glasses. **For Cat. 1-4, 6,7 and 10: July 21, 2019** **Comment:** The recommended period should suffice to establish the reliability of Pb-free substitutes in other than borosilicate glasses.
		IV. Lead and cadmium in printing inks for the application of enamels on glasses, such as borosilicate and soda lime glasses **For Cat. 8 and Cat. 9: July 21, 2021; For Sub-Cat. 8 in-vitro: July 21, 2023; For Sub-Cat. 9 industrial: July 21, 2024;** **Comment:** As it can be understood that the exemption duration may vary for various categories on the basis of Article 5(2), expiration dates have been specified here on the basis of the validity periods specified in Article 5(2) for categories, which are newly in scope.
	Knowles	24) Lead in solders for the soldering to machined through hole discoidal and planar array ceramic multilayer capacitors **For Cat. 1-7 and 10: January 21, 2019; For Cat. 8 and Cat. 9: July 21, 2021; For Sub-Cat. 8 in-vitro: July 21, 2023; For Sub-Cat. 9 industrial: July 21, 2024;**
	EUROPEAN DOMESTIC GLASS and LightingEurope	29) Lead bound in crystal glass as defined in Directive 69/493/EEC **For Cat. 1-10: July 21, 2021 For Sub-Cat. 8 in-vitro: July 21, 2023 For Sub-Cat. industrial: July 21, 2024**
	Coherent Inc. JDSU	32) Lead oxide in seal frit used for making window assemblies for Argon and Krypton laser tubes **For Cat. 1-10: July 21, 2021 For Sub-Cat. 8 in-vitro: July 21, 2023 For Sub-Cat. industrial: July 21, 2024**
	General Electric	34) Lead in cermet-based trimmer potentiometers **For Cat. 1-7 and 10: July 21, 2019; For Cat. 8 and Cat. 9: July 21, 2021; For Sub-Cat. 8 in-vitro: July 21, 2023; For Sub-Cat. 9 industrial: July 21, 2024;**
	IXYS Semiconductor GmbH General Electric	37) Lead in the plating layer of high voltage diodes on the basis of a zinc borate glass body **For categories 1-7 and 10: July 21, 2019; For Cat. 8 and 9: July 21, 2021; For Sub-Cat. 8 in-vitro: July 21, 2023; For Sub-Cat. 9 industrial: July 21, 2024**
2016 (1) 3/14 to 5/9 2016 [20][21]	The European Association of Internal Combustion Engine Manufacturers (EUROMOT)	2016-1) “Lead in bearings and bushes of diesel or gaseous fuel powered internal combustion engines applied in non-road professional use equipment: I. with engine total displacement ≥ 15 litres; II. with engine total displacement < 15 litres and the engine is designed to operate in applications where the time between signal to start and full load is required to be less than 10 seconds; or regular maintenance is typically performed in a harsh and dirty outdoor environment, such as mining, construction, and agriculture applications.”

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		For Cat. 11: **5 years from 2019**; Add an exclusion of bearings and bushings falling under this exemption to Ex. 6c of Annex III of the Directive.
	Roche Diagnostics Ltd.	2016-2) "Lead in solders used to construct and connect to Peltier thermal cyclers used for in-vitro diagnostic analysers that use polymerase chain reaction." **Exemption Denied**
2016 (BiPro) 10/28 to 12/22/2016 [22][23]	EuroWindoor AISBL et al	B- 2016) Cadmium and lead in plastic profiles containing mixtures produced from PVC waste (hereinafter referred to as 'recovered PVC'), used **for electric and/or electronic windows and doors**, where the concentration in the plastic homogeneous material does not exceed by weight 0.1 % cadmium (expressed as Cd metal) and 1 % lead (expressed as Pb metal), provided that the components concerned are visibly, legibly and indelibly marked with the statement 'Contains recovered PVC' **3 years**
2017 (1) 9/26 to 11/7 2017 [24][25]	AB Sciex	2017-1) Lead in solder used to make electrical connections to vacuum boards used in Mass Spectrometers. Boards designed to be used periodically under low pressure. 5 years. **Request for New Exemption Withdrawn**
	Oldham SAS	2017-2) Use of lead in welds for soldering of certain printed circuit board assemblies in gas detectors **Request for New Exemption Denied**
2017 (2) 10/20 to 12/1/2017 [26][27]	Stihl	Annex III, Ex. 41) Lead in solders and termination finishes of electrical and electronic components and finishes of printed circuit boards used in ignition modules and other electrical and electronic engine control systems, which for technical reasons must be mounted directly on or in the crankcase or cylinder of hand-held combustion engines (classes SH:1, SH:2, SH:3 of Directive 97/68/EC of the European Parliament and of the Council **Expires June 30, 2021**
	Japanese Business Council in Europe (JBCE)	Annex IV, Ex. 37) Lead in platinized platinum electrodes used for conductivity measurements where at least one of the following conditions applies: (a) wide-range measurements with a conductivity range covering more than 1 order of magnitude (e.g. range between 0,1 mS/m and 5 mS/m) in laboratory applications for unknown concentrations; (b) measurements of solutions where an accuracy of +/– 1 % of the sample range and where high corrosion resistance of the electrode are required for any of the following: (i) solutions with an acidity < pH 1; (ii) solutions with an alkalinity > pH 13; (iii) corrosive solutions containing halogen gas; (c) measurements of conductivities above 100 mS/m that must be performed with portable instruments.

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		7 years. However, if the Commission views the lack of involvement of producers in the research of alternatives as a point of concern, a shorter period could be granted, such as three or five years.
	Instrumentation Laboratories (represented by Intertek)	Annex IV, Ex. 41) Lead as a thermal stabiliser in polyvinyl chloride (PVC) used as base material in amperometric, potentiometric and conductometric electrochemical sensors which are used in in-vitro diagnostic medical devices for the analysis of blood and other body fluids and body gases **Renewal until April 1, 2023 , if the Commission agrees that environmental impacts of substitution justify an exemption, or 18 month transition period**
	Ametek	2017-3) Lead in solders of alpha spectrometers, pulse-processing electronics, scintillation detectors and spectroscopy systems used in equipment to identify radiation, expiring on 23 July 2024 **Request for New Exemption Denied**
	Sciex	2017-4) Lead in solder and hexavalent chromium in parts used to make RF detectors in Mass Spectrometers, to be added to Annex IV **Request for New Exemption Withdrawn**
	Asco Numatics	2017-5) Lead in thermal cut-off fuses overmolded into solenoid coils used in industrial monitoring and control instruments (Category 9) and EEE falling under Category 11. **Request for New Exemption Withdrawn**
	The European Association of Internal Combustion Engine Manufacturers (EUROMOT)	2017-7) Lead in solder of sensors, actuators, and engine control units (ECUs) of combustion engines in the scope of Regulation (EU) 2016/1628, installed in equipment used at fixed positions while in operation which is designed for professionals, but also used by non-professional users **5 years**
2018 (3) 10/31 to 12/19/2018 [28][69]	Austin Detonator	2018-2) Lead diazide, lead styphnate, lead dipicramate, orange lead (lead tetroxide), lead dioxide in electric and electronic initiators of explosives for civil (professional) use and barium chromate in long time pyrotechnic delay charges of electric initiators of explosives for civil (professional) use **5 years**

Tables 4 and 5 concern the lead exemptions listed in Annex III of RoHS 2, including changes to the Annex by way of Commission Delegated Directives. Table 4 lists the exemptions still in effect, while Table 5 lists exemptions that have expired. Many of the exemptions that were granted or renewed can be traced back to the original applicant(s), evaluation period and the relevant Commission Delegated Directive. In certain cases of expired exemptions, renewal applications that are known to be received are noted.

Table 4: RoHS 2.1, Annex III's Active Lead Exemptions

Active Annex III Lead Exemption Scope and Dates of Applicability
5(a): Lead in glass of cathode ray tubes Expires: - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11
5(b): Lead in glass of fluorescent tubes not exceeding 0.2% by weight Expires: - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11 **Evaluated August 21 – October 16, 2015** **Applicant: LightingEurope**
6(a): Lead as an alloying element in steel for machining purposes and in galvanized steel containing up to 0.35% lead by weight Expires: - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11 **Evaluated August 21 – October 16, 2015** **Applicants: Dunkermotoren, The European Steel Association (EUROFER), European General Galvanizers Association (EGGA) and Sensata Technologies [29]**
6(a)-I: Lead as an alloying element in steel for machining purposes containing up to 0.35% lead by weight and in batch hot dip galvanized steel components containing up to 0.2% lead by weight -Expires July 21, 2021 for categories 1-7 and 10 **Evaluated August 21 – October 16, 2015** **Applicants: Dunkermotoren, The European Steel Association (EUROFER), European General Galvanizers Association (EGGA) and Sensata Technologies [29]**

Active Annex III Lead Exemption Scope and Dates of Applicability
6(b): Lead as an alloying element in aluminum containing up to 0.4% lead by weight Expires: - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments, - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11 **Evaluated August 21 – October 16, 2015** **Applicants: AISBL – EAA, Sensata Technologies and Dunkermotoren [30]**
6(b)-I: Lead as an alloying element in aluminum containing up to 0.4% lead by weight, provided it stems from lead-bearing aluminum scrap recycling - Expires July 21, 2021 for categories 1-7 and 10 **[30]**
6(b)-II: Lead as an alloying element in aluminum for machining purposes with a lead content up to 0.4% by weight - Expires May 18, 2021 for categories 1-7 and 10 **Evaluated August 21 – October 16, 2015** **Applicants: AISBL – EAA, Sensata Technologies and Dunkermotoren [30]**
6(c): Copper alloy containing up to 4% lead by weight Expires: - July 21, 2021 for categories 1-7 and 10 - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11 **Evaluated August 21 – October 16, 2015** **Applicants: Bourns Inc., Dunkermotoren, Framo Morat Group, Sensata Technologies, Phoenix Contact, GmbH &Co KG, Harting KgaA, and LightingEurope [31]**
7(a): Lead in high melting temperature type solders (i.e. lead-based alloys containing 85% by weight or more lead) Expires: - July 21, 2021 for categories 1-7 and 10 (except applications covered by point 24 of this Annex) - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11 **Evaluated August 21 – October 16, 2015** **Applicants: Bourns Inc., IXYS Semiconductor, GmbH, Chenmko Enterprise Co. Ltd., Yeashin Technology Co. Ltd., Freescale Semiconductor, and Formose Microsemi Co. Ltd. [32]**
7(b): Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signaling, transmission, and network management for telecommunications Expires: - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments

Active Annex III Lead Exemption Scope and Dates of Applicability
- July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11
7(c)-I: Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound Expires: - July 21, 2021 for categories 1-7 and 10 (except applications covered under point 34) - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11 **Evaluated August 21 – October 16, 2015** **Applicants: Bourns Inc., Sensata Technologies, YAGEO Corporation, RALEC TECHNOLOGY (KUNSHAN) CO., BANDELN electronic GmbH &Co.KG, Japan Electronics & Information Technology Industries Association, Murata Elektronik GmbH, EPCOS AG, VISHAY BC components, BEYSCHLAG, GmbH, and SCHOTT AG [33]**
7(c)-II: Lead in dielectric ceramic in capacitors for a rated voltage of 125 V AC or 250 V DC or higher Does not apply to applications covered by point 7(c)-I and 7(c)-IV of this Annex. Expires: - July 21, 2021 for categories 1-7 and 10 - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11 **Evaluated August 21 – October 16, 2015** **Applicants: Japan Electronics & Information Technology Industries Association, Murata Elektronik GmbH, EPCOS AG, VISHAY BC components, BEYSCHLAG GmbH, and SCHOTT AG [34]**
7(c)-IV: Lead in PZT based dielectric ceramic materials for capacitors which are part of integrated circuits or discrete semiconductors Expires: - July 21, 2021 for categories 1-7 and 10 - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11 **Evaluated August 21 – October 16, 2015** **Applicant: ST Microelectronics [35]**
9(b): Lead in bearing shells and bushes for refrigerant-containing compressors for heating, ventilation, air conditioning and refrigeration (HVACR) applications Applies to categories 8, 9 and 11. Expires: - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments and for category 11 - July 21, 2021 for other subcategories of categories 8 and 9

Active Annex III Lead Exemption Scope and Dates of Applicability
Evaluated April 24 – June 19, 2015 **Applicant: Emerson Climate Technologies** **[36]**
11(a): Lead used in C-press compliant pin connector systems - Permitted for use in spare parts for EEE placed on the market before September 24, 2010
11(b): Lead used in other than C-press compliant pin connector systems - Permitted for use in spare parts for EEE placed on the market before January 1, 2013
12: Lead as a coating material for the thermal conduction module C-ring - Permitted for use in spare parts for EEE placed on the market before September 24, 2010
13(a): Lead in white glasses used for optical applications Expires: - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments and for category 11 - July 21, 2021 for all other categories and subcategories **Evaluated April 24 - June 19, 2015** **Applicants: Spectaris - Deutscher Industrieverband für optische, medizinische und mechatronische Technologien e.V.** **[37]**
13(b): Cadmium and lead in filter glasses and glasses used for reflectance standards Applies to categories 8, 9 and 11. Expires: - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments and for category 11 - July 21, 2021 for other subcategories of categories 8 and 9 **Evaluated April 24 - June 19, 2015** **Applicants: Spectaris - Deutscher Industrieverband für optische, medizinische und mechatronische Technologien e.V.** **[38]**
13(b)-(I): Lead in ion colored optical filter glass types Applies to categories 1 to 7 and 10. Expires July 21, 2021 **Evaluated April 24 - June 19, 2015** **Applicants: Spectaris - Deutscher Industrieverband für optische, medizinische und mechatronische Technologien e.V.** **[38]**
13(b)-(III): Cadmium and lead in glazes used for reflectance standards Applies to categories 1 to 7 and 10. Expires July 21, 2021 **Evaluated April 24 - June 19, 2015** **Applicant: Spectaris - Deutscher Industrieverband für optische, medizinische und mechatronische Technologien e.V.** **[38]**
14: Lead in solders consisting of more than two elements for the connection between the pins and the package of microprocessors with a lead content of more than 80% and less than 85% by weight - Permitted for use in spare parts for EEE placed on the market before January 1, 2011

Active Annex III Lead Exemption Scope and Dates of Applicability
15: Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit flip chip packages Expires: - February 29, 2020 for categories 1-7 and 10 (no longer renewable) - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11 **Evaluated August 21 – October 16, 2015** **Applicant: Intel Corporation** **[39]**
15(a): Lead in solders to complete a viable electrical connection between the semiconductor die and carrier within integrated circuit flip chip packages where at least one of the following criteria applies: - a semiconductor technology node of 90 nm or larger - a single die of 300 mm2 or larger in any semiconductor technology node - stacked die packages with die of 300 mm2 or larger, or silicon interposers of 300 mm2 or larger Applies to categories 1 to 7 and 10. Expires July 21, 2021. **Evaluated August 21 – October 16, 2015** **Applicant: Intel Corporation** **[39]**
17: Lead halide as radiant agent in high intensity discharge (HID) lamps used for professional reprography applications Expires: - July 21, 2021 for categories 1-7 and 10 - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11
18(b): Lead as activator in the fluorescent powder (1% lead by weight or less) of discharge lamps when used as sun tanning lamps containing phosphors such as BSP (BaSi2O5:Pb) Expires: - July 21, 2021 for categories 1-7 and 10 - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11 **Evaluated August 21 – October 16, 2015** **Applicants: NARVA Lichtquellen, GmbH+Co. KG, and LightingEurope** **[40]**
18(b)-I: Lead as activator in the fluorescent powder (1% lead by weight or less) of discharge lamps containing phosphors such as BSP (BaSi2O5:Pb) when used in medical phototherapy equipment Applies to categories 5 and 8, excluding applications covered by entry 34 of Annex IV. Expires July 21, 2021. **Evaluated August 21 – October 16, 2015** **Applicants: NARVA Lichtquellen, GmbH+Co. KG, and LightingEurope** **[40]**

Active Annex III Lead Exemption Scope and Dates of Applicability
21: Lead and cadmium in printing inks for the application of enamels on glasses, such as borosilicate and soda lime glasses Applies to categories 8, 9 and 11. Expires: - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11. For categories 1-7 and 10. Expires February 29, 2020 (no longer renewable) **Evaluated August 21 – October 16, 2015** **Applicant: LightingEurope** **[41]**
21(c): Lead in printing inks for the application of enamels on other than borosilicate glasses Applies to categories 1 to 7 and 10. Expires July 21, 2021. **Evaluated August 21 – October 16, 2015** **Applicant: LightingEurope** **[41]**
23: Lead in finishes of fine pitch components other than connectors with a pitch of 0,65 mm and less - Permitted for use in spare parts for EEE placed on the market before September 24, 2010
24: Lead in solders for the soldering to machined through hole discoidal and planar array ceramic multilayer capacitors Expires: - July 21, 2021 for categories 1-7 and 10 - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11. **Evaluated August 21 - October 16, 2015.** **Applicant: Knowles** **[42]**
25: Lead oxide in surface conduction electron emitter displays (SED) used in structural elements, notably in the seal frit and frit ring Expires: - July 21, 2021 for categories 1-7 and 10 - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11.
29: Lead bound in crystal glass as defined in Annex I (Categories 1, 2, 3 and 4) of Council Directive 69/493/EEC Expires: - July 21, 2021 for categories 1-7 and 10 - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11

Active Annex III Lead Exemption Scope and Dates of Applicability
Evaluated August 21 - October 16, 2015 **Applicants: EUROPEAN DOMESTIC GLASS and LightingEurope** **[43]**
31: Lead in soldering materials in mercury free flat fluorescent lamps (which, e.g. are used for liquid crystal displays, design or industrial lighting) Expires: - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11
32: Lead oxide in seal frit used for making window assemblies for Argon and Krypton laser tubes Expires: - July 21, 2021 for categories 1-7 and 10 - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11 **Evaluated August 21 - October 16, 2015** **Applicants: Coherent Inc. and JDSU** **[44]**
33: Lead in solders for the soldering of thin copper wires of 100 µm diameter and less in power transformers Expires: - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11
34: Lead in cermet-based trimmer potentiometer elements Expires: - July 21, 2021 for categories 1-7 and 10 - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11. **Evaluated August 21 - October 16, 2015** **Applicant: General Electric** **[45]**
37: Lead in the plating layer of high voltage diodes on the basis of a zinc borate glass body Expires: - July 21, 2021 for categories 1-7 and 10 - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments; - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11

Active Annex III Lead Exemption Scope and Dates of Applicability
Evaluated August 21 - October 16, 2015 **Applicants: IXYS Semiconductor, GmbH, and General Electric** **[46]**
41: Lead in solders and termination finishes of electrical and electronic components and finishes of printed circuit boards used in ignition modules and other electrical and electronic engine control systems, which for technical reasons must be mounted directly on or in the crankcase or cylinder of hand-held combustion engines (classes SH:1, SH:2, SH:3 of Directive 97/68/EC of the European Parliament and of the Council Expires: - July 21, 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments; - July 21, 2023 for category 8 in vitro diagnostic medical devices - July 21, 2024 for category 9 industrial monitoring and control instruments
42: Lead in bearings and bushes of diesel or gaseous fuel powered internal combustion engines applied in non-road professional use equipment: - with engine total displacement ≥ 15 liters, or - with engine total displacement < 15 liters and the engine is designed to operate in applications where the time between signal to start and full load is required to be less than 10 seconds; or regular maintenance is typically performed in a harsh and dirty outdoor environment, such as mining, construction, and agriculture applications Applies to category 11, excluding applications covered by entry 6(c) of this Annex. Expires July 21, 2024. **Evaluated March 14 - May 9, 2016** **Applicant: EUROMOT (The European Association of Internal Combustion Engine Manufacturers)** **[47]**
*44: Lead in solder of sensors, actuators, and engine control units of combustion engines within the scope of Regulation (EU) 2016/1628 of the European Parliament and of the Council, installed in equipment used at fixed positions while in operation which is designed for professionals, but also used by non-professional users Applies to category 11. Expires July 21, 2024. ***Not yet in effect (to be published in the *Official Journal of the European Union* at unknown date)** **[70]**

Table 5: RoHS 2.1, Annex III's Expired Lead Exemptions

Expired Annex III Lead Exemption Scope and Dates of Applicability
5(a): Lead in glass of cathode ray tubes - Expired July 21, 2016 for categories 1-7 and 10
5(b): Lead in glass of fluorescent tubes not exceeding 0.2% by weight - Expired July 21, 2016 for categories 1-7 and 10 **Evaluated August 21 – October 16, 2015 (for renewal consideration)** **Applicant: LightingEurope**

Expired Annex III Lead Exemption Scope and Dates of Applicability
6(a): Lead as an alloying element in steel for machining purposes and in galvanized steel containing up to 0.35% lead by weight - Expired June 30, 2019 for categories 1-7 and 10 **Evaluated August 21 – October 16, 2015** **Applicants: Dunkermotoren, The European Steel Association (EUROFER), European General Galvanizers Association (EGGA) and Sensata Technologies [29]**
6(b): Lead as an alloying element in aluminum containing up to 0.4% lead by weight - Expired June 30, 2019 for categories 1-7 and 10 **Evaluated August 21 – October 16, 2015** **Applicants: AISBL – EAA, Sensata Technologies and Dunkermotoren [30]**
7(b): Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signaling, transmission, and network management for telecommunications - Expired July 21, 2016 for categories 1-7 and 10
7(c)-III: Lead in dielectric ceramic in capacitors for a rated voltage of less than 125 V AC or 250 V DC - Expired January 1, 2013 and is permitted for use in spare parts for EEE placed on the market before January 1, 2013 **Evaluated August 21 – October 16, 2015** **Applicant: No Applicant Given**
9(b): Lead in bearing shells and bushes for refrigerant-containing compressors for heating, ventilation, air conditioning and refrigeration (HVACR) applications - Expired June 30, 2019 for categories 1-7 and 10
9(b)-(I): Lead in bearing shells and bushes for refrigerant-containing hermetic scroll compressors with a stated electrical power input equal or below 9 kW for heating, ventilation, air conditioning and refrigeration (HVACR) applications - Applied to category 1. Expired July 21, 2019. **Evaluated April 24 - June 19, 2015** **Applicant: Emerson Climate Technologies [36]**
11(a): Lead used in C-press compliant pin connector systems - Expired September 24, 2010 for categories 1-7 and 10
11(b): Lead used in other than C-press compliant pin connector systems - Expired January 1, 2013 for categories 1-7 and 10
12: Lead as a coating material for the thermal conduction module C-ring - Expired September 24, 2010 for categories 1-7 and 10
14: Lead in solders consisting of more than two elements for the connection between the pins and the package of microprocessors with a lead content of more than 80% and less than 85% by weight - Expired January 1, 2011 and is permitted for use in spare parts for EEE placed on the market before January 1, 2011
16: Lead in linear incandescent lamps with silicate coated tubes - Expired September 1, 2013

Expired Annex III Lead Exemption Scope and Dates of Applicability
17: Lead halide as radiant agent in high intensity discharge (HID) lamps used for professional reprography applications - Expired July 21, 2016 for categories 1-7 and 10
18(a): Lead as activator in the fluorescent powder (1% lead by weight or less) of discharge lamps when used as specialty lamps for diazoprinting reprography, lithography, insect traps, photochemical and curing processes containing phosphors such as SMS ((Sr,Ba)2MgSi2O7:Pb) - Expired January 1, 2011
19: Lead with PbBiSn-Hg and PbInSn-Hg in specific compositions as main amalgam and with PbSn-Hg as auxiliary amalgam in very compact energy saving lamps (ESL) - Expired June 1, 2011
20: Lead oxide in glass used for bonding front and rear substrates of flat fluorescent lamps used for Liquid Crystal Displays (LCDs) - Expired June 1, 2011
25: Lead oxide in surface conduction electron emitter displays (SED) used in structural elements, notably in the seal frit and frit ring - Expired July 21, 2016 for categories 1-7 and 10
26: Lead oxide in the glass envelope of black light blue lamps - Expired June 1, 2011
27: Lead alloys as solder for transducers used in high-powered (designated to operate for several hours at acoustic power levels of 125 dB SPL and above) loudspeakers - Expired September 24, 2010
31: Lead in soldering materials in mercury free flat fluorescent lamps (which, e.g. are used for liquid crystal displays, design or industrial lighting) - Expired July 21, 2016 for categories 1-7 and 10
33: Lead in solders for the soldering of thin copper wires of 100 µm diameter and less in power transformers - Expired July 21, 2016 for categories 1-7 and 10
41: Lead in solders and termination finishes of electrical and electronic components and finishes of printed circuit boards used in ignition modules and other electrical and electronic engine control systems, which for technical reasons must be mounted directly on or in the crankcase or cylinder of hand-held combustion engines (classes SH:1, SH:2, SH:3 of Directive 97/68/EC of the European Parliament and of the Council - Expired December 31, 2018 for categories 1-7, 10 and 11 **Evaluated November 9, 2012 - February 1, 2013 (to grant exemption) and October 20 – December 1, 2017 (for renewal consideration)** **Applicants: ANDREAS STIHL, AG & Co. KG** **[48] [68]**

Tables 6 and 7 concern the lead exemptions listed in Annex IV of RoHS 2, including changes to the Annex by way of Commission Delegated Directives. Similar to Tables 4 and 5, Table 6 lists active exemptions, whereas Table 7 lists expired exemptions. Many of the exemptions that were granted or renewed can be traced back to the original applicant(s), evaluation period and the relevant Commission Delegated Directive. In certain cases of expired exemptions, renewal applications that are known to be received are noted.

Table 6: RoHS 2.1, Annex IV's Active Lead Exemptions

Active Annex IV Lead Exemption Scope and Dates of Applicability
1. Lead, cadmium and mercury in detectors for ionizing radiation Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024
2. Lead bearings in X-ray tubes Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024
3. Lead in electromagnetic radiation amplification devices: micro-channel plate and capillary plate Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024
4. Lead in glass frit of X-ray tubes and image intensifiers and lead in glass frit binder for assembly of gas lasers and for vacuum tubes that convert electromagnetic radiation into electrons Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024
5. Lead in shielding for ionizing radiation Expires: - Medical devices and monitoring and control instruments: July 21, 2021

Active Annex IV Lead Exemption Scope and Dates of Applicability
- In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024
6. Lead in X-ray test objects Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024
7. Lead stearate X-ray diffraction crystals Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024
1a. Lead and cadmium in ion selective electrodes including glass of pH electrodes Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024
1b. Lead anodes in electrochemical oxygen sensors Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024
1c. Lead, cadmium and mercury in infrared light detectors Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024
10. Lead and cadmium in atomic absorption spectroscopy lamps Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024
11. Lead in alloys as a superconductor and thermal conductor in MRI Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024

Active Annex IV Lead Exemption Scope and Dates of Applicability
12. Lead and cadmium in metallic bonds to superconducting materials in MRI, SQUID, NMR (Nuclear Magnetic Resonance) or FTMS (Fourier Transform Mass Spectrometer) detectors Expires on June 30, 2021 Evaluated January 24 - March 20, 2012 Applicant: Test and Measurement Coalition (TMC) **[49]**
13. Lead in counterweight Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024
14. Lead in single crystal piezoelectric materials for ultrasonic transducers Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024
15. Lead in solders for bonding to ultrasonic transducers Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024
17. Lead in solders in portable emergency defibrillators Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024
18. Lead in solders of high performance infrared imaging modules to detect in the range 8-14 µm Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024
19. Lead in Liquid crystal on silicon (LCoS) displays Expires: - Medical devices and monitoring and control instruments: July 21, 2021 - In vitro diagnostic medical devices: July 21, 2023 - Industrial monitoring and control instruments: July 21, 2024

Active Annex IV Lead Exemption Scope and Dates of Applicability
22. Lead acetate marker for use in stereotactic head frames for use with CT and MRI and in positioning systems for gamma beam and particle therapy equipment Expires on June 30, 2021 Evaluated January 24 - March 20, 2012 Applicants: European Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry (COCIR) **[50]**
23. Lead as an alloying element for bearings and wear surfaces in medical equipment exposed to ionizing radiation Expires on June 30, 2021 Evaluated January 24 - March 20, 2012 Applicant: COCIR **[51]**
24. Lead enabling vacuum tight connections between aluminum and steel in X-ray image intensifiers Expires on December 31, 2019 (no longer renewable) Evaluated January 24 - March 20, 2012 Applicant: COCIR **[52]**
25. Lead in the surface coatings of pin connector systems requiring nonmagnetic connectors which are used durably at a temperature below – 20 °C under normal operating and storage conditions Expires on June 30, 2021 Evaluated January 24 - March 20, 2012 Applicant: COCIR **[53]**
26. Lead in the following applications that are used durably at a temperature below – 20 °C under normal operating and storage conditions: (a) solders on printed circuit boards; (b) termination coatings of electrical and electronic components and coatings of printed circuit boards; (c) solders for connecting wires and cables; (d) solders connecting transducers and sensors. Lead in solders of electrical connections to temperature measurement sensors in devices which are designed to be used periodically at temperatures below – 150 °C Expires on June 30, 2021 Evaluated January 24 - March 20, 2012 Applicants: COCIR and Lake Shore Cryotronics **[54]**
27. Lead in — solders, — termination coatings of electrical and electronic components and printed circuit boards,

Active Annex IV Lead Exemption Scope and Dates of Applicability
— connections of electrical wires, shields and enclosed connectors, which are used in (a) magnetic fields within the sphere of 1 m radius around the isocenter of the magnet in medical magnetic resonance imaging equipment, including patient monitors designed to be used within this sphere, or (b) magnetic fields within 1 m distance from the external surfaces of cyclotron magnets, magnets for beam transport and beam direction control applied for particle therapy. Expires on June 30, 2020 (No longer renewable for industrial monitoring and control instruments) Evaluated January 24 - March 20, 2012 Renewal Application Received December 12, 2018 for medical devices, monitoring and control instruments and in vitro diagnostic medical devices. Evaluation has not commenced. Applicant: COCIR **[55] [68]**
29. Lead in alloys, as a superconductor or thermal conductor, used in cryo-cooler cold heads and/or in cryo-cooled cold probes and/or in cryo-cooled equipotential bonding systems, in medical devices (category 8) and/or in industrial monitoring and control instruments Expires on June 30, 2021 Evaluated January 24 - March 20, 2012 Applicant: TMC **[56]**
31a. Lead, cadmium, hexavalent chromium, and polybrominated diphenyl ethers (PBDE) in spare parts recovered from and used for the repair or refurbishment of medical devices, including in vitro diagnostic medical devices, or electron microscopes and their accessories, provided that the reuse takes place in auditable closed-loop business-to-business return systems and that each reuse of parts is notified to the customer Expires on: - July 21, 2021 for the use in medical devices other than in vitro diagnostic medical devices; - July 21, 2023 for the use in in vitro diagnostic medical devices; - July 21, 2024 for the use in electron microscopes and their accessories Evaluated June 26 - September 4, 2012 Applicant: COCIR **[57]**
32. Lead in solders on printed circuit boards of detectors and data acquisition units for Positron Emission Tomographs which are integrated into Magnetic Resonance Imaging equipment Expires on December 31, 2019 Evaluated June 26 - September 4, 2012 Applicant: COCIR **[58]**

Active Annex IV Lead Exemption Scope and Dates of Applicability
33. Lead in solders on populated printed circuit boards used in Directive 93/42/EEC class IIa and IIb mobile medical devices other than portable emergency defibrillators Expires December 31, 2020 for class IIb (no longer renewable) Evaluated June 26 - September 4, 2012 Applicant: COCIR **[59]**
34. Lead as an activator in the fluorescent powder of discharge lamps when used for extracorporeal photopheresis lamps containing BSP (BaSi2O5:Pb) phosphors Expires on July 22, 2021 Evaluated June 26 - September 4, 2012 Applicant: Therakos Photopheresis **[60]**
36. Lead used in other than C-press compliant pin connector systems for industrial monitoring and control instruments Expires on December 31, 2020 (no longer renewable). May be used after that date in spare parts for industrial monitoring and control instruments placed on the market before January 1, 2021 Evaluated December 21, 2012 - February 15, 2013 Applicant: TMC **[61]**
38. Lead in solder in one interface of large area stacked die elements with more than 500 interconnects per interface which are used in X-ray detectors of computed tomography and X-ray systems Expires on December 31, 2019 (no longer renewable). May be used after that date in spare parts for CT and X-ray systems placed on the market before January 1, 2020 Evaluated November 9, 2012 - February 1, 2013 Applicant: General Electric Healthcare **[62]**
39. Lead in micro-channel plates (MCPs) used in equipment where at least one of the following properties is present: (a) a compact size of the detector for electrons or ions, where the space for the detector is limited to a maximum of 3 mm/MCP (detector thickness + space for installation of the MCP), a maximum of 6 mm in total, and an alternative design yielding more space for the detector is scientifically and technically impracticable; (b) a two-dimensional spatial resolution for detecting electrons or ions, where at least one of the following applies: (i) a response time shorter than 25 ns; (ii) a sample detection area larger than 149 mm2; (iii) a multiplication factor larger than 1,3 × 103. (c) a response time shorter than 5 ns for detecting electrons or ions; (d) a sample detection area larger than 314 mm2 for detecting electrons or ions; (e) a multiplication factor larger than 4.0 × 107

Active Annex IV Lead Exemption Scope and Dates of Applicability
Expires on: - July 21, 2021 for medical devices and monitoring and control instruments; - July 21, 2023 for in-vitro diagnostic medical devices; - July 21, 2024 for industrial monitoring and control instruments Evaluated June 26 - September 4, 2012 Applicant: Japan Business Council in Europe (JBCE) [63]
40. Lead in dielectric ceramic in capacitors for a rated voltage of less than 125 V AC or 250 V DC for industrial monitoring and control instruments Expires on December 31, 2020 (no longer renewable). May be used after that date in spare parts for industrial monitoring and control instruments placed on the market before January 1, 2021 Evaluated December 21, 2012 - February 15, 2013 Applicant: TMC [64]

Table 7: RoHS 2.1, Annex IV's Expired Lead Exemptions

Expired Annex IV Lead Exemption Scope and Dates of Applicability
28. Lead in solders for mounting cadmium telluride and cadmium zinc telluride digital array detectors to printed circuit boards Expired on December 31, 2017 Evaluated January 24 - March 20, 2012 Applicant: COCIR **[65]**
31. Lead, cadmium and hexavalent chromium in reused spare parts, recovered from medical devices placed on the market before 22 July 2014 and used in category 8 equipment placed on the market before 22 July 2021, provided that reuse takes place in auditable closed-loop business-to-business return systems, and that the reuse of parts is notified to the consumer. This exemption was set to expire July 21, 2021, but was replaced by Annex IV Exemption 31(a) on November 11, 2017.
33. Lead in solders on populated printed circuit boards used in Directive 93/42/EEC class IIa and IIb mobile medical devices other than portable emergency defibrillators Expired on June 30, 2016 for class IIa Evaluated June 26 - September 4, 2012 Applicant: COCIR **[59]**

37. Lead in platinized platinum electrodes used for conductivity measurements where at least one of the following conditions applies:
(a) wide-range measurements with a conductivity range covering more than 1 order of magnitude (e.g. range between 0,1 mS/m and 5 mS/m) in laboratory applications for unknown concentrations;
(b) measurements of solutions where an accuracy of +/– 1 % of the sample range and where high corrosion resistance of the electrode are required for any of the following:
(i) solutions with an acidity < pH 1;
(ii) solutions with an alkalinity > pH 13;
(iii) corrosive solutions containing halogen gas;
(c) measurements of conductivities above 100 mS/m that must be performed with portable instruments

Expired on December 31, 2018
Evaluated November 9, 2012 - February 1, 2013 (to grant exemption) and October 20 – December 1, 2017 (for renewal consideration)
Applicant: JBCE **[66] [68]**

41. Lead as a thermal stabilizer in polyvinyl chloride (PVC) used as base material in amperometric, potentiometric and conductometric electrochemical sensors which are used in in-vitro diagnostic medical devices for the analysis of blood and other body fluids and body gases
Expired on December 31, 2018
Evaluated August 19 - November 11, 2013 (to grant exemption)
October 20 – December 1, 2017 (for renewal consideration)
Applicant: Instrumentation Laboratory, Inc. **[67] [68]**

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