

FINAL: EUROPGEN POSITION ON THE RESTRICTION OF HAZARDOUS SUBSTANCES IN ELECTRICAL AND ELECTRONIC EQUIPMENT DIRECTIVE (2011/65/EU) (RoHS)

SECTION 1: INTRODUCTION

The Restriction on Hazardous Substances in Electrical and Electronic Equipment Directive “RoHS” legislates to reduce the amounts of certain hazardous substances used in Electrical and Electronic Equipment or “EEE” that is made available in the European Union (EU). The original Directive identifies six substances that are subject to restriction, prescribes limits for these substances and methodologies by which their presence in EEE is assessed. The Directive has subsequently been amended to include four additional substances.

This paper is jointly produced by The European Generating Set Association (EUROPGEN) and the Association of Manufacturers of Power Systems (AMPS) to inform their members of the Directive and its implications on EEE, primarily power generation system equipment that is made available on the European market.

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SECTION 2: SUMMARY

The EU RoHS Directive applies to all electrical and electronic equipment made available on the EU Market, unless the manufacturer is able to demonstrate that the product is subject to an exclusion. Transitional periods generally apply to equipment that was not in scope of the 2002/95/EC Directive – e.g., equipment referenced in the 2002/96/EC Waste Electrical and Electronic Equipment Directive, Annexes 1A and 1B. These periods expire at the latest on 22nd July 2019. During the transitional periods, non-compliant products may continue to be made available; however once the applicable transitional period has expired no further market activity is allowed unless the product is compliant.

Permanently installed generating sets and associated products rated at greater than 375 kW, or otherwise satisfying the criteria for being determined as “Large Scale”, should benefit from exclusion and if so, do not need to comply. Non-permanently installed products presently do not qualify for Large Scale exclusion and should be checked to determine if they qualify as Non Road Mobile Machinery. Otherwise, as the Directive is currently worded, non-permanently installed products do not qualify for exclusion.

Compliant product manufactured during the transitional period may be optionally stated as such on the Declaration of Conformity. Once the transitional period has expired, unless an exclusion applies, compliance must be stated on the Declaration of Conformity and is denoted by CE marking. A Declaration of Conformity should be supplied with the product. Proof of conformity should be kept for at least 10 years after the individual product has been placed on the market.

SECTION 3: OVERVIEW OF THE RoHS DIRECTIVE

History

The original RoHS Directive, 2002/95/EC (hereafter referred to as RoHS 1), was published in the Official Journal of the European Union (OJ) on 13th February 2003 with adoption by all Member States into local law by 1st July 2006. This Directive took its product applicability from the Waste Electrical and Electronic Equipment Directive, 2002/96/EC (WEEE) and in Annexes 1A and 1B of this Directive, a list of products was given to which this and the RoHS 1 Directive applied. Generating sets and their associated products were not listed in either annex nor were any products similar to these.

On 1st July 2011, following various consultations, the present RoHS Directive, 2011/65/EU (hereafter referred to as RoHS 2) was published in recast form in the OJ with adoption by all Member States into local law by 2nd January 2013. Four principal changes accompanied this recast:

- The separation of the RoHS 2 Directive from the WEEE Directive, making RoHS 2 a stand-alone Directive; and
- The transition to 'Open Scope' meaning that EEE that was not expressly excluded from the Directive was deemed in scope unless the manufacturer could prove otherwise; and
- A clarified definition of EEE to comprise any piece of equipment that needs electric currents or electromagnetic fields for at least one intended function; and
- The inclusion of RoHS 2 as a requirement for CE marking items of finished EEE placed on the European market.

Definition of Electrical and Electronic Equipment (EEE).

RoHS 2 defines EEE in Article 3 as follows:

“electrical and electronic equipment” or ‘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 1 000 volts for alternating current and 1 500 volts for direct current”.

The term “dependent is further defined as follows:

“‘dependent’ means, with regard to EEE, needing electric currents or electromagnetic fields to fulfil at least one intended function”.

This is a significantly wider definition than was applied in the original Directive, which is provided here for reference:

‘electrical and electronic equipment’ or ‘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 falling under the categories set out in Annex IA to Directive 2002/96/EC (WEEE) and designed for use with a voltage rating not exceeding 1 000 volts for alternating current and 1 500 volts for direct current;

This new definition effectively means that all low voltage power generation equipment falls within scope of the recast Directive unless the manufacturer can demonstrate that it is excluded. Furthermore, any equipment that may not at first sight appear to be EEE may be in scope of the Directive if it depends on electric currents or electromagnetic fields in order to work properly and is not subject to one or more of the exclusions set out in the Directive. An example of this is engine-driven equipment, where the engine depends on, for example an electronic governor, or electronic fuel control system. The apparatus containing the engine may be in scope unless the manufacturer can demonstrate that an exclusion applies.

Hazardous Substances.

The substances identified in both the previous RoHS Directive and RoHS 2 as being hazardous and subject to restrictions of maximum concentration by weight in homogeneous materials are:

- Lead (0.1%)
- Mercury (0.1%)
- Cadmium (0.01%)
- Hexavalent Chromium (0.1%)
- Polybrominated biphenyls (0.1%)

- Polybrominated diphenyl ethers (0.1%)

In December 2014 the European Commission published a draft amendment to the RoHS Directive, announcing that a further four substances have been included in the list of hazardous substances. Commission Delegated Directive (EU) 2015/863 amending ANNEX II was published in the Official Journal on June 4th, 2015. This amendment will take effect from 22nd July 2019 for all product categories except categories 8 (medical devices) and 9 (Monitoring and control instruments including industrial monitoring and control instruments), which come into effect 2 years later. The four additional substances are:

- Bis (2-ethylhexyl) phthalate (DEHP)
- Butyl benzyl phthalate (BBP)
- Butylphthalate (DBP)
- Diisobutyl phthalate (DIBP)

Definition of homogeneous material.

A homogeneous material is defined in the Directive as “*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.*”

In more simplistic terms, if a soldered joint on a printed circuit board is considered; the solder on that joint could be removed by an abrasive process such as filing or sanding. The solder that has been removed cannot be further separated into its constituents by the simple means identified in the definition above and therefore the solder is considered a homogeneous material and is subject to the limits on hazardous substances specified in the Directive. A shell bearing for use in an engine can be similarly considered as having discreet layers of homogeneous materials, each of which can be removed by an abrasive process, but which cannot be further separated. The substances in these layers are individually subject to limits. Coatings that are thinner than 100 nm are excluded as mentioned in the RoHS 2 FAQ¹ document, Q9.10.

RoHS 2 applies to finished equipment that is made available on the European Union market. This can generally be interpreted as equipment that has an intrinsic function without further assembly and is supplied for end-use. However, for finished EEE to be compliant with RoHS 2, every component of the EEE, unless it is subject to an exemption, must comply. Therefore, although the legislation does not necessarily require components, such as engines or alternators to be certified compliant with the Directive; manufacturers of the end-use EEE are required to comply and will need proof of compliance from each component or sub-assembly supplier.

Transitional Periods.

The Directive allows transitional periods for products that were previously not in scope of the RoHS 1 Directive and are not subject to exclusion, to continue to be made available on the market until specified dates. This is intended to allow manufacturers to bring products newly in scope to be brought into compliance with RoHS 2. The expiry date of the transitional period depends on the category of product as follows:

- Medical devices and control instruments – 22nd July 2014;
- In vitro diagnostic medical devices – 22nd July 2016;
- Industrial control and monitoring instruments – 22nd July 2017;
- All other products – 22nd July 2019.

¹ RoHS 2 FAQ published on 12th December 2012 by the European Commission available on http://ec.europa.eu/environment/waste/rohs_eee/events_rohs3_en.htm

Exclusions.

The Directive lists a number of application exclusions that, if satisfied will allow the manufacturer to claim that the product is not required to meet the provisions of the Directive. These are summarised below:

- Equipment for military purposes;
- Equipment designed to be sent into space;
- Equipment designed specifically to be installed in other equipment that is itself excluded;
- Large Scale Stationary Industrial Tools;
- Large Scale Fixed Installations;
- Means of transport;
- Non road mobile machinery (NRMM);
- Active implantable medical devices;
- Photovoltaic cells;
- Equipment for research and development made available only on a business to business basis.

Of these, the most likely exclusions to apply to some generating set products are the large scale exclusions and that for NRMM. These will be explained in more detail.

Large Scale Stationary Industrial Tools.

These will generally be machines, often with moving parts, used for the treatment or manufacturing of materials and work pieces; installed and de-installed by professionals in a manufacturing or R&D facility. The variety of applications of power system products will mean that while this exclusion might appear to apply to some installations, an identical installation in a different facility may disqualify the power system products for this exclusion. Therefore this exclusion will be of limited benefit to most members.

Large Scale Fixed Installations.

These will generally be a combination of apparatus and devices used permanently in a predefined and dedicated location and installed and de-installed by professionals. Provided that it can be defined as “Large Scale”, a permanently installed generating set installation may be determined by the manufacturer as a Large Scale Fixed Installation.

Although the Directive does not define the term “Large Scale” the FAQ document provides further clarity. In summary this means:

- Too large to be moved in an ISO 20 foot container...; or
- Too heavy to be moved by a 44 tonne road truck...; or
- Heavy duty cranes are needed for installation...; or
- Requirement to modify the installation to include foundations...; or
- An installation rated power of greater than 375 kW.

Generating sets are specifically quoted as an example of Large Scale Fixed Installations in the European Commission’s FAQ document. However, a power system installation for any of the rating definitions – e.g. prime, standby and continuous duty, with a rated power of over 375 kW, will qualify for this exclusion only if the system is permanently installed at a predefined and dedicated location. In the EU market, power systems with rated powers greater than 375 kW are likely to have both permanent and non-permanent (e.g. rental) applications, which may make this exclusion not applicable to some generating set products even though those systems are otherwise “Large Scale”. Non permanently installed equipment may be checked for compliance with the definition of Non Road Mobile Machinery.

Non Road Mobile Machinery (NRMM).

NRMM is defined differently in the RoHS 2 Directive to the same term used for emissions regulation. In RoHS 2, NRMM is defined as follows:

“machinery, with an on-board power source, the operation of which requires either mobility or continuous or semi-continuous movement between a succession of fixed working locations while working, and is made available exclusively for professional use.”

Currently this definition will apply to generators mounted on board certain products that require mobility such as dockside cranes, excavators, etc., but may not apply to many non-permanently installed stationary generating set products, such as rental units, which are not mobile while working. This definition is also not consistent with the NRMM definition in the Emission of Gaseous and Particulate Pollutants from Internal Combustion Engines to be Installed in Non-Road Mobile Machinery Directive 97/68/EC. At the time of writing a consultation has recommended that the definition of NRMM in RoHS 2 is changed to be consistent that in the 97/68/EC Directive; however the process for invoking this change is complex and lengthy and readers should assess the risk of placing any reliance on this change.

In all cases, it is the responsibility of the manufacturer to assess whether the product being placed on the market will benefit from an exclusion.

Assessment and Technical Documentation.

Manufacturers making EEE available on the market are required to assess the product and to maintain proof of compliance with the Directive. For EEE to comply with RoHS 2, each homogeneous material in each component of the EEE must comply and this may result in a significant burden of proof for a finished generating set product. Various software packages for product stewardship are available that can aid cataloguing the information. EUROPGEN anticipates that component suppliers will be working with finished product manufacturers to enable proof of compliance to be furnished.

The assessment process, the scope of the Technical Documentation (sometimes referred to as “Technical Construction File) and the manner in which the conformity of serial production is ensured is detailed in decision 768/2008/EC, Annex II, Module A, Internal Production Control. This is available through various sources or at: <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32008D0768>

The Technical Documentation and Declaration of Conformity must be available upon request from an enforcement agency from the time that the first product of a series is made available on the EU market, until 10 years after the individual product has been made available to the market or for serial manufactured products, 10 years after cessation of manufacture of the last product in the series.

In common with other Directives that form part of the New Legislative Framework, the technical documentation is not required to exist as a single physical entity. If electronic means are used to compile the technical documentation, care should be taken to ensure the security of the information and in particular, that the electronic format of the information will remain compatible, potentially for many years after compilation. Technical documentation often contains proprietary information is there is no legal requirement to divulge contents to customers, specifiers or anyone other than an appointed official.

CE Marking and Declaration of Conformity.

Following successful assessment of the product, the manufacturer is required to draw up an EU Declaration of Conformity and to affix the CE mark to the finished product, adjacent to the rating plate or wherever the name and address of the manufacturer is shown. Again, reference should be made to 768/2008/EC as above for further details. For further information on the CE marking of products, the EU Blue Guide is a valuable reference and can be obtained here:

<http://ec.europa.eu/enterprise/newsroom/press/items/detail.cfm?id=7326>

Relationship of RoHS with REACH.

The basis for RoHS and REACH (Registration, Evaluation, Authorisation and restriction of Chemical Substances) substance restrictions are different. RoHS Directive restrictions are based on hazards and if a substance is classed as hazardous and there are alternatives, then it could be nominated and restricted without evidence of actual risk and harm. The REACH Regulations are based on proven risk to human health and the environment. RoHS restrictions apply only to the use of certain hazardous substances in EEE, whereas the REACH is a general act that regulates a much wider range of substances across all applications.

RoHS2 does not influence the application of REACH and vice versa and where overlaps occur, the lowest concentration specified applies.

Exemptions and the Exemption process.

Annexes III and IV of the Directive detail exemptions for use of hazardous substances in certain applications that have been granted and their expiry dates. Annex V of the Directive details the process for applying for an exemption, which can be made by a manufacturer or any other supply chain operator. In general, applications for exemptions will only be granted if it can be demonstrated that there is no suitable alternative material available for the application in question and in almost all cases, exemptions will be time-bound. Exemptions to RoHS do not necessarily apply to REACH and vice versa.

SECTION 4: EUROPGEN POSITION ON APPLICABILITY OF RoHS2 TO POWER SYSTEM COMPONENTS

The following paragraphs represent the current position of EUROPGEN with respect to various common components of power systems. It should be noted that because of the variability of application of these products, it is the manufacturer's responsibility to verify the precise interpretation of the Directive to the individual product or installation.

a) Generating sets with rated power \leq 375 kW.

These products were not in scope of the WEEE Directive (2002/96/EC) and were therefore not subject to the RoHS 1 Directive. This situation was confirmed by the French Decree - Décret no 2014-928 du 19 août 2014. The open scope nature of RoHS 2 means that these products are now subject to the new Directive's provisions, under Annex 1 item 11, unless the manufacturer can demonstrate that any of the exclusions in the Directive apply. These products are required to comply fully by 22nd July 2019 unless excluded by their application.

b) Generating sets with rated power >375 kW that are permanently installed in a pre-defined and dedicated location.

These products are brought into scope by RoHS 2 similarly to a) above. Provided that the installation is permanent at a pre-defined and dedicated location, the product is likely to benefit from the Large Scale Fixed Installation exclusion and will therefore not be required to comply at the end of the transitional period. It should be noted that the power rating of 375 kW applies to the installation; therefore manufacturers installing several smaller generating sets into a common installation may also be able to benefit from this

exclusion.

- c) **Static generating sets ≤ 375 kW that are not permanently installed.**
Currently the definition of NRMM does not apply to these products as their operation does not require either mobility or continuous or semi-continuous movement between a succession of fixed working locations while working. At the time of writing a consultation has recommended a change to the definition of NRMM to bring this into line with that given in Directive 97/68/EC; however this is likely to take some time to achieve and the current EUROPGEN position is that these products are in scope of RoHS 2. It is uncertain whether a lower power limit may be imposed on this definition if a change occurs.
- d) **Static generating sets > 375 kW that are not permanently installed.**
The large scale fixed installation exclusions does not apply to products that are not permanently installed at a pre-defined and dedicated location. Currently the definition of NRMM does not apply to these products as their operation does not require either mobility or continuous or semi-continuous movement between a succession of fixed working locations while working. The change to the Directive referred to in c) above may affect these products, however for the time being, the current EUROPGEN position is that these products are in scope of RoHS 2.
- e) **Generators and associated products rated at ≥ 1000 V A.C. / 1500 V D.C.**
All EEE products rated at ≥ 1000 V A.C. / 1500 V D.C. are specifically excluded from the scope of RoHS 2 in accordance with Article 3 (1). Note that products that use high voltages internally but that are rated for operation at voltages less than 1000 V A.C. or 1500 V D.C. such as television monitors with cathode ray tubes do not benefit from this exclusion.
- f) **Generator control and monitoring systems.**
If made available on the market as part of the generating set product or as component specifically designed for an exclusive generating set product models, these will benefit from the same exclusions and transitional periods as the generating set. If made available on the market separately for fitting to a generating set in a plug-and-play fashion, these will be subject to the scope and applicability defined in RoHS 2 for these products. Typically these are:
- i. **Controls and monitoring equipment (for retail sale and non-professional installation):**
The transitional period for these products ended in July 2014 and these products should now comply with the Directive.
 - ii. **Industrial controls and monitoring equipment (for professional installation):**
These products are required to comply by 22nd July 2017.
 - iii. **Remote Monitoring Equipment:**
Provided this is not sold in retail outlets and is intended for professional installation only, this will be categorised as Industrial Control and Monitoring Equipment and a transitional period end date of 22nd July 2017 will apply.
- g) **Low Voltage Switchgear (≤ 1000 V A.C or 1500 V D.C.).**
EUROPGEN's interpretation is that switchgear was outside of the scope of the original WEEE Directive but has been brought into scope by RoHS 2 as described in a) above. Switchgear that is made available on the market as an integral part of a generating set installation will benefit from the same exclusions and transitional periods as the generating set. Switchgear that is made available on the market separately will need to be assessed to verify if it is in scope. For switchgear that has a current rating equivalent to > 375 kW, the manufacturer may be able to demonstrate that one of the large scale exclusions may apply, provided that the installation is permanent. For switchgear that is determined to be in scope of the Directive, this will likely be categorised as Industrial

Control and Monitoring Equipment and a transitional period end date of 22nd July 2017 will apply. Note that all switchgear rated at over 1000 V A.C. or 1500 V D.C. is excluded from scope of RoHS 2 as described in f) above.

h) Automatic Transfer Switches.

See Switchgear above.

i) Engines.

Although engines are not end-use products and do not require CE marking, therefore not themselves within the scope of RoHS; many engines are dependent upon electric currents or electromagnetic fields in order to work properly. Examples are engines with Electronic Control Units (ECUs), electronic governors, electronic injection systems, ignition systems, charge alternators, starter motors, etc. If this is the case, because the engine has this dependency, the end-use product is likely to similarly rely on electric currents or electromagnetic fields. Unless otherwise excluded, such products are likely to fall within scope of RoHS 2, even if the end use product does not at first sight appear to be EEE. Such products include but are not limited to: engine driven pumps, compressors, engine-driven stationary processing machinery such as rock crushers and most engine driven consumer equipment.

j) Generating Set Alternators.

Low voltage alternators are normally CE marked for Low Voltage Directive compliance. Although not end-use equipment in their own right, alternators will inevitably be incorporated into EEE and will be required to comply. RoHS 2 does not apply to equipment rated at over 1000 V A.C. and therefore high voltage alternators are not required to comply.

k) Cables.

As stated in the FAQ document, Q5.1, cables are in scope of RoHS 2 unless they specifically belong to an EEE or a combination of EEE that is excluded from the scope of the Directive. Cables that form a part of an EEE or an installation of EEE that benefits from a transitional period must comply by the expiry date.

l) Spare Parts.

The situation regarding spare parts has been reviewed by a Commission Impact Assessment conducted by the OEKO Institut between January and March 2014. With the present Directive wording, although non-compliant products may be made available on the EU Market during the transitional period, once this period is passed, only compliant spare parts may be used to service these products. This may create issues with compatibility and in addition, no secondary market activity is allowed for non-compliant products that are in-scope of the Directive. The situation is further complicated by the statement in the FAQ document, Q1.3, "Spare parts for repair, reuse, updating of functionalities or upgrading of capacity for a specific product category, must comply from the same date as their respective product category. Following the principle of 'repair as produced', spare parts for the specific products already made available on the market before the end of any transitional period are exempted."

The Commission Impact Study has recommended changes to the way that the RoHS 2 legislation is applied to spare parts for non-compliant products made available during the transitional period. Members are advised to check the situation regarding spare parts and to consider using their powers of lobbying pressure to ensure that these changes are made.

m) Components and Subassemblies.

Where an assembly of components or sub-assembly such as an automatic voltage regulator, engine governor or circuit breaker is placed on the EU market for incorporation

into finished products the rules for CE marking of those finished EEE products should be followed. The manufacturer of the component or subassembly will need to assess whether their products will be used in end-use equipment that qualifies as EEE and if so will need to provide proof of conformity to the end-use equipment manufacturer.

SECTION 5: INTERPRETATION.

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