

electrocube RoHS Compliant & Pb-Free

Blanket Certification for Standard Film Capacitor & RC Network Products - Solid Round Wire-Lead Terminations for Soldered Installation / Connection

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RoHS & Pb-FREE REQUIREMENTS -

The requirements for RoHS Compliance are defined by:

EU Directive 2002/95/EC of 27 January 2003 (RoHS)

EU Commission Decision 2005/618/EC of 18 August Amending Directive 2002/95/EC

EU Commission Decision 2005/717/EC of 13 October 2005 Amending Annex of 2002/95/EC

EU Commission Decision 2005/747/EC of 21 October 2005 Amending Annex of 2002/95/EC

EU Commission Decision 2006/310/EC of 21 April 2006 Amending Annex of 2002/95/EC

EU Commission Decision 2006/690/EC of 12 October 2006 Amending Annex of 2002/95/EC

EU Commission Decision 2006/691/EC of 12 October 2006 Amending Annex of 2002/95/EC

EU Commission Decision 2006/692/EC of 12 October 2006 Amending Annex of 2002/95/EC

EU Commission Decision 2008/385/EC of 24 January 2008 Amending Annex of 2002/95/EC

EU Directive 2008/35/EC of 11 March 2008 Amending Directive 2002/95/EC

Annulment of Annex Point 2 of EU Commission Decision 2005/717/EC

by Judgment of the Court of 1 April 2008

EU Commission Decision 2009/428/EC of 4 June 2009 Amending Annex of 2002/95/EC

EU Commission Decision 2009/443/EC of 10 June 2009 Amending Annex of 2002/95/EC

EU Commission Decision 2010/122/EU of 25 February 2010 Amending Annex of 2002/95/EC

EU Commission Decision 2010/571/EU of 24 September 2010 Amending Annex of 2002/95/EC

EU Commission Decision 2010/571/EU Corrigenda of 29 September 2010 Amending Annex of 2002/95/EC

EU Directive Proposal COM(2008) 809 final "RoHS 2 (II)" / "RoHS Recast" 12 March 2008

Text Adopted by the European Parliament 24 November 2010

The RoHS Recast Directive will significantly revise and reconfigure the prior RoHS Directive, incorporating prior Commission Decisions and Directives and imposing numerous revised and new requirements.

Approval of the Adopted Text by the Council of the European Union, and Publishing in the Official Journal of the European Union Journal to effect into law remains pending as of this date. The revised and new requirements are not anticipated to affect Electrocube's ability to certify product as "RoHS Compliant".

The requirements for Pb, Pb-Free and other identification are defined by:

IPC/JEDEC J-STD-609A.01-2011

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RoHS COMPLIANT / Pb-FREE PRODUCT DESCRIPTION -

Electrocube “standard” series of film capacitors are axial and radial wire-lead terminated components having cylindrical or ovalized tape-wrapped and epoxy end-filled, or epoxy-filled plastic box package styles. Hermetic capacitor product, Series 524, 351 and 651 have cylindrical metal cased component bodies and axial lead-wires. Electrocube “standard” series RC Network RG1780 – RG1784 are radial wire-lead terminated components having epoxy-filled plastic box package styles. Electrocube “standard” series RC Network RG2675 – RG2678 are radial wire-lead terminated components having epoxy-dipped package styles. These products are typically applicable to plated-through-hole installation on circuit boards, and are solder terminated manually, or by wave-solder machine process, or are manually solder terminated into wired assemblies.

Electrocube standard film Capacitor and RC Network products (as listed), supplied to our Distributors and OEM Customers as of date code 0540 (YYWW) and subsequent, shall be considered RoHS Compliant and Pb-Free, unless specifically acceptable and contracted otherwise. RoHS Compliant and Pb-Free product is specifically identified as such (refer to following commentary). The Electrocube part numbers, for the RoHS Compliant and Pb-Free products, are identical to that of the pre-existing non-compliant product configurations.

Standard / Catalog Series Products (all package styles):

- 226 Series Polyester Film Capacitors
- 230/231/232 Series Metalized Polyester Film Capacitors
- 250/251/252 Series Polyester Film & Foil Capacitors
- 330/332/333 Series Metalized Polyphenylene Sulfide Film Capacitors
- 650/652/653 Series Metalized Polycarbonate Film Capacitors
- 925 Series Metalized Polypropylene Film Capacitors
- 931/932/935 Series Metalized Polypropylene Film Capacitors
- 945 Series Metalized Polypropylene Film Capacitors
- 950/951/952 Series Polypropylene Film & Foil Capacitors
- 730 Series Combination Film Capacitors
- RG1780/RG1781/RG1782/RG1783/RG1784 Series RC Networks
- RG2675/RG2676/RG2677/RG2678 RC Networks

CURRENT EXCEPTIONS

The following standard product series ARE NOT currently RoHS Compliant, but may be provided as such, as required by specific customer requirement, by exercise of specific RoHS Annex Exemptions, and by use of specific alternative construction and components, as may be negotiated at time of quotation and order placement, but shall not be considered Pb-Free.

- 351 Series Hermetic Metalized Polyphenylene Sulfide Film Capacitors
- 524 Series Hermetic Polyester / Kraft Film & Foil Capacitors
- 651 Series Hermetic Metalized Polycarbonate Film Capacitors

The following standard product series ARE NOT currently RoHS Compliant and Pb-Free, but may be provided as such, as required by specific customer requirement, and as negotiated at time of quotation and order placement.

- 410 Series Polystyrene Film & Foil Capacitors
- 520 Series Polyester / Kraft Film & Foil Capacitors

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RoHS COMPLIANT CONTENT CERTIFICATION -

Electrocube confirms that the listed standard product series (less exceptions noted), of date code 0540 (YYWW) and subsequent, ARE COMPLIANT within the restrictions of the (current revision of) EU RoHS Directive 2002/95/EC and EU Commission Decisions / Amendments, regarding content of PBB and PBDE flame retardants, including non-use of flame retardant DecaBDE from date code 0640 and subsequent (the prior exemption for use having been annulled and expired as of 30 June 2008), and regarding content of heavy metals Pb, Hg, Cd, and Cr⁺⁶. To the present and best of our knowledge, and based upon information available to us from our suppliers, the materials and components, utilized in product construction, are understood to not intentionally contain the restricted flame retardant materials and heavy metals, and any un-intentional impurity-level content will be within restriction limitations of the (current revision of) EU RoHS Directive 2002/95/EC, and EU Commission Decisions / Amendments.

<u>SUBSTANCE</u>	<u>LIMIT</u> (by weight in homogenous material)
Lead (Pb)	<=0.1%
Exemption, Annex Point 7c-I	no limit in glass and ceramic elements of electronics components
Exemption, Annex Point 6a	<=0.35% as alloying element in steel
Mercury (Hg)	<=0.1%
Cadmium (Cd)	<=0.01%
Hexavalent Chromium (Cr ⁺⁶)	<=0.1%
Polybrominated biphenyls (PBB)	<=0.1%
Polybrominated diphenyl ether (PBDE)	<=0.1% (including DecaBDE*)

*Electrocube does not currently purchase or use materials or components utilizing DecaBDE as a flame retardant. For the period from October 2005 through October 2006, Electrocube exercised use of the "DecaBDE Exemption" to consume existing inventory of specific insulating tape materials, used typically on tape-wrapped case capacitor styles, as they were being replaced by procurement of fully compliant alternative tape materials during the same period. Product identified with date codes of 0640 and subsequent shall be considered to be RoHS compliant without use of the DecaBDE Exemption. Axial and radial lead plastic-case style components do not utilize the subject tape material, and shall be considered compliant without use of the DecaBDE Exemption from date code 0540 onward.

Exemption per RoHS Directive 2002/95/EC, Commission Decision 2005/717/EC amending the RoHS Directive as Annex Point 9a, for content of specific PBDE flame retardant DecaBDE in-excess of the limitations imposed as a PBDE, was exercised for the period from October 2005 to October 2006, to consume existing inventory of specific insulating tape materials, as they were being phased-out, and replaced by procurement of alternative materials fully RoHS compliant without exercise of exemption 9a during this same period. This exemption was primarily applicable to a wide range of capacitor product series having tape-wrapped cases. The affected product series were certified to be RoHS Compliant with disclosure of the exercised exemption 9a. Electrocube does not currently purchase or use materials or components utilizing DecaBDE as a flame retardant. Product identified with date codes of 0640 and subsequent shall be considered to be RoHS compliant without use of the DecaBDE Exemption. Axial and radial lead plastic-case style components do not utilize the subject tape material, and shall be considered compliant without use of the DecaBDE Exemption from date code 0540 onward. The DecaBDE Exemption (Annex Point 2 of EU Commission Decision 2005/717/EC / RoHS Directive Annex Point 9a) was annulled by Judgment of the Court of 1 April 2008, and expired as of 30 June 2008.

Exemption per RoHS Directive 2002/95/EC Annex Point 6a, may be exercised for content of Lead (Pb) as an alloying element in steel containing up to 0.35% Pb by weight. This exemption may in some cases be applicable to hermetically sealed Electrocube Capacitor Series 524, 351 and 651. These product series may in some cases be certified to be RoHS Compliant, but cannot be considered / certified to be Pb-Free.

Exemption per RoHS Directive 2002/95/EC Annex Point 7c-I, may be exercised for content of Lead (Pb) as an element in glass and ceramic elements of electronics components. This exemption is applicable to hermetically sealed Electrocube Capacitor Series 524, 351 and 651. These product series may in some cases be certified to be RoHS Compliant, but cannot be considered / certified to be Pb-Free.

Exemptions per RoHS Directive 2002/95/EC Annex Points beyond those specifically noted have not been exercised by Electrocube in certification of the listed standard product series to be RoHS Compliant.

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Pb-FREE CONTENT CERTIFICATION -

Electrocube confirms that the listed standard product series (less exceptions noted) of date code 0540 (YYWW) and subsequent, ARE COMPLIANT within the industry accepted definition of Pb-Free, regarding content of heavy metal Lead (Pb). To the present and best of our knowledge, and based upon information available to us from our suppliers, the materials and components, utilized in product construction, are understood to not intentionally contain the restricted heavy metal, and any un-intentional impurity-level content will be within restriction limitations of the definition of Pb-Free, per the (current revision of) Industry Standards IPC/JEDEC J-STD-609A.01-2011, and of the (current revision of) EU RoHS Directive 2002/95/EC, and EU Commission Decisions / Amendments, excluding specific exemptions of the RoHS Directive for Pb content in excess of 0.1%.

<u>SUBSTANCE</u>	<u>LIMIT*</u>
Lead (Pb)	<=0.1%

*By weight in homogenous material. RoHS Annex Exemption Points allowing >0.1% Pb content are excluded / not-applicable.

RoHS COMPLIANT / Pb-FREE PRODUCT IDENTIFICATION -

The listed Electrocube products are not directly marked to indicate RoHS Compliant or Pb-Free status. The lowest level of product packaging is marked with date code information by which compliance status may be primarily determined. Date code information may or may not be directly marked on product, based upon physical size and configuration of product, available marking capability and cost. The lowest level of product packaging, as well as shipping documentation (shipper / invoice & C of C) additionally includes specific marking or labeling to indicate product compliance status by way of appropriate RoHS Compliant and Pb-Free symbology and text, reference IPC/JEDEC J-STD-609A.01-2011.

Pb-FREE TERMINATION FINISH CATEGORY -

Electrocube provides RoHS Compliant and Pb-Free product having Tin (Sn) plated leads wires, which are Category "e3" per IPC/JEDEC J-STD-609A.01-2011.

PRODUCT MOISTURE SENSITIVITY CLASSIFICATION

Industry standards / requirements such as IPC/JEDEC Standards J-STD-020 & J-STD-033, and EIA/JEDEC Publication JEP113, for special classification, identification and packaging in regards to moisture sensitivity, are specifically applicable to surface mounted components exposed to higher temperature oven-reflow soldering processes, and not applicable to typical Electrocube standard products, to be manually or machine (wave-flow) solder terminated.

SOLDER PROCESS TEMPERATURE - DURATION CAPABILITY -

Electrocube's standard products, in pre-existing lead-containing, and in current lead-free configurations might be considered to be temperature sensitive in machine or manual soldering processes based upon pre-existing limitations of basic plastic materials from which they are constructed, and not on the basis of a change to lead-free content.

In machine controlled (wave-flow) soldering processes the combination of top and bottom side preheating, and exposure over soldering stage shall not result in component body temperatures exceeding the limitations of the applicable dielectric materials (85 deg. C for Polystyrene, 105 deg. C for Polypropylene, and 125 deg. C for Polyester, Polycarbonate, and Polyphenylene Sulfide). The maximum peak (solder) temperature and duration might be nominally characterized as 500 deg. F (260 deg. C) for 4 seconds. Wave solder processing might be considered inapplicable for product utilizing Polystyrene dielectric materials.

Manual soldering processes should utilize temperature controlled soldering iron systems having temperature of 600 to 700 deg. F (316 to 371 deg. C) and a heating duration of 2 to 5 seconds.

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Pb-FREE SOLDER PROCESS COMPATIBILITY-

In regard to elevated temperature capability and solderability, the pre-existing lead-containing and tin-lead plated, and current lead-free and tin plated configurations of the listed Electrocube standard products should be considered backward COMPATIBLE with manual and machine (wave) soldering processes (controlled within the noted guidelines) utilizing conventional tin-lead solder alloys Sn63Pb37 or Sn60/Pb40.

In regard to elevated temperature capability, the pre-existing lead-containing and tin-lead plated, and current lead-free and tin plated configurations of the listed Electrocube standard products should be considered NOT COMPATIBLE with Pb-Free machine (oven-reflow) solder profile per IPC/JEDEC Standard J-STD-020, and NOT COMPATIBLE with a typical lead-free wave-flow solder process based upon temperature limitations of dielectric material. The necessarily increased temperatures and durations of all stages of the Pb-Free oven-reflow or wave-flow solder process will significantly exceed the temperature capability the plastic dielectric materials from which these products are constructed resulting in defective components.

In regard to elevated temperature capability and solderability, the pre-existing lead-containing and tin-lead plated, and current lead-free and tin plated configurations of the listed Electrocube standard products should be considered forward COMPATIBLE with lead-free manual soldering processes (controlled within the noted guidelines).

RoHS COMPLIANT / Pb-FREE PRODUCT QUALIFICATION -

Electrocube certifies that the functional electrical performance and reliability characteristics of the RoHS Compliant and Pb-Free configurations of the applicable standard product series are equivalent to that of products previously / historically provided.