
	Qorvo Banned and Restricted Substances Specification	Page 1 of 44
	SPE-001275	Rev C

Table of Contents

1	Purpose & Scope	2
2	Definitions & Acronyms	2
3	Roles & Responsibilities	3
4	References	3
5	Compliance Requirements	15
6	Banned and Restricted Substances List	18
7	Quality Records	39
8	Appendix	39
10	Revision History	43

	Qorvo Banned and Restricted Substances Specification	Page 2 of 44
	SPE-001275	Rev C

1 Purpose & Scope

Please note that this specification is an update of QAL-21-1028, which was the former document number for the Qorvo Banned and Restricted Substances Specification. The document number has been changed to match the new Qorvo Document Center Number and Revision Scheme.

Qorvo is committed to reducing the impact of known toxic substances in our products and processes. This starts with reducing or eliminating chemicals and substances that have been identified as hazardous to air, water, soil or human health in our processes and products – from the starting materials through to assembly and shipping materials. The purpose of this document is to inform Qorvo suppliers about those substances that Qorvo bans or restricts from use in the products Qorvo purchases from its suppliers to manufacture Qorvo products.

This document applies to those suppliers whose chemicals, materials, and/or components are used to manufacture Qorvo products. These suppliers provide chemicals, materials, and or components to Qorvo Sub-Contract Assemblers (SCAs) or to Qorvo facilities, who then manufacture the Qorvo product. These requirements apply to materials to be used in engineering trials also. This is to prevent Qorvo’s development of processes that will not be accepted by our customers.

These materials are used in the manufacturing processes in the following ways:

- They are platings, components, or assembly materials that become incorporated into Qorvo’s final product.
- They do not become incorporated into Qorvo’s final product, but they contact the Qorvo product during its manufacture (cleaners, degreasers, plating preparation baths like cleaners or etching baths, developers and strippers for photoresists, etc.)
- They are used in the manufacturing processes, but they do not become incorporated into the final product, and they do not contact the Qorvo product during its manufacture (manufacturing process chilling equipment, process tanks for cleaning plating flight bars, chemicals for cleaning process equipment such as solvents, etc.)

If a supplier has any question about whether their product fits these categories, please contact the Qorvo Product Compliance Team at QorvoGreen@Qorvo.com for advice.

2 Definitions & Acronyms

Please see LIS-000602 for definitions related to Product Compliance.

3 Roles & Responsibilities

Role	Responsibilities
Qorvo Green Group (QGG)	<p>Monitor worldwide regulations and standards in order to determine the potential impact on Qorvo products</p> <p>Monitor Significant Customer requirements in order to determine the potential impact on Qorvo products</p> <p>Use the information gathered from Steps 1 and 2 above to maintain this specification.</p> <p>NOTE: All related Assembly Subcontractor and Supplier data shall be forwarded to the Qorvo Green Group at QorvoGreen@qorvo.com</p>
Qorvo Assembly Subcontractor (Sub-con) and Suppliers:	<p>Comply with sections 5 and 6 of this document.</p> <p>If the material composition of a component or material is changed, the supplier shall follow the process outlined in COR.103 Supplier Quality Manual, specifically section 5.9.7 Product and Process Changes.</p> <p>Provide a Statement of Compliance to the requirements as defined in section 5 and 6 of this document using the form in Appendix A.</p>


4 References

Reference	Title	Location
COR.103	Supplier Quality Manual	Doc Center
LIS-000591	Qorvo Banned and Restricted Substance List (MS Excel file)	Doc Center
LIS-000602	Product Compliance Definitions	Doc Center
QAL-21-1022	Supplier Process Change Request (PCR) Work Instructions	Doc Center
SPE-001202	Qorvo 3rd Party Test Report Specification for Suppliers	Doc Center


External References

Name used in this spec	Official Name of Reference	Official Reference Number	Location
ACGIH	American Conference of Government Industrial Hygienists (ACGIH)	Threshold Limit Values (TLVs)	Purchase ACGIH docs here
AIHA	American Industrial Hygiene Association (AIHA). The AIHA historically developed and posted Workplace Environmental Exposure Levels (WEELs), with Time Weighted Average (TWA) Exposure levels. In 2013 the development of WEELs was transferred from AIHA to the Occupational Alliance for Risk Science (OARS) which is managed by Toxicology for Risk Assessment (TERA).	None	OARS-WEELs on TERA Website
Austria BGB 1990/194	Regulation of the Federal Minister for Environment, Youth and Family of 12 February 1990 on restrictions on the first registration and on the identification containing formaldehyde substances, preparations and finished goods (Formaldehyde Regulation)	BGBI. No. 194/1990	Austria BGB 1990/194 pdf In German Language
Brazil CRS 023/1996	CONAMA RESOLUTION No. 023 of December 12, 1996 Establishes provisions for definitions and treatment to be given to hazardous waste in accordance with the standards adopted by the Basel Convention on the control of Transboundary Movements of Hazardous Wastes and their Deposit.	CRS 023/1996	CRS 023/1996 See pages 651, 654
Brazil CRS 313/2002	CONAMA RESOLUTION 313, October 29, 2002 Establishes provisions for the National Inventory of Solid Industrial Wastes.	CRS 313/2002	CRS 313/2002 See pages 675, 686
Brazil CRS 316/2002	CONAMA RESOLUTION 316, October 29, 2002 Establishes provisions, procedures and criteria for the operations of systems for thermic residual treatment.	CRS 316/2002	CRS 316/2002 See page 690
California 93120	ATCM to Reduce Formaldehyde Emissions from Composite Wood Products	17 CCR §93120	California 93120
California OSHA PELs	Title 8. California OSHA Chapter 4. Division of Industrial Safety	8 CCR §5155 Table AC-1.	CA OSHA PELs


Name used in this spec	Official Name of Reference	Official Reference Number	Location
	Subchapter 7. General Industrial Safety Orders Group 16. Control of Hazardous Substances Article 107. Dusts, Fumes, Mists, Vapors, and Gases §5155. Airborne Contaminants Table AC-1. Permissible Exposure Limits for Chemical Contaminants		
California Perchlorates	AB 826, The Perchlorate Contamination Prevention Act	22 CCA §67384	California Perchlorates Regulations (CCRs)
California Prop 65	Safe Drinking Water and Toxic Enforcement Act of 1986	27 CA ADC, Division 4, Chapter 1	CA Prop 65
California SB-20/50	Electronic Waste Recycling Act of 2003	SB 20, Sher, Chapter 526, Statutes of 200	CA SB-20/50
Canada SOR/2008-178	Perfluorooctane Sulfonate and its Salts and Certain Other Compounds Regulations (SOR/2008-178)	SOR/2008-178	SOR/2008-178
Canada SOR/2014-254	Products Containing Mercury Regulations (SOR/2014-254)	SOR/2014-254	SOR/2014-254
Canada SOR/2016-188	Phthalates Regulations	SOR/2016-188	SOR/2016-188
Canadian Environmental Protection Act, 1999	Canadian Environmental Protection Act, 1999	None	CEPA 1999
Canada Prohibition of Certain Toxic Substances Regulation	Prohibition of Certain Toxic Substances Regulations, 2012	SOR/2012-285	Canada Prohibition of Certain Toxic Substances
China GB 2.1-2007	Occupational exposure limits for hazardous agents in the workplace.	GB 2.1-2007	No known link to a publicly available document at this time
China GB 18401-2010	Chinese National Standards (GB 18401-2010) National General Safety Technical Code for Textile Products	GB 18401-2010	No known link to a publicly available document at this time. Requirements can be seen here .
China GB 20400-2006	The Limit of Harmful Matters in Leather and Fur: GB 20400-2006	GB 20400-2006	No known link to a publicly available document at this time. Requirements can be

	Qorvo Banned and Restricted Substances Specification	Page 6 of 44
	SPE-001275	Rev C


Name used in this spec	Official Name of Reference	Official Reference Number	Location
			seen here .
China GB 24427-2009	Chinese National Standards (GB 24427-2009): alkaline and non-alkaline zinc manganese dioxide batteries mercury cadmium lead restriction requirements	GB 24427-2009	No known link to a publicly available document at this time
China GB 24428-2009	GB 24428-2009 Limitation of mercury content for zinc silver oxide, zinc oxygen and zinc manganese dioxide button batteries	GB 24428-2009	No known link to a publicly available document at this time
China RoHS 2	Administrative Measures for the Restriction of Hazardous Substances in Electrical and Electronic Products	Order No. 32, 2016	China RoHS 2 (English translation)
Denmark Statutory Order 289	Order limiting the formaldehyde in particle board, plywood and similar panels used in furniture, fixtures and the like	Statutory Order no. 289 of 22 June 1983 Amended by: Order 616 1986	Statutory Order 289 (Danish)
Denmark Statutory Order 552	Statutory Order no. 552 of 2 July 2002 Regulating Certain Industrial Greenhouse Gases	Statutory Order no. 552 of 2 July 2002	Statutory Order 552
(EC) No 13/1999	COUNCIL DIRECTIVE 1999/13/EC of 11 March 1999 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations	(EC) No 13/1999	(EC) No 13/1999
D.C. Law 21-108	D.C. Law 21-108. Carcinogenic Flame Retardant Prohibition Amendment Act of 2016.	D.C. Law 21-108	D.C. Law 21-108
(EC) No 42/2004	DIRECTIVE 2004/42/CE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 April 2004 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products and amending Directive 1999/13/EC	(EC) No 42/2004	(EC) No 42/2004
(EC) No 850/2004	REGULATION (EC) No 850/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 April 2004 on persistent organic pollutants and	(EC) No 850/2004 Amended by: (EU) No 757/2010	(EC) No 850/2004 (EU) No 757/2010 (EU) No 519/2012 (EU) No 1342/2014

	Qorvo Banned and Restricted Substances Specification	Page 7 of 44
	SPE-001275	Rev C


Name used in this spec	Official Name of Reference	Official Reference Number	Location
	amending Directive 79/117/EEC	(EC) No 519/2012 (EU) No 1342/2014	
(EC) No 251/2009	COMMISSION DECISION of 17 March 2009 requiring Member States to ensure that products containing the biocide dimethylfumarate are not placed or made available on the market	(EC) No 251/2009 Amended by: (EC) No 153/2010 Incorporated into EU REACH Annex XVII	(EC) No 251/2009 (EC) No 153/2010 EU REACH Annex XVII
(EC) No 552/2009	COMMISSION REGULATION (EC) No 552/2009 of 22 June 2009 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as regards Annex XVII	(EC) No 552/2009 Incorporated into EU REACH Annex XVII	EU REACH Annex XVII
ECHA/NA/15/29	ECHA News Announcement: SEAC concludes on Bisphenol A, DecaBDE and PFOA restrictions and finalises two opinions for authorisation	ECHA/NA/15/29	ECHA/NA/15/29 Background Document (see pages 12-13 for proposed restrictions)
EEC/769/76	Council Directive 76/769/EEC of 27 July 1976 on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations	Directive 76/769/EEC	This Directive has been repealed and replaced by EU REACH
EEC/467/85	Council Directive 85/467/EEC of 1 October 1985 amending for the sixth time (PCBs/PCTs) Directive 76/769/EEC on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations	Directive EEC/467/85	Directive EEC/467/85 This Directive has been repealed and replaced by the Stockholm Convention
(EU) No 75/2010	DIRECTIVE 2010/75/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 24 November 2010 on industrial emissions (integrated pollution prevention and control)	(EU) No 75/2010	(EU) No 75/2010

	Qorvo Banned and Restricted Substances Specification	Page 8 of 44
	SPE-001275	Rev C


Name used in this spec	Official Name of Reference	Official Reference Number	Location
	(Recast)		
(EU) No 276/2010	COMMISSION REGULATION (EU) No 276/2010 of 31 March 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as regards Annex XVII (dichloromethane, lamp oils and grill lighter fluids and organostannic compounds)	(EU) No 276/2010 Incorporated into EU REACH Annex XVII	EU REACH Annex XVII
(EU) No 1272/2013	COMMISSION REGULATION (EU) No 1272/2013 of 6 December 2013 amending Annex XVII to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as regards polycyclic aromatic hydrocarbons	(EU) No 1272/2013 Incorporated into EU REACH Annex XVII	(EU) No 1272/2013 EU REACH Annex XVII
EU Battery	Batteries and Accumulators and Waste Batteries and Accumulators Directive	2006/66/EC Amended by: 2008/12/EC 2008/103/EC 2013/56/EU	EU Battery
EU CLP	REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006	2008/1272/EC Adapted to technical and scientific progress (ATP) 8 times to date.	EU CLP Through 6th ATP EU CLP 7th ATP EU CLP 8th ATP
EU Euroatom	Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation	EU D 96/29/Euroatom Amended by: 97/43/Euroatom 2003/122/Euroatom To be repealed and replaced by: 2013/59/Euroatom	EU 96/29/Euroatom EU 2013/59/Euroatom

	Qorvo Banned and Restricted Substances Specification	Page 9 of 44
	SPE-001275	Rev C

Name used in this spec	Official Name of Reference	Official Reference Number	Location
EU GHG	Regulation (EU) No 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases	(EU) No 517/2014 replacing (EC) No 842/2006	EU GHG
EU Nanomaterials	COMMISSION RECOMMENDATION of 18 October 2011 on the definition of nanomaterial	2011/696/EU	EU Nanomaterials
EU ODS	Regulation (EC) No 1005/2009 of the European Parliament and of the Council of 16 September 2009 on substances that deplete the ozone layer	(EC) No 1005/2009 (recast of (EC) No 2037/2000)	EU ODS (EC) No 2037/2000
EU Packaging	Packaging and Packaging Waste Directive	94/62/EC Amended by: 2004/12/EC 2005/20/EC 2013/2/EU 2015/720/EU	EU Packaging
EU REACH	Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)	(EC) No 1907/2006	EU REACH Annex XVII
EU RoHS	Restriction of Hazardous Substances in Electrical and Electronic Equipment Directive	2011/65/EU Amended by: 2015/863/EU	EU RoHS 2 Follow the EU RoHS process here .
EU Toy Safety Directive	DIRECTIVE 2009/48/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 June 2009 on the safety of toys	2009/48/EC	EU Toy Safety Directive
EU WEEE	Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE)	2002/96/EC Amended by: 2003/108/EC 2008/34/EC Repealed and recast by: 2012/19/EU	2002/96/EC 2012/19/EU Follow the EU WEEE process here .
Formaldehydverordnun g	See Austria: BGB 1990/194		
France ACT N.2012-	ION 2012-1442 of 24 December 2012 in the	ION 2012-1442	France Act N. 2012-1442

	Qorvo Banned and Restricted Substances Specification	Page 10 of 44
	SPE-001275	Rev C

Name used in this spec	Official Name of Reference	Official Reference Number	Location
1442	suspension of the manufacture, import, export and marketing of any packaging specializing in food containing bisphenol A		
France Decree no. 2012-232	Decree no. 2012-232 of 17 February 2012 on the annual declaration on substances at nanoscale in application of article R. 523-4 of the Environment code	Decree no. 2012-232	Decree no. 2012-232
Germany: ChemVerbotsV	Regulation on bans and restrictions on the marketing of dangerous substances, preparations and articles under the Chemicals Act (banning certain chemicals - ChemVerbotsV)	ChemVerbotsV	ChemVerbotsV
Germany: Consumer Goods Ordinance	Bedarfsgegenständeverordnung	None	Germany: Consumer Goods Ordinance
Germany: GS Mark	Act On The Reorganisation Of The Safety Of Technical Work Equipment And Consumer Products of 6 January 2004	Section 7. GS Mark	Germany: GS Mark
IEC 61249-2-21	The International Electrochemical Commission's (IEC) Definition of Halogen-Free	IEC 61249-2-21	IEC 61249-2-21
IEEE 1680	Standards for Environmental Assessment of Electronic Products	IEEE 1680	IEEE 1680
Indonesia ODS	Prohibition From Producing Ozone Depleting Substances And From Producing Materials That Use Ozone Depleting Substances	Regulation of the Minister of Industry of the Republic of Indonesia No. 33/M-IND/PER/4/2007	Indonesia ODS
IPC 4101	Specification for Base Materials for Rigid and Multilayer Printed Boards	IPC-4101D-WAM1	IPC-4101
Japan Evaluation of Chemical Substances	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.	Act No. 117 of October 16, 1973	Japan Evaluation of Chemical Substances
Japan Industrial Safety and Health Act	Industrial Safety and Health Act	Act No. 57 of June 8, 1972 (Last amended by Act No. 25 of 2006.	Japan Industrial Safety and Health Act
Japan Nuclear Material	Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors	Act No. 166 of June 10, 1957 Amended by:	Japan Nuclear Material

	Qorvo Banned and Restricted Substances Specification	Page 11 of 44
	SPE-001275	Rev C


Name used in this spec	Official Name of Reference	Official Reference Number	Location
		Act No. 82 of November 22, 2013	
Japan ODS	Law concerning the Protection of the Ozone Layer through the Control of Specified Substances and Other Measures	Law No. 53 of May 20, 1988 Amended by Law No. 8 of 1991, No. 89 of 1993, No. 54 of 1994	Japan ODS
J-MOSS	The Marking for Presence of the Specific Chemical Substances for Electrical and Electronic Equipment	JIS C 0950	J-MOSS
JS709	Joint JEDEC/ECA Standard, Definition Of "Low-Halogen" For Electronic Products	JS709B	JS709B
Korea Electrical Appliances	Electrical Appliances Safety Control Act	Act No.9680, 21, May, 2009	Korea Electrical Appliances And search for "Electrical Appliances Safety Control Act"
Korea Quality Control	Quality Control and Safety Management of Industrial Products Act	Act No.12314, 21, Jan, 2014	Korea Quality Control And search for "Quality Control and Safety Management of Industrial Products Act"
Korea RoHS	Resource Recycling of Electrical and Electronic Equipment and Vehicles	Act No. 8405, 2007	Korea RoHS
Kyoto Protocol	Kyoto Protocol To The United Nations Framework Convention On Climate Change	None	Kyoto Protocol See also: UNFCCC Website
Lithuania HN 96:2000	Lithuania HN 96: 2000 "Children's Textile Articles. Hygiene Norms and Regulations"	HN 96:2000	Lithuanian HN 96:2000 In Lithuanian
Louisiana Mercury Risk Reduction	Louisiana Mercury Risk Reduction Act	Title 33, Part 1, Subpart 1, Chapter 27	LA Mercury Risk Reduction (See Chapter 27)
Montreal Protocol	The Montreal Protocol on Substances that Deplete the Ozone Layer	None	Montreal Protocol
New York Battery Mgmt	2012 New York Consolidated Laws ENV - Environmental Conservation 27-0719 - Battery management and disposal.	NY Env Cons L § 27-0719 (2012)	New York Battery Mgmt
NIOSH	The National Institute for Occupational Safety and	NIOSH	Benzene

Printed copy of this document is considered an uncontrolled copy unless control copy designator is identified.

Name used in this spec	Official Name of Reference	Official Reference Number	Location
	Health (NIOSH)		Ethylbenzene n-Hexane Tetrachloroethylene Toluene Trichloroethylene m-Xylene o-Xylene p-Xylene
Norway Product Regulations	Regulations relating to restrictions on the manufacture, import, export, sale and use of chemicals and other products hazardous to health and the environment (Product Regulation)	FOR-2004-06-01-922 None	FOR-2004-06-01-922 Norwegian Environment Agency
OSPAR POPs	The List of Chemicals for Priority Action (POPs)	2004-12	OSPAR POPs
Responsible Minerals Initiative (RMI)	Responsible Minerals Initiative (formerly known as Conflict Free Sourcing Initiative (CFSI))	none	RMI
Significant Customer Requirement	Qorvo has identified several “significant” customers who are also industry leaders in Product Compliance Management. These customers’ requirements are incorporated into this document. Some of these customers’ requirements go beyond regulatory requirements, which will explain the stricter nature of some of Qorvo’s requirements.	Not applicable	Not applicable
Stockholm Convention	Stockholm Convention on Persistent Organic Pollutants	None Amended by: EC/850/2004 EU/757/2010 EU/519/2012 EU/1342/2014 SC-7/12 (hexachlorobutadiene) SC-7/13 (PCP, salts, esters) SC-7/14 (PCNs)	Stockholm Convention SC-7/12 SC-7/13 SC-7/14
Swiss ORRChem	Ordinance on the Reduction of Risks relating to the Use of Certain Particularly Dangerous Substances, Preparations and Articles	814.81	Swiss ORRChem

Name used in this spec	Official Name of Reference	Official Reference Number	Location
Taiwan Batteries	Restrictions on the Manufacture, Import, and Sale of Dry Batteries	None	No known link to a publicly available document at this time. Requirements can be seen here and here . WTO TBT Notice can be see here .
Taiwan RoHS	Section 5 “Marking of presence” of CNS 15663	CNS 15663	Information regarding this requirement can be found on the EU Commission site for WTO TBT Notices here .
Turkey: Hazardous Chemical Content	Hazardous Chemical Content of Some Consumer Products	Number: 29 236	Turkey: Hazardous Chemical Content
UL 110	UL 110 Standard for Sustainability for Mobile Phones	UL 110	UL 110
US Batteries	Mercury-Containing and Rechargeable Battery Management Act	PUBLIC LAW 104-142 EPA Universal Waste Requirements (40 CFR 273)	Public Law 104-142 USEPA 40 CFR 273
US CPSIA	Consumer Product Safety Improvement Act of 2008	PUBLIC LAW 110–314	US CPSIA
US Dept. Homeland Security	6 USC Chapter 1, Subchapter XVI: Chemical Facility Anti-Terrorism Standards, Chemicals of Interest List	6 USC Chapter 1, Subchapter XVI	US DHS CoI
US Dodd-Frank	Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, Section 1502. Conflict Minerals	Public Law 111-203	US Dodd-Frank
USEPA ODS	United States Clean Air Act	40 CFR 601-618	USEPA ODS
USEPA SCCPs SNUR	Significant New use Rule (SNUR); Benzidine-Based Dyes; Di-n-pentyl phthalate (DnPP); and Alkanes, C12-13, Chloro	Unified Agenda 2070-AJ73	USEPA SCCPs SNUR
USEPA SNURs	SIGNIFICANT NEW USES OF CHEMICAL SUBSTANCES	40 CFR 721	USEPA SNURs
USEPA TRI	Emergency Planning and Community Right-to-Know Act (EPCRA), Section 313 Toxic Release Inventory	40 CFR 372.	USEPA TRI
USEPA TSCA - Asbestos	United States Toxic Substances Control Act	40 CFR 763	USEPA TSCA - Asbestos
USEPA TSCA -	Formaldehyde Standards for Composite Wood	US Public Law 111-199	Public Law 111-199 -

Name used in this spec	Official Name of Reference	Official Reference Number	Location
Formaldehyde	Products Act (Regulations are not implemented at this time)	Will be in 40 CFR 601	Formaldehyde EPA Formaldehyde Emissions Page
USEPA TSCA - PCBs	United States Toxic Substances Control Act	40 CFR 761	USEPA TSCA - PCBs
US Radiation	United States Nuclear Regulatory Commission Regulations, Title 10 Code of Federal Regulations	40 CFR 20	US Radiation
US SEC Conflict Minerals	§ 240.13p-1 Requirement of Report Regarding Disclosure of registrant's supply chain information regarding conflict minerals.	17 CFR 240 and 249b	US SEC Conflict Minerals
Vermont Act 85	Vermont Statutes, Title 9, Chapter 80: Flame Retardants	Title 9, Chapter 80, § 2972	Vermont Act 85
Washington CHCC	Children's Safe Products Act	Children's Safe Products Chapter 70.240 RCW	Washington CHCC

	Qorvo Banned and Restricted Substances Specification	Page 15 of 44
	SPE-001275	Rev C

5 Compliance Requirements

Change Management

If the material composition of a component or material is changed, the supplier shall follow the process outlined in COR.103 Supplier Quality Manual, specifically section 6.7 Product and Process Changes. Quoting from that section of the specification:

The Supplier shall have a process to manage and track changes in requirements and product data. This shall include revision history documentation of the resulting changes in engineering documentation.

The Supplier shall provide a formal PCN to Qorvo outlining the product/process changes made after the product has been qualified by Qorvo:

- Legacy TriQuint materials shall be handled in accordance with the requirements of JESD46 Supplier Product / Process Change Notice. All PCNs shall be sent to Supplier_pcn@qorvo.com.
- Legacy RFMD materials shall be handled in accordance with QAL-21-1022 and website <https://connect.rfmd.com/sites/SQ/default.aspx> login access.


Please note that if material sourcing or the material BOM is changed, suppliers are required to notify Qorvo.

At minimum, a 90 day notification with supporting data is needed prior to the implementation of the change. Qorvo may request samples to perform internal evaluations if needed. A formal notification will be sent to the Supplier accepting or rejecting the PCN.

If there are changes as shown in A, B, or C above, the Supplier shall send Qorvo updated Material Declarations, updated Certificates of Compliance for RoHS, REACH, and Halogen-free; update any applicable 3rd party analytical testing per the requirements in Sections 5 and 6 of this document, and update the Conflict Mineral Reporting Template (CMRT).

Provide a Statement of Compliance to the requirements as defined in this document (see Appendix 1 for the Statement of Conformance form). Compliance statement shall clearly show any exemptions being claimed to the EU RoHS directive (reference note below for additional requirements on exemptions being claimed).

- If Sub-con or suppliers is not compliant to these requirements, the Sub-con or supplier shall clearly state any exceptions taken and Qorvo will take those under consideration. Qorvo may not accept your exception, but we will review our reasons with our suppliers.

	Qorvo Banned and Restricted Substances Specification	Page 16 of 44
	SPE-001275	Rev C

Note for Suppliers and Subcons:

Qorvo assumes that all EU RoHS exemptions will eventually expire. When an exemption is within two years of expiring, the supplier shall notify Qorvo and either make available a replacement material/component that will not require an exemption (e.g., fully lead-free) or provide information to Qorvo on the necessity to extend the exemption period. This information shall contain details on technical evaluations, engineering data, the supplier’s conclusion as to why extending the exemption is required and the application to the EU for requesting an extension to the directive.

Full Disclosure Material Declarations

Suppliers whose products will be used to manufacture Qorvo wafers (e.g., GaAs, GaN, SAW, BAW wafers)

Full material disclosure (Material Declaration) is not required. Suppliers should provide accurate, detailed Safety Datasheets and ensure that all substances described in Table 1 below are disclosed.

Suppliers whose products will be used to assemble Qorvo products (e.g., used in Qorvo assembly processes in Beijing CH, Brooksville FL, Costa Rica, Dezhou CH, Greensboro NC, Nuremberg GER, or Richardson TX)

Suppliers must provide full material disclosure (Material Declaration) for any qualification builds and components supplied to Qorvo. For materials and chemical preparations, please provide Safety Data Sheets (SDSs) with detailed composition information. Please use engineering calculations and/or analytical testing (when required) to determine the substances present in the components and materials supplied to Qorvo. If there are “confidential”, “proprietary”, or “trade secret” ingredients in the components or materials, please ensure that these substances are not covered by the bans and restrictions listed in Table 1. Qorvo must know about the presence of any substances listed in Table 1, due to government and customer requirements.


3rd Party lab Test Reports

See SPE-001202 “Qorvo 3rd Party Test Report Specification for Suppliers” for these requirements.

Certificates of Compliance

Sub-cons and Suppliers must provide Qorvo with a certificate of compliance to various global regulations, including the EU RoHS Directive and the EU REACH Regulation. The EU REACH Regulation includes the Candidate List of Substances of Very High Concern (SVHCs), which changes twice per year (in mid-June and mid-December). However, Qorvo will accept annual updates on the Certificates of Compliance. However, if a REACH SVHC is added that is included in components or materials purchased from the Supplier, please inform Qorvo immediately.

Process Materials

	Qorvo Banned and Restricted Substances Specification	Page 17 of 44
	SPE-001275	Rev C

Please note in Table 1 that various substances and substance categories are banned or restricted from use in manufacturing processes. Please check to ensure you are not using these substances in the restricted uses as detailed in Table 1. If you are using these substances in a restricted use, please clearly state any exceptions taken and Qorvo will take those under consideration. Qorvo may not accept your exception, but we will review our reasons with our suppliers.

Packing Materials

These requirements are focused on reels, carrier/cover tape, bags, boxes, labels, inks/dyes, foam, pallets, etc. Note that this requirement is only for Packing Material Suppliers who supply Packing Material to Qorvo to be used to ship Qorvo products to customers. It does not cover the Packing Material used to ship material to Qorvo facilities for Qorvo's use. Please note in Table 1 that various substances and substance categories are banned or restricted from use in Packing Materials. Please check to ensure you are not using these substances in Packing Materials as detailed in Table 1. If you are using these substances in a restricted use, please clearly state any exceptions taken and Qorvo will take those under consideration. Qorvo may not accept your exception, but we will review our reasons with our suppliers.

Also note that Packing Materials must contain less than a total of 80 ppm of lead, mercury, cadmium, and hexavalent chromium (not 100 ppm as listed in the EU Packaging Directive), due to customer restrictions. The cadmium content in Packaging Materials must be less than 5 ppm of this total.


Conflict Minerals

Sub-cons and suppliers must provide Qorvo with updated Responsible Minerals Initiative (RMI) Conflict Mineral Reporting Templates (CMRTs) twice per year. Qorvo will typically have mid-summer and end-of-year campaigns to solicit updated CMRTs from its supply chain. For these campaigns, Qorvo requests that Sub-cons and suppliers do a complete "refresh" of their data, by determining their current supply chain and requesting updated CMRTs from their supply chain, and requesting that their supply chain do the same. CMRTs should be in the latest version of the CMRT (which can be accessed at <http://www.responsiblemineralsinitiative.org/conflict-minerals-reporting-template/>)

Qorvo will review suppliers' CMRTs and give feedback on the degree of completion of the CMRT, the status of any smelters that may not be compliant to the Responsible Minerals Assurance Process, and may request additional investigation or even the removal of certain smelters from the suppliers' supply chains.

Documentation Control and Recordkeeping

All documentation regarding Product Compliance should be maintained within a document control system that allows traceability to the products and to the organizations that created the documents. Supplier should maintain all documentation supporting material declarations, certificates of compliance,

	Qorvo Banned and Restricted Substances Specification	Page 18 of 44
	SPE-001275	Rev C

and analytical reports for a minimum of 10 years. Supporting documentation should be checked for consistency between material declarations, MSDSs, and/or analytical reports. Discrepancies between any of this documentation should be resolved.

6 Banned and Restricted Substances List

Table 1 below lists all of the substances and substance categories that are banned or restricted in products, or are restricted in manufacturing processes used to manufacture components or materials for Qorvo products. Table 1 lists:

- The substance or substance category that is restricted or banned. Please see LIS-000591 for a list of the chemical substances that are covered by Table 1.
- The materials that this substance or substance category are banned or restricted in
- The Limits (at the Homogeneous Material level) above which the substance or substance category is restricted or banned
- The legal or customer reference for why this substance or substance category is restricted or banned. Please see the "External References" table in Section 3 to get more information on these requirements.
- Whether or not chemical analysis is required for proof of compliance to the Limits. See SPE-001202 "Qorvo 3rd Party Test Report Specification for Suppliers" for the requirements for analytical reports submitted to Qorvo.
- Comments – these may cover whether Qorvo accepts any RoHS Exemptions for the use of this material, or any other pertinent comments

	Qorvo Banned and Restricted Substances Specification	Page 19 of 44
	SPE-001275	Rev C

**TABLE 1 - QORVO BANNED & RESTRICTED SUBSTANCES LIST
(SEE LIS-000591 FOR SUBSTANCES THAT MEET THESE CATEGORIES)**

Printed copy of this document is considered an uncontrolled copy unless control copy designator is identified.

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
Aminoethyl ethanolamine CAS No. 111-41-1	All Components and Materials	Reporting is required if the substance exceeds Detectable levels at the Homogeneous Material level.	Significant Customer Policy	No	
Antimony Compounds	All Components and Materials	Notify if intentionally used. Unintentional use limited to 0.070 % (700 ppm)	California Prop 65 EU REACH Significant Customer Requirement Washington CHCC	Yes	
	Chemical products sold to Qorvo	Report the presence of any antimony compounds	USEPA TRI	No	
Arsenic Compounds	Metals and Metal Alloys	0.010 % (100 ppm)	California Prop 65 EU REACH Significant Customer Requirement Washington CHCC	No	
	Semiconductor substrates and dopants	Exempt		No	
	All other components and materials	0.005 % (50 ppm)		Yes if material is glass	
	Chemical products sold to Qorvo	Report the presence of any arsenic compounds	USEPA TRI	No	
Asbestos Compounds	All Components and Materials	No Intentional Use	EU REACH Germany: ChemVerbotsV Japan Industrial Safety and Health Act Swiss ORRChem USEPA TSCA - Asbestos	No	
Azo Colorants and azodyes	Textiles, Garments, Leathers, Plastics that have significant exposure to skin	No intentional use. 30 ppm total content if present as impurity	China GB 18401-2010 China GB 20400-2006 EU REACH Germany: Consumer Goods Ordinance	No	Qorvo does not know of any components or materials that it purchases that have significant exposure to skin
Barium Compounds	Chemical products sold to Qorvo	Report the presence of any barium compounds	USEPA TRI	No	
Benzenamine, N-Phenyl-, Reaction Products with styrene and 2,4,4-trimethylpentene (BNST) CAS No. 68921-45-9	All Components and Materials	No intentional Use	Canadian Environmental Protection Act, 1999 Canada Prohibition of Certain Toxic Substances Regulation Significant Customer Requirement	No	

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
Benzene CAS No. 71-43-2	All Components and Materials	Reporting is required if the substance exceeds 0.1 % (1000 ppm)	EU REACH Significant Customer Policy	No	
	Use in Manufacturing process	Prohibited from use in manufacturing process	ACGIH China GB 2.1-2007 NIOSH Significant Customer Policy	Yes if used in manufacturing process.	In cases where a variance from this requirement is requested by manufacturing operations associated with the manufacture of Qorvo products, the supplier must show by 3 rd party testing that the breathing zone in the process are < 0.32 mg/m ³ (0.1 ppm)
	Use as cleaning agents, degreasers, demolder solutions in all manufacturing processes (the substance contacts the product)	Prohibited from use (content of any cleaning agents, degreasers, and demolder solutions must be < 100 ppm)	Significant Customer Policy	Yes, if contained in any cleaning agents, degreasers, demolder solutions	The supplier must show by 3 rd party testing that the breathing zone in the process are < 0.32 mg/m ³ (0.1 ppm)
Beryllium Compounds	All Components and Materials	No intentional use Unintentional Use limited to 0.10 % (1000 ppm)	EU WEEE Significant Customer Requirement	Yes for Suppliers to Qorvo Mobile Products Division.	Please see Qorvo specification SPE-001202 to determine whether your materials require analytical testing or email QorvoGreen@Qorvo.com.

Printed copy of this document is considered an uncontrolled copy unless control copy designator is identified.

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
	Use in any manufacturing process	The breathing zones where beryllium is used must be tested and found to be < 0.002 mg/m ³	California OSHA PELs China GB 2.1-2007	Yes, Air quality monitoring required if used in manufacturing process	
	Chemical products sold to Qorvo	Report the presence of any beryllium compounds	USEPA TRI	No	
Bisphenol A CAS No. 80-05-7	All Components and Materials made from Bisphenol A as a monomer	No detectable levels in component or materials	France Act N.2012-1442 Significant Customer Requirement Washington CHCC	No	The presence of any detectable levels of Bisphenol A is required to be reported.
	Thermal Paper	Non-use	Significant Customer Requirement		
Bisphenol F CAS No. 620-92-8	All Materials	Reporting is required if the substance exceeds 0.01 % (100 ppm)	Significant Customer Requirement	No	
Bisphenol S CAS No. 2467-02-9; 1333-16-0; 80-09-1	All Materials	Reporting is required if the substance exceeds 0.01 % (100 ppm)	Significant Customer Requirement	No	
Bismuth Compounds	All Materials	Report the presence of any bismuth compounds	Significant Customer Requirement	No	
BNST	See Benzenamine, N-Phenyl-, Reaction Products with styrene and 2,4,4-trimethylpentene (BNST) CAS No. 68921-45-9				
Cadmium Compounds	Batteries	0.0002 % (2 ppm)	China GB 24427-2009 China GB24428-2009 EU Battery Korea Quality Control Significant Customer Requirement Swiss ORRCHEM	Yes	Qorvo does not permit any exemptions for Cadmium for RoHS Compliance.
	Packaging	80 ppm total of Cd + Cr(VI) + Hg + Pb	EU Packaging Significant Customer Requirement	Yes, if shipped to a customer	
	Solders	20 ppm	Significant Customer Requirement	Yes	
	All Other Components and Materials – Organic including Packaging	0.0005 % (5 ppm)		Yes	

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
	All Other Components and Materials - Inorganic	0.005 % (50 ppm)	California SB-20/50 California Prop 65 China RoHS 2 EU REACH EU RoHS J-MOSS Korea Quality Control Korea RoHS OSPAR POPs Significant Customer Requirement Washington CHCC	Yes	
	Chemical products sold to Qorvo	Report the presence of any cadmium compounds	USEPA TRI	No	
California Prop 65	All Components and Materials	No limits (unless listed specifically elsewhere in this table). However, the presence and amounts of any California Prop 65 substances must be reported.	California Prop 65 Significant Customer Requirement	No	The presence of California Prop 65 substances can be reported either via a Safety Data Sheet or a Full Material Declaration.
Certain Glycol Ethers	Chemical products sold to Qorvo	Report the presence of any glycol ether compounds	USEPA TRI	No	
CFATs-DHS Chemicals of Interest Compounds	Chemical products sold to Qorvo	Report the presence of any CFATs-DHS compounds	US Dept. Homeland Security	No	
CFC, HFC, PFCs, SF6 (also known as Fluorinated Greenhouse Gas Substances)	All Components and Materials	No Intentional Use	Denmark Statutory Order 552 EU GHG	No	These substances cannot contact the product during the manufacturing process.
	Manufacturing Processes	Restricted from use	Kyoto Protocol Montreal Protocol Significant Customer Requirement Swiss ORRChem		
Chlorinated Organic Solvents	Use as a solvent in paints, coatings, inks, adhesives, primers	If > 0.1 % (1000 ppm) in material, the use must be reported to Qorvo.	Significant Customer Requirement		

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
	Use as cleaning agents, degreasers, demolder solutions in all manufacturing processes	≤ 0.1 % (1000 ppm) and ≤ 900 ppm total Chlorine		Yes if used in cleaning agents, degreasers, and demolder solutions in all manufacturing processes. Use Solvent extraction, analyzed by GC-MS or HPLC-MS; or EN 14582 for total chlorine	
Chlorinated Benzene Compounds	Use as a solvent in paints, coatings, inks, adhesives, primers	If > 0.1 % (1000 ppm) in material, the use must be reported to Qorvo.	Significant Customer Requirement	No	
	Use as cleaning agents, degreasers, demolder solutions in all manufacturing processes	≤ 0.1 % (1000 ppm) and ≤ 900 ppm total Chlorine			
Chlorofluorocarbons and Halons (Class I and II Ozone Depleting Chemicals)	All components and materials	No use	EU ODS Indonesia ODS Japan ODS Montreal Protocol USEPA ODS Significant Customer Requirement	No	
	Packaging				
	Use in any manufacturing processes				
Chlorophenols	Chemical products sold to Qorvo	Report the presence of any chlorophenol compounds	USEPA TRI	No	
Chromium Compounds, including Hexavalent Chromium Compounds	Chemical products sold to Qorvo	Report the presence of any chromium compounds	USEPA TRI	No	
Chromium (Hexavalent) Compounds	Packaging	80 ppm total of Cd + Cr(VI) + Hg + Pb	EU Packaging Significant Customer Requirement	Yes, if shipped to a customer	
	Surface Coatings (platings, conversion coatings, etc.)	No detectable residue on the surface		Yes	

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
	All Other Components and Materials – Organic and Inorganic	No intentional use Unintentional Use limited to 0.050 % (500 ppm)	California Prop 65 California SB-20/50 China RoHS 2 EU REACH EU RoHS J-MOSS Korea Quality Control Korea RoHS OSPAR POPs Significant Customer Requirement Taiwan RoHS	Yes	Qorvo does not permit any exemptions for Chromium, hexavalent (Cr ⁶⁺) for RoHS Compliance.
Cobalt Compounds (excluding Cobalt Dichloride)	Any materials that have significant exposure to skin	No Intentional Use. Unintentional Use limited to 0.10 % (1000 ppm). Presence of any cobalt in any material must be reported.	Significant Customer Requirement Washington CHCC	No	Qorvo does not know of any components or materials that it purchases that have significant exposure to skin
	Chemical products sold to Qorvo	Report the presence of any cobalt compounds	USEPA TRI	No	
Cobalt Dichloride CAS No. 7646-79-9	Moisture or humidity indicator products	No Intentional Use. Unintentional Use limited to 0.10 % (1000 ppm).	EU REACH Significant Customer Requirement	No	
Conflict Minerals (tin, tantalum, tungsten, and gold and their compounds)	All Components and Materials	Only Conflict Free sources of these metals may be used in Qorvo Products.	Responsible Minerals Initiative (RMI) Significant Customer Requirement US Dodd-Frank US SEC Conflict Minerals		For any presence of tin, tantalum, tungsten, and gold (aka 3TG), all sources must be traced to the smelters processing these metals and reported to Qorvo using the RMI Conflict Mineral Reporting Template (CMRT). All smelters must be compliant to the Conflict Free Sourcing Program (RMI).
Copper Compounds	Chemical products sold to Qorvo	Report the presence of any copper compounds	USEPA TRI	No	

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
Cresol Compounds (also known as Methyl-Phenol Compounds) CAS No Name 108-39-4 <i>m</i> -Cresol 95-48-7 <i>o</i> -Cresol 106-44-5 <i>p</i> -Cresol 1319-77-3 Cresol (mixed)	All Components and Materials	≤0.001% (10 ppm)	Canadian Environmental Protection Act, 1999 Significant Customer Requirement	No	
Cyanide Compounds	Chemical products sold to Qorvo	Report the presence of any cyanide compounds	USEPA TRI	No	
(DBHP)BT OR UV-320 OR Phenol, 2-(2H-Benzotriazol-2-Yl)-4,6-Bis(1,1-Dimethylethyl)- CAS No. 3846-71-7	All Components and Materials	No Intentional Use. Unintentional Use limited to 0.0005 % (5 ppm).	EU REACH Japan Evaluation of Chemical Substances Significant Customer Requirement	No	
Diarsenic Pentoxide – CAS Number 1303-28-2 Diarsenic Trioxide – CAS Number 1327-53-3	All Components and Materials	< 0.1% (1000 ppm) at the article level	EU REACH Significant Customer Requirement	No	
Di-isocyanate Compounds	Chemical products sold to Qorvo	Report the presence of any di-isocyanate compounds	USEPA TRI	No	
Dimethylfumarate CAS No. 624-49-7	All Components and Materials	≤0.00001% (0.1 ppm)	(EC) No 251/2009 EU REACH	No	
Dioxin and Dioxin-like Compounds	Chemical products sold to Qorvo	Report the presence of any Dioxin and Dioxin-like compounds	USEPA TRI	No	
Ethylbenzene CAS No. 100-41-4	All Components and Materials	Reporting is required if the substance exceeds 0.1 % (1000 ppm)	EU REACH Significant Customer Policy	No	

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
	Use in Manufacturing process	Prohibited from use in manufacturing process	ACGIH China GB 2.1-2007 NIOSH Significant Customer Policy	Yes, Air quality monitoring required if used in manufacturing process	In cases where a variance from this requirement is requested by manufacturing operations associated with the manufacture of Qorvo products, the supplier must show by 3 rd party testing that the breathing zone in the process are < 0.32 mg/m ³ (0.1 ppm)
	Use as cleaning agents, degreasers, demolder solutions in all manufacturing processes (the substance contacts the product)	Prohibited from use (content of any cleaning agents, degreasers, and demolder solutions must be < 100 ppm)	Significant Customer Policy	Yes, if contained in any cleaning agents, degreasers, demolder solutions	The supplier must show by 3rd party testing that the breathing zone in the process are < 0.32 mg/m ³ (0.1 ppm)
Ethylenebisdithiocarbamic acid, salts and esters Compounds	Chemical products sold to Qorvo	Report the presence of any Ethylenebisdithiocarbamic acid, salts and esters compounds	USEPA TRI	No	
Formaldehyde CAS No. 50-00-0	Wood, Fiber, and Textile products	≤0.00001% (0.1 ppm)	Austria BGB 1990/194 California 93120 China GB 18401-2010 China GB 20400-2006 Denmark Statutory Order 289 Germany: ChemVerbotsV Lithuania HN 96:2000	No	
Gold Compounds	All Components and Materials	Report the presence of any Gold compounds	Conflict Free Sourcing Initiative (CFSI) Significant Customer Requirement US Dodd-Frank US SEC Conflict Minerals	No	

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
Halogenated Diphenyl Methanes: CAS No Name 76253-60-6 Ugilec 141 81161-70-8 Ugilec 121 99688-47-8 DBBT	All Components and Materials	No Intentional Use. Unintentional Use limited to Not detectable	EU REACH Significant Customer Requirement	No	
Halogens (Bromine and Chlorine)	All Components and Materials	≤ 900 ppm Br, ≤ 900 ppm Cl, ≤ 1500 ppm Br+Cl	IEC 61249-2-21 IPC 4101 JS709 Significant Customer Requirement	Yes	
Hexabromocyclodo-Decanes (HBCDDs)	All Components and Materials	No Intentional Use. Unintentional Use limited to 0.10 % (1000 ppm),	EU REACH Japan Evaluation of Chemical Substances Norway Product Regulations Significant Customer Requirement Swiss ORRChem	No	
	Packaging	No Intentional Use. Unintentional Use limited to 80 ppm	Significant Customer Requirement	No	
n-Hexane CAS No. 110-54-3	All Components and Materials	Reporting is required if the substance exceeds 0.1 % (1000 ppm)	Significant Customer Policy	No	In cases where a variance from this requirement is requested by manufacturing operations associated with the manufacture of Qorvo products, the supplier must show by 3 rd party testing that the breathing zone in the process are < 100 mg/m ³ (28 ppm)
	Use in Manufacturing process	Prohibited from use in manufacturing process	ACGIH China GB 2.1-2007 NIOSH Significant Customer Policy	Yes, Air quality monitoring required if used in manufacturing process	

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
	Use as cleaning agents, degreasers, demolder solutions in all manufacturing processes (the substance contacts the product)	Prohibited from use (content of any cleaning agents, degreasers, and demolder solutions must be < 100 ppm)	Significant Customer Requirement	Yes, if contained in any cleaning agents, degreasers, demolder solutions	The supplier must show by 3rd party testing that the breathing zone in the process are < 100 mg/m ³ (28 ppm)
Isocyanate Compounds	All Components and Materials	If any of these compounds are used, please investigate suitable alternatives. Report any usages of these compounds.	Significant Customer Requirement	No	
Lead and its Compounds	Batteries	0.0040 % (40 ppm)	China GB 24427-2009 China GB24428-2009 EU Battery	Yes	Qorvo allows the use of the following EU RoHS Exemptions 6(a), 6(b), 6(c), 7(c)-I, 7(c)-II, and 7(c)-IV.
	Cables and Cords – surface coating material	0.03 % (300 ppm)	California Prop 65 US CPSIA	Yes	
	Children's Products (other than Paint and Surface Coatings – see below)	0.01 % (100 ppm)	US CPSIA	Yes	
	Packaging	80 ppm total of Cd + Cr(VI) + Hg + Pb	EU Packaging Significant Customer Requirement	Yes, if shipped to a customer	
	Paint and Surface Coatings (including plastics; inks; surface coatings; and displays including housing, wiring, and printed circuit boards).	0.005 % (50 ppm)	IEEE 1680 US CPSIA Significant Customer Requirement	Yes	
	All Other Components and Materials - Organic	0.010 % (100 ppm)		Yes	

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
	All Other Components and Materials - Inorganic	0.080 % (800 ppm)	California SB-20/50 China RoHS 2 EU REACH EU RoHS J-MOSS Korea Electrical Appliances Korea Quality Control Korea RoHS OSPAR POPs Significant Customer Requirement US CPSIA	Yes	
	Chemical products sold to Qorvo	Report the presence of any lead compounds	USEPA TRI	No	
Manganese Compounds	Chemical products sold to Qorvo	Report the presence of any manganese compounds	USEPA TRI	No	
MCCPs (Medium Chain Chlorinated Paraffins) with the molecular formula: $C_xH_{(2x-y+2)}Cl_y$, where x = 14-17 and y = 6 to >24	All Components and Materials	No intentional use. Unintentional Use limited to < 0.1 % (1000 ppm) and < 900 ppm Cl	Significant Customer Requirement	No	

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
Mercury and its Compounds	Batteries	0.0001 % (1 ppm)	Canada SOR/2014-254 China GB 24427-2009 China GB24428-2009 EU Battery New York Battery Management Taiwan Batteries US Batteries	Yes	Qorvo does not permit any exemptions for Mercury for RoHS Compliance.
	Packaging	80 ppm total of Cd + Cr(VI) + Hg + Pb	EU Packaging Significant Customer Requirement	Yes	
	All Other Components and Materials – Organic and Inorganic	No intentional use Unintentional Use limited to 0.050 % (500 ppm)	California SB-20/50 China RoHS 2 EU REACH EU RoHS J-MOSS Korea Electrical Appliances Korea Quality Control Korea RoHS OSPAR POPs Significant Customer Requirement US CPSIA Washington CHCC	Yes	
	Chemical products sold to Qorvo	Report the presence of any mercury compounds	USEPA TRI	No	
Methyl-Phenol Compounds (Also known as Cresol Compounds)	See Cresol Compounds				
n-Methyl Pyrrolidone (NMP) CAS No. 872-50-4	Use as cleaning agents, degreasers, demolder solutions	Prohibited from use (content of any cleaning agents, degreasers, and demolder solutions must be < 100 ppm)	AIHA California OSHA PELs Significant Customer Requirement	Yes, if contained in any cleaning agents, degreasers, demolder solutions	The supplier must show by 3rd party testing that the breathing zone in the process are < 40 mg/m ³ (10 ppm)
Nanomaterials	All Components and Materials	Report any usage of nanomaterials	France Decree no. 2012-232 Significant Customer Requirement	No	

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
Nickel Compounds	Any materials that have significant exposure to skin	≤ 0.28 µg/cm ² /week leach rate using ICP/OES And Method: EN 1811:2011+AC:2012 (3samples)	California Prop 65 EU REACH	Yes if a component or material is expected to contact skin for a prolonged time period.	Qorvo does not know of any components or materials that it purchases that have significant exposure to skin
	Chemical products sold to Qorvo	Report the presence of any nickel compounds	USEPA TRI	No	
Nicotine and Nicotine Salt Compounds	Chemical products sold to Qorvo	Report the presence of any nicotine or nicotine salt compounds	USEPA TRI	No	
NMP	See n-Methyl Pyrrolidone (NMP) CAS No. 872-50-4				
Nonylphenols and Nonylphenol ethoxylate Compounds	Any materials that have significant exposure to skin	No intentional use.	EU REACH Turkey: Hazardous Chemical Content	No	Qorvo does not know of any components or materials that it purchases that have significant exposure to skin
	Chemical products sold to Qorvo	Report the presence of any Nonylphenols and Nonylphenol ethoxylate compounds	USEPA TRI	No	
Octylphenol and its ether	All Components and Materials	0.1 % (1000 ppm)	Significant Customer Requirement	No	
Organotin Compounds	All Components and Materials	No intentional use Unintentional Use limited to 0.10 % (1000 ppm)	EU REACH Japan Evaluation of Chemical Substances Norway Product Regulations Significant Customer Requirement	No	Metal tin, tin alloys, tin plating and tin inorganic compounds do not fall under this category.
PAHs – Polyaromatic Hydrocarbons	All Components and Materials	< 0.00005 % (0.5 ppm)	EU REACH Germany GS Mark Significant Customer Requirement Stockholm Convention	No	
	Chemical products sold to Qorvo	Report the presence of any PAH compounds	USEPA TRI	No	

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
Palladium Compounds	All Components and Materials	Report the presence of any Palladium compounds	Significant Customer Requirement	No	
Polybrominated Biphenyls (PBBs)	All Components and Materials - Organic	No intentional use Unintentional Use limited to 0.080 % (800 ppm) and ≤ 900 ppm Br.	California Prop 65 California SB-20/50 China RoHS 2 EU REACH EU RoHS J-MOSS	Yes	Qorvo does not permit any exemptions for PBBs for RoHS Compliance.
	All Components and Materials - Inorganic	No intentional use Unintentional Use limited to 0.080 % (800 ppm) and ≤ 900 ppm Br.	Korea Quality Control Korea RoHS OSPAR POPs Significant Customer Requirement Taiwan RoHS	Yes	
	Chemical products sold to Qorvo	Report the presence of any PBB compounds	USEPA TRI	No	
Polybrominated Diphenyl Ethers (PBDEs)	All Components and Materials - Organic	No intentional use Unintentional Use limited to 0.080 % (800 ppm) and ≤ 900 ppm Br.	California SB-20/50 China RoHS 2 EU REACH EU RoHS J-MOSS	Yes	Qorvo does not permit any exemptions for PBDEs for RoHS Compliance.
	All Components and Materials - Inorganic	No intentional use Unintentional Use limited to 0.080 % (800 ppm) and ≤ 900 ppm Br.	Korea Quality Control Korea RoHS OSPAR POPs Significant Customer Requirement Taiwan RoHS	Yes	
PCBs - Polychlorinated biphenyls and specific substitutes	All Components and Materials	No intentional use. Unintentional Use limited to < 0.1 ppm	Brazil CRS 023/1996 Brazil CRS 313/2002 Brazil CRS 316/2002 California Prop 65 Japan Evaluation of Chemical Substances Stockholm Convention Significant Customer Requirement	No	
PCNs - Polychlorinated naphthalenes (more than 3 chlorine atoms)	All Components and Materials	No intentional use. Unintentional Use limited to < 5 ppm	Japan Evaluation of Chemical Substances Stockholm Convention Significant Customer Requirement	No	

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
Pentachlorophenol and its salts and esters	All Components and Materials	No intentional use. Unintentional Use limited to < 5 ppm	EU REACH Norway Product Regulations Significant Customer Requirement Stockholm Convention UL 110	No	
PCTs - Polychloroterphenyls and derivatives	All Components and Materials	No intentional use. Unintentional Use limited to < 5 ppm	EU REACH Japan Evaluation of Chemical Substances Significant Customer Requirement Stockholm Convention	No	
Perchlorate Compounds	Batteries	0.0000006 % (6 ppb)	California Perchlorates Significant Customer Requirement	No	
	All other Components and Materials	0.0000006 % (6 ppb)			
PFOS-PFOA Compounds	All Components and Materials	≤ 0.1% by weight (1000 ppm)	Canada SOR/2008-178 ECHA/NA/15/29	Yes	
	Use in any manufacturing processes	No intentional use. Unintentional Use limited to < 10 ppm in any chemical products or mixtures	EU REACH Japan Evaluation of Chemical Substances Norway Product Regulations Significant Customer Requirement Stockholm Convention		
Phthalates	All Components and Materials	No intentional use. Unintentional Use limited to < 0.08 % (800 ppm)	California Prop 65 Canada SOR/2016-188 Significant Customer Requirement EU REACH EU RoHS US CPSIA	Yes	
	Packaging	< 0.1 % (1000 ppm)	EU REACH	No	
PVC	All Components and Materials	No intentional use. Unintentional Use limited to < 0.1 % (1000 ppm) and < 900 ppm Cl	Significant Customer Requirement	No	
n-Propyl Bromide CAS No. 106-94-5	All Components and Materials	Reporting is required if the substance exceeds Detectable levels at the Homogeneous Material level.	Significant Customer Policy	No	


Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
Radioactive Substances	All Components and Materials	No intentional use. Unintentional Use limited to non-detectable levels of ionized radiation	California Prop 65 EU Euratom Japan Nuclear Material Significant Customer Requirement US Radiation	No	
REACH (EU) Annex XIV Substances	All Components and Materials	No intentional use.	EU REACH Significant Customer Requirement	No	
REACH (EU) Annex XVII Substances	All Components and Materials	Meet all restrictions in Annex XVII	EU REACH Significant Customer Requirement	No	
REACH (EU) Substances of Very High Concern (SVHCs)	All Components and Materials	Presence is reportable if > 0.1 % (1000 ppm)	EU REACH Significant Customer Requirement	No	
RoHS (all Countries) Substances	All Components and Materials	≤ 0.1 % (1000 ppm), If greater, report the exemption being claimed	EU RoHS Significant Customer Requirement	Yes	
<p>SCCPs (Short Chain Chlorinated Paraffins)</p> <p>with the molecular formula:</p> <p>$C_xH_{(2x-y+2)}Cl_y$, where $x = 10-13$ and $y = 1-13$</p>	All Components and Materials	No intentional use. Unintentional Use limited to < 0.1 % (1000 ppm) and < 900 ppm Cl	EU REACH OSPAR POPs Stockholm Convention USEPA SCCPs SNUR Significant Customer Requirement	No	Qorvo also assumes that this category includes all SCCPs listed in the USEPA Toxic Release Inventory - List of Toxic Chemicals within the Polychlorinated Alkanes Category and Guidance for Reporting, EPA 745-B-99-023, June 1999. (There are 93 SCCPs listed in this document.)

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
	Chemical products sold to Qorvo	Report the presence of any SCCP compounds	USEPA TRI	No	
Selenium Compounds	Chemical products sold to Qorvo	Report the presence of any Selenium compounds	Significant Customer Requirement USEPA TRI	No	
Silver Compounds	Chemical products sold to Qorvo	Report the presence of any Silver compounds	Significant Customer Requirement USEPA TRI	No	
Skin Sensitizers, Class 1	Any materials that have significant exposure to skin	Report the presence of any Skin Sensitizers, Class 1, 1A, or 1B	Significant Customer Requirement	No	Qorvo does not know of any components or materials that it purchases that have significant exposure to skin
Strychnine Compounds	Chemical products sold to Qorvo	Report the presence of any Strychnine compounds	USEPA TRI	No	
Substituted Diphenyl Amines	All Components and Materials	No intentional use. The presence of these substances should be reported if greater than the detection limit.	Canadian Environmental Protection Act, 1999 Significant Customer Requirement	No	
Tetrabromobisphenol A (TBBPA) CAS No. 79-94-7	All Components and Materials	No intentional use. Unintentional Use limited to < 0.09 % (900 ppm) and < 900 ppm Br	Significant Customer Requirement	No	
Thallium Compounds	Chemical products sold to Qorvo	Report the presence of any Thallium compounds	USEPA TRI	No	
Toluene CAS No. 108-88-3	All Components and Materials	Reporting is required if the substance exceeds 0.1 % (1000 ppm)	Significant Customer Policy	No	

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
	Use in Manufacturing process	Prohibited from use in manufacturing process	ACGIH China GB 2.1-2007 NIOSH Significant Customer Policy	Yes, Air quality monitoring required if used in manufacturing process	In cases where a variance from this requirement is requested by manufacturing operations associated with the manufacture of Qorvo products, the supplier must show by 3 rd party testing that the breathing zone in the process are < 100 mg/m ³ (26 ppm)
	Use as cleaning agents, degreasers, demolder solutions in all manufacturing processes (the substance contacts the product)	Prohibited from use (content of any cleaning agents, degreasers, and demolder solutions must be < 100 ppm)		Yes, if contained in any cleaning agents, degreasers, demolder solutions	The supplier must show by 3rd party testing that the breathing zone in the process are < 100 mg/m ³ (26 ppm)
Tris(1,3-dichloro-2-propyl) Phosphate (TDCPP) CAS No. 13674-87-8	All Components and Materials	No intentional use. Unintentional Use limited to < 0.1 % (1000 ppm) and < 900 ppm Cl	California Prop 65 D.C. Law 21-108 Significant Customer Requirement Vermont Act 85 Washington CHCC	No	
Tris(2-Chloro-1-methylethyl) Phosphate (TCPP) CAS No. 13675-84-5	All Components and Materials	No intentional use. Unintentional Use limited to < 0.1 % (1000 ppm) and < 900 ppm Cl	Significant Customer Requirement Vermont Act 85	No	

Printed copy of this document is considered an uncontrolled copy unless control copy designator is identified.

Substance or Substance Category	Material or Process	Limits (Homogeneous Material Level)	Reference	Analysis Required (See SPE-001202 for acceptable methods)	Comments
Tris(2-chloroethyl) Phosphate (TCEP) CAS No. 115-96-8	All Components and Materials	No intentional use. Unintentional Use limited to < 0.1 % (1000 ppm) and < 900 ppm Cl	California Prop 65 D.C. Law 21-108 EU CLP (Reproductive Toxin) EU REACH Significant Customer Requirement Vermont Act 85 Washington CHCC	No	
USEPA Significant New Uses for Specific Chemicals	All Components and Materials	Ensure that if any substances used are under a SNUR, meet the requirements as specified in 40 CFR 721	USEPA SNURs	No	
USEPA Toxic Release Inventory Chemicals	All Components and Materials	Report the presence of these chemicals in any chemical products	USEPA TRI	No	
UV-320 CAS No. 3846-71-7	See (DBHP)BT OR UV-320 OR Phenol, 2-(2H-Benzotriazol-2-YI)-4,6-Bis(1,1-Dimethylethyl)- CAS No. 3846-71-7				
Vanadium Compounds	All Components and Materials	Report the presence of any Vanadium compounds	USEPA TRI	No	
Warfarin Compounds	All Components and Materials	Report the presence of any Warfarin compounds	USEPA TRI	No	
Washington CHCC Substances	All Components and Materials	Reporting is required if the substances exceeds: Practical quantification limit (PQL) if added intentionally, 100 ppm if present as a contaminant	Significant Customer Requirement Washington CHCC	No	
Water-Dissociable Nitrate Compounds	All Components and Materials	Report the presence of any Water-Dissociable Nitrate Compounds	USEPA TRI	No	
Xylenes CAS No Name 108-38-3 <i>m</i> -Xylene 95-47-6 <i>o</i> -Xylene 106-42-3 <i>p</i> -Xylene 1330-20-7 Xylenes (mixed)	Use in Manufacturing process	Prohibited from use in manufacturing process	ACGIH China GB 2.1-2007 NIOSH Significant Customer Policy	No	
Zinc Compounds	All Components and Materials	Report the presence of any Zinc Compounds	USEPA TRI	No	

	Qorvo Banned and Restricted Substances Specification	Page 39 of 44
	SPE-001275	Rev C

7 Quality Records

Not Applicable

8 Appendix

8.1 Appendix 1

Appendix 1

Statement of Conformance to Qorvo Banned and Restricted Substances Specification (SPE-001275)

An authorized signature below confirms the supplier mentioned has read, understands, and conforms to Qorvo Banned and Restricted Substances Specification (SPE-001275).

Supplier Information:

Supplier Name	
Supplier Address	
Contact Name*	
Contact Title	
Contact Telephone	
Contact Email	

* Company representative for Product Compliance. If there are different contacts for material declarations, lab reports, conflict minerals, etc., please list all contacts.

All raw materials, parts, or products supplied to Qorvo meet the Qorvo Banned and Restricted Substances Specification (SPE-001275). If there are situations where the Supplier does not meet Qorvo substance requirements, please list the substance(s) which violate the Qorvo Banned and Restricted Substances Specification (SPE-001275) below and inform the Qorvo representative that you received this form from.

Substance (CAS Number)	Location and Use in Product or Material	Phase Out Date

The Supplier declares that the Supplier has implemented a Product Compliance Management System that meets the requirements listed in the Qorvo Banned and Restricted Substances Specification (SPE-001275):

Requirement	Yes or No	Comment or Document Identification that meets this requirement
All documentation regarding Product Compliance is maintained within a document control system that allows traceability to the products and to the organizations that created the documents.		

Requirement	Yes or No	Comment or Document Identification that meets this requirement
Supplier maintains all documentation supporting material declarations, certificates of compliance, and analytical reports for a minimum of 10 years.		
Supporting documentation is checked for consistency between material declarations, MSDSs, and/or analytical reports. Discrepancies are resolved.		
Supplier agrees to notify Qorvo of any changes in material composition of the components or materials provided to Qorvo, and update any applicable documentation (e.g., material declarations, certificates of compliance, 3 rd party lab reports, Conflict Mineral Reporting Templates, etc.)		
Supplier has a system that provides full material disclosure for the products purchased by Qorvo that meets the requirements of Section 5.		
Supplier has a system that provides certificates of compliance for the products purchased by Qorvo for RoHS Compliance, absence or presence of SVHCs, absence or presence of PFOS, and absence or presence of substances listed in Table 1.		
The Supplier has proactively undertaken such due diligence and continuous monitoring activities of both direct and indirect supply chains as are reasonably appropriate to assure the metals (Tin, Tantalum, Tungsten, Gold, and Cobalt) are sourced from "conflict free" mines.		
The Supplier will provide Qorvo with updated CMRTs twice per year (mid-summer and end-of-year). The Supplier will work with its supply chain on any information requests from Qorvo, or any requests from Qorvo to remove particular smelters from its supply chain.		
If the material purchased from the Supplier becomes incorporated into Qorvo Mobile Division products, the Supplier agrees to analyze its products at the homogeneous material level annually using a competent external laboratory. These analyses must meet the requirements listed in SPE-001202. Suppliers can contact Qorvo at QorvoGreen@Qorvo.com to find out if their products are used in Qorvo's Mobile Products Division.		

Requirement	Yes or No	Comment or Document Identification that meets this requirement
The Supplier requires its suppliers to have a Product Compliance Management System that meets or is equivalent to the requirements listed above. If the Supplier does not require this, please explain in a written document how the Supplier ensures that its supply chain meets the requirements listed in this document.		

Are there any other issues, concerns, questions, or suggestions that the Supplier would like to share with Qorvo regarding compliance to this specification?

Section	Page No.	Comment

The person signing below certifies that the above-named Supplier has duly authorized them to sign on behalf of the Supplier.

Signature	
Printed Name	
Title	
Date	

10 Revision History

Revision	Create Date (mm/dd/yyyy)	Description of Change	Initiator of Change
A	07/11/2017	<p>Renumbered this specification from QAL-21-1028 to SPE-001275 to match new Qorvo documentation requirements. Removed 3rd Party Lab Testing requirements for Suppliers to SPE-001202. Updated to Rev H of FOR-000469. Updated all requirements to match latest "significant" customer specifications.</p> <ul style="list-style-type: none"> Removed "2-(2H-benzotriazol-2-yl) - 4,6-ditertpentylphenol OR UV-328 CAS No. 25973-55-1" requirements as Significant Customer dropped this requirement. Removed "Bis(2-methoxyethyl) ether CAS No. 111-96-6" requirements as Significant Customer dropped this requirement. Removed "Borate Compounds" requirements as Significant Customer dropped this requirement. These substances are already covered under REACH requirements. Removed "N,N-dimethylacetamide (DMAC) CAS No. 127-19-5" requirements as Significant Customer dropped this requirement. These substances are already covered under REACH requirements. Removed "Ethylene glycol dimethyl ether (EGDME) CAS No. 110-71-4" requirements as Significant Customer dropped this requirement. These substances are already covered under REACH requirements. Removed "4-(1,1,3,3-tetramethylbutyl) phenol CAS No. 140-66-9" requirements as Significant Customer dropped this requirement. These substances are already covered under REACH requirements. Removed "Trixylyl phosphate (TXP) CAS No. 25155-23-1" requirements as Significant Customer dropped this requirement. These substances are 	John Sharp



Revision	Create Date (mm/dd/yyyy)	Description of Change	Initiator of Change
		already covered under REACH requirements.	
B	08/13/2018	Annual update. Updated Conflict Minerals references from CFSI to RMI. Added entry for "Octylphenol and its ether" to Table 1.	M. Mybeck
C	10/1/2019	Annual Update. Updated Product Compliance Definitions reference. Updated links in External References. Updated "Analysis Required" column of Table 1 to align with SPE-001202. Added the following substances to Table 1: <ul style="list-style-type: none">• Bisphenol F, CAS No. 620-92-8• Bisphenol S, CAS Nos. 2467-02-9; 1333-16-0; 80-09-1	M. Mybeck

CONTROLLED DISTRIBUTION:

201, 202, 206, 208, 400, 403, 406, 407, 409, 411, 412, 413, 414, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923