ANNEX I - Examples from Orgalim signatories of the impossibility to comply with Appendix C

a) Examples from Orgalim, representing Europe's technology industries

Example from the French Association FIEEC		
Product name	Power circuit breaker with electronic trip unit S10, breaking capacity 70kA, 400V	Picture of the product 
Taxonomy Delegated Act	Annex I of the Delegated Regulation (EU) 2021/2139	
Business activity	3.20 manufacture, installation and servicing of high, medium and low voltage electrical equipment for electrical transmission and distribution that result in or enable a substantial contribution to climate change mitigation	
Description of the product (what is it used for)	N/A	
Concrete application in the product/in the process	6a: lead in steel 6b: lead in aluminum 6c: lead in copper	
Related chemicals legislation	RoHS Directive	Picture of the concrete application in the product/in the Process
Substance name	Lead	

Reason for non-compliance with Appendix C	Use of RoHS exemptions	n.a.
Why can the use of this substance not be substituted?	This power switch contains brass components with lead over the 0.1% permitted by RoHS Directive article 4.1. It benefits an exemption under article 4.6, and more specifically from exemption 6c) of annex III Without these exemptions, many electrical and electronic products would be unable to meet the safety standards imposed on this type of equipment.	
Consequences for the product/the company	Furthermore, a significant proportion of such equipment is used on circuits designed to improve energy efficiency or on circuits designed to supply renewable energy. The RoHS Directive's objective is to ban the 10 substances listed in Annex I (Article 4.1), while allowing certain uses to be exempted through delegated acts if there are no scientifically or technically feasible alternatives. By referencing Article 4.1 of the RoHS Directive in Appendix C, it excludes all EEs benefiting from exemptions from alignment. The exemptions also enable products to be placed on the market that meet the most stringent safety standards concerning electrical disconnection, thus protecting users.	

Example 1 from the German Association ZVEI		
Product name	(Solar) String inverters	Picture of the product 
Taxonomy Delegated Act	Annex I of the Delegated Regulation (EU) 2021/2139	
Business activity	3.1 manufacture of renewable energy technologies	
Description of the product (what is it used for)	Generate, use and store solar power Conversion of direct current (DC) generated by solar panels into alternating current (AC) that can be used	
Concrete application in the product/in the process	Mostly used exemptions: 6(c) - Copper alloy containing up to 4% lead by weight 7(a) - Lead in high melting temperature type solders (i.e. lead-based alloys containing 85% by weight or more lead) 7(c)-I - Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound	
Related chemicals legislation	RoHS Directive	Picture of the concrete application in the product/in the Process n.a.
Substance name	Lead	
Reason for non-compliance with Appendix C	Use of RoHS exemptions	

Why can the use of this substance not be substituted?	No environmentally friendly, technical, and economical feasible substitute	
Consequences for the product/the company	We are therefore unable to demonstrate taxonomy alignment for our string inverters at this time.	

Example 2 from the German Association ZVEI		
Product name	(EV-) chargers	Picture of the product 
Taxonomy Delegated Act	Annex I of the Delegated Regulation (EU) 2021/2139	
Business activity	3.20 manufacture, installation and servicing of high, medium and low voltage electrical equipment for electrical transmission and distribution that result in or enable a substantial contribution to climate change mitigation	
Description of the product (what is it used for)	SMA charging solutions offer particularly intelligent, sustainable and cost-effective recharging of electric vehicles by unlocking the power of the sun	
Concrete application in the product/in the process	Mostly used exemptions: 6(c) - Copper alloy containing up to 4% lead by weight 7(a) - Lead in high melting temperature type solders (i.e. lead-based alloys containing 85% by weight or more lead) 7(c)-I - Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound	

Related chemicals legislation	RoHS Directive	Picture of the concrete application in the product/in the process n.a.
Substance name	Lead	
Reason for non-compliance with Appendix C	Use of RoHS exemptions	

Example 3 from the German Association ZVEI		
Product name	Spare parts (power stacks, power contactor, transformer, cables, etc.)	Picture of the product n.a.
Taxonomy Delegated Act	Annex I I of the Delegated Regulation (EU) 2020/852	
Business activity	5.2 Sale of spare parts	
Description of the product (what is it used for)	To maintain the functionality of our renewable energy technologies	
Concrete application in the product/in the process	Mostly used exemptions: 6(c) - Copper alloy containing up to 4% lead by weight 7(a) - Lead in high melting temperature type solders (i.e. lead-based alloys containing 85% by weight or more lead) 7(c)-I - Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound	
Related chemicals legislation	RoHS Directive	Picture of the concrete application in the product/in the process
Substance name	Lead	

Reason for non-compliance with Appendix C	Use of RoHS exemptions	n.a.
Why can the use of this substance not be substituted?	No environmentally friendly, technical, and economical feasible substitute	
Consequences for the product/the company	We are therefore unable to demonstrate taxonomy alignment for our string inverters at this time.	

Example 4 from the German Association ZVEI		
Product name	Variable speed drives	Picture of the product 
Taxonomy Delegated Act	Delegated Regulation (EU) 2021/2139	
Business activity	3.20. Manufacture, installation, and servicing of high, medium and low voltage electrical equipment for electrical transmission and distribution that result in or enable a substantial contribution to climate change mitigation	
Description of the product (what is it used for)	Variable speed drives are used to control the speed of electric motors and therefore to bring energy savings.	
Concrete application in the product/in the process	They can be used in different commercial and industrial applications such as: • HVAC Systems: to regulate fans, pumps, and chillers in heating, ventilation, and air conditioning systems. • Water and Wastewater Treatment: to adjust pump speeds for efficient water distribution and treatment processes.	

	• Food & Beverage: Control electrical motors powering food extrusion process • Chemicals Industry: Control electrical motors powering centrifugal pumps, gear, membrane and piston pumps, compressors etc.	
Related chemicals legislation	RoHS Directive and REACH Regulation (Candidate List)	Picture of the concrete application in the product/in the process  .
Substance name	Lead, other SVHCs in REACH Candidate List (more information: REACH SVHC-240 declaration (abb.com))	
Reason for non-compliance with Appendix C	Legal Uncertainty regarding assessment and documentation of non-availability of suitable substitutes	
Why can the use of this substance not be substituted?	RoHS: RoHS exemptions are evaluated regularly and renewed only when alternative solutions are not yet technically mature. REACH SVHC: For the full list of candidate substances there is only an information obligation according to REACH Articles 31, 32 and 33 for substances on their own, in mixtures or in an article. Currently, there is no procedure for evaluating or communicating alternatives. This comes first with proposing a restriction on articles containing substances that are on the Authorisation List in the Annex XIV, public consultation and the evaluation of an exemption under Annex XVII. According to the legal procedures, in both cases it will take at least up to four years until the sunset date or at least three years of working on the restriction proposal for the industry to evaluate and prepare for alternatives.	
Consequences for the product/the company	Lead is present in all our products. Substitutes for power electronics are not known. Products would not be aligned while being essential to reach the objectives for energy efficiency set by the EU for 2030 (-55 & GHG emission reductions). Objectives set by the Clean Industry Deal need frequency	

	converters to reduce energy consumption. Variable speed drives decrease energy consumption of electrical motors up to 20%.	

Example 5 from the German Association ZVEI		
Product name	Large Motors and Generators	Picture of the product 
Taxonomy Delegated Act	Delegated Regulation (EU) 2021/2139	
Business activity	3.20. Manufacture, installation, and servicing of high, medium and low voltage electrical equipment for electrical transmission and distribution that result in or enable a substantial contribution to climate change mitigation	
Description of the product (what is it used for)	Motors are used to transfer electrical energy into mechanical energy. Generators are used to transfer mechanical into electrical power.	
Concrete application in the product/in the process	They can be used in different commercial and industrial applications such as: • Marine propulsion, auxiliary systems • HVAC Systems: to regulate fans, pumps, and chillers in heating, ventilation, and air conditioning systems. • Water and Wastewater Treatment: to adjust pump speeds for efficient water distribution and treatment processes. • Food & Beverage: Control electrical motors powering food extrusion process • Chemicals Industry: Control electrical motors powering centrifugal pumps, gear, membrane and piston pumps, compressors etc.	

Related chemicals legislation	RoHS Directive and REACH Regulation (Candidate List)	Picture of the concrete application in the product/in the process  .
Substance name	Lead and other SVHCs in REACH Candidate List (more information: REACH SVHC-240 declaration (abb.com))	
Reason for non-compliance with Appendix C	RoHS: RoHS exemptions are evaluated regularly and renewed only when alternative solutions are not yet technically mature. REACH SVHC: For the full list of candidate substances there is only an information obligation according to REACH Articles 31, 32 and 33 for substances on their own, in mixtures or in an article. Currently, there is no procedure for evaluating or communicating alternatives. This comes first with proposing a restriction on articles containing substances that are on the Authorisation List in the Annex XIV, public consultation and the evaluation of an exemption under Annex XVII. According to the legal procedures, in both cases it will take at least up to four years until the sunset date or at least three years of working on the restriction proposal for the industry to evaluate and prepare for alternatives.	
Why can the use of this substance not be substituted?		
Consequences for the product/the company	Lead is present in all our products. Mainly in mild steels, copper and aluminium alloys. Products would not be aligned while being essential to reach the objectives for energy efficiency set by the EU for 2030 (-55 & GHG emission reductions). Premium efficiency electrical motors and generators which ABB OY is manufacturing can reduce the global power demand by up to 10%.	

Example from the EU Sector Association Pneurop		
Product name	GA37 VSDs air compressor	Picture of the product 
Taxonomy Delegated Act	Delegated Regulation (EU) 2020/852	
Business activity	3.6 Manufacture of other low-carbon technologies	
Description of the product (what is it used for)	Air compressor, crucial for most manufacturing processes not least within sectors that are essential in the transformation to a low-carbon society https://www.atlascopco.com/en-uk/compressors/products/air-compressor/rotary-screw-compressor	
Concrete application in the product/in the process		
Related chemicals legislation	RoHS Directive	Picture of the concrete application in the product/in the process
Substance name	Lead	
Reason for non-compliance with Appendix C	Use of RoHS exemptions	
Why can the use of this substance not be substituted?	As of today, no alternatives have been identified that can effectively replace lead as a machinability enhancer in steel in all respects (6(a) and 6(a)-I). Exemptions granted under RoHS to use lead and lead compounds, that cannot be used under the EU taxonomy	
Consequences for the product/the company	We are unable to demonstrate taxonomy alignment for our compressors at this time although this market-leading technology is essential to achieve energy efficiency objectives of the EU.	

Example from the EU Sector Association Europump		
Product name	**Pumps**	**Picture of the product** 
Taxonomy delegated act	**Annex I of the Delegated Regulation (EU) 2021/2139**	
Business activity	**Different: renewable energy, heating, cooling, chemical industry, water transport, irrigation, waste water….**	
Description of the product (what is it used for)	**Pumps with electronics, inverters, sensors,… in many different applications:** - **Chemical industry** - **Seawater** - **Drinking water** - **HVAC** - **Petrochemical industry** - **Dosing** - **Laboratory** - **Food, feed and beverage production** - **Wastewater** - **As component in cars, trains, planes, machines** - **…** **Pumps are a big source for energy consumption. The electronics are required for efficiency reasons. Only by that a lot of energy can be saved. Energy efficiency targets cannot be reached without electronics, sensoring,…**	

Concrete application in the product/in the process	Mostly used exemptions: 6(c) - Copper alloy containing up to 4% lead by weight 7(a) - Lead in high melting temperature type solders (i.e. lead-based alloys containing 85% by weight or more lead) 7(c)-I - Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound	
Related chemicals legislation	**RoHS Directive**	**Picture of the concrete application in the product/in the process**
Substance name	**Lead**	  
Why can the use of this substance not be substituted?	**e.g. for rectifier diodes (and other (electrical) components) currently no lead free alternative available, which is working;** **generally for those components, where exemptions are used no** - **Environmental friendly** - **Technically feasible** - **Economic feasible** **Substitutes available.**	
Consequences for the product/the company	**Taxonomy alignment for pumps with electronics is currently not possible.** **Energy efficiency targets require the RoHS exemptions.**	

Example 1 from the Company Danfoss		
Product name	Scroll compressor	Picture of the product 
Taxonomy Delegated Act		
Business activity	Commercial air conditioning and heat pumps	
Description of the product (what is it used for)	A compressor compresses a refrigerant gas to obtain a high pressure and temperature. The refrigerant gas is afterwards cooled and condenses. A compressor is the 'heart' of the basic refrigeration cycle.	
Concrete application in the product/in the process		
Related chemicals legislation	REACH Candidate List; RoHS Directive (exemptions 6(a), 6(a)-I, 7(a), 7(c)-I)	Picture of the concrete application in the product/in the process
Substance name	Lead	
Reason for non-compliance with Appendix C	Use of RoHS exemptions	
Why can the use of this substance not be substituted?	As of today, no alternatives have been identified that can effectively replace lead as a machinability enhancer in steel in all respects (6(a) and 6(a)-I). Alternative technologies to high temperature melting point solder with similar ductility and strength as lead alloys are as yet unavailable (7(a)). Substitution technology for lead in glass and/or ceramic and/or matrix compounds of these materials used in electrical and electronic components has not been found (7(c)-I).	

Consequences for the product/the company	The product will demand a full redesign as pressures are very high (more than 20 bar).	

Example 2 from the Company Danfoss		
Product name	NRVA 25 Check valve	Picture of the product 
Taxonomy Delegated Act		
Business activity	Commercial and industrial air conditioning and heat pumps	
Description of the product (what is it used for)	In the refrigeration cycle (used for heat pumps, air conditioning and various refrigeration applications) check valves are used to control the flow direction of the refrigerant and is necessary to avoid back flows that may damage the system during certain operational stages (stand still etc.)	
Concrete application in the product/in the process		
Related chemicals legislation	REACH Candidate List; RoHS Directive (exemption 6(a))	Picture of the concrete application in the product/in the process
Substance name	Lead	
Reason for non-compliance with Appendix C	Use of RoHS exemptions	
Why can the use of this substance not be substituted?	As of today, no alternatives have been identified that can effectively replace lead as a machinability enhancer in steel in all respects (6(a)).	

Consequences for the product/the company	The product will demand a full redesign as pressures are very high (more than 20 bar)	

Example 3 from the Company Danfoss		
Product name	AKVA 15-1 Electric expansion valve	Picture of the product 
Taxonomy Delegated Act		
Business activity	Commercial refrigeration – like supermarket systems	
Description of the product (what is it used for)	The AKV valve controls the injection of refrigerant into an evaporator by a controlled expansion process. During the expansion process the pressure decreases and the gas evaporates partly, which creates a temperature drop. The low temperature is used to cool or freeze e.g. food. The injection control is a key performance subprocess in the refrigeration cycle.	
Concrete application in the product/in the process		
Related chemicals legislation	REACH Candidate List; RoHS Directive (exemption 6(a) and 6(c))	Picture of the concrete application in the product/in the process
Substance name	Lead	
Reason for non-compliance with Appendix C	Use of RoHS exemptions	

Why can the use of this substance not be substituted?	As of today, no alternatives have been identified that can effectively replace lead as a machinability enhancer in steel in all respects (6(a)). The available lead-free brass alloys are not yet applicable for the use of leaded brass in this product (6(c)).	
Consequences for the product/the company	The product will demand a full redesign as pressures are very high (more than 20 bar)	

Example 4 from the Company Danfoss		
Product name	KVC 12 Hot gas bypass regulator	Picture of the product 
Taxonomy Delegated Act		
Business activity	Transport refrigeration	
Description of the product (what is it used for)	The regulator is a part of refrigeration system and is used to direct refrigerant flow back to the compressor for recompression. This can be necessary in case of high ambient temperatures when e.g. trucks transporting food are exposed to high temperatures in the summertime.	
Concrete application in the product/in the process		
Related chemicals legislation	REACH Candidate List; RoHS Directive (exemption 6(c))	Picture of the concrete application in the product/in the process
Substance name	Lead	
Reason for non-compliance with Appendix C	Use of RoHS exemptions	

Why can the use of this substance not be substituted?	The available lead-free brass alloys are not yet applicable for the use of leaded brass in this product (6(c)).	
Consequences for the product/the company	The product will demand a full redesign as pressures are very high (more than 20 bar)	

Example 5 from the Company Danfoss		
Product name	WVO 10 Pressure operated water valve	Picture of the product 
Taxonomy Delegated Act		
Business activity	A component typically used for chillers within the commercial and industrial segment for air conditioning and heating	
Description of the product (what is it used for)	The pressure in the condenser of refrigeration systems will be opening the water flow through the valve. This water will then be heated either for pure cooling of the entire system or for heating purposes (heat pump.	
Concrete application in the product/in the process		
Related chemicals legislation	REACH Candidate List; RoHS Directive (exemptions 6(b) and 6(c))	Picture of the concrete application in the product/in the process
Substance name	Lead	
Reason for non-compliance with Appendix C	Use of RoHS exemptions	

Why can the use of this substance not be substituted?	The available lead-free brass alloys are not yet applicable for the use of leaded brass in this product (6(c)).	
Consequences for the product/the company	The product will demand a full redesign as pressures are very high (more than 20 bar)	

Example 6 from the Company Danfoss		
Product name	MBT 153 Temperature sensor	Picture of the product 
Taxonomy Delegated Act		
Business activity	Industrial sector / Marine applications	
Description of the product (what is it used for)	MBT is a temperature sensor that gives accurate temperature feedback. The sensor is used in typical industrial environments and highly robust for harsh environments.	
Concrete application in the product/in the process		
Related chemicals legislation	REACH Candidate List; RoHS (exemptions 6(a), 6(b), 6(c), 7(a) and 7(c)-I)	Picture of the concrete application in the product/in the process
Substance name	Lead	
Reason for non-compliance with Appendix C	Use of RoHS exemptions	

Why can the use of this substance not be substituted?	As of today, no alternatives have been identified that can effectively replace lead as a machinability enhancer in steel in all respects (6(a)). The available lead-free brass alloys are not yet applicable for the use of leaded brass in this product (6(c)). Alternative technologies to high temperature melting point solder with similar ductility and strength as lead alloys are as yet unavailable (7(a)). Substitution technology for lead in glass and/or ceramic and/or matrix compounds of these materials used in electrical and electronic components has not been found (7(c)-I).	
Consequences for the product/the company	The product will demand a full redesign as several internal parts need redesign.	

Example 1 from the company Siemens		
Product name	Variable speed drives	Picture of the product 
Taxonomy Delegated Act	Delegated Regulation (EU) 2021/2139	
Business activity	3.20. Manufacture, installation, and servicing of high, medium and low voltage electrical equipment for electrical transmission and distribution that result in or enable a substantial contribution to climate change mitigation	
Description of the product (what is it used for)	Variable speed drives are used to control the speed of electric motors and therefore to bring energy savings.	

Concrete application in the product/in the process	They can be used in different commercial and industrial applications such as: - HVAC Systems: to regulate fans, pumps, and chillers in heating, ventilation, and air conditioning systems. - Renewable energy: to optimize wind turbine and solar panel performance by adjusting generator speed. - Water and Wastewater Treatment: to adjust pump speeds for efficient water distribution and treatment processes. - Agriculture: to manage water pumps of irrigation system	
Related chemicals legislation	RoHS Directive	Picture of the product  Water treatment sector
Substance name	Lead, lead oxide	
Reason for non-compliance with Appendix C	Use of RoHS exemptions	
Why can the use of this substance not be substituted?	Exemptions granted under RoHS to use lead and lead compounds, that cannot be used under the EU taxonomy	
Consequences for the product/the company	Product not aligned while being essential to reach the objectives for energy efficiency set by the EU for 2030 (-55 & GHG emission reductions)	

Example 2 from the company Siemens		
Product name	SENTRON PAC4220 Power Monitoring Device	Picture of the product
Taxonomy Delegated Act	Delegated Regulation (EU) 2021/2139	
Business activity	3.20 Manufacture, installation, and servicing of high, medium and low voltage electrical equipment for electrical transmission and distribution	

Description of the product (what is it used for)	Measuring device for power system quality measurement	
Concrete application in the product/in the process	SENTRON multifunction measuring devices precisely, reproducibly, and reliably measure the energy values for in-feeds, outgoing feeders, or individual loads, and allow you to accurately record energy consumption in TN, TT, and IT networks. In addition, they also supply key measured values for assessing the system states and power quality. For processing the measured data, the devices come with a wide range of communication options to ensure smoother integration into higher-level automation and energy management systems. Their functionality is also assured in wet and dusty environments. In addition, update-capable MID-certified device versions allow for particularly future-proof charging of energy consumption	
Related chemicals legislation	REACH Regulation / RoHS Directive	
Substance name	REACh: lead, lead monoxide RoHS exemptions: 7a - Lead in high melting temperature type solders (lead-based alloys containing 85% by weight or more lead 7c-I - Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors (e.g., piezo electronic devices) or in a glass or ceramic matrix compound	
Reason for non-compliance with Appendix C	Used in electronic components (transistors, diodes and resistors). No sufficient alternatives are available. Reliable functionality of the device would not be possible without these substances at present.	

Why can the use of this substance not be substituted?	No efficient alternatives known so far. Alternatives lead to a significantly higher consumption of energy in ceramic PCB component production. The harm for the objective "climate change mitigation" would be worse compared to the effect of diborontrioxide on the objective of "pollution prevention". Skin contact and incorporation of substance in final product practically impossible.	
Consequences for the product/the company	Product not aligned while being essential to reach the revised objectives of 42.5 % of renewables by 2030	

b) Examples from UNIFE, representing the European Rail Supply Industry

Template to collect examples from signatories on the impossibility to comply with Appendix C of EU Taxonomy		
Product name	Tram	
Taxonomy Delegated Act		
Business activity	3.3 Manufacture of low carbon technologies for transport	
Description of the product (what is it used for)	Urban transport vehicle	

Concrete application in the product/in the process	For example, the Lead and its compounds are widely used in the Electric and Electronic components of the rail vehicles due to the harsh operational environment.	
Related chemicals legislation	REACH, RoHS Directive	Picture of the concrete application in the product/in the process
Substance name	Lead	
Reason for non-compliance with Appendix C	Use of RoHS Exemptions	
Why can the use of this substance not be substituted?	Lead is commonly used in electronic soldering of railway products so that the shock and vibration requirements of the rail vehicles can be achieved.	
Consequences for the product/the company	Lack of solutions for electronic component soldering.	