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MedTech Europe contribution to RoHS2 review:

Uses of 7 substances in *in vitro* diagnostic medical devices and medical devices (not exhaustive)

Substance	CAS	Uses	Notes	Risk
Antimony oxide	Name may refer to: diantimony tetroxide (CAS 1332-81-6), antimony (III) oxide (CAS 1309-64-4), antimony pentoxide (CAS 1314-60-9), antimony hexitatridecoxide (CAS N/A), and/or stibiconite (CAS N/A)	The first 3 antimony oxide compounds listed are potential flame retardants in ABS and other plastics, however they are also found in some pigments. Antimony (III) oxide and antimony pentoxide are used in the production of glasses, ceramics, and enamels, as well as a potential catalyst in PET plastic and in the vulcanization of rubber. Antimony pentoxide is also used as a flocculant in titanium dioxide. This is a common flame retardant which may be present in **medical device plastic parts**, and especially in component molds (mold= the plastic epoxy coating on the component.) This substance can even be used for the simplest of passive components, such as **capacitors, resistors, ic-chips and printed wiring board**.	ABS, plastics - Flame retardant Pigments/titanium dioxide Rubber - Vulcanization PET – Catalyst	Likely present in some finished articles

MedTech Europe
Rue Joseph II 40, 1000 Brussels – Belgium
Tel. +32 2 772 22 12 – Fax. +32 2 771 39 09
info@medtecheurope.org – www.medtecheurope.org

		Antimony oxide is a synergist flame retardant which is used (and it only works) together with another flame retardant compound, typically this is the TBBPA (below). Typical concentrations are in 2-5% range in homogeneous materials (e.g. above RoHS threshold 0.1%). If presence of antimony is detected, one would suspect TBBPA presence as well. Diantimony trioxide is a is a useful catalyst in the production of polyethylene terephthalate (PET plastic) and the vulcanization of rubber. Diantimony trioxide is used in some components in **flow cytometers** and **automatic dispensing equipment** sold to hospitals for medical supplies and drug storage.		
Tetrabromobisphenol A (TBBP-A)	79-94-7	Used as a flame retardant in polycarbonates (replaces some of the BPA). Also used to prepare some epoxy resins, used in **printed circuit boards**. TBBP-A is a monomer; **not anticipated to be in final product except as residua**l. This is a common flame retardant with wide use, used in combination with antimony oxide. Also TBBPA concentrations in homogeneous materials	Polycarbonate/epoxy - Flame retardant Printed circuit boards – Epoxy	Likely utilized during process

		exceed 0.1% RoHS thresholds (typically 2-5% conc. in homogeneous materials of the component mold epoxy).		
Indium Phosphide	22398-80-7	Used in high-power/high-frequency electronics, laser diodes and photonic integrated circuits.	Laser diodes, photonic integrated circuits	Moderate risk; specialized usage
Medium Chain Chlorinated Paraffins (MCCPs)	85535-85-9	Flame retardants and plasticizers. Also used as additives in metal working fluids, and in sealants, paints, adhesives, textiles and coatings. This could be relevant, especially **if device contains any flexible PVC coated wiring** (for these devices maybe relevant, if the EEE assembly contains internal wiring).	PVC, flexible polymers - Flame retardant, plasticizer Paints, coatings, adhesives - Formulatory component	Moderate risk; specialized usage
Beryllium and its compounds	7440-41-7, Various (notably Beryllium Copper, CAS 11108-64-8, Beryllium Oxide, CAS 1304-56-9)	Because of its low atomic number and very low absorption for X-rays, the oldest and still one of the most important applications of beryllium is in radiation windows for X-ray tubes. Beryllium alloys are used in many applications because of their combination of elasticity, high electrical conductivity and thermal conductivity, high strength and hardness, nonmagnetic properties, as well as good corrosion and fatigue resistance. Many **electrical connectors** contain beryllium copper.	Semiconductors, SMT PCBs, Heat Sinks - Beryllium Contacts, springs, membranes - Beryllium Copper Electrical insulation - Beryllium Oxide	Likely present in some finished articles

		Dopant in III-V compound semiconductors, used in some surface-mount technology (SMT) **printed circuit boards**. Potentially used as structural support and heat sink in electronic applications, specifically with polyimide glass and aluminum substrates. Beryllium copper is utilized in contacts, springs, and membranes, as well as a hardening agent in metal substrates. Beryllium oxide is an insulator and heat conductor. Beryllium could be relevant **if devices contain connectors**, where Be use is sometimes required. Are there battery contacts or any other connectors present in these devices? Another common use for beryllium is as beryllium copper alloys used in **springs** (this should be easily confirmed by checking the alloy type used in any springs). Beryllium is used in some components in **flow cytometers** and **automatic dispensing equipment** sold to hospitals for medical supplies and drug storage.		
Nickel Sulphate and Nickel Sulfamate	7786-81-4, 13770-89-3	Nickel electroplating chemical. Also a processing chemical in the production of nickel catalysts.	Metals - Electroplating	Likely utilized during process

		Limited usage of nickel sulphate in **flow cytometers**.	Catalysts - Processing chemical	
Cobalt Dichloride and Cobalt Sulphate	7646-79-9, 10124-43-3	Cobalt electroplating chemical. Also a processing chemical in the production of cobalt catalysts. Cobalt sulphate is also used in porcelains and **glass, in batteries, and inks**. **Flow cytometer parts** may contain cobalt sulphate.	Metals - Electroplating Porcelain, glass - Additive Batteries - Chemical Ink – Additive	Likely utilized during process

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