

ROHS exemptions No. 6a

Lead as an alloying element in steel for machining purposes and in galvanised steel containing up to 0,35 % lead by weight

As a Technical Department of the COMITE FRANCECLAT (French Watch, Clock, Jewellery, Silverware & Tableware Centre), CETEHOR provides the following comments about the use of leaded machining steel for quartz watch movement parts.

Machining steel

Question 1.

1.a. In accordance with the proposal “Lead as an alloying element in steel for machining purposes and in batch hot dip galvanized steel items containing up to 0,35 % lead by weight”

1.c. Explain, using technical arguments based on the criteria of Article 5(1)(a), why :

Machining steel is used in the watch-making industry to manufacture parts for quartz watch movements. The mechanical characteristics of these very small parts are highly important, as is dimensional conformity, with tolerances of between 5 and 10 µm, they are produced in medium and large production runs. The presence of a low lead content (0.2%) improves machinability considerably. Replacement of machining steel with unleaded steel is impractical both from the financial and technical points of view. Attempts at creating substitutes have been unsatisfactory to date: the considerable wear suffered by tools during machining means that parts cannot be manufactured with sufficient profitability in a severe context of competition with low-cost labour countries.

Furthermore, the longer machining cycle requires greater energy consumption.

Question 2.

2.a. Applications :

Parts for quartz watch movements: plates, wheels, screws, nuts, pins, pivots. All these parts are extremely small and must present excellent mechanical characteristics. They are machined.

NB: a watch movement is the mechanism inside the watch which measures and indicates time.

2.b and 2.c. Functions of lead :

Lead considerably improves machinability. The absence of lead increases machining times and creates greater wear on tools: tools therefore need to be replaced more often. Withdrawal of authorisation to use lead would have the effect of increasing production costs.

2.c. Quantity of lead used per year

Annual French production of quartz watches: 0.5 million

Estimated average mass of machining steel per movement: 1 g

Maximum lead content of this steel: 0.2 %

Giving a total quantity of lead of 1 kg.

Question 3.

Machining steels (for machining) use lead contents of 0.2 %, the regulatory limit could be reduced to 0.3% to allow alloy suppliers to guaranty conformity to the regulatory value.

Question 4.

See 2.b and c

The main performance criteria is machinability: cutting speed, wear of tools...

Question 5.

Tests to replace leaded machining steels with unleaded steels were inconclusive for financial reasons: greater wear on tools and longer machining cycle leading to far higher production costs.

Question 6.

Tests using unleaded steel (machining steel or stainless steel) have not allowed an alternative to be identified.

Question 8.

8.a.

No alternatives to leaded machining steels would be satisfactory at the moment. Separation of the two types of steel would not appear to be necessary.

8.c.

It is always difficult to be exhaustive. To prevent that certain properties are not taken into consideration, the exemption must not be linked to the properties of steels.

Question 9.

1) Regulatory aspect

Directive 2011/65/EU stipulates in its consideration (28) :

“When reviewing this Directive, a thorough analysis of its coherence with Regulation (EC) No 1907/2006 should be carried out by the Commission.”

and in Article 6 :

“The review and amendment of the list of restricted substances in Annex II shall be coherent with other legislation related to chemicals, in particular Regulation (EC) No 1907/2006, and shall take into account, inter alia, Annexes XIV and XVII to that Regulation. “

Entry 63 of Annex XVII of Regulation (EC) No 1907/2006, indicates that lead and its compounds

“1. Shall not be placed on the market or used in any individual part of jewellery articles if the concentration of lead (expressed as metal) in such a part is equal to or greater than 0,05 % by weight.

2. For the purposes of paragraph 1 :

(i) “jewellery articles” shall include jewellery and imitation jewellery articles and hair accessories, including:

(a) bracelets, necklaces and rings ;

(b) piercing jewellery ;

(c) wrist watches and wrist-wear ;

(d) brooches and cufflinks ;

(ii) “any individual part” shall include the materials from which the jewellery is made, as well as the individual components of the jewellery articles.

4. By way of derogation, paragraph 1 shall not apply to :

(a) crystal glass as defined in Annex I (categories 1, 2, 3 and 4) to Council Directive 69/493/EEC () ;*

(b) internal components of watch timepieces inaccessible to consumers ;

(c) non-synthetic or reconstructed precious and semiprecious stones (CN code 7103, as established by Regulation (EEC) No 2658/87), unless they have been treated with lead or its compounds or mixtures containing these substances ;

(d) enamels, defined as vitrifiable mixtures resulting from the fusion, vitrification or sintering of minerals melted at a temperature of at least 500 °C. “

Components of the movements of quartz watches are internal components and inaccessible to consumers, they are therefore exempt from the prohibition on the use of lead. So that Directive 2011/65/EU remains consistent with Regulation (EC) n° 1907/2006 when it stipulates, authorisation for lead to be used in machining steels must be maintained.

2) Environmental aspect :

Quartz watch movement parts are easily and completely removable and recyclable. The reuse of materials reduces the release of lead into the environment.

3) Financial aspect :

An absence of lead in machining steel significantly increases production costs. As these companies are mostly SMEs, they would not be able to support a prohibition when faced with low-cost foreign competition.