

Iron Platform position paper on welding electrodes

Background

Welding electrodes are welding consumables – they may be in the form of sticks / rods, or wires. The main difference is the length, with sticks and rods being shorter, and wires being longer and often supplied wound onto a spool. In both cases the electrode melts during the welding process. Some welding electrodes are not consumed during welding and thus are out of scope of this document¹. Consumable electrodes provide “filler metal” that forms the weld between the metal components to be joined (the workpiece – which usually has article status under REACH²). For this reason the chemical composition of the electrode is typically similar to the workpiece. Welding electrodes are commercially available in a variety of types and classifications. Different welding techniques and metal workpiece materials require a corresponding electrode that is appropriate for the application. Electrodes are selected initially by chemical composition (compatibility with the workpiece base metal), but shape and diameter are also important in order for the welding process to function correctly.

Conclusion

Welding electrodes should be regarded as a **substance or mixture** under REACH. Electrodes are manufactured from metal alloys³, which are regarded as special mixtures under REACH⁴ – so an electrode should also be regarded as a **special mixture**.

Registration requirements exist for the substances in the mixture, there are no further requirements relating to articles.

Iron Platform position on welding wires and electrodes

Welding electrodes are clearly objects – this is not in question. The question to be answered is whether or not they are regarded as articles or not under REACH. The term “object” can in principle refer to any product in the supply chain. The term “article” under REACH has a particular meaning and brings into play some possible obligations for those actors placing articles on the market - where either there is an intended release of a substance from the article, or where a Substance of Very High Concern (SVHC) is present in the article. In order to determine the status of welding electrodes under REACH, the

¹ Examples are electrodes for Tungsten Inert Gas (TIG) welding where the electrode does not melt.

² [Background \(eurofer.eu\)](#). Position paper determining the borderline between preparations / articles for steel and steel products

³ An example is an electrode manufactured from mild steel, which is a special mixture of the elements iron and carbon.

⁴ The REACH Regulation refers to alloys as "special mixtures" (Recital (31), Annex I (0.11.)), as amended by Regulation (EC) No 1272/2008). Therefore, an alloy is to be treated in the same way as other mixtures under REACH, which means that the alloy as such is not subject to registration but the alloying elements (e.g. metals), irrespectively of the production process of the alloy are. However, components which are not important for the properties of the alloy should be considered as impurities (i.e. they are part of a substance in the mixture) and therefore need not be registered separately.

relevant guidance is needed⁵. The guidance particularly assists companies in deciding if they have to fulfil REACH registration (Article 7(1)), communication (Article 33) and/or notification (Article 7(2)) requirements related to substances in articles.

The first step is to consult the decision tree in Figure 1, taken from the 2017 ECHA guidance document. The function of the object is as above. Both chemical composition **and** shape / surface / design of the object are important and it is not possible to unambiguously conclude *yes* or *no* to this question in Step 2. The object does **not** contain a substance / mixture that can be separated from the object.

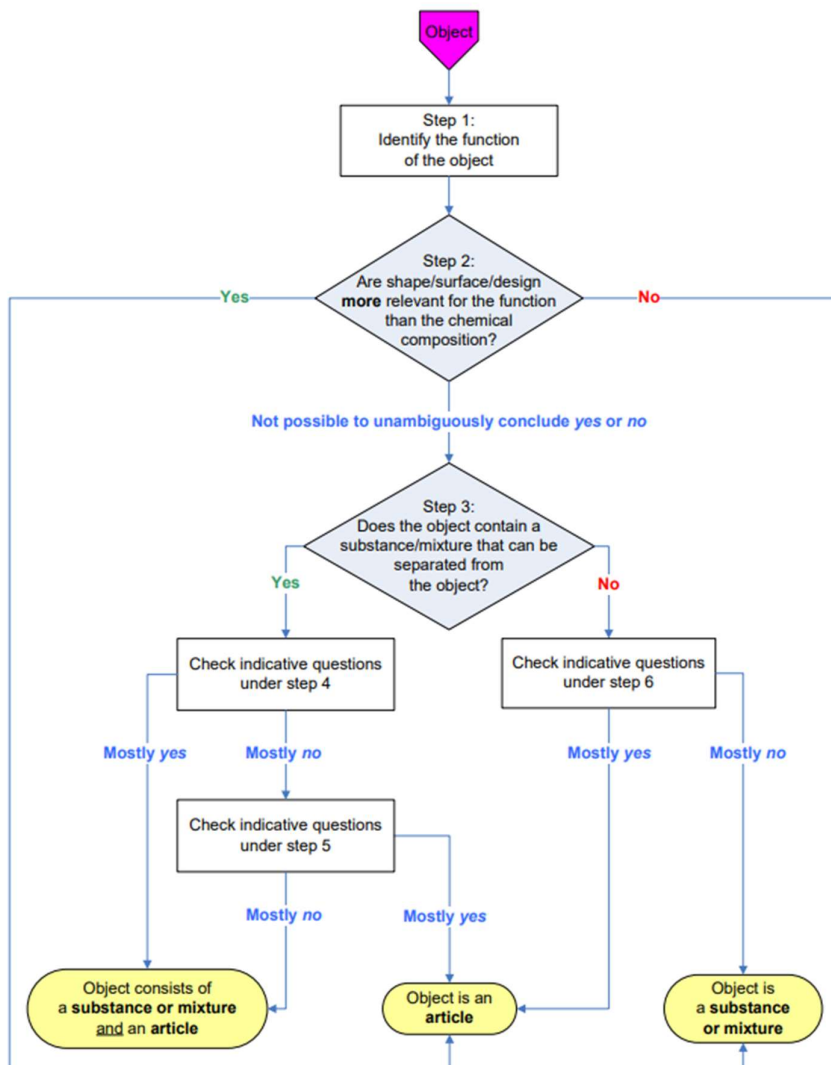


Figure 1: Decision-making on whether an object is an article or not.

⁵ Guidance on requirements for substances in articles. ECHA, June 2017, Version 4.0.

Hence the answer to Step 3 is *no* and the indicative questions under Step 6 must be checked. This step is for deciding whether the object fulfils the REACH definition of an article or not – but may however still be difficult in certain cases. Common examples are raw materials and semi-finished products that are further processed to final articles. The questions are:

Question 6a: Does the object have a function other than being further processed?

If the object predominantly has other functions (i.e. end-use functions), then this may be an indication that it is an article according to the definition of REACH.

Question 6b: Does the seller place the object on the market and/or is the customer mainly interested in acquiring it because of its shape/surface/design (and less because of its chemical composition)?

If the object is mainly put on the market or acquired because of its shape/surface/design, this is an indication that the object is an article.

Question 6c: When further processed, does the object undergo only "light processing", i.e. no gross changes in shape?

"Light processing", such as drilling, surface grinding or coating, may improve or modify an object's shape, surface or design for carrying out a function and is thus frequently applied to objects which are already articles. Thus, if only "light processing" is applied, this is an indication that the object is an article.

Processes leading to gross changes in shape, meaning changes of depth, width and height of an object, are not regarded as "light processing". These can for example be primary shaping processes (such as casting or sintering) or forming processes (such as extrusion, forging or rolling). If the object preserves at least one of its characteristic dimensions (depth, width and/or height) when further processed, the process can be regarded as "light processing".

Question 6d: When further processed, does the chemical composition of the object remain the same?

A change of the chemical composition in the next processing steps may indicate the object being a mixture. However, some treatments of an object which is an article may result in a change in its overall chemical composition, but not in the status of the object being an article. Examples are printing onto the surface, painting, applying coatings, dyeing etc.

The answers are:

- 6a – ambiguous, in many cases the electrode is also part of the welding circuit as well as being a source of filler metal for the joint. If it were not a stick, rod or wire it would not work as intended in the welding process, and this is why users purchase wire. However – the main purpose of using the electrode is for it to provide molten filler metal to go into the welded joint. The answer is more *no* than *yes*.
- 6b – more *no* than *yes*, the user selects the wire initially because of its composition (compatibility with the material being welded) – but also because it is an object i.e. suitable for use in the chosen welding process.
- 6c – clearly *no*, "light processing" – does NOT include melting (as stated in the guidance). The electrode melts and is fully consumed.

- 6d – more *yes* than *no*, the wire melts but then solidifies again with broadly the same composition. Some melting of the workpiece may also occur which can impact the composition of the weld.

Conclusion – ***no* predominates over *yes***. Predominantly answering *no* to the questions indicates that the object is a substance or mixture.

Electrodes are manufactured from metal alloys, which are regarded as special mixtures – so an electrode should also be regarded as a **special mixture**.

An example is an electrode manufactured from mild steel, which is a special mixture of the elements iron and carbon.

As the object is regarded as a mixture, there are no further requirements relating to articles.

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