



Boric Acid, Borates and Corrosion Inhibitors

Boric acid is the parent acid of borate minerals which are found naturally in the earth's crust. Borate minerals have been extracted and used commercially for over 100 years. Boric acid and related borate compounds have many uses in a wide variety of applications as diverse as medicinal products, heat resistant ceramics and in agriculture as micronutrients. In all that time, they have been considered to be of low hazard and have been used safely for generations.

Boric acid is used as a starting material for the production of a group of corrosion inhibitors that are widely used in water-mix metalworking fluids.

Classification of the Raw Materials

In spite of considerable industry and downstream user opposition based on decades of safe human experience, EC regulators decided to classify boric acid, boric oxide and disodium tetraborates for reproductive toxicity in 2009. Under the CLP Regulation, they are classified as Category 1B reproductive toxins. The classification and labelling requirements for boric acid are summarised below.

- **Classification:** Repr 1B; H360FD
- **Labelling:** Pictogram: GHS08
Signal Word: Danger
Hazard Statements: May damage fertility. May damage the unborn child.
- **Regulatory Reference:** Annex VI, Table 3.1 to Regulation (EC) No 1272/2008 of the European Parliament and Council as amended by Commission Regulation (EC) No 790/2009

Scope of the Harmonised Classification

The harmonised classification applies to boric acid, boric oxide and disodium tetraborates including borax. Where these substances are present in mixtures, specific concentration limits (SCLs) apply before the mixture also has to be classified and labelled in the same way. For boric acid it is 5.5%, which means that only those mixtures containing 5.5% or more of *free* boric acid have to be classified in this way. The SCLs of boric oxide and the disodium tetraborates included in CLP Annex VI are broadly in line with their boron content (equivalent to 1% boron).

In response to additional information provided by the borates industry, a proposal was submitted by the Polish Competent Authority (CA) to reclassify boric acid as a Category 2 reprotoxin. This was discussed by the Risk Assessment Committee (RAC) of the European Chemicals Agency (ECHA) in March 2014 but they decided that the new information was not sufficient to change the Category 1B classification. As a result the Polish CA withdrew other dossiers proposing reclassification of boric oxide and disodium tetraborates. It appears unlikely that this classification will be re-examined in the future.

Recently two more borates (disodium octaborate anhydrous and tetrahydrate) have been recommended by the RAC to be classified as Category 1B reproductive toxins but without an SCL. Instead it was considered that the general regulatory threshold for a medium potency reprotoxin of 0.3% should apply. This RAC opinion must still be formally adopted by the Commission through an ATP to the CLP Regulation. Regardless of what the Commission decides in this case, the SCLs for boric acid, boric oxide and disodium tetraborates that are included in CLP Annex VI will remain in place until a Member State submits a proposal to change them resulting in a revision of Annex VI. This is not foreseen at present.

Other borate substances and other reaction products of boric acid are not within the scope of the harmonised classification. Rather, their self-classification is a matter for the company responsible for placing it on the market, although it is likely to be discussed amongst members of the appropriate SIEFs (Substance Information Exchange Forums) as part of their registration under the REACH Regulation.

Specifically, the complex reaction product of boric acid and ethanolamine is not classified for reproductive hazard today due to an absence of test data but the registrants have submitted a test plan as part of their REACH registration and are committed to performing reproductive toxicity testing of this substance. The outcome of these tests will be used to determine whether this substance should be classified for reproductive hazard.

Finally, in terms of transporting goods from one site to another the harmonised classification as a reprotoxic substance has no effect on transport regulations. Boric acid and the other classified borates are not considered dangerous goods for transport.

Consequence of the Harmonised Classification – The Candidate List and Authorisation

A stated aim of REACH is the protection of human health and the environment, an objective that is fully supported by the UKLA and the members of the Metalworking Fluid Product Stewardship Group (MWF PSG). In order to achieve this protection, REACH introduced a process, known as Authorisation, in which those substances that are considered to pose an unacceptably high risk to human health and the environment may be removed from the market unless there is a justifiable need for them to remain.

Before a substance can be subject to Authorisation there are four stages that must occur:

1. Identification as a Substance of Very High Concern (SVHC)
2. Entry onto the Candidate List
3. Prioritisation for Authorisation
4. Addition to the REACH Annex XIV List of Substances subject to Authorisation

At each stage of this process there is no certainty that a substance will necessarily proceed to the next stage, although if a substance completes the final stage it will be potentially removed from the market for all uses that are not exempted or for which authorisations have not been granted.

Today, there is no evidence to suggest that boric acid or borates more generally pose an “unacceptably high risk” to human health or the environment when the suppliers’ recommendations are followed. However, classification as a Category 1B reprotoxic substance means that boric acid and the other borates with a harmonised classification are within the scope of Authorisation.

Boric acid, boric oxide and disodium tetraborates reached the second stage in this process in June 2010 when they were added to the Candidate List. Entry onto the Candidate List places some legal supply chain communication obligations on suppliers of those substances but it does not restrict their use in any way. Most suppliers choose to use the Safety Data Sheet to meet their communication requirements since the presence of any SVHC at 0.1% or greater has to be disclosed in Section 3.

More recently, boric acid, boric oxide and disodium tetraborates have been recommended by ECHA for inclusion on Annex XIV, the list of substances subject to Authorisation, following the publication of its 6th recommendation. A public consultation on this recommendation concluded earlier this year and at the same time the Commission took the opportunity to gather socio-economic information about the potential impact of Authorisation. Both the UKLA MWF PSG and UEIL’s HSE Committee submitted comments opposing the proposal. The recommendation still has to be finally approved by the Commission, and lobbying by industry is continuing.

Even if boric acid was added to REACH Annex XIV, its use as an intermediate (i.e. as a production raw material) to manufacture another substance (such as a salt, which is either isolated or remains in-situ) would be **out of scope** for Authorisation. Note however that the use of boric acid as an unreacted blend component in a mixture (i.e. the formulation step) would be in scope for Authorisation, although any mixtures containing free amounts of boric acid below the SCL assigned in Table 3.1 of Annex VI of CLP Regulation remain **out of scope** for Authorisation.



Boric Acid – a Starting Material for Corrosion Inhibitors

Boric acid is used as a starting material in the production of a range of corrosion inhibitor additives that are widely used in metalworking fluids. The additives are most commonly manufactured by reaction and subsequent complex formation of boric acid with alkanolamines. The corrosion inhibitors are produced by additive manufacturers for use by metalworking fluid formulators. Some formulators also use boric acid themselves. Consequently, the specific nature of the active ingredients in the corrosion inhibitors is complex and they can vary significantly in their chemistry.

Given this complexity, it is a matter for individual manufacturers and formulators to determine the chemical nature of their products and to advise their downstream users accordingly.

Users of Metalworking Fluids

The reaction conditions and the choice of whether to add boric acid directly or to use a manufactured additive are options faced by each fluid producer. If in any doubt about whether your fluid contains any free boric acid, your UKLA Metalworking Fluid Product Stewardship Group supplier will be pleased to answer any queries.

The Metalworking Fluid Product Stewardship Group

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The Metalworking Fluid Product Stewardship Group exists to promote the industry's commitment to the development, manufacture and marketing of safe and effective metalworking fluid products. It will assist in the education of users, enhance the health and safety provision to both the members and their customers' employees, protect the environment and provide qualified, reviewed information to industry, trade unions, Government and the general public.

Member companies have each subscribed to the principles of product stewardship in respect of their metalworking fluids businesses and have signed a commitment to a common code of ethics.

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