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Revision 31 July 2013 *

Draft background document for Zirconia Aluminosilicate Refractory Ceramic Fibres (Zr-RCF)

Document developed in the context of ECHA's fifth Recommendation for the inclusion of substances in Annex XIV

Information comprising confidential comments submitted during public consultation or relating to content of Registration dossiers, which is of such nature that it may potentially harm the commercial interest of companies if it was disclosed, is provided in a confidential annex to this document.

1. Identity of the substance

Zirconia Aluminosilicate Refractory Ceramic Fibres are fibres covered by index number 650-017-00-8 in Annex VI, part 3, table 3.1 of Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, and fulfil the three following conditions: a) oxides of aluminium, silicon and zirconium are the main components present (in the fibres) within variable concentration ranges b) fibres have a length weighted geometric mean diameter less two standard geometric errors of 6 or less micrometres (μm). c) alkaline oxide and alkali earth oxide ($\text{Na}_2\text{O}+\text{K}_2\text{O}+\text{CaO}+\text{MgO}+\text{BaO}$) content less or equal to 18% by weight.

Chemical name: Zirconia Aluminosilicate Refractory Ceramic Fibres
EC Number: -
CAS Number: -
IUPAC Name: -

2. Background information

2.1. Intrinsic properties

Zirconia Aluminosilicate Refractory Ceramic Fibres (Zr-RCF) were identified as a Substance of Very High Concern (SVHC) in accordance with Article 57 (a) as they are classified in Annex VI, part 3, Table 3.1 (the list of harmonised classification and labelling of hazardous substances) of Regulation (EC) No 1272/2008 as carcinogen, Carc. 1B¹ (H350i: "May cause cancer"), and were therefore included

* a) clarification regarding manufacture process (section 2.2.2.1, lines 1-3); b) removal of brand name (section 2.3, page 4, line 1)

¹ This corresponds to a classification as carcinogen cat. 2 (R45: "May cause cancer") in Annex VI, part 3, Table 3.2 (the list of harmonised classification and labelling of hazardous substances from Annex I to Directive 67/548/EEC) of Regulation (EC) No 1272/2008

in the Candidate List for authorisation on 19 December 2011, following ECHA's decision ED/77/2011 and ED/95/2012.

2.2. Imports, exports, manufacture and uses

2.2.1. Volume(s), imports/exports

According to the current analysis of the registration dossiers received, the annual volume of Zirconia Aluminosilicate Refractory Ceramic Fibres (Zr-RCF) manufactured/ imported in the EU is <10,000 t. This tonnage has to be seen as minimum as there might be more registrations falling under the Candidate List entry.

2.2.2. Manufacture and uses

2.2.2.1. Manufacture and releases from manufacture

Generally, refractory ceramic fibres (RCF) are manufactured from the melting of calcined or pure minerals such as silica, alumina, zirconia, kaolin. The manufacture process consists of blowing an air stream on the molten material flowing from an orifice at the bottom of the melting furnace (blowing process) or by directing the molten material onto a series of spinning wheels (spinning process). The fibres are further processed into bulk material or blankets to improve handling strength. The bulk material can be converted into several types of products. Using processes similar to those in the paper industry, the bulk material can be processed into boards, shapes, felts and papers. It can also be used for textiles and mixed into cements and putties. Blankets are often used directly, (e.g. as a furnace insulation material), but they are also converted into modules used for furnace lining, gaskets and other products or articles (Annex XV report, 2009, 2011).

Occupational exposure of Zr-RCF may occur during all manufacturing processes such as production of fibres, mixing and forming processes, cutting or machining the material after fibre manufacture (finishing processes) and during processes where the fibres are combined or assembled with other material. In primary production 750 workers are exposed regularly in the EU (Annex XV report, 2009, 2011).²

2.2.2.2. Uses and releases from uses

Zr-RCF are used in high temperature industries as insulation. The largest single use is furnace linings and related applications (67%). Other applications have been described in automotive industry, metal treatment and fire protection (Annex XV report, 2009, 2011). The entire volume is within the scope of authorization.

Fibre dust is present during all installation and end use processes. This includes e.g. building or manufacturing industrial furnaces or boilers for refinery or petrochemical plant equipment, kilns, foundry equipment, electric power

² Numbers of workers might have changed as these numbers refer to the year 1999.

generators at end-user locations. Exposure also occurs during furnace maintenance and removal of RCF from industrial furnace. The European Chemical Fibre Industry Association (ECFIA) estimated around 25,000 employees to be dealing with RCF including manufacturing. Regularly exposure occurs at convertors (850 workers). Sporadically exposure occurs to workers in the field of installation contractors (1,500 workers) and end uses (21,000 workers) (Annex XV report, 2009, 2011).³

2.2.2.3. Geographical distribution and conclusions in terms of (organisation and communication in) supply chain

Registrants of Zr-RCF fulfilling the substance identity definition are situated in three Member States. However this has to be considered as the minimum number as there might be more registrations falling under the Candidate List entry. The number of sites using the substance is not known. Some registrants provide site numbers in the registration dossiers, others do not. According to the provided information manufacturing sites are situated in one Member State. Based on registration information on the types of uses a high number of sites is anticipated. The registrations cover industrial as well as professional uses of the substance. The use of Zr-RCF for insulation is considered to be widespread in the EU.

2.3. Availability of information on alternatives⁴

Substitutes with a lower health risk include both fibrous and fibre-free refractory products. Fibrous products for application in the temperature range to 300 °C generally comprise glass and mineral wools. For the temperature range from 300 °C to approx. 600 °C, mineral wools or alkaline earth silicate (AES) wools can be used depending on the specific requirements of the application. From 600 °C to approx. 900 °C, generally AES wool products can be used (Annex XV report, 2009; 2011).

Above 900 °C to max. 1200 °C, the possibility for using AES wool products may be reduced owing to technological constraints. This temperature range is the main application range for aluminium silicate wool products. On the other hand current product developments indicate that the upper temperature limit of AES wool products could be increased significantly (Annex XV report, 2009; 2011).

Non-fibrous substitutes are refractory materials such as calcium silicate or vermiculite panels and mouldings, thermal insulation bricks and concretes, lightweight refractory bricks and concretes, thermal insulation refractory compounds and other non-fibrous products that meet the application requirements as substitute products. In conclusion, there are several possible substitutes for aluminium silicate wool products on the market depending on the temperature range of application (Annex XV report, 2009; 2011).

Industry acknowledges the availability of alternatives for most applications. Alternatives to RCFs are e.g. brick linings or castable linings; fibre-free foamed clay aggregate; high-temperature microporous insulation material based on alumina as well as on alumina/mullite; high porous ultra light non-fibrous ceramic foams based on alumina and mullite; ultra high temperature microporous

³ Numbers of workers might have changed as these numbers refer to the year 1999.

⁴ Please note that this information was not used for prioritisation.

insulation material. However, it has been stated that there is no validated substitute available for some petrochemical industries where fibres are exposed at high temperature applications (900 – 1200 °C) for long durations (e.g. Steam Methane Reforming) (RCOM 2009, 2011).

2.4. Existing specific Community legislation relevant for possible exemption

There seems to be no specific Community legislation in force that would allow consideration of exemption(s) of (categories of) uses from the authorisation requirement on the basis of Article 58(2) of the REACH Regulation.

2.5. Any other relevant information (e.g. for priority setting)

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3. Conclusions and justification

3.1. Prioritisation

The substance is used in high volumes in the scope of authorisation. The use of the substance is expected to take place at a high number of sites, and can potentially lead to significant worker exposure.

Verbal-argumentative approach

On the basis of the criteria, Zirconia Aluminosilicate Refractory Ceramic Fibres have a very high priority for inclusion in Annex XIV.

Scoring approach

Score			Total Score (= IP + V + WDU)
Inherent properties (IP)	Volume (V)	Uses - wide dispersiveness (WDU)	
1 Art. 57 (a); Carcinogen 1B	7 High volume in the scope of authorisation.	Overall score: 3 * 3 = 9 Expected to be used at high number of sites in the EU. Score: 3 Potential for significant exposure to workers. Score: 3	17

Conclusion, taking regulatory effectiveness considerations into account

Therefore, it is proposed to prioritise Zirconia Aluminosilicate Refractory Ceramic Fibres for inclusion in Annex XIV.

4. References

- Annex XV report (2009) - Zirconia Aluminosilicate, Refractory Ceramic Fibres. Proposal for identification of a substance as a CMR Cat 1A or 1B, PBT, vPvB or a substance of an equivalent level of concern. Submitted by Germany, August 2009. <http://echa.europa.eu/documents/10162/47c8a92c-8fb4-4b0f-85b8-64037ad542ad>
- Annex XV report (2011) - Zirconia Aluminosilicate, Refractory Ceramic Fibres. Proposal for identification of a substance as a CMR Cat 1A or 1B, PBT, vPvB or a substance of an equivalent level of concern. Submitted by Germany, August 2011. <http://echa.europa.eu/documents/10162/1fe242c7-c234-447d-89f1-5e71f87ca1ec>
- RCOM (2009) – “Responses to comments” documents. Document compiled by the German CA from the commenting period 29/08/2011 – 13/10/2011 on the identification of Zirconia Aluminosilicate, Refractory Ceramic Fibres as SVHC. <http://echa.europa.eu/documents/10162/6abbd4a9-b99c-4b2e-b2ec-39b6b7e105ec>
- RCOM (2011) – “Responses to comments” documents. Document compiled by the German CA from the commenting period 29/08/2011 – 13/10/2011 on the identification of Zirconia Aluminosilicate Refractory Ceramic Fibres (Zr-RCF) as SVHC. <http://echa.europa.eu/documents/10162/d64ba2b3-5963-4661-b0a3-2e10c0652814>