

MONOSAL 30

IRON SULPHATE FOR CEMENT INDUSTRY

The main advantages of iron sulphate in cement application are its easy availability and relatively low cost.

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Chromium is an unavoidable trace element of raw materials used in the producing of ordinary Portland cement. Today there is an even greater need to reduce the contribution to chromium levels in the clinker, which are skin irritating and toxic! To protect people and the environment, chromate has first to be rendered harmless through reduction. The addition of ferrous sulfate based agents is currently the most widely used available technology.

LEGISLATIVE MEASURES

The directive 2003/53/ES, which has come into force since the beginning of January 2005, is focused on reducing amounts of harmful hexavalent chromium (Cr^{6+}) in cement binding agents and products based on them. This directive determines that producers of cement and cement containing products have to ensure a Cr^{6+} content in bag deliveries below 2 ppm.

That is why cements contain so called reducing agents which, when mixed with water, reduce content of Cr^{6+} below 0.0002 % and are efficient for the time of cement storage, i.e. for min. 90 days from the date given on the cover under conditions determined by the National Annex NA 1 to EN 197-1.

From the point of view of judging reducing properties of agents the European standard EN 196-10 Methods for testing cements – Part 10: Determination of content of water soluble chromium (Cr^{6+}) in cement (2007-01-01) is in force. This standard specifies a method for determining water soluble chromium in cement.

It also involves a reference method for determining Cr^{6+} content in cements and cement containing materials and two other methods which are recommended as alternative ones for internal checking tests in companies. A procedure for judging agreement of a cement with requests of the Directive 2003/53/EC and an instruction for photometric determination of chromium (Cr^{6+}) reduction capacity are involved, as well.

DOSING AND EFFICIENCY OF REDUCING AGENTS

Ferrous sulphate from titanium dioxide manufactures (copperas) which contains divalent iron (Fe^{2+}) acting as efficient element for reducing harmful hexavalent chromium (Cr^{6+}) to trivalent one (Cr^{3+}) is the most used raw material for decreasing hexavalent chromium in praxis. The efficient doses of the reducing agent related to amounts of cement being manufactured can differ (a range of 0.1 – 0.5 %) and depend on raw materials, fuel (for burning) and way of its adding to cement. The addition of a reducing agent in the phase of clinker milling can influence the agent efficiency. An increased temperature of clinker before and during the milling process is important thermal exposition which accelerates chemical reactions of the reducing agent, what can decrease its efficiency. A better homogeneity of particles and their higher fineness joined with increased specific surface area are other contributions of this procedure. The accurate adjustment of the level of dosing is based on laboratory and plant tests for each of technologies of processing and processed raw material basis.

GENERAL SPECIFICATION

Chemical composition	Ferrous sulphate monohydrate $\text{FeSO}_4 \cdot \text{H}_2\text{O}$
Physical properties	Crystalline compound
CAS No.	17375-41-6
REACH registration No.	01-2119513203-57-0001
EC TARIC Code	2833 29 80

QUALITATIVE PARAMETEPS (typical)	MONOSAL 30 Rough fraction	MONOSAL 30 Medium fraction	MONOSAL 30F
Colour	light brown	light brown	light green
Fe (II) content [%]	30.8	30.8	31.6
Sieve fraction 1.0 mm [%]	0.4	–	–
Sieve fraction 0.35 mm [%]	80.0	1.3	13.8
Sieve fraction 0.25 mm [%]	5.4	19.7	33.6
Sieve fraction 0.16 mm [%]	10.4	30.7	47.5
Fraction below 0.16 mm [%]	3.8	48.3	5.1

TYPICAL COMPOSITION	MONOSAL 30 MONOSAL 30F
Mg content [%]	0.1
Mn content [%]	0.1
As content [mg/kg]	< 1.0
Hg content [mg/kg]	< 0.1
Pb content [mg/kg]	3.0
Cd content [mg/kg]	< 1.0



APPLICATION

Efficient reducing agent for reducing Cr^{6+} in cement industry. Suitable for dosing into clinker before milling (cement, dry plaster mixtures, etc.). Recommended agent for removing harmful hexavalent Chromium from industrial wastes.



This leaflet is a general guide to the properties and fields of potential application of MONOSAL 30. Information on application is given in good faith and does not constitute any guarantee. For specific grade selection, see Product Specifications or contact Technical Service at Precheza company. **Material Safety Data Sheet and additional information about products and company is available on www.precheza.cz.** Control quality of pigments is provided in all steps of production. Samples are available on request. We recommend trial application tests.

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