ChaRisma Cement Grinding Aids

General Description :

ChaRisma CR series of cement grinding aids are chemicals, added in to the mixture of clinker and gypsum during the grinding process, to optimize the particle size distribution and improve cement strength. It is solely developed and manufactured by ChaRisma. The intellectual property right of ChaRisma CR series are owned exclusively by Charisma.

Classification :

ChaRisma CR series of cement grinding aids consist of ChaRisma CR-1, CR-2 and CR-3. All comply with American standard ASTMC465-92 and China's national standard JC/T 667－2004.

Quality Assurance

ChaRisma CR is manufactured under ISO quality management system. Its performances meet entirely the requirements in china's national standard JC/T 667－2004 and other compulsory requirements for health and environment.

Compatibility :

ChaRisma CR series are compatible with concrete admixtures such as Water reducers, retarders, air entrainer and superplasticizers. The performance of the admixtures and physical properties of concrete, including water requirement and slump loss of concrete, is not influenced by the use of ChaRisma CR series.

CR-1

ChaRisma CR-1 is a liquid applied during grinding of cement whose benefits are output increase of the mill with no negative influence on cement strength .

Conformity

1. Appearance: Brown.
2. pH value: 6 to 7
3. Density: 1.19 - 1.23 g/cm^3
4. Chloride ion content : not more than 0.01%

Main Properties

1. ChaRisma CR-1 improves the grinding efficiency and increases the yield of the cement mill by around 25%.

2. ChaRisma CR-1 reduces the unit power cost of the mill up to 25% andlower the total production cost.
3. ChaRisma CR-1 betters the flowability of the powdery materials in the mill and diminishes the overgrinding of the clinker and other reactive addiitions such as blast furnace slag, fly ash, and fillers as limestone. .
4. ChaRisma CR-1 lowers the rest angle of cement and diminishes cement conglomeration in storage which results in pack set or silo set of cement, and decreases the handling cost.
5. ChaRisma CR-1 has no corrosion to mill and steel in concrete.
6. ChaRisma CR-1 has little influence on the setting time and water requirement of cement.
7. ChaRisma CR-1 does no harm to the workability, mechanical properties and durability of concrete.

Dosage

The recommended dosage of CR-1 ranges from 0.04% to 0.06% by weight of cement. The specific dosage for a mill is affected by properties of clinker and additions, and the machinery equipment and technical parameters of the mill. It should be determined through laboratory and mill trials.

Application Area

ChaRisma CR-1 is in particular suitable for improvement of the mill output and for reduction of unit power cost.

CR-2

ChaRisma® CR-2 is a liquid which is in particular developed to increase the yields of the mill grinding cement with slag as main reactive addition.

Conformity :

1. Appearance: Brown.
2. pH value: 8 to 10
3. Density: 1.21 - 1.23 g/cm^3
4. Chloride content: not more than 0.01%

Main Properties

1. ChaRisma® CR-2 increases the grinding efficiency and the mill yield of the cement whose major addition is blast furnace slag by around 20%.
2. ChaRisma® CR-2 reduces the unit power cost of the mill up to 6kw.h.
3. ChaRisma® CR-2 betters the flowability of the powdery materials in the mill and diminishes the overgrinding of the clinker and slag.
4. ChaRisma® CR-2 lowers the rest angle of cement and diminishes cement conglomeration in storage which results in pack set or silo set of cement, and decreases the handling cost.
5. ChaRisma® CR-2 has no corrosion to mill and steel in concrete.
6. ChaRisma® CR-2 has little influence on the setting time and water requirement of cement.
7. ChaRisma® CR-2 does no harm to the workability, mechanical properties and durability of concrete.

Dosage

The recommended dosage ranges from 0.04% to 0.05% by weight of cement. The specific dosage for a mill is affected by properties of clinker

and additives, and the machinery equipment and technical parameters of the mill. It should be determined through laboratory and mill trials.

Application Area

ChaRisma® CR-2 is in particular suitable for the yield gain of the mill grinding cement with slag as main addition and for reduction of unit power cost.

CR-3

ChaRisma® CR-3 is a liquid applied during grinding of cement whose benefits are output increase of the mill and reduction of the unit production cost through replacement of clinker with reactive additions such as blast furnace slag, fly ash and pozzolan or fillers.

Conformity

1. Appearance: Brown.
2. pH value: 7 to 9
3. Density: 1.18 - 1.20 g/cm^3
4. Chloride content: not more than 0.01%

Main Properties

1. ChaRisma® CR-3 significantly increases the compressive strength of cement.

2. ChaRisma® CR-3 lowers unit production cost through replacement of cement with reactive additions such as blast furnace slag, fly ash and pozzolan or fillers such as limestone.
3. ChaRisma® CR-3 optimizes the particle size distribution of cement and improves the cement fineness. It reduces the nter-particleattraction between cement grains in dry form or in water, deepen the hydration of cement at different ages.
4. ChaRisma® CR-3 betters the flowability of the powdery materials in the mill and diminishes the over-grinding of the clinker and reactive addtions.
5. ChaRisma® CR-3 lowers the rest angle of cement and diminishes cement conglomeration in storage which results in pack set or silo set of cement, and decreases the handling cost.
6. ChaRisma ®CR-3 has no corrosion to mill and steel in concrete.
7. ChaRisma ®CR-3 has little influence on the setting time and water requirement of cement.
8. ChaRisma® CR-3 does no harm to the workability, mechanical properties and durability of concrete.

Dosage

The recommended dosage of CR-3 ranges from 0.15% to 0.2% by weight of cement. The specific dosage for a mill is affected by properties of

clinker and additions, and the machinery equipment and technical parameters of the mill. It should be determined through laboratory and mill trials.

Application Area

ChaRisma® CR-3 is in particular suitable for the increase of cement strength and for reduction of unit production cost through replacement of cement with reactive additions such as blast furnace slag, fly ash and pozzolan or fillers such as limestone.

Handling Procedure of CR Series

1. Preparation Work before Use

Dosing pumps which offer adjustable flow rates should be prepared for the accurate dosing of CR series. Stopwatches and measuring graduates are necessary for the calculation of the flow rates.

2. The Method for Adding of ChaRisma CR Series

The position for adding CR Series should be close to the feeding mouth of the mill, such as the conveyor belt and the first compartment of the mill. After ChaRisma CR is measured accurately by the dosing pump, it should be sprayed directly onto the mixture of clinker and additions. If the temperature of the mixture or of the air in the mill is above 70 ℃,

ChaRisma CR should be diluted up to half the original content for more proportioned spray.

The Formula of Pump Dosage

$$L = \frac{G \times P}{\gamma \times C \times 60}$$

In the above formula G means required dosage for per ton of cement (g/t), P means the yield of the mill (t/h), **γ means** the density of the grinding aid (g/ml), C means the actual content of the aid, and L means adding amount per minute (ml/min).

3. Adjustment Procedure

a) Adding position is determined to let the adding operation more convenient and more close to the feeding point of the mill.

b) determination of the dosage

After starting the dosing pump, the outflux should be measured through the use of the stopwatch and graduate. Then the influx should be adjusted to the extent that target outflux is reached and the technical parameters of the mill are stable.

c) During the initial adding of CR series, the dosage should be started under the recommended one for the mill to adapt to it gradually. It takes normally around two hours for the mill situation is less volatile and the indicators for the end are that the sound of the mill is better and the power current of the electromotor decline and reach a narrow zone.

d) After the initial phrase, the flow rate of ChaRisma CR should be improved to the mount that required mill data are satisfactory.

As for the purpose of the mill's yield gain, when the cement fineness betters and the sound of the mill get normal, the dosing rate of ChRisma CR should be increased gradually to improve the mill output. If the cement fineness worsens, the dosage of ChaRisma CR should be reduced to a stable level that the cement fineness can match the requirement.

As for the purpose of strength gain, after the initial phrase, the input of the mixture of clinker and additions should be set and the dosage of ChaRisma CR should be increased to reduce the specific area of cement onto a targeted level.

e) The actual effect of ChaRisma CR is influenced by the mill technics, equipment structure, properties of clinker and additions.

Those are also the factors affecting the optimal dosage of ChaRisma CR.

Note :

1. Before the use of ChaRisma CR, sufficient spare capacities of the mill system should be confirmed to avoid overburden because of the increased grinding efficiency.
2. If the grinding aid is applied in the mill for the first time, initial dosage should be less than the recommended one, for more dosing rate causes more frequent fluctuation of the technical data of the mill.
3. During the adjustment period, because fierce change of the dosage results in instability of the mill's technical parameters, the flow rate of ChaRisma CR should be modified gradually

The Solution and Application Case

Solutions to the various requirements and some application case in China are as follows:

Case 1

Background: The market demand for cement is soaring but the output of the mills is less than the demand, although the clinker supply is sufficient.

Solution: ChaRisma CR-1 or CR-2 is applicable to increase the unit output of the mill with no strength reduction.

Benefits: The sales profit can be bettered from 15% to 28%, and the fixed

cost can be lowered from 8% to 20%. The reduced power cost surpasses the expenditure for the grinding aid.

Case 2

Background: The market demand for cement is soaring but the clinker output is less than the need.

Solution: ChaRisma CR-3 are applicable to increase the cement output of the mill through replacement of clinker with more reactive additions such as blast furnace slag, pozzolan and fly ash or fillers such as limestone.

Benefits: The sales profit can be bettered and the unit production cost can be lowered significantly.

Case 3

Background: The market demand for cement is depressed.

Solution: ChaRisma CR-3 is applicable to increase percentage of the reactive additions or the fillers in cement while the strength is not reduced.

Benefits: The sales profit is bettered without more market demand, because cost of raw material is lowered.

Some Application Cases

Case One

The production capacity of Chaohu Cement Corporation is two million tons annually. The average peak period in one year is totally five months and slack season is three months. CR-1 is applied during the peak period and CR-3 is used during the slack season over the past five years. The average net return is over 300 million USD through the application of CR series.

Case Two

The production capacity of Dahe Cement Corporation is eight hundred thousand tons annually. The average peak period in one year is totally six months and slack season is four months. CR-2 is applied during the peak period and CR-3 is used during the slack season over the past four years. The average net return is over six hundred thousand USD through the application of CR series.