

It is known that the use of roller protector ENGOBES is born due to the exigency to protect the roller during the firing phase.

During the years, the formulations of engobes have faced important variations connected to the new productive exigencies.

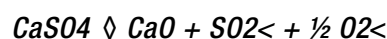
At the beginning, they had mainly a calcium sulphate and magnesite base (magnesium carbonate).

However, both of these substances had expressed problems during the years that have advised against their use.

The chemical attack of the rollers is an event that is studied since many years since it is the main cause of the break during the extraction and their cleaning phases. It has been proved that the calcium sulphate in presence of other composites among which the silica, with which interact with high temperatures, is subjected to a premature thermal degradation.

Consequently, there is an emission of free calcium oxide that connects to the roller elements modifying their base chemical structure. It leads to an increase of fragility with inevitable advanced breaks compared to the design standards. The reduction of the degradation temperature, further than causing the chemical aggression of the rollers, leads to a dangerous increase of sulphur oxides inside the kiln and in the chimney zone. It has been checked also that the presence of calcium

sulphate in recovery waters used for the mixture grinding causes elevated interferences on the dispersants action, risking to compromise the correct functionality of all the spray-drying department.



The Magnesite originates mainly two types of problems, the first one is connected to the fact that, being a carbonate rock, it is thermally less stable compared to many other minerals, it begins its decomposition with temperatures lower than 900°C.



It involves that the especially reacting free magnesium oxide originates inside the firing environment interacting with the glazes in melting, compromises hopelessly their appearance.

The Magnesite can cause a chemical aggression on the surface of the more sensitive glass materials, by producing an alkaline hydrolysis reaction on the water, during the packing or during the laying.



Mistral Italia has developed a line of products with important features:

- **They do not contain neither calcium sulphate nor magnesite (neither a trace)**
- **They are chemically neutral**
- **They have an high thermal stability**
- **They preserve the roller by guaranteeing a greater lifetime**
- **They have high sintering temperatures.**

A slightly separate argument needs to be done for the big slabs that due to their structures need highly rarefied engobes, suitable for firing cycles particularly elevated, but mainly they do not have to lead to tensions to avoid interferences with the flatness of the material. On this table, we have highlighted the main differences between our engobe formulations, with reference to the magnesite and to the calcium carbonate.

ENGOBE	T° SINTERING	T° SOFTENING	ELECTRICAL CONDUCTIVITY (sol.1%)	PH
MAGNESITE/ALUMINA	1184°C	> 1600°C	2450 µS/cm	12.5
CALCIUM SULPHATE	935°C	1440°C	3740 µS/cm	8.8
ENGOBE 16D	1228°C	1467°C	1580 µS/cm	11.9
ENGOBE 17D	1268°C	1557°C	843 µS/cm	11.5
ENGOBE 20D	1202°C	1490°C	30 µS/cm	8.1
ENGOBE 23D	1281°C	1490°C	32 µS/cm	8.1
ENGOBE 25D	1388°C	1444°C	23 µS/cm	8.1

The product that has met the greatest penetration on the market is the **23D**, also thanks to the new productive experiences connected to the big tile sizes.

The firing of the slabs on the new kilns, has shown off the trend to “dust” on pre-heating zone, connected to a higher ventilation compared to the traditional kilns. When the engobe is easily removed, it releases residues that, following the air flows, can sediment on the surface of the tiles creating an important fault.

Moreover, by “dusting”, the remaining engobe cannot be sufficient to guarantee a suitable insulation to overcome the firing zone without problems.

To avoid this inconvenient, Mistral proposes targeted solutions, by using additives that do not alter the chemical-physical features of the engobe, although they guarantee an excellent adhesion to the support throughout the pre-heating phase.



TECHNICAL SHEET

ENGOBES FOR SLABS 23D

Protective agent for ceramic rollers

CHEMICAL-PHYSICAL FEATURES

Chemical base: mixtures of synthetic inerts

Aspect: powder

Solubility: insoluble in water

PROPERTIES AND APPLICATIONS

23D ENGOBE is a protective engobe for ceramic rollers. This product allows to protect the rollers against the creation of limescales and attachments that cause problems related to the flatness of the pieces during the firing phase.

Moreover, this protective layer allows considerably the reduction of the maintenance and roller replacement costs, by extending the possibility of their use and reducing in this way the scheduled maintenances.

23D ENGOBE does not contain magnesite or calcium sulphates and, after the calcination, the product results completely insoluble. These features prevent the basic attack on the finished product during long storages and they optimize the workability of the product for the whole productive process.

We advise to grind in water with solid-water ratio of 1:1 up to the achievement of residue < 1,5% at 63 µm.

For the application, we suggest using the engobe at a density around 1300 gr/lt. and to apply one layer as uniform as possible under the tile.

To improve the anchoring of the product on the tile and to stabilize the rheology of the suspension, we suggest this additivation during the grinding phase:

CELLUMIS 25 (cmc 30cps purified) 0,50%

FLUIMIS FP3 (sodium tripolyphosphate) 0,25%

PACKAGING

23D ENGOBE is available on big-bags of 500/1000 Kgs on pallet of 1000 Kgs.



Mistral ITALIA s.r.l.

Via Tiziano, 12 - C.P. 42014 Castellarano (RE) - Italy

Tel. +39 0536 813066 - Fax +39 0536 813073 - P.IVA e C.F. 03854670365

info@mistralsrl.net - www.mistralsrl.net

—CERTECH GROUP—