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ADDITIVES FOR THE INCREASE OF THE
BREAKING LOAD "IN GREEN AND DRIED"



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ADDITIVES FOR THE INCREASE OF THE BREAKING LOAD “IN GREEN AND DRIED”

The use of additives capable of elevating the BREAKING MODULE in raw of the ceramic mixtures is a constant research in evolution.

Body binders can be a valuable ally in reducing production waste and increasing the overall process yield. They are essential when a satisfactory degree of resilience of the manufactured product cannot be achieved with raw materials alone. The polymer molecules in the formulation act by creating a network that strengthens the bonds already present between the mineral particles, a microscopic improvement that has repercussions in the macroscopic.

Mistral Italia offers its customers body binders optimised through laboratory tests according to process requirements.

In case you want to increase the flexural strength of the green product, we offer PLASTICIZING additives, while the BINDERS are suggested in case you want to optimize the characteristics of the dried product.



The choice to use a type of plasticizer or binder always requires the execution of a screening performed with the customer's raw materials and the results depend very much on the “bonds” that the additive undertakes with the components/minerals of the mixture.

An in-depth study enables the customer to obtain more **economical and environmentally friendly products.**

With a view to safeguarding the environment, Mistral Italia promotes the use of organic binding agents from plant and other renewable sources, enhancing products from other supply chains. By eliminating the use of certain categories of molecules, volatile organic compounds and sulphur derivatives can be drastically limited, thereby reducing odorous and hazardous molecules.

However, it remains essential to monitor the amount of organic matter introduced into the mix to avoid the onset of the black core problem.



As an example, we report a typical technological study carried out in the Mistral Italia laboratories. The results achieved on traditional mixtures are reported, with the use of various additives produced by Mistral Italia.

LOADS IN GREEN

MIXTURE 1

Reference		Mistral 1,5% Plasticizer	
sample number	MOR (kg/cm ²)	sample number	MOR (kg/cm ²)
1	10,5	6	12,2
2	10,8	7	12,8
3	10,4	8	12,6
4	10,7	9	12,8
5	10,8	10	12,6
Average	10,6	Average	12,6

MOR INCREASE after addition = **18,4%**

MIXTURE 2

Reference		Mistral 1,5% Plasticizer	
sample number	MOR (kg/cm ²)	sample number	MOR (kg/cm ²)
1	4,5	6	5,3
2	4,3	7	5,2
3	4,0	8	5,5
4	4,1	9	5,0
5	4,2	10	5,0
Average	4,2	Average	5,2

MOR INCREASE after addition = **23,2%**

LOADS IN DRIED

MIXTURE 1

Reference		Mistral 0,3% Binder	
sample number	MOR (kg/cm ²)	sample number	MOR (kg/cm ²)
1	33,7	6	42,8
2	30,1	7	43,4
3	33,3	8	40,9
4	32,0	9	42,6
5	32,4	10	42,3
Average	32,3	Average	42,4

MOR INCREASE after addition = **31,4%**

MIXTURE 2

Reference		Mistral 0,3% Binder	
sample number	MOR (kg/cm ²)	sample number	MOR (kg/cm ²)
1	22,3	6	33,9
2	21,0	7	34,2
3	21,7	8	34,2
4	21,3	9	34,4
5	22,8	10	33,7
Average	21,8	Average	34,08

MOR INCREASE after addition = **56,2%**

Large formats-slabs

The creation of large formats requires the use of ceramic compositions with more performing technological characteristics than “traditional formulas”. The critical issues that a technologist must solve in order to make a mixture suitable for these formats are those of obtaining a mass which has both good raw resistance values and resistance to deformation during firing. The research is therefore mainly focused on the identification of the most suitable raw materials and of course on ceramic additives to correct and/or make the product more performing.

In this regard, **Mistral Italia** has developed a series of additives to improve the technological characteristics of the mixtures, also trying to simplify and facilitate their use in the manufacturing process. So, the peculiarity of these products is of being able to optimize the technological characteristics of the mixture, without interfering with other aspects of the process such as:

- Homogenization, as the additive disperses well with the mixture
- Minimum interference on the rheological behavior of the slip
- Formulate the mixture with raw materials with a lower content of organic substances
- Monitoring and containment of carbon and sulphur and thus better management of the firing process and the occurrence of black core
- Absence of contaminating elements such as Carbon and Sulfur and therefore better management of firing and black core
- No influence on the color of the final product and on the pyro-plastic deformation of the product during firing
- Low environmental impact.