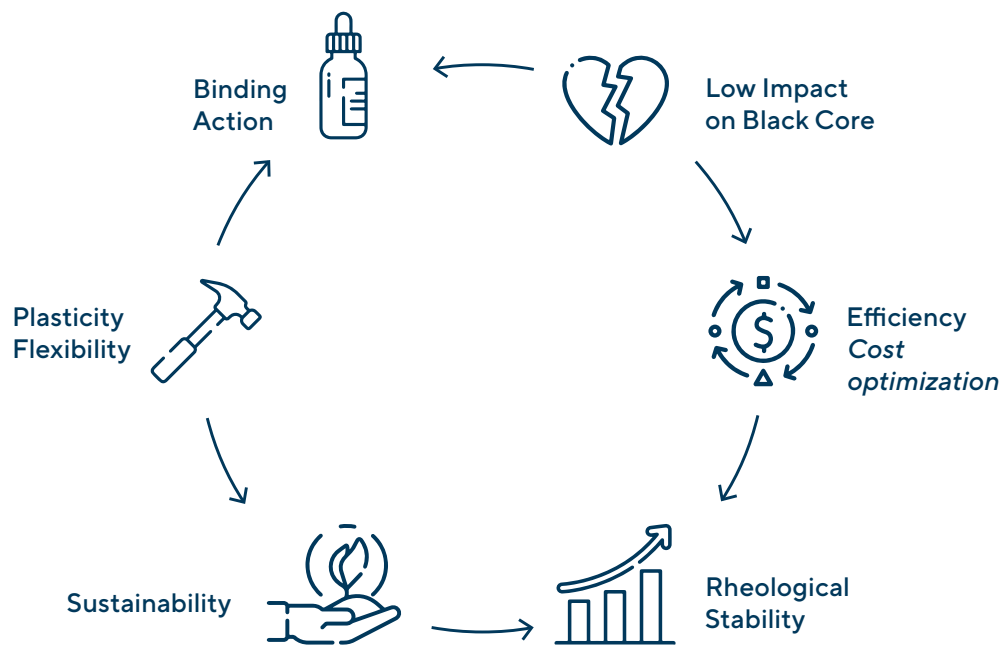


Body binders designed to enhance mechanical characteristics of the body before firing. It combines production benefit for output quantity and sustainable solutions.

The ongoing developments of the ceramic producers on body composition bring to seek any possible solution to keep the quality stability maintaining affordable costs. Moreover new technologies and new production types are at play and, on one hand, they are commercial opportunity and, on the other, a challenge when it comes the time to carry out and run a production. TENAGREEN can be the answer for many question Here below a scheme with, listed, the Tenagreen "action areas" and the consequent benefits.

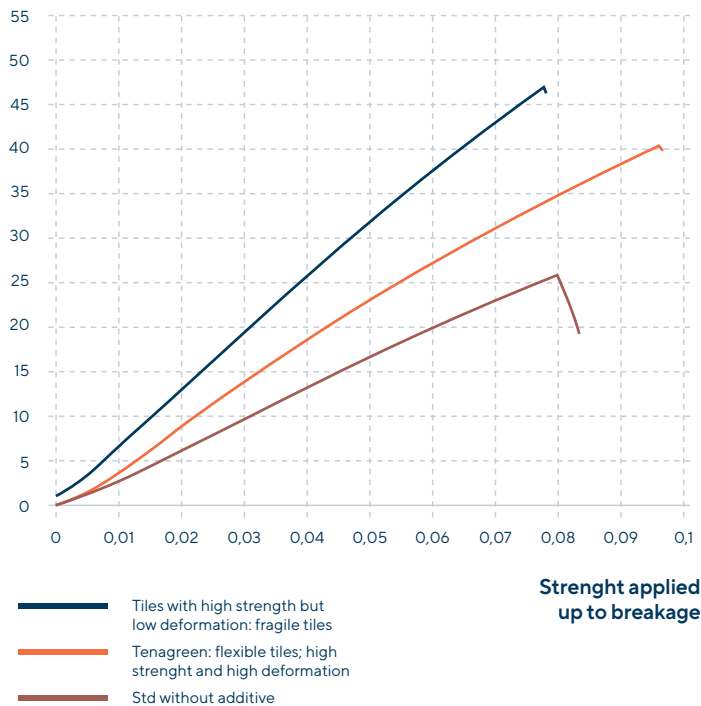
Tenagreen is a wide range of body binders/plasticizers and it's a blend of new generation resins from Lamberti technology. They are able to bring a positive contribution to the mechanical strenght in green and dry stages; improving these technological parameters means reducing the occurrence of defects or breakages and increasing the production stability and speed. No negative effect are recorded on rheology, black core formation, dimension and pyroplasticity.



Another important parameters that can be the controlled by using Tenagreen is tiles and slabs flexibility. On the way to get the mechanical strenght measurements of a given sample, it's possible to obtain its deformation before breakage as well. This deformation is calculated by detecting the displacement of the specimen under evaluation; This measurement is taken (in mm) from the first Strength applied,

thus from the first movement of the specimen. The flexibility evaluation has become in last years more and more significant for production yeld, as the tile size has become bigger and bigger. Tiles more flexible accept a bigger deformation before breaking (orange curve in the graph) permitting a steady production. Tiles with high resistance but accepting a low deformation, are fragile tiles (blue curve in the graph).

Deformation accepted before breakage



Tenagreen can also optimise costs in a sustainable way. When properly studied and customized, **Tenagreen** permits to positively support a body formula review replacing part of plastic clay content with lean clays, which are often cheaper and more readily available.

Such a formula modification brings:

- Lower raw materials cost
- Higher working densities
- Lower energy costs
- Reduced CO2 emissions
- Reduction of milling water

It's possible to state that the choice of the right **Tenagreen** brings a positive impact on the efficiency of the ceramic production, a growth with optimization of raw materials and cost. These targets can be achieved with more respect of the environment.

Tenagreen WW

Pasticizers for sanitaryware and tableware

There are evidences, based on laboratory observation, that **Tenagreen WW** brings significant improvements in the mechanical characteristics of the cast pieces while having a minimal impact on slip rheology, allowing for rapid and problem-free adoption on existing production lines. The tests gave the following results:

- Total shrinkage: no significant variations
- Pyroplastic deformation: no significant variations.
- Water absorption after firing: no significant variations
- Dry M.O.R. values: the increases are highly significant and proportional to the dosage

The product range				
Seris	Sector	Description	Dosage	Strong suit
Tenagreen N	Tiles	Liquid binders/plasticizers	0,3 ÷ 0,8%	Good value for money; good performance in green and dry MOR; no negative impact on rheology
Tenagreen S	Tiles	Liquid Binders/Plasticizers for particular production necessities and for high frit content body	0,5 ÷ 1%	Excellent performance in green and dry MOR and flexibility.
Tenagreen P	Tiles	Solid binders/plasticizers	0,2 ÷ 0,4%	Introduction in ball mill and reduced transportation cost
Tenagreen FL	Tiles	Blend of liquid binders and deflocculants	0,8 ÷ 1,2%	Introduction in ball mill and additive optimization
Tenagreen WW	Whiteware and technical ceramics	Liquid binders/plasticizers for Whiteware sector	0,5 ÷ 1,5%	Strong reduction of defects and rejected pieces; no negative impact on rheology