



CENOSPHERES IN EMULSION BASED PLASTERS, JOINT AND CRACK FILLERS

INTRODUCTION

CenoStar cenospheres are a glass hard, inert, hollow silicate sphere. Cenospheres are primarily used to reduce the weight of plastics, rubbers, resins, cement etc., but also imparts further benefits in many situations. Many of the advantages from the use of cenospheres, including increased filler loading and improved rheology, are directly attributable to the spherical nature of the material.

CENOSTAR CENOSPHERE TYPE

ES 300
ES 160
HAL 300
ES 106

ES 300 and ES500 grades are used in plasters for filling large holes. ES160 is the most commonly used grade and is used for jointing and full wall plastering.

The reasons for this are that larger particle size fillers give lower shrinkage and better filling power. However, for plasters and compounds that need to spread very thinly or which have a good surface appearance for painting etc., a plaster based upon the smaller micron size cenospheres are more suited.

The low fine grades of the ES 300 grade allow a plaster to be produced that can be applied up to 60 mm thick without cracking.

ES 106 grade is used to produce a very smooth, fine plaster that gives a surface ideal for painting. It should not be used for filling deep holes and should only be used in thin coats or as a top coat for coarser plasters.



TECHNICAL INFORMATION

There are two major types of filler (or spackling compounds as often called). The first are gypsum (calcium sulfate) based products and the second are emulsion (usually polyvinyl acetate or acrylic) based products. The gypsum products are supplied as dry powders that have to be mixed with water and the emulsion based products are supplied in a paste form.

Both types of product are used to fill the joints between gypsum board (sheet-rock or plasterboard), fill nail holes, repair cracks in gypsum board or concrete, and to full wall plaster (broad spackling).

Emulsion-based plasters have been available for many years and as well as the above uses they are also commonly sprayed (usually onto the ceiling).

In recent years these emulsion plasters have started to use cenospheres in ever increasing quantities. At the present time the use of cenospheres are confined to those fillers used by hand application or the Bazooka type machine used to joint gypsum boards.

The benefits of emulsion plasters over gypsum are generally that they are ready mixed and therefore quicker to use and that they need only be applied in a thin layer and so can be more economical to use in full wall plastering. For filling joints, cracks etc., emulsion plaster is more expensive and its benefit is restricted to speed and ease of use. However, since most decorators would prefer to use one plaster (when jointing and full wall plastering are taken into account) the emulsion plasters are very economical to use.

TYPICAL FORMULATIONS

	1	2
Water	344	274
Biocide	1	1
Dispersant	3	3
Thickener	6	6
Antifoam	2	2
Emulsion (Polyvinyl acetate, acrylic etc)*	70	120
Titanium Dioxide	10	10
Dolomite	310	350
CenoStar Cenospheres	252	230
Antifoam	2	2
Total	1000	1000
Total solids content	62%	65%
Density (approximately)	1.0 g/cc	1.1 g/cc

Both formulations are in parts by weight.

Formulation 1 is typical of a joint filler for plasterboard while formulation 2 is a harder filler used for repair of cracks and holes and often a thinner topcoat for the joint filler.

*Polyvinyl acetate is used if the plaster does not need to be water resistant and acrylic is used if it does need to be water resistant.



WHY USE CENOSTAR CENOSPHERES?

It often goes unnoticed by many manufacturers, but not only should a product be technically good in terms of properties but it should be as **easy as possible to use**.

- **Weight** - The first and most obvious advantage of using cenospheres are that the plaster will be low in density. This means that the plaster is easy to use, easy to apply and above all light in weight to carry. Many users of lightweight plasters when asked what their main like of the product is they reply that it is the lightweight resulting in less back ache and less time away from work.
- **Ease of Sanding** - Products containing microspheres are always easier to sand or polish to a smooth surface than products containing only heavyweight fillers.
- **Filling Power** - Cenospheres containing products have excellent filling properties and as a result it requires less coats or applications of the product to fill the joint or crack.
- **Low Slump** - Plasters containing cenospheres do not slump or sag as easily as heavyweight plasters.
- **Low Shrinkage** - Cenosphere microspheres are perfect spheres of non-absorbent silicate. Since a sphere is the shape with the lowest surface area it means that high volume loadings can be achieved compared to angular fillers such as calcium carbonate or dolomite. The result is lower shrinkage.

Cenospheres are also totally impermeable to liquids unlike products such as Perlite. The result is that viscosity stability is excellent. Porous products like Perlite absorb water over a period of time and the viscosity of the plaster increases unacceptably.

Generally plasters containing heavyweight fillers have a density of 1.5 g/cc and a water content of 45% (as opposed to 1.05 and 35% respectively for lightweight plaster). The result is that high shrinkage and poor filling power are noticed. However, with very careful choice of fillers some companies have been able to formulate to 25 - 30% water with heavyweight fillers. The result is a product of density 1.7 - 1.8 g/cc. This product has shrinkage and filling power closer to that of the lightweight plasters but of course the big disadvantages are that it is more difficult to use and is not liked by the end user because of its very heavy density.

CONCLUSIONS

The area of emulsion-based plasters has been one of the fastest growing for cenospheres over the last five years. The growth is continuing as more companies realize the dramatic benefits of using cenospheres. This industry now represents one of the three largest usages of cenospheres worldwide.