



CENOSPHERES IN BITUMINOUS MATERIALS



INTRODUCTION

CenoStar cenospheres are glass-hard, inert, hollow silicate spheres. Cenospheres are primarily used to reduce the weight of plastics, rubbers, resins, cement etc., but also imparts further benefits in many applications and 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

CenoStar ES-500

One of the most critical properties of CenoStar cenospheres for its use in bitumen based products is that it is resistant to the shear forces in the mixer or extruder when incorporated into the bitumen. Cenospheres produce a special Standard Grade with the weaker spheres removed therefore yielding a grade that performs exceptionally well in this application and is more resilient to weatherization.

CENOSTAR CENOSPHERES IN UNDERSEAL

The most popular use of Cenospheres in bituminous underseal is that supplied to the Do-It-Yourself trade. A typical formulation for this application is as follows:

Bitumen Solution	58
CenoStar Cenospheres	15
Calcium Carbonate	25
Cellulose Fibre	2
	100%

This formulation gives an under seal that is easy to apply by knife or brush, lightweight, has good pick up on the brush or knife and has excellent sound dampening qualities.



CENOSPHERES IN BITUMINOUS MATERIALS & CENOSPHERES IN SOUND DAMPENING

Sound dampening for the automotive industry is normally achieved by one of two systems. The first is the simple use of a sheet form sound dampener made from bitumen. The second more specialized system involves a multiple layer system of bitumen, foam or felt and rubber.

The basic concept of using cenospheres in bitumen sound dampening is to achieve low weight. However, the use of high levels of cenospheres (25% - 40% by weight) can also result in an improved performance. Some companies have found that the performance of the lightweight sheets is improved over a wider frequency range.

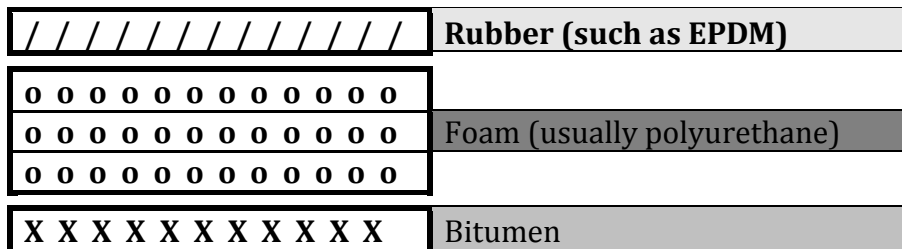
Conventional sound dampening sheets were always made with high density fillers since dense products dampen better. However, good performance is also a function of sheet thickness and it has been acknowledged for some ten years that thicker, low density sheets have improved performance over thin, high density sheets.

The choice of how to benefit from the improved performance when using cenospheres is three fold:

- The sound dampener can be applied at the same thickness thus giving a similar performance but lower weight.
- The sheet can be produced at the same weight and therefore greater thickness thus giving considerably improved properties.
- The most common approach is to apply a slightly thicker sheet which gives better performance but useful weight reduction.

Since most automobile manufacturers are looking for better performance, the latter approach is more popular when a simple bitumen sheet form sound dampener is used.

The multiple layer system is outlined below:



This system has an inherently better performance than the single bitumen layer. This is because the bitumen layer acts to dampen the sound, and the foam and the rubber layer absorb noise that is transmitted. It is usual to keep the bitumen at the same thickness and benefit from a lower weight with improved performance in this system.

OTHER APPLICATIONS

Many other bituminous applications exist such as **roofing, sound dampening** for boats, trains, machinery, domestic appliances etc., **sprayable** bituminous underseal, **epoxy** modified bitumen etc.