

An introduction into Cenospheres

Versatile in use, environmentally friendly, economical and especially valuable for the construction industry.

Cenospheres combine numerous benefits for our customers in a single product. They are of a high-quality construction material with a broad range of applications which can enhance a multitude of other materials and replace the usual additives and fillers

How they are formed; Fly ash is created during the combustion of hard coal, when the non-combustible mineral components of the coal are filtered out of the flue gas in the electrostatic precipitator. A fine dust of mineral particles, very similar to those occurring naturally, is created. Fly ash is produced in modern hard coal fired power plants throughout the world. As a byproduct of coal burning power station, the use of cenosphere helps to reduce this carbon foot print.

Fly ash in its perfect state consists of Cenospheres: Given their name by combining two Greek words ***Kenos*** hollow and ***Sphaira*** sphere. Round hollow extremely durable orbs, in recent years' cenosphere have undergone many tests proving their status as having an enormous valuable contribution to manufacturing and is now registered under **REACH**.

Being round; they act as a ball-bearing, a perfectly dry lubricant. Once agitated by a gas (air) these spheres (orbs) can be fluidised giving them the ability to be moved around like a fluid allowing them to be pumped or sprayed although completely dry. Once added in the correct quantities to another compound it can contribute to that composite, allowing it to take on a more rheological state and flow in a liquidised manner. The Orb is naturally an extremely efficient shape with the lowest possible surface area compared with its volume, which allows high solid formulation and lower shrinkage. Shrinkage is reduced by the result of the cenospheres not being able to be packed together during high concentration due to their shape, therefore helping to maintain volume in a vast array of applications.

Being hollow; each perfect orb although being as minute as 3.5 micron in size is hollow and this reduces its carbon footprint. Many other additives or fillers are practically two dimensional, however an orb is three dimensional - its area of mass is greater to its counterparts, making it of greater value. Because of its low density it is lighter, reducing the weight of a finished product without compromising strength making it perfect for a variety of procedures. Also, as it is hollow in its makeup it gives it a noise dampening quality which can be as great as 40%. likewise making it significantly lighter and as many new applications require a greener footprint a low density hard cenosphere additive which can withstand mixing, compounding and process actions accompanied by easier handling and lower transport costs fits the bill.

Inert; as they are created during the combustion of hard coal, they are the non-combustible product filtered out after being naturally produced. They have a high melting point of 1200-1400 degrees centigrade which makes them far superior to synthetic glass microspheres. They have little thermal conductivity 0.11 Wm- 1K – 1 giving them ideal specifications where high thermal insulation may be required. The cenosphere/orbs are intrinsically aluminosilicate with very low reactivity, because of this chemical composition it makes them resistant to acids and alkalis. They are neutral in pH so do not cause complications or adverse reactions in the final product.



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Oil Absorption; Cenospheres have one of the lowest oil absorption levels of any available additive due to its low surface area and smooth non-porous outer layer. Approximately 30% the density of other frequently used mineral fillers for example have the oil absorption rate of circa 18g oil/100g giving an equivalent level of 6g oil/100g.

Hardness; Cenospheres have a hardness of Mohs Scale 5-6 which proves them to have excellent qualities for milling, (see safety data sheets) grinding, blending. Also giving them outstanding erosion and weather resistance. The outer layer of the sphere is impermeable to liquids and gasses.

Electrical Insulation; Orbs can be used in compounds and electrical encapsulation as an insulator. At high frequencies its properties are effectively unaffected and any loss at lower frequencies is significantly lower than a silica filler.

Cladding and roofing qualities; The initial total solar reflectance / thermal emissivity / Solar Reflectance Index results determined for the two systems Orbolite 300 HA and Orbolite 500 supplied fall within the level of performance currently and commonly used to specify cool roof coatings. The US Green Building Council's LEED V4 sustainability rating program specifies an initial minimum SRI of 82 and 39 for low (9o) sloped roofs. The US DOE's Energy Star Program specifies a minimum initial solar reflectance for cool roofs as 0.65 (65%) and 0.25 (25%) for a low slope roof. It has been tested and proven that all measured coating samples more than fulfil these requirements.

In Brief;

- Additional bulking levels 5% to 25%.
- Easy to mix and apply.
- Electrical properties multiple applications.
- Free flowing.
- Hard (Strong Mohs scale 5-6)
- High Impact resistance.
- High depth application in one go.
- Inert.
- Light weight 0.85g/cc.
- Low absorption.
- Rheological abilities.
- Spherical.
- Thermal resistant. (melting point 1200c– 1400c) (0.11 Wm – 1K-1)
- High solar reflectance and good thermal emissivity.

Orbolite cenospheres are available in two colours - grey and off white - and a variety of grades.

106, 180, 180W, 300, 500, 500LF, 500LD, 500HA.

