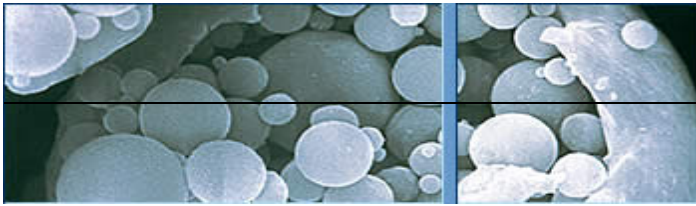


## CENOSPHERES FROM FLY ASH

Cenospheres are unique free flowing powders composed of hard shelled, hollow, minute spheres. A small proportion of the pulverised fuel ash (PFA) produced from the combustion of coal in power stations is formed as Cenospheres. Cenospheres are made up of silica, iron and alumina. Cenospheres have a size range from 1 to 500 microns with an average compressive strength of 3000+ psi. Colors range from white to dark gray. They are also referred to as microspheres, hollow spheres, hollow ceramic microspheres, microballoons, or glass beads



The main characteristics are:

- Hollow spheres with spherical morphology
- Particle sizes ranging from sub-micron to millimeters in size.
- Ultra low density
- Low thermal conductivity
- High particle strength
- Resistant to acids
- Low water absorption

Hollow spheres have been used for more than 20 years to improve the properties of a variety of finished consumer products. They were first introduced as an extender for plastic compounds, as they are compatible with plastisols, thermoplastics, latex, polyesters, epoxies, phenolic resins, and urethanes. Synthetic foams made with cenospheres have demonstrated superior mechanical properties when compared to those manufactured with fabricated microspheres. The compatibility of cenospheres with specialty cements and other building materials such as coatings and composites was also quickly identified. Since that time cenospheres have been used in a wide variety of other products, including sports equipment, insulations, automobile bodies, marine craft bodies, paints, and fire and heat protection devices

### **Proposal:**

Application of cenospheres in plastics and paints is well accepted. There is abundant availability of raw material from thermal power plants. APITCO recommends setting up a plant for cenosphere isolation from fly ash.

### **Product mix:**

Grade I cenospheres	1000 Tons per year
Grade II cenospheres	2000 Tons per year

**Market:**

Ceramics	Refractories, Castables, Tile, Fire Bricks, Aluminum Cement, Insulating Materials, Coatings
Plastics	BMC, SMC, Injection Molding, Extruding, PVC Flooring, Film, Nylon, High Density Polyethylene, Low Density Polyethylene, Polypropylene
Construction	Specialty Cements, Mortars, Grouts, Stucco, Roofing Materials, Acoustical Panels, Coatings, Shotcrete, Gunitite
Recreation	Marine Craft, Flotation Devices, Bowling Balls, Surf Boards, Kayaks, Golf Equipment, Footwear, Lawn & Garden Décor
Automotive	Composites, Undercoatings, Tires, Engine Parts, Brake Pads, Trim Molding, Body Fillers, Plastics, Sound Proofing Materials
Energy & Technology	Oil Well Cements, Drilling Muds, Industrial Coatings, Grinding Materials, Aerospace Coatings & Composites, Explosives, Propeller Blades

**Manufacturing process:**

It is estimated that cenospheres are present to an extent of about 1 % in flyash from thermal plants. Because of low density and hollow nature they float in the lagoons where fly ash is discharged. The float is collected, further isolation is carried by froth flotation and dried. Final extraction is carried out in a pneumatic conveying system connected to a tribo electric separator. In the tribo separator the fly ash is divided into three fractions. Here the cenospheres are separated from carbon and iron. The product is then graded for different end uses.

**Technology:**

Technology is available from multiple sources.

**Plant and Machinery**

Plant and machinery consist of floatation equipment, pneumatic conveying equipment, tribo electric separator.

**Raw materials**

Fly ash float from thermal plants

**Utilities:**

Power is the main utility

**Project cost:**

Rs. 5 crores

Turnover and profitability:

Rs. 5 crores with profit margin of 50 %

**Suggested location:**

Near a super thermal power plant

**Entrepreneur profile:**

This is a technology intensive process. Apart from manufacture the entrepreneur has to provide application support to end users.

**Apitco's consultancy:**

1. Technology tie – up
2. Market study