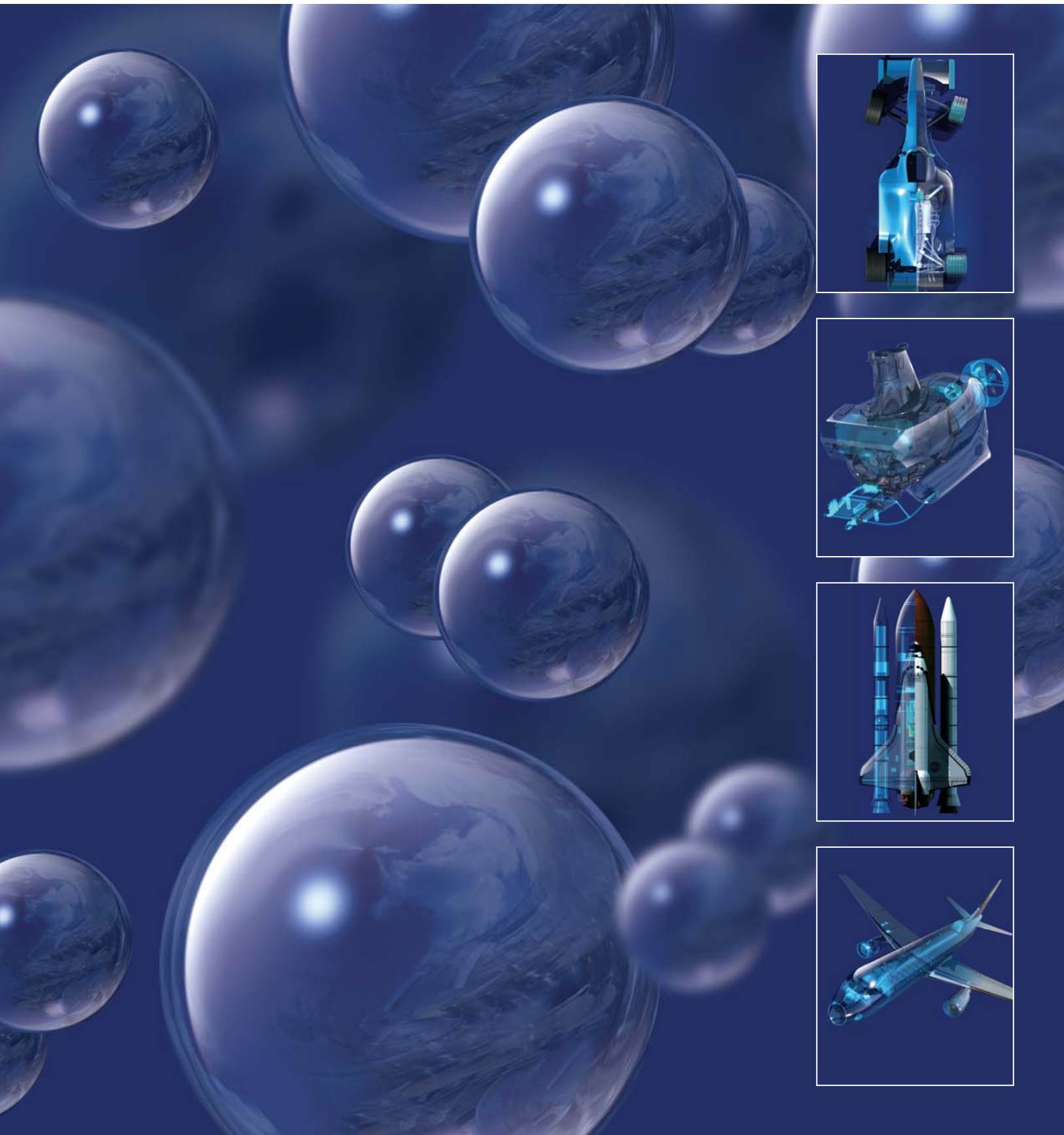


# Composite Solutions

AEM Product Group



## Contents

## Page

Introduction	1
Global Network & Markets	2
Tooling Block	3
Adhesives Sealants and Pastes	4
Microspheres	5
Plug Assist Materials	6
Cenospheres	7
Testing	8



# Introduction

Trelleborg has been manufacturing high performance tooling solutions for almost 2 decades, during which time we have achieved a global reputation for quality and reliability. Our tooling solutions are used extensively in a wide variety of markets including Formula 1, Aerospace, Defence and Automotive industries and provide end users with a competitive advantage within their market sectors. The benefits afforded by our tooling solutions range from direct savings in labour and automation to the ability to optimise resin chemistry thereby extending working times at room temperature.

## Company Profile

In January 2006 Trelleborg AB acquired all of the CRP group companies. Trelleborg, a company with over 24,000 employees operating in more than 40 countries has market leading positions based on advanced technologies and in depth applications know-how in rubbers and polymers. As a part of Trelleborg, we are able to draw upon extensive group resources to ensure that our clients are provided with the most superior Tooling Solutions available in the market.

Benefiting from a number of synergies from across the group including combined research and development programmes, materials technology, cost efficiency initiatives, production and logistical flexibility we remain true to the principles of customer service and product innovation that launched the company over 30 years ago.



Trelleborg Offshore - Skelmersdale Facility

## Customer Focus

We pride ourselves on our proven ability to support our customers and have gained an enviable reputation for being the supplier of choice to key industry OEM's contractors, operators and end users. Based on a commitment to service from first enquiry to final delivery, all projects are assigned dedicated project managers helping to ensure completion 'on time and within budget' essential in today's fast paced industry.

## Core Values

Trelleborg's basic core values are long term commitments which guide us in making decisions and conducting business. Our core values are:

- Customer focus.
- Performance.
- Innovation.
- Responsibility.

## Global Network & Markets

Trelleborg Engineered Systems is a leading global supplier of engineered solutions that focus on the sealing, protection and safety of investments, processes and individuals in extremely demanding environments.

With more than 30 manufacturing plants across 13 countries, Trelleborg Engineered Systems is a global leader in solutions for Polymer products, industrial hose, engineered fabrics and industrial antivibration.

The AEM product group has been manufacturing high performance tooling materials for more than 20 years. Through constant innovation and development,

we have increased our range of Epoxy based tooling boards to cater for all needs from light modelling work through to high performance carbon fibre component production. Recognising that it is important to have the correct supplementary products, we have developed a range of tooling boards to offer a comprehensive suite of products for the tool or pattern maker.

Our tooling solutions are used extensively where performance, durability and reliability are required encompassing such industries as Automotive, Aerospace, Marine, Leisure and Formula 1.



# Tooling Block

## Tooling Block

We are renowned for our TB range of premium epoxy tooling block which is used extensively throughout the motorsport industry for the manufacture of high precision mould tools. AEM Product Group also offers the Epoxical range of tooling board well known throughout the industry.

The range, incorporating TB650, TB620, TB610, TB400, EP671, EP678 and EP650, can be machined to highly smooth surfaces and remain extremely stable throughout a wide range of temperature fluctuations.

## Key Properties

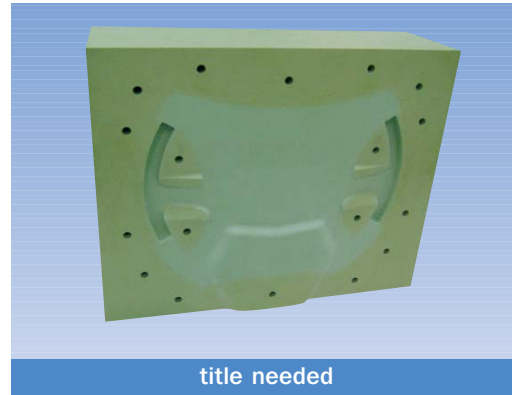
- Very good surface structure.
- High quality.
- Easy to machine.
- Temperature resistant up to 160°C.
- Excellent dimensional stability.
- Low coefficient of thermal expansion.
- Good dimensional stability.
- High impact strength.
- Density range from 0.4 to 0.7.

## Key Applications

- Prototyping.
- Modeling.
- Styling.
- Metal forming.
- Plug assist.

## Key Advantages

- Improved speed to market.
- Reduced labour times.
- Reduced machine times.
- Design cycle flexibility.
- Reduced development time.
- Consistent and repeatable.
- Reduced costs.





# Microspheres

AEM Product Group were the first company to offer a complete line of commercially available aerospace grade glass microspheres through the Eccospheres® brand. Eccospheres® glass microspheres are hollow thin-walled glass microspheres composed of sodium borosilicate glass. To the naked eye they resemble a fine, white free flowing powder; however magnification reveals them to be near perfect spheres.

## Key Applications

Eccospheres® Glass Microspheres are used extensively in a variety of markets and applications from weight saving paints in the aerospace industry through to lightweight passive radar systems for defence applications.

Eccospheres® Glass Microspheres can be found in many applications including:

- Low density syntactic core fillers.
- Potting compounds.
- Speciality paints and coatings.
- Void fillers.
- Edge sealers.

## Key Properties

Whilst we offer a standard range of Eccospheres® Glass Microspheres, we are able to customise microspheres according to customers' specifications by modifying the starting materials and manufacturing parameters. This allows us to control characteristics such as density, strength, particle size and packing factor.

The key properties across our range of Eccospheres® Glass Microspheres are:

- High temperature resistance.
- Excellent density:strength ratio.
- Clean surface chemistry.
- Excellent dimensional stability.
- Narrow particle size distribution.
- Low thermal conductivity.
- Low dielectric constant.
- Low dispersion factor.



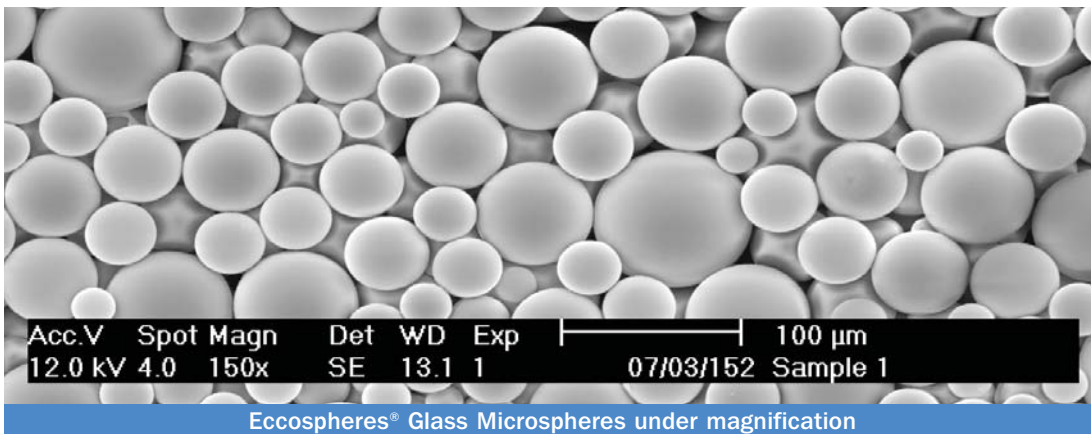
Eccospheres® Glass Microspheres

## Key Advantages

Eccospheres® Glass Microspheres provide many benefits to customers and users. Costs are reduced due to high packing factors, their unique glass chemistry allows the spheres to withstand many process conditions and their high chemical purity makes them compatible with almost all resin systems and surface treatments.

Advantages of Eccospheres® Glass Microspheres include:

- Reduced costs.
- Low density.
- High packing factor.
- Unique glass chemistry.
- High chemical purity.
- Optimisation of final product properties.
- Improved processability.
- Temperature stability to 800°C.



Eccospheres® Glass Microspheres under magnification

# Plug Assist Materials

Trelleborg AEM pioneered the development and introduction of the first syntactic foam thermoforming material in 1981, and through investment in product development, now provide a range of materials, which address the needs of the thermoforming industry.

The range included Syntac® 350, Syntac® 450, Syntac® 351, and Eccolite® Ultra.

## Key Applications

As well as being easy to machine, the material maintains its shape at elevated temperature, and therefore can be used to form a wide range of polymers/polyolefins,

PS, PE, PVC, APET and CPET. Also, its low density and low dielectric enable this material to be used in other applications, such as [.aerospace?](#)

Syntac® applications include the following:

- **Plug assist material for the thermoforming industry**
  - Food packaging
  - Medical packaging
- **Prototype tool making**
  - Automotive
  - Aerospace
  - Leisure
- **Transducers**
- **Radome housings**



Strapline required here



Strapline required here

## Key Properties

- Low thermal conductivity and specific heat.
- Excellent dimensional stability and temperature resistance.
- Smooth surface finish.
- Lightweight.
- Good abrasion resistance.

The Syntac® range of products provide many benefits to tool makers and end users alike, and offers a cost effective alternative to wood, felt, aluminium and delrin. Syntac® is engineered to address problems inherent in traditional thermoforming tooling, such as sticking, deformation and failure.

## Key Advantages

- Simple and fast plug preparation.
- No plug heaters required.
- Reduced warm up times.
- Long plug life.
- Consistent performance.



Strapline required here

# Cenospheres

## Product Description

Cenospheres or Fillite® are hollow, aluminosilicate spheres. Cenospheres are a small fraction of fly ash produced by burning coal at thermal power stations.

## Key Applications

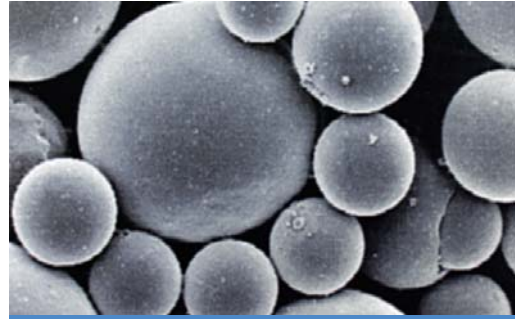
Fillite is used in oilwell cements, high temperature thermal insulation, automotive acoustic dampening, joint fillers, epoxy architectural profiles, polyurethane furniture and mouldings, ten-pin bowling ball cores, tooling compounds, adhesives, lightweight cementitious mortars and cement wall/floor panels.

## Key Advantages

- High temperature resistance – up to 1600°C.
- Very low cost compared to glass microspheres.
- Low co-efficient of thermal expansion.
- Very high strength in polymer systems.
- Low resin demand.
- Free flowing, easy to use and process.
- Excellent chemical resistance.

## Scope of Supply

Fillite® cenospheres are processed in UK, Czech Republic, China, India, Kazakhstan and Russia. They are available through Trelleborg offices in UK and USA and a global network of distributors. Grades from 500 micron top size to 106 micron top size are available in normal grey colour or in higher melting point off-white versions.



Strapline required here

## Specification Checklist

- Particle density.
- Bulk density.
- Particle size distribution.
- Sinkers content.
- Surface moisture.



Strapline required here

# Testing

Testing and product development are at the heart of Trelleborg's material advances and product solutions. Whether within the laboratories, witness testing or ongoing research and development, testing is a major focal point for the company.

Given the numerous considerations when evaluating the suitability of a material, Trelleborg undertake numerous test programmes to ensure that the most appropriate material solution is chosen for any given application.

The test /evaluation process can be grouped into two main categories:

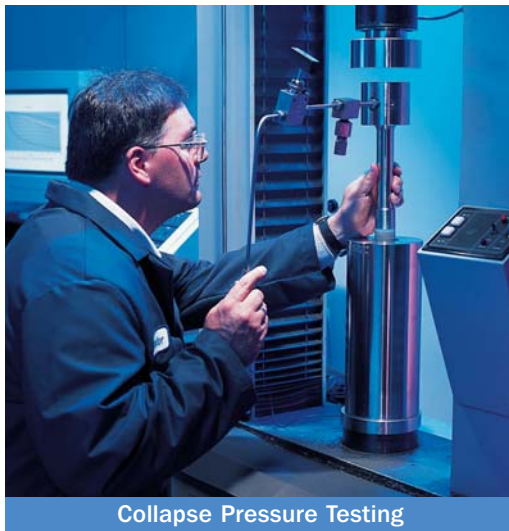
- Characterisation of Material.
- Performance /Application.

## Characterisation of Material

A wide range of laboratory scale testing is undertaken to determine the material properties and reaction at given simulated application and environmental conditions, these tests include:

- Density.
- Compressive Strength.
- Bulk Modulus.
- Tensile Properties.
- Coefficient of Linear Thermal Expansion.
- Shear Strength.

These tests ensure that, in terms of material properties the most appropriate material is selected for given operating conditions.



## Performance / Application

It is vital to clarify the materials application so that its 'in-field' properties can be evaluated ensuring its fitness for purpose. We routinely undertake performance testing encompassing:

- Impact Strength.
- Machining Behaviour.
- Dimensional Stability.

With this data, Trelleborg engineers are able to predict end of life characteristics and thus determine the ultimate material formulation. Trelleborg believe that continuous and extensive testing is the only way to remain at the forefront of material development and continue to offer solutions that expand production possibilities and improve operating efficiency.



**Eccospheres® Glass Microspheres**

Eccospheres® can also be used in ablative coating formulations for rockets and missiles

## EUROPE

### Trelleborg CRP Ltd.

Stanley Way, Skelmersdale  
Lancashire WN8 8EA, UK

Tel: +44 (0)1695 712000  
Fax: +44 (0)1695 712111

Paxton Place, West Pimbo  
Skelmersdale, Lancashire, UK

Tel: +44 (0)1695 714300  
Fax: +44 (0)1695 555586

Email: [crpsales@trelleborg.com](mailto:crpsales@trelleborg.com)  
Website: [www.trelleborg.com/crp](http://www.trelleborg.com/crp)

## NORTH AMERICA

### Trelleborg Emerson & Cuming, Inc.

290 Forbes Boulevard, Mansfield  
MA 02048, USA

Tel: +1 (774) 719 1400  
Fax: +1 (774) 719 1401

24 Teed Drive, Randolph  
MA 02368, USA

Tel: +1 (781) 963 6794  
Fax: +1 (781) 963 6788

Email: [emerson@trelleborg.com](mailto:emerson@trelleborg.com)  
Website: [www.trelleborg.com/emerson](http://www.trelleborg.com/emerson)



The information contained in this publication is for guidance only and does not constitute a specification. All figures are nominal. This document discloses subject matter in which Trelleborg CRP Limited has proprietary rights. Neither receipt nor possession thereof confers or transfers any right to reproduce or disclose the documents, any information contained therein, or any physical article or device, or to practice any method or process except by written agreement with Trelleborg CRP Limited.

Trelleborg CRP Limited is committed to further development of all its products. The right is reserved to alter this specification without prior notice.