

# SYNTAC® 450

A high temperature syntactic material for thermoforming

## Introduction

AEM product group pioneered the development and introduction of the first syntactic foam thermoforming material in 1981 and through a process of continuous investment and product development are recognised as leaders in the field.

Syntac® 450 syntactic foam is the high temperature (450°F/232°C) member of the Syntac® product family.

A rigid, high strength composite of epoxy resin and hollow glass microspheres, Syntac® 450 maintains its hardness right up to the maximum running temperature and exhibits excellent abrasion resistance.

Available in block, sheet and rod form it is easily machined using standard shop tools and offers a lightweight, durable and cost effective alternative to wood, felt and aluminium.

## Features & Benefits

Syntac® 450 is engineered to address problems inherent in traditional thermoforming tooling, such as sticking, deformation and failure.

- **Simple and fast plug preparation**  
Syntac® can be easily machined, using standard tooling equipment.
- **Smooth surface**  
Machines to a polished finish.  
Extra slip for high definition.
- **Low thermal conductivity and Specific Heat**  
Reduced warm up times, and elimination of plug sticking or fouling.
- **Excellent Dimensional Stability and Temperature Resistance**  
Maintains shape and temperature at elevated temperatures.  
Consistent performance.  
Long plug life, proven by long service history in application.



- **High Clarity**  
Virtual elimination of swirl and chill marks.
- **Lightweight**  
Reduces wear and tear on moving machinery parts.
- **Variety of rods, sheets and block available**  
Customised plugs can also be moulded.

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## Applications

Syntac® 450 can be used to form a wide range of polymer sheet materials, and works well with polyolefins, as well as APET and CPET.

It is ideal for thermoforming on a wide range of inline, sheet or rotary fed systems, such as component manufacture within the food and medical packaging, aerospace and automotive sectors. Syntac® 450 is recommended for high temperature runs and for thermoforming thicker sheet material.

The material's versatility also makes it ideal for prototype tooling in many other plastics processes.

Syntac® 450 can be used as a direct replacement for Hytac®-WF and Teflon® coated materials

## Safety

Syntac® 450 can be handled without any specific ventilation, hygiene or flammability precautions being necessary.

However, sanding, grinding and other machine operations may result in nuisance dusts that may be irritating to the eyes and upper respiratory tract. Nuisance particle masks, safety goggles and good local ventilation (preferably flexible duct work extending to the point of contact) should always be used. Consult the MSDS for more detailed information on safety and personal protection.

## Machining

Recommended speeds and feed for optimum performance when turning Syntac® 450 are as follows:

- Speeds** 3,000 – 3,500rpm.
- Cut Size** 0.25 inches (6mm) maximum.
- Feed** 15-20 inches (381-508mm) per min.
- Tooling** Carbide or high speed steel.  
Maintain sharp edge with slight chip breaker.
- Flutes** 2/3 for optimum performance.

## Technical Assistance

AEM product group welcomes discussions with potential users about the ways that Syntac® thermoforming plug materials can help increase productivity and reduce costs. Trelleborg Emerson & Cuming, Inc. provide information and assistance to help users achieve maximum benefits from Syntac® 450.

## Major cost saving benefits

- **Simple and fast plug preparation**
- **No plug heaters**
- **Reduced warm up time**
- **Consistent performance**
- **Long plug life**

## Typical properties

### Syntac® 450

	IMPERIAL	METRIC
Color	Blue	Blue
Density	46lb/ft <sup>3</sup>	736kg/m <sup>3</sup>
Service temperature	450°F	232°C
Thermal conductivity	0.09 BTU/hr-ft-°F	0.15W/m <sup>2</sup> K
Specific heat	0.50 BTU/lb-°F	2090 J/kg-°K
Coefficient of thermal expansion	17x10 <sup>-6</sup> in/in/°F	31x10 <sup>-6</sup> cm/cm/°C
Compressive strength	7,400 psi	51 MPa
Compressive modulus	341,000 psi	2351 MPa
Shore D hardness	55°D@450°F	55°D@232°C



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