



Performance at every level

Trelleborg Applied Technologies
Syntac[®] products and solutions

Operations

Trelleborg Applied Technologies is an industry expert in delivering innovative and reliable solutions that maximize performance for our customers. Our vast range of specialized, customizable materials ensure peace of mind at every stage of your project. With reliable and efficient project management and manufacturing we endeavor to take performance to new levels by achieving your goals safely, on time and within scope.

History

Trelleborg's Applied Technologies operations can trace its roots all the way back to 1905 when Henry Dunker founded Trelleborg Gummifabriks AB and turned it into Scandinavia's leading rubber production company. The inception of Trelleborg Applied Technologies in 2016 followed a 20-year period of market consolidation of well-known brands such as Advanced Engineering Materials, Ambler Technologies, Emerson and Cuming, CRP, OCP, Tyco, Polyurethane Products Limited and Unitex. Today, Trelleborg Applied Technologies continues to be a world-leader of specialized, customizable material solutions.

Innovation

As technological advancements continue to push the limits, there is a growing need to guarantee peace of mind and deliver superior material solutions. With a long-standing commitment to the development of innovative material solutions, Trelleborg Applied Technologies provides superior engineered material solutions for the most challenging applications from space to seafloor and everywhere in-between.

Expertize

As industry experts, our proven track record of engineering quality assured material solutions on-time that last the lifetime of your project, guarantee your peace of mind. Always keen to share our vast knowledge and application expertize with customers to help them accelerate their performance, now and in the future, we offer comprehensive support from conception to completion of every project. This includes training customers on the capabilities of Trelleborg's Applied Technologies portfolio of material solutions and engineering support throughout a project (however large or small). In addition to providing expertize, we control the whole supply chain including design, manufacture, testing and installation to ensure a vast range of customizable material solutions to meet your budget, time frame and installation requirements.



Syntac® 350

Syntactic composite material

With an advanced range of thermoforming plug assist materials designed to increase your productivity, reduce downtime and maintain high product quality, Trelleborg Applied Technologies strives to perform at every level.

Syntac® 350 is the industry standard white syntactic foam, made from high grade epoxy resin and hollow glass microspheres designed specifically for fabricating thermoforming plugs and other associated tooling.

Features & Benefits:

- Cost effective
- Industry standard
- Available in a castable form (Syntac® 351)
- FDA compliant CFR 177.1630 for packaging which contacts:
 - Food packaging < 250 °F / 121 °C
 - Alcoholic beverages
 - Dry food packaging
- Available in a wide range of block, rods and sheets

TYPICAL PROPERTIES		
Syntac® 350	Imperial	Metric
Color	White	White
Density	42 lb/ft ³	672 kg/m ³
Service Temperature	350 °F	177 °C
Thermal Conductivity	0.07 BTU/hr-ft-°F	0.12 W/m ² K
Specific Heat	0.50 BTU/lb-°F	2090 J/kg-K
Coefficient of Thermal Expansion	17x10 ⁻⁶ in/in-°F	31x10 ⁻⁶ cm/cm-°C
Compressive Strength	6,500 psi	45 MPa
Compressive Modulus	339,000 psi	2337 MPa
Shore D Hardness	55 °D @ 350 °F	55 °D @ 117 °C



Machining:

There are no special tools required to machine this material, however we do recommend the use of carbide tools.

- Speeds: 3,000 - 3,500 rpm
- Cut Size: 0.25 inches / 6 mm maximum
- Feed: 20 - 25 inches / 508 - 635 mm per min
- Tooling: Carbide or high speed steel, maintain sharp edge with slight chip breaker
- Flutes: 2 - 3 for optimum performance

Polishing:

Syntac® 350 materials can be polished to achieve an extremely smooth surface finish. Please follow the tips below to achieve the desired surface quality of the finished plug and to guarantee the consistency in the plug performance.

- Tooling: Sandpaper (wet or dry)
- Speeds: Rub in random motion
- Grits: Start with 220 - 600 grit and then progressively go to finer grits until you reach the desired finish

Syntac® 450

High performance syntactic material

With an advanced range of thermoforming plug assist materials designed to increase your productivity, reduce downtime and maintain high product quality, Trelleborg Applied Technologies strives to perform at every level.

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.

Syntac® 450 is easily machined using standard shop tools and offers a lightweight, durable and cost effective alternative to wood, felt and aluminum.

Features & Benefits:

- High temperature 450 °F / 232 °C
- Improved clarity - elimination of swirl and chill marks
- Increased strength compared to other epoxy syntactic material
- Available in a wide range of block, rods and sheets

TYPICAL PROPERTIES		
Syntac® 450	Imperial	Metric
Color	Blue	Blue
Density	46 lb/ft ³	736 kg/m ³
Service Temperature	450 °F	232 °C
Thermal Conductivity	0.09 BTU/hr-ft-°F	0.15 W/m ² K
Specific Heat	0.50 BTU/lb-°F	2090 J/kg ² K
Coefficient of Thermal Expansion	17x10 ⁻⁶ in/in/°F	31x10 ⁻⁶ cm/cm/°C
Compressive Strength	7,400 psi	51 MPa
Compressive Modulus	341,000 psi	2357 MPa
Shore D Hardness	55 °D @ 450 °F	55 °D @ 232 °C



Machining:

There are no special tools required to machine this material, however we do recommend the use of carbide tools.

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

Polishing:

Syntac® 450 materials can be polished to achieve an extremely smooth surface finish. Please follow the tips below to achieve the desired surface quality of the finished plug and to guarantee the consistency in the plug performance.

- Tooling: Sandpaper (wet or dry)
- Speeds: Rub in random motion
- Grits: Start with a 220 - 600 grit and then progressively go to finer grits until you reach the desired finish

Syntac® TMax

Teflon® impregnated high temperature syntactic composite material

With an advanced range of thermoforming plug assist materials designed to increase your productivity, reduce downtime and maintain high product quality, Trelleborg Applied Technologies strives to perform at every level.

Syntac® TMax is a Teflon® impregnated, high performance syntactic foam. A rigid, high strength composite of epoxy resin and hollow glass microspheres. Syntac® TMax maintains its strength right up to the maximum running temperature and exhibits reduced plug build up while operating at these high temperatures.

In addition, Syntac® TMax also exhibits excellent abrasion resistant properties coupled with a maximum running temperature of 450 °F / 232 °C. Syntac® TMax was developed to meet and exceed the distinctive expectations of our thermoforming customers.

Features & Benefits:

- Superior slip and release properties
- High temperature 450 °F / 232 °C
- Improved clarity – elimination of swirl and chill marks
- Lower sheet temperatures with reduced sticking
- Uniform material distribution
- Available in a wide range of block, rods and sheets

TYPICAL PROPERTIES

Syntac® TMax	Imperial	Metric
Color	Terra Cotta	Terra Cotta
Density	53 lb/ft ³	849 kg/m ³
Service Temperature	450 °F	232 °C
Thermal Conductivity	0.06 BTU/hr-ft·°F	0.11 W/m·K
Specific Heat	0.50 BTU/lb·°F	2090 J/kg·K
Coefficient of Thermal Expansion	16x10 ⁻⁶ in/in/°F	31x10 ⁻⁶ cm/cm/°C
Compressive Strength	10,700 psi	74 MPa
Compressive Modulus	361,500 psi	2492 MPa
Shore D Hardness	75°D @ 37°F, 55°D @ 450°F	75°D @ 23°F, 55°D @ 232°F



Machining:

There are no special tools required to machine this material, however we do recommend the use of carbide tools.

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

Polishing:

Syntac® TMax materials can be polished to achieve an extremely smooth surface finish. Please follow the tips below to achieve the desired surface quality of the finished plug and to guarantee the consistency in the plug performance.

- Tooling: Sandpaper (wet or dry)
- Speeds: Rub in random motion
- Grits: Start with 220 - 600 grit and then progressively go to finer grits until you reach the desired finish

OVERVIEW INFORMATION

Syntac	Syntac® 350	Syntac® 450	Syntac® TMax
Color	White	Blue	Red/Brown
Density	46 lb/ft ³ (736 kg/m ³)	46 lb/ft ³ (736 kg/m ³)	53 lb/ft ³ (849 kg/m ³)
Service Temperature	350 °F (176 °C)	450 °F (232 °C)	450 °F (232 °C)
Thermal Conductivity	0.069 BTU/hr-ft ² ·°F (0.12 W/m ² ·K)	0.087 BTU/hr-ft ² ·°F (0.15 W/m ² ·K)	0.060 BTU/hr-ft ² ·°F (0.11 W/m ² ·K)
Coefficient of Thermal Expansion	17x10 ⁻⁵ in/in/°F (31x10 ⁻⁶ m/m/°C)	17x10 ⁻⁵ in/in/°F (31x10 ⁻⁶ m/m/°C)	17x10 ⁻⁵ in/in/°F (31x10 ⁻⁶ m/m/°C)
Compressive Strength	6,500 psi (45 MPa)	7,400 psi (51 MPa)	10,700 psi (74 MPa)

PRODUCTION INFORMATION

Feature	Syntac® 350	Syntac® 450	Syntac® TMax
Reducing dust in machining	1	2	2
Persistence/persistence of fine details	1	2	2
Material distribution	3	4	4
Polishing	2	4	5
Use with transparent plastic	2	3	4
Minimum clearance from the side wall	2	3	4
Low adhesion surface	2	3	5
Deep drawing	3	4	4
Use in multi-layered plates	2	3	4

1 - Low 3 - Medium 5 - High

SUBSTRATE INFORMATION

Sheet material	Syntac® 350	Syntac® 450	Syntac® TMax
APET	A	P	A
CPET	A	P	P
EVOH	N	A	P
HDPE	P	P	P
HIPS	A	A	A
LDPE	P	A	P
OPS	A	P	A
PC	N	P	P
PETG	A	P	A
PMMA	A	P	P
PP	A	A	A
PS	P	A	P
Sert PVC	P	P	A
RPET	A	P	P

P - Proposed (Green) A - Acceptable (Yellow/orange) N - Not recommended (Red)

Advisory

Trelleborg Applied Technologies operates a strict quality control process, but we realise that it is not possible to completely remove internal voids in our rods and sheets. We guarantee that there will be no internal voids larger than 1/8" (3.18 mm) and no more than 2 per linear foot between 1/6" (1.58 mm) and 1/8" (3.18 mm). Surface color may vary due to; sunlight exposure, frequent handling or rod/sheet thickness. The color does not impact the performance of the material.

Manufacturing Facilities

Local presence, global reach – Trelleborg Applied Technologies have teams around the world to meet your requirements.

Boston, Massachusetts, US

Address: 24 Teed Drive, Randolph, MA 02368

Phone: +1 774 719 1400

1. *Established since 1948, Trelleborg Offshore, based in Boston, has the proven experience and expertise to solve our customers' challenges. Our areas of expertise include material development and we are an ROV center of excellence. Our main focus is in design, project management and manufacturing solutions for our customers, based on our material expertise.*
2. Office – 650 m²
3. Total site – 7,081m²
4. Workshops – 3,437m²

Krokstadelva, Norway

Address: Kalosjegata 15, 3055 Krokstadelva, Norway

Phone: +47 32 23 20 00

1. *With over 120 years of experience our expertise has made us the largest producer of rubber products and solutions in Norway since the establishment in 1896. We employ dedicated and skilled personnel in the whole value chain. Our main focus is in material development, design, project management and manufacturing tailored solutions for our customer based on their needs.*
2. Office – 2,500 m²
3. Total site – 25,000 m²
4. Workshops – 21,000 m²
5. Storage – 1,500 m²

Retford, UK

Address: Trinity Park, Randall Way, Retford,
DN22 7AX, UK

Phone: +44 (0) 1777 712500

1. *Our Retford team has proven experience and expertise in solving our customers' challenges. Our main focus is design, project management and manufacturing solutions for our customers based on our product and material expertise*
2. Office – 760 m²
3. Total site – 16,200 m²
4. Workshops – 6500 m²
5. Storage - 1000 m²
6. Testing and R&D – 35 m²

Rochdale, UK

Address: Eagle Way, Off Queensway, Rochdale,
Lancashire, OL11 1TQ, UK

Phone: +44 (0) 1706 716610

1. *Established since 1969, Rochdale has proven experience and expertise in solving our customers' challenges. Areas of expertise are material development, machining and an ROV center of excellence. The facility operates 3, 5 and 7 axis CNC machine centers and has complimentary finishing facilities for PU, paint and composite coatings.*
2. Office - 650 m²
3. Total site – 7,081 m²
4. Workshops - 3,437 m²

Email us on: appliedtechnologies@trelleborg.com

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