Signature Management

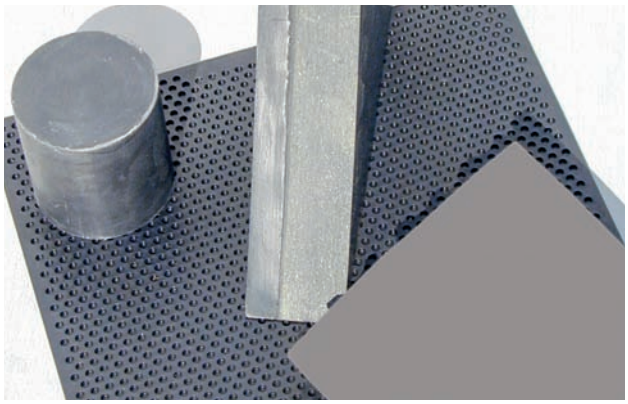
Acoustic signature control

Image: Courtesy of BAE Systems

Trelleborg acoustic treatments can be applied to a platform in a variety of forms, enabling the most suitable material to be used across the widest range of applications. We currently supply UK MOD and its contractors and have supplied products to defence organizations throughout the world.

Acoustic Signature Control
The fitting of properly designed acoustic material to submarines and surface ships can achieve a significant reduction in radiated and self noise. This will decrease the range at which vessels can be detected and classified and frequently has the benefit of increasing the performance of their own sonar systems.

Anechoic Signature Control
In order to reduce the probability of detection by active sonar, it is possible to absorb or scatter the sonar energy, by the application of special coatings to the hull of the ship or submarine; the subsequent reduction in target echo strength can considerably reduce the range at which detection is achieved.



The Products
Trelleborg manufactures a range of products to improve the signature of underwater platforms by reducing radiated noise and target strength. These products include:

- **Tiles** - Anechoic and decoupling tiles for ships and submarines and transmission loss and decoupling materials.
- **Sonar Materials** - To replace Glass Reinforced Plastic (GRP) for sonar domes and windows.
- **RhoC Materials** - Designed to match the impedance and speed of sound in sea water.
- **Damping Materials**
- **Encapsulation** - Large and small scale encapsulation of arrays with controlled exotherm.

The Capability
Trelleborg has extensive manufacturing and test equipment for a wide range of elastomeric products. We are committed to delivering high quality, state of the art, materials tailored to meet customers' specific requirements. In partnership with QinetiQ we can design the acoustic materials you need.

Contact Us

Trelleborg Applied Technology delivers innovative and reliable solutions that maximize business performance to meet your needs. Our dedicated and highly skilled staff are always on hand to provide seamless process support from initial idea, through to delivery and beyond.

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TRELLEBORG

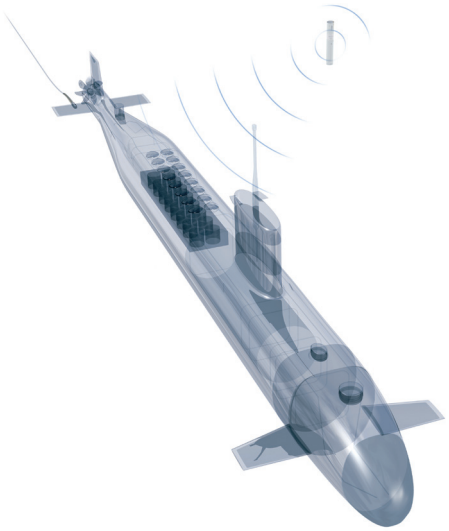
WWW.TRELLEBORG.COM/APPLIEDTECHNOLOGY

Protection Solutions

Advanced composite materials

Images: Courtesy of BAE Systems

Trelleborg has been actively involved in the development of innovative products and solutions for over 60 years. We have provided numerous innovative solutions from concept through to design and manufacture for air transport, ships, subsea vessels and land vehicles.



Today, Eccospheres®, high-performance hollow glass microspheres, and Eccofloat®, a syntactic foam series from Trelleborg, are helping to reduce weight in aircraft, increase buoyancy in submarines and remotely operated vehicles (ROV), insulate undersea pipes …and more.

We manufacture a range of high performance, low density syntactic foams for undersea buoyancy applications that can be readily shaped to conform to hull contours and outfitted for installation in the forward and aft free-flood areas of subsea vessels.

Our epoxy tooling boards are specially made for CNC machining of high-accuracy models and patterns, prepreg layup molds and other high-temperature applications.

Trelleborg researchers are currently developing advanced processes for the production of innovative “binary” combinations of large and small glass spheres and the use of novel reinforcing materials and coatings to alter mechanical, acoustic and thermal properties of syntactic foams.

Subsea Vessels
Lightweight panels built using hollow glass microspheres are preferred throughout the world for reliable deep-sea buoyancy solutions. Eccospheres® from Trelleborg feature a consistent strength-to-weight ratio to maximize buoyancy. The Eccospheres® also produce syntactic foams with excellent water absorption resistance, transparency to sound and high collapse pressures. Trelleborg composite materials are used throughout the world for:

- **Buoyancy** - balance and trimming panels
- **Fire protection** - low flame/smoke/toxicity panels
- **Deck and structures**
- **Buoys**
- **Seals**
- **Acoustics** - sound absorbent coatings
- **Deep sea applications** - including manned and unmanned submersibles
- **Towed arrays/sonar**
- **Signature management**

Ships and Barriers
Trelleborg Eccospheres® and Eccofloat® combine lightweight and high-strength with good resistance to seawater incursion and energy absorption to support the fabrication of durable composite panels for use in ships and marine barriers.

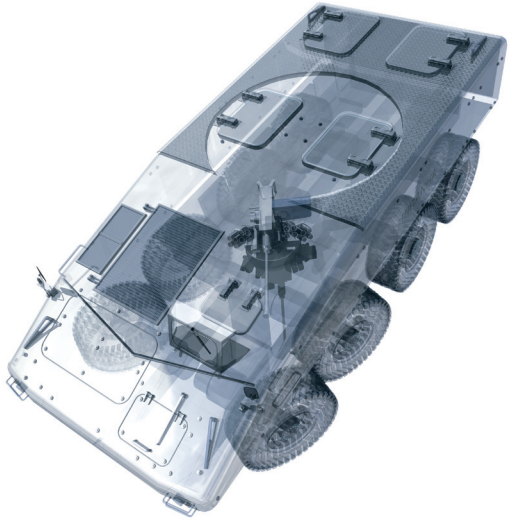
The low thermal conductivity and dielectric strength that characterize glass based syntactic also make the products ideal for use in electronic signal potting systems. Key applications include:

- **Moisture-resistant** - volume void fillers for panels, linings and doors
- **Collision protection**
- **Fire protection** - low flame/smoke/toxicity panels
- **Double hull lining systems**
- **Buoyancy**
- **Deck and structures**
- **Barriers**
- **Signature management**
- **Fluid and electrical system protection**
- **Seals**

Aircraft
Trelleborg supplies a broad range of aerospace grade, high purity glass and ceramic microspheres to the aerospace industry. The lightweight spheres are manufactured with densities ranging from 0.16 g/cc to 0.380 g/cc with uniform wall thicknesses and consistent sized distributions that can be tailored to requirements.

New-generation microspheres are being manufactured to improve flame retardation in composite compounds, reduce the detectability of aircraft by radar, protect delicate electronic components, decrease vibration in jet engines and reduce paint weight. Key applications include:

- **Fire protection** - low flame/smoke/toxicity panels
- **Stealth coatings**
- **Thermal insulation and heat shields**
- **Sealing and potting**
- **Weight reduction**
- **Signature management**



Personnel carriers
Trelleborg provides a wide range of innovative solutions focused on protection within vehicles.

We are currently exploring flame and smoke-retardant formulations featuring varied combinations of densities, strength, stiffness, failure strain and energy of fracture. The goal is production of thinner, lighter weight products for applications including:

- **Protective vehicle panels**
- **Vehicles**
- **Structures**
- **Personnel equipment**
- **Device protection**
- **Lightweight composite panels**
- **Signature management**

TRELLEBORG

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Intek® MTI-1046

Fiber hull board insulation

Intek® MTI-1046 fiber hull board insulation is an incombustible, lightweight, semi-rigid board insulation made from felted glass fibers in a nominal density of 2.9 pcf (46.5 kg/m3). It has low organic content and was the first incombustible type hull board to be developed for use in the marine industry. Intek® MTI-1046 provides additional cabin noise control, temperature control and fire resistance. The insulation has a smooth surface, it can be used in combination with waffle board and perforated glass cloth for fabricating acoustic absorptive board.

Certificates*:

- Fully approved for in-service MOD (UK) Ships.
- DEF STAN 711 and DEF STAN 713 Certified.
- U.S. Coast Guard Certificate of Approval No. 164.109/46/0
- Complies with US Navy and Nuclear Regulatory Commission product standards MIL- 742F, Type II; ASTM C 1139, Type I & II, Grade 6

Note: At times, a formal certificate of compliance is required to verify that a product meets an outside specification. In such instances, the request for the required certificate must be made at the time the order is placed. Should outside testing be a condition for certification, a charge is made to cover test expenses.

*Intek® MTI-1046 may meet additional specifications that are not listed here. Please contact us to determine if it meets your specification, or other requirements.

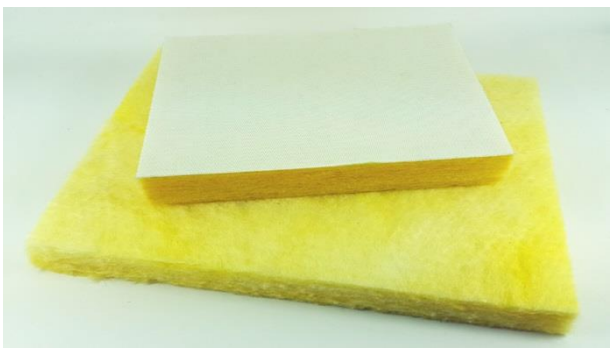
Benefits:

- High thermal performance - highly effective in reducing heat transfer
- Lower Fuel Contribution - compared to standard hull board
- Specification Compliance - complies with all current standards
- Fast installation - the standard sizes available help save cutting and trimming time and reduce waste

Applications:

Intek® MTI-1046 fiber hull board insulation is designed specifically to provide thermal and acoustical insulating control for the hull and deck heads. Typical applications include:

- Commercial vessels
- Defense vessels
- Drilling rig platforms



Typical Technical Data*

Operating temperature limit 450°F (232°C)

Thermal conductivity

Normal Density 2.9 pcf (46.5 kg/m3)			
Mean		**Thermal**	
°F	**°C**	**Btu•in/(hr•ft2•°F)**	**W/m•°C**
75	24	0.23	0.033
100	38	0.25	0.036
200	93	0.31	

Sound Absorption Coefficients Complies with MIL-I-22023D Mounting Type A (Flat on the floor) Formerly No. 4

Thickness		Frequency, Hz						
Inches	**mm**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**NRC***
1	**25**	0.06	0.29	0.75	0.99	1.04	1.02	0.75
2	**51**	0.24	1	1.11	1.08	1.06	1.05	1.05

*The above are typical values subject to normal manufacturing variation.

Contact Us

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Intek® PFI-1110

Thermal and acoustic foam insulation

Intek® PFI-1110 is used in marine, commercial, industrial and defense markets as lightweight, non-flammable, thermal and acoustic insulation. It can be cut into a variety of shapes and sizes, and specialty facings are available to meet performance and specification requirements.

Certificates*:

- DOD-I-24688
- NFPA 130, US FRA and FTA (Docket 90-A)
- Fire-Restricting Materials per the International Maritime Organization (IMO) High Speed Craft code in accordance with the IMO Resolution MSC.40(64)
- ASTM C 1482

*Intek® PFI-1110 may meet additional specifications that are not listed here. Please contact us to determine if it meets your specification, or other requirements.

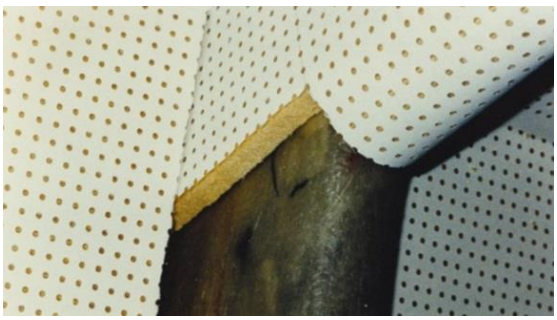
Benefits:

- Superior fire resistance - emits virtually no smoke or incapacitating toxic bi-products when exposed to an open flame and remains stable in high humidity
- Extremely lightweight - translating into fuel savings and efficiency
- Acoustic and thermal insulation - provides excellent acoustic absorption and thermal insulation properties
- Easy installation - lightweight, easy to cut and fit, and readily adapt to fabrication with other materials

Applications:

Intek® PFI-1110 thermal and acoustic foam insulation is used in a variety of applications including:

- Marine hull board
- Marine ceiling panels
- Hangar deck
- Beam and duct wrap
- Commercial HVAC duct liner
- Walls, roof and floor insulation in train carriages
- Joints and pipe shoes for cryogenic pipelines at chemical facilities
- Electronic, medical and analytical instruments



Typical Technical Data*

PROPERTIES	UNITS	VALUES	TESTING
Density	lb/ft³ (kg/m³)	0.40 (6.4)	ASTM D3574 Test A, ISO 845
Flame Spread Index		< 5	ASTM E84
Smoke Developed Index		< 5	ASTM E84
Limiting Oxygen Index	%	> 28	ASTM D2863, ISO 4589-2: 1999
Noise Reduction Coefficient (NRC), 1 in (25mm)		0.7	ASTM C423 and E795, Mounting A
Max Continuous Use Temperature	°F (°C)	400 (200)	
Thermal Conductivity at 75°F (24°C)	BTU-in/hr-ft²-°F (W/mK)	0.32 (0.046)	ASTM C518
50% Compression Force Deflection	lb/in² (kPa)	1.2 (8.3)	ASTM D3574, Test C

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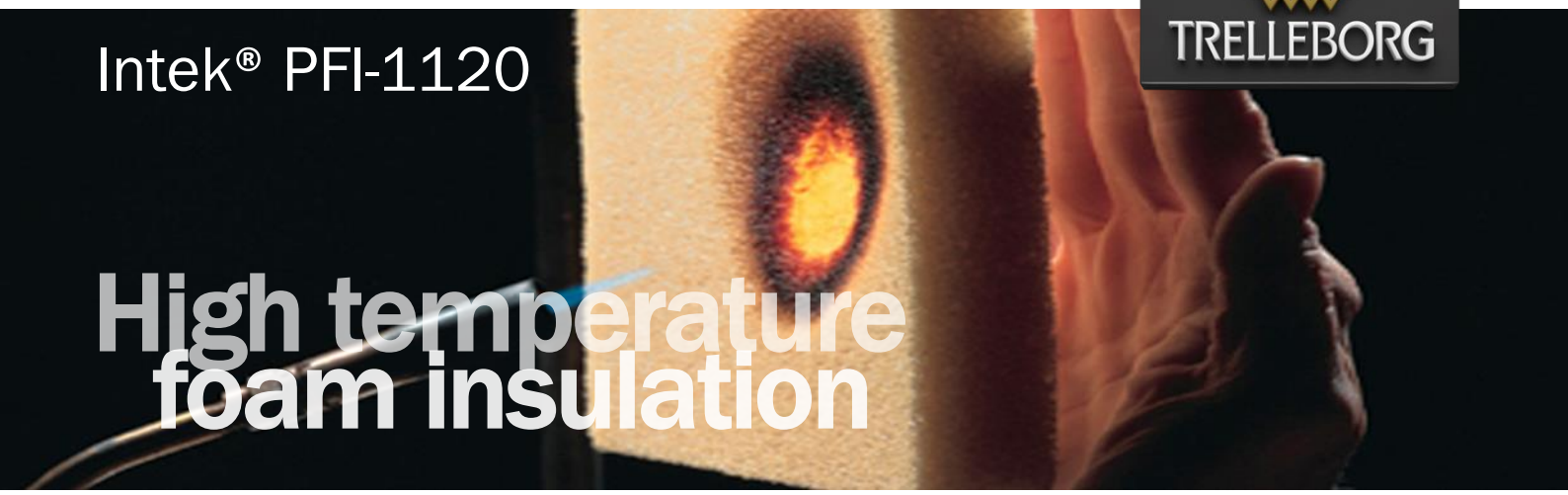
Intek® PFI-1120



High temperature foam insulation

Intek® PFI-1120 is used in commercial, industrial and defense markets as a lightweight, non-flammable, thermal and acoustic insulation and is suitable for when high temperature resistance is required. It is formaldehyde-free and demonstrates excellent long term stability under humid conditions and after temperature cycling. It can be cut into a variety of shapes and sizes, and specialty facings are available to meet performance and specification requirements.

Certificates*:

- UL 94 V-0
- DOD-I-24688
- NFPA 130, US FRA and FTA (Docket 90-A)
- Fire-Restricting Materials per the International Maritime Organization (IMO) High Speed Craft code in accordance with the IMO Resolution MSC.40(64)
- ASTM C 1482

Intek® PFI-1120 may meet additional specifications that are not listed here. Please contact us to determine if it meets your specification, or other requirements.

Benefits:

- High temperature and superior fire resistance - emits virtually no smoke or incapacitating toxic bi-products when exposed to an open flame. Remains stable in high humidity
- Extremely lightweight - translating into fuel savings and efficiency
- Acoustic and thermal insulation - excellent acoustic absorption and thermal insulation properties
- Easy installation - lightweight, easy to cut and fit, and readily adapt to fabrication with other materials

Applications:

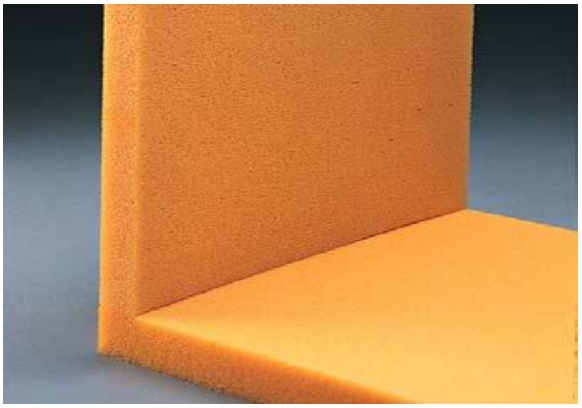
Intek® PFI-1120 high temperature foam insulation is used in a variety of applications including:

- High temperature pipes and ducts
- Night storage heaters
- Ovens
- Medical Storage
- Sensitive electronic, medical and analytical instruments
- Reactor steel containment liner insulation
- Drainage systems
- High temperature industrial application

Typical Technical Data*

PROPERTIES	UNITS	VALUES	TESTING
Density	lb/ft³ (kg/m³)	0.40 (6.4)	ASTM D3574 Test A, ISO 845
FAA Radiant Panel FAR 25.856(a)		Pass	
Flame Spread Index		< 5	ASTM E84
Smoke Developed Index		< 10	ASTM E84
Limiting Oxygen Index	%	> 40	ASTM D2863, ISO 4589-2: 1999
Noise Reduction Coefficient (NRC), 1 in (25mm)		0.7	ASTM C423 and E795, Mounting A
Max Continuous Use Temperature	°F (°C)	575 (300)	
Thermal Conductivity at 75°F (24°C)	BTU-in/hr-ft²-°F (W/mK)	0.32 (0.046)	ASTM C518

*The above are typical values subject to normal manufacturing variation.



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Intek® PFI-1130

Closed cell foam insulation

Intek® PFI-1130 is used in the commercial and defense marine market as a lightweight, non-flammable, non-fibrous thermal hull insulation for submarines and other marine vessels. It can be cut into a variety of shapes and sizes, and specialty facings are available to meet performance and specification requirements.

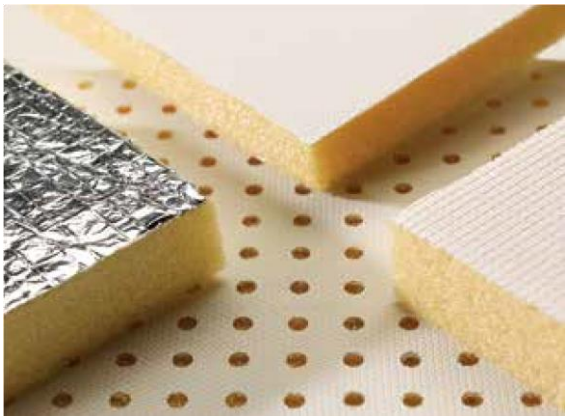
Certificates*:

- Specified as insulation for Electric Boat / Newport News current submarine programs and by BAE Systems for the Astute Program. DOD-I-24688

*Intek® PFI-1130 may meet additional specifications that are not listed here. Please contact us to determine if it meets your specification, or other requirements.

Benefits:

- Superior fire resistance - emits virtually no smoke or incapacitating toxic bi-products when exposed to an open flame. Remains stable in high humidity
- Extremely lightweight - translating into fuel savings and efficiency
- Acoustic and thermal insulation - excellent acoustic absorption and thermal insulation properties
- Easy installation - lightweight, easy to cut and fit, and readily adapt to fabrication with other materials



Applications:

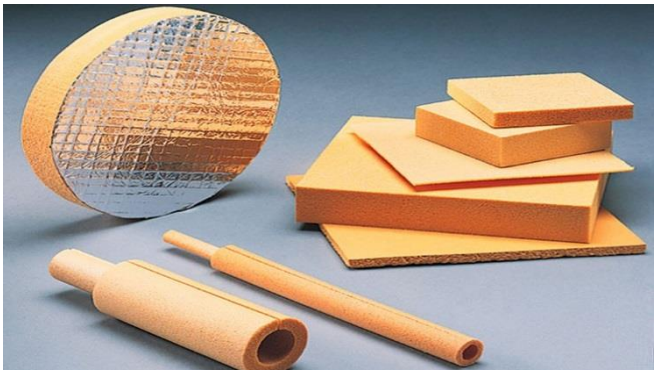
Intek® PFI-1130 closed cell foam insulation is used in a variety of applications including:

- Hull and bulkhead
- Ceiling panels
- Hangar deck
- Beam and duct wrap

Typical Technical Data*

PROPERTIES	UNITS	VALUES	TESTING
Density	lb/ft³ (kg/m³)	0.50 (8.0)	ASTM D3574 Test A, ISO 845
Flame Spread Index		≤ 5	ASTM E162
Smoke Developed Index Non-Flaming		3	ASTM E662
Smoke Developed Index Flaming		5	ASTM E662
Noise Reduction Coefficient (NRC) 1 in (25mm)		0.75	ASTM C423 and E795, Mounting A
Max Continuous Use Temperature	°F (°C)	400 (200)	
Thermal Conductivity at 75°F (24°C)	BTU-in/hr-ft²-°F (W/mK)	0.32 (0.046)	ASTM C518

*The above are typical values subject to normal manufacturing variation.



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Intek® PFI-1160

Rail foam insulation

Intek® PFI-1160 is used in the rail market as a lightweight, non-flammable, thermal and acoustic insulation. Very effective in areas that experience humid conditions, high temperatures, or where loose fibers are a concern. It can be cut into a variety of shapes and sizes, specialty facings are available to meet performance and specification requirements.

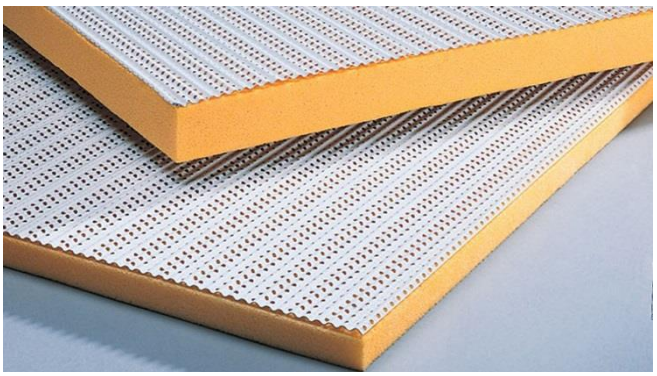
Certificates*:

- NFPA 130, US FRA and FTA (Docket 90-A)
- EN TS 45545-2
- UNI CEI 11170-3
- NF F16-101

*Intek® PFI-1160 may meet additional specifications that are not listed here. Please contact us to determine if it meets your specification, or other requirements.

Benefits:

- Superior fire resistance - emits virtually no smoke or incapacitating toxic bi-products when exposed to an open flame. Remains stable in high humidity
- Extremely lightweight - translating into fuel savings and efficiency
- Acoustic and thermal insulation - excellent acoustic absorption and thermal insulation properties
- Easy installation - lightweight, easy to cut and fit, and readily adapt to fabrication with other materials



Applications:

Intek® PFI-1160 rail foam insulation is used in a variety of applications including:

- Sidewall and roof insulation in passenger carriages
- Walls, ceilings and under floor insulation in trains
- Window and door enclosures
- Engine compartments
- HVAC Components

Typical Technical Data*

PROPERTIES	UNITS	VALUES	TESTING
Density	lb/ft³ (kg/m³)	0.43 (6.9)	ASTM D3574 Test A, ISO 845
Flame Spread Index		< 3	ASTM E162
Smoke Developed Index		< 3	ASTM E662
Noise Reduction Coefficient (NRC), 1 in (25mm)		0.75	ASTM C423 and E795, Mounting A
Noise Reduction Coefficient (NRC), 2 in (50mm)		0.95	ASTM C423 and E795, Mounting A
Max Continuous Use Temperature	°F (°C)	400 (200)	
Thermal Conductivity at 50°F (10°C)	BTU-in/hr-ft²-°F (W/mK)	0.27 (0.039)	ASTM C518

*The above are typical values subject to normal manufacturing variation.

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INTEK®

Thermal and acoustic insulation

Image: Courtesy of BAE Systems

INTEK® is a range of light weight high performance thermal and acoustic insulation products. They provide solutions for many industries, including marine, aviation, automotive and rail.

INTEK® PFI Polyimide Foam Insulation
INTEK® PFI polyimide foam insulation has unrivalled advantages over more traditional insulation materials, making them ideal for solving tough problems aboard marine vessels, aircraft and industrial applications. Polyimide foam technology was developed in the 1970's to meet the stringent fire, smoke and toxicity requirements of NASA and the US Navy. During the 1980's polyimide foam was certified for use aboard surface and submarine vessels. Today polyimide foam is used as the primary insulation aboard virtually all US Navy surface warships and submarines, and is also used or specified for more than 15 navies worldwide.

Benefits and Advantages:

- **Flame resistant** - emits virtually no smoke or incapacitating toxic bi-products when exposed to an open flame
- **Lightweight** - extremely lightweight, which translates into fuel savings and extra payload capacity
- **Wide operating temperature range** - remains functional when exposed to extreme temperatures. The foams maintain their flexibility even at cryogenic temperatures
- **Acoustic and thermal performance** - offers excellent acoustic absorption and thermal insulation properties
- **Reduced life cycle costs** - can be removed for maintenance and then reused
- **Nontoxic and environmentally friendly** - no precautions against fibers or irritating substances is required, there is no formaldehyde offgassing. The foams contain no halogens, heavy metals or ozone depleting chemicals
- **Adhesive compatible** - compatible with a variety of adhesives and performance facings such as Mylar film and perforated glass cloth

INTEK® MTI-1046 Marine Fiber Board Insulation
INTEK® MTI-1046 is a lightweight, semi-rigid board insulation made from felted glass fibers in a nominal density of 2.9 pf (46.5 kg/m^3). INTEK® MTI-1046 Hullboard is characterized by a low organic content.

- Fully approved for in-service MOD (UK) ships
- DEF STAN 711 and DEF STAN 713 certified

Characteristics
High thermal performance with a low 'k' factor of 0.23 Btu•in/(hr•ft^2•°F) at 75°F mean temperature (0.033 W/m•°C at 24°C), INTEK® MTI-1046 Hullboard is highly effective in reducing heat transfer. Operating Temperature Limit: 232°C (450°F).

Properties
INTEK® MTI-1046 Marine Fiber Board can be used in combination with waffleboard and perforated glass cloth for fabricating Acoustic Absorptive Board per Section 3.2.1 of MIL-A-23054A. Complies with current military specification requirements for a MIL- 742F, Type II; ASTM C 1139, Type I & II, Grade 6 and has been given U.S. Coast Guard Certificate of Approval No. 164.109/46/0. (ASTM C 1139 replaced MIL-I-22023D).

Fast Installation
The resilient, semi-rigid insulating board is easy to cut and fit, and can be fabricated with minimal time and effort. The standard sizes available help save cutting and trimming time and reduce waste.

TYPE 45 Insulation – UMI-1075
Glass Wool Hull Board Insulation
TYPE 45 Insulation - UMI-1075 is a lightweight, water repellent, glass wool hull board, for use as a thermal and acoustic insulation in marine applications. The product is produced by a flame attenuation process incorporating a flame retardant, thermoset binder system.

Benefits and Advantages:

- Typical weight saving on destroyer is approx 10 tons
- Improved thermal and acoustic performance over competitors

Characteristics
Manufactured with a patented controlled fiber diameter and density to insure consistent thermal and acoustic performance. Maximum performance temperature for un-faced products are 232°C (450°F).

Qualification
TYPE 45 Insulation - UMI-1075 meet the performance requirements of:

- DEF STAN 711
- DEF STAN 713
- MIL-I-742F
- MIL-I-22023D
- DOD-I-24688

Performance Facings
Available faced with glass fiber cloth, perforated cloth, white Mylar film and other specialty facings as needed to meet performance requirements.

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TRELLEBORG

Intek® UMI-1075

Glass wool insulation

Intek® UMII-1075 glass wool insulation is a lightweight, water repellent, glass wool hull board, for use as a thermal and acoustical insulation for marine applications. The product manufactured with a patented controlled fiber diameter and density to insure consistent thermal and acoustic performance. Maximum performance temperature for un-faced products are 232˚C (450˚F). Specialty facings available to meet your performance and specification requirements.

Certificates*:

- DEF STAN 711
- DEF STAN 713
- MIL-I-742F
- MIL-I-22023D
- DOD-I-24688

*Intek® MTI-1075 may meet additional specifications that are not listed here. Please contact us to determine if it meets your specification, or other requirements.

Benefits:

- Extremely lightweight - translating into fuel savings and efficiency
- Excellent fire and smoke resistance - very low smoke density and toxic gas emissions
- Acoustic and thermal insulation - exceptional acoustic absorption and thermal performance
- Easy installation - lightweight, easy to cut and fit, and readily adapt to fabrication with other materials

Applications:

Intek® UNI-1075 glass wool insulation can be used on commercial as well as defense marine vessels, including the TYPE 45. Typical applications include:

- Hull and bulkhead
- Ceiling Panels
- Hangar deck
- Beam and duct wrap

Performance Facings

Intek® UNI-1075 is available faced with glass fiber cloth, perforated cloth, white Mylar film and other specialty facings as needed to meet performance requirements.

Typical Technical Data*

PROPERTIES	TEST DATA
Density	13kgm3
Non-combustibility test	IMO resolution msc. 61(67)
Smoke index	Def Stan 02-711
Oxygen index	BS en ISO 4589
Flammability temperature index	BS en ISO 4589-3
Elemental composition	Lassiagne sodium fusion
Toxicity index	Def Stan 020-713
Spread of flame	BS 476 part 7
Alkalinity	NES 802 part3
Water absorption	BS 2972 section 11 partial immersion
Glass cloth puncture resistance	NES 802 part1 4.8a
Institute of naval medicine	No objections on health & safety
Thermal conductivity 0.038 w/mk @25mm thk	ASTM c 177-97
Compression set	Mil-1-742f sect 3.6 & 4.7.5.
Sound absorption hz	(Mil-1-23054)
25mm unfaced nrc 0.75	(dod-1-24688,ty ii, cl ii)
Inter laminate adhesion	Accordance with NES 802 section 4.7:2000

Density (un-faced)	Thickness	Length	Width
13KgM³	1", 2" ±1/8"	36", 38", 48" ±1/4"	24" ±1/4"

Custom sizes are available on request.

SOUND ABSORPTION COEFFICIENT ASTM C423-02 (Reverberation Room Method)						
Frequency	Un- Faced		Perforated Glass Fiber Cloth Faced		White Mylar Film Faced	
HZ	**1"**	**2"**	**1"**	**2"**	**1"**	**2"**
125	0.06	0.15	0.08	0.3	0.11	0.23
250	0.15	0.42	0.29	0.78	0.22	0.72
500	0.73	1.2	0.75	1.28	0.87	1.17
1000	1	1.1	1.08	1.1	0.96	0.85
2000	1.07	1.05	0.97	0.99	0.49	0.68
4000	1.07	1.07	0.76	0.87	0.24	0.29
NRC	0.75	0.95	0.75	10.5	0.65	0.85

THERMAL PROPERTIES ASTM C177-97 (Guarded Hot Plate Apparatus)			
Test	**Units**	**Glass Fiber Cloth 1"**	**Un-Faced 2"**
Conductivity, k	Btu-in/hr-ft²-°F	0.269	0.28
Resistivity, R	Hr-ft²-°F/btu	3.719	6.973

*The above are typical values subject to normal manufacturing variation.

Contact Us

Trelleborg Applied Technologies delivers innovative and reliable solutions that maximize business performance to meet your needs. Our dedicated and highly skilled staff are always on hand to provide seamless process support from initial idea, through to delivery and beyond.

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MATERIAL SAFETY DATA SHEET – TYPE 45 - UMI 1075

SECTION 1: PRODUCT IDENTIFICATION

CAS Number:	Mixture / None Assigned
Product Name:	UMI 1075
Generic Name:	Fiberglass Wool Product
Chemical Name:	Mixture
Formulation:	Mixture
Address:	Energy Control Products Trelleborg Applied Technology Halfpenny Lane Knaresborough Yorkshire UK
Telephone:	44 (0) 1423 862677
Emergency:	44 (0) 1423 862677
Fax:	44 (0) 1423 868340

SECTION 2: INGREDIENTS

INGREDIENT NAME	CAS NUMBER	PERCENT	EXPOSURE LIMITS
Fiberglass Wool	65997-17-3	15 to 95	1 fiber/cc TWA (ACGIH) 5 mg/m3 TWA respirable fraction (OSHA) 15 mg/m3 total dust (OSHA)
Urea extended Phenol-Formaldehyde Resin (cured)	N/A (Mixture)	02 to 35	Not established
Urea extended Melamine Resin (cured)	N/A (Mixture)	00 to 04	Not established
Silicone emulsion	N/A (Mixture)	00 to 08	Not established
Fiberglass Cloth Facing	N/A (Mixture)	00 to 80	Not established

SECTION 3: HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: Fibrous glass material with or without fiberglass cloth facing having no significant odor. Under normal conditions of use this product is not expected to create any unusual emergency hazards. Inhalation of excessive amounts of dust from the product may cause temporary upper respiratory irritation and/or congestion. Remove affected individuals to fresh air. Skin irritation may be treated by gently washing affected area with soap and warm water. Eye irritation may be treated by flushing eyes with large amounts of water. If irritation persists, contact physician. In the event of fire use normal fire fighting procedures to prevent inhalation of smoke and gas.

POTENTIAL HEALTH EFFECTS SUMMARY: Breathing dust from this product may cause a scratchy throat, congestion and slight coughing. Getting dust or fibers on the skin or in the eyes may cause itching, rash or redness.

ACUTE (SHORT TERM) HEALTH EFFECTS: Dust from this product is a mechanical irritant that means that it may cause irritation or scratchiness of the throat and/or itching of the eyes and skin.

CHRONIC (LONG TERM) EFFECTS: See Section 11 of this MSDS.

TARGET ORGANS: Throat, lungs, skin and eyes.

SECTION 3: HAZARD IDENTIFICATION - Continued

PRIMARY ROUTES OF ENTRY (EXPOSURE): Inhalation (breathing dust or fiber) and skin and eye contact.

MEDICAL CONDITIONS THAT MAY BE AGGRAVATED: Pre-existing chronic respiratory, skin or eye disease or condition.

SYMPTOMS OF OVEREXPOSURE

INHALATION: Irritation of upper respiratory tract (scratchy throat), coughing and congestion may occur in extreme exposure.

SKIN: Temporary irritation (itching) or redness may occur.

ABSORPTION: Not applicable.

INGESTION:	This product is not intended to be ingested or eaten under normal conditions of use. If ingested, it may cause temporary irritation to the gastrointestinal (GI) tract, especially the stomach.
EYE:	Temporary irritation (itching) or redness may occur.

SECTION 4: FIRST AID MEASURES

INHALATION:	Remove to fresh air. Drink water to clear throat. Blow nose to remove dust and fibers.
SKIN:	Wash gently with soap and warm water to remove material. Wash hands before eating or using the restroom.
ABSORPTION:	Not applicable.
INGESTION:	Product is not intended to be ingested or eaten. If this product is ingested, irritation of the gastrointestinal (GI) tract may occur and should be treated symptomatically. Rinse mouth with water to remove fibers and drink plenty of water to help reduce the irritation. No chronic effects are expected following ingestion.
EYE:	Do not rub or scratch eyes. Dust particles may cause the eyes to be scratched. Flush eyes with large amounts of water for 5 – 15 minutes. If irritation persists, contact physician.
NOTE TO PHYSICIAN:	This product is a mechanical irritant and is not expected to produce chronic health effects from acute exposure. Treatment should be directed toward removing the source of irritation with symptomatic treatment if necessary.

SECTION 5: FIRE FIGHTING MEASURES

SUMMARY:	No special procedures are expected to be necessary for this product. Normal fire fighting procedures should be followed to avoid inhalation of smoke and glass.
UNUSUAL FIRE / EXPLOSION HAZARDS:	There is no potential for fire or explosion.
EXTINGUISHING MEDIA:	Carbon dioxide (CO_2), water, water fog, dry chemical.

FLAMMABILITY PROPERTIES:

Flash Point:	Not applicable
FP Test Method:	Not applicable
Flammability Limits:	Not applicable
Flame Classification:	Not determined
Flame Propagation:	Not determined
Auto ignition Temperature:	Not determined
Decomposition Temperature:	Not determined

EXPLOSIVE LIMITS:

Lower Explosive Limit:	Not applicable
Upper Explosive Limit:	Not applicable

SECTION 6: ACCIDENTAL SPILL / RELEASE MEASURES

CONTAINMENT PROCEDURES:	Pick up large pieces. Vacuum dust. If sweeping is necessary, use a dust suppressant such as water. Do not dry sweep dust accumulation. These procedures will help to minimize potential exposures.
DISPOSAL:	Wastes are not hazardous as defined by the Resource Conservation and Recovery Act (RCRA; 40 CFR 261). Comply with state and local regulations for disposal of fiberglass wool products. If unsure of regulations, contact local Public Health Department or the local offices of the Environmental Protection Agency(EPA).

SECTION 7: HANDLING AND STORAGE

STORAGE / HANDLING:	Use protective equipment as described in SECTION 8 of this MSDS when handling uncontained material. Warehouse storage should be in accordance with any package directions. Material should be kept dry and protected from the elements.

SECTION 8: EXPOSURE CONTROL / PERSONAL PROTECTION

SUMMARY:	Protective equipment should be provided as necessary to prevent irritation of the throat, eyes and skin and to keep exposure below the applicable exposure limits identified in SECTION 2 of this MSDS.
EYE:	Safety glasses with side shields are recommended to keep dust and fibers out of the eyes.
SKIN:	Leather or cotton gloves should be worn to prevent skin contact and irritation. Barrier creams may also be used to reduce skin contact and irritation caused by fiberglass.
RESPIRATORY:	A respirator should be used if ventilation is unavailable or is inadequate for keeping dust and fiber levels below the applicable exposure limits. In those cases, use NIOSH certified disposable or reusable particulate respirator with efficiency rating of N95 or higher (under 42 CFR 84) when working with this product. For exposures up to five times the established exposure limits use a quarter mask respirator rated N95 or higher. For exposures up to ten times the established exposure limits use a half mask respirator (e.g. MSA DM-11, Racal Delta N95, 3M 8210) rated N95 or higher.

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SECTION 8: EXPOSURE CONTROL / PERSONAL PROTECTION - Continued

Operations such as sawing, blowing, tearing out and spraying may generate airborne fiber concentrations requiring higher level of respiratory protection. For exposures up to 50 times the established exposure limits use a full-face respirator rated N99 or higher.

VENTILATION: Local exhaust ventilation should be provided at areas of cutting to remove airborne fibers. General dilution ventilation should be provided as necessary to keep airborne dust and fibers below the applicable exposure limits and guidelines. The need for ventilation systems should be evaluated by a professional industrial hygienist. The Design of specific ventilation systems should be conducted by a professional engineer.

OTHER: Loose fitting, long sleeve clothing should be worn to protect skin from irritation. Exposed skin areas should be washed with soap and warm water after handling or working with fiberglass. Clothing should be washed separately from other clothes. The washer should be rinsed thoroughly (run empty for a complete wash cycle). This will reduce the chance of fiberglass being transferred to other clothing.

SPECIAL CONSIDERATION FOR REPAIR / MAINTENANCE OF CONTAMINATED EQUIPMENT:
Use personal protective equipment as discussed above. Where possible, use a vacuum cleaner before repair / maintenance to remove excessive dust and loose fiber.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

PROPERTIES:

Boiling Point:	Not determined
Evaporation Rate (Butyl acetate = 1):	Not determined
Melting Point:	>704 °C / 1300 °F
pH:	Not applicable
Saturation in Air (%):	Not applicable
Solids Content:	Not applicable
Specific Gravity (Water = 1):	Not applicable
Vapor Density (Air = 1):	Not applicable
Vapor Pressure:	Not applicable

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES - Continued

VOCs (g/liter):	Not applicable
Volatile by Volume (%):	0
Water Solubility (%):	Nil

APPEARANCE AND ODOR: Fibrous glass blanket of various colors with or without non-woven facing. No significant odor.

SECTION 10: STABILITY AND REACTIVITY

STABILITY: Product is stable. Hazardous polymerization will not occur.

REACTIVITY: This product is not reactive.

HAZARDOUS DECOMPOSITION PRODUCTS: Decomposition products are those expected from any organic material and are mainly derived from pyrolysis or burning of the resin.

SECTION 11: TOXICOLOGICAL AND EPIDEMIOLOGICAL DATA

ACUTE EFFECTS: The fibers from this product are mechanical irritants and may cause transitory irritation to exposed areas such as eyes, skin and upper respiratory passages.

CHRONIC EFFECTS: IARC reclassified fiberglass wool as Group 3 (not classifiable as to its carcinogenicity to humans) based on current human and animal research that shows no association between inhalation exposure and development of respiratory disease (IARC Monographs Vol. 81 (2002)). ACGIH and NTP have not reviewed the IARC reclassification of fiberglass wool

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICITY: This product has not been tested.

SECTION 13: DISPOSAL CONSIDERATIONS

SUMMARY: This product is not regulated as a hazardous waste by the U.S. Environmental Protection Agency (EPA) under Resource Conservation Act (RCRA) regulations. Comply with local and state regulations for disposal. If unsure of the regulations, contact local Public Health Department or the local office of the EPA.

SECTION 14: TRANSPORT INFORMATION

SUMMARY: This product is not regulated as a hazardous material for transport.

SECTION 15: REGULATORY INFORMATION

FEDERAL REGULATIONS: This product is not classified as hazardous under SARA 311/312.

ENVIRONMENTAL REGULATIONS: This product and its components are listed in the Toxic Substances Control Act Inventory (TSCA 8(b)).

SECTION 16: OTHER INFORMATION

For additional information concerning this product, contact:

Trelleborg Applied Technology, Energy Control Products,
Halfpenny Lane, Knaresborough, North Yorkshire, HG5 0PP, UK.
Telephone: +44 (0) 1423 862677 Emergency: +44 (0) 1423 862677 Fax: +44 (0) 1423 868340
appliedtech@trelleborg.com
www.trelleborg.com/appliedtechnology

MATERIAL SAFETY DATA SHEET – INTEK PFI Polyimide Foam

SECTION 1: PRODUCT IDENTIFICATION

Address: Energy Control Products
Trelleborg Applied Technology
Halfpenny Lane
Knaresborough
Yorkshire UK
Telephone: 44 (0) 1423 862677
Emergency: 44 (0) 1423 862677
Fax: 44 (0) 1423 868340

TRADE NAME: Polyimide Foam
CHEMICAL FAMILY: Polyimide
CHEMICAL NAME: Benzophenonetetracarboxylic imide polymer foam

THIS MATERIAL IS IN COMPLIANCE WITH THE TOXIC SUBSTANCES CONTROL ACT (15 USC 2601 - 2629).
CAS NO.: None

SECTION 2: COMPOSITION/ INFORMATION ON INGREDIENTS

HMIS CLASSIFICATIONS:

Health: 0
Flammability: 0
Reactivity: 0

CHEMICAL NAME	CAS NO.	EXPOSURE LIMIT
Benzophenonetetracarboxylic imide polymer foam	None	None Established
Ethanol *	64-17-5	OSHA VPEL TWA 1000 PPM
Methanol *	64-56-1	OSHA VPEL TWA 200 PPM

COMPONENTS

*** NOTE:** Small amounts of residual alcohol from the production process may initially be present in the product. This alcohol will rapidly decrease with time.

SECTION 3: HAZARD IDENTIFICATION

INHALATION: Dust can be generated during cutting or fabrication of the product. Dusts are mechanical irritants that may cause throat irritation.
EYE CONTACT: Dust can be generated during cutting or fabrication of the product. Dusts are mechanical irritants that may cause eye irritation.
SKIN CONTACT: Not expected to be a skin irritant
INGESTION: Not expected to be acutely toxic
CHRONIC EFFECTS OF OVEREXPOSURE: None known

SECTION 4: FIRST AID MEASURES

INHALATION: If inhaled, remove to fresh air, drink water to clear throat and blow nose to remove dust.
EYE CONTACT: Begin immediate eye irrigation with cool water for 10-15 minutes. If irritation persists, contact a physician.
SKIN CONTACT: Use good personal hygiene if dust contact is possible.
INGESTION: If swallowed, give two glasses of water.

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SECTION 5: FIRE FIGHTING MEASURES

FLASH POINT (METHOD):	Not applicable
FLAMMABLE LIMITS:	Not applicable
EXTINGUISHING MEDIA:	Dry chemical, water spray (fog), foam or carbon dioxide
HAZARDOUS THERMAL DECOMPOSITION PRODUCTS:	Includes oxides of carbon and nitrogen
SPECIAL FIRE FIGHTING PROCEDURES:	Avoid breathing smoke and vapor
UNUSUAL FIRE AND EXPLOSION HAZARDS:	None known

SECTION 6: ACCIDENTAL SPILL / RELEASE MEASURES

SPILLS OR LEAKS:	Sweep or shovel spills into appropriate container for disposal.
DISPOSAL METHODS:	Under the CERCLA / RCRA regulations currently in effect, this product is not regulated as a hazardous waste or material. Therefore, it may be disposed of as an industrial waste in a manner acceptable to good waste management practice and in compliance with applicable local, state and federal regulation.
STORAGE REQUIREMENTS:	No special storage required

SECTION 7: HANDLING AND STORAGE

HANDLING REQUIREMENTS:	No special requirements
STORAGE REQUIREMENTS:	Do not store where exposure to UV light is possible.

SECTION 8: EXPOSURE CONTROL / PERSONAL PROTECTION

EXPOSURE LIMITS:	Not established by OSHA / ACGIH.
The OSHA PELs for nuisance dusts are:	Respirable dust 5 mg/M3 Total dust 15 mg/M3.
EYE PROTECTION:	Safety glasses, goggles when excessive dusting may occur
PROTECTIVE GLOVES:	Not required under normal conditions
RESPIRATORY PROTECTION:	NIOSH approved dust / mist respirator when excessive dusting may occur
LOCAL EXHAUST VENTILATION:	At source of dust
MECHANICAL VENTILATION:	Recommended

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE / ODOR:	Beige to yellowish foam / Residual alcohol from the production process may result in an initial alcohol odor, which completely dissipates with time.
VAPOR PRESSURE:	Not applicable
SOLUBILITY IN WATER:	Insoluble
DENSITY:	0.3-1.0 lb/ft3 (range)
MELTING POINT:	Not established

SECTION 10: STABILITY AND REACTIVITY

STABILITY:	Stable
CONDITIONS TO AVOID:	None known
MATERIALS TO AVOID:	Strong alkaline and oxidizing acid solutions
HAZARDOUS POLYMERIZATION:	Will not occur

SECTION 11: TOXICOLOGICAL AND EPIDEMIOLOGICAL DATA

LIKELY ROUTES OF EXPOSURE:	Inhalation, Eye, Skin, Ingestion
EFFECTS OF ACUTE EXPOSURE:	None known
EFFECTS OF CHRONIC EXPOSURE:	None known
IRRITANCY OF PRODUCT:	Not expected to be an irritant
SENSITIZOR:	Not expected to be a sensitizor
CARCINOGENIC:	None known
REPRODUCTIVE TOXICITY:	None known
TERATOGENICITY:	None known
EMBRYOTOXICITY:	None known
MUTAGENICITY:	None known
NAME OF SYNERGISTIC PRODUCTS/EFFECTS:	None known

SECTION 12: ECOLOGICAL INFORMATION

AQUATIC ECOTOXICITY:	None known
TERRESTRIAL ECOTOXICITY:	None known
PERSISTENCE/ DEGRADABILITY:	None known
BIOACCUMULATIVE POTENTIAL:	None known
MOBILITY IN SOIL:	None known

SECTION 13: DISPOSAL CONSIDERATIONS

Under the CERCLA / RCRA regulations currently in effect, this product is not regulated as a hazardous waste or material. Therefore, it may be disposed of as an industrial waste in a manner acceptable to good waste management practice and in compliance with applicable local, state and federal regulation.

SECTION 14: TRANSPORT INFORMATION

DOT DESCRIPTION / PROPER SHIPPING NAME: Not regulated for transportation.

SECTION 15: REGULATORY INFORMATION

DOT DESCRIPTION / PROPER SHIPPING NAME: Not regulated for transportation.
HAZARD CATEGORIES FOR SARA 311/312 REPORTING ARE INDICATED BELOW:

HEALTH Immediate (Acute) No
HEALTH Delayed (Chronic) No
PHYSICAL Fire No
PHYSICAL Sudden Release of pressure No
PHYSICAL Reactive No
PHYSICAL Nuisance Mist/Dust Only No

SECTION 16: OTHER INFORMATION

For additional information concerning this product, contact:

Trelleborg Applied Technology, Energy Control Products,
Halfpenny Lane, Knaresborough, North Yorkshire, HG5 0PP, UK.
Telephone: +44 (0) 1423 862677 Emergency: +44 (0) 1423 862677 Fax: +44 (0) 1423 868340
appliedtech@trelleborg.com www.trelleborg.com/appliedtechnology