TECHNICAL DATA

TENCATE ADVANCED COMPOSITES USA, INC.

SPACECRAFT MATERIALS Selector

CAPABILITIES

• Fabric Prepregs	Up to 65" (1.65 m) width
• Unidirectional Prepregs	12" (30.5 cm) and 24" (61 cm) width
• Film Adhesives	Unsupported: 12" (30.5 cm) and 24"(61 cm) width Supported: up to 50" (127 cm) width
• Non-Woven Prepregs	Up to 65" (1.65 m) widths
• Tow Prepregs	Resin Content and Band Width Control

PREPREG RESIN SYSTEMS

EX-1515
225° (107°C) - 250°F (121°C) Cure

• Developed specifically for NASA, this 2nd generation, low temperature curing, toughened Cyanate Ester matrix has ultra high conversion, extremely low moisture absorption, low outgassing, high radiation resistance, is fully self adhesive and is approved for man rated spacecraft applications by NASA. EX-1515's low temperature cure coupled with its unparalleled resistance to microcracking assure that EX-1515 will yield hardware that displays the utmost in dimensional stability. Finally, EX-1515 can be post cured free standing up to 350°F for increased thermal resistance.

Applications: *Spacecraft and Stable Structures, Reflectors, Aircraft, Structures at Cryogenic Temperatures, and Radomes.*

EX-1522
350°F (177°C) Cure

• High Technology toughened epoxy system which displays low moisture absorption, low outgassing and excellent microcrack resistance compared to other epoxy systems. EX-1522 is self adhesive to honeycomb and foam cores. EX-1522 also displays a V0 flammability rating.

Applications: *Spacecraft, Aircraft, Radomes and Antennae*

EX-1549
350°F (177°C) Cure

• High technology toughened epoxy resin system with low moisture absorption, low outgassing and excellent microcrack resistance compared to other epoxy systems. EX-1549 is self adhesive to honeycomb and foam cores.

Applications: *Spacecraft, Aircraft, Radomes and Antenna*

BTCy-1
350°F (177°C) Cure

• 350°F (177°C) – 400°F (204°C) hot/wet service resin system with excellent structural properties and toughness, low moisture absorption, low outgassing, and very good electrical properties.

Applications: *Spacecraft, Aircraft, Missiles, Radomes and Antennae, High Performance Composite Structures.*

G0102.2
150°F (65°C) – 250 °F (121°C) Initial Cure

• Low temperature cure, high performance epoxy with the capability to achieve an ultimate Tg of 325°F (163°C).

Applications: *Spacecraft, Aircraft, Tooling, Sporting goods, and Marine.*

18410 Butterfield Blvd.
Morgan Hill, CA 95037
USA

Tel 408 776 0700
Fax 408 776 0107
www.tencate.com

ISO 9001
AS 9100
Registered

PREPREG RESIN SYSTEMS (CONTINUED)

BTCy-1A
350°F (177°C) Cure

•Toughened version of BTCy-1 which offers improved impact resistance while retaining the benefits of BTCy-1 from a structural and electrical standpoint. BTCy-1A is self adhesive to honeycomb and foam core.

Applications: *Spacecraft, Aircraft, Missiles, Radomes and Antennae.*

SPECIALTY ADHESIVES

EX-1516
250°F (121°C) Cure

• Toughened Cyanate Ester structural film adhesive with outstanding electrical performance, low moisture absorption, and low outgassing.

Applications: *Radomes, Antennae and other Microwave Applications, Space and Aircraft Structures, Bonding for Cryogenic Structures.*

EX-1543
350°F (177°C) Cure

• Toughened Cyanate Ester film adhesive with very good electrical performance, low moisture absorption, low outgassing and very good thermal resistance.

Applications: *Radomes, Antennae and other Microwave Applications, Space and Aircraft Structures, High Service Temperature Structures.*

EX-1502-1
250°F (121°C) Cure

• Toughened Cyanate Ester paste adhesive that offers properties similar to EX-1516 coupled with 6000 psi (41369 kPa) lap shear on aluminum.

Applications: *Radomes, Antennae and other Microwave Applications, Space and Aircraft Structures, Bonding for Cryogenic Structures.*

EX-1537
350°F (177°C) Cure

• Toughened Cyanate Ester paste adhesive with high thermal resistance and excellent structural properties.

Applications: *Radomes, Antennae and other Microwave Applications, Space and Aircraft Structures, High Service Temperature Structures.*

EX-1537-1
350°F (177°C) Cure

• Low viscosity, toughened Cyanate Ester paste adhesive with high thermal resistance and excellent structural properties.

Applications: *Radomes, Antennae and other Microwave Applications, Space and Aircraft Structures, High Service Temperature Structures.*

18410 Butterfield Blvd.
Morgan Hill, CA 95037
USA

Tel 408 776 0700
Fax 408 776 0107
www.tencate.com

TECHNICAL DATA

TENCATE ADVANCED COMPOSITES USA, INC.

CYANATE ESTER FILAMENT WINDING AND RTM RESINS

EX-1510
350°F (177°C) Cure

• Low viscosity RTM and filament winding matrix. Room temperature processable for RTM and filament winding. EX-1510 offers low moisture absorption, high Tg, good electrical properties , 350°F (177°C) hot/wet performance and a very long pot life.

Applications: *Aircraft and Space Structures, Radomes, Antennae.*

EX-1515
250°F (121°C) Cure

• Low viscosity version of TenCate Advanced Composites (TCAC) popular EX-1515 resin system. It offers the same benefits as EX-1515 for resin transfer molding, filament winding and resin infusion processes.

Applications: *Aircraft and Space Structures, Radomes, Antennae.*

EX-1545
300°F (149°F)- 350°F (177°C) Cure

• High Performance, two component liquid cyanate ester RTM resin system. Low moisture absorption, low dielectric/low loss and room temperature injection.

Applications: *Aircraft, Missiles, Automotive, Radomes, Antennae*

EX-1545-1
300°F (149°F)- 350°F (177°C) Cure

• High Performance, two component epoxy RTM resin system. Low moisture absorption, low dielectric/low loss and room temperature injection.

Applications: *Aircraft, Missiles, Automotive, Radomes, Antennae*

SYNTACTIC FOAM PRODUCTS

EX-1541
250°F (121°C) – 350°F (177°C) Cure

• Single component, Cyanate Ester syntactic foam that offers an unparalleled 10-12 lb/ft^3 (160 - 192 kg/m^3) density, low CTE, and high temperature resistance to 480°F (249°C). EX-1541 is also available in 13, 17 and 20 lb/ft^3 (208, 272 and 320 kg/m^3) versions. EX-1541 offers outstanding electrical performance.

Applications: *High Performance Core Structures, Spacecraft, Radomes and Antennae, honeycomb edge fill and potting.*

EX-1541-1
250°F (121°C) – 350°F (177°C)Cure

• EX-1541-1 is lower price epoxy formula of our EX-1541 available in 11,13, 17 and 20 lb/ft^3 versions. EX-1541-1 also offers outstanding electrical performance.

Applications: *High Performance Core Structures, Spacecraft, Radomes and Antennae, honeycomb edge fill and potting.*

BC 550
250°F (121°C) – 350°F (177°C)Cure

• High performance film format, syntactic foam with a dielectric constant of 2.0, low moisture absorption, ultimate Tg of >350°F (177°C) and flexible cure conditions.

Applications: *Radomes, Antennae, Spacecraft structures, Aircraft structures and submersibles.*

18410 Butterfield Blvd.
Morgan Hill, CA 95037
USA

Tel 408 776 0700
Fax 408 776 0107
www.tencate.com

ISO 9001
AS 9100
Registered

TECHNICAL DATA

TENCATE ADVANCED COMPOSITES USA, INC.

THERMAL MANAGEMENT PRODUCTS

Ultra High Modulus Graphite Prepregs

Unidirectional and woven prepregs based on high modulus graphite fibers from 90 - 135 Msi. These continuous fiber technology products display ultra high, in plane, thermal conductivity of up to 600 W/m°K, unparalleled specific stiffness and near 0 Coefficient of Thermal Expansion (CTE).

These prepreg materials can be produced with any of TCAC's epoxy or cyanate ester resin systems to meet all of your requirements. TCAC can also custom modify resin systems to increase thermal conductivity and lower the Coefficient of Thermal Expansion (CTE) through the thickness of the laminate.

HK Series Thermal Management Compounds

HK 8000 Cyanate Ester
U.S. Patent Pending
350°F (177°C)– 400°F (204°C) Cure

• The HK series of molding compounds are high thermal conductivity, low thermal expansion materials that are cured into final shape with the application of pressure and heat in compression molding, transfer molding or extrusion processes. The compounds' match of coefficient of thermal expansion with materials such as ceramics and silicon allow for intimate and reliable thermally conductive interfaces between a substrate made from these products and the HK based hardware. These characteristics are critical in microelectronics and spacecraft applications for increasing both thermal management efficiency and reliability. The HK series of products are based upon specially formulated cyanate ester resin chemistry which has very low moisture absorption, low ionic impurities and long term resistance to the microelectronics industry Highly • HK 8000 compound offers a thermal conductivity of 70 - 90 W/m°K coupled with a Coefficient of Thermal Expansion (CTE) of 4 - 5 ppm/°C.

Applications: *Microelectronics Heat Sinks, Heat Slugs, Heat Spreaders and Chip Lids, Spacecraft Hardware, Other Intricate Thermal Management Hardware.*

HK 9000 Cyanate Ester
U.S. Patent Pending
350°F (177°C)– 400°F (204°C) Cure

• HK 9000 compound offers a thermal conductivity of 150 - 200 W/m°K coupled with a Coefficient of Thermal Expansion (CTE) of 4 - 5 ppm/°C.

Applications: *Microelectronics Heat Sinks, Heat Slugs, Heat Spreaders and Chip Lids, Spacecraft Hardware, Other Intricate Thermal Management Hardware.*

Thermally Conductive Adhesives

TCAC has developed adhesives which offer specific performance for different needs. Present developmental projects have resulted in thermally conductive adhesives in both electrically insulative and electrically conductive forms. For any adhesive application, TCAC will develop, partner or team with customers to solve any technical challenges.

18410 Butterfield Blvd.
Morgan Hill, CA 95037
USA

Tel 408 776 0700
Fax 408 776 0107
www.tencate.com

ISO 9001
AS 9100
Registered