Technical data sheet

STYPOL®

040-8003
Flame Retardant RTM Resin

Type

STYPOL® 040-8003 is a flame retardant RTM Resin.

Uses

STYPOL® 040-8003 is a pre-promoted, flame retardant polyester resin containing styrene monomer. It is especially formulated for production of reinforced plastic products using resin transfer molding (RTM). Certain applications with specific flame retardant needs may require the addition of methyl methacrylate and modest amounts of alumina trihydrate or antimony oxide/ammonium dimolybdate.

Distinguishing Characteristics

STYPOL® 040-8086 offers the following features:

- Extremely fast wet-out
- Early development of Barcol hardness
- Good cure in thin sections
- Excellent retention of physical properties after water boil
- Classified as VE-1 and VE-2 when tested per UL 94 Vertical Burning Test.

Typical Liquid Properties (at 77°F)

Liquid properties of STYPOL® 040-8003 are shown below. These values may or may not be manufacturing control criteria. They are listed for a reference guide only. Particular batches will not conform exactly to the numbers listed because storage conditions, temperature changes, age, testing equipment (type and procedure) can each have a significant effect on the testing. Resin properties outside of these readings can perform acceptably. Final suitability of this product is in the end use performance.

Test	040-8003
Viscosity[1]	110 cps
Gel Time[2]	7 minutes

Weight per Gallon	10.0 pounds

[1]Brookfield LVF #2 at 60 rpm
[2]100 g mass, 1.5% Norox® Azox

Physical Properties

The physical properties of **STYPOL® 040-8003** are shown below. Properties are shown for both neat resins casting and for a glass fiber reinforced laminates. These are typical values and are provided for reference only.

Note: The physical properties of thermoset resins evolve as the resin cures. The properties given below are for well cured castings and laminates. Resin and laminates at different stages of cure will have varying properties.

Test	Test Method[1]	Neat Resin Casting[2]	Laminate[3]
Tensile Strength	ASTM D638	7,950 psi	13,200 psi
Tensile Modulus		490,000 psi	890,000 psi
Tensile Elongation		2.3%	1.8%
Flexural Strength	ASTM D790	15,200 psi	22,400 psi
Flexural Modulus		520,000 psi	770,000 psi
Flexure Strength after 2 hour water boil		--	20,100 psi (90% retention)
Impact (Unnotched)	ASTM D256	1.90 ft.-lbs.	1.67 ft.-lbs.
Barcol Hardness, Model #934	ASTM D2583	39	45
Heat Distortion Point at 264 psi	ASTM D648	145ºF (63°C)	--
Specific Gravity	--	1.19	--
Intermittent Flame Test (HLT-15), rating	--	--	80

[1]All tests run per internal CCP test methods. These methods are similar to the ASTM Method listed above.
[2]Neat resin casting catalyzed with 1.0% benzoyl peroxide. Casting was cured at 180°F (82.2°C) and post cured for 1hour at 240°F (115.5°C).
[3]Laminate - Resin initiated with 1.5% Norox® Azox. The laminate schedule was 2 plies of 2.0 oz. CSM. Glass content was 25%. The panel was cured at room temperature for 1 week.

Flammability

It is important to understand that the terms “flammability,” “self-extinguishing,” “fire retardant,” “flame resistant,” “non-burning,” and “burn rate” are based upon results of laboratory tests. The following bench tests are generally recognized in the reinforced plastics industry for comparison purposes and have certain limitations in either the test procedure or in the final rating:

- ASTM E-84
- ASTM E-162
- ASTM E-662
- ASTM D-229
- ASTM D-757
- ASTM D-2863
- ASTM D-635
- UL Subject 94
- Federal Test Standard 406 Method 2023.2
- HLT-15 Intermittent
- Flame Test
- IAPMO Torch Burn Test PS 11-71
- MIL R 21607
- MIL R 7575
- FAA Regulations FSSR 453
- FAA Regulations Part 25 Par. 25.8536
- Motor Vehicle Safety Standard No. 302
- Docket 90 Recommendations
- National Fire Prevention Association
- National Standard 1

The relationship of laboratory test results and flammability data to large-scale fire tests should be thoroughly examined by the user of these types of polyester resins. Improper selection of the type of resin and the method of application of the resin may introduce serious fire hazards. CCP considers it essential that the users of these polyester resins for fire retardant applications maintain strict conformance with building codes and fire insurance standards.

Application

The cure rate of polyester resins depends on a number of factors including the product's age, temperature, catalyst type, catalyst level and ambient humidity. When used in a laminating application the laminate cure rate also depends on reinforcement content and laminate thickness as well as other factors. For these reasons, we recommend that customer's check the cure rate in your plant.

STYPOL® 040-8003 is quality control tested using Syrgis NOROX® AZOX (acetyl acetone peroxide or AAP).

Arkema Luperox®224 is expected to give equivalent results. The catalyst level should not exceed 2.4% or fall below 0.9% for proper cure. A catalyst level of 1.25% at 77°F is considered ideal. This product should not be used when temperature conditions are below 60°F, as curing may be adversely affected.

Caution

Do not add any material, other than MMA, recommended fillers and peroxide catalyst, to this product without the advice of a representative of CCP Composites US.

Storage

STYPOL® 040-8003 has a shelf life of three months from date of shipment from CCP when stored at 73°F or below in a closed, factory-sealed, opaque container, and out of direct sunlight. The usage life is cut in half for every 20°F over 73°F.

CCP COMPOSITES US
WARRANTIES, DISCLAIMERS AND LIMITATION OF LIABILITY (Rev. 10/11)

Seller warrants that: (i) Buyer shall obtain good title to the product sold hereunder, (ii) at Shipment such product shall conform to Seller's specifications; and (iii) the sale or use of such product will not infringe the claims of any U.S. patent covering the product itself, but Seller does not warrant against infringement which might arise by the use of said product in any combination with other products or arising in the operation of any process. **SELLER MAKES NO OTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, EVEN IF THAT PURPOSE IS KNOWN TO SELLER. ANY APPLICATION INFORMATION OR ASSISTANCE WHICH SELLER MAY FURNISH TO BUYER IS GRATUITOUS AND SHALL IN NO WAY BE DEEMED PART OF THE SALE OF PRODUCT HEREUNDER OR A WARRANTY OF THE RESULTS OBTAINED THROUGH THE USE OF SUCH PRODUCT.**

Without limiting the generality of the foregoing, if any product fails to meet warranties mentioned above, Seller shall at Seller's option either replace the nonconforming product at no cost to Buyer or refund the Buyer the purchase price thereof. The foregoing is Buyer's sole and exclusive remedy for failure of Seller to deliver or supply product that meets the foregoing warranties. Seller's liability with respect to this contract and the product purchased under it shall not exceed the purchase price of the portion of such product as to which such liability arises. Seller shall not be liable for any injury, loss or damage, resulting from the handling or use of the product shipped hereunder whether in the manufacturing process or otherwise. In no event shall Seller be liable for special, incidental or consequential damages, including without limitations loss of profits, capital or business opportunity, downtime costs, or claims of customers or employees of Buyer. Failure to give Seller notice of any claim within thirty (30) days of shipment of the product concerned shall constitute a waiver of such claim by Buyer. Any product credit received by Buyer hereunder, if not used, shall automatically expire one (1) year from the date the credit was granted. Notwithstanding any applicable statue of limitations to the contrary, any action by Buyer relation to a claim hereunder must be instituted no later than two (2) years after the occurrence of the event upon which the claim is based. All the foregoing limitations shall apply irrespective of whether Buyer's claim is based upon breach of contract, breach of warranty, negligence, strict liability, or any other legal theory.

COMPOSITES SAFETY INFORMATION
(October 2011)

All sales of products manufactured by CCP Composites US (CCP), and described herein, are made solely on condition that CCP's customers comply with applicable health and safety laws, regulations and orders relating to the handling of our products in the workplace. Before using, read the following information, and both the product label, and Material Safety Data Sheet pertaining to each product.

Most products contain styrene. Styrene can cause eye, skin and respiratory tract irritation. Avoid contact with eyes, skin and clothing. Impermeable gloves, safety eyewear and protective clothing should be worn during use to avoid skin and eye contact. Wash thoroughly after use.

Styrene is a solvent and may be harmful if inhaled. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Extended exposure to styrene at concentrations above the recommended exposure limits may cause central nervous system depression causing dizziness, headaches or nausea and, if overexposure is continued indefinitely, loss of consciousness, liver and kidney damage.

Do not ingest or breathe vapor, spray mists or dusts caused by applying, sanding, grinding and sawing products. Wear an appropriate NIOSH/MSHA approved and properly fitted respirator during application and use of these products until vapors, mists and dusts are exhausted, unless air monitoring demonstrates vapors, mists and dusts are below applicable exposure limits. Follow respirator manufacturer's directions for respirator use.

The International Agency for Research on Cancer (IARC) reclassified styrene as Group 2B, "possibly carcinogenic to humans." This revised classification was not based on new health data relating to either humans or animals, but on a change in the IARC classification system. The Styrene Information and Research Center does not agree with the reclassification and published the following statement: Recently published studies tracing 50,000 workers exposed to high occupational levels of styrene over a period of 45 years showed no association between styrene and cancer, no increase in cancer among styrene workers (as opposed to the average among all workers), and no increase in mortality related to styrene.

Styrene is classified by OSHA and the Department of Transportation as a flammable liquid. Flammable products should be kept away from heat, sparks, and flame. Lighting and other electrical systems in the work place should be vapor-proof and protected from breakage.

Vapors from styrene may cause flash fire. Styrene vapors are heavier than air and may concentrate in the lower levels of molds and the work area. General clean air dilution or local exhaust ventilation should be provided in volume and pattern to keep vapors well below the lower explosion limit and all air contaminants (vapor, mists and dusts) below the current permissible exposure limits in the mixing, application, curing and repair areas.

Some products may contain additional hazardous ingredients. To determine the hazardous ingredients present, their applicable exposure limits and other safety information, read the Material Safety Data Sheet for each product (identified by product number) before using. If unavailable, these can be obtained, free of charge, from your CCP representative or from: CCP Composites US, P.O. Box 419389, Kansas City, MO 64141-6389; 816-391-6053.

FIRST AID: In case of eye contact, flush immediately with plenty of water for at least 15 minutes and get medical attention; for skin, wash thoroughly with soap and water. If affected by inhalation of vapors or spray mist, remove to fresh air. If swallowed, get medical attention.

Those products have at least two components that must be mixed before use. Any mixture of components will have hazards of all components. Before opening the packages read all warning labels. Observe all precautions.

Keep containers closed when not in use. In case of spillage, absorb with inert material and dispose of in accordance with applicable regulations. Emptied containers may retain hazardous residue. Do not cut, puncture or weld on or near these containers. Follow container label warnings until containers are thoroughly cleaned or destroyed.

FOR INDUSTRIAL USE AND PROFESSIONAL APPLICATION ONLY. KEEP OUT OF REACH OF CHILDREN.