

STYPOL[®]

NORSODYNE[®] H81269 TF Flame Retardant Polyester Resin

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Type

NORSODYNE[®] H81269TF is a flame retardant polyester resin.

Uses

FIREBLOCK is a series of non-halogenated, flame resistant resins and gel coats being offered to the North American Composites Market by CCP Composites in cooperation with its sister company, Cray Valley. FIREBLOCK products are part of the NORSODYNE[®] family of resin products sold world-wide by Cray Valley. NORSODYNE[®] products cover a complete range of composite resin technologies for a variety of applications.

Description

NORSODYNE[®] H 81269 TF is an un-promoted, thixotropic, flame retardant resin containing reactive monomers. It is especially formulated for building reinforced plastic parts using hand lay-up, spray-up or casting processes where flame retardant properties are required. NORSODYNE[®] H 81269 TF is non-halogenated and does not contain any antimony trioxide. It does not require the addition of any ATH filler, MMA or antimony trioxide to achieve flame retardant properties.

NORSODYNE[®] H 81269 TF is an environmentally friendly and sustainable product. CCP Composites is committed to environmentally friendly and sustainable development. This includes development of products that meet environmental and economic needs of our customers, strategic selection of raw materials using sustainable sourcing, and management of energy consumption. CCP Composites also strives to use the latest technologies in emission reduction while maintaining application and performance standards.

Distinguishing Characteristics

NORSODYNE[®] H 81269 TF offers the following features:

- Flame-retardant meeting UL 94 Plastics Flammability Standard, V-0 classification
- Meets requirements for use in the transportation industry including:
 - Docket 90A – ASTM E 162-02a Surface Flammability, ASTM E 662 Smoke Generation, and Bombardier SMP 800-C Smoke Toxicity)



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- FMVSS 302 Flammability of Interior Materials – Passenger Cars, Multipurpose Passenger Vehicles, Trucks and Buses
- Rated as Class I for ASTM E-84 Surface Burning for Building Materials
- No fillers or additives required to achieve flame retardant or smoke properties.
- Rapid wet out and non-draining
- Formulation allows for customization of fast and slow gel times for small or large parts.
- Formulated with up to 14% recycled/renewable content

NORSODYNE® H 81269 TF meets the EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) for Boat Manufacturing and Reinforced Plastic Composites Production. NORSODYNE® H 81269 TF also meets SCAQMD 1162 requirements.

NORSODYNE® H 81269 TF is compliant with the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2008 (RoHS Regulations).

Typical Liquid Properties (at 77°F)

Liquid properties of NORSODYNE® H 81269 TF 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 results. Products outside of these readings can perform acceptably. Final suitability of this product is in the end use performance

Test	NORSODYNE® H 81269 TF
HAP and Monomer Content	<24%
Viscosity ¹	950 cps
Thixotropic Index	4.0
Gel Time ^{2,3}	
• 0.075% POLYCOR® 970C903	17.5 minutes ³
Weight per Gallon	11.6 lbs

¹Viscometer RVT, #3 at 50 rpm

²100 g mass, 1.2% Arkema Luperox® DDM-9

³See the Applications section of this datasheet for gel time customization formulations.

Physical Properties

The physical properties of NORSODYNE® H 81269 TF are shown below. Properties are shown for a glass fiber reinforced laminate. 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 laminates. Laminates at different stages of cure will have varying properties.)



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Test	Test Method ¹	Laminate Results ²	Laminate Results ³
Tensile Strength	ASTM D638	6,500 psi	9,700 psi
Tensile Modulus		Not available	1,533,000 psi
Tensile Elongation		1.15%	1.62%
Flexural Strength	ASTM D790	16,700 psi	12,000 psi
Flexural Modulus		946,000 psi	1,028,000 psi
Heat Distortion Point at 264 psi ⁴	ASTM D648	266°F (130°C)	
Barcol Hardness	ASTM D2583	45-55	
Glass Content	ASTM D2584	20%	26%

¹All tests run per internal CCP Composites test methods. These methods are similar to the ASTM Method listed above.

²Laminate schedule was 3 plies of CSM, post cured at 250°F.

³Laminate schedule was 4 plies of 2.0 oz. CSM, post cured for 16 hours at 120°F.

⁴Neat resin casting post cured at 250°F.

Flammability Test Data

Flammability test results for NORSODYNE® H 81269 TF laminates are provided below. Test results for actual parts will vary depending on its structure and conditions of use. Each fabricator should verify the performance of NORSODYNE® H 81269 TF in their specific application to ensure compliance with applicable industry codes and insurance standards.

Test	Results	
ASTM D 2863 – 08 Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)	OI = 44.54 (Neat Resin Casting)	OI = 52.55 (Laminate, 20-35% glass)
UL 94 Standard Test for Flammability of Plastic Materials for Parts in Devices and Appliances ¹	V-0 Rating	
ASTM E162-08 Surface Flammability of Materials using a Radiant Heat Energy Source ¹	Flame Spread Index, I _s = 10	
ASTM E 662 Optical Smoke Density ¹	Flaming	Non-Flaming
• Specific Optical Density (D _s) at 1.5 min	D _s = 8	D _s = 1.3
• Specific Optical Density (D _s) at 4.0 min	D _s = 60	D _s = 18
Bombardier SMP 800-C ^{1,2}	Flaming – Passed	Non-Flaming – Passed
	CO – 636	CO – Not detected
	CO ₂ – 17,778	CO ₂ – 1,361
	HBr – Not detected	HBr – Not detected
	HCl – Not detected	HCl – Not detected
	HCN – Not detected	HCN – Not detected
	HF – Not detected	HF – Not detected
	NO _x – 86	NO _x – Not detected



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	SO ₂ – Not detected	SO ₂ – Not detected
FMVSS 302 Flammability of Interior Materials – Passenger Cars, Multipurpose Passenger Vehicles, Trucks and Buses ³	Burn Rate (mm/min.) = 0 (specimen did not ignite)	
ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials ⁴	Flame Spread – 25 Smoke Developed – 300 Rating - Class 1	

¹Laminate consisted of NORSODYNE® H 81269 TF resin matrix reinforced with 3 plies of 1.5 oz CSM. The resin was catalyzed with 0.05% Polycor® 970C903 and 1.0% Luperox® DDM-9. The glass content was 22%. The panel was post cured for 4 hours at 150°F.
²Results shown are maximum concentrations.

³Laminate consisted of NORSODYNE® H 81269 TF resin matrix reinforced with gun roving (1 in. chop at 20%). The resin was catalyzed with Luperox® DDM-9 at 1.5%. The laminate was cured at room temperature (75°F)

⁴Laminate consisted of NORSODYNE® H 81269 TF resin matrix reinforced with 4 plies of 2.0 oz CSM. The resin was catalyzed with 0.075% Polycor® 970C903 and 1.5% Luperox® DDM-9. The glass content was 26%. The panel was post cured for 16 hours at 120°F.

Application

NORSODYNE® H 81269 TF must be mixed prior to use. Ingredients in the NORSODYNE® H 81269 TF will settle during storage. Failure to thoroughly reincorporate these ingredients will compromise the flame retardant properties of the end product. Use mixing equipment with sufficient horsepower (relative to container size) to achieve thorough circulation from top to bottom and out to the sides of the container. The agitator must be properly sized for the container and must allow for uniform mixing regardless of the liquid level in the container. Scrape the bottom of the container to ensure that all ingredients are being pulled into the mix. After settled materials have been reincorporated, mixing once a day for 10 minutes is typically sufficient.

Air bubbling should not be used for mixing. It is not effective and only serves as a potential source of water or oil contamination. Do not over mix NORSODYNE® H 81269 TF. Over mixing can break down the resin viscosity increasing the tendency to sag.

NORSODYNE® H 81269 TF is un-promoted. Promoter must be added for the product to cure properly. Formulations for various gel times are shown in the table below.

Formula Ingredient	Gel Time ¹			
	10 minutes	15 minutes	20-25 minutes	25-35 minutes
POLYCOR® 970C903 ²	0.12%	0.10%	0.075%	0.075%
POLYCOR® 970C951 ³	0	0	0-0.01%	0.02-0.04%
Luperox® DDM-9	1.5-2.0%	1.5%	1.5-2.0%	1.5%

¹Gel time data is for 100 g mass samples at 77°F.

²Cobalt solutions having concentrations of 6% or 12% may be substituted for POLYCOR® 970C903. If using a 6% cobalt solution, double the recommended level of POLYCOR® 970C903.

³A 12% solution of HQ may be substituted for POLYCOR® 970C951.

Once the promoter is added, the mix must be used within the same day. After 24 hours, the mix will have extended gel times and may not cure correctly. This could compromise the flame retardant properties.



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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.

CCP Composites recommends that fabricators check gel time in their plants because age, temperature, humidity and catalyst will produce varied gel times. All data referencing gel or cure refers specifically to Arkema Luperox® DDM-9 catalyst. Syrgis NOROX® MEKP-9 and NOROX® MEKP-9H, Akzo Nobel CADOX L-50a and CADOX D-50 are expected to yield similar performance. Arkema Luperox® DHD-9, NOROX® MEKP-925 and NOROX® MEKP-925H, and Chemtura HP-90 may yield slightly shorter gel and cure times.

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.

Related Products

POLYCOR® 970C903 Promoter Solution

POLYCOR® 970C951 Inhibitor Solution

Related Documents

The documents shown below contain certified laboratory results for **FIREBLOCK NORSODYNE® H 81269 TF**.

Document Number	Market/ Applications	Test Method	Test Description
MB-344	General	ASTM D 2863 – 08	Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)
MB-345	Electrical Application	UL 94	Standard Test for Flammability of Plastic Materials for Parts in Devices and Appliances
MB-346	Transportation (Docket 90-A Recommended Fire Safety Practices for Transit Bus and Van Materials Selection)	ASTM E 162-08	Test for Surface Flammability of Materials using a Radiant Heat Energy Source
		ASTM E 662	Optical Smoke Density Evaluation
	Bombardier SMP 800-C	Toxic Gas Generation	
MB-347	Transportation	FMVSS 302	Flammability of Interior Materials – Passenger Cars, Multipurpose Passenger Vehicles, Trucks and Buses
MB-347	Building/	ASTM E 84	Standard Test Method for Surface Burning



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Architecture/
Construction

Characteristics of Building Materials

Caution

Do not add any material, other than the recommended promoters, inhibitors and methyl ethyl ketone peroxide, to this product without the advice of a representative of CCP Composites US.

Storage

NORSODYNE® H 81269 TF has a shelf life of 90 days from date of shipment from CCP Composites 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.

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**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 statute 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.

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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.