PRODUCT BULLETIN

March 2021

NORSODYNE FIREBLOCK™ H 81269 TF

Flame-Retardant Polyester Resin

DESCRIPTION

NORSODYNE H 81269 TF is a flame-retardant polyester laminating resin and is part of the FIREBLOCK™ products.

FIREBLOCK™ is a series of nonhalogenated, flame-resistant resins and gel coats being offered to the North American Composites Market by Polynt. NORSODYNE products cover a complete range of composite resin technologies for a variety of applications.

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 nonhalogenated 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. Polynt 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. Polynt also strives to use the latest technologies in emission reduction while maintaining application and performance standards.

BENEFITS & FEATURES

- Flame-retardant meeting UL 94 Plastics Flammability Standard, V-0 classification
- Meets requirements for use in the transportation industry including:
    - Docket 90A – ASTM E162-02a Surface Flammability, ASTM E662 Smoke Generation, and Bombardier SMP 800-C Smoke Toxicity)
    - FMVSS 302 Flammability of Interior Materials – Passenger Cars, Multipurpose Passenger Vehicles, Trucks and Buses
- Rated as Class I for ASTM E84 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)

PROPERTIES – LIQUID

Property[1]	Unit	H 81269 TF
HAP and Monomer Content	-	< 24%
Viscosity[2]	cps	950
Thix Index	-	4.0
Gel Time[3][4] 0.075% Polycor® 970C903	minutes	17.5[3]
Weight per Gallon	lbs/gal	11.6

1) All properties at 25°C/77°F unless otherwise noted
2) Brookfield Viscometer RVT Spindle #3 at 50 RPM
3) 100 g mass, 1.2% Arkema Luperox® DDM-9
4) See the Applications section of this data sheet for gel time customization formulations

PROPERTIES – PHYSICAL

Property[1]	Unit	Laminate[2]	Laminate[3]	Test Method
Tensile Strength	psi	6,500	9,700	ASTM D 638
Tensile Modulus	psi	Not available	1,533,000	ASTM D 638
Tensile Elongation	%	1.15	1.62	ASTM D 638
Flexure Strength	psi	16,700	12,000	ASTM D 790
Flexure Modulus	psi	946,000	1,028,000	ASTM D 790
Heat Distortion Point at 264 psi[4]	°C/°F	130/266	130/266	ASTM D 648
Hardness, Barcol Model 934-1	HB	50	50	ASTM D 2583
Glass Content	%	20	26	ASTM D 2584

1) Physical properties were determined using internal Polynt test methods that are similar to those listed above.
2) Laminate schedule was 3 plies of CSM, post cured at 250°F
3) Laminate schedule was 4 plies of 2.0 oz CSM, post cured for 16 hours at 120°F
4) Neat resin casting post cured at 250°F

PROPERTIES - OTHER

FLAMMABILITY TEST DATA

Test	Doc. #	Application	Results	
ASTM D2863-08: Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-like Combustion of Plastics (Oxygen Index)	MB-344	General	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)	MB-345	Electrical	V-0 Rating	
ASTM E162-08: Surface Flammability of Materials using a Radiant Heat Energy Source (1)	MB-346	Transportation (Docket 90-A Recommended Fire Safety Practices for Transit Bus and Van Materials Selection	Flame Spread Index, I_s = 10	
ASTM E662: Optical Smoke Density (1) *Specific Optical Density (D_s) at 1.5 min *Specific Optical Density (D_s) at 4.0 min			**Flaming** D_s = 8 D_s = 60	**Non-Flaming** D_s = 1.3 D_s = 18
Bombardier SMP 800-C (1) (2)			**Flaming – Passed** CO – 636 CO_2 – 17,778 HBr – Not detected HCl – Not detected HCN – Not detected HF – Not detected NO_x – 86 SO_2 – Not detected	**Non-Flaming – Passed** CO – Not detected CO_2 – 1,361 HBr – Not detected HCl – Not detected HCN – Not detected HF – Not detected NO_x – Not detected SO_2 – Not detected
FMVSS 302: Flammability of Interior Materials – Passenger Cars, Multipurpose Passenger Vehicles, Trucks and Buses (3)		Transportation	Burn Rate (mm/min.) = 0 (specimen did not ignite)	
ASTM E84: Standard Method of Test for Surface Burning Characteristics of Building Materials (4)	MB-347	Building Architecture Construction	Flame Spread – 25 Smoke Developed – 300 Rating - Class 1	

1) Laminate consisted of NORSODYNE H 81269 TF resin matrix reinforced with 3 plies of 1.5 oz CSM. The resin was promoted with 0.05% POLYCOR® 970C903 and initiated with 1.0% Luperox® DDM-9. The glass content was 22%. The panel was post-cured for 4 hours at 150°F.
2) Results shown are maximum concentrations.
3) Laminate consisted of NORSODYNE H 81269 TF resin matrix reinforced with gun roving (1 in. chop at 20%). The resin was initiated with Luperox® DDM-9 at 1.5%. The laminate was cured at room temperature (75°F)
4) Laminate consisted of NORSODYNE H 81269 TF resin matrix reinforced with 4 plies of 2.0 oz CSM. The resin was promoted with 0.075% POLYCOR® 970C903 and initiated with 1.5% Luperox® DDM-9. The glass content was 26%. The panel was post-cured for 16 hours at 120°F.

TOXICITY

Test	Application	NORSODYNE H 81269 TF Results	
NF X 70-100-1/2	Smoke toxicity	ITC	11.02
NF X 10-702	Smoke opacity	Dm	339
		VOF4	72
Classification Standard	**Name**		
NF F 16-101	Railway Rolling Stock Fire Behavior Choice of Materials		
STM S-001 index C	Technical Specification		
***IF* = 11**			

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 overmix NORSODYNE H 81269 TF. Overmixing can break down the resin viscosity increasing the tendency to sag.

NORSODYNE H 81269 TF is unpromoted. 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® 970C9903(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%

1) Gel time data is for 100 g mass samples at 77°F
2) Cobalt 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
3) A 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.

For accelerated laminate Barcol hardness development, up to 0.1% POLYCOR® 970CK103 (DMA) can be added to any of the above promoter schedules. The addition of DMA will shorten the gel time.

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 customers check the cure rate in their plant.

Polynt 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. United Initiators 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, United Initiators 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.

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 Polynt representative.

Refer to Polynt's Composites Applications Guide ("Cookbook") for equipment and application recommendations. Each user must determine the suitability of this product to his/her particular mode of operation and intended end-use application. A Polynt representative will be available to assist in the proper selection of all Polynt-Reichhold products available for commercial use.

SHELF LIFE & STORAGE

The shelf life of NORSODYNE FIREBLOCK™ H 81269 TF is 120 days from the date of manufacture from Polynt. To maximize usage life and maintain optimum properties, resins and gel coats should be stored in the original closed container at temperatures below 23°C/73°F and away from ignition sources and sunlight. Keep containers sealed to prevent moisture pick-up and monomer loss.

RELATED PRODUCTS

POLYCOR® 970C903 Promoter Solution

POLYCOR® 970C951 Inhibitor Solution

SAFETY & WARRANTY

To receive a copy of our safety and warranty information, please email safetyandwarranty@polynt.com.