

### PRODUCT CODE: C260013

HETRON® FR992 is a low viscosity, unpromoted flame retardant epoxy vinyl ester resin with a proven record of high performance in composite applications demanding excellent chemical and flame resistance.

### PERFORMANCE CHARACTERISTICS

- Excellent corrosion resistance
- High impact strength
- High tensile elongation
- No foaming
- Low flammability properties

### ADDITIONAL INFORMATION

Epoxy vinyl esters are classified separately from polyesters due to their enhanced mechanical properties. They offer excellent physical strength and, in general, much better impact and thermal shock resistance than polyester resins. These resins exhibit excellent chemical resistance towards acids, alkalis, hypochlorites, and many solvents. HETRON® FR992 is part of the comprehensive range of Ineos corrosion resistant Polyesters and Vinyl Esters made locally under licence by Allnex Composites. Selection of the correct resin for the environment is very important and reference should be made to the current version of the Ashland publication - "HETRON® and AROPOL™ Resin Selection Guide", in conjunction with Allnex Composites Technical Service staff.

### SUGGESTED USES

Equipment required to meet the Australian Potable Water standard. Corrosion resistant tanks, pipes, vats, process vessels, pumps, scrubbers, and other equipment. Also suitable for flake-glass or fibreglass reinforced linings, coatings and monolithic toppings on tanks, vats, floors, troughs, and similar applications.

### RELATED PRODUCTS

C260014	HETRON FR992HSB	Unpromoted, contains antimony
C260015	HETRON FR992HPSB	Promoted, contains antimony
C260016	HETRON FR992HTPSB	Promoted, thixotropic, contains antimony
C260017	HETRON FR992HTPSB LV	Low viscosity, promoted, thixotropic, contains antimony

### TYPICAL LIQUID RESIN PROPERTIES @ 25°C

PROPERTY	CONDITIONS	TYPICAL VALUE
Appearance	Ambient	Pale Yellow Liquid
Gardner Colour		<4
Viscosity	Brookfield LVT#2/30 @25°C	400 – 600 cP
Geltime	100 grams resin, 0.3% of 6% Cobalt Octoate, 0.1% DMA and 1.24% CUROX M100 @25°C)	4 - 7 minutes
Density		1.05g/m <sup>3</sup>
Flash Point	Setaflash	31°C
Volatile Content		38 – 42%
Shelf Life	Stored under appropriate conditions at 25C	3 Months

\* Typical values: Based on materials tested in our laboratories, but varies from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specification items.

### TYPICAL CAST RESIN PROPERTIES (FULLY POSTCURED CASTINGS)

PROPERTY	TEST METHOD	TYPICAL VALUE
Hardness	Barcol (GYZ 934-1) EN 59	35
Density	ISO R1183	1.12g/m <sup>3</sup>
Tensile Strength	ISO R527	90 MPa
Flexural Strength	ISO 178	145 MPa
Flexural Modulus	ISO 178	3.5 GPa
Tensile Elongation at Break	ISO R527	5.0 %
Heath Deflection Temperature	ISO 175 (1.8 MPa)	108°C

\* Cast resin was prepared using 1%BPO and postcured for two hours at 70°C followed by one hour at 90°C and two hours at 140°C

### FIRE RETARDENCY-FLAME SPREAD VALUES COMPOSITES

MATERIAL	FLAME SPREAD	CLASS
Control: Asbestos/Cement	0	I
HETRON FR992	50	II
**HETRON FR992 with 3% Antimony trioxide	<25	I
Control: Red Oak Lumber	100	III
Non Flame Retardant Resins	350 - 400	III

\* Typical values per ASTM E84 tunnel test: Based on 1/8" thick laminates with approximately 30% chopped glass mat. Results vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specification items.

\*\* Note : Hetron FR992HSB , Hetron FR992HPSB, Hetron FR992HTPSB & Hetron FR992HPSB LV already contain some Antimony synergist . For these resins - addition of a further 2% Antimony Trioxide or 2.5% Nyacol APE 3040 (Antimony Pentoxide dispersion) is required to achieve a Class 1 flame spread value according to ASTM E84.

#### APPLICATION GUIDELINES

##### POSTCURING THE LAMINATE

Post curing is recommended for maximum chemical and heat resistance. For a service temperature below 100°C, A postcure may extend the service life if the operating temperature is within 20°C of the present CR guide maximum temperature for the service. This means that a postcure can be beneficial for solvent applications with a temperature limit of 25°-40°C.

For service temperature above 100°C, Postcure in service may be sufficient, provided the resin specific minimum Barcol hardness values are reached before start up. For service in pure and neutral salt solutions, In general postcure may not be required, provided the resin specific minimum Barcol hardness values are reached and no acetone sensitivity is shown before start up. When using a BPO / Amine cure system, postcure is strongly recommended and should be done withing two weeks of construction. Postcure conditions as outlined in EN 13121-2 are recommended. Minimum recommended postcure conditions are 80°C for four hours.

##### FLAME RETARDANCE

Hetron FR992 epoxy vinyl ester resins are based on halogenated intermediates. These unique chemical structures account for their excellent corrosion resistance and also make these Hetron resin composites inherently flame retardant. For increased flame retardance, synergists – such as Antimony Trioxide - can be added to many of these resins during fabrication. However, antimony oxide is not effective when added to nonhalogenated resins. ASTM E84 "Standard Method of Test for Surface Burning Characteristics of Building Materials" (commonly referred to as the "Tunnel Test") is an accepted standard for determining flame spread values.

Current industry practice commonly requires materials of construction for ducts, hoods, and other fume handling equipment to have an ASTM E84 flame spread rating of 25 or less (commonly referred to as Class I). Several other tests commonly used for classifying smoke and flame retardant properties of FRP equipment include ASTM E162 "Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source (Radiant Panel Test)," ASTM E662 "Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials (Smoke Chamber)," UL94 "Standard Tests for Flammability of Plastic Materials for Party in Devices and Appliances." For more specific

information on these and other flame resistance test results (UL94, oxygen index, cone calorimeter), contact your sales or technical service representative.

### STORAGE AND HANDLING

To ensure maximum stability and maintain optimum resin handling properties, polyester resins should be stored in closed containers, away from heat sources and sunlight. The resin should be stored away from all sources of ignition. Stored resin quantities should be kept to a reasonable minimum and used on a first in/first out stock rotation basis.

### STANDARD PACKAGING

Mild Steel Drums (225kg)

Always refer to the MSDS before use