Technical data sheet

RF1001MT-00, RF1001MT-25 and RF1001MT-35

Epoxy Vinyl Ester Laminating Resins

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Description

EPOVIA® RF1001MT-00, RF1001MT-25 and RF1001MT-35 are pre-promoted, thixotropic Bisphenol-A based vinyl ester resins containing styrene monomer. They are formulated for building reinforced plastic parts using open-molding hand lay-up or spray-up processes.

EPOVIA® RF1001MT-00, RF1001MT-25 and RF1001MT-35 can be used in applications that specify Derakane® 411, Hetron® 922, Dion® 9100, Vipel® F010 and other equivalent Bisphenol-A based vinyl ester resins.

EPOVIA® RF1001MT-00, RF1001MT-25 and RF1001MT-35 are suitable for use in a wide range of end-use applications including:

- Corrosion resistant storage tanks for many industries, process pipes, flanges and fittings
- Infrastructure construction
- Fume and vapor ducting
- Construction members
- Transportation and heat exposed parts

Please refer to the EPOVIA® Corrosion Guide for RF1001 for detailed information on specific service conditions and laminate construction techniques. Fumed silica used as a thixotrope in RF1001MT-00, RF1001MT-25 and RF1001MT-35 can reduce the corrosion resistance properties in very aggressive, high pH environments. The use of non-thixed EPOVIA® RF1001DMV should be considered for resin rich, corrosion liners in very aggressive environments.

Features and Benefits

- Excellent heat resistance allows use at elevated service temperatures
- Excellent resistance to corrosion from a large number of chemicals including acids, alkalis, and solvents. (*Note*: refer to the EPOVIA® Corrosion Guide for RF1001 for detailed information on specific service conditions.)
- Low shrinkage for good dimensional stability and accurate design tolerances.

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- Superior mechanical strength allows for larger safety factors in high stress applications.
- Rapid wet-out of glass fiber, fabrics and cores
- Non-draining
- User friendly, pre-promoted; requires only the addition of organic peroxide

Liquid Properties (77 °F)

Liquid properties of EPOVIA® RF1001MT-00, RF1001MT-25 and RF1001MT-35 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 have a significant effect on the results. Products with properties outside of these readings can perform acceptably. Final suitability of this product should be determined by the fabricator in the end use performance.

Test	RF1001MT-00	RF1001MT-25	RF1001MT-35
Viscosity[1]	550 cps	550 cps	550 cps
Thixotropic Index	3.8	3.8	3.8
Weight Per Gallon	8.6 lbs.	8.8 lbs.	8.6 lbs.
Specific Gravity @ 25°C	1.03	1.05	1.03
Gel time	10.0 min.[2]	25.0 min. [3]	35.0 min. [3]

[1]Brookfield, RV #2 spindle @ 50 rpm.
[2] Method CCP-22-TAS-TM-515.2, 100 g mass, 1.5% Arkema LUPEROX® DDM-9
[3] Method CCP-22-TAS-TM-515.2, 100 g mass, 1.5% Syrgis® MEKP-9

Physical Properties

The physical properties of EPOVIA® RF1001MT-00, RF1001MT-25 and RF1001MT-35 are shown below. Properties are shown for both a neat resin casting and 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 castings and laminates. Resin and laminates at different stages of cure will have varying properties.

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Test	Test Method[3]	Neat Resin Casting [1]	Laminate [2]
Tensile Strength	ASTM D638	12,000 psi	19,600 psi
Tensile Modulus		0.54 x 10^6 psi	1.42 x 10^6 psi
Tensile Elongation		5.5%	1.9%
Flexural Strength	ASTM D790	22,000 psi	32,400 psi
Flexural Modulus		0.50 x 10^6 psi	1.03 x 10^6 psi
Heat Distortion Point at 264 psi	ASTM D648	108 °C / 226 °F	--
Barcol Hardness		40	52
Glass Content	ASTM D2584	none	39.5%

[1]Neat Resin Casting – Post cured for 2 hours at 80ºC followed by 2 hours at 120 ºC (ref. Cray Valley)

[2] Laminate construction is as follows: 2 layers 1.5 oz chopped strand mat. Cured at room temperature for 16 hours. Post cured for 4 hours at 150 ºF.

[3]All tests run per internal CCP test methods. These methods are similar to the ASTM Method listed above.

Application

EPOVIA® RF1001MT-00, RF1001MT-25 and RF1001MT-35 should be mixed prior to use. 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. 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. Over mixing can break down the resin viscosity increasing the tendency to sag.

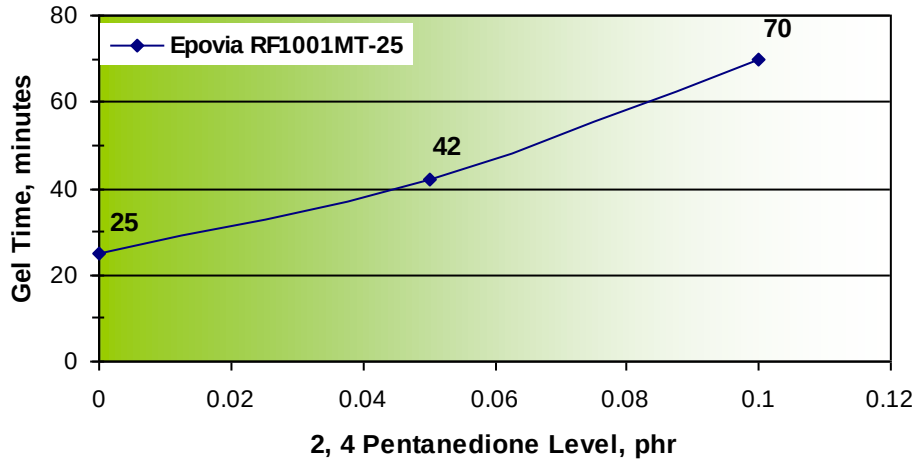
EPOVIA® RF1001MT-00, RF1001MT-25 and RF1001MT-35 are pre-promoted, but the gel time can be customized as needed for varying part conditions. The gel time can be shortened by increasing the catalyst level. The gel time can be extended for RF1001MT-25, using 2,4-pentanedione (acetyl acetone peroxide (AAP)) as an inhibitor. Sample formulations are provided as a guideline only (*below*).

Gel Time	As made	Slow	Extended
	25 min.	42 min.	70 min.
Inhibitor: 2,4 Pentanedione[2]	none	0.05 phr	0.10 phr

[1]Method CCP-22-TAS-TM-515.2, 100 g mass, 1.5% Syrgis® MEKP-9 at 77ºF (25ºC)

[2]phr = parts per hundred resin

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(1)phr = parts per hundred resin (%)

If longer gel times are needed for EPOVIA® RF1001MT-35, the gel time can be extended by addition of POLYCOR® 970C951. (*Note: or use 12% HQ inhibitor solution*). CCP Composites recommends that gel time be checked in the customer's plant because age, temperature, humidity, inhibitor age/levels and peroxide age and type will produce variable gel times.

EPOVIA® RF1001MT-00, RF1001MT-25 and RF1001MT-35 are quality control tested using Arkema LUPEROX® DDM-9 (RF1001MT-00) or Syrgis NOROX MEKP-9 (RF1001MT-25 and RF1001MT-35). Other MEKP catalysts such as Arkema LUPEROX® DHD-9, Syrgis NOROX® MEKP-925, and Chemtura HP-90 are expected to yield similar performance. Syrgis NOROX® MEKP-9H, Akzo Nobel CADOX L-50a and CADOX D-50 may also be used, but gel and cure times may vary.

The catalyst level should not exceed 2.4% nor fall below 0.9% for proper cure. The recommended peroxide usage level is 1.5% at 25°C or 77°F depending on material and room temperature, humidity, air movement, and catalyst concentration.

Related Products

EPOVIA® RF1001DMV – Same as RF1001MT-25, but un-promoted, un-thixed medium viscosity version (400 cps)

EPOVIA® RF1001L-00 – Un-promoted infusion resin

EPOVIA® RF1001L-15 – Pre-promoted infusion resin

See the EPOVIA® Epoxy Vinyl Ester Product Guide for Corrosion and Chemically Resistant Resins for related products.

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Caution

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

Storage

EPOVIA® RF1001MT-00, RF1001MT-25 and RF1001MT-35 have a shelf-life of 90 days 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.

Data Sheets/MSDS

CCP data sheets and MSDS's are available in printable format at www.ccpcompositesus.com.

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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.

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(Rev. 01/12)