

ArmorStar® VE

VE MC • VE SX • VE BX

IVSXH210

Vinyl Ester Infusion Resin

Copyright 2010

Description

ArmorStar® IVSXH210 is a pre-promoted, vinyl ester blended resin containing styrene monomer. It is formulated for building reinforced plastic parts using closed molding processes and specifically infusion processes such as vacuum bagging, SCRIMP®, and resin injection.

Features and Benefits

ArmorStar® IVSXH210 offers the following features:

- Low viscosity for good fiber wetting and mold filling performance
- Rapid fill times
- Rapid cure and Barcol development for quick demold
- Excellent strength and toughness for crack resistance
- High heat distortion temperature (HDT)
- Superior blister resistance
- Good surface cosmetics
- Compatible with standard catalyst and CHP/MEKP blends

Typical Liquid Properties (at 77°F)

Liquid properties of ArmorStar® IVSXH210 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	ArmorStar® IVSXH210
Viscosity ¹	100 cps
Gel Time ²	20 minutes



IVSXH210 - Copyright 2010

Weight per Gallon	9.0
-------------------	-----

¹Brookfield RVF #2 at 50 rpm

²100 g mass, 1.50% Luperox® DDM-9

Physical Properties

The physical properties of ArmorStar® IVSXH210 are shown below. 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	9,500 psi	16,000 psi
Tensile Modulus		580,000 psi	1,460,000 psi
Tensile Elongation		2.4%	1.6%
Flexural Strength	ASTM D790	16,000 psi	31,000 psi
Flexural Modulus		590,000 psi	1,290,000 psi
Glass Transition Temperature, Tg	CCP-22-TAS-TM-3008 (DMA)	230°F (110°C)	--

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

²Neat resin casting catalyzed with 1.5% Arkema Luperox® DHD-9. The casting cured for 16 hours at room temperature and was post cured for 4 hours at 150°F.

³Laminate - Resin initiated with 1.5% Arkema Luperox® DHD-9. The laminate schedule was 2 plies of 1.5 oz. CSM. Glass content was 35-37%. The panel was cured for 16 hours at room temperature and post cured for 4 hours at 150°F.

Application

The cure rate of thermoset resins depends on a number of factors including the product's age, temperature, catalyst type, catalyst level and ambient humidity. When used in a closed molding 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.

ArmorStar® IVSXH210 is quality control tested using Arkema Luperox® DDM-9 but can be used with a variety of peroxide initiators. When making thin laminates (<150 mils) Luperox® DDM-9 or a equivalent catalyst such as NOROX® MEKP-9, NOROX® MEKP-9H, Akzo Nobel CADOX L-50a and CADOX D-50 are recommended. Arkema Luperox® DHD-9, Syrgis NOROX® MEKP-925, NOROX® MEKP-925H and Chemtura HP-90 may also be used but gel and cure times may vary.

For thicker laminates cumene hydroperoxide/methyl ethyl ketone peroxide blends such as Arkema's Luperox® KC-70 and KC-50 can be used to reduce exotherm without negatively affecting the final cure of the composite.



IVSXH210 - Copyright 2010

The MEKP catalyst level should not exceed 2.4% or fall below 0.9% for proper cure. A catalyst level of 1.5% at 77°F is considered ideal. Contact your catalyst supplier or your CCP representative for acceptable catalyst ranges for MEKP/CHP blends. 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 organic peroxide to this product without the advice of a representative of CCP Composites US.

Storage

ArmorStar® IVSXH210 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.



IVSXH210 - Copyright 2010

**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.

IVSXH210 - Copyright 2010

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.