



ARMORCOTE®

991 Series MACT Compliant Gel Coats

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Description

Products in the ARMORCOTE® 991 Series gel coats are advanced technology polyesters developed for lower emissions, improved flexibility, and superior weathering resistance to surface yellowing and chalking. These gel coats have been formulated to be MACT compliant for the fiberglass industry.

ARMORCOTE® 991 gel coats are designed to meet the critical requirements of the marine industry. Both accelerated and 45° South Florida exposure testing reveal less yellowing than standard gel coats, and considerably less loss of gloss.

ARMORCOTE® 991 gel coats are formulated to meet the EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) for Boat Manufacturers. Contact a Polynt Composites representative for actual HAP content.

Gel coats in the ARMORCOTE® 991 Series offer blister resistance comparable to ISO/NPG gel coats.

This coating system is sag resistant and ready to spray, requiring only the proper addition of an appropriate methyl ethyl ketone peroxide to cure.

The product code for base white in the improved ARMORCOTE® 991 Series is 991WK173.

Typical Liquid Properties (77°F)

These values may or may not be manufacturing control criteria; they are listed as 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 test results. Batches with properties outside of these ranges can perform acceptably.

Test	ARMORCOTE® 991 Series
Viscosity ⁽¹⁾	13,000-19,000 cps
Thixotropic Index	4.5-7.0
Flash Point	79°F
Weight per Gallon (pigmented)	11.3 (white)
Gel Time ⁽²⁾	10-18 minutes
Lay-up Time	45-90 minutes
Sag Resistance	24 mils wet
Hide (most formulations)	Complete at 10 mils wet

⁽¹⁾ Brookfield RVF #4 Spindle @ 4 rpm

⁽²⁾ Method POLYNT-22-TAS-TM-515.2, 100g mass, 77°F with 1.8% Arkema Luperox DDM-9



Reds, yellows and dark blues may have low hiding power. Ask a Polynt Composites representative whether the selected red, yellow or blue requires a special application procedure, which is increased film thickness in multiple cured applications.

Application

ARMORCOTE® 991 gel coats must be mixed prior to use. This includes prior to production spray application and when obtaining material for patching or any material that has been set aside for patching. Several suitable types of mixing equipment and styles of agitators are available for both pails and drums. Regardless of the specific types used, the equipment must have 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. Do not overmix ARMORCOTE® 991 gel coats. Overmixing can break down the polymer coating viscosity increasing the tendency to sag. Overmixing can also result in styrene loss which could contribute to porosity. Air bubbling should not be used for mixing. It is not effective and only serves as a potential source of water or oil contamination.

Although products in the ARMORCOTE® 991 Series are formulated as MACT compliant products, it should be noted that over-atomization of a gel coat results in more volatilization (more overspray, more monomer and solids loss, more odor). It is important therefore to strive for good atomization (good fan pattern, no fingers or tails, uniform particle size of about 1/16 inch) while maintaining lowest pump and atomizing pressures as practical.

ARMORCOTE® 991 Series gel coats can be applied with air-atomized or airless equipment. Brushing or rolling is not recommended. Refer to Polynt's Composites Applications Guide, Part Four, Chapter 11.3, Conventional Gel Coat – Spray equipment for equipment recommendations. For best results these high performance coatings require careful application procedures. Poor application will quickly negate the beneficial properties of these gel coats. Refer to Polynt's Composites Applications Guide, part Four, Chapter 11.4, Conventional Gel Coat – Application.

For optimum results, uniform catalyst mix must be achieved. Even with the equipment properly calibrated, potential problems can occur due to: poorly atomized catalyst, surging problems (ARMORCOTE® or catalyst), poor tip alignment (catalyst to ARMORCOTE® mix), contamination, and poor application procedures, which will quickly negate all benefits of calibration. The equipment (and application procedures) must be monitored on a routine basis to ensure proper application and cure of the gel coat. Ask about and adhere to all equipment manufacturers' recommendations.

A delivery rate of no more than 2.5 pounds per minute with conventional air-atomized equipment and no less than 60 psi atomizing air (dynamic) at the gun is essential. Use no more than 4 pounds per minute with airless equipment. High flow rates cannot be properly achieved using air-assist airless equipment. Attempts to use flow rates over 3 pounds per minute may result in poor application. These products require a closer control of application procedure than higher VOC gel coats.

Products in the ARMORCOTE® 991 Series are lower in viscosity and are easier to pump and spray. Slightly lower pumping pressures and atomizing air pressures are normally required than are necessary for regular gel coats, and other low VOC gel coats.



Careful application procedures must be taken. A spray distance of 24 to 36 inches is recommended for airless equipment. A spray distance of 18 to 24 inches is recommended for either conventional or air-assist airless equipment. In either case, a spray distance greater than 4 feet will increase the chances for poor leveling and porosity.

Avoid overspray settling on mold surfaces by beginning spray pattern closest to the vapor/air exhaust and progressing to the opposite mold end. Maintain recommended spray distances from the mold surface.

For deep channels, recessed, and hard-to-spray areas, an extension nozzle is highly recommended.

For best overall performance properties, a wet film thickness of 18 ± 2 mils is recommended as ideal. Films less than 12 mils may not cure properly, may be hard to patch, have more print-through, and are more susceptible to water blisters. Films above 24 mils may pre-release, trap porosity, or crack, and are more subject to weathering discoloration. If water blisters are of a great concern (boat hulls), 20 to 24 mils would perform better than a thinner film, but resistance to sag, porosity and cracking could suffer. If weathering (yellowing from sunlight, decks) is of great concern, then thinner films (12 to 16 mils) would perform better, but patchability and resistance to print-through and blistering could suffer.

A fiberglass part is the mirror image of its mold. A preventive maintenance program for molds is essential. This will minimize the repair work (sanding and buffing) needed on the fiberglass parts. Sanding and buffing can reduce durability of a part by 30 to 50%.

Delamination can occur if the gel coat is left in the mold overnight without being laminated. It is essential that the gel coat at least be skinned within 8 hours of being sprayed.

Cure

It is recommended that gel time be checked in the customer's plant 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, Norox® MEKP-925 and Norox® MEKP-925H, and Pergan HP-90 may yield slightly shorter gel and cure times.

The catalyst level should not exceed 3% or fall below 1.2% for proper cure. Recommended range is 1.2% to 3.0% with 1.8% at 77°F being ideal. Normally, the film is ready for lamination in 45 to 90 minutes. This time element is dependent on material temperature, room temperature, humidity, air movement, and catalyst concentration.

This product should not be used when mold and ambient temperature conditions are below 60°F, as curing may be adversely affected. Material temperature should be at least 70°F.

Caution

ARMORCOTE® 991 products may not be compatible in the liquid state with gel coats or resins; separation can occur. Spray and pumping equipment should be completely clean of gel coats or resins.

Do not add any material other than the appropriate methyl ethyl ketone peroxide to this product without the advice of a representative of Polynt Composites.



Related Products

PATCHAID® 970XJ037, 970X900, 970XJ166 AND 970XA014 resin based aids for spray patching.

PATCHAID® Spraycure™ 970C961 monomer based aid for rapid cure of spray patches of aerosol spray.

Storage Limitations

Uncatalyzed, standard cure ARMORCOTE® has a shelf life of 120 days from date of manufacture when stored at 73°F or below, in a closed, factory sealed, opaque container, and out of direct sunlight. Fast cure gel coats (gel time less than 9.0 minutes) are stable for 60 days. The shelf life is cut in half for every 20°F over 73°F. Totes of product can have even shorter shelf life – 66% of that for drums.

SDS / Data Sheets

SDS and data sheets can be obtained by contacting your Polynt representative or Polynt Customer Service at 800-322-8103.

POLYNT SAFETY INFORMATION

All sales of products manufactured by Polynt Composites USA Inc. and described herein, are made solely on condition that Polynt Composites USA 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 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 12th Report on Carcinogens issued by the National Toxicology Program lists styrene as a "reasonably anticipated" carcinogen, but the Report cautions that the NTP listing does not mean that styrene presents a risk to persons in their daily lives. The Styrene Information and Research Center does not agree with the classification as it did not include a review of all available data. SIRC states: "HHS included styrene in the 12th RoC despite the fact that European Union regulators have determined styrene does not represent a human cancer concern. E.U. scientists reviewed the full styrene database, weighing all of the available data in reaching their conclusion."

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 workplace 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 Safety Data Sheet for each product (identified by product number) before using. If unavailable, these can be obtained, free of charge, from your Polynt Composites representative or from: Polynt Composites USA Inc., 99 East Cottage Avenue, Carpentersville, IL 60110, 800-322-8103.

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.

LIMITED WARRANTY AND LIMITATION OF LIABILITY

LIMITED WARRANTY.

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 for the product; 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 ADDITIONAL REPRESENTATIONS OR SUGGESTIONS REGARDING THE PRODUCT OR ITS POSSIBLE USES ARE BASED UPON SELLER'S GOOD FAITH OPINION AND BELIEF, BUT ARE NOT TO BE CONSTRUED AS AFFIRMATIONS OF FACT, PROMISES, OR DESCRIPTIONS, AND SHALL IN NO WAY BE DEEMED PART OF THE SALE OF PRODUCT.** In particular, and without limiting the foregoing, because of environmental and use conditions beyond Seller's control, Seller offers no warranty and makes no promise concerning the results that may be obtained by the Buyer (or the Buyer's customer) with the product or the performance of the product. Each user should satisfy itself, by adequate testing, of the suitability of the product for its particular application.

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- (a) Seller's total liability for any claim arising out of or in connection with this contract, including for breach of contract, warranty, statutory duty, or for other tort, including seller's negligence, shall not exceed the purchase price 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 LIMITATION LOSS OF PROFITS, CAPITAL OR BUSINESS OPPORTUNITY, DOWNTIME COSTS, OR CLAIMS OF CUSTOMERS OR EMPLOYEES OF BUYER, WHETHER IN AN ACTION UNDER CONTRACT, NEGLIGENCE OR ANY OTHER THEORY, ARISING OUT OF OR IN CONNECTION WITH THIS CONTRACT, OR THE USE, INABILITY TO USE, OR PERFORMANCE OF THE PRODUCT.**
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The information provided is believed to be accurate at the time of preparation, or prepared from sources believed to be reliable, but it is the responsibility of user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of the product and to determine the suitability of the product for its intended use.