



ArmorFlex® 99F

99F Series High Flex Gel Coats

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Description

ArmorFlex® 99F gel coats are advanced technology polyesters that have been formulated for the fiberglass industry. ArmorFlex® 99F gel coats have lower volatile organic compounds (VOC's) than standard gel coats.

Features and Benefits

- Enhanced crack resistance
- Good UV resistance for reduced chalking and yellowing in outdoor applications
- Good resistance to water and osmotic blistering
- Greater transfer efficiency and less overspray
- Low backside tack

ArmorFlex® 99F gel coats meet the EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) for Boat Manufacturing. Certain ArmorFlex® 99F gel coats also meet the EPA NESHAP for Reinforced Plastics Composites Production.

ArmorFlex® 99F gel coats offer good water (osmotic) blister resistance. These gel coats when applied properly and backed with one of Polynt Composites' vinyl ester barrier coats or vinyl ester skin resins will provide a durable osmotic water blister resistant composites suitable for marine boat hulls.

This coating system requires only the addition of methyl ethyl ketone peroxide (MEKP) to cure.

ArmorFlex® 99F gel coats are available in white and off-white colors. ArmorFlex® 99F gel coats are available in sprayable and brushable versions.

Typical Properties (77°F)

Typical properties of ArmorFlex® 99F gel coats are shown below. These values may or may not be manufacturing control criteria; they are listed as a reference guide only. Particular batches may not conform exactly to the numbers listed below because storage conditions, temperature, age, testing equipment (type and procedure) can each have a significant affect on the test results. Gel coats with properties outside of these ranges can perform acceptably.



Test	ArmorFlex® 99F Series	
	Sprayable Products	Brushable Products
Flash Point	79°F	79°F
Weight per Gallon	11.0-11.5	11.0-11.5
Viscosity ⁽¹⁾	10,000-19,000 cps Base Products – 13,000-19,000	20,000-52,000 cps
Thixotropic Index (2/20)	4.0-6.5	5.0-7.0
Gel Time ⁽²⁾	3-47 minutes Base Products – 15-19 minutes	9-35 minutes
Sag Resistance	Good at 20 mils	Good at 20 mils
Hide	Typically complete at 10 mils	Typically complete at 10 mils
Tack Free/Dull Gloss Time	60-90 minutes	60-90 minutes

⁽¹⁾ Brookfield RVF, spindle #4 @ 4 rpm

⁽²⁾ 100 gm mass, 1.8% Arkema Luperox® DDM-9

Application

ArmorFlex® 99F 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 type 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 ArmorFlex® 99F 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.

ArmorFlex® 99F gel coats are formulated for spray or brush application. Brushable versions have the word “Brushable” in the product description and the last character in the product code is B. Refer to Polynt’s Composites Applications Guide for guidelines on brush application. Brushing of sprayable versions is not recommended due to flow and leveling issues.

For sprayable versions, the spray equipment must be well maintained and regularly calibrated to maximize the performance of these products. Application procedure recommendations should be followed carefully. Poorly maintained equipment or poor application will quickly negate the beneficial properties of these gel coats. Refer to Polynt’s Composites Applications Guide for equipment and application recommendations.

Polynt Composites does not recommend fluid lines longer than 50 feet, or pumps smaller than 20:1 ratio. Polynt Composites recommends a gel coat delivery rate of no more than 2.5 pounds per minute with conventional air atomized equipment, and no more than 4 pounds per minute with airless equipment.



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 (ArmorFlex® 99F or catalyst), poor tip alignment (catalyst to ArmorFlex® 99F 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. Inquire about and adhere to all equipment manufacturers' recommendations.

When establishing the fan pattern for the spray equipment, use the lowest pump pressure needed to achieve a good fan pattern (no fingers or tails, uniform particle size of about 1/16"). Use of higher pressures can lead to a porosity or excessive overspray. Overspray can result in a leathery or chicken skin texture if it falls on the part surface. To minimize overspray that falls onto the mold, plan the spray pattern so that the beginning is closest to the vapor/air exhaust and progresses to the opposite mold end. The spray pattern should also allow for a wet line to be maintained.

A spray distance of 18 to 36 inches is recommended. Closer spray distances can result in blowing of the film or air entrapment. Spraying at distances greater than 4 feet will increase orange peel and porosity. For deep channels, recessed, and hard-to-spray areas, an extension nozzle is highly recommended.

For best overall end performance properties, a wet film thickness of 16 to 20 mils is recommended. The film should be applied in multiple passes with each pass having a thickness of 6 mils. More rapid film build could result in some sag and porosity. Films less than 12 mils may not cure properly, may be hard to patch, have more print-through, and be more susceptible to water blisters. Films above 24 mils may pre-release, trap porosity, crack and are more subject to weathering discoloration.

A fiberglass part is the mirror image of the 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 substantially reduce the durability of the gel coat.

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 Chemtura HP-90 may yield slightly shorter gel and cure times.

The recommended catalyst range is 1.2% to 3.0% with 1.8% at 77°F being ideal. Normally, the gel coat film is ready for lamination in 45 to 60 minutes. This time element is dependent on material temperature, room temperature, humidity, air movement, and catalyst concentration. If lay-up time is checked by the finger method, slight pressure and rubbing should be used.

These products should not be used when temperature conditions are below 70°F, as curing and pumping may be adversely affected.



Caution

ArmorFlex® 99F products may not be compatible in the liquid state with other gel coats or resins. Spray and pumping equipment must be completely clean of gel coats or resins prior to use. Defects in the final gel coat film may occur if the cleaning step is not completed properly.

Do not add any material other than recommended methyl ethyl ketone peroxide to these products without the advice of a representative of Polynt Composites.

Storage Limitations

Uncatalyzed, standard cure ArmorFlex® 99F has a shelf life of 120 days. Fast-cure ArmorFlex® 99F products (gel time less than 9.0 minutes) have a shelf life of 60 days. For both standard and fast cure products the shelf life is measured from date of manufacture.

These shelf lives are for products stored at 73°F or below, in a closed, factory-sealed, opaque container, and out of direct sunlight. The shelf life is cut in half for every 20°F over 73°F. Product stored in totes can have even shorter shelf life; only 66% of that for drums.

Related Products

Polynt Composites recommends the use of PATCHAID® when patching ArmorFlex® 99F gel coats. Please see the technical data sheets for Polynt's PATCHAID® 970XJ037, 970X900, 970XJ166 and 970XA014 products.

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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