Technical data sheet

ArmorFlex®

963 Series

Marine Gel Coats

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Description

ArmorFlex® 963 gel coats are high performance products formulated for the marine industries.

ArmorFlex® 963 gel coats meet the EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) for Boat Manufacturing. Certain specific white gel coat products may not meet the NESHAP standard for Reinforced Plastics. If in doubt, review the MSDS or contact a CCP representative.

ArmorFlex® 963's resist weathering and blistering because they are formulated to provide high performance against water and certain chemicals. These gel coats were primarily developed for *marine* applications; however, they can be used in any FRP application where high performance characteristics are desired. These gel coats provide durable, reduced maintenance products.

These gel coats require only the addition of the proper amount of the appropriate methyl ethyl ketone peroxide to cure.

Features and Benefits

- Reduced monomer losses into the air
- Comparable UV resistance to conventional gel coats
- Blister Resistance acceptable for marine applications
- Less odor
- Less overspray
- Meets BAAQMD's Regulation 8, Rule 50

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Typical Liquid Properties (77^0F, 25^0C)

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 test results. Gel coats with properties outside of these ranges can perform acceptably.

Test	Value
Viscosity [(1)]	17,500 cps
Thixotropic Index	6.0
Flash Point	79^OF
Hazardous Air Pollutants	(See MSDS for amounts)
Weight per Gallon	11.18 lbs
Gel Time [(2)]	15.5 minutes
Lay-up Time	67.5 minutes
Sag Resistance	Good @ 20 mils
Hide (Most Formulations)	Complete @ 12 mils

[(1)] Brookfield RVF #4 Spindle @ 4 rpm

[(2)] Luperox® @ 1.8% DDM-9

Application

Although ArmorFlex® 963's are formulated as low VOC products, it should be noted that over-atomization of a gel coat means more volatilization (more overspray, more monomer and solids loss, more odor). It is important then to strive for good atomization (good fan pattern, no fingers or tails, uniform particle size of about 1/16") while maintaining lowest pump and atomizing pressures as practical.

The inherent chemistry of these gel coats does not allow for the same ease of *fluid movement* experienced with other gel coats. Adjustments may have to be made for pump pressure, delivery rate, tip size and atomization. CCP does not recommend fluid lines longer than 50 feet, or pumps smaller than 20:1 ratio. In addition, ArmorFlex® 963's are more sensitive to cold temperatures than are other gel coats.

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.

ArmorFlex® 963 gel coats can be applied with conventional air atomized or air-assisted airless spray equipment. Neither brushing nor rolling is recommended.

CCP 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 (gel coat or catalyst); poor tip alignment (catalyst to gel coat 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.

For best overall end 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 be more susceptible to water blisters. Films above 24 mils may pre-release, trap porosity, 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 sag, porosity and cracking resistance could suffer. If weathering (yellowing from sunlight, decks) is of great concern, then thinner films (12 to 16 mils) would perform better, but patchability, print-through and blister resistance could suffer.

In addition to the low VOC chemistry, the lower viscosity and thixotropic index result in both less overspray and less monomer loss, but the total film thickness should be sprayed in multiple passes (at least 3 at 18 mils, 4 at 20 to 24 mils). More rapid film build could result in some sag.

Proper mold maintenance is important. Although ArmorFlex® 963 gel coats have excellent patching properties, minimal repair work is always desirable. Sanding and compounding can hasten the chalking and loss of gloss of all gel coats.

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

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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 Luperox® DDM-9 catalyst. Norac NOROX MEKP-9 and NOROX MEKP-9H, Akzo Nobel CADOX L-50a and CADOX D-50 are expected to yield similar performance. Luperox® DHD-9, NOROX MEKP-925 and NOROX MEKP-925H, and Chemtura 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 gel coat 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. Note: ArmorFlex® 963 films have a tendency to air dry and lay-up times may be deceiving. If lay-up time is checked by the finger method, slight pressure and rubbing should be used.

Special fast-cure versions are available but must be requested. These products offer lay-up times of less than 45 minutes. Fast cure products have shorter stability and should not be inventoried over 45 days.

These products (standard or fast cure) should not be used when temperature conditions are below 60°F, as curing may be adversely affected.

Exposure Data

Accelerated and South Florida exposures indicate that ArmorFlex® 963 gel coats have superior gloss retention and less yellowing than standard gel coats.

Caution

ArmorFlex® 963 gel coats are not compatible in the liquid state with isophthalic gel coats or resins. Spray and pumping equipment must be completely clean of these products before ArmorFlex® 963 gel coats can be used.

Do not over-mix gel coats. Over-mixing breaks down gel coat viscosity, increasing tendencies to sag, and causes styrene loss, which could contribute to porosity. Gel coats should be mixed once a day for 10 minutes. The gel coat should be mixing to the sides of the container with the least amount of turbulence possible. Air bubbling should not be used for mixing. It is not effective and only serves as a potential for water or oil contamination.

Do not add any material, other than a recommended methyl ethyl ketone peroxide, to these products without the advice of a representative of the CCP Composites. Under no circumstances should glycerin be added.

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Storage Limitations

Un-catalyzed, ArmorFlex® 963 gel coats have a usage life of 120 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. Fast cure gel coats are stable for 45 days. The usage life is cut in half for every 20°F over 73°F. Totes of product can have even shorter usage life--66% of that for drums.

MSDS/Data Sheets

MSDS and Data Sheets are available in printable format online 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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