

IMEDGE®

PCT100 & PCT110 Polymer Coating Technology

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Description

CCP's IMEDGE® products are high performance In Mold cutting EEDGE polymer technologies that offer unique and revolutionary alternatives to conventional FRP materials. The IMEDGE® technologies were developed to promote and drive innovation in the FRP industry. The IMEDGE® product line represents CCP's commitment to be a leader in the industry through technology, sales, technical and customer support. IMEDGE® PCT100 and PCT110 coatings are advanced Polymer Coating Technology (PCT) products that have been formulated to be used as in-mold, exterior coatings for reinforced plastic parts.

Features and Benefits

- Deep, dark, rich, high gloss colors
- Excellent color and gloss recovery after sanding and buffing
- Blush resistant
- IMEDGE® PCT100 excellent weathering resistance.
- IMEDGE® PCT110 exceptional weathering resistance
- Enhanced impact resistance and toughness for reduced cracking
- Excellent scratch and wear resistance
- Resistant to porosity
- Low weight per gallon

IMEDGE® PCT100 and PCT110 coatings are formulated to meet EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP) for both Boat Manufacturing and Reinforced Plastic Composites products.

IMEDGE® PCT100 and PCT110 coatings offer exceptional water resistance. When used by themselves IMEDGE® PCT100 and PCT110 offer excellent resistance to blushing. When backed by IMEDGE® PBT200 polymer barrier technology, CCP's ARMORGUARD® vinyl ester barrier coat products, or CCP's ARMORSTAR® vinyl ester skin resins, a durable osmotic blister resistant composite will be created that is



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suitable for applications with extended water exposure.

IMEDGE® PCT100 and PCT110 coatings are durable and crack resistant. When used in combination with IMEDGE® PBT200 the resulting composite has exceptional crack resistance.

While offering these benefits, IMEDGE® PCT100 and PCT110 coatings have retained the important construction and application qualities expected from CCP coatings, such as resistance to tearing and color separation, sag resistance, consistent liquid properties, and more. These all add up to higher quality appeal in FRP parts made with CCP IMEDGE® PCT100 and PCT110 Series products.

Typical Liquid Properties (77°F)

Typical properties of IMEDGE® PCT100 and PCT110 are shown below. These values may or may not be manufacturing control criteria. They are listed for reference 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. Products outside of these readings can perform acceptably.

Test	PCT100	PCT110
Viscosity, Brookfield RVF #4 Spindle @ 4 rpm	7,000 - 11,000 cps	7,000 - 11,000 cps
Thixotropic Index	4.0 - 6.0	4.0 - 6.0
Flash Point	79°F - 82°F	79°F - 82°F
Hazardous Air Pollutants	(See MSDS for amounts)	(See MSDS for amounts)
Volatile Organic Compounds	(See MSDS for amounts)	(See MSDS for amounts)
Weight/Gallon	8.70 - 9.70 lbs., depending on color	8.70 - 9.70 lbs., depending on color
Gel Time @ 1.8% MEKP	12 - 20 minutes	12 - 20 minutes
Lay-up Time	45 - 80 minutes	90 - 160 minutes
Sag Resistance	Good at 20 mils	Good at 20 mils
Hide (Most Formulations)	Complete at 10 mils	Complete at 10 mils

Reds, yellows and dark blues may have lower hiding power. Ask a CCP Representative whether your red, yellow or blue requires special application procedure (increased film thickness through multiple applications).

Refer to the MSDS for handling precautions. MSDS's will be supplied automatically with the first order for material, and are available by product code upon request from CCP's Regulatory Department or on CCP's website at www.ccpcompositesus.com.

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Application

IMEDGE® PCT100 and PCT110 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. When not agitated, IMEDGE® PCT100 and PCT110 develop a viscous layer at the top of the container. The material at the bottom of the container is much lower in viscosity. Material applied in this condition is likely to sag and have porosity. Mixing of the IMEDGE® PCT100 and PCT110 coatings is critical to success with the products.

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.

During mixing, the agitator speed and height initially needs to be high enough to breakdown the top viscous layer. The agitator height will then need to be lowered to achieve thorough circulation from top to bottom in the container. The agitator speed may need to be reduced as the product is mixed. Always visually check the material during and after mixing to ensure that the top viscous layer has been fully re-incorporated.

Do not over mix IMEDGE® PCT100 and PCT110. Over mixing can break down the polymer coating viscosity increasing the tendency to sag. Over mixing 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.

IMEDGE® PCT100 and PCT110 Series products are formulated for spray application. Brushing or rolling is not recommended. IMEDGE® PCT100 and PCT110 products can be applied with typical gel coat spray application equipment. Use of external catalyst mix equipment is recommended. Use of internal mix spray equipment increases the potential for porosity.

Actual spray application is similar to conventional gel coats. Refer to CCP's Composites Application Guide for additional specific application information. CCP recommends a 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 low pressure, air assist 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 (coating or catalyst), poor tip alignment (catalyst to coating mix), contamination, and poor application procedures. All of which will quickly negate the benefits of calibration. The equipment (and application procedures) must be monitored on a routine basis to ensure proper application and cure of the coating. Ask about and adhere to all equipment manufacturers' recommendations.

For best overall end performance properties, a wet film thickness of 18 ± 2 mils is recommended. 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, 20 to 24 mils would perform better than a

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thinner film; but sag, porosity and cracking resistance could suffer. If weathering 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.

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. Closer spray distances or larger tips may be required in hot weather to avoid dry spray buildup.

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. Syrgis 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.

Recommended range is 1.2% to 3.0% with 1.8% at 77°F being ideal. Normally, the coating film is ready for lamination in 45 to 80 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 dragging should be used. These products should not be used when temperature conditions are below 60°F, as curing may be adversely affected.

Patching

No matter how much care is taken in producing parts, some will have defects and require repair. The source of defects should always be investigated to determine if they can be prevented. Defect prevention is nearly always more cost effective than continuously performing repairs. In addition, repairing the exterior coating will nearly always compromise its field performance (weathering, blush resistance, etc.). See *CCP Composites Application Guide* for general patching and finishing procedures.

Recommended procedures specific to patching of IMEDGE® PCT100 and PCT110 Series products are provided below. The general process steps are repair area preparation, patching material preparation, spray patch application and finishing. You will need the following CCP products, as well as typical patching, sanding and buffing materials and tools to make the patch.

- IMEDGE® PCT100 and PCT110 – Use the same batch as used during part manufacture.
- PATCHAID® 970C961 – Used as an overspray to seal the patch open side and improve patch cure.

Repair Area Preparation

Identify the area to be repaired. Locating repair edges at design lines, break lines or other part features that visually break-up the part surface can help hide patches.

Prepare the area to be patched by sanding with 150-grit to 320-grit sand paper. Remove sanding dust. Wipe the area with ethyl acetate, methyl ethyl ketone or other suitable solvent to eliminate wax, oil or other contaminants. Be sure that the area to be patched is clean and dry before proceeding. Mask the area

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surrounding the patch area to prevent overspray from accumulating on part.

(Note: See the procedures at the end of the bulletin for steps that can be taken during repair area preparation to reduce halo.)

Preparation of Patching Material

Obtain a sample of the same batch of IMEDGE® PCT100 or PCT110 that was used to fabricate the part being repaired. Failure to use the same batch will almost certainly result in an off-color patch. Agitate the IMEDGE® PCT100 or PCT110 immediately prior to obtaining the sample. Mixing is needed to obtain a good color match and also for spray properties. See the Application section above for mixing instructions.

The preferred method of patching is to use the IMEDGE® PCT100 or PCT110 coating with no diluents or additives other than MEKP peroxide initiator. This method yields the best results for both initial patch appearance and long term field performance.

If absolutely needed for spray ability, IMEDGE® PATCHAID® 9EXB617021 can be used to thin the IMEDGE® PCT100 or PCT110. Use of IMEDGE® PATCHAID® 9EXB617021 may make the patch color dark in some colors and may reduce the blush resistance of the patch. Use the lowest level needed for sprayability. Do not exceed 20% IMEDGE® PATCHAID® 9EXB617021. Do not use PATCHAID® products other than IMEDGE® PATCHAID® 9EXB617021. Use of other PATCHAID® products can result in hazy and/or dull patches. Do not use solvents (acetone, MEK, ethyl acetate or any of the replacement solvents or cleaners) to dilute the IMEDGE® PCT100 or PCT110 coating.

Spray Patch Application

When ready to spray the patch area, catalyze the patching material with 2.0-3.0% MEK peroxide. Using a Binks 115 type spray gun, spray the catalyzed mix over the entire sanded area. Thickness should be approximately 8 to 12 mils for good cure. If spraying an area where the gel coat has been completely removed, the thickness of the spray patch must be at least equal to the thickness needed for hide.

Use a film coat of PATCHAID® 970C961 to seal the open side of the patch and enhance cure. Apply the PATCHAID® 970C961 while the patch is still wet (within 5-10 minutes of the patch being sprayed). Keep the area surrounding the patch masked-off when applying the PATCHAID® 970C961. The PATCHAID® 970C961 can reduce the gloss or cause streaking in the surrounding gel coat. Note: When used as an overspray, PATCHAID® 970C961 does not require initiator. For PATCHAID® 970C961 to provide an efficient seal, it must be sprayed as a film rather than a dust coat. Do not flood it on or spray it too thick. After PATCHAID® 970C961 has been applied, remove all tape and masking materials.

The preferred method of curing the patch is to heat the patch area using an infrared lamp. Heat should be applied to the patch within 10 minutes of spray. Setup the lamp to maintain the patch area at 110-120°F. At this temperature, the patch area should be just warm to the touch. Do not overheat the patch or surrounding part. Use of heat can cause additional surface distortion and fiber pattern near the patched area. Maintain the patch area at temperature for 1 hour. Let cool before finishing.

If unable to heat the patch area, allow the patch to cure for a minimum of 8 hours at room temperature before

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finishing. Working in temperatures cooler than 77°F may require longer cure times. Before sanding, pre-buff the patch to help drive the cure and then allow the area to cool before finishing.

Finishing

Sand the patch using a sequence of increasingly finer grit sandpapers. A recommended sequence is 400-grit, 600-grit and 800-grit. For best results sanding should be done by hand with the 400-grit step done dry to remove any orange peel and the 600-grit to 800-grit steps done wet. A dual action sander can also be used. Wipe off sanding dust in between each step. After sanding with 800-grit sand paper, use water to remove all loose dust and grit.

Start buffing using a clean 100% wool pad using a medium grit compound. CCP has found that 3M™ Perfect-it™ III Compounding Pad with Imperial™ Compound and Finishing Material quickly removes scratches left by 800-grit sandpaper with the least amount of buffing and residual haze. Use this type of buffing pad and compound or its equivalent. Ideal buffing speeds are from 1700 RPM to 2400 RPM.

Always precondition a new/clean pad by pre-buffing with compound at low RPM's in order to 'wet' the fibers of the pad. Do not use excessive buffing pressure. Let the weight of the buffer do the work. Use plenty of compound to lubricate and cool the gel coat surface. As the compound begins to dry out, lighten up on the buffer. 'Spur' the buffing pad when it starts to glaze over or change to a new preconditioned pad. For best results, keep the buffing pad flat on the surface being buffed. Tilting the buffer can introduce swirl marks. Wipe or wash off all loose compound and grit. The IMEDGE® PCT100 or PCT110 coating may leave some 'coloring' on the buffing pad. This is a function of the pigment used and is not an indication of the degree of cure.

If needed, the patch area can be polished for added gloss. Use a clean white foam waffle pad and medium grit compound. CCP has found that 3M™ Perfect-it™ Foam Compounding Pad with 3M™ Finesse-It™ II Compound and Polishing Material gives good results. Use this type of polishing pad and compound or its equivalent. Slow buffer speed to 1500-2000 rpm. It is also critical to keep the compound wet on the repair area to prevent re-scratching the surface. Water can be added for this purpose. After buffing, thoroughly wipe the area to remove all traces of finishing glaze and residue. Wax the patch area using a light-stable, exterior protective paste wax.

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Halo Reduction

The occurrence of halo or a dark rim around the patch is a common issue encountered when patching. Some steps that can be taken to reduce halo are as follows:

1. Use a coarser grit sand paper (150 to 180) to prepare the repair area.
2. Sand to a hard line at the edge of the repair area. A hard line for sanding can be created with masking tape.

Spray the patch to a hard line. The patch edge should be slightly inside of the sanded area. A hard line for patch spray can be created by putting a tapeline approximately 1/16th to 1/8th inch inside of the sanding preparation area hard line. An example is shown in Figure 1.

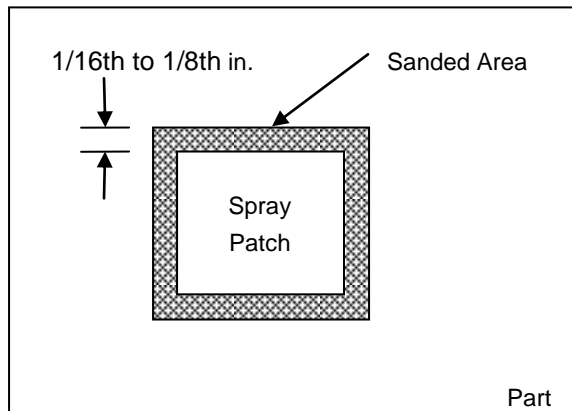


Figure 1. Schematic of Spray Patch Preparation

1. Remove all tape and masking materials. Allow patch to cure as described in the Spray Patch Application section.
2. Start sanding with a coarser grit (400-grit dry) and focus on the center of the patch. Be careful not to concentrate directly on the patch edge since this will create a depression that frames the patch area. Using the coarser grit, sand from the center of the patch out to beyond the patch edge by 0.5 to 1.0 inch. The purpose is to use the 400-grit to sand out the marks of the original 150 to 180-grit used to prep the patch area. Continue sanding with the coarser grit until the patch area is evenly smooth and the patch edge is barely detectable by feel – meaning there is no raised bump going from the non-patch area to the patch area.
3. Continue sanding with finer grits (600 and 800-grit wet) and eventually buffing and polishing. With each succeeding finer grit sandpaper, the repair edge will be moved out a little further, by 0.5 to 1.0 inch each time. Each succeeding finer grit needs to sand out the marks of the previous coarser grit. The original 2x2 inch patch can grow to a 5x5 inch area by the completion of the sanding process.

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Caution

IMEDGE® PCT100 and PCT110 Series products may not be compatible in the liquid state with certain isophthalic coatings or with isophthalic resins. Spray and pumping equipment must be completely clean of these coatings or resins before the IMEDGE® PCT100 and PCT110 Series can be used.

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

Storage

Un-catalyzed, IMEDGE® PCT100 and PCT110 products 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. 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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(Rev. 01/12)