

STYPOL® 040-8085
RTM RESIN FOR COSMETIC QUALITY PARTS

DESCRIPTION:

CCP's STYPOL® 040-8085 is an unsaturated polyester resin containing styrene monomer. This resin is a low-shrink polymer that yields high quality cosmetic parts without the use of a low profile additive. STYPOL® 040-8085 is designed to cure with different peroxide catalysts for different gel and cure scenarios. This flexibility allows optimum cycle times to be established for different classes of parts.

FEATURES AND BENEFITS:

- ▶ Superior surface cosmetics with gel coat
- ▶ Resistance to fiberglass pattern print-through
- ▶ Minimal mold build-up due to polystyrene/release agent residue
- ▶ High heat distortion temperature
- ▶ Low exotherm temperature for moderate thicknesses
- ▶ Rapid production rates
- ▶ Various gel times with different catalysts

USES:

STYPOL® 040-8085 is formulated specifically for RTM (Resin Transfer Molding). It is designed for moderately rapid production cycles of 10 minutes to 40 minutes without gel coat, or 1 to 2 hours with gel coat. The resin exhibits excellent mold release characteristics with minimal mold buildup due to polystyrene and/or mold release residue. It may be used as is or with filler and/or pigment. Fillers such as calcium carbonate, calcium sulfate or alumina trihydrate may be used from 20 to 50% by weight. Proper and allowable filler ranges are dependent upon part and mold design.

RTM is an economical closed molding process that is ideally suited to replace open mold processes for many parts. For production runs of over 1000 parts, RTM can be a lower cost manufacturing process than open molding. In addition, RTM offers zero emissions of Hazardous Air Pollutants (HAPs) during the molding process.

RELATED PRODUCTS:

STYPOL® 040-8086 is a slower curing version of STYPOL® 040-8085. STYPOL® 040-8086 is designed specifically for Light RTM (laminar shell resin transfer molding) and provides enhanced cosmetic quality

-

08/01

Copyright 2001 by

COOK COMPOSITES AND POLYMERS

P.O. Box 419389, Kansas City, MO 64141-6389

(816) 391-6000 Fax: (816) 391-6215

www.ccponline.com

TYPICAL LIQUID PROPERTIES:

These values are nominal properties that are listed for reference only. Particular batches will vary within normal manufacturing tolerances because storage conditions, temperature changes, age, and testing equipment (type and procedure) can each have a significant effect on the results. Resin properties that vary from these nominal values can perform in an acceptable manner. Final suitability of this product is in the end use performance.

<u>Test</u>	<u>Value</u>
Viscosity at 77°F, Brookfield LVF #3 Spindle @ 50 rpm	125 cP
Weight per Gallon	9.0 lbs.
Non-Volatile Material	64%
Flash Point	31°C (88°F)
Raectivity @ 77°F (25°C) with 1.25% DDM-9	
Gel Time, Cup, 100g	10 minutes
Peak Exotherm, Cup, 100g	350°F

CURE:

It is recommended that gel time be checked in the customer's plant, as age, temperature, humidity and catalyst will produce varied gel times.

This resin is designed to cure with various catalyst systems. For the quickest cure, Acetyl Acetone Peroxide (AAP, also known as 2,4-Pentanedione Peroxide) should be used. For thicker parts and /or hot weather conditions, an AAP/CHP (cumene hydroperoxide) blend should be used. For a slightly longer gel and cure time, a standard MEK peroxide should be used. Under hot weather conditions, a CHP blended MEKP should be used. Use of CHP blended catalysts for thin sections or during cool weather conditions can result in an inadequate cure at low catalyzation levels. Use of straight CHP catalyst is not recommended.

To maximize mold life, part exotherm temperatures must be kept within the limits of the tooling materials. For a typical polyester gel coat and resin mold, exotherm temperatures should be kept in the 120°F to 140°F range. To achieve this, any given part design should have a reasonable thickness consistency. For thin parts, the thickness should range between 0.060 inch and 0.14 inch. For moderate parts, thickness should range within 0.12 inch to 0.18 inch. For thick parts, thickness should range within 0.16 inch and 0.25 inch. This is necessary to ensure sufficient cure in thin areas of the part without building excessive heat in thicker sections. These thicknesses do not include the thicknesses of embedded (but nonreactive) cores such as balsa, plywood or PVC foam.

Refer to the following chart for catalyst recommendations. The catalyst level should not exceed the maximum nor fall below the minimum recommendations for most instances. This will help to ensure proper cure. However, part thickness influences cure, so the following is only a guide. Quality control and nominal reactivity is established with 1.25% DDM-9 at 77°F.

This product should not be used when temperature conditions are below 60°F, as curing may be adversely affected.

The following table presents typical 100 gram mass gel time ranges for STYPOL® 040-8085 resin using various peroxide initiators:

Peroxide Type	NORAC	ATOFINA	Min,%	Max,%	Gel Time@ 1.25%/77°F
AAP	AZOX	224	0.8	2.3	4-8 minutes
AAP/CHP Blend	750		0.9	2.4	6-10 minutes
MEKP		DDM-9	0.9	2.5	8-12 minutes
MEKP/CHP Blend	MCP-75		1.2	2.6	10-14 minutes

PHYSICAL PROPERTIES:

Polyesters do not develop ultimate physicals properties right away. Time and/or heat are needed to reach full cure. Heat may come from internal exotherm or external sources. The amount of catalyst will influence the extent of cure. With time and/or heat, a “moderate cure” will develop into “ultimate” physical properties.

When the part reaches ultimate cure depends upon time, temperature and satisfactory catalyzation. Too much or too little catalyst can result in permanent under-cure, which cannot be overcome. Practically speaking, serviceable cure time will range from overnight to a week and occasionally longer due to various circumstances. Small, properly catalyzed, thin laminates that do not exotherm and do not receive external heat may take months or more to achieve ultimate physicals. Sufficient external heat can reduce the cure time to less than a day.

Typical physical properties for STYPOL® 040-8085 are presented in the following table. Specimens were initiated with 1.25% AAP (Norox AZOX) at 77°F, cured overnight at room temperature (77°F), postcured for 1 hour at 187°F (86°C), and 2 hours at 248°F (120°C). The laminates were produced with chopped strand mat at 30 wt% glass.

<u>Test</u>	<u>Casting</u>	<u>Laminate</u>	<u>Test Method</u>
Barcol Hardness	40	45	ASTM D-2583
Tensile Strength	6.80 ksi	12.0 ksi	ASTM D-638
Tensile Modulus	0.63 msi	1.30 msi	ASTM D-638
Tensile Elongation		1.40%	ASTM D-638
Flexural Strength	10.0 ksi	22.2 ksi	ASTM D-790
Flexural Modulus	0.60 msi	1.02 msi	ASTM D-790
Heat Distortion Temp @ 264 psi	185°F	N/A	ASTM D-648

CAUTION:

Do not add any material, other than the recommended fillers, pigments and methyl ethyl ketone peroxide (MEKP), acetyl acetone peroxide (AAP), or mixtures of cumene hydroperoxide (CHP) and either MEKP or AAP. Acetyl acetone peroxide is another name for 2,4-pentanedione peroxide; *do not confuse 2,4-pentanedione peroxide with 2,4-pentanedione.*

STORAGE LIMITATIONS:

Uncatalyzed, standard cure polyester products have a storage 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.

SHIPPING:

Shipment is made in 5-gallon pails, standard 55-gallon, closed head steel drums or tank wagons.

MD 08/01

POLYESTER SAFETY INFORMATION**(Revised 09/00, supersedes 06/92)**

All sales of products manufactured by Cook Composites and Polymers Co. (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 polyester 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 polyester 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) has reclassified styrene as Group 2B, "possibly carcinogenic to humans." This new classification is 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 has 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 polyester 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.

If the label or Material Safety Data Sheet indicates lead or lead chromate is present, do not use on toys, furniture or surfaces that might be chewed by children. Wash hands thoroughly after using and before smoking or eating. Long-term overexposure by inhalation or ingestion of mists and dusts from products containing lead compounds and lead chromate can cause harmful effects to the urinary, blood, reproductive and nervous systems and may create risk of cancer. Use a respirator as explained in Paragraph 4 of this Information Sheet.

Some polyester 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, 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.

Polyester 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 polyester 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.

--

WARRANTY, DISCLAIMER, AND LIMITATION OF LIABILITY**(Rev. 06/01, supersedes 8/14/95)**

The products sold hereunder shall meet Seller's applicable specifications at the time of shipment. Seller's specifications may be subject to change at any time without notice to Buyer. Buyer must give Seller notice in writing of any alleged defect covered by this warranty (together with all identifying details, including the Product Code(s), description and date of purchase) within thirty (30) days of the date of shipment of the product or prior to the expiration of the shipment's quality life, whichever occurs first. **THE WARRANTY DESCRIBED HEREIN SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE; THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.**

The Buyer's sole and exclusive remedy against Seller shall be for the replacement of the product or refund of the purchase price in the event that a defective condition of the product should be found to exist by Seller. **NO OTHER REMEDY (INCLUDING, BUT NOT LIMITED TO, INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR LOST PROFITS, LOST SALES, INJURY TO PERSON OR PROPERTY, OR ANY OTHER INCIDENTAL OR CONSEQUENTIAL LOSS) SHALL BE AVAILABLE TO THE BUYER.**

The sole purpose of this exclusive remedy shall be to provide Buyer with replacement of the product or refund of the purchase price of the product if any defect in material or workmanship is found to exist. This exclusive remedy shall not be deemed to have failed its essential purpose so long as Seller is willing and able to replace the defective products or refund the purchase price.

To the best of our knowledge, the information contained herein is accurate.

Final determination of the suitability of the material for the use contemplated, the manner of use and whether the suggested use infringes any patents is the sole responsibility of the buyer.