PRODUCT BULLETIN

July 2021

*Opti*MOLD® II 040-8060, 040-8070

*Opti*MOLD® II Low Profile Tooling Resins

DESCRIPTION

*Opti*MOLD® II is a unique, two-component, low profile resin system. *Opti*MOLD® II is designed for tooling applications. Its low shrink properties allow for construction of molds with superior surface profile and dimensional stability.

BENEFITS & FEATURES

- Fast tool building
- Superior glass wet-out
- Lower viscosity
- Pre-promoted
- Low shrink
- Excellent dimensional stability
- Superior laminate mechanical properties
- Components are pre-weighed and packaged
- Lowered required laminate exotherm
- Extended shelf life

PROPERTIES – LIQUID

Property(1)	**Unit**	***Opti*MOLD® II Neat Resin**(4)	***Opti*MOLD® II Filled Resin**(5)
Color	-	Clear, Blue/Green	-
Viscosity(2)	cps	85	285
Gel Time(3)	minutes	17	18
Gel to Peak	minutes	10	12
Peak Exotherm	°C/°F	210/410	160/320
Weight per Gallon	lbs/gal	8.47 lbs 040-8060 = 8.55 lbs 040-8070 = 7.93 lbs	11.1 lbs

1) All properties at 25°C/77°F unless otherwise noted
2) Brookfield Viscometer LVF Spindle #2 at 30 RPM
3) 1.0% Arkema Luperox® DHD-9
4) Neat Resin: 85% 040-8060 and 040-8070
5) Filled Resin (by weight): 51 parts 040-8060, 9 parts 040-8070, and 40 parts Alumina Trihydrate (ATH)

PROPERTIES – PHYSICAL

Property[1]	Unit	*Opti*MOLD® II[2]	Test Method
Tensile Strength	psi	13,000	ASTM D 638
Tensile Modulus	psi	1,226,000	ASTM D 638
Tensile Elongation	%	1.8%	ASTM D 638
Flexure Strength	psi	17,000	ASTM D 790
Flexure Modulus	psi	710,000	ASTM D 790
Heat Deflection Temperature[3] (at 264 psi)	°C/°F	86/186	ASTM D 648
Linear Shrinkage[3]	inches/inch	0.0	ASTM D 256
Hardness, Barcol Model 934-1	HB	47	ASTM D 2583
Filler Content	%	40	-
Glass Content	%	25	-
Izod Impact	ft-lb/in	18	ASTM D 256

1) Physical properties were determined using internal Polynt test methods that are similar to those listed above.
2) Filled resin (by weight): 51 parts 040-8060, 9 parts 040-8070, and 40 parts Alumina Trihydrate (ATH)
3) Filled resin without fiber reinforcement

APPLICATION

A. Mixing

*Opti*MOLD® II is designed for the production of reinforced fiberglass molds. *Opti*MOLD® II is packaged in drums containing 255 pounds of 040-8060 resin so that a 45-pound pail of 040-8070 LPA and 200 pounds of filler (four 50-pound bags) may be added in the drum. A mix ratio of 51% by weight of 040-8060 and 9% by weight of 040-8070 to 40% by weight filler is required. For optimal physical properties, use the following fillers: R. J. Marshall A-208 (www.rjmarshall.com) or J. M. Huber SB-432 (www.huber.com).

To mix a batch at the proper mix ratio:

1. Add one pail (45 pounds) of 040-8070 to the drum (255 pounds) of 040-8060 and mix.

   If less than a full drum (500 pounds) is required, use the following table to determine the weight of each component:

To obtain X pounds of Filled Mix	040-8060	040-8070	ATH Filler
10	5.10	0.90	4.00
20	10.20	1.80	8.00
30	15.30	2.70	12.00
40	20.40	3.60	16.00
50	25.50	4.50	20.00
60	30.60	5.40	24.00
70	35.70	6.30	28.00
80	40.80	7.20	32.00
90	45.90	8.10	36.00
100	51.00	9.00	40.00
200	102.00	18.00	80.00
300	153.00	27.00	120.00
400	204.00	36.00	160.00
500	255.00	45.00	200.00

2. Add ATH filler (200 pounds or as directed by table above) to the mixture in the drum slowly under gentle agitation using a large paddle mixer.

   Do not overmix. Overmixing increases the tendency to sag. The resin should be mixed 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. High shear mixing is neither required nor desired. A bunghole mixer will not adequately mix in the filler, resulting in clumps of unmixed (dry) filler on the mold.

3. After the filler appears to be mixed in, scrape the sides of the container to remove dry filler.

4. Continue mixing for 30 minutes to allow small particles of filler to completely wet.

   Make sure that all filler is thoroughly wet with resin prior to use. Use of the mix prior to wetting of the filler can result in localized, soft, filler-rich areas in the laminate.

Filled mix should be used the same day it is made to prevent the possibility of settling. The mix should be kept under constant gentle agitation to avoid filler settling. If the material sits overnight, the filler will settle and will be difficult to re-disperse. The mixture should be used within 2-3 days. After three days, increased viscosity, extended gel time, and loss of shrinkage control may result.

B. Laminating

A fiberglass master will give best performance. We recommend only well cured fiberglass masters or masters made from *Opti*MOLD®. The mold should not be built directly from the plug. Wood or putties should be avoided, since the exotherm developed by the *Opti*MOLD® system during cure is high enough to distort some substrates. Masters made from aluminum, steel, or other metals will reduce the exothermic properties necessary for proper *Opti*MOLD® cure.

Laminating with *Opti*MOLD® II should be performed at temperatures between 75-90°F (24-32°C). Successful application is possible at temperatures outside of this range but will require specific adjustments in laminate thickness and catalyst level to keep exotherm temperatures within specification. Temperatures of all materials and process items should be between 75-90°F (24-32°C). This includes the master mold, resin, and glass roving, in addition to the ambient room temperature. Temperatures outside this range increase the likelihood of poor cure, excessive shrinkage, or laminate expansion, and the resultant substandard cosmetic quality is increased.

The cure rate of polyester resins depends on a number of factors including the product's age, temperature, catalyst type, catalyst level and ambient humidity. When used in a laminating application, the laminate cure rate also depends on reinforcement content and laminate thickness as well as other factors. For these reasons, we recommend that customers check the cure rate in their plant.

*Opti*MOLD® II is quality control tested using United Initiators NOROX® MEKP-925. Arkema Luperox® DHD-9 and Pergan Hi-Point® 90 are expected to yield similar performances. Cumene hydroperoxide (CHP) and MEKP blends are not recommended.

The catalyst level should not exceed 1.75% or fall below 1.25% for proper cure. A catalyst level of 1.5% at 77°F is considered ideal.

A standard resin pump with a catalyst slave pump provides catalyst adjustments based upon volume, not weight. Since the *Opti*MOLD® II is filled with ATH and ATH is nonreactive, the true catalyst ratio by weight is different from the volume ratio marked on the equipment. The table provides a cross reference between the catalyst percentage by volume and the true catalyst percentage by weight for the *Opti*MOLD® II system.

Catalyst % by Volume	Catalyst % by Weight
0.90	1.27
0.95	1.34
1.00	1.41
1.05	1.48
1.10	1.55
1.15	1.62
1.20	1.69
1.25	1.77

For *Opti*MOLD® II tooling resins, glass content should be between 22-28% by weight. The ideal glass content is 25% by weight. Lower glass content will result in excessive exotherm temperatures and could cause expansion of the laminate. Higher glass content will result in lower exotherm temperatures and may cause poor cure or excessive shrinkage.

Lamination should begin only after the second layer of tooling gel coat or barrier coat has cured 60-90 minutes or up to a maximum of 3 hours. A 0.040-0.060" (40-60 mil) skin coat laminate must be applied and cured to the recommended Barcol hardness before applying *Opti*MOLD® II. The recommended skin coat laminates are STYPOL® 040-4339, an isophthalic skin resin, and ARMORSTAR® VSXH-2210, a higher performance, epoxy-modified polyester skin resin. The time elements are dependent upon room temperature, air movement, humidity, catalyst type, and concentration.

The *Opti*MOLD® II lamination procedure is:

1. Apply a mist coating of resin to the work zone.

- A typical work zone ranges from 25-100 square feet, depending upon the number of laminators and ambient temperature conditions.

2. Apply 0.040" (40 mils) of gun chop to the work zone for the first lamination pass against the skin coat.

3. Roll the first pass to eliminate all air.

4. Once rolled and before gelation, apply another pass of 0.130-0.170" (130-170 mils) of gun chop to the work zone.

5. Roll this second pass for consolidation.

- A slow-motion rolling approach with a light touch helps to consolidate the material and helps to avoid just pushing the material around.

6. Cover neighboring work zones in a similar manner, maintaining a 'wet edge' between work zones.

7. Allow this 0.170-0.210" (170-210 mils) thick lamination to gel and cure, approximately 30-60 minutes from application to each work zone. The laminate should exotherm at 110-140°F (43-60°C) and turn uniformly tan-white in approximately 60 minutes.

- Times in excess of 90 minutes suggest a reduced or poor cure, and subsequent warpage and post-curing of the mold may occur.

- An infrared thermometer should be used to monitor laminate exotherm.

8. Apply additional *Opti*MOLD® II laminations until the design mold thickness is achieved.

- Each lamination can begin once the mold temperature returns to near ambient temperature (comfortable to touch).

- Subsequent laminations do not require the 0.040" (40 mil) pass, although applying material in two passes does facilitate rolling and accuracy of laminate thickness.

- The entire laminate layer thickness can be applied after the mist coating of resin for each subsequent lamination.

For best results, the entire *Opti*MOLD® II mold laminate should be applied on the same workday. Spotty interlaminar adhesion may result if one lamination is allowed to cure too completely. When delays are required, a commercially available two component urethane adhesion promoter should be used to achieve a good secondary bond. Follow the manufacturer's directions.

Refer to Polynt's Composites Applications Guide ("Cookbook") for equipment and application recommendations. Each user must determine the suitability of this product to his/her particular mode of operation and intended end-use application. A Polynt representative will be available to assist in the proper selection of all Polynt-Reichhold products available for commercial use.

SHELF LIFE & STORAGE

The shelf life of *Opti*MOLD® II 040-8060 is 120 days from the date of manufacture from Polynt. The shelf life of *Opti*MOLD® II 040-8070 is 180 days from the date of manufacture from Polynt. To maximize usage life and maintain optimum properties, resins and gel coats should be stored in the original closed container at temperatures below 23°C/73°F and away from ignition sources and sunlight. Keep containers sealed to prevent moisture pick-up and monomer loss.

Mixed *Opti*MOLD® II 040-8060 and *Opti*MOLD® II 040-8070 should be used within 2-3 days. Use of mixed *Opti*MOLD® II 040-8060 and *Opti*MOLD® II 040-8070 after 3 days could result in extended gel times and loss of shrinkage control.

RELATED PRODUCTS

POLYCOR® 945 Series Tooling Gel Coats
POLYCOR® 965 Series Tooling Gel Coats
ARMORGUARD® 967 Series Barrier Coats
ARMORSTAR® VSXH-2210 Skin Coat Resin
STYPOL® 040-4339 Skin Coat Resin

SAFETY & WARRANTY

To receive a copy of our safety and warranty information, please email safetyandwarranty@polynt.com.