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Advanced Materials

RP 6453-1 Resin / Hardener System

PARTS IN MINUTES® POLYURETHANE
FLAME RETARDANT (UL 94-VO AT 1/8")
MEDIUM FLEXURAL MODULUS PROTOTYPE SYSTEM
FOR MACHINE DISPENSING

DESCRIPTION :

RP 6453-1 system is formulated to rapidly produce prototype parts from low cost tooling. Silicon, polyurethane or epoxy molds can be used. The cured castings pass UL 94-VO at 1/8" thickness and exhibit thermoplastic-like properties including high-impact strength, thermal resistance, and good dimensional stability. When this fast-setting polyurethane system is combined with meter-mix dispensing equipment, large parts can be efficiently cycled in 15 to 30 minutes.

APPLICATIONS :

For fast production of complex prototype parts and other limited production parts series. RP 6453-1 R/H System simulates high-density polyethylene, polypropylene, and ABS.

ADVANTAGES :

- Fast cure for rapid-part turnaround
- Excellent combination of izod impact resistance and heat resistance
- Produce durable short-run and prototype parts
- Pass UL-VO @ 1/8" thickness

ACCESSORIES :

Use RenPIM® Color Pastes for the best coloring results. Other coloring materials may not be compatible with this product and yield undesirable results.

MIX RATIO :

By weight :	65 to 100	Resin to Hardener
By volume :	65 to 100	Resin to Hardener

Mixing Instructions : This highly reactive system is best suited for use employing a meter mix dispensing system or suitable cartridges/static mixer system. Your technical sales representative is available to discuss the requirements for dispensing this material.

Simple silicone, polyurethane or epoxy molds can be used for molding the RP 6453-1 system. Mold design and construction for small parts can be for pressure-free casting. Large parts will require reinforced tooling.

TYPICAL HANDLING PROPERTIES :

Tested @ 77 °F (25 °C) unless otherwise noted.

Property	**Criteria**	**ASTM Test Method**	**Test Value**
Color	Resin	Visual	Amber
	Hardener		Cream
	Cured		Buff
Specific Gravity	Resin	D-1963	1.20
	Hardener		1.18
Viscosity, cP	Resin	D-2393	200
	Hardener		2,400
Gel time (150 g)		D-2471	50 to 70 seconds

Note : These physical properties are reported as typical test values obtained by our test laboratory. If assistance is needed in establishing product specifications, please consult with our Quality Control Department.

PROCESSING :

Static mixer recommendations for general purpose, all around use :

Overall Length	**Outside Diameter**	**Inside Element Diameter**	**Number of Elements**
9.5”	0.370	0.250	32

Unacceptable results may be obtained with other static mixers. Evaluate different mixers carefully for suitability. Always make sure the fillers in RP 6453-1 hardener are completely suspended before use. Otherwise optimum performance will not be obtained.

Specialty static mixers are available from the following companies among others :

Michael Engineering Limited (989) 772-4073
Plas-Pac Industries, Inc. (860) 889-3383

SHOOT TIME :

It is important to know if your pumping equipment has the capacity to shoot the required part :

Estimated Maximum Shoot Time 1.25 – 1.75 minutes

Part Shoot Time (min.)* = Part Weight (lb.) ÷ Pumping Capacity (lb./min.)

If the Part Shoot Time does not fall within the parameters for this product, increase the capacity of the dispensing equipment or select a Part In Minutes® Polyurethane with a more suitable Shoot Time. See the Part In Minutes® Polyurethane Selector Guide for more information.

Determine part weight by taking part dimensions from a drawing and calculating the weight based on a Part In Minutes® Polyurethane density of 77 lb/ft^3. If a master model exists, it can be weighed and the prototype part weight estimated by comparing the densities of the Part In Minutes® Polyurethane vs. the material used in the master.

Determine pumping capacity of the meter-mixing equipment by shooting polyurethane into an empty cup for a specified time period. Then, calculate the pounds dispensed per minute.

* Actual pumping time may take up to 10 to 20 % longer than the calculated time because the equipment injection rate may slow down as the tool fills with polyurethane.

DEMOLD TIME :

Temperature	**Time**	**Thickness**
77 °F (25 °C)	15 – 30 minutes	1/8”

RECOMMENDED CURE SCHEDULE :

Options	**Temperature**	**Time**
1	77 °F (25 °C)	7 days
2	176 °F (80 °C)	14 hours

Curing Instructions : Parts can be cured unsupported at room temperature. This system requires a post-cure for development of maximum physical properties. After demolding at room temperature, the parts should be post-cured and supported for 14 hours at 176 °F (80 °C).

Some silicone rubber mold materials inhibit the cure of polyurethanes. In general, fewer incompatibility problems occur with platinum-catalyzed silicone rubber mold materials than with tin-catalyzed systems. To be absolutely sure compatibility of each silicone and polyurethane combination should be checked in your shop before proceeding to the tool building stage. For this testing, cast the polyurethane selected into a small silicone-rubber test mold to check for proper cure. The silicone systems must be fully cured to manufacturers’ recommendations. This is especially important with tin-catalyzed systems, which give off alcohol on curing which must evaporate from the mold before use.

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TYPICAL CURED PROPERTIES :

Tested @ 77 °F (25 °C) unless otherwise noted

Property	ASTM Test Method	Test Values[1]	Test Values[2]
Density, lb/ft^3 (g/cm^3)	D-792	77 (1.24)	77 (1.23)
Cubic inch per pound		22.3	22.5
Hardness, Shore D	D-2240	70	75
Flexural Strength, at yield, psi	D-790	7,600	8,300
Flexural Modulus, psi	D-790	240,000	230,000
Ultimate Tensile Strength, psi	D-638	4,600	5,800
Tensile Modulus, psi	D-638	230,000	250,000
% Elongation	D-638	6.0	7.4
Tg by DMA, E", °F (°C)	D-4065	193 (90)	258 (126)
Deflection Temperature, °F (°C) 66 psi	D-648	186 (86)	232 (111)
264 psi		158 (70)	219 (104)
Ultimate Compressive Strength, psi	D-695	11,000	12,000
Compressive Modulus, psi	D-695	250,000	250,000
Izod Impact, notched, ft-lb./in	D-256	0.46	0.45
Coefficient of Thermal Expansion	D-3386		
-22° to 86 °F, in/in/°F		69 x 10^{-6}	63 x 10^{-6}
-30° to 30 °C, in/in/°C		124 x 10^{-6}	113 x 10^{-6}
Flame Test, 5x0.5x0.125" specimen	UL 94V-O	Pass	Pass

[1] Cured 7 days @ 77 °F (25 °C)
[2] Cured 24 hours @ 77 °F (25 °C) plus 14 hours @ 176 °F (80°C)

PACKAGING :

Unit		***Weight***
5 gallon	Resin	26 lb.
5 gallon	Hardener	40 lb.

STORAGE :

Store at 70 to 90 °F. This product is moisture-sensitive and packaged under a blanket of dry nitrogen. Maintain factory seal, after use re-blanket with dry nitrogen and tightly reseal.

CONDITIONING :

RP 6453-1 System
This product may crystallize upon storage. If crystallized, vent container and heat to 125 – 145 °F until crystals dissolve. Stir well after product has liquefied.

If heating of products in plastic packaging is necessary, heat in a ventilated oven to 145 °F maximum. Before heating, loosen the container lid slightly to relieve any pressure buildup and place container to be heated into a metal bucket of sufficient volume to contain the product should the container tip over or leak.

RP 6453-1 Hardener
Stir well before use. This material will separate.

HANDLING :

Work in a well-ventilated area and use clean, dry tools for mixing and applying. For a two-component system, combine the resin and hardener according to mix ratio. Mix together thoroughly and use immediately after mixing. Material temperature should not be below 65 °F (18 °C) when mixing.

SHELF LIFE :

Provided this material is stored under the recommended storage conditions in the original container, it will remain in useable condition for at least one year from date of shipping.

SAFETY :

Do not use or handle this product until the Material Safety Data Sheet has been read and understood.

RP 6453-1 Resin
WARNING.Harmful if inhaled. Causes skin and eye irritation. Cause allergic skin and respiratory reaction.

Avoid contact with eyes, skin and clothing.
Avoid breathing vapor or mist.
Avoid prolonged or repeating contact with skin.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

RP 6453-1 Hardener
DANGER. CORROSIVE. Causes skin burns. Causes eye irritation. Harmful if swallowed or absorbed through the skin.

Do not get in eyes, on skin, and on clothing.
Avoid breathing vapor or mist.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

FIRST AID :

In case of contact

Skin : Immediately wash with soap and water. Remove contaminated clothing and launder before reuse. Destroy contaminated shoes.
Eyes : Immediately flush with water for at least 15 minutes. Call a physician.
Ingestion : If conscious, give plenty of water to drink. Do not induce vomiting. Call a physician.
Inhalation : Remove to fresh air. Administer oxygen or artificial respiration if necessary. Call a physician.
Other : Referral to physician is recommended if there is any question about the seriousness of any injury.

PRECAUTIONARY NOTE :

Thermosetting systems generate heat when curing. The amount of heat and the period of time in which heat is released vary significantly between systems. Additionally, ambient or compound temperature, amount of material mixed, and construction and shape of the mold or container can also be factors in the temperature profile of a mixed system. In some cases, the thermosetting reaction can be vigorous, generation heat sufficient to cause decomposition of the system with subsequent liberation of large volumes of acrid smoke.

A good rule of thumb is never mix more material than can be applied during the stated pot life or gel time. Also take care when using materials in applications other than stated on the product Data Sheet, i.e., a laminating resin for casting.

Please feel welcome to call our Product Information Department or your local Ren representative for instructions before you start your job.

Caution To protect against any potential health risks presented by our products, the use of proper personal protective equipment (PPE) is recommended. Eye and skin protection is normally advised. Respiratory protection may be needed if mechanical ventilation is not available or is insufficient to remove vapors. For detailed PPE recommendations and exposure control options consult the product MSDS or a Huntsman EHS representative.

IMPORTANT LEGAL NOTICE

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