



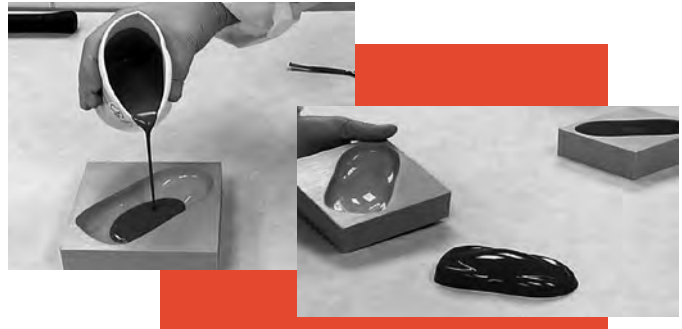
# Liquid Tooling Materials

## Repro Fast-Cast Polyurethanes

Repro Fast-Cast Polyurethanes are world-renowned as the leading class of quick-curing casting resin systems available today. These products are designed for ease of mixing, quick demolding, and unsurpassed accuracy. Repro is manufactured by Freeman and has become the standard that all other fast-setting castable urethanes are measured against.

### Repro features:

- One to one mix ratio by weight or volume
- Very low shrinkage
- Low viscosity ensuring easy pouring characteristics and excellent surface reproduction



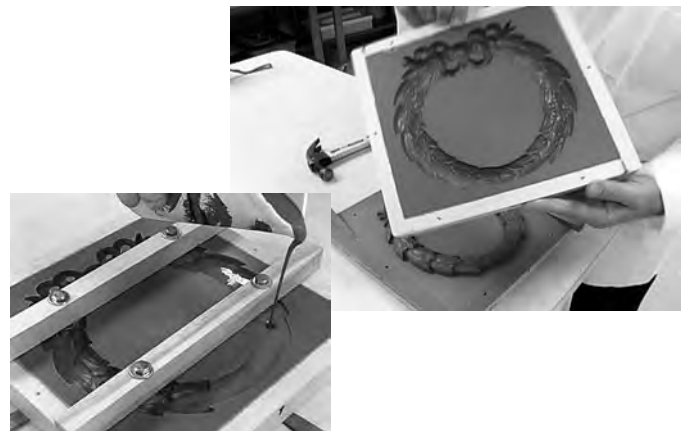
## Repro Fast-Cast Polyurethanes Specifications

	Mix Ratio (by wt or vol.)	Gel Time (min.) @ 77°F	Demold Time (min.) @ 77°F	Hardness (Shore D)	Specific Gravity	Mixed Viscosity (cP) @ 1 min.	Volumetric Yield (cu. in./lb.)	Shrinkage (in./in.)*	Compressive Strength (psi)	Flexural Strength (psi)	Flexural Modulus (psi)	Tensile Strength (psi)	Tensile Modulus (psi)	IZOD Impact Strength (ft. lbs./in.)	Heat Deflection Temp. @ 66 psi	Heat Deflection Temp. @ 26.4 psi	Coefficient Thermal Expansion (in/in/°F)
Repro One	1:1	6-7	60 - 90	87	1.75	1,500	15.8	0.001	7,860	4,290	799,000	2,350	582,000	0.30	156°F/69°C		1.79 x 10 <sup>-5</sup>
Repro 83	1:1	6-7	60 - 90	84	1.9	1,100	14.5	0.001	6,470	5,140	939,000	3,130	941,000	0.31	135°F/57°C	131°F/55°C	–
Repro NS	1:1	6-7	60 - 90	84	1.9	1,750	14.5	0.001	5,970	2,990	–	1,710	–	0.35	142°F/61°C	133°F/56°C	1.45 x 10 <sup>-5</sup>
Repro Fast	1:1	4-5	15 - 30	84	1.9	1,100	14.5	0.002	6,470	5,140	939,000	3,130	941,000	0.31	135°F/57°C	131°F/55°C	–
Repro 10	1:1	5-6	30 - 60	84	1.9	1,100	14.5	0.001	6,470	5,140	939,000	3,130	941,000	0.31	135°F/57°C	131°F/55°C	–
Repro Slow	1:1	12-14	3 - 4 hr	84	1.9	1,100	14.5	0.001	6,470	5,140	939,000	3,130	941,000	0.31	135°F/57°C	131°F/55°C	–
Repro Light	1:1	6-8	90 - 120	68	0.9	1,500	30.0	0.001	3,980	2,620	347,000	1,530	350,000	0.15	132°F/56°C	118°F/48°C	3.50 x 10 <sup>-5</sup>
Repro Ultra Light	1:1	10-11	2 - 3 hr	55	0.59	1,400	47.0	0.001	2,700	1,840	160,000	1,490	72,400	0.12	128°F/53°C	119°F/48°C	4.18 x 10 <sup>-5</sup>
Repro 95	1:1	6-7	60 - 90	84	1.9	1,450	14.5	0.001	7,140	3,070	505,000	1,770	561,000	0.29	131°F/55°C	117°F/47°C	3.13 x 10 <sup>-5</sup>
Surface Coat	1:1	13	3 - 4 hr	84	1.9	6,000	14.5	–	–	–	–	–	–	–	–	–	–
Laminating Resin	1:1	15	3 - 4 hr	84	1.9	3,500	14.5	–	–	–	–	–	–	–	–	–	–
ASTM Tests								D-2566	D-695	D-790	D-790	D-638	D-638	D-256	D-648	D-648	D-696-88

\*Dependant upon mass.

## Choosing a Repro Formulation

Criteria	Product
Balance of Features	Repro 83
Higher Temperatures	Repro One, Repro NS
Speed	Repro Fast, Repro 10
Accuracy	Repro Slow
Light Weight	Repro Light, Repro Ultra Light
Machinability	Repro 95, Repro Ultra Light
Large Size	Repro Surface Coat and Laminating Resin



## Repro Fast-Cast Polyurethanes [CONT'D.]

### Repro One

- Our most advanced fast-cast urethane
- 6-7 Min Gel Time
- 60-90 Min Demold

Repro One is the latest formulation in our extensive line of fast-cast urethanes. This castable polyurethane can be used in durable foundry tooling, thermoforming applications, mold making, as well as most general plastic casting applications.



#### Additional Advantages:

- Higher heat resistance for elevated temperature applications
- Higher Shore D hardness for improved abrasion resistance
- Lower moisture sensitivity for void-free castings
- Improved release characteristics for easier demold
- Lower density for greater volume yield
- Non-settling formulation for fast and easy mixing
- Compatible with expanded polystyrene (Styrofoam)

Catalog Number	Description	Availability	Net Wt. (Lbs.)
053090	Repro One – Gray	Quart Unit	5
053093	Repro One – Gray	Gallon Unit	20
053095	Repro One – Gray	5 Gallon Unit	100

### Repro 83

- 6-7 Min Gel Time
- 60-90 Min Demold

Repro 83 is our most popular tooling urethane with a great balance of speed and accuracy. This castable polyurethane is used extensively in foundry and thermoforming applications, mold making, and in most general plastic casting applications. Offered in a choice of blue, gray, or white.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
053150	Repro 83 – White	Quart Unit	5
053156	Repro 83 – White	Gallon Unit	20
053152	Repro 83 – Blue	Quart Unit	5
053158	Repro 83 – Blue	Gallon Unit	20
053164	Repro 83 – Blue	5 Gallon Unit	100
053154	Repro 83 – Gray	Quart Unit	5
053160	Repro 83 – Gray	Gallon Unit	20
053166	Repro 83 – Gray	5 Gallon Unit	100

### Repro NS (Non-Settling)

- 6-7 Min Gel Time
- 60-90 Min Demold

Repro NS features a non-settling additive that eliminates filler “hard-packing” and dramatically reduces the time required to pre-mix the material for use. Shakers and mixers are no longer required – simply stir with a paint paddle!

It is formulated to match the color, mix ratio, work time, low shrinkage, and surface hardness of our most popular fast cast product, Repro 83. However, Repro NS offers a higher temperature resistance. Therefore, like Repro 83, it is used in foundry and thermoforming applications, mold making, and in most general plastic casting applications.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
053153	Repro NS – Blue	Quart Unit	5
053159	Repro NS – Blue	Gallon Unit	20
053165	Repro NS – Blue	5 Gallon Unit	100

### Repro Fast

- 4-5 Min Gel Time
- 15-30 Min Demold

Formulated to have the shortest demold time of all of the Repro products for maximum part production. Repro Fast is the best choice when time is most important.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
053181	Repro Fast – Tan	Quart Unit	5
053183	Repro Fast – Tan	Gallon Unit	20
053184	Repro Fast – Tan	5 Gallon Unit	100

### Repro 10

- 5-6 Min Gel Time
- 30-60 Min Demold

The original Repro formulation, this product has a slightly longer work time, longer demold time, and less shrinkage than Repro Fast.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
053060	Repro 10 – Tan	Quart Unit	5
053064	Repro 10 – Tan	Gallon Unit	20
053062	Repro 10 – Black	Quart Unit	5
053066	Repro 10 – Black	Gallon Unit	20

### Repro Slow

- Highest level of accuracy available
- 12-14 Min Gel Time
- 3-4 Hr. Demold

Our most accurate fast-cast polyurethane system, Repro Slow features extremely low shrinkage and an extended work time that allows for the creation of larger tools.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
053201	Repro Slow – Tan	Gallon Unit	20
053202	Repro Slow – Tan	5 Gallon Unit	100

### Repro Light

- ½ the weight of Repro 83
- 6-8 Min Gel Time
- 90-120 Min Demold

Repro Light is a versatile castable urethane that is approximately one half the weight of our other Repro products. This material, which is colored brown, can be used for lightweight tools, backfill applications, and as an adhesive for many urethane modeling boards. Its hardness and color is an almost exact match to the popular tooling board RenShape 450. This material also offers lower internal porosity compared to competitive products. Repro Light offers easy machinability and can be readily worked and carved with hand tools.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
053197	Repro Light – Brown	Quart Unit	2.5
053198	Repro Light – Brown	Gallon Unit	10
053199	Repro Light – Brown	5 Gallon Unit	50



## Repro Fast-Cast Polyurethanes [CONT'D.]

### Repro Ultra Light

- 1/3 the Weight of Repro 83
- 10-11 Min Gel Time
- 2-3 Hr. Demold

A unique castable urethane, Repro Ultra Light is a very low-density, syntactic polyurethane casting resin designed for weight critical applications and easy machinability. This cream colored formulation may be worked with hand tools or CNC machining equipment when cured. A long work time allows for large, accurate castings.

Like Repro Light, this material offers a low internal porosity that produces an excellent machined surface finish. Repro Ultra Light is also an excellent choice to use as a hardness-matched adhesive for RenShape urethane foam boards.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
053196	Repro Ultra Light – Cream	Gallon Unit	7
053200	Repro Ultra Light – Cream	5 Gallon Unit	35

### Repro 95

- Aluminum-Filled
- 6-7 Min Gel Time
- 60-90 Min Demold

Repro 95 is a unique castable polyurethane featuring a high aluminum content which provides excellent machining and polishing characteristics. This casting resin has a gray metal-like appearance and is ideal for prototype thermoforming and wax injection mold applications for investment casting.



#### Unique Advantages:

- Dense, non-porous surface even after machining
- Reduced tool wear compared to standard fast-cast materials when machining
- The ultra-smooth finish of the material, even after machining, allows for easy sand release in pattern and core box applications

Catalog Number	Description	Availability	Net Wt. (Lbs.)
053051	Repro 95 – Gray	Quart Unit	5
053052	Repro 95 – Gray	Gallon Unit	20

### Repro Surface Coat & Laminating Resin System

- 13 Min Gel Time (Surface Coat)
- 15 Min Gel Time (Laminating Resin)
- 3-4 Hr. Demold (Complete Tool)

A Freeman exclusive! The Repro Surface Coat and Laminating System is a low-cost, fast, and very accurate alternative to traditional epoxy fiberglass tooling. Although this tooling urethane is not designed to be used in high-temperature or high-wear applications, Repro Surface Coat and Laminating Resin is the ideal material choice for many larger moldmaking applications. Both materials are white in color.

#### Additional Advantages:

- Low exotherm system provides for very low-shrinkage tools. System will not get hot even in thick applications.
- Quick three hour demold time versus 24 hour cure time for epoxy systems.
- Very easy system to use for first time toolmakers.
- Both the surface coat and laminating resin will adhere to material that has previously been cured.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
053188	Repro Surface Coat – White	Quart Unit	5
053189	Repro Surface Coat – White	Gallon Unit	20
053194	Repro Laminating Resin – White	Gallon Unit	20
053195	Repro Laminating Resin – White	5 Gallon Unit	100
054073	1/4" Fiberglass Strand	Box	5
054071	1/4" Fiberglass Strand	Box	50

#### SEE ALSO

Product	Page No.
Tooling Plastics Fillers	48-49
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Pattern Coatings (Primers, Paints & Sealers)	102-103
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Freeman 302 Urethane Protectant	109

## Pro-Cast Fast-Cast Polyurethanes

These urethanes are highly filled, very hard (84 Shore D), fast setting, low exotherm, low shrink, and low cost for producing foundry patterns, molds, fixtures, prototype vacuum form molds, or prototypes.

### Pro-Cast 10

- 6-10 Minute Gel Time
- 30-60 Minute Demold

This fast-setting, low-shrinkage polyurethane also features a low viscosity to reproduce fine detail. Ideal for producing prototype parts, molds and fixtures, foundry patterns, and core boxes.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056361	Procast 10 – Black	Gallon Unit	20
056362	Procast 10 – Tan	Gallon Unit	20

### Pro-Cast 20

- 7-10 Minute Gel Time
- 60-90 Minute Demold

This fast-setting, low-shrinkage polyurethane features a cured hardness of 85 Shore D. Ideal for molds, patterns and core boxes.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
056364	Procast 20 – Gray	Gallon Unit	20
056365	Procast 20 – White	Gallon Unit	20
056363	Procast 20 – Blue	Gallon Unit	20

### Pro-Cast 3-33

- 7-10 Minute Gel Time
- 60-90 Minute Demold

A low viscosity, fast setting, rigid polyurethane. This material, which is green in color, may be used to create patterns, coreboxes, and vacuum-form tools.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056366	Procast 3-33 – Green	Gallon Unit	20

### Pro-Cast 132

- 5-7 Minute Gel Time
- 30-60 Minute Demold

Formerly RenCast 132. This durable, fast-curing polyurethane offers accurate reproductions with fine detail. Good for producing holding fixtures, foundry patterns and vacuum-forming molds.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056347	ProCast 132 – Gray	Gallon Unit	20

### Pro-Cast Tool

- 10 Minute Gel Time
- 60-90 Minute Demold

Formerly Pur-Fect Tool. Pro-Cast Tool is a fast-curing, gray polyurethane with a cured hardness of 85 Shore D that requires no specialized mixing equipment to disperse the fillers. Ideal for molds, patterns, and core boxes.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056345	Pro-Cast Tool – Gray	Gallon Unit	20

## Ren Fast-Cast Urethane Systems

### RenCast 205-3

- 9-10 Minute Gel Time
- 60-90 Minute Demold
- 80D-85D Shore Hardness (w/DT 082 Filler)



This three-component, polyurethane casting system features good dimensional stability, low shrink, and rapid cure.

The addition of DT 082 (1:1:3 ratio) makes this material ideal for foundry patterns, pattern plates, core boxes, cores, gating, risers, prototypes, jigs and fixtures.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056320	RenCast 205-3 – Tan	Gallon Unit	15
056321	RenCast 205-3 Resin Only	5 Gallon	38
056322	Ren 205-3 Hardener Only	5 Gallon	38
056236	Ren DT 082 High Density Filler	5 Gallon	33

### RenCast 6426-1

- 7-8 Minute Gel Time
- 60-120 Minute Demold
- 60D-65D Shore Hardness (w/DT 081 Filler)
- 70D-80D Shore Hardness (w/DT 082 Filler)

This unique three-component polyurethane features ease of mixing, good surface reproduction and excellent physical properties. Demold time is 60 to 120 minutes depending upon mass and cure temperature.

Depending upon product application, either DT-081 Low Density (1:1:1 ratio) or DT-082 High Density (1:1:3 ratio) fillers can be used with RenCast 6426-1 (sold separately).

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056203	RenCast 6426-1 – Gray	Gallon Unit	18
056235	Ren DT 081 Low Density Filler	50 lb. Bag	50
056236	Ren DT 082 High Density Filler	5 Gallon	33

### RenCast 3265

- 3 Minute Gel Time
- 15-30 Minute Demold
- 78D Shore Hardness

This two component fast cast urethane features a fast demold time of 15 to 30 minutes, permitting multiple parts to be made in one day. This product is highly filled for low shrinkage and good wear resistance.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056103	Ren 3265 Hardner Only	6 Quarts	18
056101	RenCast 3265 Resin Only	6 Quarts	18



## Polyurethane Elastomers – Intermediate Cure

These hand pourable urethanes offer a wide range of hardnesses and working times, and can be demolded in as little as 30 minutes to two hours enabling the production of multiple thermoplastic-like prototypes and short run end use parts per day.



### Polyurethane Elastomers – Intermediate Cure Specifications

	Mix Ratio Resin: Hardener (by wt.)	Mix Ratio Resin: Hardener (by vol.)	Gel Time (min.) @ 72°F	Demold Time (hours) @ 72°F	Hardness (Shore D)	Viscosity R/H or Mixed (cps)	Density (g/cc)	Volumetric Yield (cu. in. / lb.)	Shrink (in/in)	Compressive Strength (psi)	Flexural Strength (psi)	Tensile Strength (psi)	Flexural Modulus (psi)	Deflection Temp. (°F)	Izod Impact (ft.lb/in.)	Tg per DMA (°F)
<b>Freeman 1070</b>	100:92	1:1	3	15-30 min	70	80	1.05	26.6	0.004	–	–	3000	–	–	–	–
<b>Freeman 1080 Fast</b>	117:100	1:1	7	1-3	80	150	1.12	24.7	0.001	8,300	9,500	6,650	2.88 x 105	134	–	–
<b>Freeman 1080 Slow</b>	117:100	1:1	20	2-4	80	150	1.12	24.7	0.001	8,300	9,500	6,650	2.88 x 105	134	–	–
<b>Freeman 1085</b>	1:1	1:1	6	1/2 - 2	69	80	1.12	24.7	0.002	4,880	5,600	3,300	1.7 x 105	137	–	–
<b>Freeman 1090 Fast</b>	100:90	1:1	9	1/2 - 4	80	600	1.04	26.7	0.001	–	11,000	2,500	–	–	–	–
<b>Freeman 1090 Slow</b>	100:90	1:1	20	16	80	600	1.04	26.7	0.001	–	11,000	2,500	–	–	–	–
<b>RenCast 6432-1</b>	100:50	100:50	5-6	1-2	72	50/1,100	1.09	25.4	–	7,200	8,600	5,900	234,000	163	0.6	153
<b>RenCast 6463 Fast</b>	1:1	1:1	4-6	4-6	79	280/700	1.09	25.4	–	6,800	10,800	5,700	230,000	152	1.1	–
<b>RenCast 6486 Slow</b>	100:50	100:50	7-8	8	67	7,800/75	1.16	23.9	–	–	4,800	3,600	110,000	156	6.6	217
<b>RenCast 6491</b>	1:1	89:100	4-5	4-6	85	200/640	1.14	24.3	–	33,500	16,000	8,600	400,000	205	0.8	224
<b>RenCast 6496</b>	1:1	89:100	5-6	2-4	68	–	1.10	25.2	–	–	–	4,000	110,000	140	0.8	–
<b>RenCast 6497</b>	1:1	–	4-5	2	70A	–	1.10	25.2	–	–	–	995	–	–	–	–
<b>ASTM</b>	–	–	D-2471	–	D-2240	D-2393	D-792	D-792	D-2566	D-695	D-790	D-638	D-790	D-648	D256	D4065

### Freeman 1070 – Off-White

- 3 Min Gel Time | 15-30 Min Demold
- 70D Shore Hardness

This off-white urethane elastomer is able to be hand mixed and poured to create parts that simulate injection molded plastic. Freeman 1070 is economical and features very low viscosity and low moisture sensitivity. A demold time of 15 to 30 minutes enables many parts to be poured in one day without the expenditure for a meter-mix machine. Castable to 1/2" in thickness.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055500	Freeman 1070	Pint Unit	2
055406	Freeman 1070	Gallon Unit	15.4

### Freeman 1080 – White

- 7 Min or 20 Min Gel Time | 1-3 Hr. or 2-4 Hr. Demold
- 80D Shore Hardness

This brilliant white urethane elastomer offers two gel times, 7 minutes with a fast hardener and 20 minutes with the slow hardener. Both materials feature a 1:1 mix ratio by volume, a low viscosity for pouring thin-walled parts, and sufficient time to degas. The Freeman 1080 Fast can be demolded within 1-3 hours and the Slow can be demolded within 2-4 hours. Castable to 1/2" in thickness.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055409	Freeman 1080 Fast	Gallon Unit	16
055410	Freeman 1080 Fast	5 Gallon Unit	80
055419	Freeman 1080 Slow	Pint Unit	2
055412	Freeman 1080 Slow	Gallon Unit	16
055411	Freeman 1080 Slow	5 Gallon Unit	80

### Freeman 1085 – Tan

- 6 Min Gel Time | 30-120 Min Demold
- 69D Shore Hardness

Freeman 1085 is an economical, tan colored urethane elastomer that is suitable for creating prototype injection molded parts. This product is easy to use because of a 1:1 mix ratio by weight or volume, low moisture sensitivity low viscosity for easy pouring, and can be cast to 1 1/2" thick.



Catalog Number	Description	Available	Net Wt. (Lbs.)
055502	Freeman 1085	Pint Unit	2
055127	Freeman 1085	Gallon Unit	15.2
055125	Freeman 1085 Resin Only	5 Gallon	38
055126	Freeman 1085 Hardener Only	5 Gallon	38



## Polyurethane Elastomers – Intermediate Cure [CONTD.]

### Freeman 1090 – Clear

- 9 Min or 20 Min Gel Time
- ½-4 Hr. or 16 Hr. Demold
- 80D Shore Hardness

Freeman 1090 is a water clear urethane elastomer that is ideal for creating parts which require near-perfect clarity.

This product is available in both a fast formulation which has a demold time of a half hour to four hours, as well as a slow formulation (for pouring larger parts) which requires a 16 hour cure before demolding. Both feature a one to one mix ratio and low mixed viscosity which makes it excellent for pouring thin-walled parts.

Freeman 1090 Fast may be cast up to ½" thick and the Freeman 1090 Slow may be cast up to 3" thick.

Note: Part thickness greatly affects the curing rate of Freeman 1090. Thin-walled parts may require a post cure. Permit the material to solidify at room temperature and then heat cure the part in the mold at 110 to 150F for two to six hours. After cooling, the part is ready to demold.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
055440	Freeman 1090 Fast	Gallon Unit	15.2
055417	Freeman 1090 Slow	Pint Unit	2
055415	Freeman 1090 Slow	Gallon Unit	15.2

### RenCast 6432-1 – Off-White

- 5-6 Min Gel Time
- 1-2 Hr. Demold
- 72D Shore Hardness

RenCast 6432-1 is a low viscosity polyurethane casting system for simulating injection molded plastic parts. The five to six minute gel time permits hand mixing and pouring, yet the parts are demoldable in one to two hours. This enables production of multiple parts in one day without the expense of a meter-mix machine.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056678	RenCast 6432-1	Gallon Unit	13.8
056679	RenCast 6432-1 Resin Only	5 Gallon	37.5
056680	RenCast 6432-1 Hardener Only	5 Gallon	37.5

\*Please note that two 5 gallon pails of resin are required for each 5 gallon pail of hardener to provide the correct mix ratio.

### RenCast 6463 Fast – Clear

- 4-6 Min Gel Time
- 4-6 Hr. Demold
- 79D Shore Hardness

Designed for production of crystal clear, durable, short run, and rapid prototyping parts using low cost tooling and hand mix and meter-mixing equipment. The low mixed viscosity helps produce quality parts. This material features a one-to-one mix ratio by weight or volume.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056643	RenCast 6463 Fast	Gallon Unit	14

### RenCast 6486 Slow – Amber

- 7-8 Min Gel Time
- 8 Hr. Demold
- 67D Shore Hardness

An extremely tough material which features a notched IZOD impact strength over 6 ft.lb./in. This system is designed to closely simulate the performance characteristics of polyethylene and polypropylene. Long gel time for making large parts.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
056634	RenCast 6486 Slow	Gallon Unit	12

### RenCast 6491 – Amber

- 4-5 Min Gel Time
- 4-6 Hr. Demold
- 85D Shore Hardness

RenCast 6491 is specifically designed for simulating ABS parts. A flexural modulus of 400,000 psi and impact resistance of 1.2 ft.lb./in. gives this product an excellent combination of rigidity & durability. Heat resistance is 224°F Tg by DMA.

Catalog Number	Description	Available	Net Wt. (Lbs.)
056675	RenCast 6491	Gallon Unit	16

### RenCast 6496 – White

- 5-6 Min Gel Time
- 2-4 Hr. Demold
- 68D Shore Hardness

RenCast 6496 is a non-mercury polyurethane system which closely simulates polyethylene and TPO. A five to six minute gel time enables hand mixing and pouring, but the product cures in two to four hours. Ideal for simulating thermoplastic parts.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056687	RenCast 6496	Gallon Unit	14

### RenCast 6497 – Amber

- 4-5 Min Gel Time
- 2 Hr. Demold
- 70A Shore Hardness

RenCast 6497 is an amber colored flexible polyurethane casting system used to produce rubber-like parts quickly and easily. A four to five minute gel time permits hand mixing and pouring, yet the rapid cure enables multiple parts to be made in one day without the use of a meter-mix machine. Ideal for making rubber-like parts and molds requiring flexibility.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056723	RenCast 6497	Gallon Unit	16

SEE ALSO:	Product	Page No.
	Mixing Cups and Paddles	109
	Freeman Color Tints	49



## Polyurethane Elastomers – Overnight Cure – Flexible

Urethane rubber is generally less expensive than silicone rubber and more abrasion resistant, making it a preferred material for concrete and architectural castings. However, flexible urethanes are not self-releasing and therefore require a more thorough procedure (wax and PVA) to facilitate clean and easy part release.



### Overnight Cure Flexible Polyurethane Specifications

	Mix Ratio Resin: Hardener (by wt.)	Mix Ratio Resin: Hardener (by vol.)	Gel Time (Min) @ 72° F	Demold Time (hours) @ 72° F	Hardness (Shore)	Mixed Viscosity (cps)	Density (g/cc)	Volumetric Yield (cu. in./lb.)	Shrink (in./in.)	Tensile Strength (psi)	Tear Strength (psi)	Elongation (%)	Tear, Die C (PLI)	Tear, Split (PLI)
Freeman 1035	1:1	1:1	30	16	35A	1,500	1.02	27.2	0.001	450	–	–	–	–
Freeman 1035T	80:100	1:1	20	16	40A	Thixotropic	1.17	23.6	–	–	–	–	–	–
Freeman 1040	10:100	9:100	28	16	52A	1,350	1.04	26.6	0.001	1,190	110	410	–	–
RenCast 6400-1	10:100	9:100	30	16	52A	1,300	1.04	26.6	0.001	1,260	112	420	–	–
RenCast 6401-1	25:100	22:100	20	16	65A	1,000	1.07	25.9	0.0005	1,820	171	340	–	–
RenCast 6410-1	100:100	93:100	30	16	37A	1,200	1.04	26.6	0.003	505	74	330	–	–
RenCast 6434	25:100	25:100	17	16	35 - 40A	500	1.16	24.0	0.001	1,100	120	500	–	–
Por-A-Mold S111	100:88	1:1	20	16	20A	2,000	1.29	21.5	0.001	211	–	500	51	8.1
Por-A-Mold S333	100:89	1:1	20	16	35A	1,500	1.11	24.9	0.001	400	–	450	78	9
Por-A-Mold S333TA	–	1:1	30	24	35A	Thixotropic	–	–	–	–	–	–	–	–
Por-A-Mold S555	100:80	1:1	15-20	16	50A	7,500	1.20	23.0	0.001	415	–	250	88	12
Por-A-Mold SX50-1	1:1	1:1	20	16	50A	2,000	1.03	26.9	0.001	1,200	–	450	147	20
ASTM	–	–	D-2471	–	D-2240	D-2393	D-792	D-792	D-2566	D-638	D-624	D-638		

### Freeman 1035 – Beige

- Castable to 2" in Thickness
- 30 Min Gel Time | 16 Hr. Demold
- 35A Shore Hardness

This flexible material is excellent for making molds with deep undercuts or where a flexible mold makes demolding easier. This economical urethane features a one to one mix ratio by weight or volume, making mixing easy and convenient.



Catalog Number	Description	Available	Net Wt. (Lbs.)
055129	Freeman 1035	Pint Unit	2
055401	Freeman 1035	Gallon Unit	16
055402	Freeman 1035	5 Gallon Unit	80

### Freeman 1035T – Beige

- Brushable for Creating Glove Molds
- 20 Min Gel Time | 16 Hr. Demold
- 40A Shore Hardness

This flexible urethane features a thick viscosity which enables it to be brushed over the surface of larger models or patterns without sagging or flowing from vertical surfaces. By applying several coats, a flexible "skin" may be created and subsequently reinforced with a back-up structure to offer support during use.

Catalog Number	Description	Available	Net Wt. (Lbs.)
055404	Freeman 1035T	Gallon	18

### Freeman 1040 – Off-White

- Castable to 2" in Thickness
- 28 Min Gel Time | 16 Hr. Demold
- 52A Shore Hardness

This flexible urethane is an excellent low-cost alternative to RTV silicone rubber mold making materials. Like most castable urethane rubber systems, it is ideal for general flexible mold construction, flexible parts and gaskets, plaster casting, and prototypes. Freeman 1040 flows easily and features a high tear strength.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055130	Freeman 1040	Gallon Unit	8.8
055131	Freeman 1040 Resin Only	2 Quarts	4
055132	Freeman 1040 Hardener Only	5 Gallons	40

### RenCast 6400-1 – Off-White

- Castable to 1.5" in Thickness
- 30 Min Gel Time | 16 Hr. Demold
- 52A Shore Hardness

Features outstanding tear strength and elongation. Molds made of RenCast 6401-1 can be flexed and stretched, allowing for easy removal of parts.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056530	RenCast 6400-1	Gallon Unit	8.79
056531	RenCast 6400-1 Resin Only	2 Quarts	4
056532	Ren 6400-1 Hardener Only	5 Gallons	40

## Polyurethane Elastomers – Overnight Cure – Flexible [CONT'D.]

### RenCast 6401-1 – Off-White

- Castable to 4" in Thickness
- 20 Min Gel Time | 16 Hr. Demold
- 65A Shore Hardness

Ideal for producing very flexible molds and resilient parts. Features one to one mix ratio by weight and low viscosity.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
056527	RenCast 6401-1	Gallon Unit	10
056528	RenCast 6401-1 Resin Only	Gallon	9
056529	Ren 6401-1 Hardener Only	5 Gallon	36

### RenCast 6434 – Light Amber

- Castable to 1" in Thickness
- 17 Min Gel Time | 16 Hr. Demold
- 8-40A Shore Hardness

The most flexible of Huntsman's urethanes. Its hardness may be varied from 8 to 40 Shore A by the addition of Additive-6434.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056328	RenCast 6434	Gallon Unit	10
056332	Additive 6434	5 Gallon	42

### Ren Accelerator 178-62

This liquid catalyst will accelerate the curing process, and reduce demold times. Accelerator 178-62 should be mixed thoroughly in the hardener before adding the required amount of resin.

For use only with polyurethanes RenCast 6400-1, RenCast 6401-1, RenCast 6402-1, RenCast 6403-1, RenCast 6405, RenCast 6410-1, RenCast 6419, and Freeman 1040. Please read the Technical Data Sheet for mixing instructions before using this material.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056556	Ren Accelerator 178-62	Quart	1.7

### Por-A-Mold S111 – Off-White

- Castable to 2" in Thickness
- 20 Min Gel Time | 16 Hr. Demold
- 20A Shore Hardness

This flexible urethane is used to make molds of detailed master that contain moderately deep undercuts. The most common uses include architectural and sculpture reproductions, taxidermy, prototypes, and general moldmaking applications. This economical material features a 1:1 mix ratio by volume for easy use.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
057531	Por-A-Mold S111	Gallon Unit	19

### Por-A-Mold S333 – Blue

- Castable to 2" in Thickness
- 20 Min Gel Time | 16 Hr. Demold
- 35A Shore Hardness

This flexible urethane is used to make molds of detailed masters that contain shallow undercuts. The most common uses include architectural and sculpture reproductions, taxidermy, prototypes, and general moldmaking applications. This economical material features a 1:1 mix ratio by volume for easy use.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
057337	Por-A-Mold S333	Quart Unit	4.6
057538	Por-A-Mold S333	Gallon Unit	18.5

### Por-A-Mold S333TA – Blue

- Brushable for Creating Glove Molds
- 30 Min Gel Time | 24 Hr. Demold
- 35A Shore Hardness

S333TA is a thixotropic version of the S333 that is thick enough to be applied with a brush or trowel. This provides an inexpensive and easy method for creating a flexible rubber mold of large masters. This flexible "skin" may be reinforced with rigid materials to support the rubber part for molding.

Number	Description	Availability	Net Wt. (Lbs.)
057342	Por-A-Mold S333TA	Quart Unit	4.8

### Por-A-Mold S555 – Pink

- Castable to 2" in Thickness
- 15-20 Min Gel Time | 16 Hr. Demold
- 50A Shore Hardness

This flexible urethane is used to make molds of detailed masters that do not contain undercuts. This pink rubber features a 1:1 mix ratio by volume and is used for architectural and sculpture reproductions, taxidermy, prototypes, and general mold making applications.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
057348	Por-A-Mold S555	Gallon Unit	22
057349	Por-A-Mold S555	5 Gallon Unit	99

### Por-A-Mold SX50-1 – Beige

- Castable to 2" in Thickness
- 20 Min Gel Time | 16 Hr. Demold
- 50A Shore Hardness

This flexible urethane is used to make molds of detailed masters that do not contain undercuts. This beige colored product is ideal for making concrete molds and form lines.

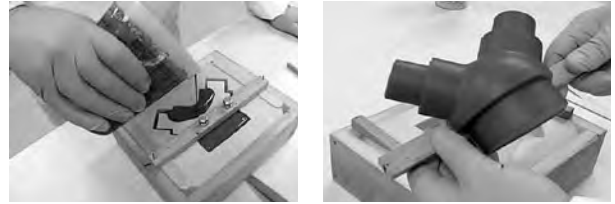
Catalog Number	Description	Availability	Net Wt. (Lbs.)
057541	Por-A-Mold SX50-1	Gallon Unit	16





## Polyurethane Elastomers – Overnight Cure – Semi-Rigid

Semi-rigid urethanes are known for their excellent impact strength and abrasion resistance, making them ideal for foundry tooling as well as semi-rigid part production.



### Overnight Cure Semi-Rigid Polyurethane Specifications

	Mix Ratio Resin: Hardener (by wt.)	Mix Ratio Resin: Hardener (by vol.)	Gel Time (Min) @ 72° F	Demold Time (hours) @ 72° F	Hardness (Shore)	Mixed Viscosity (cps)	Density (g/cc)	Volumetric Yield (cu. in./lb.)	Shrink (in./in.)	Tensile Strength (psi)	Tear Strength (psi)	Elongation (%)
Freeman 1050	1:1	100:94	26	16	85A	1,650	1.10	25.2	0.001	2,050	280	510
Freeman 1060	100:60	100:60	28	16	60D	2,600	1.05	26.4	0.001	3,200	545	320
Freeman 1066	100:50	100:50	15-17	2-4	65D	3,200	1.03	26.9	0.003	3,100	630	140
RenCast 6402-1	35:100	31:100	20	16	82A	900	1.08	25.6	0.001	2,200	180	320
RenCast 6403-1	50:100	44:100	15	16	92A	800	1.10	25.2	0.001	2,500	470	240
RenCast 6442	1:1	100:94	28	16	85A	1,600	1.09	25.4	0.001	2,100	290	525
RenCast 6443	100:60	100:60	18	16	95A	2,450	1.06	26.1	0.001	3,500	375	475
RenCast 6444	100:60	100:60	27	16	60D	2,500	1.05	26.4	0.001	3,400	550	325
RenCast 178-88/ Ren 6444	100:60	100:60	27	16	60D	2,500	1.05	26.4	0.001	3,400	550	325
Flexane 80 Liquid	100:30	-	30	-	87A	10,000	-	26.5	0.002	2,100	-	-
Flexane 94	100:45	-	10	-	97A	6,000	-	26.5	0.001	2,800	-	-
Por-A-Mold 2070	96:100	1:1	15	16	70A	2,650	1.06	26.2	0.001	1,468	-	443
ASTM	-	-	D-2471	-	D-2240	D-2393	D-792	D-792	D-2566	D-638	D-624	D-638

### Freeman 1050 – Amber

- Castable to 4" in Thickness
- 26 Min Gel Time | 16 Hr. Demold
- 85A Shore Hardness

Freeman 1050 is a tough, semi-flexible urethane that is ideal for creating molds requiring some degree of flexibility, as well as for producing semi-rigid prototypes and finished parts. A one to one mix ratio by weight. Its 26 minute gel time provides ample time to vacuum degas prior to pouring. Overnight demold time is required.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055142	Freeman 1050	Quart Unit	2.5
055141	Freeman 1050	Gallon Unit	10
055139	Freeman 1050 Resin only	5 Gallon	25
055140	Freeman 1050 Hardener only	5 Gallon	25

### Freeman 1060 – Red or Black

- Castable to 2" in Thickness
- 28 Min Gel Time | 16 Hr. Demold
- 60D Shore Hardness

This semi-rigid polyurethane casting resin is renowned throughout the industry for its excellent impact strength and abrasion resistance, particularly in foundry tooling and other modeling and prototyping applications requiring strength and durability.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
055108	Freeman 1060 Black	Quart Unit	2.5
055106	Freeman 1060 Black	Gallon Unit	10
055110	Freeman 1060 Red	Gallon Unit	10
055107A	Freeman 1060 Resin Only	5 Gallon	31.25
055107B	Freeman 1060 Black Hardener Only	5 Gallon	18.75
055111B	Freeman 1060 Red Hardener Only	5 Gallon	18.75
055116	Freeman 1060 Resin Only	55 Gallon	460
055117	Freeman 1060 Black Hardener Only	55 Gallon	280

### Freeman 1066 – Red or Black

- Castable to 2" in Thickness
- 15-17 Min Gel Time | 2-4 Hr. Demold
- 65D Shore Hardness

Freeman 1066 is a 65 Shore D polyurethane elastomer specifically designed for highly abrasive resistant foundry tooling. Harder than our Freeman 1060, this product will not deflect as much under high pressure molding processes. Plus, it has increased rigidity in thin wall sections and is able to be machined or sanded without softening. Freeman 1066 also features a fast demold time of two to four hours and a heat deflection temperature of 181°F.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055120	Freeman 1066 Black	Gallon Unit	9.75
055119	Freeman 1066 Red	Gallon Unit	9.75
055121	Freeman 1066 Resin Only	5 Gallon	32.5
055122	Freeman 1066 Black Hardener Only	5 Gallon	16.25
055118	Freeman 1066 Red Hardener Only	5 Gallon	16.25
055123	Freeman 1066 Resin Only	55 Gallon	420
055124	Freeman 1066 Black Hardener Only	55 Gallon	210
055112	Freeman 1066 Red Hardener Only	55 Gallon	210

### RenCast 6402-1 – Off White

- Castable to 1" in Thickness
- 20 Min Gel Time | 16 Hr. Demold
- 82A Shore Hardness

Ideal for production models, metal-forming pads, and a variety of mechanical parts.

Catalog Number	Description	Available	Net Wt. (Lbs.)
056533	RenCast 6402-1	Gallon Unit	7.75
056534	RenCast 6402-1 Resin Only	Gallon	9.1
056535	Ren 6402-1 Hardener Only	5 Gallon	26

## Polyurethane Elastomers – Overnight Cure – Semi-Rigid [CONT'D.]

### RenCast 6403-1 – Off White

- Castable to ½" in Thickness
- 15 Min Gel Time | 16 Hr. Demold
- 92A Shore Hardness

Ideal for metal-forming applications and parts such as impellers, rollers, gears and wheels. Features low viscosity, fast cure, high tensile strength and good load recovery.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056536	RenCast 6403-1	Gallon Unit	12
056537	RenCast 6403-1 Resin Only	5 Gallon	40
056538*	Ren 6403-1 Hardener Only	5 Gallon	40

\*Please note that two 5 gallon pails of hardener are required per each 5 gallon pail of resin to provide the correct mix ratio.

### RenCast 6442 – Light Amber

- Castable to 4" in Thickness
- 28 Min Gel Time | 16 Hr. Demold
- 85A Shore Hardness

Ideal for vibration-dampening applications as well as production and prototype parts. RenCast 6442 features one to one mix ratio by weight, long pot life, low viscosity and good wear resistance. 4" maximum thickness.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056542	RenCast 6442	Gallon Unit	13.8
056543	RenCast 6442 Resin Only	5 Gallon	40
056544	Ren 6442 Hardener Only	5 Gallon	40

### RenCast 6443 – Light Amber

- Castable to 2" in Thickness
- 19 Min Gel Time | 16 Hr. Demold
- 95A Shore Hardness

Used for foundry patterns and core boxes because it features good abrasion resistance and is moisture tolerant during casting. Cures semi-rigid in mass and is flexible in thin cross-sections.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056545	RenCast 6443	Gallon Unit	11.2
056546	RenCast 6443 Resin Only	5 Gallon	40
056547	Ren 6443 Hardener Only	5 Gallon	24

### RenCast 6444 – Light Amber

- Castable to 2" in Thickness
- 27 Min Gel Time | 16 Hr. Demold
- 60D Shore Hardness

A semi-rigid, amber-colored, elastomer for use where wear-resistance is required such as foundry patterns and core boxes. Features low viscosity and good working life allowing for ease of handling and release of entrapped air.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056521	RenCast 6444	Gallon Unit	11.2
056522	RenCast 6444 Resin Only	5 Gallon	40
056523	Ren 6444 Hardener Only	5 Gallon	24
056669	RenCast 6444 Resin Only	55 Gallon	460
056670	Ren 6444 Hardener Only	55 Gallon	276

### RenCast 178-88 / Ren 6444 – Red

- Castable to 2" in Thickness
- 27 Min Gel Time | 16 Hr. Demold
- 60D Shore Hardness

This is the red version of RenCast 6444 for foundry patterns. It uses the Ren 6444 hardener.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056519	RenCast 178-88 Resin Only	5 Gallon	40
056523	Ren 6444 Hardener Only	5 Gallon	24
056672	RenCast 178-88 Resin Only	55 Gallon	460
056670	Ren 6444 Hardener Only	55 Gallon	276

### Ren Accelerator 178-57

This liquid catalyst will accelerate the curing process and reduce demold times. Accelerator 178-57 should be mixed thoroughly in the hardener before adding the required amount of resin.

For use only with polyurethanes RenCast 6442, RenCast 6443, RenCast 6444, Freeman 1050, & Freeman 1060.

Please read the Technical Data Sheet for mixing instructions before using this material.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056557	Ren Accelerator 178-57	Quart	1.5

### Flexane® 80 – Black

- 30 Min Gel Time
- 87A Shore Hardness

Devcon Flexane 80 features low shrink and high chemical and abrasion resistance. It is ideal for creating flexible molds and holding fixtures. The Flex-Add additive may be used with Flexane 80 Liquid to produce a lower durometer castable urethane.

Catalog Number	Description	Net Wt. (Lbs.)
054625	Devcon Flexane 80 Liquid	1
054626	Devcon Flexane 80 Liquid	10
054642	Flex-Add Additive	8 fl.oz.

### Flexane® 94 – Black

- 10 Min Gel Time
- 97A Shore Hardness

Devcon Flexane 94 features low shrink and high chemical and abrasion resistance. It is a semi-rigid material for creating extremely tough, flexible molds and non-marring holding and assembly fixtures.

Catalog Number	Description	Net Wt. (Lbs.)
054627	Devcon Flexane 94 Liquid	1
054628	Devcon Flexane 94 Liquid	10

### Por-A-Mold 2070 – Amber

- Castable to 2" in Thickness
- 15 Min Gel Time | 16 Hr. Demold
- 70A Shore Hardness

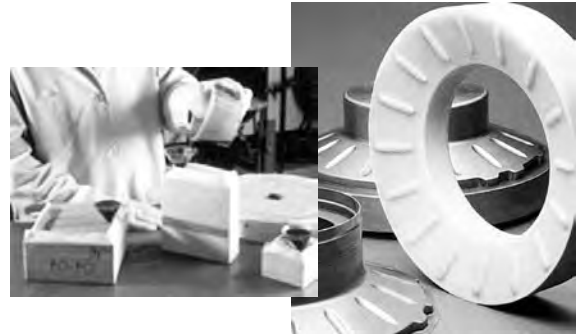
This semi-rigid urethane is used to make molds of detailed masters that do not contain undercuts. The most common uses include foundry patterns and core boxes, gaskets, liners, and fixtures. This economical material features a 1:1 mix ratio by volume for ease of use.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
057527	Por-A-Mold 2070	Gallon Unit	17.5



## Polyurethane Elastomers – Overnight Cure – Rigid

This selection of harder polyurethanes have a wide variety of end uses including prototyping thermoplastic-like parts, constructing molds for low volume metal forming applications, and making heat resistant foundry tooling. All of these products have a long gel time to provide the user sufficient time to vacuum degas prior to pouring. A 16-18 hour cure time is required before demolding.



### Overnight Cure Rigid Polyurethane Specifications

	Mix Ratio Resin: Hardener (by wt.)	Mix Ratio Resin: Hardener (by vol.)	Gel Time (Min) @ 72° F	Hardness (Shore D)	Mixed Viscosity (cps)	Density (g/cc)	Volumetric Yield (cu. in./lb.)	Shrink (in./in.)	Tensile Strength (psi)	Tear Strength (psi)	Elongation (%)
RenCast 6405	100:100	90:100	20	75	240	1.07	25.9	0.003	5,300	300	13.3
RenCast 6419	100:80	100:85	20	85	250	1.25	22.1	0.002	10,000	–	6.7
RenCast 6463 Slow	100:100	100:100	18-25	79	500	1.09	25.4	0.002	4,800	–	–
RenCast 6470	80:100	–	60-80	86	250-500	1.23	22.5	0.002	4,700	–	1.3
RenCast 178-59-1	36:100	50:100	20	88	4,000	1.61	17.2	0.001	5,500	–	–
ASTM			D-2471	D-2240	D-2393	D-792	D-792	D-2566	D-412	D-624	D-638

### RenCast 6405 – White

- Castable up to 1/2" in Thickness
- 20 Min Gel Time
- 75D Shore Hardness

Ideal for prototyping of injection molded or thermo-formed parts. Features low viscosity, minimal air entrapment, and easy mixing. RenCast 6405 produces a brilliant white colored part.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056270	RenCast 6405	Gallon Unit	16
056273	RenCast 6405 Resin Only	5 Gallon	38
056274	Ren 6405 Hardener Only	5 Gallon	38

### RenCast 6419 – Off White

- Castable up to 1/2" in Thickness
- 20 Min Gel Time
- 85D Shore Hardness

Developed specifically for prototyping, this elastomer passes UL94V-O at a thickness of .125 inches for flame retardency.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056550	RenCast 6419	Gallon Unit	15

### RenCast 6463 Slow – Clear

- Castable up to 1/2" in Thickness
- 18-25 Min Gel Time
- 79D Shore Hardness

Designed for production of crystal clear, durable, short run, and rapid prototyping parts using low cost tooling and hand mix and meter-mixing equipment. The 1:1 weight and volume mix ratio, combined with a low mixed viscosity, help produce high quality parts.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056581	RenCast 6463 Slow	Gallon Unit	14

### RenCast 6470 – Off White

- Castable up to 3/4" (or 10" with DT 082 Filler) in Thickness
- 60-80 Min Gel Time
- 85D Shore Hardness

A polyurethane casting system ideal for sheet metal forming tools, duplicate milling models, foundry pattern plates, vacuum-forming tools, negative molds/fixtures and large volume molds for the ceramic industry.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056559	RenCast 6470 Resin Only	5 Gallon	32
056560	Ren 6470 Hardener Only	5 Gallon	40
056236	Ren DT 082 High Density Filler	5 Gallon	33

### RenCast 178-59-1 – Red Brown

- Castable up to 1 1/2" in Thickness
- 22 Min Gel Time
- 85D Shore Hardness

A polyurethane that forms a very hard, durable, heat-resistant compound. Used in foundry applications with hot sand conditions.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056354	RenCast 178-59-1 Resin Only	5 Gallon	45
056355*	Ren 178-59-1 Hardener Only	5 Gallon	41

\*Please note that three 5 gallon pails of hardener are required per each 5 gallon pail of resin to provide the correct mix ratio.

### Ren Accelerator 178-62

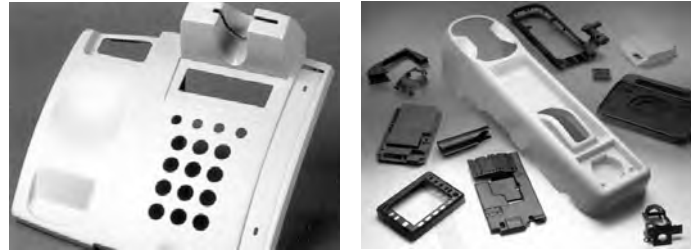
This liquid catalyst will accelerate the curing process, and reduce demold times. Accelerator 178-62 should be mixed thoroughly in the hardener before adding the required amount of resin.

For use only with polyurethanes RenCast 6400-1, RenCast 6401-1, RenCast 6402-1, RenCast 6403-1, RenCast 6405, RenCast 6410-1, and RenCast 6419. Please read the Technical Data Sheet for mixing instructions before using this material.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056556	Ren Accelerator 178-62	Quart	1.7

## Polyurethane Elastomers – Rapid Cure

This group of polyurethanes are used to produce parts that simulate the appearance and performance of injection molded thermoplastic parts. These products are low viscosity systems designed to be used with automated dispensing equipment (pg. 99) and low cost tooling. With their extremely fast gel times, these formulas permit demolding of durable parts in 15-45 minutes.



### Rapid Cure Polyurethane Elastomers Specifications

	Mix Ratio Resin: Hardener (by vol.)	Gel Time (seconds) @ 72° F	Demold Time (Min) @ 72° F	Viscosity Resin: Hardener (cps.)	Density (g/cc)	Ultimate Compressive Strength (psi)	Hardness (Shore D)	Ultimate Flexural Strength (psi)	Ultimate Tensile Strength (psi)	Flexural Modulus (psi)	Deflection Temp.* (264 psi) (°F)	Izod Impact (ft.lb./in.)	Tg per DMA (°F)
RenPIM 6450	67:100	45-65	15-30	170 / 1,600	1.16	23,100	77	7,000	4,900	184,000	208	0.9	306
RenPIM 6451	67:100	65-85	20-45	170 / 1,600	1.16	17,900	76	6,900	4,200	174,000	212	0.6	302
RenPIM 6452	67:100	50-70	15-30	30 / 1,600	1.16	22,300	79	7,900	4,300	198,000	162	0.8	252
RenPIM 6456	50:100	45-65	15-30	170 / 1,600	1.15	8,700	70	5,700	3,800	143,000	190	0.5	270
RenPIM 6458	100:100	35-60	15-30	75 / 400	1.21	14,500	86	16,500	10,200	432,000	129	0.9	190
RenPIM 6460	67:100	45-65	15-30	170 / 1,500	1.18	24,500	80	7,100	5,400	181,000	232	1.1	320
ASTM test				D2393	D792	D695	D2240	D790	D638	D790	D648	D256	D4065

#### RenPIM 6450 – Buff

- General Purpose Polyurethane
- 45-65 Second Gel Time
- 15-30 Minute Demold
- 77D Shore Hardness

Ideal for the casting of prototypes that weigh up to 10 lbs. Offers good dimensional stability, heat resistance and impact strength. Can be demolded in 15 to 30 minutes.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056553	RenPIM 6450 Iso (Resin)	5 Gallon	32
056554	RenPIM 6450 Polyol (Hardener)	5 Gallon	40

#### RenPIM 6451 – Black

- Slower Set General Purpose Polyurethane
- 65-85 Second Gel Time
- 20-45 Minute Demold
- 76D Shore Hardness

This material provides a slightly longer gel time for casting larger parts 16 to 22 lbs. Excellent high temperature performance (250°F) for prototype parts requiring heat resistance.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056568	RenPIM 6451 Iso (Resin)	5 Gallon	32
056596	RenPIM 6451 Polyol (Hardener)	5 Gallon	40

\*Buff colored Polyol is available by special order. Lead times and minimums apply.

#### RenPIM 6452 – Off-White

- High Flexural Modulus Polyurethane
- 50-70 Second Gel Time
- 15-30 Minute Demold
- 79D Shore Hardness

Ideal for the casting of prototypes that weigh up to 10 lbs in less than 30 minutes, this material offers good durability, compressive and flexural strengths.

Catalog Number	Description	Available	Net Wt. (Lbs.)
056571	RenPIM 6452 Iso (Resin)	5 Gallon	32
056572	RenPIM 6452 Polyol (Hardener)	5 Gallon	40

#### RenPIM 6456 – Black

- Medium Flexural Modulus Polyurethane
- 46-65 Second Gel Time
- 15-30 Minute Demold
- 70D Shore Hardness

Its 70D hardness is ideal for casting prototypes requiring polyethylene-like performance. Because of a 50:100 mix ratio, RenPIM 6456 can be dispensed from auto meter/mix equipment or dual-barrel cartridges.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056593	RenPIM 6456 Iso (Resin)	5 Gallon	24
056577	RenPIM 6456 Polyol (Hardener)	5 Gallon	40
056631	RenPIM 6456 Iso (Resin)	55 Gallon	270
056632	RenPIM 6456 Polyol (Hardener)	55 Gallon	450

#### RenPIM 6458 – Clear Amber

- Very High Flexural Modulus Polyurethane
- 35-60 Second Gel Time
- 15-30 Minute Demold
- 86D Shore Hardness

A fast-setting polyurethane with an outstanding flexural modulus of 432,000 psi, excellent flexural strength of 16,500 psi and good izod impact strength of 0.9 ft. lb./in.

Number	Description	Availability	Net Wt. (Lbs.)
056507	RenPIM 6458 Iso (Resin)	5 Gallon	45
056608	RenPIM 6458 Polyol (Hardener)	5 Gallon	38.25

#### RenPIM 6460 – Black

- Heat Resistant Polyurethane
- 45-65 Second Gel Time
- 15-30 Minute Demold
- 80D Shore Hardness

This material features a glass transition temperature of 320°F, excellent izod impact strength of 1.1 ft.lb./in. and a good dimensional stability.

Number	Description	Availability	Net Wt. (Lbs.)
056574	RenPIM 6460 Iso (Resin)	5 Gallon	32
056671	RenPIM 6460 Polyol (Hardener)	5 Gallon	40

\*Buff colored Polyol is available by special order. Lead times and minimums apply.



## Mold Making Silicone Rubbers

Bluestar RTV Silicone Rubber (also known as Rhodorsil®) is used extensively in applications where a flexible, self-releasing mold material is required, specifically rapid prototype tooling, polyurethane casting, and general silicone mold-making. This top quality line of silicone systems offers high accuracy, high heat resistances, and excellent tear strength and elongation properties.

Silicone rubbers are available in two types—addition cure formulations that feature a platinum-based catalyst and condensation cure silicones that feature a tin-based catalyst.



### Addition Cure Silicone Rubber

Addition Cure Silicones Offer The Following:

1. Unlimited shelf life (in cured state)
2. Very low shrinkage – for increased mold accuracy
3. Higher durometers – for greater mold stability
4. Excellent heat resistance – up to 400°F intermittently
5. A platinum based catalyst that makes it ideal for polyurethane casting because this material, when cured, won't inhibit the curing of the urethane.

### Condensation Cure Silicone Rubber

Condensation Cure Silicones Offer The Following:

1. Low shrinkage, though not as low as platinum-catalyzed rubber
2. Softer cured hardness (lower durometer) than addition cure materials, making them ideal for molds with deep undercuts.
3. Heat resistance up to 350°F intermittently.
4. A tin based catalyst that creates a more inhibition resistant material. However, these rubbers, when cured, may inhibit the curing of urethanes when poured into them.

### Addition Cure Silicone Rubber Specifications

	Hardness (Shore A)	Mixed Viscosity (cps)	Mix Ratio (by wt.)	Gel Time (Min) @ 72° F	Demold Time (hours) @ 72° F	Elongation (%)	Tear Strength (ppi)	Color	Specific Gravity	Volumetric Yield (cu.in./lb.)
V-240	60	100,000	10:1	150	16	160	74	Gray	1.23	22.5
V-243*	60	100,000	10:1	300	16	–	–	Beige	1.24	22.3
V-330 (w/ CA35)	25	10,000	10:1	100	16	510	180	Blue	1.30	21.3
V-330 (w/ CA45)	33	10,000	10:1	100	16	500	170	Blue	1.30	21.3
V-340 (w/ CA35)	40	25,000	10:1	100	16	500	180	Blue	1.33	21.0
V-340 (w/ CA45)	45	25,000	10:1	100	16	400	150	Blue	1.33	21.0
V-340 (w/ CA55)	55	25,000	10:1	100	16	340	75	Gray	1.33	21.0
V-3040	39	40,000	10:1	120	16	350	135	Clear	1.08	25.6
RTV-3460	60	85,000	10:1	90	16	230	140	Gray	1.20	23.1

\*Heat Cure Required 3-4 hours @ 300 degrees F.

### Condensation Cure Silicone Rubber Specifications

	Hardness (Shore A)	Mixed Viscosity (cps)	Mix Ratio (by wt.)	Gel Time (Min) @ 72° F	Demold Time (hours) @ 72° F	Elongation (%)	Tear Strength (ppi)	Color	Specific Gravity	Volumetric Yield (cu.in./lb.)
GP-25/Hi-Pro Green	25	50,000	10:1	210	16	380	150	Green	1.20	23.1
GP-25/Hi-Pro Blue	25	50,000	10:1	90	6	370	115	Blue	1.16	23.9
V-1062/Hi-Pro Green	14	35,000	10:1	270	16	520	120	Green	1.10	25.2
V-1062/Hi-Pro Blue	15	32,000	10:1	90	6	500	110	Blue	1.11	24.9
V-1065/Hi-Pro Green	25	45,000	10:1	180	16	440	120	Green	1.11	24.9
V-1065/Hi-Pro Blue	30	43,000	10:1	120	6	430	100	Blue	1.11	24.9
V-1067/1067B	40	50,000	100:2.5	240-300	16	300	50	Blue	1.12	24.7
V-1067/Hi-Pro Blue	37	50,000	10:1	60	6-8	250	40	Blue	1.12	24.7
V-1068/Hi-Pro Clear	14	25,000	10:1	240	16	450	115	Translucent	1.10	25.2
V-1082/Hi-Pro Clear	10	35,000	10:1	210	16	550	120	Translucent	1.10	25.1
RTV-3625/Hi-Pro Green	25	20,000	10:1	240	16	450	120	Green	1.10	25.2
RTV-3625/Hi-Pro Blue	27	20,000	10:1	30	4	390	120	Blue	1.10	25.2



## Mold Making Silicone Rubbers [CONT'D.]

### Bluestar Addition Cure Silicone Rubbers

#### V-240 Silicone Rubber

- 60A Shore Hardness
- 100,000 cps Viscosity
- 74 ppi Tear Strength

Bluestar V-240 is an extremely durable and accurate silicone rubber that features a high platinum content, which offers excellent resistance to cure inhibition. Used in rapid prototyping, especially in the simulation of injection-molded plastic parts.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054834	V-240	5 kg Unit	11
054846KG	V-240 - Base Only	20 kg	44.1
054847KG	V-240 - Catalyst Only	2 kg	4.4
054819KG	V-240 - Base Only	200 kg	440.9
054820KG	V-240 - Catalyst Only	20 kg	44.1

#### V-243 Heat Cure Silicone Rubber

- 60A Shore Hardness
- 100,000 cps Viscosity

Bluestar V-243 is a two component, high strength, silicone system that requires a heat cure to obtain optimum properties. Long work life, high strength properties, and its ability to accept high levels of silicone diluent fluid make it an excellent choice for transfer print pad and roll applications.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054922KG	V-243 - Base Only	20 kg	44.1
054923KG	V-243 - Catalyst Only	2 kg	4.4

#### V-330 Silicone Rubber

- 25A or 30A Shore Hardness
- 10,000 cps Viscosity
- 180 ppi (CA35) or 170 ppi (CA45) Tear Strength

Bluestar V-330 is a silicone that offers the flexibility of two different cured hardnesses depending on the catalyst used. V-330/CA-35 cures to a 25A Shore hardness while V-330/CA-45 results in a slightly harder compound of 33A. Both systems have high tear strength and offer the lowest viscosity in our platinum mold making line.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
054809	V-330/CA-45	1 kg Unit	2.2
054810	V-330/CA-35	5 kg Unit	11
054808	V-330/CA-45	5 kg Unit	11
054805KG	V-330 Base Only	20 kg	44.4
055218KG	CA-35 Catalyst Only	2 kg	4.4
055203KG	CA-45 Catalyst Only	2 kg	4.4
054804KG	V-330 Base Only	200 kg	440.9
055219KG	CA-35 Catalyst Only	20 kg	44.4
055206KG	CA-45 Catalyst Only	20 kg	44.1

#### V-340 Silicone Rubber

- 40A, 45A, or 55A Shore Hardness
- 25,000 cps Viscosity
- 180 ppi (CA35), 150 ppi (CA45), or 75 ppi (CA55) Tear Strength

Bluestar V-340 is one of our most popular silicone rubber systems for prototype molding applications, V-340 is a versatile system which offers the flexibility of three different cured hardnesses depending on the catalyst used. This is a low viscosity silicone which offers high strength and is economically priced.



Catalog Number	Description	UM	Net Wt. (Lbs.)
055209	V-340/CA-45	1 kg Unit	2.2
055217	V-340/CA-35	5 kg Unit	11
055200	V-340/CA-45	5 kg Unit	11
055201	V-340/CA-55	5 kg Unit	11
055202KG	V-340 Base Only	20 kg	44.1
055218KG	CA-35 Catalyst Only	2 kg	4.4
055203KG	CA-45 Catalyst Only	2 kg	4.4
055204KG	CA-55 Catalyst Only	2 kg	4.4
055205KG	V-340 Base Only	200 kg	440.9
055219KG	CA-35 Catalyst Only	20 kg	44.4
055206KG	CA-45 Catalyst Only	20 kg	44.1
055207KG	CA-55 Catalyst Only	20 kg	44.1

#### V-3040 Clear Silicone Rubber

- 39A Shore Hardness
- 40,000 cps Viscosity
- 135 ppi Tear Strength

Bluestar V-3040 is specifically formulated to make clear rubber molds. V-3040 features the high strength and excellent clarity required in high-end prototyping applications.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
054903	V-3040	1 kg Unit	2.2
054823	V-3040	5 kg Unit	11
054857KG	V-3040 Base Only	20 kg	44.1
054858KG	V-3040 Catalyst Only	2 kg	4.4
054871KG	V-3040 Base Only	200 kg	440.9
054869KG	V-3040 Base Only – Unlined Drum	200 kg	440.9
054872KG	V-3040 Catalyst Only	20 kg	44.1

#### RTV-3460 Silicone Rubber

- 60A Shore Hardness
- 85,000 cps Viscosity
- 140 ppi Tear Strength

Bluestar RTV 3460 is designed for the prototype and architectural industries where urethane elastomers and foams are commonly used. Molds made from RTV 3460 feature high tear strength, excellent dimensional stability in high pressure applications, and improved release characteristics for long mold life.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054936	RTV 3460	5 kg Unit	11
054934KG	RTV-3460 Base Only	20 kg	44.1
054935KG	RTV-3460 Catalyst Only	2 kg	4.4
054932KG	RTV-3460 Base Only	200 kg	440.9
054933KG	RTV-3460 Catalyst Only	20 kg	44.1



## Mold Making Silicone Rubbers [CONT'D.]

### Bluestar Condensation Cure Silicone Rubbers

#### GP-25 Silicone Rubber

- 25A Shore Hardness
- 50,000 cps Viscosity
- 150 ppi or 115 ppi Tear Strength

Bluestar GP-25 features an excellent mold life when casting polyester or plaster parts. Used with Hi-Pro Green or Hi-Pro Blue catalyst.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054811KG	GP-25 Base Only	20 kg	44.1
054813KG	Hi-Pro Green Catalyst Only	2 kg	4.4
054812KG	GP-25 Base Only	200 kg	440.9
054814KG	Hi-Pro Blue Catalyst Only	20 kg	44.1
054815KG	Hi-Pro Green Catalyst Only	20 kg	44.1

#### V-1062 Silicone Rubber

- 14A or 15A Shore Hardness
- 35,000 or 32,000 cps Viscosity
- 120 ppi or 110 ppi Tear Strength

Bluestar V-1062 is a high-performance, tin-catalyzed, room temperature curing silicone. The V-1062 base may be used with the Hi-Pro Green Catalyst at a ratio of 10:1 (base to catalyst) to produce a low shrink rubber with a 16 hour demold time.

The V-1062 base may also be used with Hi-Pro Blue catalyst at a ratio of 10:1 (base to catalyst). This faster curing system is able to be demolded in 6 hours.

Both rubbers are commonly used for production of polyester figurines, giftware casting, and general purpose and production molding applications.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054836	V-1062/Hi-Pro Green	4 kg Unit	8.8
054837KG	V-1062 Base Only	20 kg	44.1
055213KG	Hi-Pro Green Catalyst Only	2 kg	4.4
054878KG	Hi-Pro Blue Catalyst Only	2 kg	4.4

#### V-1065 Silicone Rubber

- 25A or 30A Shore Hardness
- 45,000 or 43,000 cps Viscosity
- 120 ppi or 100 ppi Tear Strength

Bluestar V-1065 is a high-performance, tin-catalyzed, room temperature curing silicone. This popular rubber may be used with the Hi-Pro Green Catalyst at a ratio of 10:1 (base to catalyst) to produce a low shrink, 25 shore A rubber with a 16 hour demold time.

The V-1065 base may also be used with Hi-Pro Blue catalyst at a ratio of 10:1 (base to catalyst). This faster curing system is able to be demolded in 6 hours.

Both rubbers are commonly used for production of polyester figurines, giftware casting, and production molding applications.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055210	V-1065/Hi-Pro Green	1 kg Unit	2.2
055211	V-1065/Hi-Pro Green	4 kg Unit	8.8
055212KG	V-1065 Base Only	20 kg	44.1
055213KG	Hi-Pro Green Catalyst Only	2 kg	4.4
054878KG	Hi-Pro Blue Catalyst Only	2 kg	4.4
055214KG	V-1065 Base Only	200 kg	440.9
055215KG	Hi-Pro Green Catalyst Only	20 kg	44.1
054879KG	Hi-Pro Blue Catalyst Only	20 kg	44.1

#### V-1067 Silicone Rubber

- 40A or 37A Shore Hardness
- 50,000 cps Viscosity
- 50 ppi or 40 ppi Tear Strength

Bluestar V-1067 is a high performance, tin-catalyzed, room temperature curing silicone. This rubber may be used with the V-1067B catalyst at a ratio of 100:2.5 (base to catalyst) to produce a low shrink, 40 Shore A rubber with a 16 hour demold.

The V-1067 base may also be used with Hi-Pro Blue catalyst at a ratio of 10:1 base to catalyst. This faster curing system is able to be demolded within 6-8 hours. Both systems are ideal for general moldmaking applications.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054883KG	V-1067 Base Only	20 kg	44.1
054884	V-1067 Catalyst (Blue) Only	Pint	1
054878KG	Hi-Pro Blue Catalyst Only	2 kg	4.4
054921KG	V-1067 Base Only	200 kg	440.9
054919KG	V-1067 Catalyst (Blue) Only	6 kg	13.2
054879KG	Hi-Pro Blue Catalyst Only	20 kg	44.1

#### V-1068 Special Effects Silicone Rubber

- 14A Shore Hardness
- 25,000 cps Viscosity
- 115 ppi Tear Strength

Bluestar V-1068 is a translucent silicone rubber that may be easily pigmented for making robotic and animatronic skins, prosthetics, and props for theme parks and the film industry.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054888KG	V-1068 Base	20 kg	44.1
054889KG	Hi-Pro Clear Catalyst Only	2 kg	4.4

#### V-1082 Special Effects Silicone Rubber

- 10A Shore Hardness
- 35,000 cps Viscosity
- 120 ppi Tear Strength

Bluestar V-1082 is a slightly softer version of the V-1068. Also translucent, this product may be easily pigmented for making robotic and animatronic skins, prosthetics, and props for theme parks and the film industry.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054904KG	V-1082 Base Only	20 kg	44.1
054889KG	Hi-Pro Clear Catalyst Only	2 kg	4.4
054906KG	V-1082 Base Only	200 kg	440.9
054886KG	Hi-Pro Clear Catalyst Only	20 kg	44.1

#### RTV-3625 Silicone Rubber

- 25A or 27A Shore Hardness
- 20,000 cps Viscosity
- 120 ppi Tear Strength

Bluestar RTV 3625 is a low viscosity, tin-catalyzed, room temperature curing silicone rubber. It is available with two catalysts. Hi-Pro Green catalyst will provide very low shrink with a 16-18 hour demold, while Hi-Pro Blue is able to be demolded in 4 hours with slightly higher shrink. Available in drums only.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054926KG	RTV 3625 Base	200 kg	440.9
054879KG	Hi-Pro Blue Catalyst Only	20 kg	44.1
055215KG	Hi-Pro Green Catalyst Only	20 kg	44.1

## Silicone Rubbers & Accessories

### Bluestar Aerospace & Electronics Silicone Rubbers

#### V-612 Pratt & Whitney Specification Sealant

Bluestar V-612 is a black, two component, thixotropic, addition cure, aerospace sealant. Qualified to Pratt & Whitney specification PWA-404-2, this product is a sealant designed as a vane potting and damping material.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054895KG	V-612 5 KG Kit	5 kg Unit	11

#### V-622 Pratt & Whitney Specification Sealant

Bluestar V-622 is a black two component aerospace sealant which adheres to Pratt & Whitney Specification PWA 407. This material is designed for use as abradable air seals for compressor blades of jet engines.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054894KG	V-622	2.74 kg Unit	6.04

#### V-695 GE Aircraft Engine Specification Sealant

Bluestar V-695 is a black two component aerospace sealant which adheres to General Electric Aircraft Engine Specification A15F18A1. This material is designed for use as abradable air seals for compressor blades of jet engines.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054893KG	V-695	2.74 kg Unit	6.05

#### V-205 Silicone Electronic Coating

Bluestar V-205 is a one component addition cure silicone rubber compound. This opaque black product is formulated to provide a protective coating for light sensitive transistors and integrated circuits. Features include primerless adhesion to inorganic substrates. Product must be refrigerated when not in use.

Cure Schedule for thick sections (25-50 ml) is 2 hours at 230°F and for thin sections (less than 20 ml) is 15-60 Min at 300°F.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054838KG	V-205	454 Grams	1

#### V-1022 Electronic Potting Silicone

Bluestar V-1022 is a two component condensation cure silicone rubber specifically designed for potting and encapsulating electronic and electrical components. No primer is required and V-1022 bonds to most metals and plastics.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054821KG	V-1022 Base Only	20 kg	44.1
054822KG	V-1022 Catalyst Only	0.4 kg	0.88

### Bluestar Silicone Rubber Accessories

#### 47V-50 Silicone Fluid

Bluestar 47V-50 (also known as V-50) is a non-reactive, 50 cps viscosity, silicone fluid that is used to reduce the viscosity of the silicone rubber. Adding 47V-50 to the "A" side (base) will also reduce the hardness of the rubber by a slight amount. Maximum usage should not exceed 10% by weight.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054924	47V-50 Silicone Liquid	Quart	2
054832	47V-50 Silicone Liquid	Gallon	8
054833KG	47V-50 Silicone Liquid	20 kg	44.1
054925KG	47V-50 Silicone Liquid	200 kg	441

#### V-04 Silicone Adhesion Primer

Bluestar V-04 Silicone Primer is a dilute solution of reactive silicone resin in naphtha, used to provide adhesion to various metal and wood substrates.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054816	V-04 Blue Primer	Pint	0.75
054920KG	V-04 Clear Primer	3 kg	6.6

#### V-06 Silicone Adhesion Primer

Bluestar V-06 Silicone Primer is a diluted solution of a reactive silicone resin in naphtha used as an adhesion promoter with Bluestar aerospace and industrial grade materials. This primer is qualified to Pratt & Whitney spec #PWA-556 and Allied Signal spec #PCS-5611 Type X.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054828KG	V-06R Primer	Pint	0.75

#### Vicure #2 Catalyst

Bluestar Vicure #2 Catalyst is a fast reacting catalyst used with condensation cure silicone rubbers to accelerate cure times. Please consult Product Data Sheet before using this product.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054829KG	#2 Catalyst	110 gm Bottle	0.25

#### Thixo Additive 22646

Bluestar Thixo Additive 22646, when added to any condensation cure and some addition cure silicone rubbers as a third component, changes the viscosity from a pourable consistency to brushable. The use of this additive is perfect for making glove molds. A typical ratio is 100 parts base to 10 parts catalyst to 0.5 parts Thixo Additive. Multiple layers may be applied to build thickness.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
054826KG	Thixo Additive 22646	227 grms	0.5
054825KG	Thixo Additive 22646	20 kg	44.1

#### PT Accelerator

Bluestar PT Accelerator, when added to addition cure silicone rubbers as a third component, can significantly reduce the waiting time required to demold. Ratios of 100 parts base to 10 parts catalyst to 2 parts PT Accelerator will result in a 2 hour demold time.

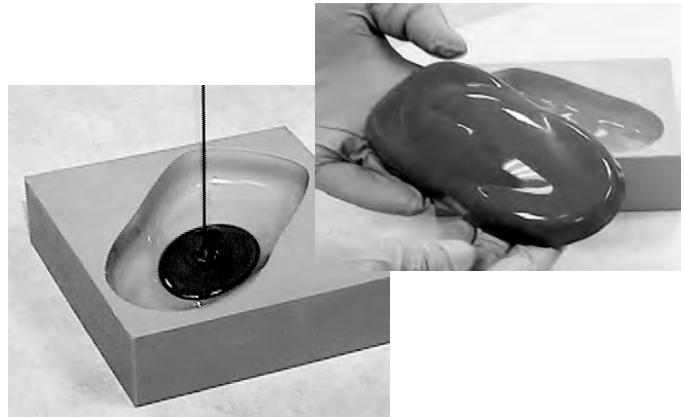
Catalog Number	Description	Availability	Net Wt. (Lbs.)
054839KG	PT Accelerator	454 grms	1



## Epoxy Casting Resins

Freeman and Huntsman Advanced Materials offer a broad, diverse line of pourable epoxy casting resins for the production of foundry patterns, core boxes, molds, fixtures, and tooling.

Iron-filled epoxy casting resins (black in color) are heavy, highly wear-resistant compounds that are suitable for foundry patterns or thin-gauge metal-forming tools. Aluminum-filled epoxy casting resins (gray in color) are not as heavy, are more readily machinable, and are available with higher temperature resistances. Epoxy casting resins generate heat (exotherm) during the curing process. This heat can become excessive if the epoxy is poured thicker than the suggested casting thickness, causing warping, cracking and/or brittleness. Therefore, be careful to choose the correct system to pour your part.



### Epoxy Casting Resin Specifications

Product Number	Mix Ratio (by wt.) Resin: Hardener	Mix Ratio (by vol.) Resin: Hardener	Gel Time (Min) @ 72°F	Demold Time (hours) @ 72°F	Hardness (Shore D)	Mixed Viscosity (cps)	Density (g/cc)	Volumetric Yield (cu. in./lb.)	Shrink (in/in)	Compressive Strength (psi)	Flexural Strength (psi)	Tensile Strength (psi)	C.T.E. (in/in/°F)*	Deflection Temp. (°F)	Tg (°F)
<b>Aluminum-Filled Epoxy Casting Resins</b>															
Freeman 801	100:12	100:23	150	24	86	4,650	1.70	16.3	0.002	12,500	11,590	7,280	3.82 x 10 <sup>-5</sup>	142	–
Freeman 805	100:18	100:29	150	24	88	9,750	1.47	18.8	0.001	17,200	9,600	8,100	–	200	–
RenCast 3269	100:9	100:18	60	24	87	4,300	1.78	15.6	0.001	14,400	13,000	8,700	3.76 x 10 <sup>-5</sup>	–	171
Devcon Aluminum Liquid	100:11	3:1	75	24	85	15-25,000	1.58	17.5	0.001	9,820	3,540	2,700	5.20 x 10 <sup>-5</sup>	250*	–
<b>High Temperature Aluminum-Filled Epoxy Casting Resins</b>															
RenCast 4036 / Ren 1500	100:6	100:10	60	24	90	20,000	1.69	16.5	0.004	30,000	7,500	6,500	1.90 x 10 <sup>-5</sup>	–	300
RenCast 4036 / Ren 1511	100:13	100:22	140	24	91	15,000	1.58	17.6	0.005	25,800	9,300	6,300	2.25 x 10 <sup>-5</sup>	–	350
RenCast 4037 / Ren 4037	100:13	100:22	140-165	24	91	12-18,000	1.58	17.6	0.005	25,800	9,300	6,300	2.25 x 10 <sup>-5</sup>	–	350
<b>Iron-Filled Epoxy Casting Resins</b>															
Freeman 855	100:10	100:25	150	24	87	13,950	2.23	12.4	0.001	13,400	9,100	6,800	–	230	–
RenCast 3209 / Ren 3209-1	100:10	100:25	90	24	75	15,000	2.04	13.5	0.005	16,500	8,400	5,500	2.60 x 10 <sup>-5</sup>	163	160
RenCast 3209 / Ren 3209-2	100:11	100:28	240	24	85	15,000	2.15	12.9	0.006	11,500	8,000	5,000	3.20 x 10 <sup>-5</sup>	120	138
RenCast 3215-1 / Ren 3215-2	100:18	100:35	200	24	88	3,600	1.65	16.9	0.004	11,100	7,300	4,900	3.80 x 10 <sup>-5</sup>	132	154
RenCast 3253	100:5	100:16	30	24	90	7,500	2.99	9.3	0.002	15,200	8,500	7,100	3.26 x 10 <sup>-5</sup>	120	169
RenCast 3261	100:5	100:16	25	24	88	35,000	2.94	9.4	0.003	16,500	8,500	6,000	3.00 x 10 <sup>-5</sup>	138	180
<b>Steel-Filled Epoxy Casting Resin</b>															
Devcon Plastic Steel Liquid	100:11	3:1	45	24	85	15-25,000	2.11	13.1	0.001	10,200	7,480	4,900	3.80 x 10 <sup>-5</sup>	250*	–
ASTM	–	–	D-2471	–	D-2240	D-2393	D-792	D-792	D-2566	D-695	D-790	D-638	D-696	D-648	D-648

\*Maximum operating temperature



## Epoxy Casting Resins [CONT'D.]

### Aluminum-Filled Room Temperature Resins

#### Freeman 801

- Castable to 3" in Thickness
- 150 Min Gel Time
- 86D Shore Hardness

This product is an economical aluminum-filled epoxy casting resin that is excellent for making wear resistant core boxes, patterns, and tooling fixtures. Low shrinkage, long gel time, and lower exotherm, enables this material to be poured to 3" in thickness.



Number	Description	Availability	Net Wt. (Lbs.)
055626Q	Freeman 801 Resin Only	Quart	2.65
055627Q	Freeman 801 Hardener Only	Pint	0.32
055626	Freeman 801 Resin Only	6 Quarts	15.9
055627	Freeman 801 Hardener Only	6 Pints	1.92
055630	Freeman 801 Resin Only	5 Gallon	60
055631	Freeman 801 Hardener Only	Gallon	7.2

#### Freeman 805

- Castable to 1/2" in Thickness
- 150 Min Gel Time
- 88D Shore Hardness

Freeman 805 is also an aluminum-filled epoxy casting resin that is similar in wear characteristics to the 801, but is designed for smaller jobs where the maximum casting thickness is only 1/2". This product also works very well for the construction of foundry tooling.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
055812	Freeman 805 Resin Only	Quart	2
055813	Freeman 805 Hardener Only	1/2 Pint	0.36
055809	Freeman 805 Resin Only	6 Quarts	12
055810	Freeman 805 Hardener Only	6 - 1/2 Pints	2.17
055807	Freeman 805 Resin Only	5 Gallons	45
055808	Freeman 805 Hardener Only	Gallon	8.1

#### RenCast 3269

- Castable to 3/4" in Thickness
- 60 Min Gel Time
- 87D Shore Hardness

This aluminum-filled epoxy features a slightly lower viscosity than the Freeman 801 and 805 for ease of pouring. Castable to 3/4", RenCast 3269 is also designed for smaller tooling projects that require good durability and wear resistance.

Catalog Number	Description	Availability	Net Wt. (lbs.)
056116	RenCast 3269 Resin Only	5 Gallon	60
056117	Ren 3269 Hardener Only	Gallon	5.5

#### Devcon Plastic Aluminum

- Castable to 3/4" in Thickness
- 75 Min Gel Time
- 85D Shore Hardness

This aluminum-filled epoxy is ideal for producing low-cost molds for plastic and rubber parts or applications requiring high strength at higher temperatures. Also available in putty form. See page 58 for details.

Catalog Number	Description	Mfg. No.	Net Wt. (lbs.)
054600	Devcon Plastic Aluminum Liquid	F2-1	1
054605	Devcon Plastic Aluminum Liquid	F2-3	3

### Aluminum-Filled High Temperature Resins

#### RenCast 4036/Ren 1500

- Castable to 1" in Thickness
- 60 Min Gel Time
- 90D Shore Hardness

This product is an aluminum-filled casting resin formulated for constructing hard and durable molds that will be subjected to elevated temperatures up to 300°F. With a maximum casting thickness of 1", 4036 is excellent for making smaller vacuum form tools, prototype injection molds, and other tooling requiring a high temperature resin.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056161	RenCast 4036 Resin Only	5 Gallon	65
056020	Ren 1500 Hardener Only	Gallon	4

#### RenCast 4036/Ren 1511

- Castable to 4" in Thickness
- 140 Min Gel Time
- 91D Shore Hardness

RenCast 4036/Ren 1511 is a lower exotherm formulation of the 4036/1500, enabling this product to be poured to a maximum thickness of 4" for larger high temperature tooling.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056166Q	RenCast 4036 Resin Only	Quart	3.12
056167Q	Ren 1500 Hardener Only	Quart	0.24
056166	RenCast 4036 Resin Only	6 Quarts	18.72
056167	Ren 1500 Hardener Only	6 Quarts	1.44
056161	RenCast 4036 Resin Only	5 Gallon	65
056160	Ren 1511 Hardener Only	2 Gallon	8.4

#### RenCast 4037 Cast-IT™ System

- Castable to 4" in Thickness
- 140-165 Min Gel Time
- 91D Shore Hardness

This economical, high temperature, aluminum-filled epoxy is excellent for constructing larger vacuum form tools, prototype injection molds, compression molds, and other high temperature tooling. Maximum continuous temperatures of 300°F and castable to 4" in thickness makes this a very versatile resin system.

Important Note: The amount of resin and hardener contained in this package size is approximately 2.5 gallons total. The manufacturer limits the liquid volume and uses a 5 gallon pail so there is adequate space for the addition of aluminum fillers.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056162	RenCast 4037 Resin Only	5 Gallon	33
056163	Ren 4037 Hardener Only	Gallon	4.4





## Epoxy Casting Resins [CONT'D.]

### Iron-Filled Casting Resins

#### Freeman 855

- Castable to ½" in Thickness
- 150 Min Gel Time
- 87D Shore Hardness

This iron-filled epoxy tooling resin features higher abrasion resistance than our aluminum-filled epoxies. Freeman 855 is used in foundry patterns, corebox construction, and some metal forming applications.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055857	Freeman 855 Casting Resin Only	5 Gallon	45
055858	Freeman 855 Casting Hardener Only	Gallon	4.5

#### RenCast 3209

- Castable to 2" or 6" in Thickness
- 90 or 240 Min Gel Time
- 75 or 85D Shore Hardness

RenCast 3209-1 Resin with Ren 3209-1 Hardener is an iron-filled casting resin that is able to be poured to a maximum thickness of 2". Features include high impact strength, 90 minute gel time, and low shrink. The material is excellent for stretch press forms, foundry patterns, and molds.

RenCast 3209-1 Resin with Ren 3209-2 Hardener is a slower curing version of the 3209-1/3209-1. This material may be cast up to 6" in thickness. This product also features good impact strength and wear resistance for light gage metal forming and foundry patterns.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056059Q	RenCast 3209-1 Resin Only	Quart	3.71
056061Q	Ren 3209-1 Hardener Only	Quart	0.40
056059	RenCast 3209-1 Resin Only	6 Quarts	22.24
056061	Ren 3209-1 Hardener Only	6 Quarts	2.40
056062	RenCast 3209-1 Resin Only	5 Gallon	39
056063	Ren 3209-1 Hardener Only	Gallon	3.9
056068	Ren 3209-2 Hardener Only	Gallon	4.29

#### RenCast 3215

- Castable to 6" in Thickness
- 200 Min Gel Time
- 88D Shore Hardness

RenCast 3215-1 Resin with Ren 3215-2 Hardener is an iron-filled casting resin that is able to be poured to a maximum thickness of 6". A very long 200 minute gel time permits casting very large parts. Thin sections may require a 48 hour demold time.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056072	RenCast 3215-1 Resin Only	5 Gallons	60
056078	Ren 3215-2 Hardener Only	2 Gallons	10.81

#### RenCast 3253

- Castable to ¾" in Thickness
- 30 Min Gel Time
- 90D Shore Hardness

A very tough material with excellent abrasion resistance. Ideal for dies, core boxes, foundry patterns, hammer forms, and fixtures.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056087	RenCast 3253 Resin Only	5 Gallon	60
056088	Ren 3253 Hardener Only	Gallon	3

#### RenCast 3261

- Castable to ½" in Thickness
- 25 Min Gel Time
- 88D Shore Hardness

A dual purpose material which may be used as a casting resin or a surface coat, this resin offers fine surface detail and impact resistance and is well suited for patterns, hammer form dies, core boxes and housing fixtures.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056092Q	RenCast 3261 Resin Only	Quart	4.99
056098Q	Ren 3261 Hardener Only	Quart	0.28
056092	RenCast 3261 Resin Only	6 Quarts	29.94
056098	Ren 3261 Hardener Only	6 Quarts	1.68

### Steel-Filled Casting Resin

#### Devcon Plastic Steel

- Castable to ¾" in Thickness
- 45 Min Gel Time
- 85D Shore Hardness

Contains 80% steel, 20% epoxy resins and modifiers. This dark gray product is very machinable with a high impact strength and an excellent resistance to chemicals and solvents. Also available in putty form. See page 58 for details.

Catalog Number	Description	Mfg. No.	Net Wt. (Lbs.)
054570	Devcon B-1 Liquid-Type Plastic Steel 1 Lb	10210	1
054575	Devcon B-4 Liquid-Type Plastic Steel 4 Lb	10220	4
054580	Devcon B-25 Liquid-Type Plastic Steel 25 Lb	10230	25

#### SEE ALSO:

Product	Page No.
Tooling Plastics Fillers	48-49
Mixing Cups, Paddles and Shop Rags	109
Gloves and Protective Wear	108
Pattern Coatings (Primers, Paints & Sealers)	102-103
Mold Releases	104-107

# Epoxy Laminating Resins

## Epoxy Laminating Resin Specifications

Product Number	Mix Ratio (by wt.) Resin: Hardener	Mix Ratio (by vol.) Resin: Hardener	Gel Time (Min) @ 72°F	Demold Time (hours) @ 72°F	Hardness (Shore D)	Mixed Viscosity (cps)	Density (g/cc)	Volumetric Yield (cu. in./lb.)	Compressive Strength (psi)	Flexural Strength (psi)	Flexural Modulus (psi)	Tensile Strength (psi)	C.T.E. (in/in/°F)	Deflection Temp. (°F)	Tg (°F)
<b>Room Temperature Laminating Resins</b>															
Freeman 601	100:10	100:14	28	24	88	3,000	1.39	19.9	39,900	34,600	–	25,000	–	128	–
Freeman 605 - 15	100:16	100:20	20	24	82	2,850	1.30	21.3	40,000	33,500	1.8 x 10 <sup>6</sup>	25,300	–	188	–
Freeman 605 - 45	100:20	100:26	37	24	86	2,800	1.28	21.6	40,000	33,500	1.8 x 10 <sup>6</sup>	25,300	–	188	–
Freeman 690	100:33	100:37	90	24	85	1,445	1.10	25.0	26,500	39,900	1.3 x 10 <sup>6</sup>	35,500	–	180	–
Miapoxy 100/95	100:24	100:25	38	24	90	800	1.13	24.5	26,000	39,000	–	36,000	0.93 x 10 <sup>-5</sup>	128	–
Miapoxy 100/97	100:26	100:25	20	24	90	1,120	1.13	24.5	28,000	37,000	–	26,000	1.0 x 10 <sup>-5</sup>	128	–
RenLam 1700-1/ Ren 1700-1	100:26	100:28	20	24	90	2,000	1.13	24.5	28,100	37,000	1.5 x 10 <sup>6</sup>	26,000	1.00 x 10 <sup>-5</sup>	128	–
RenLam 1700-1/ Ren 956	100:23	100:25	36	24	89	2,000	1.13	24.5	24,700	40,700	1.7 x 10 <sup>6</sup>	34,900	0.97 x 10 <sup>-5</sup>	129	–
RenLam 1710/ Ren 1710	100:16	100:23	22	24	90	3,500	1.35	20.5	23,000	30,000	1.8 x 10 <sup>6</sup>	25,000	1.20 x 10 <sup>-5</sup>	129	–
RenLam 1710/ Ren 956	100:16	100:23	35	24	89	2,000	1.35	20.5	26,900	32,900	1.5 x 10 <sup>6</sup>	25,000	0.81 x 10 <sup>-5</sup>	–	–
RenLam 1720/ Ren 956	100:15	100:21	40	24	90	3,200	1.34	20.5	–	36,000	1.6 x 10 <sup>6</sup>	–	1.02 x 10 <sup>-5</sup>	–	164
RenLam 177-114/ Ren 956	100:24	–	38	24	90	800	1.15	24.1	26,000	39,000	–	36,000	0.93 x 10 <sup>-5</sup>	–	273
<b>High Temperature Laminating Resins</b>															
Freeman 917	100:10	100:13	52	24	92	4,000	1.46	19.0	24,500	30,574	1.6 x 10 <sup>6</sup>	23,000	2.56 x 10 <sup>-5</sup>	–	301
RenLam 1310/ Ren 1510	100:15	–	400	24	91	9,000	1.22	22.7	43,000	82,000	5.7 x 10 <sup>6</sup>	77,000	–	–	412
RenLam 4005/ Ren 1500	100:14	100:15	50	24	90	1,900	1.19	23.3	28,000	35,000	1.6 x 10 <sup>6</sup>	26,000	0.85 x 10 <sup>-5</sup>	289	338
RenLam 4014/ Ren 1500	100:11	100:14	55	24	90	4,000	1.34	20.8	28,000	34,000	1.7 x 10 <sup>6</sup>	24,000	1.41 x 10 <sup>-5</sup>	–	333
RenLam 4017/ Ren 1510	100:15	100:18	90	24	93	8,000	1.42	19.6	44,000	77,000	–	80,000	3.4 x 10 <sup>-6</sup>	–	385
RenLam 5052	100:38	100:47	7 hrs.	24	–	500	1.17	20.2	–	19,580	4.5 x 10 <sup>6</sup>	8,700	–	–	273
ASTM	–	–	D-2471	–	D-2240	D-2393	D-792	D-792	D-695	D-790	D-790	D-638	D-696	D-648	D-648

## Room Temperature Laminating Resins

### Freeman 601 – White

- Economical, General Purpose
- 28 Min Gel Time
- 88D Shore Hardness

This economical epoxy laminating resin is used for large composite tooling and mold construction and check fixtures. Freeman 601 is white in color and is designed to be used with Freeman 701 Surface Coat.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055621	Freeman 601 Resin Only	5 Gallon	45
055622	Freeman 601 Hardener Only	Gallon	4.5
055623	Freeman 601 Resin Only	55 Gallon	400
055624	Freeman 601 Hardener Only	5 Gallon	40

### Freeman 605 – White

- General Purpose & Plastic Faced Plaster
- 20 Min Gel Time (605-15)
- 37 Min Gel Time (605-45)
- 82D Shore Hardness



This epoxy laminating resin is used for general composite tooling and mold construction. Freeman 605 is white in color, features a variable gel time (depending on the hardener used) and is designed to be used with Freeman 705 and Freeman 706 surface coats.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055612	Freeman 605 Resin Only	Quart	2
055606	Freeman 605-15 Hardener Only	½ Pint	0.32
055613	Freeman 605-45 Hardener Only	½ Pint	0.4
055609	Freeman 605 Laminating Resin Only	6 Quarts	12
055605	Freeman 605-15 Hardener Only	6 – ½ Pints	1.93
055610	Freeman 605-45 Hardener Only	6 – ½ Pints	2.4
055607	Freeman 605 Laminating Resin Only	5 Gallon	45
055608	Freeman 605-45 Hardener Only	2 – 1 Gallons	9
055614	Freeman 605 Laminating Resin Only	55 Gallon	450
055615	Freeman 605-45 Hardener Only	2 – 5 Gallons	45



## Epoxy Laminating Resins (CONT'D.)

### Freeman 690 – Translucent

- Clear Epoxy Laminating Resin
- 90 Min Gel Time
- 85D Shore Hardness

Freeman 690 features a long gel time for construction of large laminated molds and finished parts. This product is clear, making it easy to identify any air entrapment. It is low in viscosity for easy cloth wet out.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055015	Freeman 690 Resin Only	5 Gallon	45
055016	Freeman 690 Hardener Only	2 – 1 Gallons	14.85

### Miapoxy 100 – Translucent

- Clear Epoxy Laminating Resin
- 38 Min Gel Time (Mia 95)
- 20 Min Gel Time (Mia 97)
- 90D Shore Hardness

Miapoxy 100 is a clear, two component epoxy laminating system specifically designed for producing strong and accurate fiberglass laminates or repairs. This product features two hardeners: Mia 95, for longer 38 minute working time for larger parts, and Mia 97, for smaller parts or repairs with a 20 minute working time. This product is available with convenient proportioning pumps (pg. 99) for quick, accurate, and trouble-free metering of the correct amount of resin and hardener.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
405665	Miapoxy 100 Resin Only	Quart	2
405615	Mia 95 Hardener Only	Pint	0.5
405630	Mia 97 Hardener Only	Pint	0.5
405660	Miapoxy 100 Resin Only	Gallon	8
405620	Mia 95 Hardener Only	Quart	2
405635	Mia 97 Hardener Only	Quart	2.1
405650	Miapoxy 100 Resin Only	5 Gallon	32
405610	Mia 95 Hardener Only	Gallon	8
405625	Mia 97 Hardener Only	Gallon	8
405655	Miapoxy 100 Resin Only	55 Gallon	450
405605	Mia 95 Hardener Only	5 Gallon	40
405624	Mia 97 Hardener Only	5 Gallon	40

### RenLam 177-114 – Amber

- Unfilled Laminating System
- 38 Min Gel Time
- 90D Shore Hardness

RenLam 177-114 is an unfilled amber colored laminating resin. Very low viscosity and a 38 minute gel time makes this an excellent resin for constructing large fiberglass tools and parts.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056212	RenLam 177-114 Resin Only	55 Gallon	450
056202	Ren 956 Hardener Only	55 Gallon	450

### RenLam 1700-1 – Translucent

- Unfilled Laminating System
- Popular Adhesive for Lumber and RenShape
- 20 Min Gel Time
- 90D Shore Hardness



This unfilled, general purpose laminating system features excellent moisture and chemical resistance. Also used for adhesive applications and recommended for bonding wood and Ren-Shape. RenLam 1700-1 Resin can also be used with Ren 956 Hardener for extended working time.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056042Q	RenLam 1700-1 Resin Only 1 Quart	Quart	1.63
056044Q	Ren 1700-1 Hardener Only 1 Pint	Pint	0.47
056042	RenLam 1700-1 Resin Only 6 Quart	6 Quarts	9.79
056044	Ren 1700-1 Hardener Only 6 Pint	6 Pints	2.82
056045	RenLam 1700-1 Resin Only 5 Gallon	5 Gallon	42
056046	Ren 1700-1 2 Gallon Hardener Only	2 – 1 Gallons	10.92
056043	RenLam 1700-1 55 Gallon Resin Only	55 Gallon	480
056048	Ren 1700-1 5 Gallon Hardener Only	5 Gallon	31.2
056192	Ren 956 5 Gal Hardener Only	5 Gallon	40

### RenLam 1710 – White

- General Purpose
- 22 Min Gel Time
- 90D Shore Hardness

This laminating system features low odor, excellent wetting qualities, room-temperature cure and works very well on vertical surfaces. RenLam 1710 Resin can also be used with Ren 956 Hardener for extended working time.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056047Q	RenLam 1710 Resin Only	Quart	2
056058Q	Ren 1710 Hardener Only	Quart	0.35
056047	RenLam 1710 Resin Only	6 Quarts	12
056058	Ren 1710 Hardener Only	6 Quarts	2.08
056050	RenLam 1710 Resin Only	5 Gallon	38
056051	Ren 1710 Hardener Only	Gallon	6.08
056334	RenLam 1710 Resin Only	55 Gallon	500
056192	Ren 956 Hardener Only	5 Gallon	40

### RenLam 1720 – White

- Dimensionally Stable
- 40 Min Gel Time
- 90D Shore Hardness

RenLam 1720 resin with Ren 956 hardener is a white, room temperature curing laminating resin system. This material is ideal for a variety of room temperature applications where a stable fiberglass laminate is required. This product features a 40 minute gel time for larger tooling. It is approved and commonly used in the automotive and aircraft industry for close tolerance tools.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056052	RenLam 1720 Resin Only	5 Gallon	45
056192	Ren 956 Hardener Only	Gallon	40

## Epoxy Laminating Resins [CONT'D.]

### High Temperature Laminating Resins

#### Freeman 917 – Gray

- Economical
- 52 Min Gel Time
- 92D Shore Hardness

This aluminum-filled laminating resin is used in large elevated temperature fixtures & tooling. Freeman 917 is designed to work with Freeman 945 Surface Coat.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055976	Freeman 917 Resin Only	5 Gallon	45
055977	Freeman 917 Hardener Only	Gallon	4.5

#### RenLam 1310 / Ren 1510 – Black

- Ultra High Temperature
- 400 Min Gel Time
- 91D Shore Hardness

RenLam 1310 Resin / Ren 1510 Hardener is a high temperature epoxy laminating resin that features a 412°F Tg. This material is ideal for laminated tooling requiring 350°F temperature resistance with extended service life. Caution: This product will produce high exotherm and give off acrid smoke if left to cure in thicker masses. Left over mixed resin and hardener should be spread out in a thin layer to cure.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056181	RenLam 1310 Resin Only	5 Gallon	45
056040	Ren 1510 Hardener Only	Gallon	6.75

#### RenLam 4005 / Ren 1500 – Amber

- Unfilled, High Temperature System
- 50 Min Gel Time
- 90D Shore Hardness

This laminating system is an unfilled, heat-resistant epoxy suitable for continuous temperature of 300°F. This material is an excellent adhesive for bonding high-temperature tooling boards.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
056132Q	RenLam 4005 Resin Only	Quart	2
056133Q	Ren 1500 Hardener Only	Pint	0.3
056132	RenLam 4005 Resin Only	6 Quarts	12
056133	Ren 1500 Hardener Only	6 Pints	1.8
056136	RenLam 4005 Resin Only	5 Gallon	43
056039	Ren 1500 Hardener Only	Gallon	6
056137	RenLam 4005 Resin Only	55 Gallon	500
056038	Ren 1500 Hardener Only	5 Gallon	40

#### RenLam 4014 / Ren 1500 – Gray

- Aluminum-Filled, High Temperature System
- 55 Min Gel Time
- 90D Shore Hardness



This laminating system is an aluminum-filled, general-purpose product used for tooling up to 300°F. Ideal for vacuum-forming, foam molds, and RIM molds.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056141	RenLam 4014 Resin Only	5 Gallon	54.5
056039	Ren 1500 Hardener Only	Gallon	6
056142	RenLam 4014 Resin Only	55 Gallon	550
056038	Ren 1500 Hardener Only	5 Gallon	40

#### RenLam 4017 / Ren 1510 – Black

- High Temperature System
- 90 Min Gel Time
- 93D Shore Hardness

This laminating system features an extended gel time and good cloth wet-out for construction of large, high temperature tools which may operate at temperatures up to 350°F. Allows enough time for vacuum bagging when required and is ideal for bonding fixtures, prepreg lay-up molds, and vacuum-form molds.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056146	RenLam 4017 Resin Only	5 Gallon	45
056040	Ren 1510 Hardener Only	Gallon	6.75

#### RenLam 5052 – Translucent

- Unfilled Laminating System
- 7 Hour Gel Time

RenLam 5052 has a 7 hour gel time for large tool and part construction. Designed for wet layup, RTM, pressure molding, and filament winding, this system will cure at room temperature and may also be postcured at elevated temperatures for higher mechanical properties.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056283	RenLam 5052 Resin Only	5 Gallon	37
056284	Ren 5052 Hardener Only	2 – 1 Gallons	14



## Epoxy Surface Coats

These epoxy surface coats by Freeman and Huntsman Advanced Materials are ideal for creating superior tool surfaces on general purpose laminated tools as well as more demanding abrasion-resistant or heat-resistant laminated tools.

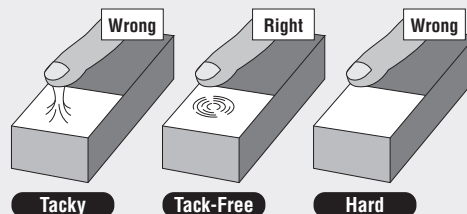


### Epoxy Surface Coat Specifications

Product Number	Mix Ratio (by wt.) Resin: Hardener	Mix Ratio (by vol.) Resin: Hardener	Gel Time (min.) @ 72°F	Demold Time (hours) @ 72°F	Hardness (Shore D)	Mixed Viscosity (cps)	Density (g/cc)	Volumetric Yield (cu. in./lb.)	Shrink (in/in)	Compressive Strength (psi)	Flexural Strength (psi)	Flexural Modulus (psi)	Tensile Strength (psi)	C.T.E. (in/in/°F)	Deflection Temp. (°F)	Tg (°F)
<b>Room Temperature Surface Coats</b>																
Freeman 701	100:8	100:13	15	24	87	Thixotropic	1.5	18.7	-	13,200	10,800	-	6,100	-	127	-
Freeman 705 - 15	100:14	100:20	15	24	90	18,300	1.4	19.6	-	16,800	7,000	0.76 x 10 <sup>6</sup>	5,100	-	250	-
Freeman 705 - 45	100:14	100:20	45	24	90	18,300	1.4	19.6	-	16,800	7,000	0.76 x 10 <sup>6</sup>	5,100	-	250	-
Freeman 706	100:14	100:20	45	24	90	15,000	1.3	21.0	-	16,800	7,000	0.76 x 10 <sup>6</sup>	5,100	-	250	-
RenGel 1118	100:9	100:13	30	24	90	Paste	1.5	19.0	0.002	13,400	6,500	-	3,500	2.56 x 10 <sup>-5</sup>	235	169
RenGel 1124	100:18	100:27	25	24	90	Paste	1.4	19.0	0.002	14,500	10,000	-	6,200	2.86 x 10 <sup>-5</sup>	127	149
RenGel 1126	100:18	100:25	24	24	90	Paste	1.4	19.7	0.002	12,000	6,800	-	4,700	2.6 x 10 <sup>-5</sup>	127	165
RenGel 1129	100:20	100:26	20	24	85	Paste	1.4	19.9	0.002	13,800	15,500	0.49 x 10 <sup>6</sup>	4,900	3.16 x 10 <sup>-5</sup>	117	156
RenGel 3260	100:9	100:16	33	24	88	30,000	1.9	14.6	0.002	17,000	9,600	1.4 x 10 <sup>6</sup>	6,500	2.10 x 10 <sup>-5</sup>	138	181
<b>High Temperature Surface Coats</b>																
Freeman 935 - 15	100:11	100:18	28	24	88	27,500	1.6	17.7	-	26,500	7,900	1.3 x 10 <sup>6</sup>	4,000	2.3 x 10 <sup>-5</sup>	370	-
Freeman 935 - 30	100:11	100:18	43	24	90	29,500	1.6	17.3	-	26,500	7,950	1.3 x 10 <sup>6</sup>	4,000	2.3 x 10 <sup>-5</sup>	370	-
Freeman 935 - 90	100:11	100:18	90	24	88	25,350	1.6	17.4	-	26,500	7,950	1.3 x 10 <sup>6</sup>	4,000	2.3 x 10 <sup>-5</sup>	370	-
Freeman 945	100:10	100:14	50	24	90	Thixotropic	1.4	19.9	-	25,000	8,000	-	5,000	3.7 x 10 <sup>-5</sup>	310	-
RenGel 4026 / Ren 1500	100:10	100:14	50-60	24	90	Paste	1.4	19.5	-	27,000	8,500	-	5,500	3.7 x 10 <sup>-5</sup>	-	310
RenGel 4026 / Ren 1501	100:10	100:14	30-40	24	90	Paste	1.4	19.5	-	27,000	8,000	-	4,000	3.2 x 10 <sup>-5</sup>	-	310
RenGel 4026 / Ren 1510	100:10	100:14	120-150	24	90	Paste	1.4	19.5	-	26,000	8,700	-	6,000	3.8 x 10 <sup>-5</sup>	-	335
RenGel 177-144 / Ren 1500	100:10	100:15	60	24	92	Paste	1.6	17.8	0.002	28,000	12,500	0.7 x 10 <sup>6</sup>	7,000	2.4 x 10 <sup>-5</sup>	-	284
ASTM	-	-	D-2471	-	D-2240	D-2393	D-792	D-792	D-2566	D-695	D-790	D-790	D-638	D-696	D-648	D-648

#### Almost Tack-Free – Testing A Surface Coat

The surface coat should dent, but leave no deposit on the finger. At this stage the next coat is applied; surface coat (2nd application), coupling coat, or laminate as required.





## Epoxy Surface Coats (CONT'D.)

### Room Temperature Resins

#### Freeman 701 – White

- Economical, General Purpose
- 15 Min Gel Time

This economical epoxy surface coat is used for constructing larger laminated tools, fixtures, and molds where a general purpose product will meet the necessary tooling requirements. The 701 is a thick viscosity material that will not sag on vertical walls.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055721	Freeman 701 Resin Only	5 Gallon	45
055722	Freeman 701 Hardener Only	Gallon	3.6

#### Freeman 705 – White

- General Purpose & Plastic Faced Plaster
- 15 Min Gel Time (705-15)
- 45 Min Gel Time (705-45)

Freeman 705 is a durable and tough epoxy surface coat for making a wide variety of composite tooling. Because this product will cure in the presence of moisture, it is ideal for constructing plastic-face plaster tools. Other features include two hardeners enabling the selection of the proper working time for smaller or larger parts.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
055712	Freeman 705 Resin Only	Quart	2
055706	Freeman 705-15 Hardener Only	½ Pint	0.28
055713	Freeman 705-45 Hardener Only	½ Pint	0.28
055709	Freeman 705 Resin Only	6 Quarts	12
055705	Freeman 705-15 Hardener Only	6 – ½ Pints	1.69
055710	Freeman 705-45 Hardener Only	6 – ½ Pints	1.69
055707	Freeman 705 Resin Only	5 Gallon	45
055704	Freeman 705-15 Hardener Only	Gallon	6.3
055708	Freeman 705-45 Hardener Only	Gallon	6.3

#### Freeman 706 – Blue

- General Purpose & Plastic Faced Plaster
- 45 Min Gel Time

Freeman 706 is very similar in to our Freeman 705 except that it has a powder blue color. This epoxy surface coat also cures in the presence of moisture for making plastic-faced plasters

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055714	Freeman 706 Resin Only	Quart	2
055715	Freeman 706-45 Hardener Only	½ Pint	0.28
055703	Freeman 706 Resin Only	6 Quarts	12
055716	Freeman 706-45 Hardener Only	6 – ½ Pints	1.69
055717	Freeman 706 Resin Only	5 Gallon	45
055718	Freeman 706-45 Hardener Only	Gallon	6.3

#### RenGel 1118 – Blue

- General Purpose & Plastic Faced Plaster
- 30 Min Gel Time

This epoxy surface coat will cure in the presence of moisture and is specifically designed for creating plastic-faced plaster tooling. RenGel 1118 is a thick viscosity that will not sag on vertical walls.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056011Q	RenGel 1118 Resin Only	Quart	2.63
056013Q	RenGel 1118 Hardener Only	Quart	0.23
056011	RenGel 1118 Resin Only	6 Quarts	15.75
056013	RenGel 1118 Hardener Only	6 Quarts	1.53
056016	RenGel 1118 Resin Only	5 Gallon	40
056017	RenGel 1118 Hardener Only	Gallon	3.6

#### RenGel 1124 – White

- General Purpose
- 25 Min Gel Time

This durable epoxy surface coat system has a green color indicator added to the resin that changes to amber when the product is completely mixed. RenGel 1124 is also formulated so multiple applications of successive layers aggressively bond to themselves, even if the underlying layer is fully cured.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056040Q	RenGel 1124 Resin Only	Quart	2.81
056042Q	RenGel 1124 Hardener Only	Quart	0.51
056040	RenGel 1124 Resin Only	6 Quarts	16.86
056042	RenGel 1124 Hardener Only	6 Quarts	3.06
056343	RenGel 1124 Resin Only	5 Gallon	56
056344	RenGel 1124 Hardener Only	2 – 1Gallon	10

#### RenGel 1126 – White

- General Purpose
- 24 Min Gel Time

RenGel 1126 is a general purpose epoxy surface coat that is lower in viscosity than the 1124, but will still provide uniform coverage on vertical surfaces without sagging. This product has slightly lower mechanical properties than the other surface coats in the Huntsman line for less demanding applications.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056023Q	RenGel 1126 Resin Only	Quart	2.27
056024Q	RenGel 1126 Hardener Only	Quart	0.44
056023	RenGel 1126 Resin Only	6 Quarts	13.60
056024	RenGel 1126 Hardener Only	6 Quarts	2.64
056026	RenGel 1126 Resin Only	5 Gallon	45
056027	RenGel 1126 Hardener Only	Gallon	8.3

#### RenGel 1129 – White

- Impact Resistant
- 20 Min Gel Time

This epoxy surface coat is formulated to produce a very high impact resistant and durable surface for laminated tooling. 1129 has a medium viscosity for easy application but still resists sagging on vertical walls.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056031	RenGel 1129 Resin Only	5 Gallon	45
056032	RenGel 1129 Hardener Only	Gallon	9

#### RenGel 3260 – Blue

- Silicon Carbide Filled
- Castable up to ½ inch thick
- 33 Min Gel Time

RenGel 3260 is a silicon carbide filled surface coat that offers very high wear resistance and excellent mechanical properties for laminated tooling used in very demanding applications. This product is recommended for making foundry tooling, check fixtures, and metal forming dies.

Alterations to the cured resin are very difficult due to the carbide filler.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056085Q	RenGel 3260 Resin Only	Quart	2.93
056086Q	RenGel 3260 Hardener Only	Quart	0.29
056085	RenGel 3260 Resin Only	6 Quarts	17.55
056086	RenGel 3260 Hardener Only	6 Quarts	1.74
056090	RenGel 3260 Resin Only	5 Gallon	60
056091	RenGel 3260 Hardener Only	Gallon	5.5



## Epoxy Surface Coats [CONT'D.]

### High Temperature Resins

#### Freeman 935 – Gray

- High-Temperature Tooling
- 28 Min Gel Time (935-15)
- 43 Min Gel Time (935-30)
- 90 Min Gel Time (935-90)

This product is a high temperature resistant epoxy surface coat for constructing laminated tooling that will be subjected to elevated temperatures such as vacuum forming tools and prototype injection molds. Freeman 935 is available with three different hardeners for a variety of gel times.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
055942	Freeman 935 Hi-Temp Resin Only	Quart	2
055943	Freeman 935-30 Hi-Temp Hardener Only	½ Pint	0.22
055939	Freeman 935 Hi-Temp Resin Only	6 Quarts	12
055940	Freeman 935-30 Hi-Temp Hardener Only	6 – ½ Pints	1.32
055937	Freeman 935 Hi-Temp Resin Only	5 Gallon	45
055944	Freeman 935-15 Hi-Temp Hardener Only	Gallon	4.94
055938	Freeman 935-30 Hi-Temp Hardener Only	Gallon	4.94
055947	Freeman 935-90 Hi-Temp Hardener Only	Gallon	4.94

#### Freeman 945 – Gray

- High-Temperature Tooling
- 50 Min Gel Time

This epoxy surface coat is an economical alternative to Freeman 935, for constructing large laminated tools that will be subjected to high temperatures. Uses include making vacuum form tools, molds to produce composite parts that require an elevated cure to solidify, as well as variety of other high temperature applications. 945 is a medium viscosity material that will not sag on vertical walls.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055966	Freeman 945 Resin Only	5 Gallon	45
055967	Freeman 945 Hardener Only	Gallon	4.5

#### RenGel 4026 – Gray

- Aluminum Filled
- 50 Min Gel Time (Ren 1500)
- 30 Min Gel Time (Ren 1501)
- 150 Min Gel Time (Ren 1510)
- 90D Shore Hardness



RenGel 4026 is specifically formulated where a high temperature resistant epoxy surface coat is required. This product features a medium viscosity for ease of application but will not sag on vertical mold surfaces. This material is designed for constructing vacuum form tools, prototype injection molds, and high temperature molds for the manufacture of composite parts requiring an elevated temperature cure.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056153Q	RenGel 4026 Resin Only	Quart	2.18
056154Q	Ren 1501 Hardener	Pint	0.24
056153	RenGel 4026 Resin Only	6 Quarts	13.08
056154	Ren 1501 Hardener	6 Pints	1.44
056156	RenGel 4026 Resin Only	5 Gallon	60
056039	Ren 1500 Hardener Only	Gallon	6
056157	Ren 1501 Hardener Only	Gallon	7.5
056040	Ren 1510 Hardener Only	Gallon	6.75

#### RenGel 177-144 – Gray

- Silicon Carbide Filled, Styrene Resistant
- 60 Min Gel Time
- 92D Shore Hardness

This epoxy surface coat is specifically designed for constructing close tolerance and long lasting molds to produce polyester parts. It is formulated with a silicon carbide filler to resist wear from abrasive materials, a chemistry that resists the effect of styrene monomer on the tool surface, and has a high temperature resistance to withstand the high exotherm generated during the polyester curing process.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056025	RenGel 177-144 Resin Only	5 Gallon	60
056039	Ren 1500 Hardener Only	Gallon	6

#### SEE ALSO:

Product	Page No.
TUF-Fil White	56
TUF-Fil Hi-Temp	57
Brushes	110

## Polyester Resins & Gelcoats

### Ordering Instructions:

For Quart of Resin purchase one 0.75 oz Catalyst  
 For Gallon of Resin purchase two 0.75 oz Catalysts  
 For 5-Gallon of Resin purchase one Pint Catalyst

### MiaLam F-37 Polyester Laminating Resin – Light Amber

MiaLam F-37 is a general purpose polyester laminating resin that is specifically designed for making high quality fiberglass reinforced molds and parts. Excellent chemical and water resistance make this product ideal for boat repair or construction. Catalyzed with Methyl Ethyl Ketone Peroxide (MEKP) at a ratio of 1.25% by weight.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
406135	MiaLam F-37 Resin Only	Quart	2.2
406130	MiaLam F-37 Resin Only	Gallon	8.8
406110	MiaLam F-37 Resin Only	5 Gallon	44.1
412161	MEKP Liquid Hardener	0.75 oz	0.05
412114	MEKP 9 Liquid Hardener	Pint	1
412115	MEKP 9 Liquid Hardener	Gallon	8

### MiaGel F-707 Polyester Gelcoat – White

This polyester gelcoat is a brilliant white color for making high quality fiberglass parts. It is ideal for the boating industry due to its excellent water resistance and gloss retention. Catalyzed with Methyl Ethyl Ketone Peroxide (MEKP) at a suggested rate of 1.8% by weight.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
406170	MiaGel F-707	Quart	2.2
406165	MiaGel F-707	Gallon	8.82
406160	MiaGel F-707	5 Gallon	44.09
412161	MEKP Liquid Hardener	0.75 oz	0.05
412114	MEKP 9 Liquid Hardener	Pint	1
412115	MEKP 9 Liquid Hardener	Gallon	8

### MiaGel F-944 Polyester Gelcoat – Neutral

This polyester gelcoat is neutral in color, enabling the user to custom color this product as desired. Use polyester coloring pastes (pg. 49) only for a high quality surface. Excellent for the boating industry due to excellent water resistance and gloss retention. Catalyzed with Methyl Ethyl Ketone Peroxide (MEKP) at a suggested rate of 1.8% by weight.

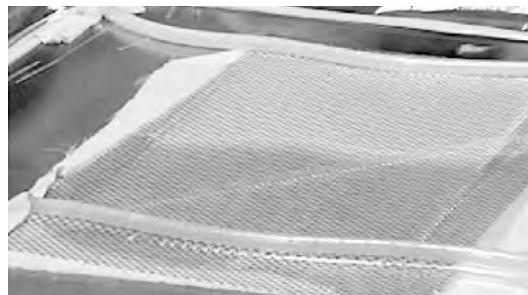
Catalog Number	Description	Availability	Net Wt. (Lbs.)
411760	MiaGel F-944	Gallon	8.8
412161	MEKP Liquid Hardener	0.75 oz.	0.05

### Orange Tooling Gelcoat – Brilliant Orange

Orange Tooling Gelcoat is a polyester based compound specifically designed for making fiberglass molds. Formulated to resist mold distortion from repeated use, this product also features a high gloss and a durable finish for long mold life. Catalyzed with Methyl Ethyl Ketone Peroxide (MEKP) at a suggested rate of 1.8% by weight.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
411023	Orange Tooling Gelcoat	Gallon	9
411025	Orange Tooling Gelcoat	5 Gallon	44
412161	MEKP Liquid Hardener	0.75 oz	0.05
412114	MEKP 9 Liquid Hardener	Pint	1
412115	MEKP 9 Liquid Hardener	Gallon	8

## Resin Infusion Epoxy Systems



### Araldite LY 8601 / Aradur 8601 – Clear

A two-component, low viscosity system with excellent toughness and enhanced wet-ability. For uses up to 140°F (60°C) with only a room temperature cure.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056708	Araldite LY 8601 Resin	5 Gallon	36
056719	Aradur 8601 Hardener	5 Gallon	36

### Araldite LY 8601 / Aradur 8602 – Clear

Araldite LY 8601 / Aradur 8602 is a stronger and faster curing version of the LY 8601 / 8601. The use of the Aradur 8602 hardener provides improved flexural, tensile, and compressive strength to the LY 8601 Resin.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056708	Araldite LY 8601 Resin	5 Gallon	36
056713	Aradur 8602 Hardener	2 Gallons	9

### Araldite LY 8605 / Aradur 8605 – Clear

RenInfusion 8605 features exceptionally long room temperature gel time for uses up to 300°F (149°C) after heated post cure.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056697	Araldite LY 8605 Resin - 5 Gal	5 Gallon	40
056698	Aradur 8605 Hardener - 5 Gal	5 Gallon	31.5
056699	Aradur 8605 Hardener - 2 Gal	2 Gallons	14
056711	Araldite LY 8605 Resin - 55 Gal	55 Gallon	450
056712	Aradur 8605 Hardener - 55 Gal	55 Gallon	315

### Araldite LY 8615 / Aradur 8615 – Light Amber

Features exceptionally long room temperature gel time for uses up to 400°F (204°C) after heated post cure.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056702	Araldite LY 8615 Resin	5 Gallon	45
056703	Aradur 8615 Hardener	5 Gallon	22.5



## Specialty Tooling Pastes & Resin Systems

These epoxy repair materials and paste compounds by Freeman and Huntsman Advanced Materials represent a wide range of specialty tooling materials for unique tool construction, repair, and alteration. Many of these materials are also often used as an alternative to fiberglass cloth reinforcement behind surface coats.



### Specialty Tooling Pastes & Resin Specifications

Product Number	Mix Ratio (by wt.) Resin: Hardener	Mix Ratio (by vol.) Resin: Hardener	Gel Time (min.) @ 72°F	Demold Time (hours) @ 72°F	Hardness (Shore D)	Mixed Viscosity	Density (lb/cc)	Volumetric Yield (cu. in./lb.)	Shrink (in/in)	Compressive Strength (psi)	Flexural Strength (psi)	Flexural Modulus (psi)	Tensile Strength (psi)	C.T.E. (in/in/°F)	Deflection Temp. (°F)	Color
Freeman 1010	100:100	100:100	60	24	77	Paste	0.95	29.1	0.001	5,000	4,600	3.1 x 10 <sup>5</sup>	3,800	-	180	Grey
Freeman 1015	100:20	-	90	24	65	Paste	1.05	26.4	0.001	-	-	-	-	-	180	Grey
Freeman 1020	100:33	100:36	50	24	55	Paste	0.46	60.7	0.001	-	-	-	-	-	190	Biege
Freeman 1030	41:100	33:100	9	90 Min	70	Paste	1.04	26.7	-	-	-	-	-	-	-	Off-White
RenLam 569/ Ren 569-1	100:11	100:18	35	24	80	Paste	1.20	23.0	-	5,000	4,600	3.8 x 10 <sup>5</sup>	2,800	3.8 x 10 <sup>-5</sup>	150	Blue
RenLam 569/ Ren 569-2	100:14	100:23	50	24	80	Paste	1.14	21.0	-	8,000	4,000	2.5 x 10 <sup>5</sup>	1,800	4.8 x 10 <sup>-5</sup>	138	Blue
RenPaste 1250	100:100	100:100	28	24	87	Paste	1.52	18.2	0.002	12,000	7,300	-	3,800	2.16 x 10 <sup>-5</sup>	176	Gray
RenPaste 1257-3	100:100	100:100	30	24	-	Paste	1.71	16.2	-	13,000	6,000	-	3,980	-	-	Blue
RenPaste 8281	100:100	100:100	90-165	24	45	Paste	0.60	46.2	0.001	1,300	549	1.2 x 10 <sup>5</sup>	413	9.4 x 10 <sup>-6</sup>	118	Blue
Por-A-Foam	90:100	100:100	2	15-20 Min	-	540	0.072	-	-	-	-	-	-	-	-	Lt. Yellow
ASTM	-	-	D-2471	-	D-2240	D-2393	D-792	D-792	D-2566	D-695	D-790	D-790	D-638	D-696	D-648	-

#### Freeman 1010 High-Density Epoxy Paste

- Recommended ½" in Thickness
- 60 Min Gel Time
- 77D Shore Hardness

This high density epoxy paste is a two component "clay-like" material that can be rolled out to a uniform thickness and applied behind an epoxy surface coat to provide a quick and easy method of surface coat reinforcement. Freeman 1010 is much stiffer in consistency than our Freeman 1020.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055101	Freeman 1010	Gallon Unit	12
055105	Freeman 1010	5 Gallon Unit	60

#### Freeman 1015 High-Density Epoxy Paste

- Recommended ½" in Thickness
- 90 Min Gel Time
- 65D Shore Hardness

Freeman 1015 is a two component epoxy paste material that may be rolled out to a uniform thickness and applied behind an epoxy surface coat to provide a quick and easy method of surface coat reinforcement.

Freeman 1015 is between our Freeman 1010 and 1020 in hardness and strength. It features much improved mixing properties when compared to our Freeman 1010.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055003	Freeman 1015	Gallon Unit	10.8

#### Freeman 1020 Low-Density Epoxy Paste

- Recommended ½" in Thickness
- 50 Min Gel Time
- 55D Shore Hardness

This is a lightweight paste laminate for surface coat or fiberglass reinforcement. Freeman 1020 is easily hand-mixed into a dough-like consistency.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055001	Freeman 1020	Gallon Unit	3.52
055002	Freeman 1020	5 Gallon Unit	17.6

#### Freeman 1030 Polyurethane Reinforcement Paste

- Recommended ½" in Thickness
- Trowelable Consistency
- 9 Min Gel Time
- 70D Shore Hardness

This fiber-filled urethane paste is perfect for creating a strong, yet lightweight back-up for flexible urethanes, silicones, or epoxies. Features include easy mixing (1:3 ratio by volume), easy application without sagging, low shrinkage, a quick 90 minute demold time.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
055418	Freeman 1030	Gallon Unit	11.4



## Specialty Tooling Pastes & Resin Systems [CONT'D.]



### RenLam 569 / Ren 569-1 Fiber-Reinforced Epoxy Paste

- Recommended ½" in Thickness
- 35 or 50 Min Gel Time
- 80D Shore Hardness

This glass fiber reinforced laminating paste simplifies construction of intricate tools and tooling aids. May be cleaned up with warm water. Mechanical mixing produces the best results, however smaller quantities may be hand kneaded.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056007	RenLam 569 Resin Only	5 Gallon	23
056008	Ren 569-1 Hardener Only	Gallon	2.53
056012	Ren 569-2 Hardener Only	Gallon	3.22

### RenPaste 1250 High-Density Epoxy Paste

- Aluminum-Filled
- 28 Min Gel Time
- 87D Shore Hardness

This 1:1 mix ratio, aluminum-filled epoxy paste combines excellent adhesive qualities with the machining characteristics of aluminum. Bonds to most metals, ceramics, glass, concrete and wood. This material is an excellent choice for potting drill bushings in composite materials and metal tools.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056036Q	RenPaste 1250 Resin Only	Quart	2.5
056037Q	Ren 1250 Hardener Only	Quart	2.5
056036	RenPaste 1250 Resin Only	6 Quarts	15
056037	Ren 1250 Hardener Only	6 Quarts	15

### RenPaste 1257-3 Highly Filled Fairing Compound

- Non-metallic
- 28 Min Gel Time
- Creamy Consistency

This epoxy paste is excellent for fairing conventional aerodynamic surfaces. Widely used by aircraft manufactures for blending contours and surface repairs for flyaway and prototype windtunnel applications. One to one mix ratio, creamy consistency, no electrolytic corrosion, and great adhesion combine to make this product high in performance and easy to use.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056014	RenPaste 1257-3 Resin Only	6 Quarts	18.02
056015	Ren 1257-3 Hardener Only	6 Quarts	18.02



### RenPaste 8281 Granular Backfill

- Maximum 8" in Thickness
- 150 Min Gel Time
- 50D Shore Hardness

This two-part epoxy system is ideal for negative mold and core mask construction as well as internal core structures for production patterns and core boxes. It is lightweight, features low shrink, and offers excellent dimensional stability.

Catalog Number	Description	Availability	Net Wt. (Lbs.)
056150	RenPaste 8281 Resin Only	5 Gallon	16
056151	Ren 8281 Hardener Only	5 Gallon	16

### Por-A-Foam Expanding Urethane Foam

- 2 Min Gel Time
- 4-5 lb/cu ft. Density

This compound is a two part component liquid urethane foam that rises to approximately 15 times its original poured volume. Por-A-Foam features a 1:1 mix ratio by volume, low viscosity, 4 to 5 lb/cu ft. cured density, and a 15 to 20 minute demold, depending on volume. The product makes an excellent light weight backup material or void filler.



Catalog Number	Description	Availability	Net Wt. (Lbs.)
057539	Por-A-Foam	Gallon Unit	16
057542	Por-A-Foam	5 Gallon Unit	80





## Plaster, Gypsum Cements & Accessories

A complete line of Industrial Plasters and Gypsum Cements for the tooling, art, and casting markets. We are able to supply most all USG plasters with minimum quantities. Please call our customer service department at 800-321-8511 for further details.

### USG Specifications

	Mix Ratio Parts Water By Wt. Per 100 Parts Plaster	Set Time (Min)	% Setting Expansion Max.	Density (lb./ft. <sup>3</sup> ) Wet	Density (lb./ft. <sup>3</sup> ) Dry	Compression Strength (psi) Dry
<b>USG Gypsum Cements</b>						
Ultralcal 30	38	25-35	0.08	115.0	99.0	6,000
Ultralcal 60	39	75-90	0.07	114.4	97.5	5,000
Hydrocal A-11	42	16-20	0.12	112.5	93.8	5,500
Hydrocal B-11	44	25-35	0.11	111.2	91.6	4,500
White Hydrocal	45	25-35	0.39	110.6	90.0	5,000
Hydrocal FGR-95	30	50-70	—	112.0	101.6	—
Medium-High Expansion	48	25-35	1.05	108.7	—	—
Hydrostone	32	17-20	0.24	119.4	108.7	10,000
<b>USG Industrial Plasters</b>						
#1 Moulding Plaster	70	27-37	0.20	99.0	69.0	2,000
#1 Casting Plaster	65	27-37	0.22	100.0	72.5	2,400
#1 Pottery Plaster	70	27-37	0.21	99.0	69.0	2,400
Lab Dental Plaster	70	6-9	—	99.0	69.0	2,000
Puritan Pottery Plaster	66	27-37	0.22	100.5	72.5	2,400
Duramold Pottery Plaster	62	27-37	0.22	102.0	75.0	2,900

### USG Gypsum Cements

#### Ultralcal 30

Primarily used as a “mass-casting material” where the mold is poured from solid gypsum. Ultracal 30 is the most popular gypsum used in tooling applications because of its good surface hardness, high compressive strength and low expansion. This material offers a slightly higher surface hardness and compressive strength than Hydrocal B-11.

Number	Description	Net Wt. (Lbs.)
036055	Ultralcal 30	50
036005	Ultralcal 30	100

#### Ultralcal 60

Similar to Ultracal 30 but features almost twice the working time which makes it suitable for larger molds. It is ideal for applications where extreme accuracy is required.

Number	Description	Net Wt. (Lbs.)
036007	Ultralcal 60	100

Available by special order only. Minimum 40 bags (1 skid)

#### Hydrocal A-11

Primarily used in the “splash casting” technique of producing large hemp-reinforced models of high accuracy, high strength and low cost. Fast setting time permits mold construction to be completed quickly and accurately.

Number	Description	Net Wt. (Lbs.)
036009	Hydrocal A-11	100



#### Hydrocal B-11

Similar to Hydrocal A-11 in setting expansion and accuracy. The main difference with Hydrocal B-11 is that it is formulated to have a longer period of plasticity enabling it to be used with templates to screed models directly from gypsum. This material has slightly less strength than Hydrocal A-11.

Number	Description	Net Wt. (Lbs.)
036069	Hydrocal B-11	50
036010	Hydrocal B-11	100

#### White Hydrocal

Basic Hydrocal Cement with a gradual set time. This product may be carved after it solidifies. For areas that need modification, additional layers of Hydrocal can be applied to itself.

Number	Description	Net Wt. (Lbs.)
036037	White Hydrocal	100

#### Hydrocal FGR-95

This material is a high-strength gypsum cement designed for use with glass fiber for fabricating glass-reinforced gypsum cement products. Excellent choice for large architectural applications.

Number	Description	Net Wt. (Lbs.)
036022	Hydrocal FGR-95	100

Available by special order only. Minimum 40 bags (1 skid)

#### Medium-High Expansion

Medium-High Expansion Plaster expands in a controllable manner to compensate for metal shrinkage in foundry applications. Patterns may be expanded from 1/8" to 3/16" per linear foot with a single pour.

Number	Description	Net Wt. (Lbs.)
036020	Medium-High Expansion	100

Available by special order only. Minimum 40 bags (1 skid)

#### Hydrostone

Hydrostone is the strongest and hardest gypsum cement available. Used primarily in tooling and high quality art object applications. This is an extremely wear-resistant material.

Number	Description	Net Wt. (Lbs.)
036034	Hydrostone	100

## Plaster, Gypsum Cements & Accessories (CONT'D.)

### USG Industrial Plasters

#### #1 Moulding Plaster

A general-purpose plaster, commonly known as Plaster of Paris, that produces casts of nominal strength, hardness and of the finest detail reproduction. Casts made of Moulding Plaster are porous and must be carefully sealed.

Number	Description	Net Wt. (Lbs.)
036060	#1 Moulding	50
036015	#1 Moulding	100

#### #1 Casting Plaster

The industry standard for figurines, plaques and cast objects. Produces a hard surface finish, minimal paint absorption and good resistance to chipping. This material offers higher strength and chip resistance than Moulding Plaster.

Number	Description	Net Wt. (Lbs.)
036030	#1 Casting	100

#### #1 Pottery Plaster

Because of its strength and long mold life, #1 Pottery Plaster is ideal for use in the ceramic industry for making slip molds.

Number	Description	Net Wt. (Lbs.)
036028	#1 Pottery	50
036027	#1 Pottery	100

#### Laboratory Dental Plaster

Similar to Moulding Plaster, this formulation produces intricate detail with acceptable hardness and strength with a set time of 6 to 9 minutes.

Number	Description	Net Wt. (Lbs.)
036025	Lab Dental Plaster	100

Available by special order only. Minimum 40 bags (1 skid)

#### Puritan Pottery Plaster

Similar to #1 Pottery Plaster, this formulation produces slightly denser and longer wearing molds for the ceramic industry.

Number	Description	Net Wt. (Lbs.)
036029	Puritan Pottery	50

Available by special order only. Minimum 40 bags (1 skid)

#### Duramold Pottery Plaster

Designed for use at a lower water to plaster ratio, this plaster has a higher wet strength for less breakage in process and provides longer mold-casting life.

Number	Description	Net Wt. (Lbs.)
036040	Duramold Plaster	100

Available by special order only. Minimum 40 bags (1 skid)

### Plaster Accessories

#### Manila Hemp

Special, fibrous material used for reinforcement of shell-type plaster reproductions. A premium-quality grade that is soft and absorbent with a good tensile strength.

Number	Description	Net Wt. (Lbs.)
054485	Manila Hemp	40–45 Lbs.

#### Rubber Plaster Mixing Containers

Available in various sizes, these containers are made of black neoprene rubber for flexibility, durability and a non-stick surface. This material is not attacked by plasters or gypsum cements. Not recommended for use with thermoset type epoxies, urethanes, or polyesters.

Number	Description	Net Wt. (Lbs.)
054440	Rubber Mixing Bowl	12 oz
054445	Rubber Mixing Bowl	20 oz
054450	Rubber Mixing Bowl	1½ Qt
054455	Rubber Mixing Bowl	5 Qt

#### Freeman Plaster Release, Liquid or Powder

Freeman Liquid Plaster Release is a mixture containing a light oil and powdered mica. When applied to the mold surface, this product will create a thin wet film for effective plaster release. Powdered mica is also sold separately for people who make their own release.

Number	Description	Net Wt. (Lbs.)
054405	Plaster Release – Powdered Mica	Pound
054410	Plaster Release – Liquid	Quart
054412	Plaster Release – Liquid	Gallon

#### Freeman PVC Fre-Sealer

Freeman PVC Fre-Sealer is used to seal plasters. It forms a moisture and chemical barrier. Enough coats should be applied to produce a gloss on the mold face. CAUTION: Fre-Sealer is not a release, but a barrier coat.

Number	Description	Net Wt. (Lbs.)
027880	PVC Fre-Sealer	Quart

#### Ren 802 PVC Lacquer Sealer

A green-colored, lacquer-type sealing agent recommended for plaster surfaces.

Number	Description	Net Wt. (Lbs.)
056213	Ren RP 802 PVC Sealer	12 oz Spray
056215	Ren RP 802 PVC Sealer	Quart

#### Plaster Gloves

Made of a tough, synthetic rubber that is resistant to most types of solvents.

Number	Description	Net Wt. (Lbs.)
054062	Plaster Gloves (Nitrile Rubber)	12 Pair

#### Plaster Release, Steric Acid Powder

Steric acid powder, when melted and mixed with kerosene to a milky consistency, provides an excellent for plaster.

Number	Description	Net Wt. (Lbs.)
054430	Plaster Release – Steric Acid	Pound