LIQUID TOOLING

Freeman offers an extensive variety of liquid materials to support the creation and duplication of parts, patterns, tools, and molds.

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.

Choosing a Repro formulation

All Repro formulations offer the below characteristics that make them user-friendly and reliable. To find something suited specifically for your project, consider your specifications and requirements, and then refer to the chart for our recommendations.

All Repro Products feature:

- *1:1 mix ratio by weight or volume*
- *Very low shrinkage*
- *Low viscosity ensuring easy pouring characteristics and excellent surface reproduction*
- *Consistent batch to batch quality*

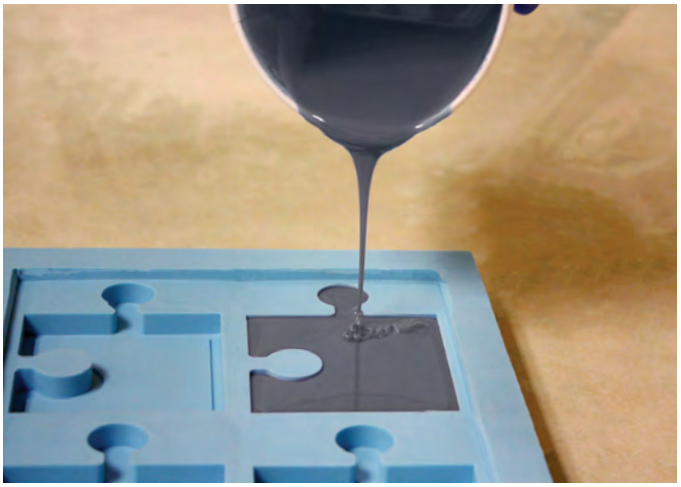
Criteria	Product
Balance of features	Repro 83, Repro NS
Higher temperatures	Repro One, Repro NS, Repro 95
Speed	Repro Fast, Repro 10
Accuracy	Repro Slow, Repro One
Light weight	Repro Light, Repro Ultra Light
Machinability	Repro 95, Repro Light, Repro Ultra Light
Large size	Repro Surface Coat and Laminating Resin
Easy mixing/non-settling	Repro One, Repro NS
Tintable	Repro Fast, Repro 10 Tan, Repro Slow

Specifications

	Mix Ratio (by wt. or vol.) R:H	Gel Time (min.) @ 72°F	Demold Time (min.) @ 72°F	Hardness (Shore D)	Specific Gravity	Mixed Viscosity (cps) @ 1 min.	Volumetric Yield (in.³/lb.)	Shrink (in./in.)*	Compressive Strength (psi)	Flexural Strength (psi)	Flexural Modulus (psi)	Tensile Strength (psi)	Tensile Modulus (psi)	Izod Impact (ft. lb./in.)	Deflection Temp. (°F)	C.T.E. (in./in./°F)
Repro One	1:1	6-7	60 - 90	87	1.75	1,500	15.8	0.0010	7,860	4,290	799,000	2,350	582,000	0.30	156°F/69°C	1.79×10^{-5}
Repro 83	1:1	6-7	60 - 90	84	1.9	1,100	14.5	0.0010	6,470	5,140	939,000	3,130	941,000	0.31	135°F/57°C	–
Repro NS	1:1	6-7	60 - 90	84	1.9	1,750	14.5	0.0010	5,970	2,990	684,000	1,710	869,000	0.35	142°F/61°C	1.45×10^{-5}
Repro Fast	1:1	4-5	15 - 30	84	1.9	1,100	14.5	0.0015	6,470	5,140	939,000	3,130	941,000	0.31	135°F/57°C	–
Repro 10	1:1	5-6	30 - 60	84	1.9	1,100	14.5	0.0012	6,470	5,140	939,000	3,130	941,000	0.31	135°F/57°C	–
Repro Slow	1:1	12-14	3 - 4 hr.	84	1.9	1,100	14.5	0.0009	6,470	5,140	939,000	3,130	941,000	0.31	135°F/57°C	–
Repro Light	1:1	6-8	90 - 120	68	0.9	1,500	30.0	0.0014	3,980	2,620	347,000	1,530	350,000	0.15	132°F/56°C	3.50×10^{-5}
Repro Ultra Light	1:1	10-11	2 - 3 hr.	55	0.59	1,200	47.0	0.0014	2,700	1,840	160,000	1,490	72,400	0.12	128°F/53°C	4.18×10^{-5}
Repro 95	1:1	6-7	60 - 90	84	1.9	1,450	14.5	0.0012	7,140	3,070	505,000	1,770	561,000	0.29	131°F/55°C	3.13×10^{-5}
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-2240	D-792	–	–	D-2566	D-695	D-790	D-790	D-638	D-638	D-256	D-648	D-696-88

*Dependent upon mass.

REPRO® FAST-CAST POLYURETHANES CONTINUED



Repro One

Repro One is our newest and most advanced formulation. This castable polyurethane can be used in durable foundry tooling, thermoforming applications, mold making, as well as most general plastic casting applications.

- 6-7 min. gel time
- 60-90 min. demold

SKU	Size	Color	Net weight (lb.)
053090	Quart Kit	Gray	5
053093	Gallon Kit	Gray	20
053095	5 Gallon Kit	Gray	100

Additional advantages of Repro One:

- *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*
- *Non-settling formulation for fast and easy mixing*
- *Compatible with expanded polystyrene (Styrofoam)*

Repro 83

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.

- 6-7 min. gel time
- 60-90 min. demold

SKU	Size	Color	Net weight (lb.)
053150	Quart Kit	White	5
053156	Gallon Kit	White	20
053152	Quart Kit	Blue	5
053158	Gallon Kit	Blue	20
053164	5 Gallon Kit	Blue	100
053154	Quart Kit	Gray	5
053160	Gallon Kit	Gray	20

Repro NS (Non-Settling)

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. 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.

- 6-7 min. gel time
- 60-90 min. demold

SKU	Size	Color	Net weight (lb.)
053153	Quart Kit	Blue	5
053159	Gallon Kit	Blue	20
053165	5 Gallon Kit	Blue	100

Repro Fast

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.

- 4-5 min. gel time
- 15-30 min. demold

SKU	Size	Color	Net weight (lb.)
053181	Quart Kit	Tan	5
053183	Gallon Kit	Tan	20
053184	5 Gallon Kit	Tan	100

Repro 10

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

- 5-6 min. gel time
- 30-60 min. demold

SKU	Size	Color	Net weight (lb.)
053060	Quart Kit	Tan	5
053064	Gallon Kit	Tan	20
053062	Quart Kit	Black	5
053066	Gallon Kit	Black	20

Repro Slow

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.

- 12-14 min. gel time
- 3-4 hour demold

SKU	Size	Color	Net weight (lb.)
053201	Gallon Kit	Tan	20
053202	5 Gallon Kit	Tan	100

Repro Light

Repro Light is a versatile castable urethane that is approximately one half the weight of our other Repro products. This material can be used for lightweight tools, backfill applications, and as an adhesive for many urethane modeling boards. Repro Light offers easy machinability and can be readily worked and carved with hand tools.

- 6-8 min. gel time
- 90-120 min. demold

SKU	Size	Color	Net weight (lb.)
053197	Quart Kit	Tan	2.5
053198	Gallon Kit	Tan	10

Repro Ultra Light

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. Repro Ultra Light is also an excellent choice to use as a hardness-matched adhesive for RenShape urethane foam boards.

- 10-11 min. gel time
- 2-3 hour demold

SKU	Size	Color	Net weight (lb.)
053196	Gallon Kit	Cream	7

REPRO® FAST-CAST POLYURETHANES CONTINUED

Repro 95

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

- 6-7 min. gel time
- 60-90 min. demold

SKU	Size	Color	Net weight (lb.)
053051	Quart Kit	Gray	5
053052	Gallon Kit	Gray	20

Additional advantages of Repro 95:

- *Dense, non-porous surface even after machining*
- *The ultra-smooth finish of the material, even after machining, allows for easy sand release in pattern and core box applications*

Repro Surface Coat & Laminating Resin System

- Surface Coat: 13 min. gel time
- Laminating Resin: 15 min. gel time
- Demold time: 3-4 hrs.

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

SKU	Description	Size	Net weight (lb.)
053189	Repro Surface Coat – White	Gallon Kit	22.5
053194	Repro Laminating Resin – White	Gallon Kit	22
054073	¼" Fiberglass Strand	Box	5
054071	¼" Fiberglass Strand	Box	50

Additional advantages of Repro Surface Coat & Laminating Resin:

- *Low exotherm system provides for very low-shrinkage tools – system will not get hot even in thick applications*
- *Quick 3-4 hour demold time compared to a 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*

THE PROCESS

Upon sealing and applying appropriate release:

1. Brush Repro Surface Coat on model and apply additional coats at 'almost tack-free' stage.
2. Combine Repro Laminating Resin with chopped fiberglass strand.
3. Apply fiberglass strand and resin mixture behind surface coat.

After approximately 3-4 hours, demold tool when cured (shown right)

OTHER FAST-CAST POLYURETHANES

Pro-Cast and Master Fast-Cast Polyurethanes are now manufactured exclusively by Freeman. These urethanes are highly filled, rigid, and fast setting. They offer low exotherm, shrink, and cost for producing foundry patterns, molds, fixtures, prototype vacuum form molds, or prototypes. We also offer RenCast products in two-component as well as three-component systems, both of which feature ease of mixing, good surface reproduction and excellent physical properties.

Specifications

	Mix Ratio (by wt. or vol.) R:H	Gel Time (min.) @ 72°F	Demold Time (min.) @ 72°F	Hardness (Shore D)	Specific Gravity	Mixed Viscosity (cps) @ 1 min.	Volumetric Yield (in.³/lb.)	Shrink (in./in.)*	Compressive Strength (psi)	Flexural Strength (psi)	Flexural Modulus (psi)	Tensile Strength (psi)	Tensile Modulus (psi)	Izod Impact (ft. lb/in.)	Deflection Temp. (°F)	C.T.E. (in./in./°F)
Pro-Cast 20	1:1	7 - 10	60 - 90	85	1.78	1,500	15.6	0.0017	7,400	4,900	580,000	3,100	941,000	0.28	139°F / 59°C	2.5×10^{-5}
Pro-Cast 132	1:1	5 - 7	30 - 60	84	1.71	5,000	16.2	0.0028	8,200	6,700	635,000	4,200	759,000	0.31	146°F / 63°C	3.5×10^{-5}
Master Dyna-Cast	1:1	6 - 7	60	85	1.9	1,500	14.5	0.0010	7,841	4,705	803,333	2,663	990,833	0.31	148°F / 64°C	–
Master Cast 783	1:1	7 - 8	60 - 90	85	1.9	1,650	14.5	0.0010	6,500	3,500	900,000	3,000	902,000	0.30	125°F / 51°C	–
RenCast 205-3	1:1	6 - 7	60 - 100	70	1.12	80	24.7	0.0022	5,000	5,600	168,000	3,300	170,000	0.35	137°F / 58°C	7.61×10^{-5}
RenCast 205-3 (w/DT-081)	1:1:1	9 - 10	30 - 120	73	0.95	1,700	29.1	0.0023	4,500	4,000	325,000	2,400	373,000	0.22	144°F / 60°C	4.12×10^{-5}
RenCast 205-3 (w/DT-082)	1:1:3	9 - 10	60 - 120	80	1.65	2,500	16.8	0.0027	6,100	5,200	512,000	3,200	587,000	0.36	127°F / 53°C	4.56×10^{-5}
RenCast 6426-1 (w/DT-081)	1:1:1	7 - 8	60 - 120	65	0.8	2,500	34.6	0.0028	5,500	3,700	340,000	2,400	–	0.24	122°F/ 50°C	–
RenCast 6426-1 (w/DT-082)	1:1:3	10 - 12	60 - 120	83	1.7	4,400	16.2	0.001	5,500	4,500	510,000	2,860	–	0.34	122°F/ 50°C	4.13×10^{-5}
ASTM Tests	–	–	–	D-2240	D-792	–	–	D-2566	D-695	D-790	D-790	D-638	D-638	D-256	D-648	D-696-88

*Dependent upon mass.

PRO-CAST POLYURETHANES

Pro-Cast 20

This fast-cast, low-shrinkage, general-purpose polyurethane is offered with a choice of three colors.

- 7-10 min. gel time
- 60-90 min. demold

SKU	Size	Color	Net weight (lb.)
056363	Gallon Kit	Blue	20
056364	Gallon Kit	Gray	20
056365	Gallon Kit	White	20

Pro-Cast 132

This durable and high-strength, fast-curing polyurethane offers accurate reproductions with fine detail. It is good for producing holding fixtures, foundry patterns and vacuum-forming molds.

- 5-7 min. gel time
- 30-60 min. demold

SKU	Size	Color	Net weight (lb.)
056347	Gallon Kit	Gray	20

MASTER FAST-CAST POLYURETHANES

Master Dyna-Cast

Master Dyna-Cast is the most popular fast-cast urethane in the Master line. This two-component material features a perfect blend of gel time, demold time, and accuracy for a wide range of uses. Its low odor, viscosity, and shrinkage all work together for detailed and precise duplications. It is perfect for producing durable foundry patterns, core boxes, and fixtures.

- 6-7 min. gel time
- 60-90 min. demold

SKU	Size	Color	Net weight (lb.)
053600	Quart Kit	Green	5
053605	Gallon Kit	Green	20

Master Cast 783

Master Cast 783 is a two-component urethane that is ideal for a variety of applications. This product also features low moisture sensitivity and fast demold times without sacrificing accuracy.

- 7-8 min. gel time
- 60-90 min. demold

SKU	Size	Color	Net weight (lb.)
053720	Gallon Kit	Blue	20

RENCAST FAST-CAST POLYURETHANES

RenCast 6426-1

- 7-8 min. gel time
- 60-120 min. demold
- 65 or 83 Shore D

This gray, three-component polyurethane features ease of mixing, good surface reproduction and excellent physical properties. 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 (sold separately).

SKU	Description	Size	Net weight (lb.)
056203	RenCast 6426-1	Gallon Kit	18
056235	Ren DT-081 Low Density Filler	50 lb. bag	50
056236	Ren DT-082 High Density Filler	5 Gallon	33

RenCast 205-3

- 6-10 min. gel time
- 60-90 min. demold
- 70, 73, or 80 Shore D

This tan-colored, three-component polyurethane casting system features good dimensional stability, low shrink, and rapid cure. Offered with a low-density (DT-081) and a high-density (DT-082) third component filler, RenCast 205-3 allows the user to custom tailor the viscosity and density of their cast parts.

SKU	Description	Size	Net weight (lb.)
056320	RenCast 205-3	Gallon Kit	15
056321	RenCast 205-3 (Resin)	5 Gallon	38
056322	Ren 205-3 (Hardener)	5 Gallon	38
056235	Ren DT-081 Low Density Filler	50 lb. Bag	50
056236	Ren DT-082 High-Density Filler	5 Gallon	33

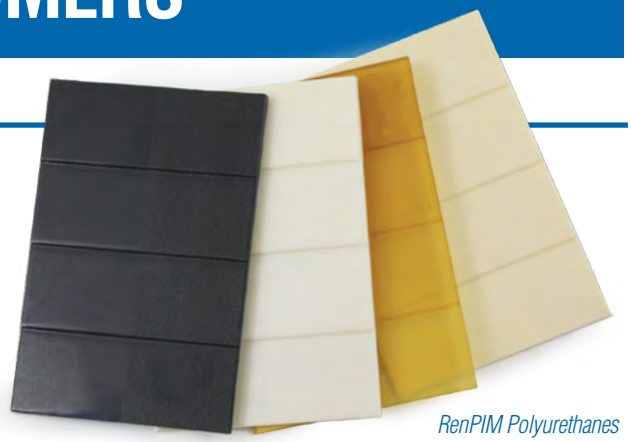
SEE ALSO

Product	Page #
Mixing Equipment	116
Tooling Plastics Fillers	57
Mixing Cups, Paddles and Shop Rags	129
Gloves and Protective Wear	129
Pattern Coatings (Primers, Paints & Sealers)	121
Mold Releases	123

POLYURETHANE ELASTOMERS

RAPID CURE ELASTOMERS

Rapid cure polyurethanes produce parts that simulate the appearance and performance of injection-molded thermoplastic parts. The short gel times permit fast demolding of durable parts. These low-viscosity systems are designed to be used with automated dispensing equipment (page 116) and low-cost tooling.



RenPIM Polyurethanes

Specifications

	Mix Ratio (by wt.) Resin:Hardener	Mix Ratio (by vol.) Resin:Hardener	Gel Time (sec.) @ 72°F	Demold Time (min.) @ 72°F	Hardness (Shore D)	Viscosity R/H (cps)	Density (g/cc)	Volumetric Yield (in.³/lb.)	Shrink (in./in.)	Compressive Strength (psi)	Flexural Strength (psi)	Flexural Modulus (psi)	Tensile Strength (psi)	Izod Impact (ft. lb/in.)	Deflection Temp. (°F)	Tg per DMA (°F)	C.T.E. (in./in./°F)	Color
RenPIM 6450	80:100	67:100	45 - 65	15 - 30	77	170 / 1,600	1.13	23.9	0.0009	23,100	7,000	184,000	4,900	0.90	208	306	67×10^{-6}	Buff or Black
RenPIM 6452	80:100	67:100	50 - 70	15 - 30	79	30 / 1,600	1.15	24.1	–	18,000	8,500	198,000	4,300	0.84	179	261	71×10^{-6}	Off-White
RenPIM 6458	100:85	1:1	50	15	86	75 / 400	1.21	22.9	–	14,100	16,500	432,000	10,200	0.87	129	190	43×10^{-6}	Clear Amber
RenPIM 6460	80:100	67:100	50	10 - 15	80	170 / 1,500	1.18	23.5	–	24,500	7,900	174,000	5,300	1.00	–	320	69×10^{-6}	Buff
ASTM	–	–	D-2471	–	D-2240	D-2393	D-792	D-792	D-2566	D-695	D-790	D-790	D-638	D-256	D-648	D-4065		–

RenPIM 6450

RenPIM 6450 is a very fast-setting polyurethane casting system that offers outstanding heat and impact resistance. The quick demold time of 15 to 30 minutes allows for the production of multiple parts per hour depending on part geometry and dispensing equipment capabilities. It is an excellent choice for replicating high-density polyethylene, polypropylene, and ABS parts and prototypes.

- 45-65 sec. gel time
- 15-30 min. demold
- 77 Shore D

SKU	Size	Net weight (lb.)
056553	5 Gallon (Resin)	32
056554	5 Gallon (Hardener)	40

RenPIM 6452

This rapid-curing system offers a high flex modulus that produces a tough prototype or short-run production part. RenPIM 6452 cures to an off-white color that may be easily pigmented and simulates many of the properties of polypropylene and ABS.

- 50-70 sec. gel time
- 15-30 min. demold
- 79 Shore D

SKU	Size	Net weight (lb.)
056571	5 Gallon (Resin)	32
056572	5 Gallon (Hardener)	40

RenPIM 6458

This very high flexural modulus urethane system is for creating rigid, stable, and extremely tough castings. This is the fastest curing RenPIM material with a demold time of 15 minutes or less and a user friendly 1:1 mix ratio. This is a good selection for duplicating the properties of high flex modulus ABS.

- 50 sec. gel time
- 15 min. demold
- 86 Shore D

SKU	Size	Net weight (lb.)
056607	5 Gallon (Resin)	45
056608	5 Gallon (Hardener)	38.3

RenPIM 6460

RenPIM 6460 is the best choice for parts and prototypes requiring elevated heat resistance. This quick-curing formulation (15 to 30 minute demold) is engineered with a glass transition temperature of 320°F.

- 50 sec. gel time
- 10-15 min. demold
- 80 Shore D

SKU	Size	Net weight (lb.)
056574	5 Gallon (Resin)	32
056671	5 Gallon (Hardener)	40

RenPIM polyurethanes offer incredible strength even when cast as thin as 1/16".

INTERMEDIATE CURE ELASTOMERS

These hand-pourable urethanes offer a wide range of hardnesses and working times, and can be demolded in as little as 15 minutes to 2 hours. This enables the production of multiple thermoplastic-like prototypes and short-run end-use parts per day.

PRC-1700

Specifications

	Mix Ratio (by wt.) Resin:Hardener	Mix Ratio (by vol.) Resin:Hardener	Gel Time (min.) @ 72°F	Demold Time (hr.) @ 72°F	Hardness (Shore D)	Viscosity R/H or Mixed (cps)	Density (g/cc)	Volumetric Yield (in.³/lb.)	Shrink (in./in.)	Compressive Strength (psi)	Flexural Strength (psi)	Flexural Modulus (psi)	Tensile Strength (psi)	Izod Impact (ft. lb/in.)	Deflection Temp. (°F)	Tg per DMA (°F)
Freeman 1070	100:92	1:1	3	15 - 30 min.	70	80	1.05	26.6	0.004	3,650	4,500	132,000	3,000	–	140	–
Freeman 1080	115:100	1:1	20	2 - 4	80	150	1.12	24.7	0.003	8,300	9,500	288,000	6,650	0.31	134	–
Freeman 1085	1:1	1:1	6	30 - 120 min.	69	80	1.12	24.7	0.002	4,880	5,600	170,000	3,300	0.35	137	172
RenCast 6432-1	100:50	100:50	5 - 6	1 - 2	72	50/1,100	1.13	24.5	0.005	7,200	8,600	234,000	5,900	0.6	145	153
RenCast 6486	100:50	1:1	7 - 8	8	67	7,800/75	1.16	23.9	–	–	4,750	110,000	3,600	6.6	156	156
RenCast 6491	1:1	89:100	4 - 5	30 - 40 min.	85	200/640	1.22	23	–	33,500	16,000	400,000	8,600	1.2	205	224
RenCast 6497	1:1	–	4 - 5	2	70A	1,875	1.10	25.2	–	–	–	–	995	–	–	–
PRC 1700*	100:60	–	17 - 19	2*	87	500	1.10	25.2	0.002	–	11,603	–	10,152	29.9	221	–
ASTM	–	–	D-2471	–	D-2240	D-2393	D-792	D-792	D-2566	D-695	D-790	D-790	D-638	D-256	D-648	D-4065

*The above properties for PRC-1700 are average values measured on specimens after curing 2 hours at 158°F, plus 16 hours at 212°F.

Freeman 1070 is an off-white color while Freeman 1085 is tan. Both are extremely easy to use but offer different casting thicknesses.

Freeman 1080

This brilliant white, tough urethane elastomer features a 1:1 mix ratio by volume, a low viscosity for pouring thin-walled parts, and sufficient time to degas. It is castable up to ½" in thickness.

- 20 min. gel time
- 2-4 hour demold
- 80 Shore D

SKU	Size	Net weight (lb.)
055419	Quart Kit	2
055412	Gallon Kit	16
055411	5 Gallon Kit	80

Freeman 1070

An easily mixed and economical urethane that can be used to create parts that simulate injection molded plastic, Freeman 1070 features an off-white color, low viscosity, ease of pouring, and a short demold time for multiple part production. It is castable up to ½" in thickness.

- 3 min. gel time
- 15-30 min. demold
- 70 Shore D

SKU	Size	Net weight (lb.)
055500	Quart Kit	2.1
055406	Gallon Kit	15.4
055405	5 Gallon Kit	77

Freeman 1085

Freeman 1085 is an excellent general-purpose prototyping urethane elastomer. It offers a tan color, 1:1 mix ratio by weight or volume for quick and easy mixing along with a very low viscosity to ensure void-free castings. It is castable up to 3" in thickness.

- 6 min. gel time
- 1/2-2 hour demold
- 69 Shore D

SKU	Size	Net weight (lb.)
055502	Quart Kit	2
055127	Gallon Kit	15.2
055125	5 Gallon (Resin)	38
055126	5 Gallon (Hardener)	38

RenCast 6432-1

RenCast 6432-1 is a low viscosity polyurethane casting system for simulating injection molded plastic parts. The 5 to 6 minute gel time permits hand mixing and pouring, yet the parts are demoldable in 1 to 2 hours. This enables production of multiple parts in 1 day without the expense of a meter-mix machine.

- 5-6 min. gel time
- 1-2 hour demold
- 72 Shore D

SKU	Size	Net weight (lb.)
056678	Gallon Kit	13.8

RenCast 6497 is recommended for thin-wall flexible parts.

RenCast 6486

This extremely tough material 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.

- 7-8 min. gel time
- 8 hour demold
- 67 Shore D

SKU	Size	Net weight (lb.)
056636	5 Gallon (Resin)	40
056637	5 Gallon (Hardener)	20

RenCast 6497

RenCast 6497 is a flexible polyurethane casting system used to produce rubber-like parts quickly and easily. A 4-5 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.

- 4-5 min. gel time
- 2 hour demold
- 70 Shore A

SKU	Size	Net weight (lb.)
056723	Gallon Kit	16

RenCast 6491

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. Its heat resistance is 224°F Tg per DMA.

- 4-5 min. gel time
- 30-40 min. demold
- 85 Shore D

SKU	Size	Net weight (lb.)
056675	Gallon Kit	16

Freeman Synthene PRC 1700

Freeman Synthene PRC 1700 is a premium performance, heat-cured, clear casting resin that offers excellent clarity, incredible toughness, and UV stability. These characteristics make PRC 1700 an excellent selection for displays, optical components, and encapsulation.

- 17-19 min. gel time
- 2 hour demold*
- 87 Shore D

SKU	Size	Net weight (lb.)
057021	5 kg (Resin)	11.02
057020	3 kg (Hardener)	6.6

*Other specifications are average values measured on specimens after curing 2 hours at 158°F, plus 16 hours at 212°F.

PRC 1700 can be easily tinted.
See our Freeman Color Tints on page 56.

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 release procedure to facilitate clean and easy part release.

Specifications

	Mix Ratio (by wt.) Resin:Hardener	Mix Ratio (by vol.) Resin:Hardener	Mixed Viscosity (cps)	Casting Limit Thickness (in.)	Hardness (Shore A)	Gel Time (min.) @ 72°F	Demold Time (hr.) @ 72°F	Density (g/cc)	Volumetric Yield (in.³/lb.)	Tensile Strength (psi)	Elongation (%)	Tear Strength (psi)	Tear, Die C (pli)	Tear, Split (pli)	Shrink (in./in.)	Color
Freeman 1035	1:1	1:1	1,500	2	35	30	16	1.02	27.2	420	1,000	–	85	–	0.001	Lt. Brown
Freeman 1040	10:100	9:100	1,350	2	45-55	38	24	1.04	26.6	1,257	225	146	–	–	0.001	Off-White
RenCast 6400-3	10:100	9:100	1,700	2	52	40	24	1.04	26.6	1,143	251	132	–	–	0.001	Off-White
RenCast 6401-3	25:100	22:100	1,200	1.5	65	40	16 - 24	1.07	25.9	1,720	270	214	–	–	0.0005	Off-White
RenCast 6410-2	1:1	93:100	1,200	4	37	26	16	1.04	26.6	504	340	85	–	–	0.003	Off-White
ISOMold URP-4102	1:1	1:1	1,025	2	29	25 - 30	16	1.02	27.2	907	1,000	–	108	24	0.001	Gray
ISOMold URP-4106	100:89	1:1	1,375	–	35	20	16	1.11	24.9	400	450	–	78	9	0.001	Blue
ISOMold UMC 501	1:1	1:1	2,200	–	50	20	16	1.03	26.9	1,200	450	155	147	20	0.001	Gray
ASTM	–	–	D-2393	–	D-2240	D-2471	–	D-792	D-792	D-638	D-638	D-624	–	–	D-2566	–

Freeman 1035

This flexible beige 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. It is castable up to 2" thick.

- 30 min. gel time
- 16 hour demold
- 35 Shore A

SKU	Size	Net weight (lb.)
055129	Pint Kit	2
055401	Gallon Kit	16
055402	5 Gallon Kit	80
055403	Drum Kit	880

Freeman 1040 offers excellent flexibility and a high tear strength.

Freeman 1040

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 is off-white, flows easily, features a high tear strength and is castable up to 2" thick.

- 38 min. gel time
- 24 hour demold
- 52 Shore A

SKU	Size	Net weight (lb.)
055130	Gallon Kit	8.8
055131	2 Quarts (Resin)	4
055132	5 Gallons (Hardener)	40

OVERNIGHT CURE - FLEXIBLE CONTINUED

RenCast 6400-1 / Ren 6400-3

RenCast 6400 is ideal for making flexible molds which can be stripped from parts having undercuts or backdraft. This off-white material can be cast as resilient parts and pads. It is very flexible and tear-resistant and is castable up to 2" thick.

- 40 min. gel time
- 24 hour demold
- 52 Shore A

SKU	Size	Net weight (lb.)
056548	0.5 lb. Thickening Agent (Resin)	0.5
056923	1 Gallon Kit	8.8
056531	2 Quart (Resin)	4
056922	5 Gallon (Hardener)	40
056900	5 Gallon (Resin)	40
056921	55 Gallon (Hardener)	400

RenCast 6401-1 / Ren 6401-3

This off-white product features outstanding tear strength and elongation. Molds made of this material can be flexed and stretched, allowing for easy removal of parts. It is castable up to 1½" thick.

- 40 min. gel time
- 16-24 hour demold
- 65 Shore A

SKU	Size	Net weight (lb.)
056926	Gallon Kit	10
056528	1 Gallon (Resin)	9
056924	5 Gallon (Hardener)	36
056551	5 Gallon (Resin)	40
056925	55 Gallon (Hardener)	450

RenCast 6410-1 / Ren 6410-3

Ideal for producing very flexible molds and resilient parts, this off-white elastomer features a 1:1 mix ratio by weight with low viscosity and is castable up to 4" thick.

- 26 min. gel time
- 16 hour demold
- 37 Shore A

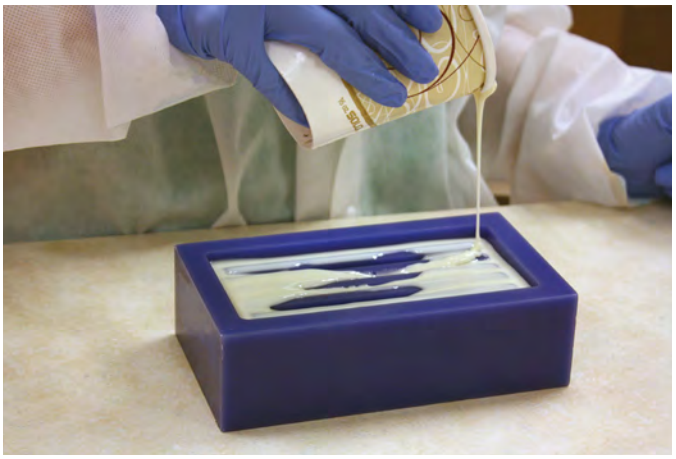
SKU	Size	Net weight (lb.)
056934	Gallon Kit	14
056540	5 Gallon (Resin)	35
056942	5 Gallon (Hardener)	35

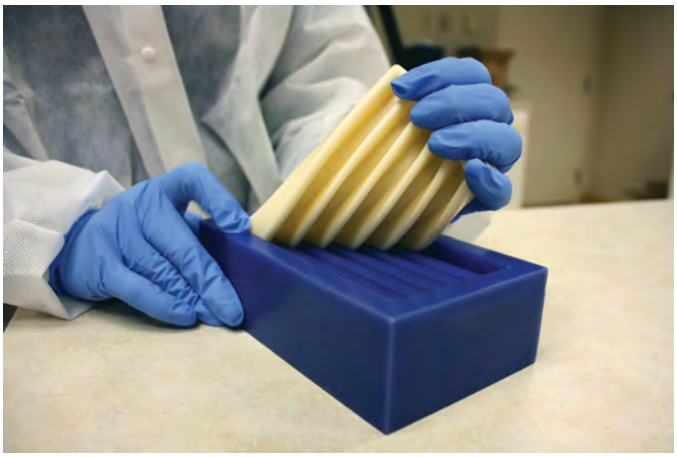
ISOMold URP-4102

This gray, low-viscosity, flexible urethane with a 1:1 mix ratio by weight or volume is most commonly used for molds of masters with undercuts, rapid prototyping, special effects, taxidermy, and sculpture reproduction.

- 25-30 min. gel time
- 16 hour demold
- 29 Shore A

SKU	Size	Net weight (lb.)
057472	10 Gallon Kit	80
057473	55 Gallon Kit	880





These overnight cure elastomers offer incredible flexibility. They are not self-releasing, so make sure to use the appropriate release system to ensure a clean and easy demolding process. You can also use Machinable Wax (page 69) shown above, which naturally features self-releasing properties.

ISOMold URP-4106

This blue 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.

- 20 min. gel time
- 16 hour demold
- 35 Shore A

SKU	Size	Net weight (lb.)
057404	2 Quart Kit	4.6
057405	2 Gallon Kit	18.5
057406	10 Gallon Kit	92.5

ISOMold UMC 501

Used to make molds of detailed masters that do not contain undercuts, this flexible, beige-colored elastomer is ideal for making concrete molds and form lines.

- 20 min. gel time
- 16 hour demold
- 50 Shore A

SKU	Size	Net weight (lb.)
057475	2 Gallon Kit	16
057476	10 Gallon Kit	80
057477	55 Gallon Kit	880

OVERNIGHT CURE - SEMI-RIGID

Freeman and Ren 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.

Freeman 1060

Specifications

	Mix Ratio (by wt.) Resin:Hardener	Mix Ratio (by vol.) Resin:Hardener	Casting Limit Thickness (in.)	Gel Time (min.) @ 72°F	Demold Time (hr.) @ 72°F	Shore Hardness	Viscosity R/H or Mixed (cps)	Density (g/cc)	Volumetric Yield (in.³/lb.)	Shrink (in. /in.)	Tensile Strength (psi)	Elongation (%)	Tear Strength (ppi)	Deflection Temp (°F)	Color
Freeman 1050	1:1	100:94	4	26	16	85A	1,650	1.10	25.2	0.001	2,050	510	280	–	Lt. Amber
Freeman 1060	100:60	100:60	2	28	16	60D	2,600	1.05	26.4	0.001	3,200	300	510	–	Red, Black
Freeman 1066	100:50	100:50	2	15-17	2-4	65D	3,200	1.03	26.9	0.0025	3,100	140	630	181	Red, Black
RenCast 6402-1/Ren 6402-3	35:100	31:100	1	31-33	24	82A	940	1.08	25.6	0.001	2,172	270	285	–	Off-White
RenCast 6403-1/Ren 6403-3	50:100	44:100	0.5	30	24	85-90A	710	1.10	25.2	0.001	3,334	328	419	–	Off-White
RenCast 6442	1:1	100:94	4	28	24	85A	1,610	1.09	25.4	<0.001	2,100	525	290	–	Lt. Amber
RenCast 6443	100:60	100:60	2	19	24	95A	2,450	1.06	26.1	0.001	3,500	475	375	–	Lt. Amber
RenCast 6444	100:60	100:60	2	27	24	60D	2,500	1.08	25.6	0.001	3,400	325	550	154	Lt. Amber
RenCast 178-88/Ren 6444	100:60	100:60	2	27	24	60D	2,500	1.05	26.4	0.001	3,400	325	550	–	Red
Flexane 80	77:23	–	4	30	10	87A	10,000	1.04	26.5	0.0018	2,100	650	350	–	Black
Flexane 94	69:31	–	4	10	5	97A	6,000	1.04	26.5	0.0014	2,800	500	415	–	Black
ISOMold URP-5122	96:100	1:1	2	15	24	70A	2,650	1.06	26.1	0.001	1,468	900	264	–	Dk. Amber
ASTM	–	–	–	D-2471	–	D-2240	D-2393	D-792	D-792	D-2566	D-638	D-790	D-624	–	

Freeman 1050

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. It features a light amber color, 1:1 mix ratio by weight for easy mixing, and a 26 minute gel time providing ample time for degassing. It is castable up to 4" thick.

- 26 min. gel time
- 16 hour demold
- 85 Shore A

SKU	Size	Net weight (lb.)
055142	Quart Kit	2.5
055141	Gallon Kit	10
055139	5 Gallon (Resin)	25
055140	5 Gallon (Hardener)	25

Both Freeman 1060 and 1066 are available in Red or Black.

Freeman 1060

An industry standard, Freeman 1060 semi-rigid polyurethane casting resin is renown 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. Freeman 1060 is available in either red or black, with a maximum cast thickness of 2".

- 28 min. gel time
- 16 hour demold
- 60 Shore D

SKU	Size	Net weight (lb.)
055108	Quart Kit (Black)	2.5
055106	Gallon Kit (Black)	10
055110	Gallon Kit (Red)	10
055107A	5 Gallon (Resin)	31.3
055107B	5 Gallon (Hardener - Black)	18.8
055111B	5 Gallon (Hardener - Red)	18.8
055116	55 Gallon (Resin)	460
055117	55 Gallon (Hardener - Black)	280

Freeman 1066

With a 65 Shore D hardness, this black or red polyurethane elastomer is specifically designed for highly abrasion resistant foundry tooling. Harder than our Freeman 1060, this product will not deflect as much under high pressure molding processes. It also has increased rigidity in thin wall sections and is able to be machined or sanded without softening. Freeman 1066 features a heat deflection temperature of 181°F, and a maximum cast thickness of 2".

- 15-17 min. gel time
- 2-4 hour demold
- 65 Shore D

SKU	Size	Net weight (lb.)
055120	Gallon Kit (Black)	9.75
055119	Gallon Kit (Red)	9.75
055121	5 Gallon (Resin)	32.5
055122	5 Gallon (Hardener - Black)	16.3
055118	5 Gallon (Hardener - Red)	16.3
055123	55 Gallon (Resin)	420
055124	55 Gallon (Hardener - Black)	210
055112	55 Gallon (Hardener - Red)	210

OVERNIGHT CURE - SEMI-RIGID CONTINUED

RenCast 6402-1 / Ren 6402-3

This product is a tough, flexible elastomer that features an off-white color and low viscosity for easy mixing and excellent detail reproduction. This system is ideal for production models, metal-forming pads, and a variety of mechanical parts. It is castable up to 1" thick.

- 31-33 min. gel time
- 24 hour demold
- 82 Shore A

SKU	Size	Net weight (lb.)
056929	Gallon Kit	7.8
056534	Gallon (Resin)	9.1
056927	5 Gallon (Hardener)	26

RenCast 6403-1 / Ren 6403-3

Ideal for durable parts such as impellers, rollers, gears and wheels, this off-white elastomer features low viscosity, fast cure, high tensile strength and good load recovery. It is castable up to ½" in thickness.

- 30 min. gel time
- 24 hour demold
- 85-90 Shore A

SKU	Size	Net weight (lb.)
056931	Gallon Kit	12
056537	5 Gallon (Resin)	40
056930	5 Gallon (Hardener)*	40

*Two 5 Gallon Hardeners are required for one 5 Gallon of Resin.

RenCast 6442

Ideal for vibration-dampening applications as well as production and prototype parts, RenCast 6442 features a 1:1 mix ratio by weight, long pot life, light amber color, low viscosity and good wear resistance. It is castable up to 4" in thickness.

- 28 min. gel time
- 24 hour demold
- 85 Shore A

SKU	Size	Net weight (lb.)
056542	Gallon Kit	13.8
056543	5 Gallon (Resin)	40
056544	5 Gallon (Hardener)	40
056566	55 Gallon (Resin)	460
056567	55 Gallon (Hardener)	460

RenCast 6443

RenCast 6443 is light amber in color, cures semi-rigid in mass and is flexible in thin cross-sections. This material is used for foundry patterns and core boxes because it features good abrasion resistance and is moisture tolerant during casting. It is castable up to 2" in thickness.

- 19 min. gel time
- 24 hour demold
- 95 Shore A

SKU	Size	Net weight (lb.)
056545	Gallon Kit	11.2
056546	5 Gallon (Resin)	40
056547	5 Gallon (Hardener)	24

RenCast 6444

RenCast 6444 is highly specified for the most demanding wear applications such as foundry patterns and core boxes. It features low viscosity and good working life allowing for ease of handling and release of entrapped air. It is castable up to 2" in thickness.

- 27 min. gel time
- 24 hour demold
- 60 Shore D

SKU	Size	Net weight (lb.)
056521	Gallon Kit	11.2
056522	5 Gallon (Resin)	40
056523	5 Gallon (Hardener)	24
056669	55 Gallon (Resin)	460
056670	55 Gallon (Hardener)	276

RenCast 178-88

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

- 27 min. gel time
- 24 hour demold
- 60 Shore D

SKU	Size	Net weight (lb.)
056519	5 Gallon (Resin)	40
056523	5 Gallon (6444 Hardener)	24
056672	55 Gallon (Resin)	460
056670	55 Gallon (6444 Hardener)	276

Devcon Flexane 80

Featuring low shrink and high chemical and abrasion resistance, this black-colored material 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.

- 30 min. gel time
- 10 hour demold
- 87 Shore A

SKU	Size	Net weight (lb.)
054625	1 lb. Kit	1
054626	10 lb. Kit	10
054642	8 oz. Additive	0.5

Devcon Flexane 94

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

- 10 min. gel time
- 5 hour demold
- 97 Shore A

SKU	Size	Net weight (lb.)
054627	1 lb. Kit	1
054628	10 lb. Kit	10

ISOMold URP-5122

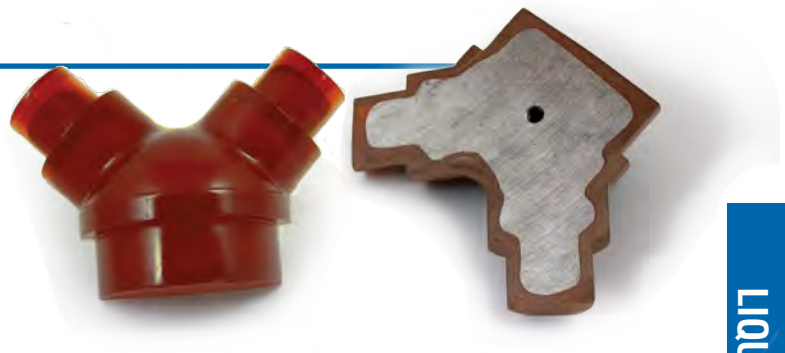
This semi-rigid urethane is used to make molds of detailed masters that do not contain undercuts. The most common uses include foundry patterns and core boxes, gaskets, liners, and fixtures. This dark amber, economical material features a 1:1 mix ratio by volume for ease of use.

- 15 min. gel time
- 16 hour demold
- 70 Shore A

SKU	Size	Net weight (lb.)
057455	2 Gallon Kit	17.5
057456	10 Gallon Kit	94

OVERNIGHT CURE - RIGID

These harder polyurethanes have a variety of uses including prototyping thermoplastic-like parts, constructing molds for low-volume metal forming applications, and heat-resistant foundry tooling. The long gel time to provide sufficient time to vacuum degas prior to pouring. A 16-24 hour cure time is required before demolding.



Specifications

	Mix Ratio (by wt.) Resin:Hardener	Mix Ratio (by vol.) Resin:Hardener	Gel Time (min.) @ 72°F	Demold Time (hr.) @ 72°F	Hardness (Shore D)	Viscosity R/H or Mixed (cps)	Density (g/cc)	Volumetric Yield (in.³/lb.)	Shrink /in./in.)	Compressive Strength (psi)	Flexural Strength (psi)	Flexural Modulus (psi)	Tensile Strength (psi)	Izod Impact (ft. lb/in.)	Deflection Temp. (°F)	Tg per DMA (°F)
Cristal HRI 120	100:75	–	120	24	87	550	1.18	23.4	0.001	–	12,618	319,082	9,717	–	176	–
RenCast 6405-1	1:1	90:100	45 - 55	24	75	220	1.13	24.5	0.001	6,400	6,600	–	4,900	0.71	124	–
RenCast 178-59-1	36:100	50:100	22	24	88	4,000	1.61	17.2	0.001	14,500	9,000	835,000	5,500	0.35	136	201
ASTM	–	–	D-2471	–	D-2240	D-2393	D-792	D-792	D-2566	D-695	D-790	D-790	D-638	D-256	D-648	D-4065

Freeman Synthene Cristal HRI 120

Cristal HRI 120 is a mercury-free clear polyurethane elastomer ideal for prototyping, encapsulating, and optical parts. This material has a 120 minute gel time and is self-degassing. It offers an overnight cure, but the demold time can be accelerated as well as strength if heat cured at 158°F for 2 hours.

- 120 min. gel time
- 24 hour demold
- 87 Shore D

SKU	Size	Net weight (lb.)
057025	5 KG (Resin)	11
057024	3.75 KG (Hardener)	8.3

RenCast 6405-1

Ideal for prototyping of injection molded or thermoformed parts, this tough urethane features low viscosity, minimal air entrapment, and easy mixing. RenCast 6405-1 is white and may be easily tinted if desired. It is castable up to ½" in thickness.

- 20 min. gel time
- 24 hour demold
- 75 Shore D

SKU	Size	Net weight (lb.)
056271	Gallon Kit	16
056273	5 Gallon (Resin)	38
056272	5 Gallon (Hardener)	38

RenCast 178-59-1

Used in foundry applications with hot sand conditions, this red-brown polyurethane forms a very hard, durable, heat-resistant compound. It is castable up to 2" in thickness. *Use three 5 gallon pails of hardener per each 5 gallon pail of resin for the correct mix ratio.

- 22 min. gel time
- 24 hour demold
- 88 Shore D

SKU	Size	Net weight (lb.)
056354	5 Gallon (Resin)	45
056355	5 Gallon (Hardener) - 3 req.*	41

POLYURETHANE ACCESSORIES

Devcon Flexane FL-10 Primer

This blue, one-component adhesion promoter increases the bonding strength of liquid polyurethanes to metal surfaces. To use, apply two coats to a clean and roughened metal surface permitting 15 minutes between applications and 30 minutes prior to pouring the urethane. Offered in a 4 oz. can. **(SKU #054635)**

Devcon Flexane FL-20 Primer

FL-20 is an orange, one-component adhesion promoter that increases the bonding strength of liquid polyurethanes to concrete, rubber, urethane, wood, fiberglass, and cured epoxy surfaces. To use, apply two coats to the clean and roughened surface permitting 15 minutes between applications and 30 minutes prior to pouring the urethane. Offered in a 4 oz. can. **(SKU #054639)**

Freeman 302 Urethane Protectant

Freeman 302 is an inert gas used to preserve and prolong the usable life of moisture sensitive polyurethanes. Before resealing the containers, spray a short burst of Freeman 302 in the open container and seal immediately. Repeat after every use. Offered in a 10 oz. aerosol can. **(SKU #054706)**

Ren Accelerators

These liquid catalysts accelerate the curing process and reduce demold times. Mix thoroughly in the hardener before adding the required amount of resin. Ren 178-57 is for use ONLY with RenCast 6442, 6443, 6444, Freeman 1050, or Freeman 1060. Ren 178-62 is for use ONLY with RenCast 6400, 6401, 6402, 6403, 6405, 6410 or Freeman 1040.

SKU	Description	Net weight (lb.)
056557	Ren 178-57 (Quart)	1.7
056556	Ren 178-62 (Quart)	1.5

MOLD MAKING SILICONE RUBBER

Elkem (formerly Bluestar) RTV Silicone Rubber is used extensively where a flexible, self-releasing mold material is required. These silicones are an excellent choice for rapid prototype tooling, polyurethane casting, and general silicone mold-making. This top quality line of silicone systems offers high accuracy, high heat resistances, excellent tear strength and incredible elongation properties. Silicone rubbers are available in two types – addition-cure (with a platinum-based catalyst) and condensation-cure (with a tin-based catalyst).

ELKEM ADDITION-CURE SILICONE RUBBER

Specifications

	Hardness (Shore A)	Mixed Viscosity (cps)	Mix Ratio (by wt.) Base:Catalyst	Gel Time (min.) @ 72°F	Demold Time (hr.)	Elongation (%)	Tear Strength (ppi)	Specific Gravity	Volumetric Yield (in.³/lb.)
V-243	60	100,000	10:1	300	3-4*	–	–	1.24	22.3
V-249	67	100,000	10:1	300	3-4*	200	–	1.24	22.3
V-330 (w/ CA-35)	25	10,000	10:1	100	16	510	180	1.30	21.3
V-330 (w/ CA-35FC)	23	10,000	10:1	40	4-6	480	180	1.30	21.3
V-330 (w/ CA-45)	33	10,000	10:1	100	16	500	170	1.30	21.3
V-330 (w/CA-45FC)	33	10,000	10:1	40	4-6	475	150	1.30	21.3
V-340 (w/ CA-35)	40	25,000	10:1	100	16	500	180	1.33	21.0
V-340 (w/ CA-35FC)	36	25,000	10:1	40	4-6	500	180	1.33	21.0
V-340 (w/ CA-45)	47	25,000	10:1	100	16	400	150	1.33	21.0
V-340 (w/ CA-45FC)	45	25,000	10:1	40	4-6	350	125	1.33	21.0
V-340 (w/ CA-55)	53	25,000	10:1	100	16	340	75	1.33	21.0
V-340 (w/ CA-55FC)	53	25,000	10:1	40	4-6	300	85	1.33	21.0
V-345	45	25,000	1:1	90	16	425	150	1.20	23.0
V-3040 (w/ V-3020B)	22	40,000	10:1	45	16	525	130	1.08	25.6
V-3040 (w/ V-3038B)	36	40,000	10:1	60	16	340	100	1.08	25.6
V-3040 (w/ V-3040B)	38	40,000	10:1	60	16	340	120	1.08	25.6
V-3040 (w/ V-3045B)	45	40,000	10:1	60	16	205	130	1.08	25.6
V-3044	38	40,000	1:1	120	16	372	114	1.09	25.4
RTV-3460	58	65,000	10:1	90	16	175	140	1.20	23.1
RTV-4410	10	2,500	1:1	90	16	800	80	1.10	25.2
RTV-4410 QC	11	1,600	1:1	10	8-12	650	60	1.08	25.6
LSR-4310	10	110,000	1:1	–	2-4*	1,060	125	1.08	25.6
ASTM	D-2240	D-2393	–	D-2471	–	D-412	D-624	–	D-792

*Indicates heat cure

Addition-Cure Silicone offers:

- *Unlimited shelf life (in cured state)*
- *Very low shrinkage for increased mold accuracy*
- *Higher durometers for greater mold stability*
- *Excellent heat resistance up to 400°F*
- *Ideal material for polyurethane casting – the platinum-based catalyst keeps cured silicone from inhibiting urethane curing*

ELKEM ADDITION-CURE SILICONE RUBBER CONTINUED

V-243 Silicone Rubber

- 60 Shore A
- 100,000 cps Viscosity
- Beige

V-243 offers long work life with high strength properties, and the ability to accept high levels of silicone diluent fluid, making it an excellent choice for transfer print pad and roll applications. This product requires a heat cure.

SKU	Size	Net weight (lb.)
054922KG	V-243 Base Only (20 kg)	44.1
054923KG	V-243 Catalyst Only (2 kg)	4.4

V-249 Silicone Rubber

- 67 Shore A
- 100,000 cps Viscosity
- Beige

Long work life, high strength properties, and a 67A Shore Hardness make this two-component silicone an excellent choice for embossing rolls, heat-activated adhesive label rolls, and hot melt glue rolls. V-249 will cure at room temperature, but requires a post cure of 200°F to reach full hardness.

SKU	Size	Net weight (lb.)
054806KG	V-249 Base Only (20 kg)	44.1
054807KG	V-249 Catalyst Only (2 kg)	4.4

V-330 Silicone Rubber

V-330 Silicone Rubber

- 23-33 Shore A
- 10,000 cps Viscosity
- Blue

This silicone offers two different cured hardnesses depending on the catalyst used. CA-35 results in a 25A Shore Hardness while 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. The Fast Cure catalysts reduce the demold time from 16 hours to only 4 hours, an excellent option where same-day demold is required.

SKU	Size	Net weight (lb.)
054809	V-330/CA-45 1 kg Kit	2.2
054810	V-330/CA-35 5 kg Kit	11
054808	V-330/CA-45 5 kg Kit	11
054805KG	V-330 Base Only (20 kg)	44.1
055218KG	CA-35 Catalyst Only (2 kg)	4.4
055203KG	CA-45 Catalyst Only (2 kg)	4.4
055224	CA-45FC Fast Cure Catalyst Only (2 kg)	4.4
054804KG	V-330 Base Only (200 kg)	441
055219KG	CA-35 Catalyst Only (20 kg)	44.1
055206KG	CA-45 Catalyst Only (20 kg)	44.1

V-340 Silicone Rubber

- 40-53 Shore A
- 25,000 cps Viscosity
- Blue or Gray

V-340 is one of our most popular silicone rubber systems for prototype molding applications due to its low viscosity, high strength, and economical price point. This versatile system also offers the flexibility of different cured hardnesses depending on the catalyst used. The Fast Cure catalysts produce a harder silicone and reduces demold time from 16 hours to only 4 hours, making them excellent options when same-day demold is required.

SKU	Size	Net weight (lb.)
055209	V-340/CA-45 1 kg Kit	2.2
055217	V-340/CA-35 5 kg Kit	11
055200	V-340/CA-45 5 kg Kit	11
055201	V-340/CA-55 5 kg Kit	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
055224	CA-45FC Fast Cure Catalyst Only (2 kg)	4.4
055204KG	CA-55 Catalyst Only (2 kg)	4.4
055205KG	V-340 Base Only (200 kg)	441
055219KG	CA-35 Catalyst Only (20 kg)	44.1
055206KG	CA-45 Catalyst Only (20 kg)	44.1
055207KG	CA-55 Catalyst Only (20 kg)	44.1
055223KG	CA-55FC Fast Cure Catalyst Only (20 kg)	44.1

V-345 Silicone Rubber

- 45 Shore A
- 25,000 cps Viscosity
- Beige

V-345 is a 1:1 mix ratio version of our very popular V-340. It features high tear strength, long mold life, excellent detail reproduction, excellent release characteristics, and an improved resistance to cure inhibition. V-345 may be easily pigmented using our Silicone Coloring Pastes (pg 56).

SKU	Size	Net weight (lb.)
054800	V-345 1 kg Kit	2.2
054801	V-345 5 kg Kit	11
054802	V-345 Base Only (20 kg)	44.1
054803	V-345 Catalyst Only (20 kg)	44.1

ELKEM ADDITION-CURE SILICONE RUBBER CONTINUED

RTV-3040 Clear Silicone Rubber

- 22-45 Shore A
- 40,000 cps Viscosity
- Translucent

RTV-3040 is specifically formulated to make clear rubber molds and features the strength and clarity required in high-end prototyping applications. RTV-3040 Base with RTV-3040 Catalyst provides a 38 Shore A hardness, our most popular combination. The base may also be used with other catalysts resulting in hardnesses from 22 to 45 Shore A. It is compliant to 21CFR177.2600 (repeated food contact applications).

SKU	Size	Net weight (lb.)
054903	RTV-3040 Quart Kit	2.2
054823	RTV-3040 Gallon Kit	11
054857KG	RTV-3040 Base Only (20 kg)	44.1
054868	RTV-3020 Catalyst Only (2 kg)	4.4
054931KG	RTV-3038 Catalyst Only (2 kg)	4.4
054858KG	RTV-3040 Catalyst Only (2 kg)	4.4
054866	RTV-3045 Catalyst Only (2 kg)	4.4
054871KG	RTV-3040 Base Only (200 kg)	441
054869KG	RTV-3040 Base Only (200 kg) Unlined	441
054867	RTV-3020 Catalyst Only (20 kg)	44.1
054937KG	RTV-3038 Catalyst Only (20 kg)	44.1
054872KG	RTV-3040 Catalyst Only (20 kg)	44.1

RTV-3044 Clear Silicone Rubber

- 38 Shore A
- 40,000 cps Viscosity
- Translucent

RTV-3044 is a 1:1 mix ratio version of our popular RTV-3040. This high-strength material reproduces intricate details while maintaining tight tolerances and has been formulated to provide improved urethane resin resistance. It is ideal for clear silicone molds and flexible prototypes.

SKU	Size	Net weight (lb.)
054861	RTV-3044 1 kg Kit	2.2
054862	RTV-3044 5 kg Kit	11
054859	RTV-3044 Base Only (20 kg)	44.1
054860	RTV-3044 Catalyst Only (20 kg)	44.1

RTV-3460 Silicone Rubber

- 58 Shore A
- 65,000 cps Viscosity
- Gray or Translucent

Available in Gray or Translucent, RTV-3460 is a two-component, addition-cure, room-temperature curing, 58 Shore A silicone rubber. It is designed for the prototype and architectural industries where urethane elastomers and foams are commonly used. Molds from this rubber feature high tear strength, excellent dimensional stability in high pressure applications, and improved release characteristics for long mold life.

SKU	Size	Net weight (lb.)
054936	RTV-3460 Gallon Kit - Gray	11
054934KG	RTV-3460 Base Only (20 kg)	44.1
054935KG	RTV-3460 Catalyst Only (2 kg) - Gray	4.4
054961	RTV-3460 Catalyst Only (2 kg) - Translucent	4.4
054932KG	RTV-3460 Base Only (200 kg)	440.9
054933KG	RTV-3460 Catalyst Only (20 kg) - Gray	44.1
054960	RTV-3460 Catalyst Only (20 kg) - Translucent	44.1

All of our Silicone Rubber products offer excellent detail reproduction.

Silbione RTV-4410 Special Effects Silicone

- 10 Shore A
- 2,500 cps Viscosity
- Translucent

Because of its high elongation, this very soft, two-component silicone is used in animatronics to create special effects skins and is perfect where extreme flexibility and repetitive motion is required. Low viscosity and a convenient 1:1 mix ratio makes RTV-4410 easy to mix and pour.

SKU	Size	Net weight (lb.)
054944	RTV-4410 Base Only (18 kg)	39.6
054945	RTV-4410 Catalyst Only (18 kg)	39.6

Silbione RTV-4410 QC Special Effects Silicone

- 11 Shore A
- 1,600 cps Viscosity
- Translucent

Offering the same features of Silbione RTV-4410, this fast-setting version can be demolded same day. RTV-4410 QC is designed for use in special effects and orthopedic applications, where flexibility and repetitive motion are required. This product offers a convenient 1:1 mix ratio.

SKU	Size	Net weight (lb.)
054950	RTV-4410 QC Base Only (18 kg)	39.6
054951	RTV-4410 QC Catalyst Only (18 kg)	39.6
054954	RTV-4410 QC Base Only (200 kg)	441
054955	RTV-4410 QC Catalyst Only (200 kg)	441

Silbione LSR-4310 Silicone Rubber

- 10 Shore A
- 110,000 cps Viscosity
- Translucent

Silbione LSR-4310 is a two-component, platinum-base silicone designed specifically for healthcare applications. This high-performance silicone offers a soft, skin-like feel that is easily pigmented with superior clarity. It meets or exceeds USP Class V1 testing requirements (refer to product TDS for details). It has a 1:1 mix ratio and features a rapid cure at elevated temperatures – a post cure is not necessary to reach the desired specifications.

SKU	Size	Net weight (lb.)
054873	LSR-4310 Base Only (18 kg)	39.7
054874	LSR-4310 Catalyst Only (18 kg)	39.7

ELKEM CONDENSATION-CURE SILICONE RUBBER

Specifications

	Hardness (Shore A)	Mixed Viscosity (cps)	Mix Ratio (by wt.) Base:Catalyst	Gel Time (min.) @ 72°F	Demold Time (hr.)	Elongation (%)	Tear Strength (ppi)	Specific Gravity	Volumetric Yield (in.³/lb.)
GP-25/Hi-Pro Green	25	50,000	10:1	210	16	380	150	1.2	23.1
GP-25/Hi-Pro Blue	26	50,000	10:1	90	6	370	115	1.16	23.9
V-1062/Hi-Pro Green	14	35,000	10:1	270	16	540	135	1.1	25.2
V-1062/Hi-Pro Blue	15	32,000	10:1	90	8	500	110	1.11	24.9
V-1065/Hi-Pro Green	25	45,000	10:1	300	16	480	140	1.11	24.9
V-1065/Hi-Pro Blue	30	43,000	10:1	120	6	430	100	1.11	24.9
V-1067/1067B	38	70,000	100:2.5	30-40	16	390	70	1.12	24.7
V-1067/Hi-Pro Blue	37	50,000	10:1	60	6-8	250	40	1.12	24.7
V-1068/Hi-Pro Clear	13	35,000	10:1	270	16	560	120	1.10	25.2
V-1082/Hi-Pro Clear	9	30,000	10:1	120	16	570	110	1.10	25.1
V-1082/Hi-Pro Clear ST	40 (00)	30,000	10:1	120	16	550	100	1.10	25.1
ASTM	D-2240	D-2393	–	–	–	D-412	D-624	–	–

Condensation-Cure Silicone offers:

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

The Hi-Pro Catalysts for our Condensation-Cure Silicone Rubbers are available in Clear, Blue, and Green.

GP-25 Silicone Rubber

- 25 or 26 Shore A
- 50,000 cps Viscosity
- Green or Blue

The economical GP-25 features an excellent mold life when casting polyester or plaster parts. The two catalyst options, Hi-Pro Green or Hi-Pro Blue, offer multiple demold times.

SKU	Size	Net weight (lb.)
054811KG	GP-25 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
054812KG	GP-25 Base Only (200 kg)	441
055215KG	Hi-Pro Green Catalyst Only (20 kg)	44.1
054879KG	Hi-Pro Blue Catalyst Only (20 kg)	44.1

V-1062 Silicone Rubber

- 14 or 15 Shore A
- 35,000 or 32,000 cps Viscosity
- Green or Blue

V-1062 is a high-performance, tin-catalyzed, room temperature curing silicone. The 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 Hi-Pro Blue catalyst at a ratio of 10:1 (base to catalyst) allows demolding in 6 hours. Both rubbers are commonly used for production of polyester figurines, giftware casting, and general purpose and production molding applications.

SKU	Size	Net weight (lb.)
054836	V-1062/Hi-Pro Green 4 kg Kit	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

- 25 or 30 Shore A
- 45,000 or 43,000 cps Viscosity
- Green or Blue

V-1065 is a high-performance, tin-catalyzed silicone commonly used for production of polyester figurines, giftware casting, and production molding application.
This popular rubber cures at room temperature with two catalyst options. Use the Hi-Pro Green Catalyst at a 10:1 ratio to produce a low shrink, 25 Shore A rubber with a 16 hour demold time. Use the Hi-Pro Blue catalyst at a 10:1 ratio for a 6 hour demold time.

SKU	Size	Net weight (lb.)
055210	V-1065/Hi-Pro Green 1 kg Kit	2.2
055211	V-1065/Hi-Pro Green 4 kg Kit	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)	441
055215KG	Hi-Pro Green Catalyst Only (20 kg)	44.1
054879KG	Hi-Pro Blue Catalyst Only (20 kg)	44.1

V-1067 Silicone Rubber

- 37 or 38 Shore A
- 70,000 cps Viscosity
- Blue or Clear

V-1067 is a high-performance, tin-catalyzed silicone ideal for general moldmaking applications. At room temperature, the V-1067B catalyst at a 100:2.5 ratio creates a low-shrink, 37 or 38 Shore A rubber with a 16 hour demold. The Hi-Pro Blue catalyst, at a 10:1 ratio, demolds within 6-8 hours.

SKU	Size	Net weight (lb.)
054883KG	V-1067 Base Only (20 kg)	44.1
054878KG	Hi-Pro Blue Catalyst Only (2 kg)	4.4
054921KG	V-1067 Base Only (200 kg)	441
054919KG	V-1067 Catalyst (Blue) Only (6 kg)	13.2
054918	V-1067 Catalyst (Clear) Only (6 kg)	13.2
054879KG	Hi-Pro Blue Catalyst Only (20 kg)	44.1

ELKEM CONDENSATION-CURE SILICONE RUBBER CONTINUED

V-1068 Special Effects Silicone Rubber

- 13 Shore A
- 35,000 cps Viscosity
- Translucent

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.

SKU	Size	Net weight (lb.)
054890	V-1068 Gallon Kit	8.8
054888KG	V-1068 Base Only (20 kg)	44.1
054889KG	Hi-Pro Clear Catalyst Only (2 kg)	4.4
054885KG	V-1068 Base (200 kg)	441
054886KG	Hi-Pro Clear Catalyst Only (20 kg)	44.1

V-1082 Special Effects Silicone Rubber

- 9 Shore A or 40 Shore 00
- 30,000 cps Viscosity
- Translucent

V-1082 is a slightly softer version of the V-1068 offering two different catalysts. The Hi-Pro Clear ST catalyst produces a harder silicone than the regular, flexible Hi-Pro Clear.

SKU	Size	Net weight (lb.)
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)	441
054886KG	Hi-Pro Clear Catalyst Only (20 kg)	44.1
054881KG	Hi-Pro Clear ST Catalyst Only (20 kg)	44.1

V-1068 and V-1082 can be used in the theatre or film industry for special effects or props. Special thanks to LifeFormations Inc. for use of this photo.

ELKEM AEROSPACE & ELECTRONICS SILICONE RUBBERS

V-612 Pratt & Whitney Specification Sealant

Elkem V-612 is a black, two-component, thixotropic, addition-cure aerospace sealant. It is designed as a vane potting and damping material. *Please note: V-612 can be supplied with Pratt & Whitney specifications. Please see our website, www.FreemanSupply.com, for complete details.*

SKU	Size	Net weight (lb.)
054896	5 oz. Kit	5
054895KG	5 kg Kit	11

V-622 Pratt & Whitney Specification Sealant

Designed for use as abradable air seals for compressor blades of jet engines, Elkem V-622 is a black, two-component aerospace sealant. *Please note: V-622 can be supplied with Pratt & Whitney specifications. Please see our website, www.FreemanSupply.com, for complete details.*

SKU	Size	Net weight (lb.)
054894KG	2.74 kg Kit	6

V-695 Silicone Aerospace Sealant

Also designed for use as abradable air seals for compressor blades of jet engines, Elkem V-695 is a black, two-component aerospace sealant.

SKU	Size	Net weight (lb.)
054893KG	2.74 kg Kit	6.1

V-205 Silicone Electronic Coating

Elkem V-205 is a one-component, addition-cure silicone rubber compound. This opaque black material provides a protective coating for light-sensitive transistors and integrated circuits. It offers primerless adhesion to inorganic substrates and must be refrigerated when not in use. The cure schedule for thick sections (25-50 ml) is 2 hours at 230°F plus 1 hour at 300°F; thin sections (less than 20 ml) require 15-60 min. at 300°F.

SKU	Size	Net weight (lb.)
054838KG	454 g	1

V-1022 Electronic Potting Silicone

This two-component, condensation-cure silicone rubber is specifically designed for potting and encapsulating electronic and electrical components. V-1022 bonds to most metals and plastics without a primer.

SKU	Size	Net weight (lb.)
054821KG	Base Only (20 kg)	44.1
054822KG	Catalyst Only (0.4 kg)	0.9

V-1022

SILICONE RUBBER ACCESSORIES

47V-50 Silicone Fluid

Elkem 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.

SKU	Size	Net weight (lb.)
054924	Quart	2
054832	Gallon	8
054833	20 kg	44.1
054925KG	200 kg	441

47V-100 Silicone Fluid

Like 47V-50, Elkem 47V-100 is also non-reactive silicone fluid that reduces the viscosity of silicone rubber, but with 100 cps viscosity. Adding 47V-100 to the "A" side (base) will also slightly reduce the hardness of the rubber and maximum usage should not exceed 10% by weight.

SKU	Size	Net weight (lb.)
054831	200 kg	441

V-04 Silicone Adhesion Primer

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

SKU	Size	Color	Net weight (lb.)
054816	Pint	Blue	0.8
054920KG	3 KG	Blue	6.6
054929KG	3 KG	Clear	6.6

V-06 Silicone Adhesion Primer

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

SKU	Size	Net weight (lb.)
054828KG	Pint	0.8
054827KG	3 kg	6.6

Vicure #2 Catalyst

Elkem Vicure #2 is a fast-reacting catalyst used with condensation cure silicone rubbers to accelerate cure times.

SKU	Size	Net weight (lb.)
054829KG	110 g Bottle	0.3

PT Accelerator

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

SKU	Size	Net weight (lb.)
054839KG	454 g	1

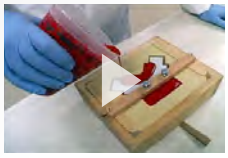
Thixo additive can be added to V-340 to create a brushable silicone material, used here as a component of a glove mold.

Thixo Additive 22646

Elkem Thixo Additive 22646 changes the viscosity of any condensation cure and some addition cure silicone rubbers from a pourable consistency to brushable. 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.

SKU	Size	Net weight (lb.)
054826KG	227 g	0.5
054825KG	20 kg	44.1

SEE ALSO *Besides all of our great products, resources such as TDS, SDS, instructional videos, selection guides and more are available on our website, www.FreemanSupply.com. Visit us online to find everything you need for your application.*



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.

Aluminum-filled
- *Gray*
- *Readily machinable*
- *Available with higher temperature resistances*

Iron-filled
- *Black*
- *Highly wear-resistant*
- *Suitable for foundry patterns or thin-gauge metal-forming tools*

Specifications

	Mix Ratio (by wt.) Resin:Hardener	Mix Ratio (by vol.) Resin:Hardener	Gel Time (min.) @ 72°F	Demold Time (hr.) @ 72°F	Hardness (Shore D)	Mixed Viscosity (cps)	Density (g/cc)	Volumetric Yield (in.³/lb.)	Shrink (in./in.)	Compressive Strength (psi)	Flexural Strength (psi)	Tensile Strength (psi)	Coefficient Thermal Expansion (in./in./°F)	Deflection Temp. (°F) (264 psi)	Tg per DMA (°F)
Aluminum-Filled Room-Temperature Epoxy Casting Resins															
Freeman 801	100:12	100:23	150	24	86	4,650	1.70	16.3	0.002	12,500	11,590	7,280	3.82×10^{-5}	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	140	24	88	4,300	1.78	15.6	0.001	14,400	13,000	8,700	3.76×10^{-5}	–	171
Devcon Plastic Aluminum	9:1	5:1	75	16	85	15,000 - 25,000	1.58	17.5	0.001	9,820	7,180	2,700	5.00×10^{-5}	–	–
Aluminum-Filled High-Temperature Epoxy Casting Resins															
Freeman 925	100:8	100:13	37	24	90	11,000	1.68	16.5	0.001	40,000	18,000	10,200	–	225	–
RenCast 4037 / Ren 4037	100:13	100:22	140	24*	91	15,000	1.58	17.6	0.005	25,800	9,300	6,300	2.25×10^{-5}	–	350
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	1.90×10^{-5}	–	350
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	2.25×10^{-5}	–	350
Iron-Filled Epoxy Casting Resins															
Freeman 855	100:10	100:25	150	24	87	13,950	2.23	12.4	0.001	13,400	9,100	6,800	2.80×10^{-5}	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	2.60×10^{-5}	165	–
RenCast 3209 / Ren 3209-2	100:11	100:28	240	24	85	15,000	2.15	12.9	0.003	11,500	8,000	5,000	3.20×10^{-5}	120	–
RenCast 3215-1/ Ren 3215-3	100:50	100:95	60	24	45	4,600	1.48	18.7	0.002	–	–	300	–	77	–
RenCast 3215-1/ Ren 3215-3	100:40	100:76	65	24	70	5,400	1.51	18.3	0.001	–	300	1,200	–	77	
RenCast 3215-1/ Ren 3215-3	100:30	100:57	70	24	85	6,200	1.54	18.0	0.002	12,600	6,900	4,300	–	77	
RenCast 3253	100:5	100:16	100	24	90	7,500	2.99	9.3	0.002	15,200	8,500	7,100	3.23×10^{-5}	120	–
RenCast 3261	100:6	100:16	25	24	88	35-50,000	2.94	9.4	0.003	16,500	8,500	6,000	3.00×10^{-5}	138	–
Other Epoxy Casting Resins															
RenCast 140	100:25	100:30	40	24	80	1,300	1.09	25.4	–	–	–	9,500	–	–	–
Devcon Plastic Steel Liquid	9:1	3:1	45	16	85	15-25,000	2.10	13.1	0.001	10,200	7,480	2,800	3.80×10^{-5}	–	–
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

*Indicates heated post cure

ALUMINUM-FILLED ROOM-TEMPERATURE EPOXY CASTING RESINS

Freeman 801

- Castable up to 3" thick
- 150 min. gel time
- 86 Shore D

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 a larger thickness.

SKU	Size	Net weight (lb.)
055626Q	Freeman 801 Resin Only (Quart)	2.7
055627Q	Freeman 801 Hardener Only (Pint)	0.32
055626	Freeman 801 Resin Only (Quarts – 6)	15.9
055627	Freeman 801 Hardener Only (Pints – 6)	1.9
055630	Freeman 801 Resin Only (5 Gallon)	60
055631	Freeman 801 Hardener Only (Gallon)	7.2

Freeman 805

- Castable up to ½" thick
- 150 min. gel time
- 88 Shore D

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 ½". This product also works very well for foundry tooling construction.

SKU	Size	Net weight (lb.)
055812	Freeman 805 Resin Only (Quart)	2
055813	Freeman 805 Hardener Only (½ Pint)	0.36
055809	Freeman 805 Resin Only (Quarts – 6)	12
055810	Freeman 805 Hardener Only (½ Pints – 6)	2.2
055807	Freeman 805 Resin Only (5 Gallon)	45
055808	Freeman 805 Hardener Only (Gallon)	8.1

RenCast 3269 / Ren 3269

- Castable up to ¾" thick
- 140 min. gel time
- 87 Shore D

This aluminum-filled epoxy features a slightly lower viscosity than the Freeman 801 and 805 for ease of pouring. Castable to ¾", RenCast 3269 is also designed for smaller tooling projects that require good durability and wear resistance.

SKU	Size	Net weight (lb.)
056116	RenCast 3269 Resin Only (5 Gallon)	60
056117	Ren 3269 Hardener Only (Gallon)	5.5

Devcon Plastic Aluminum

- Castable up to ¾" thick
- 75 min. gel time
- 85 Shore D

This aluminum-filled epoxy is ideal for producing rigid molds, patterns, and holding fixtures that can be machined to a metallic finish as well as drilled or tapped. It is also available in putty form (page 76).

SKU	Size	Net weight (lb.)
054600	Small Kit	1
054605	Large Kit	3

ALUMINUM-FILLED HIGH-TEMPERATURE EPOXY CASTING RESINS

Freeman 925

- Castable up to 1" thick
- 37 min. gel time
- 90 Shore D

Freeman 925 offers high impact and abrasion resistance, high accuracy, and low shrinkage. It is commonly used in prototype injection molding, vacuum forming, and high-temperature fixtures, handling elevated temperatures up to 225°F.

SKU	Size	Net weight (lb.)
055951	Freeman 925 Resin Only (Quart)	2
055953	Freeman 925 Hardener Only (½ Pint)	0.2
055950	Freeman 925 Resin Only (Quarts – 6)	12
055952	Freeman 925 Hardener Only (½ Pints – 6)	1
055954	Freeman 925 Resin Only (5 Gallon)	45
055955	Freeman 925 Hardener Only (Gallon)	3.6

RenCast 4036 / Ren 1500

- Castable up to 1" thick
- 60 min. gel time
- 90 Shore D

This aluminum-filled casting resin is 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.

SKU	Size	Net weight (lb.)
056166Q	RenCast 4036 Resin Only (Quart)	3.1
056167Q	Ren 1500 Hardener Only (Quart)	0.2
056166	RenCast 4036 Resin Only (Quarts – 6)	18.7
056167	Ren 1500 Hardener Only (Quarts – 6)	1.4
056161	RenCast 4036 Resin Only (5 Gallon)	65
056020	Ren 1500 Hardener Only (Gallon)	4

RenCast 4036 / Ren 1511

- Castable up to 4" thick
- 140 min. gel time
- 91 Shore D

RenCast 4036 / Ren 1511 has a lower exotherm formulation than RenCast 4036 / Ren 1500, enabling it to be poured to a maximum thickness of 4" for larger high temperature tooling, up to 300°F.

SKU	Size	Net weight (lb.)
056161	RenCast 4036 Resin Only (5 Gallon)	65
056160	Ren 1511 Hardener Only (2 Gallon)	8.4

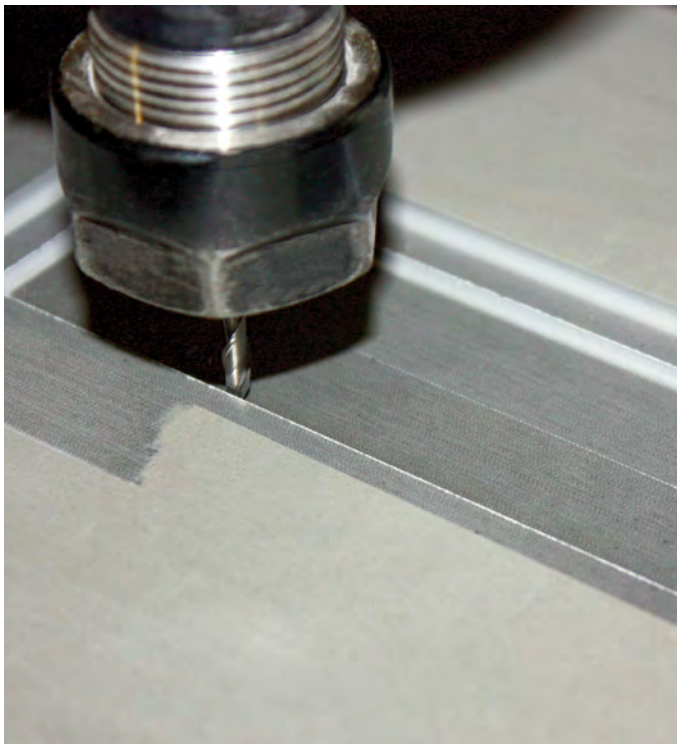
RenCast 4037 / Ren 4037

- Castable up to 4" thick
- 140-165 min. gel time
- 91 Shore D

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. This very versatile resin system is machinable, castable to 4" in thickness, and able to withstand maximum continuous temperatures of 300°F.

Important Note: The resin and hardener in this package is approximately 2.5 gallons total. The manufacturer uses a 5 gallon pail to allow adequate space for the addition of aluminum fillers if desired.

SKU	Size	Net weight (lb.)
056162	RenCast 4037 Resin Only (5 Gallon)	33
056163	Ren 4037 Hardener Only (Gallon)	4.4



RenCast 4037 can be machined for an incredibly smooth surface finish.

IRON-FILLED EPOXY CASTING RESINS

Freeman 855

- Castable up to ½" thick
- 150 min. gel time
- 87 Shore D

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

SKU	Size	Net weight (lb.)
055857	Freeman 855 Resin Only (5 Gallon)	45
055858	Freeman 855 Hardener Only (Gallon)	4.5

RenCast 3209

- Castable up to 2" or 6" thick
- 90 or 240 min. gel time
- 75 or 85 Shore D

This Epoxy Casting system offers high impact strength, low shrink and excellent wear resistance for light gage metal forming and foundry patterns, stretch press forms, and molds. The Ren 3209-2 Hardener offers a slower cure and higher castable thickness compared to the 3209-1.

SKU	Size	Net weight (lb.)
056059Q	RenCast 3209-1 Resin Only (Quart)	3.7
056061Q	Ren 3209-1 Hardener Only (Quart)	0.4
056059	RenCast 3209-1 Resin Only (Quarts – 6)	22.2
056061	Ren 3209-1 Hardener Only (Quarts – 6)	2.4
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)	4.3

RenCast 3215

- Castable from ¾" to 2" thick
- 60-70 min. gel time
- 45-85 Shore D

RenCast 3215 can be mixed in three different ratios, each offering various properties. A 100:50 ratio results in high flexibility, a 100:40 ratio is resilient, and a 100:30 ratio results in high impact resistance.

SKU	Size	Net weight (lb.)
056072	RenCast 3215-1 Resin Only (5 Gallon)	60
056083	Ren 3215-3 Hardener Only (5 Gallon)	30

RenCast 3253

- Castable up to ¾" thick
- 30 min. gel time
- 90 Shore D

This very tough epoxy with excellent abrasion resistance and good impact strength is ideal for dies, core boxes, foundry patterns, hammer forms, and fixtures.

SKU	Size	Net weight (lb.)
056087	RenCast 3253 Resin Only (5 Gallon)	60
056088	Ren 3253 Hardener Only (Gallon)	3

RenCast 3261

- Castable up to ½" thick
- 25 min. gel time
- 88 Shore D

This dual purpose resin may be used as a casting resin or a surface coat and offers fine surface detail and impact resistance. RenCast 3261 is well-suited for patterns, hammer form dies, core boxes and fixtures.

SKU	Size	Net weight (lb.)
056092Q	RenCast 3261 Resin Only (Quart)	5
056098Q	Ren 3261 Hardener Only (Quart)	0.3
056092	RenCast 3261 Resin Only (Quarts – 6)	29.9
056098	Ren 3261 Hardener Only (Quarts – 6)	1.7

OTHER EPOXY CASTING RESINS

RenCast 140

- Castable up to ¾" thick
- 40 min. gel time
- 80 Shore D

RenCast 140 is a clear, two-component epoxy casting system specifically designed for making clear parts or molds. Parts 1/8" or thinner require a heat cure at 100-150°F.

SKU	Size	Net weight (lb.)
056001	RenCast 140 Gallon Kit	9.3

Devcon Plastic Steel

- Castable up to ¾" thick
- 45 min. gel time
- 85 Shore D

Containing 80% steel and 20% epoxy resins and modifiers, this dark gray resin is very machinable with a high impact strength and an excellent resistance to chemicals and solvents. Also available in putty form (page 76).

SKU	Mfg. No.	Net weight (lb.)
054570	10210	1
054575	10220	4
054580	10230	25

SEE ALSO

Product	Page #
Tooling Plastics Fillers	57
Mixing Cups, Paddles and Shop Rags	129
Gloves and Protective Wear	129
Pattern Coatings (Primers, Paints & Sealers)	121
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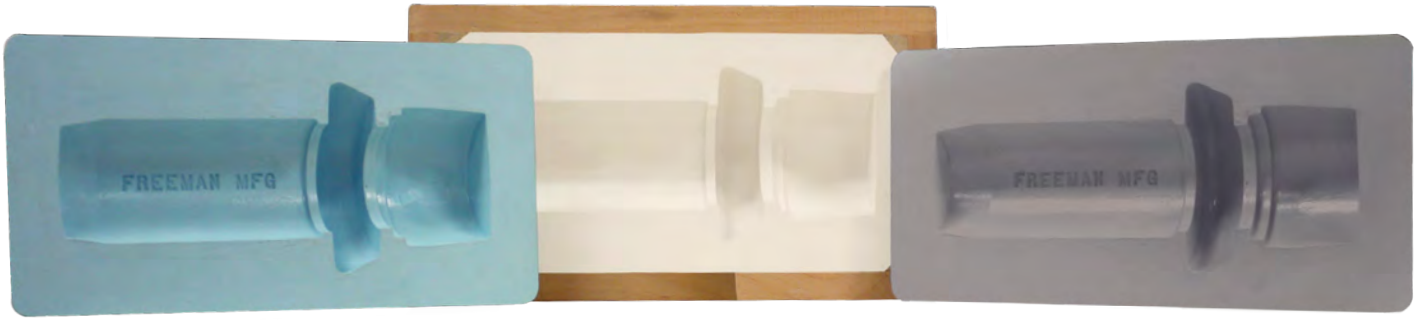
Epoxy Repair Materials	76

EPOXY SURFACE COATS

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

Freeman 701



Freeman 706 *Freeman 705* *RenGel 4026*

Specifications

	Mix Ratio (by wt.) Resin:Hardener	Mix Ratio (by vol.) Resin:Hardener	Gel Time (min.) @ 72°F	Demold Time (hr.) @ 72°F	Hardness (Shore D)	Mixed Viscosity (cps)	Density (g/cc)	Volumetric Yield (in.^{3}/lb.)	Shrink (in./in.)	Compressive Strength (psi)	Flexural Strength (psi)	Flexural Modulus (psi)	Tensile Strength (psi)	Coefficient Thermal Expansion (in./in./°F)	Deflection Temp. (°F)	Tg per DMA (°F)
Room-Temperature Surface Coats																
Freeman 701	100:8	100:13	15	24	87	Thixotropic	1.48	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	0.76×10^6	5,100	–	250	–
Freeman 705-45	100:14	100:20	45	24	90	18,300	1.4	19.6	–	16,800	7,000	0.76×10^6	5,100	–	250	–
Freeman 706-45	100:14	100:20	45	24	90	15,000	1.3	21.0	–	16,800	7,000	0.76×10^6	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	2.56×10^{-5}	235	–
RenGel 1124	100:18	100:27	25	24	90	Paste	1.4	19.0	0.002	14,500	10,000	–	6,200	2.89×10^{-5}	127	149
RenGel 1126	100:18	100:25	24	24	90	Paste	1.4	19.7	0.002	12,000	6,800	0.72×10^6	4,700	2.60×10^{-5}	127	165
RenGel 1129	100:20	100:26	20	24	85	Paste	1.4	19.9	0.002	13,900	15,500	0.49×10^6	4,880	3.16×10^{-5}	117	156
RenGel 3260	100:9	100:16	33	24	88	30,000	1.9	14.6	0.002	17,000	9,600	1.43×10^6	6,500	2.10×10^{-5}	138	–
High-Temperature Surface Coats																
Freeman 935-30	100:11	100:18	43	24	90	29,500	1.6	17.3	–	26,500	7,950	1.3×10^6	4,000	2.30×10^{-5}	370	–
Freeman 945	100:10	100:14	45-55	24	90	Thixotropic	1.4	19.9	–	25,000	8,000	–	5,000	3.70×10^{-5}	310	–
RenGel 4026 / Ren 1500	100:10	100:14	50-60	24	90	Paste	1.43	19.4	0.005	27,000	8,500	–	5,500	3.70×10^{-5}	–	310
RenGel 4026 / Ren 1501	100:10	100:14	30-40	24	90	Paste	1.4	19.4	0.0015	27,000	8,000	–	4,000	3.20×10^{-5}	–	310
RenGel 4026 / Ren 1510	100:10	100:14	120	24	90	Paste	1.4	19.4	–	26,000	8,700	–	6,000	3.80×10^{-5}	–	335
RenGel 177-144	100:10	100:15	60	24	92	Paste	1.6	17.8	0.002	28,000	12,500	0.7×10^6	7,000	2.40×10^{-5}	–	140
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

ROOM-TEMPERATURE SURFACE COATS

Freeman 701

- General Purpose
- White
- 15 min. gel time

This epoxy surface coat is used for constructing larger laminated tools, fixtures, and molds. Its thick viscosity means it will not sag on vertical walls.

SKU	Size	Net weight (lb.)
055721	Freeman 701 Resin Only (5 Gallon)	45
055722	Freeman 701 Hardener Only (Gallon)	3.6

Freeman 705

- Plastic-Face Plaster
- White
- 15 or 45 min. gel time

Freeman 705 offers good durability for a variety of composite tooling. Since it cures in the presence of moisture, it is ideal for plastic-face plaster tools. The choice of hardeners offer different working times.

SKU	Size	Net weight (lb.)
055712	Freeman 705 Resin Only (Quart)	2
055706	Freeman 705-15 Hardener Only (½ Pint)	0.3
055713	Freeman 705-45 Hardener Only (½ Pint)	0.3
055709	Freeman 705 Resin Only (Quarts – 6)	12
055705	Freeman 705-15 Hardener Only (½ Pints – 6)	1.7
055710	Freeman 705-45 Hardener Only (½ Pints – 6)	1.7
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

- Plastic-Face Plaster
- Blue
- 45 min. gel time

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

SKU	Size	Net weight (lb.)
055714	Freeman 706 Resin Only (Quart)	2
055715	Freeman 706-45 Hardener Only (½ Pint)	0.3
055703	Freeman 706 Resin Only (Quarts – 6)	12
055716	Freeman 706-45 Hardener Only (½ Pints – 6)	1.7
055717	Freeman 706 Resin Only (5 Gallon)	45
055718	Freeman 706-45 Hardener Only (Gallon)	6.3

RenGel 1118

- Hydroprobic
- Blue
- 30 min. gel time

RenGel 1118 will cure in the presence of moisture and is specifically designed for plastic-faced plaster tooling. It has a thick viscosity and will not sag on vertical walls.

SKU	Size	Net weight (lb.)
056016	RenGel 1118 Resin Only (5 Gallon)	40
056017	Ren 1118 Hardener Only (Gallon)	3.6

RenGel 1124

- General Purpose
- White
- 25 min. gel time

This durable epoxy surface coat system has a green color indicator in the resin that changes to amber when the product is completely mixed. Successive layers will aggressively bond to themselves, even to a cured underlying layer.

SKU	Size	Net weight (lb.)
056340Q	RenGel 1124 Resin Only (Quart)	2.8
056342Q	Ren 1124 Hardener Only (Quart)	0.5
056340	RenGel 1124 Resin Only (Quarts – 6)	16.9
056342	Ren 1124 Hardener Only (Quarts – 6)	3.1
056343	RenGel 1124 Resin Only (5 Gallon)	56
056344	Ren 1124 Hardener Only (Gallons – 2)	10

RenGel 1126

- General Purpose
- White
- 24 min. gel time

This general-purpose epoxy surface coat is lower in viscosity than RenGel 1124 but provides uniform coverage on vertical surfaces without sagging. It offers lower mechanical properties for less demanding applications.

SKU	Size	Net weight (lb.)
056023Q	RenGel 1126 Resin Only (Quart)	2.3
056024Q	Ren 1126 Hardener Only (Quart)	0.4
056023	RenGel 1126 Resin Only (Quarts – 6)	13.6
056024	Ren 1126 Hardener Only (Quarts – 6)	2.6
056026	RenGel 1126 Resin Only (5 Gallon)	45
056027	Ren 1126 Hardener Only (Gallon)	8.3

RenGel 1129

- Impact Resistant
- White
- 20 min. gel time

RenGel 1129 has a medium viscosity for easy application while resisting sagging on vertical walls. It produces a durable, high-impact resistant and durable surface for laminated tooling.

SKU	Size	Net weight (lb.)
056031	RenGel 1129 Resin Only (5 Gallon)	45
056032	Ren 1129 Hardener Only (Gallon)	9

RenGel 3260

- Silicone Carbide Filled
- Blue
- 33 min. gel time

Perfect for demanding applications, this silicon carbide-filled surface coat offers very high wear resistance. It is castable up to ½" thick and is ideal for foundry tooling, check fixtures, and metal forming dies. Alterations to the cured resin are very difficult due to the silicon carbide filler.

SKU	Size	Net weight (lb.)
056085Q	RenGel 3260 Resin Only (Quart)	2.9
056086Q	Ren 3260 Hardener Only (Quart)	0.3
056085	RenGel 3260 Resin Only (Quarts – 6)	17.6
056086	Ren 3260 Hardener Only (Quarts – 6)	1.7
056090	RenGel 3260 Resin Only (5 Gallon)	60
056091	Ren 3260 Hardener Only (Gallon)	5.5

HIGH-TEMPERATURE SURFACE COATS

RenGel 4026

- Aluminum filled
- Gray
- 30-150 min. gel time

RenGel 4026 is formulated to be high-temperature resistant as well as for creating vacuum form tools and prototype injection molds. This medium-viscosity material will not sag on vertical walls.

SKU	Size	Net weight (lb.)
056153Q	RenGel 4026 Resin Only (Quart)	2.2
056167Q	Ren 1500 Hardener Only (Pint)	0.2
056154Q	Ren 1501 Hardener Only (Pint)	0.2
056153	RenGel 4026 Resin Only (Quarts – 6)	13.1
056167	Ren 1500 Hardener Only (Pints – 6)	1.4
056154	Ren 1501 Hardener Only (Pints – 6)	1.4
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)	6.8

RenGel 177-144

- Silicon Carbide filled
- Gray
- 60 min. gel time

This product's silicon carbide filler resists abrasive wear and effects of styrene monomer on the tool surface. It is ideal for close-tolerance, long-lasting molds for polyester parts and can withstand the high exotherm during the curing process.

SKU	Size	Net weight (lb.)
056025	RenGel 177-144 Resin Only (5 Gallon)	60
056039	Ren 1500 Hardener Only (Gallon)	6

Freeman 935-30

- Aluminum filled
- Gray
- 43 min. gel time

This high-temperature resistant epoxy surface coat is ideal for constructing laminated tooling subjected to elevated temperatures such as vacuum forming and prototype injection molds.

SKU	Size	Net weight (lb.)
055942	Freeman 935 Resin Only (Quart)	2
055943	Freeman 935-30 Hardener Only (½ Pint)	0.2
055939	Freeman 935 Resin Only (Quarts – 6)	12
055940	Freeman 935-30 Hardener Only (½ Pints – 6)	1.3

Freeman 945 Surface Coat

Freeman 945

- Aluminum filled
- Gray
- 45-55 min. gel time

Freeman 945 is for large laminated tools subjected to high temperatures, serviceable up to 300°F. Uses include applications such as vacuum form tools and molds to produce composite parts that require an elevated cure to solidify. This medium-viscosity material will not sag on vertical walls.

SKU	Size	Net weight (lb.)
055966	Freeman 945 Resin Only (5 Gallon)	45
055967	Freeman 945 Hardener Only (Gallon)	4.5

DID YOU KNOW? *Freeman's Tech Team is ready to guide you on any project, large or small. To ask technical questions about a product or process, just call (800) 321-8511, option 5 or email tech@freemansupply.com. You will be connected to a technical representative specially trained on our products! They will be able to provide specifications, troubleshoot a problem, walk you through an application process, and provide various other technical information.*

EPOXY LAMINATING RESINS

These resins are ideal for general-purpose fiberglass laminated tooling and demanding abrasion-resistant or heat-resistant laminated tools.

Specifications

	Mix Ratio (by wt.) Resin:Hardener	Mix Ratio (by vol.) Resin:Hardener	Gel Time (min.) @ 72°F	Demold Time (hr.) @ 72°F	Hardness (Shore D)	Mixed Viscosity (cps)	Density (g/cc)	Volumetric Yield (in.³/lb.)	Compressive Strength (psi)	Flexural Strength (psi)	Flexural Modulus (psi)	Tensile Strength (psi)	Coefficient Thermal Expansion (in./in./°F)	Deflection Temp. (°F) @ 264 psi	Tg per DMA (°F)
Room-Temperature Laminating Resins															
Freeman 601	100:10	100:14	28	24	88	3,000	1.39	19.9	39,900	9,100	1.0×10^6	25,000	–	128	–
Freeman 605-15	100:16	100:20	20	24	82	2,850	1.30	21.3	40,000	33,500	1.8×10^6	25,300	–	188	–
Freeman 605-45	100:20	100:26	37	24	86	2,800	1.28	21.6	40,000	33,500	1.8×10^6	25,300	–	188	–
Freeman 690	100:33	100:37	90	24	86	1,445	1.10	25.0	26,500	39,900	1.3×10^6	35,500	–	180	–
Miapoxy 100 / 95	100:24	100:25	38	24	90	800	1.13	24.5	26,000	39,000	–	36,000	0.93×10^{-5}	128	–
Miapoxy 100 / 97	100:26	100:25	20	24	90	1,120	1.13	24.5	28,000	37,000	–	26,000	1.00×10^{-5}	128	–
RenLam 1700-1/ Ren 1700-1	100:26	100:28	20	24	90	2,000	1.13	18.5	28,000	37,000	1.5×10^6	26,000	1.00×10^{-5}	128	–
RenLam 1700-1/ Ren 956	100:23	100:25	36	24	89	1,350	1.13	18.5	24,700	40,700	1.73×10^6	34,900	0.97×10^{-5}	128	–
RenLam 1710/ Ren 1710	100:16	100:23	22	24	90	3,500	1.35	18.8	23,000	30,000	1.84×10^6	25,000	1.20×10^{-5}	129	164
RenLam 1710/ Ren 956	100:16	100:23	35	24	90	2,000	1.35	18.8	26,900	32,900	1.5×10^6	25,000	0.81×10^{-5}	129	–
RenLam 1720/ Ren 956	100:15	100:21	40	24	90	3,200	1.34	20.5	21,000	36,000	1.6×10^6	20,000	1.02×10^{-5}	–	164
RenLam 177-114/ Ren 956	100:24	–	38	24	90	800	1.15	24.1	26,000	39,000	–	36,000	0.93×10^{-5}	–	273
RenLam 8100	100:25	100:29	35	24	92	2,500	1.13	18.5	23,450	42,180	1.91×10^6	32,224	1.2×10^{-6}	128	167
High-Temperature Laminating Resins															
Freeman 917	100:10	100:13	52	24	92	4,000	1.46	19.0	24,500	30,574	1.6×10^6	23,000	2.56×10^{-5}	–	301
RenLam 4005/ Ren 1500	100:14	100:15	50	24	90	1,900	1.19	23.3	28,000	35,000	1.6×10^6	26,000	0.85×10^{-5}	289	338
RenLam 4014/ Ren 1500	100:11	100:14	55	24	90	4,000	1.34	20.8	28,000	34,000	1.7×10^6	24,000	1.41×10^{-5}	–	333
RenLam 4017/ Ren 1510	100:15	100:18	90	24	93	8,000	1.42	19.6	44,000	77,000	4.4×10^6	80,000	3.40×10^{-5}	–	350
RenLam 5052	100:38	100:47	7 hr.	24	–	700	1.17	20.2	–	20,305	4.5×10^6	12,473	–	–	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

- 28 min. gel time
- 88 Shore D
- White

This economical, general-purpose epoxy laminating resin is used for large composite tooling, mold construction and check fixtures. Freeman 601 is designed to be used with Freeman 701 Surface Coat.

SKU	Size	Net weight (lb.)
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

- 20 or 37 min. gel time
- 82 or 86 Shore D
- White

This general-purpose epoxy laminating resin features a variable gel time (depending on the hardener used) and is designed to be used with Freeman 705 and Freeman 706 Surface Coats.

SKU	Size	Net weight (lb.)
055612	Freeman 605 Resin Only (Quart)	2
055606	Freeman 605-15 Hardener Only (½ Pint)	0.3
055613	Freeman 605-45 Hardener Only (½ Pint)	0.4
055609	Freeman 605 Resin Only (Quarts – 6)	12
055605	Freeman 605-15 Hardener Only (½ Pints – 6)	1.9
055610	Freeman 605-45 Hardener Only (½ Pints – 6)	2.4
055607	Freeman 605 Resin Only (5 Gallon)	45
055608	Freeman 605-45 Hardener Only (Gallons – 2)	9
055614	Freeman 605 Resin Only (55 Gallon)	450
055615	Freeman 605-45 Hardener Only (5 Gallon) - 2 Req.	45

ROOM-TEMPERATURE LAMINATING RESINS CONTINUED

Freeman 690

- 90 min. gel time
- 86 Shore D
- Translucent

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.

SKU	Size	Net weight (lb.)
055015	Freeman 690 Resin Only (5 Gallon)	45
055016	Freeman 690 Hardener Only (Gallons – 2)	14.9

Miapoxy 100

- 38 or 20 min. gel time
- 90 Shore D
- Translucent

Miapoxy 100 is a clear, two-component epoxy laminating system specifically designed for producing strong and accurate fiberglass laminates or repairs. The Mia 95 hardener offers a longer 38 minute working time for larger parts, and the Mia 97 hardener offers a 20 minute working time for smaller parts or repairs.

SKU	Size	Net weight (lb.)
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

SEE ALSO *Convenient proportioning pumps (page 116) are sold separately for quick, accurate, and trouble-free metering of the correct amount of Miapoxy 100 resin and hardener.*

RenLam 1700-1

- 20 or 36 min. gel time
- 90 Shore D
- Translucent

This unfilled, general-purpose laminating system features excellent moisture and chemical resistance. Also used for adhesive applications and recommended for bonding wood and RenShape. Ren 956 hardener can also be used for an extended working time.

SKU	Size	Net weight (lb.)
056042Q	RenLam 1700-1 Resin Only (Quart)	1.6
056044Q	Ren 1700-1 Hardener Only (Pint)	0.5
056042	RenLam 1700-1 Resin Only (Quarts – 6)	9.8
056044	Ren 1700-1 Hardener Only (6 Pints)	2.8
056045	RenLam 1700-1 Resin Only (5 Gallon)	42
056046	Ren 1700-1 Hardener Only (Gallons – 2)	10.9
056043	RenLam 1700-1 Resin Only (55 Gallon)	480
056048	Ren 1700-1 Hardener Only (5 Gallon)	31.2
056192	Ren 956 Hardener Only (5 Gallon)	40

RenLam 1710

- 22 or 35 min. gel time
- 90 Shore D
- White

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

SKU	Size	Net weight (lb.)
056050	RenLam 1710 Resin Only (5 Gallon)	38
056051	Ren 1710 Hardener Only (Gallon)	6.1
056334	RenLam 1710 Resin Only (55 Gallon)	500
056192	Ren 956 Hardener Only (5 Gallon)	40
056336	Ren 1710 Hardener Only (5 Gallon)	40

RenLam 1720

- 40 min. gel time
- 90 Shore D
- White

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

SKU	Size	Net weight (lb.)
056052	RenLam 1720 Resin Only (5 Gallon)	45
056192	Ren 956 Hardener Only (5 Gallon)	40

RenLam 177-114

- 38 min. gel time
- 90 Shore D
- Amber

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

SKU	Size	Net weight (lb.)
056212	RenLam 177-114 Resin Only (55 Gallon)	450
056202	Ren 956 Hardener Only (55 Gallon)	450

RenLam 8100

- 35 min. gel time
- 92 Shore D hardness
- Light Yellow

RenLam 8100 / Ren 8100 is an unfilled fast-cure general purpose laminating resin system offering good wet-out and excellent strength.

SKU	Size	Net weight (lb.)
056009	RenLam 8100 Resin Only (5 Gallon)	38
056010	Ren 8100 Hardener Only (2 Gallon)	9.5

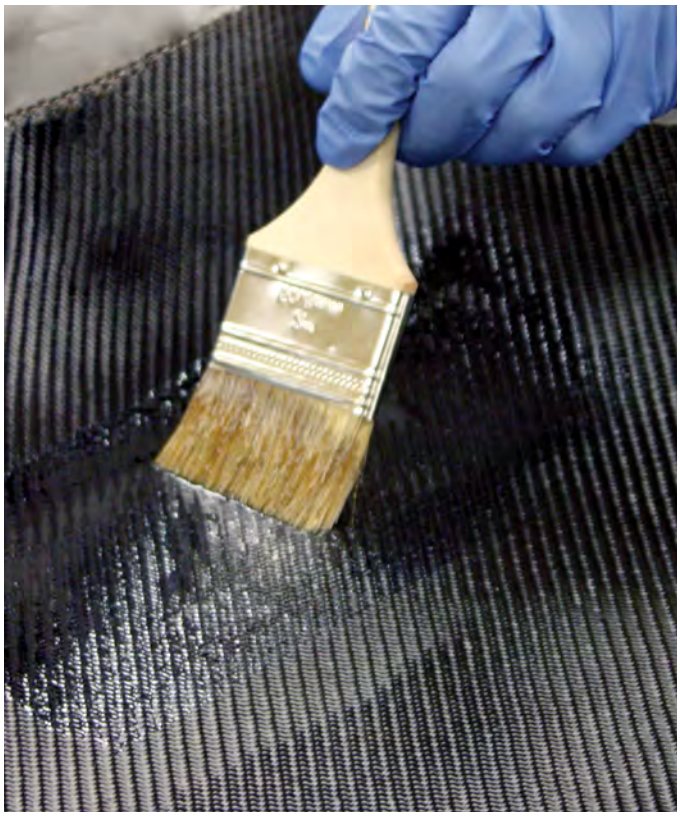
HIGH-TEMPERATURE LAMINATING RESINS

Freeman 917

- 52 min. gel time
- 92 Shore D hardness
- Gray

Freeman 917 features low viscosity, adequate gel time, excellent wet out characteristics, low shrinkage, good durability, and heat resistance. It is ideal for vacuum-form molds, blow molds, holding, nesting, and bonding fixtures that are typically subjected to high temperatures.

SKU	Size	Net weight (lb.)
055976	Freeman 917 Resin Only (5 Gallon)	45
055977	Freeman 917 Hardener Only (Gallon)	4.5



RenLam 4005 / Ren 1500

RenLam 4005 / Ren 1500

- 50 min. gel time
- 90 Shore D hardness
- Amber

This laminating system is an unfilled, heat-resistant epoxy suitable for continuous temperature of 300°F. This material is an excellent adhesive for bonding RenShape High-Temperature Tooling Boards (page 16).

SKU	Size	Net weight (lb.)
056132Q	RenLam 4005 Resin Only (Quart)	2
056133Q	Ren 1500 Hardener Only (Pint)	0.3
056132	RenLam 4005 Resin Only (Quarts – 6)	12
056133	Ren 1500 Hardener Only (Pints – 6)	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

- 55 min. gel time
- 90 Shore D hardness
- Gray

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

SKU	Size	Net weight (lb.)
056138	RenLam 4014 Resin Only (Quarts – 6)	14
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

- 90 min. gel time
- 93 Shore D hardness
- Black

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. RenLam 4017 / Ren 1510 is also the recommended adhesive for bonding RenShape 5065 (page 16).

SKU	Size	Net weight (lb.)
056144	RenLam 4017 / Ren 1510 Gallon Kit	9.2
056146	RenLam 4017 Resin Only (5 Gallon)	45
056040	Ren 1510 Hardener Only (Gallon)	6.8

RenLam 5052

- 7 hour gel time
- Translucent

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.

SKU	Size	Net weight (lb.)
056283	RenLam 5052 Resin Only (5 Gallon)	37
056284	Ren 5052 Hardener Only (Gallons – 2)	14

RESIN INFUSION EPOXY SYSTEMS

Araldite Epoxy Systems, by Huntsman Advanced Materials, were developed to meet the needs of composites manufacturers involved in vacuum assisted resin transfer molding. These products feature the low viscosity and long pot life needed for proper wet-out of fiberglass, carbon, and other reinforcing materials used in infusion processes. They also offer good dimensional stability and cured physical characteristics to support production of high quality void-free composite tools and parts.

These systems are designed for the Seemans Composite Resin Injection Molding Process (SCRIMPSM), used on boats and other nautical applications.

Specifications

	Mix Ratio (by wt.) Resin: Hardener	Gel Time (min.) @ 72°F	Demold Time (hr.) @ 72°F	Hardness (Shore D)	Mixed Viscosity (cps)	Density (g/cc)	Volumetric Yield (in.^{3}/lb.)	Shrink (in./in.)	Compressive Strength (psi)	Flexural Strength (psi)	Flexural Modulus (psi)	Tensile Strength (psi)	Elongation (%)	Tg per DMA (°F)	Color
LY 8601 / 8602	100:25	70	24	82	175	1.12	24.6	0.001	15,410	11,013	3.2×10^5	7,871	6	164	Clear
LY 8604 / 8604	100:15	220	24	81	370	1.14	24.3	0.001	17,790	11,411	4.1×10^5	7,600	2	164	Clear
LY 8605 / 8605	100:35	480-580	24	89	700	1.06	26.0	–	–	12,200	3.8×10^5	6,921	2.5	307	Clear
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	–

Araldite LY 8601 / Aradur 8602

Araldite LY 8601 / Aradur 8602 is a two-component, low-viscosity epoxy system developed for use in the production of advanced composites using vacuum-assisted resin transfer molding (VARTM), resin transfer molding (RTM), Seemans Composite Resin Injection Molding Process (SCRIMPSM), or other infusion processes. It has excellent toughness, and the increased reactivity allows for a faster ambient temperature cure and reduced demold time. It is ideal for the production of advanced composites.

SKU	Size	Net weight (lb.)
056708	Araldite LY 8601 Resin (5 Gallon)	36
056713	Aradur 8602 Hardener (Gallons – 2)	9

Araldite LY 8604 / Aradur 8604

This two-component, low-viscosity system produces advanced composites using the vacuum-assisted resin transfer process (VARTM), resin transfer molding (RTM), Seemans Composite Resin Injection Molding Process (SCRIMPSM), or other infusion processes.

SKU	Size	Net weight (lb.)
056706	Araldite LY 8604 Resin (5 Gallon)	43
056707	Aradur 8604 Hardener (Gallon)	6.5

Araldite LY 8605 / Aradur 8605

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

SKU	Size	Net weight (lb.)
056697	Araldite LY 8605 Resin (5 Gallon)	40
056699	Aradur 8605 Hardener (Gallons – 2)	14
056700*	Araldite LY 8605 Resin (55 Gallon)	377
056701*	Aradur 8605 Hardener (55 Gallon)	396

Please see our website, www.FreemanSupply.com, for ordering instructions.

Araldite 8601 can create large flat parts such as the backing for a snowboard.

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. These materials are often used as an alternative to fiberglass cloth reinforcement behind surface coats.

Specifications

	Mix Ratio (by wt.) Resin:Hardener	Mix Ratio (by vol.) Resin:Hardener	Gel Time (min.) @ 72°F	Demold Time (hr.) @ 72°F	Hardness (Shore D)	Mixed Viscosity (cps)	Density (g/cc)	Volumetric Yield (in.^{3}/lb.)	Shrink (in./in.)	Compressive Strength (psi)	Flexural Strength (psi)	Flexural Modulus (psi)	Tensile Strength (psi)	Coefficient Thermal Expansion (in./in./°F)	Deflection Temp. (°F)	Color
Freeman 1010	1:1	1:1	60	24	77	Putty	0.95	29.1	0.001	5,000	4,600	3.1×10^5	3,800	–	180	Gray
Freeman 1020	100:33	100:36	50	24	55	Putty	0.46	60.7	0.001	28,000*	32,000*	–	500*	–	190	Beige
Freeman 1030	41:100	33:100	9	1.5	70	Paste	1.04	26.7	–	–	–	–	–	–	–	Tan
Freeman 1105	100:87	1:1	1.5	20 min.	–	300	0.09	307	–	–	–	–	–	–	–	Beige
RenCast 1774	100:25	100:39	6 hr.	24	57	9,900	0.25	110.7	0.003	450	380	–	–	3.2×10^{-5}	128	White
RenLam 569/ Ren 569-1	100:11	–	35	16	80	Dough-like	1.20	23.0	0.002	8,000	4,600	3.8×10^6	2,800	3.8×10^{-5}	150	Blue
RenLam 569/ Ren 569-2	100:14	–	50	24	80	Dough-like	1.14	23.0	0.0017	5,000	4,000	2.5×10^6	1,800	4.8×10^{-5}	138	Blue
RenPaste 1250	1:1	1:1	28	24	87	Paste	1.52	18.2	0.002	12,000	7,300	9.8×10^5	3,800	2.16×10^{-5}	129	Gray
RenPaste 1257-3	1:1	1:1	30	24	–	Paste	1.71	15.7	–	13,000	6,000	–	3,980	–	–	Blue
RenPaste 8281	1:1	1:1	90-165	24	45	Dough-like	0.60	46.2	0.0002	1,300	549	1.2×10^5	413	9.4×10^{-6}	118	Blue
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	–

**Results from laminate tool.*

Freeman 1010 High-Density Epoxy Paste

- 60 min. gel time
- 77 Shore D Hardness
- Castable up to 1/2" thick

Freeman 1010 is a two-component "clay-like" material that can be rolled to a uniform thickness. It can be applied behind an epoxy surface coat for reinforcement or between two laminates to quickly increase tool thickness. Freeman 1010 has a much stiffer consistency than our Freeman 1020.

SKU	Size	Net weight (lb.)
055101	Gallon Kit	12
055105	5 Gallon Kit	60

Freeman 1020 Low-Density Epoxy Paste

- 50 min. gel time
- 55 Shore D Hardness
- Castable up to 1/2" thick

Easily hand-mixed into a dough-like consistency, this lightweight material is ideal for fiberglass or surface coat reinforcement. Like Freeman 1010, it can be applied behind an epoxy surface coat for reinforcement or between two laminates to quickly increase tool thickness.

SKU	Size	Net weight (lb.)
055001	Gallon Kit	3.52
055002	5 Gallon Kit	17.6

Freeman 1030 Polyurethane Reinforcement Paste

- 9 min. gel time
- 70 Shore D Hardness
- Castable up to 1/2" thick

This fiber-filled paste creates a strong, lightweight back-up for flexible urethanes and silicone glove molds. Features include easy mixing (1:3 ratio by volume), no sagging, low shrinkage, and a quick demold time.

SKU	Size	Net weight (lb.)
055418	Gallon Kit	11.4

Freeman 1105 Pourable Foam

- 1.5 min. gel time
- 5 lb. Density
- Expands 10x pour size

Freeman 1105 is a pourable, 1:1 mix ratio by volume urethane foam. It features a low viscosity, 5 lb./ft.^{3} density, and demolds in 20 minutes as a lightweight casting or back-up material.

SKU	Size	Net weight (lb.)
055446	Gallon Kit	15

RenCast 1774 Epoxy Foam System

- 6 hr. gel time
- 57 Shore D Hardness
- Expands 2.5-3.5x pour size

This slow-rising foam cures at room temperature and can be used for tooling back-up and lightweight casting applications. It ranges from 12 to 18 lb./ft.^{3} depending on the amount of foaming additive used, size poured, and room temperature. The hardener includes a 165 g. vial of additive.

SKU	Size	Net weight (lb.)
056064	Resin Only (5 Gallon)	30
056065	Hardener Only (Gallon)	7.9

SPECIALTY TOOLING PASTES & RESIN SYSTEMS CONTINUED

RenLam 569 Fiber-Reinforced Epoxy Paste

- 35 or 50 min. gel time
- 80 Shore D Hardness
- Castable to 1/2" thick

This glass fiber reinforced laminating paste simplifies construction of intricate tools and tooling aids. Mechanical mixing produces the best results, but smaller quantities may be hand-kneaded. The slow-set hardener allows for construction of larger tools.

SKU	Size	Net weight (lb.)
056007	RenLam 569 Resin Only (5 Gallon)	23
056008	Ren 569-1 Fast-Set Hardener Only (Gallon)	2.5
056012	Ren 569-2 Slow-Set Hardener Only (Gallon)	3.2

RenPaste 1250 High-Density Epoxy Paste

- 28 min. gel time
- 87 Shore D Hardness
- Sag - Pass: 1/2", Fail: 1"

This 1:1 mix ratio, aluminum-filled epoxy paste combines excellent adhesive qualities with the machining characteristics of aluminum. It 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.

SKU	Size	Net weight (lb.)
056036Q	RenPaste 1250 Resin Only (Quart)	2.5
056037Q	Ren 1250 Hardener Only (Quart)	2.5
056036	RenPaste 1250 Resin Only (Quarts – 6)	15
056037	Ren 1250 Hardener Only (Quarts – 6)	15

RenPaste 1257-3 Highly Filled Fairing Compound

- 30 min. gel time
- Creamy Consistency
- Sag - Pass: 1/4", Fail: 3/8"

This epoxy paste is excellent for fairing conventional aerodynamic surfaces. It is widely used by aircraft manufactures for blending contours and surface repairs for flyaway and prototype windtunnel applications. A 1:1 mix ratio, creamy consistency, no electrolytic corrosion, and great adhesion combine to make this product high in performance and easy to use.

SKU	Size	Net weight (lb.)
056014	RenPaste 1257-3 Resin Only (Quarts – 6)	18
056015	Ren 1257-3 Hardener Only (Quarts – 6)	18

RenPaste 8281 Granular Backfill

- 90-165 min. gel time
- 45 Shore D Hardness
- Castable to 8" thick

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.

SKU	Size	Net weight (lb.)
056150	RenPaste 8281 Resin Only (5 Gallon)	16
056151	Ren 8281 Hardener Only (5 Gallon)	16

POLYESTER GELCOATS & RESINS

MiaGel F-707 Polyester Gelcoat

This polyester gelcoat is a brilliant white color for making high-quality fiberglass parts. It is ideal for marine applications due to its excellent water resistance and gloss retention. Catalyze with Methyl Ethyl Ketone Peroxide (MEKP) at a suggested rate of 1.8% by weight. F-707 offers a 10-17 minute gel time.

SKU	Size	Net weight (lb.)
406170	MiaGel F-707 (Quart)	2.2
406165	MiaGel F-707 (Gallon)	8.8
406160	MiaGel F-707 (5 Gallon)	44.1
412162	MEKP Liquid Hardener (1 oz.)	0.06

MiaGel F-944 Polyester Gelcoat

This polyester gelcoat is neutral in color, enabling the user to custom color this product as desired. Use polyester coloring pastes (page 56) only for a high-quality surface. The excellent water resistance and gloss retention makes F-944 perfect for the boating industry. Catalyze with Methyl Ethyl Ketone Peroxide (MEKP) at a suggested rate of 1.8% by weight. F-944 offers a 10-17 minute gel time.

SKU	Size	Net weight (lb.)
411760	MiaGel F-944 (Gallon)	8.8
412162	MEKP Liquid Hardener (1 oz.)	0.06

Orange Tooling Gelcoat

Orange Tooling Gelcoat is a polyester-based compound specifically designed for fiberglass molds. Formulated to resist mold distortion from repeated use, it also features a high gloss and a durable finish for long mold life. Catalyze with Methyl Ethyl Ketone Peroxide (MEKP) at a suggested rate of 1.8% by weight. This gelcoat offers a 20-30 minute gel time.

SKU	Size	Net weight (lb.)
411024	Orange Tooling Gelcoat (Gallon)	4.5
411025	Orange Tooling Gelcoat (5 Gallon)	44.1
412162	MEKP Liquid Hardener (1 oz.)	0.06

MiaLam F-37 Polyester Laminating Resin

MiaLam F-37 is a light-amber colored, general-purpose polyester laminating resin specifically designed for high-quality fiberglass reinforced molds and parts. Applied using brush roller or spray equipment, this product features lower viscosity for excellent wet-out. Catalyze with Methyl Ethyl Ketone Peroxide (MEKP) at a ratio of 1.25% by weight. F-37 offers a 15 minute gel time.

SKU	Size	Net weight (lb.)
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
412162	MEKP Liquid Hardener (1 oz.)	0.06

ORDERING INFORMATION

One Quart of Resin requires one 1 oz. Catalyst. One Gallon of Resin requires two 1 oz. Catalysts. One 5-Gallon of Resin requires ten 1 oz. Catalysts.

DYES AND PIGMENTS

Freeman Color Tints

These highly concentrated coloring tints are for urethane and epoxy resin systems. For urethanes, mix thoroughly into the part B or polyol side before combining with part A. For epoxies, add to the resin side before combining with the hardener. 0.01% to 3% can produce deep colors but may also be used with clear urethanes and epoxies to obtain a transparent color. Can cause staining – wear hand and eye protection.

SKU	Color	Net weight (lb.)
055420	Yellow	2 oz.
055421	Green	2 oz.
055422	Blue	2 oz.
055423	Red	2 oz.
055424	White	2 oz.
055425	Black	2 oz.
055426	Orange	2 oz.
055427	Violet	2 oz.
055428	Brown	2 oz.

Araldite DW Coloring Pastes

These concentrated pigments in an epoxy resin are ideal for coloring all Ren Epoxy Compounds and most RenCast Polyurethane Elastomers. They produce a rich, solid color for opaque, not transparent, final parts. Based on the total weight of resin and hardener, add the paste up to 3% without significantly changing your material's cured properties. Available in Gallon sizes.

SKU	Color	Net weight (lb.)
056244	White	8
056245	Yellow	8
056246	Red	8
056248	Blue	8
056250	Black	8

Mia Polyester Coloring Pastes

This wide assortment of concentrated polyester pigments is used to color polyester gelcoats, laminating resins, and repair materials. Maximum concentration of pigment should not exceed 3%. Used with polyester systems only, these pastes are not compatible with epoxies or urethanes.

SKU	Color	Net weight (lb.)
412240	White (100 mL)	0.4
412242	Blue (100 mL)	0.4
412246	Beige (100 mL)	0.4
412248	Brown (100 mL)	0.4
412250	Yellow (100 mL)	0.4
412252	Red (100 mL)	0.4
412256	Black (100 mL)	0.4
412258	Gray (100 mL)	0.4
412260	Green (100 mL)	0.4
412215	Black (1 kg)	2.2
412217	Blue (1 kg)	2.2
412225	Gray (1 kg)	2.2
412230	Beige (1 kg)	2.2
412210	Gray (Gallon)	9

SEE ALSO

Product	Page #
Polyurethane Accessories	36

Silicone Coloring Pastes

These 4 oz. pastes are used for coloring Elkem (formerly Bluestar) silicone rubber. You can attain any color for your application by blending multiple colors. As always, conduct small-scale trial and error testing before starting your project.

SKU	Color	Net weight (lb.)
055430	Black	0.3
055431	Red	0.3
055432	Blue	0.3
055433	White	0.3
055434	Yellow	0.3

Mia Polyester Coloring Pastes

TOOLING PLASTICS FILLERS

Aluminum Fillers

Freeman offers a wide range of aluminum fillers that are commonly used with epoxies and other tooling resins. Aluminum Powder is typically added to resin systems in smaller concentrations (up to 10%) for appearance purposes or to increase machinability and wear resistance. The size of the filler used depends on the size of the tool and other specific requirements. The sizes, from smallest to largest, are:

	Particle Size	Mesh	Description
Aluminum Powder	0.0006"	N/A	Fine powder
Aluminum Sand	0.006" – 0.040"	100 – 18	Sand
Aluminum Spheres	0.020" – 0.074"	30 – 10	Coarse sand
Aluminum Shot	0.125", 0.25", & 0.31"	N/A	Flattened & round pellets
Aluminum Puffs	0.25" to 0.375"	N/A	Flattened pellets

SKU	Description	Net weight (lb.)
406383	Aluminum Powder (Mia 82)	2.5
056230	Aluminum Powder (RP-34)	40
059015	Aluminum Sand	2.5
054497	Aluminum Sand	50
059010	Aluminum Spheres	2.5
054495	Aluminum Spheres	50
059005	Aluminum Shot (MF-40)	2.5
054491	Aluminum Shot (MF-40)	50
054493	Aluminum Puffs	50

Freeman Low-Density Fillers

Freeman Low Density Fillers are hollow glass spheres used to reduce weight and shrinkage in epoxy and urethane resins. These fillers are ideal to create a porous backup for vacuum form fixtures and tools. These fillers can also be added to mass-cast epoxies to lower exotherm, thus allowing a greater cast thickness. This filler will not sink to the molded surface of most plastics due to its light density.

	Particle Size	Bulk density
Freeman 120 / Mia 68	2-4 mm diameter	12 lb. / ft.^{3}
Freeman 240 / Mia 69	4-8 mm diameter	11 lb. / ft.^{3}

SKU	Description	Size	Net Weight (lb.)
054459	Mia 68 Low-Density Filler	2 Quart	0.75
054460	Freeman 120 Low-Density Filler	Bag	32
054462	Mia 69 Low-Density Filler	2 Quart	0.75
054461	Freeman 240 Low-Density Filler	Bag	30

Ren DT 081 & Ren DT 082 Liquid Tooling Fillers

DT-081 is a low density filler for use with RenCast 6426-1, RenCast 205-3, or epoxy laminating resins as a lightweight back-up material.
DT-082 is a high density filler for use with RenCast 6426-1, RenCast 205-3, or epoxy laminating resins as a back-up material.

SKU	Description	Size	Net weight (lb.)
056235	Ren DT 081 Low-Density Filler	Bag	50
056236	Ren DT 082 High-Density Filler	Pail	33

Walnut Shells

This low-cost material extends the resin and reduces the weight of cast parts. It is easily mixed into epoxy and polyurethane resins. This filler will not sink to the molded surface of most plastics due to its light density.

SKU	Description	Size	Net weight (lb.)
054488	Walnut Shells 8/12 Mesh	2 Quart	2.5
054490	Walnut Shells 8/12 Mesh	Bag	50

Calcium Carbonate

Calcium Carbonate is a white, powder-type filler that may be added to epoxy or polyester resins to reduce costs, reduce shrinkage, increase viscosity, and/or improve physical properties.

SKU	Description	Size	Net weight (lb.)
406312	Mia 61 Calcium Carbonate	Quart	1.9
406314	Mia 61 Calcium Carbonate	2 Quart	3.7
406316	Mia 61 Calcium Carbonate	Gallon	10

Ceramic Spheres

Ceramic Spheres are gray, hollow, light-weight fillers used to reduce weight and shrinkage in epoxy, urethane, or polyester resins. Particle size is 0.006" in diameter.

SKU	Description	Size	Net weight (lb.)
406342	Mia 64 Ceramic Spheres	Quart	0.8
406344	Mia 64 Ceramic Spheres	2 Quart	1.7
406346	Mia 64 Ceramic Spheres	Gallon	4.8
412415	Mia 64 Ceramic Spheres	Bag	50

Walnut Shells

Graphite Powder

TOOLING PLASTICS FILLERS CONTINUED

Glass Bubbles

Glass Bubbles are very lightweight, hollow glass spheres that may be added to epoxy, urethane, or polyester resins to make them lighter in weight, shrink less, and machine easier. Depending on the degree of filler added, paste consistencies may be obtained. The mean particle size is 0.002".

SKU	Description	Size	Net weight (lb.)
406352	Mia 65 Glass Bubbles	Quart	0.2
406354	Mia 65 Glass Bubbles	2 Quart	0.5
406356	Mia 65 Glass Bubbles	Gallon	1.1

Milled Glass Fibers

Milled Glass Fibers are finely cut, 1/32" long fiberglass filaments that are used for thickening epoxy, polyester, or urethane resin systems, or to increase their physical and mechanical properties. Also, this material may be used to promote adhesion when applying additional laminations to a cured laminate.

SKU	Description	Size	Net weight (lb.)
406362	Mia 66 Glass Fiber	Quart	1.3
406364	Mia 66 Glass Fiber	2 Quart	2.8
406366	Mia 66 Glass Fiber	Gallon	7.5
054075	Milled Glass Fibers (Glass Flock) 1/32" Long	Bag	50
056229	Ren RP 32 Glass Fibers	Box	50

Alumina Trihydrate (ATH)

Alumina Trihydrate is used as a filler for epoxy, urethane, or polyester resins, where fire retardant properties or increased thermal conductivity are required. This material is white in color.

SKU	Description	Size	Net weight (lb.)
406372	Mia 67 Alumina Tri Hydrate	Quart	2
406374	Mia 67 Alumina Tri Hydrate	2 Quart	3.8
406376	Mia 67 Alumina Tri Hydrate	Gallon	11.5

Freeman Low-Density Fillers

Wood Flour

Cotton Flock

Also referred to as milled cotton fibers, cotton flock is used as a filler to thicken epoxy resins or to promote adhesion between laminate layers. It offers dimensional stability and enhanced compound strength. It is also used for patching and repairing surfaces, although it is not recommended for boat hull repairs. This filler is best suited in areas that will not be submerged or in constant contact with water.

SKU	Description	Size	Net Weight (lb.)
406302	Mia 60 Cotton Flock	Quart	0.75
406304	Mia 60 Cotton Flock	2 Quart	1.2
406306	Mia 60 Cotton Flock	Gallon	2.5
054080	Cotton Flock (Milled Cotton Fibers)	Box	50

Wood Flour

Wood flour is mainly used to repair or bond wood. It may be used to thicken epoxy laminating resin to provide less sag and more bond strength. It is ideal for fillets in sharp corners, filling gaps in wooden structures, and any type of wood bonding. The particles are free-flowing and easily disperse in the resin.

SKU	Description	Size	Net weight (lb.)
406322	Mia 62 Wood Flour	Quart	0.5
406324	Mia 62 Wood Flour	2 Quart	1
406326	Mia 62 Wood Flour	Gallon	2.75

Fumed Silica

Fumed Silica is a thickening agent that may be added to epoxy, urethane, or polyester resins to increase the viscosity. High filler loading will produce paste-like consistencies, ideal for creating fillets, repair materials, or making fairing compounds smoother and easier to apply.

SKU	Description	Size	Net weight (lb.)
406332	Mia 63 Fumed Silica	Quart	0.8
406334	Mia 63 Fumed Silica	2 Quart	0.16
406336	Mia 63 Fumed Silica	Gallon	0.46
054077	Fumed Silica (Cab-O-Sil M-5)	Bag	10
412034	Fumed Silica (Aerosil 200)	Bag	10

Graphite Powder

Graphite Powder is a black filler that may be added to epoxy, urethane, or polyester resins. This very hard filler will add abrasion resistance and provide a low-friction surface to the finished part.

SKU	Description	Size	Net weight (lb.)
406392	Mia 84 Graphite Powder	12 oz.	0.75

Calcium Carbonate

GYPSUM CEMENTS, PLASTER & ACCESSORIES

We offer a complete line of USG® Gypsum Cements and Industrial Plasters for the tooling, art, and casting markets. We are able to supply most USG® plasters with minimum quantities.

Specifications

	Mix Ratio (by wt.) Water:100 pts. Plaster	Set Time (min.)	% Setting Expansion Max.	Density (lb./ft.^{3}) Wet	Density (lb./ft.^{3}) Dry	Compressive Strength (psi)
USG Gypsum Cements						
Ultracal 30	38	25-35	0.08	115.0	99.0	6,000
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
Hydrostone	32	17-20	0.24	119.4	108.7	10,000
USG Industrial Plasters						
#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	2,000
Duramold Pottery Plaster	62	27–37	0.22	102.0	75.0	2,900

USG GYPSUM CEMENTS

Ultracal 30

SKU	Net weight (lb.)
036055	50
036005	100

Primarily used as a "mass-casting material" where the mold is poured from solid gypsum. Ultracal 30 is the most popular gypsum used in close-tolerance 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 then Hydrocal B-11.

Hydrocal A-11

SKU	Net weight (lb.)
036008	50
036009	100

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

Hydrocal B-11

SKU	Net weight (lb.)
036069	50
036010	100

This is similar to Hydrocal A-11 in setting expansion and accuracy but offers a longer period of plasticity. This enables it to be used with templates to screed models directly from gypsum. This material has slightly less strength than Hydrocal A-11 and is recommended for use in build-up of template-formed models.

White Hydrocal

SKU	Net weight (lb.)
036038	50
036037	100

A 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.

Hydrostone

SKU	Net weight (lb.)
036035	50
036034	100

Hydrostone is the strongest and hardest gypsum cement available. It is used primarily in tooling and where high strength and resistance to water absorption is necessary. It is also recommended for high-quality art and statuary castings.

USG INDUSTRIAL PLASTERS

#1 Moulding Plaster

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

SKU	Net weight (lb.)
036060	50
036015	100

#1 Casting Plaster

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

SKU	Net weight (lb.)
036031	50
036030	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.

SKU	Net weight (lb.)
036028	50
036027	100

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. Available by special order only; minimum quantities apply.

SKU	Net weight (lb.)
036040	100

Plaster Mixing Guidelines

Plaster particles should be completely dispersed in the water for a uniform, homogenous slurry. Batch size, mixer design, mixing time, water purity and temperature must be controlled.

- ***Water Purity*** *Drinking water is usually suitable but contaminated water will lengthen setting time and cause other surface issues.*
- ***Water Temperature*** *Variations in temperature will affect setting time and cause other difficulties. A uniform temperature produces the best gypsum mold or cast.*
- ***Water-to-Plaster Ratio*** *Variations in this ratio will affect cast absorption, strength, and performance.*

Plaster Mixing Directions

1. *Sift or strew plaster into water slowly and evenly. Do not pour water into plaster or drop large amounts of plaster directly into water.*
2. *Allow to soak for 2-4 minutes and mix for approximately 2-5 minutes to obtain a creamy plaster slurry.*
3. *Hand mixing is acceptable for small batches up to 5 lb. and a minimum consistency of 50 cc but will not produce optimal properties. Mechanical mixing is recommended for ideal results.*

PLASTER ACCESSORIES

Manila Hemp

This premium-quality grade fibrous material offers good absorption and tensile strength It is used for reinforcement of shell-type laster reproduction.

SKU	Net weight (lb.)
054485P	22

Freeman Plaster Release, Liquid or Powder

Freeman 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 those who make their own release.

SKU	Size	Net weight (lb.)
054405	Powdered Mica (By the Pound)	1
054410	Liquid (Quart)	2
054412	Liquid (Gallon)	8

Ren 802 PVC Lacquer Sealer

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

SKU	Size	Net weight (lb.)
056215	Quart	2

Plaster Release, Steric Acid Powder

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

SKU	Net weight (lb.)
054430	1

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. These containers are not recommended for use with thermoset epoxies, urethanes, or polyesters.

SKU	Size
054435	4 oz.
054440	12 oz.
054445	20 oz.
054450	1½ Quart
054455	5 Quart

Plaster Gloves

These medium-size gloves are made of a tough, puncture-resistant synthetic rubber that is resistant to most types of solvents. They are elbow-length for full coverage. Other sizes available upon request.

SKU	Size
054062	12 Pairs

SEE ALSO

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