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115 Years of Excellence

The year Freeman was founded...

- ▶ The first college football bowl game was held in California
- ▶ The U.S. President was Theodore Roosevelt
- ▶ Electric Theatre, the first movie theater in the United States, opened in Los Angeles, California
- ▶ The first teddy bear was produced
- ▶ American writer John Steinbeck was born



1950



Colorized

"Humble Beginnings"

1902 Bill Freeman resold excess shop materials to other foundry pattern shops in the Toledo, OH area. This side business was named Freeman Pattern Supply and moved to Toledo as a regional supplier.

Mid-Century Expansion

1960s Freeman acquired several similar suppliers around the country and became the nation's largest tooling material supplier to pattern shops. This enabled Freeman to serve the rapidly growing automotive and aerospace industries.

Entry into Manufacturing

Also in the 1960s, Freeman expanded into manufacturing with the acquisition of a specialty wax manufacturer in Cleveland, OH, officially becoming Freeman Manufacturing and Supply Company.

Growth & Expansion

Restructuring & Building Partnerships

1980s Freeman was restructured and streamlined: the headquarters moved to Cleveland, OH and the largest branch was opened near Detroit, MI. The tooling plastics manufacturing division developed and grew while an enduring partnership began with CIBA, later Huntsman Advanced Materials.

The Move to Avon

1998 Freeman's new facility in Avon, OH (near Cleveland) became its headquarters to this day. Since then, it has expanded to 150,000 sq. ft. in order to accommodate the growing staff and reliable stocking of products.

Geographical Growth & Major Acquisitions

2000s Several warehouses and sales territories were added, ultimately covering a majority of North America. Several companies were acquired.

MF COMPOSITES

Montreal-based supplier of tooling and composite materials



Pattern supply and specialty wax divisions of Kindt-Collins Co.



Leading distributor of die boards and other steel rule die materials

matt

Jewelry wax manufacturer based out of New Jersey



Liquid Tooling



Avon Headquarters

1902 vs. Now

- Then: 1 Location
▶ **NOW: 12 Locations**
- Then: Serving local Toledo area
▶ **NOW: Worldwide shipping**
- Then: 1 Industry (Foundry)
▶ **NOW: More than a dozen Industries**
- Then: Less than 50 products
▶ **NOW: Nearly 700 products**
- Then: Fewer than 10 employees
▶ **NOW: 120+ employees nationwide**
- Then: Delivery by train, boat & buggy
▶ **NOW: Shipping via all carriers**



Growing Support Staff



Diecasting Acquisition

Freeman Today

We've come a long way in 115 years! While the traditional pattern shop supply business remains at our core, Freeman services numerous industries and is continually expanding in order to serve a wide range of customers.



Industries & Applications

- ▶ Automotive & aircraft
- ▶ Modelmaking
- ▶ Rapid prototyping
- ▶ Jewelry manufacturing
- ▶ High-performance composites construction
- ▶ Vacuum forming
- ▶ Steel rule diemaking
- ▶ Injection molding
- ▶ Metal stamping
- ...and much more!

Branch Locations and Public Warehouses

Freeman has strategically placed satellite locations across North America with customer service representatives ready to help. Thousands of products are stocked at these locations as well as public warehouses to reduce your shipping costs.

Strategic & Effective Stocking

Freeman's inventory staff constantly monitors sales and stocking data across the country to properly provide the right amount of products at each location.

Worldwide Shipping

Freeman ships orders all across the globe and has various international distributors available to supply customers with top-quality products.



OHIO (HEADQUARTERS)

1101 Moore Road
Avon, OH 44011
TEL 800-321-8511
TEL 440-934-1902
FAX 440-934-7200

KANSAS

Garvey Warehouse
5755 S. Hoover Road Bldg. #5
Wichita, KS 67215
TEL 800-792-1047
FAX 817-568-0908

ONTARIO

FiFo Logistics
3600B Laird Road Unit 8
Mississauga, ON L5L 6A7
TEL 800-345-9259
FAX 586-774-1019

QUEBEC

3475 boul Pitfield
Montreal, QC H4S 1H3
TEL 800-263-7699
TEL 514-335-3530
FAX 514-335-3225

CALIFORNIA

MWave
20153 Paseo del Prado
Walnut, CA 91789
TEL 800-325-2100
FAX 440-934-7200

MICHIGAN

27655 Groesbeck Highway
Roseville, MI 48066
TEL 800-345-9259
TEL 586-774-1210
FAX 586-774-1019

OREGON

Terminal Transfer Inc.
15745 N. Lombard St., Ste. 100
Portland, OR 97203
TEL 800-558-0866
FAX 262-789-5407

TEXAS

3152 S.E. Loop 820
Fort Worth, TX 76140
TEL 800-792-1047
TEL 817-551-7301
FAX 817-568-0908

GEORGIA

Shippers Warehouse
of Georgia
9250 S. Main Street
Jonesboro, GA 30236
TEL 800-445-0811
FAX 440-934-7200

NORTH CAROLINA

PSC International
101 Bailey Street
Mocksville, NC 27028
TEL 800-321-8511
FAX 440-934-7200

PENNSYLVANIA

909 Strickler Rd.
Mt. Joy, PA 17552
TEL 800-631-4230
TEL 717-653-5300
FAX 717-653-7372

WISCONSIN

4921 South 2nd St.
Milwaukee, WI 53207
TEL 800-558-0866
TEL 262-789-9800
FAX 262-789-5407

Did You Know...

...Freeman has an industry-leading team of technical representatives?

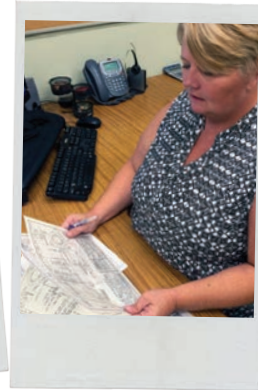
With collectively over 100 years of technical experience, our representatives and their personal connections provide creative solutions for our customers' problems. Our technical reps are located across North America to provide in-person technical assistance, handle local shipping and stocking questions, and build relationships with our customers that last a lifetime.



...Freeman has an in-house Technical Team and Lab?

Our Tech Team and Lab work closely together to test current and potential products for quality and specifications. The Lab is always working on new product development as well as continuous improvement of existing products.

Our Technical staff is available to answer any question, large or small, via email or phone. Simply reach out and they will be able to assist!

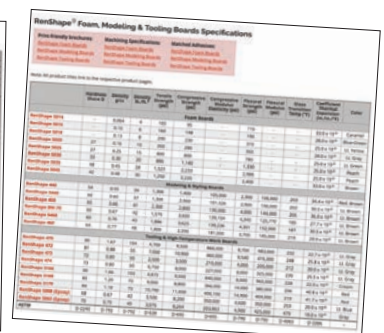


...Freeman provides technical information for products?

Looking for safety or technical data?
Our website has it all!

Simply enter the product you're looking for more information on and follow the links.

These resources are easily accessible and constantly updated. Visit our website to access all our technical data!



...Freeman's Newsletter features exclusive deals, videos & more?

Access exclusive content by signing up for our newsletters!

We work hard to bring you the best content 6 times a year with product spotlights and promotions, special deals, technical tips, and more!

Sign up today to be the first to hear about new products, new videos, and featured solutions and techniques at

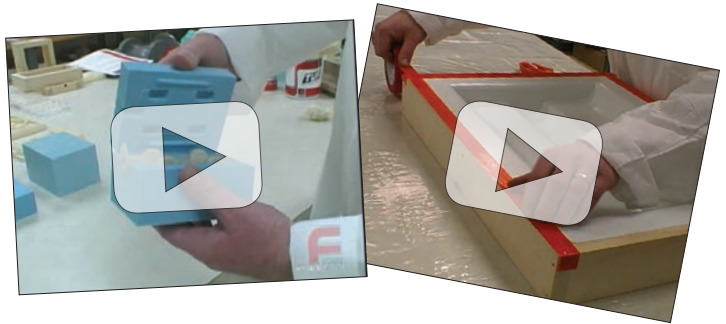
www.FreemanSupply.com/newsletter



...Freeman has a complete instructional video library?

Freeman's video library contains over three hours of instructional and product videos, making it the most comprehensive free resource for making parts, patterns, tools and molds.

Simply visit our Library on our website or subscribe to our channel on YouTube (@freemanmfg). You'll be able to stream our videos as well as ask technical questions. Our Tech Team monitors our YouTube account and answers your questions.



...Freeman's website is constantly upgraded with new features?

Since we've unveiled our revamped website, we've added features such as a favorites list, quote builder, interactive closeout list, web discounts, quotes/order history, and more!

Now, you can get all of that and more with a Freeman 360° Account! Make sure to keep checking back – we're always adding new features to make your experience hassle-free.



No forms to complete – place an order faster

Tracking #	Status
1Z4720310358314894	Completed

Keep track of your order from start to finish



Description	Unit Price	Total
Repro 83 Blue Gal Unit	\$82.62	\$82.62
Sub Total		\$82.62

Complete access to product pricing

Create new order

Check Out »

No need to wait for a quote – order directly

Sign up today at FreemanSupply.com – it's FREE!



MACHINABLE MEDIA

This is the broadest and most diverse offering of machinable media available, carefully selected by Freeman to represent the best in the industry today. These materials are used by leading designers and engineers for everything from styling, modeling, fixtures, and foundry tooling to prototype metal-forming and composite tooling, prototype injection molding, vacuum forming, and rapid product development.

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RenShape® Boards

17-18



Perfect Plank Engineered Lumber

19-20



Rough Sawn Pattern Lumber

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Richlite Laminate, MDF & more

THE HISTORY *of* MACHINABLE MEDIA

From the beginning...

Historically, there were only two choices when selecting materials for projects.

...to synthetic development...

Because these choices were so extreme in their differences, synthetic materials were developed to bridge the gap in the mid-20th century.

...to the ORIGINAL Modeling Board...

In the 1980's, technology took a giant leap forward with synthetic work boards. RenShape 450, the original modeling and tooling board, was developed.

...to the wide range of choices today.

Today, Freeman is proud to offer the widest range of options for your tooling needs. From the original materials to the specialty work boards, Freeman has a product to suit even the most complicated application.

WOOD

pg. 19

- ✓ Easily workable by hand or machine
- ✓ Economical



METAL

- ✓ Even more stable & durable
- ✓ Superior finish



PERFECT PLANK

pg. 17

- ✓ Uniform in texture
- ✓ Virtually defect-free
- ✓ Ready for use immediately



RICHLITE

pg. 21

- ✓ Hard & durable
- ✓ Machinable
- ✓ Abrasion, moisture, & chemical resistant



RENSHAP 450

pg. 13

- ✓ Consistent texture
- ✓ Virtually defect-free
- ✓ Dimensionally Accurate



MACHINABLE WAX

pg. 69

- ✓ Easily machinable
- ✓ Self-releasing



RENSHAP FOAM BOARDS

Densities ranging from 4-30 lb.
Offers excellent workability

Applications

Modeling
Aerospace
Composites
Architecture & design
Low-density substrates

pg. 11

RENSHAP MODELING & STYLING BOARDS

Densities ranging from 34-48 lb.
Ease of machining & good edge definition
Excellent dimensional stability

Applications

Modeling
Proofing
Fabricating

pg. 13

RENSHAP TOOLING & HIGH-TEMP WORK BOARDS

Ease of machining
Excellent dimensional stability
Minimal residual particles for easy cleanup

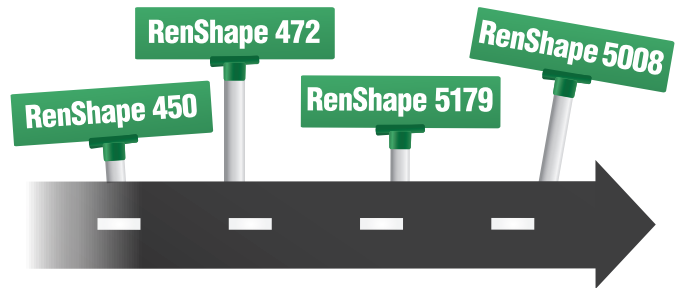
Applications

Duplicating aids
Foundry patterns & hammer-form dies
Temperature-resistant tooling

pg. 15

RENSHAP[®] BOARDS

➔ The original modeling board, RenShape 450, was the catalyst for this diverse line of materials that has grown to meet the needs of nearly every styling, modeling, and tooling application. This versatile line features popular boards such as RenShape 450, 472, 5179 and 5008. Manufactured in the United States to the highest quality standards, RenShape remains the top choice and Freeman is proud to be its number one distributor.



Specifications

	Hardness (Shore D)	Density (g/cc)	Density (lb./ft. ³)	Tensile Strength (psi)	Compressive Strength (psi)	Compressive Modulus (psi)	Flexural Strength (psi)	Flexural Modulus (psi)	Glass Transition Temp (°F)	C.T.E. (in./in./°F)	Color
Foam Boards*											
RenShape 5014	—	0.064	4	105	95	—	116	—	—	33.0 x 10 ⁻⁶	Caramel
RenShape 5015	—	0.10	6	160	148	—	190	—	—	28.0 x 10 ⁻⁶	Blue-Green
RenShape 5018	—	0.13	8	290	230	—	310	—	—	28.0 x 10 ⁻⁶	Lt. Yellow
RenShape 5020	27	0.16	10	350	280	—	350	—	—	28.0 x 10 ⁻⁶	Lt. Gray
RenShape 5025	27	0.25	15	800	800	—	780	—	—	28.0 x 10 ⁻⁶	Lt. Green
RenShape 5030	33	0.30	20	895	1,140	—	1,330	—	—	25.0 x 10 ⁻⁶	Peach
RenShape 5035	48	0.45	28	1,523	2,233	—	2,988	—	—	25.0 x 10 ⁻⁶	Peach
RenShape 5045	42	0.48	30	1,250	2,200	—	2,400	—	—	25.0 x 10 ⁻⁶	Brown
Modeling & Styling Boards											
RenShape 440	54	0.55	34	1,300	1,400	105,000	2,300	106,000	203	34.4 x 10 ⁻⁶	Red-Brown
RenShape 5440	60	0.60	37	1,300	2,900	101,526	2,900	106,000	203	30.5 x 10 ⁻⁶	Lt. Brown
RenShape 450	65	0.66	41	2,300	2,800	135,000	4,000	144,000	205	36.0 x 10 ⁻⁶	Lt. Brown
RenShape BM-70	60	0.67	42	1,570	3,600	139,104	4,340	125,770	185	27.7 x 10 ⁻⁶	Lt. Brown
RenShape 5460	60	0.70	43	1,886	3,625	139,236	4,351	152,000	187	30.5 x 10 ⁻⁶	Lt. Brown
RenShape 460	64	0.77	48	1,800	2,200	181,000	3,700	185,000	219	29.9 x 10 ⁻⁶	Lt. Brown
Tooling & High-Temperature Work Boards											
RenShape 470	90	1.67	104	4,700	9,500	866,000	8,700	983,000	232	22.7 x 10 ⁻⁶	Lt. Gray
RenShape 472	81	0.88	55	7,000	10,900	460,000	9,540	416,000	248	25.8 x 10 ⁻⁶	Lt. Gray
RenShape 473	72	0.80	50	2,500	3,500	210,000	4,000	200,000	212	30.0 x 10 ⁻⁶	Lt. Gray
RenShape 474	73	0.80	50	6,750	8,000	227,000	8,000	325,000	230	26.5 x 10 ⁻⁶	Lt. Gray
RenShape 5166	90	1.66	103	4,875	9,500	840,000	8,000	965,000	228	22.0 x 10 ⁻⁶	Cream
RenShape 5169	85	1.20	75	9,000	8,800	366,000	14,000	380,000	206	40.8 x 10 ⁻⁶	Red
RenShape 5179	84	1.18	73	10,790	11,600	400,100	14,900	404,000	210	41.7 x 10 ⁻⁶	Red
RenShape 5008**	68	0.67	42	3,500	8,200	350,000	4,600	350,000	253	20.0 x 10 ⁻⁶	Lt. Blue
RenShape 5065**	70	0.79	49	3,076	8,264	203,863	4,900	425,000	470	18.0 x 10 ⁻⁶	Gray
ASTM	D-2240	D-792	D-792	D-638	D-695	D-695	D-790	D-790	D-4065	D-3386	—

*RenShape Foam Boards have a service temperature up to 176°F. **Epoxy boards

Machining Specifications

	Roughing Speed (RPM)	Roughing Feed (IPM)	Finishing Speed (RPM)	Finishing Feed (IPM)
Foam Boards				
5014	2,500	200	15,000	200
5015	2,500	200	15,000	200
5018	2,500	200	15,000	200
5020	2,500	200	15,000	200
5025	2,500	200	15,000	200
5030	2,500	200	15,000	200
5035	2,500	100	15,000	200
5045	2,500	100	15,000	200
RenShape Modeling & Styling Boards				
440	2,000	200	15,000	200
5440	2,000	100	15,000	200
450	2,000	100	15,000	200
BM-70	2,000	100	15,000	200
5460	2,000	100	15,000	200
460	1,600	40	10,000	100

	Roughing Speed (RPM)	Roughing Feed (IPM)	Finishing Speed (RPM)	Finishing Feed (IPM)
RenShape Tooling & High-Temp Work Boards				
470	1,600	40	10,000	100
472	1,600	40	10,000	100
473	1,600	40	10,000	100
474	1,600	40	10,000	100
5166	1,600	40	10,000	100
5169	1,600	40	10,000	100
5179	1,500	60	10,000	100
5008	1,600	40	10,000	100
5065	1,600	40	10,000	100

Cutters Roughing

1" Ball End mill,
4-Flute, Carbide

Finishing

5/8" Ball End mill,
2-Flute, Carbide

Depth Roughing

Varied from 1/4" to 2 1/2"
deep with 40% stepover

Finishing

1/8" deep leaving 0.002"
scallop height

Please note: These machining parameters are starting points. Cutter type, material, spindle speed, feed rate, machine power, and rigidity all affect machining results. User must determine best parameters for specific applications.

Application Guide*

RenShape #	5014	5015	5018	5020	5025	5030	5035	5045	440	5440	BM-70	450	5460	460	470	472	473	474	5166	5169	5179	5008	5065
CNC Profiling	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Models (Architectural, styling, temporary)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Low-density substructure	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Tooling aids & fixtures	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Intermediate-temp master & lay-up tools	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
High-temp master & lay-up tools	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Foundry patterns	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Vacuum-form molds	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Metalfforming tools	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

● Ideal ○ Acceptable ○ Not recommended

*Results may vary depending on your specific project

Matched Adhesives & Repair Materials

Foam Boards									Modeling & Styling Boards						Tooling & High-Temperature Boards								
RenShape #	5014	5015	5018	5020	5025	5030	5035	5045	440	5440	450	BM-70	5460	460	470	472	473	474	5166	5169	5179	5008	5065
Adhesives																							
Repro Ultralight	X	X	X	X	X	X	X	X															
Repro Light						X	X	X	X	X	X	X	X	X									
Fast Set 505	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Fast Set 506															X	X	X	X	X	X	X		
Fast Set 517	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
DunaBond 3140	X	X	X	X	X	X	X	X															
DunaBond 3206	X	X	X	X	X	X	X	X															
Ren-Weld 103	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
RenLam 1700-1									X	X	X	X	X	X	X	X	X	X	X	X	X		
RenLam 4005															X	X	X	X	X	X	X		
RenLam 4017																						X	
Ren-Weld 5008																						X	
Repair Materials																							
TUF-Carv	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
TUF-Fil															X	X	X	X					
TUF-Fil White															X				X				
Hi-Temp TUF-Fil															X	X	X	X				X	
RenPatch 5169																				X	X		

	Mix ratio (by weight)	Viscosity (cps)	Gel time (min.) @ 77°F	Light handling time (hr.)	Hardness (Shore D)	Density	Service temp.	Color	Notes
Adhesives									
Repro Ultralight	1:1	1,200	10-11	4	55	0.59	128°F	Tan	Low-density polyurethane with good bond strength
Repro Light	1:1	1,500	6-8	4	68	0.9	132°F	Brown	Low-density polyurethane with good bond strength
Fast Set 505	1:1	10,000	5	0.5	85	1.11	200°F	Clear	Economical 5-minute epoxy
Fast Set 506	1:1	1,500	5	1	80	1.15	266°F	Clear	Epoxy with excellent bond strength and high-service temperature
Fast Set 517	1:1	14,000	15-20	4	80	1.15	200°F	Clear	Epoxy offers longer gel times with short light handling time
DunaBond 3206	N/A	3,500 - 4,000	35-40	2	—	1.07-1.11	176°F	Light Yellow	Polyurethane formulated for RenShape Foam Boards
DunaBond 3140	N/A	1,500-2,000	60-70	3-4	—	1.07-1.09	176°F	Amber	Polyurethane formulated for RenShape Foam Boards
Ren-Weld 103	100:26	2,100	20	10	68	1.08	128°F	Light Yellow	Low-viscosity epoxy with flow control agents to prevent run-out
RenLam 1700-1	100:26	2,000	20	24	90	1.13	128°F	Light Yellow	Low-viscosity epoxy laminating resin with excellent bond strength
RenLam 4005	100:14	1,900	50-60	24	90	1.19	289°F	Amber	Epoxy with excellent bond strength for high-temp applications
RenLam 4017	100:15	8,000	90	3-4	93	1.42	350°F	Black	Hi-Temp epoxy laminating resin for RenShape 5065
Ren-Weld 5008	100:20	-	75	4	68	0.65	200°F	Light Blue	A medium-speed adhesive which is hardness and color matched for use with RenShape 5008
Repair Materials									
TUF-Carv	100:1.5	581,000	10	0.5	71	1.14	128°F	4 options	Easy to machine polyester repair paste
TUF-Fil	100:1.5	912,000	11	0.5	81	1.74	128°F	Brown	81 Shore D polyester repair paste for room-temperature applications
TUF-Fil White	100:1.5	400,000	9	0.5	95	2.5	128°F	White	95 Shore D polyester repair paste for room-temperature applications
Hi-Temp TUF-Fil	100:1.5	581,000	10	0.5	71	1.14	350°F	4 options	Polyester repair paste for high-temperature applications
RenPatch 5169	100:89	Paste	45-75 (sec)	0.25	85	1.12	167°F	Red	Polyurethane repair paste formulated for RenShape 5169 and RenShape 5179

RENSHAP® FOAM BOARDS

Quick Facts

- Closed-cell polyurethane foam boards formulated for styling, modeling, prototyping and fabricating applications
- Can be worked by hand or machine
- Non-abrasive to cutting tools
- Not compatible with addition-cure silicone rubbers
- Compatible with condensation-cure silicone rubbers

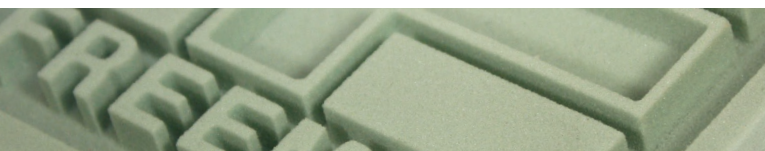


RenShape 5014 Polyurethane Foam Board

RenShape 5014 is our lightest weight and most economical foam styling board. It is excellent for appearance models.

- ▶ 4 lb./ft.³ density
- ▶ Caramel color

SKU	Thickness	Width	Length	Bd. ft.
075805	6"	24"	96"	96
075800	2"	48"	96"	64
075801	4"	48"	96"	128
075806	6"	48"	96"	192



RenShape 5015 Polyurethane Foam Board

RenShape 5015 features a very low density of 6 lb./ft.³. This material is excellent for machining lightweight styling models and appearance models.

- ▶ 6 lb./ft.³ density
- ▶ Blue-green color

SKU	Thickness	Width	Length	Bd. ft.
075836	2"	48"	96"	64
075844	4"	48"	96"	128
075846	6"	48"	96"	192



RenShape 5018 Polyurethane Foam Board

RenShape 5018 is a rigid, low density, closed-cell urethane foam. This product has an 8 lb./ft.³ density for making economical, lightweight styling and appearance models.

- ▶ 8 lb./ft.³ density
- ▶ Light yellow color

SKU	Thickness	Width	Length	Bd. ft.
075851	4"	18"	96"	48
075856	8"	24"	96"	128
075854	4"	48"	96"	128
075855	6"	48"	96"	192
075852	8"	48"	96"	256
075860	18"	48"	96"	576



RenShape 5020 Polyurethane Foam Board

Although this board provides a better surface finish than RenShape 5018, it is used in many of the same applications. The light gray color makes RenShape 5020 a great choice for architectural models.

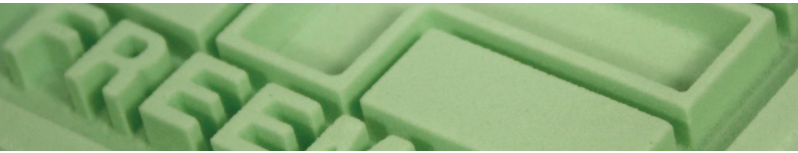
- ▶ 10 lb./ft.³ density
- ▶ Light gray color

SKU	Thickness	Width	Length	Bd. ft.
075175	2"	24"	96"	32
075176	4"	24"	96"	64
075177	6"	24"	96"	96
075178	8"	24"	96"	128
075174	2"	48"	96"	64
075182	4"	48"	96"	128
075183	6"	48"	96"	192
075180	8"	48"	96"	256



RenShape Foam Boards range in densities from 4 to 30 lb., making them suitable for lightweight models.

FOAM BOARDS CONTINUED



RenShape 5025 Polyurethane Foam Board

Improving on the RenShape 5020's surface finish, RenShape 5025 is used in many large and lightweight styling applications. 24" x 16" boards are also available for smaller projects.

- ▶ 15 lb./ft.³ density
- ▶ Light green color

SKU	Thickness	Width	Length	Bd. ft.
075119	4"	24"	16"	10.67
075123	2"	24"	96"	32
075124	4"	24"	96"	64
075122	6"	24"	96"	96
075125	8"	24"	96"	128
075135	2"	48"	96"	64
075132	3"	48"	96"	96
075126	4"	48"	96"	128
075121	6"	48"	96"	192



RenShape 5030 Polyurethane Foam Board

With an even better surface finish than RenShape 5025, RenShape 5030 is budget-friendly while offering a very good surface finish with excellent edge definition.

- ▶ 20 lb./ft.³ density
- ▶ Peach color

SKU	Thickness	Width	Length	Bd. ft.
075264	2"	24"	96"	32
075265	4"	24"	96"	64
075266	6"	24"	96"	96
075267	8"	24"	96"	128
075252	1/2"	48"	96"	16
075254	1"	48"	96"	32
075256	2"	48"	96"	64
075261	4"	48"	96"	128
075259	8"	48"	96"	256



RenShape 5035 Polyurethane Foam Board

RenShape 5035 features a medium low density of 28 lb./ft.³. It is ideal for master models, prototypes, and CAD design verification.

- ▶ 28 lb./ft.³ density
- ▶ Peach color

SKU	Thickness	Width	Length	Bd. ft.
075115	8"	24"	96"	128



RenShape 5035 and RenShape 5045 (pictured) work extremely well on the CNC. They create flakes rather than dust when machined, allowing for fast, easy clean-up.



RenShape 5045 Polyurethane Foam Board

RenShape 5045 provides the best surface finish and edge definition of all RenShape foam boards.

- ▶ 30 lb./ft.³ density
- ▶ Brown color

SKU	Thickness	Width	Length	Bd. ft.
075529	3/4"	24"	96"	12
075530	1"	24"	96"	16
075521	2"	24"	96"	32
075528	3"	24"	96"	48
075522	4"	24"	96"	64
075524	5"	24"	96"	80
075523	6"	24"	96"	96
075864	1/2"	48"	96"	16
075861	1"	48"	96"	32
075525	2"	48"	96"	64
075863	3"	48"	96"	96

SEE ALSO

Product	Page #
Repro Light & Repro Ultra Light for gluing	26
DunaBond	81
Freeman #60 Pattern Coating	121

RENSHAP[®] MODELING & STYLING BOARDS

Quick Facts

- Formulated for styling, modeling, prototyping & fabricating applications
- Can be worked by hand or machine
- Less abrasive to cutting tools



RenShape 5440 Polyurethane Styling Board

RenShape 5440 is a higher density version of 440, offering an improved surface finish without sacrificing ease of machining. These boards are manufactured in metric sizes (500mm x 1500mm). The Imperial equivalent sizes are provided below.

- ▶ 35 lb./ft.³ density
- ▶ Light brown color
- ▶ Ideal for master patterns

SKU	Thickness	Width	Length	Bd. ft.
075501	0.98"	19.7"	59.1"	7.92
075502	1.97"	19.7"	59.1"	15.85
075503	2.96"	19.7"	59.1"	23.9
075504	3.94"	19.7"	59.1"	31.8

RenShape 440 Polyurethane Styling Board

RenShape 440 is a medium-low density board used for master models, CNC styling models, prototypes, and visual models. RenShape 440 machines easily at fast cutting speeds, finishes to a good surface with excellent edge definition and produces very little tool wear.

- ▶ 34 lb./ft.³ density
- ▶ Light red-brown color
- ▶ General purpose & economical

SKU	Thickness	Width	Length	Bd. ft.
075236	2"	16"	60"	13.33
075146	1"	20"	60"	8.33
075147	2"	20"	60"	16.67
075148	3"	20"	60"	25
075149	4"	20"	60"	33.33
075151	6"	20"	60"	50

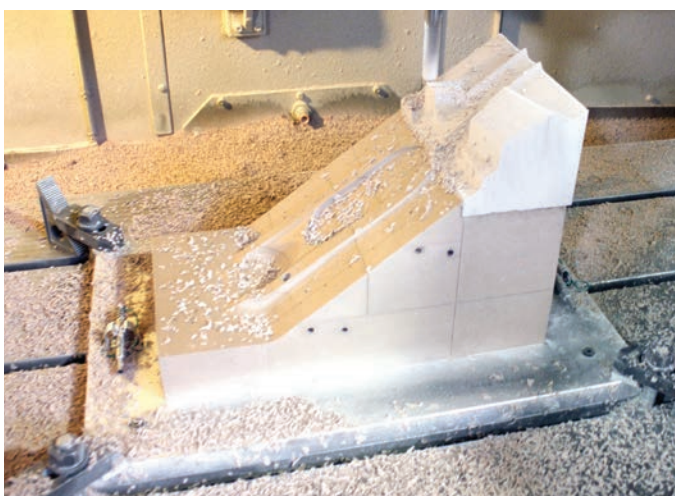


RenShape 450 Polyurethane Modeling Board

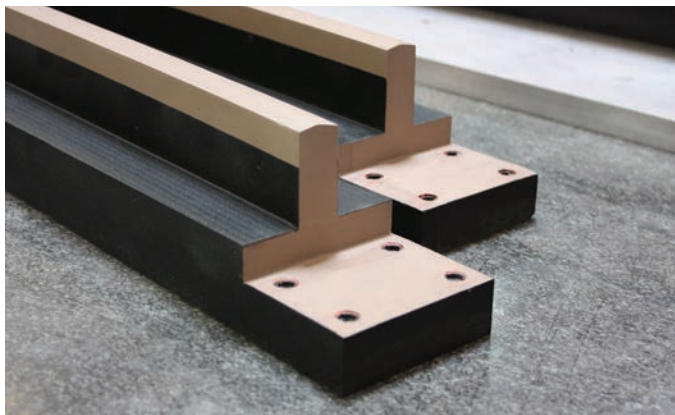
RenShape 450 is the original medium density polyurethane modeling and styling board. An ideal material for models and prototypes, master patterns, and tooling aids, this material will produce very stable, dimensionally accurate tools with well-defined edges and surface detail. RenShape 450 can be machined using standard woodworking tools and will not result in objectionable dust particles when planed, milled, sawed or drilled. It resists warping and can be easily painted and finished for appearance and prototype models.

- ▶ 41 lb./ft.³ density
- ▶ Light brown color
- ▶ Superior machinability and stability

SKU	Thickness	Width	Length	Bd. ft.
075139	2"	20"	15"	4.17
075202	2"	16"	60"	13.33
075205	4"	16"	60"	26.67
075140	1"	20"	60"	8.33
075141	2"	20"	60"	16.67
075142	3"	20"	60"	25
075143	4"	20"	60"	33.33
075203	1"	24"	60"	10
075206	2"	24"	60"	20
075211	3"	24"	60"	30



RenShape 440, 5440, and 450 offer excellent ease of machining.



Well-defined edges are possible with BM-70 due to its excellent surface finish.



RenShape BM-70 Medium-Density Modeling Board

RenShape BM-70 is a polyurethane modeling board that features excellent machinability, while holding precise tolerances and well-defined edges. Applications include master patterns, models, prototype foundry patterns, and automotive and architectural models.

- ▶ 42 lb./ft.³ density
- ▶ Light brown color
- ▶ Excellent edge definition

SKU	Thickness	Width	Length	Bd. ft.
075532	1.97"	19.7"	59.1"	15.9
075533	2.95"	19.7"	59.1"	23.9
075534	3.94"	19.7"	59.1"	31.8
075541	5.9"	19.7"	59.1"	47.7
075535	2"	24"	60"	20.0
075536	3"	24"	60"	20.0
075537	4"	24"	60"	40.0
075539	6"	24"	60"	60.0



RenShape 5460 Polyurethane Modeling Board

RenShape 5460 is lower density version of 460, offering excellent surface finish and ease of machining while minimizing the dust prevalent in many other modeling boards in this range.

- ▶ 43 lb./ft.³ density
- ▶ Light brown color
- ▶ High-quality surface finish

SKU	Thickness	Width	Length	Bd. ft.
075518	2"	24"	60"	20
075519	3"	24"	60"	30
075520	4"	24"	60"	40



RenShape 460 offers an excellent surface finish for many large and lightweight styling applications.



RenShape 460 Polyurethane Modeling Board

RenShape 460 is a medium-high density polyurethane modeling and styling board. It was developed to meet the growing demand for higher-quality, more dimensionally accurate, machined master patterns and prototypes. With a smoother surface finish than RenShape 450, this board is an ideal material for prototype vacuum-forming tools, styling prototypes, master models, tooling aids, and automotive die models. Carbide cutters are recommended, but not necessary.

- ▶ 48 lb./ft.³ density
- ▶ Light brown color
- ▶ Excellent surface finish

SKU	Thickness	Width	Length	Bd. ft.
075213	2"	16"	60"	13.33
075214	4"	16"	60"	26.67
075229	1"	20"	60"	8.33
075219	2"	20"	60"	16.67
075221	3"	20"	60"	25
075222	4"	20"	60"	33.33
075169	1"	24"	60"	10
075170	2"	24"	60"	20
075171	3"	24"	60"	30
075172	4"	24"	60"	40

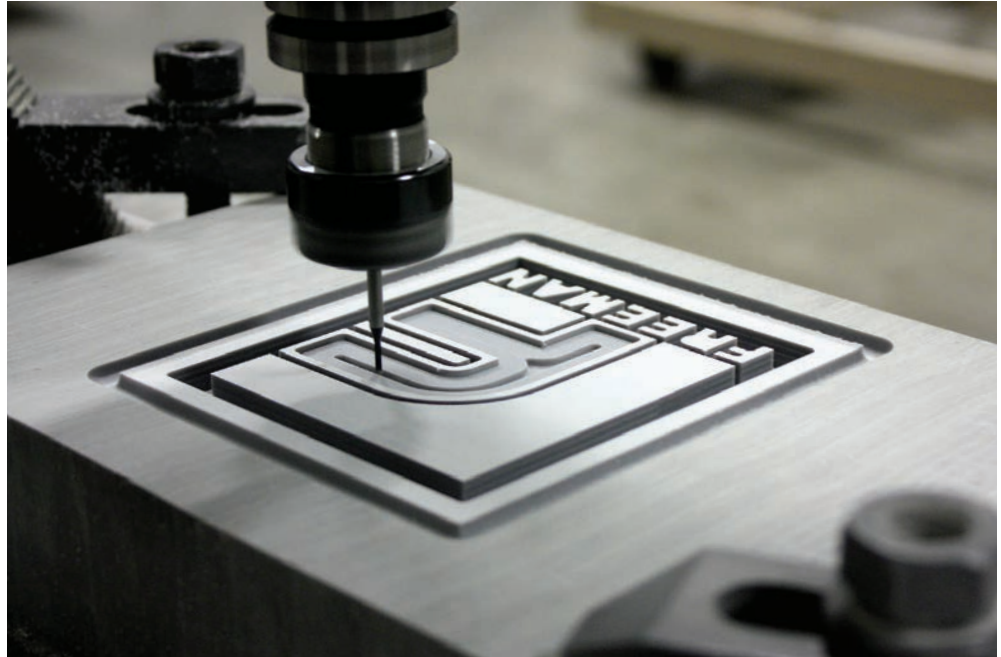
SEE ALSO

Product	Page #
Ren-Weld 103	81
Freeman #60 Pattern Coating	121
Freeman Wood & Plaster Sealer	121

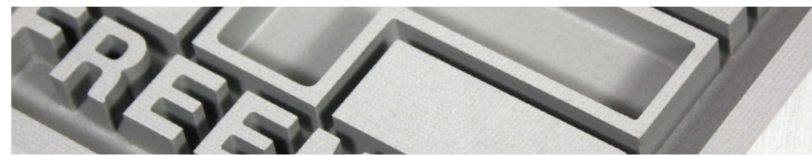
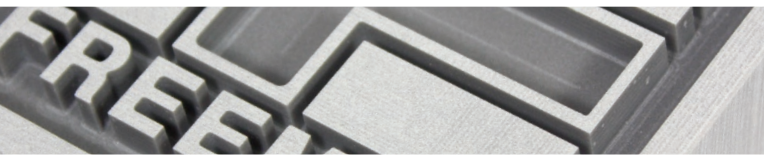
RENSHAPE® TOOLING & HIGH-TEMP BOARDS

Quick Facts

- Designed for high-wear and high-temperature applications
- Excellent stability and machined edge definition
- High-quality machined surface finish
- Non-abrasive to cutting tools



Many RenShape boards offer ease of machining while minimizing dust.



RenShape 470 Polyurethane Fixture Board

RenShape 470 is a high-density polyurethane board designed for CNC machining of production fixtures. This is the most durable fixture board in the RenShape line for the most demanding applications and is excellent for thermoforming tools designed to produce clear plastic parts.

- ▶ 104 lb./ft.³ density
- ▶ Light gray color
- ▶ Extremely tough and dense

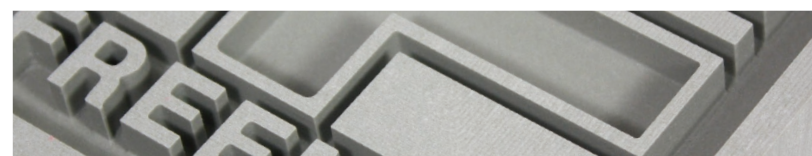
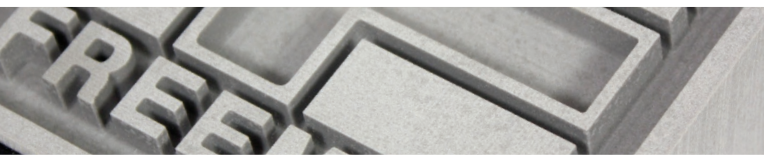
SKU	Thickness	Width	Length	Bd. ft.
075209	2"	20"	60"	16.67

RenShape 473 Polyurethane Fixture Board

RenShape 473 is an economical board that offers a lighter density than traditional fixture boards. It may be used for check fixtures, model bases, patterns, and thermoform tools where requirements are less demanding.

- ▶ 50 lb./ft.³ density
- ▶ Light gray color
- ▶ Most economical fixture board

SKU	Thickness	Width	Length	Bd. ft.
075153	2"	16"	60"	13.33
075154	3"	16"	60"	20
075155	4"	16"	60"	26.67
075156	6"	16"	60"	40



RenShape 472 Polyurethane Fixture Board

RenShape 472 is a polyurethane board designed for machining of production fixtures capable of withstanding extended use and handling. It combines light weight with toughness and abrasion resistance to withstand typical production environments.

- ▶ 55 lb./ft.³ density
- ▶ Light gray color
- ▶ Ideal for foundry patterns and thermoform tools

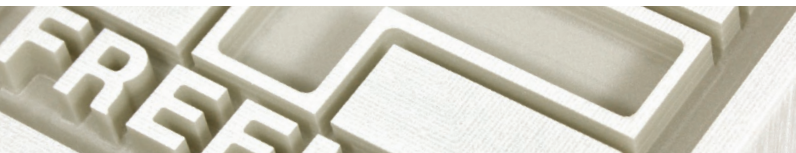
SKU	Thickness	Width	Length	Bd. ft.
075242	1"	20"	60"	8.33
075243	2"	20"	60"	16.67
075245	3"	20"	60"	25
075244	4"	20"	60"	33.33
075238	5"	24"	30"	25
075239	6"	24"	30"	30

RenShape 474 Polyurethane Fixture Board

This strong and durable board is engineered to machine well and produce good detail with less dust than other fixture boards. It is ideal for creating economical check fixtures, trim fixtures, and drill fixtures.

- ▶ 50 lb./ft.³ density
- ▶ Light gray color
- ▶ Excellent combination of durability, surface finish and light weight

SKU	Thickness	Width	Length	Bd. ft.
075614	2"	24"	60"	20
075622	3"	24"	60"	30
075630	4"	24"	60"	40

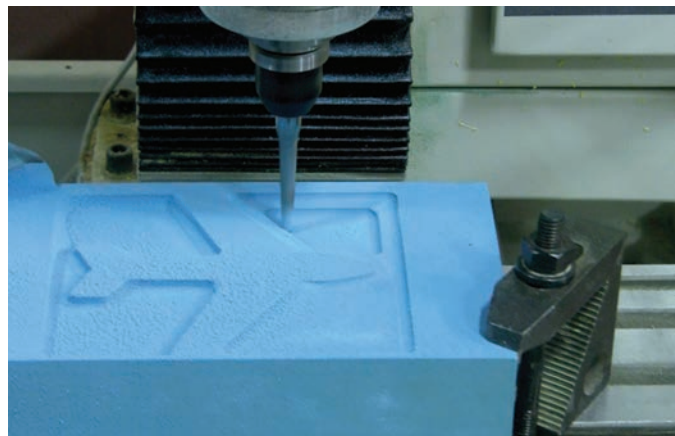


RenShape 5166 Metal-Forming Board

RenShape 5166 is a polyurethane board that is designed for use in forming metal parts for prototype and low volume production.

- ▶ 103 lb./ft.³ density
- ▶ Cream color
- ▶ Ideal for metal-forming applications

SKU	Thickness	Width	Length	Bd. ft.
075237	2"	20"	60"	16.67
075199	4"	20"	30"	16.67



RenShape 5008 is well-suited for designing master models.



RenShape 5169 Foundry Pattern & Tooling Board

RenShape 5169 is a polyurethane board that is designed for machining extremely durable and wear resistant foundry patterns, core boxes and other tools that require high wear and impact resistance. Its superior edge definition, dimensional stability and polishing characteristics also make it an excellent material for thermoforming tools designed to produce clear plastic parts.

- ▶ 75 lb./ft.³ density
- ▶ Red color
- ▶ Highest wear resistance

SKU	Thickness	Width	Length	Bd. ft.
075246	1"	20"	60"	8.33
075232	2"	20"	60"	16.67
075233	3"	20"	60"	25
075234	4"	20"	60"	33.33
075127	5/8"	24"	30"	3.125
075131	3/4"	24"	30"	3.75
075247	5"	24"	30"	25
075248	6"	24"	30"	30
075128	1"	24"	60"	10
075129	1 1/4"	24"	60"	12.5
075130	1 1/2"	24"	60"	15
075164	2"	24"	60"	20
075165	3"	24"	60"	30
075166	4"	24"	60"	40



RenShape 5008 Epoxy Modeling Board

RenShape 5008 is an epoxy modeling board designed for tooling use up to 230°F (110°C) and is well-suited for building master models, layup tools for low and medium temperature curing prepreps, and other heat-resistant tooling. This medium density epoxy material features a very low coefficient of thermal expansion to produce outstanding accuracy and dimensional stability.

- ▶ 42 lb./ft.³ density
- ▶ Light blue color
- ▶ Dimensional stability & prepreg compatibility

SKU	Thickness	Width	Length	Bd. ft.
075288	1"	24"	60"	10
075289	2"	24"	60"	20
075290	4"	24"	60"	40
075291	6"	24"	60"	60

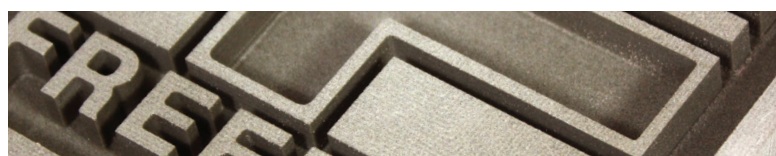


RenShape 5179 Foundry Pattern & Tooling Board

RenShape 5179 is a red polyurethane board specifically designed for machining highly accurate, dimensionally stable, and wear-resistant foundry patterns. It machines well with minimal chipping and is excellent for thermoforming tools designed to produce clear plastic parts.

- ▶ 73 lb./ft.³ density
- ▶ Red color
- ▶ Machines well with minimal chipping

SKU	Thickness	Width	Length	Bd. ft.
075546	1"	24"	60"	10
075554	2"	24"	60"	20
075562	3"	24"	60"	30
075570	4"	24"	60"	40
075577	5"	24"	30"	25
075585	6"	24"	30"	30



RenShape 5065 High-Temperature Epoxy Board

RenShape 5065 High-Performance, High-Temperature Epoxy board was developed for use at temperatures up to 400°F (204°C) in applications such as aerospace master models and lay-up tools for high temperature curing prepreps. RenShape 5065 offers good edge definition, good surface finish, and excellent dimensional stability with a high glass transition temperature of 470°F (243°C).

- ▶ 49 lb./ft.³ density
- ▶ Gray color
- ▶ Ideal for aerospace master modeling

SKU	Thickness	Width	Length	Bd. ft.
075272	2"	24"	60"	20
075273	4"	24"	60"	40
075274	6"	24"	60"	60

SEE ALSO

Product	Page #
RenPatch 5169 Repair Paste	76
Ren-Weld 5008 Adhesive	81
Ren Tooling Board Adhesives	81
Chemtrend Semi-Permanent Mold Releases	125

PERFECT PLANK LUMBER

For over 60 years, skilled craftsmen have made Perfect Plank their primary choice when it comes to high quality pattern lumber. Perfect Plank is manufactured to provide a dry, thick, stress-free pattern plank that is uniform in texture, low in moisture and virtually defect-free.

Perfect Plank is designed to free the user from the time-consuming tasks of planing, jointing, sizing, and gluing to assemble larger blocks for pattern construction. Perfect Plank maximizes the skills and efficiency of the pattern maker, mold maker, and model maker because each board is immediately ready for use in a wide variety of sizes.



Virtually Defect-Free

All Perfect Plank is made from carefully inspected pieces of lumber with very few of the defects that cost the user time and money. This lumber is precisely dried and stress-relieved, then finger-jointed into narrow, vertical-grained strips.



Accurate Construction

The strips are then accurately machined prior to being glued face-to-face to form the standard width plank. The accuracy of Perfect Plank is especially evident in the glue lines of each piece. Thin lines of water-resistant glue are cured with state-of-the-art electronic gluing equipment to make Perfect Plank easy to carve and machine without causing unnecessary wear of woodworking tools and cutter blades.



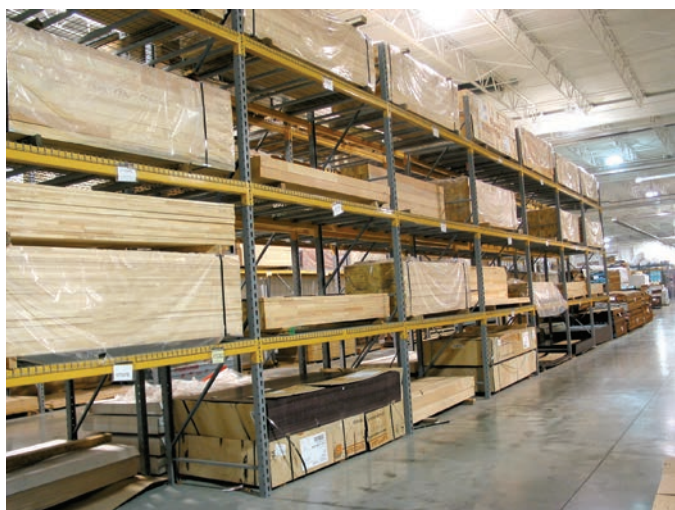
Superior Stability

The vertical grain construction of Perfect Plank produces a pattern lumber that has much greater dimensional stability than ordinary, straight grain pattern lumber. Vertical grain Perfect Plank will resist twisting and cupping and will produce patterns, molds, and models that are far superior to those made from ordinary rough sawn lumber.



Properly Stored

All Perfect Plank is stored in climate controlled warehouses, which ensures consistent moisture content regardless of the location or time of year you require your next delivery.



Features

Virtually defect-free	The pine species is equivalent to select grades of pattern lumber while the mahogany species is equivalent to FAS grades.
Grain	Tight, straight, vertical grain as opposed to the wide, diagonal and/or straight grain commonly found in other products.
Moisture content	Kiln-dried to a low and uniform moisture content throughout. (controlled to 8% - 10%)
Surfacing	Each board is surfaced on four sides.
End gluing	Individual wood strips joined by precision finger-jointing with non-abrasive adhesives.
Edge gluing	Strips are edge-glued with uniformly thin glue lines of water-resistant adhesive.
Immediately usable	Simply select the thickness needed, cut off the required length, and begin to build your pattern. With Perfect Plank, every cubic inch is usable.

ORDERING INFORMATION

This material is ordered by the full board. Board feet per board is listed as a reference. When ordering, please indicate how many boards are needed.

Custom orders

Additional sizes are available by custom order in thicknesses from 1" to 6", widths 12" to 48", and lengths up to 16'. Maple Perfect Plank is available by special order. Lead times are based on availability. Please contact customer service for pricing and delivery information on all custom orders.

Perfect Plank Pine

This popular laminated plank is uniformly dried, virtually free from defects, and planed on all four sides for immediate use. It is an excellent alternative to the select Sugar Pine grades which are becoming increasingly difficult to source.

SKU	Description	Nom.* Thickness	Nom.* Width	Length	Bd. ft./pc.
074005	4/4 Perfect Plank Pine	1"	18"	96"	12
074007	5/4 Perfect Plank Pine	1¼"	18"	96"	15
074010	6/4 Perfect Plank Pine	1½"	18"	96"	18
074012	7/4 Perfect Plank Pine	1¾"	18"	96"	21
074014	8/4 Perfect Plank Pine	2"	18"	96"	24
074015	9/4 Perfect Plank Pine	2¼"	18"	96"	27
074020	10/4 Perfect Plank Pine	2½"	18"	96"	30
074025	12/4 Perfect Plank Pine	3"	18"	96"	36
074028	13/4 Perfect Plank Pine	3¼"	18"	96"	39
074030	14/4 Perfect Plank Pine	3½"	18"	96"	42
074035	16/4 Perfect Plank Pine	4"	18"	96"	48
074040	17/4 Perfect Plank Pine	4¼"	18"	96"	51
074048	20/4 Perfect Plank Pine	5"	18"	96"	60
074050	21/4 Perfect Plank Pine	5¼"	18"	96"	63
074052	22/4 Perfect Plank Pine	5½"	18"	96"	66
074055	24/4 Perfect Plank Pine	6"	18"	96"	72

*Actual thicknesses are approximately ⅛" less and actual widths are 17" +/- ¼". Other sizes may be available by special order. Please call for details.

Perfect Plank Mahogany

Constructed from genuine Mahogany, this laminated wood product is the best choice for high-tolerance patterns, models, and fixtures. It is uniformly dried, virtually free from defects, and planed on all four sides for immediate use.

SKU	Description	Thickness	Width	Length	Bd. ft./pc.
074600	4/4 Perfect Plank Mahogany	1"	18"	96"	12
074602	5/4 Perfect Plank Mahogany	1¼"	18"	96"	15
074604	6/4 Perfect Plank Mahogany	1½"	18"	96"	18
074608	8/4 Perfect Plank Mahogany	2"	18"	96"	24
074610	9/4 Perfect Plank Mahogany	2¼"	18"	96"	27
074618	12/4 Perfect Plank Mahogany	3"	18"	96"	36
074620	13/4 Perfect Plank Mahogany	3¼"	18"	96"	39
074626	16/4 Perfect Plank Mahogany	4"	18"	96"	48
074628	17/4 Perfect Plank Mahogany	4¼"	18"	96"	51
074634	20/4 Perfect Plank Mahogany	5"	18"	96"	60
074640	23/4 Perfect Plank Mahogany	5¾"	18"	96"	69
074642	24/4 Perfect Plank Mahogany	5⅞"	18"	96"	72

Other sizes may be available by special order. Please call for details.

Perfect Plank Jelutong

Due to its extremely fine texture and consistent grain structure, this species of Perfect Plank is the best for hand carving or CNC machining. Constructed from Jelutong, this laminated wood product is uniformly dried, virtually free from defects, and planed on all four sides for immediate use.

SKU	Description	Nom.* Thickness	Nom.* Width	Length	Bd. ft./pc.
074310	6/4 Perfect Plank Jelutong	1½"	18"	96"	18
074314	8/4 Perfect Plank Jelutong	2"	18"	96"	24
074315	9/4 Perfect Plank Jelutong	2¼"	18"	96"	27
074320	10/4 Perfect Plank Jelutong	2½"	18"	96"	30
074325	12/4 Perfect Plank Jelutong	3"	18"	96"	36
074326	13/4 Perfect Plank Jelutong	3¼"	18"	96"	39
074335	16/4 Perfect Plank Jelutong	4"	18"	96"	48
074340	17/4 Perfect Plank Jelutong	4¼"	18"	96"	51
074349	20/4 Perfect Plank Jelutong	5"	18"	96"	60
074350	21/4 Perfect Plank Jelutong	5¼"	18"	96"	63
074355	24/4 Perfect Plank Jelutong	6"	18"	96"	72

*Actual thicknesses are approximately ⅛" less and actual widths are 17" +/- ¼". Other sizes may be available by special order. Please call for details.

Perfect Plank Alder

Red Alder is a domestically grown species found primarily on the Pacific coast. Slightly lighter in weight and color than Mahogany, this hardwood offers an excellent alternative to higher priced Mahogany. Perfect Plank constructed from Alder is uniformly dried for stability, virtually free from defects, and planed on four sides for immediate use.

SKU	Description	Thickness	Width	Length	Bd. ft./pc.
074710	9/4 Perfect Plank Alder	2¼"	18"	96"	27
074718	13/4 Perfect Plank Alder	3¼"	18"	96"	39
074724	17/4 Perfect Plank Alder	4¼"	18"	96"	51

Other sizes may be available by special order. Please call for details.

Perfect Plank Poplar

Constructed from domestically grown poplar, this hardwood plank offers a lower cost alternative to Mahogany Perfect Plank. As with all Perfect Plank products, it is uniformly dried for stability, virtually free from defects, and planed on four sides for immediate use.

SKU	Description	Thickness	Width	Length	Bd. ft./pc.
074810	9/4 Perfect Plank Poplar	2¼"	18"	96"	27
074818	13/4 Perfect Plank Poplar	3¼"	18"	96"	39
074824	17/4 Perfect Plank Poplar	4¼"	18"	96"	51
074832	21/4 Perfect Plank Poplar	5¼"	18"	96"	63

Other sizes may be available by special order. Please call for details.

ROUGH SAWN PATTERN LUMBER



Freeman offers a complete selection of soft woods and hardwoods graded specifically for pattern and model construction. All of our lumber adheres to accepted grading rules. We take great pride in the quality of our lumber and all of our lumber products are stored inside climate controlled warehouses to maintain specified moisture content and overall quality. Many of our grades of lumber are available surfaced two sides (S2S) for a small additional charge. All dimensions are nominal.

SOFT WOODS

Eastern White Pine

Its straight grain and comparatively uniform texture makes Eastern White Pine similar to Sugar Pine, although it is not as easily carvable as Sugar Pine. All of our Eastern White Pine is kiln-dried and ranks high in stability. Eastern White Pine offers an economical alternative to Sugar Pine. It is available as #2 Common, and is stored inside climate controlled warehouses to maintain specified moisture content and overall quality.

No. 2 Common

SKU	Description	Thickness	Width	Length
071254	6/4 No. 2 Common	1½"	12"	6'-16'
071251	8/4 No. 2 Common	2"	12"	6'-16'

Jelutong

Because of its low density, fine texture, and exceptional workability, Jelutong is ideal for pattern shop applications as well as fine detail work and intricate carving. Jelutong is a white wood with approximately the same weight properties as sugar pine and accepts pattern coatings very well. To minimize splitting and checking, all boards are carefully kiln-dried to under 12% moisture content and stored inside climate controlled warehouses to maintain specified moisture content and overall quality.

SKU	Description	Thickness	Width	Length
073007	5/4 Jelutong	1¼"	12"	8'-18'
073010	6/4 Jelutong	1½"	12"	8'-18'
073015	8/4 Jelutong	2"	12"	8'-18'

Pattern Sugar Pine

All Sugar Pine pattern lumber stocked by Freeman is kiln-dried and selected to meet the exacting specifications and requirements of pattern and model makers. By maintaining an average moisture content of 10% to 12%, and storing in climate controlled warehouses, we ensure that our customers receive boards that are stable and consistent in quality.

No. 2 Common

A very popular standard grade for the patternmaker. The entire board can be used in a wide range of applications where tight, sound knots do not affect performance and cost is a major factor. Tight knots are generally limited to 3¾", but most are significantly smaller and well-spaced. Spike knots are permitted, but we purchase our lumber with the objective of minimizing this defect.

SKU	Description	Thickness	Width	Length
071225	4/4 No. 2 Common	1"	12"	8'-16'
071230	5/4 No. 2 Common	1¼"	12"	8'-16'
071235	6/4 No. 2 Common	1½"	12"	8'-16'
071240	8/4 No. 2 Common	2"	12"	8'-16'
071241	10/4 No. 2 Common	2½"	12"	8'-16'
071242	12/4 No. 2 Common	3"	12"	8'-16'

No. 3 Common

The most economical choice for the patternmaker. This grade is typically used for medium to large applications where cost of the lumber is of primary importance and surface rework is allowed. The most notable surface imperfections are random knots on both surfaces. Tight knots may be up to 4½" in diameter while loose knots may be up to 2½" in diameter.

SKU	Description	Thickness	Width	Length
071275	8/4 No. 3 Common	2"	12"	8'-16'

ORDERING INFORMATION

This material is ordered by the board foot. Due to random dimensions, orders will be filled as close as possible to board feet requested, therefore exact board feet and pricing cannot be guaranteed. Please make us aware if you have specific requirements for boards with random lengths.

Calculate board feet

$$\frac{\text{Length} \times \text{Width} \times \text{Thickness (inches)}}{144} = \text{Board Feet}$$

Mahogany

Genuine Mahogany is the most popular and best known of the hardwoods used for pattern and model work. It is extremely stable, withstands abrasion, and wears well. It has straight and close grain and carves easily. All Mahogany Pattern Lumber stocked by Freeman is kiln-dried and stored inside our climate controlled warehouses to maintain specified moisture content and overall quality. Freeman has been providing the trade with straight-grained Pattern Mahogany for over 50 years.

FAS Pattern Mahogany

The highest grade of Mahogany available (virtually defect-free) that is selected for its straight grain and used for producing high-quality patterns and models. We also offer FAS Mahogany in 6' to 7' lengths which provides a lower cost option for those jobs that do not require the longer length.

SKU	Description	Thickness	Width	Length
072005	4/4 FAS Mahogany	1"	6"+	8'-16'
072015	6/4 FAS Mahogany	1½"	6"+	8'-16'
072020	8/4 FAS Mahogany	2"	6"+	8'-16'
072025	10/4 FAS Mahogany	2½"	6"+	8'-16'
072030	12/4 FAS Mahogany	3"	6"+	8'-16'
072035	16/4 FAS Mahogany	4"	6"+	8'-16'
072120	4/4 FAS Mahogany	1"	6"+	6'-7'
072130	6/4 FAS Mahogany	1½"	6"+	6'-7'
072135	8/4 FAS Mahogany	2"	6"+	6'-7'

Freeman Pattern Mahogany

Similar to our FAS Pattern Mahogany, but at a lower cost, this grade is selected for straight grain but allows for a small number of pin worm holes and other minor defects. Though widths are somewhat narrower than our FAS grade, our stock is typically 6" and wider.

SKU	Description	Thickness	Width	Length
072150	4/4 Pattern Mahogany	1"	6"+	8'-16'
072155	5/4 Pattern Mahogany	1¼"	6"+	8'-16'
072160	6/4 Pattern Mahogany	1½"	6"+	8'-16'
072165	8/4 Pattern Mahogany	2"	6"+	8'-16'
072172	16/4 Pattern Mahogany	4"	6"+	6'-7'

ORDERING INFORMATION

This material is ordered by the board foot. Due to random dimensions, orders will be filled as close as possible to board feet requested, therefore exact board feet and pricing cannot be guaranteed. Please make us aware if you have specific requirements for boards with random lengths.

Hard Maple

A hard, strong, white-colored wood with excellent wear-resistant characteristics. Kiln dried for stability and consistent quality.

SKU	Description	Thickness	Width	Length
075015	4/4 Hard Maple FAS	1"	6"+	8'-16'
075025	6/4 Hard Maple FAS	1½"	6"+	8'-16'
075030	8/4 Hard Maple FAS	2"	6"+	8'-16'

Poplar

Poplar is a domestically-grown, economical hardwood species that offers good workability and hardness characteristics. This pattern lumber is relatively clear and free of most defects. Stocked in "Face & Better", this species offers the patternmaker affordable performance compared to Sugar Pine and Mahogany.

SKU	Description	Thickness	Width	Length
075046	4/4 Poplar	1"	6"+	8'-16'
075047	5/4 Poplar	1¼"	6"+	8'-16'
075048	6/4 Poplar	1½"	6"+	8'-16'
075050	8/4 Poplar	2"	6"+	8'-16'
075051	10/4 Poplar	2½"	6"+	8'-16'
075052	12/4 Poplar	3"	6"+	8'-16'
075053	16/4 Poplar	4"	6"+	8'-16'

Calculate board feet

$$\frac{\text{Length} \times \text{Width} \times \text{Thickness (inches)}}{144} = \text{Board Feet}$$

SEE ALSO

Product	Page #
TUF-Fil® (for repairing Mahogany and Poplar)	74
TUF-Carv® (for repairing Pine and Jelutong)	74
Freeman White & Gold Wood Glues	83
Wood Screws	115
Abrasives	111
Pattern Coatings (Primers, Paints & Sealers)	121

RICHLITE® FIBER-LAMINATE SHEETS

Richlite Fiber-Laminate Sheets offer excellent machinability and dimensional stability. They are abrasion, moisture and chemical resistant. This remarkably strong material resists warping and maintains a uniform flatness and thickness.



Physical properties

Specific Gravity	1.24
Water Absorption (% @ 1"/25 hr.)	1.45
Impact Strength (ft. lb./in.)	1.17
Tensile Strength (lb./sq. in.)	19,000
Flexural Strength (lb./sq. in.)	22,000
Compressive Strength (lb./sq. in.)	30,650
Abrasion-Resistance (Taber CS-17-% loss/1,000 revolutions)	0.0107
Hardness (Shore D)	86
Coefficient of Thermal Expansion (in./in. °F)	1.1×10^{-6}
Density (lb./cu. ft.)	77.4
UL Classified	Class A
Color	Oak

ORDERING INFORMATION

Richlite is available in thicknesses ranging from 1/2" to 3", widths 16" to 48", and lengths 48" or 96". Some sizes are special order and subject to extended lead times. Please see our website, www.FreemanSupply.com, or contact Customer Service for complete information.

User tips

Sawing – Carbide-tipped saw blades are recommended for both circular and table saw cutting applications. The proper feed rate, combined with a sharp blade will result in coarse sawdust. All sawing should be performed dry.

Milling, Routing, & Machining – Carbide cutters are recommended. The proper feed rate, combined with a sharp cutter will result in coarse sawdust. All machining should be performed dry.

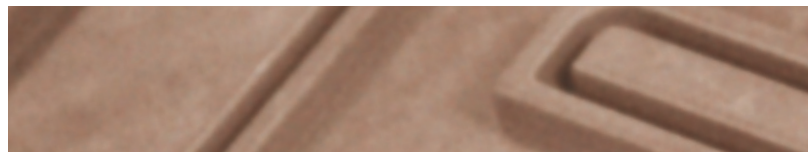
Drilling & Tapping – The use of high speed steel drills and taps are recommended for short production runs and shallow holes. For longer production runs and deeper holes, use carbide-tipped drills and taps. When tapping Richlite, use a slightly smaller pilot drill than specified for the size tap required. This will assure optimum thread strength. Whenever possible, the piece to be machined should be backed up by another piece of scrap material to prevent chipping around the holes. Lift the drill frequently to allow chips to be removed and to prevent the build-up of excess heat. Holes drilled parallel to the lamination should be clamped or secured in a vise. All drilling and tapping should be performed dry.

Sanding & Buffing – Sanding can be performed by using a belt or disc sander, or by hand. Sand using the same procedures and techniques as used with wood. Dry sanding is recommended.

Bonding Richlite Fiber-Laminate Sheet – Lightly sand the mating surfaces to be glued. Use an epoxy adhesive, such as RenLam 1700-1.

MDF – MEDIUM DENSITY FIBERBOARD

Medium Density Fiberboard (MDF) is a low cost machinable media for producing master patterns, models, and prototypes. This product features a uniform density for smooth machining and low tool wear. MDF will accept a wide range of sealers, primers, and coatings to produce a hard, durable tool surface.



Physical Properties

Color	Beige
Density	38 lb./ft. ³ +/-2 lb.
Internal Bond	90 lb./in. ²
Moisture Content	5-8%
Hardness (Shore D)	45-55

SKU	Thickness	Width	Length	Board foot/piece
076225	2"	24"	96"	32
076230	4"	24"	96"	64
076226	2"	49"	97"	66
075231	4"	49"	97"	132

Other sizes may be available by special order. Please call for details.

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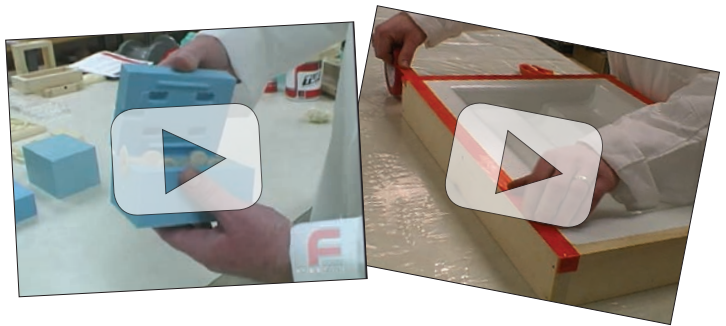
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Freeman's video library contains over three hours of instructional and product videos, making it the most comprehensive free resource for making parts, patterns, tools and molds.

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Since we've unveiled our revamped website, we've added features such as a favorites list, quote builder, interactive closeout list, web discounts, quotes/order history, and more!

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1Z4720310358314894	Completed

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from start to finish*



Description	Unit Price	Total
Repro 83 Blue Gal Unit	\$82.62	\$82.62
Sub Total		\$82.62

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LIQUID TOOLING

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

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Fast-Cast Polyurethanes

29-36



Polyurethane Elastomers

37-42



Silicone Rubber

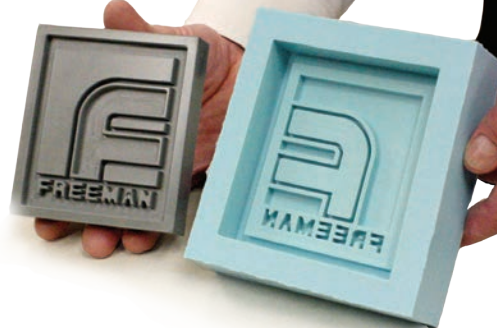
42-60



Epoxy, Polyester, and Accessories

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.



LIQUID TOOLING

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 x 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 x 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 x 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 x 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 x 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



LIQUID TOOLING

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 x 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 x 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 x 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 x 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 x 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 x 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



LIQUID TOOLING

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

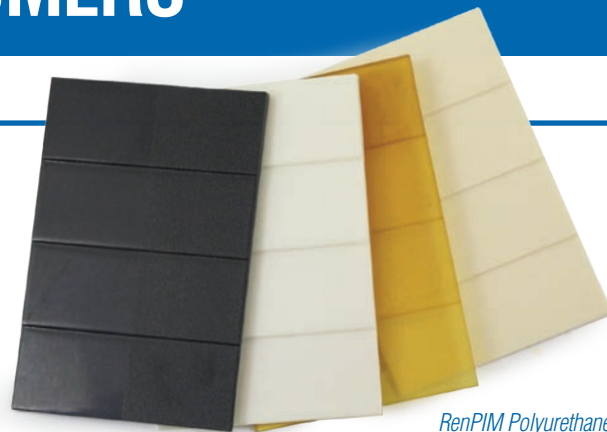
SEE ALSO

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
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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 x 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 x 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 x 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 x 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 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 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 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



LIQUID TOOLING

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 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 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 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

INTERMEDIATE CURE CONTINUED

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 Synthane PRC 1700

Freeman Synthane 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

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



Freeman 1040 offers excellent flexibility and a high tear strength.

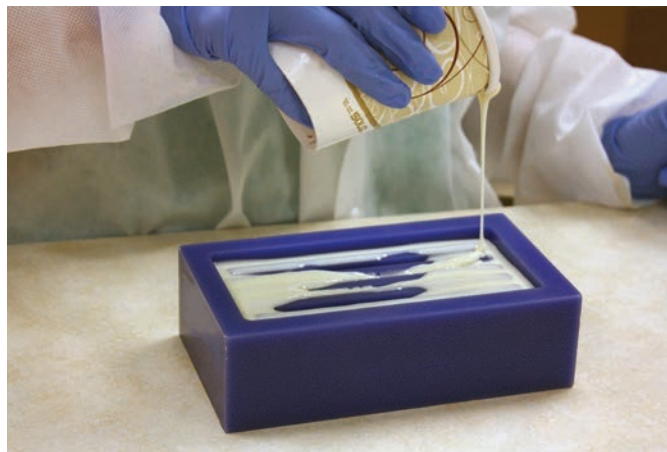
OVERNIGHT CURE - FLEXIBLE CONTINUED

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

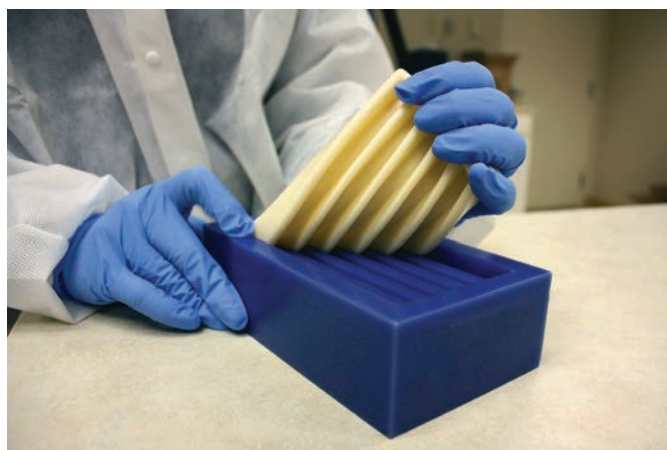


RenCast 6401-1 / Ren 6401-3

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



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.

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

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.

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

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



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

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 1/2" 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 1/2" 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

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

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.

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 (psi)	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.

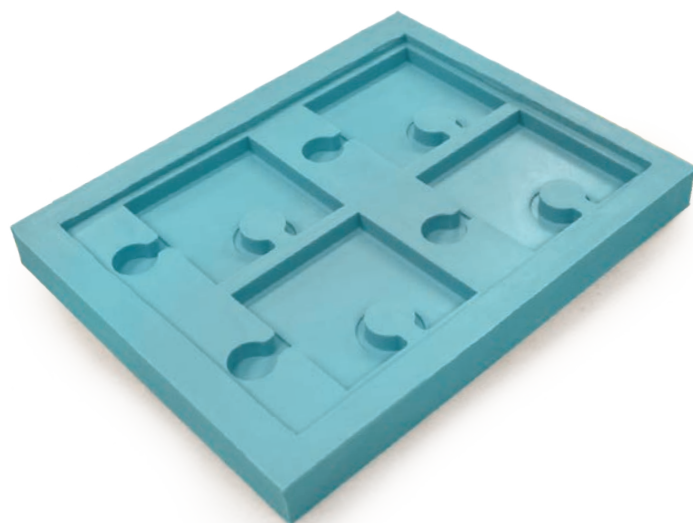
SKU	Size	Net weight (lb.)
055209	V-340/CA-45 1 kg Kit	2.2
055217	V-340/CA-35 5 kg Kit	11
055200	V-340/CA-45 5 kg Kit	11
055201	V-340/CA-55 5 kg Kit	11
055202KG	V-340 Base Only (20 kg)	44.1
055218KG	CA-35 Catalyst Only (2 kg)	4.4
055203KG	CA-45 Catalyst Only (2 kg)	4.4
055224	CA-45FC Fast Cure Catalyst 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 (psi)	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

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

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.*

V-695 Silicone Aerospace Sealant

Also designed for use as abradable air seals for compressor blades of

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

jet engines, Elkem V-695 is a black, two-component aerospace sealant.

V-205 Silicone Electronic Coating

Elkem V-205 is

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

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.

V-1022 Electronic Potting Silicone

This two-component, condensation-cure silicone rubber is

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

specifically designed

for potting and encapsulating electronic and electrical components.

V-1022 bonds to most metals and plastics without a primer.



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

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

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.

47V-100 Silicone Fluid

Like 47V-50, Elkem 47V-100 is also non-reactive

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

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.

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

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

in naphtha 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.

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

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

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.

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 x 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 x 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 x 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 x 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 x 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 x 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 x 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 x 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 x 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 x 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 x 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 x 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 1/2" 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 1/2". 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 (1/2 Pint)	0.36
055809	Freeman 805 Resin Only (Quarts – 6)	12
055810	Freeman 805 Hardener Only (1/2 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 3/4" 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 3/4", 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 3/4" 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

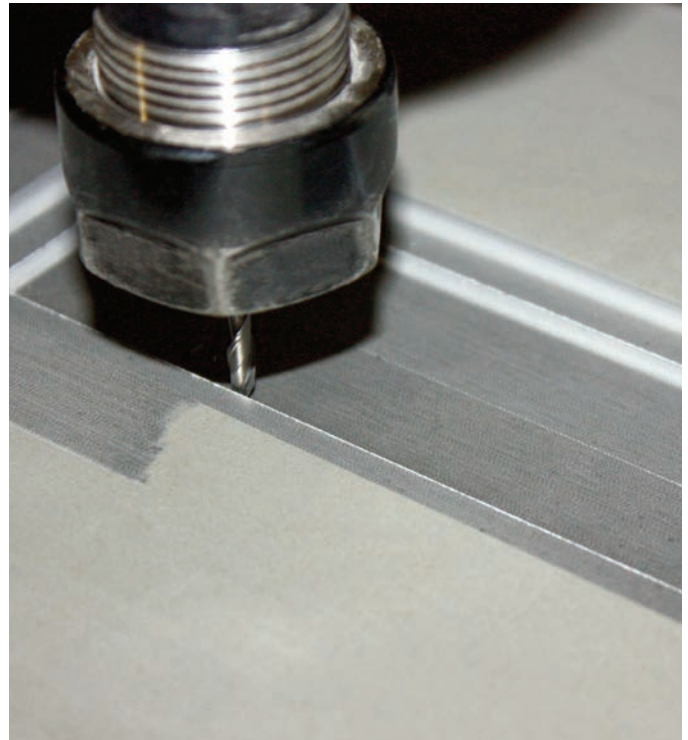
- ▶ Castable up to 4" thick
- ▶ 140-165 min. gel time
- ▶ 91 Shore D

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

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 ⅛" or thinner require a heat cure at 100-150°F.

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

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

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 SURFACE COATS



Freeman 701

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 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 x 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 x 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 x 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 x 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 x 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 x 10 ⁶	4,700	2.60 x 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 x 10 ⁶	4,880	3.16 x 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 x 10 ⁶	6,500	2.10 x 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 x 10 ⁶	4,000	2.30 x 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 x 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 x 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 x 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 x 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 x 10 ⁶	7,000	2.40 x 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

- ▶ Hydrophobic
- ▶ 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 x 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 x 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 x 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 x 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 x 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 x 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 x 10 ⁶	26,000	1.00 x 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 x 10 ⁶	34,900	0.97 x 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 x 10 ⁶	25,000	1.20 x 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 x 10 ⁶	25,000	0.81 x 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 x 10 ⁶	20,000	1.02 x 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 x 10 ⁻⁵	—	273
RenLam 8100	100:25	100:29	35	24	92	2,500	1.13	18.5	23,450	42,180	1.91 x 10 ⁶	32,224	1.2 x 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 x 10 ⁶	23,000	2.56 x 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 x 10 ⁶	26,000	0.85 x 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 x 10 ⁶	24,000	1.41 x 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 x 10 ⁶	80,000	3.40 x 10 ⁻⁵	—	350
RenLam 5052	100:38	100:47	7 hr.	24	—	700	1.17	20.2	—	20,305	4.5 x 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

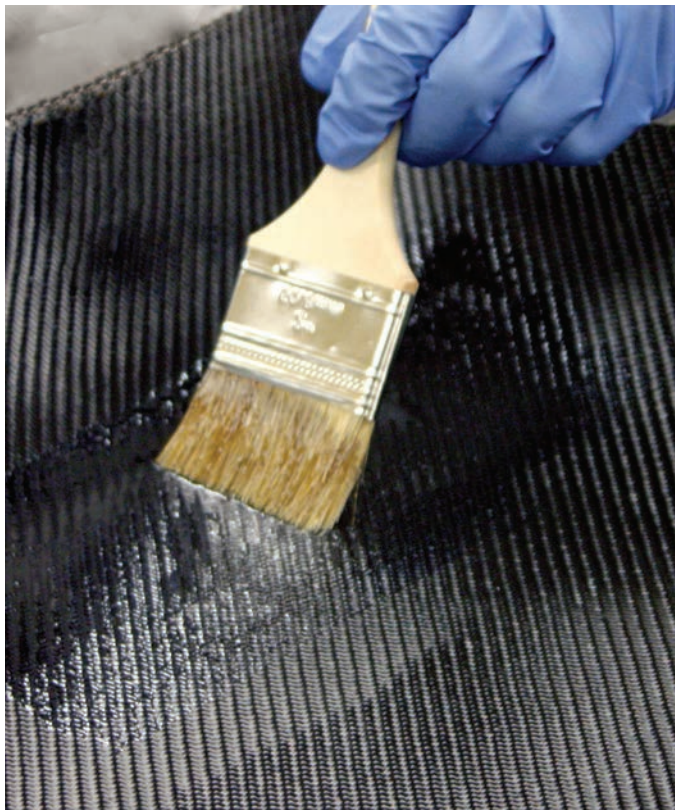
Freeman 917

- ▶ 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 x 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 x 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 x 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.



LIQUID TOOLING

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 x 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 x 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 x 10 ⁶	2,800	3.8 x 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 x 10 ⁶	1,800	4.8 x 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 x 10 ⁵	3,800	2.16 x 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 x 10 ⁵	413	9.4 x 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

Polyurethane Accessories

Page

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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

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 than Hydrocal B-11.

SKU	Net weight (lb.)
036055	50
036005	100

Hydrocal A-11

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.

SKU	Net weight (lb.)
036008	50
036009	100

Hydrocal B-11

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.

SKU	Net weight (lb.)
036069	50
036010	100

White Hydrocal

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.

SKU	Net weight (lb.)
036038	50
036037	100

Hydrostone

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.

SKU	Net weight (lb.)
036035	50
036034	100

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.

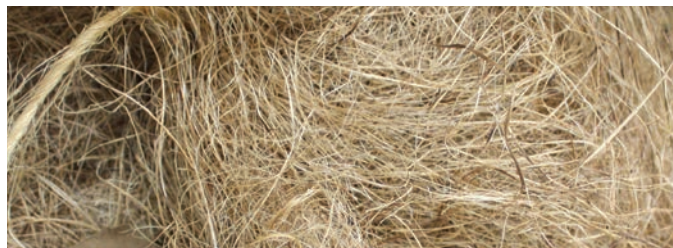
SKU	Net weight (lb.)
036028	50
036027	100

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 ACCESSORIES



Manila Hemp

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

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.



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

Product	Page #
Freeman Wood & Plaster Sealer	121

FABRICS & BAGGING

This comprehensive selection of materials from the biggest names in the industry offers solutions for the construction of large, lightweight molds and production parts.

62-63

Fiberglass Cloth

64

Kevlar™ Cloth

65

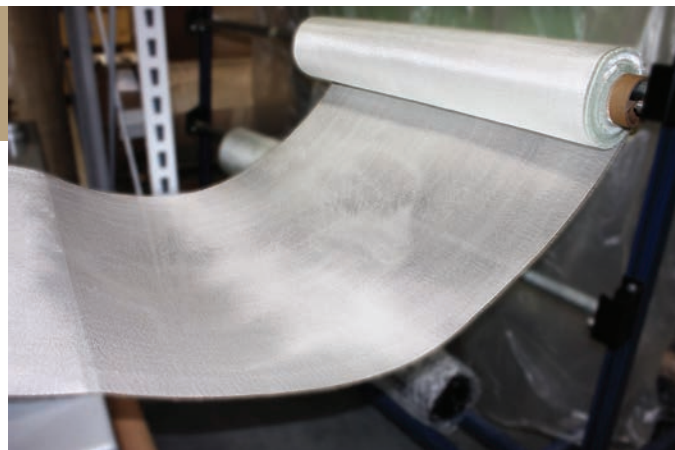
Carbon Fiber Cloth

66

Mia Vacuum Bagging Supplies

FIBERGLASS CLOTH

Used to construct laminate plastic parts and tooling with epoxy and polyester resins, Freeman fiberglass fabrics are the finest quality materials manufactured by BGF and are compatible with both epoxy and polyester resin systems. Available by the yard (unless otherwise noted) and in full rolls.



Specifications

Style	Weight (oz./sq. yd.)	Weave	Thickness (inches)	Yarn Desc. (Warp)*	Yarn Desc. (Fill)*	Yarns/In. (Ends x Picks)	Breaking Strength Warp (lb./in.)	Breaking Strength Fill (lb./in.)	Finish
120	3.12	4 HS	0.005	ECD 450 1/2	ECD 450 1/2	60 X 58	105	87	504 Volan
1522	3.64	Plain	0.006	ECG 150 1/2	ECG 150 1/2	24 X 22	65	60	504 Volan
3733	5.75	Plain	0.008	ECG 37 1/0	ECG 37 1/0	18 X 18	150	115	504 Volan
7533	5.90	Plain	0.009	ECG 75 1/2	ECG 75 1/2	18 X 18	110	100	504 Volan
2532	7.00	Plain	0.011	ECG 25 1/0	ECG 25 1/0	16 X 14	150	100	504 Volan
7532	7.10	Plain	0.010	ECG 75 1/3	ECG 75 1/3	16 X 14	135	100	627 Silane
7725	8.50	2x2 Twill	0.010	ECG 75 1/0	ECG 75 1/0	54 X 18	-	-	504 Volan
7725 Black	8.70	2x2 Twill	0.010	ECG 75 1/0	ECH 25 1/0	54 X 18	-	-	A454
1581	8.80	8 HS	0.010	ECG 150 1/2	ECG 150 1/2	57 X 54	198	175	504 Volan
7781	8.71	8 HS	0.009	ECDE 75 1/0	ECDE 75 1/0	57 X 54	242	231	504 Volan
7500	9.64	Plain	0.015	ECG 37 1/2	ECG 37 1/2	16 X 14	235	215	504 Volan
7544	18.23	2 End Plain	0.021	ECG 37 1/2	ECG 37 1/4	27 X 14	450	390	504 Volan
7587	20.10	Mock Leno	0.030	ECG 37 1/2	ECG 37 1/2	39 X 21	420	215	504 Volan
1597	38.00	Triple Plain	0.039	ECG 37 1/4	ECG 37 1/4	30 X 30	700	600	504 Volan

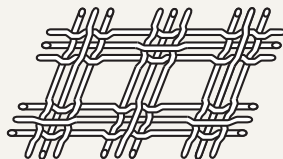
*E = E Glass C = Continuous filament D = 5 micron diameter DE = 6 micron diameter G = 9 micron diameter H = 10 micron diameter K = 13 micron diameter

Weave Types

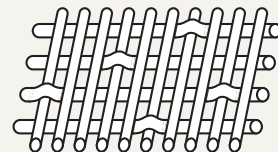
Plain – The warp (length-wise) and fill (cross-wise) yarns cross over and under each other. This weave has the maximum number of interlacings, the most crimp, and the most stability. It is excellent for use in flat panel laminates.



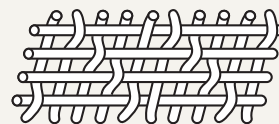
Mock Leno – The yarns run in groups in both warp and fill, locking each other in place at the interlacings. This style gives maximum thickness, good dimensional stability and medium-stiff drapability. Excellent in tooling applications.



Satin – The warp yarn crosses over four or more fill yarns, under one, over four, etc. Very drapable, it conforms well to contoured surfaces in manufactured parts. Often used to reinforce plastics due to high bidirectional strength.



Triple Plain – This special weave features very good drapability and conforms readily to contoured plains.



3 oz. Fiberglass Cloth (#120)

This fiberglass cloth is tightly woven and has a soft, smooth surface, making it ideal for demanding applications where print-through must be minimized or avoided. Commonly used in aerospace and other high-quality fabrications, this cloth conforms easily to contoured surfaces and compound curves.

SKU	Weave	Width	Full Roll Length (yd.)
054152	4 HS	38"	500

4 oz. Fiberglass Cloth (#1522)

This lightweight fiberglass cloth works well for most light-duty applications where a clear wet-out is required. Sometimes referred to as "deck cloth", it is popular in the construction of lightweight models, RC aircraft, surfboards, sailboards, and canoes. It is frequently used as a surfacing fabric to stop print-through when backed by layers of heavier fabric in molded parts.

SKU	Weave	Width	Full Roll Length (yd.)
054096	Plain	50"	125

6 oz. Fiberglass Cloth (#3733)

3733 is a flexible fabric that wets-out transparently and is well suited to a wide range of lightweight, general-purpose applications including laminating, reinforcing and sheathing/waterproofing. It is also widely used in boat building, cedar strip canoes, and lightweight repairs.

SKU	Weave	Width	Full Roll Length (yd.)
054093	Plain	38"	125

6 oz. Fiberglass Cloth (#7533)

This fabric is well suited to various lightweight, general-purpose applications including small craft boat building, reinforcing, sheathing/waterproofing, and lightweight tooling.

SKU	Weave	Width	Full Roll Length (yd.)
054089	Plain	38"	125
054087	Plain	50"	125

FIBERGLASS CLOTH CONTINUED

7 oz. Fiberglass Cloth (#2532)

Commonly referred to as "boat cloth" because of its wide range of marine construction, this easy-to-use, medium-weight cloth is ideal for waterproofing and repair applications.

SKU	Weave	Width	Full Roll Length (yd.)
054081	Plain Weave	38"	125
054082	Plain Weave	50"	125

7 oz. Fiberglass Cloth (#7532)

This medium-weight, easy-to-use cloth is widely used in marine construction and repairs and tooling applications. Available in full rolls only.

SKU	Weave	Width	Full Roll Length (yd.)
054086	Plain	38"	125

8.5 oz. Fiberglass Cloth (#7725)

This cloth's diagonal weave pattern is highly desired for its cosmetic appearance and is used in many high-performance applications. Its highly conformable properties allow it to fit in tight areas and around complex shapes.

SKU	Weave	Width	Full Roll Length (yd.)
054098	2x2 Modified Twill	38"	125

8.8 oz. Fiberglass Cloth (#1581)

This tightly woven fiberglass cloth is used where a high glass-to-resin ratio is required, producing a stronger, lighter composite than is possible with a plain weave. Its eight-harness satin weave pattern enables it to conform around curved surfaces more easily than a plain weave, making it a popular choice in aerospace and other high-end applications.

SKU	Weave	Width	Full Roll Length (yd.)
054083	8 HS	38"	125

8.8 oz. Fiberglass Cloth (#7781)

Like 1581, this cloth is used where a high glass-to-resin ratio is required, producing a stronger, lighter composite than is possible with a plain weave. Its tightly-woven, eight-harness satin weave pattern is flatter than 1581 and enables it to conform around curved surfaces more easily, making it a popular choice in aerospace and other high-end applications.

SKU	Weave	Width	Full Roll Length (yd.)
054153	8 HS	50"	125

10 oz. Fiberglass Cloth (#7500)

The most popular medium-weight fiberglass fabric, 7500 features an excellent balance of cost, weight, and strength. Its well-known versatility makes it popular for tooling, FRP boat construction, sandwich core panels, waterproofing and other high-strength layout applications.

SKU	Weave	Width	Full Roll Length (yd.)
054144	Plain	38"	125
054091	Plain	50"	125



18 oz. Fiberglass Cloth (#7544)

This heavy-duty cloth features a plain weave that is less "open" than a mock leno weave, resulting in a higher glass-to-resin ratio. It is primarily used in place of multiple layers of a medium-weight fabric where a rapid build-up is required. This heavier cloth's less conformable characteristics make it better suited for flat or slightly curved shapes, and/or as back-up layers behind lighter surfacing layers.

SKU	Weave	Width	Full Roll Length (yd.)
054147	2 End Plain	38"	125

20 oz. Fiberglass Cloth (#7587)

This heavy-duty cloth features a mock leno weave that is more "open" than a plain weave, making it easier to wet-out. It is primarily used in place of multiple layers of a medium-weight fabric when a rapid build-up is required. This heavier cloth's less conformable characteristics make it better suited for flat or slightly curved shapes, and/or as back-up layers behind lighter surfacing layers.

SKU	Weave	Width	Full Roll Length (yd.)
054148	Mock Leno	38"	80

38 oz. Fiberglass Cloth (#1597)

This is the heaviest fiberglass cloth and features a triple weave. It is primarily used with epoxy in applications where a very strong, rapid build-up is required or to reinforce wood. This heavier cloth's less conformable characteristics make it better suited for flat or slightly curved shapes, and/or as back-up layers behind lighter surfacing layers.

SKU	Weave	Width	Full Roll Length (yd.)
054151	Triple Plain	38"	50

Fiberglass Tapes (8.75 oz.)

These plain weave fiberglass tapes are offered in various widths and are used with or without fiberglass cloth to laminate plastic tooling for exact duplication applications. Manufactured with bound/hemmed edges and a 627 silane finish, they are sold in full rolls only. The Unidirectional tape is made with heavy 12 oz. / sq. yd. fiberglass stitched to a ¾ oz. / sq. yd. mat. The mat helps hold the fiberglass together during cutting and laminating.

SKU	Width	Full Roll Length (yd.)
054105	½"	50
054129	1"	50
054130	2"	50
054131	3"	50
054132	4"	50
054133	6"	50
054134	12"	50



OTHER FIBERGLASS REINFORCEMENTS



Fiberglass Strand

Ideal for use with Repro Laminating Resin or epoxy laminating resins where a faster layup is required, Fiberglass Strand is also easier to apply than cloth around irregular areas.

SKU	Description	Net Weight (lb.)
054074	1/8" Fiberglass Strand	5
054072	1/8" Fiberglass Strand	55
054073	1/4" Fiberglass Strand	5
054071	1/4" Fiberglass Strand	50

Fiberglass Stitchmat

Also referred to as Biaxial Mat, Stitchmat is a heavy, 18-ounce woven roving, stitched to a light 3/4 oz. fiberglass mat. Used mainly with polyester laminating resins for building laminate strength and thickness, the mat helps hold the roving together during cutting and laminating.

SKU	Description	Width	Length
404748	Stitchmat 18 oz. roving with 3/4 oz. mat	50"	76 yards

Fiberglass Chopped Strand Mat

This unwoven reinforcement fabric is manufactured from chopped fiberglass strands secured with a powder binder. Compatible with polyester, vinyl ester, and epoxy resins, this product is most commonly used in the hand lay up process and ideal for constructing a wide variety of laminated parts.

SKU	Description	Width	Length
404830	1.5 oz. Chopped Strand Mat	38"	200'
404835	1.5 oz. Chopped Strand Mat	50"	200'

Lengths are an approximation.

Fiberglass Veil Cloth

Flexiveil 130 Fiberglass Veil Cloth is a non-woven, continuous-strand fiberglass lightweight mat that provides a resin-rich surface reinforcement to fiberglass gel coats or epoxy surface coats. This product strengthens the surface, helps prevent print-through of woven reinforcing layers of fiberglass cloth, shields against corrosion and stress, and protects against excessive wear. It conforms easily to contoured surfaces, is 10 mil thick (0.010"), and is manufactured using A glass for superior corrosion and chemical resistance.

SKU	Description	Width	Length
054136	Flexiveil 130 (10 mil)	40"	50'
054135	Flexiveil 130 (10 mil)	40"	1200'

KEVLAR® CLOTH

Kevlar® fiber, also known as aramid fiber, is most widely known for its superior resistance from impact, fatigue, wear, and tear. All of our Kevlar® woven fabrics are made with Kevlar™ 49, the structural grade of Kevlar® material for composite reinforcement (as opposed to Kevlar® 29, the ballistic grade material).

Lighter than fiberglass but heavier than carbon fiber, it is used for manufacturing sporting goods equipment, marine vessels of all sizes, and in the automotive and aerospace industries. It is often used with either fabric to improve the toughness, flexibility, abrasion resistance, and most importantly, impact resistance of a composite part.

Kevlar® will degrade when exposed to UV light, so accommodation should be made in part design or choice of matrix materials and additives. Kevlar® is a registered trademark of DuPont.



1.7 oz. Kevlar® Cloth (Style 5120)

SKU	Weave	Width
404301	Plain	38"

► Finish	618
► Warp	195 Denier Kevlar®
► Fill	195 Denier Kevlar®
► Construction (Ends x Picks)	34 X 34 (per inch)
► Breaking Strength	200 lb. / in. (in both directions)
► Thickness	0.004 in.

This is our thinnest and lightest Kevlar® cloth, used in many smaller applications or in larger composite applications that require the performance of Kevlar® with the least amount of additional weight or part thickness.

5 oz. Kevlar® Cloth (Style 5285)

SKU	Weave	Width
404312	4 HS	38"

► Finish	618
► Warp	1140 Denier Kevlar®
► Fill	1140 Denier Kevlar®
► Construction (Ends x Picks)	17 X 17 (per inch)
► Breaking Strength	650 lb. / in. (in both directions)
► Thickness	0.01 in

This is our standard weight Kevlar® fabric in 4-harness satin weave form. The 4HS weave provides greater conformability for working with irregular shapes and in corners.

CARBON FIBER CLOTH

Carbon Fiber fabric is well known as one of the strongest and stiffest reinforcement materials available. Although it is more expensive than glass, it easily justifies its premium price when used in high-performance applications.

All Freeman Carbon Fiber fabrics are top-quality materials manufactured by BGF and made exclusively from polyacrylonitrile (PAN) precursors, thus making them suitable for all high-performance applications. Available by the yard and in full rolls.

3K Carbon Fiber Cloth – Plain Weave (#94901)

SKU	Width	Full Roll Length (yd.)
404005	50"	100
► Warp		3K
► Fill		3K
► Construction (Ends x Picks)		12 x 12
► Weight		5.7

Our lightest carbon fiber cloth features a plain weave (the 'one over, one under' pattern gives it a checkerboard appearance) that is commonly used by manufacturers of lightweight aerodynamic parts.

While not as drapable as the 2x2 twill weave, it is easier to handle.

3K Carbon Fiber Cloth – 2x2 Twill Weave (#94933)

SKU	Width	Full Roll Length (yd.)
404015	50"	100
► Warp		3K
► Fill		3K
► Construction (Ends x Picks)		13 x 13
► Weight		6.2

This is our lightest carbon fiber cloth that features the popular 2x2 twill weave (the 'two over, two under' pattern gives a diagonal appearance) that many recognize as "the look" of carbon fiber. This weave

also makes it more drapable, yet more delicate to handle.

6K Carbon Fiber Cloth – 2x2 Twill Weave (#94910)

SKU	Width	Full Roll Length (yd.)
404020	50"	100
► Warp		6K
► Fill		6K
► Construction (Ends x Picks)		12 x 12
► Weight		11.2

A medium weight carbon fiber cloth features the popular 2x2 twill weave (the 'two over, two under' pattern gives a diagonal appearance) that many recognize as "the look" of carbon fiber.

However, since it is not as

drapable as the 3k carbon cloth, it is more often used in structural applications.

6K Carbon Fiber Cloth – 5HS Weave (#94900)

SKU	Width	Full Roll Length (yd.)
404010	50"	100
► Warp		6K
► Fill		6K
► Construction (Ends x Picks)		12 x 12
► Weight		11.2

This medium-weight cloth features a five-harness satin weave, giving it higher drapability than the 6K 2x2 twill weave.

12K Carbon Fiber Cloth – 2x2 Twill Weave (#94140)

SKU	Width	Full Roll Length (yd.)
404030	50"	100
► Warp		12K T300
► Fill		12K T300
► Construction (Ends x Picks)		11 x 11
► Weight		19.2

This heavy-duty carbon fiber cloth features the popular 2x2 twill weave, giving it adequate drapability for its size. While more difficult to form than lighter carbon cloths, this fabric enables rapid buildup,

making it ideally suited for the construction of flat parts with high strength and stiffness requirements.

Unidirectional Carbon Fiber Tapes

SKU	Width	Full Roll Length (yd.)
404060	1"	100
404062	2"	100
404064	3"	100
404066	4"	100
404068	6"	100
► Warp		12K
► Fill		G150 Fiberglass
► Construction (Ends x Picks)		11 x 8
► Weight		8.8

These tapes are made from flat filaments of carbon (not twisted, like yarns), and provide the strength and stiffness of carbon fiber in one direction only, thus enabling the maximum precision in orientation. Sold by the yard.



MIA VACUUM BAGGING SUPPLIES

Mia Vacuum Bag and Release Film

SKU	Thickness	Width	
400500	0.002"	60"	Mia Vacuum Bag and Release Film is a product that can be used both as the vacuum bag as well as an effective release film. Ideal for polyester, vinylester, epoxy, and phenolic resins, it has a temperature resistance to 285°F. Polyolefin film, green in color.

Mia Stitch Peel Ply Fabric

SKU	Thickness	Width	
406800	0.006"	60"	This nylon fabric is used in the laminating process and is placed directly against the back side of a laminated tool. This provides a rough surface that may be readily bonded to, thus saving valuable time in sanding or abrading the surface. Mia Stitch Peel Ply also has "red tracers" to easily identify the peel ply after the part is cured, so the risk of forgetting to remove the peel ply is minimized.

Mia Perforated Release Film

SKU	Thickness	Width	
400502	0.002"	60"	Mia Perforated Release Film is a polyolefin film that contains uniformly spaced perforations. These 0.015" holes, staggered on ¼" centers, permit the excess resin from the laminate to flow through the film and be absorbed in the bleeder cloth.

Mia Breather / Bleeder Fabric

SKU	Width	
400505	60"	This multi-purpose product may be used as a bleeder to absorb excess resin, as well as a breather to permit even air flow over the tool surface. This polyester product is white in color, weighs 4 oz. / sq. yd., and is suitable for a maximum temperature of 375°F.

Mia Flow Resin Infusion Media

SKU	Thickness	Width	
406005	0.05"	60"	This red polyethylene flow media is designed to provide even resin flow through the entire part during the infusion process. Mia Flow is engineered with two distinct strand layers to provide consistent channels for resin flow. The product is 0.050" thick with ¼" mesh size openings.

Mia Pressure Sensitive Tape

SKU	Thickness	Width	Length
406668	0.015"	1"	72 yd.

Mia Pressure Sensitive Tape is a polyester, multi-purpose, pressure sensitive tape that uses a rubber based adhesive. This material is used for holding down vacuum bagging materials or masking off areas where excess resin flow or flash may occur. The tape is orange and temperature resistant to 350°F.



Mia Sealant Tape

SKU	Thickness	Width	Length	
406665	⅛"	½"	25'	Mia Sealant Tape is designed to secure the bagging film to the tool surface. This yellow synthetic rubber provides an excellent sealing surface while still being able to be removed cleanly from metal or composite surfaces. Good up to 400°F, this product is sold in rolls ⅛" thick x ½" wide x 25' long.



Mia Bagging Hardware

Mia Vac Valve (406685) is a premium-quality vacuum valve made from machined aluminum and comes complete with base, silicone seal, and pressure plate for quick and easy installation. Male ¼" NPT threads.

Mia Vac Gauge (406670) is a liquid-filled gauge with a range of adjustment from 30" Hg to -5" Hg. Large 2.5" diameter face with male ¼" NPT threads.

Mia Quick Disconnect (406661/406662) is sold as two separate items and may be purchased individually. Both are made from plated steel to provide years of service. Temperature resistance to 500°F.

Mia Vac Hose (406680) is a ⅝" I.D. x 10' long vacuum hose that may be used for low temperature applications (275°F max) or room temperature use. ¼" male NPT fittings on both ends.

Mia Venturi Vacuum Generator (406690) is a low-cost alternative to a traditional vacuum pump. This unit, when connected to 80 psi of compressed air, is able to generate a vacuum up to 25.5" Hg. It has a ⅛" NPT female connection to compressed air and a ¼" NPT male connection to attach the vacuum hose.





SPECIALTY WAX

Manufactured in our state of the art facility in Avon, OH, all of our wax products are batch-tested in our own full-service laboratory. The quality of our wax products is world-renowned and unsurpassed by any of our peers.

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Sheet Wax

69-70



Machinable Wax & File-A-Wax®

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Fillet Wax & Accessories

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Other Waxes

SHEET WAX

Freeman Sheet Wax is used primarily to simulate metal or part thickness when making metal forming dies or punches, resin transfer molds (RTM), or any two-part molds requiring a uniform part thickness. Formulated and manufactured by Freeman, these waxes are available in most thicknesses from .007" to .394" with a tolerance of $\pm .001$ ".

266 Hi-Temp Thermo-Stable Sheet Wax

Our most popular sheet wax, this medium brown wax was developed primarily for use with tooling plastics to prevent wax deformation under exothermic heat conditions. 12" x 24" and 8" x 12" are available Plain or Adhesive-backed. 6" x 6" is available Adhesive-backed only.

- ▶ More flexible than 165 Regular Sheet Wax – forms quickly and accurately to any contoured surface
- ▶ Natural draping characteristics at room temperature and absence of memory (spring-back) eliminate the need to warm or temper wax
- ▶ Melting point of 282°F
- ▶ Adhesive can be applied manually with Sheet Wax Adhesive Spray (page 84)

165 Regular Sheet Wax

This yellow-colored wax is formulated for durability and translucency. 12" x 24" and 8" x 12" are available Plain or Adhesive-backed.

- ▶ Firm surface for durability and depression resistance
- ▶ Translucency of sheets up to 1/8" thick, excellent for visualizing layout lines and transcribing engineering information
- ▶ Melting point of 177°F
- ▶ Adhesive can be applied manually with Sheet Wax Adhesive Spray (page 84)

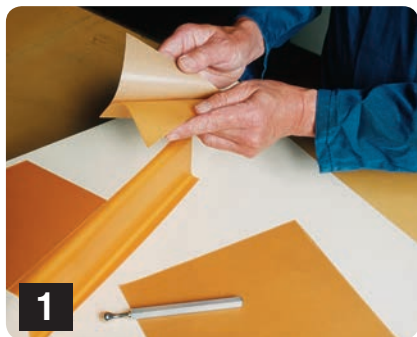
Master HT-260 Regular Sheet Wax

Formulated to withstand high temperatures, this wax was developed for casting and laminating resins that either require or give off heat during curing. 12" x 24" is available Plain or Adhesive-backed.

- ▶ Extremely pliable
- ▶ Melting point of 260°F
- ▶ Adhesive can be applied manually with Sheet Wax Adhesive Spray (page 84)

Please see our website, www.FreemanSupply.com, for complete details and part numbers. When ordering, specify the type, backing, and thickness you require. Custom thicknesses are available with a 10 box minimum.

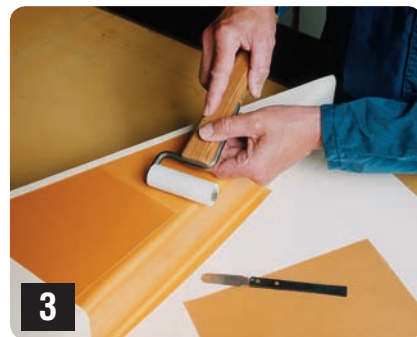
Sheet Wax Application Procedure



Remove the backing from the self-adhesive wax sheets or apply Sheet Wax Spray Adhesive per directions on plain sheet wax.



Position wax sheets onto model or tool. Use butt joints or the 'overlay and cut' jointing technique.



Roll to extrude air bubbles for a flat, even surface.



Accurately fit subsequent pieces.



Consolidate corners using filleting tools.



Repair imperfections in joints by using Master Gap Wax (page 72) or Protolina Modeling Clay (page 120).

FREEMAN MACHINABLE WAX

An Industry Staple

Formulated and manufactured by Freeman, this extremely hard, synthetic material machines faster than polyurethane and epoxy tooling boards or metals without sacrificing quality of finish, surface detail, or dimensional accuracy.



The Next Generation

Standard and custom sizes are available in **three formulations**: the original, industry-standard **Blue**, the economical, user-friendly **Purple**, and the refined and enhanced **Turquoise**.

What is Machinable Wax?

Qualities

Non-abrasive

Unlike metal and tooling boards that can cause significant wear on cutting tools.

User-friendly

Machining produces chips instead of dust for a cleaner work environment.

Self-releasing/self-sealing

Pour liquid tooling plastics (including epoxy, urethane and silicone rubber) into Machinable Wax without requiring the use of sealers or release agents.

Able to be glued

Produces large or irregularly-shaped pieces for machining with the use of 3M #90 Spray Adhesive (page 84).

Self-lubricating

Enables all machining operations to be performed without the need for coolants or cutting fluids.

Wide variety of sizes

Eliminates the waste associated with using large tooling boards for smaller projects.

Applications

- **Molds and prototypes:** creates accurate reproductions
- **Education:** as a training aid and project material
- **CNC:** demonstrations or proofing machining programs
- **Medical/Dental:** molds for proton therapy or dental work

Machining guidelines

	Spindle Speed	Feed Rate
Roughing	3,000 rpm	100 in./min.
Finishing	8,000-10,000 rpm	40-100 in./min.

Data obtained using a 1/2" ball end mill

Calculating weight

$\frac{L \times W \times \text{Thickness (inches)}}{28.8} =$	Weight (lb.)
--	--------------



Which one is right for me?

Each batch is manufactured to the highest standards in world-class facilities with high-quality ingredients while still keeping your budget in mind. With competitive prices and better results, you'll find no better match for your project.

Original Classic Blue

This tried-and-true wax has been the industry-standard for over 30 years. It performs exceptionally well on the CNC or when carving by hand.

Economical Purple

Ideal for educational training programs or testing, this wax undergoes the same quality standards as the other formulations while being budget-friendly.

Enhanced Turquoise

This premium wax is ideal for applications where a high level of detail and accuracy is needed whether working by hand or machine.

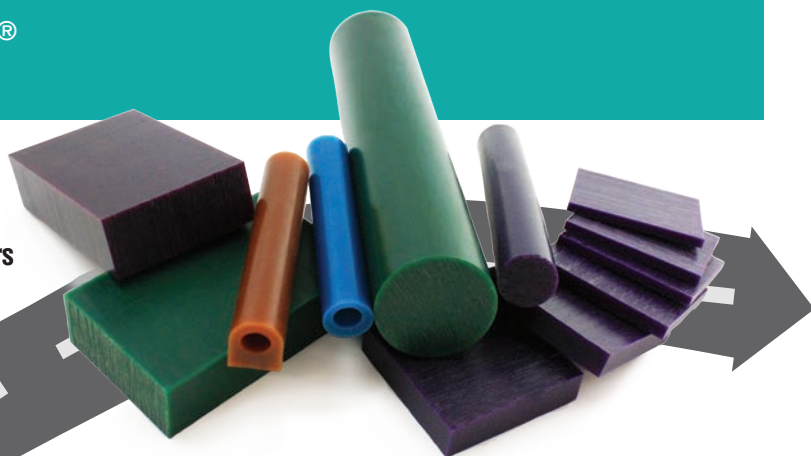


	Blue	Purple	Turquoise
Hardness (Shore D)	50-55	52	56
Surface Finish	Excellent	Good	Excellent
Fine Detail	Good	Fair	Excellent
Proofing	Excellent	Excellent	Excellent
Flexibility	Excellent	Excellent	Good
Thin-Walled Sections	Good	Good	Excellent

FERRIS® FILE-A-WAX®

A Trusted Brand

Also formulated and manufactured by Freeman, the creators of **Machinable Wax**, these carving waxes are legends in the jewelry industry. Known for their variety of hardnesses, carvability, and shape options, you are sure to find a wax for every possible jewelry pattern making application.



Always Expanding

In addition to the classic blue, purple, green, gold, and orange, we have extended the File-A-Wax line to six unique formulations by adding Turquoise. This new, truly unique wax is both easily hand-carved and possesses exceptional machining properties.



First choose your color...

	Blue	Purple	^{NEW!} Turquoise	Green	Gold	Orange
Flexibility	Excellent	Good	Fair	Fair	Good	Poor
Hard Carvability	Good	Excellent	Excellent	Fair	Good	Good
Hardness (Shore D)	52	55	56	57	59	60
High-Speed CNC	Poor	Fair	Excellent	Good	Excellent	Excellent

SPECIALTY WAX

...then choose your shape:

Standard

½ lb. and 1 lb. pound blocks, common slice packages and slice assortments

Tubes & Rods

Square slabs, square blocks, round bars and oval bracelet bars

Designer

Individually packaged solid bars, round tubes and flat-sided tubes

Fixture

A wide variety of sizes to fit various CNC milling machine fixtures



Photo courtesy of Brian Smith of Smithology Custom Jewelry

Custom blocks and cylinders are also available! Visit www.FreemanWax.com to find a distributor near you.

MASTER PROTOWAX

This unique machinable investment casting wax is perfect for prototype work or even short-run part requirements. Please see our website, www.FreemanSupply.com or contact Customer Service for complete details.

- ▶ Easily turned, milled, drilled, tapped, and carved faster than metal without any tool wear
- ▶ Excellent stability and low expansion rate virtually eliminate investment shell cracking problems
- ▶ Available in blocks up to 5" thick, and cylinders from 2" to 8.5" in diameter up to 12" long; custom sizes available



Specifications

Color	Specific Gravity	Ash Content	Hardness (Shore D)	Softening Point	Volumetric Shrinkage @ Room Temp.	Viscosity @ 160°F (CPS)
Red	0.94	0.010%	43	157°F	7%	30

FILLET WAX & ACCESSORIES

Specifications

	Ring & Ball Softening Point (±6)	Flash Point (F°)	Hardness (Shore D)
Freeman Fillets	179	465	30
Master Fillets	173	465	26
Di-Dup Fillets	156	465	14
Master Bond Fillets	168	465	15
Master Marble Fillets	169	465	15
String Wax Di-Dup	156	465	14
String Wax Fillet	179	465	30
Half-Round Wax	179	465	30

Freeman Wax Fillets

Freeman Wax Fillets are made of a performance-proven, high melting point wax formulation for meeting a wide variety of pattern shop applications.



Boxes

SKU	Fillet #	Dia./Rad.	Length
085104	1R	1/16" R	1640'
085208	2	1/8" R	1152'
085212	3	3/16" R	460'
085216	4	1/4" R	292'
085220	5	5/16" R	240'
085224	6	3/8" R	190'
085228	7	7/16" R	144'
085232	8	1/2" R	106'
085240	10	5/8" R	72'
085248	12	3/4" R	44'
085264	16	1" R	24'

Rolls

SKU	Fillet #	Dia./Rad.	Length
085302	00R	1/32" D	1500'
085303	0R	3/64" D	1500'
085304	1R	1/16" D	750'
085408	2	1/8" R	500'
085412	3	3/16" R	400'
085416	4	1/4" R	175'
085420	5	5/16" R	125'
085424	6	3/8" R	85'
085428	7	7/16" R	40'
085432	8	1/2" R	40'

Master Wax Fillets (Summer Formula)

Primarily used for master patterns, this wax offers patternmakers a quality product that is easy to apply, produces accurate results and is economical.

Boxes

SKU	Fillet #	Dia./Rad.	Length
085800	1R	1/16" D	1640'
085805	2	1/8" R	1152'
085810	3	3/16" R	460'
085815	4	1/4" R	292'
085820	5	5/16" R	240'
085825	6	3/8" R	190'
085830	7	7/16" R	144'
085835	8	1/2" R	106'
085840	10	5/8" R	72'
085845	12	3/4" R	44'
085850	16	1" R	24'
085855	1/8" Round		2'

Rolls

SKU	Fillet #	Dia./Rad.	Length
085900	00R	1/32" D	1500'
085905	0R	3/64" D	1500'
085910	1R	1/16" D	750'
085915	2	1/8" R	500'
085920	3	3/16" R	400'
085925	4	1/4" R	175'
085930	6	3/8" R	125'
085935	8	1/2" R	85'
085940	10	5/8" R	40'
085945	12	3/4" R	40'

Master Marble Wax Fillets (Winter Formula)

This specialized blend of waxes is formulated specifically for the cultured marble industry. It produces a smooth radius on synthetic marble products. Under most normal working conditions, this wax adheres to the cultured marble mold without the use of heated fillet tools. 24 strips per box.

SKU	Fillet #	Diameter	Length
085660	2	1/8"	1152'
085665	3	3/16"	460'
085670	4	1/4"	292'
085675	6	3/8"	190'
085680	8	1/2"	106'

Master Bond Wax Fillets

This is a soft, self-adhering wax compound for the full-mold process and is used to apply a smooth radius to a foam pattern. The wax burns at a rate equal to 1.1 lb./ft.³ density foam, eliminating inclusions. 24 strips per box.

SKU	Fillet #	Radius	Length
085620	2	1/8"	1152'
085625	3	3/16"	460'
085630	4	1/4"	292'
085635	5	5/16"	240'
085640	6	3/8"	190'
085645	7	7/16"	144'
085650	8	1/2"	106'
085655	12	3/4"	44'

Freeman Di-Dup Wax Fillets

Freeman Di-Dup Wax Fillets are softer than our standard wax fillets and also have a lower melting point. These two features make them ideal for creating inside radii on expanded polystyrene foam patterns. This material is cut into 24" lengths and packaged in 2 lb. boxes.

SKU	Fillet #	Radius	Length
085504	4	1/4"	350'
085506	6	3/8"	175'
085508	8	1/2"	80'
085510	10	5/8"	75'
085512	12	3/4"	35'
085516	16	1"	20'

Freeman String Wax

String Wax is a round wax product that, when melted, is used as an adhesive to secure investment casting wax patterns to the gating system or for general wax pattern repair.

SKU	Description	Diameter	Approx. Length
085606	Di-Dup – Roll	1/8"	440'
085433	Fillet – Roll	1/8"	880'
085209	Fillet – Box	1/4"	292'

Freeman Half Round Wax

This specialty wax is extruded to a uniform half round shape making this material ideal for mold registration when applied to the parting line of a mold surface. Manufactured using our Fillet Wax formulation, this material will not inhibit the curing of silicones, urethanes, or plasters.

SKU	Radius	Width	Length
085114	1/8"	1/4"	24"
085113	3/16"	3/8"	24"
085112	5/16"	5/8"	24"
085111	3/8"	3/4"	24"

Fillet Tools

Freeman's high-quality, chrome-plated steel ball-end Fillet Tools are manufactured to accurate diameters to correctly and easily install wax or leather fillet.



SKU	Size	Radii
046380	# 1	1/16" & 1/8"
046385	# 2	3/16" & 1/4"
046390	# 3	5/16" & 3/8"
046395	# 4	1/2" & 5/8"

Alcohol Lamp

This chrome-plated brass lamp comes complete with snuffer cap attached by chain and an adjustable cotton wick. The 7" long cotton wick raises and lowers by hand screw.



SKU	Description
046730	Metal Alcohol Lamp (5 oz.)
046735	Replacement Wicks

OTHER WAXES

Specifications

	Flash Point (°F)	Hardness (Shore D)	Melting Point (°F)	Ash Content (%)
Optical Soluble	565	50±10	142-152	—
Sol-U-Carv	565	45	137-147	—
Beeswax	475	25	147	—
Paraffin (140°)	445	26	141	0.002
Paraffin (150°)	485	26	151	0.002
MicroCrystalline	580	22	178	0.002
Sculpture (Yellow)	572	30	167	0.002
Sculpture (Brown)	572	20	167	0.002
Victory Brown	500	20	174	0.002
Master Gap	465	Paste	145±6	—
Tapping	465	26	177±6	—

Blind Gauging Wax

- ▶ Produced to precise thicknesses, available from .015" to .105"
- ▶ Manufactured in 1/2" x 1 1/4" adhesive-backed strips, 100/box
- ▶ Specifically formulated for checking clearances between the fan and casing during repair and maintenance of jet engines

Please see our website, www.FreemanSupply.com, or contact Customer Service for complete details and part numbers.



Optical Soluble Wax

Freeman Optical Soluble Wax is a high-quality investment casting wax specifically formulated for the optical and jewelry industry. This product is completely soluble in warm water and is ideal for making any design where a hollow area in the finished pattern is desired. It is also used in the optical industry for the manufacturing of intraocular lenses. Available in 50 lb. boxes (SKU #118423).

Sol-U-Carv

A carvable wax that is water soluble, making it ideal for use in lost wax casting, especially in the making of cores, hollow beads, or other pieces that feature hollow areas. Available in 1 lb. boxes (SKU #115090).

Beeswax

Our pure filtered Beeswax is a firm, light-colored wax commonly used for modeling, engraving, and finishing leather, textiles, and wood. Available in 1 lb. boxes (SKU #027220).



Refined Paraffin Wax

This petroleum-based hard white wax is available in a 140°F (SKU # 117734) and 150°F (SKU # 117735) melting temperature formulation. Both have a crystalline or semi-crystalline structure and are available in 10 lb. 2" x 10" x 14" slabs.

MicroCrystalline Wax

This light-yellow, petroleum-based wax is low in odor and has a soft, sticky feel. Available in 10 lb. 2" x 10" x 14" slabs (SKU # 117713).

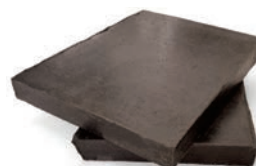
Sculpture Wax

These petroleum-based waxes that remains flexible at low temperatures, is very easy to carve, offers good surface finishes and have superior adhesive qualities. They are most commonly used as adhesives and sculpting waxes, but can also be blended for candle-making. Available in yellow (SKU # 110354) or Brown (SKU # 117718) in 4.5 lb. 4" dia. x 20" billets.



Victory Brown Wax

This brown wax is less crystalline than paraffin wax and remains flexible at low temperatures. It may be used as an adhesive, in investment castings, and blended in for candle-making. Easily molded by hand, it may also be used as a sculpture wax. Available in 11 lb. 1 1/4" x 12" x 19" slabs (SKU # 117715).

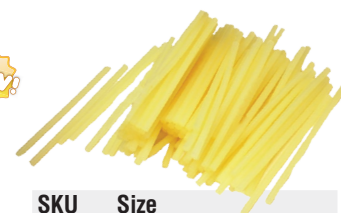


Master Gap Wax NEW!

By popular demand, Freeman has formulated Master Gap Wax, a soft, green wax that quickly and easily fills gaps in sheet wax at room temperature. This wax applies much smoother and faster than clay and cleans up quickly. Apply with a spatula and remove excess with a plastic scraper in one pass! Available in Quart (SKU #119669) or Gallon (SKU #119668).

Tapping Wax NEW!

Save yourself time and effort with Tapping Wax. Designed to make cleanup after tapping threads faster and easier, simply place a Tapping Wax stick in the drilled hole after reaming, and tap. The wax will collect the debris, eliminating the hassle of cleaning out compacted metal shavings.



SKU	Size
110359	4.5 lb. Billet
119636	1/4" x 6" Sticks (1 lb. Box)
119637	3/16" x 6" Sticks (1 lb. Box)
119638	3/8" x 6" Sticks (1 lb. Box)
119639	1/2" x 6" Sticks (1 lb. Box)

SEE ALSO

Product	Page #
Freeman Core Vent Wax	93



ADHESIVES & REPAIR MATERIALS

This is Freeman's full line of adhesives supporting all of your tooling and prototyping needs, from the most advanced build-up materials to basic glue and dispensing equipment.

74-75

TUF® & Master® Repair Materials

77-79

Epoxy Adhesives

80-82

Methacrylates & Cyanoacrylates

83-84

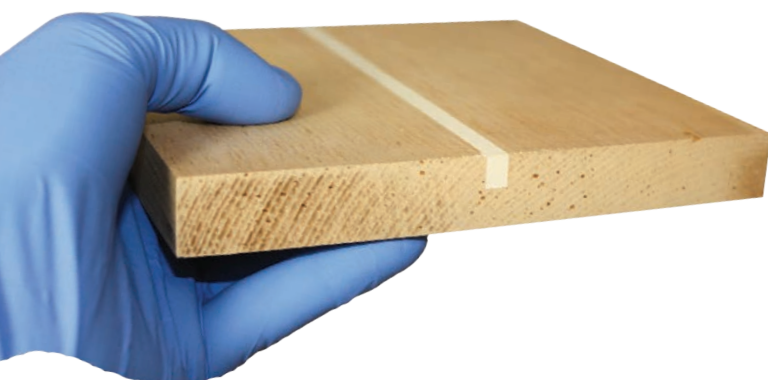
Other Adhesives, Tools & Supplies

FREEMAN TUF® REPAIR & BUILD-UP MATERIALS

Quick Facts

Formulated and manufactured by Freeman, TUF is a complete line of quality polyester repair & build-up materials which features:

- Fast setting – sandable in 15 minutes
- Low shrinkage
- “No-sag” properties
- Good wear resistance and bonds to most surfaces
- Good chemical resistance



TUF-Fil®

Freeman TUF-Fil closely matches mahogany and other hardwoods in hardness. Suitable for high-wear applications, it may be scraped, filed, tapped and sanded when fully cured. While it is still rubbery, it is carvable using woodworking tools. TUF-Fil Gray (Aluminum) makes a great repair material for gray fixture boards. Hardener included.

SKU	Size	Color	Net weight (lb.)
053405	Quart	Mahogany	2.8
053410	Quart	Pine	2.8
053415	Quart	Gray (Aluminum)	2.8
053425	Gallon	Mahogany	11.5
053430	Gallon	Pine	11.5
053435	Gallon	Gray (Aluminum)	11.5
053428	3 Gallon Cartridge	Mahogany	31.5
053433	3 Gallon Cartridge	Pine	31.5
053437	3 Gallon Cartridge	Gray (Aluminum)	31.5

TUF-Fil® White

TUF-Fil White is the hardest, strongest and most dense of the TUF line of products. Excellent for repairing composite laminate tooling. Hardener included.

SKU	Size	Color	Net weight (lb.)
053420	Quart	White	3.8
053440	Gallon	White	12.5
053438	3 Gallon Cartridge	White	31.5

Specifications

	Mix Ratio (by wt.) Resin: Hardener	Gel Time (Min)	Hardness (Shore D) @ 24 hr.	Viscosity (cps)	Density (g/cc)	Colors Available
TUF-Fil	100:1.5	11	81	912,000	1.74	Mahogany, Pine, Gray
TUF-Fil White	100:1.5	9	95	400,000	2.50	White
Hi-Temp TUF-Fil	100:1.5	9	82	830,000	1.68	Dark Gray
TUF-Carv	100:1.5	10	71	581,000	1.14	Mahogany and Pine
ASTM	—	D-2471	D-2240	D-2393	D-792	—

Hi-Temp TUF-Fil®

Hi-Temp TUF-Fil is ideal for the repair, build-up or alteration of tooling that will be subjected to operating temperatures up to 350°F. It features very good adhesion when used on composite tooling, metal, RenShape 5008, RenShape 5065, and wood materials. Hardener included.

SKU	Size	Color	Net weight (lb.)
053451	Quart	Dark Gray	2.5
053452	Gallon	Dark Gray	10
053453	3 Gallon Cartridge	Dark Gray	30

TUF-Carv®

Freeman TUF-Carv Repair & Build-Up Material is a less dense material than TUF-Fil, closely matching the hardness of pine and jelutong. It is ideal for any job that requires a durable, yet carvable finish. TUF-Carv, when cured, can be carved, sawed, sanded, filed, tapped and machined easily with woodworking tools. Hardener included.

SKU	Size	Color	Net weight (lb.)
053205	Quart	Mahogany	1.8
053210	Quart	Pine	1.8
053215	Gallon	Mahogany	7
053220	Gallon	Pine	7
053225	3 Gallon Cartridge	Mahogany	21
053230	3 Gallon Cartridge	Pine	21

Cream Hardener

This premium quality white catalyst is designed for use with all of the TUF Products. This product may also be used to catalyze other manufacturers' polyester filler products. The bright white color does not significantly change the color of the basic resin.

SKU	Size	Color	Net weight (lb.)
053445	1 oz. Tube	White	0.1
053450	4 oz. Tube	White	0.3

MASTER REPAIR & BUILD-UP MATERIALS

Quick Facts

Our Master line features high-quality, two-component polyester repair materials that offer:

- Thicker viscosities for ease of application on vertical walls
- Fast setting – sand or machine in 15 minutes
- Durable surfaces for excellent wear resistance
- Good chemical and water resistance, bonds well to most substrates

Master® Quick-Bild II

Our most popular Master repair formulation offers a thick viscosity for excellent sag resistance on vertical walls, 85 Shore D hardness for superior wear resistance, and different-colored hardeners. This two-component, quick setting material hardens in 15 minutes, creating a durable repair to metal, plastic, and wood. Hardeners sold separately.

SKU	Size	Net weight (lb.)
053890	1 Quart (Resin Only)	3.5
053895	1 Gallon (Resin Only)	13.3
053815	Black Cream Hardener (For Quarts)	1 oz.
053825	Mahogany Cream Hardener (For Quarts)	1 oz.
053835	Pine Cream Hardener (For Quarts)	1 oz.
053445	White TUF Cream Hardener (For Quarts)	1 oz.
053820	Black Cream Hardener (For Gallons)	4 oz.
053830	Mahogany Cream Hardener (For Gallons)	4 oz.
053840	Pine Cream Hardener (For Gallons)	4 oz.
053450	White TUF Cream Hardener (For Gallons)	4 oz.

Specifications

	Mix Ratio (by wt.) Resin: Hardener	Gel Time (Min)	Hardness (Shore D) @ 24 hr.	Viscosity (cps)	Density (g/cc)	Colors Available
Quick-Bild II	100:1.5	9	85	1,380,000	1.65	Mahogany, Pine, Black, White
Quick-Carve	100:1.5	10	69	400,000	1.13	Mahogany
Quick-Bild P80	100:1.5	10	70	580,000	1.13	Pine
ASTM	–	D-2471	D-2240	D-2393	D-792	–

Master® Quick-Carve

Master Quick-Carve is a two-component polyester repair

material that features good durability yet is easily carved or sanded when extensive hand finishing is required. Quick-Carve is excellent for fast repairs to wood patterns and is available as a mahogany-colored resin with included hardener.

SKU	Size	Net weight (lb.)
053910	1 Quart	1.8

Master® Quick-Bild P80

This is the most economical polyester repair material in the

Master line for larger and more frequent repairs. This two-component resin system solidifies in 15 minutes and features a 70 Shore D hardness for good durability. Its creamy consistency for ease of application and good sag resistance on vertical surfaces complements the pine resin color to match many of the softer woods used for patterns and models. Hardener included.

SKU	Size	Net weight (lb.)
053905	1 Gallon	7

GENERAL PURPOSE REPAIR MATERIALS

POLYESTER-BASED REPAIR MATERIALS

Plas-Fil

This is an excellent compound for repairing defects in metal, fiberglass, and wood. Using the included red cream hardener (SKU #053507) as the catalyst, this paste material will solidify in approximately 15 minutes and is able to be sanded to a smooth, durable finish.

SKU	Size	Net weight (lb.)
412515	Gallon	7.8

Dynalite™

Lightweight, carvable, sandable, and economically-priced, this polyester repair material is a useful material for a wide range of tooling alterations and repair. Includes red hardener (SKU #0053501).

SKU	Size	Net weight (lb.)
053502	Gallon	7.5
053507	Tube Hardener	4 oz.

Platinum Polyester Repair Material

This lightweight, high-quality polyester filler compound adheres aggressively to steel, galvanized steel, and aluminum. Its smooth, creamy texture makes it easy to apply. Includes blue hardener (SKU #053499).

SKU	Size	Net weight (lb.)
053508	3-Gallon Cartridges (2)	21.6

USC Base Coat/Clear Coat™

This polyester filler provides a smooth, self-leveling surface for high-quality repair projects and extra adhesion to galvanized, zinc-treated, and aluminum surfaces. Includes raspberry cream hardener.

SKU	Size	Mfg. No.	Net weight (lb.)
053510	Gallon	16060B	8.8

Fillet Shapers

Made of high quality spring steel, this set of four fillet tools is ideal for creating fillets from any TUF product or any paste repair material. Each tool is 5¾" long and is ground to a smooth radius. Radius sizes are 1/16", 1/8", 3/16", 1/4", 5/16", 3/8", and 1/2". (SKU #046375, set of 4)



EPOXY-BASED REPAIR MATERIALS

Devcon DE087 Wear Resistant Putty

This blended, aluminum-filled putty repairs fatigued metal surfaces requiring exceptional durability and ruggedness. It repairs molds at the parting line where metal has been lost or worn and fills voids in castings.

SKU	Mfg. No.	Net weight (lb.)
054638	DE-087	20

Devcon Aluminum Putty

Aluminum-filled epoxy putty bonds to aluminum and many other metals for dependable non-rusting repairs to castings, machinery and equipment. It fills porosity in aluminum castings and can be machined, drilled, or tapped using conventional metalworking tools.

SKU	Mfg. No.	Net weight (lb.)
054585	10610	1
054590	10620	3

Devcon Fasmetal™ Putty

High-performance, alumina-filled epoxy is used for making fast and dependable emergency repairs to leaks in pipes carrying ores, coal, cement, sand, and gravel. It conveniently hardens in 5 minutes and can be applied in temperatures as low as 40°F.

SKU	Mfg. No.	Net weight (lb.)
054643	10780	0.75

Devcon Plastic Steel® Putty

This putty can be used for hundreds of routine maintenance, production, and tooling applications and bonds to most metals, concrete, and some plastics. It can be drilled, tapped, machined, or painted. **SKU #054582** is a faster 5-Minute Putty.

SKU	Mfg. No.	Net weight (lb.)
054555	10110	1
054560	10120	4
054565	10130	25
054582	10240	1



Devcon Titanium Putty

This titanium-reinforced epoxy is for making repairs to machinery and equipment that can be precision machined. It features excellent temperature resistance (350°F), high compressive strength, and resistance to many chemicals and most acids, bases, solvents, and alkalis.



SKU	Mfg. No.	Net weight (lb.)
054631	10760	1

Dynaluminum

Dynaluminum is a hand-kneadable fast-curing epoxy putty that provides quick repairs to most metal, wood, glass, concrete, ceramics, and plastics.

SKU	Size	Net weight (lb.)
053650	¾" dia. x 7"	1

Dynasteel

Dynasteel is similar to Dynaluminum but offers excellent lap shear strength for making repairs on any type of steel.

SKU	Size	Net weight (lb.)
053665	¾" dia. x 7"	1

Lab-Metal & Lab-Solvent

Lab-Metal is an aluminum-filled, ready-to-use repair paste for metal and non-metal applications. This air-hardening, extremely durable formulation may be milled, drilled, tapped, and sanded smooth for a long-lasting repair. Both the standard (350°F) and Hi-Temp (1000°F) formulations work well for powder coating applications. Lab-Solvent thins the material for spray and brush applications.

SKU	Size	Net weight (lb.)
027335	Lab-Metal (Quart)	3
027337	Hi-Temp Lab-Metal (Pint)	1.5
027330	Lab-Solvent (Pint)	1

POLYURETHANE-BASED REPAIR MATERIALS

SEM Adhesive & Repair Material

SEM Quick Set 180 is a two-component, general purpose, black urethane adhesive with a three-minute working time. It is designed for repairing and bonding most small to medium plastic, steel, aluminum, glass, SMC and fiberglass parts. SEM Multi-Plastic Repair Material is a two-component epoxy for fast repairs on most flexible and semi-rigid plastics. The materials are packaged in dual mix cartridges with two nozzles. Applicator Gun and Mixing Tips are also available separately.

SKU	Description	Size
054288	Multi-Plastic Repair Material	8.5 fl. oz.
054289	Quick Set 180 Adhesive	8.5 fl. oz.
054290	Applicator Gun	
054283	Mixing Tips	6-pack

RenPatch 5169 Foundry Board Repair Paste

RenPatch 5169 is a red polyurethane repair material that bonds securely to RenShape 5169 and RenShape 5179. It closely matches the boards in color, hardness, machinability, and thermal stability.

SKU	Size	Net weight (lb.)
056622	50 ml	0.2



SEM Adhesive & Repair Materials are packaged in dual mix cartridges dispensed by nozzles.

EPOXY ADHESIVES

Freeman offers a broad line of two-component epoxy adhesives for bonding a wide range of metals and plastics. Epoxy adhesives consist of an epoxy resin plus a hardener. They allow great versatility in formulation since there are many resins and many different hardeners. They form extremely strong durable bonds with most materials, especially metals.



Specifications

	Mix ratio by weight Resin:Hardener	Mix ratio by volume Resin:Hardener	Gel Time (min.) @ 72°F	Light Handling Time	Cure Time (hour) @ 72°F	Mixed Viscosity (cps)	Hardness (Shore D)	Lap Shear Strength (psi)	Peel Strength (pli)	Tensile Strength (psi)	Service Temp./ Max (°F)	Color
Freeman Fast Set 505	1:1	1:1	3-5	15 min.	4	10,400	85	—	—	2,500	200	Clear
Freeman Fast Set 506	1:1	1:1	5	60 min.	4	15,000	80	—	—	8,000	266	Clear
Freeman Fast Set 517	1:1	1:1	15-20	3-4 hours	4	14,000	80	—	—	2,500	200	Clear
3M Panel Bonding	172:100	200:100	90	4 hours	24	100,000-225,000	—	—	—	—	180	Black
ASI MP 5405	1:1	1:1	3-5	15 min.	24	12,500	80	—	—	7,000	266	Clear
Fastweld 10	1:1	1:1	4	30 min.	4	250,000	85	2,840	—	3,850	—	Gray
Devcon 5-Minute	1:1	1:1	4	45 min.	45 min.	8,000-10,000	85	1,400	2	1,400	200	Clear
Araldite 2012	1:1	1:1	4	20 min.	1.75	30,000	82	2,700	31	—	175	Yellow
Araldite 2013	100:60	1:1	75	4 hours	10	Paste	80	2,600	23	5,000	160	Gray
Araldite 2014	2:1	2:1	80	4 hours	5	90,000	84	2,600	17	5,500	285	Gray
Araldite 2015	1:1	1:1	40	4 hours	10	Paste	75	2,400	29	3,400	212	Beige
AY557/HY557	1:1	1:1	4	10 min.	4	14,000	83	2,560	—	4,630	—	Clear
AW1258/HV1258	1:1	1:1	23	4 hours	6	Paste	89	2,840	—	5,600	—	Gray
AV8503/HV8503	100:92	1:1	30	3 hours	24	250,000	78	3,380	—	3,400	250	Blue-Green
AW8594/HY994	100:40	100:55	75	—	—	7,500	85	3,410	—	6,600	164	White
AW8595/HW8595	—	1:1	60	4 hours	16	29,000	70	2,600	—	2,200	141	Clear
Araldite 8579	100:40	100:40	60	8 hours	8	125,000	—	2,500	—	—	248	Gray
TDR-1100-11	100:42	2:1	95	8 hours	24	13,000	85	4,100	—	9,000	195	Clear
ASTM	—	—	D-2471	—	—	D-2393	D-2240	D-5868	—	D-1002	—	—

Basics of Adhesive Chemistries

Epoxy

- Strong, durable bonds
- Wide range of working times to choose from
- Excellent bond with metals

Methacrylates

- Toughened & modified type of acrylic
- High strength & toughness
- Supplied as two parts (resin and catalyst)
- Tolerates minimal surface preparation
- Bonds well to wide range of materials
- Wide range of fast-curing speeds
- Liquids or pastes, gap-fills up to 5mm

Cyanoacrylates

- Cures through reaction with moisture
- Works best with close-fitting joints
- Solidifies in seconds
- Suited to small plastic parts and rubber

Polyurethanes

- Generally flexible, good for bonding different materials
- Used when a flexible bond line is required
- Strong resilient joints resistant to impact
- Bonds GRP (glass fiber-reinforced plastics) and thermoplastic materials

Hot Melts

- Based on modern polymers, related to sealing wax
- For fast assembly of lightly-loaded foundry cores

EPOXY ADHESIVES CONTINUED

Freeman Fast Set 505 Epoxy Adhesive

Freeman Fast Set 505 is a rapid-curing, two-component epoxy adhesive. With a gel time of 5 minutes, parts glued can be handled in 15 minutes. The 1:1 ratio, color indicator, and available pumps (below) ensure complete and easy mixing. It is excellent for bonding metal, wood, ceramic, fiberglass, and most RenShape modeling and styling boards. The 50 ml cartridges include one static mix nozzle.

SKU	Size	Net weight (lb.)
055352	50 ml	0.12
055350	Pint	2
055360	Gallon	16
055360	5 Gallon	90

Freeman Fast Set 506 Epoxy Adhesive

Freeman Fast Set 506 is a stronger adhesive for difficult to bond materials and is recommended for adhering leather fillet. Its 60-minute handling time and heat resistance up to 266°F make it a good choice for thermoforming applications.

SKU	Size	Net weight (lb.)
055347	2 pint	2

Freeman Fast Set 517 Epoxy Adhesive

Freeman Fast Set 517 is similar to Fast Set 505 yet has a 15-20 minute gel time and 3-4 hour handling time.

SKU	Size	Net weight (lb.)
055365	Pint	2
055366	Gallon	16
055369	5 Gallon	90

Pumps for Freeman Fast Set 505 & 517

These pumps are sold separately and work with the Fast Set 505 and 517. They are calibrated for 1:1 mix ratio materials.

SKU	Size
055361	1 Pump
055362	2 Pumps

3M Panel Bonding Adhesive

3M Panel Bonding Adhesive is a two-part epoxy adhesive with extended work time. It exhibits an excellent adhesion to wood, metal substrates, and a wide variety of plastics. This adhesive works well when bonding carbon fiber laminate with aluminum and wood reinforced framing. 3M Panel Bond is black in color and blends very nicely when cured.

SKU	Size	Net weight
135533	200 ml	0.65

ASI MP 5405 Epoxy Adhesive

ASI MP 5405 is a two-part unfilled epoxy adhesive designed for ceramics and most plastics.

SKU	Size	Net weight (lb.)
414850	50 ml (Clear)	0.2
414856	50 ml (Black)	0.2

It cures to a tough, semi-rigid material and is free flowing in viscosity. It features good resistance to water, salt spray, inorganic acids and bases, and most organic solvents. It was specially formulated to a 1:1 mix ratio for use in either dispensing equipment or side-by-side dual cartridges.

Fastweld 10 Epoxy Adhesive

This fast-setting epoxy adhesive is ideal for bonding small parts for repair work. Fastweld 10 will cure at temperatures as low as 5°C (41°F).

SKU	Size	Net weight (lb.)
056505	50 ml	0.12
056512	9 oz. Tube	0.56
056511	9 oz. Tubes (Case of 24)	13.5

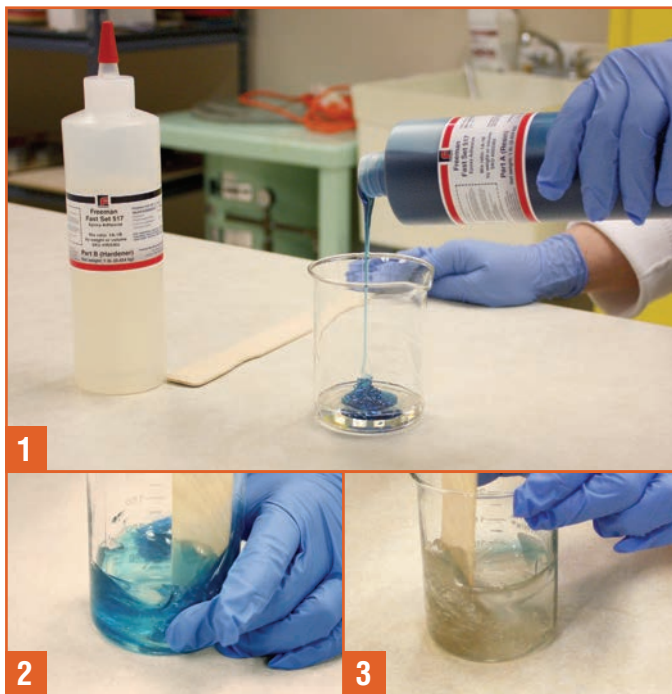


Devcon 5-Minute Epoxy

A widely popular, rapid-curing, low viscosity, general-purpose adhesive and/or encapsulant


SKU	Size	Mfg. No.	Net weight (lb.)
054647	50 ml	14270	0.12
054618	2.5 oz. Tube	14210	2.5
054620	15 fl. oz.	14200	1
054634	9 lb.	14630	9

which easily dispenses, mixes in seconds, and dries in 15 minutes with full strength in 1 hour. It bonds rigid durable substrates such as metals, glass, ceramics, concrete, and wood in all combinations, forming a clear hard rigid bond that self-levels in minutes.



Fast Set 505 and Fast Set 517 now offer a color indicator for proper mixing. The material changes from blue to clear to indicate a complete mix.

ARALDITE 2000 SERIES EPOXY ADHESIVES

 The Araldite line of two component epoxy adhesives is a diverse selection engineered to bond a wide variety of materials, including the most challenging metals, composites, and thermoplastics. With various formulations and gel times ranging from 4 minutes to 1½ hours, Araldite is the most versatile line of adhesives for a wide range of bonding applications.

Araldite 2010-1 Epoxy Adhesive

This fast-setting epoxy adhesive is ideal for 056400 50 ml 0.13 bonding metal, ceramics, rubber, plastics, and glass. Araldite 2010-1 features a 10 minute gel time, a handling strength of 30 minutes, and a thick viscosity for vertical applications.

SKU	Size	Net weight (lb.)
056400	50 ml	0.13

Araldite 2011 Epoxy Adhesive

This two-component epoxy adhesive has a high shear strength and good resistance to dynamic loading. It features room temperature cure and long 120-minute work life. It also offers strong bonding to metals, ceramics, rubbers and rigid plastics.

SKU	Size	Net weight (lb.)
056768	50 ml	0.12
056769	200 ml	0.5
056447T	Two 3.6 oz. Tubes	0.5
056447	Two 3.6 oz. Tubes (Case of 24 sets)	10.9
056480Q	Quart	4
056480	6 Quarts	24
056409	2 Gallons (Resin)	17.6
056463	2 Gallons (Hardener)	14.1

Araldite 2012 Epoxy Adhesive

This tough epoxy adhesive features high shear strength and a 4-minute work life. It cures at room temperature and offers a strong bond to metals, ceramics and rubbers.

SKU	Size	Net weight (lb.)
056452	50 ml	0.13

Araldite 2013 Epoxy Adhesive

This gap-filling epoxy adhesive features good environmental stability and chemical resistance. It is ideal for use on metals, ceramics and rubbers.

SKU	Size	Net weight (lb.)
056453	50 ml	0.18
056471	200 ml	0.71

Araldite 2014 Epoxy Adhesive

This gap-filling, no-sag epoxy adhesive features excellent resistance to water and chemicals as well as a 250°F heat resistance. It cures at room temperature and is ideal for use on metals and electronic components.

SKU	Size	Net weight (lb.)
056454	50 ml	0.18
056466	200 ml	0.71
056481	6 Quart	24

Araldite 2015 Epoxy Adhesive

This sag-resistant, tough epoxy adhesive with good shear strength cures at room temperature. It is ideal for metals, sheet molding compounds and fiberglass reinforced parts.

SKU	Size	Net weight (lb.)
056770	50 ml	0.16
056771	200 ml	0.71
056497	6 Quart	24

OTHER ARALDITE EPOXY ADHESIVES

Araldite AY 557 / HY 557 Epoxy Adhesive

This epoxy adhesive is fast setting for quick repairs on small parts. Suggested for metal bonding, this material also works for gluing most tooling boards and some plastics. The 1:1 mix ratio and 10-minute handling strength makes this adhesive easy to use for fast gluing.

SKU	Size	Net weight (lb.)
056482	50 ml	0.18
056483	5 Gallon (Resin)	45
056484	5 Gallon (Hardener)	45

Araldite AV 1258 / HV 1258 Epoxy Adhesive

This aluminum-filled, general-purpose paste machines easily and is recommended for general bonding, repair, and gap filling. It is well suited for industrial maintenance applications and approved by the armed forces for making emergency repairs in the field.

SKU	Size	Net weight (lb.)
056641	11 oz. Tube	0.7
056507	11 oz. Tube (Case of 24)	16.5
056499Q	Quart (Resin)	3
056501Q	Quart (Hardener)	3
056499	6 Quarts (Resin)	18
056501	6 Quarts (Hardener)	18
056407	Gallon (Resin)	22
056427	2 Gallons (Hardener)	22

Araldite AV 8503 / HV 8503 Epoxy Adhesive

This high-viscosity, two-component epoxy adhesive is specifically designed for bonding sheet molding compound (SMC). It can be heat accelerated for faster curing and has a maximum service temperature of 250°F.

SKU	Size	Net weight (lb.)
056758	6 Quarts (Resin)	14.5
056759	6 Quarts (Hardener)	13.4

Araldite AW 8594 / HY 994 Epoxy Adhesive

Araldite AW 8594 / HY 994 is a two-part laminating system for fabricating snow skis, snowboards, and other composite parts. A heat cure is recommended for optimal results.

SKU	Size	Net weight (lb.)
056438	5 Gallon (Resin)	52
056414	5 Gallon (Hardener)	34.5

Araldite AW 8595 / HW 8595 Epoxy Adhesive

This epoxy adhesive has a medium viscosity of 21,000 cps for good gap filling properties. Translucent in color, 8595 has excellent flexibility and bonds to a variety of substrates.

SKU	Size	Net weight (lb.)
056638	50 ml	0.18

Araldite 8579 Epoxy Adhesive

Araldite 8579 is a gray, thixotropic, room-temperature curing paste that spreads easily and has good gap-filling characteristics. Heat resistant to 248°F, it offers good chemical resistance.

SKU	Size	Net weight (lb.)
056479Q	Quart (Resin)	2.2
056478Q	Quart (Hardener)	0.9
056479	6 Quarts (Resin)	13.2
056478	6 Quarts (Hardener)	5.3

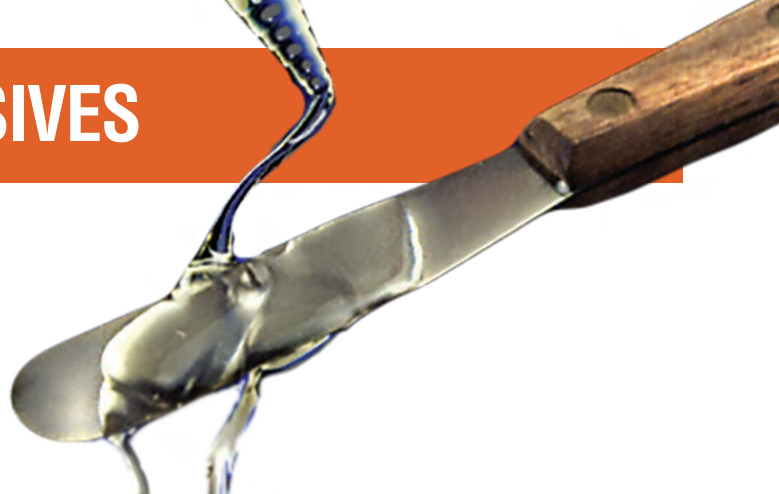
Araldite TDR 1100-11 Epoxy Adhesive

This tough epoxy adhesive is perfect for bonding fiberglass, plastics, and wood. It displays excellent results when heat cured above 170°F. It is an ideal adhesive for archery bow construction.

SKU	Size	Net weight (lb.)
056419	5 Gallon (Resin)	35
056420	5 Gallon (Hardener)	35

METHACRYLATE ADHESIVES

Freeman offers ASI and Devcon two-component methacrylate adhesives. All are formulated for easy handling and are generally excellent for bonding thermoplastics, composites, and some metals. Methacrylates are usually the best choice for bonding dissimilar substrates.



Specifications

	Mix ratio by weight Resin:Hardener	Mix ratio by volume Resin:Hardener	Gel Time (min.) @ 72°F	Light Handling Time	Cure Time (hour) @ 73°F	Mixed Viscosity (cps)	Hardness (Shore D)	Lap Shear Strength (psi)	Peel Strength (pli)	Tensile Strength (psi)	Serviceable Temp. / Max (°F)	Color
MP 55300	1:1	1:1	4-6	10-15	—	60,000	—	3,000-3,500	—	3,000-3,500	250	Amber
MP 55305	1:1	1:1	3-5	6-10	—	60,000	—	2,500	—	2,500	250	Off-White or Black
MP 55310	1:1	1:1	10-18	20-35	—	60,000	—	3,000-3,500	—	3,000-3,500	250	Off-White
MP 55420	10:1	10:1	4-6	9-13	—	90,000	—	2,800	—	2,500	250	Off-White
Plastic Welder	—	1:1	4-6	45-60	24 hrs	50,000	78	—	35-40	3,000	250	White or Black
ASTM	—	—	D-2471	—	—	D-2393	D-2240	—	—	—	—	—

ASI MP 55300 Methacrylate Adhesive

MP 55300 forms tough, durable bonds to many substrates including plastic, composites and metal.

Surface cleaning or preparation is not required in most cases or the use of primers or chemical wipes.

SKU	Size	Net weight (lb.)
415150	50 ml	0.3
415152	400 ml	1.3
415151	10 Gallon Kit	90

ASI MP 55305 Methacrylate Adhesive

MP 55305 is a 1:1 mix ratio adhesive designed for bonding a wide range of thermoplastics, composites, and metals. MP 55305 has excellent impact resistance and is thixotropic for applications on vertical surfaces. This product is fast curing with a 3-5 minute working time and parts may be handled in 6-10 minutes.

SKU	Size	Net weight (lb.)
415156	50 ml	0.2
415158	400 ml (Off-White)	1.3
415159	400 ml (Black)	1.3

ASI MP 55310 Methacrylate Adhesive

MP 55310 is a 1:1 mix ratio adhesive that features a long work time of 10-18 minutes for bonding larger parts. It is excellent for gluing composites, thermoplastics, and metals. This product also has good chemical and impact resistance as well as exceptional flexibility.

SKU	Size	Net weight (lb.)
415162	50 ml	0.2
415164	400 ml	1.3
415166	10 Gallon Kit	80.6

ASI MP 55420 Methacrylate Adhesive

MP 55420 is a 10:1 mix ratio adhesive that features a 4-6 minute working time for fast assembly of plastic, metal, or composite parts. Parts may be handled in 15-20 minutes. Fully cured parts bonded with MP 55420 have excellent resistance to thermal cycling and resistance to a wide range of chemicals.

SKU	Size	Net weight (lb.)
415199	380 ml	1

Plexus MA 300 Methacrylate Adhesive

This toughened structural adhesive is formulated for bonding difficult-to-bond

SKU	Mfg. No.	Color	Net weight (lb.)
054651	IT410	Black	50 ml
054652	30500	White	50 ml

substrates such as nylon containing alloys, modified polyesters, epoxy composites and standard plastics. This 1:1 mix ratio methacrylate features superior bond strength, durability, and impact resistance. It has a creamy consistency with excellent gap-filling capabilities and good peel strength in all environments.

CYANOACRYLATE ADHESIVES

Freeman offers a complete line of single component cyanoacrylate adhesives and accessories for various bonding applications. These fast-setting materials are designed for metal, wood, plastic, and tooling board adhesive requirements.

Freeman F-Bond Instant CA Adhesives

F-Bond Thin: General purpose and extremely fast setting.

F-Bond Medium: Rapid-setting medium viscosity adhesive with excellent flexibility.

F-Bond Thick: Rapid-setting high viscosity, ideal for gap-filling applications.

F-Bond Gel: Thixotropic formulation allowing for vertical applications.

F-Bond Flex Black: Formulated with a flexible rubber filler which allows for high vibration and shock applications.



SKU	Size	Viscosity level	Viscosity (cps)
055300	2 oz.	Thin	3
055307	8 oz.	Thin	3
055319	1 lb.	Thin	3
055301	2 oz.	Medium	250
055308	8 oz.	Medium	250
055302	2 oz.	Thick	1500
055309	8 oz.	Thick	1500
055320	1 lb.	Thick	1500
055303	20 g.	Gel	Thixotropic
055311	2 oz.	Flex Black Thick	1500

Freeman F-Bond Accessories

F-Bond Accelerator: Accelerates cure time and increases gap-filling capabilities

F-Bond Dosing Tips: High-quality precision application replacement tips for our 2 oz. bottles

F-Bond Piercing Cap: A needle point cap to prevent dispenser clogging

SKU	Description	Size
055304	Accelerator (w/pump)	2 oz.
055324	Accelerator Aerosol	10 oz.
055305	Accelerator	8 oz.
055315	8 oz. Cap	
055314	Dosing Tips	
055316	Piercing Cap	

Devcon ZipGrip® GPE3 Adhesive

This low viscosity (20 cps), single-component cyanoacrylate adhesive is for close-fitting parts. ZipGrip bonds in seconds to rubber, fixturing rubber gaskets, splicing o-rings, repairing plastics and metals. It is also highly resistant to aging and weathering.

SKU	Size	Mfg. No.
054629	14 grams	70144

ASI NI Series Adhesive

ASI NI 1000 is a clear, Butyl-based instant adhesive that reduces frosting on parts and the need for sophisticated ventilation. ASI NI 1000 will cure in 15 seconds.

SKU	Size
413760	2 oz.

ASI Cyanoacrylate Accessories

QUICK-TAC can be brushed or sprayed and provides faster set times. It is ideal for bonding porous materials such as fabrics or woods, filling gaps up to 0.20", bonding acidic surfaces, or low-humidity conditions. Quick-Tac 2 is acetone-based and Quick-Tac 4 is heptane-based. Debonder is a single-component material that removes cured adhesive from work stations and also flushes and cleans dispensing systems.

SKU	Description	Size
414014	QUICK-TAC 4	2 oz.
414018	QUICK-TAC 4	8 oz.
414004	QUICK-TAC 2	1 Gallon
414108	Debonder	2 oz.

REN TOOLING BOARD ADHESIVES

DunaBond

DunaBond 3206 and 3140 are single-part urethane adhesives developed for RenShape Foam Boards. They can also be used to bond polystyrene, phenolic, metals, fiberglass laminates, wood and concrete. DunaBond 3206 offers a working time of 15-18 minutes and DunaBond 3140 offers a working time of 35-40 minutes.

SKU	Size	Net weight (lb.)
415830	3140 (35 oz.)	2.2
415831	3206 (35 oz.)	2.2

Ren-Weld 103

This light yellow epoxy adhesive is formulated for the effective bonding of RenShape Foam, Modeling, Styling, and Tooling Boards. Ren-Weld 103 has a 2,100 cps viscosity for ease of application yet contains flow control agents to prevent excessive resin run-out. Other features include a 20 minute gel time and a 10 hour handling strength.

SKU	Size	Net weight (lb.)
056506	Gallon Kit	10

Ren-Weld 5008

Ren-Weld 5008 is a medium-speed adhesive that is hardness and color matched for RenShape 5008. It has a 75 minute gel time and reaches full strength after 24 hours. The cure time may be accelerated by heating the material to 200°F for 4 hours.

SKU	Size	Net weight (lb.)
056108	Gallon Kit	6



Ren-Weld 5169

This red urethane adhesive is designed for gluing RenShape 5169 and 5179 Foundry Boards. Ren-Weld 5169 has a 1:1 mix ratio by volume, 8-13 minute gel time, 80D Shore hardness, and an 8-10 hour handling strength.

SKU	Size	Net weight (lb.)
056620	Quart Kit	4

SEE ALSO

Product	Page #
RenShape Boards	9
Repro Ultra Light for RenShape Foam Boards	25
Repro Light for medium density boards	25
RenLam 1700-1 for medium density boards	51

POLYURETHANE ADHESIVES

Specifications

	Mix ratio by weight Resin:Hardener	Mix ratio by volume Resin:Hardener	Gel Time (min.) @ 72°F	Light Handling Time (hr.)	Cure Time (hr.) @ 73°F	Mixed Viscosity (cps)	Hardness (Shore A)	Lap Shear Strength (psi)	Peel Strength (pli)	Tensile Strength (psi)	Color
AW 8680/HW 8680	93:100	1:1	15	10	48	50,000	30D	—	—	1,100	Gray
Araldite 2040	93:100	1:1	15	10	24	50,000	30D	1,700	—	1,100	Gray
Araldite 2041	80:100	1:1	12	4	16	50,000	85	2,800	—	2,100	Pink
Araldite 2042	80:100	1:1	2.5	1	6	50,000	85	2,800	—	2,100	Pink
AW 8680/HW 8685	80:100	1:1	8-10	2	12	34,000	85	2,900	—	2,100	Black
AW 8683/HW 8683	100:60	100:60	15	—	24	2,750	95	—	100	3,500	Off-White
ASTM	—	—	D-2471	—	—	D-2393	D-2240	D-1002	—	D-638	—

Araldite AW 8680 / HW 8680

This general-purpose adhesive remains flexible once cured. It is well suited for bonding polycarbonate, nylon, other plastics and primed metals.

SKU	Size	Net weight (lb.)
056417	6 Quarts (Resin)	12.8
056418	6 Quarts (Hardener)	13.8

Araldite 2040

This flexible general-purpose adhesive offers a 15 minute work time and a light handling time of 10 hours that can be accelerated with heat. Araldite 2040 is best used for bonding plastic, polycarbonate and nylon.

SKU	Size	Net weight (lb.)
056456	50 ml	0.13

Araldite 2041

Araldite 2041 offers excellent environmental stability and impact resistance. It has a 15 minute work time and bonds polycarbonate ABS, FRP, SMC, nylon and can also be used on primed metals.

SKU	Size	Net weight (lb.)
056457	50 ml	0.13

Araldite 2042

This environmentally stable and impact-resistant adhesive offers a fast work time and light handling time that can be accelerated with heat. It is suitable for bonding polycarbonate ABS, FRP, SMC and nylon, and materials with different coefficients of thermal expansion.

SKU	Size	Net weight (lb.)
056458	50 ml	0.13
056466	200 ml	0.5

Araldite AY 8680 / HY 8685

This two-part adhesive is specifically formulated for bonding plastics. It bonds well to polycarbonate, ABS, nylon and other plastics.

SKU	Size	Net weight (lb.)
056173	50 ml kit	0.13
056766	5 Gallon (Resin)	43
056767	5 Gallon (Hardener)	50

Araldite AY 8683 / HY 8683

This two-part elastomeric adhesive is formulated for filter-bonding applications. Its low viscosity allows convenient mixing by hand or meter-mix equipment.

SKU	Size	Net weight (lb.)
056439	5 Gallon (Resin)	40
056441	5 Gallon (Hardener)	24

HOT MELT FOUNDRY ADHESIVES

Manufactured by Power Adhesives LTD. and specifically formulated for instant bonding of foundry cores, these hot melt adhesives are comprised of 100% solids, containing no solvents or water.

Tecbond® 501 Foundry Adhesive

This material has a low viscosity for easy flow. It can be applied at 385°F and has a heat resistance of up to 350°F. Each rigid stick is 1¼" in diameter and 1½" long for maximum glue flow.

SKU	Diameter	Length	Net weight (lb.)
176071	1.75"	1.625"	22

Tecbond® 601 Foundry Adhesive

Tecbond 601 is higher in viscosity and faster setting than Tecbond 501. It is applied at 385°F and can tolerate temperatures up to 185°F. Each rigid stick is 1¼" in diameter and 1½" long for maximum glue flow.

SKU	Diameter	Length	Net weight (lb.)
176072	1.75"	1.625"	22

Tec® 3400 Hot Melt Glue Applicator

This updated applicator is for applying 1.75" diameter hot melt adhesives. This lightweight model features a 400 watt stainless steel heater cartridge, 4-minute warm up, and a precision controller that detects various fault conditions to protect the tool. The Tec® 3400 operates on standard 110 voltage and includes a one-year warranty. (SKU # 176074)



DIE MAKING ADHESIVES



Z-Bond™

This water-based PSA adhesive is formulated for slick UV-Coated dieboards. It bonds easily and removes with no residue.

SKU	Size	Net weight (lb.)
055996	8 lb. tub	8
055997	1 lb. bottle	1

BirchBond™

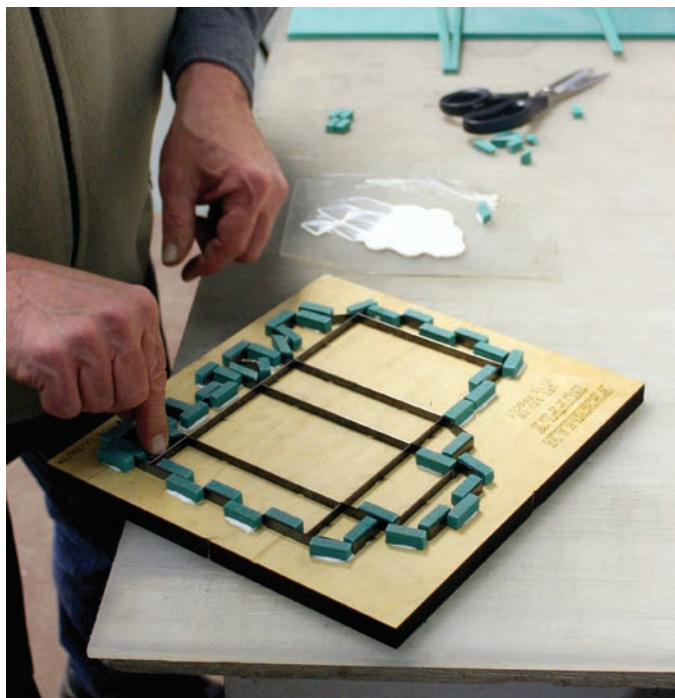
Birch Bond is an excellent adhesive for bonding birch dieboard. Easily and quickly applied with brush or roller, BirchBond offers a high built-in wet tack that helps prevent board movement during clamping.

SKU	Size	Net weight (lb.)
022710	Gallon	9
022715	5 Gallon	45

DieStrip™ Adhesive

This reliable latex adhesive for flat die rubber grips securely and strips cleanly when re-rubbing the die. Rubber can easily be pulled off by hand or scraped off with a wood chisel, leaving little to no residue.

SKU	Size	Net weight (lb.)
055994	Gallon	8



A diemaker uses DieStrip Adhesive to secure ejection rubber (page 110) next to the steel rule (page 109).

SEE ALSO

Product	Page #
F-Bond Adhesives & Accessories	81



WOOD GLUE

Freeman Medium Viscosity White Wood Glue

Freeman Medium Viscosity White Wood Glue is a polyvinyl acetate adhesive that offers a great balance of set time, viscosity, and holding strength. It is extremely effective for gluing most all species of hardwood and softwood.

SKU	Size	Net weight (lb.)
022128	Gallon	9
022640	5 Gallon	45

Freeman High Viscosity White Wood Glue

Freeman High Viscosity White Wood Glue is a thicker version of our Medium White Wood Glue for vertical applications or where a higher viscosity adhesive is preferred. It is extremely effective for gluing most all types of wood and is excellent for installing leather fillets due to the increased viscosity.

SKU	Size	Net weight (lb.)
023639	Gallon	9
023640	5 Gallon	45

Freeman Fast Set White Wood Glue

The fastest-setting wood glue we offer, it is used for assembly work where rapid hardening is required. Works well with all types of hardwood and softwood.

SKU	Size	Net weight (lb.)
022663	Gallon	9
022664	5 Gallon	45

Freeman Gold Wood Glue

Light yellow in color, this glue features a high viscosity and fast set time, making it ideal for assembly and fillet work.

SKU	Size	Net weight (lb.)
023635	Gallon	9
023636	5 Gallon	45

Master White Wood Glue

Master White Wood Glue has a high built-in wet tack that helps prevent board movement during clamping. It is ready for use requiring no mixing, blending or heating and can be used at temperatures as low as 60°F. Easily and quickly applied with brush or roller, it can bond dissimilar materials such as wood, cork, oil-free leather, plastics and metals.

SKU	Size	Net weight (lb.)
022700	Gallon	9
022705	5 Gallon	45

Wood Glue Applicator Bottles

These non-stick, empty plastic glue bottles in popular and convenient sizes are available for pattern shop use. The screw-on plastic spout, which can be cut to desired opening size, gets the glue into the tight places.

SKU	Size
023658	2 oz. (Bottle w/Spout)
023660	8 oz. (Bottle w/Spout)
023665	16 oz. (Bottle w/Spout)
023670	Quart (Bottle w/Spout)
023673	2 oz. (Spout Only)
023662	8 oz. (Spout Only)
023672	16 & 32 oz. (Spout Only)

OTHER SPECIALTY ADHESIVES

Sheet Wax Spray Adhesive

Sprayway Number 66 is the easiest way to coat plain sheet wax for fabrication. It can also be used on paper, plastics, leather, metal or glass.

SKU	Size
054510	15.6 fl. oz.

3M™ Super 77™ Multipurpose Adhesive

Super 77 Spray Adhesive is a fast-drying, general-purpose adhesive designed for permanently attaching fabric, paper, plastics, and light-weight foams to rigid-base materials.

SKU	Mfg. No.	Net weight (lb.)
054516	21210-9	24 fl. oz.

3M™ Polystyrene Foam Insulation 78 Spray Adhesive

This adhesive creates a high-temperature resistant bond while providing a work time ideal for polystyrene panel bonding, roofing membrane attachments, and foam boards.

SKU	Mfg. No.	Net weight (lb.)
054514	41593-7	16.25 fl. oz.

3M™ Hi-Strength 90 Spray Adhesive

High Strength 90 Adhesive bonds to concrete, wood, MDF, laminates, polyethylene and more. Extreme high-strength and fast-tack adhesive provides strong permanent bond. Ideal adhesive for decorative laminates, particleboard, and many other materials, even polyethylene, polypropylene, and SBR rubber. 1 minute dry time for fast, extremely strong permanent results and high productivity.

SKU	Mfg. No.	Net weight (lb.)
054515	30023-3	24 fl. oz.

Superbond Special Adhesive

Superbond is a high-strength hot melt adhesive specially designed for instantly and firmly joining waxes used in the lost wax casting process. Clean burn-out is assured.

SKU	Size	Net weight (lb.)
119560	Tray	1

DISPENSING GUNS AND STATIC MIX NOZZLES

50 ml Conversion Kit

This conversion kit is an economical alternative to a dedicated dispensing gun when you do not require a high volume of 50 ml cartridges. It is suggested for use with a standard 9" caulking gun. (SKU #415480)

Adhesive Dispensing Guns

These dispensing guns are designed for a variety of materials and are available in a wide range of sizes.

SKU	Size	Method	Features
056460	50 ml	Manual	Includes two inserts for 1:1 and 2:1 mix ratios.
056462	200 ml	Pneumatic	Designed for 200 ml cartridges.
056598	200 ml	Manual	Designed for 200 ml cartridges.
415476	380 ml	Manual	Designed for coaxial 380 ml cartridges and ASI 10:1 mix ratio materials.
415478	400 ml	Manual	Designed for Huntsman, Araldite, and ASI 400 ml cartridges.
415479	490 ml	Manual	Designed for ASI 490 ml cartridges.

50 ml Static Mix Nozzles

These 50 ml static mix nozzles are available in various shapes, lengths, and with a range of features to suit your adhesive dispensing needs.

SKU	Shape	Length	Inside Diameter	Elements	Features
056488	Round	6"	0.250"	21	Conventional, most widely used in industry
415802	Square	4.03"	0.203"	20	Two-thirds the length of round spiral mixers, less adhesive waste, fits nearly all 50 ml cartridges
056510	Mini	2.5"	0.125"	17	Least adhesive waste, suitable only for lower-viscosity adhesives

200/380/400/490 ml Static Mix Nozzle

These static mix nozzles effectively and completely mix adhesives for a variety of gun sizes. 415800 can be used with the 200, 380, and 400 ml dispensing cartridges. 415803 is designed for the 490 ml cartridges.

SKU	Shape	Length	Inside Diameter	Elements	Features
415800	Square	5" (mixing)	3/8"	24	Includes integral nut, eliminating need for individual retaining nut
415803	Square	8.5" (overall)	10 mm	24	

400 ml Manual Dispensing Gun

200 ml Manual Dispensing Gun

50 ml Manual Dispensing Gun



FOUNDRY TOOLS & SUPPLIES

Freeman offers the industry's largest selection of hard-to-find tools and supplies designed for demanding foundry environments.

86-89



Mold Alignment Dowels

91-93



Core Box Vents & Accessories

96



Freeman-Palmer Pattern Plates

97-98



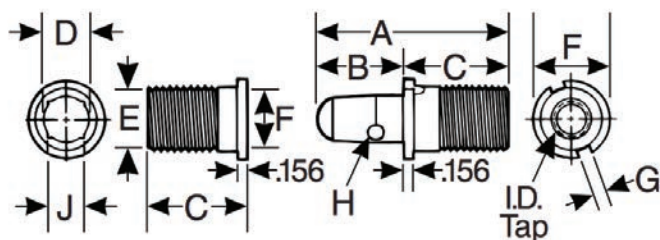
Foundry Tools & Other Supplies

CORE BOX ALIGNMENT DOWELS

Freeman Husky Dowels

- ▶ Precisely machined for accuracy
- ▶ Threaded for easy installation & removal
- ▶ Hardened for long life
- ▶ Black oxide treatment prevents rust

A Freeman exclusive, the No. 55 Husky Dowel is widely considered the strongest threaded body steel dowel available. Its blackened body prevents rust for a long, heavy duty life. The pin body and bushing body have the same outside diameter, enabling boxes to be booked for fast, accurate installation.



		Dowel Dimensions											
SKU	Description	A	B	C	D	E	F	G	H	J	Threads I.D.	Threads O.D.	
164020	Male Pin - Standard	1 3/4"	1 3/16"	—	5/8"	—	1 5/16"	3/16"	3/16"	—	1/2" - 13	1 3/16" - 20	
164025	Male Pin - Long	2 1/4"	1 5/16"	—	5/8"	—	1 5/16"	3/16"	3/16"	—	1/2" - 13	1 3/16" - 20	
164030	Male Pin - Extra Long	3"	2 1/16"	—	5/8"	—	1 5/16"	3/16"	3/16"	—	1/2" - 13	1 3/16" - 20	
164035	Female Bushing	—	—	1 5/16"	5/8"	1 3/16"	1 5/16"	—	—	1/2"	—	1 3/16" - 20	
164040	Complete Set - Standard (25/box)		164045	Complete Set - Long (25/box)		164050	Complete Set - Extra Long (25/box)						

Freeman Husky Dowels Installation Tools



- 164525 (A) Drill 3/4" diameter
- 164530 (B) Reamer 49/64" diameter
- 164515 (C) Counterbore
- 164520 (D) Tap with Pilot 1 3/16" - 20
- 164545 (E) 1" Socket 1/2" Drive
- 164510 (F) Pin Wrench with Cross Pin
- 164560 (G) Cross Pin for Wrench
- 164540 (H) Socket 5/8" X 12-Point Socket, 1/2" Drive
- 164535 (I) Square Drive Bit
- 164550 Socket Wrench Handle - 10 5/8" long, 1/2" Drive (not shown)
- 163780 Replacement Counterbore Cam w/Set Screw

New Packaging

All Freeman dowels now feature sturdy packaging with specially fitted inserts that keep sets together and provide proper storage.

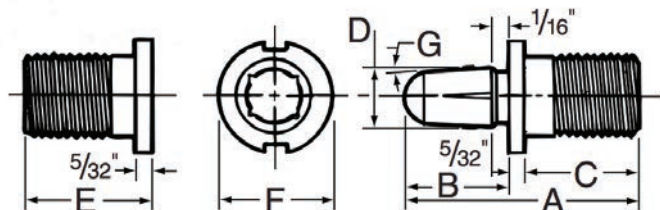


CORE BOX ALIGNMENT DOWELS CONTINUED

Master Sure-Lock (True-Line) Steel Dowels

- ▶ Threaded for easy installation and removal - dowel may be extracted even if the pin is broken
- ▶ Ideal for small to medium sized jobs
- ▶ Hardened for long life
- ▶ Black oxide treated to prevent rust

This popular heavy-duty steel dowel system is the most specified alignment system in the industry. Master Sure-Lock (True-Line) Dowels are a Freeman exclusive design manufactured to exacting standards.



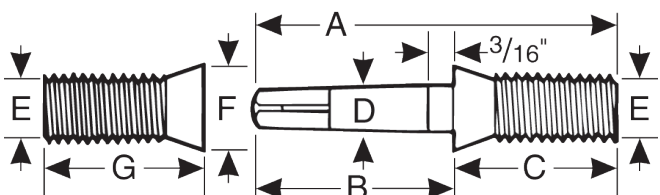
	Dowel Complete	SKU Male Pin	Female Bushing	Size	Dowel Dimensions							
					A	B	C	D	E	F	G	Threads
Regular	166100 (50/box)	166140	166120	1	1 1/4"	1 7/32"	9/16"	1/4"	2 3/32"	9/16"	1 1/2"	3/8" - 24
	166105 (50/box)	166145	166125	2	1 11/32"	5/8"	9/16"	5/16"	2 3/32"	5/8"	3"	7/16" - 20
	166110 (50/box)	166150	166130	3	1 1/2"	1 1/16"	2 1/32"	3/8"	1 3/16"	1 1/16"	2 1/4"	1/2" - 20
	166115 (50/box)	166155	166135	4	1 19/32"	25/32"	2 1/32"	1/2"	1 3/16"	1 3/16"	4"	5/8" - 18
Long	—	166160	166125	2	2 1/32"	1 1/4"	1 3/16"	5/16"	2 3/32"	5/8"	4"	7/16" - 20
	—	166165	166130	3	2 1/2"	1 3/8"	3 1/32"	3/8"	1 3/16"	1 1/16"	4"	1/2" - 20
	—	166170	166135	4	2 11/16"	1 9/16"	3 1/32"	1/2"	1 3/16"	1 3/16"	4"	5/8" - 18

Pins and bushings sold individually; or together in box quantities (number of sets per box noted above).

Freeman Square-Head Steel Dowels

- ▶ Precisely machined for accuracy
- ▶ Square head design for easy installation & removal
- ▶ Hardened for long life
- ▶ Black oxide treatment prevents rust

The familiar square head of these dowels remains one of the best methods of offering a sturdy bearing surface for the inserting wrench to grasp. Dowels frozen in threads by foundry use can be removed with adjustable wrenches. All parts of one size are interchangeable, so changes in pin length or bushing length are possible without completely reworking the job. Offering good wear resistance and high strength, these dowels are commonly used for aluminum, gray iron, brass or plastic pattern equipment and are especially useful for shell mold and hot box pattern equipment.



	Dowel Complete	SKU Male Pin	Female Bushing	Size	Dowel Dimensions							
					A	B	C	D	E	F	G	Drill Tap
Regular	161005 (50/box)	161025	161045	1	1 1/4"	1 7/32"	2 3/32"	1/4"	3/8"	1/2"	2 3/32"	1 9/64" 3/8" - 24
	161010 (50/box)	161030	161050	2	1 11/32"	5/8"	2 3/32"	5/16"	7/16"	9/16"	2 3/32"	1 1/32" 7/16" - 20
	161015 (50/box)	161035	161055	3	1 1/2"	1 1/16"	1 3/16"	3/8"	1/2"	5/8"	1 3/16"	1 3/32" 1/2" - 20
	161020 (50/box)	161040	161060	4	1 19/32"	25/32"	1 3/16"	1/2"	5/8"	3/4"	1 3/16"	1 7/32" 5/8" - 18
Long	—	161065	161085	1	2 1/4"	1 1/4"	1"	1/4"	3/8"	1/2"	3 1/32"	1 9/64" 3/8" - 24
	—	161070	161090	2	2 1/4"	1 1/4"	1"	5/16"	7/16"	1 7/32"	1"	1 1/32" 7/16" - 20
	—	161075	161095	3	2 1/4"	1 1/4"	1"	3/8"	1/2"	5/8"	1"	1 3/32" 1/2" - 20
	—	161080	161100	4	2 1/4"	1 1/4"	1"	1/2"	5/8"	3/4"	1"	1 7/32" 5/8" - 18
*Extra Long	—	161110	*	3	3"	2"	1"	3/8"	1/2"	—	—	1 3/32" 1/2" - 20
	—	161115	*	4	3"	2"	1"	1/2"	5/8"	—	—	1 7/32" 5/8" - 18

*Standard or long bushings can be used. Pins and bushings sold individually or together in box quantities (number of sets per box noted above).

CORE BOX ALIGNMENT DOWELS CONTINUED

Steel Dowel Installation Tools

Our drills, reamers, counterbores, and taps are top-quality tools made of high-grade tool steel for long lasting performance and proper dowel installation. Please note which tools are designed for the Master Sure-Lock (True-Line) or Freeman Square-Head dowels.

Description	SKU/Dowel Size			
	#1	#2	#3	#4
Drill Bit for both styles	163620	163625	163630	163635
Reamer for both styles	163560	163565	163570	163575
Counterbore for Master	163761	163766	163771	163776
Counterbore for Freeman	163580	163585	163590	163595
Tap for both styles	163600	163605	163610	163615
Wrench for Freeman	163540	163545	163550	163555
Slotted Wrench for Master	163740	163745	163750	163755
Milled Wrench for Master	163720	163725	163730	163735

Steel Dowel Installation Guide

1 Drilling – Using the appropriate sized drill bit, drill a hole deep enough to allow the pin and pilot of the tap (step four) to reach its proper depth (the exact depth will vary depending on which size dowel you are installing).

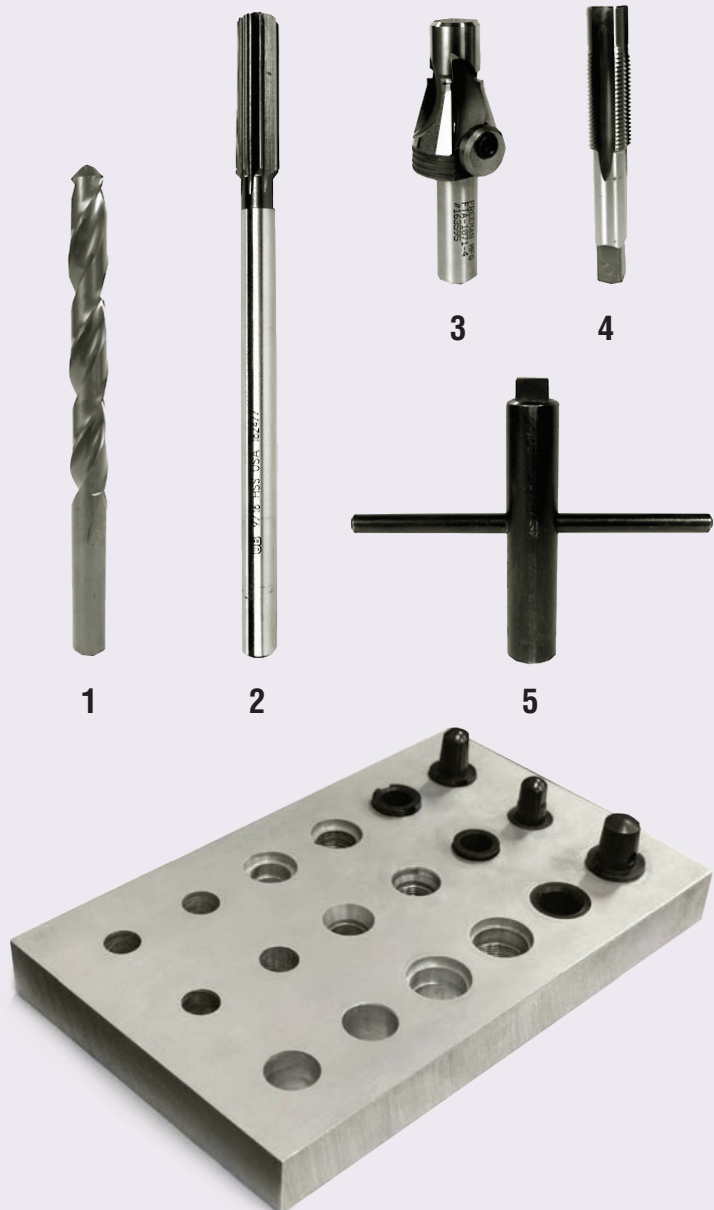
2 Reaming – Use the appropriate reamer to make the previously drilled hole smooth and precise in dimension.

3 Counterboring – Next you must counterbore the hole. This tool is designed with a pilot end to perfectly align itself in the center of the reamed hole before boring a perfect concentric bevel or shoulder. In order to prevent boring too deep, the counterbore has an adjustable cam with a set screw (SKU #163780), allowing you to manually set the depth of your counterbore.

4 Tapping – This tap is also designed with a pilot end to precisely cut the threads in the hole. With a tap wrench attached, you can manually turn the tap to create the threads.

5 Install Pin and Bushing – You now have an accurate, precise hole ready for installation of the dowel pin or bushing. Each style of dowel requires its own specially designed set of wrenches or sockets for easy installation.

NOTE: Each style of dowel has its own counterbore to accommodate the differences in how the dowel sets below the surface. Both Husky dowels and Sure-Lock (True-Line) dowels have square shoulders while the Square-Head dowels have beveled shoulders. If you are using a CNC machine, the cam should be unnecessary.



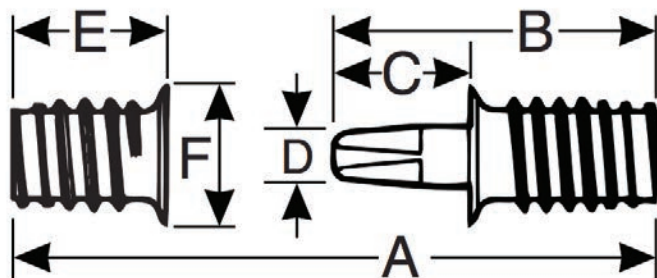
CORE BOX ALIGNMENT DOWELS CONTINUED

Freeman Square-Head Brass Dowels & Installation Tools

- ▶ Coarse, sharp threads and square-head design offer easy and secure installation
- ▶ Precisely machined for accuracy
- ▶ Solid brass prevents rust

These Brass Dowels are used for hardwood and softwood pattern equipment, plasters and plastics. The square head provides four wide flat areas that fit perfectly into the wrench, ensuring accuracy and control when installing both the pin and

bushing. The large contact surface of the male dowel withstands the strain of removing without stripping. The wrench covers the entire pin of the male dowel down to the flange of the dowel. This eliminates the difficulties of squaring the wrench to the dowel and the work when inserting.



SKU					Dowel Dimensions						
Dowel Set	Male Pin	Female Bushing	Wrench Tool	Size	A	B	C	D	E	F	Drill Bit Size
162005 (100/box)	162040	162075	163505	1	1 ¹ / ₁₆ "	5 ¹ / ₈ "	9 ¹ / ₃₂ "	1 ¹ / ₆₄ "	1 ¹ / ₃₂ "	9 ¹ / ₃₂ "	3 ¹ / ₁₆ "
162010 (100/box)	162045	162080	163510	2	2 ⁷ / ₃₂ "	4 ⁹ / ₆₄ "	1 ¹ / ₃₂ "	3 ¹ / ₁₆ "	2 ⁷ / ₆₄ "	2 ³ / ₆₄ "	1 ¹ / ₄ "
162015 (100/box)	162050	162085	163515	3	1 ¹ / ₃₂ "	1 ⁵ / ₁₆ "	2 ⁷ / ₆₄ "	7 ¹ / ₃₂ "	3 ³ / ₆₄ "	2 ⁷ / ₆₄ "	5 ¹ / ₁₆ "
162020 (50/box)	162055	162090	163520	4	1 ⁷ / ₃₂ "	1 ⁹ / ₆₄ "	1 ⁷ / ₃₂ "	1 ⁹ / ₆₄ "	3 ⁹ / ₆₄ "	3 ⁹ / ₆₄ "	7 ¹ / ₁₆ "
162025 (50/box)	162060	162095	163525	5	1 ⁷ / ₁₆ "	1 ³ / ₈ "	2 ¹ / ₃₂ "	1 ³ / ₃₂ "	2 ³ / ₃₂ "	2 ³ / ₃₂ "	9 ¹ / ₁₆ "
162030 (50/box)	162065	162100	163530	6	1 ⁷ / ₈ "	1 ⁴ / ₆₄ "	5 ¹ / ₆₄ "	3 ⁵ / ₆₄ "	1 ⁵ / ₁₆ "	1 ⁵ / ₁₆ "	3 ¹ / ₄ "
166330 (20/box)	166365	166400	*	7	2 ³ / ₈ "	2 ¹ / ₈ "	1 ⁵ / ₁₆ "	1 ³ / ₁₆ "	1 ³ / ₁₆ "	1 ³ / ₁₆ "	1"

*To install the Size 7 Pin, use a standard 5/16" hex wrench. To install the Size 7 Bushing use SKU #163536. This is a 5/16" square drive bit requiring a 5/16" 12 point socket for installation (not included). Pins and bushings sold individually; or together in box quantities (number of sets per box noted above).

OTHER CORE BOX ALIGNMENT DOWELS

Malleable Iron Dowels

These dowels are most commonly used to properly align very large core box halves, split patterns and loose pieces made from wood. Available in three sizes.

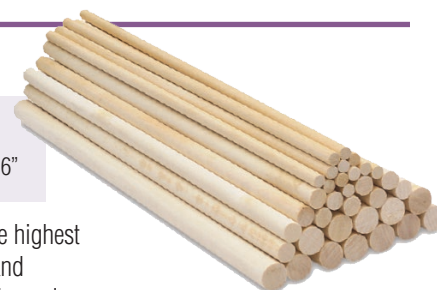


SKU	Description	Pin Diameter	Base Diameter
026210	Pin	1/2"	2"
026220	Pin	3/4"	2 1/2"
026230	Pin	1"	2 7/8"
026205	Bushing	1/2"	2"
026215	Bushing	3/4"	2 1/2"
026225	Bushing	1"	2 7/8"

Wood Dowels

- ▶ Standard 36" lengths
- ▶ Exact Diameters from 1/8" to 6"

These dowels are made of the highest grade birch, finished round and smooth from straight grained wood.



Foundry Locators

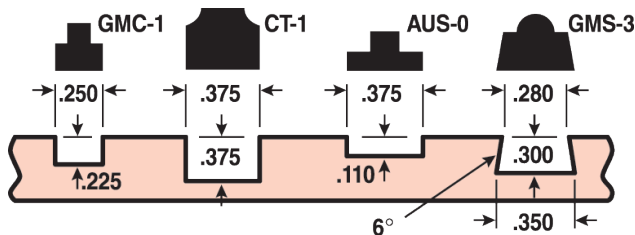
- ▶ Diameters from 0.125" to 0.750"
- ▶ Injection molded for accuracy
- ▶ Round or oblong shapes

Foundry Locators are yellow, high-density polystyrene alignment pins used to precisely position foundry cores. They help to improve the accuracy and quality of complex, multiple-core

castings. Please see our website, www.FreemanSupply.com, for complete details and part numbers.



SEALS, CLAMPS & ACCESSORIES



Dike-O-Seal Preform Strip

- ▶ Can be installed and secured without adhesive
- ▶ Corners can be machined at 45° to the intersecting grooves
- ▶ Seal can be set in groove without cutting and bonding ends
- ▶ Available in 20 and 40 Shore A

This product provides an effective seal in core boxes and gassing plates. To quickly put the core box into production, bond into channels with Freeman F-Bond Adhesives (page 81).

SKU	Description	Hardness (Shore A)	Mfg No.	Length
177105	Preform Strip	20	GMC-1	50'
177115	Preform Strip	20	AUS-0	50'
177125	Preform Strip	20	GMS-3	50'
177140	Preform Strip	20	CT-1	50'
177110	Preform Strip	40	GMC-1	50'
177120	Preform Strip	40	AUS-0	50'
177130	Preform Strip	40	GMS-3	50'
177146	Preform Strip	40	CT-1	50'
177142	Preform Strip – 1/8" Round	20	1/8" R	50'
177143	Preform Strip – 1/4" Round	20	1/4" R	50'
177148	Cutter For GMS-3 Strip			

Please see our website, www.FreemanSupply.com, for other designs.

Shalco Blowplate Gasket

These high heat resistant (500°F) silicone rubber

gaskets are designed to be used for sealing shell-core and hot-box coremaking equipment. Reinforced with 26 gauge perforated steel, they provide a positive seal between the core box and the blowplate thus eliminating the escape of curing gases, air, and sand.

SKU	Length	Width	Thickness
177205	24"	24"	3/16"

Striptube

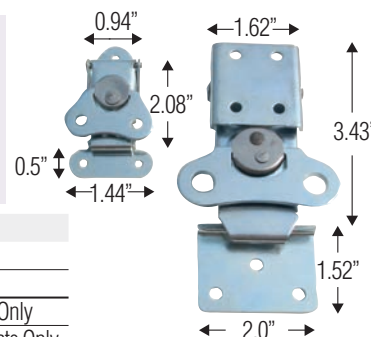
This hollow, round, 60A neoprene rubber gasket material is an effective seal in foundry core boxes and gassing plates. Striptube is easily compressed and not affected by gasoline, naphtha, or kerosene.

SKU	Diameter	Length
033475	1/8"	10'
033482	3/16"	10'
033484	1/4"	10'
033486	5/16"	10'



Link-Lock Fasteners

- ▶ Ideal for securing core box halves during molding
- ▶ Positive locking, springless latching and heavy-duty construction
- ▶ Compact and flat-closing



SKU	Description
408255	#3 Light Duty Set
408256	#2 Medium Duty Set
408255P	#3 Light Duty Keeper Plate Only
408256P	#2 Medium Duty Keeper Plate Only

Peerless Core Box Clamps

- ▶ Parts sold individually - all 3 required for complete set
- ▶ Heavy gauge steel for long life
- ▶ Center section brings core box parting line together
- ▶ Two sizes for various jobs

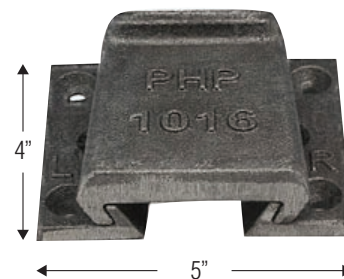


SKU	Description
177500	Left Bracket 2"
177502	Right Bracket 2"
177504	Centerpiece 2"
177508	Left Bracket 3"
177509	Right Bracket 3"
177510	Centerpiece 3"
177511*	Core Box Clamp Cable

*Cable may be attached to centerpiece and core box to prevent accidental loss.

PHP Ductile Iron Core Box Clamps

- ▶ Parts sold individually - all 3 required for complete set
- ▶ Cast ductile iron for long life and durability
- ▶ Center section brings core box parting line together



SKU	Description
177517	Left Bracket 4"
177518	Right Bracket 4"
177516	Centerpiece 4"

Dike-O-Lastic Ejector Buttons

Ejector Buttons are ideal for contributing to clean draws on deep pockets or cavities on match-plates or core boxes. Diameters are from 1/4" to 2 3/4". Please see our website, www.FreemanSupply.com, for complete details and part numbers.



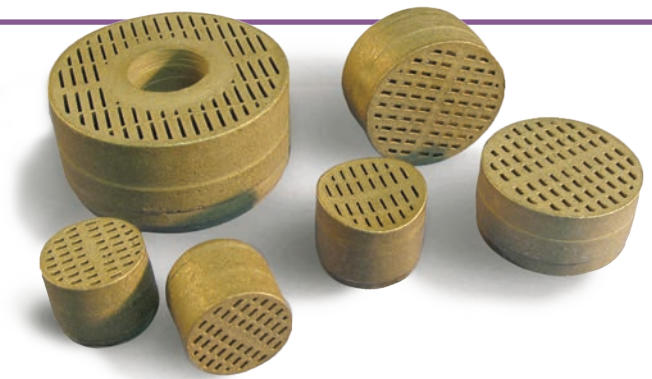
CORE BOX AIR RELEASE VENTS

VENTISTAMP CORE VENTS

► Designed for maximum durability and performance, these high-quality investment-cast core vents were developed for high-production applications where standard slotted vents would traditionally be used.

- One piece construction – no screens or foils to break
- Extremely flat head surface allows less imperfection in core
- Middle of vent diameter is 0.005" oversized – tight installation prevents movement
- Tapered slots less likely to clog with sand and binders
- Top of vent diameter is 0.003" undersized – prevents deformation of the slots
- Metric or Imperial sizes available

Please see our website, www.FreemanSupply.com, for complete details and part numbers.



Zanatta Vents

- ▶ Height: 5/16"
 - ▶ Brass alloy offers high wear resistance
 - ▶ For sand with 60-80 AFS fineness
- Options:**
- ▶ Slot Widths 0.2 mm to 0.45 mm tapered 20°
 - ▶ Diameters from 3/16" to 1 3/4" (3 mm to 45 mm)



Maxvents

- ▶ Brass alloy offers high wear resistance
 - ▶ For sand with 60-80 AFS fineness
- Options:**
- ▶ Slot Widths 0.008" (0.2 mm) or 0.018" (0.45 mm) tapered 30°
 - ▶ Diameters from 3/16" to 1 3/4" (3 mm to 45 mm)
 - ▶ Heights 5/16" or from 6 mm to 12 mm



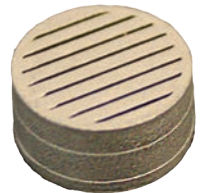
Meltvents FS

- ▶ Slot Width: 0.12" (0.3 mm)
- Options:**
- ▶ Diameters from 3/16" to 1" (3 mm to 25 mm)
 - ▶ Heights from 8 mm to 10 mm
 - ▶ Stainless steel or carbon, offering high wear resistance and versatility with a wide variety of binder systems



Meltvents KT

- ▶ Resistance to high temperature and higher thermal conductivity compared to Stainless Steel alloys, allowing accelerated cooling processes
- Options:**
- ▶ Slot Widths from 0.10 mm to 0.40 mm
 - ▶ Diameters from 3/16" to 5/8" (3 mm to 20 mm)
 - ▶ Heights 8 mm or 10 mm



SHALCO CORE VENTS

► Shalco Super Vents are self-cleaning and feature an opening rate of more than 43%. Compared to an average of 13% for slotted vents and 30% for screen vents, Super Vents are more effective and efficient. They also prevent clogging, allowing for continuous operation of a core molding machine during no-bake molding.

Please see our website, www.FreemanSupply.com, for complete details and part numbers.

Super Vents

- ▶ Slot Width: 0.010"
- Options:**
- ▶ Diameters from 1/4" to 1"; 3 mm to 16 mm
 - ▶ Heights either 1/4" or 5/16"; 6 mm or 8 mm
 - ▶ With or without support bar
 - ▶ Metric sizes available online



Standard Core Vent Selection Guide

#1 – Material

- Brass is soft, therefore easier to contour, remove from the core box, and clean
- Steel offers greater wear and temperature resistance, and provides uniform heating and cooling with steel core boxes
- Aluminum is popular for Styrofoam molding applications

#2 – Style

The “opening rate” (amount of space provided) varies by vent style. Slotted vents average about 13% and can be machined to contour with the core box surface. Screen Vents average about 30% and are primarily used in flat areas of the core box.

#3 – Slot Width/Screen Mesh

The slot width or mesh size required is determined by the sand mesh size used in your core making process. The slot width or mesh opening must not be greater than the sand mesh in order to hold the sand in the core box while allowing air to escape.

#4 – Dimensions

- Diameter is determined by the size of the area requiring venting and the number of vents preferred in the particular location on the core box
- Height is based on the shoulder depth created by the step drill (insert drill)
- Head Thickness affects the ability to contour the vent to the tool surface – a thicker head allows for more contouring and a thinner head is less likely to clog with binders

These guidelines do not include Shalco Super Vents or Ventistamp vents, both of which offer unique advantages superior to most standard brass and steel vents.

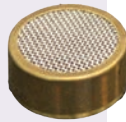
STANDARD SCREEN CORE VENTS

Type K, Screen – Brass

- ▶ High venting area with corrosion-resistant, nickel-copper alloy (monel) screen

Options:

- ▶ Meshes in 24, 35, 40, and 50
- ▶ Diameters from 1/8" to 1"
- ▶ Heights from 1/4" to 1/2"
- ▶ Support bars in 1/2" and larger diameter vents



Type 150L, Lectromesh – Brass

- ▶ Excellent for flat surfaces or finer sands
- ▶ Mesh: 150 over 25 LM (Lectromesh)

Options:

- ▶ Diameters from 1/8" to 1"
- ▶ Heights from 1/4" to 5/16"
- ▶ Support bars in 1/2" and larger diameter vents



Type LM, Lectromesh – Brass

- ▶ Thin, flat screen prevents clogging

Options:

- ▶ Meshes of 25 or 40
- ▶ Diameters from 1/8" to 1"
- ▶ Heights from 1/4" to 1/2"
- ▶ Support bars in 1/2" and larger diameter vents

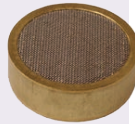


Type G, Screen – Brass

- ▶ Thin, flat screen prevents clogging
- ▶ Mesh: 60 x 70

Options:

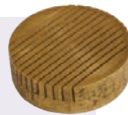
- ▶ Diameters from 1/8" to 1"
- ▶ Heights 1/4" or 5/16"
- ▶ Support bars and additional 14 mesh in 1/2" and larger diameter vents



STANDARD SLOTTED CORE VENTS

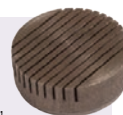
Type D, Slotted – Brass

- ▶ Head Thickness: 0.093"
- #### Options:
- ▶ Slot Widths from 0.10 to 0.030"
 - ▶ Diameters from 1/8" to 1"
 - ▶ Heights of 1/4" or 5/16"



Type C, Slotted – Steel

- ▶ Head Thickness: 0.093"
- #### Options:
- ▶ Slot Widths of 0.010" to 0.020"
 - ▶ Diameters from 1/8" to 1"; 8 mm - 16 mm
 - ▶ Heights from 1/4" to 5/16"; 10 mm



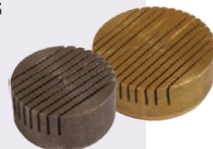
Type T, Taper Slotted – Brass

- ▶ Self-cleaning tapered slots diverge towards underface, preventing sand clogging
 - ▶ Slot Width: 0.012"
 - ▶ Head Thickness: 0.080"
 - ▶ Height: 5/16"
- #### Options:
- ▶ Diameters from 1/8" to 1"



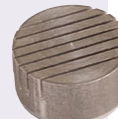
Type XD, Slotted – Brass or Steel

- ▶ For mounting on and contouring to extremely irregular surfaces
 - ▶ Head Thickness: 0.156"
- #### Options:
- ▶ Diameters from 1/8" to 1 1/4"
 - ▶ Heights of 5/16" or 3/8"
 - ▶ Slot Widths from 0.010" to 0.015"



Type AD, Slotted – Aluminum

- ▶ Well-suited for aluminum molds
- #### Options:
- ▶ Diameters from 1/8" to 1/2"
 - ▶ Heights from 1/8" to 1/4"
 - ▶ Slot Widths of 0.010" or 0.014"
 - ▶ Head Thicknesses of 0.093" or 0.156"

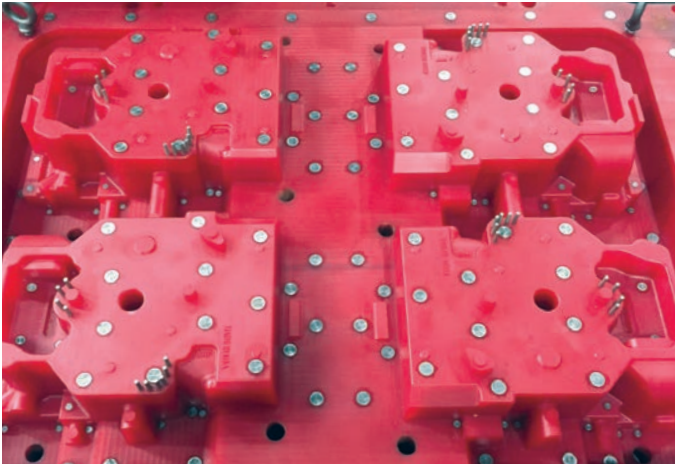


Vilsum Metric – Nylon

- ▶ Highly recommended for blow squeeze machines, v-process, and cold box and CO2 sand systems
 - ▶ Slot Width: 0.4 mm
 - ▶ Height: 7 mm
- #### Options:
- ▶ Diameters from 6 mm to 20 mm



CORE VENT ACCESSORIES



Vent Plugs are used to seal vent holes.

Vent Plugs

- ▶ Sold by the bag (100 vents/bag)
- Options:**
 - ▶ Diameters from $\frac{3}{16}$ " to 1"
 - ▶ Heights from $\frac{1}{4}$ " or $\frac{3}{8}$ "
 - ▶ Aluminum, Brass, and Steel

Please see our website, www.FreemanSupply.com, for complete details and part numbers.



Freeman Core Vent Wax

Freeman Brown Core Vent Wax is used to vent oil sand cores of curved or irregular shape. The wax is placed in critical locations in the sand as the core is molded. The wax dissipates when the core is baked, leaving a clean vent of high permeability. Available in full round and half round shapes. *Please see our website, www.FreemanSupply.com, for complete details and part numbers.*



SKU	Description	Diameter	Radius	Approx. Length	Net weight (lb.)
086001	Full Round	$\frac{1}{32}$ "	—	2300'	1
086002	Full Round	$\frac{1}{16}$ "	—	875'	1
086003	Full Round	$\frac{3}{32}$ "	—	325'	1
086004	Full Round	$\frac{1}{8}$ "	—	800'	4
086006	Full Round	$\frac{3}{16}$ "	—	350'	4
086008	Full Round	$\frac{1}{4}$ "	—	195'	4
086012	Full Round	$\frac{3}{8}$ "	—	85'	4
086016	Full Round	$\frac{1}{2}$ "	—	50'	4
086020	Full Round	$\frac{5}{8}$ "	—	30'	4
086117	Half Round	—	$\frac{3}{8}$ "	41'	4
086118	Half Round	—	$\frac{5}{16}$ "	75'	4
086119	Half Round	—	$\frac{3}{16}$ "	150'	4
086120	Half Round	—	$\frac{1}{8}$ "	340'	4
086121	Half Round	—	$\frac{1}{8}$ "	600'	4

Insert Drills for Core Box Air-Release Vents

These drills allow for quick vent installation. This tool rough drills, relief drills, and reams to correct depth with concentricity. A complete drill consists of drill bit and collar.



SKU	Shank Diameter	Drill Diameter
033301	$\frac{1}{8}$ "	$\frac{1}{8}$ "
033302	$\frac{3}{16}$ "	$\frac{3}{16}$ "
033303	$\frac{1}{4}$ "	$\frac{1}{4}$ "
033304	$\frac{5}{16}$ "	$\frac{5}{16}$ "
033305	$\frac{3}{8}$ "	$\frac{3}{8}$ "
033306	$\frac{7}{16}$ "	$\frac{7}{16}$ "
033307	$\frac{1}{2}$ "	$\frac{1}{2}$ "
033308	$\frac{1}{2}$ "	$\frac{9}{16}$ "
033309	$\frac{1}{2}$ "	$\frac{5}{8}$ "
033310	$\frac{1}{2}$ "	$\frac{3}{4}$ "
033311	$\frac{1}{2}$ "	$\frac{7}{8}$ "
033312	$\frac{1}{2}$ "	1"



Freeman Core Vents

Freeman Vent Cleaners

Made with a tapered spring steel blade and a durable injection

molded plastic handle, these tools are ideal for cleaning sand and binder from slotted core vents. The Screen Vent Cleaner has steel wire bristles at each end and measures $\frac{1}{4}$ " in diameter with $\frac{7}{8}$ " long steel wire bristles.



MOLD ALIGNMENT HARDWARE

FREEMAN BUTTONS & INSTALLATION TOOLS

Freeman Concentric Mold-Lock Buttons

These buttons provide the easiest and most economical means of reducing scrap rate of castings due to mold shift.

- ▶ One-piece construction for easy installation
- ▶ Exceptional heat and wear resistance
- ▶ Concentric design to prevent button misalignment

SKU	Size	Plate Thickness	Hole Diameter
165200	Small	1/2"	1 1/2"
165202	Small	5/8"	1 1/2"
165204	Small	3/4"	1 1/2"
165206	Small	1"	1 1/2"
165208	Large	1/2"	2"
165210	Large	5/8"	2"
165212	Large	3/4"	2"
165214	Large	1"	2"



Freeman Match-Lok Buttons

These buttons are a simple and economical way for eliminating mold shift on flat metal pattern plates. They are precision machined from aluminum, which ensures accurate and positive matching between cope and drag halves.

SKU	Diameter	Height	Qty/Bx
165005	1"	0.254"	100
165010	1 1/2"	0.254"	50
165013	2"	0.254"	1



Installation Tools

Installation Instructions

1. Drill the hole through the plate.
2. Ream the hole.
3. Counterbore the hole using the correct diameter cutter.
4. Select the proper rivet length for the thickness of the plate.
5. Place the rivet through the button and the reamed hole, with the head of the rivet on top of the button.
6. Using the staking tool,peen the portion of the rivet that extends into the counterbored area to secure it in place.

Rivets

SKU	Plate Thickness	Diameter	Qty/Box
165015	3/8"	13/32"	100
165020	1/2"	17/32"	100
165025	5/8"	21/32"	100
165030	3/4"	25/32"	100
165035	1"	1 1/32"	100

Installation Tools

SKU	Description
165040	Drill — 1/64"
165045	(C) Reamer — 5/16"
165050	(D) Staking Tool
165055	(A) Counterbore (1" Buttons)
165060	(A) Counterbore (1 1/2" Buttons)
165065	(A) Counterbore (2" Buttons)
165070	(B) Replacement Pilot for Counterbores

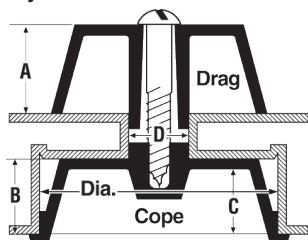


ADOLF INSERTS & INSTALLATION TOOLS

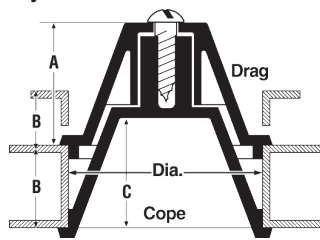
Adolf's plastic injection molded alignment cope and drag inserts provide a quick and simple method to ensure accurate alignment of mold halves.



Style "A"



Style "B"



Adolf Cope and Drag Inserts

Style "A" inserts are installable on matchboards one above the other, or separated on cope and drag plates or molding boxes.

- ▶ Two parts (one drag, one cope)
- ▶ ABS plastic
- ▶ 1½" to 3½" diameters

SKU	Dimensions					Mfg. No.
	Dia.	A	B	C	D	
165150	1.5"	0.50"	0.50"	0.437"	0.375"	1.5A
165151	2"	0.75"	0.625"	0.531"	0.50"	2A
165152	2.5"	1.25"	0.625"	0.531"	0.50"	2.5AA
165153	2.5"	1.25"	1"	0.906"	0.50"	2.5A
165154	3.5"	1.25"	1"	0.906"	0.50"	3.5A

Style "B" Zero Tolerance Inserts are specifically designed for accurate alignment of matchplates used with green sand only.

- ▶ Zero clearance on diameter ensures perfect alignment
- ▶ Easily identified by gray color
- ▶ 1½" to 2½" diameters

SKU	Dimensions				Mfg. No.
	Dia.	A	B	C	
165159	1.50"	0.875"	0.5-1.125"	0.75"	1.5BOT
165160	1.75"	1.125"	0.625-1.125"	1"	1.75BOT
165161	2.50"	1.125"	0.75-1.125"	1"	2.5BOT

Style "B" halves telescope together and interlock at the parting lines of the plate. They are designed for matchplates, matchboards, and automatic molding machines.

- ▶ Non-sticking, acid resistant plastic
- ▶ Installable in plates of various thicknesses
- ▶ 1½" to 2½" diameters

SKU	Dimensions				Mfg. No.
	Dia.	A	B	C	
165156	1.50"	0.875"	0.5-1.125"	0.75"	1.5B
165157	1.75"	1.125"	0.625-1.125"	1"	1.75B
165158	2.50"	1.125"	0.75-1.125"	1"	2.5B

1.5B = ½" or thicker plate

1.75B = ⅝" or thicker plate

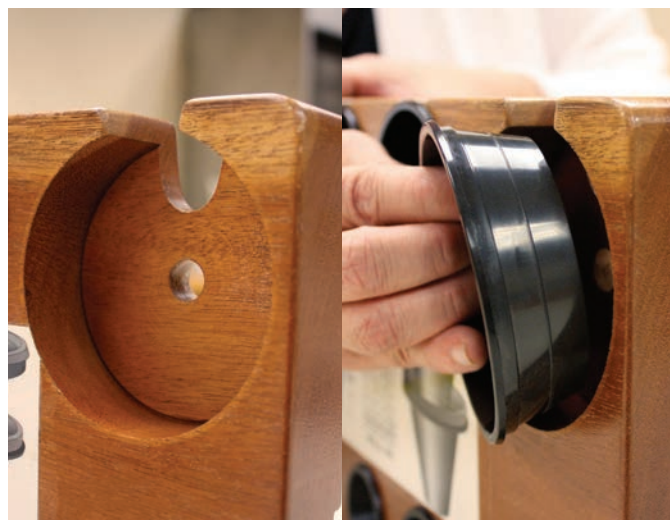
2.5B = ¾" or thicker plate

Installation Tools for Adolf Cope and Drag Inserts

Adolf installation tools are specially designed for quick, easy and precise cutting of the required holes necessary to install these buttons. Designed for use on wood only.

SKU	Description	Diameter	Mfg. No.
165162	Cutter for use w/standard ⅜" Drill	1½"	1.5CU
165163	Cutter Holder with ½" Pilot & ¾" Shank (Blade not included)	¾"	0.75CH
165164	Blade	1½"	1.5CB
165165	Blade	1¾"	1.75CB
165166	Blade	2"	2CB
165167	Blade	2½"	2.5CB
165168	Blade	3½"	3.5CB

Please see our website, www.FreemanSupply.com, for metal cutting tool information.



FREEMAN PALMER PATTERN PLATES

CAST ALUMINUM CHAINLOCK PLATES FOR AUTOMATIC MACHINES

Produced using permanent mold casting methods for maximum hardness, minimum deflection, maximum wear resistance and longer life, these plates feature:

- Certified aluminum only
- Flat, parallel, and uniform thickness
- Uniform density for maximum machinability
- Chainlock segments are $\frac{5}{8}$ " wide at the base and located $\frac{1}{4}$ " inside the flask line, providing maximum usable area while still maintaining good anti-shift properties

Plates can be special ordered with characteristics to the right. Minimum order quantities may apply. Please see our website, www.FreemanSupply.com, or contact our Customer Service department at (800) 321-8511 for complete details, part numbers, and cut-to-size and offset styles.

- Drilled
- Short
- No Chainlock
- Chainlock (Sides Only)
- Chainlock (Ends Only)
- Chainlock (Corner Only)

Plates for Hunter Machines

Hunter 10

- ▶ Thickness: $\frac{1}{2}$ ", $\frac{5}{8}$ ", $\frac{3}{4}$ "
- ▶ Flask Size: 14" x 19"
- ▶ Overall Size: 16 $\frac{1}{2}$ " x 22" or 17 $\frac{1}{2}$ " x 26"

Hunter 18

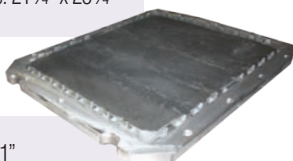
- ▶ Thickness: $\frac{1}{2}$ "
- ▶ Flask Size: 18" x 20"
- ▶ Overall Size: 21 $\frac{1}{4}$ " x 23 $\frac{1}{4}$ "

Hunter 20

- ▶ Thickness: $\frac{5}{8}$ " or $\frac{3}{4}$ "
- ▶ Flask Size: 20" x 24"
- ▶ Overall Size: 23 $\frac{1}{8}$ " x 27 $\frac{1}{8}$ "

Hunter 32

- ▶ Thickness: 1"
- ▶ Flask Size: 30" x 32"
- ▶ Overall Size: 34 $\frac{1}{8}$ " x 36 $\frac{1}{8}$ "



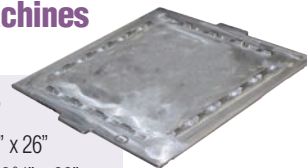
Plates for Beardsley & Piper Machines

B&P 2016

- ▶ Thickness: $\frac{1}{2}$ ", $\frac{5}{8}$ ", $\frac{3}{4}$ "
- ▶ Flask Size: 16" x 20"
- ▶ Overall Size: 18 $\frac{1}{2}$ " x 22 $\frac{3}{8}$ "

B&P 2620

- ▶ Thickness: $\frac{3}{4}$ "
- ▶ Flask Size: 20" x 26"
- ▶ Overall Size: 22 $\frac{3}{4}$ " x 30"



Plates for Roberts Sinto Machines

FBM-I

- ▶ Thickness: $\frac{1}{2}$ " or $\frac{5}{8}$ "
- ▶ Flask Size: 14" x 19"
- ▶ Overall Size: 17" x 22"

FBN-2S

- ▶ Thickness: $\frac{5}{8}$ "
- ▶ Flask Size: 20" x 24"
- ▶ Overall Size: 23 $\frac{1}{4}$ " x 27 $\frac{1}{4}$ "

FBM-2T

- ▶ Thickness: $\frac{3}{4}$ "
- ▶ Flask Size: 20" x 24"
- ▶ Overall Size: 23 $\frac{1}{4}$ " x 27 $\frac{1}{4}$ "

FBO-III

- ▶ Thickness: $\frac{5}{8}$ " or $\frac{3}{4}$ "
- ▶ Flask Size: 20" x 24"
- ▶ Overall Size: 23" x 26"

FBO-II

- ▶ Thickness: $\frac{1}{2}$ " or $\frac{5}{8}$ "
- ▶ Flask Size: 14" x 19" or 16" x 20"
- ▶ Overall Size: 17 $\frac{3}{4}$ " x 27 $\frac{1}{2}$ " or 19 $\frac{1}{16}$ " x 27 $\frac{1}{2}$ "

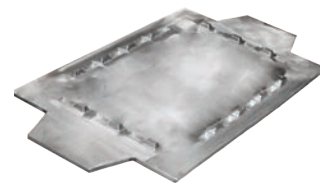
Other

- ▶ Thickness: $\frac{3}{4}$ "
- ▶ Flask Size: 20" x 24"
- ▶ Overall Size: 24 $\frac{5}{8}$ " x 26"

CAST ALUMINUM CHAINLOCK PLATES FOR NON-AUTOMATIC MACHINES

Designed to fit most jolt and jolt squeeze machines, these plates are cast in permanent molds to ensure flatness, uniform thickness, and durability. Other thicknesses and sizes are available on request. *Please see our website, www.FreemanSupply.com, or contact our Customer Service department at (800) 321-8511 for complete details and part numbers.*

- ▶ Thickness: $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ ", or $\frac{3}{4}$ "
- ▶ Flask Width: 12" to 20"
- ▶ Flask Length: 12" to 20"
- ▶ Overall Width: 14" to 22"
- ▶ Overall Length: 19" to 27"



MATCH-LOK MAGNESIUM (DOWMETAL) PLATES

These highly accurate Freeman Palmer Match-Lok Pattern Plates feature urethane mold locks for use on Hunter automatic molding machines. *Please see our website, www.FreemanSupply.com, or contact our Customer Service department at (800) 321-8511 for complete details and part numbers.*

Hunter 10

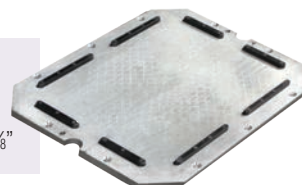
- ▶ Thickness: $\frac{1}{2}$ "
- ▶ Flask Size: 14" x 19"
- ▶ Overall Size: 16 $\frac{1}{2}$ " x 22" or 17 $\frac{1}{2}$ " x 26"

Hunter 20

- ▶ Thickness: $\frac{5}{8}$ " or $\frac{3}{4}$ "
- ▶ Flask Size: 20" x 24"
- ▶ Overall Size: 23 $\frac{1}{8}$ " x 27 $\frac{1}{8}$ "

Hunter 32

- ▶ Thickness: 1"
- ▶ Flask Size: 30" x 32"
- ▶ Overall Size: 34 $\frac{1}{8}$ " x 36 $\frac{1}{8}$ "



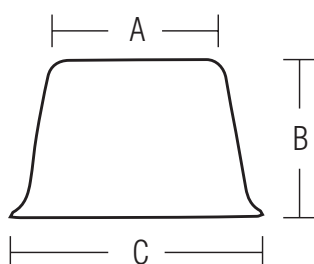
Guaranteed flatness ± 0.005 " in any one foot, guaranteed thickness tolerance of 0.0010" in any one plate.

FOUNDRY SPECIALTY TOOLS & SUPPLIES

Flex-Gate Flexible Gating



Flex-Gate is a strong flexible plastic that can be used in place of wood gating on pattern plates. Flex-Gate can be easily cut with a knife and fastened to the plate with nails, screws, or glue. Its concave base holds it securely on the pattern plate. Because of its strength, Flex-Gate does not break or tear, allowing the runner to be removed and reused.



Dimensions	#8 (SKU #176003)	#16 (SKU #176004)	#20 (SKU #176005)
A	1/2"	5/8"	1"
B	1/2"	3/4"	3/4"
C	5/8"	1/2"	1 1/4"
Length	36"	36"	36"

Slicks and Trowels

These slicks and trowels are hand-constructed from quality steel and designed for hand custom molding operations. They are available in a variety of sizes and shapes. *Please see our website, www.FreemanSupply.com, or contact our Customer Service department at (800) 321-8511 for complete details and part numbers.*



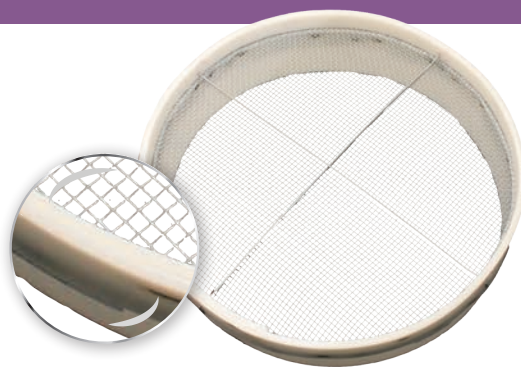
Mouth Spray Can

These cans made of heavy brass are used to spray liquid partings, light washes or similar materials. Any air nozzle can be used. Available in Pint sizes (SKU #176880) or Quart sizes (SKU #176885).



Paste Bulb

This durable 14 oz. container is used to dispense glue in core bonding applications. (SKU #176860)



Hand Riddles

Freeman Hand Riddles are used for the fine sifting of foundry sand onto the mold surface. This ensures uniform coverage to prevent casting defects. These riddles are made from galvanized wire screen and heavy gauge plastic rims for long life. Each riddle is 18" in diameter.

SKU	Mesh	Wire Diameter	Size Opening
176849	#1	0.080	0.920
176820	#4	0.035	0.215
176838	#5	0.035	0.165
176839	#6	0.035	0.132
176830	#8	0.028	0.097
176831	#10	0.017	0.083
176832	#12	0.018	0.066
176833	#14	0.020	0.051
176834	#16	0.018	0.045

Lance Pyrometer

The Lance Pyrometer is designed to accurately measure the temperatures of non-ferrous molten metals to within 2%. It features an easily replaceable meter, 36" long immersion thermocouple, 8" Protected Marshall Tip and Fahrenheit-Centigrade analog meter read-out. The temperature range for this pyrometer is 0°F to 2,350°F.

SKU	Description	Mfg. No
176721	Lance Pyrometer	MT 400
176723	Replacement Thermocouple w/Tip	for MT 400

Bench Rammer

This 14" long Bench Rammer is made of hard maple with an oil finish and designed with one wedge shaped end and one 3 1/2" -diameter cylindrical end. (SKU #176754)



Abrasive Core Files

Easily clean foundry cores with these 20 grit flat files made of a strong, fiberglass-reinforced, silicon carbide abrasive resin bond material. Available in thicknesses from 1/8" to 1/2", widths of 1" or 2", and lengths from 8" to 12".

Please see our website, www.FreemanSupply.com, for complete details and part numbers.



FOUNDRY SPECIALTY TOOLS & SUPPLIES CONTINUED



Leather Fillet & Accessories

This fillet is manufactured using the highest grade of leather, allowing for greater flexibility, faster fabrication and increased wear resistance. Larger diameters contain multiple slits on the underside to allow for easy installation. White or Gold Wood Glue may be used with this product. Sold in full bundles.

SEE ALSO

Product	Page #
Fastweld 10	78

SKU	Fillet No.	Radius	Feet/Bundle
023105	1/2	1/32"	100
023110	1	1/16"	100
023115	1 1/2	3/32"	100
023120	2	1/8"	100
023125	2 1/2	1/32"	100
023130	3	3/16"	100
023135	4	1/4"	100
023140	5	5/16"	100
023145	6	3/8"	100
023150	7	7/16"	100
023155	8	1/2"	100
023160	10	5/8"	100
023165	12	3/4"	100
023170	14	7/8"	50
023175	16	1"	50

Cleveland Vibrators

Linear shock action vibration makes the SA-EP the most powerful continuous-duty vibrator available for its size. It is ideal for use on matchplates in jolt-squeeze operations. It also features low air consumption and variable frequency.



SKU	Description	Piston Diameter	Vibrations/min. @ 60 psi
176900	SA-EP Vibrator	1/2"	16,000
176901	SA-EP Vibrator	5/8"	14,100
176902	SA-EP Vibrator	3/4"	12,700
176903	SA-EP Vibrator	1"	11,000
176904	SA-EP Vibrator	1 1/4"	7,600
176899	SA-EP 3/4" Spring Only	—	—
176906	SA-EP 3/8" Swivel Only	—	—

Dux-Bak Non-Silica Dry Parting and Parting Bags

This 6" x 10" Parting Bag is made of a special cloth for dusting Dux-Bak Non-Silica Dry Parting powder onto a pattern. Dux-Bak Non-Silica Dry Parting is available in quantities of 1 lb. through a 500 lb. drum.

SKU	Description	Size
054400	Non-Silica Dry Parting	Pound
176870	Parting Bag	Each

Freeman Malleable-Iron Rapping Plates

Freeman Rapping Plates are cast malleable inserts that enable a foundryman to easily remove wooden patterns or loose pieces from the molding sand. Designed to be installed flush on the parting line, each plate has a threaded hole for inserting an eye bolt or a draw rod.



SKU	Size	Width	Length	Round Style
026005	1	5/8"	1 1/2"	Size Diameter Thickness
026010	5	3/4"	1 5/8"	026074 1 1 1/4" 3/8"
026015	6	3/4"	2 1/4"	026076 2 1 3/4" 1/2"
026020	8	7/8"	2 1/4"	026078 3 2 3/8" 9/16"
026025	9	1"	3"	026080 4 3" 5/8"
026030	10	1"	3 1/2"	
026035	11	2 1/4"	2 1/4"	
026040	12	1 1/4"	3 3/4"	
026045	14	1 1/4"	4 1/2"	
026050	16	2 3/4"	2 3/4"	
026055	17	3"	5 1/2"	

Disamatic Urethane Wipers & Brass Keepers

These replacement urethane wipers and brass keepers are pre-drilled for the Mark IV Disamatic.

SKU	Description
177211	Disa Urethane Wiper Blade
177212	Brass Keeper



Sprayon Blue Layout Fluid

This is a fast-drying, non-flaking, non-etching layout fluid that will not crack or peel. Its smooth, non-glare finish allows for clear, precise scribe lines. Offered in 12 oz. cans (SKU #038082).



DIEBOARDS & PLYWOOD

In addition to supplying the highest quality pattern grade lumbars for over 100 years, Freeman offers flat and rotary dieboards, a variety of high-grade, economical plywoods, and specialty sheet materials that are used in a wide range of applications.

100-101

Flat Dieboards

101

Rotary Dieboards

102-104

Plywood

104

Other Sheet Materials

FLAT DIEBOARDS

Freeman offers a variety of flat dieboards such as Birch, Ash, Maple, MDF and other specialty boards. Please visit our website, www.FreemanSupply.com, for full details, dimensions, and part numbers.

Premium Birch Dieboard



- ▶ Thicknesses: from 1/4" to 1"
- ▶ Widths: from 11 3/4" to 72"
- ▶ Lengths: from 42" to 96"
- ▶ Available in Regular & Long Grain

This Birch is imported from the finest mills to offer a true dieboard grade of laser-quality birch. From cutting dies to stripping and blanking tools, this board is ready for a variety of applications at a great value.

UV Coated Birch Dieboard



- ▶ Thicknesses: from 5/16" to 1"
- ▶ Widths: from 30" to 60"
- ▶ Lengths: from 48" to 96"
- ▶ Available in Regular & Long Grain

Freeman's lab-tested UV Stabilized Birch provides a very flat and stable cutting die. The completely sealed smooth hard surface is great for strippers and blankers as well.



White Seal Birch Dieboard



- ▶ Thicknesses: from 5/8" to 1 1/2"
- ▶ Width: 48"
- ▶ Lengths: 60" or 72"

This stabilized board offers diemakers a unique look and 5 coats of finish for the ultimate in stability. The surface not only completely seals the board, but enhances the dimensional marks and etching from the laser when knifing.

Ultraflat Maple™ Dieboard



- ▶ Thicknesses: from 1/4" to 1"
- ▶ Widths: from 27" to 48"
- ▶ Lengths: from 39" to 72"
- ▶ Available with No Coating or UV Coating

The industry's flattest Maple Dieboard is guaranteed flat to IADD specifications and certified stamped flat. This board was developed in response to diemakers' and converters' requests for a flatter maple dieboard.



Our CITO Steel Rule (page 109) can be applied to a die board with a rawhide mallet. (page 110)

FLAT DIEBOARDS CONTINUED

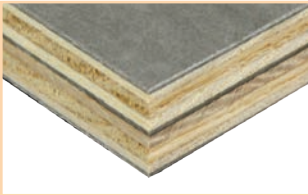
Ash Dieboard



- ▶ Thickness: 5/8"
- ▶ Widths: from 27" to 36"
- ▶ Lengths: from 39" to 48"

This Hard White Ash Dieboard features the ultimate in strength and value. This dieboard now offers diemakers and converters a tougher, flatter, American made alternative to traditional maple and imported birch.

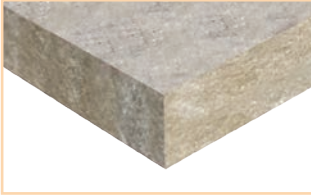
3G Composite Diebase



- ▶ Thickness: 5/8"
- ▶ Width: 48"
- ▶ Lengths: 60" or 72"

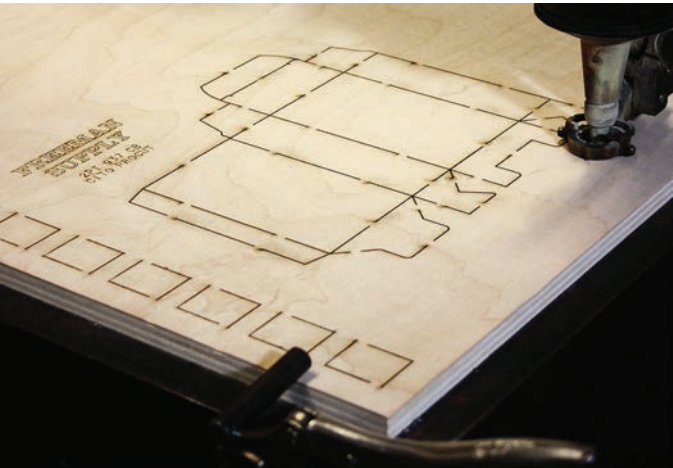
This board consists of three gray laminates alternating with Ash and Maple Veneers. It was developed to offer diemakers an exceptionally strong, dimensionally stable diebase for use in high-end tooling. The three levels of laminate allow this board to laser-cut much better than comparable wood/composite dieboards.

MDF Dieboard



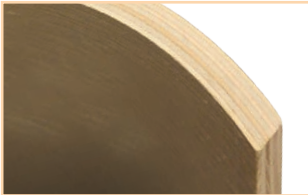
- ▶ Thicknesses: 8 mm, 5/8", or 3/4"
- ▶ Widths: from 30" to 49"
- ▶ Lengths: from 48" to 97"
- ▶ Available in Maple

Our most economical dieboard for short-run throw away tooling, this MDF material laser-cuts well and lays flat.



ROTARY DIEBOARDS

RynoPly™ Rotary Dieboard



- ▶ Thicknesses: 1/2" or 5/8"
- ▶ Widths: from 7" to 27 1/4"
- ▶ Lengths: from 41" to 120"

RynoPly Ash Rotary was developed to offer diemakers and converters a tougher rotary dieboard. Constructed with 7 plies of Northern-grown Hard White Ash veneer, it is built to handle even the most demanding rotary applications. The superior shock resistance qualities of Ash compared to other hardwoods make this a long-lasting dieboard.

SEE ALSO

Product	Page #
Dieboard Adhesives	83
Dieboard Hardware & Equipment	109

PATTERN PLYWOOD



Freeman Pattern Plywoods are manufactured from 1½" to 2" in thickness for use in making large core box bottom boards and sides, large cope & drag plates, or general heavy duty applications. Available in solid pine or maple-faced pine, these plywoods feature "almost void free" construction throughout.



Our Pattern Plywood is stocked in multiple warehouse locations across the country.

Freeman Maple-Faced Pattern Plywood

Smooth maple facing on both faces with a solid pine interior combines quality with economy in a thick plywood panel.

SKU	Nominal Thickness	Width	Length	Grade	No. Plys
075373	1½"	48"	96"	D3	11
075374	1¼"	48"	96"	D3	11
075375	1½"	48"	96"	D3	13
075376	1¾"	48"	96"	D3	15



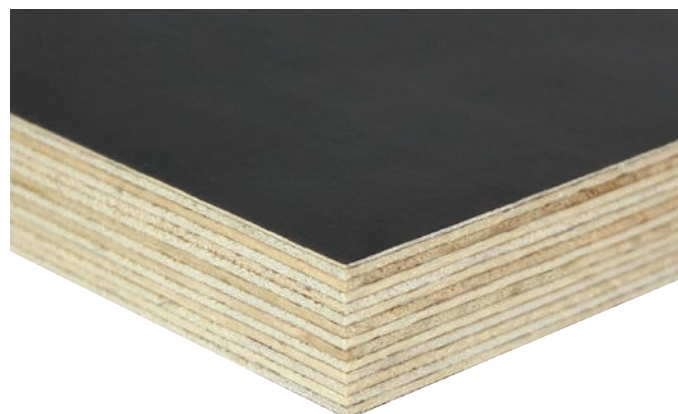
Freeman Pine Pattern Plywood

Solid Pine construction combines a smooth surface with durability for a thick plywood panel.

SKU	Nominal Thickness	Width	Length	Grade	No. Plys
075364	1¼"	48"	96"	AB	9
075365	1½"	48"	96"	AB	11
075366	1¾"	48"	96"	AB	13
075367	2"	48"	96"	AB	13



SPECIALTY PLYWOOD



Euroform Plywood

Euroform is made with the same high quality construction as Eurobirch with the addition of thermally fused phenolic facings for durability and moisture resistance. It is excellent for pattern plates or core box construction.

SKU	Nominal Thickness	Width	Length	No. Plys
075392	¾"	48"	96"	14
075393	1"	48"	96"	18

Eurobirch Plywood

Eurobirch is the highest quality plywood in our line. It is suitable for pattern plates, core box construction, or any heavy duty application. All sizes are equivalent to A-B grade.

SKU	Nominal Thickness	Width	Length	No. Plys
075382	19MM	48"	96"	14
075383	25MM	48"	96"	18

Russian Birch Plywood

Russian Birch plywood is constructed with thin veneers of solid Birch and is assembled using phenolic adhesive which provides a waterproof bond line. This material is an economical alternative to Eurobirch.

SKU	Nominal Thickness	Width	Length	No. Plys
075389	18 mm	48"	96"	17
075385	30 mm	48"	48"	21

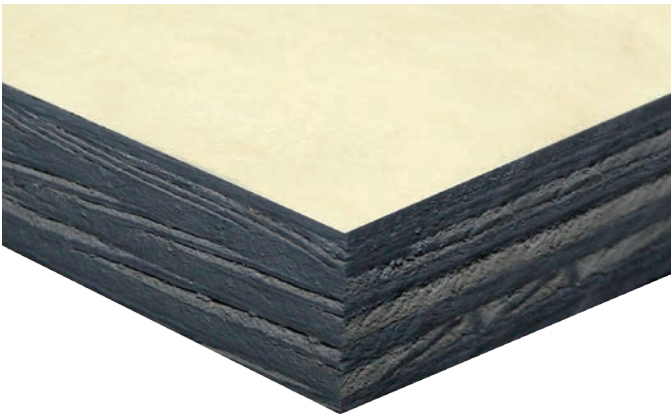
STANDARD PLYWOOD



MDO (Medium Density Overlay) Fir Plywood

MDO Plywood is produced with a resin-treated fiber overlay on both sides that is generally smooth and opaque. This allows for rapid, even paint and coating applications. MDO Plywood is manufactured with 100% waterproof adhesives and has an inner ply construction of C grade veneers and B grade or better face and back veneers.

SKU	Nominal Thickness	Width	Length	Grade	No. Plys	Pc/unit*
075341	¾"	48"	96"	AB	7	30
075342	1"	48"	96"	AB	9	32
075347	1½"	48"	96"	AB	9	26



HDO (High Density Overlay) Fir Plywood

HDO Plywood is manufactured with a thermosetting resin-impregnated fiber surface bonded to both outer plys under heat and pressure. It provides a smooth, uniform surface which is resistant to abrasion, moisture penetration and deterioration from many common chemicals and solvents. HDO Plywood is bonded with 100% waterproof glue with face veneers grade B or better with a semi-opaque thermosetting resin-impregnated surface.

SKU	Nominal Thickness	Width	Length	Grade	No. Plys	Pc/unit*
075343	¾"	48"	96"	AB	7	44
075344	1"	48"	96"	AB	9	30



Fir Plywood

Suitable for general construction requirements, this plywood is manufactured of solid fir laminations.

SKU	Nominal Thickness	Width	Length	Grade	No. Plys	Pc/unit*
075331	¾"	48"	96"	AC	7	44
075332	1"	48"	96"	AC	7	33

Pine Plywood

This general-purpose construction-grade plywood is constructed of pine laminations glued with exterior adhesive. This product will have larger internal voids and surface defects.

SKU	Nominal Thickness	Width	Length	Grade	No. Plys	Pc/unit*
075351	¾"	48"	96"	CDX	5	48

Birch-Faced Plywood

Freeman offers an extensive selection of smooth surface birch-faced plywoods for a variety of woodworking applications. Thicknesses are available from ½" to 1" and all contain a veneer core.

SKU	Nominal Thickness	Width	Length	Grade	No. Plys	Pc./unit*
075326	¾"	48"	96"	A2	7	40
075324	½"	48"	96"	C3	5	66
075333	⅝"	48"	96"	C3	7	60
075321	¾"	48"	96"	C3	7	50
075322	1"	48"	96"	C3	9	35
075325	¾"	48"	96"	D3 (shop)	7	50
075372	1"	48"	96"	D3 (shop)	9	35
075386	25 mm	60"	60"	BB/CP	26	16

* Pc./unit listed for shipping reference only. Sheets are sold individually.

PLYWOOD GRADING



Splits and Wood Repairs



Knots or Burls



Mineral Streaks



Wood Patches

Hardwood

Hardwood plywood uses two characters to designate the panel grade. The face is normally graded using a letter and the back is normally graded using a number.

Face Grades

A. Smooth and free of large knots. Small pin knots, burls, or slight mineral streaks permitted. Best grade for a plywood face.

B. Similar to "A" face with sound knots or repaired knots permitted. Slightly rougher grain and mineral streaks typical.

C. Sound, repaired, or pin knots and small burls permitted. Mineral streaks readily evident.

D. Similar to "C" grade but more repaired knots, sound knots, and rough cut veneer permitted.

Back Grades

1. Sound, tight knots up to $\frac{3}{8}$ " in diameter. Rough grain and small splits permitted.

2. Sound, tight knots up to $\frac{3}{4}$ " in diameter. Repaired knots, rough cut veneer, and mineral streaks common.

3. $\frac{1}{2}$ " to $1\frac{1}{2}$ " diameter knots allowed on the face. Repaired knots, unlimited small defects, and streaks permitted.

Softwood

Softwood plywood uses two letter characters to designate the grade of the panel. The face and back are both normally graded using a letter.

A. This veneer is smooth and free of pitch pockets, knots, and open splits. Repaired splits or wood patches may be permitted.

B. This grade is smooth and free from open defects, but sound knots up to 1" in diameter are evident. Wood repairs or repaired knots or splits are common in the veneer.

C. Unlimited tight knots up to $1\frac{1}{2}$ " in diameter are characteristic to the grade. Open knots, splits, wood patches, and repairs are permitted.

D. This grade has no limit to the number of defects or repairs. Knotholes are permissible to $2\frac{1}{2}$ " in diameter and open splits are common.

GENERAL SHEET MATERIALS

Aluminum Sheet

This sheet is ideal for layouts, templates and build-ups. Sold by the sheet and shipped flat in 24" x 72" sheets.

SKU	Thickness	Width	Length
027540	0.032"	72"	24"
027545	0.050"	72"	24"
027550	0.063"	72"	24"
027555	0.090"	72"	24"
027560	0.125"	72"	24"
027565	0.190"	72"	24"
027570	0.250"	72"	24"

Masonite Sheets

Fully tempered Masonite Sheets are hard, smooth, and most commonly used for pattern layout.

SKU	Nominal Thickness	Width	Length
075309	$\frac{1}{8}$ "	48"	96"
075319	$\frac{1}{4}$ "	48"	96"

Acetate Sheet

This clear economy cellulose acetate sheet can be used for template and layout work. Packaged flat in 20" x 50" sheets.

SKU	Thickness	Width	Length
027520	.020"	20"	50"
027525	.030"	20"	50"
027530	.040"	20"	50"
027535	.060"	20"	50"

Armorboard

Armorboard is an exterior plywood panel with $\frac{3}{8}$ " standard hardboard on both faces.

SKU	Nominal Thickness	Width	Length
075370	$\frac{3}{4}$ "	48"	96"

Particle Board

Ideally suited for mold-box and master pattern bottom board construction, this is a smooth-finish particle board.

SKU	Nominal Thickness	Width	Length
075304	$\frac{1}{2}$ "	48"	96"
075101	$\frac{3}{4}$ "	48"	96"

Melaboard

Melaboard is a white particle board panel with 130 gram melamine film thermally fused to both faces.

SKU	Nominal Thickness	Width	Length
075350	$\frac{3}{4}$ "	49"	97"



HARDWARE & EQUIPMENT

Freeman's extensive selection of hardware for the tooling industry includes pattern letters, embossing tapes, abrasives, fasteners, specialty equipment, assorted bits & cutters, and more.

106-107



Freeman Pattern Letters

109-110



Dieboard Hardware

111-115



Abrasives & Fasteners

116-118



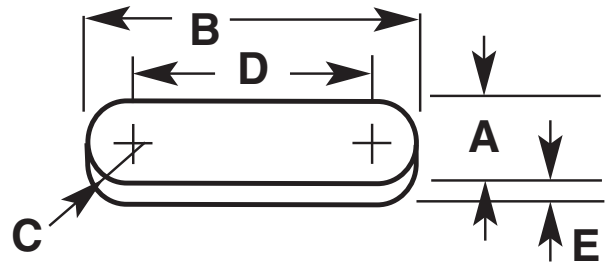
Equipment & Other Accessories

FREEMAN PATTERN LETTERS

FREEMAN LOK-IN LETTERS



These letters and holder are made with a high-quality investment cast steel and a dovetail design to secure the characters firmly in place while permitting their easy removal and replacement. The letters are available in a variety of sizes, in letters A-Z, numbers 0-9, a blank, and a dash symbol. Freeman also offers end plates and replacement screws. Please see our website, www.FreemanSupply.com, for complete details and part numbers.



Lok-In Letter Holder

The holder is available in multiple letter widths and dimensions. The end plates (including screws) and replacement screws are also available.

Holder Size	A	C	E	3 Letter		4 Letter		5 Letter		6 Letter		7 Letter		8 Letter		9 Letter	
				B	D	B	D	B	D	B	D	B	D	B	D	B	D
1/4"	1/2"	1/4"	3/16"	1 1/16"	1 3/16"	1 31/32"	1 19/32"	2 1/4"	1 3/4"	2 17/32"	2 1/32"	2 13/16"	2 3/16"	3 3/32"	2 19/32"	3 19/32"	2 29/32"
3/8"	3/4"	3/8"	3/16"	2 11/32"	1 19/32"	2 13/16"	2 1/16"	3 1/4"	2 1/2"	3 11/16"	2 15/16"	4 3/16"	3 7/16"	4 19/32"	3 27/32"	5 11/32"	4 9/32"
1/2"	15/16"	15/32"	3/16"	3 1/16"	2 1/8"	3 21/32"	2 23/32"	4 9/32"	3 11/32"	4 31/32"	4 1/32"	5 9/16"	4 5/8"	6 7/32"	5 9/32"	6 7/8"	5 15/16"
3/4"	1 1/8"	9/16"	3/16"	3 19/32"	2 15/32"	4 11/32"	3 3/32"	5 1/8"	4"	5 27/32"	4 23/32"	6 23/32"	5 19/32"	7 3/8"	6 1/4"	8 1/8"	7"

Letter Dimensions

Freeman offers both letters and numbers in the Lok-In style. Available in 1/4", 3/8", 1/2", 3/4" and 1" recessed. The line also includes a blank and dash.

SHARP-FACE GOTHIC PATTERN LETTERS

See the measuring guide on page 107 for ordering instructions.

White Metal

- ▶ Heights from 1/8" to 3"
- ▶ Widths from 0.162" to 2.750"
- ▶ Thicknesses from 1/16" to 3/8"



Aluminum with Sprigs

- ▶ Heights from 1/8" to 1"
- ▶ Widths from .175" to .825"
- ▶ Thicknesses from .0313" to .1719"



Aluminum

- ▶ Heights from 3/16" to 2"
- ▶ Widths from .225" to 1.6375"
- ▶ Thicknesses from .0469" to .25"



Brass

- ▶ Heights from 3/16" to 2"
- ▶ Widths from .200" to 1.850"
- ▶ Thicknesses from 1/16" to 1/4"



Reverse - White Metal

- ▶ Heights from 3/16" to 2"
- ▶ Widths from .200" to 1.850"
- ▶ Thicknesses from 1/16" to 1/4"



Reverse - Brass

- ▶ Heights from 1/4" to 1"
- ▶ Widths from 0.262" to 0.950"
- ▶ Thicknesses from 1/16" to 5/32"



Rubber

- ▶ Heights from .220" to 0.725"
- ▶ Widths from .625" to 0.730"
- ▶ Thickness of 0.180"



Plastic

- ▶ Heights from 1/4" to 1 1/8"
- ▶ Injection-molded plastic
- ▶ Thicknesses from .045" to .120"



OTHER PATTERN LETTERS

Flat-Face Gothic - White Metal

- ▶ Heights from $\frac{3}{16}$ " to $2\frac{1}{2}$ "
- ▶ Widths from .200" to 2.350"
- ▶ Thicknesses from $\frac{1}{32}$ " to $\frac{3}{16}$ "



Round-Face Gothic - White Metal

- ▶ Heights from $\frac{3}{8}$ " to $1\frac{1}{2}$ "
- ▶ Widths from 0.400" to 1.425"
- ▶ Thicknesses from $\frac{3}{32}$ " to $\frac{3}{16}$ "



Heavy Hairline - White Metal

- ▶ Heights from $\frac{1}{8}$ " to 1"
- ▶ Widths from .143" to 0.875"
- ▶ Thicknesses from $\frac{1}{32}$ " to $\frac{1}{8}$ "



Light Hairline - White Metal

- ▶ Heights from $\frac{1}{8}$ " to $\frac{3}{4}$ "
- ▶ Widths from 0.125" to 0.625"
- ▶ Thicknesses from $\frac{1}{32}$ " to $\frac{1}{16}$ "



Heavy Hairline - Brass

- ▶ Heights from $\frac{1}{8}$ " to $\frac{1}{2}$ "
- ▶ Widths from .143" to 0.462"
- ▶ Thicknesses from $\frac{1}{16}$ " to $\frac{1}{32}$ "



Deep Block - White Metal

- ▶ Heights from $\frac{1}{4}$ " to 2"
- ▶ Widths from 0.375" to 1.825"
- ▶ Thicknesses from $\frac{1}{8}$ " to $\frac{1}{4}$ "



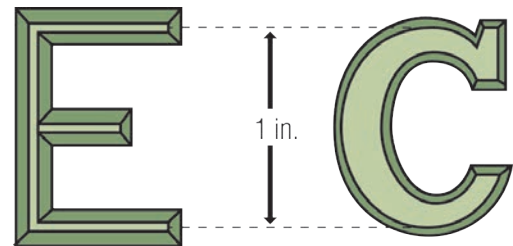
Tablet - White Metal

- ▶ Heights from $\frac{1}{4}$ " to 3"
- ▶ Widths from 0.350" to 2.400"
- ▶ Thicknesses from $\frac{3}{32}$ " to $\frac{1}{8}$ "



ORDERING INSTRUCTIONS

Traditionally, specific letter heights are measured from the top of the face to the bottom of the face (C). Other letters are measured from the center of the top of the face to the center of the bottom of the face (E). Each letter style is coded with "C" or "E" to show which method of measurement applies.



Sharp-Face Gothic (E)

Height	$\frac{1}{8}$ "	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{3}{8}$ "	$\frac{7}{16}$ "	$\frac{1}{2}$ "	$\frac{9}{16}$ "	$\frac{5}{8}$ "	$\frac{3}{4}$ "	$\frac{7}{8}$ "	1"	$1\frac{1}{4}$ "	$1\frac{1}{2}$ "	$1\frac{3}{4}$ "	2"	$2\frac{1}{4}$ "	$2\frac{1}{2}$ "	3"
Thickness	$\frac{1}{16}$ "	$\frac{1}{16}$ "	$\frac{1}{16}$ "	$\frac{1}{16}$ "	$\frac{1}{16}$ "	$\frac{3}{32}$ "	$\frac{3}{32}$ "	$\frac{1}{8}$ "	$\frac{1}{8}$ "	$\frac{1}{8}$ "	$\frac{5}{32}$ "	$\frac{5}{32}$ "	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{1}{4}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{5}{16}$ "	$\frac{3}{8}$ "
Width	0.162"	0.2"	0.262"	0.325"	0.375"	0.5"	0.555"	0.562"	0.7"	0.725"	0.85"	0.95"	1.15"	1.4"	1.6"	1.85"	2.1"	2.3"	2.75"

Flat-Face Gothic (E)

Height	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$\frac{3}{4}$ "	$\frac{7}{8}$ "	1"	$1\frac{1}{4}$ "	$1\frac{1}{2}$ "	2"	$2\frac{1}{2}$ "
Thickness	$\frac{1}{32}$ "	$\frac{1}{16}$ "	$\frac{1}{16}$ "	$\frac{1}{16}$ "	$\frac{1}{16}$ "	$\frac{5}{64}$ "	$\frac{3}{32}$ "	$\frac{3}{32}$ "	$\frac{1}{8}$ "	$\frac{9}{64}$ "	$\frac{5}{32}$ "	$\frac{3}{16}$ "	$\frac{3}{16}$ "
Width	0.2"	0.331"	0.4"	0.45"	0.575"	0.675"	0.775"	0.9"	1.0"	1.2"	1.45"	1.9"	2.35"

Round-Face Gothic (E)

Height	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$\frac{3}{4}$ "	1"	$1\frac{1}{4}$ "	$1\frac{1}{2}$ "
Thickness	$\frac{3}{32}$ "	$\frac{3}{32}$ "	$\frac{1}{8}$ "	$\frac{1}{8}$ "	$\frac{3}{16}$ "	$\frac{3}{16}$ "	$\frac{3}{16}$ "
Width	0.4"	0.537"	0.637"	0.725"	0.95"	1.175"	1.425"

Heavy Hairline (E)

Height	$\frac{1}{8}$ "	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$\frac{3}{4}$ "	1"
Thickness	$\frac{1}{32}$ "	$\frac{1}{32}$ "	$\frac{1}{32}$ "	$\frac{1}{16}$ "	$\frac{1}{16}$ "	$\frac{1}{16}$ "	$\frac{1}{16}$ "	$\frac{1}{16}$ "	$\frac{1}{8}$ "
Width	0.143"	0.2"	0.25"	0.3"	0.35"	0.462"	0.537"	0.637"	0.875"

Light Hairline (E)

Height	$\frac{1}{8}$ "	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{3}{4}$ "
Thickness	$\frac{1}{32}$ "	$\frac{1}{32}$ "	$\frac{1}{32}$ "	$\frac{1}{32}$ "	$\frac{1}{32}$ "	$\frac{1}{16}$ "	$\frac{1}{16}$ "
Width	0.125"	0.175"	0.231"	0.275"	0.318"	0.437"	0.625"

Deep Block (E)

Height	$\frac{1}{4}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$\frac{3}{4}$ "	$\frac{7}{8}$ "	1"	$1\frac{1}{4}$ "	$1\frac{1}{2}$ "	2"
Thickness	$\frac{1}{8}$ "	$\frac{1}{8}$ "	$\frac{1}{8}$ "	$\frac{1}{8}$ "	$\frac{1}{8}$ "	$\frac{3}{16}$ "	$\frac{3}{16}$ "	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{1}{4}$ "
Width	0.375"	0.475"	0.575"	0.662"	0.762"	0.862"	0.95"	1.175"	1.35"	1.825"

Tablet (C)

Height	$\frac{1}{4}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$\frac{3}{4}$ "	1"	$1\frac{1}{4}$ "	$1\frac{1}{2}$ "	2"	3"
Thickness	$\frac{3}{32}$ "	$\frac{3}{32}$ "	$\frac{3}{32}$ "	$\frac{3}{32}$ "	$\frac{3}{32}$ "	$\frac{3}{32}$ "	$\frac{1}{8}$ "	$\frac{1}{8}$ "	$\frac{1}{8}$ "	$\frac{1}{8}$ "
Width	0.35"	0.425"	0.525"	0.625"	0.7"	0.9"	1.062"	1.25"	1.7"	2.4"

TAPES AND EMBOSSERS



*Tapes not to scale.

Embossing Tapes

We offer Zinc, Brass, Aluminum, and Steel Embossing Tapes for use with Roovers or any other embossing presses. Please note that Brass and Steel Tapes must be purchased in box quantities and have extended lead times. All other tapes are sold individually.



SKU	Material	Letter Size	Thickness	Roll Width	Roll Length	Rolls/Box
035070	Aluminum	1/4"	.012"	1/2"	120'	10
035075	Aluminum	1/4"	.015"	1/2"	85'	10
035090	Aluminum	5/16"	.018"	3/4"	80'	7
035100	Aluminum	3/8"	.018"	7/8"	80'	6
035110	Aluminum	3/4"	.022"	1 1/4"	65'	4
035120	Aluminum	3/4"	.022"	1 1/2"	65'	4
035015	Zinc	1/4"	.015"	1/2"	120'	10
035025	Zinc	5/16"	.018"	3/4"	80'	7
035030	Zinc	3/8"	.020"	7/8"	105'	6
035035	Zinc	1/2"	.022"	1 1/8"	95'	5
035045	Zinc	3/4"	.022"	1 1/2"	65'	4
035124	Brass	1/4"	.015"	1/2"	85'	10
035125	Brass	3/8"	.020"	7/8"	125'	6
035076	Cold Roll Steel	1/4"	.015"	1/2"	85'	10
035078	Cold Roll Steel	3/8"	.015"	7/8"	85'	6



Roovers Embossing Press

Primarily used in the pattern and foundry industries for numbering patterns and core boxes. Other applications include numbering bins, parts, machines, storage areas, lockers, etc. Known for their rugged construction and simple operation, these embossing presses are furnished with deep strike type characters. Reverse styles of characters and replacement parts are available.

SKU	Description	Mfg. No.
019370	1/4" Letter Size, 1/2" Wide Tape	T-10A
019372	3/8" Letter Size, 7/8" Wide Tape	T-20

Dymo Tapewriter Replacement Tapes

The Dymo Tapewriter has been discontinued, but replacement tapes are still available with and without adhesive.

SKU	Description	Tape Width
035195	Aluminum Metal Tape without Adhesive	1/2"
035196	Aluminum Metal Tape with Adhesive	1/2"

CUSTOMIZED LOGOS

Special letters, figures, monograms, and logos can be made either from existing patterns or a drawing. Logos are available for order in White Metal and Aluminum with a 100-piece minimum per order.

Please provide the following for a quote:

1. Dimensions (Length x Width x Thickness)
2. To-Scale Drawing of Logo

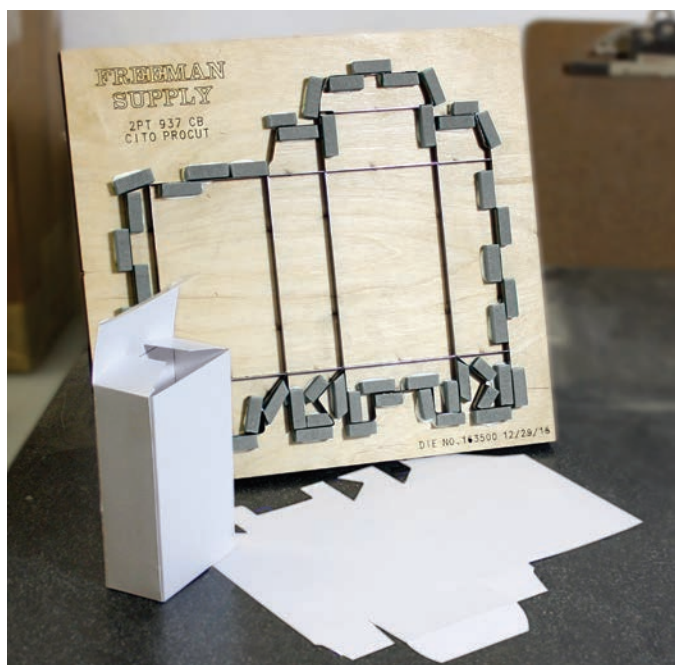
We will respond with a price for the logos and the amount of the one-time set up charge for the mold. A mold will then be created and a sample will be sent for approval.



Email or fax all diagrams to:
Freeman Manufacturing & Supply Co.
Inside Sales Department
(440) 934-7200
contactus@freemansupply.com

DIE MAKING HARDWARE

Since entering the Die Making industry in 2015, Freeman is committed to becoming your one-stop-shop for all die making needs. We offer a broad selection of steel rule, ejection rubber, and other die supplies for diemakers and converters nationwide. Dieboards can be found on page 100 and Die Making Adhesives can be found on page 83. Please see our website, www.FreemanSupply.com, for complete details and part numbers.



HS CITO Steel Rule and Freeman Ejection Rubber are used here on Freeman's UltraFlat Maple Dieboard to create a die for a reverse tuck box.

HS CITO Steel Rule

HS CITO steel rule is manufactured using high-quality Japanese steel combined with an EBNER Austrian heat treat. The result is a premium cutting rule with a hardened edge for long life on-press and outstanding bendability due to the deep decarburization of the body. There is no cracking during the bending process. HS CITO Creasing Rule is differentiated by a variety of characteristics, including the smooth surface of the crease top, no sharp edges, and excellent thickness and height tolerances.



Cutting Rules

- ▶ 2 pt. or 3 pt.
- ▶ 0.918" - 0.937"
- ▶ Shaved or Ground Edge
- ▶ Coils ACW or CCW
- ▶ Boxed Strips
- ▶ 42°, 52°, or Long Center Bevel

Creasing Rules

- ▶ 2 pt. or 3 pt.
- ▶ 0.003" thick
- ▶ Widths of 36" to 60"
- ▶ Coils ACW or CCW

Sword Cut

- ▶ 2 pt.
- ▶ 0.937" thick
- ▶ Ground and Polished Edge
- ▶ Coils ACW

Kerf Bits for Steel Rule Dies

- ▶ From 2 pt. to 6 pt.
- ▶ 1/8" Perimeter Cutters
- ▶ 0.240" Clean Out Bits
- ▶ 5 flute geometry cuts clean
- ▶ Stays cool for long life



These high-performance bits are manufactured from the highest quality sub-micrograin carbide and are designed to last longer and have the lowest deflection of any other bit on the market. An overheated bit causes the edges to round-over and tear the wood fiber, causing poor kerf quality, extra clean-out, and premature bit breakage. The improved 5 flute geometry keeps the bit cool so the edges stay sharp.



Black Maxx Counterplate

- ▶ 1.3 mm – 4 mm
- ▶ 42" x 42" sheet size
- ▶ Tightest thickness tolerances
- ▶ Easy-adhere back side
- ▶ Made in Germany

Black Maxx Counterplate has the tightest thickness tolerance in the industry of ± 0.03 mm, allowing for board-to-board and channel depth consistency. One side of the board has a "structured surface" that allows adhesive to easily bond without affecting the thickness tolerance. When

milled, this mixture of phenolic resin and phenolic paper produces a clean channel for precise creasing. Produced in Germany with the highest quality materials, this counterplate offers the reliability every diemaker needs.

Mylar®

- ▶ 150 ft. or 300 ft. rolls
- ▶ Thicknesses of .003" or .005"
- ▶ Matte on one side for perfect plotting
- ▶ No edge curl
- ▶ Roll widths of 36", 42", 48", or 60"

Freeman Premium Mylar is manufactured with a precise thickness tolerance and unrolls easily with no edge curl or memory. Matted one side, it readily accepts all plotter ink with minimal smudging.



DIEMAKING HARDWARE CONTINUED

Rawhide Mallets

Our Rawhide Mallets are constructed from the finest materials and manufactured in the USA. Freeman's innovative #4 Long Rawhide Safety Mallet offers a 4 $\frac{3}{4}$ " head – compared to the traditional 3 $\frac{1}{2}$ " – providing an additional level of safety and longer life. Our #2 and larger mallets are available with energy-absorbing foam grips for improved ergonomics and comfort.

SKU	Size	Diameter	Length
081028*	#0	1"	2"
081029*	#1	1 $\frac{1}{4}$ "	2 $\frac{1}{2}$ "
080997	#2	1 $\frac{1}{2}$ "	3"
080998	#3	1 $\frac{1}{4}$ "	3 $\frac{1}{8}$ "
080999	#4	2"	3 $\frac{1}{2}$ "
081002	#4 Long Head	2"	4 $\frac{3}{4}$ "
081003	#4 Long Head & Handle	2"	4 $\frac{3}{4}$ "
081000	#5	2 $\frac{3}{4}$ "	4 $\frac{1}{4}$ "
081001	#6	2 $\frac{3}{4}$ "	4 $\frac{3}{4}$ "

*Grips not included

Elastomer Mallets

These heavy-duty mallets are constructed with an advanced elastomer resin for durability and toughness. This innovative #4 Long Elastomer Safety Mallet offers a 5" head – compared to the traditional 3 $\frac{1}{2}$ " – providing an additional level of safety. All of our elastomer mallets are supplied with durable foam grips for improved ergonomics, comfort and grip.

SKU	Size	Diameter	Length
081010	#4	2"	3 $\frac{1}{2}$ "
081012	#4L Long	2"	5"
081014	#5	2 $\frac{3}{4}$ "	4 $\frac{1}{4}$ "
081016	#6	2 $\frac{3}{4}$ "	4 $\frac{3}{4}$ "



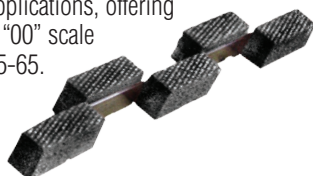
Regular and Safety Mallets

EJECTION RUBBER

Freeman F-65

- ▶ Black
- ▶ Open Cell
- ▶ Medium Density
- ▶ Thicknesses of $\frac{1}{4}$ ", $\frac{3}{8}$ " or $\frac{1}{2}$ "
- ▶ Sheets, Strips, or Blocks

This medium-firm density rubber is used for flat die applications, offering a durometer "00" scale reading of 55-65.



Freeman F-70

- ▶ Pink
- ▶ Open Cell
- ▶ Firm Density
- ▶ Thicknesses of $\frac{1}{4}$ ", $\frac{3}{8}$ " or $\frac{1}{2}$ "
- ▶ Sheets, Strips, or Blocks

Freeman F-70 is a firm density rubber for flat die applications, offering a 65-70 durometer "00" scale reading.

Freeman F-70P

- ▶ Red
- ▶ Premium Open Cell
- ▶ Firm Density
- ▶ Thicknesses of $\frac{1}{4}$ ", $\frac{3}{8}$ " or $\frac{1}{2}$ "
- ▶ Sheets, Strips, or Blocks

F-70P Ejection Rubber is a premium firm density rubber offering a more uniform cell structure and a 65-70 durometer "00" scale reading. It is available with or without PSA.

Freeman F-75

- ▶ Dark Red
- ▶ Open Cell
- ▶ Extra Firm Density
- ▶ Thicknesses of $\frac{1}{4}$ ", $\frac{3}{8}$ " or $\frac{1}{2}$ "
- ▶ Sheets, Strips, or Blocks



This extra-firm density rubber is used for flat die applications, offering a 70-75 durometer "00" scale reading. It is available with or without PSA.

Freeman F-257

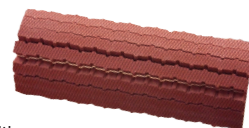
- ▶ Gray
- ▶ Closed Cell
- ▶ Medium Density
- ▶ Thicknesses from $\frac{1}{4}$ " to $\frac{3}{4}$ "
- ▶ Sheets, Strips, or Blocks

This gray, closed cell, medium-density rubber is primarily used on rotary die applications, as well as some flat die applications. It is available with or without PSA.

Freeman Guide Strip™

- ▶ Dark Red
- ▶ Open Cell
- ▶ Extra Firm Density
- ▶ $\frac{3}{8}$ " x $\frac{3}{8}$ " x 18 $\frac{1}{2}$ "
- ▶ Strips with Guide Points

Made with F-75 rubber, these strips are water-jet cut to ensure exact widths. This results in consistent ejection properties across the entire cutting die. The strips are available with or without adhesive.



Freeman Patriot Blue

- ▶ Blue
- ▶ Micro Cell
- ▶ Medium Density
- ▶ Thicknesses of $\frac{1}{4}$ ", $\frac{3}{8}$ " or $\frac{1}{2}$ "
- ▶ Sheets, Strips, or Wave

Freeman Patriot Blue micro-cellular ejection rubber offers diemakers a premium, high-performance, long-life ejection material. It is excellent for flat and rotary applications and is available with or without PSA.

Freeman Gum Rubber

- ▶ Cream
- ▶ Closed Cell
- ▶ Slot Rubber
- ▶ Thicknesses of $\frac{1}{16}$ ", $\frac{3}{32}$ " or $\frac{1}{8}$ "
- ▶ 12" x 36" Sheets

Gum Rubber is a durable slot rubber, or dense ejection rubber with a 35-45 Shore A hardness, and it used in slots or tight areas on a die. Gum Rubber has been a reliable industry standard for many years.

We are constantly expanding our One Stop Shop for Die Making. For dieboards and other accessories, please see page 100 or visit www.FreemanDieSupply.com.

ABRASIVES

Abrasive Types Available

Garnet: A reddish-brown, natural mineral that features a medium hardness and good cutting edges that have a tendency to break or fracture when used, thus creating new cutting edges. Garnet is used primarily for fine finishing of wood.

Aluminum Oxide: A synthetic, gray-brown mineral that is tough and durable. This widely used abrasive is ideal for both woodworking and metalworking.

Silicon Carbide: A very hard, shiny, synthetic, black-colored mineral with a brittle quality permitting it to fracture into sharp, sliver-like wedges as it works. Silicon carbide is used for sanding a wide range of metals, plastics, or glass.

Backing Types Available

Paper: Used mainly with garnet abrasive. Paper sheets are available in weights A, C, and D (A being the lightest).

Cloth: Produces a durable and flexible backing, and is mainly used with aluminum oxide abrasive.

Waterproof Paper: Used mainly with silicon carbide abrasive.

Grit Chart

Grit	Coarseness Level
40-60	Coarse
80-120	Medium
150-180	Fine
220-240	Very Fine
280-320	Extra Fine
360-600	Super Fine



Other weights and grits are available by special order. Please see our website, www.FreemanSupply.com, or contact Customer Service for complete details and part numbers.

ABRASIVE SHEETS (9" X 11")



Garnet Paper Sheets

These 3M™ abrasives are open coat – where the abrasive granules cover 50-70% of the backing and are set at a pre-determined spacing to reduce loading or clogging.

SKU	Weight	Grit	Style #	Sheets
132005	A	80	110N	50
132010	A	100	110N	100
132015	A	120	110N	100
132020	A	150	110N	100
132025	A	180	110N	100
132030	A	220	110N	100
132071	C	100	130N	100
132076	C	120	130N	100
132081	C	150	130N	100
132052*	D	40	—	50
132056	D	50	140N	50
132061	D	60	140N	50
132066	D	80	140N	50

*Not manufactured by 3M™

Aluminum-Oxide Cloth Sheets

These 3M™ abrasive products are made with aluminum oxide uniformly applied to light, J weight cloth sheets. They are primarily used for metalworking but may also be used for woodworking.

SKU	Weight	Grit	Style #	Sheets
132095	J	80	211K	50
132100	J	100	211K	50
132105	J	120	211K	50

Silicon Carbide Wetordry™ Paper Sheets

These sheets are made by coating a waterproof paper backing with silicon carbide. The flexible A weight paper is primarily for wet sanding automotive applications. The sturdy C weight paper is designed for general industrial applications requiring greater backing strength. They are good for metal, wood, glass and tooling boards such as RenShape 5169 and 5179 (page 16).

SKU	Weight	Grit	Style #	Sheets
132150	A	220	413Q	50
132165	A	600	413Q	50
132130	C	80	431Q	50
132135	C	100	431Q	50
132142	C	150	431Q	50
132145	C	180	431Q	50
132155	C	320	431Q	50
132160	C	400	431Q	50

Silicon Carbide Coated Abrasive Mesh

Commonly referred to as “drywall sandpaper” or “sanding screen”, this abrasive is made with a silicon carbide mineral coated on a durable screen cloth mesh with waterproof bond. Ideal for plaster and other substrates that would load conventional abrasives.

SKU	Grit	Style #	Sheets
132170	80	483W	25
132175	100	483W	25

DISC SANDER ABRASIVES



3M™ Aluminum-Oxide PSA Cloth Discs

These 3M discs are the premium in our line, featuring aluminum-oxide abrasive resin-bonded to a durable X weight cloth backing. These discs feature factory-applied adhesive on the backing to enable quick and easy installation to the machine. Primarily used for sanding metal.

SKU	Dia.	Grit	Disc/Pkg.*
131455	12"	40	10
131465	15"	36	10
131460	15"	40	10
131475	16"	36	10
131470	16"	40	10
131468	16"	60	10
131480	18"	40	10

*These discs are sold individually. Unit quantities are listed for pricing and packaging reference only.

SKU	Dia.	Grit	Disc/Pkg.*
131495	20"	36	10
131490	20"	40	10
131488	20"	50	10
131487	20"	60	10
131486	20"	80	10
131515	24"	36	10
131505	24"	40	10
131509	24"	50	10
131510	24"	50	10
131511	24"	60	10
131530	30"	36	10
131525	30"	40	10

*These discs are sold individually. Unit quantities are listed for pricing and packaging reference only.

3M™ Aluminum-Oxide Plain-Back Cloth Discs

This product features aluminum oxide abrasive resin-bonded to a cloth backing for superior life when sanding metal. Freeman Latex or Master Disc Cement must be used to apply these discs to the machine.

SKU	Dia.	Grit	Disc/Pkg.*
131605	24"	40	10
131615	30"	40	10

*These discs are sold individually. Unit quantities are listed for pricing and packaging reference only.

Garnet Resin Bond Paper Discs

Garnet is a natural mineral that, when used as an abrasive, provides excellent results for the sanding of wood. This sharp abrasive covers 100% of the disc (closed coat) for smooth stock removal and is resin-bonded for a long service life. Freeman Latex or Master Disc Cement must be used to apply these discs to the machine.

SKU	Dia.	Grit	Disc/Pkg.**
131115	12"	40	100
131135	15"	40	100
131155	16"	40	100
131165	18"	40	100
131175	20"	40	25
131195*	24"	40	20
131201	24"	40	20
131215	30"	40	20
131223	36"	40	20

*These discs are manufactured with a 1" diameter center hole.

**These discs are sold individually. Unit quantities are listed for pricing and packaging reference only.

Disc Cement

Both Master Disc Cement (SKU #025510) and Freeman Latex Disc Cement (SKU #025505) are specifically formulated for securing paper and cloth-backed abrasives to any disc sanding machine. They are fast-drying, easy to use, and available in Quarts.



Easy Application

1. Clean both surfaces to be bonded and ensure steel disc is free of grease.
2. Brush the Latex Disc Cement onto both the abrasive backing and steel disc.
3. Allow to dry (10-30 min.) before applying abrasive.
4. Align edges of abrasive disc to steel disc and apply carefully.
5. Roll down abrasive disc from the center outward.
6. Trim the excess abrasive from the outside diameter of the disc.

Freeman Abrasive Cleaner Bar

The Abrasive Cleaner Bar is easy to use — just hold the bar securely and carefully push against the rotating abrasive disc until the majority of loaded particles are removed. It will allow 3 to 4 times more abrasive disc and belt life as well as prevent burning, chatter marks and machine vibration caused by loaded abrasives. The bar is 1 5/8" x 1 5/8" x 8 1/4" (SKU #136850).



SPINDLE SANDER ABRASIVES

Our abrasive sleeves and expanding rubber drums are designed for oscillating spindle sanders including State, Master, and other makes and models. These abrasive sleeves are constructed to give dependable service and excellent surface finishes.

Garnet Sleeves

Garnet is a natural mineral that provides excellent results for the sanding of wood when used as an abrasive. State and Master brands are listed for reference purposes. For other sander models, please refer to diameter and length dimensions when choosing appropriate sleeves.



State Spindle Sanders

- ▶ Diameters from 1/4" to 6"
- ▶ Lengths from 5" to 11"
- ▶ Grits of 40 to 100

Master Spindle Sanders

- ▶ Diameters from 1 1/4" to 4"
- ▶ Length of 11"
- ▶ Grit of 40

Please visit our website, www.FreemanSupply.com, for complete dimensions and part numbers.

Aluminum-Oxide Sleeves

These sleeves are made with Aluminum-Oxide, a tough, durable and synthetic gray-brown mineral. These resin-bonded, cloth-backed abrasive sleeves are used primarily in metalworking and plastic applications. State and Master brands are listed for reference purposes. For other sander models, please refer to diameter and length dimensions when choosing appropriate sleeves.

State Spindle Sanders

- ▶ Diameters from 1/4" to 4"
- ▶ Lengths from 5" to 9"
- ▶ Grits from 36 to 120

Master Spindle Sanders

- ▶ Diameters from 1/4" to 4"
- ▶ Length from 6 to 11"
- ▶ Grits from 36 to 200

Please see our website, www.FreemanSupply.com, for complete dimensions and part numbers.

Expandable Rubber Drums

These Expandable Rubber Drums are made of a rubber compounded for proper resiliency. For uniform compression and expansion, each drum is supplied with two steel washers appropriately sized to each drum. Each drum is 9" long and is sized to fit a 3/4" diameter spindle.

SKU	Outside diameter
133220	1"
133225	1 1/4"
133230	1 1/2"
133235	2"
133242	2 1/2"
133245	3"
133250	4"



3M™ ROLOC™ DISCS

Used with grinders or electric drills, these abrasive discs are designed for grinding and polishing wood, metal, or plastic. The exclusive 3M Roloc system locks the disc securely in place with just a half twist and unlocks just as easily. Available with aluminum-oxide or Scotch-Brite abrasive.

3M Roloc Aluminum Oxide Discs & Holders

3M Roloc style TR (plastic button) discs are resin-bonded, aluminum oxide discs that are offered in a variety of pad hardnesses. They provide an extremely effective means of deburring and finishing wood or metal surfaces. The discs are sold in full packages and the disc holders are sold separately and individually.

- ▶ Diameters from 1" to 4"
- ▶ Grits from 24 to 120
- ▶ 25 or 50 discs per package

Please see our website, www.FreemanSupply.com, for complete dimensions and part numbers.



SCOTCH BRITE® INDUSTRIAL HAND PADS (6" X 9")

Scotch-Brite Heavy Duty Hand Pad

Most durable and aggressive pad for quick stock removal.

Scotch Brite Blending Pads

Slightly finer abrasive than the heavy duty pad. Excellent for removing scratches on metal, wood, or synthetic surfaces.

Scotch-Brite General Purpose Hand Pad

This is the most popular Scotch Brite abrasive – it is coarse enough for cleaning and finishing but fine enough to produce good surface finishes.

Scotch-Brite Ultra-Fine Hand Pad

Fine textured for ultra-fine finishing or metal, wood, plastics, and composites.

Scotch-Brite Light Duty Hand Pad

A very mild abrasive for gentle, yet through cleaning. Commonly used with liquid detergent.

SKU	Description	Color	Pads/Box	Mfg. No.
136799	Heavy Duty	Tan	20	7440
136800	Heavy Duty	Tan	10	7440
136802	Blending	Gray	10	7446
136805	General Purpose	Maroon	20	7447
136810	Ultra Fine	Light Gray	20	7448
136801	Light Duty	White	20	7445



CARTRIDGE ROLLS

Cartridge Rolls

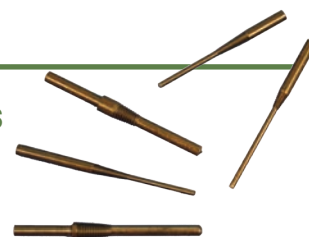
These products are designed for finish sanding of concave surfaces of metal, wood, or plastics. Made from resin bonded aluminum oxide cloth for long life, these products work well with air or electric grinders. A steel mandrel must be used to secure the abrasive to the tool.



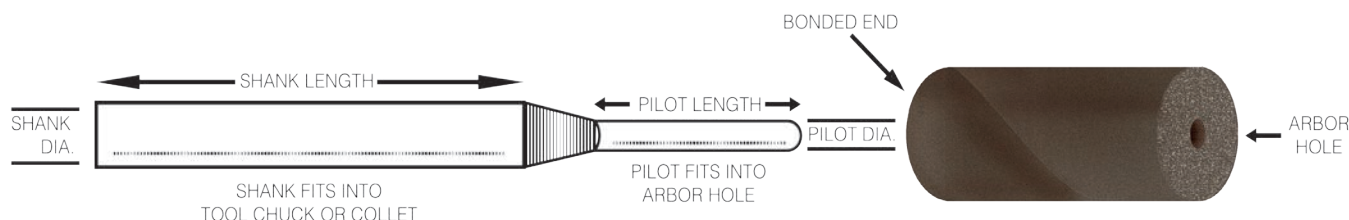
- ▶ Outside diameters from 1/8" to 1"
- ▶ Lengths from 1" to 2"
- ▶ Pilot diameters from 5/64" to 1/4"
- ▶ Grits from 40 to 240

Mandrels for Cartridge Rolls

This steel adapter is used to secure and hold both tapered and parallel sided cartridge rolls for use on air grinders or electric drills. This holder is used by sliding the cartridge roll onto the mandrel pilot until the bottom of the abrasive touches the threaded steel area. Simply screw the cartridge roll onto the threads to secure. Your mandrel should be at least 1/4" shorter than your cartridge roll.



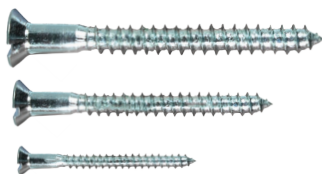
- ▶ Shank diameters of 1/8" or 1/4"
- ▶ Pilot diameters from 5/64" to 1/4"
- ▶ Pilot lengths from 1/2" to 2"



FASTENERS

Wood Screws

- ▶ High-grade wire steel, zinc-plated
- ▶ Phillips head and slotted head styles available
- ▶ Lengths: from 1" to 6"
- ▶ Gauges: 8, 10, 12, or 14



Steel Pinch Dogs

- ▶ Forged tool-steel
- ▶ Sold individually
- ▶ Lengths: from 3/4" to 3 1/2"



Solid Brass Escutcheon Pins

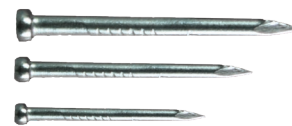
- ▶ Sold in 1 lb. boxes
- ▶ Lengths: from 1/4" to 1"
- ▶ Head diameters: from 0.092 to 0.165
- ▶ Shaft diameters: 0.065 to 0.083
- ▶ Gauges: 14, 16, or 18



Images may not be to scale. Please see our website, www.FreemanSupply.com, for complete details and part numbers.

Wire Brads

- ▶ Sold in 1 lb. boxes
- ▶ Lengths: from 1/2" to 1 1/2"
- ▶ Gauges: 15, 16, 17, 18, or 20



Flat Head Wire Nails

- ▶ Sold in 1 lb. boxes
- ▶ Lengths: from 1/2" to 1 1/2"
- ▶ Gauges: 15, 16, 17, 18, or 20



Drywall Screws

- ▶ Self-tapping, coarse threaded
- ▶ Phillips head
- ▶ Lengths: from 1" to 3"
- ▶ Gauges: 6 or 8
- ▶ Screws/box: from 2,000 to 10,000



Corrugated Fasteners

- ▶ Sold by the box (100/box)
- ▶ Depths: from 1/2" to 5/8"
- ▶ Corrugations: 5



BAND SAW ACCESSORIES

Matchless Grease Stick

This 1 1/2 lb. wax-based band saw blade lubricant is packaged in a 2 1/2" by 10" tube. 24 per case, sold individually. (SKU #027725)

Castrol Stick Wax Lubricant

Used for lubricating metal-cutting band saw blades and cutting tools, this 15 oz. light yellow wax is packaged in a cardboard tube for ease of use. Dimensions: 2" dia. x 11" length. Sold by the full case of 24 tubes. (SKU #027886)

Band Saw Replacement Tires

All tires are 3/16" thick and each tire diameter before attachment is approximately 20% less than the wheel diameter.



SKU	Wheel Diameter	Tire Width
031500	12"	1"
031505	14"	1 1/16"
031510	16"	1 5/16"
031512	18"	1 1/2"
031515	20"	1 5/8"
031520	26"	2"
031525	30"	2"
031530	32"	2"
031532	34"	2 1/8"
031535	36"	2 1/8"
031540	38"	2 1/4"

Band Saw Tire Cement

This pint-size contact adhesive is used for gluing band saw tires onto band saw wheels. (SKU #031550)



Instructions

1. Remove old tire, clean wheel completely
2. Without adhesive, stretch tire onto wheel
3. Using small wedges, create a space between tire & wheel
4. Apply band saw tire cement to tire & wheel
5. Using an air hose, dry the adhesive completely
6. Repeat with another coat of adhesive and dry again
7. Apply a third application if necessary to build up thickness
8. Dry completely
9. Remove wedges, press tire firmly to wheel
10. Ready for use in one hour

DEGASSING, MIXING & DISPENSING EQUIPMENT

Gas Vac II Industrial Vacuum Degassing Unit

Designed for simplified and dependable operation, this vacuum efficiently deaerates urethane elastomers and silicone rubbers resulting in casts that are virtually void-free in quality. The clear acrylic lid permits viewing while maintaining complete seal and the heavy-gauge steel support stand mounted on swivel casters offers portability.



SKU	Description	Net weight (lb.)
054300	Degassing Unit	185
054303	Vacuum Seal	—

Vacuum Seal included with purchase, sold separately as well.

- ▶ Large chamber (14" dia. x 17" deep)
- ▶ 1/2 hp, two stage, direct drive pump displaces up to 6 CFM
- ▶ Thermal protected capacitor start & 20 micron factory rating
- ▶ 28"W x 25"D x 31"H, 115V, 60 Hz motor

Red Devil Mixer

Make any project easier with the Red Devil Mixer's 3-way agitation action for smooth and quiet mixing. This heavy-duty, clamp-design, electric mixer is for effective mixing of Freeman's line of Repro Fast-Cast urethanes, paint, or any other low to medium viscosity liquid. Available with bench or pedestal mount.



- ▶ Heavy-duty twin arm design for mixing — 6 pints, 4 quarts, 2 gallons
- ▶ New safety covers for mixer arms
- ▶ 15-minute dial timer
- ▶ 110 volt, 1/2 HP, 60 Hz, heavy guard

SKU	Description	Height	Width	Depth	Weight (lb.)
054311	1400-00 Red Devil Mixer	31½"	41½"	29½"	191
054313	No. 5153 Counter Base*	19"	33"	20¾"	20
054314	No. 5151 Pedestal Base*	46"	33"	18"	75

*Dimensions include mixer.

Plunge Industrial Mixers

This heavy-duty Plunge Mixer has a rugged zinc-aluminum alloy mixing head mounted with a set screw to a steel shaft. Its smooth-bottom teeth thoroughly mixes resins containing high-density fillers much faster and more effectively than standard drill-driven paint mixers. The mixing head's tumble finish allows for quick clean up of resins and paints.

SKU	Size	Length	Shaft Dia.	Head Dia.	Model No.
054190	Quart	13¼"	5/16"	2¼"	002
054195	Gallon	17"	5/16"	3¾"	003
054200	5 Gallon	23½"	1/2"	5⅞"	006A



Jiffy Mixer

This all-purpose mixer is designed and manufactured to thoroughly mix epoxies, resins, plastics, chemicals, paints and many other materials at 450 to 750 RPM without sucking air into material or splashing material outside container.



SKU	Shaft Length	Container Size	Top Dia.	Bottom Dia.	Depth of Head	Shaft Dia.	Model No.
054220	10¼"	Pint	1¼"	1¼"	1⅜"	¼"	LM
054215	10¼"	1-2 Gallon	2⅝"	2⅝"	2⅜"	¼"	HS-1
054210	20½"	5-10 Gallon	4⅝"	5½"	5"	½"	PS-1

Miapoxy 100 Hand Pumps

Miapoxy 100 Hand Pumps are specifically designed for fast and accurate dispensing of the Miapoxy 100 Resin and Hardener (page 51). Each pump is clearly marked with a different colored sticker for resin and hardener. Use one stroke of the hardener pump for every stroke of the resin pump to obtain the correct mix ratio. Kit size 1/2 includes one resin pump for quarts and gallons, one hardener pump for pints and one hardener pump for quarts and gallons. Kit size 3 includes one resin pump for 5-gallons and one hardener pump for quarts and gallons.



SKU	Size
406650	1/2
406655	3

SCALES

Ohaus Compact Electronic Scale

This portable and accurate scale may be operated with an AC adapter or 3 AA batteries (both included). The Ohaus CS5000 Scale offers a 5,000 g (1 lb., 4 oz.) capacity with a large stainless steel platform and readability to 1 g. **(SKU #054239)**



Plastic Resin Portion Scale

This scale was designed and engineered specifically for weighing plastics, chemicals, and plasters. Face dial markings are graduated in ½ ounces up to 80 ounces. The adjustable dial permits weighing up to 80 ounces without figuring or allowing for the container weight. **(SKU #054235)**



SHEARS



Airtech Techshears cutting fiberglass cloth

Airtech Techshears

- ▶ Titanium nitride coated blades for a super-sharp, long-lasting edge
- ▶ Adjustable cutting force for different materials
- ▶ Micro-serrated blades available for cutting aramid fabric
- ▶ Both left and right handed

These shears are the highest quality that Airtech offers. Techshears are designed with a cantilever action that reduces cutting effort significantly. 7.5" in length **(SKU #402375)**.



Airtech Shop Shears

- ▶ Thick blades for heavy duty cutting
- ▶ Blades are hardened throughout, not case hardened
- ▶ Soft Santoprene inserts to cushion the handles

These high quality shears are constructed from heavy gage stainless steel to provide years of service in cutting fiberglass and carbon cloth. 10" in length **(SKU #402368)**.

Heritage Spring Action Snip

- ▶ Spring action self opening reduces fatigue during use
- ▶ Micro-serrated blades for effective cutting of aramid fabric
- ▶ Cushion handle grips for user comfort

These hot forged, chrome plated snips are ideal for cutting aramid, carbon, Kevlar® and fiberglass fabric. 6.5" in length **(SKU #048040)**.



ASSORTED CUTTERS AND BITS

Multi-Spur Wood Boring Drill Bits

These high speed steel wood boring bits are ideal for fast cutting of larger holes. The spurs cut clean holes while the center point provides precise location. Designed for wood only. Shank diameter is 1/2".



SKU	Bit Diameter
043524	3/4"
043532	1"
043536	1 1/8"
043540	1 1/4"
043542	1 5/16"
043544	1 3/8"
043548	1 1/2"
043554	1 3/4"
043556	1 7/8"
043558	2"
043564	2 3/8"
043566	2 1/2"
043574	3"

Adjustable Countersink Cutter

The Countersink Cutter has a beveled head and is used to countersink while drilling pilot holes for flat head wood screws. The set screw holds countersink head onto drill; depth of drill and countersink is adjustable. The cutter can be used on any one of the four drill sizes.

SKU	Countersink Diameter	Drill Size
041996	1/2"	1/8"
043820	1/2"	3/16"
043822	1/2"	7/32"
043824	1/2"	1/4"



Rotary Surfer

This surfacing cutter is designed to be used in a drill press to machine and plane wood and plastic. It features two diameters and silicon carbide cutters for long cutter life.

SKU	Description	Diameter
043900	Rotary Surfer	1 1/2"
043902	Rotary Surfer	3"
043904	Blade Only	1 1/2"
043906	Blade Only	3"



Karbide Kutzall® Rotary Burrs

Karbide Kutzall Rotary Burrs are ideal for wood, fiberglass, plastic, rubber, soft stone and composites. They feature patented SSG structured carbide teeth. These tungsten-carbide teeth are very free-cutting and can be dressed to produce very smooth finishes. ALWAYS WEAR SAFETY GLASSES when working with these Rotary Burrs.



SKU	Head Shape	Head Dia.	Head Width	Shank Dia.	Mfg. No.
043840	Taper	1/4"	1 1/4"	1/4"	T-14
043844	Taper	3/4"	1 1/4"	1/4"	T-34
043850	Ball Nose	1/4"	1 1/4"	1/4"	BN-14
043854	Ball Nose	3/4"	1"	1/4"	BN-34
043860	Cylinder	1/4"	1 1/4"	1/4"	C-14
043862	Cylinder	1/2"	3/4"	1/4"	C-12
043864	Cylinder	3/4"	1 1/4"	1/4"	C-34

Brad Point Wood Boring Drill Bits

This high speed steel drill bit features a sharp center point for precise hole location and the outside diameter is designed to score the hole before stock removal. These two features combine to create a clean and accurate hole without chipping. Ideal for dowel pin installation. For use with wood only.



SKU	Bit Diameter	Shank Diameter	Flute Length	Overall Length
043280	1/8"	1/8"		3"
043284	3/16"	3/16"		3 1/2"
043288	1/4"	1/4"		4"
043292	5/16"	5/16"		4 1/2"
043294	3/8"	3/8"		5"
043300	1/2"	1/2"		6"
043304	5/8"	1/2"	4"	6"
043306	1 1/16"	1/2"	4"	6"
043308	3/4"	1/2"	4"	6"
043312	7/8"	1/2"	4"	6"

Other sizes available by special order. Please see our website, www.FreemanSupply.com, for details.



ACCESSORIES

A wide variety of processing supplies and hardware to support the creation and duplication of parts, patterns, tools, and molds.

120

Clay & Modeling Products

121

Pattern Coatings

122-128

Solvents & Release Systems

129-131

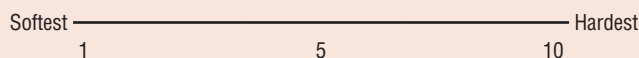
Mixing Supplies & Application Tools

CLAY MODELING PRODUCTS

CHAVANT INDUSTRIAL STYLING & SCULPTING CLAYS

Freeman stocks a complete line of high quality Chavant Modeling Clay products for the professional sculptor as well as the industrial designer.

Hardness Scale



Professional Plasteline

This modeling compound is ideal for the professional sculptor and all school levels. Plasteline is soft, smooth, permanently plastic, reusable and does not require heating. Contains sulphur.

SKU	Hardness	Size	Color	Net weight (lb.)
027200	3	1" x 3¾" x 4½"	Brown	1
027205	3	4½" x 4½" x 11"	Brown	10

Non-Sulphurated Plasteline (NSP)

This non-sulphurated sculpting clay offers similar performance to the Professional Plasteline. Although the clay does not contain sulphur, it may cause curing inhibition with certain silicone rubber. Use Protolina or Permoplast modeling clay to eliminate silicone inhibition.

SKU	Hardness	Size	Color	Net weight (lb.)
027201	4	2¾" x 2¾" x 5"	Brown	2
027202	7	2¾" x 2¾" x 5"	Brown	2
027203	9	2¾" x 2¾" x 5"	Brown	2

CM-50

Softest of the sulphur-type styling clays, this medium-hard formulation offers excellent adhesion and consistency for producing accurate models.

SKU	Hardness	Size	Color	Net weight (lb.)
027214	5	2½" x 12" Billet	Brown	2.5

CM-70

Hardest of the sulphur-type clays, this styling clay is popular throughout the automotive industry where surface detail and finish are critical.

SKU	Hardness	Size	Color	Net weight (lb.)
027217	7	2½" x 11" Billet	Brown	2

J-525

This hard formulation provides a slightly harder modeling compound than the CM-50. This results in better edge definition and surface detail. Contains sulphur.

SKU	Hardness	Size	Color	Net weight (lb.)
027215	6	2½" x 12" Billet	Brown	2.5
027207	6	3" x 16" Billet	Brown	6

Le Beau Touche

This extremely smooth plasteline clay does not contain sulphur and is often characterized as having the feel of a water-based clay. Also available in a higher melting point formulation.

SKU	Hardness	Size	Color	Net weight (lb.)
027221	4	2¾" x 2¾" x 5"	Brown	2

Y-2 Klay

Chavant's Y-2 Klay is the hardest product in their line of industrial styling clays. This clay is sulphur-free for use with silicone rubbers and is 30-40% lighter than other styling clays for ease of handling larger models.

SKU	Hardness	Size	Color	Net weight (lb.)
027206	10	2½" x 11" Billet	Dark Brown	1.75

Please see our website, www.FreemanSupply.com, for a full line of clay tools.

MODELING CLAYS

Protolina Modeling Clays

This soft, sulphur-free modeling clay is ideal for use in styling and engineering shops, development and prototype work, and die and pattern shops. It will not deteriorate with age, is not sticky or greasy and will not crumble.

SKU	Hardness	Color	Net weight (lb.)
027204	2	Tan	1
027213	2	Gray	1
027228	2	Green	2

Permoplast Modeling Clays

A non-hardening modeling clay that is excellent for sculpting, creating parting lines for two part molds, and general mold making. It contains no sulfur, making it ideal for use with silicone rubbers.

SKU	Hardness	Color	Net weight (lb.)
027194	2	Cream	1
027195	2	Cream	5
027198	2	Green	1
027199	2	Green	5



Clays can be used to adhere a part to the mold box.

PATTERN COATINGS



Freeman 90-1 in Red, Yellow, and Clear Orange

Freeman 90-1 Pattern Coating

The industry standard, Freeman 90-1 is a durable, high-gloss, fast-drying, lacquer-based coating made up of heat-resistant resins to withstand the chemicals and heat encountered with most no-bake binders. It is self-leveling and can be applied by spraying when thinned with Freeman Fre-Thin Thinner (page 122).

SKU	Size	Color	Net weight (lb.)
024105	Gallon	Clear	8
024110	Gallon	Clear Orange	8
024115	Gallon	Black	8
024120	Gallon	Red	8
024125	Gallon	Burnt Orange	8
024130	Gallon	Yellow	8
024135	Gallon	Gray	8
024140	Gallon	Aluminum	8
024145	Gallon	White	8

Freeman No. 60 Pattern Coating

Freeman No. 60 Pattern Coating is a sandable, high-build, gray-colored lacquer primer which is formulated for use with cold box and no-bake sand systems. It is ideal for wood patterns, low density polyurethane foam, and core boxes and it also used as a primer for 90-1 coatings.

SKU	Size	Color	Net weight (lb.)
024005	Gallon	Gray	8

Master Kincote Pattern Coating

Master Kincote is a durable, high-quality coating for wood patterns. It brushes on easily and adheres well, providing maximum protection by standing up to abrasion, moisture, chemical solutions and most foundry binder systems.

SKU	Size	Color	Net weight (lb.)
024500	Gallon	Aluminum	8
024505	Gallon	Black	8
024510	Gallon	Clear	8
024515	Gallon	Gray	8
024520	Gallon	Vermilion	8
024525	Gallon	Yellow	8

Master Foundry-Kote Pattern Coating

Master Foundry-Kote forms a smooth, hard film on patterns and core boxes that is water and oil resistant. It resists sand abrasion and protects patterns and core boxes against most no-bake binders. Easily brushable, this self-leveling coating dries rapidly and adheres readily to wood, metal, plastic and most other surfaces. It is intended as a final clear coat.

SKU	Size	Net weight (lb.)
024530	Gallon	8

Freeman Wood & Plaster Sealer

This clear lacquer sanding sealer may be applied by brush or spray and is ideal for sealing wood master models to prepare the surface for plastic duplication. It is formulated to seal wood, plaster, sheet wax, MDF and other porous materials. For basic release procedures, see page 136. Use Fre-Thin Thinner (page 122) for desired viscosity.

SKU	Size	Net weight (lb.)
054554	12 oz. (aerosol)	1
054553	Pint	0.8
054550	Gallon	10
054551	5 Gallon	50

Bacolac Professional Sandable Sealer

This clear material is specifically formulated as a high-build, easily sandable coating for sealing and smoothing wood, MDF, plaster, and other porous surfaces.

SKU	Size	Net weight (lb.)
054531	Gallon (Sealer)	8
054532	Gallon (Reducer)	8

Krylon® Tough Coat™ Gray Sandable Primer

This lacquer-based primer fills in porosity and other imperfections on models and rigid molds. It is fast drying, easily sandable, and can be top-coated with another high gloss lacquer if desired.

SKU	Size	Net weight (lb.)
038064	12 oz. can	1

Flake Shellac

Freeman offers the highest grade of light orange flake shellac. A bright, hard and glossy surface can be achieved when mixed with Alcohol Solvent. The mix ratio is 4 lb. of Flake Shellac to 1 gallon of Alcohol Solvent (page 122).

SKU	Size	Net weight (lb.)
027110	by the pound	1

Prepared Shellac

This amber, shellac-based sealer is an excellent product for painting wood, plaster, and other porous surfaces. It will remain bright and dry hard.

SKU	Size	Net weight (lb.)
027116	Gallon	11

Dunapox

This epoxy sealer can be applied to polyurethane, epoxy, and other tooling materials and is designed for applications up to 400°F. It is excellent for high-temperature curing prepregs, composite layup tooling, prototyping, and master model making. Once cured the sealer has a Shore D hardness of 85, resulting in a tough ultra-smooth tool surface that is ideal for the demanding tolerances of today's aerospace industry. It is easy to apply as it can be brushed, rolled or sprayed.

SKU	Size	Net weight (lb.)
024000	Gallon (Blue)	8.3
024001	Gallon (Black)	8.3

MOLD SURFACING PRODUCTS

Duratec products are designed to quickly establish a hard, durable, high-gloss surface on lower cost mold materials such as RenShape Polyurethane Foam boards, MDF, plaster, and wood. They may also be used to resurface polyester molds to increase mold life. Each product must be used with the Duratec Hardener (sold separately).

Duratec Polyester Clear Sealer

This low viscosity, two-component, rapid-curing sealer anchors Duratec primers to porous or hard-to-bond substrates such as MDF, wood, plaster, and concrete. It features a 14-16 minute gel time and may be top coated in 1-2 hours.

SKU	Size	Mfg. No.	Net weight (lb.)
024452	Gallon	823	9.5

Duratec Polyester Sanding & Surfacing Primers

The Sanding Primer is the original formulation for easy sanding on applications that require only a moderate shine. The Sanding Primer EZ is even easier to sand and produces a higher luster finish. The Surfacing Primer, while more difficult to sand, produces the highest luster. Duratec Clear Hi-Gloss additive may be added for even greater shine.

SKU	Description	Mfg. No.	Net weight (lb.)
024472	Duratec Gray Sanding Primer (Gallon)	707-007	10.9
024482	Duratec Gray Sanding Primer EZ (Gallon)	707-061	11.8
024455	Duratec Gray Surfacing Primer (Gallon)	707-002	10.9
024458	Duratec White Surfacing Primer (Gallon)	714-002	10.9
024456	Duratec White Surfacing Primer (5 Gallon)	707-002	57.7
024475	Duratec Clear Hi-Gloss Additive (Gallon)	904-001	8.5

Duratec Vinyl Ester Surfacing Primer

This two-component polyester surfacing compound is similar to the regular Surfacing Primer but offers a higher heat-distortion temperature of 280°F. It is ideal for surfacing vacuum form tools and as a high-temperature gel coat reinforced with epoxy laminates. It features an 18-22 minute gel time and may be sanded within 1-6 hours to a high-gloss finish.

SKU	Size	Mfg. No.	Net weight (lb.)
024484	Gallon	1799-005	11.2

Duratec StyroShield Primer

This unique polyester primer may be applied directly to Expanded Polystyrene (EPS) Foam models or patterns without attacking the surface. StyroShield forms a barrier that enables conventional polyester resins, putties, and surfacing materials to be used to create a hard, smooth, and shiny surface. It may be applied by spray, brush, or roller.

SKU	Size	Mfg. No.	Net weight (lb.)
024473	Gallon	707-018	6.6

Duratec Hardener

This MEKP hardener is required for use with all of the Duratec resins listed. Two of the 1.48 oz. bottles catalyze one gallon of resin.

SKU	Size	Mfg. No.	Net weight (lb.)
024465	1.48 oz.	411	0.1

Formula Five Clean 'N Glaze

This mild buffing compound is used to remove fine scratches and surface hazing from mold surfaces. It will also produce a high luster finish for subsequent applications of mold wax.

SKU	Size	Net weight (lb.)
054270	Quart	2.2

FREEMAN INDUSTRIAL SOLVENTS

Freeman Lacquer Thinners

90-1 Fre-Thin Lacquer Thinner is our premium product for reducing 90-1 Pattern Coatings, Wood & Plaster Sealer, and No. 60 Coating. 45 Lacquer Thinner is an economical alternative for less demanding performance.

SKU	Size	Net weight (lb.)
024155	90-1 Fre-Thin (Gallon)	8
024210	90-1 Fre-Thin (5 Gallon)	40
024405	45 Lacquer Thinner (5 Gallon)	41

Master Kincote Thinner

Master Kincote Thinner is formulated for use with Master Kincote and Foundry-Kote. It is ideal for thinning out coatings and is an excellent solvent for cleaning brushes.

SKU	Size	Net weight (lb.)
024600	Gallon	8
024605	5 Gallon	40

Please see our website, www.FreemanSupply.com, for additional solvents.

Alcohol Solvent

Pure methyl alcohol for use in our alcohol lamps is the best solvent available for cutting flake shellac and various cleaning requirements.

SKU	Size	Net weight (lb.)
027130	Gallon	10
027135	5 Gallon	50

Polyester Thinning Agent

Polyester Thinning agent is a specialized resin used to thin the viscosity of polyester repair and build-up materials.

SKU	Size	Net weight (lb.)
053900	Quart	2.2

Freeman Acetone Solvent

Freeman Acetone is a popular solvent for removing uncured resins, greases, and most wax release agents from work surfaces or molds. This product dries quickly and leaves no residue behind.

SKU	Size	Net weight (lb.)
023210	Quart	2.1
023215	Gallon	8
023217	5 Gallon	40

SACRIFICIAL MOLD RELEASES

WAX-BASED MOLD RELEASES



Freeman Wax Release

Freeman Wax Release

This product is formulated and manufactured by Freeman specifically for the effective release of urethanes, epoxies, or polyester resins. It has a gel-like consistency that is easily applied with a brush. For basic release procedures, see page 136.

SKU	Size	Net weight (lb.)
055051	Quart	1.5
055052	Gallon	6.1
055053	5 Gallon	30.5

Johnson Paste Wax

This is a good general-purpose release agent for epoxies, urethanes, rubber, acrylics or ceramics.

SKU	Size	Net weight (lb.)
027885	1 lb. Can	1

ISOKote 531

ISOKote 531 is an effective wax release of urethanes, epoxies, and polyester resins. ISOKote 531 is available in aerosol or liquid form.

SKU	Size	Net weight (lb.)
057428	14 fl. oz. Aerosol	1
057429	Quart	1.8

Trewax® Clear Paste Wax

Trewax is a high-quality, carnauba-based paste wax preferred by many moldmakers to effectively release epoxies, polyesters, and polyurethanes.

SKU	Size	Net weight (lb.)
027884	12.35 fl. oz.	0.8

RenLease 803-1

RenLease 803-1 is a white liquid parting agent that may be brushed or sprayed. It dries clear, and may be polished for high gloss. It offers an excellent release at temperatures up to 250°F and from all types of surfaces. Contains a small amount of silicone. A minimum of three coats is recommended.

SKU	Size	Net weight (lb.)
056222	Quart	1.5
056221	5 Gallon	33

RenLease 805-1

RenLease 805-1 White paste wax is an excellent release at temperatures up to 250°F. It is easy to apply and buffs to high gloss. RenLease 805-1 does not contain silicone.

SKU	Size	Net weight (lb.)
056205	Quart	1

Partall Paste #2

Paste #2 is a hard paste wax that is effective as a release agent for urethanes, epoxies, or polyester resin systems. It contains no silicone.



SKU	Size	Net weight (lb.)
054267	24 oz. Can	1.5

Partall Hi-Temp Wax

Hi-Temp Wax is a blend of waxes and semi-permanent release agents creating an excellent release for resins that cure or catalyze at temperatures between 150°F - 350°F. It contains no silicone.

SKU	Size	Net weight (lb.)
054266	12 oz. Can	0.8

Chemwax 500

Chemwax 500 is a wax release agent designed to be applied and let dry. This material offers fast solvent evaporation, no buffing requirements, and temperature stability to 300°F. May be applied with spray equipment, wiping, or brushing. It is an excellent release for expandable urethane foam.

SKU	Size	Net weight (lb.)
058374	Gallon	5.8
058376	5 Gallon	29

Formula Five Mold Release Wax

Formulated using carnauba wax, hydrocarbon waxes, and silicone to produce a highly effective mold release. Supplied in a paste consistency, this release is ideal for use with polyesters, epoxies, or urethanes.

SKU	Size	Net weight (lb.)
054271	12 oz. Can	0.8

SILICONE-BASED MOLD RELEASES

Caution: Silicone-based mold releases should not be used on parts that require painting.

RenLease 76 Silicone Spray

RenLease 76 Silicone Spray is a premium quality silicone based spray release designed for use on epoxies and polyurethanes. It offers an improved spray pattern and improved dispersal from can.

SKU	Size	Net weight (lb.)
056195	12 fl. oz.	1

RenLease 78-2 Silicone Spray

RenLease 78-2 Silicone Release Agent is formulated specifically for epoxy and polyurethane resin systems. It forms a slick, non-melting surface with a heat-resistance of 400°F.

SKU	Size	Net weight (lb.)
056210	9.25 fl. oz.	1

Silicone Spray

This is a high-solids content liquid in an aerosol can. Silicone Spray is used to release epoxies or urethanes from any mold. It has a heat resistance up to 600°F for high heat applications.

SKU	Size	Net weight (lb.)
054420	12 fl. oz.	1.5

PVA-BASED MOLD RELEASES

Partall Film #10

Partall Film #10 is a water and alcohol based polyvinyl alcohol (PVA) coating comprised of water soluble, film forming materials. It is excellent for releasing epoxies, polyesters, and urethanes. For basic release procedures, see page 136.

SKU	Size	Net weight (lb.)
054251	Pint (Green)	0.9
054256	Gallon (Green)	9
054261	5 Gallon (Green)	42
054262	5 Gallon (Clear)	41

Chemlease 66H Silicone Release Agent

Chemlease 66H is a silicone for the effective release of epoxies and urethanes. Excellent temperature resistance of 600°F for hot molded parts. Available in liquid and aerosol packaging.

SKU	Size	Net weight (lb.)
058310	9.5 fl. oz. Aerosol	0.58
058334	Gallon	5.9
058336	5 Gallon	29.7

MR-515 Release Agent

This specialized release agent is for releasing urethane rigid foams, cast urethane elastomers, and other thermoset resins.

SKU	Size	Net weight (lb.)
058490	Aerosol	1

Chemlease 5051 Release Agent

Chemlease 5051 (formerly known as MR-515H) is a specialized silicone release agent designed specifically for releasing urethane rigid foams, cast urethane elastomers, and other thermoset resins. For best results, apply using conventional spray equipment. Reapply after every part to ensure good release.

SKU	Size	Net weight (lb.)
058496	5 Gallon	30
058498	55 Gallon	330

OTHER RELEASE AGENTS



Pattern Release 202

Ideal for patterns and coatings used in the preparation of silicone rubber molds and will prevent silicone from adhering to cured silicone. This petroleum jelly may be used on a wide variety of pattern materials.

SKU	Size	Net weight (lb.)
054426	16 fl. oz.	1.5

Sprayon P.T.F.E. Dry Film Mold Release

Sprayon P.T.F.E. Dry Film Mold Release is made with DuPont Krytox® Dry Film, which provides excellent anti-stick properties that will not transfer to the finished part. This product contains no silicone to interfere with the painting of finished parts. Temperature resistance to 575°F.

SKU	Size	Net weight (lb.)
038077	12 fl. oz.	1

Sprayon Paintable Mold Release

Sprayon Paintable Mold Release exhibits excellent release properties where low silicone concentration is required and will not interfere with coating or bonding operations subsequent to molding.

SKU	Size	Net weight (lb.)
038078	12 fl. oz.	1

SEMI-PERMANENT RELEASE SYSTEMS

CLEANERS - SOLVENT BASED

Chemlease Mold Cleaner EZ

Mold Cleaner EZ removes release agents, buffing and polishing compounds, dirt, and grease from a variety of mold surfaces. The resulting surface is then suitable for applying Chemlease semi-permanent primers and sealers, ensuring a good chemical bond. It does not contain any chemicals listed on the Hazardous Air Pollutants list (HAPs).

SKU	Size	Net weight (lb.)
058194	Gallon	6.3
058196	5 Gallon	31.3

Chemlease Mold Cleaner 101

Chemlease Mold Cleaner 101 is excellent for removing excess wax and resin build-up on metal mold surfaces used to construct composite tools. Spraying the surface to be treated and permitting to soak for a period of time has proven an effective method.

SKU	Size	Net weight (lb.)
058610	5 Gallon	42.9
058612	55 Gallon	471.4



Chemtrend offers a variety of release system products.

Zyvax Surface Cleaner

Zyvax Surface Cleaner aids in the preparation of new and used molds/tools prior to treatment with Zyvax mold conditioners and release agents. It removes waxes and other surface contaminants without harming or dulling the mold's working surfaces. It will also clean brushes and spray equipment.

SKU	Size	Net weight (lb.)
300005	Gallon	9

PRIMERS - SOLVENT BASED

Chemlease MPP 2180

MPP 2180 is a heavy-duty primer that prepares and seals mold surfaces. It is excellent for polyester, phenolic, metal, RenShape Epoxy and some RenShape Polyurethane tooling boards. It provides a smooth, non-porous surface for the application of semi-permanent sealers and release agents. MPP 2180 is a mold primer only and has no release properties. It is a less hazardous alternative to MPP 117.

SKU	Size	Net weight (lb.)
058212	Quart	1.8
058214	Gallon	7
058216	5 Gallon	35.2

Chemlease MPP 117

MPP 117 is a one-component mold primer for polyester, epoxy, phenolic, and metal molds. Two coats of this material are typically sufficient to seal the mold surface. It is not a release agent and requires Chemlease release agents to be applied over the cured surface to ensure good demold.

SKU	Size	Net weight (lb.)
058204	Gallon	7



Chemlease MPP 2180 greatly improves the surface of RenShape 5065 (page 16).

SEALERS - SOLVENT BASED

Chemlease 15 Sealer EZ

Chemlease 15 Sealer EZ is specifically designed to minimize mold porosity when using semi-permanent release agents. It is compatible with fiberglass, metals, and most solid or dense surfaces. It does not contain any chemicals listed on the Hazardous Air Pollutants list (HAPs).

SKU	Size	Net weight (lb.)
058002	Quart	1.6
058004	Gallon	6.3
058006	5 Gallon	31.6

Mono-Coat E308 Mold Sealer

Mono-Coat E308 is a solvent based semi-permanent mold sealer specifically designed to be used on Monolithic Graphite Molds.

SKU	Size	Net weight (lb.)
058660	Gallon	6.8

MOLD RELEASES - SOLVENT BASED

Chemlease One FS EZ

Chemlease One FS EZ is a semi-permanent release that is easy to apply and provides multiple releases for high gloss composite molding. Used as a wipe-on only product.

SKU	Size	Net weight (lb.)
058474	Gallon	6
058476	5 Gallon	30.2
058478	55 Gallon	333

Chemlease PMR EZ

Chemlease PMR is a semi-permanent release specifically designed for the composites industry where a high quality finish is required. This product features multiple releases between applications and produces an excellent gloss with minimal transfer to the finished part. Used as a wipe on/wipe off product. Chemlease PMR-90 EZ is a higher slip formulation of Chemlease PMR EZ.

SKU	Size	Net weight (lb.)
058244	Gallon	6
058246	5 Gallon	30

Chemlease PMR-90 EZ

Chemlease PMR-90 EZ is a high-slip version of the Chemlease PMR EZ for closed molding of abrasive materials or low draft parts. This product features multiple releases between applications and produces an excellent gloss with minimal transfer to the finished part. Used as a wipe-on / wipe-off product. This material does not contain any chemicals listed on the Hazardous Air Pollutants list (HAPs).

SKU	Size	Net weight (lb.)
058264	Gallon	6

Mono-Coat E179 N-ODS

Mono-Coat E179 N-ODS is a solvent based, semi-permanent release where transfer of the release to the molded part is minimal. This product may be applied to hot or cold mold surfaces.

SKU	Size	Net weight (lb.)
058658	Gallon	6.4

Chemlease R&B EZ

Chemlease R&B EZ is a high-slip, semi-permanent release for closed molding of abrasive materials or low draft parts. This product features multiple releases between applications and produces an excellent gloss with minimal transfer to the finished part. Used as a wipe-on / wipe-off product.

SKU	Size	Net weight (lb.)
058424	Gallon	6.1
058426	5 Gallon	31.7

Chemlease 41 EZ

Chemlease 41 EZ is a semi-permanent release specifically designed for the composites industry where a matte finish is desired. This product features multiple releases between applications with minimal transfer to the finished part. Used as a wipe-on / wipe-off product.

SKU	Size	Net weight (lb.)
058024	Gallon	6
058026	5 Gallon	30

Chemlease 41-90 EZ

Chemlease 41-90 EZ is a high slip semi-permanent release designed for non-cosmetic parts and multiple releases. Used as a wipe-on / wipe-off product. This material does not contain any chemicals listed on the Hazardous Air Pollutants list (HAPs).

SKU	Size	Net weight (lb.)
058044	Gallon	6
058046	5 Gallon	30

Chemlease 70 EZ

Chemlease 70 EZ is a semi-permanent release specifically designed for the composites industry where a high quality finish is required. This product features multiple releases between applications and produces an excellent gloss with minimal transfer to the finished part. Used as a wipe-on / wipe-off product.



SKU	Size	Net weight (lb.)
058064	Gallon	6

Chemlease 70-90 EZ

Chemlease 70-90 EZ is a high slip semi-permanent release for closed molding of polyester parts. This product features multiple releases between applications and produces an excellent gloss with minimal transfer to the finished part. Used as a wipe-on / wipe-off product.

SKU	Size	Net weight (lb.)
058084	Gallon	6

Chemlease IM02

Chemlease IM02 is an internal release system and lubricant that may be added to polyester resins to reduce the dependency on the external release agent. Normally used in concentrations of 0.5 to 1.0%, this product should be used for non gel-coated part molding only.

SKU	Size	Net weight (lb.)
058414	Gallon	7.1
058416	5 Gallon	35.7
058418	55 Gallon	377.9

CLEANERS - WATER BASED

Zyvox Waterclean Mold Cleaner

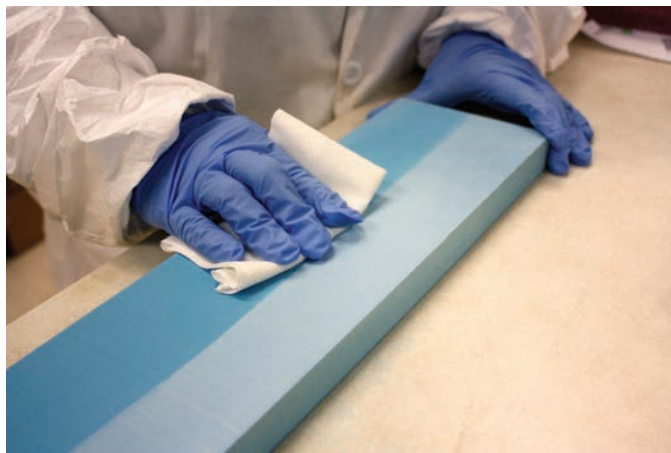
Waterclean provides an environmentally safe and effective water-based alternative for the removal of surface contaminants. It is non-hazardous, non-flammable and does not harm the surface. It eliminates sanding and/or solvent washing when preparing parts for painting, bonding or other processes that require a completely clean surface.

SKU	Size	Net weight (lb.)
300001	Gallon	9

Zyvox Waterworks Fresh Start Mold Cleaner

Zyvox Waterworks Fresh Start has been developed for use in the aerospace industry to clean a tool or finished part to a waterbreak-free surface without the use of solvents or other hazardous components. Fresh Start is effective in removing most contaminants and semi-permanent release coatings on both new and existing tools.

SKU	Size	Net weight (lb.)
300092	16 oz.	1
300080	5 Gallon	45



Zyvox Waterclean Mold Cleaner is used on RenShape 5008 (page 16).

SEALERS - WATER BASED

Zyvox Sealer GP

Zyvox Sealer GP is a high modulus, clear, flexible film with superior substrate adhesion that forms a protective shield on the mold or tool surface. As a conditioner, Sealer GP is designed to treat both the chemical and physical bonding sites found on every raw mold surface. In addition, Sealer GP provides the base needed to extend the life of the release coating and will allow optimal performance from the release coating.

SKU	Size	Net weight (lb.)
300020	Gallon	9

Zyvox Sealproof Mold Release Agent Conditioner

Zyvox Sealproof is a durable non-VOC visible film that offers a matte surface and superior adhesion to wood, gelcoat, steel, carbon-graphite, fiberglass, aluminum and all types of composites. When applied in conjunction with Enviroshield Release Agent, it provides multiple releases and reduces cleaning time. For a totally solvent-free mold release system, use Zyvox Waterclean, Zyvox Sealproof and Zyvox Enviroshield.

SKU	Size	Net weight (lb.)
300010	Gallon	9

MOLD RELEASES - WATER BASED

Chemlease 2191W

Chemlease 2191W is an environmental friendly water-based release agent for FRP composites as well as advanced composite epoxy and phenolic prepreg molding. Chemlease 2191W can be sprayed or wipe applied with minimal transfer of release agents onto the composite tool.

SKU	Size	Net weight (lb.)
058620	Gallon	8.3

Zyvox EnviroShield

This versatile, odorless and non-VOC release agent is for applications requiring multiple releases, superior surface finish with high gloss, and easy touch-up for seamless production cycles. Enviroshield gives outstanding release performance when applied over Sealer GP. It chemically bonds to the mold surface and, when applied correctly, will not transfer to the molded part or other processing equipment.

SKU	Size	Net weight (lb.)
300025	Gallon	9

Zyvox WaterShield

Zyvox WaterShield is a high-performance polymer coating created to give multiple releases while exceeding the most demanding environmental requirements. WaterShield has no VOC's, is so versatile it can be used for most molding operations, and is preferred for application directly on warm mold tools.

SKU	Size	Net weight (lb.)
300030	Gallon	9

Zyvox Flex-Z

Flex-Z provides flexibility in various mold release levels. Formulated to control physical and chemical factors in polyester-molding environments, Flex-Z reduces prep time, eliminates sag and delivers predictable release across the performance spectrum from minimum to maximum slip.

SKU	Size	Color	Slip level	Net weight (lb.)
300050	Gallon	#1 Red	Minimum	9
300055	Gallon	#2 Purple	Low/Medium	9
300060	Gallon	#3 Yellow	Medium	9
300065	Gallon	#4 Orange	Medium/High	9
300070	Gallon	#5 Blue	High	9
300075	Gallon	#6 Green	Extra High	9

Zyvox Waterworks Departure

Zyvox Waterworks Departure is a non-hazardous mold release system designed specifically for the aerospace industry. It combines the latest release technology with the convenience of an environmentally safe product. The Waterworks system is free from hazardous and flammable materials, and government safety approval means no costly facility improvements. Departure is thermally stable up to 500° F. (260° C.).

SKU	Size	Net weight (lb.)
300087	Quart	2.1
300090	Gallon	9
300089	1 canister (100 wipes)	2.2

ROTATIONAL MOLD RELEASE SYSTEMS

CLEANERS AND PRIMERS

Chemtrend MOC-1EZR

Chem-Trend MOC-1EZR Mold Cleaner removes wax, grease, and other contaminants from rotational mold surfaces. It works well to prepare the surface of new or reconditioned molds in preparation for the application of primers or release agents.

SKU	Size	Net weight (lb.)
058602	Gallon	6.3
058604	5 Gallon	31.3
058606	55 Gallon	343.8

Chemtrend Mono-Coat RM-1910RP

Mono-Coat RM-1910RP is formulated for priming and sealing rotational molds made of steel, stainless steel, and aluminum. It will increase the gloss of the mold surface and provide an excellent surface for the release agent. It has no release properties and must be used with the appropriate Mono-Coat release.

SKU	Size	Net weight (lb.)
058572	Gallon	7
058574	5 Gallon	35.2

MOLD RELEASE AGENTS

Chemtrend Mono-Coat RM-1930RB

Mono-Coat RM-1930RB is a solvent based semi-permanent release system for minimal transfer of the release agent to the finished part. Additional features include high temperature stability, good abrasion resistance, and no build-up on the mold surface.

SKU	Size	Net weight (lb.)
058598	Gallon	6.6
058599	5 Gallon	32.8

Chemlease Mono-Coat RM1964RF

Mono-Coat RM-1964RF is a solvent-based semi-permanent release agent especially formulated for molding operations when high degree of slip is the primary requirement. Mono-Coat RM-1964RF also offers low transfer of release agent to parts, high-temperature stability, and abrasive resistance.

SKU	Size	Net weight (lb.)
058670	Gallon	6.5

Chemtrend Mono-Coat RM-1903WRB

Mono-Coat RM-1903WRB is a water-based semi-permanent release agent that is excellent for rotational molding of all grades of polyethylene. Suitable for aluminum, steel, and particularly effective on stainless steel, this product provides high temperature stability with no transfer to the molded part.

SKU	Size	Net weight (lb.)
058502	Gallon	8.3
058504	5 Gallon	41.7
058506	55 Gallon	458.5

Chemlease Mono-Coat E255

This system provides a non-transferring release film for effective use in the rotational molding process. E255 features a high degree of slip and high temperature stability. May be applied to cool or hot mold surfaces ambient to 370°F.

SKU	Size	Net weight (lb.)
058444	Gallon	6.4
058446	5 Gallon	32.2

Chemtrend Mono-Coat RM-1921WRB

Mono-Coat RM-1921WRB is a water-based semi-permanent release agent where tight dimensional control and high gloss are required. Recommended for all type of polyethylene.

SKU	Size	Net weight (lb.)
058582	Gallon	8.3
058584	5 Gallon	41.7
058586	55 Gallon	458.7

Chemtrend Mono-Coat RM-1904WRB

Mono-Coat RM-1904WRB is a water-based semi-permanent release for rotational molds, designed to prevent pre-release from stainless steel and aluminum. It is ideal for all grades of polyethylene, and provides multiple releases with no transfer to the molded part.

SKU	Size	Net weight (lb.)
058512	Gallon	8.3
058514	5 Gallon	41.7
058516	55 Gallon	458.5

Chemtrend Mono-Coat RM-1909RB

Mono-Coat RM-1909RB is a solvent-based semi-permanent release agent for molding operations where high temperature and abrasion resistance is required. It is excellent for all types of polyethylene as well as rubber.

SKU	Size	Net weight (lb.)
058562	Gallon	6.5
058564	5 Gallon	32.6
058566	55 Gallon	358.3

Chemtrend Mono-Coat RM-1905RF

Mono-Coat RM-1905RF is a semi-permanent release agent specifically designed for use on flanges and vent-tubes in all types of rotational molds. This product has 100% solids and has excellent thermal stability.

SKU	Size	Net weight (lb.)
058522	Gallon	8.1
058524	5 Gallon	40.5
058526	55 Gallon	445.5

Chemtrend Flow Promoter

Chemtrend Flow Promoter is for rotational mold surfaces that have been properly released using Chemtrend Mono-Coat Release Agents. It promotes resin flow and helps prevent bridging and pin holes in parts that have complex contours and fine detail.

SKU	Size	Net weight (lb.)
058601	Aerosol Can	0.6

MIXING CUPS & PADDLES

Paper Cups

These paper cups are ideal for mixing all types of tooling and reproduction plastics. The lined paper cups are specially coated to prevent resin absorption. The larger paper cups are untreated. Cups sold individually.

SKU	Description	Cups/package	Cups/Case
054037	Lined Paper Cups (16 oz.)	50	500
054042	Lined Paper Cups (32 oz.)	25	500
054048	Untreated Paper Cups (83 oz.)	25	100
054050	Untreated Paper Cups (165 oz.)	25	100

Plain Plastic Cups

These cups are ideal for mixing all types of tooling and reproduction plastics. They are made of high-density polyethylene (HDPE), white in color, and unmarked. Cups sold individually.

SKU	Size	Cups/case
054031	12 oz. Cups	500
054036	16 oz. Cups	500
054041	32 oz. Cups	500
054047	64 oz. Cups	200
054049	85 oz. Cups	200
054055	128 oz. Cups	120
054051	166 oz. Cups	120

Graduated Plastic Cups

These convenient plastic cups are also made of high density polyethylene (HDPE). However, these cups are translucent and have both milliliter and ounce graduations on the container to aid in mixing. Cups sold individually.

SKU	Size	Cups/case
054025	24 oz.	100
054026	48 oz.	50

Wood Mixing Paddles

Wood mixing paddles for both gallon and 5 gallon containers. Both paddles are ideal for mixing paint, urethanes, epoxies, or any other liquid. Sold by the box.

SKU	Description	Thickness	Width	Length	Qty/box
054524	Paddles for 1 Gallon	1/8"	1 1/8"	14"	50
054521	Paddles for 1 Gallon	1/8"	1 1/8"	14"	500
054525	Paddles for 5 Gallon	7/32"	1 3/8"	21"	250

Tongue Depressors

These polished hardwood depressors are excellent for mixing small quantities of tooling plastics and repair materials.

SKU	Width	Length	Qty/box
054520	3/4"	6"	500

GLOVES & PROTECTIVE WEAR

Vinyl Gloves

Vinyl gloves are an economical choice for activities that do not require the highest degree of tactile precision. Vinyl does not offer as much dexterity as nitrile or latex and tends to tear more easily, but offers the best value for low-risk applications. Our vinyl gloves feature rolled cuffs to provide greater tear resistance and easy gripping.

SKU	Description	Pairs/box
054060	5 mil (Large)	50
054061	5 mil (X-Large)	50

Latex Gloves

Latex gloves provide superior dexterity and barrier protection. However, because latex is a natural substance, the protein in latex gloves can cause an allergic reaction and irritation in some people. Our latex gloves feature rolled cuffs to provide greater tear resistance and easy gripping.

SKU	Description	Pairs/box
054064	With Powder – 8 mil (Large)	100
054063	Latex Gloves – 8 mil (X-Large)	100
054066	Powder-Free – 7.5 mil (Large)	50
054068	Powder-Free – 7.5 mil (X-Large)	50

Nitrile Gloves

Nitrile gloves are made of synthetic latex. They contain no latex proteins and are three times more puncture resistant than latex rubber. More importantly, they offer superior resistance to many types of chemicals.

SKU	Description	Pairs/box
054070	7 mil (Large)	50
054069	7 mil (X-Large)	50

3M Particulate Respirators (Mask)

Because of their low-profile shape, eye glasses, goggles and face shields can be easily worn without interference. They are excellent to wear when operating sanders and other dust creating equipment. These masks do not protect the user from toxic dusts, spray paints, or organic vapor.

SKU	Mfg. #	Qty/box
054526	8210	20



Tyvek® Sleeves

These 18" long sleeves are designed to protect workers' arms from resin contact. Tyvek is a durable yet pliable fabric that resists tears, snags, and punctures, and its slick surface prevents particle entrapment. These sleeves are purchased in pairs. (SKU #418002)



Tyvek® Apron

These comfortable, reusable aprons form a virtually impermeable barrier against dirt, grease, grime, sprays, chemicals, and moisture. Like the Tyvek sleeves, these aprons are made of a durable yet pliable fabric that resists tears, snags, and punctures. Its slick surface prevents particle entrapment. Even though these aprons are disposable, they can often be used over and over (depending on work conditions). These 28" x 36" aprons feature serged seams and long ties for a comfortable fit. (SKU #418001)



Freeman Heavy-Duty Shop Apron

This very heavyweight cotton apron is tough enough for shop use. Features include two chest pockets, two hip pockets, metal ferrule tie holes and heavy-duty stitching. (SKU #054065)



APPLICATION TOOLS

BRUSHES

White-Bristle Throwaway Brush

This low-cost expendable brush is ideal for epoxy tooling work and one-time use.

The unpainted wood handle has pure bristles firmly fastened in the ferrule. Width: ½" to 3".



Ox Hair Brush

This brush features very fine and soft ox hair bristles, a chiseled edge, nicked ferrule, and a walnut finish handle. Ideal for applying shellac and other coatings. Width: ¼" or ½".

Acid Brush

Used for applying surface coats, this economical, throwaway-type brush is good for brushing into small areas. It features a long metal handle and ½" chiseled edge horsehair bristle. Width: ½".

Nylon Throwaway Brush

Low cost and expendable, this brush is excellent for applying epoxy surface coats. It features a plastic handle with nylon bristles firmly fastened in the ferrule. Width: ½" to 3".

Economy Flat-Bristle Brush

This brush features pure white china bristles, double thick with a chiseled edge. Bristles are secured with a nicked ferrule plastic handle. Width: ½" to 3". 12 per box.

Please see our website, www.FreemanSupply.com, for complete details and part numbers.

Molder's Brush

The Molder's Brush features black horsehair staple set with a solid hardwood block.

It is ideal for general foundry applications. Trim length: 2 7/8"; Block size: 9" x 1 1/8".



Aluminum Paint Pot

- Size: 1 or 2 quart
- Brush sold separately

Make applying materials by brush easier and more efficient with the



Freeman exclusive Aluminum Paint Pot.

This aluminum domed pot enables you to hang your brush while keeping the bristles in the paint. The dome cover seals the container, enclosing both paint and brush, preventing drying, evaporation, and thickening of the contents. Available in one or two quart sizes.

SKU	Size	Net weight (lb.)
046667	1 Quart	0.5
046668	2 Quart	1

ROLLERS

Bodi Standard Rollers

- Plastic or Aluminum
- Diameter: ¾" to 1"
- Length: 3" or 6"

These strong, long-life rollers are made with deep grooves and thin fins, providing excellent air release. The patented handle is specially designed for long hours of use and accepts extension handles for hard-to-reach jobs.

The non-corrosive ¼" frames clean easily in solvent.

Bodi Quik Change Rollers

- Plastic or Aluminum
- Diameter: ½" to 1"
- Length: 2" to 6"

Easily clean these rollers with non-corrosive ¼" steel frames, especially in acetone replacement systems. Just push on and pull off the head for easy removal. Available as a complete rollerhead or separate replacement heads.

Bodi Bristle Rollers (Quik Change)

- Head also available separately
- Diameter: ¾" or 1"
- Length: 3" or 6"

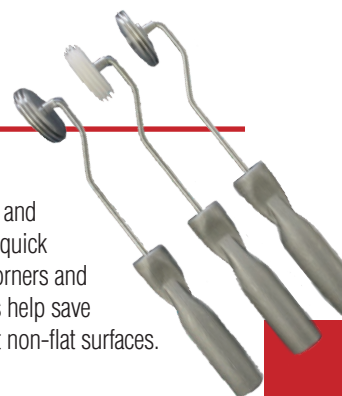
Pure Bristle Rollers are spirally wound to produce strong laminations and roll out glass smoothly.



Bodi Corner Rollers

- Plastic or Aluminum
- Diameter: 2"
- Roller Head Width: ¾" to 5/8"

High quality Delrin™ and aluminum rollers for quick and easy rolling of corners and ridges. Corner rollers help save time when rolling out non-flat surfaces.



Bodi Mini Rollers

- Aluminum
- Diameter: ¼"
- Length: 1" to 3"

For applications requiring an extra small roller, these are high quality ¼" diameter aluminum rollers on ⅛" small steel frames mounted in aluminum handles. Disassembles for easy cleaning.

Bodi Paddle Wheel Rollers (Quik Change)

- Head also available separately
- Diameter: ¾"
- Length: 3" or 6"

With the thinnest fins in the business for excellent air release, these rollers have smooth horizontal (regular) fins. All heads are aluminum.

Please see our website, www.FreemanSupply.com, for complete details, part numbers, and additional rollers.

CLEAN-UP SUPPLIES

MVP Waterless Hand Cleaner

MVP is a waterless hand cleaner that removes grease, resins, oils, adhesives, and tar. Does not contain harsh abrasives or irritating solvents. Contains lanolin to soothe and smooth skin. MVP gallon size has a convenient pump (sold separately) for easy dispensing.

SKU	Description	Size
054209	MVP Waterless Hand Cleaner	Quart
054205	MVP Waterless Hand Cleaner	Gallon
054206	Pump Only for Gallon Unit	



WypAll Shop Rags

These general purpose shop rags are made of 100% cotton and used for clean-up, cleaning mold surfaces from excess release, and applying Chemlease mold cleaners, primers, and semi-permanent release agents. There are 100 rags in each handy pop-up dispenser. (SKU #418010)



Safety Plunger Can

The Safety Plunger Can is ideal for dispensing acetone (page 122) onto a shop rag for mold cleaning. To dispense, place shop rag on dispenser and depress the plunger. Sold in quart cans. (SKU #418005)



MISCELLANEOUS ACCESSORIES

Kraft Paper

A high-quality, 40 lb. plain Kraft paper. Also available with coating on one side on special order basis.

SKU	Description	Width	Length
054078	Kraft Paper - Plain	36"	900'

Masking & Double-Face Tapes

High-quality masking and double-face tape for various shop uses.

SKU	Description	Width (mm)	Length (yd.)	Rolls/box
035240	Masking Tape	24	60	36
035250	Masking Tape	48	60	24
035210	Double Face Tape	18	36	48
035215	Double Face Tape	24	36	36
035220	Double Face Tape	36	36	24
035225	Double Face Tape	48	36	24



DEMOLDING WEDGES

These high-impact wedges assist in demolding applications and are color coded for easy identification.



GREEN - "Super Tuff": Made of extremely high impact nylon.

High-quality wedge that maintains a sharp insertion edge five times longer than standard wedges to ensure that there is no damage to mold edges.

WHITE - "Econo": Made of high grade plastic to resist breakage. Lower cost wedge. Has a textured finish.

TAN - "Flex": Made of flexible plastic for inserting into compound curved mold edges.

SKU	Description	Thickness	Width	Length	Color
300380	Super Tuff Nylon Wedge	1/2"	1 1/2"	4"	Green
300386	Super Tuff Nylon Wedge	5/8"	2 1/8"	6"	Green
300384	Econo Wedge	1/2"	1 1/2"	4"	White
300390	Econo Wedge	5/8"	2 1/8"	6"	White
300394	Econo Wedge	1"	3 1/8"	10"	White
300382	Flex Wedge	1/2"	1 1/2"	4"	Tan
300388	Flex Wedge	5/8"	2 1/8"	6"	Tan
300392	Flex Wedge	1"	3 1/8"	10"	Tan

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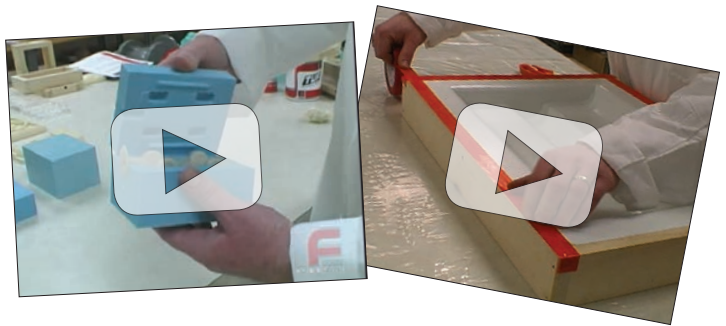
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Description	Unit Price	Total
Repro 83 Blue Gal Unit	\$82.62	\$82.62
Sub Total		\$82.62

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Glossary of Plastic Tooling Terms

Adhesion – The state in which two surfaces are held together by interfacial force.

Coefficient of Thermal Expansion – The fractional change in length of a material for a unit of change in temperature. Normally expressed in “inch-per-inch, per degree Fahrenheit”.

Compressive Strength – $\frac{1}{2}$ " x $\frac{1}{2}$ " x 1" specimen is mounted in a compression-type tester between two heads that exert pressure at a constant rate of movement until the specimen fails by rupturing or deforming to a % of its height. Normally expressed in “pounds per square inch”, this test provides the maximum load sustained, divided by the original area of the specimen.

Cure – To change the physical properties of a plastic or resin by chemical reaction, which may be condensation, polymerization, or addition: usually accomplished by the action of either heat or catalyst or both, and with or without pressure.

Deflection Temperature – The temperature at which a 5" x $\frac{1}{2}$ " x $\frac{1}{2}$ " specimen deflects .010 inches under a stated load of 66 or 264 pounds per square inch.

Density – Mass per unit volume of a substance, expressed in units such as grams per cubic centimeter, pounds per cubic foot or pounds per gallon.

Endothermic – Pertaining to a reaction which is accompanied by the absorption of heat.

Exothermic – Pertaining to a reaction which is accompanied by the evolution (giving off) of heat.

Flexural Modulus – The ratio, within the elastic limit, of the applied stress on a test specimen in flexure to the corresponding strain in the outermost fibers of the specimen.

Flexural Strength – 5" x $\frac{1}{2}$ " x $\frac{1}{8}$ " specimen is placed on supports 4" apart and a standard load is applied to the center of the specimen at a specified rate. The maximum stress in the outer fiber at the moment of crack or break is expressed in “pounds-per-square-inch”.

Glass Transition Temperature (T_g) – A reversible change that occurs when plastic is heated to a certain temperature range, characterized by a rather sudden transition from a hard, glassy, or brittle condition to a flexible or elastomeric condition.

Gel Time – With reference to thermosetting resins, the interval of time between introduction of the catalyst and the formation of a semi-solid system consisting of a network of aggregates in which a liquid is held. The initial jelly-like solid phase that develops during the formation of a resin from a liquid, usually a 4-fluid ounce mass.

Percentage of Elongation – Increase in length of a specimen at the instant before rupture occurs. Normally expressed as a percentage.

Plasticity – The ability of a material to withstand continuous and permanent deformations by stress exceeding the yield value of the material without rupture. The opposite of elasticity.

Post-curing – The process of forming an uncured thermosetting resin article, then completing the curing after the article has been removed from its forming mold or mandrel.

Pot-life (working life) – The period during which a compound, after mixing with a catalyst, solvent or other compounding ingredients, remains suitable for its intended use.

Shore Hardness (Indentation Hardness) – The hardness of a material as determined by either the size of an indentation made by an indenting tool under a fixed load, or the load necessary to produce penetration of the indenter to a pre-determined depth. To measure the Shore hardness of a material a Shore testing instrument is used which is comprised of spring-loaded indenter point projecting through a hole in a presser foot and a device to indicate the distance the point projects beyond the face of the foot. The scale readings range from 0 (for 0.100 penetration) to 100 (for zero penetration). A Shore “A” instrument employs a “sharp” indenter point with a load of 822 grams. The Shore “D” instrument employs a “blunt” point and the load is 10 pounds.

Taber Wear Index – The ability of a material to withstand mechanical action such as rubbing, scraping or erosion, that tends to progressively remove material from its surface. Usually expressed in milligrams loss per number of cycles per a given load.

Tensile Modulus – The ratio of stress to corresponding strain below the proportional limit of the material. Expressed normally in pounds-per-square-inch.

Tensile Strength – $\frac{1}{8}$ " thick x $\frac{3}{4}$ " to $\frac{1}{2}$ " wide x 8 $\frac{1}{2}$ " long specimen is inserted in an Instron Tester and is pulled apart at specified rates until the specimen fails by separating. Usually expressed in pounds-per-square-inch.

Thermoforming – The process of forming a thermoplastic sheet into a three-dimensional shape by clamping the sheet in a frame, heating it to render it soft and flowable, then applying differential pressure to make the sheet conform to the shape of a mold or die positioned below the frame.

Thermoplastics – Resins or plastic compounds which in their final state as finished articles are capable of being repeatedly softened by increased temperature and hardened by decrease of temperature by means of physical change.

Thermosetting Plastics (thermosets) – Resins or plastic compounds which in their final state as finished articles are substantially infusible or insoluble. Thermosetting resins are often liquids at some stage in their manufacture or processing, which are cured by heat, catalyst or other chemical means. After being fully cured, thermosets cannot be reliquified by heat.

Thixotropy – A flow characteristic evidenced by a decrease in viscosity of a fluid when it is stirred at a constant or increasing rate of shear. When the stirring or shearing is discontinued, the apparent viscosity of the fluid gradually increases back to the original value. Changes in both directions are dependent on time as well as shear.

Viscosity – The thickness of a substance and its resistance to flow. The higher the viscosity number, the thicker the substance.

Metric & English Conversions Table

Liquid Volume

When you know	You can find	If you multiply by
ounces	milliliters	30
pints	liters	0.47
quarts	liters	0.946
gallons	liters	3.785
milliliters	ounces	0.034
liters	pints	2.1
liters	quarts	1.0567
liters	gallons	0.2642

Mass

When you know	You can find	If you multiply by
ounces	grams	28.35
pounds	kilograms	0.4536
short tons (2000 lbs)	metric tons	0.9
grams	ounces	0.03527
kilograms	pounds	2.2046
metric tons (1000 kg)	short tons	1.1

Length

When you know	You can find	If you multiply by
inches	millimeters	25.4
feet	centimeters	30.48
yards	meters	0.9144
miles	kilometers	1.6093
millimeters	inches	0.03937
centimeters	inches	0.39370
meters	yards	1.0936
kilometers	miles	0.6214

Area

When you know	You can find	If you multiply by
square inches	square centimeters	6.452
square feet	square meters	0.0929
square yards	square meters	0.836
square miles	square kilometers	2.5899
acres	square hectometers	0.4
square centimeters	square inches	0.155
square meters	square yards	1.196
square kilometers	square miles	0.3861
square hectometers	acres	2.5

Reference Tables

Shore Hardness Guidelines

Material	Approx. Shore A	Approx. Shore D
Rubber band, white eraser	25-30	—
Pink eraser	35-45	—
Rubber stamp	40-55	—
Hard eraser, inner tube	45-65	—
Leather belt, tire tread	65-75	—
Rubber shoe sole	75-85	25-30
Tap washer, skateboard wheel	85-95	30-40
Garden hose	95-100	40-50
Hard book cover	—	50-55
Golf ball	—	55-65
Wood yard stick	—	70-75
White board	—	75-80
Bowling ball, bone	—	85-90

Temperature

When you know	You can find	If you
Fahrenheit	Celsius	subtract 32 and then multiply by .55
Celsius	Fahrenheit	multiply by 1.8 and then add 32

Properties of Metal Casting

	Weight lb./in. ³	Weight vs. Mahogany	Shrink in./ft.	Melt Pt. °F
Aluminum	.0975	3.1 x	5/32	1,220
Brass	.2961	9.5 x	3/16	1,616
Copper	.3210	10.1 x	3/16	1,981
Cast Iron	.2670	8.5 x	1/8	2,105
Steel	.2835	9.5 x	1/4	2,500
Zinc	.2565	8.2 x	5/16	788

Viscosity Guidelines

Viscosity in Centipoise (@ 75°F)	Similar in consistency to:
1	= Water
500	= #10 Motor Oil
2,500	= Pancake Syrup
10,000	= Honey
25,000	= Chocolate Syrup
50,000	= Ketchup
250,000	= Peanut Butter
>1,000,000	= Paste Caulking

Fractions, Decimals, Millimeters

Fractions	Decimals	Millimeters	Millimeters	Decimals	Fractions
	$\frac{1}{64}$	.0156	0.3969	13.0969	$\frac{33}{64}$
	$\frac{1}{32}$	.0313	0.7938	13.4938	$\frac{17}{32}$
	$\frac{3}{64}$	.0469	1.1906	13.8906	$\frac{35}{64}$
$\frac{1}{16}$	$\frac{5}{64}$	.0625	1.5875	14.2875	$\frac{9}{16}$
	$\frac{3}{32}$	.0781	1.9844	14.6844	$\frac{37}{64}$
$\frac{1}{8}$	$\frac{7}{64}$	.0938	2.3813	15.0813	$\frac{19}{32}$
	$\frac{9}{64}$	.1094	2.7781	15.4781	$\frac{39}{64}$
	$\frac{5}{32}$	.125	3.1750	15.8750	$\frac{5}{8}$
	$\frac{11}{64}$	.1406	3.5719	16.2719	$\frac{41}{64}$
$\frac{3}{16}$	$\frac{13}{64}$	.1563	3.9688	16.6688	$\frac{21}{32}$
	$\frac{7}{32}$	.1719	4.3656	17.0656	$\frac{43}{64}$
	$\frac{15}{64}$	.1875	4.7625	17.4625	$\frac{11}{16}$
$\frac{1}{4}$	$\frac{17}{64}$	.2031	5.1594	17.8594	$\frac{45}{64}$
	$\frac{9}{32}$	.2188	5.5563	18.2563	$\frac{23}{32}$
	$\frac{19}{64}$	.2344	5.9531	18.6531	$\frac{47}{64}$
$\frac{5}{16}$	$\frac{21}{64}$	.25	6.3500	19.0500	$\frac{3}{4}$
	$\frac{11}{32}$	.2656	6.7469	19.4469	$\frac{49}{64}$
	$\frac{23}{64}$	.2813	7.1438	19.8438	$\frac{25}{32}$
$\frac{3}{8}$	$\frac{25}{64}$	.2969	7.5406	20.2406	$\frac{51}{64}$
	$\frac{13}{32}$	.3125	7.9375	20.6375	$\frac{13}{16}$
	$\frac{27}{64}$	.3281	8.3344	21.0344	$\frac{53}{64}$
$\frac{7}{16}$	$\frac{29}{64}$	.3438	8.7313	21.4313	$\frac{27}{32}$
	$\frac{31}{64}$	.3594	9.1281	21.8281	$\frac{55}{64}$
		.375	9.5250	22.2250	$\frac{7}{8}$
		.3906	9.9219	22.6219	$\frac{57}{64}$
		.4063	10.3188	23.0188	$\frac{29}{32}$
		.4219	10.7156	23.4156	$\frac{59}{64}$
		.4375	11.1125	23.8125	$\frac{15}{16}$
		.4531	11.5094	24.2094	$\frac{61}{64}$
		.4688	11.9063	24.6063	$\frac{31}{32}$
$\frac{1}{2}$		.4844	12.3031	25.0031	
		.500	12.7000	25.4000	1

Preparing Patterns and Molds

Sealing A Wood Pattern/Model

(also applies to plaster and sheet wax)



1. Apply one coat of Freeman Wood and Plaster Sealer (a fairly thin viscosity, lacquer-based paint) to the bare wood surface using a pure bristle brush and allow the material to absorb into the wood.



2. After the first coat has dried (about half an hour), you'll notice that the sealer has swelled the grain and made it rough. Using sand paper or Scotch-Brite®, lightly sand the surface to make it smooth again. Sanding is not necessary when working with plaster or sheet wax.



3. Wipe off the pattern with a cloth and then apply a second coat of sealer.



4. After allowing the second coat to dry overnight, lightly sand the wood again and wipe it off with a cloth.

5. You are now ready to apply the release agents.

Applying Release Agents



1. Cover the entire surface with Freeman Wax Release (a semi-paste, typically applied with a brush).

2. Allow this coat to dry or immediately wipe the off excess with a cloth.



3. We suggest at least two coats of Wax Release to make sure your entire part is covered evenly.

4. Next, you'll need to apply two layers of Partall PVA mold release (a polyvinyl alcohol) with brush or a spray.



5. Each coat will require a half hour of drying time unless you use a fan or air hose.

6. After the second coat of PVA has dried thoroughly, apply a final coat of Freeman Wax Release.



7. Buff this last coat very gently so as not to break through the layers of the PVA.

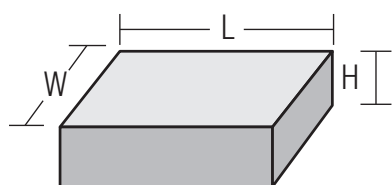
Additional Notes

- Epoxy, urethane, or metal patterns require only the use of wax release agents. Apply three coats and lightly buff after each.
- Plaster patterns should be dried in an air-circulating oven at 120°-125° F for 16 hours, or in dry air for 48 hours before applying sealer.
- Plaster patterns can also be sealed.
- Sheet Wax should be sealed with aerosol version.

Calculating Material Requirements

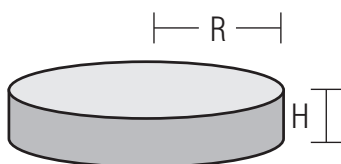
Step 1

Calculate the volume of the part (or mold) in cubic inches. Follow whichever shape is closest to your model or mold:



Volume of a Rectangle

$$L \times W \times H$$



Volume of a Cylinder

$$R \times R \times H \times 3.14$$

Step 2

Find the volumetric yield for your material. This number, which can be found in most specification tables, represents how much coverage your material will achieve. If the Volumetric Yield is not available, you can calculate it based on the specific gravity (density).

1. Find the specific gravity (or density) on the specification table and/or SDS. This is measured in grams per cubic centimeter (grams/cm³).
2. Divide 27.68 by the density (grams/cm³) to calculate the Volumetric Yield (in.³/lb.).

Step 3

Divide the volume of the part in cubic inches (step 2) by the volumetric yield (step 1) to determine the amount of material required in pounds

$$\frac{\text{Volume of Model or Mold (in.³)}}{\text{Volumetric Yield (in.³/lb.)}} = \frac{\text{Weight of Product}}{\text{Required (lb.)}}$$

Step 4

Select package size and quantity based on calculated weight.

Calculating Material for Mix Ratio

Once you know how much material you need and the product's mix ratio (found on the TDS or product packaging), you may need to calculate the mix ratio for a specific weight of A & B combined. Let's use an example.

Say a product's mix ratio is 100:60 by weight and you need 1,438 grams total.

Calculate the above equation to determine the pounds needed

You will need 3.17 lb. for a pour. This equals 1,438 grams (ounces x 28.35 = grams).

Determine ratio multiplier

The 1.6 factor is the multiplier to work out the resin based on the total amount of resin required. Calculated from the mix ratio 100:60 meaning if you have 100 parts resin you will need 60 parts hardener. 160 divided by 100 = 1.6.

Determine how much of each resin and hardener to mix

Take the total weight (in grams) needed of mixed resin and divide by your ratio multiplier: 1,438 / 1.6 = 898.75 g resin, therefore the hardener is 539.25 g (1,438 - 898.75). So you would now pour 898.75 g resin and 539.25 g hardener.

Poured too much on one side? Calculate for the other side

If you accidentally over-pour by 30 grams on the resin side, multiply 30 x 1.6 (the mix ratio multiplier) and you get 48. You would add 18 grams of hardener (48-30=18).

Still not sure?

Our Technical staff is available to answer any question, large or small, via phone at (800) 321-8511 opt. 5 or via email at tech@freemansupply.com.



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