



Ren Tooling Resin Systems

Reduce time-to-market with tooling
produced from Ren laminating systems,
casting materials and pastes

Ren® Tooling Resin Selector Guide

Vantico, Ren Tooling Systems manufactures and markets a full line of epoxies and several polyurethanes with a broad range of physical and performance properties for tooling applications. The versatile product line is backed by our long-term expertise in plastic tooling.

Among the products we supply are room-temperature and heat-resistant surface coats, laminating systems, casting materials and room-temperature pastes.

A comprehensive family of accessories including aluminum fillers in a variety of sizes and forms, thickeners, release agents, hand cleaners, brushes and paddles is also available.

In addition to a complete product line, we offer customers technical support on the use of tooling systems and techniques that can help optimize product performance and tool quality.

Surface Coats

Product Number	Mixing Ratio, Resin to Hardener, By Weight	Gel Time, min.	Mixed Viscosity, Brookfield, cP	Specific Gravity	Volumetric Weight, cu. in./lb.	Hardness, Shore D	Ultimate Compressive Strength, psi @ 77°F (25°C)	Ultimate Flexural Strength, psi @ 77°F (25°C)	Ultimate Tensile Strength, psi @ 77°F (25°C)	Tg,* °F (°C)	Coefficient of Thermal Expansion, in./in./°F	Shrinkage, in./in. (Cast)
Typical Properties of Room-temperature Surface Coats												
RP 1118 R/H	100/9	① 30	Sag: pass ⅛" - fail ¼"	1.46	19.0	90	13,400	6,500	3,500	169 (76)	26 x 10 ⁻⁶ ***	0.002 Mold #0
RP 1124 R/H	100/18	① 25	Sag: pass ⅛" - fail ¼"	1.43	19.0	90	14,500	10,000	6,200	149 (65)	29 x 10 ⁻⁶ ***	0.002 Mold #0
RP 1126 R/H	100/18	① 24	Sag: pass ⅛" - fail ⅛"	1.40	19.7	90	12,000	6,800	4,700	165 (74)	26 x 10 ⁻⁶	0.002 Mold #0
RP 1129 R/H	100/20	① 20	Sag: pass ⅛" - fail ⅛"	1.39	19.9	85	13,900	15,500	4,880	156 (69)	32 x 10 ⁻⁶	0.0016 Mold #0
RP 3260 R/H	100/9	① 33	30,000	1.90	14.6	88	17,000	9,600	6,500	181 (83)	21 x 10 ⁻⁶	0.002 Mold #1
Typical Properties of Heat-resistant Surface Coats												
RP 4026R/RP 1500H	100/10	① 50-60	Sag: pass ⅛" - fail ⅛"	1.43	19.5	90	27,000	8,500	5,500	310 (154)	37 x 10 ⁻⁶	-
RP 4026R/RP 1501H	100/10	① 30-40	Sag: pass ⅛" - fail ⅛"	1.43	19.5	90	27,000	8,000	4,000	310 (154)	32 x 10 ⁻⁶ ***	0.005 Mold #0
RP 4026R/RP 1510H	100/10	① 2 hrs	Sag: pass ⅛" - fail ⅛"	1.43	19.5	90	26,000	8,700	6,000	335 (168)	38 x 10 ⁻⁶	-
TDT 177-144R/RP 1500H	100/10	① 60	Sag: pass ⅛" - fail ⅛"	1.56	17.8	92	28,000	12,500	7,000	284 (140)	24 x 10 ⁻⁶	0.002 Mold #0
TDT 177-148R/RP 1500H	100/12	① 45	Sag: pass ⅜" - fail ½"	1.39	19.9	90	24,900	10,500	7,100	268 (131)	56 x 10 ⁻⁶	0.004 Mold #0
CGL 1320R/RP 1510H	100/8	① 5 hrs	Sag: pass ⅛" - fail ⅛"	1.50	18.6	93	28,500	12,300	8,800	396 (202)	25 x 10 ⁻⁶	0.003 Mold #0

Room-temperature Surface Coats

RP 1118 R/H Blue, Hydrophobic

Smooth, easy-to-apply surface coat that cures at room temperature even in the presence of high humidity. Oven postcure will increase heat resistance. For constructing plastic-faced plaster tools.

RP 1124 R/H White, Thixotropic

Easy-to-mix, sag-resistant system that provides superior surface duplication and outstanding intercoat and laminate adhesion. Turns from green to white when fully blended. Versatile for room-temperature applications such as drill and assembly fixtures and other tooling aids.

RP 1126 R/H White, Thixotropic

Universal, brushable surface coat with good working time and good impact resistance.

RP 1129 R/H White, Impact Resistant

Easy-to-handle system with good vertical hang-up and excellent surface duplication.

RP 3260 R/H Blue, Abrasion Resistant, Silicon Carbide Filled

Brushable system that also can be cast up to 1/2-in. (1-cm) thick. For use on dies, foundry patterns, hammer forms and core boxes.

Heat-resistant Surface Coats

RP 4026R/RP 1501H Gray, Sag Resistant, Aluminum Filled

Easy-to-apply system with excellent surface duplication. Gels at room temperature but requires an elevated-temperature postcure for maximum physical properties. Designed for vacuum-form molds, injection molds, stretch dies, nesting fixtures and other high-heat tooling.

RP 4026R/RP 1500H Gray, Long Work Life

Performs like RP 4026R/RP 1501H but utilizes a hardener that extends pot life and work time. For large, high-heat tools.

RP 4026R/RP 1510H Gray, Very Long Work Life

Easy-to-handle surface coat with a hardener that extends work life to more than two hours. For use on vacuum-form molds, blow molds, injection molds, and other tools subjected to elevated temperatures.

TDT 177-144R/RP 1500H Gray, Wear Resistant, Silicon Carbide Filled

Styrene-resistant system for applications including RIM, RTM, cold compression and spray-up molds that incorporate styrene monomer and abrasive fibers.

TDT 177-148R/RP 1500H Gray, Polishable

Thixotropic system that produces a styrene-resistant, heat-resistant surface that can be polished to a 90+ gloss. Well suited for molds used to form parts with a high gloss surface.

CGL 1320R/RP 1510H Black, High Temperature, Graphite Filled

High Tg system with excellent resistance to crazing. Features a long four-hour work life. For autoclave use.

Typical Properties Chart Test Information

Gel Time ASTM D-2471
Mixed Viscosity Brookfield ASTM D-2393
Specific Gravity ASTM D-792
Volumetric Weight (in a cast bar) ASTM D-792
Hardness Shore D ASTM D-2240
Compressive Strength ASTM D-695
Flexural Strength (5% Strain) ASTM D-790
Tensile Strength ASTM D-638
Deflection Temperature (264 psi) ASTM D-648
Coefficient of Thermal Expansion ASTM D-3386
Shrinkage (Cast) ASTM D-2566 - (Molds are half round, steel, 10 in. long)

Mold #0 – 0.5 in. deep	Mold #2 – 2.250 in. deep
Mold #1 – 0.875 in. deep	Mold #3 – 4.250 in. deep

† Properties are in a 10-oz. glass cloth laminate rotated 90°, otherwise data reported was obtained on cast specimens.

†† Properties are in a 10-oz. graphite fabric laminate.

*Tg by DMA ASTM D-4065
**Tg by TMA ASTM D-3386
***CTE by TMA ASTM D-3386

① 4 fluid oz. ② 14 fluid oz. ③ 12 lb. ④ 6.5 lb.
⑤ 8 fluid oz. ⑥ 200 grams ⑦ 15 fluid oz. ⑧ 100 grams

Laminating Materials

Product Number	Mixing Ratio, Resin to Hardener, By Weight	Gel Time, min.	Mixed Viscosity, Brookfield, cP	Specific Gravity	Volumetric Weight, cu. in./lb.	Hardness, Shore D	Ultimate Compressive Strength, psi @ 77°F (25°C)	Ultimate Flexural Strength, psi @ 77°F (25°C)	Ultimate Tensile Strength, psi @ 77°F (25°C)	Tg,* °F (°C)	Coefficient of Thermal Expansion, in./in./°F
Typical Properties of Room-temperature Laminating Materials											
RP 286 R/H	100/18	⑤ 20-30	2,400	1.42	19.6	90	40,400	35,300	26,500	—	—
RP 1700-1 R/H†	100/26	① 20	2,000	(Cast 1.13)	18.5	90	28,000	37,000	26,000	164 (73)	10 x 10 ⁻⁶
RP 1710 R/H†	100/16	① 22	3,500	1.71 (Cast 1.35)	18.8	90	23,000	30,000	25,000	164 (73)	12 x 10 ⁻⁶
RP 1720 R/H†	100/15	① 24	2,200	1.34	20.5	86	21,000	32,000	20,000	164 (73)	15 x 10 ⁻⁶
RP 3270 R/H†	100/14	① 28	3,600	1.70	16.3	84	23,000	30,000	28,000	171 (77)	11 x 10 ⁻⁶
TDT 231-1 R/H†	100/28	① 25	1,800	1.14	18.7	90	23,000	36,000	26,800	160 (71)	10 x 10 ⁻⁶
TDT 232-1 R/H†	100/22	① 35	2,000	1.36	20.5	94	22,000	37,000	26,000	154 (68)	11 x 10 ⁻⁶
Typical Properties of Heat-resistant Laminating Materials											
RP 4005R/RP 1500H†	100/14	① 50	1,900	1.19	23.3	90	28,000	35,000	26,000	338 (166)	8.5 x 10 ⁻⁶
RP 4005R/RP 1510H†	100/16	② 110	3,300	1.19	23.3	90	28,000	28,000	21,400	360 (182)	8.5 x 10 ⁻⁶
RP 4014R/RP 1500H†	100/11	① 55	4,000	1.34	20.8	90	28,000	34,000	24,000	340 (171)	14 x 10 ⁻⁶
RP 4014R/RP 1510H	100/14	② 90	5,300	1.30	21.4	93	33,700	37,200	26,500	351 (177)	8.3 x 10 ⁻⁶
RP 4017R/RP 1510H††	100/15	① 90	8,000	1.42	19.6	93	44,000	77,000	80,000	385 (196)	34 x 10 ^{-6****}
CGL 1310R/RP 1510H	100/15	① 400	9,000	1.25	22.3	91	43,000	82,000	77,000	412 (211)	25 x 10 ⁻⁶
Typical Properties of Room-temperature Laminating Pastes											
RP 569R/RP 569-1H	100/11	④ 35	Dough-like	1.20	23	80	8,000	4,600	2,800	150 (63)	38 x 10 ^{-6****}
RP 569R/RP 569-2H	100/14	④ 50	Dough-like	1.14	21	80	5,000	4,000	1,800	138 (60)	48 x 10 ⁻⁶

Room-temperature Laminating Materials

RP 286 R/H White, Fast Strength, Filled

Thixotropic laminating system with easy-to-handle viscosity and outstanding compressive strength. For laminated tools and structures.

RP 1700-1 R/H Translucent, Low Viscosity, Unfilled

Thixotropic system with good wet-out and moisture resistance. For hand lay-up of fiberglass and other reinforcing fabrics and for bonding wood and Ren Shape® modeling materials.

RP 1710 R/H White, Good Wet-out, Filled

Dimensionally stable, thixotropic material that provides excellent cloth penetration. Can be demolded after eight hours. Withstands up to 190°F (88°C) on a broad range of laminated tools.

RP 1720 R/H White, Dimensionally Stable, Filled

Low-shrinkage system with excellent wet-out that holds close tolerances. Approved by major automotive industry manufacturers for critical laminating projects.

RP 3270 R/H Blue, Wear Resistant, Silicon Carbide Filled

Durable product with outstanding compressive strength. For use on laminated dies, hammer forms and foundry patterns.

TDT 231-1 R/H Translucent, Bondable, Unfilled

Thixotropic system with a 25-minute gel time. Turns from green to translucent when fully blended. Provides good cloth wet-out and outstanding adhesion between laminate layers for up to 24 hours at room temperature without surface preparation. Designed for use with RP 1124 R/H surface coat to fabricate high-quality, durable tools.

TDT 232-1 R/H White, Bondable, Filled

Easy-to-blend system that turns from green to white when completely mixed. Produces strong bonds between new and old laminate layers for up to 40 hours at room temperature without surface preparation. For use with RP 1124 R/H surface coat to produce large laminated tools.

Heat-resistant Laminating Systems

RP 4005R/RP 1500H Amber, Good Work Life, Unfilled

Easy-to-handle system for hand lay-up or vacuum bagging. Withstands temperatures to 300°F (149°C). Unfilled for good wet-out and minimal voids. Requires elevated-temperature postcure to attain full physical properties. Designed for use in vacuum-form, RTM, RIM and compression molds as well as other high-temperature tooling.

RP 4005R/RP 1510H Amber, Long Work Life, Unfilled

Wet lay-up system with a 160-minute work life. Withstands temperatures to 300°F (149°C) after an elevated-temperature postcure. Developed for constructing large vacuum-form and compression molds with intricate surface detail.

RP 4014R/RP 1500H Gray, Thixotropic, Filled

General-purpose laminating material for tools with vertical surfaces. Requires postcure to attain full physical properties. Designed for use in vacuum-form, RTM, RIM and compression molds as well as other high-temperature tooling to 300°F (149°C).

RP 4014R/RP 1510H Gray, High Strength, Filled

Wet lay-up system with 90-minute work life that can withstand temperatures to 300°F (149°C) after an elevated-temperature postcure. Designed for fabricating large vacuum-form and compression molds and for use in shops with high ambient temperatures.

RP 4017R/RP 1510H Black, Long Work Life

High-temperature material with good cloth wet-out that cures at room temperature but requires an elevated-temperature postcure. Developed for fabricating large, high-quality tools that must perform to 350°F (177°C), such as bonding fixtures, prepreg lay-up molds and vacuum-form molds.

CGL 1310R/RP 1510H Black, 400°F (200°C) System, Unfilled

Multifunctional epoxy-based laminating system with a long three-hour work life. Provides excellent high-temperature performance after an elevated-temperature postcure. For fabricating high-strength tools that will be exposed to very high temperatures.

Room-temperature Laminating Pastes

RP 569R/RP 569-1H Blue, Fast Demolding, Glass Reinforced

Easy-to-handle paste for quick, one-step construction of room-temperature tools and tooling aids with complex contours. Mechanical mixing produces best results. Small quantities can be hand kneaded.

RP 569R/RP 569-2H Blue, Long Work Life, Glass Reinforced

Paste with increased work life that permits fabrication of large tools for room-temperature applications. Mechanical mixing produces best results. Small quantities can be hand kneaded.

Casting Materials

Product Number	Mixing Ratio, Resin to Hardener, By Weight	Gel Time, min.	Mixed Viscosity, Brookfield, cP	Specific Gravity	Volumetric Weight, cu. in./lb.	Hardness, Shore D	Ultimate Compressive Strength, psi @ 77°F (25°C)	Ultimate Flexural Strength, psi @ 77°F (25°C)	Ultimate Tensile Strength, psi @ 77°F (25°C)	Tg,* °F (°C)	Coefficient of Thermal Expansion, in./in./°F	Shrinkage, in./in. (Cast)
Typical Properties of Room-temperature Epoxy Casting Materials												
RP 200 R/H	100/10	⑦ 90	25,000	1.74	15.9	88	12,000	10,600	6,000	158 (70)	13 x 10 ⁻⁶	0.0017 Mold #2
RP 206 R/H	100/10	① 80-90	10,000	2.27	12.2	89	14,000	8,600	5,800	—	—	—
RP 306 R/H	100/30	① 22	4,500	0.90	30.7	80	12,500	4,400	3,100	145 (63)	48 x 10 ⁻⁶	0.005 Mold #0
RP 1774 R/H	100/25/1.2	① 360	9,900	0.25	102.0	57	450	380	—	117 (47)	32 x 10 ⁻⁶	0.003 Mold #3
RP 3209-1 R/H	100/10	① 90	15,000	2.04	13.5	75	16,500	8,400	5,500	160 (71)	26 x 10 ⁻⁶	0.005 Mold #2
RP 3209-2 R/H	100/11	② 240	15,000	2.15	12.9	85	11,500	8,000	5,000	138 (59)	32 x 10 ⁻⁶	0.006 Mold #3
RP 3215-1 R/H	100/9	② 65	3,600	1.76	15.9	90	13,300	7,600	6,000	162 (72)	24 x 10 ⁻⁶	0.005 Mold #2
RP 3215-2 R/H	100/18	② 200	3,600	1.65	16.9	88	11,100	7,300	4,900	154 (68)	38 x 10 ⁻⁶	0.004 Mold #2
RP 3215-3 R/H	100/30 100/40 100/50	① 70 65 60	6,200 5,400 4,600	1.54 1.51 1.48	18.0 18.3 18.7	85 70 47	12,600 Soft Rubbery	6,900 300 Rubbery	4,300 1,200 300	120 (49) 93 (34) N/A	— — —	0.002 Mold #1 0.002 Mold #1 —
RP 3253 R/H	100/5	② 30	7,500	2.99	9.3	90	15,200	8,500	7,100	169 (76)	33 x 10 ⁻⁶	0.002 Mold #1
RP 3261 R/H	100/5	① 25	35,000	2.94	9.4	88	16,500	8,500	6,000	180 (82)	30 x 10 ⁻⁶	0.003 Mold #1
RP 3262 R/H	100/10	① 45	20,000	1.70	16.7	86	14,400	10,300	7,300	180 (82)	27 x 10 ⁻⁶	0.003 Mold #1
RP 3266 R/H	55/45 50/50 45/55	① 32 35 39	2,500 2,500 2,500	1.12 1.10 1.10	25.0 25.2 25.2	75 60 40	14,000 2,600 Rubbery	2,200 120 Rubbery	2,000 520 Rubbery	136 (58) 102 (39) N/A	— — —	0.002 Mold #1 0.002 Mold #1 0.002 Mold #1
RP 3269 R/H	100/9	② 60	4,300	1.78	15.6	87	14,400	13,000	8,700	171 (77)	38 x 10 ⁻⁶	0.001 Mold #1
RP 3269-1 R/H	100/12	② 150	4,600	1.70	16.3	87	12,500	11,600	7,300	146 (63)	38 x 10 ⁻⁶	0.003 Mold #2

Room-temperature Epoxy Casting Materials

RP 200 R/H Gray, Low Shrinkage, Aluminum Filled

Low-viscosity, machinable system that reproduces fine detail with minimal voids. For stretch form dies, lost wax molds and patterns.

RP 206 R/H Black, High Density, Filled

Low-viscosity, low-shrink epoxy that reproduces fine surface detail. For forming molds, patterns and checking or holding fixtures.

RP 306 R/H Brown, Low Density, Microballoon Filled

Easy-to-mix and pour syntactic foam that reproduces fine detail, is virtually unaffected by high humidity and is hand carvable. Designed for patterns, cores and surface castings up to 1-in. (2.5-cm) thick.

RP 1774 R/H Off-white, Lightweight Foam

Easy-to-handle, slow-rising (1-3x expansion), three-component epoxy system with low shrinkage. For mold back-ups and other lightweight tools.

RP 3209-1 R/H Black, High Strength, Iron Oxide Filled

Low-shrinkage product with long work life and high compressive and flexural strength. Can be cast to 2-in. (5-cm) thick for production of stretch press forms, foundry patterns, core boxes, holding fixtures and drop hammer dies.

RP 3209-2 R/H Black, Thick Casting, Iron Oxide Filled

Easy-to-handle system with an extended gel time that can be cast against metal up to 6-in. (15-cm) thick. Formulated for chuck jaws, production castings, patterns, molds and backfilling.

RP 3215-1 R/H Black, Impact Resistant, Iron Oxide Filled

Low-shrinkage, low-viscosity system that produces good wear resistance. For casting forming dies, foundry patterns and fixtures up to 3/4-in. (2-cm) thick.

RP 3215-2 R/H Black, Thick Casting, Iron Oxide Filled

General-purpose, low-viscosity material with slower cure cycle to permit backfilling and casting of dies and foundry patterns, up to 4-in. (10-cm) thick, against metal.

RP 3215-3 R/H Black, Variable Hardness, Iron Oxide Filled

Low-viscosity, machinable system that produces resilient, chip-resistant castings with hardnesses from Shore 45D to 85D. Can be cast against metal up to 4-in. (10-cm) thick for dies, fixtures and patterns.

RP 3253 R/H Black, Wear Resistant, Iron Filled

Tough material with outstanding resistance to surface abrasion. Designed for thin (3/4-in., 2-cm) castings used in dies, punches, core boxes and hammer forms.

RP 3261 R/H Black, Impact Resistant, Iron Filled

Casting system with excellent flow which also can be used as a surface coat. Accurately reproduces surface detail from patterns and models and forms castings with high compressive and flexural strengths. For foundry patterns, hammer form dies, core boxes and holding fixtures cast against metal up to 1/2-in. (1-cm) thick.

RP 3262 R/H Gray, High Strength, Aluminum Filled

Easy-to-mix system that provides excellent reproduction of detail in castings to 1/2-in. (1-cm) thick. Designed for forming working faces on metallic-core punches, dies and lost wax molds.

RP 3266 R/H Amber, Flexible, Unfilled

Low-viscosity, variable hardness system formulated for producing flexible, impact-resistant castings up to 1-in. (2.5-cm) thick.

RP 3269 R/H Gray, Low Viscosity, Aluminum Filled

Low-shrinkage system with high strength and good machinability. For casting duplicate models, stretch dies and contour checking blocks up to 3/4-in. (2-cm) thick as well as for surface casting fixtures, dies and lost wax molds.

RP 3269-1 R/H Gray, High Strength, Aluminum Filled

Low-viscosity, machinable material with long work life. Reproduces fine detail in castings, up to 4-in. (10-cm) thick, formed against metal. Developed for patterns, hammer forms, holding fixtures, drop hammer dies and backfilling.

Casting Materials

Product Number	Mixing Ratio, Resin to Hardener, By Weight	Gel Time, min.	Mixed Viscosity, Brookfield, cP	Specific Gravity	Volumetric Weight, cu. in./lb.	Hardness, Shore D	Ultimate Compressive Strength, psi @ 77°F (25°C)	Ultimate Flexural Strength, psi @ 77°F (25°C)	Ultimate Tensile Strength, psi @ 77°F (25°C)	Tg,* °F (°C)	Coefficient of Thermal Expansion, in./in./°F	Shrinkage, in./in. (Cast)
Typical Properties of Room-temperature Polyurethane Casting Materials												
PUR-FECT TOOL® I	100/100	① 10	1,800	1.79	15.4	83	6,800	4,250	2,800	172 (78)	33 x 10 ⁻⁶	0.002 Mold #1
Pro-Cast® 10	100/100	⑥ 6-10	1,500	1.75	15.9	81	7,200	5,000	3,300	203 (95)	25 x 10 ⁻⁶	0.002 Mold #1
Pro-Cast 20	100/100	⑥ 7-10	1,500	1.78	15.6	85	7,400	4,900	3,100	190 (88)	25 x 10 ⁻⁶	0.0017 Mold #1
Pro-Cast 30	100/100	⑥ 7-10	4,500	2.03	13.7	80	6,800	3,000	1,800	189 (87)	36 x 10 ⁻⁶	0.005 Mold #1
RP 132 R/H	100/100	⑥ 5-7	5,000	1.71	16.3	84	8,200	6,700	4,200	192 (89)	19 x 10 ⁻⁶	0.0028 Mold #1

Typical Properties of Silicone Rubber Moldmaking System

RP 6473 Si R/H	100/7	150-200	30,000-60,000	1.01	27.5	30A	—	—	600	—	—	—
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Typical Properties of Heat-resistant Epoxy Casting Materials

RP 4036R/RP 1500H	100/6	① 60	20,000	1.69	16.5	90	30,000	7,500	6,500	300 (149)	19 x 10 ⁻⁶	0.004 Mold #1
RP 4036R/RP 1511H	100/13	② 140	15,000	1.58	17.6	91	25,800	9,300	6,300	350** (177)	22 x 10 ⁻⁶	0.005 Mold #3
Cast-IT™ 2000	100/7	60	50,000	2.1	13.2	91	25,500	14,000	9,000	408 (209)	15 x 10 ⁻⁶	0.001 Mold #2

Paste Materials

Product Number	Mixing Ratio, Resin to Hardener, By Weight	Gel Time, min.	Mixed Viscosity, Brookfield, cP	Specific Gravity	Volumetric Weight, cu. in./lb.	Hardness, Shore D	Ultimate Compressive Strength, psi @ 77°F (25°C)	Ultimate Flexural Strength, psi @ 77°F (25°C)	Ultimate Tensile Strength, psi @ 77°F (25°C)	Tg,* °F (°C)	Coefficient of Thermal Expansion, in./in./°F	Shrinkage, in./in. (Cast)
Typical Properties of Room-temperature Paste Materials												
RP 1220 R/H	100/50	① 33	Sag: pass ¼" - fail ⅜"	1.64	16.9	81	12,000	6,500	3,750	178 (81)	22 x 10 ⁻⁶	0.002 Mold #1
RP 1225 R/H	100/18	① 15	Sag: pass ¼" - fail ½"	1.44	19.2	88	14,300	7,800	4,500	176 (80)	30 x 10 ⁻⁶	0.002 Mold #1
RP 1250 R/H	100/100	① 28	Sag: pass ½" - fail 1"	1.52	18.2	87	12,000	7,300	3,800	176 (80)	22 x 10 ⁻⁶	0.002 Mold #1
RP 3281 R/H	100/100	② 2.5-3 hrs	Dough-like	0.55	50	50	2,690	1,500	1,086	158 (70)	16 x 10 ⁻⁶	0.0002 Mold #3
TDT 177-113 R/H	100/82	① 20	Sag: pass ⅜" - fail ½"	0.68	40	63	4,000	4,500	2,750	150 (65)	35 x 10 ⁻⁶	0.004 Mold #0
TDT 177-119 R/H	100/12	① 35	Sag: pass ¼" - fail ⅜"	0.94	29.4	85	13,700	4,600	4,100	282 (139)	19 x 10 ^{-6****}	—

Room-temperature Polyurethane Casting Materials

PUR-FECT TOOL® I Gray, Fast Curing, Filled

Low-shrinkage polyurethane with a Shore 83D hardness, excellent dimensional stability, good abrasion and impact resistance and high compressive strength. Useful for duplicating molds, assembly jigs and fixtures, and short-run foundry patterns, core boxes and molds cast up to 4-in. (10-cm) thick.

Pro-Cast 10 Black or Tan, 30-60 Minute Demold, Filled

Fast-setting, low-shrinkage polyurethane that reproduces fine detail and has a low coefficient of thermal expansion. For prototype parts, molds and fixtures.

Pro-Cast 20 Off-White, Blue or Gray, 60-90 Minute Demold, Filled

Fast-setting, low-shrinkage polyurethane with a Shore 85D hardness. For molds, patterns and shop aids.

Pro-Cast 30 Gray, Thermally Conductive, Aluminum Filled

Machinable polyurethane that reproduces fine detail and can be demolded after 60 minutes. For patterns, molds and shop aids.

RP 132 R/H Gray, Fast Setting, Filled

Tough, fast-curing polyurethane that offers accurate reproduction of detail. For holding fixtures, foundry patterns and vacuum-form molds.

Silicone Rubber Moldmaking System

RP 6473 Si R/H Clear, High Elongation

Tough, flexible silicone rubber with a Shore hardness of 30A, elongation of 300 and tear strength of 60 ppi. Offers excellent surface duplication and is ideal for casting difficult, complex molds. For prototype duplicating molds with high clarity.

Heat-resistant Epoxy Casting Materials

RP 4036R/RP 1500H Gray, High Strength, Aluminum Filled

Gels at room temperature. Requires high-temperature postcure for optimum properties. Produces castings up to 1-in. (2.5-cm) thick that can withstand temperatures to 300°F (149°C). Designed for casting vacuum-form, compression and injection molds.

RP 4036R/RP 1511H Gray, High Strength, Aluminum Filled

Slower version of RP 4036R/RP 1500H. Gels at room temperature followed by a supported, elevated-temperature postcure. For casting vacuum-form, compression and injection molds up to 2-in. (5-cm) thick. Thicker castings require use of RP 39 or RP 40 aluminum filler.

Cast-IT 2000 Gray, Ultra High Strength, Aluminum Filled

High-performance casting system with good fluidity for easy handling. Exhibits very low shrinkage, excellent dimensional stability and high strength after an elevated-temperature postcure. Cured surfaces can be polished for a metal-like finish. Produces castings up to 2-in. (5-cm) thick. Thicker sections require cooling lines every 2 in. (5 cm). Ideal for injection molds.

Room-temperature Paste Materials

RP 1220 R/H Green, Sag Resistant

Tough, low-shrinkage, machinable system that is useful as a base coat for splined aircraft/aerospace mock-ups and models as well as a repair paste for router fixtures and a potting material for bushings and inserts.

RP 1225 R/H White, Fast Setting

Easy-to-handle, low-shrinkage paste that produces strong bonds between successive coats. For finish splining and surface repair of models and room-temperature tools.

RP 1250 R/H Gray, Versatile, Aluminum Filled

Low-shrinkage, color-coded system that provides exceptional adhesion to metals, ceramics, glass, concrete and wood. The cured paste can be scraped, filled, sanded or machined to a feather edge.

RP 3281 R/H Blue, Low Density, Dough-like, Microballoon Filled

Economical, extremely low-shrinkage filler material with convenient work life and outstanding dimensional stability. Developed as a back-fill to stiffen and reinforce plastic tools and for constructing quick, low-cost negative molds and core masks as well as internal core structures for foundry patterns and core boxes.

TDT 177-113 R/H Brown, Workable, Repair Paste

Smooth, stable paste that is machinable and color-matched to Ren Shape 450 for cosmetic or structural repair of masters and use as an adhesive.

TDT 177-119 R/H Gray, Structural Repair Paste

Stable, easy-to-apply paste that is color-matched to Ren Shape 550 intermediate-temperature modeling material. For cosmetic and structural repair of Ren Shape 550 masters.

Accessories

Coloring Pastes

Easy-to-blend pastes packaged in tubes and gallons for custom coloring of epoxy, polyurea and polyurethane materials. Available colors:

DW-0131 - White	DW-0132 - Yellow
DW-0133 - Red	DW-0134 - Green
DW-0135 - Blue	DW-0136 - Brown
DW-0137 - Black	

Colors available for Parts-In-Minutes® polyurethanes:

PIM - Blue	PIM - Red
PIM - Black	PIM - Green
PIM - Yellow	

RP 32 Fiberglass Milled Fibers

Fibers measuring approximately 1/32 in. (1 mm) that can increase impact strength, heat-distortion temperature and dimensional stability of epoxy compounds.

RP 34 Aluminum Powder

Powder that retains high strength at high loading levels. Easy to drill and machine with minimal breakage and chip-out.

RP 35 White Floc

Easy-to-use cellulose floc for thickening epoxy materials.

RP 37 Aluminum Alloy Puffs

Measuring 3/8 in. to 1/2 in. (1 cm), puffs are easy to mix and wet-out when added to laminating and casting systems. Provide high strength-to-weight ratio in mixed systems and minimize shrink and exotherm. Designed for filling vacuum chambers and constructing tool backups.

RP 38 Aluminum Granules

Fine, 145-mesh granules that permit high filler loading to improve impact and compressive strength in laminating systems. For use in dies, compression and injection molds.

RP 39 Aluminum Grain

Particles measuring 1/16 in. (2 mm) in diameter and from 1/8-in. to 1/4-in. (3-mm to 6-mm) long for easy mixing and pouring of mass-casting systems. Designed for casting back-up structures on a variety of patterns and tools.

RP 40 Aluminum Shot

Very easy-to-mix particles measuring approximately 3/16 in. (5 mm) in diameter. Feature high cured compressive strength.

RP 64 Treated, Glass Cloth Tape

Style 7500, 8-ounce tape with selvaged edges supplied in widths of 1-1/2 in., 3 in., 6 in. and 12 in. (4 cm, 8 cm, 15 cm and 30 cm). For a broad range of laminating applications.

RP 70-S Hand Cleaner

All-purpose cleaner for use with and without water to remove grease, uncured plastics and adhesives, paint, stains and other shop dirt from hands and tools.

RP 78-2 Release Agent

Aerosol silicone-based release film that forms a slick surface that is non-melting and heat resistant up to 400°F (204°C). Formulated specifically for use on epoxies and polyurethanes. It is not recommended for releasing silicone rubber from silicone rubber.

RP 79-2 Release Agent

Aerosol, semi-permanent, dry-film Teflon** -based release agent formulated without wax or silicone. Resists transfer from the mold to the part. Designed for use on epoxies, polyurethanes and polyesters.

RP 802 Sealer

Green, PVC-based lacquer sealer that can be sprayed or brushed on plaster or wood surfaces.

RP 803 Release Agent

White, wax-based, liquid parting agent that produces an exceptionally thin film to ensure accurate pick-up of minute detail. Contains a trace amount of silicone. Dries clear and can be polished to a high gloss. Can be used on metal, wood, plastic and composites.

RP 804 Release Film

Water-soluble, PVA-based, film-forming material with good flow. Dark green film can be sprayed or brushed on most substrates. For releasing surfaces with complex contours in conjunction with a second release agent such as RP 78-2 or RP 79-2. Should not be used as a sealer.

Ren Shape Sealer No. 1

A high-performance base coat for use on freshly cast Cast-IT 2000 and newly milled Ren Shape-Express™ 2000 surfaces before application of release agents. Helps protect molds from chemical attack.

RP 805 Release Agent

Easy-to-apply, hard-wax release agent that buffs to a high gloss. Can be used on plastic, metal or properly sealed wood and plaster molds.

RP 870 Primer

Liquid, two-component primer with long, eight-hour work life. Designed to improve adhesion of polyurethane systems to metal substrates including iron, steel, aluminum, galvanized iron and stainless steel.

Brushes and Paddles

Plastic-handled 1-in. and 2-in. (2.5-cm and 5-cm) brushes with stiff nylon, non-absorbent bristles for use with epoxy resins. Hardwood paddles finished with a smooth surface.

Ren Tooling Systems CD Rom

A comprehensive CD Rom including descriptions of Ren Tooling Systems products, technical data sheets, video clips, illustrated customer success stories, technical papers and recommended tooling techniques is available. To obtain a CD Rom, call 800-955-5509, or write: Product Literature, Vantico, 4917 Dawn Avenue, East Lansing, Michigan 48823.

*Teflon is a registered trademark of E.I. DuPont de Nemours and Company.

Epoxy Application, Handling and Storage

Storage Temperatures and Conditions

Store epoxy resins and hardeners at temperatures from 65°F to 90°F (18°C to 32°C), unless the product label indicates otherwise. During cold weather, place containers of resin and hardener on pallets and at least 24 inches from the wall to avoid lowering the temperature of the materials. **Avoid storing materials near outside walls or doors.**

Product Shelf Life

Shelf life is the maximum amount of time a compound can be stored in its original, unopened container at temperatures from 65°F to 90°F (18°C to 32°C). After this period, or if the can has been opened or damaged or the temperature parameters have been exceeded, the material may degrade and not attain its full physical performance characteristics.

Crystallization

Epoxies that are contaminated with dust, dirt or moisture, or are subjected to low temperatures, may undergo a physical change that causes crystal formation. The first sign of crystallization is a grainy texture in the resin or hardener. This granulation can cause the material to crystallize and solidify.

Do not use material that has any sign of crystallization until it has been reliquified.

A crystallized resin or hardener can be returned to its original state by heating the compound to 120°F to 140°F (48°C to 60°C) and stirring the material until its normal consistency is regained.

Curing/Post Curing

The normal cure time for a room-temperature system is seven days at 77°F (25°C). Lower temperatures will increase the cure time; temperatures above 77°F (25°C) will reduce cure time but will increase shrinkage significantly.

Heat-resistant epoxies require an elevated-temperature postcure to enable the resin and hardener to develop their full physical and high-temperature properties. **Systems that are not properly postcured may fail when subjected to high temperatures.**

To determine the correct cure/postcure schedule for a material, refer to the product's data sheet. A typical cure/postcure schedule for a heat-resistant epoxy is:

- Cure at room temperature for 16 to 24 hours;
- Postcure in an oven or autoclave, on the pattern if possible, for two hours each at 150°F (66°C), 200°F (93°C), 250°F (121°C) and 300°F (149°C).

This cure schedule will produce a tool that can perform at temperatures to 300°F (149°C). To reduce potential mold shrinkage and warpage problems, postcure tools to a temperature only 50° higher than their anticipated operating temperature.

IMPORTANT:

The following supercedes Buyer's documents. SELLER MAKES NO REPRESENTATION OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. No statements herein are to be construed as inducements to infringe any relevant patent. Under no circumstances shall Seller be liable for incidental, consequential or indirect damages for alleged negligence, breach of warranty, strict liability, tort or contract arising in connection with the product(s). Buyer's sole remedy and Seller's sole liability for any claims shall be Buyer's purchase price. Data and results are based on controlled or lab work and must be confirmed by Buyer by testing for its intended conditions of use. The products described herein have not been tested for, and are therefore not recommended for, uses for which prolonged contact with mucous membranes, abraded skin, or blood is intended; or for uses for which implantation within the human body is intended.

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