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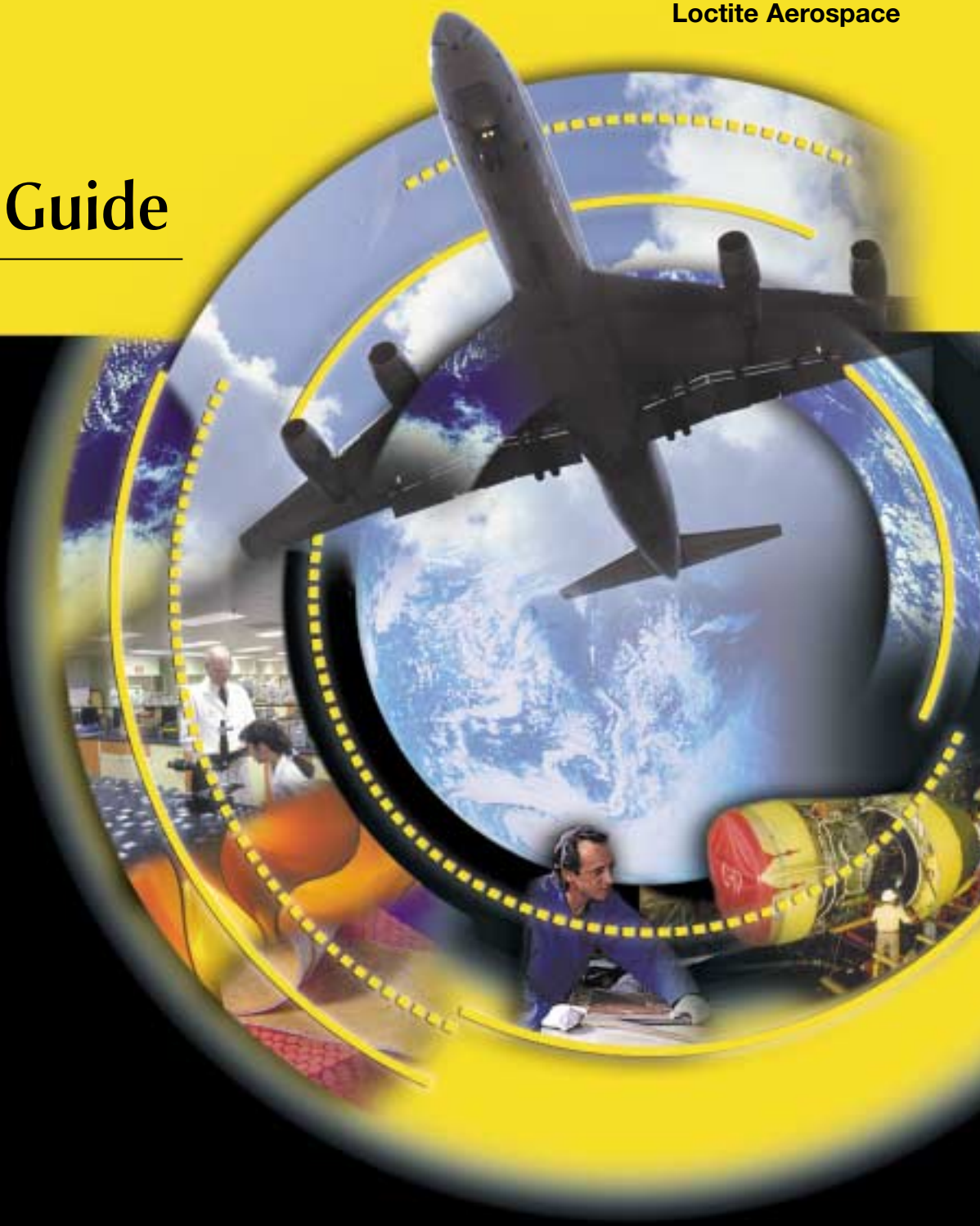
Loctite Aerospace

Product Selector Guide

Aerospace
Adhesive
Systems



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Henkel Technologies

RTM Resins	Service Temperature	Pot Life (minutes)	Page
Hysol EA 9150 Resin	250°F/121°C	480	4

Tough High Strain Pastes	Service Temperature	Bell Peel (77°F/25°C)	Page
Hysol EA 9309.3NA	180°F/82°C	75 (lb/in)/335 (N/25mm)	4
Hysol EA 9313	120°F/49°C	50 (lb/in)/225 (N/25mm)	4
Hysol EA 9320NA	>180°F/82°C	35 (lb/in)/150 (N/25mm)	4
Hysol EA 9330	180°F/82°C	60 (lb/in)/265 (N/25mm)	4
Hysol EA 9330.3	180°F/82°C	60 (lb/in)/265 (N/25mm)	4
Hysol EA 9346.5	300°F/149°C	60 (lb/in)/265 (N/25mm)	4
Hysol EA 9359.3	200°F/93°C	75 (lb/in)/335 (N/25mm)	4
Hysol EA 9360	>225°F/107°C	60 (lb/in)/265 (N/25mm)	4
Hysol EA 9361	140°F/60°C	35 (lb/in)/150 (N/25mm)	4
Hysol EA 9371	180°F/82°C	15 (lb/in)/70 (N/25mm)	4

High Temperature Filled Pastes	Service Temperature	Pot Life (minutes)	Page
Hysol EA 934NA	300°F/149°C	40	4
Hysol EA 9321	250°F/121°C	40	4
Hysol EA 9392	350°F/177°C	75	6
Hysol EA 9394	350°F/177°C	100	6
Hysol EA 9394/C-2	450°F/232°C	480	6
Hysol EA 9395	350°F/177°C	100	6

Liquid Shims	Service Temperature	Pot Life (minutes)	Page
Hysol EA 934NA	300°F/149°C	40	4
Hysol EA 9360	>225°F/107°C	40	4
Hysol EA 9377	>200°F/93°C	60	4
Hysol EA 9394	350°F/177°C	100	6
Hysol EA 9394.2	225°F/107°C	15	6

Low Viscosity Wet Lay-up Pastes	Cure Temperature	Pot Life (minutes)	Page
Hysol EA 956	77°F/25°C	30	4
Hysol EA 9390	200°F/93°C	120	4
Hysol EA 9396	77°F/25°C	75	6
Hysol EA 9396/C-2	200°F/93°C	480	6

Syntactics and Low-Density Pastes	Service Temperature	Density	Page
Hysol EA 960F	160°F/71°C	N/A	4
Hysol EA 9396.6MD	300°F/149°C	37 (pcf)/0.60 (g/cc)	6
Hysol TF 3056FR	77°F/25°C	30 (pcf)/0.48 (g/cc)	4

Frekote®			Page
Mold Release	All Frekote Products		6-7

Primers			Page
Adhesive Primers	All Hysol Primers		8-9

250°F Service Metal Bonding Films	Service Temperature	Honeycomb Climbing Drum Peel	Page
Hysol EA 9602.3	250°F/121°C	20 (in•lb/in)/90 (m•N/m)	8
Hysol EA 9628	250°F/121°C	18 (in•lb/in)/80 (m•N/m)	8
Hysol EA 9628H	250°F/121°C	20 (in•lb/in)/90 (m•N/m)	8
Hysol EA 9686	300°F/149°C	17 (in•lb/in)/76 (m•N/m)	8
Hysol EA 9696	250°F/121°C	25 (in•lb/in)/110 (m•N/m)	8

300°F Service Composite Bonding Films	Service Temperature	Outtime (days @ 77°F/25°C)	Page
Hysol EA 9695	>300°F/149°C	90	8

High Temperature Engine Nacelle Films	Service Temperature	Outtime (days @ 77°F/25°C)	Page
Hysol EA 9657	400°F/204°C	15	8
Hysol EA 9673 (BMI)	550°F/288°C	30	8
Hysol EA 9689	420°F/216°C	10	8

Core Splices	Service Temperature	Expansion Ratio	Page
Hysol EA 9833.1 (BMI)	450°F/232°C	2-3x	10
SynSpand 9899CF	350°F/177°C	1-2x	10

Syntactic Films	Service Temperature	Density	Page
SynCore 9823.1	250°F/121°C	42 (pcf)/0.67 (g/cc)	10
SynCore 9872.1	350°F/177°C	42 (pcf)/0.67 (g/cc)	10

Expanding Syntactic Films - Core Fills	Service Temperature	Density	Page
SynSpand 9899	350°F/177°C	8-25 (pcf)/0.12-0.40 (g/cc)	10
SynSpand 9899CF	350°F/177°C	18-35 (pcf)/0.29-0.56 (g/cc)	10

Jet Engine Abradable Seals	Service Temperature	Outtime (days @ 77°F/25°C)	Page
SynSpand EA 9890	180°F/82°C	15	10

Composite Surfacing Films	Service Temperature	Outtime (days @ 77°F/25°C)	Page
SynSkin HC 9837.1	350°F/177°C	90	10

Hysol® Paste Adhesives and Specialty Resins

Product	Applications							Characteristics								Mechanical Properties			
																	Tensile Lap Shear		
	Potting	Structural Repair	Low Viscosity Wet Lay-up	Composite Bonding	High Peel Strength	Syntactic	Liquid Shim	≥180°F/82°C Service	≥300°F/149°C Service	Improved Hot/Wet Properties	Toughened	Service Temperature (°F/°C)	Consistency	Form (1 part or 2 part)	Peel Strength	Bell Peel 77°F (lb/in)/25°C (N/25mm)	-67°F (psi)/-55°C (MPa)	77°F (psi)/25°C (MPa)	200°F (psi)/93°C (MPa)
Hysol EA 934NA	●	●					●		●			300/149	Thixotropic	2	Nil	—	2800/19.3	3100/21.4	2000/13.8
Hysol EA 956		●	●						●			300/149	Low Viscosity	2	Nil	—	1800/12.4	2300/15.9	1500/10.3
Hysol EA 960F												160/71	Thixotropic	2	Nil	—	2000/13.8	2200/15.2	700/4.8
Hysol TF 3056FR	●					●						77/25	Syntactic	2	Nil	—	1100/7.6	1000/6.9	300/2.1
Hysol EA 9150 Resin			●	●				●			●	250/121	Low Viscosity	2	Low	—	—	—	—
Hysol EA 9309.3NA		●		●	●			●		●	●	180/82	Moderate Viscosity	2	High	75/335	5500/38.0	5000/34.5	750/5.2
Hysol EA 9313					●						●	120/49	Low Viscosity	2	High	50/225	4200/29.0	4500/31.0	500/3.5
Hysol EA 9320NA					●			●			●	>180/82	Moderate Viscosity	2	Moderate	35/150	3400/23.5	4600/31.7	1000/6.9
Hysol EA 9321	●	●						●			●	250/121	Thixotropic	2	Low	6/25	3000/20.7	4000/27.6	1700/11.7
Hysol EA 9323		●						●			●	250/121	Low Viscosity	2	Low	4/20	2800/19.3	4200/29.0	1100/7.6
Hysol EA 9330		●		●	●			●			●	180/82	Moderate Viscosity	2	High	60/265	5000/34.5	5000/34.5	750/5.2
Hysol EA 9330.3		●		●	●			●			●	180/82	Thixotropic	2	High	60/265	5700/39.3	4900/33.8	750/5.2
Hysol EA 9346.5		●		●	●			●		●	●	300/149	Moderate Viscosity	1	High	60/265	4500/31.0	5500/38.0	4500/31.0
Hysol EA 9359.3		●		●	●			●		●	●	200/93	Thixotropic	2	High	75/335	4000/27.6	4500/31.0	1000/6.9
Hysol EA 9360		●		●	●		●	●		●	●	>225/107	Thixotropic	2	High	60/265	4000/27.6	5000/34.5	1200/8.3
Hysol EA 9361		●		●							●	140/60	Low Viscosity	2	Moderate	35/150	4000/27.6	3500/24.1	500/3.5
Hysol EA 9371		●		●				●			●	180/82	Moderate Viscosity	2	Low	15/70	1600/11.0	3700/25.5	1000/6.9
Hysol EA 9377							●		●			>200/93	Thixotropic	2	Nil	—	2300/15.9	2300/15.9	2000/13.8
Hysol EA 9390		●	●	●					●	●		>350/177	Low Viscosity	2	Nil	—	2200/15.2	3500/24.1	3000/20.7

Bulk Properties					Handling					Description
Tensile Strength @ 77°F (psi)/ 25°C (MPa)	Tensile Modulus @ 77°F (ksi)/ 25°C (MPa)	Elongation @ 77°F/25°C % at break	Compressive Strength @ 77°F (psi)/25°C (MPa)	Compressive Modulus @ 77°F (ksi)/25°C (MPa)	Mix Ratio Weight (Part A/Part B)	Cure Temperature (°F/°C)	Cure Time	Storage Temperature (°F/°C)	Pot Life (minutes/lb)/(minutes/kg)	
6200/ 42.8	647/ 4450	1.2	13500/ 93.1	367/ 2530	100:33	77/25 200/93	5-7 days 1 hour	40/4	40/1 40/.5	Cures at 77°F/25°C, possesses superior strength to 300°F/149°C. Ideal for potting, filling, fairing, and shim applications.
5800/ 40.0	370/ 2250	2.5	16900/ 116.6	580/ 4000	100:58	77/25 200/93	5-7 days 1 hour	40/4	30/1 30/.5	Very low viscosity, cures at room temperature, maintains strength at high temperatures. Ideal for wet lay-up repair.
—	—	—	—	—	100:50	77/25 160/71	24 hours 1 hour	77/25	30/.25 30/.1	Fast-set fairing and smoothing compound for exterior aircraft surfaces. Color changes when fully mixed. Sandable after six hours.
—	—	—	2000/ 13.8	80/ 550	100:36	77/25 160/71	5-7 days 1 hour	77/25	60/.25 60/.1	Low density, thixotropic potting compound. Cured adhesive is self-extinguishing to flame. Density 30 pcf (0.48 g/cc).
11000/ 75.9	414/ 2850	5	—	—	100:88	250/121	1 hour	77/25	480/1 480/.5	Low viscosity, toughened system formulated for resin transfer molding. 250°F/121°C cure and service temperature.
4500/ 31.0	324/ 2230	10	7500/ 51.7	245/ 1700	100:22	77/25 180/82	5-7 days 1 hour	77/25	35/1 35/.5	Toughened adhesive with excellent peel strength. Contains glass beads for bondline control.
6300/ 43.5	330/ 2280	8	9000/ 62.1	263/ 1800	100:25	77/25 180/82	5-7 days 1 hour	77/25	60/1 60/.5	Very low viscosity adhesive yielding tough, flexible bonds. Injectable.
5000/ 34.5	330/ 2280	9	8800/ 60.7	265/ 1820	100:19	77/25 180/82	5-7 days 1 hour	77/25	25/.5 25/.25	High shear and high peel adhesive system with room temperature cure.
7100/ 49.0	420/ 2900	6	9000/ 62.1	284/ 1960	100:50	77/25 180/82	5-7 days 1 hour	40/4	40/1 40/.5	Thixotropic adhesive that yields tough, durable bonds over a wide temperature range.
3500/ 24.1	375/ 2600	9	10700/ 73.8	256/ 1770	100:45	77/25 180/82	5-7 days 1 hour	40/4	30/1 30/.5	Viscous, but pourable liquid adhesive that yields tough, durable adhesive bonds over a wide temperature range.
5600/ 38.6	384/ 2650	2.4	7700/ 53.1	253/ 1750	100:33	77/25 180/82	5-7 days 1 hour	77/25	60/.25 60/.1	Easy mix adhesive with high peel strength and excellent environmental durability.
6100/ 42.1	390/ 2680	9	—	—	100:33	77/25 180/82	5-7 days 1 hour	77/25	60/.25 60/.1	Non-slump thixotropic adhesive with high peel strength and excellent environmental durability.
5000/ 34.5	260/ 1800	3	15000/ 103.5	400/ 2750	—	250/121	1 hour	40/4	14 days/1 14 days/.5	Moderate viscosity, one component, high peel and shear strength. Outstanding hot/wet properties. Recommended replacement for EA 9304.1, EA 9304.2.
5300/ 36.6	320/ 2200	7.7	—	—	100:44	77/25 180/82	5-7 days 1 hour	77/25	40/1 40/.5	Excellent peel and shear strength. Bonds variety of substrates. Volumetric mix ratio 2:1. Improvement over EA 9309NA series adhesives.
—	—	—	—	—	100:43	77/25 180/82	5-7 days 1 hour	77/25	40/.5 40/.25	Volumetric mix ratio 2:1. Structural adhesive, exhibits excellent peel strength and tensile lap shear strength to 250°F/121°C.
3000/ 20.7	105/ 720	50	—	—	100:140	77/25 180/82	5-7 days 1 hour	77/25	120/.25 120/.1	High elongation, good shear, peel and flexibility. General purpose bonding, sealing, and cryogenic applications.
—	—	—	—	—	100:62	77/25 180/82	24 hours 1 hour	40/4	18/.25 18/.1	Fast-set, tough, good hot/wet properties. Handling strength after two hours. Volumetric mix ratio 1:1.
—	—	—	16000/ 110.3	700/ 4820	100:19	77/25 180/82	5-7 days 1 hour	40/4	60/.25 60/.1	Moldable plastic shim, excellent microcracking resistance under thermal cycling. High compressive strength.
8200/ 56.6	418/ 2900	2.5	5300*/ 36.6*	—	100:56	200/93	3.5 hours	40/4	120/.5 120/.25	Low viscosity system for high temperature wet lay-up composite repair. Qualified to BMS 8-301.

* Compression shear strength as a wet lay-up resin with 3K-70-P fiber.

Hysol® Paste Adhesives and Specialty Resins, cont'd

Product	Applications							Characteristics								Mechanical Properties			
																	Tensile Lap Shear		
	Potting	Structural Repair	Low Viscosity Wet Lay-up	Composite Bonding	High Peel Strength	Syntactic	Liquid Shim	≥180°F/82°C Service	≥300°F/149°C Service	Improved Hot/Wet Properties	Toughened	Service Temperature (°F/°C)	Consistency	Form (1 part or 2 part)	Peel Strength	Bell Peel 77°F (lb/in)/25°C (N/25mm)	-67°F (psi)/-55°C (MPa)	77°F (psi)/25°C (MPa)	200°F (psi)/93°C (MPa)
Hysol EA 9392	●	●		●			●		●		●	350/177	Thixotropic	2	Moderate	40/ 180	3500/ 24.0	4300/ 29.7	2200/ 15.2
Hysol EA 9394	●	●		●			●		●	●	●	350/177	Thixotropic	2	Low	20/ 90	3300/ 22.8	4200/ 29.0	2900/ 20.0
Hysol EA 9394.2	●	●					●	●			●	225/107	Thixotropic	2	Nil	—	2900/ 20.0	4500/ 31.0	—
Hysol EA 9394/C-2		●							●			450/232	Moderate Viscosity	2	Low	10/ 45	3500/ 24.0	5000/ 34.5	3500/ 24.1
Hysol EA 9395	●	●		●					●	●	●	350/177	Thixotropic	2	Low	15/ 70	2300/ 15.9	4000/ 27.6	2400/ 16.6
Hysol EA 9396		●	●	●					●	●	●	350/177	Low Viscosity	2	Moderate	25/ 110	3300/ 22.8	3500/ 24.1	3200/ 22.1
Hysol EA 9396/C-2		●	●	●					●	●		400/204	Low Viscosity	2	Low	15/ 70	2500/ 17.2	3000/ 20.7	2000/ 13.8
Hysol EA 9396.6MD	●					●			●			300/149	Syntactic	2	Nil	—	2000/ 13.8	2600/ 18.0	1500/ 10.3

Frekote® Mold Release Products

Product	Application Temperature Range	Cure Time	Benefits	Description
Frekote Aqualine™ C-200 / C-210	120°-300°F/ 50°-150°C	Post cure the final film for at least 40 mins. at 140°F/ 60°C, 20 mins. at 212°F/100°C, or 15 mins. at 250°F/ 120°C	• Very low VOC content • No mold build-up • No contaminating transfer • Non-flammable	A unique water-based release agent designed to provide multiple release with no contaminating transfer. Chemically bonds to the mold surface to form a thin, chemically resistant coating capable of releasing all thermoset composites. Aqualine C-210 Touch-Up is designed for applications where a hot (>140°F/ 60°C) mold touch-up is required or where spray application is being used.
Frekote B-15 Sealer	Up to 140°F/60°C	24 hours at room temperature, or bake for 60 minutes at 210°-300°F/100°-150°C	• Seals mold porosity • No contaminating transfer • Compatible with all Frekote products	Formulated as a sealer for molds with micro-porosity problems, small surface scratches or imperfections. Used in conjunction with other Frekote products, B-15 provides an excellent base coat enhancing the release advantages of all Frekote products.
Frekote #1-NC	400°F/204°C	No curing time required	• All purpose lubricating • Fast drying • Easy to use • Excellent anti-stick properties	A non-CFC Teflon®-based release agent which exhibits excellent anti-stick and release characteristics. Provides a release coating effective with all types of rubber compounds, epoxies, and polyurethanes. Particularly effective for releasing silicone rubber and epoxies. All purpose dry lubricant for gears, belts, connectors, glass, metals, wood and even paper. Teflon® is a registered trademark of E.I. Dupont de Nemours Co. Inc.
Frekote 44-NC	Up to 140°F/60°C	3 hours at room temperature, or bake for 15 mins. at 210°-300°F/ 100°-150°C	• High thermal stability • Better mold utilization • No mold build-up • High productivity • Significantly lower mold maintenance costs • No contaminating transfer	A non-CFC release agent designed to provide multiple releases with no contaminating transfer. Can be used for the release of thermoplastics, thermosetting resins, boron, aramid, graphite/carbon fiber composites and fiberglass laminates.

Bulk Properties					Handling					Description
Tensile Strength @ 77°F (psi)/ 25°C (MPa)	Tensile Modulus @ 77°F (ksi)/ 25°C (MPa)	Elongation @ 77°F/25°C % at break	Compressive Strength @ 77°F (psi)/25°C (MPa)	Compressive Modulus @ 77°F (ksi)/25°C (MPa)	Mix Ratio Weight (Part A/Part B)	Cure Temperature (°F/°C)	Cure Time	Storage Temperature (°F/°C)	Pot Life (minutes/lb)/(minutes/kg)	
6000/ 41.4	480/ 3300	4.6	—	—	100:32	77/25 180/82	5-7 days 1 hour	77/25	75/.25 75/.1	Room temperature cure, excellent shear strength at high temperatures. Tough, durable over wide temperature range. Toughened version EA 934NA and EA 9394.
6675/ 46.0	615/ 4250	1.7	10000/ 158.6	—	100:17	77/25 150/66	5-7 days 1 hour	77/25	100/1 100/.5	Thixotropic adhesive with structural properties to 350°F/177°C. Volumetric mix ratio 4:1.
—	—	—	—	—	100:27	77/25 200/93	5-7 days 1 hour	77/25	15/.25 15/.1	Fast cure adhesive for liquid shim and potting. Handling strength within 6-8 hours.
—	—	—	24000/ 165.5	—	100:20	200/93	1 hour	77/25	480/1 480/.5	Elevated cure, thixotropic adhesive with structural properties to 450°F/232°C.
8070/ 55.7	715/ 4900	2.6	14000/ 96.6	428/ 2950	100:17	77/25 150/66	5-7 days 1 hour	77/25	100/1 100/.5	Two-part, nonmetallic filled version of EA 9394.
8000/ 55.2	400/ 2750	3.4	70000*/ 482.8*	8000*/ 55150*	100:30	77/25 150/66	5-7 days 1 hour	77/25	75/1 75/.5	Two-part, low viscosity, unfilled version of EA 9394. Qualified to BMS 8-301.
—	—	—	14000/ 96.6	—	100:36	200/93	1 hour	77/25	480/.25 480/.1	Two-part, elevated cure, unfilled, low viscosity adhesive with structural properties to 400°F/204°C.
—	—	—	3800/ 26.2	—	100:31	77/25 180/82	5-7 days 1 hour	40/4	120/1 120/.5	77°F/25°C cure, syntactic, with excellent high temperature properties. Density of 37 pcf (0.6. g/cc).

Frekote® Mold Release Products, cont'd

Product	Application Temperature Range	Cure Time	Benefits	Description
Frekote 48-NC	Up to 140°F/60°C	3 hours at room temperature, or bake for 15 mins. at 210°-300°F/ 100°-150°C	• High thermal stability • Better mold utilization • No mold build-up • High productivity • Significantly lower mold maintenance costs • No contaminating transfer	A non-CFC release agent with the same polymeric base as Frekote 44, with only a slight modification in the solvent blend for better non-transference. This semi-permanent, non-migratory release system chemically bonds to the mold surface to form a microthin film, which is stable at temperatures exceeding most molding processes. Can be used for the release of epoxies (thermosets and prepregs), polyester resins, thermoplastics, adhesives, and rotational molded plastics.
Frekote 55-NC	Up to 140°F/60°C	30 minutes at room temperature, or bake for 5 mins. at 210°-300°F/ 100°-150°C	• Fast dry and cure • No mold build-up • High thermal stability • Reduced odor • No contaminating transfer	A non-CFC release agent designed to provide multiple releases with no contaminating transfer. This semi-permanent, non-migratory release system chemically bonds to the mold surface to form a microthin film that is stable at process temperatures.
Frekote 700-NC	Up to 275°F/135°C	5-10 minutes after final coat at room temperature	• Superior multiple release • High gloss and high slip • No chlorinated solvents • Versatile: releases most polymers	A non-CFC, semi-permanent, multiple release polymer resin which effectively releases all polymer resins. Versatile agent that provides slip where mold geometry problems are encountered. Cures at room temperature, gives high-gloss finish to molded parts.
Frekote 770-NC	Up to 140°F/60°C	5-10 minutes after final coat at room temperature	• Fast dry and cure • High gloss and high slip • Versatile: releases most polymers • No mold build-up • Reduced odor	A non-CFC, semi-permanent, multiple release polymer resin that effectively releases all thermoset resins. Versatile agent that provides slip where mold geometry problems are encountered. Rapid dry and cure at room temperature to give a high slip film capable of maximum release performance.
Frekote 815-NC	Up to 275°F/135°C	60 minutes after final coat at room temperature, or bake for 15 minutes at 140°-275°F/60°-135°C	• No chlorinated solvents • No mold build-up • Maximum mold utilization • Room temperature application • High thermal stability	Designed to form a semi-permanent release interface on mold surfaces. The multiple release non-migratory release system chemically bonds to the mold surface to form a microthin chemically resistant coating. Will release all natural and synthetic organic rubber compounds.

* Longitudinal compressive strength as a wet lay-up resin with T-300-W133 fiber.

Hysol® Film Adhesives and Primers

Product	Applications					Characteristics				Mechanical Properties					
										Lap Shear					Primer Coverage
	Sprayable	Composite Surfacing	Low VOC	Composite Bonding	Metal and Honeycomb Bonding	≥180°F/82°C Service	≥350°F/177°C Service	Service Temperature (°F/°C)	Outtime (Days @ 77°F/25°C)	-67°F (psi)/-55°C (MPa)	77°F (psi)/25°C (MPa)	Elevated Temperature (psi/MPa)	Honeycomb Climbing Drum Peel @ 77°F (in•lb/in)/25°(m•N/m)	Flatwise Tension @ 77°F/25°C (psi/MPa)	Square Foot/Gal @ 0.3 mil dry film thickness/ Square Meter/Gal @ .008 mm dry film thickness
Films															
Hysol EA 9602.3 (.060 psf) (300 g/m²)					●	●		250/121	30	5700/ 39.3	5400/ 37.2	3200 @ 200°F 22.0 @ 93°C	20/ 90	1300/ 9.0	
Hysol EA 9628 (.060 psf) (300 g/m²)				●	●	●		250/121	20	5500/ 38.0	6000/ 41.3	2000 @ 250°F 13.8 @ 121°C	18/ 80	1400/ 9.7	
Hysol EA 9628H (.060 psf) (300 g/m²)				●	●	●		250/121	20	5500/ 38.0	5800/ 40.0	1500 @ 250°F 10.3 @ 121°C	20/ 90	1100/ 7.6	
Hysol EA 9657 (.080 psf) (400 g/m²)				●	●		●	400/204	15	4800/ 33.0	5000/ 34.5	2300 @ 350°F 15.9 @ 177°C	13/ 60	1150/ 8.0	
Hysol EA 9673 (BMI) (0.10 psf) (500 g/m²)				●	●		●	550/288	30	2000/ 13.8	2000/ 13.8	2200 @ 500°F 15.2 @ 260°C	3/ 15	600/ 4.1	
Hysol EA 9686 (.060 psf) (300 g/m²)		●		●	●	●		300/149	90	5800/ 40.0	5800/ 40.0	1000@300°F 6.9 mpa @ 149°C	17/ 76	1000/ 6.9	
Hysol EA 9689 (0.10 psf) (500 g/m²)				●	●		●	420/216	10	3700/ 25.5	3500/ 24.1	3200 @ 350°F 22.0 @ 177°C	8/ 35	850/ 5.9	
Hysol EA 9695 (.050 psf) (250 g/m²)		●		●	●	●		>300/149	90	4400*/ 30.3*	5000*/ 34.5*	2800* @ 270°F 19.3* @ 132°C	—	1200/ 8.3	
Hysol EA 9696 (.060 psf) (300 g/m²)		●		●	●	●		250/121	90	7000/ 48.3	6000/ 41.3	2000 @ 250°F 13.8 @ 121°C	25/ 110	1300/ 9.0	
Primers															
Hysol EA 9203	●				●			300/149	365	—	1000** 6.9**	—	—	—	—
Hysol EA 9205R	●				●			350/177	20	4000/ 27.6	4300/ 29.7	3300 @ 350°F 22.8 @ 177°C with EA 9689 film	8/ 35	850/ 5.9	160/ 15
Hysol EA 9210H 10%	●				●			250/121	90	5500/ 38.6	6300/ 43.4	3000 @ 220°F 20.7 @ 104°C with EA 9628H film	20/ 90	1100/ 7.6	450/ 42
Hysol EA 9257	●		●		●			350/177	30	4800/ 33.1	5000/ 34.5	2000 @ 350°F 13.8 @ 177°C with EA 9657 film	13/ 60	1150/ 8.0	1200/ 110
Hysol EA 9296	●		●		●			250/121	20	7000/ 48.3	6000/ 41.3	2000 @ 250°F 13.8 @ 121°C with EA 9696 film	23/ 100	1300/ 9.0	1000/ 92

*Composite double overlap shear
**On unetched metal
***Postcure of 2 hours @ 475°F/245°C

Bulk Properties		Handling			Description
Tg Dry (°F/°C)	Tg Wet (°F/°C)	Cure Temperature (°F/°C)	Cure Time (hours)	Storage Temperature (°F/°C)	
220/104	180/82	250/121	1	0/-18	Modified epoxy film, tacky, supported or unsupported. Exceeds MMM-A-132, Ty 1, Cl 3 and MIL A-25463, Ty 1, Cl 1, 2.
250/121	210/99	250/121	1	0/-18	Modified epoxy film, good stress, environmental resistance and structural properties up to 250°F/121°C.
240/116	200/93	250/121	1	0/-18	Modified epoxy film, high peel strength, good stress, environmental resistance and structural properties up to 250°F/121°C.
360/182	270/132	350/177	1	0/-18	High temperature service film adhesive designed for high honeycomb peel in a reticulated sound suppression structure. Qualified to BMS 5-137.
568/298	410/210	350/177	1***	0/-18	Modified BMI film adhesive, superior strength to 550°F/288°C. Moisture resistant, processes like conventional high temperature epoxies. Minimum order required.
271/133	N/A	250/121	1	0/-18	Moisture resistant, toughened 250°F/121°C curing film with service performance to 300°F/149°C. Excellent for composite or metal bonding.
435/224	345/174	350/177	1	0/-18	Modified epoxy film adhesive with high temperature strength and long term thermal durability.
[1] 252/122 [2] 302/150	[1] 187/86 [2] 203/95	250/121 350/177	1.5	0/-18	Low-flow composite bonding film, excellent environmental resistance. Composite structure repair, cure and co-cure with composite laminates. Qualified to Airbus.
250/121	220/104	250/121	1	0/-18	Moisture resistant, toughened 250°F/121°C service, modified epoxy film. Qualified to BMS 5-101 and BMS 5-129.
—	—	N/A	—	77/25	Primer, enhances adhesion on poorly prepared surfaces. Requires only room temperature drying prior to bond. Use with room temperature curing paste adhesives.
—	—	350/177	1	0/-18	Corrosion inhibiting primer designed for long term service at 350°F/177°C.
—	—	275/135	1	0/-18	Corrosion inhibiting primer, maintains surface bondability after multiple prebonding cure cycles. Distinct color change during cure.
—	—	270/132	1	40/5	Water-borne corrosion inhibiting primer, maintains surface bondability after multiple prebonding cure cycles. Meets SCAQMD Rule 1124. Replacement for EA 9210B.
—	—	250/121	1	40/5	Water-borne corrosion inhibiting primer, for use with all 250°F/121°C film adhesives, such as Hysol EA 9696. Meets SCAQMD Rule 1124.

[1] 250°F/121°C cure
[2] 350°F/175°C cure

Loctite® Syntactic products

Product	Applications				Characteristics					Bulk Properties			
	Composite Surfacing	Syntactic Film, Nonexpanding	Syntactic Film, Expanding	Core Splice	180°F/82°C Service	≥300°F/149°C Service	Service Temperature (°F/°C)	Outtime (days @ 77°F/25°C)	Outtime (days @ 90°F/32°C)	Block Compressive (dry) @ 77°F (psi)/25°C (MPa)	Tensile Strength @ 77°F (psi)/25°C (MPa)	Tensile Modulus @ 77°F (ksi)/25°C (MPa)	
SynCore® Syntactic Films													
SynCore 9823.1		●			●		250/121	15	10	9000/ 62	4500/ 31	363/ 2500	
SynCore 9872.1		●				●	350/177	15	10	8800/ 61	4500/ 31	400/ 2750	
SynSpand® Expanding Syntactic Films													
SynSpand EA 9890 Abradable Seal			●				180/82	15	10	–	1100/ 7.6	62/ 430	
SynSpand 9899			●				250/121	15	10	500 @ 12 pcf density/ 3.45 @ 0.19 g/cc	–	–	
SynSpand 9899CF			●	●			350/177	15	10	2000 @ 26 pcf density/ 13.8 @ 0.42 g/cc	–	–	
SynSkin® Composite Surfacing Films													
SynSkin HC 9837.1	●						350/177	90	21	–	–	–	
Core Splice*													
Hysol® EA 9833.1 (BMI)				●		●	450/232	30	10	–	–	–	

*SynSpand 9899CF may also be used as a core splice.

Handling			Description
Cure Temperature (°F/°C)	Cure Time (hours)	Storage Temperature (°F/°C)	
250/121	1	0/-18	Toughened, low density syntactic core, superior moisture resistance, co-curable with variety of 250°F/121°C curing epoxy prepregs.
350/177	1	0/-18	Toughened, low density syntactic core, superior moisture resistance, co-curable with wide variety of 350°F/177°C curing epoxy prepregs.
250/121	2	0/-18	Expanding modified epoxy film, cures at 250°F/121°C, used for jet engine abradable fan seals.
250/121	1	0/-18	Very high expansion closed cell expanding film designed for use as shop floor aid in closed mold processes.
250/121 or 350/177	1	0/-18	Closed cell expanding syntactic film for use in a designed medium density/strength range of 18-35 pounds per cubic foot (0.29-0.56 g/cc). Ideal for core filling and edge close-out.
250/121 or 350/177	1	0/-18	Epoxy-based composite surfacing film, improves surface quality of honeycomb stiffened composite parts. Cures at 250°F/121°C or 350°F/177°C with a variety of epoxy prepregs. Resistant to microcracking from thermal cycling. Black and Lightning Strike versions available.
350/177 with 450/232 postcure	2 @ 450°F/232°C	0/-18	Modified BMI foaming core splice, co-curable with wide variety 350°F/177°C curing epoxy prepregs. Elevated service temperature to 450°F/232°C. Tube shear 800 psi @ 77°F/5.5 MPa @ 25°C, 500 psi @ 250°F/3.5 MPa @ 121°C.

Loctite formulates and manufactures a wide variety of structural bonding and structural enhancing materials for the aerospace industry. These materials provide our customers with practical, economic, and performance benefits that, once implemented, are apparent to their customers as well. The Loctite® Hysol® brand of aerospace adhesives and syntactic products are developed and manufactured in Bay Point, California, and are supported by a global sales and distribution network.

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- **Hysol® Paste Adhesives and Specialty Resins**
  One and two-part epoxy paste adhesive systems for potting, bonding, fairing, and repair; moldable plastic shim; matrix resins; specialty resins for resin transfer molding, wet lay-up, and repair.

- **Hysol® Film Adhesives and Primers**
  Film adhesives and corrosion-inhibiting low VOC primers for metal and composite bonding; engine nacelle bonding; honeycomb applications such as control surfaces, wing flaps, engine slats, leading edges, and wing-to-body fairings.

- **Syntactic Products**
  SynSpand® closed-cell expanding syntactic films for custom density-to-strength ratios in honeycomb core fill and core splice, resulting in lower costs of co-cure applications by eliminating secondary manufacturing processes.

  SynCore® syntactic films for lightweight composite designs. Ideal for edge close-out and composite sandwich structure.

  SynSkin® composite surfacing films for flawless off-tool composite surface and reduction of surface preparation steps prior to painting.

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