

Alodine

FREKOTE

Hysol



Take Flight With Henkel

Aerospace Product Selector Guide



Excellence is our Passion

AEROSPACE

Composites, Structural Adhesives
and Surface Treatments

Henkel Aerospace develops structural adhesives, metal surface treatments and composites that serve the aircraft OEM and MRO industries and are listed in over 5,000 aerospace specifications. Henkel invests heavily in R&D and product support, and has been a world market leader in these industries for over 40 years. Innovative materials provide our customers with practical, economic and performance benefits.

Our key product brands are:

■ Conversion Coatings

Alodine

■ Structural Adhesives

Hysol

■ Mold Release Systems

FREKOTE

■ Surface Treatments



Our Adhesive & Composite Systems include:

Paste Adhesives and Specialty Resins 4

- 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.

Film Adhesives, Peel Ply and Primers 8

- Film adhesives and corrosion-inhibiting low VOC primers for metal and composite bonding.
- Engine nacelle bonding.
- Honeycomb applications for control surfaces, wing flaps, engine slats, leading edges and wing-to-body fairings.
- Nitrile phenolic systems with excellent chemical and fuel resistance.

Dispensing Systems 10

- Designed for two-part systems.
- Available for fixed or variable ratios.

Syntactic Products 12

- Closed-cell expanding syntactic films for custom density-to-strength ratios in honeycomb core fill and core splice.
- Syntactic films for lightweight composite designs.
- Composite surfacing films for flawless off-tool composite surface and reduction of surface preparation steps prior to painting.

Core Splice Adhesives 14

- Foaming core splice adhesives.
- Extrudable versions are available.
- Controlled expansion.

Mold Release Products 14

- Semipermanent release coatings for composite and metal tool surfaces.
- New water-based and low-VOC release coating.
- Non-migratory release system.

Quick Reference Guide 16

Our Surface Treatments include:

Cleaners 18

- Available in multiple chemistries.
- Suitable for batch and immersion applications.

Deoxidizers and Etchants 20

- Chromium-free deoxidizers available.
- Etchants ideal for removing soils.

Conversion Coatings 22

- *Alodine* conversion coatings are available for light metals, such as aluminum, magnesium and titanium.
- Henkel also offers alternative non-chrome solutions, such as *Alodine* 5700 or *Alodine* T-5900.
- Offer full line of touch-up coatings, including the top-used *Alodine* Touch-N-Prep pens.

Jet Engine Cleaners 26

- Henkel produces all process chemistries for the overhaul of aircraft engines and land-based compressors.
- Process solutions for both hot and cold sections.
- Designed to remove the toughest soils and scales.

Compressor wash products provide on-wing cleaning solutions:

- Improve engine performance.
- Reduce fuel consumption.

Surface Conditioners and Sealers 28

- Pretreatments and post-treatments available.
- Phosphate-free formulations available.
- Improve corrosion resistance.

Depaint / Repaint 30

- VOC-free and water-based cleaners available.
- Interior and exterior paint removal cleaners.
- Environmentally sustainable paint removers.
- Primers for improved paint adhesion.



Our market segments and main technologies:

| Served Market | Main Technologies |
|-----------------------------------|---|
| <i>Commercial Airplanes</i> | Adhesives, Surface Treatments, Composites |
| <i>Airframes</i> | Adhesives, Surface Treatments, Composites |
| <i>MRO</i> | Adhesives, Surface Treatments, Composites |
| <i>Military and Helicopters</i> | Paste and Film Adhesives |
| <i>Regional and Business Jets</i> | Composites, Adhesives, Surface Treatments |
| <i>Engine Nacelles</i> | Composites, Adhesives, Surface Treatments |
| <i>Interiors</i> | FR Adhesives |

This product selector guide refers to our structural adhesive, composite and surface treatment systems. Please contact us via www.henkel.com/aerospace for customer-specific product requests or more information.

Adhesive Systems

Paste Adhesives and Specialty Resins

| Product | Applications | | | | | | | | | | Characteristics | | | Tensile Lap Shear Mechanical Properties | | | | | |
|------------------------------|--------------|-------------------|--------------------------|-------------------|--------------------|-----------|-------------|----------------------|-----------------------|-------------------------------|-----------------|-------------------------------|--------------------|---|---------------|--|---------------------------|-------------------------|--------------------------|
| | Potting | Structural Repair | Low Viscosity Wet Lay-up | Composite Bonding | High Peel Strength | Synthetic | Liquid Shim | 180°F / 82°C Service | 300°F / 149°C Service | Improved Hbt / Wet Properties | Toughened | Service Temperature (°F / °C) | Consistency | Form (1 part or 2 part) | Peel Strength | Beil 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 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 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 9377 | | | | | | • | • | | | | | >200/93 | Thixotropic | 2 | Nil | – | 2300/15.9 | 2300/15.9 | 2000/13.8 |
| NEW! Hysol EA 9380 | | • | • | • | | • | • | • | | | | 250/121 | Thixotropic | 2 | High | 50/225 | 4650/32 | 5350/37 | >3500/>24.1 |
| NEW! Hysol EA 9380.05 | | • | • | • | | • | • | • | | | | 250/121 | Thixotropic | 2 | High | 38/169 | 4030/27.8 | 5190/35.8 | 3380/23.3 |
| Hysol EA 9390 | | • | • | • | | | • | • | | | | >350/177 | Low Viscosity | 2 | Nil | – | 2200/15.2 | 3500/24.1 | 3000/20.7 |

We have experts available to design and install meter mix operations.
Call Henkel for customized dispensing equipment or pre-measured packaging.
See page 10 for more details.



| 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. |
| 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 bond line 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. |
| 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 a variety of substrates. Volumetric mix ratio 2:1. |
| - | - | - | - | - | 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, tensile lap shear strength to 250°F/121°C. |
| - | - | - | 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. |
| - | - | - | 11300/78 | 355/2950 | 100:55 | 160/70 | 4 hours | 40/4 | 180/1 180/.5 | Cures at low temperature. Offers strength, toughness and high temperature resistance of heat-curing film adhesives, with greater flexibility and ease of use. Can be applied to large parts with controlled meter mix operation. |
| - | - | - | - | - | 2.266:1 | 176/80 250/121 | 2 hours 1 hour | 40/4 | 300/1 300/.5 | High degree of cure after a low temperature cure time that offers strength, toughness and high temperature resistance of heat curing film adhesives with greater flexibility and ease of use. Can be applied to large parts via a controlled meter mix operation or via dual cartridge static mixer kits. |
| 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. |

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

Adhesive Systems

Paste Adhesives and Specialty Resins

| Product | Applications | | | | | | | | Characteristics | | | | Tensile Lap Shear Mechanical Properties | | | | | |
|----------------------------|--------------|-------------------|--------------------------|-------------------|--------------------|-----------|-------------|----------------------|-----------------------|-----------------------------|-----------|-----------------------------|---|-------------------------|---------------|--|---------------------------|-------------------------|
| | 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 | Beil Peel 77°F (lb./in.) / 25°C (N/25mm) | -67°F (psi) / -55°C (MPa) | 77°F (psi) / 25°C (MPa) |
| 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 |
| NEW! Hysol EA 9820 | • | | | • | | | | | | | 350/177 | Thixotropic | 1 | Nil | – | – | – | – |
| NEW! Hysol EA 9825 | • | | | • | | | | | | | 350/177 | Thixotropic | 1 | Nil | – | – | 2000/14 | – |

Composite Systems

Infusion and Specialty Resins

| Product | Applications | | | | | | | | Characteristics | | | | | | |
|---------------------------------|--------------|-------------------|----------------|-------------------|--------------------|-----------|-------------|----------------------|-----------------------|-----------------------------|-----------|-----------------------------|--------------------|-------------------------|---------------|
| | Potting | Structural Repair | Infusion Resin | 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 |
| Hysol EA 9150 Resin | | | • | | | | | | | | | 250/121 | Low Viscosity | 2 | Low |
| Henkel Benzoxazine 99110 | | • | | | | | | | | | | 300/149 | Low Viscosity | 1 | N/A |
| Henkel Benzoxazine 99120 | | • | | | | | | | | | | 250/121 | Moderate Viscosity | 1 | N/A |
| Henkel Benzoxazine 99900 | | • | | | | | | | | | | 300/149 | Binder | 1 | N/A |



| 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) | |
| 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 | 24 hours 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 Hysol/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 Hysol/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). |
| - | - | - | 22800/157 | - | - | 250/121 or 350/177 | 1.5 hours or 1 hour | 0/-18 | >8 hours | High-density, one-component epoxy syntactic for use on honeycomb composite parts requiring high compressive strength at temperatures up to 350°F (177°C). Ideal for fastener or attachment potting and panel edge reinforcing. |
| - | - | - | 12232/84 | - | - | 250/121 or 350/177 | 1.5 hours or 1 hour | 0/-18 | >8 hours | Low-density, one-component epoxy syntactic for use on honeycomb composite parts requiring high compressive strength at temperatures up to 350°F (177°C). Ideal for fastener or attachment potting and panel edge reinforcing. |

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

| Mechanical 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) | Flexural Strength @ 77°F / 25°C (MPa) | Flexural Modulus @ 77°F / 25°C (ksi) / 25°C (MPa) | Fracture Toughness @ 77°F (in-lb./in. ³) / 25°C (J/m ²) | Mix Ratio Weight (Part A / Part B) | Cure Temperature (°F / °C) | Cure Time | Storage Temperature (°F / °C) | Pot Life (minutes / lb.) / (minutes / kg) | |
| 11000/75.9 | 414/2850 | 5 | - | - | 100:88 | 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. |
| 14.0/71 | 0.54/4.4 | 1.5 | 23.3/ 161 | 0.65/ 4.5 | 0.64/ 112 | N/A | 356/180 | 90 minutes | 73/23 | > 6 months | One-part Infusion resin for RTM & VARTM processing. Low viscosity, high hot-wet properties and very good flame, smoke and toxicity |
| 15.4/97 | 0.50/3.7 | 4.6 | 21.2/ 146 | 0.51/ 3.5 | 2.70/ 472 | N/A | 356/180 | 90 minutes | 73/23 | > 6 months | One-part Infusion resin for VARTM processing. Moderate viscosity, very high toughness with good hot wet properties. |
| - | - | - | - | - | - | N/A | N/A | N/A | 73/23 | > 12 months | Binder for use with infusion resin. Use for compaction and preforming of reinforcement. Increases interlaminar toughness |

Adhesive Systems

Film Adhesives

| Product | Applications | | | Characteristics | | | Mechanical Properties | | | | | Primer Coverage | |
|----------------------------|--------------|---------------------|--------------------------|-------------------|---------------------------|----------------------|-----------------------|-------------------------------|-------------------------------|---------------------------------|----------------------------------|-----------------|---|
| | Sprayable | Composite Surfacing | Low Viscosity Wet Lay-up | Composite Bonding | Metal & Honeycomb Bonding | 180°F / 82°C Service | 350°F / 177°C Service | Service Temperature (°F / °C) | Out-time (Days @ 77°F / 25°C) | Lap Shear | Elevated Temperature (psi / MPa) | | Honeycomb Climbing Drum Peel @ 77°F (in.-lb. / in.) / 25° (m-N / m) |
| FILMS | | | | | | | | | | | | | |
| Hysol EA 9628 | | • | • | • | | 250/121 | 20 | 5500/38.0 | 6000/41.3 | 2000 @ 250°F 13.8 @ 121°C | 18/80 | 1400/9.7 | – |
| Hysol EA 9628H | | • | • | • | | 250/121 | 20 | 5500/38.0 | 5800/40.0 | 1500 @ 250°F 10.3 @ 121°C | 20/90 | 1100/7.6 | – |
| Hysol EA 9657 | | • | • | • | | 400/204 | 15 | 4800/33.0 | 5000/34.5 | 2300 @ 350°F 15.9 @ 177°C | 13/60 | 1150/8.0 | – |
| NEW! Hysol EA 9658 | | • | • | • | | 350/177 | 15 | 3900/27.0 | 4800/33.0 | 2800 @ 350°F 19 @ 177°C | 12/50 | 1000/7.0 | – |
| Hysol EA 9673 (BMI) | | • | • | • | | 550/288 | 30 | 2000/13.8 | 2000/13.8 | 2200 @ 500°F 15.2 @ 260°C | 3/15 | 600/4.1 | – |
| Hysol EA 9686 | • | • | • | • | | 300/149 | 90 | 5000/40.0 | 5800/40.0 | 1000 @ 300°F 6.9 mpa @ 149°C | 17/76 | 1000/6.9 | – |
| Hysol EA 9689 | | • | • | • | | 420/216 | 10 | 3700/25.5 | 3500/24.1 | 3200 @ 350°F 22.0 @ 177°C | 8/35 | 850/5.9 | – |
| Hysol EA 9695 | • | • | • | • | | >300/149 | 90 | 4400* / 30.3* | 5000* / 34.5* | 2800* @ 270°F 19.3* @ 132°C | – | 1200/8.3 | – |
| Hysol EA 9696 | • | • | • | • | | 250/121 | 60 | 7000/48.3 | 6000/41.3 | 2000 @ 250°F 13.8 @ 121°C | 25/110 | 1300/9.0 | – |
| Hysol PL 737 | | | • | • | • | 350/177 | 14 | 2500/17.2 | 3500/24.1 | 2400 @ 350°F 16.5 @ 177°C | – | 5195/35.8 | – |
| Hysol PL 777-1FR | | | • | • | | 300/149 | 20 | 5000/34.5 | 5000/34.5 | 2900 @ 250°F 20.0 @ 121°C | – | – | – |
| Hysol PL 780-1 | | • | • | • | • | 350/177 | 10 | 2700/18.6 | 4200/29.0 | 1800 @ 350°F 12.4 @ 177°C | – | 1075/7.4 | – |
| Hysol PL 795 | • | • | • | • | | 350/177 | 100 | 3500/24.1 | 3900/26.9 | 2500 @ 270°F 17.2/132°C | – | 864/5.9 | – |
| Hysol PL 795-1 | • | • | • | • | | 350/177 | 100 | 3600/24.8 | 4300/29.7 | 1900 @ 300°F 13.1 @ 149°C | – | 1000/6.9 | – |
| NEW! Hysol PL 7000 | • | | • | | | 300/149 | 30 | 3600/26.2 | 4500/31.0 | 1300 @ 270°F 9.0 @ 132°C | – | 1070/7.4 | – |
| Hysol PL 696 | • | • | • | • | | 250/121 | 3 | 3326/23 | 3680/25 | 1973 @ 250°F 14 @ 121°C | 34/154 | | |
| Hysol EA 9681 | | • | • | • | | 250/121 | 30 | 3045/21 | 2900/20 | 2857 @ 250°F 19.7 @ 121°C | – | | |



| Bulk Properties | | Handling | | | Description |
|--|--|--------------------------|-------------------|-----------------------------|--|
| Tg Dry (°F/°C) | Tg Wet (°F/°C) | Cure Temperature (°F/°C) | Cure Time (hours) | Storage Temperature (°F/°C) | |
| 250/121 | 210/99 | 250/121 | 1 | 0/-18 | First generation, modified epoxy film, good stress, environmental resistance and structural properties up to 250°F/121°C. Data from .060 psf, 300 g/m ² . |
| 240/116 | 200/93 | 250/121 | 1 | 0/-18 | First generation, modified epoxy film, high peel strength, good stress, environmental resistance and structural properties up to 250°F/121°C. Data from .060 psf, 300 g/m ² . |
| 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. Data from .080 psf, 400 g/m ² . |
| 392/200 | 300/150 | 350/177 | 1 | 0/-18 | High temperature and high durability film adhesive designed for high toughness and high temperature performance where continuous exposures up to 350°F/177°C are required. |
| 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. Data from 0.10 psf, 500 g/m ² . |
| 271/133 | N/A | 250/121 | 1 | 0/-18 | Second generation, moisture resistant, toughened 250°F/121°C curing film with service performance to 300°F/149°C. Excellent for composite or metal bonding. Data from .060 psf, 300 g/m ² . |
| 435/224 | 345/174 | 350/177 | 1 | 0/-18 | Modified epoxy film adhesive with high temperature strength and long-term thermal durability. Data from 0.10 psf, 500 g/m ² . |
| ¹⁾ 252/122 ²⁾ 302/150 | ¹⁾ 187/86 ²⁾ 203/95 | 250/121 350/177 | 1.5 | 0/-18 | Second generation, low flow, composite bonding film; excellent environmental resistance. Composite structure repair, cure and co-cure with composite laminates. Qualified to Airbus. Data from .050 psf, 250 g/m ² . |
| 250/121 | 220/104 | 250/121 | 1 | 0/-18 | Second generation, moisture-resistant, toughened 250°F/121°C service, modified epoxy film. Qualified to BMS 5-101 and BMS 5-129. Data from .060 psf, 300 g/m ² . |
| - | - | 295/146 350/177 | 2 1 | 0/-18 | Nonmetallic, modified epoxy film specifically designed for use in structural aircraft components. Low flow characteristics. Intermittent service to 400°F/204°C. |
| - | - | 250/121 350/177 | 1.5 1 | 0/-18 | Flame retardant, nonmetallic modified epoxy film adhesive designed to cure at either 250°F/121°C or 350°F/177°C with a service temperature in excess of 300°F/149°C. |
| - | - | 350/177 | 1 | 0/-18 | Nonmetallic, toughened, modified epoxy film designed for bonding metal, composite and thermoplastic structures. High shear properties at 350°F/177°C. Excellent hot-wet properties. High flow characteristics. |
| - | - | 250/121 350/177 | 1.5 1 | 0/-18 | Epoxy film adhesive designed for composite bonding applications. May cure at 250°F/121°C or 350°F/177°C, with service temperatures up to 350°F/177°C. Ideal for co-cure or secondary bonding applications. Outstanding handling characteristics. Superior elevated temperature performance at 270°F/132°C. Excellent out-time. Exceeds requirements of BMS 5-154. Can be used for both surfacing film and lightning strike applications. |
| - | - | 250/121 350/177 | 1.5 1 | 0/-18 | Tougher version of Hysol/PL 795. Excellent flow characteristics. Excellent tack and handling characteristics. Improved elevated temperature performance. Can be used for both surfacing film and lightning strike applications. |
| 145 | - | 250/121 350/177 | 1.5-2 1-2 | 0/-18 | Epoxy film adhesive formulated to provide excellent performance properties in composite bonding, and has excellent results on composite surfaces that have been exposed to bond shop environments and may have absorbed moisture. Excellent fracture toughness (G1C) over composite surfaces exhibiting cohesive failure patterns, indicating superior adhesion characteristics. Qualified at Boeing. |
| 228/109 | 221/105 | 140/60 200/93 | .5-1 | 0/-18 | Epoxy-based structural film adhesive designed primarily for out-of-autoclave curing process applications requiring low cure temperatures as well as low curing pressures and is also available in lightning strike configurations. In addition, it improves surface quality of composite structures, while having the ability to bond a variety of similar and dissimilar materials. |
| 275/135 | 240/115 | 250/121 | 1.5 | 0/-18 | Epoxy film adhesive for bonding applications. Hysol/EA9681 is formulated to provide excellent performance properties for many bonding applications, and has excellent results on composite surfaces that have been exposed to bond shop environments and may have absorbed moisture. Hysol/EA9681 was designed to be cured outside the autoclave with vacuum only at 250°F (120°C). |

* Composite double overlap shear. ** On unetched metal. *** Post-cure of 2 hours @ 475°F/245°C.

¹⁾ 250°F/121°C cure. ²⁾ 350°F/175°C cure.

Adhesive Systems

Peel Ply and Primers

| Product | Applications | Characteristics | Lap Shear | | | | Mechanical Properties | | | Primer Coverage |
|-------------------------------|--------------|-----------------|-----------|---------|-----------|---|-----------------------|---|---|-----------------|
| | | | 300°/149 | 14 | - | - | - | - | - | |
| PEEL PLY | | | | | | | | | | |
| <i>Hysol EA 9895 WPP</i> | • | • | • | 300/149 | 14 | - | - | - | - | - |
| NEW! <i>Hysol EA 9896 WPP</i> | • | • | • | 200/93 | 14 @ 23°C | - | - | - | - | - |

| Product | Applications | Characteristics | Mechanical Properties | | | | | | | | |
|-----------------------------|--------------|-----------------|-----------------------|---------|--|-----------|--------------|---|-------|----------|----------|
| | | | 3165/22 | 4200/29 | 1500 @ 250°F 10 @ 121°C with Hysol/PL 639 film | N/A | N/A | 600/212 | | | |
| PRIMERS | | | | | | | | | | | |
| <i>Hysol AL 2000</i> | • | • | • | 250/121 | 30 | 3165/22 | 4200/29 | 1500 @ 250°F 10 @ 121°C with Hysol/PL 639 film | N/A | N/A | 600/212 |
| <i>Hysol EA 9203</i> | • | • | • | 300/149 | 365 | - | 1000**/6.9** | - | - | - | - |
| <i>Hysol EA 9257</i> | • | • | • | 350/177 | 30 | 4800/33.1 | 5000/34.5 | 2000 @ 350°F 13.8 @ 177°C with Hysol/EA 9657 film | 13/60 | 1150/8.0 | 1200/416 |
| NEW! <i>Hysol EA 9258.1</i> | • | • | • | 350/177 | 30 | 3900/27.0 | 4800/33.0 | 2800 @ 350°F 19 @ 177°C | 12/50 | 1000/7.0 | 1200/416 |

* Composite double overlap shear. ** On unetched metal. *** Post-cure of 2 hours @ 475°F/245°C.

Dispensing Systems

Versatile dispensing systems for two-part adhesive chemistries incorporate a variety of feed system options.

Available in fixed or variable ratio, the systems offer programmable shot size and integrated PLC controls with convenient touch screen capability. These units come standard with mild steel pump components with optional abrasion resistant or 304 stainless steel.



Meter Mix 3000



| Bulk Properties | | Handling | | | Description |
|-----------------------|----------------------|--------------------------|-------------------|-----------------------------|--|
| Tg Dry (°F/°C) | Tg Wet (°F/°C) | Cure Temperature (°F/°C) | Cure Time (hours) | Storage Temperature (°F/°C) | |
| ¹⁾ 302/150 | ¹⁾ 203/95 | 350/177 | 1.5 | 0/-18 | Pre-impregnated, polyester peel ply product supplied in film form. Specially designed resin system capable of curing at 350°F/177°C. Compatible with state-of-the-art composite prepreg resin systems. Provides minimal residual peel ply fibers at the bond surface after curing and removal. |
| 270/132 | 200/93 | 250/121 | 1.5-2 | 0/-18 | Pre-impregnated, nylon peel ply product supplied in film form. Specially designed resin system capable of curing at 250°F/121°C. Compatible with state-of-the-art composite prepreg resin systems. Provides minimal residual peel ply fibers at the bond surface after curing and removal. Data from .025 psf, 122g/m ² . |

| Bulk Properties | | Handling | | | Description |
|-----------------|---|----------|-----|-------|---|
| | | | | | |
| - | - | 315/157 | 1.5 | 40/5 | Heat-curing, nitrile phenolic, water-based primer. Cured product furnishes excellent resistance to chemicals and water. Qualified to Boeing BMS 5-42, Type 3. |
| - | - | 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. |
| - | - | 270/132 | 1 | 40/5 | Waterborne, corrosion-inhibiting primer, maintains surface bondability after multiple prebonding cure cycles. Meets SCAQMD Rule 1124. Replacement for Hysol/EA 9210B. |
| - | - | 350/177 | 1 | 40/5 | Waterborne, corrosion-inhibiting primer, designed to provide enhanced toughness and high temperature performance where continuous exposures up to 350°F/177°C are required. Meets SCAQMD Rule 1124. |

¹⁾ 350°F/177°C cure.

Features:

- Fixed and variable mix ratio capability
- Programmable shot size selection from touch screen
- Ratio check valves
- Adjustable flow control
- Mild steel or abrasion resistant pumps available
- 4.5" W x 3.4" H monochrome touch screen and PLC
- Cycle totalizer
- Maintenance totalizer
- Automatic purge controller
- Emergency stop palm button
- Foot switch activation



Direct from the factory premeasured packaging.

Composite Systems

Syntactic Products

| Product | Applications | | | | Characteristics | | | Bulk Properties | | | | |
|--------------------------------|---------------------|-------------------------------|---------------------------|-------------|----------------------|-----------------------|-------------------------------|-------------------------------|-------------------------------|---|--|---|
| | Composite Surfacing | Syntactic Film, Non-Expanding | Syntactic Film, Expanding | Core Splice | 180°F / 82°C Service | 300°F / 149°C Service | Service Temperature (°F / °C) | Out-time (Days) @ 77°F / 25°C | Out-time (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 | | | | | | | | | | | | |
| <i>SynCore 9823.1</i> | • | | | • | 250/121 | | 15 | 10 | | 9000/62 | 4500/31 | 363/2500 |
| <i>SynCore 9872.1</i> | • | | | • | 350/177 | | 15 | 10 | | 8800/61 | 4500/31 | 400/2750 |
| <i>SynCore HC 9875</i> | • | | | • | 350/177 | | 15 | 10 | | 21800/150.0 | 5000/34.5 | 580000/3999 |

| Product | Applications | | | | Characteristics | | | Bulk Properties | | | | |
|---|---------------------|-------------------------------|---------------------------|-------------|----------------------|-----------------------|-------------------------------|-------------------------------|-------------------------------|---|--|---|
| | Composite Surfacing | Syntactic Film, Non-Expanding | Syntactic Film, Expanding | Core Splice | 180°F / 82°C Service | 300°F / 149°C Service | Service Temperature (°F / °C) | Out-time (Days) @ 77°F / 25°C | Out-time (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) |
| SYNSPAND EXPANDING SYNTACTIC FILMS | | | | | | | | | | | | |
| <i>SynSpand EA 9890 Abradable Seal</i> | | • | | | 180/82 | | 15 | 10 | | – | 1100/7.6 | 62/430 |
| <i>SynSpand 9899</i> | | • | | | 250/121 | | 15 | 10 | | 500 @ 12 pcf density / 3.45 @ 0.19 g/cc | – | – |
| <i>SynSpand 9899CF*</i> | | • | • | | 350/177 | | 15 | 10 | | 2000 @ 26 pcf density / 13.8 @ 0.42 g/cc | – | – |
| NEW! <i>SynSpand EA 9835 Abradable Seal</i> | | • | | | | | 15 | 10 | | – | – | 250/1724 |
| NEW! <i>SynSpand EA 9840 Abradable Seal</i> | | • | | | | | 15 | 10 | | – | – | 134/924 |

Composite Systems

Syntactic Products

| Product | Applications | | | | Characteristics | | | Bulk Properties | | | | |
|----------------------------------|---------------------|-------------------------------|---------------------------|-------------|----------------------|-----------------------|-------------------------------|-------------------------------|-------------------------------|---|--|---|
| | Composite Surfacing | Syntactic Film, Non-Expanding | Syntactic Film, Expanding | Core Splice | 180°F / 82°C Service | 300°F / 149°C Service | Service Temperature (°F / °C) | Out-time (Days) @ 77°F / 25°C | Out-time (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) |
| COMPOSITE SURFACING FILMS | | | | | | | | | | | | |
| <i>SynSkin HC 9837.1</i> | • | | | | 350/177 | | 90 | 21 | | – | – | – |
| <i>Hysol PL 795SF</i> | • | | | | 350/177 | | 100 | – | | – | – | – |

* *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 a 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 a wide variety of 350°F/177°C curing epoxy prepregs. |
| 350/177 | 2 | 0-18 | High crush strength, low density syntactic core material, co-curable with a variety of 350°F/177°C curing epoxy prepregs. |

| Handling | | | Description |
|--------------------------|-------------------|-----------------------------|---|
| Cure Temperature (°F/°C) | Cure Time (hours) | Storage Temperature (°F/°C) | |
| 250/121 | 2 | 0/-18 | Expanding modified epoxy film, cures at 250°F/121°C, used for jet engine abrasion 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 | 2 | 0/-18 | Expanding modified epoxy film, cures at 300°F/149°C, used for jet engine abrasion fan seals. |
| 250/121 or 350/177 | 2 | 0/-18 | Expanding modified epoxy film, cures at 300°F/149°C, used for jet engine abrasion fan seals. |

| Handling | | | Description |
|--------------------------|-------------------|-----------------------------|---|
| Cure Temperature (°F/°C) | Cure Time (hours) | Storage Temperature (°F/°C) | |
| 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. |
| 250/121 or 350/177 | 1.5 or 1 | 0/-18 | Modified epoxy film specifically formulated to improve the surface appearance of composite honeycomb structures. Excellent surface appearance; reduced pinholing, extra finishing. Superior out-time. Good building tack; repositionable on itself, prepregs, tools. |

Composite Systems

Core Splice Adhesives

| Product | Applications | Characteristics | | | | | | Tube Shears @ 77°F (psi) / 25°C (MPa) | | Tube Shears @ 250°F (psi) / 121°C (MPa) | |
|------------------------------|--------------|-----------------|---|---|---------|----|----|---------------------------------------|----------|---|--|
| | | | | | | | | | | | |
| CORE SPLICES | | | | | | | | | | | |
| Hysol EA 9833.1 (BMI) | | | • | • | 450/232 | 30 | 10 | 1000/6.9 | 1000/6.9 | | |
| Hysol MA 557 | | | • | • | 350/177 | 10 | 5 | 1191/8.2 | 1063/7.3 | | |
| Hysol MA 562 | | | • | • | 350/177 | 20 | 10 | 1200/8.3 | 1150/8.0 | | |
| Hysol MA 562S | | | • | • | 350/177 | 10 | 10 | 1100/7.6 | 1000/6.9 | | |
| Hysol MA 562SFR | | | • | • | 350/177 | 10 | 10 | 850/5.8 | 1000/6.9 | | |
| Hysol PL 460 | | | • | • | 350/177 | 30 | 10 | 1682/11.6 | 1170/8.1 | | |
| Hysol MA 560 | | | | • | 350/177 | 30 | 10 | 1190/8.2 | 850/5.9 | | |

Composite Systems

Mold Release Products

| Product | Application / Temp. Range | Cure Time | Benefits | Description |
|----------------------------|---------------------------|---|---|---|
| Frekote PMC | 60-104°F / 15-40°C | N/A | <ul style="list-style-type: none"> • Easy to use • Eliminates contaminants • Enhances release effectiveness | PMC is a special blend of solvents designed to dissolve and remove wax from molds without dulling the surface. This product can also be used to clean composite and metal mold surfaces as well as for cleaning brushes and equipment. |
| Frekote 915WB | 50 - 104°F / 10 - 40°C | Cure for 5 minutes at ambient temperature | <ul style="list-style-type: none"> • Water-based polisher • Polishing liquid • Removes cured films | A water-based cleaner for composite and metal molds. The surfactants and emulsifiers in combination with soft abrasives give excellent cleaning results without dulling or scratching the surface. |
| Frekote B-15 Sealer | Up to 140°F/60°C | 24 hours at room temperature, or bake for 60 minutes at 210°F - 300°F / 100°C - 150°C | <ul style="list-style-type: none"> • Seals mold porosity • No contaminating transfer • Compatible with all <i>Frekote</i> products | Formulated as a sealer for molds with microporosity problems, small surface scratches or imperfections. Used in conjunction with other <i>Frekote</i> products, <i>Frekote B-15</i> provides an excellent base coat, enhancing the release advantages of all <i>Frekote</i> products. |
| Frekote 44-NC | Up to 140°F/60°C | 3 hours at room temperature, or bake for 15 minutes at 210°F - 300°F / 100°C - 150°C | <ul style="list-style-type: none"> • 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. |



| Handling | | | Description |
|--------------------------------|-----------------|-------|---|
| 350/177 with 450/232 post-cure | 2 @ 450°F/232°C | 0/-18 | Modified BMI foaming core splice, co-curable with a wide variety of 350°F/177°C curing epoxy prepregs. Elevated service temperature to 450°F/232°C. |
| 250/121 or 350/177 | 1.5 or 1 | 0/-18 | Modified epoxy foaming adhesive that may be cured at 250°F/121°C or 350°F/177°C. Designed to seal, splice or reinforce honeycomb materials. Excellent slump resistance, medium tack, nonmetallic. |
| 250/121 or 350/177 | 1.5 or 1 | 0/-18 | General-purpose 250°F/121°C or 350°F/177°C curing foaming adhesive. Designed for service temperatures from -67°F/-55°C to 350°F/177°C. Medium tack, nonmetallic, low exotherm properties, excellent slump resistance, uniform expansion, qualified to many industry specifications. |
| 250/121 or 350/177 | 1.5 or 1 | | Modified epoxy foaming adhesive that may be cured at 250°F/121°C or 350°F/177°C. Nonmetallic, medium tack, excellent slump resistance. |
| 250/121 or 350/177 | 1.5 or 1 | | Modified epoxy foaming adhesive that may be cured at 250°F/121°C or 350°F/177°C. Flame-retardant, nonmetallic, medium tack, excellent slump resistance. |
| 250/121 or 350/177 | 1.5 or 1 | | Foaming epoxy adhesive in paste form for easy extrusion through packaged cartridges. Expands and cures at temperatures from 250°F/121°C to 350°F/177°C. Qualified to Boeing BMS 5-90, Type IV. |
| 250/121 or 350/177 | 1 | 0/-18 | A modified epoxy, low density (24-25 psf) foaming film adhesive capable of expanding 2.5 times the original thickness. Cures at 250°F (121°C) or 350°F (177°C) and is designed for service at temperatures from -67°F (-55°C) to 350°F (177°C). Nonmetallic, medium tack, excellent slump resistance. |

| Product | Application / Temp. Range | Cure Time | Benefits | Description |
|-------------------------------|---------------------------|--|--|---|
| Frekote 55-NC | Up to 140°F/60°C | 30 minutes at room temperature, or bake for 5 minutes at 210°F - 300°F / 100°C - 150°C | <ul style="list-style-type: none"> Fast dry and cure No mold buildup High thermal stability Reduced odor No contaminating transfer | A non-CFC release agent designed to provide multiple releases with no contaminating transfer. This semipermanent 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 | <ul style="list-style-type: none"> Superior multiple release High gloss and high slip No chlorinated solvents Versatile: releases most polymers | A non-CFC, semipermanent, multiple release polymer resin that effectively releases all thermoset 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 | <ul style="list-style-type: none"> Fast dry and cure High gloss and high slip Versatile: releases most polymers No mold buildup Reduced odor | A non-CFC, semipermanent, 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 Aqualine C-800 | 60-122°F/15-50°C | 3 hours at room temperature, or bake for 15 min. at 210-300°F / 100-150°C | <ul style="list-style-type: none"> High slip Easy application Multiple releases Low transfer No corrosion / oxidation of the mold surface Minimal mold buildup | A water-based, zero VOC, mold release designed for releasing composite materials. This product offers easy application and higher number of releases which causes lower product usage and less operator exposure to chemicals. |

Adhesive and Composite Systems

Quick Reference Guide

| | | | |
|--|----------------------------|-------------------------------------|------------------|
| TOUGH HIGH STRAIN PASTES | Service Temperature | Bell Peel (77°F/25°C) | Pages 4–5 |
| <i>Hysol EA 9309.3NA</i> | 180°F/82°C | 75 (lb./in.)/335 (N/25 mm) | |
| <i>Hysol EA 9313</i> | 120°F/49°C | 50 (lb./in.)/225 (N/25 mm) | |
| <i>Hysol EA 9320NA</i> | >180°F/82°C | 35 (lb./in.)/150 (N/25 mm) | |
| <i>Hysol EA 9323</i> | 250°F/121°C | 4 (lb./in.)/17.8 (N/25 mm) | |
| <i>Hysol EA 9330</i> | 180°F/82°C | 60 (lb./in.)/265 (N/25 mm) | |
| <i>Hysol EA 9330.3</i> | 180°F/82°C | 60 (lb./in.)/265 (N/25 mm) | |
| <i>Hysol EA 9359.3</i> | 200°F/93°C | 75 (lb./in.)/335 (N/25 mm) | |
| <i>Hysol EA 9360</i> | >225°F/107°C | 60 (lb./in.)/265 (N/25 mm) | |
| NEW! <i>Hysol EA 9380</i> | 250°F/121°C | 50 (lb./in.)/220 (N/25 mm) | |
| NEW! <i>Hysol EA 9380.05</i> | 250°F/121°C | 38 (lb./in.)/169 (N/25 mm) | |
| HIGH TEMPERATURE FILLED PASTES | Service Temperature | Pot Life (minutes) | Pages 4–7 |
| <i>Hysol EA 934NA</i> | 300°F/149°C | 40 | |
| <i>Hysol EA 9321</i> | 250°F/121°C | 40 | |
| <i>Hysol EA 9394</i> | 350°F/177°C | 100 | |
| <i>Hysol EA 9394 / C-2</i> | 450°F/232°C | 480 | |
| <i>Hysol EA 9395</i> | 350°F/177°C | 100 | |
| LIQUID SHIMS | Service Temperature | Pot Life (minutes) | Pages 4–7 |
| <i>Hysol EA 934NA</i> | 300°F/149°C | 40 | |
| <i>Hysol EA 9360</i> | >225°F/107°C | 40 | |
| <i>Hysol EA 9377</i> | >200°F/93°C | 60 | |
| <i>Hysol EA 9394</i> | 350°F/177°C | 100 | |
| <i>Hysol EA 9394.2</i> | 225°F/107°C | 15 | |
| LOW VISCOSITY WET LAY-UP PASTES | Cure Temperature | Pot Life (minutes) | Pages 4–7 |
| <i>Hysol EA 956</i> | 77°F/25°C | 30 | |
| <i>Hysol EA 9390</i> | 200°F/93°C | 120 | |
| <i>Hysol EA 9396</i> | 77°F/25°C | 75 | |
| <i>Hysol EA 9396 / C-2</i> | 200°F/93°C | 480 | |
| SYNTACTICS AND LOW-DENSITY PASTES | Service Temperature | Density | Pages 4–7 |
| <i>Hysol EA 960F</i> | 160°F/71°C | N/A | |
| <i>Hysol EA 9396.6MD</i> | 300°F/149°C | 37 (pcf)/0.60 (g/cc) | |
| NEW! <i>Hysol EA 9820</i> | 350°F/177°C | N/A | |
| NEW! <i>Hysol EA 9825</i> | 350°F/177°C | N/A | |
| RTM RESINS | Service Temperature | Pot Life | Pages 6–7 |
| <i>Hysol EA 9150 Resin</i> | 250°F/121°C | 480 minutes | |
| <i>Henkel Benzoxazine 99110</i> | 300°F/149°C | > 6 months | |
| <i>Henkel Benzoxazine 99120</i> | 250°F/121°C | > 6 months | |
| <i>Henkel Benzoxazine 99900</i> | 300°F/149°C | > 12 months | |
| METAL BONDING FILMS | Service Temperature | Honeycomb Climbing Drum Peel | Pages 8–9 |
| <i>Hysol EA 9628</i> | 250°F/121°C | 18 (in.-lb./in.)/80 (m-N/m) | |
| <i>Hysol EA 9628H</i> | 250°F/121°C | 20 (in.-lb./in.)/90 (m-N/m) | |
| <i>Hysol EA 9658</i> | 350°F/177°C | 20 (in.-lb./in.)/50 (m-N/m) | |
| <i>Hysol EA 9686</i> | 300°F/149°C | 17 (in.-lb./in.)/76 (m-N/m) | |
| <i>Hysol EA 9696</i> | 250°F/121°C | 25 (in.-lb./in.)/110 (m-N/m) | |
| <i>Hysol PL 737</i> | 350°F/177°C | N/A | |
| <i>Hysol PL 777-1FR</i> | 300°F/149°C | N/A | |

| | | | |
|---|----------------------------|--|--------------------|
| COMPOSITE BONDING FILMS | Service Temperature | Out-time (Days @ 77°F/25°C) | Pages 8–9 |
| Hysol EA 9695 | >300°F/149°C | 90 | |
| Hysol PL 795 | 350°F/177°C | 100 | |
| Hysol PL 795-1 | 350°F/177°C | 100 | |
| NEW! Hysol PL 7000 | 300°F/149°C | 30 | |
| HIGH TEMPERATURE ENGINE NACELLE FILMS | Service Temperature | Out-time (Days @ 77°F/25°C) | Pages 8–9 |
| Hysol EA 9657 | 400°F/204°C | 15 | |
| NEW! Hysol EA 9658 | 350°F/177°C | 10 | |
| Hysol EA 9673 (BMI) | 550°F/288°C | 30 | |
| Hysol EA 9689 | 420°F/216°C | 10 | |
| Hysol PL 780-1 | 350°F/177°C | 10 | |
| Out of Autoclave Film Adhesives | Service Temperature | Out-time (Days @ 77°F/25°C) | Pages 8–9 |
| Hysol PL 696 | 250°F/121°C | 34 (in.-lb./in.)/154 (m-N/m) | |
| Hysol EA 9681 | 250°F/121°C | | |
| PEEL PLY | Cure Temperature | Out-time (Days @ 77°F/25°C) | Pages 10–11 |
| Hysol EA 9895 WPP | 350°F/177°C | 14 | |
| NEW! Hysol EA 9896 WPP | 250°F/121°C | 14 @ 23°C | |
| PRIMERS | | | Pages 10–11 |
| Adhesive Primers | All Primers | 14 | |
| CORE SPLICES | Service Temperature | Expansion Ratio | Pages 12–15 |
| Hysol EA 9833.1 (BMI) | 450°F/232°C | 2–3 x | |
| Hysol MA 557 | 350°F/177°C | 2.1–2.2 x | |
| Hysol MA 562 | 350°F/177°C | 2–3.5 x | |
| Hysol MA 562S | 350°F/177°C | 2–3 x | |
| Hysol MA 562SFR | 350°F/177°C | 2–3 x | |
| Hysol MA 560 | 350°F/177°C | 2–3 x | |
| Hysol PL 460 | 350°F/177°C | 2–3 x | |
| SynSpand 9899CF | 350°F/177°C | 1–2 x | |
| NON-EXPANDING SYNTACTIC FILMS | Service Temperature | Density | Pages 12–13 |
| SynCore 9823.1 | 250°F/121°C | 42 (pcf)/0.67 (g/cc) | |
| SynCore 9872.1 | 350°F/177°C | 42 (pcf)/0.67 (g/cc) | |
| SynCore HC 9875 | 350°F/177°C | 55–60 (lb./ft. ³) 881–961 (kg/m ³) | |
| EXPANDING SYNTACTIC FILMS – CORE FILLS | Service Temperature | Density | Pages 12–13 |
| SynSpand 9899 | 350°F/177°C | 8–25 (pcf)/0.12–0.40 (g/cc) | |
| SynSpand 9899CF | 350°F/177°C | 18–35 (pcf)/0.29–0.56 (g/cc) | |
| JET ENGINE ABRADABLE SEALS | Service Temperature | Out-time (Days @ 77°F/25°C) | Pages 12–13 |
| SynSpand EA 9890 | 180°F/82°C | 15 | |
| NEW! SynSpand EA 9835 | 250°F/121°C | 15 | |
| NEW! SynSpand EA 9840 | 250°F/121°C | 15 | |
| COMPOSITE SURFACING FILMS | Service Temperature | Out-time (Days @ 77°F/25°C) | Pages 12–13 |
| Hysol HC 9837.1 | 350°F/177°C | 90 | |
| Hysol PL 795SF | 350°F/177°C | 100 | |
| FREKOTE | | | Pages 14–15 |
| Mold Releases | All Frekote Products | | |

Surface Treatments

Cleaners

| Product | Application | | | | | | | | | | Substrate | | | | | | |
|------------------------------------|--------------------|-------------------|-----------|---------------|------------------------|---------------------|---|------------------------------------|--------------------------|------------------------|---------------------------|----------|-----------|----------------------|-----------------|----------|---------|
| | Aqueous Degreasing | Alkaline Cleaning | Acid Etch | Alkaline Etch | Deoxidizer / Desmutter | Conversion Coatings | Magnesium Phosphate Conversion Coatings | Zinc Phosphate Conversion Coatings | Boric Sulfuric Anodizing | Chromic Acid Anodizing | Phosphoric Acid Anodizing | Aluminum | Magnesium | Magnesium - Die Cast | Stainless Steel | Titanium | Ferrous |
| CLEANERS | | | | | | | | | | | • | • | • | • | • | • | • |
| Ridoline 298 | • | | | | • | | | • | • | • | • | | | | • | | |
| Turco 4215 NC-LT | • | | | | • | | | • | • | • | • | | | • | • | • | |
| Turco Liquid Sprayeze NP-LT | • | • | | | • | | | • | • | • | • | • | | • | • | • | |
| Turco 6849 | • | | | | • | • | | • | • | • | • | • | | • | • | • | |
| Turco Altrex 24 | • | | | | • | | | • | • | • | • | • | | • | • | • | |
| Turco Aldet | • | | | | • | | | • | • | • | • | | | • | • | | |
| Turco C 2087X | • | | | | | • | • | | | | | • | | • | • | | |
| Turco C NVT | • | | | | | • | • | | | | • | | | • | • | • | |
| Turco Ridoline 4355 | • | | | | • | • | | • | • | • | • | • | | • | • | • | |
| Turco Ridoline 909 | • | | | | • | | | • | • | • | • | • | | • | • | • | |

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| Consistency | | Form | | Chemistry | | Time (Minutes) | | Temperature (°F/°C) | | Mix Ratio (product:water) | | Time (Minutes) | | Temperature (°F/°C) | | Mix Ratio (product:water) | | Description | | |
|-------------|--------------|-----------------------|------------------|-------------------------|---------------|---------------------|------------------------|---------------------------------|--|---------------------------|--|-----------------|--|---------------------|--|---------------------------|--|-------------|--|---|
| | | | | | | Process (Immersion) | | | | | | Process (Spray) | | | | | | | | |
| Liquid | Concentrated | Alkaline, Water-based | 3-15 minutes | 130°-180°F 54°- 82°C | 4-10% v/v | 1-3 minutes | 120°-140°F | 1-4 oz./gal. | | | | | | | | | | | | <i>Ridoline 298</i> is a liquid, non-silicated, immersion cleaner for aluminum and aluminum alloys. It is formulated for use in anodizing and conversion coating lines. It is free rinsing and will remove a variety of soils including oils, greases, inks, and wax-based markings. |
| Powder | Concentrated | Alkaline, Water-based | 3-15 minutes | 120°-140°F | 5-8 oz./gal. | 1-3 minutes | 120°-140°F | 3%-10% v/v | | | | | | | | | | | | <i>Turco 4215 NC-LT</i> is a white granular mix developed for cleaning ferrous and nonferrous alloys by spray, immersion and ultrasonic methods at low temperatures. Ideal for cleaning fuel and hydraulic components and for cleaning metals prior to metal bonding. |
| Liquid | Concentrated | Alkaline, Water-based | 3-15 minutes | 100°-140°F | 5%-25% v/v | | | | | | | | | | | | | | | <i>Turco Liquid Sprayeze NP-LT</i> is a straw-colored liquid, developed to remove shop soil, lube oils, light drawing oils and drawing waxes from ferrous, aluminum, copper and titanium alloys. In addition, it is also suitable for cleaning most magnesium alloys, zinc and cadmium, and is ideal for precleaning metals prior to phosphating and painting. |
| Liquid | Concentrated | Alkaline, Water-based | Varies as needed | 131°-158°F 55°-70°C | 10-20% v/v | | | | | | | | | | | | | | | <i>Turco 6849</i> is a clear, aqueous alkaline degreaser formulated to remove shop soils, marking inks, COSMOLINE, grease and lube oils from ferrous and non-ferrous alloys. Offers both exceptional effectiveness and exceptional tank life. Replaces solvent-type vapor degreasing fluids with an effective aqueous cleaner. The costs and hazards normally associated with chlorinated solvent cleaning are thereby greatly reduced. |
| Liquid | Concentrated | Alkaline, Water-based | 3-10 minutes | 120°-130°F | 5-8% v/v | | | | | | | | | | | | | | | <i>Turco Altrex 24</i> is an inhibited, non-etching, concentrated liquid alkaline cleaner for cleaning aluminum and aluminum alloys. The product is an effective remover of most soils found on aluminum, plus other metals, and can be used in a variety of cleaning operations. |
| Powder | Concentrated | Alkaline, Water-based | 3-15 minutes | 120°-155°F | 4-8 oz./gal. | | | | | | | | | | | | | | | <i>Turco Aldet</i> is a non-silicated, caustic-free, mildly alkaline granular product designed for immersion cleaning applications on aluminum and aluminum alloys without etching the aluminum alloy itself. It is also used for cleaning ferrous and non-ferrous metals such as copper, brass, magnesium and zinc. |
| Liquid | Concentrated | Alkaline, Water-based | 3-10 minutes | 160°-195°F | 8-12% v/v | 1-5 minutes | 175°-190°F 70°-88°C | 5.4-8 gals. per 100 gals. water | | | | | | | | | | | | <i>Turco C 2087X</i> is a single package liquid cleaner formulated for the removal of lubricants and other drawing compounds or oils from baskets, racks, tumbling barrels and production parts. The cleaner may be applied by either spray or immersion. |
| Powder | Concentrated | Alkaline, Water-based | Varies as needed | 180°F min. | 5-12 oz./gal. | | | | | | | | | | | | | | | <i>Turco C NVT</i> is a heavy-duty, alkaline cleaner for immersion and barrel cleaning operations. It is particularly suited to plating, porcelain enameling and other critical finishing operations which require the utmost in cleanliness. In addition, it has tremendous soil tolerance, and cleans and rinses well even under the heavy soil loads of barrel washing of screw and header machine products. |
| Liquid | Concentrated | Alkaline, Water-based | 3-15 minutes | 110-160°F | 5-25 % v/v | | | | | | | | | | | | | | | <i>Turco Ridoline 4355</i> is a phosphate-free liquid, immersion-applied, non-etching, cleaning product designed specifically to replace halogenated hydrocarbon vapor degreasers for cleaning aluminum alloys. It is formulated for removal of various soils such as oils, greases, inks and wax based markings. Superior cleaning characteristics compared to vapor degreasing, while providing some amount of interstage corrosion protection. |
| Powder | Concentrated | Alkaline, Water-based | 3-15 minutes | 130°-180°F | 5-12 oz./gal. | | | | | | | | | | | | | | | <i>Turco Ridoline 909</i> is a medium-duty, caustic-free, immersion cleaner that provides excellent wetting, emulsifying and dispersing properties which are effective in the removal of a wide variety of soils on ferrous and non-ferrous metals. In addition, it is safe on steel, aluminum, brass and zinc die castings. |

Surface Treatments

Deoxidizers and Etchants

| Product | Application | | | | | | | | | | Substrate | | | | | | | |
|--|--------------------|-------------------|-----------|---------------|------------------------|---------------------|---|------------------------------------|--------------------------|------------------------|---------------------------|----------|-----------|----------------------|-----------------|----------|---------|--------------------------|
| | Aqueous Degreasing | Alkaline Cleaning | Acid Etch | Alkaline Etch | Deoxidizer / Desmutter | Conversion Coatings | Magnesium / Phosphate Conversion Coatings | Zinc Phosphate Conversion Coatings | Boric Sulfuric Anodizing | Chromic Acid Anodizing | Phosphoric Acid Anodizing | Aluminum | Magnesium | Magnesium - Die Cast | Stainless Steel | Titanium | Ferrous | See Technical Data Sheet |
| DEOXIDIZERS | | | | | | | | | | | | | | | | | | |
| <i>Turco Aldox V</i> | | | | | | | | | | | | | | | | | | |
| <i>Turco Deoxalume 2310</i> | | | | | | | | | | | | | | | | | | |
| <i>Turco Deoxidizer 6 Makeup</i> <i>Turco Deoxidizer 16 Replenisher</i> | | | | | | | | | | | | | | | | | | |
| <i>Turco D HX-357 Make-Up</i> <i>Turco D HX-357 Replenisher</i> | | | | | | | | | | | | | | | | | | |
| <i>Turco Liquid Smut-Go NC</i> | | | | | | | | | | | | | | | | | | |
| <i>Turco Nitradd (T-4104)</i> | | | | | | | | | | | | | | | | | | |
| ETCHANTS | | | | | | | | | | | | | | | | | | |
| <i>Turco Aluminux Etch L</i> | | | | | | | | | | | | | | | | | | |
| <i>Turco 5578-L</i> | | | | | | | | | | | | | | | | | | |
| <i>Turco Mil Etch</i> | | | | | | | | | | | | | | | | | | |
| <i>Turco Nova EC-202L</i> | | | | | | | | | | | | | | | | | | |

Surface Treatments

Conversion Coatings

| Product | Application | | | | | | | | | | Substrate | | | | | | | |
|---|--------------------|-------------------|-----------|---------------|------------------------|---------------------|---|------------------------------------|------------------------------------|------------------------|---------------------------|----------|-----------|----------------------|-----------------|----------|---------|--------------------------|
| | Aqueous Degreasing | Alkaline Cleaning | Acid Etch | Alkaline Etch | Deoxidizer / Desmutter | Conversion Coatings | Magnesium Phosphate Conversion Coatings | Zinc Phosphate Conversion Coatings | Boric Sulfuric Conversion Coatings | Chromic Acid Anodizing | Phosphoric Acid Anodizing | Aluminum | Magnesium | Magnesium - Die Cast | Stainless Steel | Titanium | Ferrous | See Technical Data Sheet |
| CONVERSION COATINGS | | | | | | | | | | | • | • | • | • | • | • | • | |
| Alodine 600 | | | | | • | | | | | | • | | | | | | | |
| Alodine 1200S | | | | | • | | | | | | • | | | | | | | |
| Alodine 1600 Alodine 1660 Additive | | | | | • | | | | | | • | | | | | | | |
| Alodine 5200 | | | | | • | | | | | | • | • | • | | | • | | |
| Alodine 5700 | | | | | • | | | | | | • | • | • | | | • | | |
| Alodine T 5900 | | | | | • | | | | | | • | • | • | | | • | | |
| Alodine T 5900 RTU | | | | | • | | | | | | • | • | • | | | • | | |
| Bonderite 7400 | | | | | • | | | | | | • | | | | | | • | |

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Alodine



| Consistency | | Form | | Chemistry | | Time (Minutes) | | Temperature (°F / °C) | | Mix Ratio (product:water) | | Description | |
|---------------------|----------------------------|------------------|-------------------------|-----------------------|---------------------------------------|------------------------|-----------------------|---------------------------------------|--|---------------------------|--|-------------|--|
| Process (Immersion) | | | | | | Process (Spray) | | | | | | Description | |
| Powder | Concentrated | Chromate | 1-5 minutes | 70°-100°F 21°-38°C | 12.5 lbs. per 100 gals. water | 1-3 minutes | 70°-100°F 21°-38°C | 12.5 lbs. per 100 gals. water | <i>Alodine 600</i> is a powdered chemical used to produce a chromate conversion coating on aluminum and its alloys, which ranges in color from light, iridescent gold to tan. It can be applied by immersion or spray methods, does not contain complex cyanides, and is particularly recommended where a low dielectric resistance coating is desired. | | | | |
| Powder | Concentrated | Chromate | 15 seconds to 3 minutes | 70°-100°F 21°-38°C | 6.3 lbs. per 100 gals. water | 15 seconds to 1 minute | 70°-100°F 21°-38°C | 6.3 lbs. per 100 gals. water | <i>Alodine 1200S</i> is a powdered chemical used to produce a protective coating on aluminum to minimize corrosion and provide an improved bond for paint. | | | | |
| Liquid | Concentrated, Two Packages | Chromate | 1-5 minutes | 60°-130°F | 0.65% v/v A1600 1.3% v/v A1660 | | | | <i>Alodine 1600</i> is a concentrated, liquid two-package chemical used to produce a chromate conversion coating on aluminum and all its alloys. The color ranges from light iridescent gold to tan. <i>Alodine 1600</i> does not contain complex cyanides. | | | | |
| Liquid | Concentrated | Non-chrome | 1-5 minutes | 70°-100°F 21°-38°C | 1% - 5% v/v | 1-5 minutes | 70°-100°F 21°-38°C | 1%-5% v/v | <i>Alodine 5200</i> treatment is a chromium-free product specifically formulated for treating non-ferrous alloys. Spray or immersion applications may be used. This process provides an excellent base for bonding of adhesives and organic finishes. | | | | |
| Liquid | Ready-to-Use | Non-chrome | 1-5 minutes | 70°-100°F 21°-38°C | Use as Received | 1-5 minutes | 70°-100°F 21°-38°C | Use as Received | <i>Alodine 5700</i> is a chromium-free conversion coating specifically formulated for treating aluminum and its alloys. This product is formulated as a Ready-to-Use material for spray applications. The process provides an excellent base for organic finishes. | | | | |
| Liquid | Concentrated | Trivalent Chrome | 5-10 minutes | 70°-100°F 21°-38°C | 5% v/v AT5900, 1% v/v AT5900 Toner | 1.5-3.0 minutes | 70°-100°F 21°-38°C | 5% v/v AT5900, 1% v/v AT5900 Toner | <i>Alodine T 5900</i> treatment is a complex trivalent chromium conversion coating formulated for treating aluminum and its alloys, metals coated with IVD aluminum, magnesium, titanium and zinc surfaces. The process provides bare ASTM-B117 salt spray resistance, and it serves as an excellent base for bonding of paint and adhesives. Neither the product itself nor the conversion coating developed by the process contains hexavalent chromium. | | | | |
| Liquid | Ready-to-Use | Trivalent Chrome | 5-10 minutes | 70°-100°F 21°-38°C | Use as Received | 1.5-3.0 minutes | 70°-100°F 21°-38°C | Use as Received | <i>Alodine T 5900 RTU</i> treatment is a complex trivalent chromium conversion coating formulated for treating aluminum and its alloys, metals coated with IVD aluminum, magnesium, titanium and zinc surfaces. This Henkel product is formulated as a Ready-to-Use material for manual spray applications. | | | | |
| Liquid | Concentrated | Non-chrome | | | | 2-5 minutes | Ambient | 3 to 15% per 100 gals. water | <i>Bonderite 7400</i> is formulated for non-rinsing, dry-in-place that produces a uniform conversion coating, which improves adhesion and bare corrosion resistance on aluminum, galvanized steel, iron, steel and zinc surfaces. | | | | |

Surface Treatments

Conversion Coatings

| Product | Application | | | | | | | | | | Substrate | | | | | | | |
|--|--------------------|-------------------|-----------|---------------|------------------------|---------------------|---|------------------------------------|------------------------------------|------------------------|---------------------------|----------|-----------|----------------------|-----------------|----------|---------|--------------------------|
| | Aqueous Degreasing | Alkaline Cleaning | Acid Etch | Alkaline Etch | Deoxidizer / Desmutter | Conversion Coatings | Magnesium Phosphate Conversion Coatings | Zinc Phosphate Conversion Coatings | Boric Sulfuric Conversion Coatings | Chromic Acid Anodizing | Phosphoric Acid Anodizing | Aluminum | Magnesium | Magnesium - Die Cast | Stainless Steel | Titanium | Ferrous | See Technical Data Sheet |
| CONVERSION COATINGS (TOUCH UP) | | | | | | | | | | | | | | | | | | |
| <i>Alodine Magnesium Treatment Kit</i> | | | | | | | | | | | | | | | | | | |
| <i>Alodine 120 Brush Kit</i> | | | | | | | | | | | | | | | | | | |
| <i>Alodine 871 Touch-N-Prep Coating</i> | | | | | | | | | | | | | | | | | | |
| <i>Alodine 1132 Touch-N-Prep Coating</i> | | | | | | | | | | | | | | | | | | |
| <i>Alodine Touch-N-Prep Replacement Tips</i> | | | | | | | | | | | | | | | | | | |
| <i>Alodine 1201</i> | | | | | | | | | | | | | | | | | | |
| <i>Alodine 5700 Wipes</i> | | | | | | | | | | | | | | | | | | |
| PHOSPHATE CONVERSION COATINGS | | | | | | | | | | | | | | | | | | |
| <i>Bonderite 37 Make Up</i> <i>Bonderite 37 Replenisher B</i> | | | | | | | | | | | | | | | | | | |
| <i>Bonderite 880 Make Up</i> <i>Bonderite 880 Replenisher</i> | | | | | | | | | | | | | | | | | | |
| <i>Parco Lubrite 2 / Thermoil Granodine</i> | | | | | | | | | | | | | | | | | | |









Alodine




| Consistency | | Form | | Chemistry | | Time (Minutes) | | Temperature (°F / °C) | | Mix Ratio (product:water) | | Time (Minutes) | | Temperature (°F / °C) | | Mix Ratio (product:water) | | Description | | |
|---------------------|---------------------------|---------------------|--------------------|-----------------------------|--|-----------------|--|-----------------------|--|---------------------------|--|--------------------------|-------------------------|--------------------------|---|---------------------------|--|-------------|--|--|
| Process (Immersion) | | | | | | Process (Spray) | | | | | | Description | | | | | | | | |
| Liquid | Ready-to-Use Two-Part Kit | Chromate | | | | | | | | | | Until dry | Ambient | Use as Received | The <i>Alodine</i> Magnesium Treatment Kit contains products formulated for treating magnesium alloys to produce a chromate conversion coating conforming to SAE AMS-M-3171, Type VI. The application method conforms to requirements in NAVAIR 01-1A-509 and is meant primarily for touch-up, corrosion repair processes of magnesium alloys. | | | | | |
| Liquid | Ready-to-Use Two-Part Kit | Chromate | | | | | | | | | | See Technical Data Sheet | Ambient | Use as Received | <i>Alodine</i> 120 Brush Kit contains products formulated for treating aluminum. This kit contains sufficient chemicals for cleaning and coating approximately 100 square feet of aluminum surface when used under normal conditions and in accordance with the directions. | | | | | |
| Liquid | Ready-to-Use | Trivalent Chrome | Until dry | Ambient | Use as Received | | | | | | | | | | | | | | <i>Alodine</i> 871 <i>Touch-N-Prep</i> Coating is a non-hexavalent, tri-chrome, dry-in-place conversion coating designed for use on aluminum and its alloys. The pen used to deliver this product provides an easy and safe method of repairing bare areas of aluminum surfaces. | |
| Liquid | Ready-to-Use | Chromate | Until dry | Ambient | Use as Received | | | | | | | | | | | | | | <i>Alodine</i> 1132 <i>Touch-N-Prep</i> Coating is a non-hexavalent, tri-chrome, dry-in-place conversion coating designed for use on aluminum and its alloys. The pen used to deliver this product provides an easy and safe method of repairing bare areas of aluminum surfaces. | |
| N/A | N/A | N/A | N/A | N/A | N/A | | | | | | | | | | | | | | A felt replacement tip for use with the <i>Alodine Touch-N-Prep</i> Coating applicator. | |
| Liquid | Ready-to-Use | Chromate | | | | | | | | | | 2-5 minutes | Ambient to 100°F / 38°C | 50% - 100% v/v | <i>Alodine</i> 1201 is a nonflammable, chromic acid-based coating chemical that will produce a chrome conversion coating on aluminum and its alloys. | | | | | |
| Liquid | Presaturated Wipe | Non-chrome | 2-5 minutes | Ambient | Used as Received | | | | | | | | | | | | | | <i>Alodine</i> 5700 Wipes are a chromium-free conversion coating specifically formulated for treating aluminum and its alloys. This product is formulated as a Ready-to-Use material for wipe applications. The process provides an excellent base for organic finishes. | |
| Liquid | Concentrated | Zinc Phospahte | 2-4 minutes | 140°-170°F 60°-77°C | See Technical Data Sheet | | | | | | | 45-90 seconds | 130°-160°F 54°-71°C | See Technical Data Sheet | <i>Bonderite</i> 37 chemicals are formulated primarily for treating hot-dip galvanized and certain continuous electrogalvanized surfaces which are difficult to coat with other materials. Applied by spray or immersion, the treatment will prevent white spots, seediness and pinpoint buildup. Steel may be given an excellent coating by adding Accelerator 130 or 131, and the process is well suited for mixed production of galvanized and steel. Limited quantities of aluminum can be coated satisfactorily. If much aluminum is to be treated, other processes are preferred. Cadmium must never be run through the solution because it will poison the bath. | | | | | |
| Liquid | Concentrated | Zinc Phospahte | 2-5 minutes | 175°F +/- 10°F 80°C +/- 5°C | 45 lbs. per 100 gals. water | | | | | | | | | | | | | | <i>Bonderite</i> 880 is formulated with an internal crystal-refining agent, and is particularly designed for coating steel by immersion. The treatment converts the metal surface to a dense, smooth, zinc phosphate coating which inhibits corrosion and increases the gloss, adhesion and durability of paint finishes. | |
| Liquid | Concentrated | Manganese Phosphate | Approx. 15 minutes | 140°-170°F 60°-77°C | 120 lbs. (11 gallons) per 100 gals. of water | | | | | | | | | | | | | | <i>Parco</i> Lubrite 2 is formulated to produce nonmetallic, oil-absorptive coatings on iron and steel bearing surfaces. These corrosion-resistant coatings consist chiefly of iron and manganese phosphates, and reduce wear on such articles as pistons, rings, liners, camshafts, tappets, motor blocks and similar bearing surfaces. | |

Surface Treatments

Jet Engine Cleaners

| Product | Application | | | | | | | | | | Characteristics | | | | |
|---|------------------------|---------------------|-------------------------|----------------------------|----------|---------------------|---------------------|------------------------|-------------------------------|-------------|-----------------|------------------------|-------------------------------|---|-----------------------|
| | Metal Processing Lines | Jet Engine Cleaning | Aircraft Parts Cleaning | Aircraft Depaint & Repaint | Coolants | Aircraft Appearance | Aircraft Protection | Composite Applications | Maintenance & Production Aids | Consistency | Form | How to Apply | Mix Ratio (product to water) | Chemistry | |
| DEOXIDIZERS | | | | | | | | | | | | | | | |
|  Turco T-4181L (Liquid Alkaline Rust Remover) | • | • | • | | | | | | | | Liquid | Concentrated | Immersion | Process Dependent – See Henkel Representative | Alkaline |
| Turco 5668 | | • | • | | | | | | | | Liquid | Concentrated | Immersion | Add Entire Contents of Container to Stripping Tank | Diphase Liquid |
|  Turco 5948-DPM | • | • | • | • | • | | | | | | Liquid | Concentrated | Immersion, Spray or Mop | Immersion: 11:3-20 Spray/Mop: 1:9-30 | Alkaline, Water-Based |
|  Turco 5948-R | • | • | • | • | • | | | | | | Liquid | Concentrated | Immersion, Spray or Mop | 3%-30% in Water | Alkaline, Water-Based |
| Turco Liquid Sprayeze NP-LT | • | • | • | | | | | | | | Liquid | Concentrated | Immersion or Spray | Immersion: 15%-25% in Water Spray: 3%-10% in Water | Alkaline, Water-Based |
| JET ENGINE CLEANERS / HOT LINE | | | | | | | | | | | | | | | |
| Turco T-4181L (Liquid Alkaline Rust Remover) | • | • | | | | | | | | | Liquid | Concentrated | Immersion | Process Dependent – See Henkel Representative | Alkaline |
|  Turco 4338-L | | • | | | | | | | | | Liquid | Two-Part, Concentrated | Immersion | Part 1 : & 2 : 15%-25% by Volume | Alkaline Permanganate |
|  Turco 4409 | | • | | | | | | | | | Liquid | Concentrated | Immersion, Brush or Hand Wipe | 5%-50% in Water | Acidic |
|  Turco Rust Bloc | • | • | • | | | | | | | | Liquid | Concentrated | Immersion or Spray | 0.75%-1.75% in Water | Alkaline |
|  Turco Scale Gon 5 | | • | | | | | | | | | Liquid | Concentrated | Immersion | 20%-30% in Water | Mildly Acidic |
|  Turco Scale Gon 7 | | • | | | | | | | | | Liquid | Concentrated | Immersion | 20%-30% in Water | Mildly Acidic |

TYPICAL COLD LINE PROCESS:

*  Global Product Line

1. Pre-clean with *Turco* Liquid Sprayeze NP-LT, or
2. Dip clean with *Turco* 5948-DPM.
3. Rinse.
4. Use *Turco* 4181L to remove dirt and scale from steel and titanium alloys.
5. Rinse.
6. Use *Turco* 5668 to remove coatings for full inspection.



| Substrate | | | | | | | Operation | | Description | |
|-----------|---------------------|-----------|-----------------|----------|---------|-------------|--------------------------|--------------------------------|---|--|
| Aluminum | Composite Materials | Magnesium | Stainless Steel | Titanium | Ferrous | Non-Ferrous | See Technical Data Sheet | Temperature (°F/°C) | Time (Minutes) | |
| | | • | • | • | • | • | | 176°F-203°F 80°C-95°C | 15-60 minutes | <i>Turco</i> T-4181L (Liquid Alkaline Rust Remover) is an amber, liquid compound formulated to remove rust, paints, lube oils, drawing pastes, cutting oils and protective oils from ferrous alloys by immersion methods. Will not attack ferrous alloys, magnesium alloys, stainless steels, brass, bronze or MONEL alloys when used as directed. <i>Turco</i> T-4181L is normally used at 50% to 75% in water at 176°F-203°F/80°C-95°C and can be used on titanium alloys when diluted to 12% to 15% in water at 158°F-167°F/70°C-75°C. |
| • | • | • | • | • | • | • | | 158°F-203°F 70°C-80°C | 15-60 minutes | <i>Turco</i> 5668 is a diphasic, liquid paint remover developed to remove resistant coatings, such as aluminized silicones, polyurethanes, acrylics, epoxies and chromated primers without using phenols, chromate, chlorinated solvents or acids. Ideal for the removal of PRC-1560M and PRC-1560MC coatings and is not detrimental to aircraft metals such as aluminum, titanium, magnesium, cadmium, conversion coatings, Dow coatings or ferrous alloys. Meets all requirements of MIL-R-83936B for removal of paint from aircraft wheels, landing gear components, and other aircraft and AGE components. |
| • | | • | • | • | • | • | | 149°F-176°F 65°C-80°C | Immersion: 5-15 minutes | <i>Turco</i> 5948-DPM is an alkaline, water-based, blue, concentrated compound formulated to effectively clean painted and unpainted aircraft exterior and interior surfaces when diluted with water. Ideally suited for use on all models of jet aircraft. It is also designed to be used in immersion tanks, for dip applications. |
| • | | • | • | • | • | • | | 149°F-176°F 65°C-80°C | Immersion: 5-15 minutes | <i>Turco</i> 5948-R is an alkaline, water-based, blue, concentrated compound formulated to effectively clean painted and unpainted aircraft exterior and interior surfaces when diluted with water. Ideally suited for use on all aircraft large or small, and for cleaning engine parts during engine overhaul. It is also designed to be used in immersion tanks, for dip applications. |
| • | | • | • | • | • | • | | 90°F-190°F 32°C-88°C | Immersion: 5-15 minutes Spray: 1-2 minutes | <i>Turco</i> Liquid Sprayeze NP-LT is a straw-colored liquid, developed to remove shop soil, lube oils, light drawing oils and drawing waxes from ferrous, aluminum, copper and titanium alloys. Suitable for cleaning most magnesium alloys, zinc and cadmium, and is ideal for precleaning metals prior to phosphating and painting. Does not contain free caustic, readily rinses from metal surfaces with room temperature water. |
| | | | • | • | • | | | 176°F-203°F 80°C-95°C | 15-60 minutes | <i>Turco</i> T-4181L (Liquid Alkaline Rust Remover) is an amber, liquid compound formulated to remove rust, paints, lube oils, drawing pastes, cutting oils and protective oils from ferrous alloys by immersion methods. Will not attack ferrous alloys, magnesium alloys, stainless steels, brass, bronze or MONEL alloys when used as directed. <i>Turco</i> T-4181L (Liquid Alkaline Rust Remover) is normally used at 50% to 75% in water at 176°F-203°F/80°C-95°C and can be used on titanium alloys when diluted to 12% to 15% in water at 158°F-167°F/70°C-75°C. |
| | | | • | • | • | | | 176°F-203°F 80°C-95°C | 30-60 minutes | <i>Turco</i> 4338-L is a two-part liquid, alkaline permanganate formulation developed specifically for jet engine cleaning. It modifies high temperature heat scale by chemically changing the structure of the oxide deposit to one that is properly conditioned for ease of chemical removal in subsequent processing steps. Approved by Rolls-Royce, GEAE, and Pratt & Whitney. |
| | | | • | • | • | | | Ambient to 140°F/ 60°C 3 | 3-10 minutes | <i>Turco</i> 4409 is a clear, colorless liquid acid cleaner and deoxidizer designed for use on ferrous and non-ferrous alloys by immersion, spray and hand wipe methods. It is not intended for use on magnesium alloys and high strength steels. |
| • | | • | • | • | • | • | | Ambient to 203°F/95°C | Varies | <i>Turco</i> Rust Bloc is an alkaline liquid used as a rust inhibiting rinse additive or cleaner. It provides temporary in-plant rust protection for steel and cast iron. |
| | | | • | • | • | | | 176°F-194°F 80°C-90°C | 30 minutes | <i>Turco</i> Scale Gon 5 is an acid-activated, yellow liquid used in the <i>Turco</i> Jet Engine Process to condition and remove high temperature scale from jet engine parts. Approved by Rolls-Royce, GEAE and Pratt & Whitney. |
| | | | • | • | • | | | 176°F-194°F 80°C-90°C | 30 minutes | <i>Turco</i> Scale Gon 7 is an acid-activated, yellow liquid used in the <i>Turco</i> Jet Engine Process to condition and remove high temperature scale from jet engine parts. Approved by Rolls-Royce. |

TYPICAL HOT LINE PROCESS:

1. Pre-clean with *Turco* Liquid Sprayeze NP-LT.
2. Rinse.
3. Use *Turco* 4181L to remove carbon and light scale.
4. Rinse.
5. Use *Turco* Scale Gon 5 acid-based scale conditioner.
6. Rinse.
7. Use *Turco* 4338-L to remove major scale.
8. Rinse.
9. Use *Turco* 4181L or *Turco* 4409 to continue scale removal.
10. Rinse.
11. Apply *Turco* Rust Bloc.

Surface Treatments

Jet Engine Cleaners

| Product | Application | | | | | | | | | | Characteristics | | | | |
|------------------------|------------------------|---------------------|-------------------------|----------------------------|----------|---------------------|---------------------|------------------------|--------------------------------|-------------|-----------------|--------------|------------------------------|-------------------------|--|
| | Metal Processing Lines | Jet Engine Cleaning | Aircraft Parts Cleaning | Aircraft Depaint & Repaint | Coolants | Aircraft Appearance | Aircraft Protection | Composite Applications | Maintenance & Production Aides | Consistency | Form | How to Apply | Mix Ratio (product to water) | Chemistry | |
| COMPRESSOR WASH | | | | | | | | | | | | | | | |
| Turco 5884 | • | | | | | | | | | Liquid | Concentrated | Spray | 1:1-4 | Alkaline, Solvent-Based | |
| Turco 6783-10 | • | | | | | | | | | Liquid | Ready-to-Use | Spray | Spray Use as Received | Alkaline, Solvent-Based | |
| Turco 6783-50 | • | | | | | | | | | Liquid | Concentrated | Spray | 20% in Water | Alkaline, Solvent-Based | |

Surface Treatments

Surface Conditioners and Sealers

| Product | Application | | | | | | | | | | Substrate | | | | | | |
|----------------------------|--------------------|-------------------|-----------|---------------|-------------------------|---------------------|---|------------------------------------|--------------------------|------------------------|---------------------------|----------|-----------|----------------------|-----------------|----------|---------|
| | Aqueous Degreasing | Alkaline Cleaning | Acid Etch | Alkaline Etch | Decoxidizer / Desmutter | Conversion Coatings | Magnesium Phosphate Conversion Coatings | Zinc Phosphate Conversion Coatings | Boric Sulfuric Anodizing | Chromic Acid Anodizing | Phosphoric Acid Anodizing | Aluminum | Magnesium | Magnesium - Die Cast | Stainless Steel | Titanium | Ferrous |
| SURFACE CONDITIONER | | | | | | | | | | | • | • | • | • | • | • | • |
| Fixodine M | | | | | • | | | | | | | | | | • | • | |
| Fixodine Z | | | | | | • | | | | | | | | | • | • | |
| SEALERS | | | | | | | | | | | • | • | • | • | • | • | • |
| Parcolene 99X | | | | | | • | | | | | | | | | • | | |
| Parcolac 2945 | | | | | | • | | | | | | | | | • | | |



| Substrate | | | | | | | | Operation | | Description |
|-----------|---------------------|-----------|-----------------|----------|---------|-------------|--------------------------|---------------------|-------------------------|--|
| Aluminum | Composite Materials | Magnesium | Stainless Steel | Titanium | Ferrous | Non-Ferrous | See Technical Data Sheet | Temperature (°F/°C) | Time (Minutes) | |
| • | | • | • | • | • | | | Ambient | Approximately 5 minutes | <i>Turco 5884</i> is a concentrated liquid cleaner that is effective in the removal of oil, salt and solid deposits from compressor blades, guide vanes and rotors of in-service jet engines. Periodic cleaning of these components is necessary to avoid power loss, abnormal temperature increases and increased fuel consumption. Approved to MIL-C-85704B Type I. |
| • | | • | • | • | • | | | Ambient | Approximately 5 minutes | <i>Turco 6783-10</i> is an aqueous compressor cleaner which effectively removes oil, salt and solid deposits from compressor blades, guide vanes and rotors of in-service turbine engines. Periodic cleaning of these components is necessary to avoid power loss, abnormal temperature increases, increased fuel consumption and excessive NOx emissions. Supplied in a Ready-to-Use liquid form. Meets MIL-C-85704B Type II and III. |
| • | | • | • | • | • | | | Ambient | Approximately 5 minutes | <i>Turco 6783-50</i> is a concentrated, aqueous compressor cleaner that effectively removes oil, salt and solid deposits from compressor blades, guide vanes and rotors of inservice turbine engines. Use at 20% by volume in distilled, demineralized or good drinking quality water. For cold weather (below 0°C), add 20% by volume isopropanol, ethanol or glycol. Meets MIL-C-85704B Type II and III. |

| Consistency | Form | Chemistry | Process (Immersion) | | | Process (Spray) | | | Description |
|-------------|--------------|-------------------------|---------------------|--------------------------|--------------------------------|-----------------|--------------------------|-------------------------------|---|
| | | | Time (Minutes) | Temperature (°F/°C) | Mix Ratio (product:water) | Time (Minutes) | Temperature (°F/°C) | Mix Ratio (product:water) | |
| Powder | Concentrated | Surface Conditioner | 1 minute | 120°-190°F 49°-88°C | 3.5 lbs. per 100 gals. water | 1 minute | 120°-190°F 49°-88°C | 3.5 lbs. per 100 gals. water | <i>Fixodine M</i> is a powdered conditioning agent used for articles of iron and steel, ahead of a <i>Parco</i> Lubrite treatment. It eliminates the coarse, crystalline coatings sometimes obtained on iron and steel surfaces, which have been pickled with acids or cleaned with strong alkalis. It promotes the formation of a dense and fine crystalline phosphate coating. |
| Powder | Concentrated | Surface Conditioner | 10-60 seconds | Maximum of 140°F 60°C | 1 lb. per 100 gals. water | 10-60 seconds | Maximum of 140°F 60°C | 1 lb. per 100 gals. water | <i>Fixodine Z</i> is especially formulated to prepare iron, steel, aluminum, zinc and zinc-alloy surfaces for subsequent crystalline phosphate coating applications. These surfaces may be treated singly or in mixed production by either spray or immersion processing. The titanium-containing conditioning chemical promotes the formation of a dense, fine-grained phosphate coating, which is preferred as a paint base because it promotes superior adhesion and durability in corrosive environments. |
| Liquid | Concentrated | Non-chrome | 20-120 seconds | Ambient | 0.75 gal. per 100 gals. water | 20-120 seconds | Ambient | 0.75 gal. per 100 gals. water | <i>Parcolene 99X</i> post-treatment is a chromium- and phosphate-free post-treatment especially formulated for use over all types of conversion coatings used in the pretreatment of steel, zinc and aluminum surfaces. |
| Liquid | Concentrated | Oil, Water-emulsifiable | > 1 minute | 80°-150°F 26°-66°C | 5-30 gals. per 100 gals. water | | | | <i>Parcolac 2945</i> is a water-emulsifiable, rust-preventive oil designed primarily for use on articles treated with a phosphate conversion coating. It can also be applied over paint-base-type iron phosphate and zinc phosphate coatings, over black oxide coatings and on bare metal. |

Surface Treatments

Depaint/Repaint

Aircraft Parts Cleaning

Aircraft Depaint & Repaint

Aircraft Appearance

Consistency

Form

How to Apply

Mix Ratio (product to water)

Chemistry

| Product | Application | | | Characteristics | | | | |
|--|-------------|---|---|-----------------|--------------|----------------|---|-----------------------|
| EXTERIOR WASH | | | | | | | | |
| <i>Turco Aerowash</i> | | | • | Liquid | Concentrated | Spray or Mop | 5%-30% in water, depending upon soil | Alkaline, Water-based |
| <i>Turco Aerowash XTR-1</i> | | | • | Liquid | Concentrated | Spray or Mop | Use as Received, 1 part concentrate to 3-15 parts water depending upon soil | Alkaline, Water-based |
| <i>Turco 6871</i> | | | • | Liquid | Concentrated | Spray or Mop | Use as Received, 1 part concentrate to 3-15 parts water depending upon soil | Alkaline, Water-based |
| <i>Turco Air-Tec #23</i> | | | • | Liquid | Concentrated | Spray or Foam | 1 part concentrate to 3-15 parts water | Alkaline, Water-based |
| <i>Turco 5948-DPM</i> | • | • | • | Liquid | Concentrated | Spray or Mop | 1 part concentrate to 9-30 parts water | Alkaline, Water-based |
| <i>Turco 5948-R</i> | • | • | • | Liquid | Concentrated | Spray or Mop | 3%-30% in water | Alkaline, Water-based |
| FLAP & WHEEL WELL | | | | | | | | |
| <i>Turco 5948-DPM Thick</i> | • | • | • | Liquid | Concentrated | Spray or Mop | Use as Received | Alkaline, Water-based |
| METAL BRIGHTENERS | | | | | | | | |
| <i>Turco Metal Glo #6</i> | | | • | Liquid | Concentrated | Brush or Spray | Full strength or 1:1 | Acid, Solvent |
| <i>Turco Metal Glo FF (Concentrate)</i> <i>Turco Metal Glo FF RTU</i> <i>Turco Metal Glo FF RTU (Winter Version)</i> | | | • | Liquid | Concentrated | Brush or Spray | Full strength or 1:2 | Acid, Solvent |



| Substrate | | | | | | | | Temperature | | Time | | Description |
|-----------|---------------------|-----------|------------|-----------------|----------|---------|-------------|--------------------------|-------------------------|------|--|---|
| Aluminum | Composite Materials | Magnesium | Mild Steel | Stainless Steel | Titanium | Ferrous | Non-Ferrous | | | | | |
| • | • | | • | • | • | • | | Ambient | Varies | | | <p><i>Turco Aerowash</i> is a concentrated liquid all-purpose maintenance cleaner. It contains a unique blend of alkaline materials, solvents and surfactants, which makes this product highly effective against a wide variety of soils. <i>Turco Aerowash</i> is safe to use on all metals, glass, painted surfaces and plastics.</p> <p><i>Turco Aerowash XTR-1</i> is a silicate-free, VOC-free, water-based, concentrated cleaner, formulated to effectively clean painted and unpainted aircraft exterior surfaces. <i>Turco Aerowash XTR-1</i> is a gel-type cleaner and is ideally suited for use on all surfaces. <i>Turco Aerowash XTR-1</i> meets the standards of AMS 1523A Cleaner for Exterior Aircraft Surface Thickened or Gel-Type, Water-based.</p> <p><i>Turco 6871</i> is a new environmentally sustainable cleaner that is low VOC, and free of chromates, phosphates and silicates. This alkaline cleaner is dilutable with water to clean painted and unpainted exterior aircraft surfaces by spraying or foaming methods. MIL-DTL-8777D and MIL-DTL-87937 approved.</p> |
| • | • | | • | • | • | • | | Ambient | Varies | | | <p><i>Turco Air Tec #23</i> is a clear, straw-colored, alkaline concentrate designed to be diluted with water to clean painted and unpainted exterior aircraft surfaces by spraying or foaming methods. Meets requirements of MIL-C-87936A, Type I.</p> |
| • | • | | • | • | • | • | | Ambient | Varies | | | <p><i>Turco 5948-DPM</i> is an alkaline, water-based, blue concentrated compound formulated to effectively clean painted and unpainted aircraft exterior and interior surfaces when diluted with water. Ideally suited for use on all models of jet aircraft. It is also designed to be used in immersion tanks, for dip applications.</p> |
| • | • | | • | • | • | • | | Ambient | Varies | | | <p><i>Turco 5948-R</i> is an alkaline, water-based, blue, concentrated compound formulated to effectively clean painted and unpainted aircraft exterior and interior surfaces when diluted with water. Ideally suited for use on all aircraft large or small, and for cleaning engine parts during engine overhaul. It is also designed to be used in immersion tanks, for dip applications.</p> |
| • | | | • | • | • | • | | Greater than 65°F / 18°C | 5-15 minutes | | | <p><i>Turco 5948-DPM Thick</i> is an environmentally advantaged thixotropic, water-based, heavy duty aircraft cleaner. It is a blue, viscous, alkaline, water-based, concentrated compound formulated to effectively cling to painted and unpainted aircraft exterior and interior surfaces. Ideally suited for use on all jets, especially in baggage bins, flap and wheel well areas, and on engines before overhaul.</p> |
| • | | | | | | | | Ambient to 120°F / 49°C | Varies with temperature | | | <p><i>Turco Metal Glo #6</i> is a nonflammable, tri-acid, detergent-solvent based cleaner, brightener, deoxidizer and prepaint conditioner for aluminum. It contains viscosity builders that allow for added contact time for vertical surfaces. Produces a chemically clean (water-break free) and streak-free surface when used according to directions. Can be used to clean, deoxidize and brighten aluminum surfaces prior to welding, painting or to prepare the surface for a subsequent conversion coating. Meets the requirements of U.S. MIL-C-38334A, Amend. 1, Type 1, Class 1. Listed on QPL. <i>Turco Metal Glo #6</i> can be used on all aircraft metals, except magnesium and high strength steel. This product is non-crazing to acrylics and can be used over well-bonded paints.</p> |
| • | | | | | | | | See data sheet. | See data sheet. | | | <p><i>Turco Metal Glo FF</i> is a nonflammable, non-fluoride, acid based cleaner, brightener, deoxidizer and prepaint conditioner for aluminum. <i>Turco Metal Glo FF</i> contains viscosity builders that allow for added contact time, enabling this product to remove corrosion products from horizontal and vertical surfaces. Cleaning with deoxidizing produces a chemically clean (water-break free) and streak-free surface.</p> |

Surface Treatments

Depaint/Repaint

Aircraft Parts Cleaning
Aircraft Depaint & Repaint
Aircraft Appearance
Consistency
Form
How to Apply
Mix Ratio (product to water)
Chemistry

| Product | Application | | | Characteristics | | | | |
|--|-------------|--|--|-----------------|---------------------------|---------------------------|---|-----------------|
| CONVERSION COATINGS | | | | | | | | |
| <i>Alodine 1200S</i> | • | | | Powder | Concentrated | Immersion | 6.3 lbs. per 100 gals. water | Chromate |
| <i>Alodine 1000L (Liquid)</i> | • | | | Liquid | Concentrated | Spray or Immersion | 10.0 gals. per 100 gals. or 10% by volume | Chromate |
| <i>Alodine 5700</i> | • | | | Liquid | Ready-to-Use | Spray | Use as Received | Organo-Metallic |
| <i>Alodine T 5900</i> | • | | | Liquid | Concentrated | Spray, Brush or Immersion | <i>Alodine T 5900</i> 5.0 gals. per 100 gals. <i>Alodine T 5900 Toner</i> 1.0 gals. per 100 gals. | Tri-Chrome |
| <i>Alodine T 5900 RTU</i> | • | | | Liquid | Ready-to-Use | Spray, Brush or Immersion | Use as Received | Tri-Chrome |
| <i>Alodine T 5923</i> | • | | | Liquid | Ready-to-Use | Spray, Brush or Immersion | Use as Received | Tri-Chrome |
| <i>Turco Liquid Alumigold C</i> | • | | | Liquid | Concentrated | Spray or Immersion | Spray: 25% Immersion: 15% | Chromate |
| TOUCH-UP CONVERSION COATINGS | | | | | | | | |
| <i>Alodine Magnesium Treatment Kit</i> | • | | | Liquid | Ready-to-Use Two-Part Kit | Kit | Use as Received | Chromate |
| <i>Alodine 871 Touch-N-Prep Coating</i> | • | | | Liquid | Ready-to-Use | Pen | Use as Received | Tri-Chrome |
| <i>Alodine 1132 Touch-N-Prep Coating</i> | • | | | Liquid | Ready-to-Use | Pen | Use as Received | Chromate |
| <i>Alodine 1201</i> | • | | | Liquid | BRUSH: Ready-to-Use | Brush or Immersion | IMMERSION: 33 part - <i>Alodine 1201</i> 67 parts - water | Chromate |

Alodine



| Substrate | | | | | | | | Temperature | Time | Description |
|-----------|---------------------|-----------|------------|-----------------|----------|---------|-------------|--------------------------|---|--|
| Aluminum | Composite Materials | Magnesium | Mild Steel | Stainless Steel | Titanium | Ferrous | Non-Ferrous | | | |
| • | | | | | | | | 70°-100°F 21°-38°C | 15 seconds to 3 minutes | <i>Alodine 1200S</i> is a powdered chemical used to produce a protective coating on aluminum to minimize corrosion and provide an improved bond for paint. <i>Alodine 1200S</i> coating chemical, listed on Qualified Product List QPL-81706, is an approved material to produce Class 1A and Class 3 coatings, bare or painted, in accordance with military specifications. |
| • | | | | | | | | 70°-160° F (21-71°C) | 2-5 minutes 15-30 seconds | <i>Alodine 1000L</i> is a liquid chemical used to produce a protective coating on aluminum and aluminum alloys. The coating provides protection for aluminum and an excellent bond for organic coatings. <i>Alodine 1000L</i> develops a clear or colorless protective coating, and it should be used when the characteristic aluminum appearance or finish must be retained. <i>Alodine 1000L</i> is approved for use under Boeing Specification BAC 5719 for Class B. |
| • | | • | | | • | | | Ambient to 100°F/38°C | 2-5 minutes | <i>Alodine 5700</i> is a chromium-free conversion coating specifically formulated for treating aluminum and its alloys. This product is formulated as a Ready-to-Use material for spray applications. The process provides an excellent base for organic finishes. |
| • | | • | | | • | | | 70°-90°F 21°-32°C | 7-10 minutes | <i>Alodine T 5900</i> treatment is a complex trivalent chromium conversion coating formulated for treating aluminum and its alloys, metals coated with IVD aluminum, magnesium, titanium and zinc surfaces. The process provides bare ASTM-B117 salt spray resistance, and it serves as an excellent base for bonding of paint and adhesives. Neither the product itself nor the conversion coating developed by the process contains hexavalent chromium. <i>Alodine T 5900</i> can be used in immersion or pressure spray washers. |
| • | | • | | | • | | | 70°-90°F 21°-32°C | 7-10 minutes | <i>Alodine T 5900 RTU</i> treatment is a complex trivalent chromium conversion coating formulated for treating aluminum and its alloys, metals coated with IVD aluminum, magnesium, titanium and zinc surfaces. This Henkel product is formulated as a Ready-to-Use material for manual spray applications. The process provides bare ASTM-B-117 salt spray resistance, and it also serves as an excellent base for organic finishes and adhesives. |
| • | | • | | | • | | | 70°-90°F 21°-32°C | 7-10 minutes | <i>Alodine T 5923</i> treatment is a complex trivalent chromium conversion coating formulated for treating aluminum and its alloys, metals coated with IVD aluminum, magnesium, titanium and zinc surfaces. This Henkel product is formulated as a Ready-to-Use material for manual spray applications. The process provides bare ASTM-B-117 salt spray resistance, and it also serves as an excellent base for organic finishes and adhesives. |
| • | | | | | | | | 68°-86° F 20°-30°C | Minutes Spray: 0.25-5 Immersion: 0.15-10 | <i>Turco Liquid Alumigold C</i> is an acidic liquid product used to produce a chromate conversion coating on aluminum and all its alloys. <i>Turco Liquid Alumigold C</i> is non-complex cyanide-accelerated, and it is applied by immersion or spray applications to produce lighter colorless or heavier-colored coatings. |
| | | • | | | | | | Ambient | Until dry | The <i>Alodine Magnesium Treatment Kit</i> contains products formulated for treating magnesium alloys to produce a chromate conversion coating conforming to SAE AMS-M-3171, Type VI. The application method conforms to requirements in NAVAIR 01-1A-509 and is meant primarily for touch-up, corrosion repair processes of magnesium alloys. |
| • | | | | | | | | Ambient | Until dry | <i>Alodine 871 Touch-N-Prep</i> Coating is a non-hexavalent chromium dry-in-place conversion coating designed for use on aluminum and its alloys. The applicator used to deliver this product provides an easy and safe method of repairing bare areas of aluminum surfaces. <i>Alodine 871</i> is formulated for both bare corrosion protection such as ASTM 921-02 and bonding applications when combined with organic coatings or structural adhesives. |
| • | | | | | | | | Ambient | Until dry | A felt-tipped marker that provides a chromate conversion coating on aluminum surfaces prior to painting. Meets MIL-DTL-81706A, Class 1A & 3, Form VI, Method D. Ideal for coating repair work. |
| • | | | | | | | | Ambient to 100°F/38°C | 2-5 minutes | <i>Alodine 1201</i> is a nonflammable, chromic acid-based coating chemical that will produce a chrome conversion coating on aluminum and its alloys. |

Surface Treatments

Depaint/Repaint

| Product | Application | | | Characteristics | | | | | Substrate | | | | | | | |
|------------------------------------|-------------------------|----------------------------|---------------------|-----------------|--------------|----------------|------------------------------|----------------------------------|-----------|---------------------|-----------|------------|-----------------|----------|---------|-------------|
| | Aircraft Parts Cleaning | Aircraft Depaint & Repaint | Aircraft Appearance | Consistency | Form | How to Apply | Mix Ratio (product to water) | Chemistry | Aluminum | Composite Materials | Magnesium | Mild Steel | Stainless Steel | Titanium | Ferrous | Non-Ferrous |
| PAINT REMOVERS | | | | | | | | | | | | | | | | |
| Turco 1270-5 | • | • | | Liquid | Ready-to-Use | Spray | Use as Received | Alkaline | • | • | | | | | | |
| Turco 1270-6 | • | • | | Liquid | Ready-to-Use | Spray | Use as Received | Alkaline | • | • | | | | | | |
| Turco 5351 (T-5469) | • | • | | Liquid | Ready-to-Use | Spray or Brush | Use as Received | Neutral Methylene Chloride based | • | • | | • | • | • | • | |
| Turco 5668 | • | • | | Liquid | Ready-to-Use | Immersion | Use as Received | | • | • | | • | • | • | • | |
| Turco 6776-LO | • | • | | Liquid | Ready-to-Use | Spray | Use as Received | Acidic | • | | | • | • | • | | |
| Turco 6813 E | • | • | | Liquid | Ready-to-Use | Spray or Brush | Use as Received | Alkaline, Water-based | • | • | | • | • | • | • | |
| Turco 6813 ED | • | • | | Liquid | Ready-to-Use | Spray or Brush | Use as Received | Alkaline, Water-based | • | • | | • | | • | | |
| Turco 6881 | • | • | | Liquid | Ready-to-Use | Spray | Use as Received | Peroxide Activated, Water-based | • | | | • | • | • | • | |
| Turco EA Stripper 6930 | • | • | | Liquid | Ready-to-Use | Spray | Use as Received | Peroxide Activated, Water-based | • | | | • | • | • | • | |
| Turco EA Stripper 6950 | • | • | | Liquid | Ready-to-Use | Spray | Use as Received | Peroxide Activated, Water-based | • | | | • | • | • | • | |
| Turco EA Stripper R 6955 GL | • | • | | Liquid | Ready-to-Use | Spray | Use as Received | Peroxide Activated, Water-based | • | | | • | • | • | • | |
| Turco R 9100 GL | • | • | | Liquid | Ready-to-Use | Spray | Use as Received | Alkaline | • | • | | | | | | |

KOROFLEX is a trademark of PRC-Desoto International, Inc.



Temperature

Time

| | | Description |
|-----------|--------|--|
| Ambient | Varies | <i>Turco</i> 1270-5 is a viscous white emulsion that does not contain any of the hazardous or highly toxic components of conventional paint removers. It is free of aromatic hydrocarbons, chlorinated solvents, phenol and chromates. <i>Turco</i> 1270-5 was developed as a paint softener to be used in combination with blast media and high pressure water. However, with sufficient time and /or elevated temperatures, <i>Turco</i> 1270-5 can remove selected paint systems without the necessity for blasting or high pressure rinsing. It is particularly effective in selective removal of topcoats from painted composites which employ a nylon-type intermediate barrier coat. For other systems, both the topcoat and the intermediate primer may be removed leaving the chromated primer intact. |
| Ambient | Varies | <i>Turco</i> 1270-6 is a viscous white emulsion that does not contain any of the hazardous or highly toxic components of conventional paint removers. It is free of aromatic hydrocarbons, chlorinated solvents, phenol and chromates. <i>Turco</i> 1270-6 was developed as a paint softener to be used in combination with blast media and high pressure water. However, with sufficient time and /or elevated temperatures, <i>Turco</i> 1270-6 can remove selected paint systems without the necessity for blasting or high pressure rinsing. It is particularly effective in selective removal of topcoats from painted composites which employ a nylon-type intermediate barrier coat. For other systems, both the topcoat and the intermediate primer may be removed, leaving the chromated primer intact. |
| Ambient | Varies | <i>Turco</i> 5351 (T-5469) is a yellow, viscous paint remover developed to remove epoxy, polyurethane and similar coatings from metal surfaces at ambient temperatures. <i>Turco</i> 5351 (T-5469) clings to vertical and overhead surfaces and forms a surface film that helps retard evaporation and extend the working life of the stripper. <i>Turco</i> 5351 (T-5469) should not be used on material that are affected by chlorinated hydrocarbons. |
| 70°-80° C | Varies | <i>Turco</i> 5668 is a diphasic, liquid paint remover developed to remove resistant coatings, such as aluminized silicones, polyurethanes, acrylics, epoxies and chromated primers without using phenols, chromate, chlorinated solvents or acids. <i>Turco</i> 5668 is ideal for the removal of PRC-1560M and PRC-1560MC coatings, and is not detrimental to aircraft metals such as aluminum, titanium, magnesium, cadmium, conversion coatings, Dow coatings or ferrous alloys. <i>Turco</i> 5668 is supplied with a built-in, non-aqueous chemical seal which retards evaporation and helps minimize drag out losses. |
| Ambient | Varies | <i>Turco</i> 6776-LO environmentally advantaged paint remover is low-odor, thixotropic, developed for effective stripping of such resistant finishes as epoxies, epoxy primers, polyurethanes and similar catalyzed paints. Offers a significant advance in work place safety. Does not contain methylene chloride, chlorinated solvents, phenols, chromates, ammonia or amines. Complies fully with the aircraft / aerospace NESHAP. Can be used on aluminum, mild steel, cast iron and titanium when used as directed. Not recommended for use on high strength steel or magnesium. Meets the "Effect on Metals" requirements of MIL-R-81903A. |
| Ambient | Varies | <i>Turco</i> 6813 E water-based, environmentally advantaged paint remover is a viscous, pink liquid formulated to remove multiple coats of aircraft paints, such as epoxies and polyurethanes, including such resistant primers as KOROFLEX. Clings to vertical as well as overhead surfaces, and can be used on aluminum, magnesium, cadmium-plated steels and other ferrous metals. |
| Ambient | Varies | <i>Turco</i> 6813 ED is a viscous, blue-green liquid formulated to remove multiple coats of aircraft paints, such as epoxies and polyurethanes, including such resistant primers as KOROFLEX. <i>Turco</i> 6813 ED paint remover clings to vertical as well as overhead surfaces, and can be used on aluminum, magnesium, cadmium-plated steels and other ferrous metals. |
| Ambient | Varies | <i>Turco</i> 6881 environmentally advantaged paint remover is low-odor, thixotropic, activated by hydrogen peroxide. It was developed for effective stripping of such resistant finishes as epoxies, epoxy primers, polyurethanes and similar catalyzed aircraft paints. Offers a significant advance in paint stripper technology. Complies fully with the aircraft / aerospace NESHAP. Can be used on aluminum, mild steel, high strength steel and titanium when used as directed. Not recommended for use on magnesium. Meets the corrosivity requirements of TT-R-2918 except magnesium and cadmium. |
| Ambient | Varies | <i>Turco</i> EA Stripper 6930 environmentally advantaged paint remover is low-odor, thixotropic, activated by hydrogen peroxide. It was developed for effective stripping of such resistant finishes as epoxies, epoxy primers, polyurethanes and similar catalyzed aircraft paints. Offers a significant advance in paint stripper technology. Complies fully with the aircraft / aerospace NESHAP. Can be used on aluminum, mild steel, high strength steel, cadmium plated steel and titanium when used as directed. Meets the corrosivity requirements of Federal Specification TT-R-2918A. Not recommended for use on magnesium. |
| Ambient | Varies | <i>Turco</i> Stripper 6950 is an environmentally advantaged thixotropic paint remover activated by hydrogen peroxide. It was developed for effective stripping of such resistant finishes as epoxies, epoxy primers, polyurethanes and similar catalyzed aircraft paints. <i>Turco</i> Stripper 6950 paint remover offers a significant advance in paint stripper technology. Offers a significant advance in paint stripper technology. Complies fully with the aircraft / aerospace NESHAP. Can be used on aluminum, mild steel, high strength steel, cadmium-plated steel and titanium when used as directed. |
| Ambient | Varies | <i>Turco</i> Stripper 6955 GL is an environmentally advantaged thixotropic paint remover activated by hydrogen peroxide. It was developed for effective stripping of such resistant finishes as epoxies, epoxy primers, polyurethanes, and similar catalyzed aircraft paints. <i>Turco</i> Stripper 6955 GL paint remover offers a significant advance in paint stripper technology. Offers a significant advance in paint stripper technology. Complies fully with the aircraft / aerospace NESHAP. Can be used on aluminum, mild steel, high strength steel, cadmium plated steel and titanium when used as directed. |
| Ambient | Varies | <i>Turco</i> R 9100 GL is a viscous pink emulsion that does not contain any aromatic hydrocarbons, phosphates, borates, silicates or hydrogen peroxide. It was developed as a neutral pH product for removal of paint systems utilizing a polyamide type intermediate coating to allow for selective stripping of the topcoat layers while leaving the primer layer intact. Complies fully with the aircraft / aerospace NESHAP to minimize hazards in work areas. Safe on aircraft metals, including magnesium and high strength steel. Very low evaporative loss allows for extended dwell times and one stripping coat removal. |

Surface Treatments

Depaint/Repaint

Aircraft Parts Cleaning

Aircraft Depaint & Repaint

Aircraft Appearance

Consistency

Form

How to Apply

Mix Ratio (product to water)

Chemistry

| Product | Application | | | Characteristics | | | | | |
|-----------------------------|-------------|---|---|-----------------|--------------|--------------|-----------------|-----------------------|--|
| LANDING GEAR | | | | | | | | | |
| <i>Turco 5668</i> | • | • | | Liquid | Ready-to-Use | Immersion | Use as Received | | |
| <i>Turco 5948-DPM Thick</i> | • | • | • | Liquid | Concentrated | Spray or Mop | Use as Received | Alkaline, Water-based | |



| Substrate | | | | | | | | Temperature | Time | Description |
|-----------|---------------------|-----------|------------|-----------------|----------|---------|-------------|--------------------------|--------------|--|
| Aluminum | Composite Materials | Magnesium | Mild Steel | Stainless Steel | Titanium | Ferrous | Non-Ferrous | 70°-80°C | Varies | <i>Turco 5668</i> is a diphase, liquid paint remover developed to remove resistant coatings, such as aluminized silicones, polyurethanes, acrylics, epoxies and chromated primers without using phenols, chromate, chlorinated solvents or acids. <i>Turco 5668</i> is ideal for the removal of PRC-1560M and PRC-1560MC coatings, and is not detrimental to aircraft metals such as aluminum, titanium, magnesium, cadmium, conversion coatings, Dow coatings or ferrous alloys. <i>Turco 5668</i> is supplied with a built-in, non-aqueous chemical seal which retards evaporation and helps minimize drag out losses. |
| | | | | | | | | Greater than 65°F (18°C) | 5-15 minutes | <i>Turco 5948-DPM Thick</i> is an environmentally advantaged, thixotropic, water-based, heavy-duty aircraft cleaner. It is a blue, viscous, alkaline, water-based, concentrated compound formulated to effectively cling to painted and unpainted aircraft exterior and interior surfaces. Ideally suited for use on all jets, especially in baggage bins, flap and wheel well areas, and on engines before overhaul. |

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

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