



Remember how cool it felt to build the perfect airplane?

Hysol® Turco® Frekote® Alodine®

Henkel still does.

For over 50 years, you have depended on the trusted brands of Hysol®, Turco®, Frekote® and Alodine®. Henkel has extended that trust and added the value of unparalleled global technical support, customer service, and product innovation.

Discover the new standard in aerospace.

www.aerospace.henkel.com



Product Selector Guide for the Aerospace Industry

Henkel Racing

Henkel's logo is highly visible on Formula One and NASCAR racing cars to demonstrate the company's commitment to racing and innovative product development. If you want to win, you need the best car with the best engineering expertise. Henkel brings a wealth of experience and technologies to support the drive for victory.



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Properties listed are typical values and are not intended for use in preparing specifications. Actual values may vary. Recommendations and suggestions contained herein are limited to reasonable commercial use. No express warranties are intended by any representation and there are no warranties which extend beyond the description on the face hereof. The user is advised to use adherends and cure conditions when evaluating these products that are as representative as possible of those used in the actual manufactured item.

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The aerospace group of Henkel develops structural adhesives and metal and composite surfacing treatments that serve the aircraft OEM and MRO industries. Henkel invests heavily in R&D and product support and is a leader in these industries. Innovative materials provide our customers with practical, economic and performance benefits.

Our key product brands are:

- Hysol® Structural Adhesives
- Frekote® Mold Release Systems
- Turco® Surface Treatments
- Alodine® Conversion Coatings

OUR ADHESIVE SYSTEMS INCLUDE:

Paste Adhesives and Specialty Resins

Hysol® 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. Our current developmental products include VARTM, RTM and RFI materials based upon Henkel's new Epsilon chemistry. This new chemistry, based upon benzoxazine chemistry, is room temperature stable and has high Tg, even under wet conditioning.

Film Adhesives and Primers

Hysol® and Plastilock® film adhesives and corrosion-inhibiting low VOC primers for metal and composite bonding; engine nacelle bonding; honeycomb applications such as control surfaces, wing flaps, engine slats, leading edges, and wing-to-body fairings. Nitrile phenolic systems provide excellent chemical and fuel resistance. Henkel acquired the Plastilock® line of aerospace adhesives from Sovereign Specialty Chemicals, Inc. in 2004. This acquisition included adhesives, surfacing films, core splices and nitrile phenolics.

Core Splice Adhesives

Extensive product selection of foaming core splice adhesives; controlled expansion; excellent slump resistance; dual cure capabilities; low exotherm properties; closed cell technology; extrudable versions available.

Syntactic Products

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

SynCore® syntactic films for lightweight composite designs. Ideal for edge close-out and composite sandwich structure. Available in shaped form for custom designs.

SynSkin® composite surfacing films for flawless off-tool composite surface and reduction of surface preparation steps prior to painting. Available with metallic screens/foils for composite lightning strike protection.

Mold Release Coatings

Frekote® semi-permanent release coatings, the standard in mold release agents for composite and metal tool surfaces. Dependable release, ease of application, high gloss finish, minimal mold build-up, and maximum releases per application. Our newest Frekote® product is water-based and low VOC.



OUR SURFACE TREATMENT SYSTEMS INCLUDE:

Process Line Cleaners

Wide array of neutral, alkaline or acid process line cleaners to fit the demanding requirements of the aerospace industry. Designed for either multi-metal or specific substrates to meet requirements of OEM customers. May be used in immersion, spray or brush applications. Extensive line of exterior aircraft cleaners meeting comprehensive OEM and military specifications.

Etchants and Deoxidizers

Latest technology in etchants and deoxidizers used prior to conversion coating, anodizing or chemical milling. OEM approvals are key to the selection of appropriate process line chemistries. All Henkel products are OEM specified.

Conversion Coatings

Alodine® conversion coatings for light metals, such as aluminum, magnesium and titanium. Henkel is the industry leader in conversion coating technologies, with traditional industry standard products, such as Alodine® 1200S™, as well as alternative non-chrome solutions, such as Alodine® 5700™ or Alodine® T-5900™.

Engine Chemistries

Henkel produces all process chemistries for the overhaul of aircraft engines and land based compressors. Simplified processes meet OEM standard practices. Process solutions for both hot and cold sections. Designed to remove the toughest soils and scales, and provide for efficient NDT evaluation. New "GL" (global) product line offers Henkel products and quality around the world.

Compressor wash products provide on-wing cleaning solutions for improved engine performance and reduced fuel consumption.

Accessory Shops, Removed Components, Flap and Wheel Well Cleaners

Engineered solutions for the industry's most demanding requirements include paint strippers, scale removers, dinol remover, wax removers and general application cleaners. Extensive line of products for cleaning aircraft components and accessory parts, flaps, wheel wells, and wheel and brake assemblies.

Paint Strippers, Maskants, Machine and Grinding Coolants

Extensive line of environmentally advantaged paint strippers for use in depaint of aircraft and aircraft parts. NESHAP compliant thixotropic strippers are designed to cling to vertical surfaces and improve paint removal efficiency. Dual phase immersion paint strippers utilize a thin seal layer to prevent evaporation and reduce consumption of key stripping components.

Turco® 2K maskants provide one-pass coatings that can be processed within minutes of application, eliminating the need for multiple coats and extensive ventilation and solvent recovery equipment.

Multan® biostable cutting and grinding fluids for metalworking are designed for substrates ranging from aluminum to exotic steel and titanium alloys. No tank side additions of biocide or EP additives are necessary. Multan® products improve tool life and provide additional operational savings over competitor products.

OUR SURFACE TREATMENT SYSTEMS INCLUDE COMPLETE PROCESS SOLUTIONS:

Aircraft Depaint / Repaint Systems

Paint Strippers

Turco® 6776-LO™
Turco® 6813-E™
Turco® 6840-S™
Turco® EA Stripper 6916™
Turco® EA Stripper 6930™

Cleaners

Turco® 5948-DPM™
Turco® 6849™

Corrosion Removers

Alumiprep® 33™
Turco® Metal Glo #6
Turco® WO #1

Conversion Coatings

Alodine® 600™
Alodine® 600 RTU™
Alodine® 1000 RTU™
Alodine® 1200S™
Alodine® 1201™
Alodine® 1500™
Alodine® 1600™
Alodine® 5200™
Alodine® 5700™
Touch-N-Prep® Alodine® 1132™
Brush Alodine® 120™ Kit
Magnesium Treatment Kit

Jet Engine Overhaul Processes

Alkaline Process

Turco® Rust Bloc
Turco® 4338-L™
Turco® 5948-DPM™
Turco® 4181-L™ (Liquid ARR)

Bearing Cleaning Process

Turco® Aquasorb
Turco® 4181-L™ (Liquid ARR)

Compressor Washes

Turco® 5884™
Turco® 6783™ Series

Alkaline / Acid Process

Turco® Rust Bloc
Turco® 4338-L™
Turco® 4409 GL™
Turco® 5948-DPM™
Turco® 4181-L™ (Liquid ARR)
Turco® Scale Gon 7™

Thrust Reverser Cleaner

Turco® 5805™
Turco® 5948-DPM™ Thick

Paint and Carbon Removers

Turco® 5668™
Turco® 6776™ Thin
Turco® 9045-6™

Cleaners

Ridoline® 298™
Ridoline® 4355™
Turco® 4215 NC LT™
Turco® 5578-L™
Turco® 6751-L™
Turco® 6849™
Turco® 4181-L™ (Liquid ARR)
Turco® Liquid Sprayze NP-LT™

Etchants / Brighteners

Aluminux® Etch L™
Alumiprep® 33™
Mil-Etch®
Nova EC-202 L
Turco® Metal Glo #6
Turco® WO #1

Cleaner

Turco® 4215 NC-LT™

Deoxidizers

Turco® Liquid Smut-Go® NC
Deoxidizer 6/16

Exterior Cleaners

Aerowash
Turco® 5948-DPM™
Turco® Air Tec 23

Interior Cleaners

Turco® 5948-DPM™

Wheel and Brake Cleaners

Turco® Liquid Sprayze NP-LT
Turco® Aviation
Turco® Rust Bloc
Turco® 5668™

General Purpose Cleaning

Turco® Rust Bloc
Turco® 5948-DPM™
Turco® 5948-DPM™ Thick
Turco® Aviation
Turco® Liquid Sprayze NP-LT™

Titanium Cleaners

Turco® 4181-L™ (Liquid ARR)
Turco® Vitro-Klene

Plater's Wax Remover

Turco® 6802™

Deoxidizers

Turco® Aldox® V
Deoxalume® 2310™
Deoxidizer 6/16
Turco® Liquid Smut-Go® NC
Turco® Nitradd (T-4104)

Maskants

Turco® Form Maskant 6914G™/6915™

Flap and Wheel Well Cleaner

Turco® 5948-DPM™ Thick

Landing Gear Cleaners

Turco® 5668™
Turco® 5948-DPM™ Thick

Exhaust Track Remover

Turco® 5805™

Use our Interactive Selector Guide at

www.aerospace.henkel.com

Finding the right product is easier than ever!
Simply select parameters and then Search.
A detailed product list pops up, with links to technical data.

Interactive Selector Guide

Use our [Interactive Selector Guide](#) to help you choose the product that best suits your needs.

View [Material Safety Data Sheets](#) by product code number. Product code numbers are represented by two alphabetical characters followed by seven digits, of which the last three are zero. The last three digits represent a size code that is not necessary for Material Safety Data Sheet selection. A link to Material Safety Data Sheets is also available from the sub-menu product categories.

Pastes & Specialty Resins

One- and two-part Hysol® 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. Henkel offers several [custom packaging](#) options.

Film Adhesives & Primers

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

Syntactic & Specialty Products

Technical and material safety data sheets are available at

www.aerospace.henkel.com

The all-inclusive Site Search feature enhances browsing with a single mouse click.

Quick Reference Guide

STRUCTURAL ADHESIVES

LEGEND	METAL AND HONEYCOMB ASSEMBLY
	COMPOSITE ASSEMBLY
	HIGH TEMPERATURE ASSEMBLY
	SURFACE TREATMENTS

RTM RESINS	SERVICE TEMPERATURE	POT LIFE (MINUTES)	PAGE 8
Hyso [®] EA 9150™ Resin	250°F/121°C	480	
TOUGH HIGH STRAIN PASTES	SERVICE TEMPERATURE	BELL PEEL (77°F/25°C)	PAGE 8
Hyso [®] EA 9309.3NA™	180°F/82°C	75 (lb/in)/335 (N/25mm)	
Hyso [®] EA 9313™	120°F/49°C	50 (lb/in)/225 (N/25mm)	
Hyso [®] EA 9320NA™	>180°F/82°C	35 (lb/in)/150 (N/25mm)	
Hyso [®] EA 9330™	180°F/82°C	60 (lb/in)/265 (N/25mm)	
Hyso [®] EA 9330.3™	180°F/82°C	60 (lb/in)/265 (N/25mm)	
Hyso [®] EA 9346.5™	300°F/149°C	60 (lb/in)/265 (N/25mm)	
Hyso [®] EA 9359.3™	200°F/93°C	75 (lb/in)/335 (N/25mm)	
Hyso [®] EA 9360™	>225°F/107°C	60 (lb/in)/265 (N/25mm)	
Hyso [®] EA 9361™	140°F/60°C	35 (lb/in)/150 (N/25mm)	
Hyso [®] EA 9371™	180°F/82°C	15 (lb/in)/70 (N/25mm)	
Hyso [®] EA 9380™	250°F/121°C	50 (lb/in)/220 (N/25mm)	
HIGH TEMPERATURE FILLED PASTES	SERVICE TEMPERATURE	POT LIFE (MINUTES)	PAGE 8
Hyso [®] EA 934NA™	300°F/149°C	40	
Hyso [®] EA 9321™	250°F/121°C	40	
Hyso [®] EA 9392™	350°F/177°C	75	
Hyso [®] EA 9394™	350°F/177°C	100	
Hyso [®] EA 9394™/C-2™	450°F/232°C	480	
Hyso [®] EA 9395™	350°F/177°C	100	
LIQUID SHIMS	SERVICE TEMPERATURE	POT LIFE (MINUTES)	PAGE 8
Hyso [®] EA 934NA™	300°F/149°C	40	
Hyso [®] EA 9360™	>225°F/107°C	40	
Hyso [®] EA 9377™	>200°F/93°C	60	
Hyso [®] EA 9394™	350°F/177°C	100	
Hyso [®] EA 9394.2™	225°F/107°C	15	
LOW VISCOSITY WET LAY-UP PASTES	CURE TEMPERATURE	POT LIFE (MINUTES)	PAGE 8
Hyso [®] EA 956™	77°F/25°C	30	
Hyso [®] EA 9390™	200°F/93°C	120	
Hyso [®] EA 9396™	77°F/25°C	75	
Hyso [®] EA 9396™/C-2™	200°F/93°C	480	
SYNTACTICS AND LOW-DENSITY PASTES	SERVICE TEMPERATURE	DENSITY	PAGE 8
Hyso [®] EA 960F™	160°F/71°C	N/A	
Hyso [®] EA 9396.6MD™	300°F/149°C	37 (pcf)/0.60 (g/cc)	
Hyso [®] EA 9815™	250°F/121°C	N/A	
FREKOTE [®]			PAGE 10
Mold Releases	All Frekote [®] Products		
PEEL PLY	CURE TEMPERATURE	OUTTIME (DAYS @ 77°F/25°C)	PAGE 12
Hyso [®] EA 9895™	350°F/177°C	14	
METAL BONDING FILMS	SERVICE TEMPERATURE	HONEYCOMB CLIMBING DRUM PEEL	PAGE 12
Hyso [®] EA 9602.3™	250°F/121°C	20 (in•lb/in)/90 (m•N/m)	
Hyso [®] EA 9628™	250°F/121°C	18 (in•lb/in)/80 (m•N/m)	
Hyso [®] EA 9628H™	250°F/121°C	20 (in•lb/in)/90 (m•N/m)	
Hyso [®] EA 9686™	300°F/149°C	17 (in•lb/in)/76 (m•N/m)	
Hyso [®] EA 9696™	250°F/121°C	25 (in•lb/in)/110 (m•N/m)	
PL 639™ Nitrile Phenolic	180°F/82°C	N/A	
PL 663™ Nitrile Phenolic	270°F/132°C	N/A	
PL 737™	350°F/177°C	N/A	
PL 777-1FR™	300°F/149°C	N/A	
COMPOSITE BONDING FILMS	SERVICE TEMPERATURE	OUTTIME (DAYS @ 77°F/25°C)	PAGE 12
Hyso [®] EA 9695™	>300°F/149°C	90	
PL 795™	350°F/177°C	100	
PL 795-1™	350°F/177°C	100	
PL 7000™	300°F/149°C	30	
HIGH TEMPERATURE ENGINE NACELLE FILMS	SERVICE TEMPERATURE	OUTTIME (DAYS @ 77°F/25°C)	PAGE 12
Hyso [®] EA 9657™	400°F/204°C	15	
Hyso [®] EA 9673™ (BMI)	550°F/288°C	30	
Hyso [®] EA 9689™	420°F/216°C	10	
PL 780-1™	350°F/177°C	10	
PRIMERS			PAGE 12-14
Adhesive Primers	All Primers		
CORE SPLICES	SERVICE TEMPERATURE	EXPANSION RATIO	PAGE 16
Hyso [®] EA 9833.1™ (BMI)	450°F/232°C	2-3x	
MA 557™	350°F/177°C	2.1-2.2x	
MA 562™	350°F/177°C	2-3.5x	
MA 562S™	350°F/177°C	2-3x	
MA 562SFR™	350°F/177°C	2-3x	
PL 460™	350°F/177°C	2-3x	
PL 685™	350°F/177°C	2-3x	
SynSpand [®] 9899CF™	350°F/177°C	1-2x	
NON-EXPANDING SYNTACTIC FILMS	SERVICE TEMPERATURE	DENSITY	PAGE 16
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)	

Quick Reference Guide

STRUCTURAL ADHESIVES CONTINUED

EXPANDING SYNTACTIC FILMS - CORE FILLS	SERVICE TEMPERATURE	DENSITY	PAGE 16
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	OUTTIME (DAYS @ 77°F/25°C)	PAGE 16
SynSpand [®] EA 9890™	180°F/82°C	15	
COMPOSITE SURFACING FILMS	SERVICE TEMPERATURE	OUTTIME (DAYS @ 77°F/25°C)	PAGE 16
SynSkin [®] HC 9837.1™	350°F/177°C	90	
PL 795SF™	350°F/177°C	100	
PL 7001SF™	300°F/149°C	100	
SURFACE TREATMENTS			
ALKALINE CLEANERS			PAGE 18
Ridoline [®] 4355™	Turco [®] 6849™		
Turco [®] 4215 NC-LT™	Turco [®] T-4181-L™ (Liquid ARR)		
Turco [®] 5578-L™	Turco [®] Vitro-Klene		
Turco [®] 5948-DPM™			
DEOXIDIZERS			PAGE 20
Deoxalume [®] 2310™	Turco [®] Liquid Smut-Go [®] NC		
Turco [®] Aldox V	Turco [®] Nitradd (T-4104)		
Deoxidizer 6/16			
ETCHANTS			PAGE 20
Aluminux [®] Etch L™	Mil-Etch [®]		
Alumiprep [®] 33™	Nova EC-202 L		
Turco [®] Metal Glo #6	Turco [®] WO #1		
CONVERSION COATINGS			PAGE 20
Alodine [®] 600™	Alodine [®] 1600™	Magnesium Treatment Kit	
Alodine [®] 600 RTU™	Alodine [®] 5200™	Touch-N-Prep [®] Alodine [®] 1132™	
Alodine [®] 1000 RTU™	Alodine [®] 5700™	Brush Alodine [®] 120™ Kit	
Alodine [®] 1200S™	Alodine [®] T 5900™		
Alodine [®] 1201™	Alodine [®] T 5900™ Toner		
Alodine [®] 1500™	Alodine [®] T 5900™ RTU		
JET ENGINE CLEANING, COLD LINE			PAGE 22
Turco [®] 5668™	Turco [®] Liquid Sprayeze NP-LT™		
Turco [®] 5948-DPM™	Turco [®] T-4181-L™ (Liquid ARR)		
JET ENGINE CLEANING, HOT LINE			PAGE 22
Turco [®] Rust Bloc	Turco [®] T-4181-L™ (Liquid ARR)		
Turco [®] 4338-L™	Turco [®] Scale Gon 7™		
Turco [®] 4409 GL™			
COMPRESSOR WASH			PAGE 22
Turco [®] 5884™	Turco [®] 6783™ Series		
ACCESSORY SHOP PRODUCTS			PAGE 24
Turco [®] Aquasorb	Turco [®] 5948-DPM™ Thick		
Turco [®] Aviation	Turco [®] 6802™		
Turco [®] 4215 NC-LT™	Turco [®] 9045-6™		
Turco [®] 5805™			
LANDING GEAR/THRUST REVERSER			PAGE 24
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Turco [®] 5805™			
EXTERIOR WASH			PAGE 24
Aerowash [®]	Turco [®] 5948-DPM™		
Turco [®] Air-Tec #23™			
REMOVED COMPONENTS			PAGE 24
Turco [®] 5948-DPM™	Turco [®] 9045-6™		
DINOL REMOVER			PAGE 24
Turco [®] 5948-DPM™ Thick			
FLAP AND WHEEL WELL			PAGE 24
Turco [®] 5948-DPM™ Thick			
WHEEL AND BRAKE			PAGE 26
Turco [®] Rust Bloc	Turco [®] Aviation		
Turco [®] 5668™	Turco [®] Liquid Sprayeze NP-LT™		
Turco [®] 6751-L™			
STRIPPERS			PAGE 26
Turco [®] 6776-LO™	Turco [®] 6840-S™		
Turco [®] 6776™ Thin	Turco [®] EA 6916™ Stripper		
Turco [®] 6813-E™	Turco [®] EA 6930™ Stripper		
MASKANTS			PAGE 26
Turco [®] Form Maskant 6914G™	Turco [®] Form Maskant 6915™		
MACHINE AND GRINDING COOLANTS, BIOSTABLE			PAGE 26
Multan [®] Machine Coolants			

* The above list represents our most common products. Additional products are featured on our website at www.aerospace.henkel.com.

ADHESIVE SYSTEMS

Paste Adhesives and Specialty Resins

We have experts available to design and install meter mix operations.
Call Henkel for customized dispensing equipment or pre-measured packaging.
See page 14 for more details.

Product	Applications								Characteristics				Mechanical Properties				Bulk Properties				Handling				Description				
	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 Hot/Wet Properties	Toughened	Service Temperature (°F/°C)	Consistency	Form (1 part or 2 part)	Peel Strength	Bell Peel 77°F (lb/in)/ 25°C (N/25mm)	Tensile Lap Shear			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)
Hysol® EA 934NA™	•	•					•	•			300/149	Thixotropic	2	Nil	—	2800/ 19.3	3100/ 21.4	2000/ 13.8	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.
Hysol® EA 956™		•	•					•			300/149	Low Viscosity	2	Nil	—	1800/ 12.4	2300/ 15.9	1500/ 10.3	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.
Hysol® EA 960F™											160/71	Thixotropic	2	Nil	—	2000/ 13.8	2200/ 15.2	700/ 4.8	—	—	—	—	—	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.
Hysol® EA 9150™ Resin			•	•			•		•		250/121	Low Viscosity	2	Low	—	—	—	—	11000/ 75.9	414/ 2850	5	—	—	100:88	250/121	1 hour	77/25	480/1 480/.5	Low viscosity, toughened system formulated for resin transfer molding. 250°F/121°C cure and service temperature.
Hysol® EA 9309.3NA™		•	•	•			•	•	•		180/82	Moderate Viscosity	2	High	75/ 335	5500/ 38.0	5000/ 34.5	750/ 5.2	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.
Hysol® EA 9313™				•					•		120/49	Low Viscosity	2	High	50/ 225	4200/ 29.0	4500/ 31.0	500/ 3.5	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.
Hysol® EA 9320NA™				•			•		•		>180/82	Moderate Viscosity	2	Moderate	35/ 150	3400/ 23.5	4600/ 31.7	1000/ 6.9	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.
Hysol® EA 9321™	•	•					•		•		250/121	Thixotropic	2	Low	6/ 25	3000/ 20.7	4000/ 27.6	1700/ 11.7	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.
Hysol® EA 9323™		•					•		•		250/121	Low Viscosity	2	Low	4/ 20	2800/ 19.3	4200/ 29.0	1100/ 7.6	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.
Hysol® EA 9330™		•	•	•			•		•		180/82	Moderate Viscosity	2	High	60/ 265	5000/ 34.5	5000/ 34.5	750/ 5.2	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.
Hysol® EA 9330.3™		•	•	•			•		•		180/82	Thixotropic	2	High	60/ 265	5700/ 39.3	4900/ 33.8	750/ 5.2	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.
Hysol® EA 9346.5™		•	•	•			•	•	•		275/135	Moderate Viscosity	1	High	60/ 265	4500/ 31.0	5500/ 38.0	4500/ 31.0	5000/ 34.5	260/ 1800	3	15000/ 103.5	400/ 2750	—	250/121	1 hour	40/4	14 days/1 14 days/.5	Moderate viscosity, one component, high peel and shear strength. Outstanding hot/wet properties. Recommended replacement for Hysol® EA 9304.1™ and Hysol® EA 9304.2™.
Hysol® EA 9359.3™		•	•	•			•	•	•		200/93	Thixotropic	2	High	75/ 335	4000/ 27.6	4500/ 31.0	1000/ 6.9	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. Improvement over Hysol® EA 9309NA™ series adhesives.
Hysol® EA 9360™		•	•	•			•	•	•		>225/107	Thixotropic	2	High	60/ 265	4000/ 27.6	5000/ 34.5	1200/ 8.3	—	—	—	—	—	100:43	77/25 180/82	5-7 days 1 hour	77/25	40/.5 40/.25	Volumetric mix ratio 2:1. Structural adhesive, exhibits excellent peel strength, and tensile lap shear strength to 250°F/121°C.
Hysol® EA 9361™		•	•				•		•		140/60	Low Viscosity	2	Moderate	35/ 150	4000/ 27.6	3500/ 24.1	500/ 3.5	3000/ 20.7	105/ 720	50	—	—	100:140	77/25 180/82	5-7 days 1 hour	77/25	120/.25 120/.1	High elongation, good shear, peel and flexibility. General purpose bonding, sealing and cryogenic applications.
Hysol® EA 9371™		•	•				•		•		180/82	Moderate Viscosity	2	Low	15/ 70	1600/ 11.0	3700/ 25.5	1000/ 6.9	—	—	—	—	—	100:62	77/25 180/82	24 hours 1 hour	40/4	18/.25 18/.1	Fast-set, tough, good hot/wet properties. Handling strength after two hours. Volumetric mix ratio 1:1.
Hysol® EA 9377™							•	•			>200/93	Thixotropic	2	Nil	—	2300/ 15.9	2300/ 15.9	2000/ 13.8	—	—	—	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.
Hysol® EA 9380™		•	•	•			•	•	•		250/121	Thixotropic	2	High	50/ 225	4650/ 32	5350/ 37	>3500/ >24.1	—	—	—	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.
Hysol® EA 9390™		•	•	•			•	•			>350/177	Low Viscosity	2	Nil	—	2200/ 15.2	3500/ 24.1	3000/ 20.7	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.
Hysol® EA 9392™	•	•	•				•		•		350/177	Thixotropic	2	Moderate	40/ 180	3500/ 24.0	4300/ 29.7	2200/ 15.2	6000/ 41.4	480/ 3300	4.6	—	—	100:32	77/25 180/82	5-7 days 1 hour	77/25	75/.25 75/.1	Room temperature cure, excellent shear strength at high temperatures. Tough, durable over wide temperature range. Toughened version of Hysol® EA 934NA™ and Hysol® EA 9394™.

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



ADHESIVE SYSTEMS

Paste Adhesives and Frekote® Mold Releases

Product	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	Tensile Lap Shear				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)	Description	
																Bell Peel 77°F (lb/in)/25°C (N/25mm)	-67°F (psi)/-55°C (MPa)	77°F (psi)/25°C (MPa)	200°F (psi)/93°C (MPa)												
Hysol® EA 9394™	•	•	•				•	•	•	•		350/177	Thixotropic	2	Low	20/90	3300/22.8	4200/29.0	2900/20.0		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.
Hysol® EA 9394.2™	•	•					•	•		•		225/107	Thixotropic	2	Nil	—	2900/20.0	4500/31.0	—		—	—	—	—	—	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.
Hysol® EA 9394™/C-2™			•					•				450/232	Moderate Viscosity	2	Low	10/45	3500/24.0	5000/34.5	3500/24.1		—	—	—	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.
Hysol® EA 9395™	•	•	•					•	•	•		350/177	Thixotropic	2	Low	15/70	2300/15.9	4000/27.6	2400/16.6		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, non-metallic filled version of Hysol® EA 9394™.
Hysol® EA 9396™		•	•	•				•	•	•		350/177	Low Viscosity	2	Moderate	25/110	3300/22.8	3500/24.1	3200/22.1		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.
Hysol® EA 9396™/C-2™		•	•	•				•	•			400/204	Low Viscosity	2	Low	15/70	2500/17.2	3000/20.7	2000/13.8		—	—	—	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.
Hysol® EA 9396.6MD™	•					•		•				300/149	Syntactic	2	Nil	—	2000/13.8	2600/18.0	1500/10.3		—	—	—	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).
Hysol® EA 9815™	•		•	•			•	•	•			250/121	Moderate Viscosity	1	High	50/275	4500/31	5100/35	2500/1700		—	—	—	26739/185	267/1843	—	250/121	1 hour	0/-18	14 days/1 14 days/.5	Pumpable, one-component, high peel and high shear strength when bonding to aluminum and composite substrates. Reduces application time.

PASTE ADHESIVES AND SPECIALTY RESINS

PASTE ADHESIVES AND SPECIALTY RESINS



Frekote® Mold Release Products

Product	Application Temperature Range	Cure Time	Benefits	Description	Product	Application Temperature Range	Cure Time	Benefits	Description
Frekote® 900-WB™	70°-90°F/21°-32°C	Cure for more than 1 hour at ambient temperature after last coat	<ul style="list-style-type: none"> Non-toxic water-based system Apply at room temperature Cure at room temperature Low VOC Non-flammable Thermal stability 480°F/250°C 	A proprietary water-based emulsion developed for releasing aerospace and other high performance composite structures. Designed to be applied and cured at ambient shop temperature. Spray application is recommended for best appearance of part off tool.	Frekote® 48-NC™	Up to 140°F/60°C	3 hours at room temperature, or bake for 15 mins. at 210°-300°F/100°-150°C	<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 with the same polymeric base as Frekote® 44-NC™, with only a slight modification in the solvent blend for better non-transference. This semi-permanent, non-migratory release system chemically bonds to the mold surface to form a microthin film, which is stable at temperatures exceeding most molding processes.
Frekote® B-15™ Sealer	Up to 140°F/60°C	24 hours at room temperature, or bake for 60 mins. at 210°-300°F/100°-150°C	<ul style="list-style-type: none"> Seals mold porosity No contaminating transfer Compatible with all Frekote® products 	Formulated as a sealer for molds with microporosity problems, small surface scratches or imperfections. Used in conjunction with other Frekote® products, Frekote® B-15™ provides an excellent base coat enhancing the release advantages of all Frekote® products.	Frekote® 55-NC™	Up to 140°F/60°C	30 mins. at room temperature, or bake for 5 mins. at 210°-300°F/100°-150°C	<ul style="list-style-type: none"> Fast dry and cure No mold build-up High thermal stability Reduced odor No contaminating transfer 	A non-CFC release agent designed to provide multiple releases with no contaminating transfer. This semi-permanent release system chemically bonds to the mold surface to form a microthin film that is stable at process temperatures.
Frekote® 44-NC™	Up to 140°F/60°C	3 hours at room temperature, or bake for 15 mins. at 210°-300°F/100°-150°C	<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.	Frekote® 700-NC™	Up to 275°F/135°C	5-10 mins. 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, semi-permanent, 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 mins. 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 build-up Reduced odor 	A non-CFC, semi-permanent, multiple release polymer resin that effectively releases all thermoset resins. Versatile agent that provides slip where mold geometry problems are encountered. Rapid dry and cure at room temperature to give a high slip film capable of maximum release performance.

FREKOTE® MOLD RELEASE PRODUCTS

FREKOTE® MOLD RELEASE PRODUCTS

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

ADHESIVE SYSTEMS

Film Adhesives

Product	Applications					Characteristics				Mechanical Properties					Bulk Properties		Handling			Description
	Sprayable	Composite Surfacing	Low VOC	Composite Bonding	Metal & Honeycomb Bonding	180°F/82°C Service	350°F/177°C Service	Service Temperature (°F/°C)	Outtime (Days @ 77°F/25°C)	-67°F (psi)/-55°C (MPa)	77°F (psi)/25°C (MPa)	Lap Shear	Elevated Temperature (psi/MPa)	Honeycomb Climbing Drum Peel @ 77°F (in•lb/in)/ 25°C (m•N/m)	Flatwise Tension @ 77°F/25°C (psi/MPa)	Primer Coverage	Tg Dry (°F/°C)	Tg Wet (°F/°C)	Cure Temperature (°F/°C)	



FILM ADHESIVES

FILM ADHESIVES

FILMS																					
Hysol® EA 9602.3™				•	•		250/121	30	5700/39.3	5400/37.2	3200 @ 200°F 22.0 @ 93°C	20/90	1300/9.0			220/104	180/82	250/121	1	0/-18	First generation modified epoxy film, tacky, supported or unsupported. Exceeds MMM-A-132, Ty 1, CI 3 and MIL A-25463, Ty 1, CI 1, 2. Data from .060 psf, 300 g/m².
Hysol® EA 9628™				•	•	•	250/121	20	5500/38.0	6000/41.3	2000 @ 250°F 13.8 @ 121°C	18/80	1400/9.7			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/m².
Hysol® EA 9628H™				•	•	•	250/121	20	5500/38.0	5800/40.0	1500 @ 250°F 10.3 @ 121°C	20/90	1100/7.6			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/m².
Hysol® EA 9657™				•	•	•	400/204	15	4800/33.0	5000/34.5	2300 @ 350°F 15.9 @ 177°C	13/60	1150/8.0			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/m².
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			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/m².
Hysol® EA 9686™	•			•	•	•	300/149	90	5800/40.0	5800/40.0	1000 @ 300°F 6.9 mpa @ 149°C	17/76	1000/6.9			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/m².
Hysol® EA 9689™				•	•	•	420/216	10	3700/25.5	3500/24.1	3200 @ 350°F 22.0 @ 177°C	8/35	850/5.9			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/m².
Hysol® EA 9695™	•			•	•	•	>300/149	90	4400*/30.3*	5000*/34.5*	2800* @ 270°F 19.3* @ 132°C	—	1200/8.3			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/m².
Hysol® EA 9696™	•			•	•	•	250/121	60	7000/48.3	6000/41.3	2000 @ 250°F 13.8 @ 121°C	25/110	1300/9.0			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/m².
PL 639™ Nitrile Phenolic				•	•		180/82	90	3350/23.1	4000/27.6	2400 @ 180°F 16.6 @ 82°C							350/177	1	40/4	Nitrile phenolic film adhesive designed for metal-to-metal structural bonds. Excellent peel strength. Good chemical and fuel resistance. Excellent vibration dampening properties. Qualified to MMM-A-132, Type 1, Class 2.
PL 663™ Nitrile Phenolic				•	•	•	270/132	90	2700/18.6	3900/26.9	1500 @ 270°F 10.3 @ 132°C							305/152	1.6	40/4	Nitrile phenolic film adhesive for structural bonding. Excellent chemical and fuel resistance. Superior peel strength. Ideal for bonding and sealing metals, composites and ceramics. Meets requirements of General Dynamics specification FMS 3014B.
PL 737™				•	•	•	350/177	14	2500/17.2	3500/24.1	2400 @ 350°F 16.5 @ 177°C		5195/35.8					295/146 350/177	2 1	0/-18	Non-metallic modified epoxy film specifically designed for use in structural aircraft components. Low flow characteristics. Intermittent service to 400°F/204°C.
PL 777-1FR™				•	•		300/149	20	5000/34.5	5000/34.5	2900 @ 250°F 20.0 @ 121°C							250/121 350/177	1.5 1	0/-18	Flame retardant non-metallic 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.
PL 780-1™				•	•	•	350/177	10	2700/18.6	4200/29.0	1800 @ 350°F 12.4 @ 177°C		1075/7.4					350/177	1	0/-18	Non-metallic 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.
PL 795™	•			•	•	•	350/177	100	3500/24.1	3900/26.9	2500 @ 270°F 17.2/132°C		864/5.9					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 outtime. Exceeds requirements of BMS 5-154. Can be used for both surfacing film and lightning strike applications.
PL 795-1™	•			•	•	•	350/177	100	3600/24.8	4300/29.7	1900 @ 300°F 13.1 @ 149°C		1000/6.9					250/121 350/177	1.5 1	0/-18	Tougher version of 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.
PL 7000™	•			•			300/149	30										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 (G _{1C}) over composite surfaces exhibiting cohesive failure patterns, indicating superior adhesion characteristics. Qualified at Boeing.

* Composite double overlap shear.

** On unetched metal.

*** Postcure of 2 hours @ 475°F/245°C.

¹⁾ 250°F/121°C cure.

²⁾ 350°F/175°C cure.

ADHESIVE SYSTEMS

Syntactic Products and Core Splices



SYNTACTIC PRODUCTS

SYNTACTIC PRODUCTS

Product	Applications	Characteristics	Bulk Properties	Handling	Description	
SYNCORE® SYNTACTIC FILMS						
SynCore® 9823.1™	•	250/121	9000/62 4500/31 363/2500	250/121 1	Toughened, low density syntactic core, superior moisture resistance, co-curable with variety of 250°F/121°C curing epoxy prepregs.	
SynCore® 9872.1™	•	350/177	8800/61 4500/31 400/2750	350/177 1	Toughened, low density syntactic core, superior moisture resistance, co-curable with wide variety of 350°F/177°C curing epoxy prepregs.	
SYNSPAND® EXPANDING SYNTACTIC FILMS						
SynSpand® EA 9890™ Abradable Seal	•	180/82	— 1100/7.6 62/430	250/121 2	Expanding modified epoxy film, cures at 250°F/121°C, used for jet engine abradable fan seals.	
SynSpand® 9899™	•	250/121	500 @ 12 pcf density/ 3.45 @ 0.19 g/cc	250/121 1	Very high expansion, closed cell expanding film designed for use as shop floor aid in closed mold processes.	
SynSpand® 9899CF™*	•	350/177	2000 @ 26 pcf density/ 13.8 @ 0.42 g/cc	250/121 or 350/177 1	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.	
COMPOSITE SURFACING FILMS						
SynSkin® HC 9837.1™	•	350/177	— — —	250/121 or 350/177 1	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.	
PL 795SF™	•	350/177	— — —	250/121 or 350/177 1.5 or 1	Modified epoxy film specifically formulated to improve the surface appearance of composite honeycomb structures. Excellent surface appearance; reduced pinholing, extra finishing. Superior outtime. Good building tack; repositionable on itself, prepregs, tools.	
PL 7001SF™	•	300/149	— — —	250/121 or 350/177 1.5 or 1	Modified film specifically formulated to improve the surface appearance of composite honeycomb structures. May be cured at 250°F/121°C or 350°F/177°C. Excellent outtime. Outstanding handling and tack characteristics. Excellent hot-wet durability.	
CORE SPLICES						
			Tube Shears @ 77°F (psi)/25°C (MPa)	Tube Shears @ 250°F (psi)/121°C (MPa)		
Hysol® EA 9833.1™ (BMI)	•	450/232	1000/6.8	1000/6.8	350/177 with 450/232 postcure 2 @ 450°F/232°C 0/-18	Modified BMI foaming core splice, co-curable with wide variety of 350°F/177°C curing epoxy prepregs. Elevated service temperature to 450°F/232°C. Tube shear 800 psi @ 77°F/5.5 MPa @ 25°C, 500 psi @ 250°F/3.5 MPa @ 121°C.
MA 557™	•	350/177	1191/8.2	1063/7.3	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, non-metallic.
MA 562™	•	350/177	1200/8.3	1150/8.0	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, non-metallic, low exotherm properties, excellent slump resistance, uniform expansion, qualified to many industry specifications.
MA 562S™	•	350/177	1100/7.5	1000/6.8	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. Non-metallic, medium tack, excellent slump resistance.
MA 562SFR™	•	350/177	850/5.8	1000/6.8	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. Flame-retardant, non-metallic, medium tack, excellent slump resistance.
PL 460™	•	350/177	1682/11.6	1170/8.1	250/121 or 350/177 1.5 or 1 0/-18	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.
PL 685™	•	350/177	1200/11.2	1000/6.8	250/121 or 350/177 1.5 or 1 0/-18	Expanding film adhesive designed for applications that require controlled expansion and environmental durability. Cures at temperatures from 250°F/121°C to 350°F/177°C and features a 30-day maximum outtime at room temperature. Qualified to BMS 5-90, Type III.

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

SURFACE TREATMENTS

Process Line Cleaners

Product	Applications						Characteristics				Alloys						Operation		Description		
	Metal Processing Lines	Jet Engine Cleaning	Aircraft Parts Cleaning	Aircraft Depaint & Repaint	Coolants	Aircraft Appearance	Aircraft Protection	Consistency	Form	How to Apply	Mix Ratio (product:water)	Chemistry	Aluminum	Magnesium	Stainless Steel	Titanium	Ferrous	Non-Ferrous		Temperature	Time
PROCESS LINE CLEANERS																					
Ridoline® 4355™	•						Liquid	Concentrated	Immersion	5%-15% in Water	Alkaline	•						110°-160°F 40°-70°C	2-15 minutes	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.	
Turco® 4215 NC-LT™	•	•					Powder	Concentrated	Immersion, Spray or Ultrasonic	Immersion: 40-60 g/l Spray: 7-15 g/l Ultrasonic: 3-15 g/l	Mildly Alkaline	•	•	•	•	•		113°-131°F 45°-55°C	Immersion: 5-10 mins Spray: 2-4 mins	White granular mix developed for cleaning ferrous and non-ferrous 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.	
Turco® 5578-L™	•						Liquid	Ready to Use	Immersion or Spray	Use as Received or Diluted to 15%	Alkaline				•			176°-203°F 80°-95°C	Immersion: 15-60 minutes	Amber liquid compound formulated to clean and etch titanium, columbium and tantalum alloys by spray or immersion systems. Readily removes mill soils, marking inks, lube oils, cutting oil and fingerprints at a low concentration and will etch titanium at higher concentrations. It is an effective etch prior to adhesive bonding, diffusion bonding, painting, welding and brazing. Boeing approved.	
Turco® 5948-DPM™	•	•	•			•	Liquid	Concentrated	Immersion, Spray or Mop	Immersion: 1:3-20 Spray/Mop: 1:9-30	Alkaline, Water-Based	•	•	•				149°-176°F 65°-80°C	Immersion: 5-15 minutes	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.	
Turco® 6751-L™	•	•					Liquid	Concentrated	Spray	1%-4% in Water	Alkaline						•	•	86°-140°F 30°-60°C	1-2 minutes	Liquid alkaline low temperature cleaner for spray applications. It is a brown colored liquid, developed to remove shop soils, lube oils, light drawing oils and drawing waxes from ferrous and non-ferrous metals. Rinses from metal surfaces with room temperature water and is effective from 86°-140°F/30°-60°C.
Turco® 6849™	•	•	•				Liquid	Concentrated	Immersion	10%-20% in Water	Alkaline	•	•	•	•	•	•	131°-158°F 55°-70°C	Varies as needed	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.	
Turco® 4181-L™ (Liquid Alkaline Rust Remover)	•	•					Liquid	Concentrated	Immersion	50%-75% in Water	Alkaline			•	•	•		176°-203°F 80°-95°C	15-60 minutes	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. Can be used on titanium alloys when diluted to 12% to 15% in water at 158°-167°F/70°-75°C.	
Turco® Vitro-Klene	•						Powder	Concentrated	Immersion	60-75 g/l	Caustic				•	•		158°F/70°C to Boiling Point	Varies as needed	Brown granular mixture formulated to remove drawing compounds, lube oil, rust preventive compounds, and other tenacious soils from ferrous and titanium alloys prior to vitreous enameling and other processes that require a high degree of cleanliness. Will provide a water-break-free surface when used as recommended. Corrosive to aluminum, cadmium and zinc alloys, and should not be used on these alloys. Approved to Boeing BAC 5749.	

PROCESS LINE CLEANERS

PROCESS LINE CLEANERS

Metal Preparation Process:

1. Clean.
2. Deoxidize.
3. Etch.
4. Conversion Coat.

Typical Titanium Pretreatment Process:

1. Aqueous clean with Ridoline® 4355™.
2. Rinse.
3. Alkaline clean (see above).
4. Acid etch with Nitrad.

5. Rinse.
6. Conversion coat with Alodine® 5200™.

Typical Aluminum Pretreatment Process:

1. Aqueous degrease with Ridoline® 4355™ or Turco® 6849™.
2. Rinse.
3. Alkaline clean with Altrex® 24™ or Ridoline® 4355™.

4. Rinse.
5. Alkaline etch with Mil-Etch® or Aluminux® Etch L.
6. Rinse.
7. Deoxidize with Deoxidizer 6/16 or Deoxalume® 2310™.

8. Rinse.
9. Conversion coat with Alodine® 5200™, Alodine® 1200S™, or Anodize.
10. Rinse.



SURFACE TREATMENTS

Deoxidizers, Etchants and Conversion Coatings

	Metal Processing Lines	Jet Engine Cleaning	Aircraft Parts Cleaning	Aircraft Depaint & Repaint	Coolants	Aircraft Appearance	Aircraft Protection	Consistency	Form	How to Apply	Mix Ratio (product:water)	Chemistry	Aluminum	Magnesium	Stainless Steel	Titanium	Ferrous	Non-Ferrous	Temperature	Time	Description	
																						Product
DEOXIDIZERS	DEOXIDIZERS																					
	Deoxalume® 2310™	•						Liquid	Concentrated	Immersion or Spray	10-20% Deoxalume® 2310™ by Volume, 25-30% Nitric Acid	Acidic, Non-Chrome	•						60°-90°F 15°-30°C	2-10 minutes	Chromium-free concentrated acidic liquid product specifically formulated for deoxidizing and desmutting wrought aluminum alloys. Extremely effective in removing surface oxides, discolorations due to heat treatment or thermal deburring, and smut that develops during alkaline etching and chemical milling. Meets the deoxidizing requirements of MIL-W-6858C, Paragraph 4.2 and many other aerospace specifications.	
	Turco® Aldox® V	•						Liquid	Concentrated	Immersion or Spray	13-17% Turco® Aldox® V 23-27% Nitric Acid	Non-Chrome	•						50°-120°F 10°-50°C	Varies with Alloy	Brown liquid formulated to deoxidize, desmut, and lightly etch aluminum alloys by spray or immersion methods. Free of chrome and is ideal for processing alloys that require low surface resistance prior to anodizing, conversion coating, bonding, or welding. It is approved by Boeing BAC 5765.	
	Deoxidizer 6/16	•						Liquid	Concentrated, Two Packages	Immersion or Spray	For 100 gals Solution: 5 gal Deoxidizer 6, 10 gal Nitric or 5 gal Sulfuric Acid	Chromated	•						60°-90°F 15°-30°C	Immersion: 1-20 mins Spray: 30 secs-3 mins	Primarily utilizes two liquid products: Deoxidizer 6 Makeup and Deoxidizer 16 Replenisher. These are added to either dilute nitric acid or dilute sulfuric acid to produce an efficient production bath for deoxidizing, desmutting or acid etching aluminum and its alloys. Process approved for BAC 5765, Solution 27 (A, B & C).	
	Turco® Liquid Smut-Go® NC	•						Liquid	Concentrated	Immersion or Spray	18%-20% in Water	Acidic, Non-Chrome	•						50°-122°F 10°-50°C	1-10 minutes	Dark brown liquid formulated to deoxidize and desmut aluminum alloys by spray or immersion methods. Chromate-free. Ideal for processing alloys that require low surface resistance prior to anodizing, conversion coating, bonding, or welding.	
Turco® Nitrad® (T-4104)	•						Liquid	Concentrated	Immersion	Varies with Alloy	Acidic			•	•				Depends on alloy See data sheet.	See data sheet.	Clear, colorless liquid acidic compound designed to be added to nitric acid/water solutions to enhance the descaling and pickling of stainless steels and heat resistant alloys, including titanium alloys, by immersion methods.	
ETCHANTS	ETCHANTS																					
	Aluminux® Etch L™	•						Liquid	Concentrated	Immersion	10%-15% in Water	Alkaline	•				•		100°-160°F 40°-70°C	2-10 minutes	Concentrated liquid alkaline product developed to produce a fine satin etch on aluminum and its alloys. It offers an exceptionally uniform etch and extended bath life. Approved for BAC 5786 use.	
	Alumiprep® 33™	•		•				Liquid	Concentrated	Immersion, Brush or Spray	Immersion: 1:3 Brush: 1:2 to 5, Spray: 1:3	Phosphoric Acid-Based	•						Ambient to 120°F/49°C		Non-flammable phosphoric acid-based cleaner, brightener and prepaint conditioner for aluminum. It should not be used on high copper bearing aluminum alloys or aluminum castings. Cleaning with Alumiprep® 33™ produces a chemically clean and corrosion-free aluminum surface.	
	Turco® Metal Glo #6			•				Liquid	Concentrated	Brush or Spray	Full strength or 1:1	Acid, Solvent	•						Ambient to 120°F/49°C	Varies with temperature	Non-flammable 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. Meets the requirements of MIL-C-38334A, Amend. 1, Type 1, Class 1. Listed on QPL. 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.	
	Mil-Etch®	•						Powder	Concentrated	Immersion	3%-6% in Water	Alkaline	•				•		100°-160°F 40°-70°C	5-10 minutes	Granular alkaline product formulated to produce a fine satin or frosted etch on aluminum and its alloys. The working solution develops a low level foam blanket to prevent caustic mist from escaping into the workplace. Approved for use under BAC 5786.	
	Nova EC-202 L	•						Liquid	Concentrated	Immersion	4%-10% in Water	Alkaline	•				•		120°-180°F 50°-85°C	1-5 minutes	Liquid alkaline aluminum etch cleaner for immersion applications that will produce a lightly etched finish on aluminum alloys, while simultaneously removing any oils and other soils present on the work surface. Approved for use under BAC 5786.	
Turco® WO #1	•		•				Liquid	Concentrated	Immersion or Spray	5%-25% in Water	Acidic	•		•				Ambient to 140°F/60°C	3-10 minutes	Clear, colorless liquid acid cleaner and deoxidizer designed for use on aluminum and aluminum alloys. It may be used in dip, spray and hand wipe processes.		
CONVERSION COATINGS	CONVERSION COATINGS																					
	Alodine® 600™	•		•				Powder	Concentrated	Immersion or Spray	12.5 lbs per 100 gals Water or 15 g/l	Chromate No Cyanide	•						70°-100°F 20°-40°C	1-5 minutes	Powdered chemical used to produce a chromate conversion coating on aluminum and its alloys, which ranges in color from light, iridescent gold to tan. Approved under MIL-C-81706 for use by Application Methods A and C, Classes 1A and 3. Listing on QPL 81706 indicates its acceptance under the MIL-C-5541 document of current issue.	
	Alodine® 600 RTU™			•				Liquid	Ready to Use	Immersion or Spray	Use as Received	Chromate No Cyanide	•						70°-100°F 20°-40°C	Immer.: 2-5 mins Spray: 15-30 secs	Ready to use liquid product that produces a chromate conversion coating on aluminum and its alloys. The coating produced provides excellent protection for unpainted aluminum and bonds paint well.	
	Alodine® 1000 RTU™	•		•				Liquid	Ready to Use	Brush or Spray	Use as Received	Chromate	•						Ambient	1-3 minutes	Ready to use aqueous solution for producing a protective coating on aluminum and its alloys. The coating provides excellent protection for painted and unpainted aluminum and bonds paint well. It is specifically designed for touching-up abraded or damaged areas.	
	Alodine® 1200S™	•		•				Powder	Concentrated	Immersion	6.3 lbs per 100 gals Water or 8 g/l	Chromic Acid-Based	•						70°-100°F 20°-40°C	15 seconds to 3 minutes	Powdered chemical used to produce a protective coating on aluminum to minimize corrosion and provide an improved bond for paint. The Alodine® 1200S™ coating chemical, listed on QPL-81706, is an approved material to produce Class 1A and Class 3 coatings, bare or painted, in accordance with MIL C-5541C.	
	Alodine® 1201™	•		•				Liquid	Brush: Ready to Use	Brush or Immersion	Immersion: 33 gals per 67 gals Water	Chromic Acid-Based	•						Ambient to 100°F/38°C	2-5 minutes	Non-flammable, chromic acid-based coating chemical that will produce a chrome conversion coating on aluminum and its alloys.	
	Alodine® 1500™	•						Liquid	Concentrated	Immersion or Spray	1 gal per 100 gals Water or 10 g/l	Chromic Acid-Based	•						70°-160°F 20°-70°C	Immersion: 2-5 mins Spray: 15-30 secs	Liquid chemical used to produce a protective coating on aluminum or aluminum alloys. The coating provides protection for aluminum and is an excellent bond for clear organic coatings. Listed on the register for QPL-MIL-C-81706 and is approved to be used by Methods A and C (spray and immersion processing) to produce Class 3 coatings in accordance with MIL-C-5541 (current issue). May also be used to process aluminum under Specification MIL-S-5002.	
	Alodine® 1600™	•						Liquid	Concentrated, Two Packages	Immersion or Spray	1.3%-2% in Water	Chromate	•						60°-130°F 15°-55°C	1-5 minutes	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. It does not contain complex cyanides. Approved for use under MIL-DTL-81706A, formerly MIL-C-81706, Classes 1A and 3, Form, I, Method C and BAC-5719.	
	Alodine® 5200™	•						Liquid	Concentrated	Immersion or Spray	1.5%-7.5% in Water	Organo-Metallic	•	•		•			70°-120°F 20°-50°C	1-5 minutes	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.	
	Alodine® 5700™			•				Liquid	Ready to Use	Spray	Use as Received	Organo-Metallic	•	•		•			Ambient to 100°F/38°C	2-5 minutes	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.	
	Alodine® T 5900™	•		•				Liquid	Concentrated	Immersion, Brush or Spray	5% in Water	Trivalent Chrome	•						75°-110°F 24°-43°C	Immersion/Brush: 5-10 minutes Spray: 1.5-3 mins	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 nor the conversion coating developed by the process contains hexavalent chromium. Alodine® T 5900™ can be used in immersion or pressure spray washers.	
	Alodine® T 5900™ Toner	•		•				Liquid	Concentrated	Use w/T5900™	1%	Additive	•						75°-110°F 24°-43°C	Imm./Br.: 5-10 mins Spray: 1.5-3 mins	Used to build up the Alodine® T 5900™ bath.	
Alodine® T 5900™ RTU	•		•				Liquid	Ready to Use	Immersion Brush or Spray	Use as Received	Trivalent Chrome	•						Ambient	Imm./Br.: 5-10 mins Spray: 1.5-3 mins	Complex trivalent chromium conversion coating formulated for treating aluminum and its alloys, metals coated with IVD aluminum, magnesium, titanium and zinc surfaces. Formulated as a ready to use material for manual spray applications. The process provides bare ASTM-B117 salt spray resistance and it also serves as an excellent base for organic finishes and adhesives.		

DEOXIDIZERS

ETCHANTS

CONVERSION COATINGS

SURFACE TREATMENTS

Jet Engine Cleaners

Product	Applications						Characteristics				Alloys						Operation		Description
	Metal Processing Lines	Jet Engine Cleaning	Aircraft Parts Cleaning	Aircraft Depaint & Repaint	Coolants	Aircraft Appearance	Aircraft Protection	Consistency	Form	How to Apply	Mix Ratio (product:water)	Chemistry	Aluminum	Magnesium	Stainless Steel	Titanium	Ferrous	Non-Ferrous	

CONVERSION COATINGS CONTINUED

Touch-N-Prep® Alodine® 1132™	•						Liquid	Ready to Use	Pen	Use as Received	Chromate	•							Ambient	Until dry	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.
Brush Alodine® 120™ Kit	•						Liquid	Ready to Use Two-Part Kit	Kit	Use as Received	Chromate	•							Ambient	Until dry	Formulated for treating aluminum to conform to MIL-C-5541C, Class 1A. The 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.
Magnesium Treatment Kit				•			Liquid	Ready to Use	Brush	Use as Received	Chromate		•						Ambient	1-5 minutes	Formulated for treating magnesium alloys to conform 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.

JET ENGINE CLEANING, COLD LINE

Turco® 5668™	•	•	•				Liquid	Ready to Use	Immersion	Add entire contents of container to stripping tank	Alkaline	•	•	•	•	•	•	158°-176°F 70°-80°C	15-60 minutes	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. 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.
Turco® 5948-DPM™	•	•	•	•		•	Liquid	Concentrated	Immersion, Spray or Mop	Immersion: 1:3-20 Spray/Mop: 1:9-30	Alkaline, Water-Based	•	•	•	•	•	•	149°-176°F 65°-80°C	Immersion: 5-15 minutes	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.
Turco® Liquid Sprayeze NP-LT™	•	•	•				Liquid	Concentrated	Immersion or Spray	Immersion: 15%-25% in Water Spray: 3%-10% in water	Alkaline, Water-Based	•		•	•	•		90°-190°F 30°-90°C	Immersion: 5-30 minutes Spray: 1-2 mins	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, and is effective from 90°-190°F/32°-88°C.
Turco® T-4181™ (Liquid Alkaline Rust Remover)	•	•	•				Liquid	Concentrated	Immersion	50%-75% in Water	Alkaline		•	•	•	•		176°-203°F 80°-95°C	15-60 minutes	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. Can be used on titanium alloys when diluted to 12% to 15% in water at 158°-167°F/70°-75°C.

Typical Cold Line Process:

1. Pre-clean with Turco® Liquid Sprayeze, or
2. Dip clean with Turco® 5948-DPM™.
3. Rinse.
4. Use Turco® 4181-L™ to remove dirt and scale.
5. Rinse.
6. Use Turco® 5668™ to remove coatings for full inspection.

JET ENGINE CLEANING, HOT LINE

Turco® Rust Bloc	•	•	•				Liquid	Concentrated	Immersion or Spray	Immersion: 10%-20% in Water Spray: 2%-5% in Water	Alkaline	•	•	•	•	•	•	Ambient to 203°F/95°C	Varies	Alkaline liquid used as a rust inhibiting rinse additive or cleaner. It provides temporary in-plant rust protection for steel and cast iron.
Turco® 4338-L™		•					Liquid	Two-Part, Concentrated	Immersion	50%-75% in Water	Alkaline, Permanganate			•	•	•		176°-203°F 80°-95°C	30-60 minutes	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.
Turco® 4409 GL™		•					Liquid	Concentrated	Immersion, Spray or Hand Wipe	5%-50% in Water	Acidic			•	•	•		Ambient to 140°F/60°C	3-10 minutes	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.
Turco® T-4181™ (Liquid Alkaline Rust Remover)	•	•					Liquid	Concentrated	Immersion	50%-75% in Water	Alkaline			•	•	•		176°-203°F 80°-95°C	15-60 minutes	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. Can use on titanium alloys when diluted to 12% to 15% in water at 158°-167°F/70°-75°C.
Turco® Scale Gon 7™		•					Liquid	Concentrated	Immersion	20%-30% in Water	Mildly Acidic			•	•	•		176°-194°F 80°-90°C	30 minutes	Next generation acid activated scale conditioner and scale remover designed for jet engine cleaning. Improves scale removal efficiency while providing for extended process tank life.

Typical Cold Line Process:

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

COMPRESSOR WASH

Turco® 5884™		•					Liquid	Concentrated	Spray	1:1-4	Alkaline, Solvent-Based	•		•	•	•	•	Ambient	Approx. 5 minutes	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.
Turco® 6783-3™ (Europe Only)		•					Liquid	Concentrated	Spray	10% in Water	Alkaline, Water-Based	•		•	•	•	•	Ambient	Approx. 5 minutes	Concentrated aqueous compressor cleaner that effectively removes oil, salt and solid deposits from compressor blades, guide vanes and rotors of in-service turbine engines. Use at 10% by volume in distilled, demineralized or good drinking water. For cold weather (below 32°F/0°C), add 20% by volume isopropanol, ethanol or glycol. Meets MIL-C-85704B Type II and III.
Turco® 6783-10™		•					Liquid	Ready to Use	Spray	Use as Received	Alkaline, Water-Based	•		•	•	•	•	Ambient	Approx. 5 minutes	Aqueous compressor cleaner that 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. Ready to use liquid form. Meets MIL-C-85704B Type II and III.
Turco® 6783-50™		•					Liquid	Concentrated	Spray	20% in Water	Alkaline, Water-Based	•		•	•	•	•	Ambient	Approx. 5 minutes	Concentrated aqueous compressor cleaner that effectively removes oil, salt and solid deposits from compressor blades, guide vanes and rotors of in-service turbine engines. Use at 20% by volume in distilled, demineralized or good drinking water. For cold weather (below 32°F/0°C), add 20% by volume isopropanol, ethanol or glycol. Meets MIL-C-85704B Type II and III.

SURFACE TREATMENTS

Specialty Cleaners

SPECIALTY CLEANERS

SPECIALTY CLEANERS

Product	Applications						Characteristics				Alloys						Operation		Description	
	Metal Processing Lines	Jet Engine Cleaning	Aircraft Parts Cleaning	Aircraft Depaint & Repaint	Coolants	Aircraft Appearance	Aircraft Protection	Consistency	Form	How to Apply	Mix Ratio (product:water)	Chemistry	Aluminum	Magnesium	Stainless Steel	Titanium	Ferrous	Non-Ferrous		Temperature
ACCESSORY SHOP PRODUCTS																				
Turco® Aquasorb	•	•					Liquid	Ready to Use	Immersion, Brush or Spray	Use as Received	Petroleum Solvent	•	•	•	•	•	•	Ambient		Clear, amber liquid, formulated to impart short-term rust and corrosion protection to both ferrous and non-ferrous metals during manufacturing and overhaul. It displaces water from metal surfaces, leaving an oil-like protective film, which prevents corrosion and rusting under humid conditions. Ideal for post oil treatments, such as phosphate, and is often used on aircraft engine and wheel bearings and similar components after rework.
Turco® Aviation	•	•	•				Powder	Concentrated	Immersion or Spray	Immersion: 30-60 g/l Spray: 7.5-15 g/l	Alkaline	•	•	•	•	•	•	Immersion: 167°-185°F 75°-85°C Spray: 158°-167°F 70°-75°C	Immersion: 2-10 minutes Spray: 30 second to 2 minutes	White granulated alkaline compound formulated for the removal of mill inks, oils, shop soils and other difficult-to-remove soils from aluminum, steel, copper, magnesium, cadmium and nickel alloys.
Turco® 4215 NC-LT™	•	•	•				Powder	Concentrated	Immersion, Spray or Ultrasonic	Immersion: 45-60 g/l Spray: 7-15 g/l Ultrasonic: 3-15 g/l	Mildly Alkaline	•		•	•	•	•	113°-131°F 45°-55°C	Immersion: 5-10 minutes Spray: 2-4 mins	White granular mix developed for cleaning ferrous and non-ferrous 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.
Turco® 5805™	•	•					Liquid	Ready to Use	Spray	Use as Received	Alkaline	•	•	•	•	•	•	Ambient	15-30 minutes	Clear viscous liquid, developed specifically for cleaning and brightening jet engine thrust reversers, cowling, landing gears, etc., during overhaul.
Turco® 5948-DPM™ Thick	•	•				•	Liquid	Concentrated	Immersion, Spray or Mop	Immersion: 1:3-20	Alkaline, Water-Based	•		•	•	•	•	Immersion: 149°-185°F 65°-85°C	5-15 minutes	Environmentally advantaged thixotropic, water-based, heavy duty aircraft cleaner. It is a blue, viscous, alkaline, 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.
Turco® 6802™	•						Liquid	Ready to Use	Immersion	Use as Received		•	•	•	•	•	•	Maximum 257°F/125°C	Time for wax to melt or dissolve	Clear, amber liquid developed to remove platter's wax (such as Rigidex) and similar low melting stop-off compounds by immersion in the heated product. It is free of chlorinated hydrocarbons, phenols, and chromate. Turco® 6802™ can be used on all metals.
Turco® 9045-6™	•	•					Liquid	Ready to Use	Immersion	Use as Received	Water-Based			•	•	•		104°-140°F 40°-60°C	30 minutes to 2 hours	Unique water-based carbon remover used to remove carbon deposits and difficult-to-remove soils found in aircraft engines. It cleans engine blocks, pistons, carburetors, transmissions, and brake assemblies. It is an effective carbon remover for jet engine overhaul. It may also remove some paints.
LANDING GEAR/THRUST REVERSER																				
Turco® 5668™	•	•	•				Liquid	Ready to Use	Immersion	Add Entire Contents of Container to Stripping Tank		•	•	•	•	•	•	158°-176°F 70°-80°C	15-60 minutes	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. Meets all requirements of MIL-R-83936B for removal of paint from aircraft wheels, landing gear components, and other aircraft and AGE components.
Turco® 5805™	•	•				•	Liquid	Ready to Use	Spray	Use as Received	Alkaline	•	•	•	•	•	•	Ambient	15-30 minutes	Clear viscous liquid, developed specifically for cleaning and brightening jet engine thrust reversers, cowling, landing gears, etc., during overhaul.
Turco® 5948-DPM™ Thick	•	•				•	Liquid	Concentrated	Immersion, Spray or Mop	Immersion: 1:3-20	Alkaline, Water-Based	•	•	•	•	•	•	Immersion: 149°-176°F 65°-80°C	5-15 minutes	Environmentally advantaged thixotropic, water-based, heavy duty aircraft cleaner. It is a blue, viscous, alkaline, 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.
EXTERIOR WASH																				
Aerowash®	•					•	Liquid	Concentrated	Spray or Mop	5%-30% in Water, Depending Upon Soil	Alkaline, Water-Based	•	•	•	•	•	•	Ambient	Varies	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. It is safe to use on all metals, glass, painted surfaces, and plastics.
Turco® Air-Tec #23™						•	Liquid	Concentrated	Spray or Foam	1 Part Concentrate to 3-15 Parts Water	Alkaline, Water-Based	•	•	•	•	•	•	Ambient	Varies	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.
Turco® 5948-DPM™	•	•	•			•	Liquid	Concentrated	Spray or Mop	1 Part Concentrate to 9-30 Parts Water	Alkaline, Water-Based	•	•	•	•	•	•	Ambient	Varies	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.
REMOVED COMPONENTS																				
Turco® 5948-DPM™	•	•	•	•		•	Liquid	Concentrated	Immersion, Spray or Mop	Immersion: 1:3-20 Spray/mop: 1:9-30	Alkaline, Water-Based	•	•	•	•	•	•	149°-176°F 65°-80°C	Immersion: 5-15 minutes	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.
Turco® 9045-6™	•	•	•				Liquid	Ready to Use	Immersion	Use as Received	Water-Based			•	•	•		104°-140°F 40°-60°C	30 minutes to 2 hours	Unique water-based carbon remover used to remove carbon deposits and difficult-to-remove soils found in aircraft engines. It cleans engine blocks, pistons, carburetors, transmissions, and brake assemblies. It is an effective carbon remover for jet engine overhaul. It may also remove some paints.
DINOL REMOVER																				
Turco® 5948-DPM™ Thick	•	•				•	Liquid	Concentrated	Immersion, Spray or Mop	Immersion: 1:3-20	Alkaline, Water-Based	•	•	•	•	•	•	Immersion: 149°-185°F 65°-85°C	5-15 minutes	Environmentally advantaged thixotropic, water-based, heavy duty aircraft cleaner. It is a blue, viscous, alkaline, 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.
FLAP AND WHEEL WELL																				
Turco® 5948-DPM™ Thick	•	•				•	Liquid	Concentrated	Immersion, Spray or Mop	Immersion: 1:3-20	Alkaline, Water-Based	•	•	•	•	•	•	Immersion: 149°-176°F 65°-80°C	5-15 minutes	Environmentally advantaged thixotropic, water-based, heavy duty aircraft cleaner. It is a blue, viscous, alkaline, 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.

SURFACE TREATMENTS

Specialty Cleaners, Strippers, Maskants and Coolants

	Metal Processing Lines	Jet Engine Cleaning	Aircraft Parts Cleaning	Aircraft Depaint & Repaint	Coolants	Aircraft Appearance	Aircraft Protection	Consistency	Form	How to Apply	Mix Ratio (product:water)	Chemistry	Aluminum	Magnesium	Stainless Steel	Titanium	Ferrous	Non-Ferrous	Temperature	Time	Description	
																						Product
WHEEL AND BRAKE	WHEEL AND BRAKE																					
	Turco® Rust Bloc	•	•	•				Liquid	Concentrated	Immersion or Spray	Immersion: 10%-20% in Water Spray: 2%-5% in Water	Alkaline	•	•	•	•	•	•	Ambient to 203°F/95°C	Varies	Alkaline liquid used as a rust inhibiting rinse additive or cleaner. It provides temporary in-plant rust protection.	
	Turco® 5668™	•	•	•				Liquid	Ready to Use	Immersion	Add Entire Contents of Container to Stripping Tank	Alkaline	•	•	•	•	•	•	158°-176°F 70°-80°C	15-60 minutes	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. Meets all requirements of MIL-R-83936B for removal of paint from aircraft wheels, landing gear components, and other aircraft and AGE components.	
	Turco® 6751-L™	•		•				Liquid	Concentrated	Spray	1%-4% in Water	Alkaline	•	•	•	•	•	•	86°-140°F 30°-60°C	1-2 minutes	Liquid, alkaline, low temperature cleaner for spray applications. It's a brown colored liquid, developed to remove shop soils, lube oils, light drawing oils and drawing waxes from ferrous and non-ferrous metals. Rinses from metal surfaces with room temperature water and is effective from 86°-140°F/30°-60°C.	
	Turco® Aviation	•	•	•				Powder	Concentrated	Immersion or Spray	Immersion: 30-60 g/l Spray: 7.5-15 g/l	Alkaline	•	•	•	•	•	•	Immersion: 167°-185°F 75°-85°C Spray: 158°-167°F 70°-75°C	Immersion: 2-10 minutes Spray: 30 second to 2 minutes	White granulated alkaline compound formulated for the removal of mill inks, oils, shop soils and other difficult-to-remove soils from aluminum, steel, copper, magnesium, cadmium and nickel alloys.	
Turco® Liquid Sprayeze NP-LT™	•	•	•				Liquid	Concentrated	Immersion or Spray	Immersion: 15%-25% in Water Spray: 3%-10% in Water	Alkaline, Water-Based	•		•	•	•		90°-190°F 30°-90°C	Immersion: 5-30 minutes Spray: 1-2 mins	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, and is effective from 90°-190°F/30°-90°C.		
PAINT STRIPPERS	PAINT STRIPPERS																					
	Turco® 6776-LO™	•		•	•			Liquid	Ready to Use	Spray	Use as Received	Acidic	•		•	•	•		Ambient	Varies	Environmentally advantaged paint remover is low odor, thixotropic, and developed for effective stripping of resistant finishes such 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 with the aircraft/aerospace NESHAP. Not recommended for use on high strength steel or magnesium. Meets the "Effect on Metals" requirements of MIL-R-81903A.	
	Turco® 6776™ Thin	•		•	•			Liquid	Diphase Ready to Use	Immersion	Use as Received	Acid Activated	•		•		•		68°-100°F 20°-40°C	As Needed	Light amber, diphase liquid developed for removing chemical resistant paints, such as epoxies, polyurethanes and epoxy primers, from aluminum alloys, mild steels and cast iron by immersion. It operates with an oil seal to reduce odors.	
	Turco® 6813-E™	•	•	•	•			Liquid	Ready to Use	Spray or Brush	Use as Received	Alkaline, Water-Based	•	•	•	•	•	•	Ambient	Varies	Water-based environmentally advantaged paint remover. 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.	
	Turco® 6840-S™	•		•	•			Liquid	Ready to Use	Spray or Brush	Use as Received	Water-Based	•	•	•	•	•	•	85°-100°F 30°-40°C	Varies	Water-based environmentally advantaged paint remover. Viscous, light purple liquid formulated to remove multiple coats of paints. Clings to vertical as well as overhead surfaces and can be used on aluminum, magnesium, cadmium plated steels and other ferrous metals.	
	Turco® EA 6916™ Stripper	•		•	•			Liquid	Ready to Use	Spray	Use as Received	Acid, Water-Based	•		•	•	•		Ambient	Extended	Water-based, environmentally advantaged, paint remover. Low odor, thixotropic, developed for effective stripping of such resistant finishes and epoxies, epoxy primer, polyurethanes and similar catalyzed paints. Also effective in removing "sanding primer." Specially designed to be effective on very thick coatings, up to 25 mils or more. Remains wet and active for extended periods of time. Complies fully with the aircraft/aerospace NESHAP. Can be used on aluminum, mild steel, cast iron, and titanium. Meets the "Effect on Metals" requirements of MIL-R-81903A.	
Turco® EA 6930™ Stripper	•		•	•			Liquid	Ready to Use	Spray	Use as Received	Peroxide Activated, Water-Based	•		•	•	•	•	Ambient	Varies	Environmentally advantaged paint remover. Low odor, thixotropic, activated by hydrogen peroxide. Developed for effective stripping of resistant finishes such 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. Meets the corrosivity requirements of TT-R-2918A.		
MASKANTS	MASKANTS																					
	Turco® Form Maskant 6914G™ and Turco® Form Maskant 6915™	•						Liquid	Two-Part	Spray	1:1 by Weight	Polyurethane-Based	•		•	•	•	•	>35°F/5°C	Cure Time: 30 seconds to 2 minutes	Two component, 100% solids, polyurethane-based, hand-strippable protective coating, which provides protection to aerospace metals during chemical and mechanical processing. These components are mixed at the point of application in a specially designed applicator and cure rapidly on the metal surface. The cured film is referred to as Turco® Form 2K Maskant.	
MACHINE AND GRINDING COOLANTS, BIOSTABLE	MACHINE AND GRINDING COOLANTS, BIOSTABLE																					
	Multan® Machine Coolants	•				•		Liquid	Concentrate	Circulation to Machine	Depends on Specific Product	Alkaline, Semi-Synthetic	•		•	•	•		Do not freeze		Oil rejecting, semi-synthetic fluids designed for machining and grinding ferrous and aluminum alloys. The unique composition of corrosion inhibitors, Extreme Pressure (EP) additives, lubricity additives, biocides and bio-resistant components provide a durable low foaming product for today's light-to-heavy machining and grinding operations.	

Typical Paint Stripping Process:

1. Protect surfaces that will not be stripped.
2. Apply either an acid, alkaline, or peroxide paint stripper to surface. See above list.
3. Agitate paint surface with stiff brush. Squeegee off loosened paint and rinse.
4. Follow with Turco® 5948-DPM™ to wash prior to etching.
5. Rinse.
6. Use Turco® Metal Glo #6 to etch metal prior to conversion coating. Follow Turco® Metal Glo #6 application instructions.
7. Apply conversion coating. Follow instructions related to the specific Turco® conversion coating.