



Jet Engine Cleaning

The compressor plays a key role in the optimum performance of a jet engine. Any impairment of efficiency has a significant impact on operating costs and maintenance intervals. Depending on the operating environment, dust, salts and exhaust gas deposits are major causes of reduced performance, resulting in higher fuel consumption and increased turbine wear. Therefore, proper cleaning of the compressor significantly reduces operating costs and ensures peak performance of the jet engine.

The innovative approach and high quality standards of Turco® products have made Henkel a worldwide market leader in jet engine cleaning and overhaul. Henkel was first to introduce environmentally compatible cleaning agents under the Turco® brand. Based on competence backed by 80 years in the aviation industry, Henkel offers a complete range of Turco® products for compressor cleaning.

The worldwide presence of Turco® products enables Henkel to offer jet engine overhaul cleaning technologies to manufacturers of all current engine types. The product range includes cleaning agents of different compositions and for all standard cleaning methods, such as abrasive, on-line/off-line and overhaul procedures. Practical tests have shown that Turco® jet engine cleaning agents are very effective in restoring an engine's optimum performance.

Reasons to Chemically Clean

- Increase Engine Efficiency
- Reduce Fuel Consumption
- Effective Non-Destructive Testing (NDT) Inspections
- Reduce EGTs
- Reduce CO, CO₂ + NO_x Emissions

Reasons to Use Turco® Products

- 80 Years Serving the Industry
- Proven Technology
- Cost Competitive
- Global Presence
- Extensive R&D
- Equipment and Chemistry Packages

On-Line Cleaning

This method, also known as "running wash", can be carried out quickly, efficiently and economically during operations, without major maintenance downtime. On-line cleaning extends maintenance intervals for off-line cleaning. Moreover, the performance curve remains significant in reducing fuel consumption.

The special composition of Turco® cleaning agents ensures superior cleaning results in the high-temperature areas of the compressor. The cleaning agents burn without leaving a residue, thus avoiding turbine blade damage.

This Turco® product range has virtually zero salt or ash content, and can also be used for off-line cleaning.

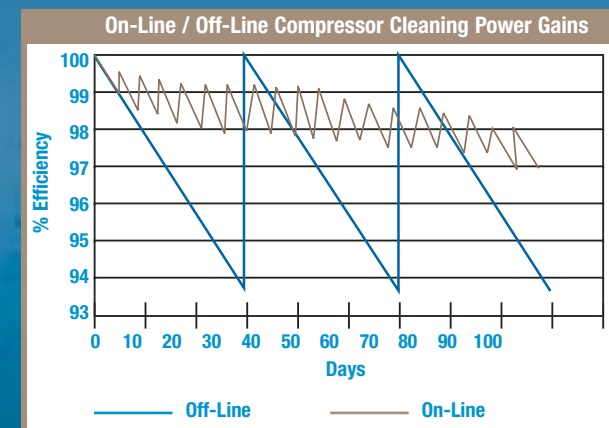
Off-Line Cleaning

This method, also known as "crank washing", becomes necessary when the engine's performance declines due to contamination. For off-line cleaning, it is possible to use other cleaners that are very effective but do not have the benefit of being Environmentally Advantaged™, as is the case with our water-based products. While the on-line procedure is able to restore some 98% of an engine's performance, off-line cleaning achieves close to 100%. Turco® jet engine cleaners for off-line use (water or solvent-based) increase time between overhauls, reduce downtime and increase compressor life by reducing corrosion.

Overhaul Maintenance Cleaning

The overhaul maintenance cleaning of a jet engine and its components is scheduled to allow for inspection and preparation for additional work by removing the scale, soil and dirt build-up. Once an engine is dismantled to begin the inspection phase, chemical cleaning is recommended prior to NDT, which uses fluorescent penetrants to detect cracks and defects. Physical abrasion or shot blasting could potentially prevent detection by covering over areas of interest.

Turco® specially formulated cleaning agents work not only to ensure worry-free inspections, but also to restore engine appearance and efficiency with components that are free of build-up.



Our complete global service goes above and beyond, with high quality products that are always available.

Henkel — Your Worldwide Partner

- Australia • Austria • Belgium • Brazil • Canada • Chile • China • Colombia • Czech Republic • Denmark • England • Finland • France • Germany • Greece • Holland • Hungary • Italy • Japan • Mexico • Netherlands • Norway • Philippines • Poland • Portugal • Singapore • Slovenia • Spain • Sweden • Switzerland • Taiwan • Turkey

Henkel is one of the world's largest suppliers of chemicals to the aviation industry. The Turco® brand has been serving the U.S. military for over 80 years. Henkel has led in the development of cleaners, paint strippers and carbon removers for use in aviation manufacturing, maintenance and overhaul. Henkel provides a full line of Environmentally Advantaged™ products, including paint strippers without phenol, chromate, or methylene chloride. Turco® branded products are available worldwide through a network of subsidiaries, licensees, and distributors.

- Acid and Alkaline Cleaners
- Emulsion Cleaners
- Etchants and Deoxidizers
- Chemical Milling Products
- Aircraft Exteriors Cleaners
- Non-Chlorinated Solvents
- Conversion Coatings
- Environmentally Advantaged™ Paint Strippers

For more information on the trusted brands of Hysol®, Turco®, Frekote® and Alodine® products, please contact your local Henkel representative at 866-332-7024 or visit us on the web at www.aerospace.henkel.com.

Approvals

- General Electric
- Honeywell
- Military — Mil-PRF-85704C
- Pratt & Whitney
- Rolls Royce
- Snecma



Henkel Corporation
Aerospace
32100 Stephenson Highway
Madison Heights, Michigan 48071
U.S.A.
866-332-7024
www.henkel.us
www.aerospace.henkel.com

Key Henkel Aerospace Brands:
Hysol® Turco® Frekote® Alodine®

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Jet Engine Cleaning Technologies from Henkel

Quality is our standard

Innovation our strategy

Customer commitment our promise



Jet Engine Cleaning Product Chart

More detailed information is provided in our technical specification and material safety data sheets. Manufacturer acceptance certificates and military specifications are available.

Product Name	Description	Purpose	Suitability	Features	Application
On-Line/Off-Line Cleaner					
Turco® 6783-10 (Ready-to-Use)	Water-Based	Removes oil, salt and solid deposits from compressor blades, guide vanes and rotors of in-service jet engines.	Meets requirements of low chloride, sulfur phosphorus and potassium	<ul style="list-style-type: none"> EA (Environmentally Advantaged™) Non-flammable, non-toxic and non-corrosive 	RTU (Ready-to-Use)
Turco® 6783-50					Dilution Ratio 1:4. Preferred dilution with distilled or demineralized water
Turco® 5884	Solvent-Based	Removes oil, salt and solid deposits from compressor blades, guide vanes and rotors of in-service jet engines.	Very low in phenol, chloride and sulfur in addition to being ash-free	<ul style="list-style-type: none"> Ideal for hydraulic fluids and lubricants 	Dilution Ratio 1:1-1:4. Preferred dilution with distilled or demineralized water
Overhaul Cleaning Process: Cold Section					
Turco® Liquid Sprayeze NP-LT	Alkaline Degreaser	Removes shop soil, lube oils, light drawing oils and drawing waxes from ferrous, aluminum, copper and titanium alloys in addition to most magnesium alloys, zinc and cadmium.	Contains less than 1 ppm lead, silver, zinc, tin, copper and cadmium in addition to containing less than 50 ppm halogens	<ul style="list-style-type: none"> Does not contain free caustic Free rinsing with room temperature water 	<i>Spray Application:</i> 3-10% by Volume Water 90-190°F (32-88°C) <i>Operating Pressure:</i> 20-30 psi <i>Immersion Application:</i> 5-25% by Volume Water 90-190°F (32-88°C)
Turco® 5948 DPM	Heavy Duty Alkaline Cleaner	Removes soils, such as synthetic oil films, grease, carbon and exhaust residues, from aircraft engine components, exterior surfaces, landing gears, wheel wells, flaps, etc.	Does not contain phosphates, chromates or butyl cellosolve	<ul style="list-style-type: none"> Nonstaining and nonstreaking to aluminum Noncrazing to plexiglass Ideal for exterior and interior cleaning, as well as parts cleaning Free rinsing 	<i>Spray and Manual Application:</i> Dilution Ratio: 1:9-1:30 <i>Immersion Application:</i> Dilution Ratio 1:3-1:20 • 140-176°F (60-80°C)
Turco® 5668	Hot Tank Paint Stripper	Removes resistant coatings, such as aluminized silicones, polyurethanes, acrylics, epoxies and chromated primers.	Does not contain phenols, chromate, chlorinated solvents or acids	<ul style="list-style-type: none"> Supplied with a built-in, non-aqueous chemical seal which retards evaporation and helps minimize drag out losses Easily rinsed from parts with steam or high pressure water 	<i>Immersion Application:</i> RTU (Ready-to-Use) 158-176°F (70-80°C)
Turco® Alkaline Rust Remover T-4181 and NEW Turco® 4181 GL	Alkaline Rust Removers	Removes rust, paints, greases and carbon residues from ferrous and chrome nickel alloys, as well as titanium, when used as directed. Not for use on aluminum.	Does not contain phenols, chromate or solvents	<ul style="list-style-type: none"> Developed for use on precision surfaces where dimensional change and hydrogen embrittlement must be avoided 	<i>General Cleaning:</i> 200-300 LB (90-136 kg) per 100 GL Water: 185-205°F (85-95°C) <i>Titanium Cleaning:</i> 37.5-50 LB (17-23 kg) per 100 GL Water: 168°F (75°C) Max.
Overhaul Cleaning Process: Hot Section					
Turco® 5948 DPM	Heavy Duty Alkaline Cleaner	Removes soils, such as synthetic oil films, grease, carbon and exhaust residues, from aircraft exterior surfaces, landing gears, wheel wells, flaps, etc.	Does not contain phosphates, chromates or butyl cellosolve	<ul style="list-style-type: none"> Nonstaining and nonstreaking to aluminum Noncrazing to plexiglass Ideal for exterior and interior cleaning, as well as parts cleaning Free rinsing 	<i>Spray and Manual Application:</i> Dilution Ratio 1:9-1:30 Parts Water <i>Immersion Application:</i> Dilution Ratio 1:3-1:20 Parts Water 140-176°F (60-80°C)
Turco® 5948 R	Heavy Duty Alkaline Cleaner	Removes soils, such as synthetic oil films, grease, carbon and exhaust residues, from aircraft engine components, exterior surfaces, landing gears, wheel wells, flaps, etc.	Does not contain phosphate or chromates	<ul style="list-style-type: none"> Nonstaining and nonstreaking to aluminum Noncrazing to plexiglass Ideal for exterior and interior cleaning, as well as parts cleaning Free rinsing 	<i>General Cleaning Applications:</i> 3-10% by Volume Water <i>Immersion Applications:</i> Dilution Ratio 1:3-1:20 • 140-176°F (60-80°C)
NEW Turco® 4181 GL	Alkaline Degreaser and Rust Remover	Removes rust, paints, lube oils, drawing pastes, cutting oils and protective oils from ferrous alloys, magnesium alloys, stainless steels, brass, bronze or Monel alloys when used as directed. It can be used on titanium alloys when used as directed.	A global product that does not contain phenols, chromate or solvents	<ul style="list-style-type: none"> Developed for use on precision surfaces where dimensional change and hydrogen embrittlement must be avoided 	<i>General Cleaning or Rust Removal:</i> 24-35% by Volume Water Optional - Turco® 4181-GL Additive • 6 to 9 fl. oz. 180-199°F (82-93°C) <i>Titanium and Ti Alloys:</i> 7-10% by Volume of Water Optional - Turco® 4181-GL Additive • 2.3 to 2.9 fl. oz. per 100 GL Max. 180°F (82°C)
Turco® Scale Gon #5	Mildly Acidic Scale Conditioner	High temperature scale remover designed to facilitate non-destructive testing (penetrant) and reconditioning of parts.	Contains no EDTA	<ul style="list-style-type: none"> Not temperature critical – wide, safe operating range 	<i>Immersion Application:</i> 20-30%, by Volume Water 180-195°F (80-90°C) 140-176°F (65-80°C)
NEW Turco® Scale Gon #7	Mildly Acidic Scale Conditioner	High temperature scale remover designed to facilitate non-destructive testing (penetrant) and reconditioning of parts.	Contains no EDTA and provides improved bath life over Turco® Scale Gon #5	<ul style="list-style-type: none"> Especially suited for the treatment of CrNi and Ni alloys such as nimonics and ferritic chromium steels Not temperature critical – wide, safe operating range – although optimum results are obtained with temperatures between 140-185°F (60-85°C) 	<i>Immersion Application:</i> 5.3-7.9% by Volume Water 150-185°F (65-85°C)
Turco® 4338 L	Alkaline Permanganate Cleaner	Liquid alkaline permanganate formulation developed specifically for jet engine high temperature heat scale by chemically changing the structure of the oxide deposit to one that is properly conditioned for ease of chemical removal.	Supplied as a liquid concentrate form that provides much greater safety and ease of handling when compared to dry powdered products, both for tank make-up and for tank maintenance	<ul style="list-style-type: none"> Suited for use on all ferrous and high temperature alloys over a wide range of concentrations to handle various types of scale Not to be used on reactive alloys such as aluminum Superior tank life compared to powder permanganate products 	<i>Immersion Application:</i> 15-25% by Volume Water 176-203°F (80-95°C)
NEW Turco® 4409 GL	Inhibited Acidic Scale Remover	Liquid designed for use on ferrous and nonferrous alloys by immersion, spray and hand wipe methods.	Supplied as a liquid concentrate for easy handling to provide an additional benefit of allowing use at elevated temperatures, improving scale removal time and efficiency	<ul style="list-style-type: none"> Specifically designed for use in overhaul of jet engine components Cleaner can be diluted to meet specific cleaning/deoxidizing requirements Free rinsing 	<i>Immersion Application:</i> 25-50% (ambient tank cleaning) 5-10% (hot tank cleaning) • Ambient to 150°F (65°C)
Turco® Rust Bloc	Rust Inhibitor	A rinse additive that acts as a corrosion preventative.	Free of chromate, nitrite, toxic fumes, vapors, oils, HAPs and VOCs	<ul style="list-style-type: none"> Long tank life 	<i>Rinse Inhibitor:</i> 0.7-1% by Volume Water • Ambient to 200°F (93°C) <i>Spray Washer:</i> 2-5% by Volume Water • Ambient to 200°F (93°C) 10-60 psi <i>Immersion:</i> 10-20% by Volume Water • Ambient to 200°F (93°C)

