

# THE WORLD'S MOST REVOLUTIONARY GAS TURBINE COMPRESSOR CLEANER

# TURBO-K

is specially designed for on-line (hot wash) and off-line (cold wash) cleaning of gas turbine compressors. On-line cleaning of gas turbine compressors is known to provide the most effective method for preventing gas turbine fouling. It ensures maximum available power output, better fuel efficiency and reduced wear and tear on machine components such as bearings and blades. The period between necessary gas turbine shut-downs for off-line washing (crank-wash) is significantly extended, thus reducing costly downtime and production losses.

**TURBO-K**<sup>®</sup> is non-hazardous, water-based, non-corrosive, non-toxic, non-flammable and biodegradable Gas Turbine Compressor cleaner with no Alkyl Phenol Ethoxylates (a-p-e), Nonyl Phenol Ethoxylates (n-p-e) and other ingredients with aquatic toxicity in its formulation. The products have the highest rating by both CEFAS & OSPAR.

**TURBO-K**<sup>®</sup> is based upon a complex formulation relying on a property called **synergism** that improves detergency. Its formulation does not just rely on simple non-ionic surfactants for its cleaning. Thus it has no "cloud point temperature" for exceptional dirt suspension abilities so that all fouling is carried into the combustion chamber during on-line cleaning. This results in extremely high cleaning performance that other gas turbine compressor cleaners cannot match.

**TURBO-K**<sup>®</sup> has been used worldwide on all types of gas turbines. Independent and unsolicited testimonials avow to the utmost superiority of Turbo-K product when cleaning gas turbine compressors. Product conforms to US-MIL-PRF-85704C specification for Type II (Off-Line) and Type III (On-Line) aqueous cleaner concentrate.

**TURBO-K**<sup>®</sup> has inherent corrosion inhibiting properties that are compatible with aluminum, magnesium, nickel-cadmium, stainless steel, and titanium to further protect the compressor against possible corrosion.

**TURBO-K**<sup>®</sup> has been approved by the major gas turbine manufacturers such as GE (General Electric), Alstom Power, Centrax, Dresser Rand, GHH Borsig / MAN, Pratt & Whitney, RR (Rolls Royce), Siemens, Solar Turbines. Contact us for specific approvals.

**TURBO-K**<sup>®</sup> is supplied as an industry standard 1:4 concentrate. A Ready-To-Use (RTU) is also available.



## TURBO-K<sup>®</sup> PRODUCT DATA

**Description:** A concentrated neutral water-based detergent cleaning fluid for cleaning and corrosion inhibiting of gas turbine compressors.

**Dilution:** For on-line cleaning dilute 1:4 (1 part of Turbo-K and 4 parts of demineralized water) before use. Potable water may be used for off-line / Crank Wash.

**Composition:** Blended triple-active formula of cationic, nonionic and amphoteric surfactants, corrosion inhibitors, organic solvents and demineralized water.

**Appearance:** Brown coloured liquid.

**Solubility:** Completely soluble in water. No agitation is required.

**Compatibility:** Not corrosive or detrimental to any of the materials normally used in gas turbine compressors or aircraft structures.

**Safety:** Turbo-K product is non-aggressive against the eyes and skin. However, standard safety procedures for the application and handling of cleaning products must be observed.

**Disposal:** Turbo-K product is biodegradable. Small spillage can be flushed with water. For large spillage, absorb with sand or earth prior to disposal. Disposal of the off-line wash effluent is determined by the engine fouling found in the solution.

**Storage:** Store between 4° C and 80° C. If inadvertently frozen, product can still be used after thawing.

**Shelf Life:** 5 years.

**Packaging:** 20 liter can. Gross Weight: 21.50 Kg.  
200 liter drum. Gross Weight: 212.00 Kg.  
1000 liter IBC/Tote. Gross Weight: 1080 Kg.

**Shipping:** No restrictions. Product is classified as non-hazardous for international transport by air and sea.

**Tariff Code:** UK 3402 20 90 / USA 3402 20 51

## Applications:

For On-line / Hot Wash Turbo-K is injected into the compressor via spray ring or lance while the gas turbine is operating. Off-line / Crank Wash is performed while the gas turbine is in a cooled state utilizing cranking speed. Each OEM details the required volume for both on-line and off-line cleaning.



### Typical Properties:

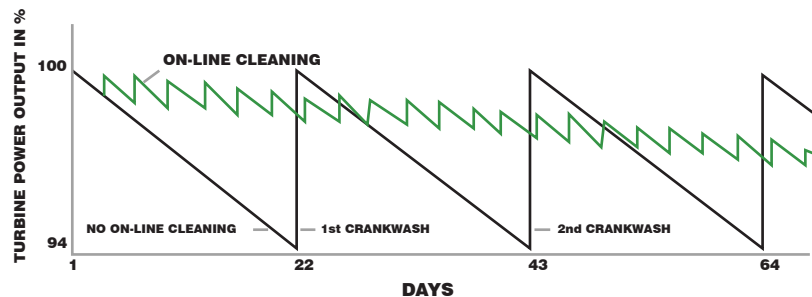
Specific gravity:	1.0 ± 0.10
pH (20° C):	7.0 ± 0.50
Viscosity (20° C Centistokes):	20 ± 5
Flash Point (° C Pensky-Martins):	Min 100
Ash Content:	< .05% w/w
Sodium & Potassium:	Less than 2 ppm
Solubility Refract:	Completely Soluble 19 ± 1
Magnesium & Calcium:	< 5 ppm
Vanadium:	< 0.1 ppm
Lead:	< 0.1 ppm
Tin / Copper:	< 10 ppm
Sulphur:	< 50 ppm

### Why should you invest in Turbo-K?

Water alone cannot remove greasy hydrocarbon deposits on engine components and its use may lead to corrosion problem. The use of gas turbine compressor cleaners made from flammable hydrocarbon solvents results in severe damage to the seals, bearings and metals used in the engine. Turbo-K has now solved these problems through the use of the latest technology for the on-line cleaning and off-line cleaning of gas turbine compressors.

Turbo-K formulation relies on "synergism property", where two, three or more detergents work together in synergy to produce a cleaning power many times greater than what would have been expected of them individually. This formulation allies two powerful characteristics. Firstly, its formidable soil removing properties deep clean every surface while secondly, its particle suspension abilities that ensure what is removed stay removed. This alliance means Turbo-K is totally immune against the known "cloud point" phenomenon of conventional surfactant cleaners. Thus, unlike other gas turbine compressor cleaners that tend to re-deposit the bulk of the dirt back onto the latter stages of the compressor upon reaching the "cloud point" temperature **Turbo-K continues to clean right down through the compressor without re-depositing foul particles collected during the on-line cleaning process.**

### PERFORMANCE LOSSES WITH AND WITHOUT ON-LINE CLEANING



**Turbo-K contains only fully biodegradable components & contains no substances that could degrade or cause damage to the environment.**

### Why should you perform on-line and off-line cleaning?

When gas turbines are run, they become foul with airborne contaminants such as oil, soot, unburned fuel, soils and salt which encrust compressor components. Power loss follows as the compressor loses efficiency and degrades the performance of the engine, leading to higher operating temperatures, increased fuel consumption and shorter component life.

Investigation and trials by the US Military between 1993 and 1996 proved that on-line washing with correctly formulated water-based detergent could substantially fully restore power to 100% of the original. The US Military also concluded that on-line washing was intrinsically more cost effective; while at the same time it totally eliminated the effluent disposal problems. Downtime for engine cooling was abolished and the period between necessary gas turbine shut-downs for off-line washing (crank-wash) would be extended, thus **reducing costly downtime and production losses.**

# TURBO-K

Turbo-K International Limited  
Holly Lane Ind Est, Atherstone  
Warwickshire CV9 2QZ UK  
Telephone: +44 1827 722911  
Fax: +441827 722919  
Email: [info@turbo-k.com](mailto:info@turbo-k.com)  
[www.turbo-k.com](http://www.turbo-k.com)

Global Distribution:  
Roselli Chemicals Inc.  
Email: [info@rosellichemicals.com](mailto:info@rosellichemicals.com)  
[www.rosellichemicals.com](http://www.rosellichemicals.com)