"Turbo-K" Gas Turbine Compressor Cleaner: Effective Gas Turbine Compressor Washing Based on Latest Surfactant Chemistry Research

Development History:

Turbo-K compressor cleaner was formulated early 1998 after it was found that the majority of the established products on the market at the time did not meet the new and tougher US Military (NavAir, Trenton/New Jersey) MIL-PRF-85704C practical engine cleaning requirements for on-line washing (type III) a year earlier. The Military's comprehensive investigation checked actual power recovery after the first, second and third fired wash in a statistical relevant and common condition test bed trial (equal starting conditions for each cleaner).

The investigation demonstrated that for a product to be successful in on-line washing it must not only have the ability to effectively remove blade fouling dirt but also the ability to hold on to it during the traverse of the compressor stages so that the dirt reaches the combustion chamber where it is burned up. Many of the established products tested did not hold on to the dirt and re-deposited it onto the latter stages of the compressor thus preventing full power recovery.

Commonly compressor cleaners are blended based on single system non-ionic surfactant formulas. **These have the drawback that they suffer from a phenomenon called "cloud point"** - **the temperature where the detergent drops the dissolved dirt out of suspension**. Fouling picked up from the first few compressor stages is then re-deposited on the downstream stages which prevents full power recovery.

The higher the cloud point temperature of a detergent, the better the product's dirt suspending ability during the traverse of the compressor. In the ideal situation a cleaner has an infinitely high cloud point or better none at all to give it total immunity against re-depositing of fouling. **This is the case with Turbo-K: formulated especially with on- line washing in mind and having no cloud point, the product can maximise the power recovery in fired washing**.

With full on-line washing recovery proven the U.S. Military realised that the time-consuming off-line washing with its attendant regulatory problems and costs of effluent disposal into the surface water drains was avoidable. They have implemented on-line washing only across most of their engine maintenance procedures.

Universally suitable: Turbo-K for both on-line and off-line washing

For exceptional performance both in off-line and on-line washing, Turbo-K is equipped with a "triple active" surfactant system. Three different cleaning ingredients based on latest surfactant chemistry research not only complement but in fact amplify each other so that the product is able to tackle the most difficult dirt found on compressor blades and hold it in suspension throughout the compressor during on-line washing thus enabling full power recovery.

Water based Turbo-K is free of hydrocarbon solvents and formulated according to the newest environmental regulations and standards. Since its market introduction in 1998 Turbo-K is now approved worldwide and in use on engines from less than 1MW up to heavy duty gas turbine power stations of over 250MW.

TURBO-K

Turbo-K Compressor Super Cleaner - product information in brief:

Product: Water-based, triple surfactant system detergent cleaner for off-line and on-line washing of gas turbine engine compressors.

Application: Dilute 1 part Turbo-K with four parts water of quality according to the GT OEM specification. Can be used in ambient temperature solution or with heated water as and if desired or specified.

Packing volume: Turbo- K concentrate 1:4 is packaged in 20 litre PE-canisters, 200 litre PE-drums or 1000 litre IBCs (intermediate bulk containers).

Approvals: Meets relevant GT OEM specifications worldwide such as the following:

ALSTOM Power (ABB), Switzerland, ALSTOM Power (ABB STAL), Sweden, ALSTOM Power (Ruston), England, Allied Signal (Honeywell), Dresser Rand, GEAE (GE Aircraft Engines), GEIAD (LM engines), GEPS (Frame engines), MAN/GHH BORSIG, Kawasaki, Mitsubishi, Pratt & Whitney, Pratt & Whitney Canada, Rolls-Royce/UK, Rolls-Royce Indianapolis (Allison), Siemens, Siemens-Westinghouse, Solar Turbines, Turbomeca, US Mil-PRF-85704C.

Antifreeze: For engine safety (icing precautionary measure), add antifreeze agent according to GT OEM recommendations if used in low ambient temperatures. Compatibility e.g. with IPA, Methanol, Ethylene Glycol, Methyl Ethyl Ketone, Acetone. Please refer to Technical Bulletin No. 3 for mixing ratios.

Place of Production: Turbo-K is manufactured by Turbo-K International Limited in the UK and brought to the market by a worldwide network of distributors. Write to info@turbo-k.biz or info@rosellichemicals.com or call +1-289-3661662 for the nearest distribution point.

Product Data:

Ingredients: Proprietary mixture of surfactants and demineralised water.

Properties: Dark, straw coloured liquid, completely soluble in water. Non flammable, non toxic, biodegradable. Sp. Gravity 1.10 ± 0.1. PH value 7.5 ± 0.5. Flash point >100°C.

Hazards: Prolonged contact could dry out skin. Wear gloves when handling. Avoid contact with eyes (minor irritation possible upon contact). Ingestion could cause discomfort. R26/38, S24/25.

Storage: No special precautionary measures necessary. Store above 5°C.

Transport: Not dangerous under UN, IMO, ADR/RID and IATA/ICAO. SIN: not assigned.

Disposal: Breaks down under biological sewage treatment. Practically non toxic to organisms in sewage plants.