

GAS TURBINE COMPRESSOR CLEANING SYSTEMS & CHEMICALS FOR ALL TYPES OF GAS TURBINES



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An average 46,500kW gas turbine with normal fouling & showing a 3% power decrease & 1% heat rate increase can suffer a loss of performance costing more than \$500,000 every year.

Understanding our customers' need to keep their engines operational at the highest possible output and lowest possible cost Rochem Technical Services offers a range of On-crank (crankwash) and On-line (Fired Wash) engine cleaning systems and chemicals.

ROCHEM PRODUCTS HAVE THE FOLLOWING BENEFITS:

- Proven track record, over 30 years in business
- In excess of 8000 systems installed world-wide on every type of gas turbine
- Full range of specialist chemical products to meet all types of compressor fouling
- Supplier to OEM's for new equipment & end users for retrofit application
- Strategic stock of FYREWASH chemical products held world-wide & distributed via our world-wide business network
- Full product support by our own industry expert team
- Equipment & FYREWASH chemicals are designed & manufactured inhouse by Rochem
- FYREWASH Chemicals have extensive OEM approvals
- Manufacturing to ISO9001:2000 and ISO14001

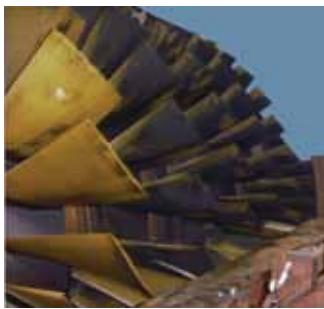
HOW DO COMPRESSORS FOUL?

In spite of the highly sophisticated air cleaning systems available today, ingestion of air borne particles into the gas turbine compressor is inevitable. As a result, fouling of air-path surfaces in the turbine compressor occurs, leading to performance loss and increased fuel consumption.

Worldwide field experience has clearly demonstrated that axial flow compressor deterioration during operation accounts for the major portion of gas turbine related performance loss from the new and clean condition. Of the total gas turbine performance loss approximately 70% can usually be attributed to compressor deterioration due to blade fouling. Fouling of axial flow compressor blades is generally attributed to airborne particulate in the sub-micron to 10 micron size range and this will be the major source of fouling.

Another possible source of compressor fouling is oil leakage from the compressor rotor inlet bearing.

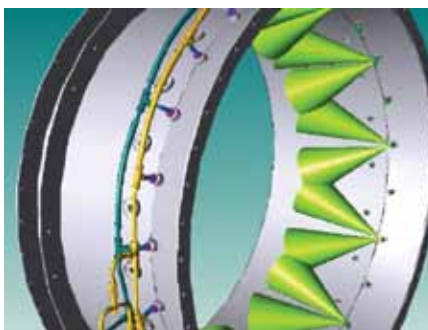
WHY DOES THIS FOULING AFFECT MY ENGINES' PERFORMANCE?



Axial flow compressor blading comprises smooth airfoil shapes similar to an airplane wing and consequently blade performance may deteriorate due to increases in surface roughness or due to shape changes brought about by blade deposits. Blade deposits or fouling, of the type shown reduces both compressor airflow and efficiency that combine to reduce gas turbine output and overall thermal efficiency. In addition the compressor discharge pressure drops due to the reduced air mass flow rate through the turbine nozzle. Fouling will therefore be recognised by a drop in turbine output for a given exhaust gas temperature, accompanied by a lower compressor discharge pressure. These effects will be accompanied by an increase in heat rate, resulting in increased fuel consumption.

HOW DO YOU CLEAN YOUR COMPRESSOR?

Hand clean – time consuming & labour intensive high loss of revenue due to shutdown



Abrasive cleaning – crushed walnut shells, or similar, are ingested into the air inlet whilst the engine is running. Contaminants are removed by 'shot blasting', performance is often short-lived & potential damage to surface coatings and cooling path blockages may result leading to permanent performance loss.



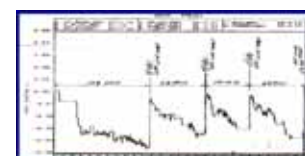
Wet Cleaning - the most effective & least damaging is to perform a strict washing regime combining on-line and off-line washing using FYREWASH® chemicals & treated water.

On-line cleaning is performed with the engine running on load, a wash solution is injected into the air inlet using specially designed nozzles to ensure comprehensive wetting of the compressor blades & effective cleaning through the compressor stages.



ENGINE PERFORMANCE GRAPH – BETWEEN ONLINE WASHES

Off-line cleaning is performed with the engine shutdown & cranking, a wash solution is injected into the air inlet using specially designed nozzles to ensure comprehensive wetting of the compressor blades & effective cleaning through the compressor stages. A post rinse, using treated water, cycle ensures that all of the removed fouling is removed from within the compressor prior to start-up.



ENGINE PERFORMANCE GRAPH – REGULAR ONLINE WASHING

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ROCHEM
TECHNICAL SERVICES
Established in 1978

What equipment do I need?

Rochem design & manufacture specialist nozzles producing optimum droplet size distribution and wetting of the compressor inlet to provide effective cleaning of the compressor blades while eliminating potential blade surface erosion. Injection flow rates are optimised as to not degrade the machine by over wetting. Computational Fluid Dynamics and 3D modelling techniques are used together with field testing to continually develop & improve our system efficiency.

Rochem wash delivery systems are designed for ease of use, minimum maintenance providing control of fluid delivery to the on-line and off-line nozzles.



FYREWASH Chemicals a range of specialist compressor cleaning chemicals with outstanding performance designed for all types of fouling & meeting current OEM & environmental standards world-wide.

All of the Rochem FYREWASH chemical range is suitable for both on-line & off-line washing. They are mixed with treated water in a ratio of 4:1



FYREWASH® F1

A high purity solvent & surfactant formulation for heavy duty on and off-line compressor cleaning

FYREWASH® F2

Highly biodegradable natural solvent for on-line and off-line compressor cleaning

FYREWASH® F3

Highly biodegradable water-based detergent for on-line and off-line cleaning of compressors

FYREWASH® F3RR

Developed specially to meet the needs of and clean Rolls Royce gas turbine compressors.

FYREWASH® SB

The original heavy duty on-line and off-line cleaner for gas turbine compressors

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