TECHNICAL DATA SHEET

GAS TURBINE POWER AUGMENTATION

Delivering efficient compressor technology for more than 30 years

INDUSTIAL GAS TURBINES

Operators of gas turbine engines know too well the problems of meeting their power requirements on hot days when the demand is highest and engine performance is lowest. They know too well the costs of installing new capacity or upgrading older engines.

The most cost effective solution for the problem may be augmentation of mass flow and/or evaporative cooling. A noted research group has reported results for a General Electric MS7000E which show a 3-4° F. drop in compressor discharge temperature and a commensurate power increase of nearly 20% - 12MW.
Very small water droplets from hundreds of spray nozzles were injected into the inlet ducting. Larger droplets were extracted to prevent blade erosion. The study group estimated the cost at $90 - $100 per augmented kilowatt - or more than $1 million dollars!

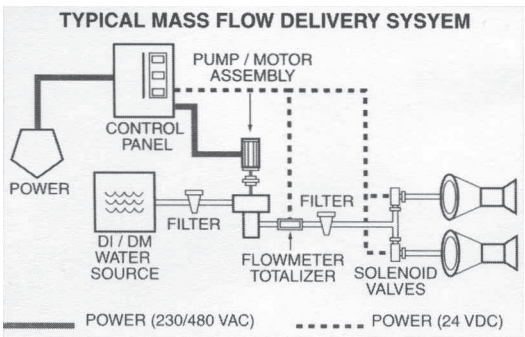
TOO GOOD TO BE TRUE - WHAT'S THE DOWN-SIDE?

- Availability of DI/DM water - Water of sufficient purity is costly.Considerable water is conserved since Mendit's system eliminates droplet extraction.
- Fouling is accelerated by the ingestion of moisture borne particulates into the compressor. **ECT's** Compressor cleaning technology can be added cost effectively into a single skid.

STAINLESS STEEL PRESSURIZED TANKS

The stainless steel are equipped with a regulator, filter, & adjustable relief valve. Standard tanks are available in 300 gallon capacities; additional sizes can be suppliedcomplete list.

ECT is the manufacturer of R-MC Compressor Cleaner, an environmentally safe concept in cleaning gas turbines. **ECT** also offers a comprehensive line of injection hardware.



THE ECT DESIGN:

- No need for large droplet extraction. Maximum cooling for a minimum of H_2O.
- Flow may be user adjusted with **ECT's** unique variable frequency drive to meet changing temperature and humidity conditions.
- Nozzle design assures consistent droplet size.
- Every **ECT** system includes on-line cleaning equipment as an option to deal with the fouling problem.
- Low installation and maintenance burden make **ECT's** system the most cost effective in the industry.

OUR SYSTEM WORK WITH OTHER POWER AUGMENTATION SYSTEMS!

- Refrigeration - a Frame 6 operator gained 2mW by adding **ECT** mass flow technology to a chiller system.
- Evaporative cooling & fogging - **ECT's** system is not affected by relative humidity, making it an ideal addition to evaporative cooling.
- Fogging - see above.

EASY INSTALLATION

- Unlike fogging, our system typically requires 24 nozzles or less!
- Our system can be driven by existing pumps (we only require 1000 psi).
- Consistent droplet size - **ECT's** heavy duty nozzles run for hundreds, sometimes thousands of hours without wear.
- Nozzle plugging practically non-existent - and in rare cases when plugging does occur, our nozzles can be removed, cleaned and replaced in minutes with hand tools.

ECT
Engine Cleaning Technology
401 East Fourth Street
Bridgeport, PA 19405
Tel: 610-239-5120
Fax: 610-239-7863
info@ectinc.net
www.ectinc.net

POWERBACK CRANK WASH

Delivering efficient compressor technology for more than 30 years

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THE PROBLEM:

Crank washing is vital to efficient gas turbine operation. Contaminantation and fowling can disturb airflow, degrade compressor efficiency, increase fuel use and subject hot section components to excessive thermal effects. Compressor crank washing on a regular schedule can optimize engine efficiency and even extend the time between needed inspections and repairs.

THE SOLUTION:

PowerBack is the most aggressive solvent-free detergent available. Packaged to deliver 6% solids when mixed it contains **twice** the active materials versus all other specialty crank washes. PowerBack's proprietary anti foaming chemistry improves rinsing and reduces the time required to crank wash.

PowerBack requires no special handling or reporting if spilled. Cationic cleaning action aggressively attacks both organic contaminants such as oil and grease as well as inorganic fouling such as salts and soils. PowerBack can be used in accordance with the crank washing instructions for virtually all makes and models of industrial gas turbines.

Unlike most solvent products, **PowerBack** requires no secondary storage and is available in both a pre-mixed and a concentrate form, which is mixed at a ratio of six parts demineralized or deionized water to one part PowerBack. A single 30 USG drum of concentrate yields 210 gallons of cleaner. The pre-mixed product is ready for use as received. Products are available in 5 USG pails, 30 USG drums, 55 USG drums, and 300 USG Portafeed containers.

ECT is the manufacturer of R-MC Compressor Cleaner, an environmentally safe concept in cleaning gas turbines. **ECT** also offers a comprehensive line of injection hardware.

THE BENEFITS:

- **Low Foaming**

- **Requires NO Agitation**
  Mix 6 parts demineralized water with 1 part R-MC

- **Non-Toxic**
  Contains no alkalis, phosphate acids or 2-butoxyethanol

- **Biodegradable**
  Mixture of cationic surface active agents and deionized water

- **Non-Flammable**
  Contains no petroleum by-products

- **User Friendly**
  ECT's products do not require special D.O.T. restrictions

- **Meets Specifications**
  For virtually all OEM specifications for flight and ground turbines

PowerBack was formulated to be effective, economical and most importantly, environmentally safe.

In test after test, **PowerBack** outperforms other crank washes in restoration of lost power.

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R-MC COMPRESSOR CLEANER

Delivering efficient compressor technology since 1985

TECHNICAL DATA SHEET

THE PROBLEM:

The outcome is predictable when fouling accumulate in the compressor of a gas turbine engine.

- Power is sharply reduced.
- Running temperatures are elevated.
- Fuel consumption is increased with stalls and vibration occurring during acceleration.

THE SOLUTION:

The remedy is R-MC. **ECT**'s patented gas path cleaner inhibits and reverses contaminant buildup. It can be injected without shutting down the engine and regular use removes layered deposits and discharges them as a fine white ash along with the exhaust gases.
R-MC is a unique combination of cationic, surface active agents in a water based carrier which has no harmful effect on fuels, lubricants or engine components.

THE OUTCOME:

As part of a normal maintenance program, R-MC can reduce fuel consumption, lower operating temperatures, restore the engine to optimum efficiency, and increase engine life.

ECT, the manufacturer of R-MC, has been in the gas turbine industry since the 1970's.

ECT designs and manufactures compressor cleaning injection pump skids for a variety of industrial and aeroderivative engines.

ECT also provides field installation services, customized systems, and a drum recovery program.

ECT has designed on-line and off-line cleaning nozzles for a wide range of engines. Contact your Technical Representative for a complete list.

ECT is the manufacturer of R-MC Compressor Cleaner, an environmentally safe concept in cleaning gas turbines. ECT also offers a comprehensive line of injection hardware.

THE BENEFITS:

- **Safe for On-line Use**
  Contains no solvents
- **Non-Toxic**
  Contains no alkalis, phosphate acids or 2-butoxyethonol
- **Biodegradable**
  Mixture of cationic surface active agents and deionized water
- **Non-Flammable**
  Contains no petroleum by-products
- **User Friendly ECT's** Products do not require special D.O.T. restrictions
- **Meets Specifications**

For virtually all OEM specifications for flight and ground turbines

R-MC was formulated to be effective, economical and most importantly, environmentally safe.

When used as part of a comprehensive program of ingestive on-line cleaning, R-MC will keep your axial flow compressor rotating at peak efficiency.

ECT
Engine Cleaning Technology
338 Circle Of Progress Dr.
Pottstown, PA 19464
Tel: 610-239-5120
Fax: 610-239-7863
info@ectinc.net
www.ectinc.net