

SAFER | HEALTHIER | MORE PRODUCTIVE

INNOVATIVE FILTRATION SOLUTIONS FOR GAS TURBINE





How Sensor Technology and Air Filtration Reduce Corrosive Events

Most of the operations in North Sea offshore conditions result in corrosion issues. Corrosion causes mechanical damages that are well known in the industry as well as effects on human health especially within areas of high salt in the air such as salt/chlorine plants in Central America.

Clean air is essential to a safe, healthy, and productive environment. Employee safety, product yield, mechanical performance, and energy consumption are all factors impacted by air filtration. Airborne contaminants such as corrosion can cause a wide range of problems for employees, the equipment they operate, and the facilities that house them.

Composition of seawater

Element	% of total	gms /kg
Chlorine	55.29	19.353
Sodium	30.74	10.76
Magnesium	3.69	1.292
Sulfate	7.75	2.712
Calcium	1.18	0.412
Potassium	1.14	0.399

Source: Chemical composition of seawater; Salinity and the major constituents - soest.hawaii.edu

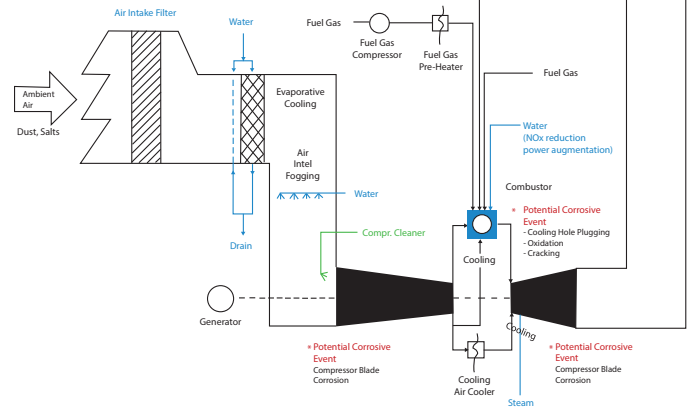
Operators cannot change the environment in which they operate. They need an efficient and effective way to measure the level of corrosion containment in the air into intake systems allowing for corrective actions to include new suitable filters to their environment.

Knowing within a minute of events that put into the system corrosive agents are very important data. This information can lead maintenance schedules and work around to be during down times of the turbines.



Without the use of high efficiency inlet filtration, corrosive airborne particulates will enter turbine and increase the risk of early faulting and catastrophic events.

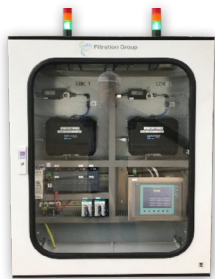
*Areas of Potential Corrosive Hazard



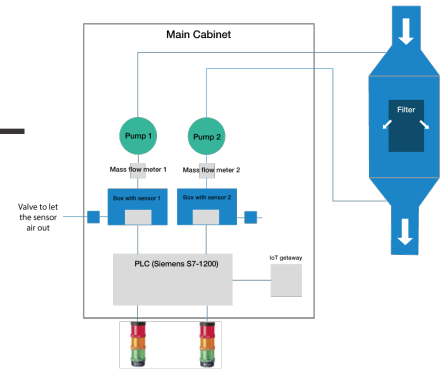
Innovative Patented Process that Measures Corrosion in Real Time

Corrosion Monitor Unit Sensor (CMU)

North America Gas Turbine (NAGT) Filtration Group, has developed a patented sensor with an early warning corrosion indication that allows operators to monitor the levels of corrosion into gas turbine inlet systems. The CMU 4000 Sensor (CMU) is designed to take real-time air stream data from before filter (Dirty Side) to post filter (Clean Side) and measure level of corrosion-related contaminants using ISA standards showing safe, cautionary, and extreme level indications. The CMU will also measure temperature, humidity, and dp. Options include particle counters and system cooling and heating for extreme areas and challenged sites worldwide.



The CMU system is built within a solid all weather watertight unit designed for all-weather conditions. How it works. The CMU is built to detect corrosive environments by an air sampling probe out of the required area regardless of airspeeds. The sample air is sent through the corrosion sensor system. Both dirty side air and clean side air samples are taken at the same time and measured by two separate sensor units. The advantage of the CMU is that it can detect corrosive events much faster and in real-time than the usual techniques of corrosion detection such as coupons. The Sensor can theoretically detect a corrosive event within minutes and give operators live indicators of events and also if the temperature, humidity, and pressure have changed in this time. The system was designed to collect all data but designed to allow for operators to understand events at each indication to take countermeasure if necessary to prevent. The Corrosiveness will be shown in Angstroms according to the ANSI /ISA Norm and he converts this change over time into the 30 day ISA classes.



Finding the Right Inlet Filtration Solutions for High Return on Investment

In the case of gas turbines, unscheduled maintenance and plant shutdowns have extremely expensive consequences costing a plant owner millions of dollars per day. Similarly, for gas turbine manufacturers, the inability to guarantee part service life due to uncontrolled environmental factors increases financial liabilities associated with equipment warranties.

Corrosive events throughout gas turbine processing can vastly reduce the lifespan of critical parts like turbine blades, bearings, and fuel-related metal case or delivery systems. Critical parts like these can be protected by inlet design that considers high-efficiency filters to reduce the amount of small particulate in the air intake like salt aerosols and moisture containing dust. The inlet design should also be partnered with sensor technologies like the CMU sensor to preventatively address airborne corrosives that will contaminate gas turbine processing and lead to catastrophic events.

KEY TAKEAWAYS

- A TCO (Total Cost of Ownership) analysis will yield data to help you estimate accurate maintenance costs over the service contract periods.
- CMU Sensor will continually report on airborne corrosives allowing the operator to adapt inlet filtration solutions for continuous high peak performance.
- CMU Sensor assists with planned maintenance schedules and during inspections to correctly identify the number of contaminants the system has ingested for countermeasures and inhibits catastrophic events.
- Identify key Inlet air filtration components that will protect gas turbine and part total cost of ownership.



Testimonial - Cydsa Co-Generation Power Plant

Cydsa is a 75 year-old Chemical and Energy Mexican company that runs five business units: Salt for edible and industrial purposes, Chlorine and caustic soda, Refrigerant gases, Cogeneration of Electricity and Steam, and Underground Storage of Hydrocarbons.

"We have reached out to Filtration Group NAGT early 2017 when we were facing significant downtime for repairs for our two main power plants. Filtration Group immediately got involved and provided a phased solution approach. First, the immediate/temporary solution was to get us operational, second intermediate monitoring systems, and third a permanent/final solution that incorporated all phases. The first and temporary phase was to use Filtration Group (FG) PuraGrid carbon filters grid eliminating about 90% plus of contaminants which enable us to get back to a power system uptime of 92-94%. Along with that, we add a moisture barrier prefilter using FG Drop Safe® technology. The result, no more failures and brought us valuable time to implement the entire solution. The second phase was to include the innovative Corrosion Monitoring Unit (CMU), allowing us to monitor in real-time events we could not see or determine levels of contaminants. Today we have all these systems that are now fully part of our permanent solution.

The CMU today allows our operators to take proactive countermeasures and avoid future damages. Our permanent solution: A new filtration and monitoring systems by Filtration Group NAGT is, I believe, to be "best in its class" today".

Preventive Inlet Filtration Solutions for Gas Turbine Plants

Our experiences of providing solutions have started in the most demanding corrosion areas around the world. Most of the operations in North Sea offshore conditions result in corrosion issues. Finding solutions within a highly contaminated environment with industrial plants such as chlorine and salt production is all part of our day's works. Corrosion can cause mechanical damages that are well known in the industry, but solutions to corrosion are part of a key story with our CMU Sensor and OnGuard technology.

Clean air is essential to a safe, healthy, and productive environment. Mechanical performance and energy consumption are all factors impacted by air filtration.

Pre Filters



P-Series



Series 400



GeoPleat

Rigid- Drop Safe®, Pocket Filters



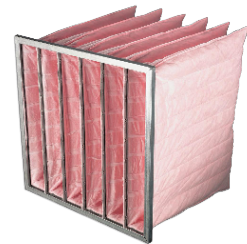
Drop Safe®



Rigid Pocket Series

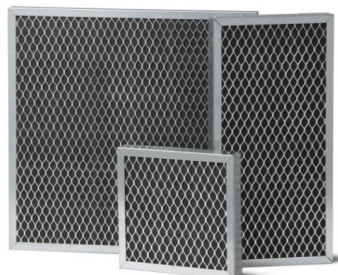


Rhino Series



SoniQ® Series

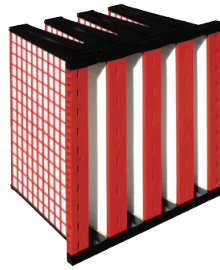
Carbon – PuraGrid Panel by Purafil



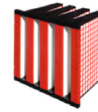
Panel- V-Bank



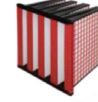
FP and FPS Series



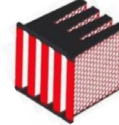
FV and FVX Series



FV and FVC series
M6-H13
292mm
20-25m²



FVX and FVXC series
M6-H13
440mm deep
32-36m²



FVXX series
M6-H13
600mm deep
45-50m²

Conical Cylindrical Type



Hydro-Wraps – with “Drop Safe®” Technology

What the Experts Say

Preventative maintenance is the key to an optimized system. You must schedule routine filter change-outs and be prepared with a stocked inventory to prevent costly production downtimes and keep energy consumption low.



CONTACT US FOR A FREE ON-SITE SURVEY
BY ONE OF OUR FILTER AND INLET AIR EXPERTS.



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