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METRIC
MILLIMETERS
CENTIMETERS

0 1 2 3 4 5 6 7 8 9 10 11 12

PURAFIL®

FIRST
IN CLEAN
AIR

ENGINEERED 4

INDUSTRIAL
FACILITIES



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1
Cc
CORROSION
CONTROL

2
Pr
PROCESS
RELIABILITY

CLEAN AIR SOLUTIONS **4** INDUSTRIAL APPLICATIONS

PREVENTING CORROSION + IMPROVING PROCESS RELIABILITY

For more than 40 years, Purafil has provided clean air solutions to industrial facilities worldwide. Purafil specializes in the design and manufacture of corrosion control media and scrubbers to improve process reliability. Our scrubbers provide clean air to control rooms, motor control centers, rack rooms, and other areas housing electronics and electrical equipment. Purafil also manufactures scrubbers to protect electronic cabinets, DC monitors, and air compressors from damage caused by corrosive air.

IMPROVING PROCESS RELIABILITY:

Purafil dry-chemical media and scrubbers protect computer systems, air compressors, switch gear and other critical equipment against premature failures due to corrosion. With the cost of a single circuit board totaling \$3,500 to \$35,000, a dry-chemical scrubber from Purafil saves time and money.

A Purafil system offers many other benefits including:

- Ensuring the smooth operation of production processes
- Preventing lost revenues due to repairs and downtime
- Extending the service life of sensitive electronics and instrumentation
- Reducing corrosion levels to those specified by the Instrumentation, Systems and Automation Society Standard 71.04-1985, the universally accepted guideline for warranties of electronic and electrical equipment.

ENGINEERED SOLUTIONS:

Purafil believes in the value of air quality assessment and continuous real-time monitoring, so customers can verify the performance of their air scrubbers and the level of corrosion in the protected space. These tools enable customers to prevent corrosion damage and are key to a successful air quality control program.

Purafil maintains 20,000 installations worldwide in industrial facilities including:

- Oil refineries
- Pulp and paper mills
- Fertilizer plants
- Steel mills
- Textile manufacturers
- Gas processing facilities
- Petrochemical plants
- Smelting plants
- Mining
- Pharmaceutical plants

Our solutions for industrial corrosion control include:

AIR QUALITY ASSESSMENT: We assess your environment to determine the types and levels of corrosive gases in your control room, motor control center, rack room, or other areas housing sensitive electronics.

AIR MONITORING: Continuous real-time corrosion monitoring to verify the performance of your air filtration system and to prevent isolated corrosion events using Purafil's patented OnGuard systems.

AIR SCRUBBING: We offer engineered media and built-to-order systems for protection of electronics, air compressors and personnel.

TECHNICAL SERVICES: We offer a broad range of services from circuit board failure analysis to media life analysis and on-site consultations to ensure clean air.



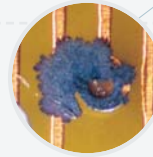
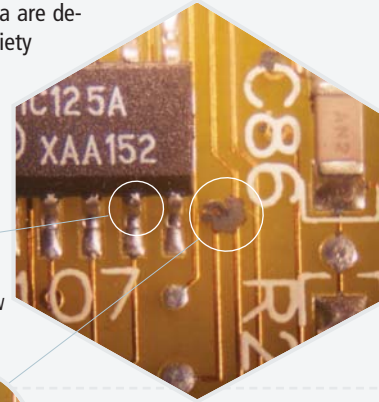
AIR QUALITY ASSESSMENT:

A controlled space, such as a control room or motor control center is designed in accordance with strict environmental criteria to protect sensitive electronics from damage caused by corrosive gases. These criteria are developed by the Instrumentation, Systems and Automation Society of America (ISA), a professional society that develops environmental standards for environments in which process control equipment is located.

ISA Standard 71.04-1985 titled "Environmental Equipment Conditions for Process Management and Control Systems, Airborne Contaminants," has become the accepted guide for warranties of electronic/electrical equipment. Purafil systems are designed to reduce contamination levels to those required by ISA. According to ISA, reactivity monitoring using coupons (pictured below) provides a quantitative measure of the potential of a particular atmospheric environment to corrode electronic/electrical components.







MAGNIFIED VIEW OF A CORRODED TRANSISTOR



MAGNIFIED VIEW OF A CORRODED CIRCUIT BOARD

Purafil's Air Quality Assessment Service provides specially prepared coupons in critical operating environments. The rate of corrosion buildup, measured in Angstroms, on the coupon is indicative of the environment's Air Quality Classification — G1, G2, G3, or GX — as defined by ISA (detailed in table below). Purafil performs this service as a diagnostic tool to determine the types and levels of contaminants in various areas of your facility.

ISA STANDARD S71.04-1985

CLASS	REACTIVITY RATE	AIR QUALITY CLASSIFICATION	PURAFIL COUPONS
G1	<300 Å/30 DAYS	MILD- Corrosion is not a factor	
G2	<1000 Å/30 DAYS	MODERATE- Corrosion is measurable	
G3	<2000 Å/30 DAYS	HARSH- High probability that corrosion attacks will occur	
GX	≥2000 Å/30 DAYS	SEVERE- electronic/electrical equipment is not expected to survive	

AIR MONITORING:

Purafil's OnGuard® series of real-time reactivity monitors provide a continuous measure of environmental corrosion levels, correlate to ISA's air quality classification scheme. Place an OnGuard monitor at the outlet of your air scrubber to verify the monitor in the room to identify corrosion-related events. Most importantly, OnGuard monitors provide continuous identify trends and take preventive action.



ONGUARD CONTINUOUS CORROSION TRANSMITTER (CCT):

- Measures in real-time the amount of corrosion forming on copper and silver surfaces, and transmits this information to the distributed control system via a 4-20 mA output signal.



ONGUARD 3000 (OG3) ATMOSPHERIC CORROSION MONITOR:

- Real-time reactivity data can either be logged by an internal data logger or transmitted directly to the distributed control system via a 4-20 mA output signal.
- Records or transmits temperature and relative humidity readings.

AIR SCRUBBING:

By using Purafil air scrubbing media and systems, you can greatly improve the reliability of production processes. You can also prevent expenditures for new systems and lost revenue due to repairs and other downtime-related expenses. We provide engineered solutions and comprehensive services to meet any corrosion challenge.



PURAFIL offers the following **MEDIA** for specific gas challenges:

1 PURACARB® - Manufactured specifically for corrosive environments and removal of acid gases, including hydrogen sulfide and sulfur dioxide, in industrial settings.

2 PURAFIL® SP - Demonstrates a higher working capacity for broad-spectrum oxidation of contaminants in actual field conditions, where multiple gas challenges are present.

3 PURAKOL® - Used in combination with other Purafil media to ensure broad-spectrum removal of pollutants.





PURAFIL® SIDE ACCESS SYSTEM (PSA)

Modular system design features insulated double-wall casing and filters moderate levels of acid gases in less polluted areas of the plant. Can also be used as a filter in a recirculation circuit.



COMPRESSOR INTAKE FILTER (CIF)

Removes contaminant gases from polluted airstreams entering the compressor while preventing corrosion damage to intercoolers, diffusers and casings. Clean air is provided to instrumentation.



POSITIVE PRESSURIZATION UNIT (PPU)

Works in tandem with standard air handling equipment to eliminate corrosive, acid gases and provides continuous positive pressure within the space as it recirculates the air.



CORROSIVE AIR UNIT (CA)

Self-contained air purification system that cleans and recirculates air inside the protected space.

DEEP BED SCRUBBER (DBS)

Located outside the protected space to pressurize and provide ISA Class G1 air with up to 4 independent bulk-fill media beds for complex gas challenges to ensure a long residence time for system high-efficiency.



TUB SCRUBBER SYSTEM (TSS)

Located outside protected space to pressurize and provide ISA Class G1 air. It has a single, 3-foot deep media bed, which is designed to mitigate high concentrations of a targeted gas.



ELECTRONIC CABINET UNIT (ECU)

Side-mounted system that protects electronics contained in a sealed cabinet from acid gases as it cleans and recirculates air within the cabinet and pressurizes the space.

$$x_1 = x (t_1/t)^A$$

TECHNICAL SERVICES 4 INDUSTRIAL APPLICATIONS

PURAFIL'S TECHNICAL SERVICES enable customers to prevent corrosion damage and are key to a successful air quality control program. Purafil provides the following complimentary services and technical expertise, so we can quickly and effectively solve difficult problems, identify factors contributing to corrosion damage, and help to prevent corrosion occurrences.



CIRCUIT BOARD FAILURE ANALYSIS:

Using specialized laboratory equipment, Purafil will analyze your failed circuit boards to determine the location of corrosive attack and the exact cause of failure.

SYSTEM START-UP:

Purafil representatives are on-site at the time of system start-up to ensure the equipment is working properly. System performance is verified to guarantee that corrosion-free air is being delivered.



MEDIA LIFE ANALYSIS:

As a complimentary service, Purafil's laboratory analyzes samples of Purafil media from your air scrubber to determine the remaining life. A date for replacement can then be scheduled to ensure the protected space is not exposed to gas breakthrough or media is replaced prematurely.

ON-GOING SERVICE:

Purafil's comprehensive service program is performed by our local representatives. Services include environmental monitoring, room and equipment inspection, and media sampling and replacement notification.



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