

MARKET SEGMENT BROCHURE: OIL & GAS

MAINTAINING FULL REFINERY CAPACITY BY IMPROVING RELIABILITY AND SAFETY

ELIMINATING CORROSION TO PREVENT ELECTRONIC
EQUIPMENT FAILURE AND MITIGATING THE RISK OF TOXIC
GAS RELEASES



purafil
Filtration Group®

MAJOR PROBLEMS FACED IN REFINERIES



ARE YOU CONCERNED WITH PRODUCTION DOWNTIME?

Corrosive gases such as hydrogen sulfide (H_2S), sulfur dioxide (SO_2), sulfur trioxide (SO_3), and nitrogen oxides (NO_x) released as a byproduct of refining crude oil can wreak havoc on electronic equipment reliability. The corrosion of contacts and components on circuit boards accounts for 30-40% of all equipment failures and is likely caused by harmful corrosive gases inside the electronic equipment rooms. Prevent downtime, reduce maintenance costs, and avoid unsafe equipment failure by protecting your equipment rooms and satellite rooms. The International Society of Automation (ISA) recommends a clean air environment rated G1 to prevent equipment failure. Custom UL certified and explosion proof scrubbers can maintain a clean and pressurized environment to meet NFPA496 code requirements and ensure zero downtime due to corrosion.

Purafil Solutions: Positive Pressurization Units, Corrosive Air Units, Side Access Units, and Deep Bed Scrubbers

ARE YOU CONFIDENT IN YOUR ALKYLATION UNIT SAFETY EQUIPMENT?

Because of the risk associated with operating alkylation units, the American Petroleum Institute (API) has issued the recommended practice API RP 751. Custom scrubbers are designed specifically to comply with this standard to protect control rooms and provide a safe haven so that employees can safely respond to an accidental release of toxic gas such as Hydrogen Fluoride (HF). Purafil is a proven and trusted provider of safety equipment, also offering solutions for controlling toxic levels of ammonia, SO_2 , Cl_2 and H_2S .

Purafil Solution: Deep Bed Scrubbers

SAFELY CALIBRATE SENSORS TO COMPLY WITH EMISSION REGULATIONS

Regulations like EPA 40 CFR 60 Subpart JA require carefully mixing unpleasant and harmful gases like H_2S and NO_x for proper sensor calibration to ensure that emission regulations are being met. Small fiberglass scrubbers are ideal gas cabinet vent filters for ensuring safe operation.

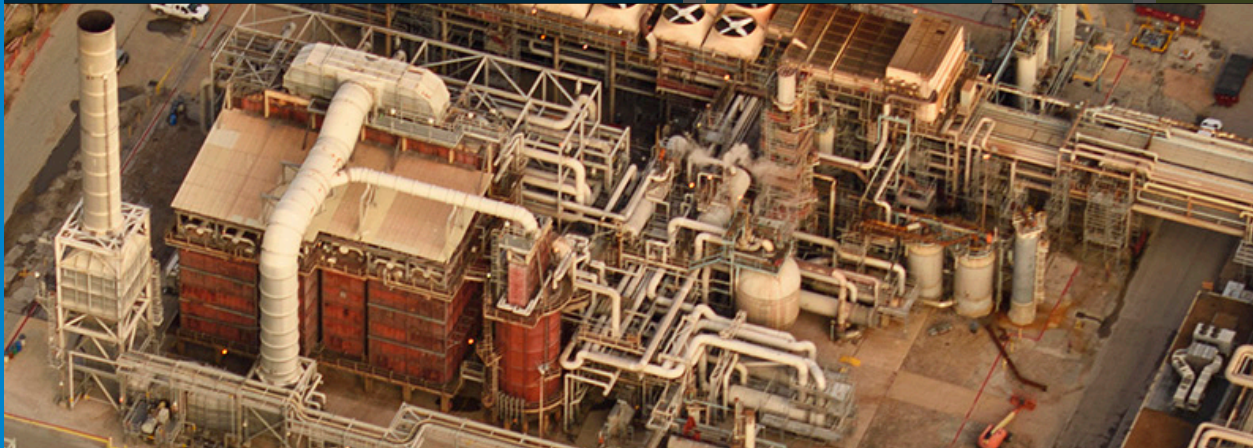
Purafil Solution: Purafil Fiberglass Drum Scrubbers

DETERMINE THE AIR QUALITY IN YOUR CONTROL ROOM BEFORE IT CAUSES EQUIPMENT FAILURE

RoHS, commonly called the "lead-free directive", is intended to reduce the use of hazardous substances in electronic equipment. However, ongoing research has shown that printed circuit boards made using lead-free materials can be more susceptible to corrosion. A passive air monitoring program using Corrosion Classification Coupons (CCCs) offers an inexpensive air quality indicator for potential corrosion related failure.

Purafil Solution: Purafil Corrosion Classification Coupons (CCC)

PURAFIL PROVIDES THE SOLUTION



PROTECTING THE WORLD'S LARGEST REFINERY

The world's largest refinery is a private sector crude oil refinery located in Gujarat, India and produces 1,240,000 barrels per day. Producing primary and intermediate petrochemical materials, plastics, synthetic fibers, and synthetic rubber generates highly corrosive gases such as H_2S , SO_2 , and NO_x . Aware of the potential risks and costs associated with inadequate corrosion control, the refinery made plans to incorporate Purafil's corrosion control technology into the HVAC designs for their 28 control and satellite rooms.

Purafil was selected because of their experience in the industrial marketplace and superior performance of their air purification systems. Purafil Deep Bed Scrubbers (DBS) were installed at the fresh air intake of each control room and satellite room, providing 700- 2,000 CFM of clean pressurization air. OnGuard Corrosion Monitors were also installed to provide real-time air quality data and send alerts before contamination breakthrough could occur.

"Purafil provided the technical knowledge and equipment necessary to protect production processes and meet established standards."

Purafil, Inc. is the leading manufacturer of dry-chemical media, scrubbers, and monitors in the oil and gas industries. Our products and solutions identify and remove harmful and unpleasant particles, gases, odors, bacteria, and viruses from the environment. The results are increased comfort levels, better equipment reliability, and confidence that environmental safety regulations are being met and exceeded.

PURAFIL'S DRY-SCRUBBING MEDIA ADVANTAGE



PURAFIL ENGINEERED MEDIA

By using Purafil air scrubbing media, 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. Our patented media formulations are manufactured using special chemicals that react with corrosive gases and remove them from the air stream. Contaminant gases are chemically transformed into harmless solids that remain trapped inside the media. Known as chemisorption, this process converts damaging contaminants into harmless salts.

Purafil's media perform well at all temperatures and humidity levels, are non-flammable, UL certified, and remove a broad range of contaminants. Our media provides more than double the removal capacity of equivalent competitor products for key target gases. As a complimentary service, our laboratory technicians analyze samples from your system(s) and provide a report indicating the estimated media replacement date based on the specific conditions in your facility. Purafil's media is either bulk-filled within our engineered equipment, or packaged in our MediaPAK™ modules and PuraGRID® filters.

Purafil offers the following granular media for your specific gas challenges:



PURAFIL® SP

Demonstrates a higher working capacity for broad spectrum oxidation of contaminants, where multiple gas challenges are present. UL Certified for flammability.



PURACARB®

Manufactured specifically for the removal of acid gases, including hydrogen sulfide and sulfur dioxide, in industrial settings.



PURAKOL®

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

PuraGRID™ Filter with GridBLOK™ Technology

The GridBLOK is a gas-phase air filtration medium in the form of an extruded carbon composite with a large number of small, parallel cells or channels. The GridBLOK is composed of essentially 100% adsorbent materials allowing the entire composite structure to function as a gas filter. Due to the large number of cells in each GridBLOK, the contact area between the adsorbent media and the airstream that travels inside the cells is very large. These cells are parallel so that the flow is not obstructed and the pressure drop is extremely low. The PuraGRID is available in multiple patented media formulations specific to your needs:



PURAFIL CUSTOM EQUIPMENT



DEEP BED SCRUBBER (DBS)

Located outside the protected space to pressurize and provide ISA Class G1 air with up to four independent bulk-filled media beds for complex gas challenges to ensure a long residence time for system efficiency. Airflows of 500 - 8,000 CFM.



POSITIVE PRESSURIZATION UNIT (PPU)

Modular system design works in tandem with standard air handling equipment to eliminate corrosive gases and provides continuous positive pressure within the space as it recirculates the air. Airflows of 500 - 4,000 CFM.



CORROSIVE AIR UNIT (CA)

Self-contained modular air purification system that cleans and recirculates air inside the protected space. Airflows of 500 - 4,000 CFM.



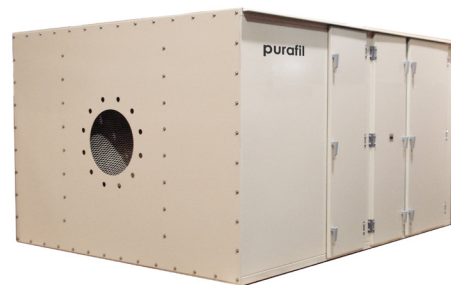
Drum Scrubber (DS)

Targets removal of low-level gas emissions found at industrial sites. It is recommended for smaller air flow applications and is available in three sizes: Airflows of 100 cfm, 300 cfm, and 500 CFM.



PURAFIL® SIDE ACCESS SYSTEM (PSA)

Modular system design features insulated double-walled construction 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. Airflows of 250 - 50,000 CFM.



COMPRESSOR INTAKE FILTER (CIF)

Modular system design removes contaminant gases from polluted airstreams entering the compressor while preventing corrosion damage to intercoolers, diffusers and casings. Airflows of 400-18,000 CFM.

AIR QUALITY ASSESSMENT AND MONITORING

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 were developed by the International Society of Automation (ISA). The ISA Standard 71.04-2013 titled “Environmental Equipment Conditions for Process Management and Control Systems: Airborne Contaminants,” has become the accepted guide for warranties of electronic equipment.

Purafil’s Air Quality Assessment Service provides specially prepared Corrosion Classification Coupons (CCCs) for critical operating environments. The rate of corrosion buildup, measured in angstroms, on the coupon is indicative of the environment’s severity level – G1, G2, G3, or GX. Purafil performs this service as a diagnostic tool to determine the types and levels of contaminants in various areas of your facility.

ISA STANDARD 71.04-2013			
CLASS	COPPER REACTIVITY LEVEL (IN ANGSTROMS)*	SILVER REACTIVITY LEVEL (IN ANGSTROMS)*	AIR QUALITY CLASSIFICATIONS
G1	< 300	< 200	MILD <i>Corrosion is not a factor</i>
G2	< 1,000	< 1,000	MODERATE <i>Corrosion is measurable</i>
G3	< 2,000	< 2,000	HARSH <i>High probability that corrosion attacks will occur</i>
GX	> 2,000	> 2,000	SEVERE <i>Electronic/electrical equipment is not expected to survive</i>

*Normalized to a 30-day exposure. 1 angstrom = one hundred-millionth of a centimeter, or 10^{-10} meter.

AIR QUALITY MONITORING

Purafil’s OnGuard® Smart (OGS) Monitor helps protect your equipment by measuring and transmitting the level of corrosion in your facility, allowing for action to be taken before problems develop. Purafil’s OGS can transmit real-time data to your SCADA system via a 4-20 mA output signal, and is accessible over ethernet. In addition, the Purafil OGS contains internal temperature, humidity, and room pressure sensors. In remote applications, it can be operated as a data logger using battery power. All measurements are directly related to ISA Standard 71.04-2013.

