

# Emerson reduces long-term lifecycle expenses with Model 700 and Model 500 gas chromatographs at large polyethylene plant in Brazil

## RESULTS

- Continuous operation since 2008
- Reduced maintenance by approximately \$30,000 to-date, as compared to average GC service requirements
- Implemented system without shelters, reducing initial cost by approximately \$200,000



## APPLICATION

The application is a continuous-operation polyethylene process that polymerizes ethylene in the presence of a catalyst from an exothermic reaction. The polyethylene process produces polymers and copolymers for use in film, blow molding, injection molding, roto molding, pipe, sheet and thermoforming, and wire and cable coating.

## CUSTOMER

Braskem S.A

## CHALLENGE

It is extremely important that the quality of polyethylene be consistently high. To achieve high-consistency polyethylene, gas chromatograph compositional measurements are conducted at critical points in the polyethylene process to ensure a quality product that meets specifications.

“We needed an analytical team with solid chromatography know-how, and the ability to build a reliable sample conditioning system, and we found that with Emerson. Our 10 GCs follow all the operational parameters, such as temperature from electrical trace, verification with standards, and methods that focus on repeatability and precision. All we need to do is provide high-quality carrier gas and ensure that the filters are in good condition, and we know that everything will work fine!”

Elson Suzart, Automation  
Rogerio Matos, Analytical  
Braskem S.A

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Process Management

**SOLUTION**

The plant's process control strategy currently includes a distributed control system, programmable logic controller, and safety instrumentation system, and in the future, it will be used for advanced process control. Gas chromatographs are the key to the process control, sending fast and accurate results to the distributed control system.

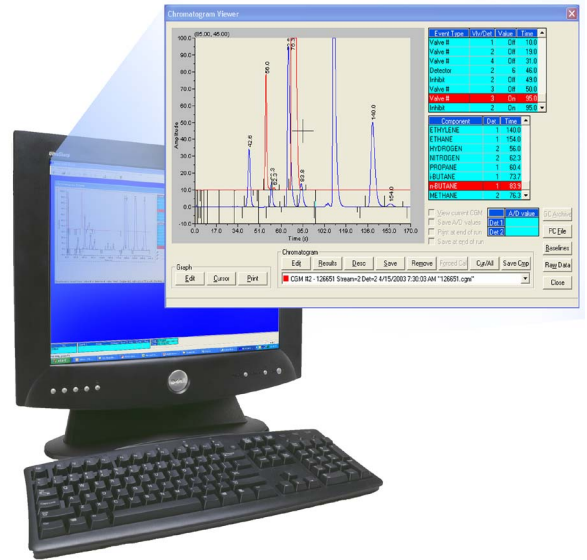
Rosemount Analytical provided 10 process gas chromatographs to the polyethylene plant, each with sample conditioning capabilities. The Model 700s and Model 500s are used to monitor the ethylene and comonomer for common impurities, such as carbon dioxide, methane, ethane, and propane. A diluent recycle is also monitored for the presence of hydrogen, ethane, hexane, heptane, and ethylene.

The gas chromatographs communicate to the plant's distributed control system via a MODBUS protocol to the DCS historian. The gas chromatographs collect data regarding the progress in the reactor by measuring the flash tank off-gases. By measuring the amounts of unreacted ethylene, as well as the comonomer and hydrogen, the gas chromatographs can indicate the quality of reactions occurring.

The 10 gas chromatographs — nine Model 700 gas chromatographs and one Model 500 gas chromatograph — are used for the following measurements:

- Ensure ethylene feed purity
- Ensure comonomer feed purity
- Monitor impurities recycled with the diluent
- Provide feedback on reaction kinetics

The scope of this project also included other Emerson products, including Micro Motion Coriolis flow meters and Fisher control valves.



Braskem S.A considers the Rosemount Analytical gas chromatographs the ideal GCs for their requirements for several reasons:

- High accuracy when compared to the industry standard, as well as good precision and reliability
- Minimal calibration frequency of 20 days, with a low deviation from calibration gas
- Low cost of maintenance and high performance due to good detectors and low carrier gas flow and consumption
- Fast cycle time, rugged hardware, and a reliable sample conditioning system