

# Bulk and Specialty Gas Purity Measurements in Gas Bottling Plants

## APPLICATION

Industrial gas bottling and blending plants require accurate gas concentration monitoring of bulk and specialty gas products to ensure purity requirements for a variety of end users. Emerson offers several Rosemount Analytical gas analyzer methodologies to meet the gas monitoring needs of gas bottling plants.

Likewise, monitoring gas purity at both ends of the bulk gas supply network can be important. Point monitoring at the high-pressure cylinder filling manifolds and outlet lines of the air separation plant or gas manufacturing facility as well as the custody transfer receipt at the bottling plants, may all require accurate and reliable gas monitoring.

## BACKGROUND

Large scale production of important industrial bulk gases such as nitrogen (N<sub>2</sub>), oxygen (O<sub>2</sub>) and argon (Ar) is performed in an air separation plant. Other gases of commercial importance which are usually not obtained directly from the atmosphere include: hydrogen (H<sub>2</sub>), helium (He), carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), ammonia (NH<sub>3</sub>), sulfur dioxide (SO<sub>2</sub>) and other specialty gases. Bottling plants fill cylinders with various gas products and blends to meet the demand for a variety of end-use applications.

The end-user applications all have product purity and concentration and blend accuracy requirements. These applications include:

- electronic and semi-conductor manufacturing
- inert process blanketing/purging
- EPA protocol gases used as calibration standards for Continuous Emission Monitoring Systems (CEMS) and mobile source test vans
- medical diagnostics
- engine emission testing standards
- safety and industrial hygiene

## APPLICATION SOLUTIONS

Emerson provides a wide range of Rosemount Analytical analyzer methodologies to meet the monitoring needs of a gas bottling plant. Table 1 highlights several of these application solutions.

**TABLE 1. GAS BOTTLING PLANT GAS ANALYZER APPLICATIONS**

Application	Gas	Typical Ranges	Detection Method	Model No.
Impurities in pure gases: air, Ar, He, H <sub>2</sub> , N <sub>2</sub>	O <sub>2</sub>	0 to 25% (air only)	Paramagnetic (PMD)	X-STREAM
	CO <sub>2</sub>	0 to 10/0 to 500 ppm	Non-Dispersive Infrared (NDIR)	X-STREAM
	THC	0 to 1/0 to 10 ppm	Flame Ionization Detection (FID)	NGA FID 400A
Certified EPA Protocol Calibration Standards	CO in N <sub>2</sub> or air	0 to 100 ppm	Non-Dispersive Infrared (NDIR)	X-STREAM
	NO in N <sub>2</sub> or air	0 to 25/0 to 100 ppm	Chemiluminescence (CLD)	NGA CLD
	SO <sub>2</sub> in N <sub>2</sub> or air	0 to 50/0 to 300 ppm	UV Absorption (UVA)	X-STREAM
	O <sub>2</sub> in N <sub>2</sub>	0 to 25%	Paramagnetic (PMD)	X-STREAM
	CO <sub>2</sub> in N <sub>2</sub> or air	0 to 20%	Non-Dispersive Infrared (NDIR)	X-STREAM
	NO <sub>2</sub> in N <sub>2</sub> or air	0 to 500 ppm	Chemiluminescence (CLD)	NGA CLD
Analytical Instrument Calibration Standards	CH <sub>4</sub> in air	0 to 10/0 to 100 ppm	Flame Ionization Detection (FID)	NGA FID 400A
	C <sub>3</sub> H <sub>8</sub> in air	0 to 10/0 to 100 ppm	Flame Ionization Detection (FID)	NGA FID 400A
	H <sub>2</sub> in N <sub>2</sub>	0 to 2%	Thermal Conductivity (TC)	X-STREAM
	He in N <sub>2</sub>	0 to 4%	Thermal Conductivity (TC)	X-STREAM

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