	MEASUREMENT POLICIES	
	GAS MEASUREMENT	MP - 1
Approved by:	Measurement Steering Committee	
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POLICY OBJECTIVE & SCOPE

This Policy defines the requirements for the design and installation of existing and new gas measurement systems at upstream facilities. Specifically, the measurement equipment used and volume computations performed where the volume or resulting energy is used in the production accounting allocations or regulatory reporting. This policy applies to both AltaGas owned meters and situations where the customer meters is a receipt point meter for an AltaGas facility.

- REFERENCES**
1. ERCB Directive 017 Measurement Requirements for Upstream Oil and Gas Operations (S4. Gas Measurement)
 2. ERCB Directive 046 Production Audit Requirements
 3. AltaGas Engineering Specifications, ES 103, Measurement Equipment
 4. AltaGas Effluent Measurement Policy (MP-10)

- REQUIREMENTS**
- Measurement Requirements*
1. Meters shall be installed at all points of receipt (contract delivery points) into AltaGas' facilities unless otherwise agreed to by AltaGas.
 2. If AltaGas agrees to use a Customer's meter upstream of the point of receipt (contract delivery points) the meter must comply with the AltaGas Measurement Policies, including this policy. The Customer's meter must at a minimum meet the following requirements:
 - Customer's meters configurations are to measure dry gas (continuous measurement of all gas and liquids after separation). See AltaGas' Effluent Measurement Policy for additional requirements. All exceptions are to be approved by the appropriate AltaGas Divisional VP.
 - Fuel gas sources are to be upstream of the Customer's dry gas meter (exceptions must be approved by the appropriate AltaGas Divisional VP).
 - The Customer must deliver, to the appropriate AltaGas Operations Accountant on a regular basis (annually at a minimum), a current, accurate, and authorized measurement schematic. The measurement schematic must provide evidence of:
 - i. Meter run configuration including separation and dry gas measurement
 - ii. Identification and location if liquids are recombined with the gas
 - iii. Measurement points of fuel gas sources
 - If fuel gas source is downstream of meter and not measured the Customer's engineered estimation calculation must be provided to, and confirmed with, the AltaGas Operations Accountant each month.
 3. Meters shall be installed at each inlet to a gas processing plant downstream of a separator to ensure dry gas metering. Separate gathering systems that terminate at a gas processing plant shall have independent separation and metering.
 4. Fuel and **continuous** flare volumes that are greater than 500 m³ per day shall be metered with an acceptable meter.

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5. A meter shall be installed downstream at all gas processing plants as a check meter to validate the 3rd party gas sales meter.


Measurement Equipment and Installation

1. Gas meters will be installed that are deemed to be the most appropriate for each specific installation and will meet the installation requirements under ERCB Directive 17 S.4.31. Typical measurement devices include:
 - Orifice meters
 - Linear meters (Turbine and Vortex)
 - Rotary meters
 - Positive displacement meters
 - Ultrasonic meters
 - Venturi
 - Coriolis mass meters
2. All orifice meter runs must be identified with a permanently marked plate with the following: manufacture's name, serial number, date of manufacture, average upstream inside diameter (ID), and the AGA3 version/year.
3. Orifice meters must have sensing lines that are self draining. Knock-out pots are not acceptable.
4. Chart recorders must be suitably winterized to prevent sensing lines and other piping from freezing.
5. Chart recorders must not be more than 8 days per cycle unless evidence of exception criteria under ERCB S.5 is provided.
6. All meters subject to this policy and installed after July 1, 2010 must be equipped with electronic flow measurement (EFM).
7. AltaGas' controls over measurement and reporting start with a standard access to electronic measurement data.
 - a. All AltaGas owned meters subject to the Measurement Program must have direct connectivity to AltaGas' web based field data capture system (ZediAccess.com for FG&P & Harmattan and FlowCal for transmission pipelines) where meter parameters are monitored and updated.
 - b. All Customer meters which are considered the source of receipt point measurement must be provided to AltaGas electronically in a standard format at no cost to AltaGas.
8. All existing wells with plunger lifts or pumps must have electronic flow measurement (EFM) unless otherwise approved by the appropriate AltaGas Divisional VP. (24 hr charts will be the only approved alternative).

Volume Computation

Gas volumes are to be computed in accordance with the following guidelines:

1. Volumes and energy shall be reported in SI units (10^3m^3 and GJ).
2. All field measurement data, such as line size, orifice size, temperature, pressure, will be reported in:
 - Imperial units for charted systems
 - SI units for EFM systems

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3. All measurement will be referenced back to standard conditions of 101.325 kPa and 15°C
4. The atmospheric pressure based on the actual elevation must be determined by using certified government topographical maps or GPS. The calculation of atmospheric pressure is based on the following:

Elevation in feet:	$14.696 - (0.0005 \times \text{elevation}) \text{ psi}$
Elevation in metres:	$101.325 - (0.0113 \times \text{elevation}) \text{ kPa}$
5. Orifice meters must follow the following standards:

Volume calculations:


 - (i) For existing facilities, volumes may be calculated in accordance with the American Gas Association Report No. 3 (AGA3), Second Edition 1985, Orifice Metering of Natural Gas and Other Related Hydrocarbon Fluids.
 - (ii) For new facilities, volumes shall be calculated in accordance with the American Gas Association Report No. 3 (AGA3), Third Edition 1990, Orifice Metering of Natural Gas and Other Related Hydrocarbon Fluids.

Compressibility factors used in gas volume calculations (corrections for the deviation from Boyle's Law) shall be made in accordance with:

 - (iii) For existing facilities, corrections for the deviation from Boyle's Law shall be made in accordance with American Gas Association, Transmission Committee Report No. 8 (AGA 8), First Edition 1985, Compressibility Factors of Natural Gas and Other Related Hydrocarbon Gases, or Redlich-Kwong equation of state with Wichert-Aziz correction factor for sour gas
 - (iv) For new facilities, corrections for the deviation from Boyle's Law shall be made in accordance with American Gas Association, Transmission Committee Report No. 8 (AGA 8), Second Edition 1992, Compressibility Factors of natural gas and Other Related Hydrocarbon
6. Fuel or continuous flare volumes less than 500 m³ per day may be estimated using an engineering calculation provided the calculation is updated on a yearly basis or earlier if significant operating conditions change. When continuous flaring occurs and exceeds 500 m³ per day and it is uneconomic or impractical to install metering, exemption must be applied for from the ERCB (or other regulatory agencies) with proof of a reliable volume determination method.
7. All gas entering an AltaGas facility will be dry gas measured or effluent corrected in accordance with AltaGas' Effluent Measurement Policy.

Meter Parameter Verification (Configuration File)

1. AltaGas has established *Standard Data* requirements that must be managed to ensure measurement values are accurately calculated. See AltaGas Engineering Specifications for Measurement Standard Data requirements.
2. On an annual basis, the meter *Configuration File*, as defined in the AltaGas Engineering Specifications for Measurement Standard Data must be validated by the Operator. The Configuration File validation will include a validation of: contract hour, atmospheric pressure, pressure base, temperature base, meter tube inside diameter, orifice plate size, static pressure tap location, orifice plate material, meter tube material, calibration static pressure range, calibration differential pressure range, calibration temperature range, AGA-3 reference, and AGA-8 reference.

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ROLES & RESPONSIBILITIES	
<p>Customers – To comply with this policy when AltaGas agrees to use a Customer’s meter upstream of the point of receipt (contract delivery points).</p> <p>Operations Engineers - To select and install gas measurement devices and equipment in accordance with the requirements of this Policy and to approve measurement equipment and configurations installed by customers if used for Production Accounting allocations or reporting.</p> <p>Operators – To maintain the measurement equipment operated in the field in accordance with these requirements. To identify, document, and communicate any deficiencies in a timely manner to the Operations Supervisor. To validate the meter configuration parameters and address differences on an annual basis.</p> <p>Operations Supervisor’s – To provide Operators support and appropriate training to identify, document and communicate the existence of deficiencies. To ensure deficiencies are appropriately addressed in a timely manner.</p> <p>Manager Operations – To ensure compliance to this policy is supported.</p> <p>Measurement Program Steering Committee – To direct and approve measurement policies including this Gas Measurement Policy.</p>	