

Flow meter testing services





FortisBC's measurement department manages and services measurement devices for more than one million FortisBC natural gas customers and over 135,000 electricity customers.

In addition, we provide gas and electric measurement services to other utilities, municipalities, manufacturers, co-ops and transmission companies across North America.

With a focus on innovation, FortisBC offers experience, economies of scale and access to leading-edge technology.

Innovative and advanced

Offering unsurpassed flow measurement accuracy, FortisBC's state-of-the-art facility can test flow meters over a wide range of operating conditions using carbon dioxide (CO₂) as a test medium. For high-pressure testing, we match the Reynolds number using the gas density of CO₂ matched to that of natural gas in true operating field conditions.

Studies show that turbine meters need to be calibrated under in-service conditions for acceptable accuracy.* The best results are obtained by matching the in-service Reynolds number and flow rates.

The dependency of turbine meters on the Reynolds number can have a significant impact on measurement accuracy. For example, meters in low-pressure, low-flow applications operate at the lowest Reynolds conditions. Meter performance can change up to several per cent when comparing low-pressure test conditions (typically under 1-1.5 million Reynolds numbers) to high-pressure test conditions.

*Sources:

George, D.L., GRI Topical Report GRI-03-0172, "Metering Research Facility Program: Effects of Line Pressure and Gas Density on Turbine Meter Measurement Accuracy at Conditions from Atmospheric Air to 700 psig in Natural Gas." Gas Research Institute, Des Plaines, Illinois, August 2004.

George, Fraser, Nored and Tang, "Carbon Dioxide as a Test Fluid for Calibration of Turbine Meters." American Gas Association Spring Conference 2004, American Gas Association, Washington, D.C., May 2004.

Meters that are tested at lower flows relative to the meter's Q_{max} (maximum flow) and lower pressures (e.g. atmospheric) have the greatest loss in accuracy when used at pipeline conditions. Meters that operate at a higher Reynolds number and tested at high pressure provide a more accurate calibration.

Test capabilities

We can test meters to meet a range of conditions:

Flow range	350-230,000 ACFH (10-6,500 m ³ /hr)
Pressure range (CO ₂ test medium)	2" - 12" turbine meter 0 - 235 psig (0 - 1.620 kPa)
Temperature range	5°C - 35°C (41°F - 95°F)
Fluid type	CO ₂
Calibration capabilities	ANSI 150, 300, 600 and meters sized NPS 2 to NPS 12
Maximum Reynolds no.	9,200,000
Measurement uncertainty	+/- 0.27%
Reproducibility	+/- 0.2%
Traceability	traceable to international standards through Germany's PTB
Meter runs	complete meter runs up to 22' (6.7 m)

What is a Reynolds number?

A dimensionless ratio of inertial to viscous forces that takes into account the flow rate and physical properties of a fluid. It is proportional to flow rate and density, and inversely proportional to meter diameter and viscosity.

Credentials

Our high-pressure testing facility is ISO 17025 certified and Measurement Canada accredited.

We ensure all service personnel are trained for their specialty and are current with Measurement Canada Regulations and the American Gas Association's Report No. 7, Measurement of Natural Gas by Turbine Meters.

Cost of measurement error

	Meter size	Annual energy delivered	Annual energy cost	Annual cost of 0.5% volume error	Cost of 0.5% volume error in each 6 year calibration cycle
	Inches	MMBtu	US\$	US\$	US\$
at 60 psig	4"	245,000	1,225,000	6,000	37,000
	6"	409,000	2,045,000	10,000	61,000
	8"	818,000	4,090,000	20,000	123,000
	8"HC	1,227,000	6,135,000	31,000	184,000
	12"	1,908,000	9,540,000	48,000	286,000
	12"HC	3,134,000	15,670,000	78,000	470,000
at 600 psig	4"	2,018,000	10,090,000	50,000	303,000
	6"	3,364,000	16,820,000	84,000	505,000
	8"	6,729,000	33,645,000	168,000	1,009,000
	8"HC	10,093,000	50,465,000	252,000	1,514,000
	12"	15,700,000	78,500,000	393,000	2,355,000
	12"HC	25,794,000	128,965,000	645,000	3,869,000

Notes:

- Turbine meters operating at 30 per cent of Qmax on the average.
- Energy content of natural gas based on 1.0205 MBtu/cu.ft.
- Cost of energy calculated based on \$5.00 USD per MMBtu (not including delivery cost).

Superior service

The benefits of using FortisBC's measurement department include:

- flexibility to change pressure and temperature
- repair facility for Sensus, Instromet, Elster and Daniel products
- completion of all shipping and customs documentation
- large volume of spare parts kept in stock
- accurate billing for turbine customers
- independent third-party verification
- immediate year-round access to test facilities
- fast turnaround times
- technical expertise

Measurement research and development

Providing a range of testing and consulting services, we can tailor services to fit your requirements.

We're here to help

For more information or inquiries contact:

Toll-free: **1-800-667-4338**

Email: **measurement@fortisbc.com**

FortisBC Measurement

444 Okanagan Avenue East
Penticton, British Columbia
V2A 3K3 Canada

fortisbc.com/measurement

Flow meter testing service request

Canadian customers

Company name		Address		Date (Yr/Mth/Day)
Main contact name	Fax	Telephone number	E-mail address	
Shipping contact name (<input type="checkbox"/> check if same as main contact)	Fax	Telephone number	E-mail address	
Billing address	City	Province	Postal code	
Meter owner company name and address (<input type="checkbox"/> check if same as billing address)	City	Province	Postal code	
Ship to address when meters completed (<input type="checkbox"/> check if same as billing address)	City	Province	Postal code	

Meter specifications		Service/test conditions (check all that apply)					
Meter badge number (<input type="checkbox"/> check if same as serial number)		Type		Pressure or Flow Rates %			
Meter make, model, & size		<input type="checkbox"/> 10 Point High Pressure (Reynolds Number)		<input type="checkbox"/> Pressure (test at maximum pressure) OR <input type="checkbox"/> Flow (test at maximum flow)			
		<input type="checkbox"/> 5 Point High Pressure (Reynolds Number standard)		<input type="checkbox"/> Pressure (test at maximum pressure) OR <input type="checkbox"/> Flow (test at maximum flow)			
Number of meters (for multiple meters/ types use additional quote form)	Serial number	<input type="checkbox"/> 2 Point Atmospheric		N/A	20%	N/A	95%
Meter run provided with meter <input type="checkbox"/> No <input type="checkbox"/> Yes (provide sketch)		<input type="checkbox"/> Other (specify)					
In-test (additional cost) A test completed prior to repair and calibration to establish the performance of the meter in its current condition (Note: no "X" indicates not required) <input type="checkbox"/> Yes, 5 points at 95%, 75%, 50%, 20%, 10% +/- 5% <input type="checkbox"/> Yes, 2 points at 95% and 20% +/- 5% <input type="checkbox"/> Yes, provide points: _____ Type of in-test required <input type="checkbox"/> Atmospheric in-test <input type="checkbox"/> High Pressure in-test		Field operating conditions		Units		Max.	Min.
		Flow		ACFH	M ³ /hr		
		Pressure		PSIG	kPa		
		Temperature		°F	°C		
Order/repair requirements		Gas composition		Mole %			
Seal meters (for custody transfer meters) <input type="checkbox"/> Yes, provide Measurement Canada Company Registration number: _____ <input type="checkbox"/> No, meter for informational purposes only		Methane (CH ₄)		If natural gas composition is not given, a NG composition at a molecular weight of 16.77 will be used to derive missing properties.			
Paint meters (grey only) <input type="checkbox"/> Yes, no additional cost <input type="checkbox"/> No		Ethane (C ₂ H ₆)					
Repair details <input type="checkbox"/> New meter, no repairs needed. <input type="checkbox"/> In service meter, repairs required. <input type="checkbox"/> In service meter, no repairs required (explain below)		Propane (C ₃ H ₈)					
		Butane (C ₄ H ₁₀)					
		Carbon Dioxide (CO ₂)					
		Nitrogen (N ₂)					
		Other fluid (provide name)					

If applicable, add any details regarding repairs:

Additional information (please use separate sheet if needed)

All quotations will be returned by e-mail	Turnaround <input type="checkbox"/> 4 - 6 weeks <input type="checkbox"/> 5 days (additional cost)	Required date (Yr/Mth/Day)
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Shipping requirements	
Preferred shipping company (name/phone number)	Carrier account number (if applicable)

To submit your request, or if you have any questions, please contact:

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FortisBC Measurement

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