

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 (CO_2) as a test medium. For high-pressure testing, we match the Reynolds number using the gas density of CO_2 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, 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 Qmax (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.

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.

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 Amercian 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

Non-Canadian customers

Company name									Date	(Yr/Mtř	/Day)		
Main contact name		Fax		Telephone number	I	E-mail addr		S	I				
Shipping contact name (check if same as main contact) Fax			Telephone number	number E-mail address									
Billing address (City	I			State/country				Zip code		
Ship from address (check if same as billing address)			City	Ý			State/country				Zip code		
Ship to address when meters completed (check if same as billing address)			City	y			State/country				Zip code		
Company name and address to appear on Calibration Certificate			City	s			State/country				Zip code		
Meter specifications				Service/test conditions (check all that apply)									
Meter badge number (check if same as	serial number)			Type Pressure or Flow Rates %									
				10 Point High Pressure (Reynolds Number)			Pressure (test at maximum pressure) OR Flow (test at maximum flow)						
Meter make, model, & size				8 Point High Pressure (Reynolds Number) F			Pressure (test at maximum pressure) OR Flow (test at maximum flow)						
Number of meters (for multiple meters/ types use additional quote form)	Serial number		5 Point High Pressure (Reynolds Number standard)				Pressure (test at maxi				imum pressure) OR n flow)		
Meter run provided with meter						10	1%	20%	50%	-	5%	95%	
No Yes (provide sketch)								2070	0070		0,0	0070	
<u>In-test</u> (additional cost)				Other (specify)									
A test completed prior to repair and calibra	tion to establish the	he performance of th	ne										
	indicates not requ	ulled)		Field operating			Units		Ma	x.	N	/lin.	
 Yes, 3 points at 5%, 30%, 30% Yes, 3 points at 20%, 50%, 70% Yes, provide points; 			Flow			J M3/br							
					PSIC		kP2						
Type of in-test required		_	Temperature	°F		- °C							
Atmospheric, in-test				Gas composition				Mole %					
Paint meters (grey only)				Methane (CH ₄)						If nat	iral da	s	
No Yes (no additional cost)				Ethane (C ₂ H ₆)						composition is not			
Repair details				Propane (C ₃ H ₈)						given	, a NG	ata	
New meter, no repairs required. In service meter, repairs required. In service meter, no repairs required (explain below). If applicable, add any details regarding repairs (use separate sheet if needed):				Butane (C₄H₁₀)							molecular weight of 16.77 will be		
				Carbon Dioxide (CO ₂)						used	to deri	ve	
				Nitrogen (N ₂)					properties.				
				Other fluid (provide name)									
All quotations will be returned by e-mail			s (additional cost)			Requ	ired date	(Yr/Mth/E	Day)				
Shipping requirements													
All pick-up and delivery of meters will be co	pordinated by For	tisBC. Freight, parts	and o	customs fees are add	litional								
Date meter will be ready for pickup by carr	ier (Yr/Mth/Day)												
The following information is require	ed by Customs												
Type of container used				Quantity of boxes on pallet Quantity of			tity of	oallets					
Shipment type Total weight of shipme				nent (lbs)	Country of origin (where meter manufactured)								
Fair market value (if meter were sold, at what cost) provide cost for each meter. not to			tal	IRS number (Internal Revenue Service tax number)					ber)				

\$		D USD	-				
To submit your request, or if you have any questions, please contact:	FortisBC Measurement						
2765b 17/06	Toll Free: Direct:	1-800-667-4338 1-250-490-2613	Web: E-mail:	fortisbc.com/measurement measurement@fortisbc.com			
	Fax:	1-250-490-8714					

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