

SPG-266

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APPROBATION SPECIALE

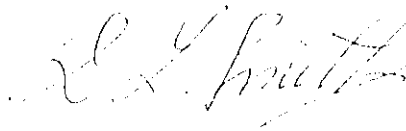
SPECIAL APPROVAL

Accordée à:

Granted to:

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Attention: Mr. W. Fallis



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SPECIAL APPROVAL 266

SUBJECT: Metric BVI-CI with Supercompressibility
Correction Provision

Special Approval has been granted by the Director, Legal Metrology Branch, to Kingston Public Utilities Commission to install the following measuring instrument, utilizing a specially constructed metric auxiliary volume correcting device with a built-in supercompressibility correction provision, at Queen's University, Kingston, Ontario:

1. Gas Meter

Turbine meter	MGT-8
Maximum working pressure	900 kPa
Manufacturer	Canadian Meter Company
Serial number	80-17158
Cartridge serial number	M-13238
Inspection number	5223
Output drive capacity	10 m ³ /rev

2. Auxiliary device

Base Volume Index Continuous Integrator	Metric BVI-CI
Manufacturer	Canadian Meter Company
Serial Number	VC-4339
Input drive capacity	10 m ³ /rev
Pressure range, kPa (psig)	0-400 (0-58)
Atmospheric pressure, kPa (psig)	100.318 (14.55)
Base Pressure, kPa (psig)	101.325 (14.7)
Temperature range, °C (°F)	-30 to 60 (-22 to 140)
Base temperature, °C (°F)	15 (59)
Observation scales for pressure and temperature	Metric
Uncorrected counter multiplier	10
Corrected counter multiplier	100

Operating Conditions

Relative density	0.577
Mol % N ₂	2.05
Mol % CO ₂	0.42
Minimum line pressure kPa (psig)	103.4 (15)
Normal line pressure kPa (psig)	172.4 (25)
Maximum line pressure kPa (psig)	379.2 (55)
Minimum line temperature °C (°F)	1.7 (35)
Normal line temperature °C (°F)	5.6 (42)
Maximum line temperature °C (°F)	10 (50)

The use of this metric auxiliary device is subject to the appropriate requirements for verification and re-verification as delineated in Departmental Instructions, Part VIB, for BV type instruments. Also, refer to the applicable sections in Technical Gas Circulars G-70-7, G-72-1 and G-74-5 for detailed instructions covering the testing of BVI-CI type instruments.

The BVI-CI, in computing and registering the corrected volume at base conditions, incorporates a supercompressibility correction factor (F_{pv}^{-2}) based on the following "fixed" conditions:

Relative density	0.577
N ₂ composition	2.05 mol%
CO ₂ composition	0.42 mol%
Average line temperature	5.6°C (42°F)

In the verification process, in addition to the temperature and pressure correction factors, it is necessary to apply the proper supercompressibility correction factor (F_{pv}^{-2}) to the uncorrected test volume.

Reference shall be made to the following Table for a listing of the supercompressibility correction factors applicable for the various applied pressures. Interpolation shall be used where pressures are not as tabled.

Line Pressure

Supercompressibility
Correction Factor (F_{pv}^2)

<u>Pa</u>	<u>psig</u>	
303.4	15	1.0023
37.9	20	1.0030
72.4	25	1.0038
106.8	30	1.0046
175.8	40	1.0062
210.3	45	1.0070
244.7	50	1.0078
283.7	60	1.0094

The conditions for supercompressibility correction, relative density, mol % N_2 , mol % CO_2 , and average flowing temperature shall be clearly displayed on a nameplate permanently attached to the instrument.

If at any time the actual operating conditions are observed to fall outside of the above ranges or values, the Legal Metrology Branch shall be notified accordingly.

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