Department of consumer and corporate affairs / Ministère de la consommation et des corporations

STANDARDS BRANCH - DIRECTION DES NORMES

NOTICE OF APPROVAL

G-34-2

OTTAWA April 23, 19791

ROCKWELL ROTO-SEAL POSITIVE DISPLACEMENT GAS METERS

This approval supersedes Circular G-34-1, dated June 27, 1969.

Approval

Model Designation

	R-3D*	R-3	R-5	R-8	R-11
Rated Capacity, cu. ft. per hour	3,000	3,000	5,000	8,000	11,000
Volume per rev. of meter, cu. ft.	0.0400	0.0400	0.0400	0.125	0.125
Volume per rev. of output shaft, cu.ft.	10 *	10	10	100	100
Maximum working pressure, psi.	125	125,250 575,720,1440	125	125, 720 1,440	125
Meter connections, flange	2"	2"	3"	3"	4"

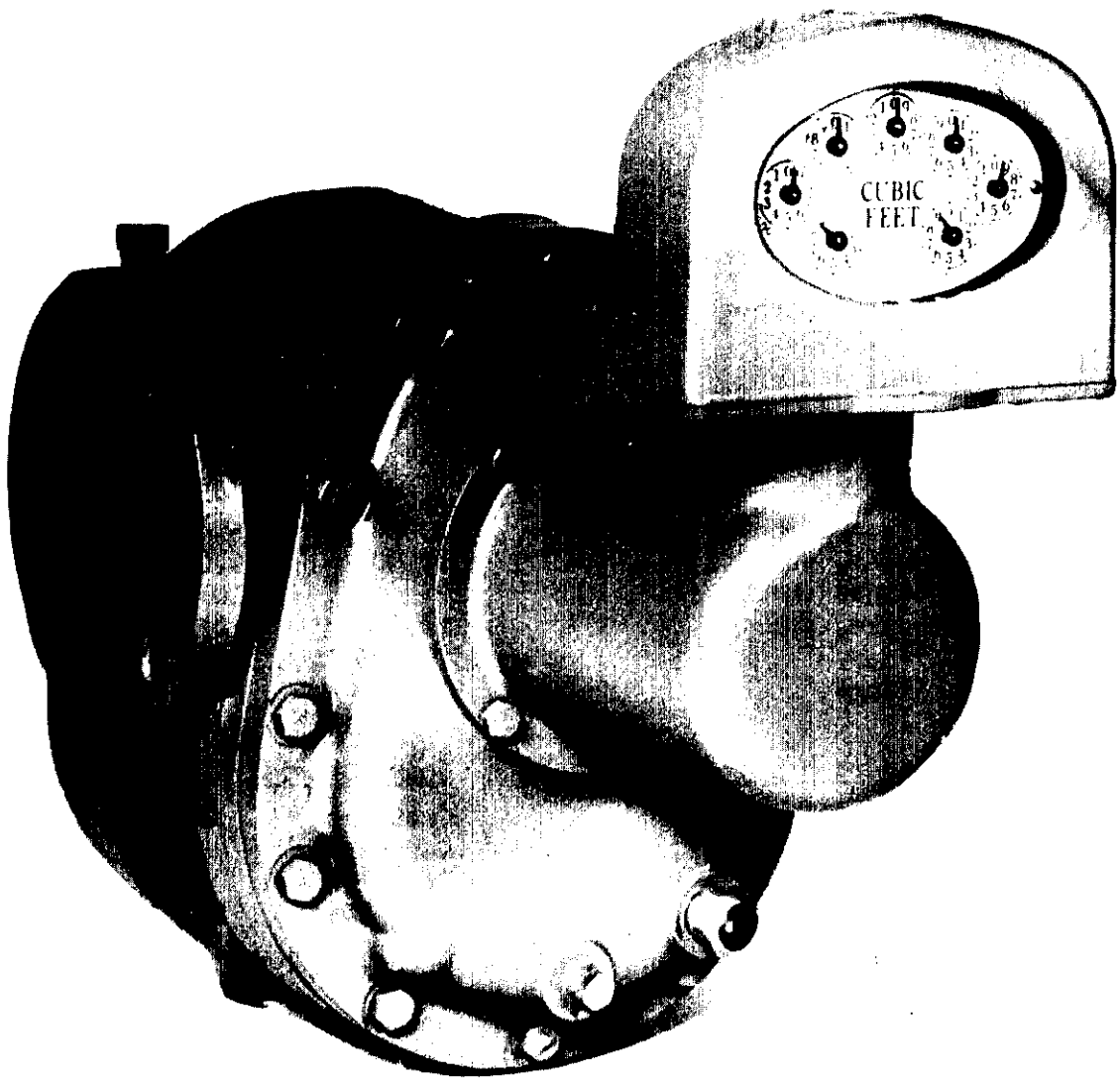
Model	Pressure Rating, Psi	Body Material	Flange Rating
R-3D*	125	Cast Iron	125
R-3	125,250	Cast Iron	125 and 250 C.I.
R-3	575	Ductile Iron	ASA 300
R-3,R-8	720	Cast Steel	ASA 300
R-3,R-8	1,440	Cast Steel	ASA 600
R-5,R-8,R-11	125	Cast Iron	125 C.I.

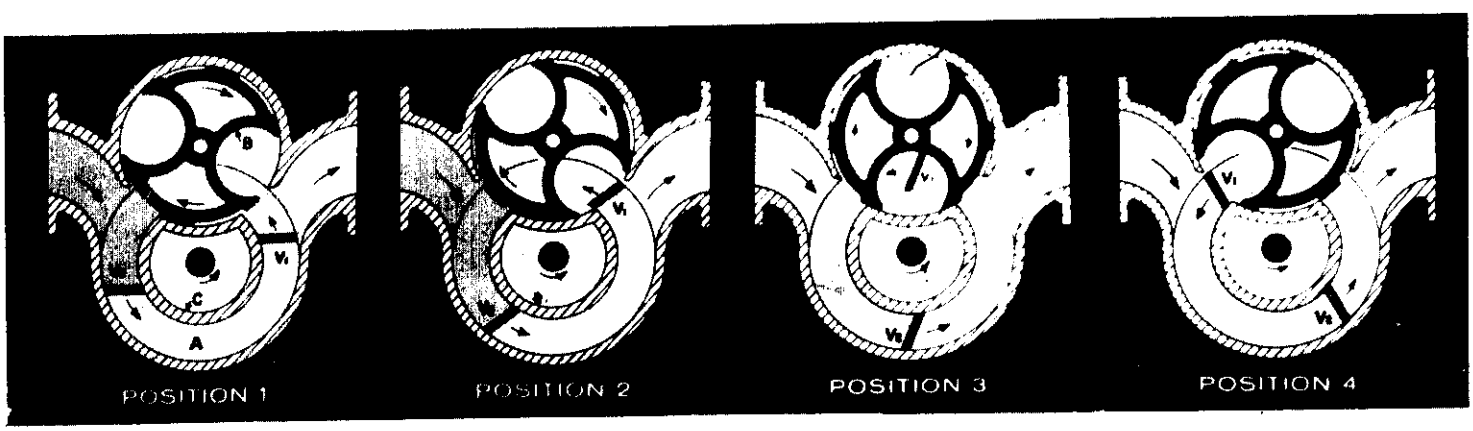
The "End Bells" of all meters with pressure rating of 125 and 250 psi are made of aluminum. Higher pressure meters have end bells of the same material as body.

*This model is equipped with a counter register and has no provision for accepting an auxiliary volume correcting device. Volume per rev. of output shaft refers to test dial volume.

NOTE: Any meter which in service is not fitted with an auxiliary volume correcting device (e.g. one which has a conventional clock or counter type register) is APPROVED FOR USE ON LOW PRESSURE ONLY of approximately seven ounces per square inch or less.

ROCKWELL ROTO-SEAL POSITIVE DISPLACEMENT GAS METERS
(Except Counter Type Version)





DESCRIPTION

Except for the model R-3D, which has a six digit Durant counter register driven directly from the meter through a gear train assembly, as shown on attached illustration, other models have a magnetic drive assembly connecting to the output shaft of the meter. In other respects all models are the same and the following description applies, except as noted above.

The Roto Seal gas meter measures volume by a rotary movement of two vanes in an annular channel.

It contains the following basic assemblies: (1) A machined meter case which contains the basic measuring mechanism consisting of (a) the main rotor with two vanes, the idler rotor, and the timing gears attached to one end plate, and (b) the central stationary member and the magnetic register drive assembly attached to the other end plate. (2) Two end bell assemblies, one of these carrying a magnetic follower and associated gear train to the meter index or volume correcting device. Both end bells serve as oil sumps for splash lubrication.

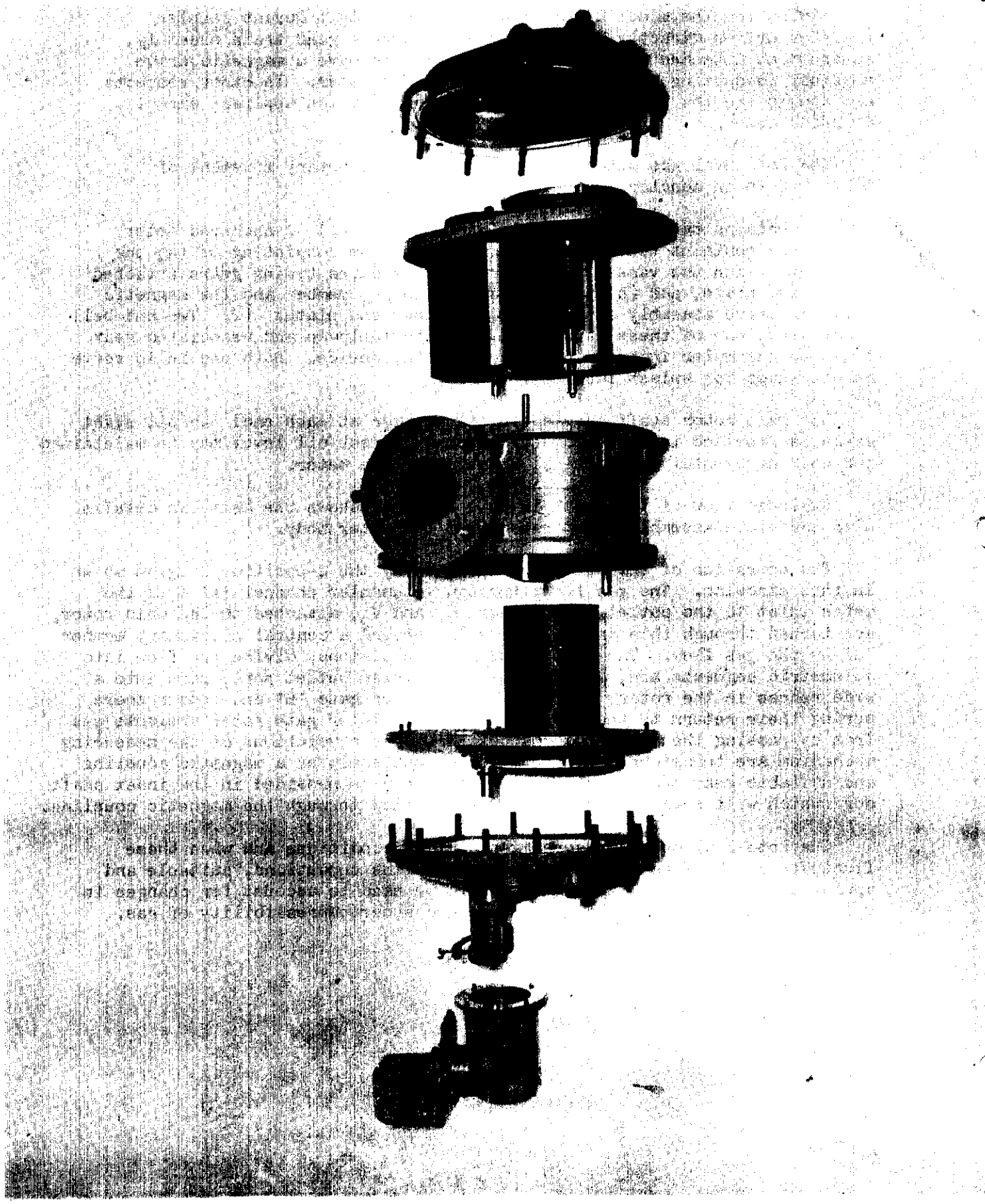
The main rotor shaft carries an oil slinger at each end. An oil sight gauge is provided in each end bell so that correct oil level may be maintained for both horizontal and vertical mounting of the meter.

Exploded view of the meter in this circular shows the meter in details with end plate assemblies separated from the meter body.

The operation of the meter is explained by the 4-position diagram shown in this circular. The gas flows through an annular channel 'A' from the meter inlet to the outlet. Two vanes, V_1 and V_2, attached to the main rotor, are turned through this annular space 'A' around a central stationary member 'C' by the gas flow. The vanes, acting like pistons, divide the flow into volumetric segments and, after passing the meter outlet port, move into a wide recess in the rotary abutment of the idler gate 'B' and remain there during their return to the meter inlet. This idler gate rotor prevents gas from by-passing the measuring channel 'A'. The revolutions of the measuring mechanism are transferred to the meter output shaft by a magnetic coupling and suitable gear train assembly. A shear pin is provided in the index shaft dog which will shear by the torque transmitted through the magnetic coupling.

The Roto Seal meter measures gas at line conditions and when these fluctuate and billing refers to other than line conditions, suitable and approved volume correcting devices shall be used to account for changes in volume caused by temperature, pressure and supercompressibility of gas.

ROCKWELL ROTO-SEAL POSITIVE DISPLACEMENT GAS METERS
(Shown with instrument drive take off)



The computation of the volume of gas, at the contract temperature and pressure, which has been registered in cubic feet at line conditions is based on the ideal gas laws modified by a deviation factor available in the form of a Supercompressibility factor (Fpv), determined according to the A.G.A. Gas Measurement Committe Report No. 3, Orifice Metering of Natural Gas.

The general equation for converting the meter readings at line conditions to a contract base pressure and temperature is

$$Qs = Qd \quad Pm \quad Tm \quad (Fpv)^2$$

Qs = Quantity of gas at the contract base pressure and temperature, cu. ft.

Qd = Actual (displaced) gas passed at existing meter conditions, cu. ft.

Pm = Pressure multiplier

$$= \frac{\text{Weighted average existing gauge pressure + barometric pressure}}{\text{Absolute pressure base}}$$

Tm = Temperature multiplier

$$= \frac{\text{Temperature base + 460}}{\text{Weighted average flowing gas temperature + 460}}$$

Fpv = Supercompressibility factor based upon the weighted average gas pressure and temperature and the normal composition of the gas. The composition is represented by its specific gravity, its content of nitrogen and carbon dioxide and its calorific value as used in the derivation of Fpv values.

The selection of the weighted average supercompressibility factor, Fpv, should be based on a record of the flowing gas volumes, pressures and temperatures. If no continuous record is available, the variations in pressure and temperature normally existing in the line must not introduce an error greater than ±0.5% in the selected $(Fpv)^2$ factor.

The Roto Seal meter may be installed in a horizontal or vertical pipe line, and when in the latter position the flow must be down through the meter. The piping should be arranged to prevent strains on the meter when direct support is not provided. On installation where flow rates may periodically exceed the rated capacity of the meter the manufacturer suggests inclusion of an orifice of proper size on the downstream of the meter to limit the maximum flow.

The temperature probe for the volume correcting device may be placed on the downstream or upstream side of the meter but the pressure tap must be taken from the upstream side.

ROCKWELL ROTO-SEAL GAS METER MODEL R-3D

Meter's nameplate shall include the following information:

(i) Maker's name
(ii) Meter serial number
(iii) Type or Model Designation
(iv) Rated capacity of the meter, cu. ft/hr.
(v) Maximum pressure rating, p.s.i.g.

Approval granted to:

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ROCKWELL ROTOR-SEAL GAS METER MODEL R-3D