



G-0034 Rev 3

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



STANDARDS BRANCH - DIRECTION DES NORMES

# NOTICE OF APPROVAL

G-34-3

OTTAWA January 12, 1972

## ROCKWELL ROTO-SEAL POSITIVE DISPLACEMENT GAS METERS

This approval supersedes Circular G-34-2, dated April 23, 1971

### Approval

	<u>Model Designation</u>			
	R-3	R-5	R-8	R-11
	R-3D*	R-5D*	R-8D*	R-11D*
	RP-3 <sup>+</sup>	RP-5 <sup>+</sup>	RP-8 <sup>+</sup>	RP-11 <sup>+</sup>
Rated capacity, cu. ft. per hr.	3,000	5,000	8,000	11,000
Volume per rev. of meter, cu. ft.	0.040	0.040	0.125	0.125
Volume per rev. of output shaft, cu. ft.	10	10	100	100
Maximum working pressure	-- See Table below --			
Meter connections, flange	2"	3"	3"	4"

<u>Pressure Rating, psi</u>	<u>Model</u>	<u>Body Material</u>	<u>Flange Rating</u>
125	R-3, R-5, R-8, R-11	Cast Iron	125 C.I.
125	R-3D, R-5D, R-8D, R-11D	Cast Iron	125 C.I.
125	RP-3, RP-5, RP-8, RP-11	Cast Iron	125 C.I.
250	R-3, RP-3	Cast Iron	250 C.I.
575	R-3, RP-3	Ductile Iron	ASA 300
720	R-3, RP-3, R-8, RP-8	Cast Steel	ASA 300
1440	R-3, RP-3, R-8, RP-8	Cast Steel	ASA 600

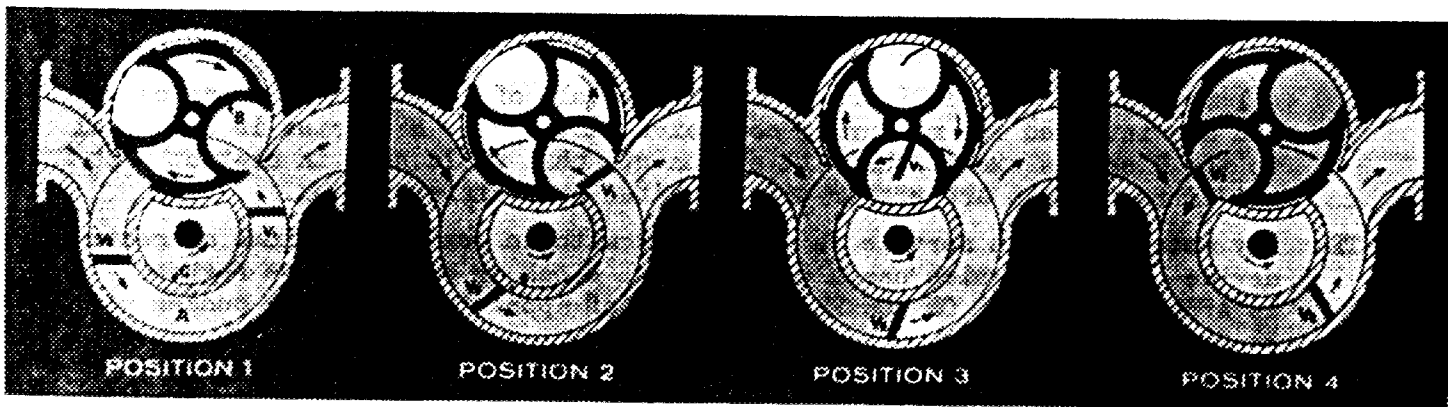
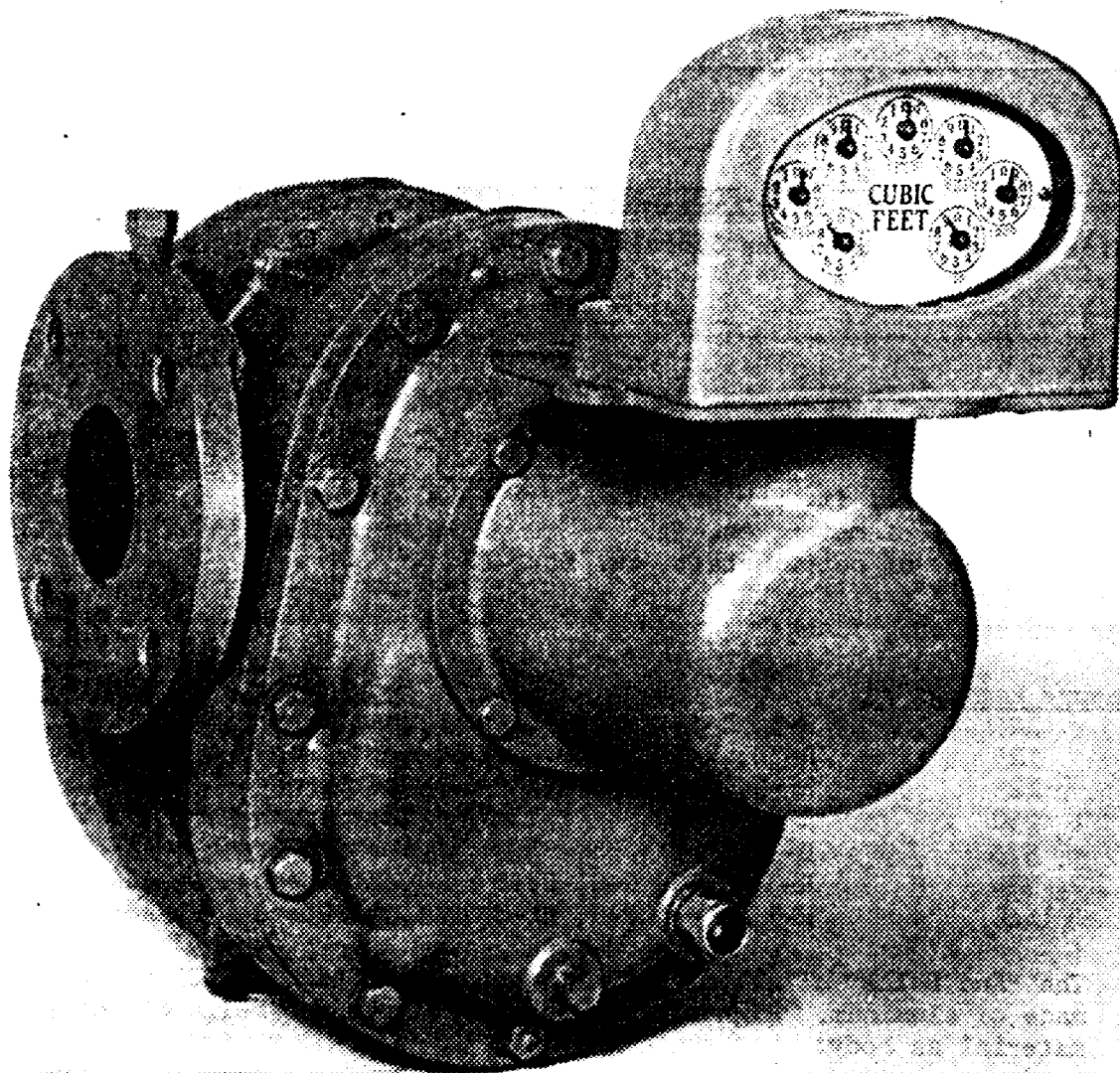
The "End Bells" of all meters with pressure rating of 125 and 250 psi are made of aluminum. Higher pressure meters have end bells of the same material as body.

\*These models are equipped with a counter register and have no provision for accepting auxiliary volume correcting devices. Volume per rev. of output shaft refers to test dial volume.

+All meters designated RP are production models of the standard R series and are intended for measuring corrosive gases. The RP series is identical to the R series except that all components that would come in contact with the corrosive gas are either teflon coated or stainless steel.

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 ROTARY-STAL 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.

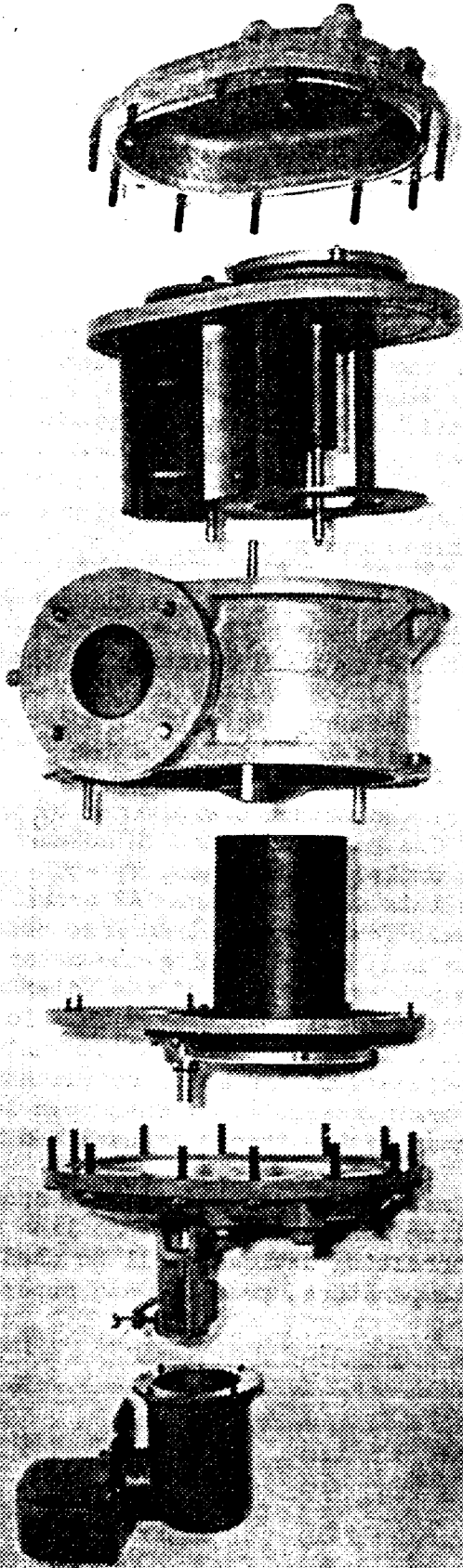
The main rotor shaft carries an oil slinger at each end. An oil sight gauge is provided in each end bell so that correct oil level may be maintained for both horizontal and vertical mounting of the meter.

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 RCTC-SFAL 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 Committee 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

$$Q_s = Q_d P_m T_m (F_{pv})^2$$

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

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

$P_m$  = Pressure multiplier

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

$T_m$  = Temperature multiplier

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

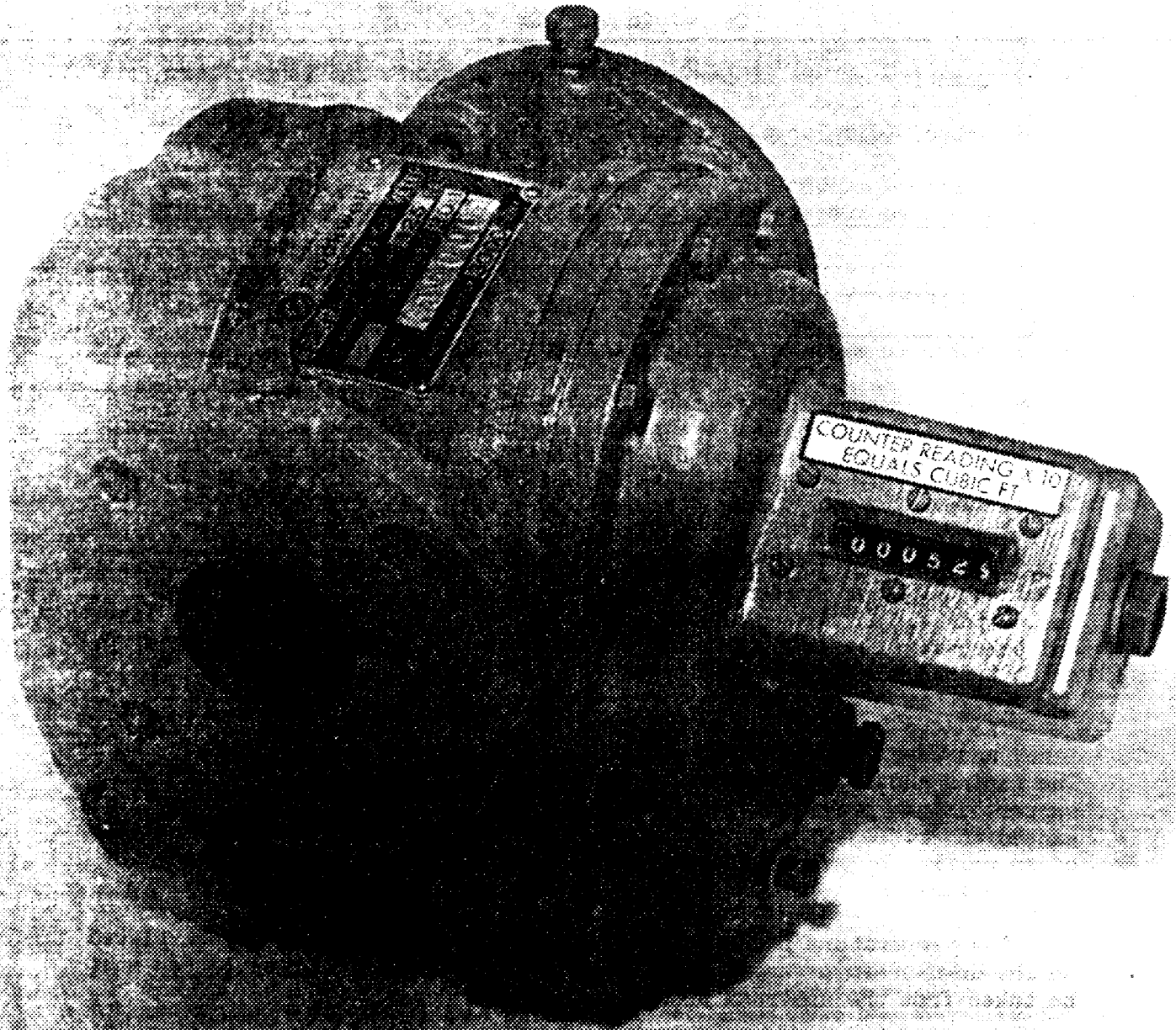
$F_{pv}$  = Supercompressibility factor based upon the weighted average gas pressure and temperature and the normal composition of the gas. The composition is represented by its specific gravity, its content of nitrogen and carbon dioxide and its calorific value as used in the derivation of  $F_{pv}$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

The selection of the weighted average supercompressibility factor,  $F_{pv}$ , 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  $\pm 0.5\%$  in the selected  $(F_{pv})^2$  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 ROTOC-SEAL GAS METER MODEL R-3D

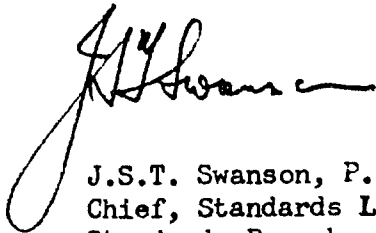


Meter's nameplate shall include the following information:

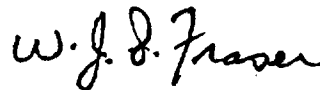
- (i) Maker's name
- (ii) Meter serial number
- (iii) Type or Model Designation
- (iv) Rated capacity of the meter, cu. ft/hr.
- (v) Maximum pressure rating, p.s.i.g.

Approval granted to:

Rockwell Manufacturing Company of Canada Ltd.  
Guelph,  
Ontario.



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Chief, Standards Laboratory,  
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Standards Branch.

Ref. SL-100-41 D

ROCKWELL R-1000-3000 GAL. METER MOD. R-3D

