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NOTICE OF APPROVAL
AVIS D'APPROBATION

G-120

Ottawa, April 28, 1977

DURMAC PROCESS EQUIPMENT LTD., COMPUTERIZED, PRESSURE AND TEMPERATURE COMPENSATED, GAS MEASUREMENT SYSTEM

APPARATUS

1. Inline Turbine Flowmeters:
Manufactured By: Electronic Flo-Meters Incorporated
Andover, England

A. Inline Flanged Turbine Flowmeters with non-lubricated ball race bearings and electronic pick-up.

Type Designation	F/1/60	F/1½/125	F/2/250	F/3/500
Flow Range, C.F.H. at Line Conditions	300-1,800	360-3,600	720-7,200	1,440-14,400
Nominal Bore Size, Inches	1	1½	2	3

B. Inline Flanged Turbine Flowmeters with lubricated ball race bearings and electronic pick-up.

Type Designation	F/4/1000	F/6/2000	F/8/4000
Flow Range, C.F.H. at Line Conditions	2,800-28,800	6,000-60,000	12,000-120,000
Nominal Bore Size, Inches	4	6	8

Notes 1. Pressure rating of these flowmeters is governed by the applicable flange rating which is available in ASA 150, 300 and 600. However, the range of approved pressures for gas flow measurement is also governed by the approved pressure range for the transducers used in a flowmetering system.

2. Approved environmental temperature range for these meters in gas measurement applications is from -20°C to +70°C. This limitation is imposed due to the maximum permissible environmental temperature range for the electronic sensor-pick-up located on the meter.

3. Body material of these meters, regardless of size, is stainless steel.

4. Flange material may be either carbon steel or stainless steel.

2. Pressure Transducers, Model 108 D 46
Manufactured By: Viatran Corporation, Grand Island, New York, for Electronic Flo-Meters Incorporated, Dallas, Texas.

Nominal Pressure Ranges, psig	0-300	0-500	0-1,000	0-1,500
Approved Restricted Pressure Ranges, psig	100-300	165-500	330-1,000	500-1,500
Pressure Connections (Female) inches N.P.T.	¼	¼	¼	¼

Note: Due to variations of the signal output from transducer to transducer per volt input, the computer is to be pre-aligned to match a given transducer.

3. Temperature Transducer, Model 302-1-A-3-C (TT-1)
Manufactured By: Weed Instrument Company Incorporated, Elgin, Texas.

Temperature Range;	0-180°F
Temperature Sensor:	Platinum Resistance Element
Length of Sensor Probe, inches	4½

4. Electronic Computer, Model T-12/PTG
Manufactured By: Electronic Flo-Meters Incorporated, Dallas, Texas.

Volume Readout:	6 Digit, non-resettable counter
Maximum count rate	20 per sec.
Capacity per count, S.C.F.	Selected as required from 1 to 1,000
Maximum frequency of input to computer from sensor-pick-up	10,000 Hz
Power Requirements	100-125 volts A.C. 50-60 Hz
Output Supplies	5 volts D.C. (For Electronic Meter Pick-up)
Program Factor Setting	Binary Code Switch Board with positions for units, tens and hundreds
Ambient Temperature Range	-20°C to +70°C


MADE IN ENGLAND
Electronic Flo-Meters Inc.
Dallas Texas

DESCRIPTION

A complete measuring system comprises a computer, a pressure transducer, a temperature transducer and a turbine meter.

The computer receives electrical signals from the meter (frequency) and two transducers (analog) and effectively calculates and registers the passed volume referenced to desired base conditions.

The resolution of the readout can be selected, as desired, from 2 to 1,000 S.C.F. per count by means of the frequency dividing network.

The computer is equipped with a programming facility composed of three sets of binary coded program switches.

The program factor is "placed" into the computer by means of this facility.

The Canadian distrubutor's manual DTM 1001 delineates the procedure required for proper programming.

The program factor can be modified to include an appropriate supercompressibility factor for the expected range of service conditions. The program factor can also be used as calibration provision for adjusting the system's accuracy to within tolerance.

Due to manufacturing tolerances for each pressure transducer, the computer is to be electronically aligned with each specific pressure transducer.

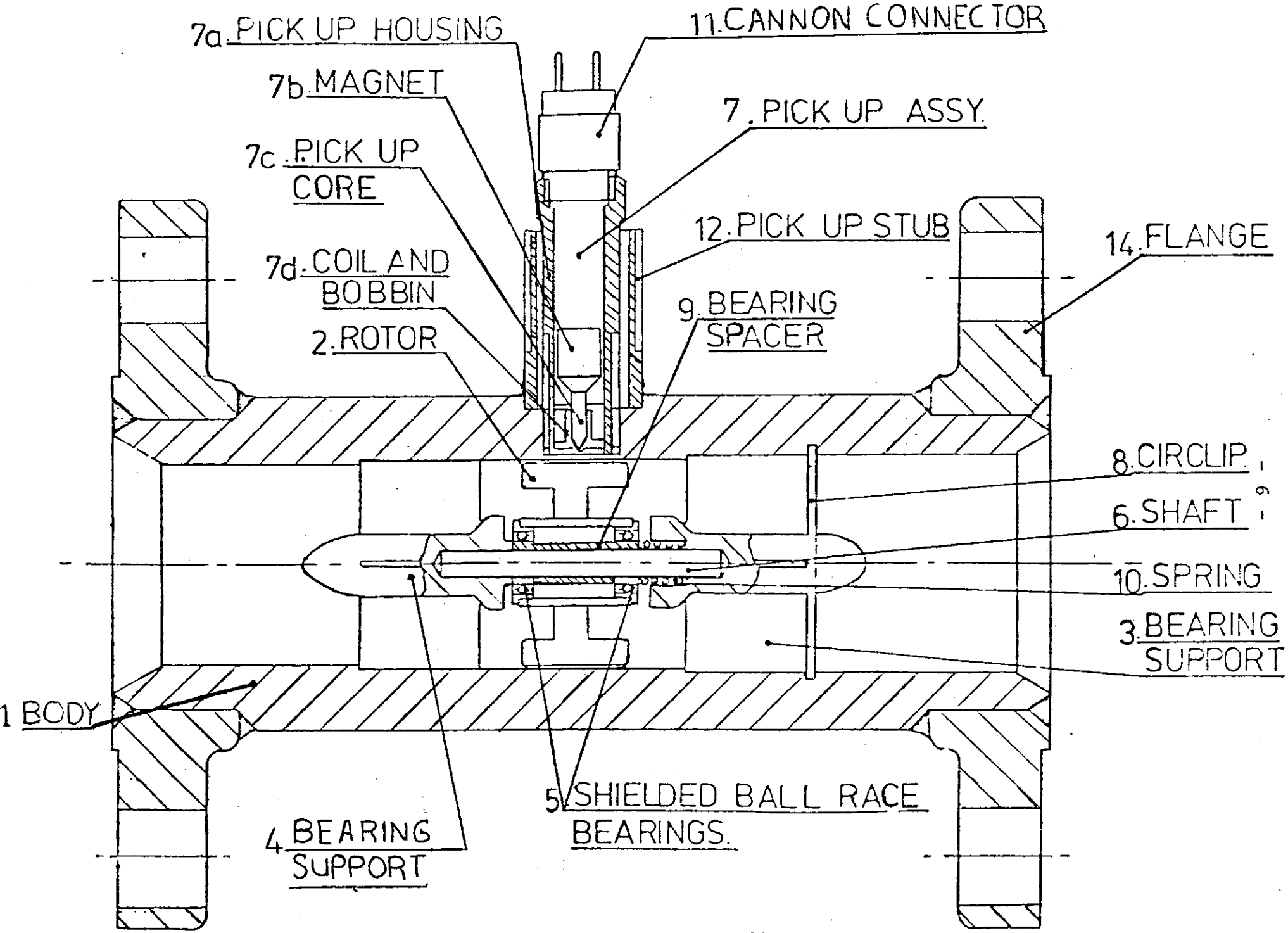
Note: Sections of Technical Manual DTM 1001 which refer to a flow rate circuit are not applicable to the model of flow computer approved in this circular.

Nameplate Marking Requirements

The various components shall bear nameplates or decals including the following information: (These nameplates shall be located on the housings, when components are encased in the approved explosion proof Crouse-Hinds enclosures.)

A) Meter

Canadian Distributor's Name
Manufacturer's Name
Model No. or Type Designation
Serial No.
Approved Flow range A.C.F.H.
Maximum Working Pressure
Direction of Flow
Calibration Factor, "K" (Counts/A.C.F.)



TURBINE METER WITH SHIELDED BALL RACE BEARINGS

B) Pressure Transducer

Canadian Distributor's Name
Manufacturer's Name
Model No. or Type Designation
Serial No.
Approved Pressure Range
Calibration: Input ---Vdc; Output -- mV/volt
mV/psi

C) Temperature Transducer

Canadian Distributor's Name
Manufacturer's Name
Model No.
Serial No.
Approved Temperature Range

D) Computer

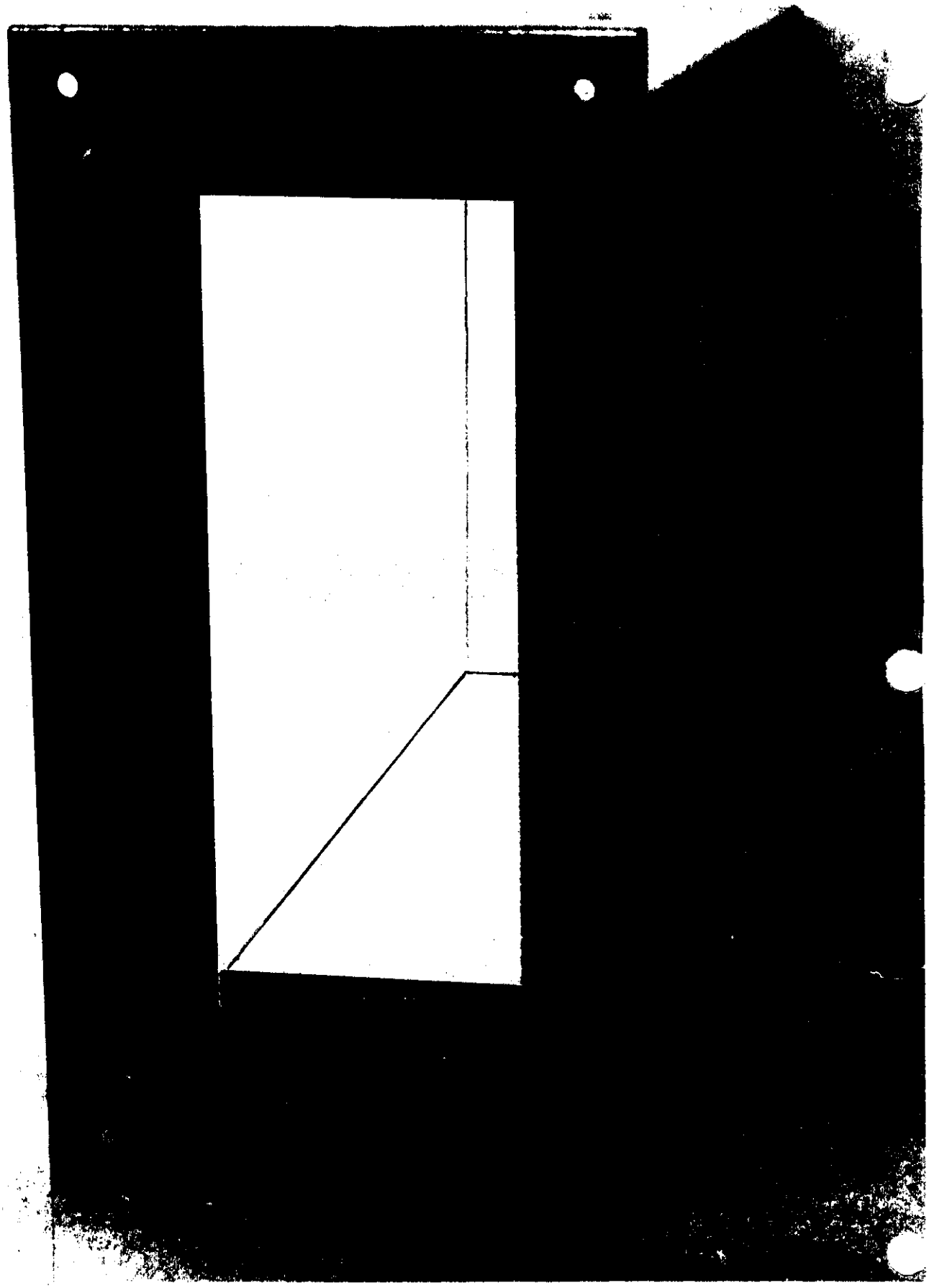
Canadian Distrubutor's Name
Manufacturer's Name
Model No.
Serial No.
Ambient operating temperature
Serial No. of pressure transducer used in system
Pressure Range --- to --- psig
Base Pressure
Programmed Atmospheric Pressure
Temperature Range
Base Temperature
Supercompressibility Factor
Program Factor *

* This factor is to be verified using the method of calibration outlined on pages 16 to 19 of Technical Manual DTM 1001.

The units of measurement, i.e. S.C.F., with appropriate multiplier, shall be clearly marked below or directly to the right of the counter.

Sealing Requirements

The various components will be encased in explosion proof and/or weather proof housings and effectively sealed against tampering. The illustrations on this circular show the types of enclosures to be used. The following method of sealing applies:



A) Meter

The electronic pick-up unit (EPU) which transmits the meter volume signal to the computer, will be enclosed in a Crouse-Hinds model GUAC-36 explosion proof housing. Sealing will be accomplished by means of sealing wire or an approved equivalent. The wire shall effectively seal the screwed cap on the housing to the body of the enclosure by passing through a drilled screw head on each component.

B) Temperature Transducer

Enclosed in a Crouse Hinds model GUAB-26 housing the temperature transducer shall be sealed in the same manner as the electronic pick-up unit.

C) Computer

Two housings are available, as illustrated in the circular.

1) An explosion proof casing in which the circuit boards are fixed horizontally by means of studs, nuts and spacers. Sealing provision is same as indicated for the electronic pick-up unit in Section A above.

2) A weatherproof, wall-mounted case, housing the computer in its normal assembly. Provision is made for sealing through appropriate holes in the bolt heads securing the front and rear panels to the centre portion of the enclosure.

To permit access to the power switch the sealing of the front cover shall be the responsibility of the utility.

It may be noted that photographs do not reflect the required sealing arrangements and the approved type of non-resettable counter.

Installation Requirements

The turbine meter is designed for operation in a horizontal position with the electronic pick-up at the uppermost location.

The maximum allowable length of the interconnecting cables from the turbine meter, the pressure transducer and the temperature transducer to the computer is 100 feet. Signal amplifiers have not been approved for use with this system. Transmission cables are to be enclosed in conduits and each cable shall be installed in a separate conduit. Where transmission cables are

run inside control cabinets and etc., the shielded cables shall be bundled and separated from other conductors. Also, conduits carrying transmission cables shall not closely parallel conduits carrying power to electrical motors, starters and etc.

Since this type of system can be affected by electrical noise, the installation procedures with regard to the type of cable to be used, grounding requirements and etc. must be adhered to. Page 23 of the Technical Manual DTM-1001 details cable specifications.

The turbine meter must be placed in service with the following upstream and downstream piping requirements:

a. With Straightening Vanes:

- When straightening vanes are used, ten (10) diameters of straight pipe are required upstream and five (5) downstream. Straightening vanes are required to meet specifications as appear in A.G.A. Report No. 3, on orifice meters.

b. Without Straightening Vanes

When straightening vanes are not used, twenty (20) diameters of straight pipe are required upstream and five (5) diameters of straight pipe are required downstream.

Refer to Technical Gas Circular G-77-3 for a description of the required field test procedure.

Approval granted to:

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and
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