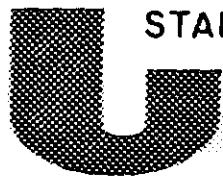




Department of consumer and corporate affairs / Ministère de la consommation et des corporations



STANDARDS BRANCH - DIRECTION DES NORMES

NOTICE OF APPROVAL

S.WA-783

OTTAWA March 12, 1970.

Approved: NEPTUNE - ATCs FOR 1-1/4", 1-1/2" AND 2" METERS FOR LPG
manufactured by: Neptune Meters Limited, Toronto.

Apparatus Listed: Neptune type 1 style 22 and type 3 style 22 automatic temperature compensators for registers on meters used for commercial propane.

Rating of Apparatus: The temperature range of these ATC units is -10°F to 125°F . When the temperature of the propane being metered falls below -10°F , the ATC continues compensating as though the temperature were only -10°F , and under-compensation results.

Conditions: The use of these automatic temperature compensators (ATCs) is restricted to 1-1/4" (type 1 ATC), 1-1/2" (type 1 ATC) and 2" (type 3 ATC) type 4D Neptune meters for LPG, installed on tank trucks or other locations where a connection can be made from the vapour release vent line on the meter to the vapour space of the supply tank.

These ATCs are designed for commercial propane with a coefficient of expansion corresponding to a liquid with specific gravity of 0.508 ($60/60^{\circ}\text{F}$) and they therefore may only be used on commercial propane (a mixture of propane, butanes and ethane) with specific gravities in the range 0.500 to 0.515.

All retail meters owned by a particular propane dealer must either all be equipped with ATCs or none may be equipped. The ATC must be in the compensating position at all times, except if sealed in the non-compensating position by an Inspector of Weights and Measures. All tickets and invoices from meters equipped with these ATCs must bear the legend "gallons at 60°F ".

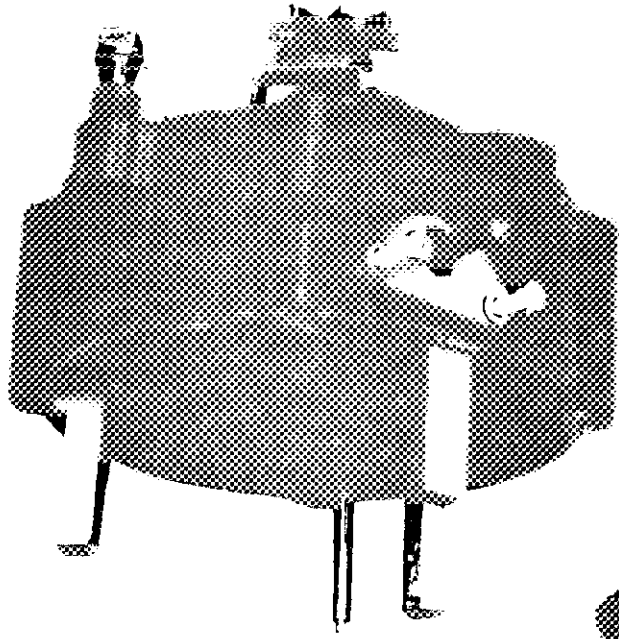
Other conditions shall apply as required by ST-SPEC-V2 - "Specification for Installation Verification and Use of Meters for LPG."

Approved models of Lockheed computing registers may be used in conjunction with the ATC unit, as well as approved models of Neptune registers. When a Lockheed register is used, a Neptune series 200 ("gear shifter" type) adapter-calibrator is installed between the register and the ATC unit on the 1-1/4" and 1-1/2" meters.

Description: The temperature of the liquid propane is sensed by a liquid-filled thermostat bulb incorporating an internal bellows element whose length changes with temperature, and which with a push-rod moves the lower end of the lever on the ATC assembly. The upper end of the lever through a push-rod adjusts a variable speed (ratio) device; the ratio of the turns of the output shaft (which drives the meter register) to the turns of the input shaft (from the metering elements) is thereby made to vary linearly

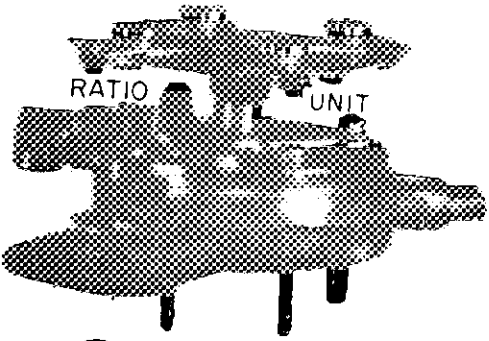
NEPTUNE - ATCs FOR 1 1/4", 1 1/2" AND 2" METERS FOR LPG

S.WA-783



UPPER PUSH ROD

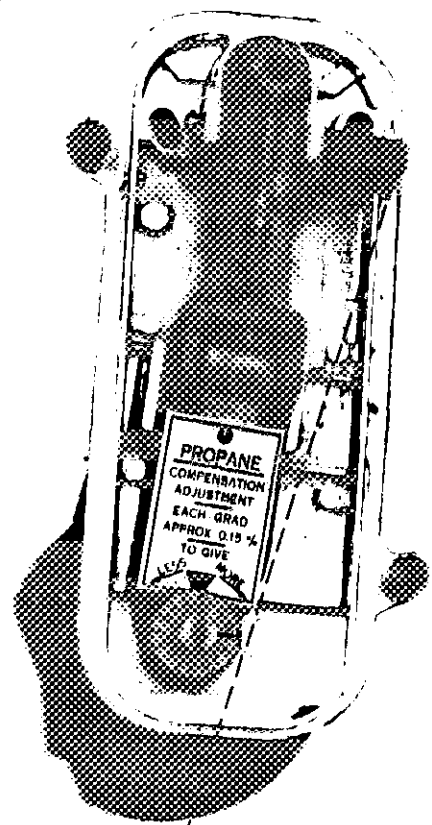
VARIABLE



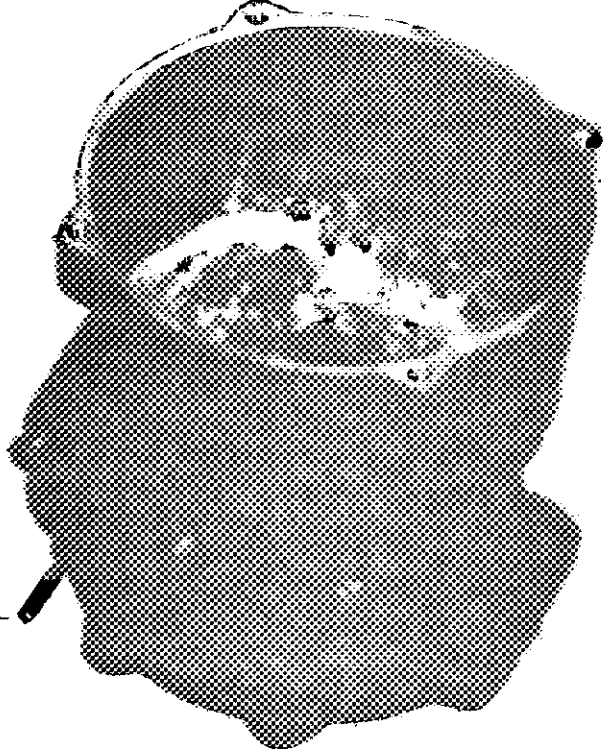
RATIO UNIT



PIN IN COMPENSATING POSITION



PIN IN NON-COMPENSATING (60° F) POSITION



LOWER PUSH-ROD

PARTIAL DISASSEMBLY OF TYPE I STYLE 22 ATC

(FOR 1 1/4" AND 1 1/2" METERS)

with propane temperature. The ratio of the lever arms has been designed so that the variable ratio of the shafts at any temperatures corresponds to the temperature correction factor for propane at that temperature.

With the pin in the uncompensating position, the position of the upper lever is fixed and is not affected by product temperature. In the uncompensating position, the lever sets the push-rod to a position corresponding to a product temperature of 60°F; with the push-rod in this position, the ratio of the variable ratio drive or ATC mechanism has been factory adjusted for a ratio of 1.000 and the adjustment screw sealed with coloured wax.

Once the upper adjustment screw has been set, the lettered dial (A,B,--) is used to adjust the lower lever so that with the pin in the compensating position and a product temperature of 60°F, there is no movement of the upper lever or push-rods; that is, the ATC device retains the 1.000 ratio.

There is normally no flow of liquid in the top casing part of the meter body in which the ATC thermostat is located (as it is isolated from the flowing, metered liquid by the meter chamber cover plate) and the liquid surrounding the bulb would therefore change its temperature only by heat conduction through the metal and convection currents in the liquid. This alone would only very slowly cause the thermostatic bulb to respond to changes in temperature of the metered liquid to increase the circulation about the thermostat, unmeasured liquid is drawn off from above the metering elements and returned to the truck through the line for the connection for the vapour release and differential valves. This liquid is made to flow over the entire surface of the thermostat bulb by surrounding it with a sleeve through which the liquid must pass. By this means, the temperature of the liquid surrounding the bulb is kept at that of the metered stream. Flow of liquid past the bulb starts as soon as the power take-off on the delivery vehicle is engaged, and the bulb is pre-conditioned to the product temperature before delivery actually starts, while the operator is unreeling the hose and making the connection to the customer's tank.

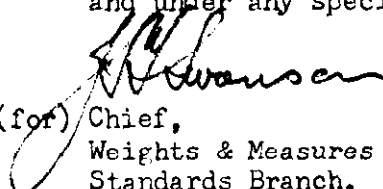
Testing: The ATC is tested at the Neptune plant using water controlled at temperatures of 40°F, 75°F and 100°F. In addition a temperature of 0°F is simulated by moving the push rod the appropriate amount, and checking the compensation effected by the variable ratio drive.


The ATC unit on 1-1/4" and 1-1/2" meters is tested in the field by installing an odometer on the uncompensated shaft and carrying out tests as in W.&M. Circular 67/9, dated April 17, 1967, and letters to all District Inspectors dated July 20, 1967 and September 10, 1969.

The ATC on the 2" meter has a permanently installed odometer-type volumetric register, and it is tested in the field by simply comparing the readings of the uncompensated and compensated registers. To facilitate calibration, a change gear shifter common to the odometer and the compensated register has been installed, with an extra pair of calibrating gears, with the same ratio as the gears in the compensated register. On all sizes of meters, product temperature is to be measured using a mercury-glass thermometer placed in the strainer (not the meter) thermal well.

References: SW-85-N4 SL-102-719

Note: Approval is granted under the Weights and Measures Act, Chapter 292, and Regulations thereunder (P.C. 6894) for use in Canada under the general conditions of P.C. 689 and under any special conditions listed above.

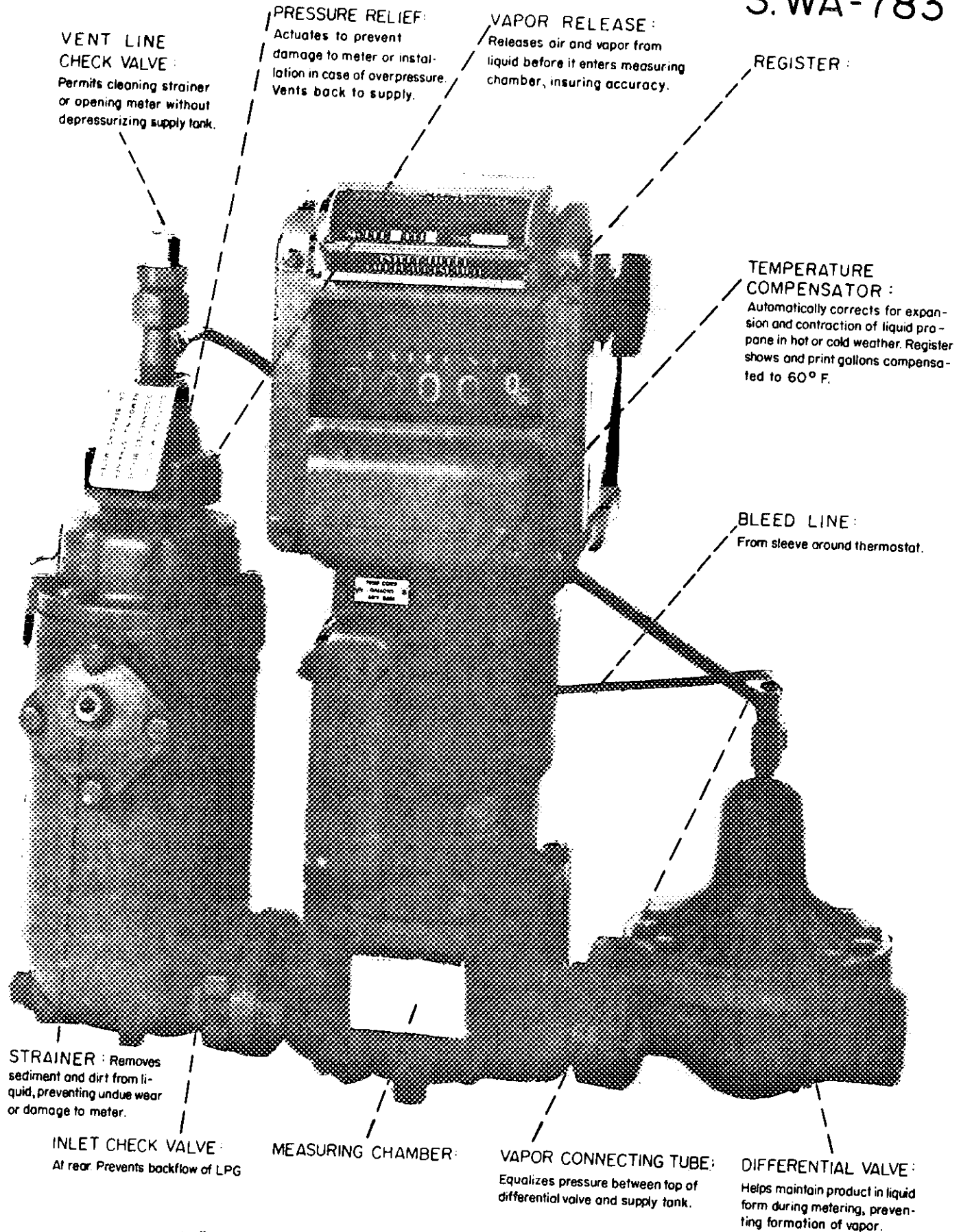

(for) Chief,
Weights & Measures Division,
Standards Branch.


R.W. MacLean,
Director,
Standards Branch.

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NEPTUNE - ATCs FOR 1¼", 1½" AND 2" METERS FOR LPG

S.WA-783



1½" TYPE 4D METER WITH TYPE 1 STYLE 22 ATC UNIT