

SERAPHIN® GRADUATED NECK PROVER

OPERATING AND MAINTENANCE INSTRUCTIONS

Seraphin® Test Measure
A Division of Pemberton Fabricators, Inc.
Rancocas, NJ



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SERIES M

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CARE, MAINTENANCE, AND USE OF A

SERAPHIN[®] PROVER

- A SERAPHIN[®] prover is designed and constructed according to NIST handbook 105-3 and API Manual of Petroleum Measurement Standards (MPMS) Chapter 4.
- Prover calibration may be established at 1-year intervals and extended or reduced on historical evidence up to the limit determined by your regulatory agency, but should not exceed 3 years due to possible leaking valves or seals which are often difficult to observe under field conditions.
- The prover should be maintained in a clean, dent free condition for accurate readings.

I. Prover Wetting Procedure:



1. If the prover is clean and free of debris, fill the prover with liquid from the meter device being checked. Fill the prover until the amount on the meter reads the nominal capacity of the prover.

NOTE: *The prover must be filled once and drained in order to wet the internal sides of the prover body. Wetting the internals of the prover helps ensure consistency in the amount of liquid that clings to the sides, from one test to the next.*

2. Establishing a “wet-down” condition: Fill the prover with product to its nominal level on the scale. Open the valve at the base and drain the product. Once the main flow breaks, drain the prover for an additional 30 seconds, and then close the valve.
3. This constitutes a “wet down” condition and is ready for an official test.

II. Testing Procedure:

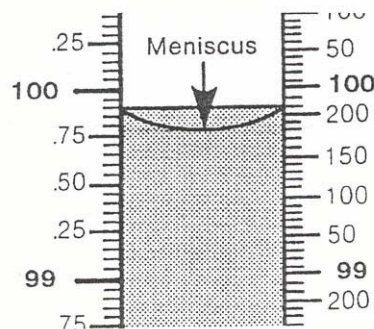
1. Record the meter register, or zero the prover counter if one is being used.

Stop Static.

WARNING: *The prover system must be properly grounded prior to conducting petroleum measurement testing to prevent possible static electricity from sparking which could ignite a flammable product. Follow all safety measures.*

2. If a flammable liquid is being tested, ensure the prover is grounded to a proper earth ground using a grounding cable and clamp (to eliminate static electricity build-up).
3. Check and adjust the leveling device(s) to ensure that the prover is level and verify that the prover drain valve is closed.
4. Fill the prover using the dispensing equipment until the meter being checked reads the nominal capacity of the prover.
5. Identify the volume measurement on the scale by reading the meniscus in the gauge glass. Look directly from eye level to a horizontal line tangential to the bottom of the meniscus. Record the result.



6. Drain the prover by opening the bottom drain valve. Once the main flow breaks, drain the prover for an additional 30 seconds and close the valve. This is necessary to provide a consistent “to deliver” condition.

7. Perform a second measurement by repeating the procedure in 3. through 6. above. Compare the meter reading to the volume observed on the scale. The two successive measurements should agree with the meter tolerance specifications of the meter manufacturer.



CAUTION: *Disposal of drained fluid should be done in an environmentally safe and responsible manner in accordance with good industry practices and in compliance with OSHA regulations*

8. If excessive disagreement is observed, check the dispenser and the prover for leakage and cleanliness and repeat the procedure until the results of two successive runs repeat within acceptable tolerance

III. Care and Maintenance

1. Check provers periodically for leaks at the valve, seams and at the gauge assembly. If a leak is detected, call your SERAPHIN® for authorized repair parts.

Note: *Refer to NIST Handbook 44, API Manual of Petroleum Measurement Standards (MPMS) Chapter 4, Sect. 8 Operation of Proving Systems and Chapter 12.2 Calculations of Petroleum Quantities for detailed information and procedures.*

Terminology

Bottom loading: Method of filling a volumetric vessel. Intake is made with a bottom load adapter.

Capacity, nominal: The nominal capacity of a field standard test measure or prover is the volume used to designate the measure or prover. The volume is determined by the nominal mark on a graduated upper neck gauge and between the nominal mark on the graduated upper neck gauge and the lower shut off valve or zero mark on a lower neck gauge on a prover.

***NOTE:** The nominal capacity of the prover has be set at the Seraphin® facility using Standards that are traceable to the National Institute of Standards and Technology (NIST). If uncertainty values or a higher order of calibration is needed the unit should be sent to a certified calibration laboratory.*

Cubical coefficient of thermal expansion: Three dimensional expansion or contraction of a material due to temperature change, expressed °C⁻¹ or °F⁻¹

Field standard test measure: A measure that can be hand held and is usually less than 40 Liters (10 Gallons).

"High Resolution" standard: A standard with a small diameter neck for improved resolution in reading the meniscus. Generally used in the laboratory as a standard or check standard for measurement control of a primary standard.

Main flow cessation: The moment when a full discharge stream "breaks" and becomes a trickle or a drip.

Prover: Bottom drain is implied. Filled from the top or bottom loading, depending on intended use. May be free standing, mounted permanently, or on truck or trailer and not hand held.

Reference temperature: The temperature at which the measure is intended to contain or to deliver its nominal capacity.

Sight-flow-indicator: A fitting with windows to visually observe the flow through a pipe.

Submerged fill pipe: Pipe used in top filling to minimize foaming of liquids, such as fuel oil and milk, by discharging the product into the bottom of a prover.

To contain: An indication that the standard is adjusted to contain its intended volume when filled from its empty condition at a reference temperature. (the empty condition is "dry" and test measures or provers are generally not used in this condition).

To deliver: An indication that the standard is adjusted to deliver its intended volume at a reference temperature. Provers used in a "wet" condition are marked To Deliver.

Tolerance: Maximum permissible error. A value fixing the limit of allowable error or departure from the true performance or value.

Vapor recovery: A system for entrapping and collecting vapors for return to the tank to prevent expulsion into the atmosphere.

SAFETY

The use of a test measure or prover standard may involve hazardous materials, operations, and equipment. Seraphin does not purport to address all safety problems associated with the use of each product. It is the responsibility of the user of the standard to establish appropriate safety and health practices and determine the applicability of local and federal regulatory limitations prior to use. Specific safety information is documented in the various trade references (e.g. American Petroleum Institute and Petroleum Equipment Institute).

Commercial liquid measuring devices, tested with provers, are typically used to measure quantities of petroleum products. Petroleum products are known hazardous materials and hazardous wastes. The user is encouraged to obtain Material Safety Data Sheets (MSDS) from the manufacturer of any product encountered. Federal, state and local safety and disposal regulations concerning hazardous materials encountered should be reviewed by the user.

Safety devices and locks should be installed to prevent inadvertent operation of, or unauthorized tampering with, equipment. All automated or power-operated meter proving systems should have emergency manual operators for use during an accident or power failure. Grounding devices should be provided to protect against electrical shock or static discharge in both tank prover and \ electrical instrumentation.

All electrical connections must be explosion proof. All wiring, including low voltage wiring shall meet the requirements of Article 300, 500, Group D, Class 1, Division 1, and 250.45 and/or other applicable articles of the latest edition of the National Electrical Code.

SERAPHIN® TEST MEASURES
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CERTIFICATE OF WARRANTY

PEMBERTON FABRICATORS, INC. FULLY WARRANTS THAT THE PRODUCT SUPPLIED SHALL CONFORM TO THE DESCRIPTION IN THE QUOTATION AND AGREES TO REPAIR OR REPLACE F.O.B. SHIPPING POINTS, ANY PARTS EXCEPTING EXPENDABLE ITEMS SUCH AS FILTERS AND LIGHTS THAT FAIL DUE TO DEFECTS IN MATERIAL OR WORKMANSHIP WITHIN ONE YEAR OF USE OR 18 MONTHS AFTER SHIPMENT, WHICHEVER OCCURS FIRST.

Other than those expressly stated herein, there are no other warranties of any kind, expressed or implied, and specifically excluded but not by way of limitation, are the implied warranties of fitness for particular purpose and merchantability.

It is understood and agreed that Pemberton Fabricators, Inc.'s liability whether in contract, in tort, under any warranty, in negligence or otherwise shall not exceed the cost of repair or replacement, f.o.b. shipping points, of defective parts. Under no circumstances shall Pemberton Fabricators, Inc. be liable for special, indirect, incidental, or consequential damages. The price stated for the equipment is a consideration in limiting Pemberton Fabricators, Inc.'s liability. No action, regardless of form, arising out of the transactions of this agreement may be brought by purchaser more than one year after the cause of action has accrued.

The warranty for the equipment proposed is as stated in the above paragraphs. It is not re-stated--nor does it appear in any other form.