SERAPHIN® SLIP-ON CALIBRATION UNIT

OPERATING AND MAINTENANCE INSTRUCTIONS

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

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PEMBERTON FABRICATORS, INC.

RANCOCAS, NJ, U.S.A.

Description:

The Seraphin® Slip-on Designed to slip easily into the bed of a pick-up truck, Seraphin's Slip-On Volumetric Calibration Unit can speed the job of calibrating multiple fuel dispensing units, while at the same time, enhancing safety. The unit consists of three 5 gallon NIST compliant bottom drain provers individually plumbed to (3) 80 gallon, Stainless Steel transfer tanks. The 80 gallon configuration allows for up to 48 calibration tests before returning to the fuel station's storage tank for dumping

***CAUTION*:** *Secure the Slip-on unit to the bed of the pick-up truck, so that the unit does not shift during driving and stopping.*

Set-up Procedure for calibration with 5 gallon prover:

1. Electrically ground the slip-on unit, to a proper earth ground, using the 50 ft. of grounding cable enclosed in a retractable reel which is mounted on the skid deck. Also, check to see that the grounding strap from the prover to the tank is secure. This will dissipate any static electricity that could be generated during the filling of the prover.


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. Remove the (3) cotter pins from the locking bracket and slide the “U” bracket out so that the provers can be free standing and able to be leveled individually.

3. Close all 3 prover drain valves and 3 holding tank gravity drain valves.

4. Remove the Vapor Cap from the top of the prover neck, exposing the neck opening.

5. Visually inspect, from the top neck opening, the interior of the prover to ensure it is free of debris which could affect the accuracy of the liquid volume measurement.

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. Open the prover drain valve to drain the prover into its holding tank. Once the cessation of main flow breaks, as viewed through the sight flow indicator, wait 30 seconds and then close the drain valve.

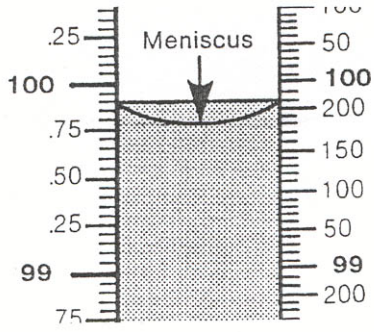
3. The prover is now wet down and is ready for an official test.

Conducting the Calibration with the 5 gallon prover:

1. Fill the special "J" prover until the amount on the meter reads the nominal capacity of the prover.

2. Level the prover on its leveling ball joint until the bubble in the circular level is in the center circle.

3. 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



4. Compare the reading on the graduated scale to the meter reading. Document or record the difference in readings.

5. Open the prover drain valve. Once the cessation of the main flow breaks, wait 30 seconds and then close the drain valve.

> ***NOTE:*** *Ensure the tank gravity drain valve is closed when draining the prover into the tank, to avoid the possibility of fuel spillage.*

Gravity draining of the 80 gallon holding tanks:

1. Ensure tank gravity drain valve is completely closed.

2. Connect the 2" petroleum drain hose (provided with the vehicle) to the tank gravity drain quick connect fitting, for the tank you wish to drain.

3. Route the hose to the below ground storage tank inlet piping.

> ***NOTE:*** *Place traffic cones around the storage tank inlet and the drain hose to alert motorists in the station of the hazard and that work is in progress.*

4. Open the gravity drain isolation valve.

5. Ensure the gravity drain hose is attended at all times when draining to ensure it stays in the storage tank inlet until completely drained.

6. Once the tank is completely drained, close the holding tank gravity drain valve.

7. Disconnect the petroleum drain hose from the holding tank gravity drain connection.

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> **CAUTION:** *Ensure all fuel residual is drained from the hose into the underground storage tank prior to lifting the hose from the storage tank inlet.. 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. Stow the drained hose, secure the provers with the (3) locking brackets making sure to replace the cotter pins and replace vapor caps.

Maintenance and Care of Seraphin® Trailers

Tires

1. Make sure the trailer tires and wheels are of the same size, type, tread design and load carrying capacity. Differences may adversely affect trailer handling and could increase a risk of loss of vehicle control.

2. Inflate tire pressure to manufacturers specifications and check weekly, when cool, before you drive. Failure to maintain the proper recommended pressure can adversely affect the way your trailer handles. If one tire looks lower than the others, use a tire gauge to check pressure, and adjust if required. Check the tire pressure every few weeks (including spare).

WARNING: *Under-inflation is the most common cause of tire failures and may result in severe tire cracking, tread separation or "blowout", with unexpected loss of vehicle control and increased risk of injury. Under-inflation increases sidewall flexing and rolling resistance, resulting in heat buildup and internal damage to the tire. It may also result in unnecessary tire stress, irregular wear, loss of vehicle control and accidents. A tire can lose up to half of its air pressure and not appear to be flat!*

3. Periodically inspect the tire threads and remove stones, nails, glass or other objects that may be wedged in the tread grooves. Check for holes or cuts that may permit air leakage from the tire and make necessary repairs.

4. Inspect the tire sidewalls for cuts, bruises and other damage every 3 months or 3,000 miles. If internal damage to the tire is suspected, have the tire demounted and inspect in case it needs to be repaired or replaced.

5. Check that wheel nuts and bolts are tight every 3 months or 3,000 miles.

Lights

1. Make sure that all running lights, brake signals and hazard lights are operational with each use.

2. To replace trailer lamps, carefully pull the lamp from the assembly, remove the defective bulb from the socket and replace with a similar bulb.

Brakes

1. Inspect brake to be sure they are operational with each use.

2. Adjust brakes to proper operating clearance every 3 months or 3, 000 miles

3. Inspect brake linings for wear and contamination annually or every 12,000 miles.

4. Inspect brake magnets for wear and current draw every 6 months or 6,000 miles.

5. Check brake cylinders for leaks and sticking annually or every 12,000 miles.

6. Check brake controller for correct amperage and modulation every 6 months or 6,000 miles.

7. Inspect trailer brake wiring for bare spots, fray etc. annually or every 12,000 miles

Axle

1. Inspect hub/drum for abnormal wear or scoring annually or every 12,000 miles

2. Inspect wheel bearings and cups for corrosion or wear. Clean and repack annually or every 12,000 miles.

3. Inspect the seals for leakage. Replace if removed annually or every 12, 000 miles.

4. Inspect springs for wear or loss of arch annually or every 12,000 miles.

5. Inspect suspension parts for bending, loose fasteners or wear every 6 months or 6,000 miles.

6. Inspect hanger welds annually or every 12,000 miles.

Hitching the Trailer to the Truck

1. Park the trailer on a level surface. Crank the front jack to an appropriate height, above the vehicle's hitch. Lower the jack, adjusting the ball and the hitch so that the tongue securely fastened.

2. Raise the tongue jack high enough so that it can not hit while being transported

3. Connect the safety chains to the hook retainers of the vehicle hitch. To connect the trailer's safety chains, cross the chains under the trailer tongue and allow slack for turning corners. **Do not attach safety chains to the bumper.**

Trailer Connector

1. Seraphin supplies a thermo-plastic 7-way RV Connector that has brass contacts to prevent corrosion. It is interchangeable with other 7-way RV Connectors. 12 volts, 30 amps

Typical Wiring Diagram for 7-Pole Connector

1. Ground	**White**
2. Electric Brakes	**Blue**
3. Tail Running Lights	**Green**
4. Battery	**Black**
5. LH Stop & Turn	**Red**
6. RH Stop & Turn	**Brown**
7. Auxiliary	**Yellow**

Note: *Locate wires by function only. Color coding is not standard among all manufacturers.*

Vehicle Loading

1. Properly loading your trailer will provide maximum return of trailer design performance. The maximum recommended loaded trailer weight, GVWR (Gross Combined Vehicle Rating) is the highest possible weight of a fully loaded trailer. You can find this listed on the trailer identification plate on the tongue of the trailer.

2. The GCW (Gross Combined Weight) is the weight of the loaded vehicle (GVW) plus the weight of the fully loaded trailer. The GCW (Gross Combined Weight) must never exceed the GCWR (Gross Combined Weight Rating) which can be found by consulting your truck dealership or in the truck owners guide.

WARNING: *Do not use replacement tires with lower load carrying capacities than the originals because they may lower the trailer's GVWR limitation Replacement tires with a higher limit than the originals do not increase the GVWR.*

3. Towing a trailer places an additional load on your vehicle's engine, transmission, axle, brakes and suspension. Inspect these components carefully prior to and after any towing operation.

Reference:

For officially recognized petroleum measurement procedures and methods—reference:

- NIST Handbook 44 Specifications, and Tolerances, and other Technical Requirements for Weighing and Measuring.

- API Manual of Petroleum Measurement Standards, Chapter 4, Section 4 (Tank Provers) and Section 8 (Operation of Proving Systems).

Care and Maintenance

- Check provers, valves and piping periodically for dents and leaks at the seams, joints, connections and gauge assembly. If a leak is detected, call SERAPHIN® for authorized repair parts.
- Periodically check that the Slip-on unit is secured to the to the bed of the pick-up truck, to prevent shifting within the bed of the truck..
- When removing the Special J prover for calibration or service , always remove the nuts on the bolts at the flange. Unscrewing the ball joint can damage the Teflon® sealing ring causing leakage and/or problems swiveling the ball joint.
- If the ball joint needs to be removed or adjusted use the Stainless Steel Wrench provided.
- Tighten the acrylic glass to a torque of 50 inch pounds.
- Check the butterfly valves for leakage by watching for leakage occurring during testing through the acrylic sight flow indicator. If leakage occurs a flapper valve may be replaced – without having to recalibrate the unit. If the valve it self is replaced, the unit should be re-certified for accuracy.

Terminology

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

Capacity, nominal: **T**he 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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