TYPE 99.20 FIXED, PORTABLE AND VEHICLE MOUNTED MEASURING TANKS

APPLICATION

Fixed, mobile or vehicle mounted reservoirs that are calibrated for the delivery of pre-determined volumes of liquid.

EQUIPMENT

Volumetric proving standard, narrow-neck metal standard, glass graduate standard, and / or positive displacement meter (compared in relation to a local standard), pump and assorted hoses.

USE

- Whenever possible witness a measurement / delivery (or interview the operator) to ensure that mobile or vehicle mounted tanks are placed on a level surface for measurement; that they are not used to deliver quantities between internal markers; and that the valve operation sequence is appropriate (dry line vs wet line calibration).

NOTE: Measurement Canada will calibrate and certify measuring tanks only if they are the only means of measuring product (ie that product is not metered at some point in the trade transaction).

- Fixed tanks are levelled within the limits marked on the level gauges.
- Device has been initially inspected (if applicable) and bears the initial inspection marks.

VISUAL EXAM (MARKING AND LABELLING)

- Device is marked with the required information (manufacturer’s name, model and serial number, Capacity(ies), wet or dry line calibration, identification of individual compartments, etc).
- Information is located as required and marking is permanent (if applicable).
- Marking plate is permanently affixed to the device.
- Initial inspection marks (dye or approved label).
- Marking device usage restriction (if applicable).

VISUAL EXAMINATION (SEALS)

- Internal capacity indicators are sealed.

VISUAL EXAMINATION (INSTALLATION - GENERAL)

- Designed and constructed and assembled to ensure delivery of liquids within tolerances.
- Rigidity of tank shell and bulkheads.
- Automatic means for venting the tank when filled or emptied.
- Vehicle mounted tanks must be designed to ensure a complete discharge of the contents when on a surface that is within 3 degrees of level.
- Space between compartments equipped with drains.
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VISUAL EXAMINATION OF MARKERS

- Design of capacity indicators .......................................................... R.301
- Location of capacity indicators in a tank ........................................ R.302, R.303
- Capacity indicators affixed to a permanent section of the tank and sealable .................................................. R.304
- Suitable opening to access capacity indicator for installation, sealing and reading ............................................. R.305
- Conditional prohibition of gauge glass fittings ........................................ R.306
- Internal capacity indicator of vehicle mounted tanks: centrally located in the compartment, affixed to a mounting bracket and sealable .............................................. R.312
- Two or more capacity indicators affixed to the same mounting bracket .................................................. R.313
- Sensitivity of internal capacity indicators ........................................... R.314

VISUAL EXAMINATION (PIPING, MANIFOLDS, AND DELIVERY HOSES)

- Provisions for flow connection between calibrated tanks; and provisions for manifolds that connect a battery of calibrated compartments (check valves) .................................................. R.300, R.320
- Length, size and stiffness of discharge dry hose ....................................... R.307
- Provisions for complete delivery through pumps ....................................... R.308
- Provisions for bottom fill connection and drain connection (split outlet piping) .................................................. R.316
- Provisions for splitting a manifold in two sections ....................................... R.317
- Delivery piping may be concealed on vehicle tanks restricted for bunker oil .................................................. R.219

PERFORMANCE

NOTE: Certified volumetric provers and measures are required to be wet and dripped in accordance to their verification certificate .......................... STP-22

Volume correction for the expansion or contraction of the prover shell need to be calculated into the observed volume reading ........................................... STP-23

In-service limits of error apply to tests performed in the field ............ Bulletins V-3 and V-23

Liquid that can be used for the calibration of tanks shall have a thermal coefficient of expansion, volatility and viscosity not greater than domestic furnace oil; and must not have a corrosive effect on the tanks (usually furnace or stove oil, or water) .......................... R.321

Tanks can be tested and calibrated only after their installation has been completed . . . R.322

Tanks (other than vehicle mounted) must be calibrated to a valve immediately adjacent to their outlet connection .................................................. R.323

For safety and in order to minimize chances of fraud, vehicle mounted tanks should preferably be calibrated “dry lines”. 
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**NOTE:** Tanks can be calibrated using certified provers and measures. The prover must be compatible to the liquid chosen to perform the calibration. Proviers must be mounted above the tanks to be calibrated on a stable surface and set to be levelled. To optimize accuracy, the prover size should be such as to minimize the number of draft to be poured into the tank. The drain hose must be as short and rigid as possible to ensure complete delivery into the tank. The prover is filled to its nominal capacity; the liquid is poured into the tank; the prover is drained into the tank to be calibrated in accordance with the Prover Wetting and Drainage procedure (STP-22).

Tanks can be calibrated using a precise and repeatable master meter. The meter must be compatible with the liquid used for the calibration. Consult the Master Meter Calibration Procedure ........................................... STP-30

- Ensure that the tank is levelled or the vehicle rest on a levelled surface.
- Ensure that the drains between the compartments of vehicles are not plugged and the vents on the top of the compartment are open to atmosphere.

- Ensure that there is no liquid left in the tank or compartments.
- Open the valve of the tank; or the safety valves and manifold and drain valves on vehicles. Drain the tank or compartments completely.

**NOTE:** Safety valves are located immediately adjacent to the outlet of the compartment

- Perform a line drainage test ........................................... STP-31
- Close the valve of the tank
- Determine whether vehicle mounted compartments will be calibrated "dry" or "wet".

**NOTE:** This information must be marked on the nameplate in a prescribed manner.

- Close the safety valve and leave the manifold and drain valves open in the case of vehicle mounted compartments calibrated "dry lines".
- Close the manifold valves and leave the safety valves and main drain valve open in the case of vehicle mounted compartments calibrated "wet lines".

**PROCEDURE USING A PROVER AND TEST MEASURES**

- Fill the prover to its nominal capacity. Check for leaks at prover valves and hose connection; if any, they must be fixed before pursuing further
- Fill the tank to the lower markers by making successive prover drops. Graduated standards or smaller measures which may be required should be assembled before testing begins.

**NOTE:** In the case of a wet line calibration of vehicle mounted compartments, withdraw four or five litres of product by opening the manifold valve and return the product back to the compartment; this procedure is to ensure that no air was trapped during filling.
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- Ensure that the safety valve or the manifold valves as well as piping do not leak
- Perform a sensitivity test .............................................................. STP-32
- Adjust and seal the capacity indicator
- Proceed to verify the next higher capacity indicator. Multiple capacity tanks require multiple markers. Verify each one sequentially, to full capacity.

NOTE: A sensitivity test is required only for the lower indicator.

- Perform an expansion space test ............................................... STP-33
- In the case of multiple vehicle mounted compartments interconnected by a manifold, when the first compartment is calibrated, perform a manifold back flow test ...................... STP-34
- Proceed the same manner for the other compartments
- Seal the markers and stamp the nameplate with inspection marks

PROCEDURE USING A MASTER METER

The procedure for calibrating tanks using a master meter or volumetric provers is the same. The difference is the means of measuring the product used for calibration. Master meters must be tested before and after calibration. Consult the Master Meter Calibration Procedure ............. STP-30

REVISION

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