

Field Inspection Manual	Part: 4-STP	Section: 36	Page: 1 of 3
Volumetric Measuring Devices	Issued: 2010-04-01	Revision Number: 1	

52.12, 52.22 SPECIALISED TEST PROCEDURE - PROCEDURE FOR TESTING AIRCRAFT REFUELLERS

APPLICATION

Vehicle mounted or fixed (hydrant) aircraft refuellers.

PURPOSE

Provide additional requirements and tests to be performed when a metering system is used to defuel aircraft.

LEGISLATIVE REFERENCES: R.262, R.263 and R.266 (1)(2) and (3), R.286.

- Collapsible hoses without spring-loaded anti-drain valves permitted R.286
- Meter must be capable of registering backward R.250, R.281

NOTE: The piping configuration must be such, and check valves, selector valves and appropriate interlocks must be installed to prevent any diversion of product when switching from fuel-defuel modes.

PROCEDURE

NOTE: Because these products are used to fuel aircraft, additional precautions must be taken. The trader must be consulted regarding the necessary precautions to be followed when handling the product and the steps required to clean the prover (if necessary) to prevent contamination of product. When returning product to storage, the trader should take charge of the manipulations (hoses, valves, pumps).

METER USED IN FUEL MODE ONLY

If the installation does not permit the defuelling of an aircraft using the meter, the standard procedure for pump supplied meters should be used.

METER USED IN DEFUEL MODE

If the installation is designed so that the meter can be used to defuel an aircraft, the standard procedure for a pump supplied meter should be used to test the meter in fuel mode. The prover shall be filled with the bottom loading connections. After the last test, the prover must not be drained.

After normal testing, the meter must be tested in defuel mode by draining the prover through the meter:

With the standard prover, piping and hose full, set the meter (piping/valves) in defuel mode.

Make sure that the hose and upstream piping (the upstream piping in defuel mode is different than in fuel mode) are full.

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Note liquid level in the prover (P_D).

Set the register to zero.

Empty the prover using the system as if it was defuelling an aircraft.

When the prover is empty, note meter's reading (M_D).

NOTE: Do not drain the prover using the drain petcock valve.

Set the system back in fuel mode.

Set the register to zero.

Fill the standard prover.

Note the meter (M_F) and prover (P_F) readings.

As the quantity metered in defuel mode is more than prover's content (part or all of the hose is drained), we cannot compare meter and prover readings like we do in fuel mode.

The results must be calculated as follows:

$$\% = ((P_F - P_D + M_D - M_F) \div M_F) * 100$$

where:

P_F = prover's indication on fuel mode test

P_D = prover's indication before defuel mode test

M_D = meter's registration on defuel test

M_F = meter's registration on fuel test

EXAMPLE:

After the last test in fuel mode, the prover contains 1501.2 litres. The meter is set in defuel mode and the liquid is pumped back in the truck via the meter. The meter then registers 1545.4 litres. The meter is set back in fuel mode, the register set to zero and the prover is filled. The meter registers 1539.5 litres and the prover indicates 1497.7 litres.

To determine if the results are acceptable:

$$\% = ((P_F - P_D + M_D - M_F) \div M_F) * 100$$

$$\% = ((1497.7 \text{ litres} - 1501.2 \text{ litres} + 1545.4 \text{ litres} - 1539.5 \text{ litres}) \div 1539.5 \text{ litres}) * 100$$

$$\% = 0.16\%$$

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INTERPRETATION OF RESULTS

The deviation (%) must be within the limits of error. In the above example, the meter could be used in defuel mode.

If the results in defuel mode are not acceptable and the owner of the equipment cannot or does not want to take appropriate actions so that the meter can operate within limits of error in both modes, a plate indicating that the meter must not be used in trade in defuel mode must be affixed near the meter at a readily visible location and the Inspection Certificate annotated the same way. This allows the owner to operate the device as a filling only system. A back check valve is required as per R.281.

NOTE: Because of the significant differences between fuelling and defuelling in a system, an inspector cannot take the results of the tests for one mode and presume that the other will perform the same. In order to certify the system for fuelling or defuelling or both, tests must be made in each mode of operation for which certification is desired.

REVISION 1

April 2010. Device type 52.12, 52.22 was added to the list of device types identified in the title line.