AEROSPACE RECOMMENDED PRACTICE

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ARP 868

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Revised

PRESSURE DROP TEST FOR FUEL SYSTEM COMPONENTS

1. PURPOSE - This recommended practice provides a relatively simple method for establishing static pressure drop through fuel system components in one step, without prior determination of the inlet and the outlet line connection pressure drop normally required.

2. SCOPE - This method of pressure drop test is applicable to any system component using the appropriate fluid under usage consideration.

3. GENERAL REQUIREMENTS

3.1 Fuel - MIL-J-5624 JP-4
(Note: The use of test fluid is acceptable provided the recorded pressure drop is corrected to fuel in accordance with Type II of Spec. MIL-F-7024.)

3.2 Fuel Flow - 0 to maximum flow, compatible with the design capacity of the component.

4. DETAILED REQUIREMENTS

4.1 Test Set-up - The test set-up is defined schematically in Figure 1 and Figure 2.

4.1.1 Fuel Tank

4.1.1.1 Shape of the tank is optional.

4.1.1.2 The minimum quantity of fuel shall be a volume equivalent to the maximum fuel flow for 2 minutes plus 10 gallons. The tank volume shall be at least 1.1 times the fuel volume.

4.1.1.3 A tank drain shall be provided to permit taking fuel sample, temperature and specific gravity measurement.

4.1.2 Fuel Pump - The pump shall be capable of providing the maximum fuel flow as defined in paragraph 3.2.

4.1.3 Flow Control Valve - A control valve shall be provided to regulate the flow as required.

4.1.4 Flow Meter - A calibrated flow meter shall be used to record fuel flow.

4.1.5 Differential Pressure Gage

4.1.5.1 Two units are required to measure the pressure drop at locations as shown in Figure 1.

4.1.5.2 The pressure gage shall be compatible with the ΔP to be recorded and shall be calibrated for accuracies prior to test.

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4.2 Test Procedure

4.2.1 Establish fuel flow through the system as defined in Figure 1 at incremental flow rate up to the maximum flow specified in paragraph 3.2 and allow each flow condition to stabilize.

4.2.2 At each stabilized flow condition record ΔP_1 and ΔP_2.

4.2.3 Obtain a fuel sample and record fuel temperature and specific gravity.

4.3 Pressure Drop Determination - To determine the net static pressure drop through the component, the procedure is as follows:

4.3.1 Double reading of differential pressure gage No. 1 ($2\Delta P_1$).

4.3.2 Subtract reading of differential pressure gage No. 2 (ΔP_2).

4.3.3 Component static pressure drop: $\Delta P_V = 2\Delta P_1 - \Delta P_2$.

$$2\Delta P_1 = 2\Delta P_L + 2\Delta P_V + 2\Delta P_\ell$$

$$-\Delta P_2 = -2\Delta P_L - \Delta P_V - 2\Delta P_\ell$$

$$2\Delta P_1 - \Delta P_2 = 0 + \Delta P_V + 0$$

PREPARED BY SAE COMMITTEE AE-5, AEROSPACE FUEL, OIL & OXIDIZER SYSTEMS

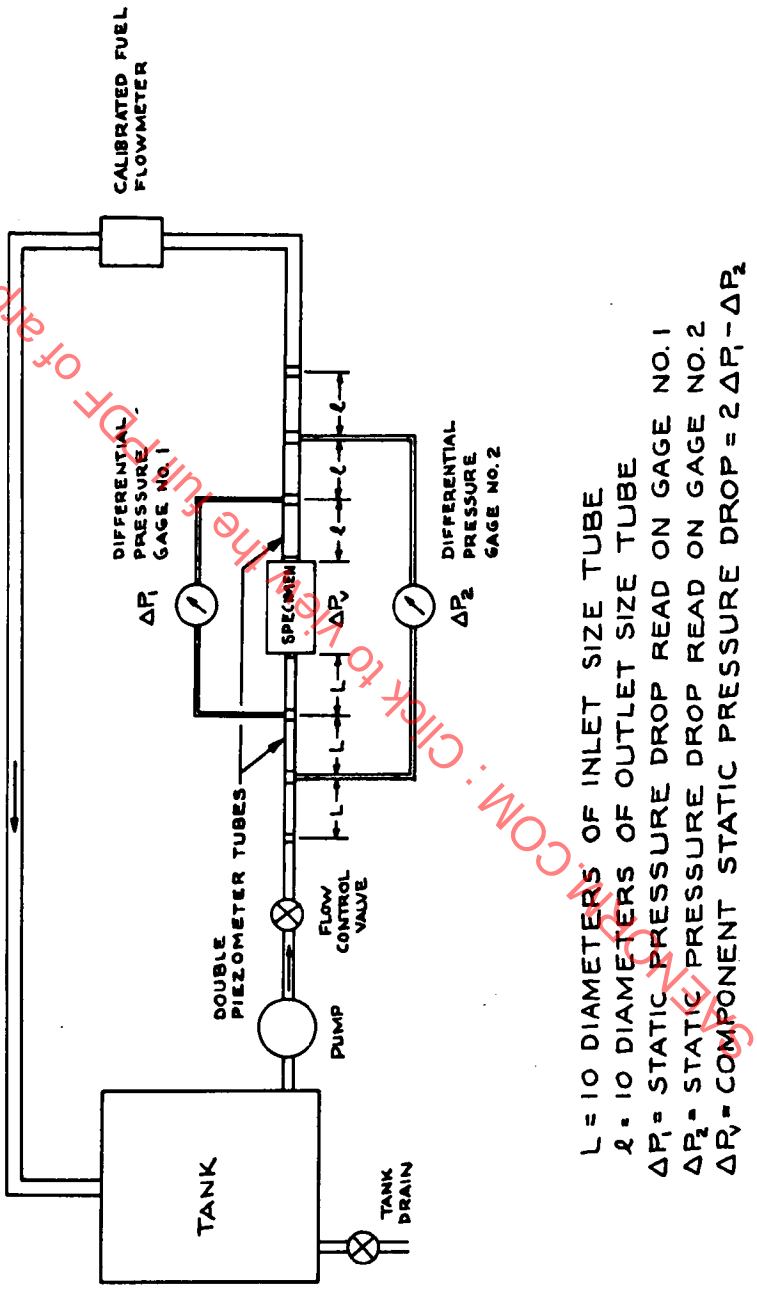

Figure 1. Pressure Drop Test Set-Up