



# AEROSPACE RECOMMENDED PRACTICE

ARP24

REV. E

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Superseding ARP24D

## Determination of Hydraulic Pressure Drop

### RATIONALE

This document has been determined to contain basic and stable technology which is not dynamic in nature.

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## 1. SCOPE:

This SAE Aerospace Recommended Practice (ARP) provides analytical and test methods for determining pressure drop in fluid systems such as hydraulic, fluid, oil, and coolant used in aerospace vehicles. Determining pressure drop by analytical and test results will be discussed.

## 2. REFERENCES:

### 2.1 Applicable Documents:

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

#### 2.1.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001; [www.sae.org](http://www.sae.org)

ARP4386                      Terminology and Definitions for Aerospace Fluid Power, Actuation and Control Technologies

AS4395                      Fitting End, Flared Tube Connection, Design Standard

## 2.2 Related Publications:

The following publications are provided for information purposes only and are not a required part of this SAE Aerospace Technical Report.

### 2.2.1 National Fluid Power Association Publications: Available from National Fluid Power Association, Inc., 3333 N. Mayfair Road, Milwaukee, WI 53222-3219; [www.nfpa.com](http://www.nfpa.com)

NFPA/T2.12.1      Hydraulic Fluid Power – Systems and Products – Method of Measuring Average Steady State Pressure

NFPA/T2.12.10      Recommended Practice - Hydraulic fluid power – Systems and products – Testing general measurement principles and techniques

## 2.3 Definitions:

Refer to ARP4386 for general hydraulic system terms that are used in this document.

**PRESSURE DROP:** A fluid flowing through a tube meets a certain amount of resistance due to kinetic and viscous effects. The pressure required to overcome this resistance and to maintain a certain flow rate is known as “pressure drop.”

## 3. TEST METHODS:

### 3.1 Test Set-up:

All parts of a hydraulic system (including tubing fittings, valves, etc.) through which flow is maintained will have a certain pressure drop. When using a hydraulic test stand, the pressure drop through a valve is measured by placing it in a line between the pump and the flow meter with a pressure gage at each end of the valve. While reading the gages on the valve, the required flow must be stabilized through the valve and the flow meter. The difference in readings of the two gages is the approximate pressure drop for the flow shown on the flow meter.

If accurate results are to be obtained, special pressure pick-ups must be used and they must be placed at a sufficient distance from any flow disturbance, as shown in typical test set-ups shown in Figures 1 and 2. As a guideline, these should be installed at least 5 times the tube inside diameter upstream and at least 10 times the tube inside diameter downstream from any other connection using straight rigid lines.