



**ANSI/(NFPA)T3.5.28 R1-1997
(R2004)**
Second edition
17 April 1997

Hydraulic fluid power – Valves – Pressure differential-flow characteristic – Method of measuring and recording

(Revision and redesignation of ANSI/B93.49M-1980)

A NATIONAL INDUSTRY STANDARD FOR FLUID POWER

Approved by Committee ASC B93,
accredited by the American National Standards Institute (ANSI)



Descriptors: flow characteristic, measuring; flow characteristic, reporting; fluid power; pressure differential, measuring; pressure differential, reporting; pressure drop; pressure loss; testing, flow characteristic; testing, pressure differential; testing, valve; valve, hydraulic fluid power; valve, port size

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Foreword

This Foreword is not part of American National Standard, *Hydraulic fluid power — Valves — Pressure differential-flow characteristic — Method of measuring and reporting* (Revision to ANSI/B93.49M-1980), ANSI/(NFPA)T3.5.28 R1-1997.

The Hydraulic Valve Section, T3.5, met on 21 September 1994 and a recommendation was made to revise this standard. The document will be updated to revise the reference and add other information.

At the 8 February 1995 meeting of T3.5, the proposed TSP was reviewed and approved. Zilek Liberfarb (Fluid Power Systems, Inc.) agreed to serve as Project Chairman.

The TSP was approved by the Technical Board at their 13 April 1995 meeting.

Draft No. 1 was prepared by NFPA's Technical Staff and forwarded to Project Chairman Liberfarb for his review. Mr. Liberfarb reviewed the draft and forwarded changes to Headquarters on 19 April 1995. Headquarters' incorporated the changes in the document and Draft No. 2 was attached to the T3.5's meeting agenda dated 24 May 1995. It was voted to send this document out for General Review at the 24 May 1995 T3.5 meeting.

The document was updated at Headquarters and sent out for General Review on 17 July 1995. The General Review closed on 29 August 1995 with comments from five companies. Letters to the commentators were sent out on 19 December 1995. At the 14 February 1996 T3.5 meeting, Mr. Liberfarb stepped down and Project Chairman and Ronald Rueter, Hydraforce, Inc., agreed to serve as Project Chairman. T3.5 was mail balloted on 27 March 1996 for approval to put this document on the Technical Board agenda for approval to Ballot. At the 11 April 1996 Technical Board meeting T3.5.28 R1 was granted approval to Ballot.

The document was sent out for Ballot on 24 May 1996. Balloting closed on 15 July 1996 with four approval comments. Three commentators had already signed off and their changes incorporated into the document. On 22 July 1996 the numbering was corrected in the document due to a phone call from the fourth commentator. The updated document was received at headquarters on 15 November 1996. The document was granted final approval at the 5 December 1996 Technical Board meeting.

Project Group Members who developed this standard.

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Project Chairman
Hydraforce, Inc.

Wayland Tenkku
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On 17 December 1996, ANSI/(NFPA)T3.5.28 R1 was submitted to ANSI Committee B93 for Ballot. Balloting closed with no negative ballots. Final approval was granted to this document on 17 April 1997.

The membership roster of Standards Committee B93 at the time of Ballot:

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Material Handling Institute

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Daniel B. Shore

Vice Chairman

National Fluid Power Association

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On 29 June 2004, ANSI/(NFPA)T3.5.28 R1-1997 was submitted to ANSI Committee B93 for ballot to reaffirm. Balloting closed on 13 August 2004 with no negative votes. ANSI/(NFPA)T3.5.28 R1-1997 (R2004) was approved by ANSI's Board of Standards Review on 15 December 2004.

The membership roster of Standards Committee B93 at the time of ballot:

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American Society of Agricultural Engineers
Scott Cedarquist

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Jack Walrad
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Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit. Hydraulic valves are required to modulate or direct the pressure and/or flow through the system. These valves must operate with some desired efficiency criterion; the pressure differential-flow characteristics (commonly called pressure drop) is an important consideration in establishing a valve's ability to meet this criterion.

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Hydraulic fluid power — Valves — Pressure differential-flow characteristic — Method of measuring and reporting

1 Scope

1.1 This standard includes:

- the determination of the pressure differential-flow characteristics of any fluid power valve;
- a uniform method of presenting the test data;
- standardized information for conducting comparative tests.

1.2 This standard is intended to:

- provide a uniform laboratory procedure for measuring the pressure losses associated with any given flow path in a hydraulic valve;
- provide a standard means of reporting the pressure losses measured;
- establish uniform specified values for comparing the pressure losses of different valve designs.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this document. At the time of publication, the editions indicated were valid. All documents are subject to revision, and parties to agreements based on this document are encouraged to investigate the possibility of applying the most recent editions of the documents indicated below. NFPA maintains registers of currently valid NFPA/ANSI standard.

ANSI/B93.2-1986, *Fluid power systems and products — Glossary*.

ISO 4411:1986, *Hydraulic fluid power — Valves — Determination of pressure differential/flow characteristics*.

ISO 1000:1992, *SI units and recommendations for the use of their multiples and of certain of their units*.

ANSI/(NFPA)T2.12.1-1993, *Hydraulic fluid power — Systems and products — Method of measuring average steady-state pressure*.

ANSI/(NFPA)T2.12.10-1993, *Recommended practice — Hydraulic fluid power — Systems and products — Testing general measurement principles and tolerances*.

ANSI/IEEE 268-1992, *Metric Practice*.

ISO 1219-1:1991, *Fluid power systems and components — Graphic symbols and circuit diagrams — Part 1: Graphic symbols*.

ASTM/D 445-1988, *Standard Test Methods for Kinematic Viscosity and Opaque Liquids*.