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AN INDUSTRY STANDARD FOR FLUID POWER

**Hydraulic fluid power —
Directional control valve —
Method for determining the metering characteristics**

Descriptors: control variable, displacement control variable; specified flow rate; flow rate; work port; specified pressure differential bar; pressure, load bar; pressure differential, measured bar; pressure, specified bar; pressure differential, tare bar; viscosity; aeration; filtration.

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Foreword

This Foreword is not part of NFPA standard *Hydraulic fluid power — Directional control valve — Method for determining the metering characteristics*, NFPA/T3.5.14 R2-2009.

The Hydraulic Valve Section, NFPA/T3.5, recommended at their 23 August 2003 meeting that this standard should be revised, noting that the document needed to be updated to revise the references and add other information.

At the 18 February 2004 meeting of NFPA/T3.5, the proposed Title, Scope and Purpose (TSP) was reviewed. Jerry Carlin (Eaton Corp.) agreed to serve as project chairman. The TSP and initial revision draft were reviewed and approved at the 19 May 2004 meeting of NFPA/T3.5. The TSP was approved by the Technical Board at their 12 August 2004 meeting. The project group met on 22 September 2004 and on 16 March 2005, making several revisions to the document draft.

A revised TSP limiting the scope to open center valves was approved by the Technical Board at their 11 August 2005 meeting. The project group met on 21 September 2005 and agreed on several revisions. The document was circulated for general review on 22 December 2005. The voting resulted in seven approval votes and five abstentions, and the comments were satisfactorily resolved.

At the 20 September 2006 joint meeting of NFPA/T3.5 and U.S. TAG to ISO/TC 131/SC 5/WG 2, a motion was approved to ask the NFPA Technical Board for permission to circulate the document for simultaneous NFPA final and ANSI approval ballots. The NFPA Technical Board gave such approval on 11 January 2007.

The document was circulated for simultaneous NFPA final and ANSI approval ballots on 7 August 2007. As a result of a decision made by the NFPA Board of Directors at its meeting on 27 June 2009, NFPA discontinued its activities as an ANSI Accredited Standards Developer.

The voting from the NFPA ballot resulted in eleven approval votes, three abstentions and zero disapprovals. All comments were satisfactorily resolved. At the 11 February 2009 joint meeting of NFPA/T3.5 and U.S. TAG to ISO/TC 131/SC 5/WG 2, a motion was approved to ask the NFPA Technical Board for permission to publish the document. At its meeting on 2 April 2009, the NFPA Technical Board approved the document for publication.

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Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit. Some hydraulic valves are required to modulate flow or pressure with some specific relationship between the valve control input and resultant output. The relationships between the valve control input and the output flows for a given inlet pressure and output pressure are the metering characteristics of the product. The metering characteristics of a hydraulic directional control valve may be an important consideration when selecting a valve as part of a system.

Hydraulic fluid power — Directional control valve — Method for determining the metering characteristics

1 Scope

This standard is intended to provide a uniform procedure for obtaining and reporting the metering characteristics of an open center hydraulic directional control valve.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this document. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this NFPA document are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referenced applies. NFPA maintains registers of currently valid NFPA Standards. Standards development organization contact information and links can be found on the NFPA website (www.nfpa.com).

IEEE/ASTM SI 10 (latest edition), *Standard for Use of the International System of Units (SI): The Modern Metric System*.

ISO 1000 (latest edition), *SI units and recommendations for the use of their multiples and of certain other units*.

ISO 1219-1 (latest edition), *Fluid power systems and components — Graphic symbols and circuit diagrams — Part 1: Graphic symbols for conventional use and data processing applications*.

ISO 3448 (latest edition), *Industrial liquid lubricants — ISO viscosity classification*.

ISO 4406 (latest edition), *Hydraulic fluid power — Fluids — Method for coding the level of contamination by solid particles*.

ISO 5598 (latest edition), *Fluid power systems and components — Vocabulary*.

NFPA/T2.12.1 (latest edition), *Hydraulic fluid power — Systems and products — Methods of measuring average steady state pressure*.

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

ASTM/D 445 (latest edition), *Standard Test Methods for Kinematic Viscosity of Transparent and Opaque Liquids*.

3 Definitions

For definitions of other terms used, see ISO 5598.

displacement control variable: Mechanical displacement, pilot pressure or electrical current used to control the valve metering element. For hydraulic piloted or electrically operated valves, the metering element position must be recorded as well as the input variable.