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**Hydraulic fluid power — Valves  
— Determination of differential  
pressure/flow rate characteristics**

*Transmissions hydrauliques — Distributeurs — Détermination des  
caractéristiques de pression différentielle/débit*





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ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 5, *Control products and components*.

This third edition cancels and replaces the second edition (ISO 4411:2008), which has been technically revised. The main changes compared to the previous edition are as follows:

- “volume flow rate” is replaced with “flow rate”;
- “flow rate symbol  $q_v$ ” is replaced with “ $q$ ”;
- updated and improved quality of [Figure 1](#) and [Figure 2](#).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit. Hydraulic valves control the direction, pressure or flow rate of the fluid in the system.

When fluid flows through a valve, it encounters some resistance, which results in a loss of pressure; this loss is called the pressure differential.

This document is intended to unify testing methods for hydraulic fluid power valves to enable the pressure differential/flow characteristics of different valves to be compared.



# Hydraulic fluid power — Valves — Determination of differential pressure/flow rate characteristics

## 1 Scope

This document specifies methods for determining, under steady-state conditions, the pressure differential caused by the flow through any given path in a hydraulic fluid power valve. Requirements for test installations, procedures and presentation of results are specified.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4401, *Hydraulic fluid power — Four-port directional control valves — Mounting surfaces*

ISO 5598, *Fluid power systems and components — Vocabulary*

ISO 5781, *Hydraulic fluid power — Pressure-reducing valves, sequence valves, unloading valves, throttle valves and check valves — Mounting surfaces*

ISO 6263, *Hydraulic fluid power — Compensated flow-control valves — Mounting surfaces*

ISO 6264, *Hydraulic fluid power — Pressure-relief valves — Mounting surfaces*

ISO 9110-1, *Hydraulic fluid power — Measurement techniques — Part 1: General measurement principles*

ISO 9110-2, *Hydraulic fluid power — Measurement techniques — Part 2: Measurement of average steady-state pressure in a closed conduit*

ISO 10372, *Hydraulic fluid power — Four- and five-port servovalves — Mounting surfaces*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5598 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 3.1

#### **tare pressure differential**

pressure loss between the pressure-tapping points as generated by the test equipment exclusive of the test valve

### 3.2

#### **measured pressure differential**

measured pressure loss between the pressure-tapping points, including the pressure loss through the test valve and the test equipment