
**Hydraulic fluid power — General rules
relating to systems**

Transmissions hydrauliques — Règles générales relatives aux systèmes



Contents	Page
1 Scope	1
2 Normative references	1
3 Definitions	3
4 Requirements	4
4.1 General	4
4.2 Hazards	4
4.3 Safety requirements	5
4.4 System requirements	6
4.5 Site conditions	7
5 System design	8
5.1 Circuit diagrams	8
5.2 Identification	9
5.3 Installation, use and maintenance	10
5.4 Use of standard parts	11
5.5 Seals and sealing devices	11
5.6 Maintenance and operating data	11
5.7 Operation and maintenance manuals	12
5.8 Ports	12
5.9 System temperature	12
6 Energy conversion components	13
6.1 Hydraulic pumps and motors	13
6.2 Cylinders	14
6.3 Gas-loaded accumulators	17
7 Valves	19
7.1 Selection	19
7.2 Mounting	19
7.3 Manifolds	20
7.4 Electrically operated valves	20
7.5 Symbol plates	21
7.6 Adjustments	21
7.7 Removal	21

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8	Fluids and conditioning components	22
8.1	Hydraulic fluids	22
8.2	Fluid reservoirs	23
8.3	Filtration and fluid conditioning	26
8.4	Heat exchangers	28
9	Piping	29
9.1	General requirements	29
9.2	Pipe and tube requirements	30
9.3	Support of piping	30
9.4	Foreign matter	31
9.5	Hose assemblies	31
9.6	Quick-action couplings	32
10	Control systems	32
10.1	Unintended movement	32
10.2	System protection	32
10.3	Components	33
10.4	Control systems with servo and proportional valves	34
10.5	Other design considerations	34
10.6	Location of controls	36
10.7	Emergency controls	36
11	Diagnostics and monitoring	37
11.1	Pressure measurement	37
11.2	Fluid sampling	37
11.3	Temperature sensing	37
12	Cleaning and painting	37
13	Preparation for transportation	38
13.1	Identification of piping	38
13.2	Packaging	38
13.3	Sealing of openings	38
13.4	Handling facilities	38
14	Commissioning	38
14.1	Verification tests	38
14.2	Noise	38
14.3	Fluid leakage	39
14.4	Final data to be provided	39
14.5	Modifications	39
14.6	Inspection	40
15	Identification statement	40

Annex A (informative) Items requiring supplier/purchaser agreement	41
Annex B (informative) List of hazards	42
Annex C (informative) Cross reference list ISO 4413/EN 982	45
Annex D (informative) Bibliography	51
Index	54

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 4413 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 9, *Installations and systems*.

This second edition cancels and replaces the first edition (ISO 4413:1979), which has been technically revised.

Annexes A to D of this International Standard are for information only.

Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit.

The application of hydraulic fluid power systems requires a thorough understanding and precise communication between supplier and purchaser. This International Standard was prepared to assist that understanding and communication and to document many of the good practices learned from experience with hydraulic systems.

Use of this International Standard assists:

- a) the identification and specification of the requirements for hydraulic systems and components;
- b) the identification of respective areas of responsibility;
- c) the design of systems and their components to comply with specific requirements;
- d) understanding of the safety requirements of a hydraulic system.

General rules given in this International Standard have no legal status except those paragraphs that are included in contractual agreements between purchasers and suppliers. Deviation from those parts of this International Standard included in contractual agreements shall also be agreed to in writing by the purchaser and supplier. Attention shall be drawn by the purchaser and/or supplier to applicable national or local codes or laws.

General rules that contain the verb “shall” are counsels of good engineering practice, universally applicable with rare exception. Use of the word “should” in the document is not an indication of choice but an indication that the desirable engineering practices described may have to be modified due to the peculiarities of certain processes, environmental conditions or equipment size.

Titles or parts of the text which are marked with an asterisk (*) indicate subclauses for which discussion is needed between the supplier and purchaser to define the requirements and/or responsibilities. These are also listed in annex A.

Hydraulic fluid power — General rules relating to systems

1 Scope

This International Standard provides general rules relating to hydraulic systems on machinery used in industrial manufacturing processes. It is intended as a guide for both suppliers and purchasers, with a view to ensuring:

- a) safety;
- b) uninterrupted system operation;
- c) ease and economy of maintenance;
- d) long life of the system.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

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

ISO 1219-2:1995, *Fluid power systems and components — Graphic symbols and circuit diagrams — Part 2: Circuit diagrams*.

ISO 4400:1994, *Fluid power systems and components — Three-pin electrical plug connectors with earth contact — Characteristics and requirements*.

ISO 4401:1994, *Hydraulic fluid power — Four-port directional control valves — Mounting surfaces*.

ISO 4406:—¹⁾, *Hydraulic fluid power — Fluids — Method for coding level of contamination by solid particles.*

ISO 4021:1992, *Hydraulic fluid power — Particulate contamination analysis — Extraction of fluid samples from lines of an operating system.*

ISO 5598:1985, *Fluid power systems and components — Vocabulary.*

ISO 5781:—²⁾, *Hydraulic fluid power — Pressure-control valves (excluding pressure-relief valves), sequence valves, unloading valves, throttle valves and check valves — Mounting surfaces.*

ISO 6149-1:1993, *Connections for fluid power and general use — Ports and stud ends with ISO 261 threads and O-ring sealing — Part 1: Ports with O-ring seal in truncated housing.*

ISO 6162:1994, *Hydraulic fluid power — Four-screw split-flange connections for use at pressures of 2,5 MPa to 40 MPa (25 bar to 400 bar) — Type I metric series and type II inch series.*

ISO 6164:1994, *Hydraulic fluid power — Four-screw, one-piece square-flange connections for use at pressures of 25 MPa and 40 MPa (250 and 400 bar).*

ISO 6263:1997, *Hydraulic fluid power — Compensated flow-control valves — Mounting surfaces.*

ISO 6264:1998, *Hydraulic fluid power — Pressure-relief valves — Mounting surfaces.*

ISO 6952:1994, *Fluid power systems and components — Two-pin electrical plug connector with earth contact — Characteristics and requirements.*

ISO 7368:1989, *Hydraulic fluid power — Two-port slip-in cartridge valves — Cavities.*

ISO 7789:1998, *Hydraulic fluid power — Two-, three- and four-port screw-in cartridge valves — Cavities.*

ISO 7790:1997, *Hydraulic fluid power — Four-port modular stack valves and four-port directional control valves, sizes 02, 03 and 05 — Clamping dimensions.*

ISO 8434-1:1994, *Metallic tube connections for fluid power and general use — Part 1: 24° compression fittings.*

ISO 8434-2:1994, *Metallic tube connections for fluid power and general use — Part 2: 37° flared fittings.*

1) To be published. (Revision of ISO 4406:1987)

2) To be published. (Revision of ISO 5781:1987)

ISO 8434-3:1995, *Metallic tube connections for fluid power and general use — Part 3: O-ring face seal fittings.*

ISO 8434-4:1995, *Metallic tube connections for fluid power and general use — Part 4: 24° cone connectors with O-ring weld-on nipples.*

ISO 10372:1992, *Hydraulic fluid power — Four- and five-port servovalves — Mounting surfaces.*

ISO 10763:1994, *Hydraulic fluid power — Plain-end, seamless and welded precision steel tubes — Dimensions and nominal working pressures.*

ISO/TR 11688-1:1995, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning.*

ISO 12151-1:—³⁾, *Connections for hydraulic fluid power and general use — Hose fittings — Part 1: Hose fittings with ISO 8434-3 O-ring face seal end.*

ISO 12151-2:—³⁾, *Connections for hydraulic fluid power and general use — Hose fittings — Part 2: Hose fittings with ISO 8434-1 and ISO 8434-4 24° cone connector ends with O-rings.*

ISO 12151-3:—³⁾, *Connections for hydraulic fluid power and general use — Hose fittings — Part 3: Hose fittings with ISO 6162 flange ends.*

ISO 12151-4:—³⁾, *Connections for hydraulic fluid power and general use — Hose fittings — Part 4: Hose fittings with ISO 6149-2 and ISO 6149-3 stud ends.*

ISO 12151-5:—³⁾, *Connections for hydraulic fluid power and general use — Hose fittings — Part 5: Hose fittings with ISO 8434-2 37° flared ends.*

IEC 204-1:1997, *Electrical equipment of industrial machines — Part 1: General requirements.*

IEC 529:1989, *Degrees of protection provided by enclosures (IP code).*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 5598 and the following definitions apply.

3.1 actuator: Component that transforms fluid energy into mechanical energy (e.g. motor, cylinder).

3.2 commissioning: Procedure by which a system is formally accepted by the purchaser.

3.3 component: Individual unit (e.g. cylinder, motor, valve, filter; but excluding piping) comprising one or more parts, designed to be a functional part of a fluid power system.

3) To be published.