

BS ISO 14540:2013



BSI Standards Publication

**Hydraulic fluid power —  
Dimensions and requirements  
for screw-to-connect quick-  
action couplings for use at a  
pressure of 72 MPa (720 bar)**

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**National foreword**

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**Hydraulic fluid power — Dimensions  
and requirements for screw-to-  
connect quick-action couplings for use  
at a pressure of 72 MPa (720 bar)**

*Transmissions hydrauliques — Dimensions et exigences des raccords  
rapides de type à visser pour usage à une pression de 72 MPa (720 bar)*





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## Foreword

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The committee responsible for this document is ISO/TC 131, *Fluid power systems*, Subcommittee SC 4, *Connectors and similar products and components*.

## Introduction

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

Screw-to-connect quick-action couplings conforming to this International Standard are designed to join or separate fluid conductors ensuring, at the same time, sufficient resistance and safety in applications characterized by very high working pressures up to 72 MPa (720 bar).





# Hydraulic fluid power — Dimensions and requirements for screw-to-connect quick-action couplings for use at a pressure of 72 MPa (720 bar)

## 1 Scope

This International Standard specifies dimensional and performance requirements for hydraulic screw-to-connect quick-action couplings designed to be used at pressure of 72 MPa (720 bar<sup>1</sup>) in static conditions as an interface between a hydraulic power unit and a tool. Typical applications for these couplings are related to hydraulic jacks, rams, clamping devices, hand tools, and cylinders.

This International Standard covers two types of such couplings: the “P” type, which has a poppet valve, and the “S” type, which has a spherical valve.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including amendments) applies.

ISO 725, *ISO inch screw threads — Basic dimensions*

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

ISO 5864, *ISO inch screw threads — Allowances and tolerances*

ISO 7241-2, *Hydraulic fluid power — Quick-action couplings — Part 2: Test methods*

## 3 Terms and definitions

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

### 3.1

#### **fluid loss**

fluid that exits the coupling when it is disconnected

### 3.2

#### **residual static pressure**

static pressure remaining in the circuit without flow

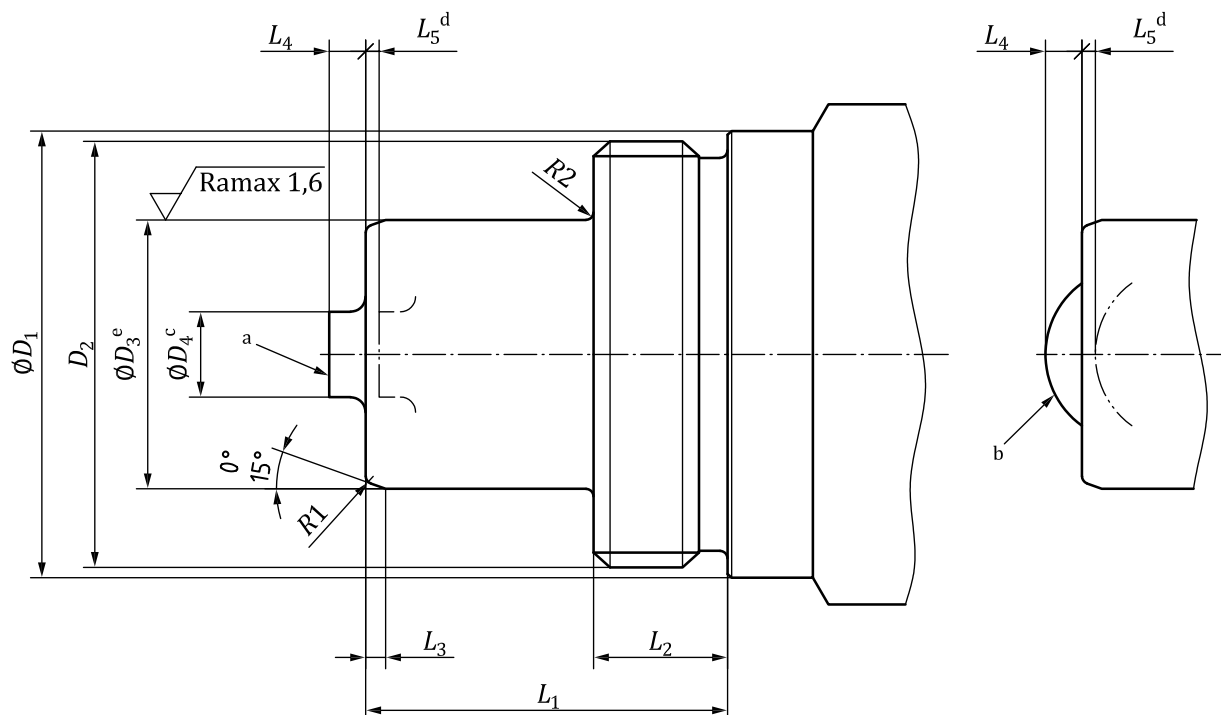
## 4 Dimensional requirements

Couplings shall conform to the dimensions shown in [Figure 1](#) and given in [Table 1](#).

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1) 1 bar = 100 kPa = 10<sup>5</sup> Pa = 0,1 MPa; 1 Pa = 1 N/m<sup>2</sup>

Surface roughness values in micrometres



- a The shape of the valve is optional; “P” type version (with poppet valve) is shown.
- b The shape of the valve is optional; “S” type version (with spherical valve) is shown.
- c Use dimension  $D_4$ , unless the valve is spherical.
- d Maximum valve travel against stop.
- e Sealing diameter.

NOTE All dimensions and shape after  $L_1$  and  $D_1$  are left to the manufacturer.

**Figure 1 — Dimensional requirements**

**Table 1 — Dimensional requirements**

Dimensions in millimetres

Size <sup>a</sup>	$\text{Ø}D_1$	$D_2$ <sup>c</sup>	$\text{Ø}D_3$	$\text{Ø}D_4$ <sup>b</sup>	$L_1$	$L_2$	$L_3$	$L_4$	$L_5$	$R_1$	$R_2$
	min			min			max	max	max		max
6,3	26,5	1-18 UNS	15,77 15,85	1,9	18,95 19,15	7,75 7,98	2,0	4	0,4	0,5 1,0	0,6
10	31,5	1-3/16-16 UN	18,96 19,04	2,5	25,32 25,47	9,30 9,52	2,5	4	0,4	0,5 1,3	0,6

<sup>a</sup> Size designation corresponds to the nominal hose size of the recommended hose; see ISO 4397.

<sup>b</sup> Use dimension  $D_4$  unless the valve is spherical.

<sup>c</sup> In accordance with basic dimensions and formulae given in ISO 725 and ISO 5864, tolerance class 2A. See [Annex A](#) for the dimensions of the 1-18 UNS thread.

## 5 Performance requirements

5.1 Couplings conforming to this International Standard shall meet or exceed the performance requirements specified in [Table 2](#).

**Table 2 — Performance requirements by coupling size**

Performance parameter	Size 6,3 <sup>a</sup>	Size 10 <sup>a</sup>
Working pressure <sup>b</sup>	72 MPa (720 bar)	
Minimum burst pressure (coupled) <sup>c</sup>	216 MPa (2 160 bar)	
Minimum burst pressure for the “P” type (uncoupled) <sup>c</sup>	216 MPa (2 160 bar)	
Minimum burst pressure for the “S” type (uncoupled) <sup>c</sup>	144 MPa (1 440 bar)	
Rated flow <sup>d</sup>	12 l/min	23 l/min
Maximum pressure drop at rated flow <sup>d</sup>	300 kPa (3 bar)	450 kPa (4,5 bar)
Maximum fluid loss per disconnection <sup>e</sup>	0,5 ml	1 ml
Maximum residual static pressure for connection <sup>f</sup>	10 MPa (100 bar)	
<sup>a</sup> Size designation corresponds to the nominal hose size of the recommended hose; see ISO 4397. <sup>b</sup> See <a href="#">5.3</a> . <sup>c</sup> See <a href="#">5.4</a> . <sup>d</sup> See <a href="#">5.5</a> . <sup>e</sup> See <a href="#">5.6</a> . <sup>f</sup> Internal residual static pressure present in one coupling half.		

5.2 The performance requirements apply to couplings made from carbon steel. The use of any combination of other materials and the related performance requirements shall be agreed between the customer and manufacturer.

5.3 The working pressure shall be verified in both the coupled and uncoupled conditions by pressure impulse testing for 10 000 cycles at the working pressure (low-cycle fatigue test) using the test pressure wave form specified in ISO 7241-2.

5.4 The burst pressure shall be verified by testing in both the coupled and uncoupled conditions in accordance with ISO 7241-2.

5.5 The pressure drop at rated flow shall be verified by testing in accordance with ISO 7241-2.

5.6 The fluid loss per disconnection shall be verified by testing in accordance with ISO 7241-2.

5.7 The maximum residual static pressure for connection shall be verified by connecting 100 times in accordance with ISO 7241-2 at 10 MPa (100 bar) pressure present in one coupling half only.

## 6 Best practice

6.1 Manufacturers of couplings conforming to this International Standard shall give proper written information to the customer about safety, correct use, best practice, and maintenance in order to allow correct and safe use of the products.

6.2 Couplings conforming to this International Standard are subject to very high internal pressure. The final user shall always use the most suitable protection devices when using the product and shall keep out of the product’s range of action.

6.3 Couplings conforming to this International Standard are not designed to be connected and disconnected under working pressure. However, [Table 2](#) provides information about the maximum residual static pressure, which is present in one half only, that is allowable for connection.

6.4 Couplings of the “S” type, which have a spherical valve, are not preferred for applications that require that the coupling be pressurized in the disconnected condition.

## 7 Designation

Hydraulic couplings conforming to this International Standard shall be designated as follows:

- a) the word “Coupling”, followed by
- b) a reference to this International Standard (i.e. ISO 14540), followed by a spaced hyphen, followed by
- c) the size, followed by a spaced hyphen, followed by
- d) the type designation, i.e. P for a coupling with a poppet valve or S for a coupling with a spherical valve.

### EXAMPLE

Hydraulic quick-action coupling conforming to this International Standard of size 6,3 and of the “P” type is designated as follows:

**Coupling ISO 14540:—, 6,3- P**

## 8 Marking

Couplings conforming to this International Standard shall be permanently marked at least with the manufacturer’s name, logo, or product identification.

## 9 Identification statement (reference to this International Standard)

The following statement should be used in test reports, catalogues, and sales literature when electing to comply with this International Standard: “Dimensional and performance requirements conform to ISO 14540, *Hydraulic fluid power — Dimensions and requirements for screw-to-connect quick-action couplings for use at a pressure of 72 MPa (720 bar)*.”

## Annex A (normative)

### Basic dimensions of the 1-18 UNS inch screw thread

[Tables A.1](#) and [A.2](#) provide the basic dimensions of the 1-18 UNS inch screw thread. They provide dimensions of, respectively, the external and internal threads.

**Table A.1 — Dimensions for 1-18 UNS, class 2A, inch screw threads (external)**

Thread		Allowance	Major diameter		Pitch diameter		Minor diameter
			max	min	max	min	max
1-18 UNS	in	0,0014	0,9986	0,9899	0,9625	0,9578	0,9325
	mm	0,037	25,364	25,144	24,447	24,329	23,686

**Table A.2 — Dimensions for 1-18 UNS, class 2B, inch screw threads (internal)**

Thread		Minor diameter		Pitch diameter		Major diameter
		max	min	max	min	min
1-18 UNS	in	0,953	0,940	0,9701	0,9639	1,0000
	mm	24,206	23,876	24,640	24,484	25,400

## Bibliography

- [1] ISO 4397, *Fluid power connectors and associated components — Nominal outside diameters of tubes and nominal hose sizes*









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