

INTERNATIONAL
STANDARD

ISO
6149-3

First edition
1993-11-01

**Connections for fluid power and general
use — Ports and stud ends with ISO 261
threads and O-ring sealing —**

iTeh STANDARD PREVIEW

Part 3:

**(Light-duty (L series) stud ends —
Dimensions, design, test methods and
requirements**

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Raccordements pour transmissions hydrauliques et pneumatiques et applications générales — Orifices et éléments mâles à filetage ISO 261 et joint torique —

Partie 3: Éléments mâles de série légère (série L) — Dimensions, conception, méthodes d'essai et prescriptions



Reference number
ISO 6149-3:1993(E)

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 6149-3 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Sub-Committee SC 4, *Connectors and similar products and components*.

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ISO 6149 consists of the following parts, under the general title *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*
- *Part 2: Heavy-duty (S series) stud ends — Dimensions, design, test methods and requirements*
- *Part 3: Light-duty (L series) stud ends — Dimensions, design, test methods and requirements*

Annex A forms an integral part of this part of ISO 6149. Annex B is for information only.

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Introduction

In fluid power systems, power is transmitted and controlled through a fluid (liquid or gas) under pressure within an enclosed circuit. In general applications, a fluid may be conveyed under pressure.

Components are connected through their threaded ports by stud ends on fluid conductor fittings to tubes and pipes or to hose fittings and hoses.

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Connections for fluid power and general use — Ports and stud ends with ISO 261 threads and O-ring sealing —

Part 3:

Light-duty (L series) stud ends — Dimensions, design, test methods and requirements

1 Scope

This part of ISO 6149 specifies dimensions, performance requirements and test procedures for metric adjustable and non-adjustable light-duty (L series) stud ends and O-rings.

Stud ends in accordance with this part of ISO 6149 may be used at working pressures up to 40 MPa (400 bar¹⁾) for non-adjustable stud ends, and 31,5 MPa (315 bar) for adjustable stud ends. The permissible working pressure depends upon the stud end size, materials, design, working conditions, application, etc.

For threaded ports and stud ends specified in new designs in hydraulic fluid power applications, only ISO 6149 is to be used. Threaded ports and stud ends in accordance with ISO 1179 and ISO 11926 are not to be used for new designs in hydraulic fluid power applications.

Conformance to the dimensional information in this part of ISO 6149 does not guarantee rated performance. Each manufacturer should perform testing according to the specification contained in this part of ISO 6149 to assure that components comply with the performance ratings.

1) 1 bar = 0,1 MPa = 10⁵ Pa; 1 MPa = 1 N/mm²

2) To be published.

3) To be published. (Revision of ISO 261:1973)

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NOTE 1 A significant number of tests have been conducted to confirm the performance requirements of connection ends made from carbon steel. This part of ISO 6149 applies to fittings detailed in ISO 8434-2.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 6149. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 6149 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 48:—²⁾, *Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD) (Combined revision of the second edition (ISO 48:1979), and ISO 1400:1975 and ISO 1818:1975).*

ISO 261:—³⁾, *ISO general-purpose metric screw threads — General plan.*

ISO 965-1:1980, *ISO general purpose metric screw threads — Tolerances — Part 1: Principles and basic data.*

ISO 3448:1992, *Industrial liquid lubricants — ISO viscosity classification.*

ISO 3601-3:1987, *Fluid systems — Sealing devices — O-rings — Part 3: Quality acceptance criteria.*

ISO 4759-1:1978, *Tolerances for fasteners — Part 1: Bolts, screws and nuts with thread diameters between 1,6 (inclusive) and 150 mm (inclusive) and product grades A, B and C.*

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

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 6149-2:1993, *Connections for fluid power and general use — Ports and stud ends with ISO 261 threads and O-ring sealing — Part 2: Heavy-duty (S series) stud ends — Dimensions, design, test methods and requirements.*

ISO 6803:1984, *Rubber or plastics hoses and hose assemblies — Hydraulic pressure impulse test without flexing.*

3 Definitions

For the purposes of this part of ISO 6149, the definitions given in ISO 5598 and the following definitions apply.

3.1 adjustable stud end: Stud end connector that allows for fitting orientation through final tightening of the locknut to complete the connection. This type of stud end is typically used on shaped fittings (e.g. tees, crosses and elbows).

3.2 non-adjustable stud end: Stud end connector that does not require specific orientation before final tightening of the connection because it is only used on straight fittings.

4 Dimensions

Light-duty (L series) stud ends shall conform to the dimensions shown in figures 1 and 2 and given in table 1. Hex tolerances across flats shall be in accordance with ISO 4759-1, product grade C.

5 Requirements

5.1 Working pressure

Light-duty (L series) stud ends made of low carbon steel shall be designed for use at the working pressures given in table 2.

5.2 Performance

Light-duty (L series) stud ends made of low carbon steel shall meet at least the burst and impulse pressures given in table 2, when tested in accordance with clause 7.

5.3 Flatness and fit of adjustable stud end washers

The washer shall be clinched to the stud end with a tight slip fit to an interference fit. The slip fit shall be tight enough so that the washer cannot be shaken loose to cause it to drop from its uppermost position by its own weight. The locknut torque needed to move the washer at the maximum washer interference fit shall not exceed the torques given in table 3.

Any washer surface that is out of flatness shall be uniform (i.e. not wavy) and concave with respect to the stud end and shall conform to the allowances given in table 3.

6 O-rings

O-rings for use with light-duty (L series) stud ends shall conform to the dimensions shown in figure 3 and given in table 4.

7 Test methods

Parts used for the cyclic endurance or burst test shall not be tested further, used or returned to stock.

7.1 Burst pressure test

7.1.1 Principle

Test three samples to confirm that light-duty (L series) stud ends meet or exceed a ratio of 4:1 between the burst and working pressures.

7.1.2 Materials

7.1.2.1 Test block and stud ends

Test blocks shall be unplated and hardened to 50 HRC to 55 HRC. Stud ends shall be made from low carbon steel and shall be plated.

7.1.2.2 Test O-rings

Unless otherwise specified, O-rings shall be made from nitrile (NBR) rubber with a hardness of (85^{+10}_0) IRHD when measured in accordance with ISO 48. O-rings shall conform to the dimensions given in table 4 and shall meet or exceed the quality requirement grade N of ISO 3601-3.

7.1.3 Procedure

7.1.3.1 Thread lubrication

For testing only, threads and contact surfaces shall be lubricated with hydraulic oil with a viscosity of VG 32 in accordance with ISO 3448 prior to the application of torque.

7.1.3.2 Stud end torque

Test stud ends after application of the torques given in table 5. Apply adjustable stud end locknut torques after the stud end has been backed out one full turn from finger-tight position, to test correctly the worst possible actual assembly conditions.

7.1.3.3 Pressure rise rate

During the burst test, the rate of pressure rise shall not exceed 138 MPa/min (1 380 bar/min).

7.1.4 Test report

Test results and conditions shall be reported on the test data form given in annex A.

7.2 Cyclic endurance (impulse) test

7.2.1 Principle

Test six samples at their respective impulse pressures.

7.2.2 Materials

Use the same materials as those given in 7.1.2.

7.2.3 Procedure

7.2.3.1 Thread lubrication

Apply lubricant as specified in 7.1.3.1.

7.2.3.2 Stud end torques

Apply torque as specified in 7.1.3.2.

7.2.3.3 Cycle and pressure rise rate

The cycle rate shall be uniform between 0,5 Hz and 1,3 Hz and shall conform to the wave pattern shown in ISO 6803, except that the pressure rise rate shall be adjusted accordingly.

7.2.4 Requirements

The six samples tested shall pass a cyclic endurance test of 1 000 000 cycles.

7.2.5 Test report

Test results and conditions shall be reported on the test data form given in annex A.

8 Designation of stud ends

Light-duty (L series) stud ends shall be designated by

- "Stud end";
- reference to this part of ISO 6149, i.e. ISO 6149-3;
- thread size ($d_1 \times P$).

EXAMPLE

Stud end ISO 6149-3 - M18 × 1,5

9 Identification

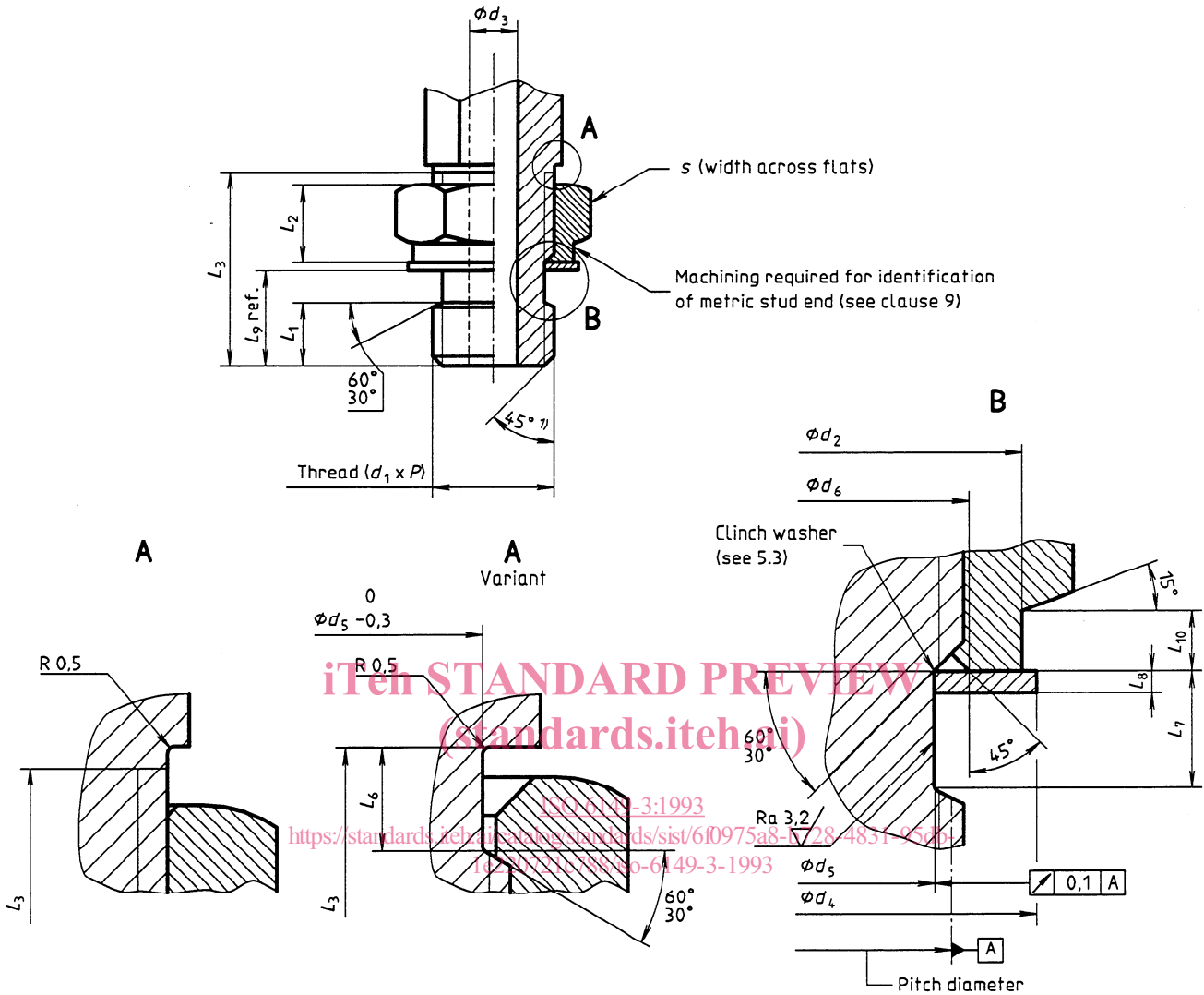
Light-duty (L series) stud ends shall be identified as shown in figures 1 and 2 and in accordance with the dimensions given in table 1. Non-adjustable (straight) stud ends shall be identified by a cylindrical machining of diameter d_2 and length L_5 adjacent to thread d_1 and a notch on diameter d_2 . Adjustable stud ends shall be identified by only a cylindrical machining of diameter d_2 and length L_{10} on the end of the locknut that is adjacent to the washer. In addition to this identification, for both the non-adjustable and adjustable stud ends, the manufacturer may mark the stud ends with the word "metric".

10 Identification statement (reference to this part of ISO 6149)

Use the following statement in test reports, catalogues and sales literature when electing to comply with this part of ISO 6149:

"Light-duty (L series) stud ends conform to ISO 6149-3:1993, *Connections for fluid power and general use — Ports and stud ends with ISO 261 threads and O-ring sealing — Part 3: Light-duty (L series) stud ends — Dimensions, design, test methods and requirements.*"

Dimensions in millimetres,
surface roughness in micrometres



1) Chamfer to minor diameter of thread.

Figure 1 — Adjustable light-duty (L series) stud end

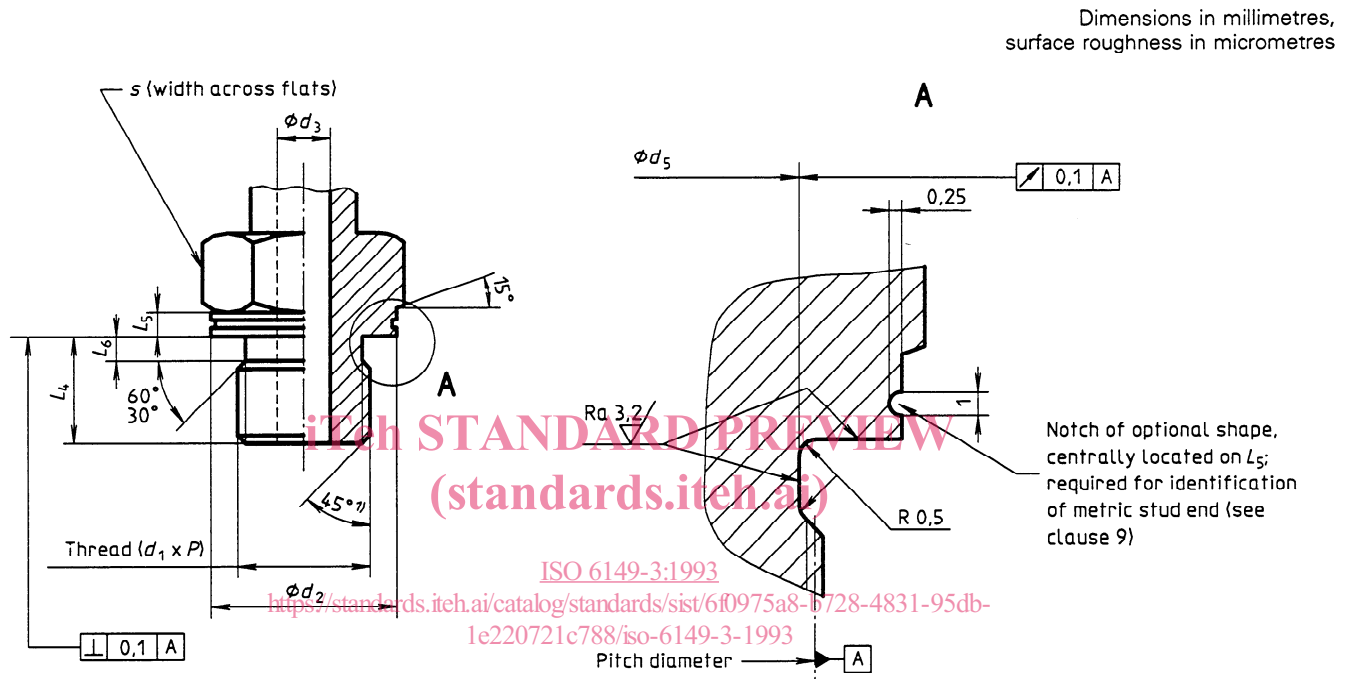


Figure 2 — Non-adjustable light-duty (L series) stud end