

Submitted for recognition as an American National Standard

**CONNECTIONS FOR FLUID POWER AND GENERAL USE—
PORTS AND STUD ENDS WITH ISO 261 THREADS AND O-RING SEALING
PART 1: PORT WITH O-RING SEAL IN TRUNCATED HOUSING**

This document is technically equivalent to ISO 6149-1 except as noted in the Foreword.

Foreword—This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

SAE J2244/ISO 6149 Parts 1 and 2 were prepared by SAE FCCTC-SC1, Automotive and Hydraulic Tube and Fitting Subcommittee and ISO/TC 131 Fluid Power Systems. SAE J2244/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: Port with O-Ring Seal in Truncated Housing

Part 2: Heavy-duty (S Series) Stud Ends—Dimensions, Design, Test Methods, and Requirements

The two parts of SAE J2244 constitute a revision of ISO 6149:1980. This revision defines performance requirements, dimensions, and designs for port and heavy-duty (S series) stud ends. Significant testing was conducted to confirm the performance requirements of stud ends made from carbon steel. ISO 6149-2 applies to fittings detailed in ISO 8434 parts 1, 3, and 4.

SAE J2244 Parts 1 and 2 are technically equivalent to ISO 6149 parts 1 and 2, respectively. Parts produced to either standard will interchange with parts produced to the other standard. **Two main differences exist between the SAE standards and the ISO standards: size M30 x 2 is included in SAE standard but not in the ISO standard and the tube ODs have been shown in the SAE standard for the port sizes.** The SAE subcommittee chose not to include ISO 6149-3, a light-duty stud end, within SAE J2244 to minimize part proliferation.

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 fluid conductor fittings to tubes and pipes, or to hose fittings and hoses.

Ports are an integral part of fluid power components, such as pumps, motors, valves, cylinders, etc.

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SAE J2244/1 (ISO 6149-1) Issued DEC91

1. **Scope**—This part of SAE J2244 specifies dimensions for fluid power metric ports for use with adjustable and nonadjustable stud ends shown in SAE J2244/2.

Ports in accordance with this part of SAE J2244 may be used at working pressures up to 63 MPa for nonadjustable stud ends and 40 MPa for adjustable stud ends. The permissible working pressure depends upon materials, design, working conditions, application, etc.

For threaded ports and stud ends specified in new designs in hydraulic fluid power applications, only SAE J2244 shall be used. Threaded ports and stud ends in accordance with ISO 1179, ISO 9974, and SAE J1926 (ISO 11926) shall not be used for new designs in hydraulic fluid power applications.

2. References

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

2.1.1 ISO PUBLICATIONS—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

- ISO 261:1973—ISO general purpose metric screw threads—General plan
- ISO 1179-1:-¹—Connections for fluid power and general use—Ports and stud ends with ISO 228-1 threads with elastomeric and metal-to-metal sealing—Part 1: Threaded port
- ISO 1179-2:-¹—Connections for fluid power and general use—Ports and stud ends with ISO 228-1 threads with elastomeric and metal-to-metal sealing—Part 2: Heavy duty (S series) and light duty (L series) stud ends with elastomeric sealing (type E)
- ISO 1179-3:-¹—Connections for fluid power and general use—Ports and stud ends with ISO 228-1 threads with elastomeric and metal-to-metal sealing—Part 3: Light duty (L series) stud ends with sealing by O-ring with retaining ring (types G and H)
- ISO 1179-4:-¹—Connections for fluid power and general use—Ports and stud ends with ISO 228-1 threads with elastomeric and metal-to-metal sealing—Part 4: Stud end for general use only with metal-to-metal sealing (type B)
- ISO 1302:1978—Technical drawings—Method of indicating surface texture on drawings
- ISO 2306:1972—Drills for use prior to tapping screw threads
- ISO 5598:1985—Fluid power systems and components—Vocabulary
- ISO 6149-1:-¹—Connections for fluid power and general use—Ports and stud ends with ISO 261 threads and O-ring sealing—Part 1: Port with O-ring seal in truncated housing
- ISO 6149-2:-¹—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 6149-3:-¹—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
- ISO 7789:-¹—Hydraulic fluid power—Two, three- and four-port screw-in cartridge valve cavities
- ISO 9974-1:-¹—Connections for fluid power and general use—Ports and stud ends with ISO 261 threads and elastomeric sealing ring and metal-to-metal sealing—Part 1: Threaded port
- ISO 9974-2:-¹—Connections for fluid power and general use—Ports and stud ends with ISO 261 threads and elastomeric sealing ring and metal-to-metal sealing—Part 2: Stud end with elastomeric sealing (type E)

1. To be published.

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ISO 9974-3:-²—Connections for fluid power and general use—Ports and stud ends with ISO 261 threads and elastomeric sealing ring and metal-to-metal sealing—Part 3: Stud end with metal-to-metal sealing (type S)

ISO 11926-1:-²—Connections for fluid power and general use—Ports and stud ends with ISO 725 threads and O-ring sealing—Part 1: Threaded port

ISO 11926-2:-²—Connections for fluid power and general use—Ports and stud ends with ISO 725 threads and O-ring sealing—Part 2: Heavy duty (S series) stud end

ISO 11926-3:-²—Connections for fluid power and general use—Ports and stud ends with ISO 725 threads and O-ring sealing—Part 3: Light duty (L series) stud end

2.2 Other Publications—U.S. References Identical to ISO References

2.2.1 ANSI PUBLICATIONS—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ANSI/ASME B1.13M—83—Metric Screw Threads—M Profile

2.2.2 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J343 APR91—Test and Procedures for SAE 100R Series Hydraulic Hose and Hose Assemblies

SAE J1926 AUG88—Specifications for Straight Thread O-ring Boss Port

SAE J2244/2 DEC91—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

3. Definitions—For the purposes of this part of SAE J2244, the definitions given in ISO 5598 shall apply.

4. Port Size—The ports shall be specified by ISO 6149-1 and the thread size, separated by a colon, for example, SAE J2244/1: M18 x 1.5.

5. Requirements

5.1 Dimensions—Ports shall conform to the dimensions given in Figure 1 and Table 1.

5.2 Identification—Each port in accordance with this part of SAE J2244 shall be identified by a raised ring, per Figure 2 and Table 2, or by permanently marking "metric" next to the port, or by a permanent identification label on the component to read "ISO 6149 metric."

6. Test Methods—Ports shall be tested along with stud ends per the test methods and requirements in SAE J2244/2.

7. Identification Statement—Use the following statement, except for M30 x 2,³ in test reports, catalogues, and sales literature when electing to comply with this part of SAE J2244 (ISO 6149-2): Ports conform to SAE J2244/1 (ISO 6149-1), Connections for Fluid Power and General Use—Ports and Stud Ends with ISO 261 Threads and O-ring Sealing—Part 1: Port with O-ring Seal in Truncated Housing.

2. To be published.

3. Not included in ISO 6149.

TABLE 1—SAE J2244/1 PORT DIMENSIONS

Dimensions in Millimeters															
Tube OD	Inch Nominal Tube Dash Size	Inch Nominal Tube OD min	Inch Nominal Tube OD in	Thread Size d ₁ ⁽¹⁾	d ₂ Large ⁽²⁾ min	d ₂ Small ⁽³⁾ min	d ₃ ⁽⁴⁾ Ref	d ₄	d ₅ +0.1 0	L ₁ +0.4 0	L ₂ ⁽⁵⁾ Min	L ₃ Max	L ₄		Z° ±1°
													Min Thread	Full Thread	
4	−2	3.18	0.125	M8 x 1	17	14	3	12.5	9.1	1.6	11.5	1	10	10	12°
5	−3	4.76	0.188	M10 x 1	20	16	4.5	14.5	11.1	1.6	11.5	1	10	10	12°
6	−4	6.35	0.250	M12 x 1.5	23	19	6	17.5	13.8	2.4	14	1.5	11.5	11.5	15°
8	−5	7.94	0.312	M14 x 1.5 ⁽⁶⁾	25	21	7.5	19.5	15.8	2.4	14	1.5	11.5	11.5	15°
10	−6	9.52	0.375	M16 x 1.5	28	24	9	22.5	17.8	2.4	15.5	1.5	13	13	15°
12	−8	12.7	0.500	M18 x 1.5	30	26	11	24.5	19.8	2.4	17	2	14.5	14.5	15°
16	−10	15.88	0.625	M22 x 1.5	34	29	14	27.5	23.8	2.4	18	2	15.5	15.5	15°
20	−12	19.05	0.750	M27 x 2	40	34	18	32.5	29.4	3.1	22	2	19	19	15°
22	−14	22.22	0.875	M30 x 2 ⁽⁷⁾	43	38	18	36.5	32.4	3.1	22	2	19	19	15°
25	−16	25.4	1.000	M33 x 2	49	43	23	41.5	35.4	3.1	22	2.5	19	19	15°
30	−20	31.75	1.250	M42 x 2	60	52	30	50.5	44.4	3.1	22.5	2.5	19.5	19.5	15°
38	−24	38.10	1.500	M48 x 2	66	57	36	55.5	50.4	3.1	25	2.5	22	22	15°
50	−32	50.80	2.000	M60 x 2	76	67	44	65.5	62.4	3.1	27.5	2.5	24.5	24.5	15°
				M20 x 1.5 ⁽⁸⁾	32	27		25.5	21.8	2.4		2	14.5	14.5	15°

1. Per ISO 261 tolerance class 6H. Tap drill per ISO 2306 class 6H.

2. Spotface diameter with identification ridge.

3. Spotface diameter without identification ridge.

4. Reference only, connecting hole application may require a different size.

5. Tap drill depths given require use of a bottoming tap to produce the specified full thread lengths. Where standard taps are used increase tap drill depths accordingly.

6. Preferred for diagnostic port applications.

7. Not included in ISO 6149.

8. For plug for cartridge cavity only. (See ISO 7789.)

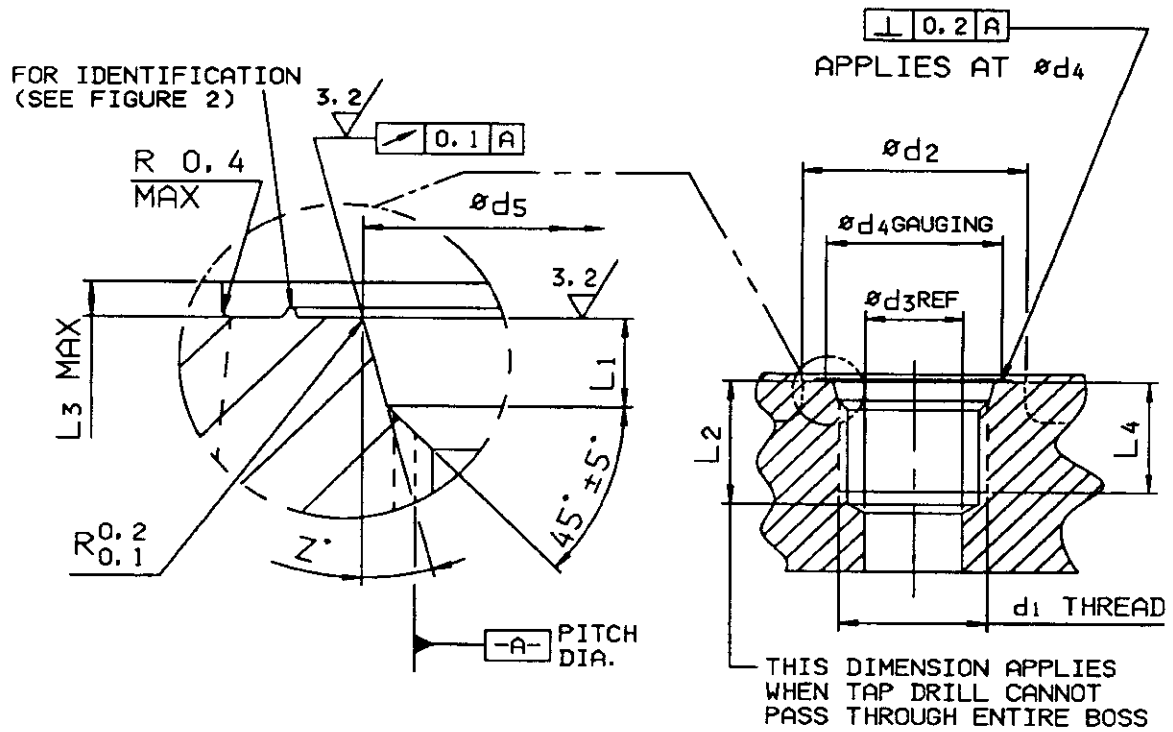


FIGURE 1—SAE J2244/1 PORT DETAIL

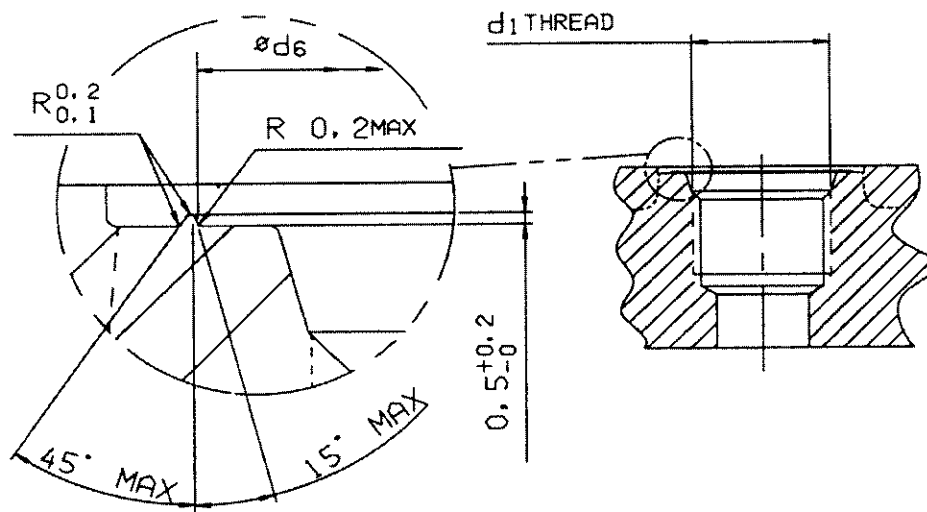


FIGURE 2—SAE J2244/1 PORT IDENTIFICATION DETAIL (SEE 5.2)

TABLE 2—SAE J2244/1 PORT IDENTIFICATION DIMENSIONS

Dimensions in Millimeters	
Thread Size d_1	d_6 $+0.5$ 0
M8 x 1	14
M10 x 1	16
M12 x 1.5	19
M14 x 1.5	21
M16 x 1.5	24
M18 x 1.5	26
M22 x 1.5	29
M27 x 2	34
M30 x 2 ⁽¹⁾	38
M33 x 2	43
M42 x 2	52
M48 x 2	57
M60 x 2	67
M20 x 1.5 ⁽²⁾	27

1. Not included in ISO 6149.

2. For plug for cartridge valve cavity only. (See ISO 7789.)

8. **Key Words**—fluid power, pipe fittings, standard connection, standard coupling, pipe joints, ports, stud ends, specifications, design, operating requirements, dimensions, designation, test methods, metric, straight thread, O-ring seal, high pressure

PREPARED BY THE SAE FLUID CONDUCTORS AND CONNECTORS TECHNICAL COMMITTEE
SC1—AUTOMOTIVE AND HYDRAULIC TUBE AND FITTING

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Rationale—SAE J2244 is being published by SAE to standardize the specifications for a metric port and stud end. This standard is technically equivalent to ISO 6149 currently being finalized by ISO/TC 131 committee members. SAE J2244 incorporates all changes being proposed by the U.S. delegation to the ISO committee draft. SAE J2244 will provide a copy of the ISO standard within the SAE standards system for use by U.S. companies and achieve standardization of fitting designs within the industry, as well as promote its use in international trade. The standard is metric per SAE J916.

SAE J2244/2 has been extensively tested to ensure the stud ends meet the specified performance requirements outlined in the standard.

Relationship of SAE Standard to ISO Standard—This standard is technically equivalent to ISO 6149-1.

Application—This part of SAE J2244 specifies dimensions for fluid power metric ports for use with adjustable and nonadjustable stud ends shown in SAE J2244/2.

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Reference Section

ISO 261:1973—ISO general purpose metric screw threads—General plan

ISO 1179-1:⁴—Connections for fluid power and general use—Ports and stud ends with ISO 228-1 threads with elastomeric and metal-to-metal sealing—Part 1: Threaded port

ISO 1179-2:⁴—Connections for fluid power and general use—Ports and stud ends with ISO 228-1 threads with elastomeric and metal-to-metal sealing—Part 2: Heavy duty (S series) and light duty (L series) stud ends with elastomeric sealing (type E)

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ISO 6149-1:⁴—Connections for fluid power and general use—Ports and stud ends with ISO 261 threads and O-ring sealing—Part 1: Port with O-ring seal in truncated housing

4. To be published.

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ISO 6149-2:-⁵—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 6149-3:-⁵—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

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Developed by the SAE Fluid Conductors and Connectors Technical Committee SC1—Automotive and Hydraulic Tube and Fitting

5. To be published.