



Connectors For World Class Products

Connector Proliferation:

Today many different types of connectors are being used around the world. Most of these have come about through historical use and local preference for a certain design concept. Some connections of the North American origin such as four bolt flange, SAE straight thread and 37° flare have found some degree of acceptance and use in Europe and Japan as a result of the exports of U.S. machinery to the regions after World War II. But, large majority of usage is made up of a variety of indigenous port and tube connections. A quick review of the commonly used connections around the world reveals that there are eight different port connections and eleven different tube/hose connections.

Port Connections:

NPTF	ISO 6149 (Metric Straight Thread O-ring Port)
SAE Straight Thread (UN/UNF)	JIS-PT (BSPT)
4-Bolt Flange	JIS-B2351 (BSPP similar to SAE)
ISO 1179 (BSPP)	
ISO 9974 (Metric)	

Tube/Hose Connections:

37° Flare (SAE)	30° Flare, BSPP (JIS)
24° Flareless, Inch Threads (SAE)	24° Flareless, Metric (JIS)
60° Cone Swivel, NPSM (SAE)	60° Cone, BSPP (JIS)
O-Ring Face Seal (SAE)	60° Cone, Metric (JIS)
24° Cone, Metric (DIN)	37° Flare, Metric (Russia)
60° Cone, BSPP (BSi)	

The Challenge:

Leakage is no longer acceptable in world class products. Above proliferation, besides limiting availability and increasing cost, increases leakage potential through misapplications. Therefore, the challenge facing the fluid power industry is two fold — eliminate leakage and minimize proliferation.

Meeting The Challenge:

This challenge has been met through a very intensive and cooperative effort by the member nations of sub-committee 4 of the ISO Technical Committee 131 (ISO/TC131). The subcommittee started this effort in 1989 and has completed development of performance based standards for the most widely used ports and tube/hose connections to limit proliferation, and strongly endorsing those with elastomeric seals to eliminate leakage in hydraulic systems.

Five ports, four threaded and the four bolt flange, and four tube/hose connections as shown on the following page (Fig. U1) have been standardized. The threaded ports and tube/hose connections are paired in the ISO 8434 series of fitting standards as defined in the table below.

To minimize proliferation in port usage and promote leak free connections, the sub-committee strongly endorses use of ISO 6149 port for all new designs by including the following statement in all port standards:

“For threaded ports and stud ends specified in new designs in hydraulic fluid power applications, only ISO 6149 shall be used. Threaded ports and stud ends in accordance with ISO 1179, ISO 9974 and ISO 11926 shall not be used for new designs in hydraulic fluid power applications.”

On the tube/hose connection side, only ISO 8434-3 (O-ring Face Seal) and ISO 8434-4 (24° cone with weld nipple) feature elastomeric seal for zero leak performance. Combining these with the ISO 6149 for the port connection leads to two (2) combinations (complete fittings) for use in leak-free world class products. They are:

ISO 8434-3	O-ring Face Seal and ISO 6149 Port
ISO 8434-4	24° Cone With Soft Seal and ISO 6149 Port

For large port connections, the four bolt flange connection per ISO 6162 (SAE J518 is included in ISO 6162) remains widely used and the recommended connection.

Application	Port	Tube/Hose Connection			
		24° Cone Flareless (DIN) (Bite Type)	37° Flare (Inch Threads)	ORFS	24° Cone Weld Nipple
For All Designs	Metric ISO 6149 (SAE J2244)	ISO 8434-1	ISO 8434-2	ISO 8434-3	ISO 8434-4*
Not for New Designs in Hydraulic Fluid Power	BSPP ISO 1179 (DIN 3852-2)	ISO 8434-1	ISO 8434-2	—	ISO 8434-4*
	Metric ISO 9974 (DIN 3852-1)	ISO 8434-1	—	—	ISO 8434-4*
	UN/UNF ISO 11926 (SAE J1926)	—	ISO 8434-2	—	—

Table U1 — ISO Standard Port and Tube/Hose Connection Combinations

* Will be included in ISO 8434-1 at the next revision.

Dimensions and pressures for reference only, subject to change.