DILO. Sustainably tight.

High-Pressure Tube Unions

A solution for highly demanding pipe connections

Overview

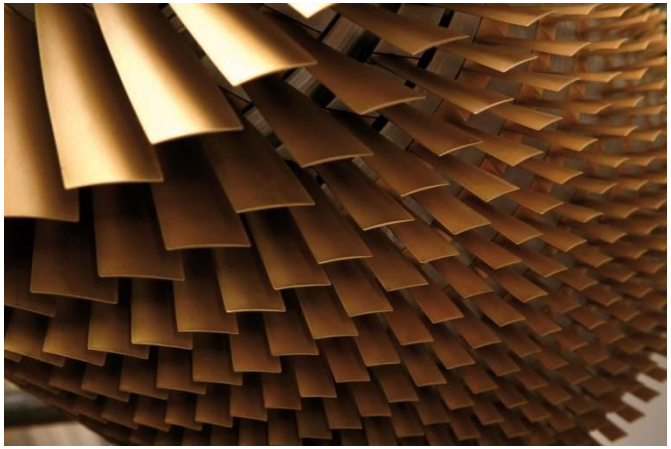
- Areas of application
- The DILO sealing principle
- Sealing efficiency and product advantages
- Construction types and series
- Torque tables
- Options
- Quality control
- Tests and certificates
- References

DILO high-pressure tube unions

Areas of application

Turbine construction

- Gas turbines
- Steam turbines
- Industrial turbines



Fields of application

Chemical industry

- In case of aggressive media where elastomeres must not be used any more
- In case of high temperatures (heat transfer oil)

Fields of application

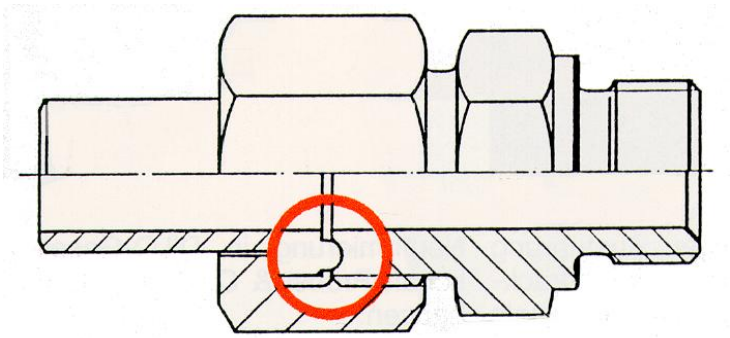
Further areas of application

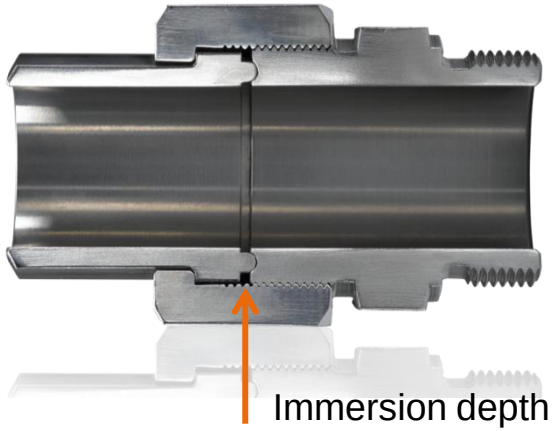
- Power stations
- Aerospace industry
- Hydrogen applications
- Pipeline construction
- Mechanical and apparatus engineering
- Feed-water pumps
- Dosing pumps
- Processing pumps
- Hydraulic systems
- Compressors

DILO sealing principle

Hermetically sealed and long term tightness

- Metal-to-metal sealing principle without intermediate seal: **DI**chtungs**LO**s (DILO = without seal)
- Formation of two sealing areas through closely touching groove and tongue
- Braking area on the DILO tongue part prevents structural deformation of the sealing areas





DILO high-pressure tube unions

Product characteristics:

- Suitable for pressures up to 1,000 bar and vacuum
- Temperature resistant from -270 ° C up to +500 ° C (dependent on the material used)
- Applicable for all fluids with the correct steel grade
- Long term high level of gas tightness even if unions are frequently loosened and re-connected
- Simple assembly and disassembly
- High resistance to vibrations
- Complete interchangeability of pieces

Sustainably tight:
1 x 10^{-8} mbar l/sec corresponds to a leak rate of < 1 cm^3 in 30 years!

Weld-on tube unions

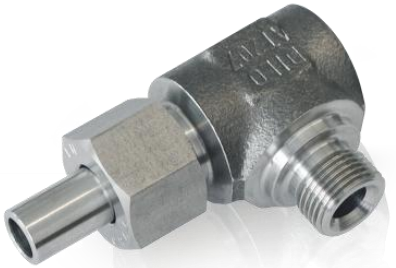
For permanent pipe connections

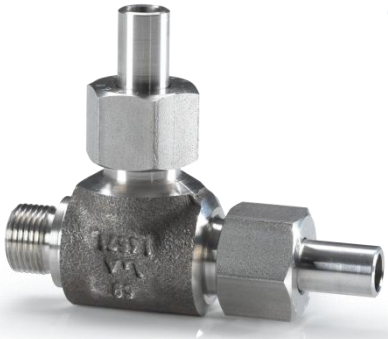
- With weld end on both sides
- For tube diameters from DN 3 to DN 50
- Straight version, angles and Tee form
- Temperature-resistant from -270 ° C up to 500 ° C (dependent on the material used)
- Versions for pressures up to 1,000 bar on request

Screw in tube unions

For variable application

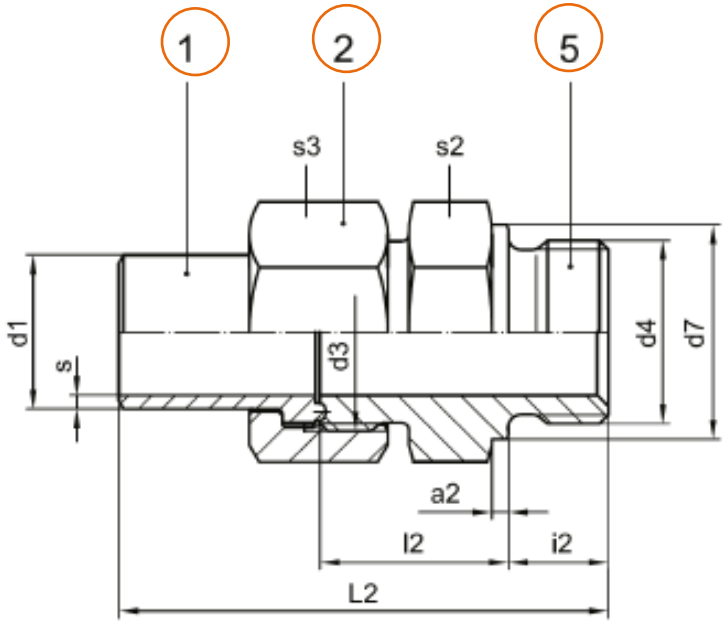
- With weld end and screw in thread
- For tube diameters from DN3 to DN50
- Straight version, angles and Tee form
- Metric, Whitworth or NPT thread
- Temperature-resistant from -270 ° C up to +500 ° C (dependent on the material used)
- Versions for pressures up to 1,000 bar on request





Screw in tube union with Whitworth thread

Sectional view



Three-part union consisting of:

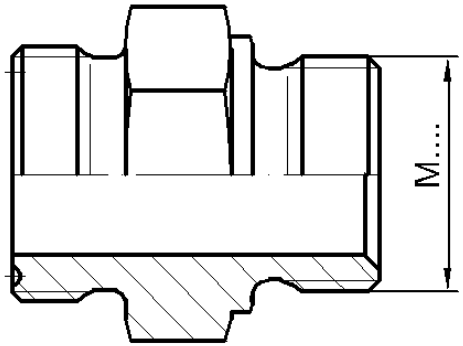
1 = weld-on stub

2 = clamping nut

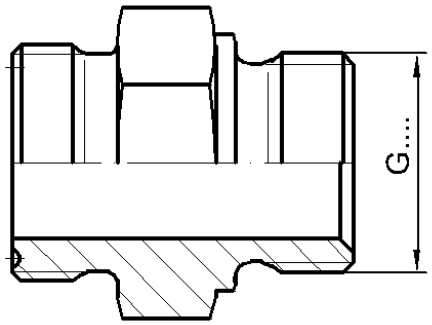
5 = weld-on screw stub

Screw-in threads

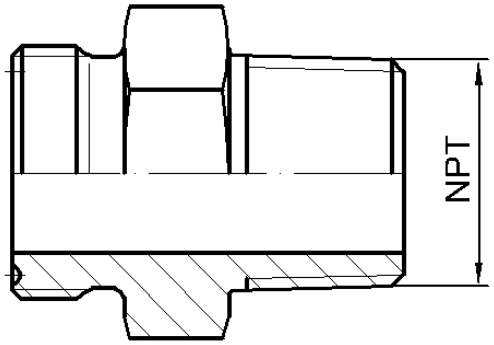
Thread types



Metric thread acc. to DIN 13
Thread angle 60˚



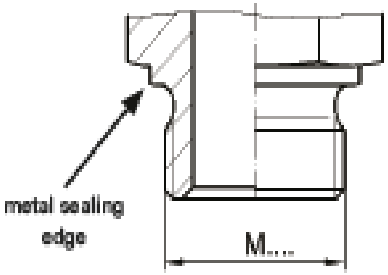
Whitworth thread acc. to DIN/ISO 228
Thread angle 55˚



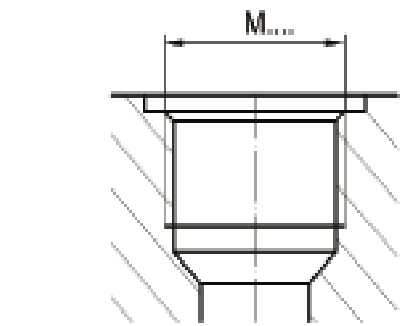
American conical thread acc. to ANSI/ASME B1.20.1
Thread angle 60˚

Screw-in stub and screw-in holes

according to DIN 3852 – part 1:
with cylindric, metric thread
according to DIN 13

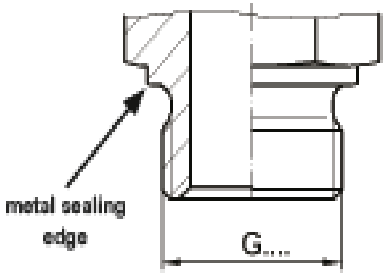


screw-in stub
form B

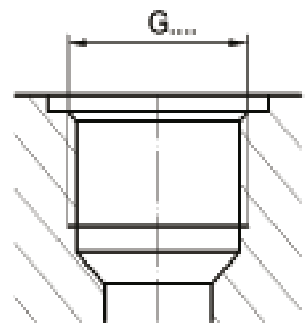


screw-in hole
form X

according to DIN 3852 – part 2:
with cylindric Whitworth thread
according to DIN/ISO 228

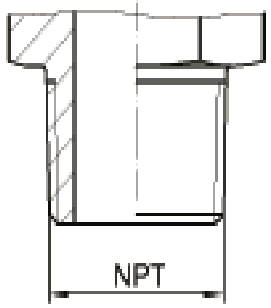


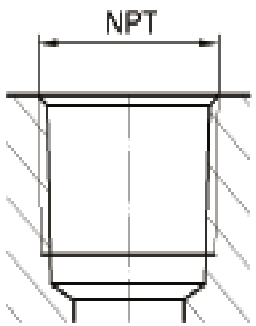
screw-in stub
form B



screw-in hole
form X

NPT:
Plug and screw-in hole with conical
NPT thread according to
ANSI / ASME B 1.20.1-1983





Throttlefree angle-swivel unions

For variable positioning of the weld end

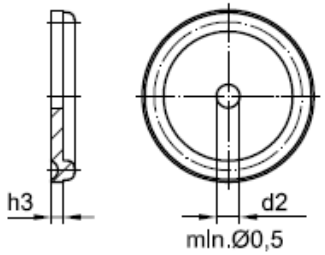
- With infinitely variable weld end
- For tube diameters from DN3 to DN40
- Temperature-resistant from -270 ° C up to +500 ° C (dependent on the material used)
- Angles, L or Tee form
- Metric, Whitworth or NPT thread

Blanking disks

For reliable isolating of pipes

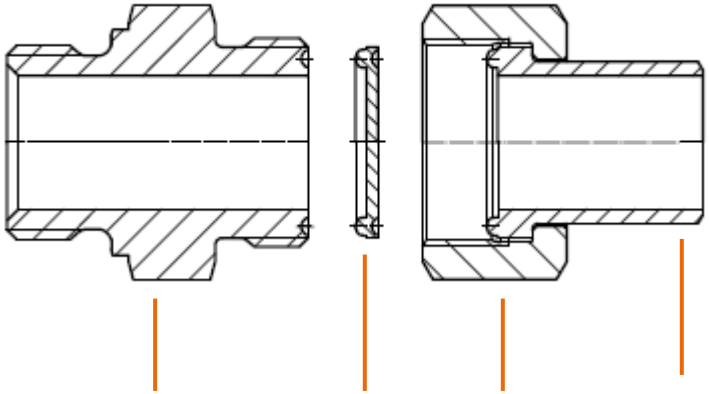
- To fit between tongue and groove parts
- For all series and pressure ranges
- Available bored out for flow restriction
- Temperature-resistant from -270 ° C up to +500 ° C (dependent on the material used)

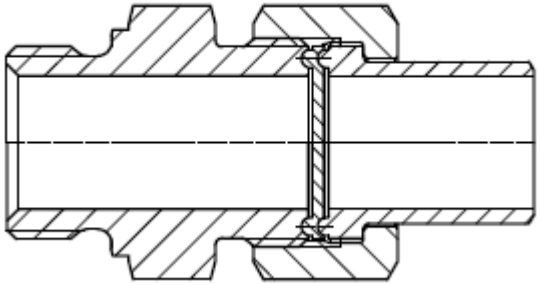
Dosing bore for flow restriction



Blanking disks

Correct mounting of a blanking disk





- To be fitted in between tongue and groove
- Blanking disk is fixed by pressing the weld-on stub and clamping nut

Gauge connection unions

For reliable connection of gauges

- Applicable in pressure ranges to nominal pressures
- PN100, 200 and 320 bar
- Suitable for G ½” gauge threads and all standard series
- Available for pipes from DN3 to DN10
- Other thread sizes are available on request

Superheated steam unions

For applications up to 500 ° C

- Available as weld on or screw in version
- Suitable for pressures up to PN100
- With metric or Whitworth thread
- Suitable for pipe diameters from DN3 to DN40
- High temperature-resistant 1.7335 steel
- Special materials for higher temper-atures are available

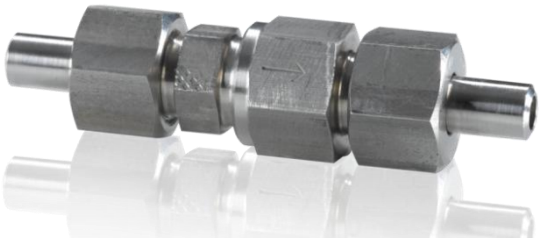
Straight screw-in tube union

Straight weld-on tube union

Manual blocking valves and non-return valves

For medium flow regulation

- Robust durable version
- Complete DILO connecting parts are available
- Temperature range of non-return valves from -20 to +70 ° C (media-dependent)
- Application range of manual blocking valves from -270 ° C up to 400 ° C
- Available in DIN 1.0460 and 1.4571 materials



High-pressure hoses

For liquids and pressures up to PN 320

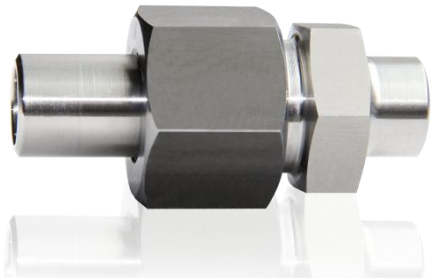
- Applicable for high pressure and vacuum use
- Suitable for temperature range from -40 ºC to +100 ºC
- Consisting of internal and external oil and water-proof layer
- Available in any hose length

Special tube unions

For customer-specific applications

- Components are available in different materials
- Chamfered fittings to adapt to different pipe and weld on stub wall thickness
- Double stubs for other connecting options are available

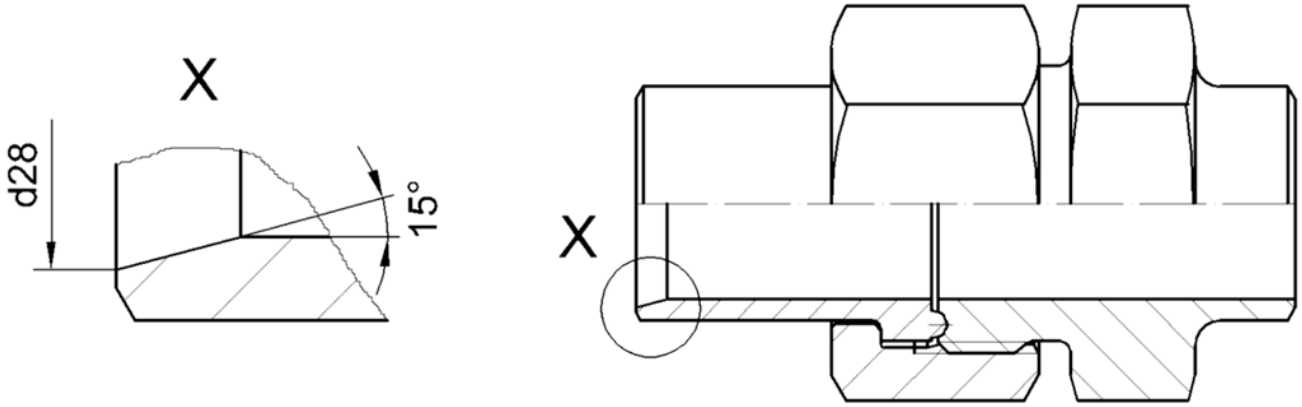
Double stub



Material combinations:

- Areas touching the medium are made from stainless steel
- Union nut made from steel

Option: Adjustment of tube wall thickness



e. g. 21.3 x 2.0 tube connection dimension

Type: J1A16-N1 = d28 = 17.3

Pressure ranges

M Series for pipes acc. to DIN 2391

M1 = 100 bar

M2 = 200 bar

M3 = 320 bar

M6 = 640 bar

M10 = 1,000 bar

J Series for pipes acc. to DIN 2448

J1 = 100 bar

J2 = 250 bar

J3 = 320 bar

Torque table for DILO tube unions

Nominal diameter	Series								Special version	
	M 1	MH 1	J 1	JH 1	M 2	J 2	M 3	J 3	M 6	M 10
	Operating overpressure								Operating overpressure	
	PN 100	PN 100	PN 100	PN 100	PN 200	PN 250	PN 320	PN 320	PN 640	PN 1000
3	20	25	20	25	20	20	20	20	25	30
4	20	30	25	30	25	25	25	25	35	50
5	-	-	-	-	-	-	25	25	-	-
6	25	40	25	40	30	30	30	30	50	70
8	25	45	30	45	35	35	40	40	65	80
10	30	55	35	50	45	45	50	60	90	110
12	35	65	45	55	55	50	60	75	110	125
16	40	80	55	80	65	75	80	90	145	205
20	50	100	70	110	80	110	100	120	220	245
25a	-	-	-	-	-	-	150	-	-	-
25	65	130	80	145	100	135	170	185	255	-
32	85	170	110	190	130	175	220	245	-	-
40a	110	-	-	-	-	-	-	-	-	-
40	145	220	190	250	170	240	-	290	-	-
50	220	-	290	-	220	300	-	-	-	-

Torque table for DILO screw-in tube unions

Nominal diameter	Series								Special version	
	M 1	MH 1	J 1	JH 1	M 2	J 2	M 3	J 3	M 6	M 10
	Operating overpressure								Operating overpressure	
	PN 100	PN 100	PN 100	PN 100	PN 200	PN 250	PN 320	PN 320	PN 640	PN 1000
3	-	30	-	30	28/30	28/30	28/30	28/30	-	-
4	25	40	25	40	30	30	30	30	72	72
5	-	-	-	-	-	-	40	30	-	-
6	28/30	48/40	28/30	48/40	40	40	48/40	48/40	72	98/92
8	30	60/72	30	60/72	48/40	48/40	60/72	60/72	98	128
10	40	72	40	72	60/72	60/72	72	72	128	138
12	48/72	98/92	60/72	98/92	72	72	98/92	98/92	138	138
16	72	128	98/92	128	98/92	98/92	128	128	138	-
20	92	138	128	138	128	128	138	138	143	-
25a	-	-	-	-	-	-	143	-	-	-
25	128	143	138	143	138	138	143	143	152	-
32	138	152	143	152	143	143	152	152	-	-
40a	143	-	-	-	-	-	-	-	-	-
40	143	158	152	158	152	152	-	158	-	-
50	158	-	158	-	158	-	-	-	-	-

Uncompromising quality

Comprehensive quality management

- R & D
- Engineering & Design
- Manufacture
- Sales
- Training
- Service

Quality assurance

Test certificates / approvals

With chemical and mechanical values, examination according to the AD notes and DIN regulations

- All materials with 3.1 B certificate
- Material and certificate approval for re-stamping of 3.1 B and 3.1 C-material

Process control

Process control during production

Stamping of parts with:

- Batch no.
- Material identification
- Manufacturer‘s logo
- Nominal diameter

Approvals and tests

Certified quality

- Certification in accordance with ISO 9001:2008
- Confirmation of quality assurance in accordance with KTA 1401
- HP0 approval as manufacturer of pressure equipment
- Production supervision in accordance with 97/23/EC pressure equipment directive

References (extract)

Customers relying on DILO:

- Air Liquide
- Alstom Power
- Ansaldo Energia Italy
- BASF SE
- Bayer AG
- Blohm & Voss AG
- BMW Group
- Bopp & Reuther Sicherheits- und Regelarmaturen GmbH
- Robert Bürkle GmbH
- D&N Kraftwerkstechnik GmbH
- Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)
- EADS Astrium GmbH
- EagleBurgmann Germany
- EcoNautic Systems GmbH
- GEA Refrigeration
- Großkraftwerk Mannheim AG
- HKS GmbH
- KSB
- Linde AG
- MAN Diesel & Turbo Germany
- Maschinen- & Apparatebau Westerwald GmbH & Co. KG
- Norgren GmbH
- OMV Refining & Marketing GmbH
- Ruhrpumpen GmbH
- RWE
- Siemens AG
- Single Temperiertechnik GmbH
- Skodock GmbH
- STEAG Power Saar GmbH
- Thomann GmbH
- TMS Turbomaschinenservice GmbH
- Max Weishaupt GmbH
- Witzenmann GmbH
- …and many others

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