framatome

Nuclear-grade RT-Type Pipe Unions

Certified Pipe Unions Licensed for Use in Nuclear Power Plants

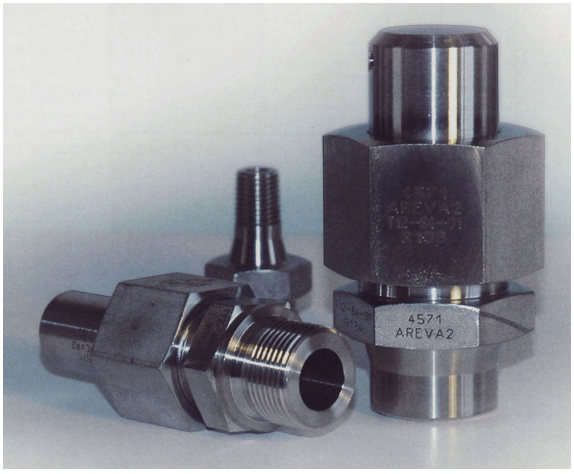
Proven in service nuclear-grade RT-Type Pipe Unions guarantee stringent quality and leak-tighness requirements in reactor engineering

Nuclear-grade Pipe Unions

The RT-Type Pipe Union is a pipe and tube coupling component which meets highest safety and quality standards. Since 1970 the RT-Type Pipe Union has been developed to meet the stringent quality and leak-tightness requirements in reactor engineering. The structural design permits RT-Type Pipe Unions to be disconnected and reconnected many times. The RT-Type Pipe Union is certified and licensed for use in the highest quality class (class 1, components part group 1) for nuclear power plants (NPP).

Among others, typical fields of application are:

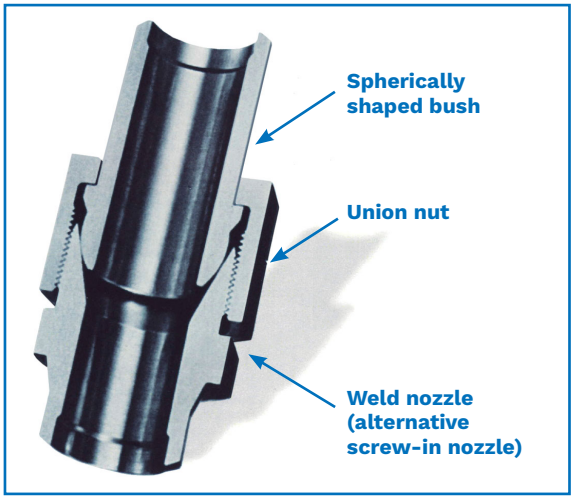
- Drainage and venting line connections
- Dead-end barriers of small bore piping
- Connections of measurement leads (DN4 – DN6)
- All kind of small bore piping which have been removed



Nuclear Grade RT-Type Pipe Unions

Design of the RT-Type Pipe Unions

- The distinguishing feature of the RT-Type Pipe Union is the shape of the contiguous sealing surface: One is spherical the other is in the shape of an internal cone
- The sealing surface of the two union pieces are directly pressed on each other by the union nut
- An elastic annular pre-tension is built up in the region of the sealing surface when the union nut is tightened. This ensures uniformly leak-tightness of the RT-Type Pipe Union under all loads (including dynamic loads) and, in particular, prevents temporary leakage in the event of rapid temperature transients.
- The structural design permits RT-Type Pipe Unions to be disconnected and reconnected many times without loss of leak-tightness
- All threaded parts are made of stainless steel X6CrNiMoTi17-12-2 (1,4571) cold worked (C 700)



Design Features and Sealing Principle

Your performance
is **our** everyday **commitment**

Dimensions in mm or inch (“) and degree (°)

Nuclear-grade Pipe Unions Qualification-tested RT-Type Pipe Unions								Versions															
				Conecting thread		Size across flats		Weld nozzle Spherical bush Union nut			Weld nozzle Blank spherical bush Union nut			Screw-in nozzle Spherical bush Union nut			Screw-in nozzle Blank spherical bush Union nut						
Nominal size DN	Design pressure (Pa)	Design Temperature (°C)	Pipe joint	Screw-in nozzle, metric ISO	Screw-in nozzle, Withworth R	Union nut	Weld nozzle	Gasket on screw-in nozzle	A	B	C	D	E	F	G	H[5]	J	K	L	M	N	O	P	Q
4	250	362	8.5 x 2.25 10 x 3	M12 x 1.5	–	19	19	SK[1]	64	34	8.5[4]	4	30°	20	25	35	55	61	10	32	18.5	4	52	–
6	250	362	10 x 2	M16 x 1.5	G1/4”	22	19	SK[1]	76	44	10	6.2	30°	22	32	38	64	76	12	38	21	6.2	64	5
9	250	362	16 x 3.8 13.5 x 2.6	M18 x 1.5		30	27	SK[1]	87	50	16·0 13.5	8.3	30°	25	45	45	82	90 104	12	48 62	25 24	8.3 3	85 99	5
15	250 250 145	362 362 190	21.3 x 3.2 21.3 x 2.9 21.3 x 2.6		G3/4”	36	32	SK[2]	94	58	21.3	14.8 15.4 16.0	30°	29	45	45	81	99	19	50	32	15.5	86	5
25	250 250 53	362 362 200	33.7 x 4.0 33.7 x 3.6 21.3 x 2.6		G1”	50	46	O-Ring[3]	112	68	33.7	25.6 26.3 28.4	30°	36.5	55.5	55	99.5	112	19	56	45	20	99.5	5

[1] Screw-in gudgeon, shape B to DIN 3852 Part 1 resp. 2, lozenge SK, screw-in nozzle DN 9 with a length of 48 mm shall be shape A and with a length of 62 mm shall be shape B

[2] Sealing ring A7-D from Nickelmaterial (2.4066); 26.8 x 31.9 x 2 according DIN 7603 or sealring lozenge section 27 x 32 mm from austenitic material

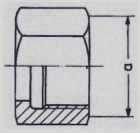
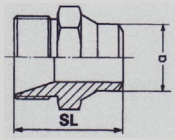
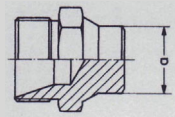
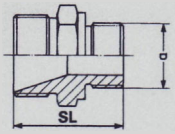
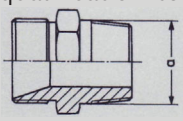
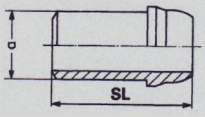
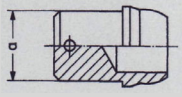
[3] Sealing ring A7-D from Nickelmaterial (2.4066); 33.5 x 40 x 3.5 according DIN 7603. Use of synthetic O-Ring depends on allowable temperature range and resistance to fluid handled

[4] Applicable only to spherical bush; 10 mm for weld nozzle (pipe connection 10 x 3)

[5] Size H applicable also to blank nozzle

Order Numbers

RT-Type Pipe Union Parts

Design and Dimensions	Designation	DN	Size	Order No.
	**Union nut**	4 6 9 15 25	M14 x 1.5 M18 x 1.5 M24 x 1.5 M30 x 1.5 M42 x 1.5	430[3] 630[3] 930 1530 2530
 Special lengths SL[1] for DN15, 45 < SL ≤ 150 for DN25, 55 < SL ≤ 150	**Weld nozzle** from Ø2 to Ø6.2 orifice possible from Ø3 to Ø8.3 orifice possible	4 6 6 9 9 9 15 15 15 25 25 25	10 x 3 10 x 3 10 x 2 13.5 x 2.6 16 x 3.8 16 x 3.8 21.3 x 2.9 21.3 x 2.6 21.3 x 3.2 33.7 x 3.6 33.7 x 2.6 33.7 x 4.0	410[3] 610[3] 611[3] 918[3] 910 916 1510 1510 A[3] 1510 D[3] 2510 2510 A[3] 2510 D[3]
	**Blank nozzle**	4 6 9 15 25	10 Ø 10 Ø 16 Ø 21.3 Ø 33.7 Ø	417[3] 617[3] 917 1517 2517
 Special lengths SL[1] for DN15, 45 < SL ≤ 150 for DN25, 55 < SL ≤ 150	**Screw-in nozzle** with Ø3 orifice	4 6 6 9 9 15 25	M12 x 1.5 M16 x 1.5 G 1/4” M18 x 1.5 M18 x 1.5 G 3/4” G 1”	412[3] 612[3] 613[3] 914[3] 915[3] 1512 2512
Special pipe union (not qualification-tested) 	**Screw-in nozzle** Screw-in nozzle 52 long Screw-in nozzle 70 long	 9 9 15	 NPT 1/2” NPT 1/2” NPT 1/2”	 913[3] 912[3] 1513[3]
 Special lengths SL[1] for DN15, 58 < SL ≤ 150 for DN25, 68 < SL ≤ 150	**Spherical bush**	4 6 9 9 15 15 15 25 25 25	8.5 x 2.25 10 x 2.0 16 x 3.8 13.5 x 2.6 21.3 x 2.9 21.3 x 2.6 21.3 x 3.2 33.7 x 3.6 33.7 x 2.6 33.7 x 4.0	420[3] 620[3] 920 922 1520 1520 A[3] 1520 D[3] 2520 2520 A[3] 2520 D[3]
	**Blank spherical bush with milled wrench size**	4 6 9 15 25	8.5/WS[2] 7 10/WS[2] 8 16/WS[2] 14 12.3/WS[2] 18 33.7/WS[2] 28	432[3] 632[3] 932 1532 2532

[1] Special lenghts DN4, DN6 and DN9 available on request
[2] Wrench Size
[3] Special type will be manufactured separately; not available on stock

Qualification Tests

The qualification for the RT-Type Pipe Union was accepted by the German independent agency TÜV SÜD Industrie Service GmbH and certified according DIN EN 10204 with a 3.1 resp. 3.2 (TÜV) acceptance test certificate.

The RT-Type Pipe Union is manufactured in accordance with the Framatome specification based on DIN EN 10272 and additional requirements and tests according to TL 1702/00.

Scope of use

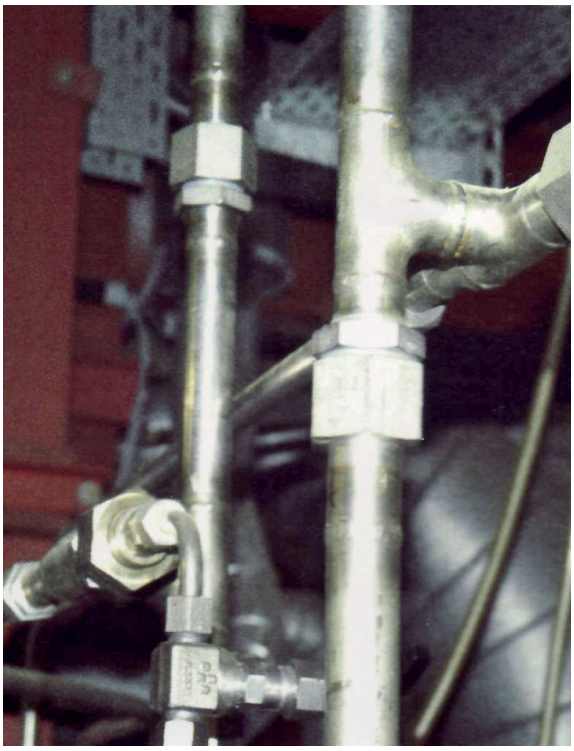
Primary and secondary systems of nuclear power plants with pressurized and boiling water reactors

Used material

All threaded parts are made of stainless steel X6CrNiMoTi17-12-2 (1.4571) cold worked (C700)

Operating conditions

- Pressure: max. 25 Mpa
- Temperature: max. 362 °C
- Medium:
  - demineralized water
  - boric-acid-containing demineralized water
  - pure water steam
  - Potable water <100°C
  - other media have to be agreed to by Framatome GmbH and TÜV SÜD Industrie GmbH



Nuclear Grade RT-Type Pipe Unions: Application example

Key figures

Over **300.000** RT-Type Pipe Union units have been supplied to date and have been proven in service in nuclear power plants

TÜV SÜD Industrie Service GmbH qualification test certificate number **T 12-84-01**

Customer Benefits

The nuclear-grade RT-Type Pipe Unions technology offers numerous advantages in comparison to traditional connections:

- Certified and licensed for usage in the highest quality class for NPPs (class 1, components part group 1)
- Multiple disconnections and reconnections without loss of leak-tightness
- Resistance against intergranular stress corrosion cracking (IGSCC); all threaded parts are made of stainless steel X6CrNiMoTi17-12-2 (1.4571) cold worked (C700)
- Uniform leak-tightness under all loads and, in particular, prevents temporary leakage in the event of rapid temperature transients
- No additional gaskets necessary
- No dedicated calculations necessary; Tightening torques will be delivered for the corresponding unions
- No need for complex piping supports are not necessary thanks to the units low weight

Contact: spare-parts@framatome.com
www.framatome.com