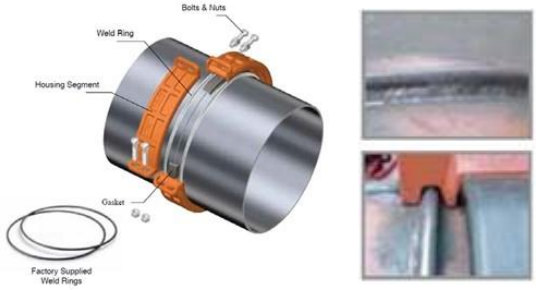
aalberts integrated piping systems

R-88 RING JOINT COUPLING



The Shurjoint Model R-88 Ring Joint Coupling is an ideal pipe joining method when pipe is difficult to groove or when grooving is not the preferred joining method. Available in sizes 8" to 96" the R-88 offers ease of use and excellent performance.

The Shurjoint Model R-88 Ring Joint Coupling is supplied with a pair of factory supplied weld rings. For installation weld a ring on each pipe end to be connected, next mount the rubber gasket over the pipe ends, place coupling segments over the gasket and fasten the bolts and nuts.

R-88 couplings should always be installed so that the coupling bolt pads make metal to metal contact.

The Shurjoint R-88 Ring Joint Coupling is considered a shouldered coupling with the factory supplied weld rings serving as the joint shoulders. The R-88's performance standards meet and or exceed the requirements of ASTM F1476 and AWWA C606. The factory supplied weld rings offer a much more economical and installation friendly alternative to that of traditional shoulder rings, including Type A, B, C, D, E, and G rings.

The R-88 coupling can also be used on stainless steel pipe with optional weld rings available in compatible stainless steel grades. Check with Shurjoint for details and availability.

Typical applications include:

- Water & Waste Water Treatment Plants
- Mining & Tunnel Boring
- Pulp & Paper
- Hydroelectric Plants
- Co-Gen Electric Plants
- Food & Beverage
- Compressed Air
- HVAC

material specification

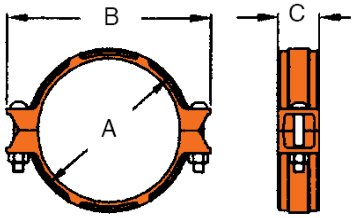
- Housing:
  Ductile Iron to ASTM A536, Gr. 65-45-12, min. tensile strength 65,000 psi (448 MPa).
  - 8"-26" consist of two housing segments
  - 28"-38" consist of six housing segments
  - 40"-96" consist of eight housing segments
- Surface Finish:
  Standard painted finishes in orange or RAL3000 red.
  - Hot dip zinc galvanized (optional)
  - Epoxy Coatings in RAL3000 red or other colors (optional).
- Weld Rings:
  Carbon Steel SAE J403 (ANSI) 1020.
  - Stainless steel: 304, 316, 316L.
- Rubber Gasket:
  Grade "E" EPDM (Color code: Green stripe) Good for cold & hot water up to +230°F (+110°C). Also good for services for water with acid, water with chlorine or chloramines, deionized water, seawater and waste water, dilute acids, oil-free air and many chemicals. Not recommended for petroleum oils, minerals oils, solvents and aromatic hydrocarbons.
  Maximum Temperature Range: -30°F (-34°C) to +230°F (+110°C)*.
  *EPDM gaskets for water services are not recommended for steam services unless couplings or components are accessible for frequent gasket replacement.
  - Other options: Grade "T" - Nitrile
    Grade "M" – Halogenated Butyl.

  For additional details contact Shurjoint.
- Bolts & Nuts:
  ¾" ~ 1½": Heat treated carbon steel track bolts to ASTM A183 Gr. 2, minimum tensile strength 110,000 psi (758 MPa), Zinc electroplated, with heavy-duty hexagonal nuts to ASTM A563.
  - Stainless steel bolts and stainless steel nuts or Silicone-Bronze nut are available upon request.

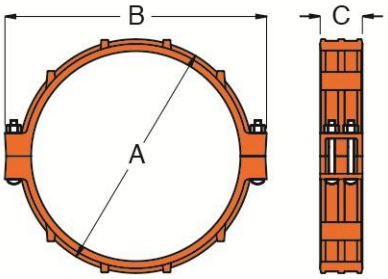
SHURJOINT®

MODEL R-88 / R-88N RING JOINT COUPLING

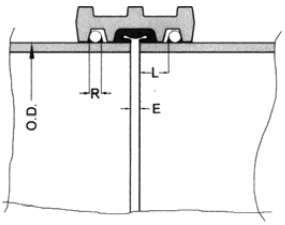
The Shurjoint Model R-88 Ring Joint Coupling is available in sizes 8" / 200 mm and above. Sizes 14" / 350 mm to 26" / 650 mm are now available in a two-segment style (R-88N). The two-segment style offers an easier and faster installation.



8"-12"
(R-88)



14"-26"
(R-88N)



Ring Clamp

Model R-88 / R-88N Ring Joint Coupling

Nominal Size	Pipe O.D.	Rings both sides fully welded**		Axial Displace-ment+ E	Angular Movement /Deflection †		Dimensions			Bolts		Sealing Surface L	Ring Size R	No. of Clamps ‡	Weight
		Max. Working Pressure (CWP)*	Max. End Load (CWP)*		Per Coupling	Per Pipe	A	B	C	No.	Size				
in	in	psi	lbf	in	(°)	in/ft	in	in	in		in	in	in	No.	lbs
mm	mm	bar	kN	mm		mm/m	mm	mm	mm		mm	mm	mm		kgs
8	8.625	400	23350	0-0.340	2.14	0.45	10.08	13.00	3.11	2	¾ x 4¾	0.91	¼	3	16.8
200	219.1	28.0	105.51	0-8.7		37	256	330	79		M20x120	23	6.0		7.6
10	10.750	400	36280	0-0.340	1.95	0.41	12.29	15.20	3.25	2	¾ x 4¾	0.91	¼	3	22.2
250	273.0	28.0	163.81	0-8.7		34	312	386	83		M20x120	23	6.0		10.1
12	12.750	400	51040	0-0.190	0.82	0.17	14.72	17.90	3.39	2	⅞ x 6½	1.02	5/16	3	30.8
300	323.9	28.0	230.59	0-4.8		14	374	455	86		---	26	8.0		14.0
200 JIS	8.516	400	22770	0-0.340	1.50	0.31	9.96	12.87	3.11	2	---	0.91	¼	3	17.6
	216.3	28.0	102.83	0-8.7		26	253	327	79		M20x120	23	6.0		8.0
250 JIS	10.528	400	34800	0-0.340	1.50	0.31	12.05	14.96	3.25	2	---	0.91	¼	3	22.0
	267.4	28.0	157.16	0-8.7		26	306	380	83		M20x120	23	6.0		10.0
300 JIS	12.539	400	49360	0-0.190	1.50	0.31	14.53	17.72	3.39	2	---	1.02	5/16	3	32.6
	318.5	28.0	222.97	0-4.8		26	369	450	86		M20x120	26	8.0		14.8
14	14.000	400	61540	0-0.250	1.20	0.25	15.93	19.40	3.65	2	⅞ x 5½	1.02	5/16	4	31.5
350	355.6	28.0	277.94	0-6.4		21	405	493	93		---	26	8.0		14.3
16	16.000	400	80380	0-0.250	0.90	0.19	17.92	21.52	3.65	2	⅞ x 5½	1.02	5/16	4	35.0
400	406.4	28.0	363.02	0-6.4		16	455	547	93		---	26	8.0		15.9
18	18.000	400	101730	0-0.375	1.20	0.25	20.37	24.17	4.23	2	1 x 5½	1.18	5/16	4	59.9
450	457.2	28.0	459.45	0-9.5		21	517	614	107		---	30	8.0ð		27.2
20	20.000	400	125600	0-0.375	1.08	0.23	22.46	25.99	4.35	2	1 x 5½	1.18	⅜	4	69.5
500	508.0	28.0	567.22	0-9.5		19	570	660	110		---	30	9.5		31.6
24	24.000	400	180860	0-0.375	0.80	0.17	27.17	30.00	4.84	4	⅞ x 6½	1.18	½	4	101.9
600	609.6	28.0	816.80	0-9.5		14	690	762	123		---	30	12.7		46.3
26	26.000	300	159190	0-0.500	1.06	0.22	29.58	32.78	6.69	4	1 x 10	1.97	½	4	173.5
650	660.4	20.0	684.72	0-12.7		18	751	832	170		---	50	12.7		78.7

Note: Dimensions are subject to change without notice. Other sizes are available on request.

*Working Pressure and End Load are the total from all internal and external loads based on the applicable pipe wall thickness.

**Working Pressure is based on rings both sides fully welded standard wall carbon steel pipe.

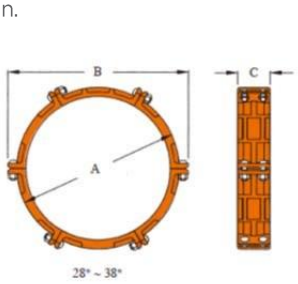
+Allowable Axial Displacement and Angular Movement (Deflection) figures shown are the maximum nominal range of movement at each R-88 coupling joint when rings are welded in the standard position. For design and installation purposes these figures should be reduced by 25%.

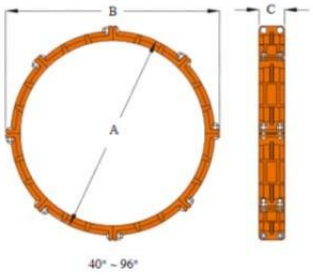
ð10mm shoulder rings are acceptable.

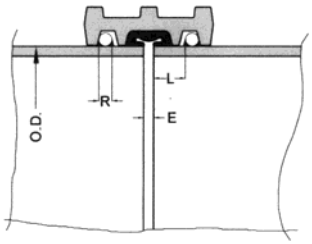
‡The number of ring clamps listed is the minimum required to correctly position the weld ring around the circumference of the pipe end.

MODEL R-88 RING JOINT COUPLING (Large Diameter)

The Shurjoint Model R-88 Ring Joint Coupling is available in sizes 28" / 700 mm to 96" / 2400 mm. The larger diameter couplings are comprised of 6 to 8 housing segments depending on the size and feature two bolts at each joint segment to ensure a positive connection.







Ring Clamp

Model R-88 Ring Joint Coupling (Large Diameter)

Nominal Size	Pipe O.D.	Rings both sides fully welded**		Axial Displace-ment+ E	Angular Movement/ Deflection †		Dimensions			Bolts		Sealing Surface L	Ring Size R	No. of Clamps ‡	Weight
		Max. Working Pressure (CWP)*	Max. End Load (CWP)*		Per Coupling	Per Pipe	A	B	C	NO	Size				
in	in	psi	lbf	in	(°)	in/ft	in	in	in		in	in	in	No.	lbs
mm	mm	bar	kN	mm		mm/m	mm	mm	mm		mm	mm	mm		kg
28	28.0	300	184630	0-0.500	0.90	0.19	31.75	35.47	6.69	12	⅞ x 4	2.00	½	4	222.2
700	711.2	20.0	794.11	0-12.7		16	806	901	170			50	12.7		101
30	30.0	300	211950	0-0.500	0.86	0.18	33.75	37.6	6.69	12	1 x 3½	2.00	½	4	218.9
750	762.0	20.0	911.61	0-12.7		15	857	955	170			50	12.7		99.5
32	32.0	300	241150	0-0.500	0.84	0.18	35.75	39.45	6.69	12	1 x 3½	2.00	½	4	225.4
800	812.8	20.0	1037.21	0-12.7		15	908	1002	170			50	12.7		102.2
34	34.0	300	272230	0-0.500	0.84	0.18	37.75	41.5	7.87	12	1 x 3½	2.00	½	4	253
850	863.4	20.0	1170.37	0-12.7		15	959	1054	200			50	12.7		115
36	36.0	300	305200	0-0.500	0.76	0.16	39.75	43.5	7.87	12	1 x 3½	2.00	½	4	246
900	914.4	20.0	1312.72	0-12.7		13	1010	1103	200			50	12.7		111.6
38	38.0	232	262980	0-0.500	0.76	0.16	41.75	45.5	7.87	12	1 x 3½	2.00	½	4	275
950	965.2	16.0	1170.10	0-12.7		13	1060	1156	200			50	12.7		125
40	40.0	232	291390	0-0.625	0.80	0.17	44.69	48.39	7.87	16	1 x 3½	2.37	⅝	6	310.2
1000	1016.0	16.0	1296.51	0-15.9		14	1135	1229	200			60	15.9		141
42	42.0	232	321250	0-0.625	0.86	0.18	46.7	50.71	7.87	16	1 x 3½	2.37	⅝	6	326.9
1050	1066.8	16.0	1429.41	0-15.9		15	1186	1288	200			60	15.9		148.6
44	44.0	232	352580	0-0.625	0.80	0.17	48.66	52.64	7.87	16	1 x 3½	2.37	⅝	6	343.2
1100	1117.6	16.0	1568.78	0-15.9		14	1236	1337	200			60	15.9		156
48	48.0	232	419600	0-0.625	0.70	0.15	52.68	55.91	7.87	16	1 x 3½	2.37	⅝	6	466.7
1200	1219.2	16.0	1866.98	0-15.9		12	1338	1420	200			60	15.9		211.8
52	52.0	175	371460	0-0.625	---	---	61.25	60.67	7.87	16	1¼ x 5	2.37	⅝	6	453.2
1300	1320.8	12.0	1643.33	0-15.9		---	1555	1541	200			60	15.9		206
54	54.0	175	400580	0-0.625	---	---	63.25	62.52	7.87	16	1¼ x 5	2.37	⅝	6	472.1
1350	1371.6	12.0	1772.17	0-15.9		---	1607	1588	200			60	15.9		214.6
56	56.0	175	430800	0-0.625	---	---	65.38	64.69	7.87	16	1¼ x 5	2.37	⅝	6	488.2
1400	1422.4	12.0	1905.87	0-15.9		---	1660	1643	200			60	15.9		222

Note: Dimensions are subject to change without notice. Other sizes are available on request.

*Working Pressure and End Load are the total from all internal and external loads based on the applicable pipe wall thickness.

**Working Pressure is based on rings both sides fully welded standard wall carbon steel pipe.

+Allowable Axial Displacement and Angular Movement (Deflection) figures shown are the maximum nominal range of movement at each R-88 coupling joint when rings are welded in the standard position. For design and installation purposes these figures should be reduced by 25%.

‡The number of ring clamps listed is the minimum required to correctly position the weld ring around the circumference of the pipe end.

Model R-88 Ring Joint Coupling (Large Diameter)

Nominal Size	Pipe O.D.	Rings both sides fully welded**		Axial Displace-ment+ E	Angular Movement/ Deflection †		Dimensions			Bolts		Sealing Surface L	Ring Size R	No. of Clamps ‡	Weight
		Max. Working Pressure (CWP)*	Max. End Load (CWP)*		Per Coupling	Per Pipe	A	B	C	NO	Size				
in	in	psi	lbf	in	(°)	in/ft	in	in	in		in	in	in	No.	lbs
mm	mm	bar	kN	mm		mm/m	mm	mm	mm		mm	mm	mm		kg
60	60.0	175	494550	0-0.625	---	---	69.38	68.82	7.87	16	1¼ x 5	2.37	⅝	6	537.2
1500	1524.0	12.0	2187.87	0-15.9		---	1762	1748	200			60	15.9		244.2
66	66.0	175	598709	0-0.750	---	---	76.00	75.75	8	16	1½ x 5	2.37	¾	8	612.5
1650	1676.4	12.0	2663.19	0-19.1		---	1932	1924	216			60	19.1		278.4
68	68.0	175	635544	0-0.750	---	---	78.50	78.03	8	16	1½ x 5	2.37	¾	8	785.4
1700	1727.2	12.0	2827.04	0-19.1		---	1994	1982	216			60	19.1		357
72	72.0	175	712513	0-0.750	---	---	82.50	82.28	8	16	1½ x 6⅞	2.37	¾	8	737.7
1800	1828.8	12.0	3169.41	0-19.1		---	2095	2090	216			60	19.1		335.3
84	84.0	100	553890	0-0.750	---	---	94.75	93.81	8	16	1½ x 5	2.37	¾	8	780.3
2100	2133.6	7.0	2501.46	0-19.1		---	2406	2383	216			60	19.1		354.7
96	96.0	100	723450	0-0.750	---	---	106.75	106.54	8	16	1½ x 5	2.37	¾	8	823.2
2400	2438.4	7.0	3267.21	0-19.1		---	2711	2706	216			60	19.1		374.2

Note: Dimensions are subject to change without notice. Other sizes are available on request.

*Working Pressure and End Load are the total from all internal and external loads based on the applicable pipe wall thickness.

**Working Pressure is based on rings both sides fully welded standard wall carbon steel pipe.

+Allowable Axial Displacement and Angular Movement (Deflection) figures shown are the maximum nominal range of movement at each R-88 coupling joint when rings are welded in the standard position. For design and installation purposes these figures should be reduced by 25%.

‡The number of ring clamps listed is the minimum required to correctly position the weld ring around the circumference of the pipe end.

Pressure Ratings of Carbon Steel Pipe (ASTM A53 Gr. B)

When designing a piping system, you must select pipe with the appropriate wall thickness to correspond with the intended working pressure of the system. The table lists design working pressure by the pipe wall schedule, XS, STD and LW, of representative ASTM A53 Gr. B carbon steel pipe calculated in accordance with the formula stipulated in ASME B31.1 Power Piping para. 104.1.

$$P = \frac{2SE(tm - A)}{Do - 2y(tm - A)}$$

Where:
P = Maximum internal service pressure (psi)
SE = Allowable stress (psi) (ASTM A53 Gr. B = 15,000 psi)
tm = Minimum pipe wall thickness (inch) (87.5% of nominal wall thickness)
Do = Outside diameter of pipe (inch)
y = A coefficient (For ferritic steels 600°F or below = 0.4)
A = Additional thickness (inch) (A = 0)

Angular deflection

The R-88 coupling is designed to provide a restrained joint with a controlled range of angular deflection (flexibility). The degree of deflection is influenced by several factors, including; pipe, fitting and component dimensions, pipe end squareness, ring location, weld size and system pressure. When designing a piping system these considerations should be factored into the system. When designing a system requiring increased deflection (flexibility) please contact Shurjoint for customized solutions.

As with all piping systems proper support, anchoring and bracing are essential. Industry standard requirements such as B31.1 (Power Piping), B31.9 (Building Services) and B31.11 (Slurry Transportation), etc. should be followed for your specific type of pipeline system application.

Maximum internal service pressure of Carbon Steel Pipe, ASTM A53 Gr. B (psi)

Nom. Size	XS	STD	LW
in / mm	0.5"	0.375"*	0.25"/0.312"^
8 / 200	1586	1006	777
10 / 250	1262	913	621
12 / 300	1058	788	522
14 / 350	962	717	475
16 / 400	839	625	415
18 / 450	744	555	368
20 / 500	668	499	331
24 / 600	555	415	275
26 / 650	512	382	318
28 / 700	475	355	295
30 / 750	443	331	275
32 / 800	415	310	258
36 / 900	368	275	229
38 / 950	349	261	217
40 / 1000	331	248	206
42 / 1050	315	236	187
44 / 1100	301	225	
48 / 1200	275	206	
52 / 1300	254	190	
54 / 1350	245	183	
56 / 1400	236	177	
60 / 1500	220	165	
66 / 1650	200	150	
68 / 1700	194	145	
72 / 1800	183	137	
84 / 2100	157	118	
96 / 2400	137	103	

Exception: * 8" = 0.322" and 10" = 0.365"
^ 8" to 24" = 0.25" and 26" to 40" = 0.312"

14" and 16" R-88 couplings used at the Eastside Combined Sewer Overflow Tunnel Boring Project – Portland, Oregon, USA.

Pipe Dimensional Tolerance Requirements

Dimensional tolerance requirements for pipe ends used with R-88 couplings: For pipes used in conjunction with the R-88 Ring Joint Coupling, the pipe ends shall meet the Shurjoint dimensional requirements listed above and, in the API, 5L Table 10, listed below, "Tolerances for diameter and out-of-roundness", Diameter tolerances, Pipe end, Welded Pipe. For pipe sizes greater than 56"/DN1400, the same 56"/DN1400 formula shall apply. Pipe ovality and pipe end surface finish including flat spots and imperfections shall not vary more than the limits of API 5L end tolerance.

Specified Outside Diameter D (in)	Diameter Tolerance, inches d				Out-of-Roundness Tolerance in	
	Pipe except the end a		Pipe end a,b,c		Pipe except the End a	Pipe End a,b,c
	SMLS Pipe	Welded Pipe	SMLS Pipe	Welded Pipe		
< 2.375	-0.031 to + 0.016		- 0.031 to + 0.016		0.048	0.036
≥2.375 to 6.625	+/- 0.0075D		- 0.016 to + 0.063		0.020D for $\frac{D}{t} \leq 75$ By agreement for $\frac{D}{t} > 75$	0.015D for $\frac{D}{t} \leq 75$ By agreement for $\frac{D}{t} > 75$
>6.625 to 24.000	+/- 0.0075D	+/- 0.0075D, but max of 0.125	+/- 0.005D, but max of 0.063		0.020D	0.015D
>24 to 56	+/- 0.01D	+/- 0.005D but max of 0.160	+/- 0.079	+/- 0.063	0.015D for but max of 0.060 For $\frac{D}{t} \leq 75$ By agreement for $\frac{D}{t} > 75$	0.01D for but max of 0.500 For $\frac{D}{t} \leq 75$ By agreement for $\frac{D}{t} > 75$
>56	As agreed					

a. The pipe end includes a length of 4 in ate each of the pipe extremities
b. For SMLS pipe the tolerance apply for t≤0.984in and the tolerances for the thicker pipe shall be as agreed
c. For expanded pipe with D≥8.625in and for non-expanded pipe, the diameter tolerance and the out-of-roundness tolerance may be determined using the calculated inside diameter or measured inside diameter rather than the specified OD.
d. For determining compliance to diameter tolerance, the pipe diameter is defined as the circumference of the pipe in any circumferential plane divide by Pi.

Recommend Assembly Instructions for the R-88 Couplings

The 28" through 38" R-88 couplings consist of 6 housing sections, and the 40" through 96" R-88's consist of 8 housing sections.

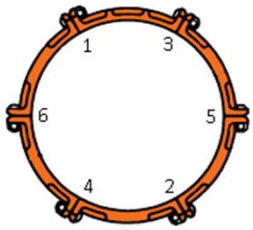
When tightening these couplings, care should be taken to tighten them in an equal sequence around the pipe. Both bolts of each bolt pad should also be tightened equally during the sequence.

The tightening sequence should consist of 2-3 turns of each nut on each bolt, of the bolt pad, and then repeated for the opposite bolts 180° from those tightened. Then alternating; the sequence similar to that used when tightening a flange, as shown in the layout below.

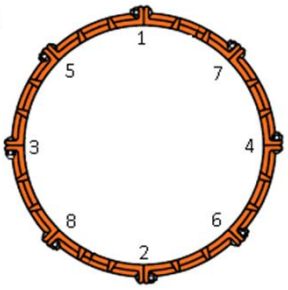
This should be repeated while checking the pad gaps to ensure equal force is applied around the entire circumference, until fully torqued. The amount of torque to be applied is based on the bolt size and is given in the table below.

For more R-88 installation instructions, please refer to the 2013 Ring joint Piping System Catalog.

Recommended Tightening Sequence



28"~ 38"



40"~ 96"

RECOMMENDED TORQUE

BOLT SIZE X NUMBER	LB – FT (NM)
5/8" x 6	100 - 130 (136 - 176)
3/4" x 6	150 - 200 (203 - 271)
7/8" x 8	180 - 220 (244 - 298)
1" x 16	200 - 250 (271 - 339)
1-1/4" x 16	250 - 350 (339 - 475)
1-1/2" x 16	350 - 500 (475 - 678)

Note: For systems subject to vibration or movement the use of Belleville washers or periodic checks to ensure tightness of bolts and nuts are recommended

General note

- Maximum Working Pressure (CWP) listed is the maximum cold water pressure for general piping services tested to ASTM F1476 and or AWWA C606 methods. Figures listed are based on roll- or cut-grooved standard wall carbon steel pipe. For other pipe schedules or pipe materials, contact Shurjoint for additional information.
- Max. End Load is calculated based on the maximum working pressure (CWP).
- Listed and or Approved Pressures are pressure ratings for fire protection systems, tested and approved by various approval bodies. Please always refer to the latest approval data posted on the Shurjoint website.
- Field Joint Test: For one time only, the system may be tested hydrostatically at 1½ times the maximum working pressure listed (AWWA C606 5.2.3).
- Warning: Piping systems must always be depressurized and drained before attempting disassembly and or removal of any components.
- The 10 Year Limited Warranty applies to manufacturing defects only and does not cover severe service/temperature applications or wear parts.
- Shurjoint reserves the right to change specifications, designs and or standard without notice and without incurring any obligations.

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