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Data Sheet 6.0 | Rubber Pump Flexes

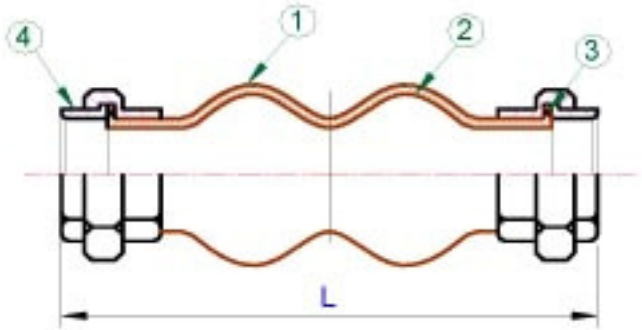
All rubber bellows are suitable for L.T.H.W. and chilled water systems.
All Tied and Untied rubber bellows are rated at the following pressure temp. -
16 Bar @ 70 Degs. Cent.
12 Bar @ 80 Degs. Cent.
9 Bar @ 90 Degs. Cent.

UNI Type EPDM rubber bellows "Union"

Rating - 16.0 Bar.g Temp. –Minus 10 / 90 Degrees Cent.
Construction - EPDM double sphere, with textile cord & steel wire reinforcement.
Connections - Galvanised carbon steel female union.
Burst Pressure 48 bar

CONSTRUCTION

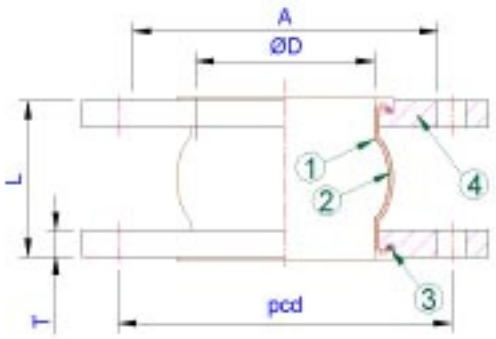
Item	Part	Materials
1	Main Body	EPDM Rubber
2	Lining	Nylon Cord Fabric
3	Wire	Hard steel wire
4	Unions	Forgeable Cast Iron (BSP m)



Item No.	Model/Code	Nom Size	Length L	Unit WT
1	UNI.15.BSP	DN15 -1/2"	200.00mm	2.0 Kgs
2	UNI.20.BSP	DN20- 3/4"	200.00mm	2.2 Kgs
3	UNI.25.BSP	DN25 -1"	200.00mm	3.3 Kgs
4	UNI.32.BSP	DN32-1,1/4"	200.00mm	3.7 Kgs
5	UNI.40.BSP	DN40-1,1/2"	200.00mm	4.4 Kgs
6	UNI.50.BSP	DN50 -2"	200.00mm	5.4 Kgs
7	UNI.65.BSP	DN65-2,1/2"	240.00mm	6.7 Kgs
8	UNI.80.BSP	DN80 - 3"	240.00mm	8.8 Kgs

UT Type "Untied"

Rating - 16.0 Bar.g Temp. –Minus 10 / 90 Degrees Cent.
Construction - EPDM single sphere, with 4-textile cord layers reinforcement.
A single sphere membrane reinforced EPDM rubber with wire-reinforced collars.
Connections - Carbon steel swivel flanges drilled to BS4504 PN16 Zinc Plated finished. Burst Pressure 48 bar

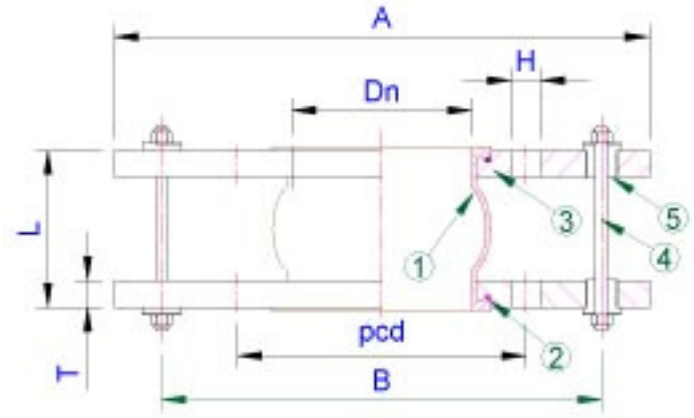


(DN) Nom Ø	T	Length L	Pcd	Holes H	No. Bolt Holes	Compression	MaxWK'G Press@70°C	Max Vacuum	Angle Deflection
32	16	130	100	18	4	15	16 bar	0.6 bar	15°
40	16	130	110	18	4	15	16 bar	0.6 bar	15°
50	16	130	125	18	4	15	16 bar	0.6 bar	15°
65	16	130	145	18	4	20	16 bar	0.6 bar	15°
80	18	130	160	18	8	20	16 bar	0.6 bar	15°
100	18	130	180	18	8	20	16 bar	0.6 bar	15°
125	20	130	210	18	8	20	16 bar	0.6 bar	15°
150	22	130	240	23	8	20	16 bar	0.6 bar	15°
200	22	130	295	23	12	20	16 bar	0.6 bar	15°
250	24	130	355	27	12	20	16 bar	0.6 bar	15°

Item No.	Model/Code	Nom Size	Length L	Unit WT
1	UT.32.16	DN32-1,1/4"	130.00mm	2.6 Kgs
2	UT.40.16	DN40-1,1/2"	130.00mm	3.4 Kgs
3	UT.50.16	DN50 -2"	130.00mm	4.7 Kgs
4	UT.65.16	DN65-2,1/2"	130.00mm	5.6 Kgs
5	UT.80.16	DN80 - 3"	130.00mm	7.4 Kgs
6	UT.100.16	DN100 -4"	130.00mm	7.9 Kgs
7	UT.125.16	DN125 -5"	130.00mm	10.3 Kgs
8	UT.150.16	DN150 -6"	130.00mm	12.8 Kgs
9	UT.200.16	DN200 -8"	130.00mm	18.4 Kgs
10	UT.250.16	DN250 -10"	130.00mm	25.4 Kgs
11	UT.300.16	DN300 -12"	130.0mm	29.6 Kgs

T-Type "Tied"

Rating - 16.0 Bar.g Temp. –Minus 10 / 90 Degrees Cent.
Construction - EPDM single sphere, with 4-textile cord layers reinforcement.
A single sphere membrane reinforced EPDM rubber with wire-reinforced collars.
Connections - Carbon steel tied flanges drilled to BS4504 PN16 Zinc Plated finished.
Accessories - Tie-rod restraints with rubber 'Top-Hat' noise isolation washers / adjustment nuts. Burst Pressure 48 bar.

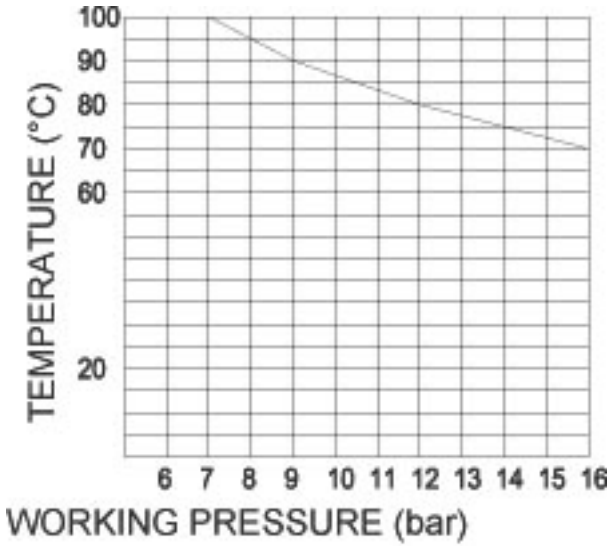


(DN) Nom Ø	A	B	T	Length L	Pcd	Holes H	No. Bolt Holes	Com-pression	MaxWK'G Press@70°C	Max Vacuum	Angle Deflection
32	260	200	16	130	100	18	4	15	16 bar	0.75 bar	15°
40	270	210	16	130	110	18	4	15	16 bar	0.75 bar	15°
50	285	225	16	130	125	18	4	15	16 bar	0.75 bar	15°
65	305	245	16	130	145	18	4	20	16 bar	0.75 bar	15°
80	320	260	16	130	160	18	8	20	16 bar	0.75 bar	15°
100	340	280	18	130	180	18	8	20	16 bar	0.75 bar	15°
125	410	330	18	130	210	18	8	20	16 bar	075 bar	15°
150	445	365	22	130	240	23	8	20	16 bar	0.75 bar	15°
200	500	420	22	130	295	23	12	20	16 bar	0.75 bar	15°
250	555	475	24	130	355	27	12	20	16 bar	0.75 bar	15°

Item No.	Model/Code	Nom Size	Length BL	Unit WT
1	T.32.16	DN32 / 1,1/4"	130.00mm	4.0 Kgs
2	T.40.16	DN40 / 1,1/2"	130.00mm	5.2 Kgs
3	T.50.16	DN50 / 2"	130.00mm	7.2 Kgs
4	T.65.16	DN65 / 2,1/2"	130.00mm	8.1 Kgs
5	T.80.16	DN80 / 3"	130.00mm	9.4 Kgs
6	T.100.16	DN100 / 4"	130.00mm	11.1 Kgs
7	T.125.16	DN125 / 5"	130.00mm	13.6 Kgs
8	T.150.16	DN150 / 6"	130.00mm	16.5 Kgs
9	T.200.16	DN200 / 8"	130.00mm	22.5 Kgs
10	T.250.16	DN250 / 10"	130.00mm	31.7 Kgs
11	T.300.16	DN300 / 12"	130.0mm	37.0 Kgs

Flanges to PN16 BS4504

All Rubber Flexes and Bellows are to be installed strictly in accordance with our installation instructions, which are available on request and at www.fabricatedproducts.co.uk



TEMPERATURE – PRESSURE RATIO

Introduction to Rubber Bellows

Application

Rubber Bellows are primarily used to absorb noise and vibration between rotating equipment such as pumps or chillers and pipe work. Their high flexibility also makes them suitable for compensating small installation misalignments. Rubber Bellows can be used just like a metal expansion joint to compensate for axial, lateral or angular movement. As any other unrestrained expansion joint, rubber bellows will extend under pressure. Their pressure thrust however varies with length as the shape of the bellows change. However the forces involved are just as large. The pressure thrust is calculated by multiplying the cross sectional area, times the maximum pressure. To prevent the bellows from extending, the pipe work needs to be anchored. Typical applications are taking up thermal expansion in plastic pipe work or noise isolation in small diameter pipe work at low pressures. Fabricated Products bellows are thin walled and therefore extremely flexible, ensuring the highest degree of noise and vibration isolation.

Selection

Not all rubber bellows are the same. To ensure a long and trouble free working life, it is vital to select the right bellows for the application. Temperature and pressure are the most important, but not the only criteria that need to be considered.

Pressure

Most bellows in these data sheets are rated at a maximum pressure of 16-bar g. However this needs to be de-rated at temperatures above 70°C as the factor of safety is reduced.

Temperature

The maximum temperature ratings vary for the different type of bellows. Nylon reinforced bellows should never be used at temperatures above 90°C.

Medium

EPDM rubber is the most suitable for heating and chilled water systems.

Life

All rubber bellows have a limited life. Rubber is an organic compound that will age with time. The life is determined by external influences such as ultraviolet light, ozone etc., but the main influence is temperature. The higher the working temperature, the shorter the life expectancy.

Quality

Fabricated Products bellows are of the highest quality standard. They are manufactured under strict quality control.

Installation and Maintenance

Comprehensive Installation instructions accompany each delivery of bellows. These must be followed to ensure maximum service life. They also include instructions for care and maintenance.

Installation instructions for Rubber Bellows

Pre-installation check

1. Selection

Prior to installation, check that you have the right bellows for the particular duty. Rubber bellows have temperature and pressure limitations. Maximum allowable pressures need to be derated at temperatures above 70°C.See Fabricated Products data sheets for allowable pressures and temperatures. All rubber bellows will extend under pressure. These pressure thrust forces can be very substantial at pressures above 2.0 bar and 100mm n.b. size unless the pipe work can be sufficiently anchored a tied bellows should be fitted (see fig.1).

2. Mating Flanges

We strictly recommend that the rubber bellows are mated up against full bore weld neck flanges only (see fig.5.). If installed in this manner no additional gaskets are required. We advise against using slip on or screwed flanges as mating flanges as these can damage the rubber bellows. Once the sealing face has been damaged the medium will penetrate the reinforcement layers and destroy the integrity of the bellows. If it is unavoidable to use this type of mating flange, a gasket must be used (this should be a hard gasket such as Klingerite and be at least 3mm thick). The gasket should reach the internal bore of the rubber bellows (see fig.4.). Another option is to fill the gap of the slip on flange with weld and grind it flush (see fig.3.).

3. Misalignment

Check that the two mating flanges are parallel and that they are in line (maximum allowed offset is 5mm in any direction). The gap between flanges should be within +/- 5mm of the bellows neutral length (see fig.7.). Ensure that the pipe work is adequately supported. The bellows must not support pipes or plant.

Installation

1. Bolts

Bolts should be inserted from the bellows side (see fig.5.). On some larger sizes this may not be possible. In that case a bolt of the exact length needs to be selected. An alternative is to use studding cut to length and fitted with a nut at both sides (see fig.6.). This is important, as the bellows will increase in diameter under pressure. Even if there is space between the bolt and bellows in an unpressurized state, they may foul when pressurized. Bolts of the right diameter must be used to ensure correct alignment.

2. Alignment

Take care when inserting the bellows into the gap between the two mating flanges. Sharp edges can damage the sealing face of the bellows. Before tightening the bolts, ensure that the bellows fit evenly in its flange groove and does not get pinched between flanges. The sealing face of the bellows must be concentric with the sealing face of the mating flanges.

3. Tightening the bolts

Great care has to be taken with the tightening of the flange bolts. Remember that you are tightening against a rubber face. As with gaskets, over tightening will cause the joints to leak and it will damage the bellows. “Tighter is definitely not better!” Tighten opposite bolts to get an even pressure all round (check the gap between the flanges). Rubber will set and the bolts will have to be retightened after 24 hours.

4. Tie bars

Once the bellows is fitted, ensure that the tie bars are tight. If necessary adjust nuts at either end. All tie bars should be at equal length. When three or more tie bars are fitted it may be necessary to remove one tie bar to aid installation. Ensure that washers are reassembled in the right order and orientation. A lock nut must be refitted.

5. Anchoring

Rubber bellows must be anchored to ensure their correct performance. Tied rubber bellows should be selected for sizes above 100mm and where pressures exceed 2.5 bar.

Taking care of Rubber Bellows

1. Paint
Do not paint rubber bellows. The paint will attack the rubber. (This also applies to paint splatter).

2. Welding
Protect the rubber from weld spatter. When welding, always ensure that the bellows is bridged using a continuity strap

3. Lagging
Do not lag rubber bellows on heating systems. The increased temperature will reduce the life of the bellows.

4. Tie bar check
Once the system is filled but not under pressure, check that the tie bars are still tight (pipe work on springs may have dropped due to the weight of the water). Retighten the bars if slack. Note: tie bars should never be slackened off to reduce noise or vibration transmission, major damage to equipment may occur.

5. Water treatment
Most bellows use an EPDM inner liner. EPDM is a proven material in heating and chilled water systems. It is resistant to glycol and to most chemicals used in water treatment, when used in normal concentrations. As suppliers of water treatment chemicals are reluctant to give information about their formulations, we cannot approve any specific chemical.

Best Practice
The following are only recommendations but if followed they will ensure the maximum service life of the rubber bellows.
System - when the bellows are installed on rotating equipment such as pumps to absorb noise and vibration, the pipe work either side of the bellows should be guided. This ensures that the bellows moves and not the pipe work (see fig. 8) thus acting as an acoustic break.

Storage
Rubber joints should be stored in a fairly cool dry place protected from sunlight. They should be stored flat on the flange with no sunlight on them.

Installation drawings for rubber pump flexes

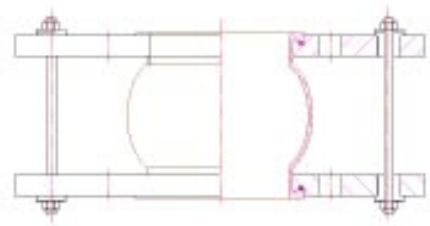


Fig.1. Tied bellows

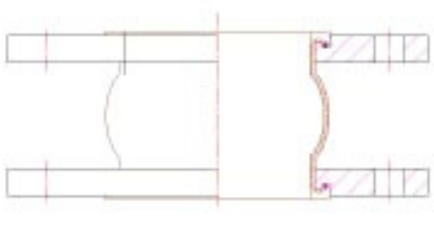


Fig.2. Untied bellows

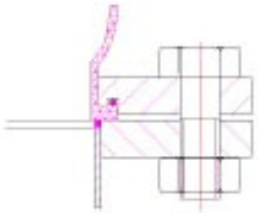


Fig.3. gap filled with weld then ground flush

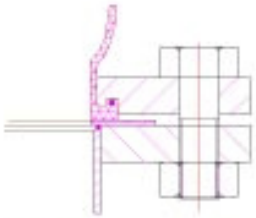


Fig.4. Slip on mating flanges

Fig.5. Full bore weld neck flange

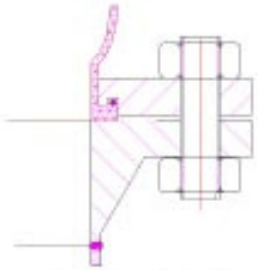


Fig.6. Use of studding

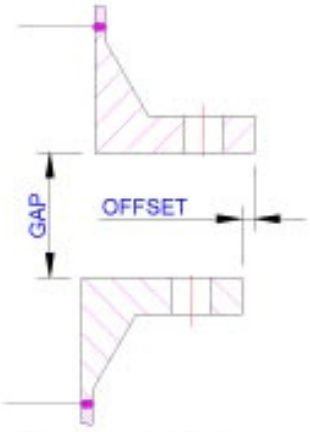


Fig.7. Max offset ± 5mm.
GAP= bellows length ± 5mm

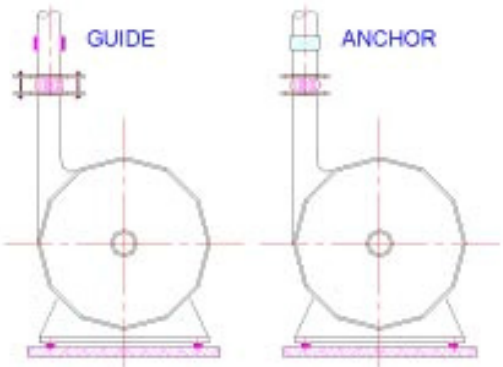


Fig.8. Positioning of guides or anchors on pumps etc..