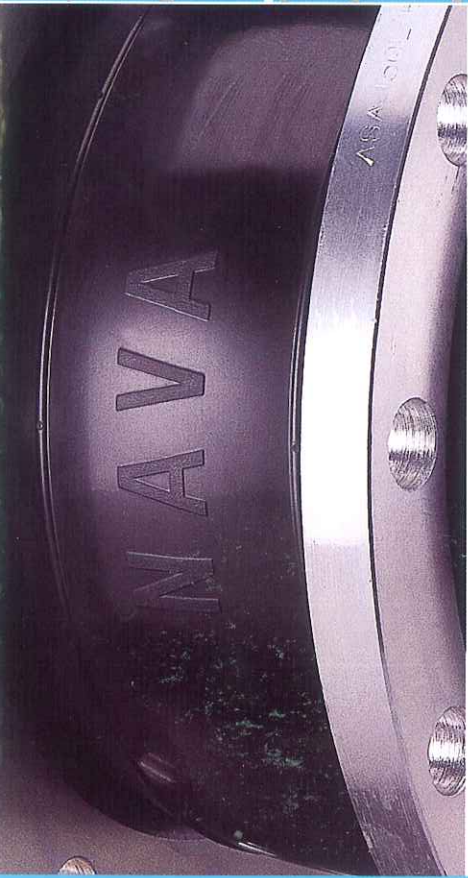


NAVA Model: 321 & 322

# Rubber Flexible/ Expansion Joints



### Features

#### Spherical Shapes

- Stronger than the conventional "Spool Arch" types.
- The spherical design "flowing-arch" reduces turbulence, sediment build-up and thrust area when compared to the "high-arch" design.

#### Greater Range of Movement

- Compared to the "old" product, spherical types can absorb more axial compression, elongation, deflection and angular movements.

#### Vibration, Noise and Shock Absorption

#### Easy Installation

- The floating metallic flanges freely rotate on the bellows, compensating for mating flange misalignment.
- Manufactured by high pressure molding of elastomer and high-tensile fabric reinforcement, NAVA Rubber Flexible / Expansion Joints have a thinner wall section and lighter weight. Lower spring forces are therefore required, reducing piping stress-strain-damage.

#### Connections

- Carbon steel flanges are Chromate coated for corrosion protection.
- Standards of Connections:

*For Single-Sphere Rubber Joints:*

Model 321-AF : ANSI 150 Lb

Model 321-PF : PN 16

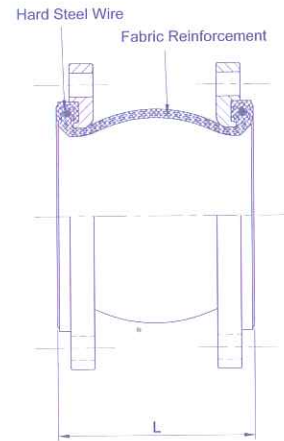
*Other standards such as BS, DIN and JIS are also available.*

*For Double-Sphere Rubber Joints:*

Model 322-AF : ANSI 150 Lb

Model 322-SS : Union Ends, BSPT or NPT

### SINGLE-SPHERE RUBBER JOINTS

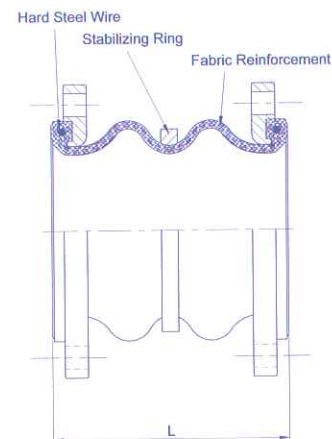


Model : 321-AF (ANSI 150 Lb Flange)  
321-PF (PN 16 Flange)

#### Operating Conditions

Temperature	: -10°C to 105°C	
Burst Pressure	: 1½" - 12"	: 850 psi (58 bar)
	: 14" - 24"	: 340 psi (23 bar)

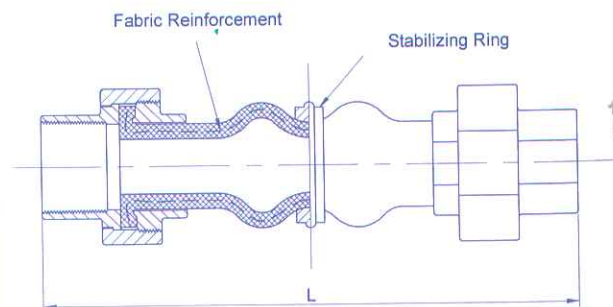
### DOUBLE-SPHERE RUBBER JOINTS



Model : 322-AF (ANSI 150 Lb Flange)

#### Operating Conditions

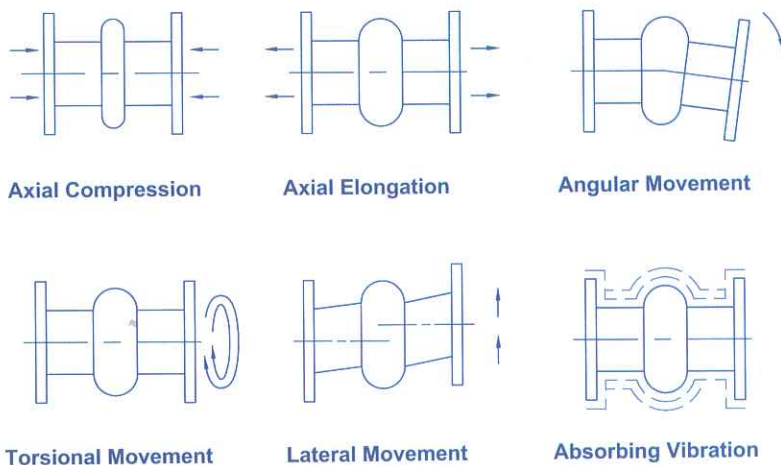
Temperature	: -10°C to 105°C	
Burst Pressure	: 1½" - 12"	: 850 psi (58 bar)
	: 14" - 24"	: 340 psi (23 bar)



Model : 322-SS (Union Ends, BSPT or NPT)

#### Operating Conditions

Temperature	: -10°C to 105°C
Burst Pressure	: 710 psi (50 bar)



### Applications

NAVA Rubber Flexible / Expansion Joints are widely used in :

- HVAC Systems
- Water Supply Services
- Drainage Systems
- Water Treatment Plants
- Marine Services
- Electrical Generating Plants
- Chemical Processing Plants

Nominal Diameter		Installed Length		Travel	Allowable Movements from Neutral				Pressure		Weight
inch	mm	Natural Length L mm	Min - Max Installed mm	Total Compressed Extended mm	Axial Compression mm	Axial Extension mm	Lateral Deflection mm	Angular Deflection degree	At 80°C psi	Vacuum mmHg	Joint & Flanges kg
1¼	32	95	89-97	87-99	8	4	8	15°	225	660	2.1
1½	40	95	89-97	87-99	8	4	8	15°	225	660	2.45
2	50	105	99-107	99-110	8	5	8	15°	225	660	3.86
2½	65	115	107-118	103-121	12	6	10	15°	225	660	5.6
3	80	130	122-133	118-133	12	6	10	15°	225	660	6.4
4	100	135	122-140	117-145	18	10	12	15°	225	660	7.8
5	125	170	156-175	152-180	18	10	12	15°	225	660	10.7
6	150	180	167-185	162-190	18	10	12	15°	225	660	13.2
8	200	205	186-212	180-220	25	14	22	15°	225	660	18.8
10	250	240	221-247	215-254	25	14	22	15°	225	660	26.6
12	300	260	241-267	235-274	25	14	22	15°	225	660	37.7
14	350	265	246-273	240-281	25	14	22	15°	150	660	54.5
16	400	265	246-273	240-281	25	14	22	15°	125	660	76.4
18	450	265	246-273	240-281	25	14	22	15°	125	660	77.3
20	500	265	246-273	240-281	25	14	22	15°	125	660	79.5
24	600	265	246-273	240-281	25	14	22	15°	125	660	116

Information for other sizes is available upon request.

Nominal Diameter		Installed Length		Travel	Allowable Movements from Neutral				Pressure		Weight
inch	mm	Natural Length L mm	Min - Max Installed mm	Total Compressed Extended mm	Axial Compression mm	Axial Extension mm	Lateral Deflection mm	Angular Deflection degree	At 80°C psi	Vacuum mmHg	Joint & Flanges kg
1¼	32	175	137-190	125-205	53	27	45	40°	225	660	2.4
1½	40	175	137-190	125-205	53	27	45	40°	225	660	3.1
2	50	175	137-190	125-205	53	27	45	40°	225	660	4.1
2½	65	175	137-190	125-205	53	27	45	40°	225	660	6
3	80	175	137-190	125-205	53	27	45	40°	225	660	6.5
4	100	225	187-242	175-260	53	31	40	35°	225	660	9.2
5	125	225	187-242	175-260	53	31	40	35°	225	660	11.1
6	150	225	187-242	175-260	53	31	40	35°	225	660	13.4
8	200	325	280-342	265-360	65	30	35	30°	225	660	20
10	250	325	280-342	265-360	65	30	35	30°	225	660	29
12	300	325	280-342	265-360	65	30	35	30°	225	660	43
14	350	350	315-364	304-380	43	30	30	20°	150	660	61
16	400	350	315-364	304-380	43	30	30	20°	125	660	79
18	450	350	315-364	304-380	43	30	30	20°	125	660	82
20	500	350	315-364	304-380	43	30	30	20°	125	660	84
24	600	350	315-364	304-380	43	30	30	20°	110	660	134

Information for other sizes is available upon request.

Nominal Diameter		Installed Length		Travel	Allowable Movements from Neutral				Pressure		Weight
inch	mm	Natural Length L mm	Min - Max Installed mm	Total Compressed Extended mm	Axial Compression mm	Axial Extension mm	Lateral Deflection mm	Angular Deflection degree	At 80°C psi	Vacuum mmHg	Joint & Flanges kg
½	15	203	186-206	181-209	22	6	22	32°	150	660	0.8
¾	20	203	186-206	181-209	22	6	22	32°	150	660	0.8
1	25	203	186-206	181-209	22	6	22	25°	150	660	1.1
1¼	32	203	186-206	181-209	22	6	22	25°	150	660	1.4
1½	40	203	186-206	181-209	22	6	22	20°	150	660	1.7
2	50	203	186-206	181-209	22	6	22	15°	150	660	2.4
2½	65	203	186-206	181-209	22	6	22	12°	150	660	4.3
3	80	203	186-206	181-209	22	6	22	10°	150	660	4.9

## Available Styles / Materials

Material Code	Cover Elastomer	Tube Elastomer	Max. Operating Temperature
BB	Chloro Butyl	Chloro Butyl	105°C
EE	EPDM	EPDM	105°C
NH	Neoprene	Hypalon	100°C
NN	Neoprene	Neoprene	105°C
NP	Neoprene	Nitrile (Buna)	100°C

Standard product material code : NN

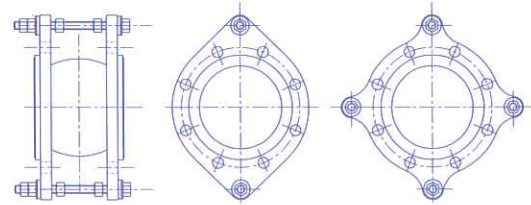


## Pressure-Temperature Factor

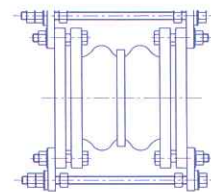
Pressure / Temperature Correction Factor	Operating Temperature					
	80°C	85°C	90°C	95°C	100°C	105°C
Max. Working Pressure (x factor)	x 1	x 0.92	x 0.83	x 0.75	x 0.67	x 0.6

## Number of Control Rods in Relation to Working Pressure

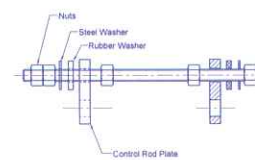
Nominal Diameter		Rod Diameter	Working Pressure			
inch	mm		100 psi	150 psi	200 psi	225 psi
1	25	12			2	2
1¼	32	12			2	2
1½	40	12			2	2
2	50	16			2	2
2½	65	16			2	2
3	80	16			2	2
4	100	16			2	2
5	125	16			2	2
6	150	16		2	2	2
8	200	20	2	2	2	2
10	250	22	4	4	4	4
12	300	24	4	4	4	4
14	350	24	4	4		
16	400	28	4			
18	450	28	4			
20	500	28	4			
24	600	32	4			



Special Flanges With Tie Rods



Standard Flanges With Tie Rods



Control Unit Assembly

## Note

- When installing the joint with a slip-on flange, the internal flange surface must be free of particles.
- Raised face flanges are not recommended.
- Bolts & nuts must be equally tightened in a diagonal pattern until the gap between flanges is within 2 – 3mm.
- The nuts should be placed at the external side of mating flange.
- After installation, adjust the nuts of tie rods to required axial movement.

**WARRANTY** Nava Armaturen (herein referred to as Nava or the Company) for a period of 12 months from date of delivery to original buyer will repair or replace, without charge, products which our examination proves to be defective in design, material and workmanship under normal conditions of use and service. If, after examination of the product, we are of the opinion that the product or alleged defect is not covered by the warranty for whatever reason, the buyer is liable for any labour, parts or transport costs incurred by Nava.

This warranty is made expressly in lieu of any other warranties, express or implied. The buyer's sole and exclusive remedy shall be for the repair or replacement of defective products as provided herein. The Company is not responsible for any expenses (including shipping, installation and removal) or incidental or consequential damages caused by items of our manufacture or sale. Nava neither assumes nor authorizes any person to assume for it any other liability in connection with the sale of such products.

This warranty is void to any product which has been subject to misuse, negligence or accident, which has been repaired or altered in any manner outside of Nava's factory or which has been used in a manner contrary to Nava's instructions or recommendations. Nava shall not be responsible for design errors due to inaccurate or incomplete information supplied by the buyer or its representatives.

The manufacturer reserves the right to make changes without prior notification. (NAVA/321&322/06/06)

## NAVA ARMATUREN

Weidkamp 180  
 D-45356 Essen  
 Germany

Telephone : +49 (0) 201 86 19 205  
 Facsimile : +49 (0) 201 86 19 120