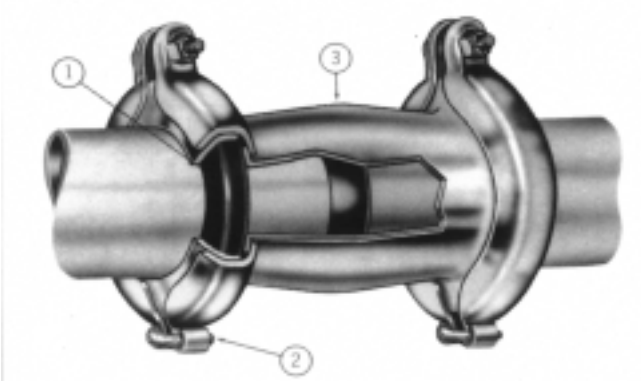
Flexmaster® Joints

Flexmaster® Joints in Standard and Self-Restrained Configurations



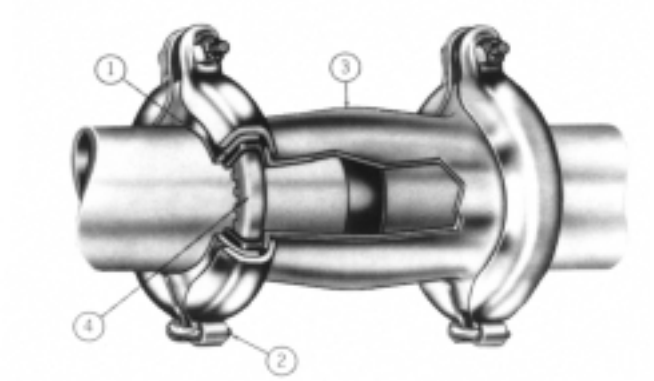
STANDARD FEATURES

① Gasket provides compression seal when tightened against tube or pipe.

② Hinged coupling provides for quick, easy assembly.

③ Bulged sleeve allows for ±4° angular misalignment.

All gasket materials listed on page 248 are available in the standard style, increasing the number of suitable applications.



SELF-RESTRAINED FEATURES

① Gasket provides compression seal when tightened against tube or pipe.

② Hinged coupling provides for quick, easy assembly.

③ Bulged sleeve allows for ±4° angular misalignment.

Plus

④ Notched channel ring which grips pipe firmly to restrict movement along pipe or tubing.

Gasket materials available include the C (Buna-N) and D (EPDM) compounds.

Flexmaster® joints are available in both standard and self-restrained styles. The self-restrained style has a stainless steel gripping ring inside each gasket. This feature allows the joint to maintain a firm grip on the pipe or tube, preventing movement along the pipe or tube.

The bulged, straight-through Flexmaster joints accommodate angular misalignment up to ±4° per end. Tees, elbows, and crosses accommodate angular misalignment up to ±2° per end. See pages 254 thru 259 for the angular misalignment allowed on each specific part. Flexmaster joints are designed for up to 300 psi (2.07 MPa) service, depending on application and size. Refer to pressure ratings on page 248.

Flexmaster joints absorb vibration and are ideal for making quick connections and disconnections when repairing or disassembling a system. They can be furnished with several types of gasket compounds and sleeve materials, including stainless steel for marine and corrosive applications.

Flexmaster joints are currently in use in thousands of applications throughout the world. For typical Flexmaster joint applications see photos on page 260.

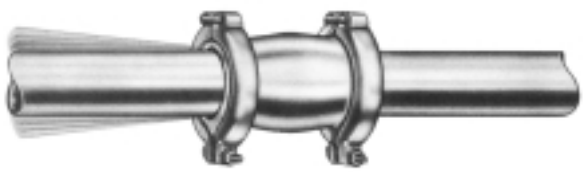
This page is part of a complete catalog which contains technical and safety data that must be reviewed when selecting a product.

SAVE TIME – MAKE PIPE AND TUBE CONNECTION EASIER

used on plain end tube or pipe

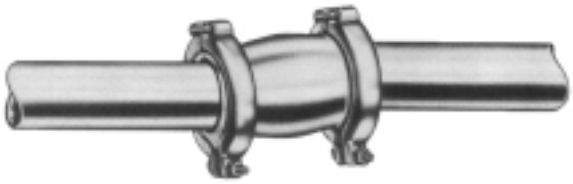
No threading, flanging, welding, grooving or other special end preparation of tube or pipe is required. Use pipe after it is cut to appropriate lengths. The Flexmaster joint will accommodate large tolerances in the length of the gap. See Table 1, page 253 for insertion depth tolerances.

absorbs vibration



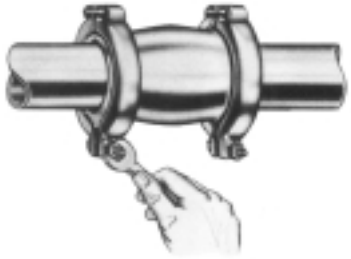
Pipe vibration and noise can be drastically reduced with Flexmaster joints. The resilient, thick rubber of the Flexmaster joint gasket absorbs vibration and noise. Use of the self-restrained style restricts movement along vibrating pipes and tubes.

even misaligned piping is no problem



The Flexmaster joint design eliminates flanged bolt holes and pipe threads that require careful alignment. The Flexmaster bulged joint permits up to a total of ±4° angular installation misalignment at each end while maintaining a leakproof seal.

easy to install



Installation time can be slashed by using Flexmaster joints. Basic assembly tools are all that's needed. After extensive use, the gaskets can be replaced easily and quickly. See page 252 for complete assembly instructions.

Gasket Temperature Ratings††

C Buna-N (standard)	water **-25°F. to +180°F.** (-32°C. to +82° C.)
	oils **-25°F. to +215°F.** (-32°C. to +101°C.)
V Fluorocarbon	**-25°F. to +450°F.** (-32°C. to +232°C.)
S Silicone	**-65°F. to +350°F.** (-54°C. to +177°C.)
D EPDM	water and water/glycol mixture **+20°F. to +275°F.** (+29°C. to +137°C.)
G Mineral Fiber Non-asbestos	**+70°F. to +1200°F.** (+21°C. to +649°C.)
N Buna-N (High Temp.)	water and steam **-25°F. to +225°F.** (-32°C. to +107°C.)
	-25°F. to +250°F. (-32°C. to +121°C.) oils

††Maximum temperature ratings are meant as a guide only.
For extreme temperature conditions, consult factory.

Vacuum Ratings†

Size Range		Standard Gasket	Self-Restrained Gasket
Pipe	**Tube**		
All Sizes	All Sizes	**25 in. Hg.** 1.79 bar	**25 in. Hg.** 1.79 bar

NOTE:
°F, inches, in. Hg., psi in bold
°C, mm, bar, MPa in light

Pressure Ratings†

Size Range		Standard Gasket	Self-Restrained Gasket
Pipe	**Tube**		
$^3/_8$ - $^3/_4$	**$^1/_2$ - $1^3/_8$** 12.7 - 35.1	**300 psi** (2.07 MPa)	**300 psi** (2.07 MPa)
1 - 2	**$1^1/_2$ - $2^1/_2$** 38.1 - 63.5	**200 psi** (1.38 MPa)	**200 psi** (1.38 MPa)
$2^1/_2$ - 6	**3-6** 76.2 - 152.4	**150 psi** (1.03 MPa)	**150 psi** (1.03 MPa)

†**Warning:** The Flexmaster® joint is designed to seal pipe and tube connections. The Flexmaster joint is not intended to hold piping systems together. Normal hangers, guides, anchors and other external piping restraints must be used to restrain the piping or tubing system from movement.

Pipe and tube materials, which can be connected by Flexmaster joints*

Pipe or Tube Material	Standard Gasket	Self-Restrained Gasket**
Carbon Steel	X	X
Stainless Steel	X	X
Aluminum	X	Not Recommended
P.V.C. (Plastic)	X	Not Recommended
Copper	X	Not Recommended

*All piping and tubing connected by Flexmaster® joints must meet the nominal O.D. dimensions presented on pages 254-259.

**Piping and Tubing, which use self-restrained gaskets, must have a hardness between 45-85 on a Rockwell "B" scale (45-85 Rb).

AEROQUIP GASKET IDENTIFIER CHART

Gasket Designation	Gasket Compound	Gasket Color	Identifying Color Patch
C	Buna-N (standard)	Black	Yellow or White
N	Buna-N (high temp)	Black	Rust Orange
D	EPDM	Black	Dark Blue
V	Fluorocarbon	Black	Light Green
S	Silicone	Rust Orange	None
B**	Butyl	Off White	None
G	Mineral Fiber	Metallic Silver	None

****Obsolete. Contact Eaton Aeroquip for replacement information.**

This page is part of a complete catalog which contains technical and safety data that must be reviewed when selecting a product.

GASKET MATERIAL:
C - BUNA-N (Standard)
D – EPDM (high temperature)
N – BUNA-N
S – SILICONE
V – FLUOROCARBON

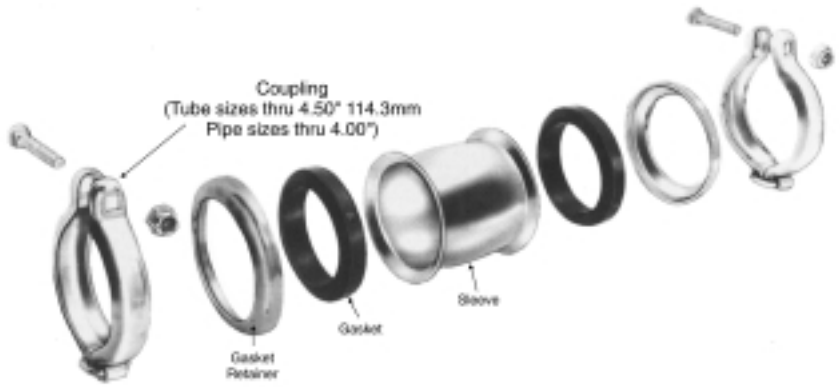
KEY:
G GOOD
F FAIR
– NOT RECOMMENDED

⚠ WARNING: Compatibility of gasket material with conveyed fluid is an essential factor in avoiding chemical reactions that may result in release of fluids or failure of the connection with the potential of causing severe personal injury or property damage. The list below provides recommendations for fluid and gasket compatibility. However, the final responsibility for determining compatibility rests with the user.

FLUID	Gasket Material D	C/N	V	S
Acetic Acid (concentrated) RT	F	F	G	F
Acetic Acid (dilute) RT (to 10%)	F	F	G	G
Acetic Acid Vapors	F	F	F	F
Acedit Anhydride	–	F	–	F
Acetone	G	–	–	F
Acetylene	G	G	G	F
Air	G	G	G	G
Air (Hot) 215°	G	F	G	G
Alcohols, Aliphatic	G	F	G	G
Alcohols, Aromatic	F	–	F	F
Alkaline Solutions (Hydroxides)	F	G	F	G
Aluminum Salt Solutions	G	G	G	G
Ammonia Gas (Cold)	G	G	–	–
Ammonia, Liquid (Anhydrous)	G	G	–	F
Ammonia Aqueous	G	F	–	G
Ammonium Salt Solutions	G	G	F	F
Aniline Dyes	F	–	G	F
Aniline Oils	F	–	F	F
Asphalt	–	–	G	–
Benzine (Gasoline)	–	G	G	–
Bromine	–	–	G	–
Butylene	–	F	G	–
Calcium Hypochlorite (no free Chlorine)	G	–	G	F
Calcium Salt Solutions	G	G	G	F
Carbolic Acid (Phenol) RT or Hot	F	–	G	–
Carbon Dioxide (Dry)	G	G	F	F
Carbonic Acid	G	F	G	G
Carbon Disulphide RT	–	–	G	–
Carbon Tetrachloride RT	–	–	G	–
Chlorinated Solvents	–	–	G	G
Chlorine (Dry)	–	–	G	–
Chlorine (wet or solutions)	F	–	G	–
Cottonseed Oil	G	G	G	G
Creosote (wood or coal tar)	–	G	G	–
Chromic Acid 50%	–	F	G	–
Citric Acid	G	G	G	G
Copper Salt Solutions	G	F	G	G
Diesel Fuel	–	G	G	–
Ethers RT	F	F	G	–
Ethylene Glycol	G	G	G	G
Ethylene Dichloride	–	–	G	–
Ferric Salt Solutions	G	G	G	G
Ferrous Salt Solutions	G	G	G	G
Formaldehyde RT	F	–	–	G
Fuel Oil	–	G	F	–
Furfural	G	–	–	–
Freon 12 (Refrigerant)	G	G	G	–
Freon 13 (Refrigerant)	F	G	G	–
Gasoline (Sour or refined)	–	G	G	–
Glycerin (Glycerol)	G	G	G	G
Heptane	–	G	G	–
Hexane	–	G	G	–

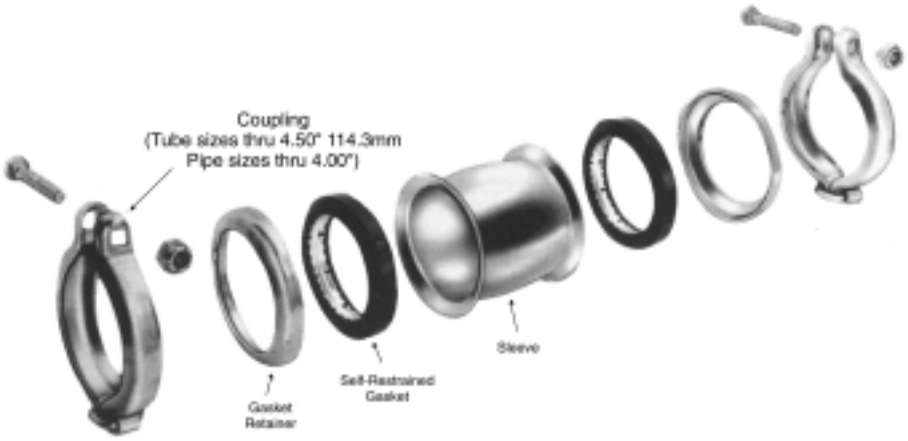
FLUID	Gasket Material D	C/N	V	S
Hydraulic Oils				
Straight Petroleum Base	–	G	G	–
Water Petroleum Emulsion	–	G	G	F
Water Glycol	G	G	G	F
Straight Phosphate Ester	G	–	F	F
Phos. Ester/Petroleum Blend	–	–	F	–
Ester Blend	G	G	F	F
Silicone Oils	G	G	G	–
Hydrochloric Acid RT	G	F	G	–
Hydrofluoric Acid (48% sol) RT	–	–	G	–
Hydrolube	G	G	G	F
Hydrogen Peroxide (dilute)	F	F	G	G
Hydrogen Peroxide (concentrated)	–	–	F	F
Hydrogen Sulfide (dry) RT	F	F	–	–
Hydrogen Sulfide (wet) RT	F	–	G	–
Hypochlorite Solutions (no free Chlorine)	G	F	G	F
Kerosene RT	–	G	G	–
Linseed Oil	–	G	G	–
Lube Oil (Mineral)	–	G	G	–
Lubricating Oils (Diester Base)	–	F	G	–
Magnesium Salt Solutions	G	G	G	G
Mercuric Chloride	G	G	G	–
Mercury	G	G	G	F
Mineral Oil	–	G	G	G
Naphtha	–	F	G	–
Napthalene	–	–	G	–
Nitric Acid (less than 20%)	F	–	G	–
Oleic Acid	–	G	F	–
Oxalic Acid	G	F	G	F
Oxygen, Gaseous	G	F	G	G
Paraffin	–	G	G	F
Petroleum Oils (Sour or Refined)	–	G	G	–
Phosphoric Acid (Commercial)	G	–	G	–
Potassium Salt Solutions	G	G	G	G
Pydraul C Series, F	F	–	G	F
F Series	G	–	–	–
Sodium Salt Solutions	G	G	G	F
Steam	F	–	–	–
Sulfur	G	–	–	–
Sulfur Dioxide (wet or dry)	G	–	–	F
Sulfuric Acid (10-75%)	F	–	G	–
Sulfuric Acid (75-95%)	–	–	G	–
Sulfuric Acid (95%) RT	–	–	G	–
Sulfurous Acid	–	F	G	–
Tannic Acid	F	G	F	F
Trichlorethylene	–	–	G	–
Turpentine	–	F	G	–
Vegetable Oils	G	G	G	G
Water (fresh or salt) cold	G	G	G	G
Water (fresh or salt) hot +215°F. max.	G	⚠	G	–
Xylene	–	–	G	–
Zinc Salt Solutions	G	G	G	G

⚠ C maximum + 180°F., N maximum +225°F.



Coupling
(Tube sizes over 4.50" 114.3mm
Pipe sizes over 4.00" 101.6 mm)

Standard (Un-Restrained) Style



Self-Restrained Style

NH16XX ( ) 000 ( ) 0000

Basic Part Number (from pages 254-259)
Example: NH1600

Gasket Material:
- C = Buna-N (Standard)
- D = EDPM
- * N = BUNA-N (High Temperature)
- * S = Silicone
- * V = Fluorocarbon
- * G = Mineral Fiber (EXHAUST APPLICATIONS NOT SUBJECT TO FLEXING)

* Available in Standard (Un-Restrained) Model Only.

Example Part Number: NH1600C075B0250
Complete assemblies may be ordered by the procedure shown above. Standard components may be ordered as shown on page 251.

Size of Pipe or Tube to be connected: (in hundredths of inch)
Example: .75" = 075

Sleeve Material:
B = Plated Steel (Standard)
S = Stainless Steel (Sleeve only – consult Eaton Aeroquip for availability)

Joint Length (in thousands of inch).
Example: 2.5" = 0250
Style is available in lengths shown. Other lengths are available in multiples of 1-inch on special requests. Contact Eaton Aeroquip for availability.

		COUPLING	STRAIGHT SLEEVES	GASKET RETAINER	GASKETS **NOTE:** Letter "X" in part numbers shown indicates a code letter to be filled in for Gasket Material. **Gasket Codes:** C = Buna-N (standard), D = EPDM, G = Mineral Fiber, N = Buna-N (Hi-Temp), S = Silicone, V = Fluorocarbon. (Other materials available. Consult Eaton Aeroquip.)									
						Material Available From Stock							Material Available From Stock	
Tube Size (inches)	Tube O.D. (inches)	Includes Nut and Bolt Standard	Standard	Standard	Standard Gasket	C	D*	G	N*	S	V	Self-restrained Gasket	C	D*
1.00	1.00	NH100085-075YF	NK1237-075B0250	NK1000023-075	NK1000064X100	X	X	X		X	X	NK1000062X100	X	
1.25	1.25	NH100085-100YF	NK1237-100B0288	NK1000023-100	NK1000064X125	X	X		X	X	X	NK1000062X125	X	X
1.38	1.38	NH100086-150YF	NK1237-138B0300	NK1000056-138	NK1000064X138	X				X		NK1000062X138	X	
1.50	1.50	NH100086-150YF	NK1238-150B0300	NK1000056-150	NK1000064X150	X	X			X	X	NK1000062X150	X	X
1.75	1.75	NH100085-150YF	NK1238-175B0350	NK1000056-175	NK1000064X175	X	X					NK1000062X175	X	
2.00	2.00	NH100086-200YF	NK1238-200B0350	NK1000056-200	NK1000064X200	X	X	X		X	X	NK1000062X200	X	
2.25	2.25	NH100085-200YF	NK1238-225B0400	NK1000056-225	NK1000064X225	X	X							
2.50	2.50	NH100086-250YF	NK1238-250B0400	NK1000056-250	NK1000064X250	X	X			X	X	NK1000062X250	X	X
2.88	2.88	NH100085-250YF	NK1237-250B0650	NK1000023-250	NK1000063X250	X	X	X		X	X	NK1000061X250	X	
3.00	3.00	NH100086-300YF	NK1238-300B0500	NK1000056-300	NK1000064X300	X	X		X	X	X	NK1000062X300	X	
3.25	3.25	NH100086-325YF	NK1238-325B0650	NK1000056-325	NK1000064X325	X						NK1000062X325	X	
3.50	3.50	NH100085-300YF	NK1237-300B0650	NK1000023-300	NK1000063X300	X	X	X	X	X	X	NK1000061X300	X	X
4.00	4.00	NH100085-350YF	NK1237-350B0650	NK1000023-350	NK1000063X350	X	X	X	X	X	X	NK1000061X350	X	X
4.50	4.50	NH100085-400YF	NK1237-400B0650	NK1000023-400	NK1000063X400	X	X		X	X	X	NK1000061X400	X	X
5.00	5.00	NH100086-500YF	NK1238-500B0650	NK1000056-500	NK1000064X500	X	X					NK1000062X500	X	X
Pipe Size (inches)	Pipe O.D. (inches)													
.38	.675	NH100085-038YF	NK1237-038B0200	NK1000023-038	NK1000063X038	X					X			
.50	.840	NH100085-050YF	NK1237-050B0225	NK1000023-050	NK1000063X050	X	X		X	X	X	NK1000061X050	X	
.75	1.050	NH100085-075YF	NH1237-075B0250	NK1000023-075	NK1000063X075	X		X	X	X	X	NK1000061X075	X	
1.00	1.315	NH100085-100YF	NK1237-100B0288	NK1000023-100	NK1000063X100	X	X		X	X	X	NK1000061X100	X	X
1.25	1.660	NH100085-125YF	NK1237-125B0325	NK1000023-125	NK1000063X125	X	X		X	X	X	NK1000061X125	X	X
1.50	1.900	NH100085-150YF	NK1237-150B0350	NK1000023-150	NK1000063X150	X	X		X	X	X	NK1000061X150	X	X
2.00	2.375	NH100085-200YF	NK1237-200B0400	NK1000023-200	NK1000063X200	X	X		X	X	X	NK1000061X200	X	X
2.50	2.875	NH100085-250YF	NK1237-250B0650	NK1000023-250	NK1000063X250	X	X	X	X	X	X	NK1000061X250	X	X
3.00	3.500	NH100085-300YF	NK1237-300B0650	NK1000023-300	NK1000063X300	X	X	X	X	X	X	NK1000061X300	X	X
3.50	4.000	NH100085-350YF	NK1237-350B0650	NK1000023-350	NK1000063X350	X	X	X	X	X	X	NK1000061X350	X	X
4.00	4.500	NH100085-400YF	NK1237-400B0650	NK1000023-400	NK1000063X400	X	X		X	X	X	NK1000061X400	X	X
5.00	5.563	NH100085-500YF	NK1237-500B0650	NK1000023-500	NK1000063X500	X	X		X		X	NK1000061X500	X	
6.00	6.625	NH100085-600YF	NK1237-600B0650	NK1000023-600	NK1000063X600	X	X		X		X	NK1000061X600	X	X

*These gasket materials can be ordered in sizes other than those listed. Contact Eaton Aeroquip for availability.

BOLT PART NUMBER

JOINT SIZE (inches)		BOLT PART NUMBER	NUT PART NUMBER
Tube	Pipe	Carbon Steel	Carbon Steel
.50 to 1.12	.38 to .75	56519A4-7	56535A4C-C
1.25 to 2.50	1 to 2	56519A5-8	56535A5C-C

JOINT SIZE (inches)		BOLT PART NUMBER	NUT PART NUMBER
Tube	Pipe	Carbon Steel	Carbon Steel
2.75 to 5	2.50 to 4	56519A6-14	56535A6C-C
6	5 to 6	56519A8-16	56535A8C-C

Stainless steel bolting is recommended for replacement where mineral fiber gaskets are used or when high temperatures exist. Contact Eaton Aeroquip for replacement bolts and nuts on High Temperature Flexmaster joint for +1200°F. (+649°C.).

Pipe and tubing preparation and Flexmaster® joint installation instructions

1. Pipe (Tube) End Preparation
- a) Deburr and clean pipe (tube) ends.
- b) Surface should be free of deep scratches, gouges, dents, dirt, etc.

2. Joint Installation
- a) Install retainer (1), gasket* (2) and sleeve (3) on one side of pipe in sequence shown in Figure 1.
- b) Install remaining retainer (4) and gasket (5) on other pipe end.
- c) Position retainer (4) and gasket (5) to proper pipe insertion depth (“D”) as shown in Table 1.

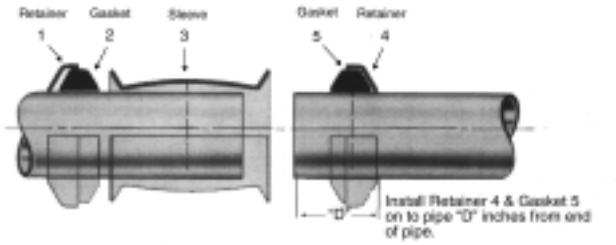


Figure 1

- d) Slide sleeve (3) to gasket (5) and move gasket (2) and retainer (1) into position as shown in Figure 2. Pipe must be inserted to proper depth (“D”) into both gaskets as shown in Table 1.

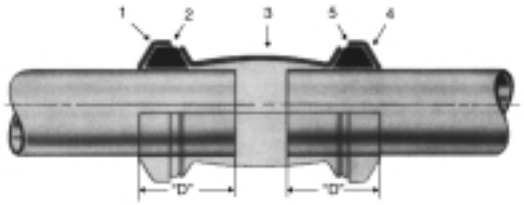


Figure 2

***3.** Special Notes
- a) Assembly of gaskets can be made easier by dipping gaskets in water or the fluid to be sealed. The use of other rubber lubricants can be detrimental to the life of the gaskets. Never lubricate the metal parts.
- b) Self-restrained gasket installation. To simplify installation of a self-restrained gasket, install lower gasket halfway onto the pipe first, leaving the split area in the steel retaining ring free at the top. See Figure 3. Then, stretch the gasket and split area of the retaining ring until they slip
over the tube or pipe and into position. Refer to Figure 3.

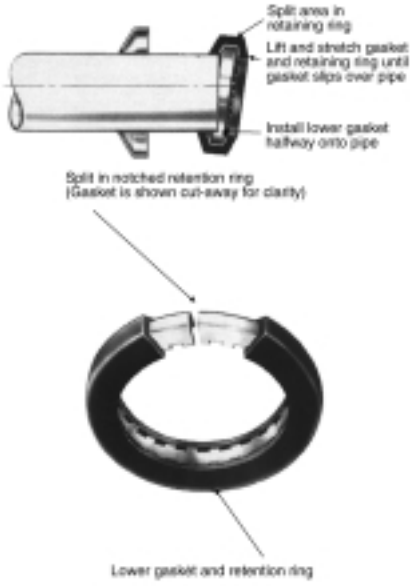


Figure 3

4. Coupler Installation
Install both V-couplings, encompassing the retainer, gasket and sleeve as shown in Figure 4. Do not tighten either coupling until the entire joint is assembled (See Figure 2). Tighten nuts to the torque specified in Table 2. Do not lubricate the nut or bolt before assembly. The gap method outlined in Table 3 may be used for standard gaskets only.

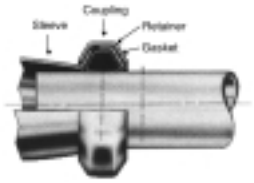


Figure 4

WARNING

Maximum temperature ratings are meant as a guide only. For extreme temperature conditions, consult factory.

Improper installation, use or selection of the Flexmaster joint can result in personal injury, property damage or death.

This page is part of a complete catalog which contains technical and safety data that must be reviewed when selecting a product.

Table 1. Required insertion depth* of pipe and tube

Pipe			Tube		
Pipe Size	**"D" min.**	**"D" max.**	**Tube Size**	**"D" min.**	**"D" max.**
.38	**.71** 18	**1.00** 25.4	**.75** 19.1	**.74** 18.8	**1.10** 27.9
.50	**.71** 18	**1.09** 27.7	**.88** 22.3	**.65** 16.5	**1.00** 25.4
.75	**1.00** 25.4	**1.21** 30.7	**1.00** 25.4	**.72** 18.3	**1.21** 30.7
1.00	**1.14** 29	**1.39** 35.3	**1.12** 28.4	**.93** 23.6	**1.21** 30.7
1.25	**1.15** 29.2	**1.56** 39.6	**1.25** 31.8	**1.16** 29.5	**1.40** 35.6
1.50	**1.16** 29.5	**1.62** 41.1	**1.38** 35.1	**1.20** 30.5	**1.46** 37.1
2.00	**1.18** 30	**1.84** 46.7	**1.50** 38.1	**1.18** 30	**1.45** 36.8
2.50	**1.68** 42.7	**2.38** 60.5	**1.75** 44.5	**1.22** 31	**1.69** 42.9
3.00	**1.70** 43.2	**2.40** 61	**2.00** 50.8	**1.15** 29.2	**1.68** 42.7
3.50	**1.72** 33.7	**2.42** 61.5	**2.25** 57.2	**1.24** 31.5	**1.84** 46.7
4.00	**1.74** 44.2	**2.44** 62	**2.38** 60.3	**1.18** 30	**1.84** 46.7
5.00	**2.08** 52.8	**2.24** 56.9	**2.50** 63.5	**1.17** 29.7	**1.83** 46.5
6.00	**1.86** 47.2	**2.33** 59.2	**2.75** 69.9	**1.74** 44.2	**1.90** 48.3
			2.88 73.0	**1.68** 42.7	**2.38** 60.5
			3.00 76.2	**1.67** 42.4	**2.30** 58.4
			3.25 82.6	**1.67** 42.4	**2.48** 63
			3.50 88.9	**1.70** 43.2	**2.40** 61
			4.00 101.6	**1.72** 33.7	**2.42** 61.5
			4.50 114.3	**1.74** 44.2	**2.44** 62
			5.00 127	**1.75** 44.5	**2.07** 52.6

**Dimensions shown are for standard, straight, bulged sleeves only. Elbows, tees and specials must meet the minimum insertion depths.*

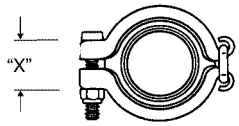
NOTE: **inches and inch-lbs in bold**, mm and N·m in light.

Table 2. Flexmaster® joint assembly tightening guide. Torque Method of Installation**

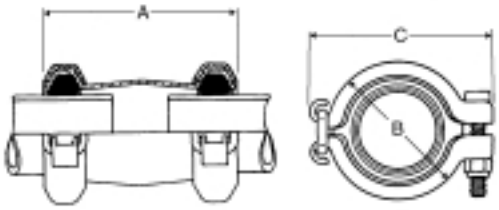
Size	Standard	Self-restrained
.75" to 1.12" Tube (19.1 to 28.4 mm) **.38" to .75" Pipe**	**40-60 inch-lbs.** (4.55-6.88 N·m)	**40-60 inch-lbs.** (4.55-6.88 N·m)
1.25" to 2.75" Tube (31.8 to 69.9mm) **1" to 2" Pipe**	**90-110 inch-lbs.** (10.14-12.39 N·m)	**140-160 inch-lbs.** (15.78-18.13 N·m)
2.88" to 3.50" Tube (73 to 88.9 mm) **2.50" to 3" Pipe**	**180-200 inch-lbs.** (20.27-22.52 N·m)	**220-240 inch-lbs.** (24.79-27.14 N·m)
4" to 5" Tube (101.6 to 127 mm) **3.50" to 4" Pipe**	**240-260 inch-lbs.** (27.14-29.28 N·m)	**280-300 inch-lbs.** (31.53-33.8 N·m)
6" Tube (152.4 mm) **5" to 6" Pipe**	**300-320 inch-lbs.** (33.8-36.15 N·m)	**480-500 inch-lbs.** (54.05-56.42 N·m)

**Note: The torque values specified are for an un-lubricated (dry) nut and bolt.

Table 3. Optional Clearance Method for Installation of Standard Gaskets. (Self-restrained gaskets must be installed by Torque Method).



Tube Size	Pipe Size	Dimension x ± .06 1.5
.50, .63, .75 12.7, 16.0, 19.1	**3/8, 1/2**	**.62** 15.8
1.00, 1.13 25.4, 28.7	**3/4**	**.69** 17.5
1.25, 1.38 31.8, 35.1 **1.50, 1.75** 38.1, 44.5	**1**	**.94** 23.9
	1 1/4	**.94** 23.9
	1 1/2	**.94** 23.9
2.25 57.2	**2**	**.88** 22.4
2.50, 2.75 63.5, 69.9	**2 1/2**	**1.50** 38.1
3.00, 3.25 76.2, 82.6	**3**	**1.56** 39.6
	3 1/2	**1.56** 39.6
	4	**1.56** 39.6
5.00, 6.00 127, 152.4	**5,6**	Use Torque Method



Basic part number: NH1600
NH1650

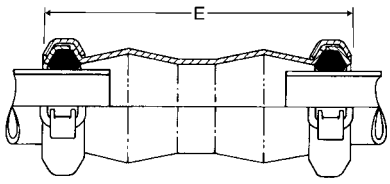
Allowable misalignment: ±4° per end

Dimensions: **inches in bold**
mm in light

Pipe Size	Pipe O.D.	B	C	Straight Part Number*	A
.38	**.675** 17.1	**1.48** 37.6	**2.34** 59.4	**NH1600X038X0200 –	**2.00** 50.8
.50	**.840** 21.3	**1.65** 41.9	**2.53** 64.3	NH1600X050X0225 NH1650X050X0225	**2.25** 57.2
.75	**1.050** 26.7	**1.86** 47.2	**2.75** 69.9	NH1600X075X0250 NH1650X075X0250	**2.50** 63.5
1.00	**1.315** 33.4	**2.37** 60.2	**3.48** 88.4	NH1600X100X0288 NH1650X100X0288	**2.88** 73.2
1.25	**1.660** 42.2	**2.71** 68.8	**3.85** 97.8	NH1600X125X0325 NH1650X125X0325	**3.25** 82.6
1.50	**1.900** 48.3	**2.96** 75.2	**4.11** 104.4	NH1600X150X0350 NH1650X150X0350	**3.50** 88.9
2.00	**2.375** 60.3	**3.43** 87.1	**4.60** 116.8	NH1600X200X0400 NH1650X200X0400	**4.00** 101.6
2.50	**2.875** 73.0	**4.73** 120.1	**6.23** 158.2	NH1600X250X0650 NH1650X250X0650	**6.50** 165.1
3.00	**3.500** 88.9	**5.36** 136.1	**6.87** 174.5	NH1600X300X0650 NH1650X300X0650	**6.50** 165.1
3.50	**4.000** 101.6	**5.86** 148.8	**7.38** 187.5	NH1600X350X0650 NH1650X350X0650	**6.50** 165.1
4.00	**4.500** 114.3	**6.36** 161.5	**7.89** 200.5	NH1600X400X0650 NH1650X400X0650	**6.50** 165.1
5.00	**5.563** 141.4	**8.22** 208.8	**10.62** 269.7	**NH1600X500X0650 NH1650X500X0650	**6.50** 165.1
6.00	**6.625** 168.3	**8.86** 225.0	**11.24** 285.5	**NH1600X600X0650 NH1650X600X0650	**6.50** 165.1

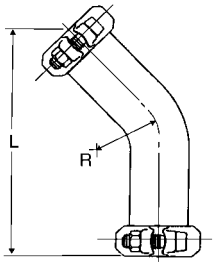
NOTE: Letter X in part numbers shown indicates a code letter to be filled in. See page 250 for explanation of part numbers and how to order.
**Black part numbers are standard type. Gray part numbers are self-restrained type.*
***Sleeve in this size is cylindrical (no-bulge). Allowable misalignment is ±2° per end for this size.*

This page is part of a complete catalog which contains technical and safety data that must be reviewed when selecting a product.



Basic part number: NH1600 (Long)
NH1650 (Long)

Allowable misalignment: ±4° per end



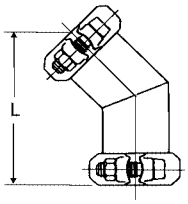
Basic part number: NH1601
NH1651

Allowable misalignment: ±2° per end

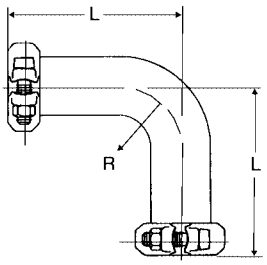
Dimensions: **inches in bold**
mm in light

Pipe Size	Pipe O.D.	Straight Double-Bulged Part Number*	E†	45° Long Elbow Part Number*	L	R
.38	**.675** 17.1	**NH1600X038X0200 –	**2.00** 50.8	NH1601X038X –	**4.16** 105.7	**.88** 22.3
.50	**.840** 21.3	NH1600X050X0350 NH1650X050X0350	**3.50** 88.9	NH1601X050X NH1651X050X	**4.37** 111.0	**1.06** 26.9
.75	**1.050** 26.7	NH1600X075X0400 NH1650X075X0400	**4.00** 101.6	NH1601X075X NH1651X075X	**5.33** 135.4	**1.31** 34.3
1.00	**1.315** 33.4	NH1600X100X0450 NH1650X100X0450	**4.50** 114.3	NH1601X100X NH1651X100X	**5.77** 146.6	**1.62** 41.1
1.25	**1.660** 42.2	NH1600X125X0550 NH1650X125X0550	**5.50** 139.7	NH1601X125X NH1651X125X	**5.97** 151.6	**1.88** 47.8
1.50	**1.900** 48.3	NH1600X150X0575 NH1650X150X0575	**5.75** 146.1	NH1601X150X NH1651X150X	**6.18** 157.0	**2.12** 53.8
2.00	**2.375** 60.3	NH1600X200X0675 NH1650X200X0675	**6.75** 171.5	NH1601X200X NH1651X200X	**6.40** 162.6	**2.62** 66.5
2.50	**2.875** 73.0	NH1600X250X01125 NH1650X250X01125	**11.25** 285.8	NH1601X250X NH1651X250X	**7.26** 184.3	**3.25** 82.6
3.00	**3.500** 88.9	NH1600X300X01125 NH1650X300X01125	**11.25** 285.8	NH1601X300X NH1651X300X	**8.54** 216.9	**5.00** 127.0
3.50	**4.000** 101.6	NH1600X350X01125 NH1650X350X01125	**11.25** 285.8	NH1601X350X NH1651X350X	**9.18** 233.1	**6.00** 152.4
4.00	**4.500** 114.3	NH1600X400X01125 NH1650X400X01125	**11.25** 285.8	NH1601X400X NH1651X400X	**9.82** 249.4	**7.00** 177.8
5.00	**5.563** 141.4	**NH1600X500X0650 NH1650X500X0650	**6.50** 165.1			
6.00	**6.625** 168.3	**NH1600X600X0650 NH1650X600X0650	**6.50** 165.1			

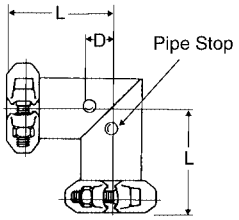
NOTE: Letter X in part numbers shown indicates a code letter to be filled in. See page 250 for explanation of part numbers and how to order.
**Black part numbers are standard type. Gray part numbers are self-restrained type.*
***Sleeve in this size is cylindrical (no-bulge). Allowable misalignment is ±2° per end for this size.*
*†Straight, Double-Bulged joints are available in longer lengths than "E" shown in increments of 1 inch. Consult Eaton Aeroquip. "E" dimension is **minimum length** for longer joints.*



Basic part number:
NH1617
NH1667
Allowable misalignment:
±2° per end



Basic part number:
NH1602
NH1652
Allowable misalignment:
±2° per end



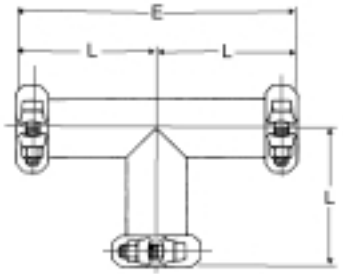
Basic part number:
NH1618
NH1668
Allowable misalignment:
±2° per end

Pipe Size	45° Short Elbow Part Number*	L	90° Long Elbow Part Number*	L	R	90° Short Elbow Part Number*	L	D
.38	NH1617X038X –	**2.56** 65.0	NH1602X038X –	**2.44** 62.0	**.88** 22.3	NH1618X038X –	**1.88** 47.8	**.38** 9.7
.50	NH1617X050X NH1667X050X	**2.99** 75.9	NH1602X050X NH1652X050X	**2.56** 65.0	**1.06** 26.9	NH1618X050X NH1668X050X	**2.03** 51.6	**.46** 10.7
.75	NH1617X075X NH1667X075X	**3.41** 86.6	NH1602X075X NH1652X075X	**3.88** 98.6	**1.31** 34.3	NH1618X075X NH1668X075X	**2.31** 58.7	**.56** 14.2
1.00	NH1617X100X NH1667X100X	**3.89** 98.8	NH1602X100X NH1652X100X	**4.25** 108.0	**1.62** 41.1	NH1618X100X NH1668X100X	**2.69** 68.3	**.72** 18.3
1.25	NH1617X125X NH1667X125X	**4.42** 112.3	NH1602X125X NH1652X125X	**4.50** 114.3	**1.88** 47.8	NH1618X125X NH1668X125X	**3.09** 78.5	**.88** 22.3
1.50	NH1617X150X NH1667X150X	**4.85** 123.2	NH1602X150X NH1652X150X	**4.88** 124.0	**2.12** 53.8	NH1618X150X NH1668X150X	**3.41** 86.6	**1.00** 25.4
2.00	NH1617X200X NH1667X200X	**5.55** 141.0	NH1602X200X NH1652X200X	**5.38** 136.7	**2.62** 66.5	NH1618X200X NH1668X200X	**3.97** 100.8	**1.25** 31.8
2.50	NH1617X250X NH1667X250X	**5.97** 151.6	NH1602X250X NH1652X250X	**6.12** 155.4	**3.25** 82.6	NH1618X250X NH1668X250X	**4.62** 117.3	**1.56** 39.6
3.00	NH1617X300X NH1667X300X	**6.40** 162.6	NH1602X300X NH1652X300X	**8.06** 204.7	**5.00** 127.0	NH1618X300X NH1668X300X	**5.00** 127.0	**1.88** 47.8
3.50	NH1617X350X NH1667X350X	**6.83** 173.5	NH1602X350X NH1652X350X	**9.06** 230.1	**6.00** 152.4	NH1618X350X NH1668X350X	**52.5** 133.4	**2.19** 55.6
4.00	NH1617X400X NH1667X400X	**7.26** 184.4	NH1602X400X NH1652X400X	**10.06** 255.5	**7.00** 177.8	NH1618X400X NH1668X400X	**5.50** 139.7	**2.44** 62.0

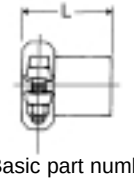
Dimensions: **inches in bold**
mm in light

NOTE: Letter X in part numbers shown indicates a code letter to be filled in. See page 250 for explanation of part numbers and how to order.
**Black part numbers are standard type. Gray part numbers are self-restrained type.*

This page is part of a complete catalog which contains technical and safety data that must be reviewed when selecting a product.



Basic part number: **NH1604**
NH1654
Allowable misalignment: ±2° per end

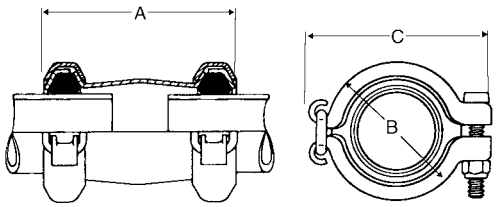


Basic part number: **NH1606**
NH1656
Allowable misalignment: ±2° per end

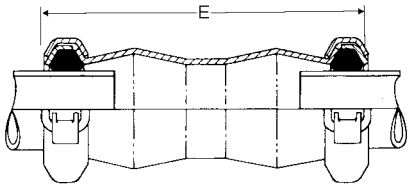
Pipe Size	Tee Part Number*	L	E	Bulkhead Joint Part Number*	Min. L
.38	NH1604X038X –	**2.25** 57.2	**4.50** 114.3	NH1606X038X –	**1.75** 45.1
.50	NH1604X050X NH1654X050X	**2.50** 63.5	**5.00** 127.0	NH1606X050X NH1656X050X	**1.75** 45.1
.75	NH1604X075X NH1654X075X	**2.88** 73.2	**5.76** 146.3	NH1606X075X NH1656X075X	**2.25** 57.2
1.00	NH1604X100X NH1654X100X	**3.50** 88.9	**7.00** 177.8	NH1606X100X NH1656X100X	**2.50** 63.5
1.25	NH1604X125X NH1654X125X	**4.12** 104.6	**8.24** 209.3	NH1606X125X NH1656X125X	**2.62** 66.5
1.50	NH1604X150X NH1654X150X	**4.50** 114.3	**9.00** 228.6	NH1606X150X NH1656X150X	**2.88** 73.2
2.00	NH1604X200X NH1654X200X	**5.25** 133.4	**10.50** 266.7	NH1606X200X NH1656X200X	**3.38** 85.9
2.50	NH1604X250X NH1654X250X	**6.94** 176.3	**13.88** 352.6	NH1606X250X NH1656X250X	**4.00** 101.6
3.00	NH1604X300X NH1654X300X	**7.94** 201.7	**15.88** 403.4	NH1606X300X NH1656X300X	**4.00** 101.6
3.50	NH1604X350X NH1654X350X	**8.69** 220.7	**17.38** 441.5	NH1606X350X NH1656X350X	**4.00** 101.6
4.00	NH1604X400X NH1654X400X	**9.44** 239.8	**18.88** 479.6	NH1606X400X NH1656X400X	**4.00** 101.6

Dimensions: **inches in bold**
mm in light

NOTE: Letter X in part numbers shown indicates a code letter to be filled in. See page 250 for explanation of part numbers and how to order.
**Black part numbers are standard type. Gray part numbers are self-restrained type.*



Basic part number: **NH1625**
NH1675
Allowable misalignment: ±4° per end



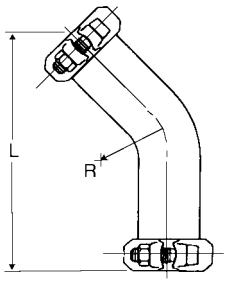
Basic part number: **NH1625 (Long)**
NH1675 (Long)
Allowable misalignment: ±4° per end

Tube Size	B	C	Straight Part Number*	A	Straight Double-Bulged Part Number*	E†
.75	**1.65**	**2.53**	NH1625X075X0225	**2.25**	NH1625X075X0350	**3.50**
19.1	41.9	64.3	–	57.2	–	88.9
.88	**1.65**	**2.53**	NH1625X088X0225	**2.25**	NH1625X088X0350	**3.50**
22.2	41.9	64.3	–	57.2	–	88.9
1.00	**1.86**	**2.75**	NH1625X100X0250	**2.50**	NH1625X100X0400	**4.00**
25.4	47.2	69.9	NH1675X100X0250	63.5	NH1675X100X0400	101.6
1.12	**1.86**	**2.75**	NH1625X112X0250	**2.50**	NH1625X112X0450	**4.50**
28.6	47.2	69.9	–	63.5	–	114.3
1.25	**2.37**	**3.48**	NH1625X125X0288	**2.88**	NH1625X125X0450	**4.50**
31.8	60.2	88.4	NH1675X125X0288	73.2	NH1675X125X0450	114.3
1.38	**2.55**	**3.68**	NH1625X138X0300	**3.00**	NH1625X138X0475	**4.75**
34.9	64.8	93.5	NH1675X138X0300	76.2	NH1675X138X0475	120.7
1.50	**2.55**	**3.68**	NH1625X150X0300	**3.00**	NH1625X150X0475	**4.75**
38.1	64.8	93.5	NH1675X150X0300	76.2	NH1675X150X0475	120.7
1.75	**2.96**	**4.11**	NH1625X175X0350	**3.50**	NH1625X175X0575	**5.75**
44.5	75.2	104.4	NH1675X175X0350	88.9	NH1675X175X0575	146.1
2.00	**3.06**	**4.20**	NH1625X200X0350	**3.50**	NH1625X200X0575	**5.75**
50.8	77.7	106.7	NH1675X200X0350	88.9	NH1675X200X0575	146.1
2.25	**3.43**	**4.60**	NH1625X225X0400	**4.00**	NH1625X225X0675	**6.75**
54.9	87.1	116.8	–	101.6	–	171.5
2.38	**3.43**	**4.60**	NH1600X200X0400	**4.00**	NH1600X200X0675	**6.75**
60.3	87.1	116.8	NH1650X200X0400	101.6	NH1650X200X0675	171.5
2.50	**3.55**	**4.72**	NH1625X250X0400	**4.00**	NH1625X250X0675	**6.75**
63.5	90.2	133.9	NH1675X250X0400	101.6	NH1675X250X0675	171.5
2.75	**4.73**	**6.23**	NH1625X275X0400	**4.00**	NH1625X275X0675	**6.75**
69.9	120.1	158.2	–	101.6	–	171.5
2.88	**4.73**	**6.23**	NH1600X250X0650	**6.50**	NH1600X250X01125	**11.25**
73.0	120.1	158.2	NH1650X250X0650	165.1	NH1650X250X01125	285.8
3.00	**4.86**	**6.34**	NH1625X300X0500	**5.00**	NH1625X300X01125	**11.25**
76.2	123.4	161.0	NH1675X300X0500	127.0	NH1675X300X01125	285.8
3.25	**5.11**	**6.60**	NH1625X325X0650	**6.50**	NH1625X325X01125	**11.25**
86.6	129.8	167.7	–	165.1	–	285.8
3.50	**5.36**	**6.87**	NH1600X300X0650	**6.50**	NH1600X300X01125	**11.25**
88.9	136.1	174.5	NH1650X300X0650	165.1	NH1650X300X01125	285.8
4.00	**5.86**	**7.38**	NH1600X350X0650	**6.50**	NH1600X350X01125	**11.25**
101.6	148.8	187.5	NH1650X350X0650	165.1	NH1650X350X01125	285.8
4.50	**6.36**	**7.89**	NH1600X400X0650	**6.50**	NH1600X400X01125	**11.25**
114.3	161.5	200.5	NH1650X400X0650	165.1	NH1650X400X01125	285.8
5.00	**6.86**	**8.76**	**NH1625X500X0650	**6.50**	**NH1625X500X0650	**6.50**
127.0	174.2	222.5	NH1675X500X0650	165.1	NH1675X500X0650	165.1

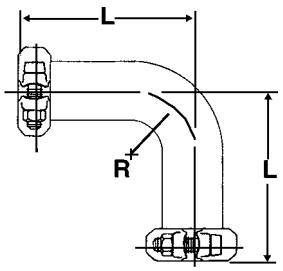
Dimensions: **inches in bold**
mm in light

NOTE: Letter X in part numbers shown indicates a code letter to be filled in. See page 250 for explanation of part numbers and how to order.
**Black part numbers are standard type. Gray part numbers are self-restrained type.*
***Sleeve in this size is cylindrical (un-bulged). Allowable misalignment for this size is ±2° per end.*
*†Straight, Double-Bulged joints are available in longer lengths than "E" shown in increments of 1 inch. "E" dimension is **minimum length** for longer joints.*

This page is part of a complete catalog which contains technical and safety data that must be reviewed when selecting a product.



Basic part number: **NH1626**
NH1676
Allowable misalignment: ±2° per end

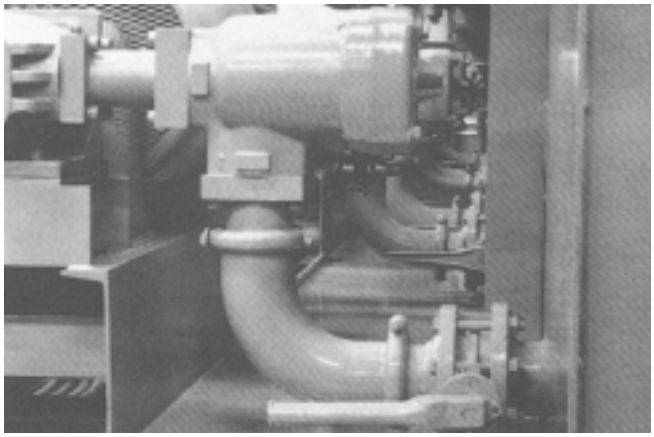


Basic part number: **NH1627**
NH1677
Allowable misalignment: ±2° per end

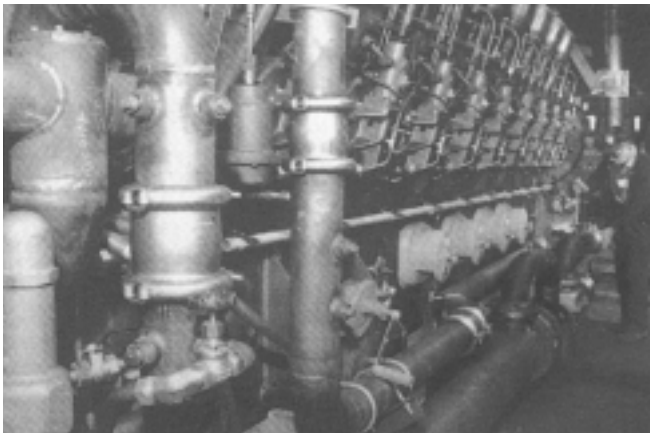
Tube Size	45° Elbow Part Number*	L	R	90° Elbow Part Number*	L	R
.75 19.1				NH1627X075X –	**2.62** 66.5	**1.06** 26.9
.88 22.2						
1.00 25.4	NH1626X100X NH1676X100X	**5.33** 140.5	**1.31** 34.3	NH1627X100X NH1677X100X	**3.88** 98.6	**1.31** 34.3
1.12 28.6						
1.25 31.8	NH1626X125X NH1676X125X	**5.77** 146.6	**1.62** 41.1	NH1627X125X NH1677X125X	**4.25** 108.0	
1.38 34.9	NH1626X138X NH1676X138X	**5.97** 151.6	**1.75** 44.5	NH1627X138X NH1677X138X	**4.50** 114.3	**1.75** 44.5
1.50 38.1	NH1626X150X NH1676X150X	**5.97** 151.6	**1.75** 44.5	NH1627X150X NH1677X150X	**4.50** 114.3	**1.75** 44.5
1.75 44.5				NH1627X175X NH1677X175X	**5.00** 127.0	**2.25** 54.9
2.00 50.8	NH1626X200X NH1676X200X	**6.30** 160.0	**2.25** 57.2	NH1627X200X NH1677X200X	**5.00** 127.0	**2.25** 54.9
2.25 54.9						
2.38 60.3						
2.50 63.5	NH1626X250X NH1676X250X	**6.62** 168.1	**2.75** 69.9	NH1627X250X NH1677X250X	**5.62** 142.7	**2.75** 69.9
2.75 69.9						
2.88 73.0						
3.00 76.2	NH1626X300X NH1676X300X	**7.68** 195.1	**3.38** 85.9	NH1627X300X NH1677X300X	**6.44** 164.6	**3.38** 85.9
3.25 86.6						
3.50 88.9	NH1601X300X NH1651X300X	**8.54** 216.9	**5.00** 127.0	NH1627X350X NH1677X350X	**8.06** 104.7	**5.00** 127.0
4.00 101.6	NH1601X350X NH1651X350X	**9.18** 233.1	**6.00** 152.4	NH1627X400X NH1677X400X	**9.06** 130.1	**6.00** 152.4
4.50 114.3	NH1601X400X NH1651X400X	**9.82** 249.4	**7.00** 177.8	NH1627X450X NH1677X450X	**10.6** 155.5	**7.00** 177.8
5.00 127.0						

Dimensions: **inches in bold**
mm in light

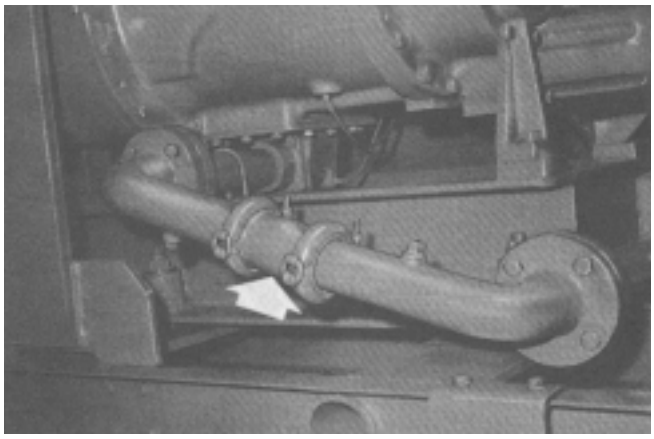
NOTE: Letter X in part numbers shown indicates a code letter to be filled in. See page 250 for explanation of part numbers and how to order.
**Black part numbers are standard type. Gray part numbers are self-restrained type.*
Flexmaster® flanged and threaded styles shown on this page are not normally stock items and are not available in stainless steel. Consult factory for delivery.



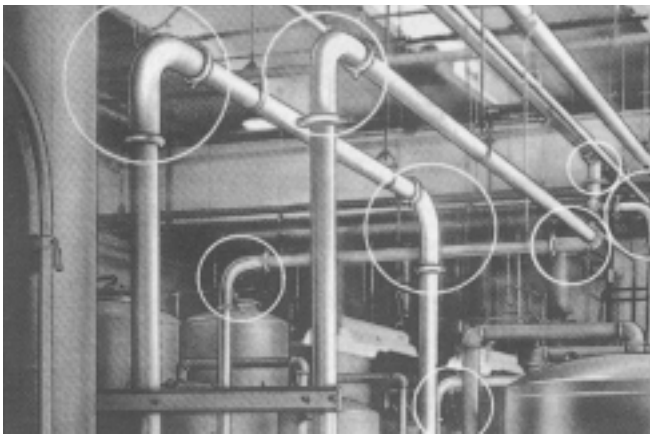
Flexmaster® joint elbows on a large hydraulic power system, which connect pipe from pumps to hydraulic fluid reservoirs.



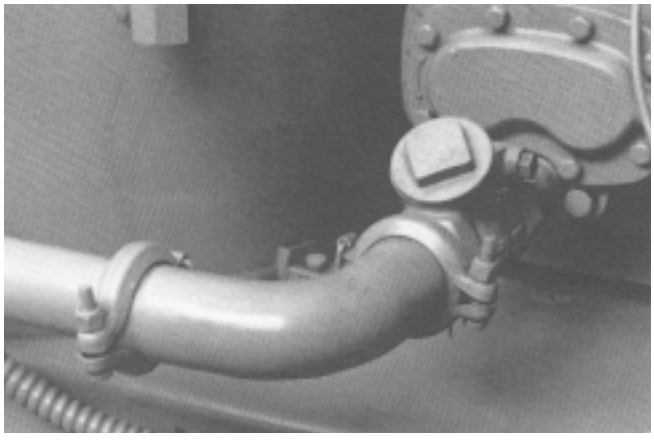
Flexmaster joints join water lines on a huge diesel engine.



A number of Flexmaster joints are installed on this compressor to connect water and oil lines, providing quick, easy connection and protection against vibration.



A large dry-cleaning plant uses Flexmaster joints to connect piping at elbow junctures.



Flexmaster joints are used to join piping on air compressors.

This page is part of a complete catalog which contains technical and safety data that must be reviewed when selecting a product.

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