$8.00

METAL HOSE & BRAID
APPLICATION & DESIGN GUIDE

FLEXICRAFT

HOSECRAFT USA

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How to Order Flexicraft Hose Assemblies

Please provide the following information, or choose a standard connector (pg. 19 - 21):

1. **Size of Hose:** Nominal Diameter
2. **System Application:** Flowing Media, Special Requirements
3. **Length of Hose Assembly:** Overall (End to End)
4. **Type of Hose:** Material(s) of Construction, Any Corrosive Conditions
5. **Fittings:** Size, Type, Alloy Each End
6. **Pressure or Vacuum:** Internal, External
7. **Temperature:** Operating, Ambient
8. **Movement:** Static or Intermittent, Direction, Amount
9. **Flow Rate:** Liner Considerations
10. **Special Testing Requirements:** Additional Requests

This guide provides additional information on the details of choosing hose for a given application. However, with the above information our engineers can choose a hose right for your needs.

Flexicraft has been supplying industry with quality piping products for over 40 years. Our reputation for superior products and technical support sets us apart from our competition.

In addition to non-metallic expansion joints, **Flexicraft** is a supplier of metallic expansion joints, braided hose, expansion loops, pulsation dampeners, and other specialty piping products using bellows technologies. Hosecraft USA is a division of Flexicraft and supplies every type and style of industrial hose. For more information or to order,

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Corrugated Metal Hose

Flexible metal hose is a versatile tool for the designer which provides connections where rigid connectors are impossible or impractical. It offers many advantages, such as strength and corrosion/temperature resistance. Metal hose absorbs thermal growth, controls vibration and noise, connects misaligned piping, and joins parts of machinery.

When unbraided corrugated metal hose is subjected to high internal pressure the hose is elongated beyond its ability to recover. The corrugations are stretched out of shape, and the flexibility of the hose is impaired. It is therefore necessary to equip the hose with a device which can flex with the hose and prevent elongation under internal pressure. The outer braid is just such a device.

The braid consists of a tubular sheath of metal wires woven in a basket weave fashion. It is made to fit snugly over the hose, and is fastened to the ends of the hose. The braid is designed to be strong enough to withstand elongation for the full pressure rating of the hose. The braid alloy is usually similar to that of the hose with which it is used, but may be different for reasons of strength, corrosion resistance, etc.

STANDARD CONSTRUCTION & DESIGN

A. Inner Corrugated Hose:
Type 304, 321 or 316 Stainless Steel
Bronze

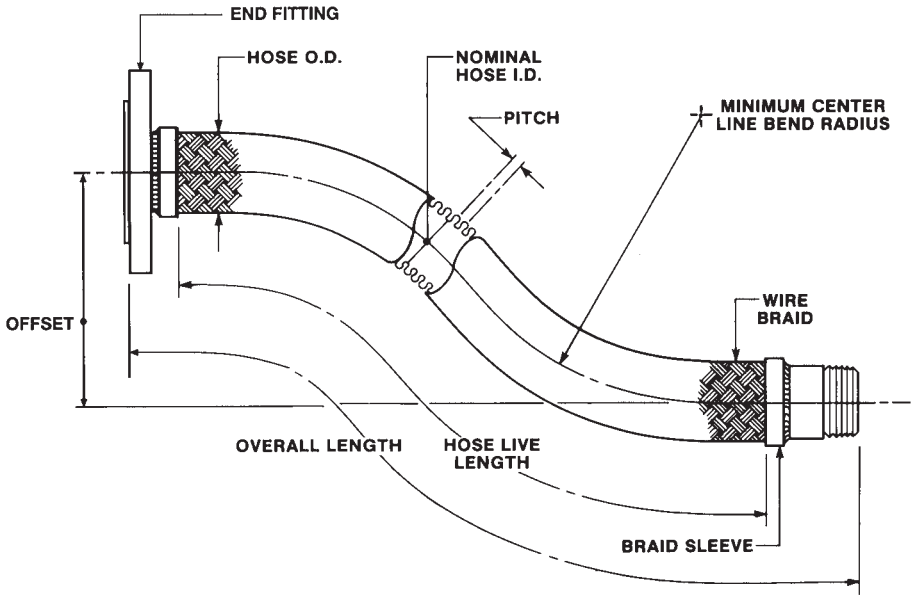
(Optional Material available)

B. Outer Braid:
Type 304 Stainless Steel
Bronze

(Optional Material available)

C. End Fittings: See pages 16 and 17.

METAL HOSE TERMINOLOGY
TYPICAL ASSEMBLY



Selection Criteria

SIZE

The size of flexible metal hose is expressed as a nominal diameter. The existing piping will normally dictate the size of the metal hose for a particular application. However, flow rate, velocity and pressure drop considerations may also influence the selection of the hose size.

SYSTEM APPLICATION

The type of media being conveyed is an important consideration in the selection process. Metal hose is subject to corrosion by both the material flowing through it and the outside environment. For almost all applications, a metal hose can be selected that is resistant to the intended media. Since metal hose is a thin-walled product, it will not have the same total life as heavier walled tube or pipe of the same material.

END FITTINGS

The many uses of corrugated, flexible metal hose are complemented by the comprehensive range of end fittings that are available. Such end fittings may be male or female pipe threads, unions, flanges, flared tube fittings, or other specially designed connectors. End fittings are attached by welding, silver brazing, soldering, and mechanical means, depending on the type of hose and alloy. Many of these common types of end fittings are shown on pages 16 and 17. We will make or adapt any type fitting to our hose.

PRESSURE

The nominal pressure ratings of flexible metal hose varies according to type, material and size. Specific pressure ratings for each type of flexible metal hose are found in each section of the catalog. Under actual working conditions, pressure is affected by many other factors such as temperature, pulsating or shock conditions, and bending stresses. Page 9 explains how such factors specifically affect the properties of corrugated metal hose. Also, review the “Temperature Correction Factor Table” on page 9 for adjusting pressure ratings at operating temperatures higher that 70° F.

TEMPERATURE

The physical properties of any material varies with temperature. Limits for operating temperature are affected by the working pressure, the type of media being conveyed and the nature of the application. By careful selection of material, it is possible to provide flexible metal hose for a wide range of operating temperatures. The choice of hose type, metal alloy, end fittings and method of fitting attachment determines the temperature limit.

MOVEMENT

Flexible metal hose is generally used in four types of applications:

1. To correct problems of misalignment
2. To provide flexibility in manual handling operations
3. To compensate for intermittent or constant movement
4. To absorb vibration

In all of these types, careful hose selection, design of the assembly, and installation are important for optimal service life. The flexibility of a hose is determined by its mechanical design and the inherent flexibility of its material. Specific information and data about Flexicraft hose motions are found on subsequent pages.

FLOW VELOCITY

Where flow is abrasive or velocity is greater than 150 ft./sec. gas or 75 ft./sec. liquid, a flexible metal liner of fully interlocked hose should be used. When the hose is installed in a bent condition, the allowable velocity should be reduced 50% for a 90° bend, 25% for a 45° bend.

TESTING

Leak test and dimensional testing are performed on all hoses shipped. Upon request, mass spectrometer and liquid penetration testing can be performed. Material test reports are available upon request.

OTHER CONSIDERATIONS

Due to the corrugations, an increased pressure drop can be expected with the metal hose. A rule of thumb is the pressure drop triples compared to piping. If this is critical to your application, additional information can be provided by the factory.

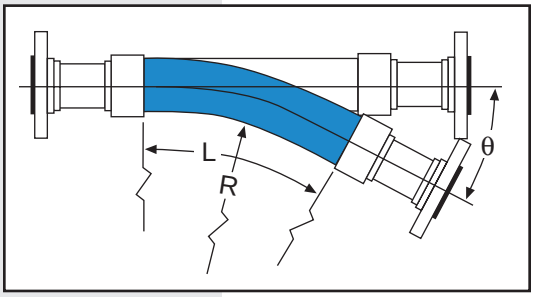
Classification Of Motions

RANDOM MOTION

Such motion is non-predictable and may occur from the manual handling of a hose assembly. Care must be taken to prevent over bending of the hose and to avoid external abrading of the wire braid.

ANGULAR MOTION

This type of motion occurs when one end of a hose assembly is deflected in a simple bend with the ends not remaining parallel.



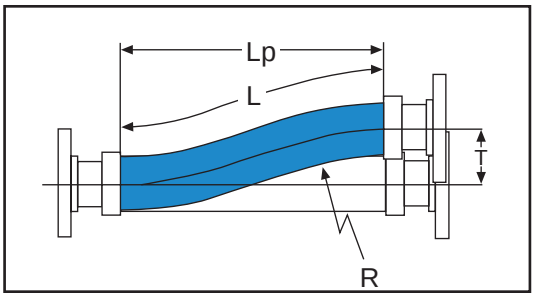
FORMULA: $L = \frac{\pi R \theta}{180}$

L = Live Hose Length (inches)
π = 3.1416
R = Minimum Centerline Bend Radius for constant flexing (inches)
θ = Angular Deflection (degrees)

(*See values on Maximum Design Conditions, page 10.)*

OFFSET MOTION

Offset (lateral) motion occurs when one end of the hose assembly is deflected in a plane perpendicular to the longitudinal axis with the ends remaining parallel.



FORMULA: $L = \sqrt{6RT + T^2}$

$Lp = \sqrt{L^2 - T^2}$

L = Live Hose Length (inches)
Lp = Projected Live Hose Length (inches)
R = Minimum Centerline Bend Radius (inches)
T = Offset Motion to one side of Centerline (inches)

(See values on Maximum Design Conditions, page 10.)

Note 1: When the offset motion occurs to both sides of the hose centerline, use total travel in the formula; i.e. 2 times "T".
Note 2: The offset distance "T" for constant flexing should never exceed 25% of the centerline bend radius "R".
Note 3: If the difference between "L" and "Lp" is significant, exercise care at installation to avoid stress on hose and braid at the maximum offset distance.

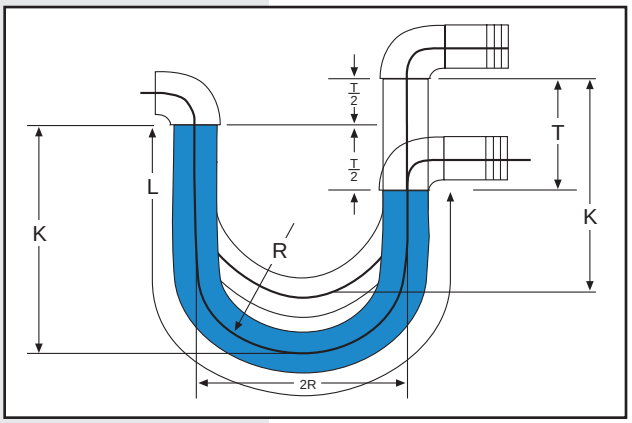
AXIAL MOTION

This type of motion occurs when there is extension or compression of the hose along its longitudinal axis. This motion is restricted to unbraided corrugated hose only and is limited to small movements, low pressures such as exhaust gas venting to atmosphere.

(Bellows Type Expansion Joints and Expansion Loops are specifically designed for this type of movement. Please see our Expansion Joint Design and Expansion Loop Guides.)

Classification Of Motions (continued)

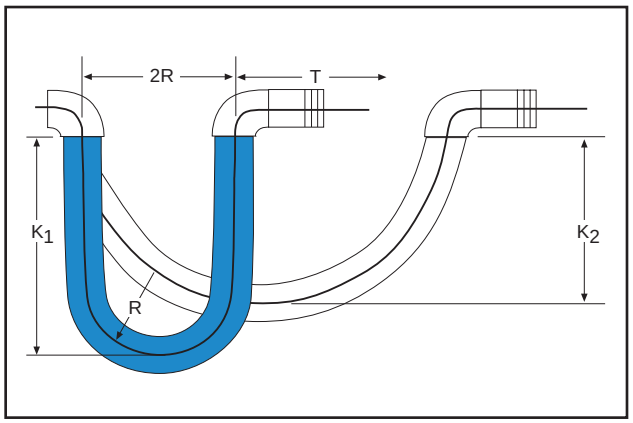
VERTICAL TRAVELING LOOP FORMULAE



FORMULA: $L = 4R + \frac{T}{2}$

$K = 1.43R + \frac{T}{2}$

HORIZONTAL TRAVELING LOOP FORMULAE



FORMULA: $L = 4R + 1.57T$

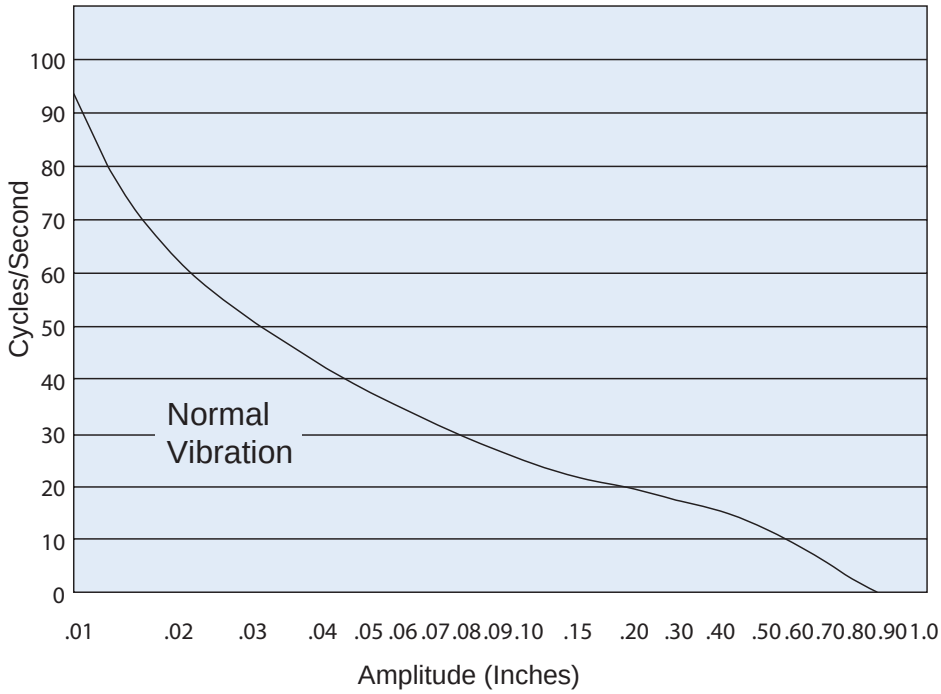
$K_1 = 1.43R + .785T$

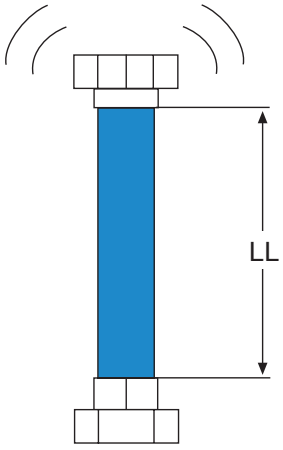
$K_2 = 1.43R + \frac{T}{2}$

T = Total Travel (inches)
R = Minimum Centerline Bend Radius (inches)

L = Live Hose Length (inches)
K = Loop Length (inches)

VIBRATION GRAPH





Expected vibration should fall below line on chart.

Guide To Specification Table Headings

The specification tables on the following pages tabulate the dimensions and properties of metal corrugated hose. This page gives complete descriptions for each of the column headings of those tables.

PROPERTIES

HOSE I.D. – This column lists the I.D. sizes of the corrugated hose.

BRAID TYPE – This column shows the number of wire braid covering(s) required for the indicated pressure rating.

HOSE O.D. – This column indicates the nominal outside diameter of each size stated in inches.

CENTERLINE RADIUS FOR STATIC BEND – This column states, in inches, the minimum bend radius to which a hose size may be bent when installed in conditions of no movement other than infrequent vibrations.

CENTERLINE RADIUS FOR INTERMITTENT FLEXING – This column states, in inches, the minimum bend radius to which a hose size may be bent when installed in conditions of controlled motion that occur on a regular or intermittent basis.

PRESSURE RATINGS – The maximum non-shock working, maximum test, and nominal burst pressures for each hose size shown are based on assemblies with welded-on fittings for stainless steel hose, and brazed-on fittings for bronze hose. The ratings are in PSIG at 70° F.

The Maximum Working Pressure Rating is the maximum operating pressure to which a hose assembly should be subjected. These ratings represent the application of a 4 to 1 safety factor against nominal burst pressure. For installations involving pulsating or surge pressures, the peak pressure should be limited to 50% of the maximum working pressure.

The Maximum Test Rating is the maximum pressure to which a straight hose assembly may be subjected without causing permanent deformation of the hose.

The Nominal Burst Rating is the pressure at which a hose assembly can be expected to rupture. This rating is predicated upon the hose being installed in a straight position and at normal room temperature.

TEMPERATURE CORRECTION FACTORS

Temperature in Degree F.	MATERIAL				
	BRONZE	STEEL	MONEL	304 STAINLESS	321 OR 316 ELC STAINLESS
ROOM TEMP	1.00	1.00	1.00	1.00	1.00
150	.92	.99	.93	.96	.97
200	.89	.97	.90	.92	.94
250	.86	.96	.87	.91	.92
300	.83	.93	.83	.86	.88
350	.81	.91	.82	.85	.86
400	.78	.87	.79	.82	.83
450	.75	.86	.77	.80	.81
500		.81	.73	.77	.78
600		.74	.72	.73	.74
700		.66	.71	.69	.70
800		.52	.70	.64	.66
900		.50		.58	.62
1000					.60
1100					.58
1200					.55
1300					.50
1400					.44
1500					.40

TEMPERATURE CORRECTION FACTORS FOR ELEVATED TEMPERATURE APPLICATIONS.

As the service temperature increases, the maximum pressure a hose assembly can withstand decreases. The material from which the hose is made and the method of fitting attachment (mechanical, soldered, welded, silver brazed) determines the maximum pressure at which an assembly can be used. By using the factors given in the chart, the approximate safe working pressure at elevated temperatures can be calculated for assemblies.

Maximum Design Conditions
SB1 & SB2 Braided Metal Hose

SB1 and SB2 are corrugated stainless steel hoses with a single or double stainless steel braid. It has a large pressure and temperature capacities, and is resistant to bursting, cracking, and crushing even under accidental exposure to flame, while being quite flexible and resistant to vibration.

It is available in a wide range of sizes for a large variety of liquid and gas transfer throughout industry.

-320F to 1500F.

HOSE DIA	PRES (SB1 SGNL BRAID)	PRES (SB2 DBL BRAID)	VAC	BEND RADIUS STATIC*	BEND RADIUS DYNAMIC	WEIGHT
(in)	(psi)	(psi)	(in Hg)	(in)	(in)	(lbs/ft)
1/4	2116	3125	30	1	5	0.28
3/8	1501	2401	30	1.25	5.5	0.27
1/2	1075	1720	30	1.5	6	0.32
3/4	792	1267	30	2.25	8	0.73
1	571	914	30	2.75	9	0.91
1 1/4	531	850	30	3.5	10.5	1.12
1 1/2	472	755	30	4	12	1.56
2	516	826	30	5	15	1.66
2 1/2	387	619	30	8	20	2.75
3	316	506	30	9	22	3.7
3 1/2	297	475	30	10	24	2.9
4	232	371	30	13	27	4.6
5	191	306	30	18	31	6.1
6	165	264	30	19	36	7.4
8	234	374	30	20	40	12
10	230	367	30	25	50	20
12	161	257	30	30	60	23
14	119	190	30	35	70	24
16	110	170	30	37	74	25
18	85	150	30	41	82	27
20	65	115	30	45	90	28
22	50	90	30	49	98	30
24	45	80	30	57	104	31

* Static radius used for only a few cycles, such as for initial offset.
Burst pressure is 4:1 to operating pressure. Test pressure at 1.5:1.
See temperature correction factor page 9.

Maximum Design Conditions
SB3 High Pressure Braided Metal Hose

SB3 is a very high pressure corrugated 316L stainless steel hose with a stainless steel braid. It has a higher pressure capacity than the standard braided metal hoses, along with high temperature capacity. It is resistant to bursting, cracking, and crushing even under very high temperatures and accidental exposure to flame, while being flexible and resistant to vibration. Applications include a variety of high pressure liquid and gas transfer. Sold as finished assemblies only.

-320F to 1500F.

HOSE DIA	PRES	# BRAIDS	VAC	BEND RADIUS STATIC*	BEND RADIUS DYNAMIC	WEIGHT
(in)	(psi)	(psi)	(in Hg)	(in)	(in)	(lbs/ft)
1/4	5320	2	30	1	5	0.4
3/8	3925	2	30	1.125	5.5	0.52
1/2	3680	2	30	1.5	7.5	0.76
3/4	3555	2	30	2.125	8.5	1.6
1	2810	2	30	2.75	10	2.1
1 1/4	2500	2	30	3.75	11.5	2.9
1 1/2	2220	2	30	5	13	3.6
2	1680	2	30	6.75	15	4.6
3	1475	2	30	9	21	7.3
4	1225	3	30	11.5	27	13.8
5	1200	3	30	14	32	16.8
6	950	3	30	17	37	22.2
8	875	3	30	22	46	32.4
10	750	3	30	26	56	45.4
12	525	3	30	32	62	50.4

* Static radius used for only a few cycles, such as for initial offset.
Burst pressure is 4:1 to operating pressure. Test pressure at 1.5:1.
See temperature correction factor page 9.

Maximum Design Conditions
SU1 Unbraided Metal Hose

SU1 is a corrugated stainless steel hose that can be used at lower pressures at high temperatures. It is quite flexible and resistant to vibration, and is available in a large range of sizes. For higher pressures, see the braided metal hoses options.

Applications include liquid and gas transfer at high temperatures and lower pressures.

-320F to 1500F.

HOSE DIA	PRES	VAC	BEND RADIUS STATIC*	BEND RADIUS DYNAMIC	WEIGHT
(in)	(psi)	(in Hg)	(in)	(in)	(lbs/ft)
1/4	180	30	1	5	0.11
3/8	100	30	1.25	5.5	0.16
1/2	80	30	1.5	6	0.19
3/4	70	30	2.25	8	0.3
1	40	30	2.75	9	0.4
1 1/4	25	30	3.5	10.5	0.52
1 1/2	20	30	4	12	0.75
2	15	30	5	15	0.95
2 1/2	12	30	8	20	1.2
3	10	30	9	22	1.42
3 1/2	9	30	10	24	1.65
4	8	30	13	27	1.9
5	6	30	18	31	3.22
6	5	30	19	36	3.87
8	6	30	20	40	5.14
10	5	30	25	50	8.2
12	3	30	30	60	9.8
14	3	30	35	70	10.6
16	2	30	37	74	12.2
18	1	30	41	82	13.8
20	1	30	45	90	15.4
22	1	30	49	98	17.1
24	0.75	30	57	104	18.6

* Static radius used for only a few cycles, such as for initial offset.
Burst pressure is 4:1 to operating pressure. Test pressure at 1.5:1.
See temperature correction factor page 9.

Maximum Design Conditions
BB1 & BB2 Braided Bronze Hose

BB1 & BB2 are corrugated bronze hoses with a single and double bronze braid. It has a high pressure capacity at high temperatures. It is resistant to bursting, cracking, and crushing even under accidental exposure to flame, while being quite flexible and resistant to vibration.

-50F to 450F.

HOSE DIA	PRES (BB1 SGNL BRAID)	PRES (BB2 DBL BRAID)	VAC	BEND RADIUS STATIC*	BEND RADIUS DYNAMIC	WEIGHT
(in)	(psi)	(psi)	(in Hg)	(in)	(in)	(lbs/ft)
1/4	1125	1687	30	1	5.5	0.28
3/8	875	1312	30	1.25	6	0.27
1/2	725	1087	30	1.5	7	0.32
3/4	625	937	30	2.25	8	0.73
1	425	637	30	3	10	0.91
1 1/4	425	625	30	3.5	12	1.2
1 1/2	350	525	30	4	13.5	1.6
2	275	412	30	5	17	1.7
2 1/2	225	337	30	8	22	3
3	188	281	30	12	24	4
4	142	227	30	14	24	5

* Static radius used for only a few cycles, such as for initial offset.
Burst pressure is 4:1 to operating pressure. Test pressure at 1.5:1.
See temperature correction factor page 9.

Live Hose Length For Degree Of Bend

Centerline Bend Radius (Inches)	MINIMUM LIVE LENGTH FOR ANGULAR BEND "θ"		
	45°	90°	180°
1	1	2	4
2	2	3-1/2	7
3	2-1/2	5	10
4	3-1/2	6-1/2	13
5	4	8	16
6	5	10	20
7	5-1/2	11	22
8	6-1/2	13	26
9	7-1/2	14-1/2	29
10	8	16	32
11	9	18	36
12	10	19-1/2	39
13	10-1/2	21	42
14	11-1/2	22-1/2	45
15	12	24	48
16	13	26	52
17	13-1/2	27	54
18	14-1/2	29	58
19	15-1/2	30-1/2	61
20	16	32	64
21	17	33-1/2	67
22	17-1/2	35	70
23	18-1/2	36-1/2	73
24	19	38	76
25	20	40	80

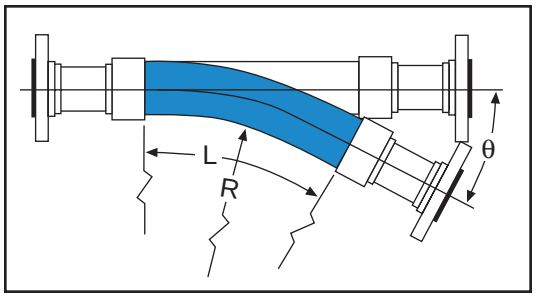
Centerline Bend Radius (Inches)	MINIMUM LIVE LENGTH FOR ANGULAR BEND "θ"		
	45°	90°	180°
26	21	42	83
27	21-1/2	43	86
28	22-1/2	44-1/2	89
29	23	46	92
30	24	48	95
31	24-1/2	49	98
32	25-1/2	51	101
34	27	54	108
36	28-1/2	57	114
38	30	60	120
40	32	63	126
45	36	72	144
50	40	80	160
55	45	90	180
60	49	97	194
65	53	105	210
70	56	112	224
80	65	130	260
90	73	145	290
100	80	160	320
120	95	190	380
140	112	225	450
160	128	255	510
180	143	285	570
200	160	320	640

MINIMUM LIVE LENGTH

Determine the centerline bend radius required for your application (see previous charts). Under the column headed "Centerline Bend Radius In Inches", find your radius and read horizontally to the desired angular bend (45°, 90° or 180°). The number in that column will be the minimum live length required to make the bend.

ASSEMBLY LENGTH

The live length and overall length of the assembly must be determined to complete the design. The live length is the flexible portion of an assembly determined from this chart. After the live length has been determined, the overall length is determined by adding the dimensions of the end fittings (dimension "A" in subsequent fitting chart).



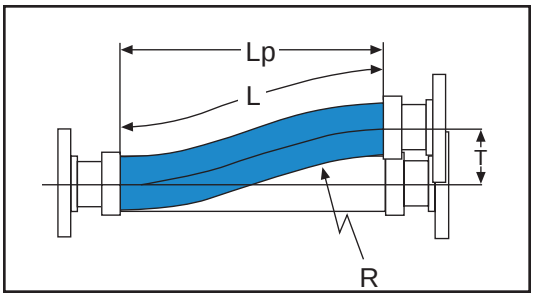
Live Hose Length For Offset Motion

Centerline Bend Radius (Inches)	MINIMUM LIVE LENGTH For Intermittent Offset Motion "T".													
	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1-1/2"	2"	3"	4"	5"	6"	8"	10"
5	2	3	3-1/2	4	5	6	7	7-3/4	10-1/4	12-1/4	13-1/2	15	18	20-1/2
6	2-1/4	3-1/4	3-3/4	4-1/4	5-1/4	6-1/4	7-1/2	8-1/4	10-3/4	12-3/4	14-1/4	16	19	21-1/2
7	2-3/8	3-3/8	4	4-3/4	5-3/4	6-3/4	8-1/4	9-1/4	11-1/2	13-1/2	15-1/4	17	19-3/4	23
8	2-1/2	3-1/2	4-1/4	5	6	7	8-3/4	10	12-1/2	14-1/2	16-1/4	18	21-1/2	24-1/4
9	2-5/8	3-3/4	4-1/2	5-1/4	6-1/2	7-1/2	9-1/4	10-3/4	13-1/4	15-1/4	17	19	22-1/2	25-1/2
10	2-3/4	4	4-3/4	5-1/2	6-3/4	8	9-3/4	11-1/4	13-3/4	16	18	20	23-1/2	26-1/2
11	2-7/8	4-1/8	5	5-3/4	7-1/4	8-1/4	10-1/4	11-3/4	14-1/2	16-3/4	18-3/4	20-3/4	24-1/2	27-1/2
12	3	4-1/4	5-1/4	6	7-1/2	8-1/2	10-1/2	12-1/4	15	17-1/2	19-1/2	21-1/2	25-1/2	28-3/4
13	3-1/8	4-1/2	5-1/2	6-1/4	7-3/4	9	10-3/4	12-3/4	15-3/4	18	20-1/4	22-1/2	26-1/4	29-3/4
14	3-1/4	4-3/4	5-3/4	6-1/2	8	9-1/4	11-1/4	13-1/4	16-1/4	18-3/4	21	23-1/2	27-1/4	30-3/4
15	3-3/8	4-7/8	5-7/8	6-3/4	8-1/4	9-3/4	11-3/4	13-1/2	16-3/4	19-1/4	21-3/4	24-1/4	28	31-3/4
16	3-1/2	5	6	7	8-1/2	10	12-1/4	14	17-1/4	20	22-1/2	25	29	32-3/4
17	3-5/8	5-1/8	6-1/4	7-1/4	8-3/4	10-1/4	12-1/2	14-1/2	17-3/4	20-1/2	23-1/4	25-1/2	29-3/4	33-1/2
18	3-3/4	5-1/4	6-1/2	7-1/2	9	10-1/2	13	15	18-1/4	21-1/4	24	26	30-1/2	34
19	3-7/8	5-3/8	6-5/8	7-3/4	9-1/4	10-3/4	13-1/4	15-1/4	18-3/4	21-3/4	24-1/2	26-3/4	31-1/4	35
20	4	5-1/2	6-3/4	8	9-1/2	11	13-1/2	15-3/4	19-1/4	22-1/2	25	27-1/2	32-1/4	36-1/4
22	4-1/8	5-3/4	7	8-1/4	9-3/4	11-1/2	14	16-1/4	20	23-1/4	25-3/4	28-1/2	33-1/2	37-1/2
24	4-1/4	6	7-1/4	8-1/2	10	12	14-1/2	17	20-3/4	24	26-1/2	29-1/2	34-3/4	39
26	4-3/8	6-1/4	7-1/2	8-3/4	10-1/2	12-1/2	15	17-1/2	21-1/2	25	27-3/4	30-3/4	36	40-1/4
28	4-1/2	6-1/2	7-3/4	9	11	13	15-3/4	18-1/4	22-1/2	26	29	32	37-1/2	41-1/2
30	4-3/4	6-3/4	8-1/4	9-1/2	11-3/4	13-1/2	16-1/2	19	23-1/2	27-1/4	30-1/2	33-1/2	39	43-3/4
35	5-1/4	7-1/4	9	10-1/4	12-1/2	14-1/2	18	20-3/4	26-1/4	29-1/2	32-3/4	36	42	47
40	5-1/2	7-3/4	9-1/2	11	13-1/2	15-1/2	19	22	27	31-1/4	35	38-1/2	44-3/4	50
45	6	8-1/4	10	11-3/4	14-1/4	16-1/2	20-3/4	23-1/2	28-1/2	33-1/4	37	41	47-1/2	53
50	6-1/4	8-3/4	10-3/4	12-1/4	15	17-1/2	21-1/2	24-3/4	30	35	39	43	50	56
60	6-3/4	9-1/2	11-3/4	13-1/2	16-1/2	19	23-1/4	27	33	38-1/4	43	47	54-1/2	61
70	7-1/4	10-1/4	12-3/4	14-3/4	17-3/4	20-1/2	25-1/4	29	35-1/2	41-1/2	46	51	58-3/4	65-3/4
80	7-3/4	11	13-1/2	15-1/2	19	22	27	31	38	44	49-1/2	54	62-3/4	70
90	8-1/4	11-3/4	14-1/4	16-1/2	20-1/4	23-1/2	28-1/2	33	40-1/2	46-3/4	52	57-1/4	66-1/4	74-1/4
100	8-3/4	12-1/4	15	17-1/2	21-1/4	24-1/2	30	35	42-1/2	49-1/4	55	60-1/2	69-3/4	78-1/4

***IMPORTANT NOTE**: The values shown in the shaded portion are applicable to static bends only. For intermittent flexing, the offset motion should never be greater than 25% of the centerline bend radius.*

MINIMUM LIVE LENGTH

Determine the centerline bend radius required for your application (see previous charts). Under the column headed “Centerline Bend Radius In Inches”, find your radius and read horizontally to the desired distance from centerline. The number in that column will be the minimum live length required to make the offset.



ASSEMBLY LENGTH

The live length and overall length of the assembly must be determined to complete the design. The live length is the flexible portion of an assembly determined from this chart. After the live length has been determined, the overall length is determined by adding the dimensions of the end fittings (dimension “A” in subsequent fitting chart).

Hose Fitting Dimensions

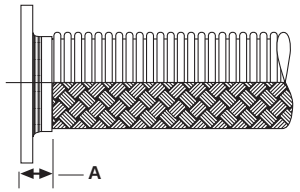
FITTING NAME	HOSE FITTING DIMENSIONS (Inches)										
1. Plate Steel Flange	Hose I.D.	2	2-1/2	3	4	5	6	8	10	12	14
	Dim. A	1-3/8	1-5/8	1-3/8	1-5/8	1-3/4	1-3/4	2	2	2	2
2. Male Pipe Nipple	Hose I.D.	1/4	3/8	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3
	Dim. A	2-3/8	2-1/2	2-1/2	2-5/8	3-1/4	3-1/4	3-3/4	3-3/4	4	4
3. Vanstone or Floating Flange Type C Stub End	Hose I.D.	2	2-1/2	3	4	5	6	8	10	12	14
	Dim. A	3-1/4	3-1/2	3-1/2	4	4	4-1/2	5	6	7	7
4. Weld Nipple/ 37-1/2" Bevel	Hose I.D.	1/4	3/8	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3
	Dim. A	2-3/8	2-1/2	2-1/2	2-5/8	3-1/4	3-1/4	3-3/4	3-3/4	4	4
5. Female Pipe Coupling	Hose I.D.	1/4	3/8	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3
	Dim. A	1-7/8	2	2	2-5/8	2-3/4	2-3/4	2-7/8	3-1/4	4	4-3/8
6. Female Union	Hose I.D.	1/4	3/8	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3
	Dim. A	2	2-3/8	2-1/2	2-5/8	3-1/4	3-1/4	3-3/8	3-3/4	4-1/2	5
7. Male Hex Nipple	Hose I.D.	1/4	3/8	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3
	Dim. A	1-1/2	1-3/4	2	2-1/8	2-3/16	2-1/2	2-1/2	3	3-3/4	3-3/4
8. Male Pipe w/Hex Nut	Hose I.D.	1/4	3/8	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3
	Dim. A	2-3/8	2-1/2	2-1/2	2-5/8	3-1/4	3-1/4	3-3/4	3-3/4	4	4

For larger diameters and other fittings, contact factory.

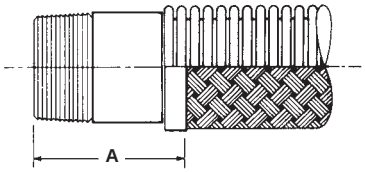
Hose Fitting Illustrations

THE FOLLOWING ILLUSTRATES THE HOSE FITTING DIMENSIONS ON PAGE 16.

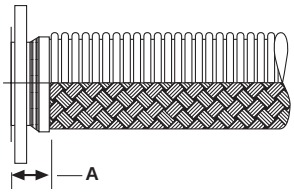
1. PLATE STEEL FLANGE



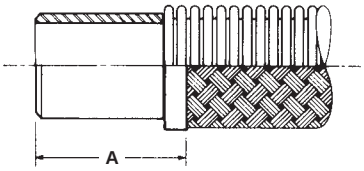
2. MALE PIPE NIPPLE



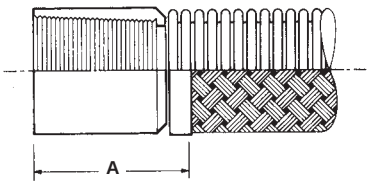
3. VANSTONE OR FLOATING FLANGE



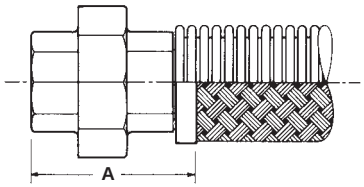
4. WELD NIPPLE/37-1/2” BEVEL



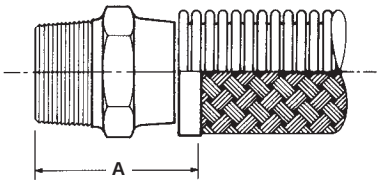
5. FEMALE PIPE COUPLING



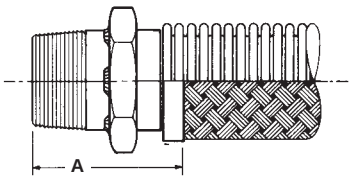
6. FEMALE UNION



7. MALE HEX NIPPLE



8. MALE PIPE W/HEX NUT

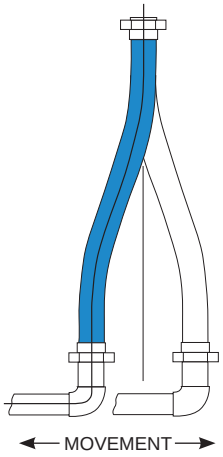


Installation Instructions

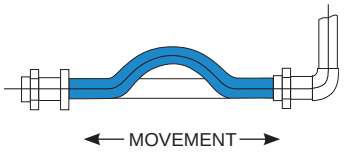
1. *DO NOT COMPRESS AXIALLY*

Metallic hose is limited to bending movements, and does not compress in the axial direction. (For this application, see our expansion joint and expansion loop catalogs.

RIGHT



WRONG

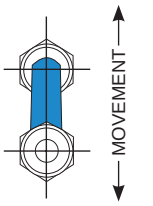


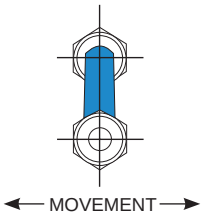
2. *DO NOT TORQUE*

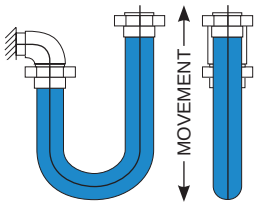
A hose may be torqued by:

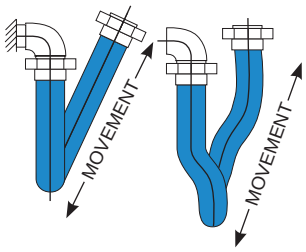
A) Twisting in Installations. A union or floating flange can be used at one end of the hose assembly to avoid twisting. Where flanges are used, the fixed flange end should be bolted into place before the floating flange end. Where a threaded nipple and a union are used, the nipple end should be threaded into place, and then the union tightened into place using two wrenches.

B) Twisting on Flexures. Always install the hose so that flexing takes place in one plane only, and in the plane of bending. The hose should be installed such that the flexing occurs in the plane of bending only.



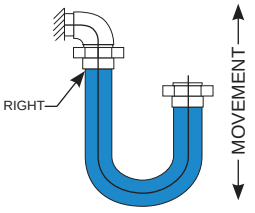


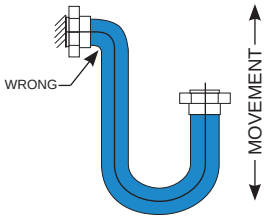


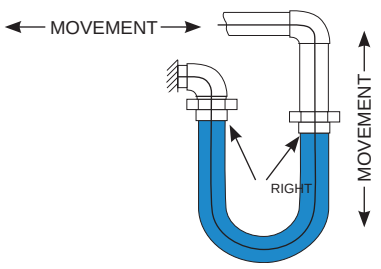


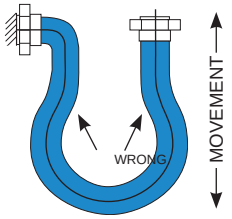
3. *AVOID SHARP BENDS*

The minimum centerline bend radius for intermittent flexing should never be less than the values specified.







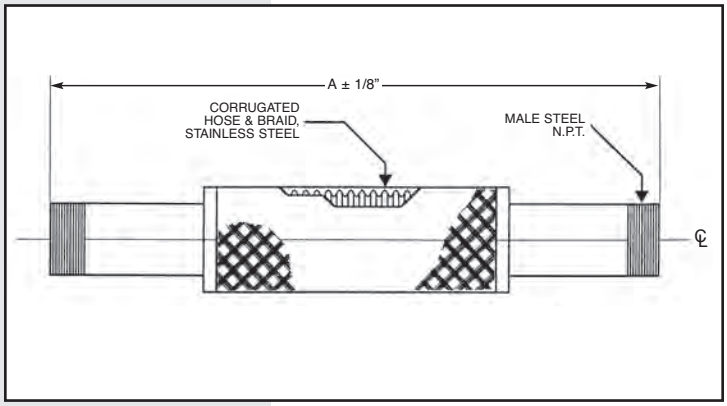


Standard Flexible Connectors

Common length & fitting combinations are kept in stock as flexible connectors for pumps and other equipment. These connectors are competitively priced, and are available for quick shipment.

MODEL TTS & TTL

MALE THREAD ENDS, SHORT & LONG

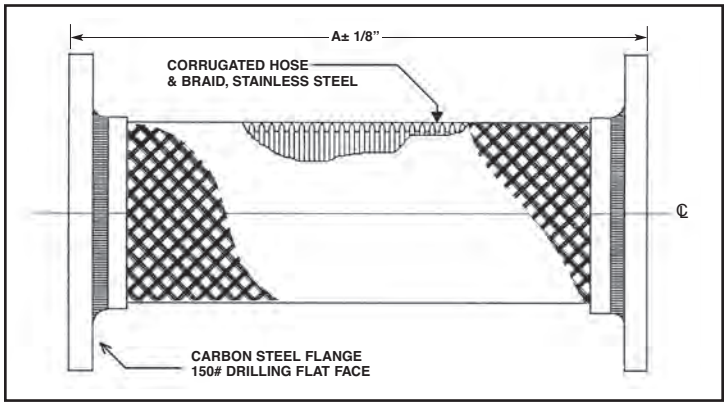


PIPE SIZE	A		PRESSURE @ 70 F	
	SHORT	LONG	BRZ	ST STL
3/4"	7"	10"	370	750
1	8	10	250	605
1-1/4	8-1/2	10	200	570
1-1/2	9	12	200	525
2	10-1/2	14	170	455
2-1/2	-	16	-	345
3	-	16	-	290

TEMP. CORRECTION FACTOR		
TEMP (F)	BRZ	ST STL
70	1.0	1.0
200	.89	.92
300	.83	.86
400	.78	.82
500	-	.77
600	-	.73

MODEL FFS, FFM & FFL

#150 FLANGE ENDS, SHORT, MEDIUM & LONG

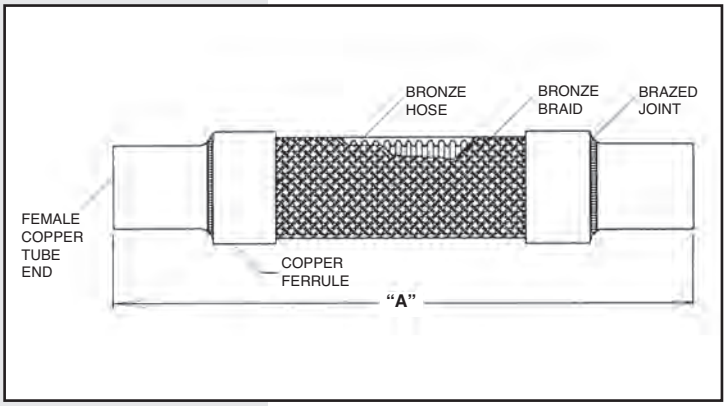


PIPE SIZE	A			PRES @ 70 F
	SHORT	MED	LONG	
2-1/2"	9"	10-1/4"	12"	345
3	9	10-5/8	14	289
4	9	11-3/4	16	300
5	11	13-5/8	18	220
6	11	14-1/8	20	200
8	12	15-3/8	22	190
10	13	17-3/4	24	150
12	14	18-3/8	26	125
14	14	20	28	105

TEMP. CORRECTION FACTOR	
TEMP (F)	ST STL
70	1.0
200	.92
300	.86
400	.82
500	.77
600	.73

Standard Flexible Connectors

MODEL SSS & SSL
SWEAT ENDS, SHORT & LONG

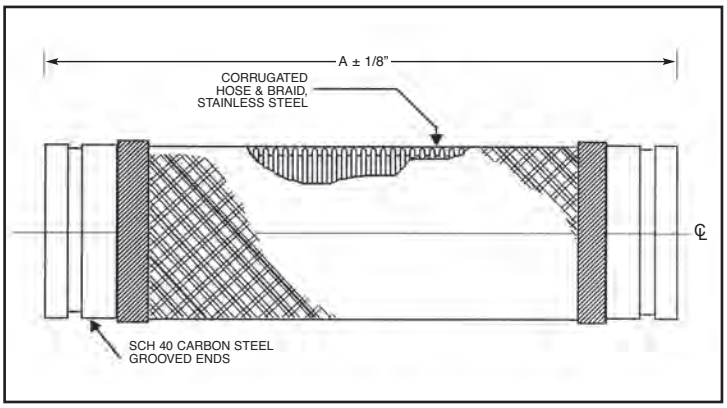


PIPE SIZE	A		PRES @ 70 F
	SHORT	LONG	
1/8"	-	7-1/2"	450
1/4	-	8-1/4	450
3/8	-	9	450
1/2	10"	9-3/4	450
3/4	10	11-1/2	340
1	10	13	302
1-1/4	10	14-3/4	280
1-1/2	12	17	245
2	14	20	190
2-1/2*	16	24	320
3*	16	27	302
3-1/2*	-	32	150
4*	-	33	150

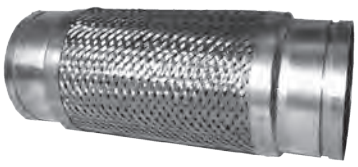
TEMP. CORRECTION	
TEMP (F)	BRZ
70	1.0
200	.89
300	.83
400	.78

*Sizes from 2-1/2" up utilize stainless steel braided hose for higher pressure.

MODEL GG
GROOVE END X GROOVE END



PIPE SIZE	A	PRES @ 70 F
2"	12"	450
2	14	345
3	14	289
4	16	300
5	17	220
6	18	200
8	20	190
10	24	150
12	25	125

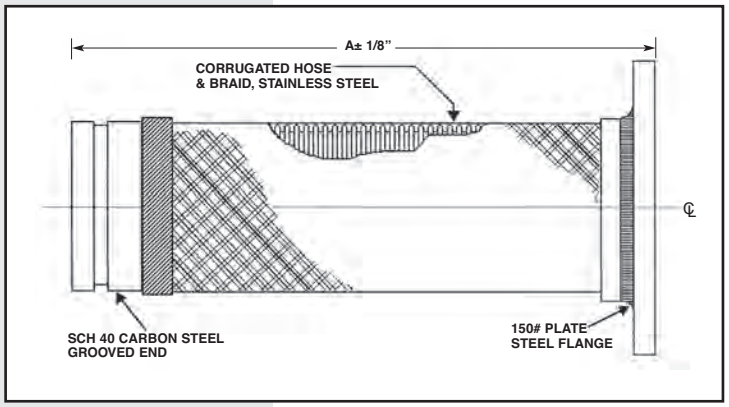


TEMP. CORRECTION FACTOR	
TEMP (F)	ST STL
70	1.0
200	.92
300	.86
400	.82
500	.77
600	.73

Standard Flexible Connectors

MODEL GF

FLANGE END X GROOVE END

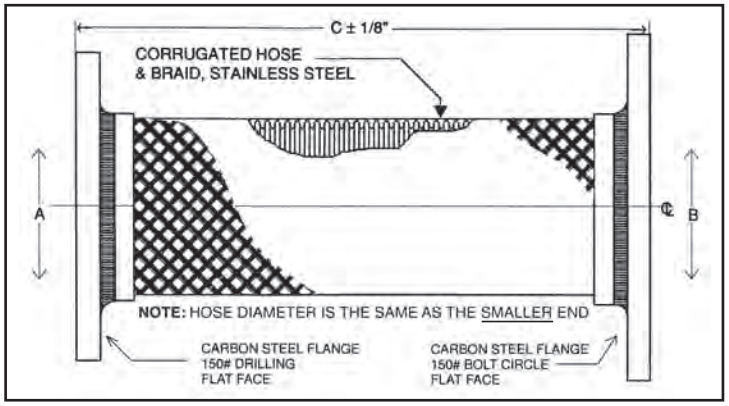


PIPE SIZE	A	PRES @ 70 F
2"	12"	450
2	14	345
3	14	289
4	16	300
5	17	220
6	18	200
8	20	190
10	24	150
12	25	125

TEMP. CORRECTION FACTOR	
TEMP (F)	ST STL
70	1.0
200	.92
300	.86
400	.82
500	.77
600	.73

MODEL FF REDUCER

REDUCING FLANGE X FLANGE



A DIA	B DIA	C LENGTH	PRES @ 70 F
2-1/2"	3"	9"	345
2-1/2	4	9	345
3	4	9	289
3	5	9	289
4	5	9	300
4	6	9	300
5	6	11	220
5	8	11	220
6	8	11	200
6	10	11	200
8	10	12	190
8	12	12	190
10	12	13	150

TEMP. CORRECTION FACTOR	
TEMP (F)	ST STL
70	1.0
200	.92
300	.86
400	.82
500	.77
600	.73

Terms and Conditions

1. All quotations are subject to approval, acceptance and correction at the home office Any errors in quotations resulting in orders will be corrected and re-submitted to the customer for their acceptance or refusal.

No prices may be made up from information other than that shown in the tables.

2. All prices are F.O.B. factory, Chicago, Illinois, are are quoted exclusive of any taxes.

Shipments boxed for trans-ocean export add 10% to total trade price.

Terms: Net 30 days from date of invoice.

3. Cancellation or alteration of an order or return of any product by Buyer may not be made without advance written consent of manufacturer and shall be subjected to a cancellation charge.

A 35% minimum restocking charge shall be placed on any returned goods of stocked items. Fabricated items are not returnable.

4. We will not be responsible for delays in shipping due to conditions beyond our control such as strikes, fires, or accidents.

5. Any claims for shortages or damaged products must be made in writing within 10 days after receipt of shipment.

6. Prices subject to change without notice.

Design and Dimensional Specifications

The products illustrated reflect the design characteristics at time of printing.

Flexicraft reserves the right to change dimensions, materials, or methods of construction without notice. Please contact the factory for certified prints (exact dimensions) when necessary.

Limited Warranty

All products are warranted to be free of defects in material and workmanship for a period of one year from the date of shipment, subject to the limitations below.

If the purchaser believes a product is defective the purchaser shall: (a) Notify the manufacturer, state the alleged defect and request permission to return the product. (b) If permission given, return the product with transportation prepaid. If the product is accepted for return and found to be defective, the manufacturer will, at its discretion, either repair or replace the product F.O.B. factory, within 60 days of receipt, or refund the purchase price. Other than to repair, replace or refund as described above, purchaser agrees that manufacturer shall not be liable for any loss, costs, expenses or damages of any kind arising out of the product, its use, installation or replacement, labeling, instructions, information or technical data of any kind, description of product or use, sample or model, warnings or lack of any of the foregoing. NO OTHER WARRANTIES, WRITTEN OR ORAL, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY, ARE MADE OR AUTHORIZED. NO AFFIRMATION OF FACT, PROMISE, DESCRIPTION OF PRODUCT OF USE OR SAMPLE OR MODEL SHALL CREATE ANY WARRANTY FROM THE MANUFACTURER, UNLESS SIGNED BY THE PRESIDENT OF MANUFACTURER. These products are not manufactured, sold or intended for personal, family or household purposes.

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