Application Data

Important Safety Information

Read this page before using any of the information in this catalog. This catalog is designed to be used as a guide in selecting the proper hose for the applications listed herein. It contains many cautions, warnings, guidelines, and directions for the safe and proper use of Boston hose. All these directions and footnotes should be read and understood before specifying or using any of these hoses.

Throughout this catalog, potentially harmful situations are highlighted with the following symbols.

 This symbol is used to indicate imminently hazardous situations which, if not avoided, will result in serious injury or death.

 This symbol is used to indicate potentially hazardous situations which, if not avoided, could result in serious injury or death.

 This symbol is used to indicate potentially hazardous situations which, if not avoided, may result in property or equipment damage.

Some of the most common problems in the chemical hose industry result from improper hose and coupling selection, improper assembly techniques, failure to correctly inspect and test hose assemblies, and improper cleaning practices and hose assembly storage techniques.

In turn, these situations can lead to material leakage, spraying, spattering, end blow-offs, explosions, and other situations that may result in serious personal injury and property damage.

Personal injuries caused by improper hose assembly specification, installation, and usage could include cuts and abrasions, serious burns, irreparable eye damage, or even death. Therefore, for your safety and the safety of others working around you, Eaton strongly urges you to read and comply with all safety information printed in this publication.

 **WARNING:** Failure to properly follow the manufacturer's recommended procedures for the care, maintenance and storage of a particular hose may result in its failure to perform in the manner intended and may result in serious injury, death, and damage to property.

 **WARNING:** Testing can be dangerous and should be done only by trained personnel using proper tools and procedures. Failure to follow such procedures might result in serious injury, death, or damage to property.

Consult the coupling manufacturer to make sure you choose the correct coupling and proper assembly for the application, or contact Eaton Technical Support.

Before using any hoses in this catalog, consult the safety section in this catalog, and Chemical Compatibility Chart on page 21 or Boston Hose Chemical Resistance Guidelines. If you do not have the most recent copy, contact Eaton Customer Support at 1-888-258-0222.

Selection of Hose

Selection of the proper Boston hose for an application is essential to the proper operation and safe use of the hose and related equipment. Inappropriate hose selection may result in hose leakage, bursting, or other failure which may cause serious bodily injury or property damage from spraying fluids or flying projectiles. To avoid serious bodily injury or property damage resulting from selection of the wrong hose, you should carefully review the information in this catalog. Some of the factors to consider in proper hose selection are:

- hose size
- hose length
- hose ends
- fluid conveyed
- bends
- temperature
- hose pressure
- static head pressure
- installation design

These factors and the supplemental information contained in this catalog should be considered in selecting the proper hose for your application. If you have any questions regarding the proper hose for your application, please contact Eaton at 1-888-258-0222.

Application Data

Important Safety Information

Proper Selection of Hose Ends

Selection of the proper Boston hose end or coupling is essential to the proper operation and safe use of hose assemblies and related equipment. Inadequate attention to the selection of the end fittings may result in hose leakage, bursting, or other failure which may cause serious bodily injury or property damage from spraying fluids or flying projectiles. In order to avoid serious bodily injury or property damage resulting from selection of an incompatible hose end or coupling, you should carefully review the information in this catalog. Some of the factors which are involved in the selection of the proper hose couplings are:

- fluid compatibility
- temperature
- installation design
- hose size
- corrosion requirements
- fluid conveyed

The given hose and hose end selection factors and the other information contained in this catalog should be considered by you in selecting the proper hose end fitting for your application.

If you have any questions regarding the use of hose/hose ends, please contact Eaton Technical Support at 1-888-258-0222.

Hose Installation

Proper installation is essential to the proper operation and safe use of the hose assembly and related equipment.

Improper hose assembly installation may result in serious injury or property damage caused by spraying fluids or flying projectiles. In order to avoid serious bodily injury or property damage resulting from improper hose assembly installation carefully review the information in this catalog. Some of the factors to be considered when installing a hose assembly are:

- hose elongation or contraction
- proper bend radius/hose routing under pressure
- elbows and adapters to relieve strain
- protection from rubbing or abrasion high temperature sources
- protection against excessive movement
- twisting from pressure spikes/surges

These hose assembly installation factors and the other information in this catalog should be considered by you before installing the hose assembly. If you have any questions regarding proper hose installation, please contact Eaton Technical Support at 1-888-258-0222.

Hose Maintenance

Proper maintenance of the hose is essential to the safe use of the hose and related equipment. Hose should be stored in a dry place. Hose should also be visually inspected. Any hose that has a cut or gouge in the cover that exposes the reinforcement should be retired from service. Hoses should also be inspected for kinking or broken reinforcement. If the outside diameter of the hose is reduced by 20% or more, the hose should be repaired or removed from service. Inadequate attention to hose maintenance may result in hose leakage, bursting, or other failure which may cause serious bodily injury or property damage from spraying fluids, flying projectiles, or other substances.

Coll-O-Crimp Hose, Hose Ends and Assembly Equipment Compatibility

The Coll-O-Crimp Equipment Package, Coll-O-Crimp Hose Ends and Coll-O-Crimp Hose have been engineered and designed as a complete hose assembly system. Each component of the Coll-O-Crimp hose assembly system is compatible with other Coll-O-Crimp components to which it relates. Component compatibility, along with the use of quality components, insures the production of reliable hose assemblies when assembled properly. The use or intermixing of fittings and hose not specifically engineered and designed for use with each other and Coll-O-Crimp equipment is not recommended and may result in the production of unsafe or unreliable hose assemblies. This can result in hose assembly leakage, hose separation or other failures which can cause serious bodily injury or property damage from spraying fluids, flying projectiles, or other substances.

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Elastomer Chart

The chart below shows the general characteristics of some of the common rubber compounds. Elastomers are mixed with various chemicals to provide a wide range of physical properties for specific service needs.

ASTM DESIGNATION	COMMON NAME	COMPOSITION	GENERAL PROPERTIES
CR	Neoprene	Chloroprene	•Good abrasion •Good weathering resistance •Good oil resistance •Flame retarding
NBR	Nitrile (Buna-N)	Acrylonitrile-butadiene	•Excellent oil resistance •Moderate resistance to aromatics
IIR	Butyl	Isobutylene-isoprene	•Excellent ozone resistance •Good resistance to fire resistant fluids •Good heat resistance •Low permeability •Poor resistance to petroleum fluids
CIIR	Chlorinated Butyl	Chloro-isobutylene isoprene	•Same as Butyl
SBR	SBR	Styrene-butadiene	•Good abrasion resistance •Poor resistance to petroleum fluids
EPDM	EPDM	Ethylene-propylene diene terpolymer	•Excellent ozone resistance •Good chemical resistance •Good temperature resistance •Poor resistance to petroleum fluids
XLPE	Cross-Linked Polyethylene	Polyethylene & cross linking agents	•Excellent chemical resistance
PA	Nylon	Polyamide	•Good abrasion resistance •Good chemical resistance •Low coefficient of friction
CSM	Hypalon	Chloro-sulfonated Polyethylene	•Excellent ozone resistance •Good abrasion resistance •Good heat resistance •Fair petroleum qualities
NR	Natural Rubber	Polyisoprene	•Excellent abrasion resistance •Acid resistance •Not oil resistant
V-NBR	Vinyl Nitrile	PVC/NBR	•Good ozone resistance •Good resistance to animal fats & oils •Good petroleum resistance
UHMWPE	Ultra-high molecular weight polyethylene	Polyethylene	•Excellent chemical resistance •Moderate heat resistance •FDA-accepted material
CM	CPE	Chlorinated Polyethylene	•Excellent ozone resistance •Excellent weathering resistance •Good abrasion resistance •Good heat resistance •Good resistance to petroleum oils
XNBR	Carboxylated Nitrile	Carboxylated Acrylonitrile-butadiene	•Excellent abrasion resistance •Excellent oil resistance •Excellent weather resistance
PTFE	Teflon	Polytetrafluoroethylene	•Excellent temperature resistance •Excellent chemical resistance •FDA accepted material •Low coefficient of friction for high flow rates and easy cleaning •Excellent resistance to thermocycling
PVC	PVC	Polyvinylchloride	•Resistant to many chemicals •Good Flexibility
FEP	Teflon	Fluorinated Ethylene Propylene	•Excellent temperature resistance •Excellent chemical resistance •FDA accepted material •Low coefficient of friction for high flow rates and easy cleaning •Excellent resistance to thermocycling

Application Data

Mass Equivalents Chart

MASS EQUIVALENTS TABLE

Pounds (lb)	Grams (g)	Kilograms (kg)	Tons	Ounces (oz)
1	453.5930	0.4536	0.0005	16
10	4535.9300	4.5359	0.0050	160
20	9071.8600	9.0719	0.0100	320
30	13607.7900	13.6078	0.0150	480
40	18143.7200	18.1437	0.0200	640
50	22679.6500	22.6797	0.0250	800
60	27215.5800	27.2156	0.0300	960
70	31751.5100	31.7515	0.0350	1120
80	36287.4400	36.2874	0.0400	1280
90	40823.3700	40.8234	0.0450	1440
100	45359.3000	45.3593	0.0500	1600
120	54431.1600	54.4312	0.0600	1920
130	58967.0900	58.9671	0.0650	2080
140	63503.0200	63.5030	0.0700	2240
150	68038.9500	68.0390	0.0750	2400
160	72574.8800	72.5749	0.0800	2560
170	77110.8100	77.1108	0.0850	2720
180	81646.7400	81.6467	0.0900	2880
190	86182.6700	86.1827	0.0950	3040
200	90718.6000	90.7186	0.1000	3200
210	95254.5300	95.2545	0.1050	3360
220	99790.4600	99.7905	0.1100	3520
230	104326.3900	104.3264	0.1150	3680
240	108862.3200	108.8623	0.1200	3840
250	113398.2500	113.3983	0.1250	4000
260	117934.1800	117.9342	0.1300	4160
270	122470.1100	122.4701	0.1350	4320
280	127006.0400	127.0060	0.1400	4480
290	131541.9700	131.5420	0.1450	4640
300	136077.9000	136.0779	0.1500	4800
310	140613.8300	140.6138	0.1550	4960
320	145149.7600	145.1498	0.1600	5120
330	149685.6900	149.6857	0.1650	5280
340	154221.6200	154.2216	0.1700	5440
350	158757.5500	158.7576	0.1750	5600
360	163293.4800	163.2935	0.1800	5760
370	167829.4100	167.8294	0.1850	5920
380	172365.3400	172.3653	0.1900	6080
390	176901.2700	176.9013	0.1950	6240
400	181437.2000	181.4372	0.2000	6400

Mass = 1 kg = 0.001 metric ton = 2.20462 lb_m = 35.27392 oz

1 lb_m = 16 oz = 5 x 10^{-4} ton = 453.593 g = 0.53593 kg

Length = 1 m = 100 cm = 1000 mm = 10^6 microns (µm) = 10^{10} angstroms (Å)

= 39.37 in = 3.2808 ft = 1.0936 yd = 0.0006214 mile

Application Data

Temp. & Pressure Conversion Chart

Temperature Conversions Chart

Degrees F (Fahrenheit)	Degrees K (Kelvin)	Degrees C (Celsius)
-40	233.15	-40.00
-20	253.15	-28.89
0	273.15	-17.78
20	293.15	-6.67
40	313.15	4.44
60	333.15	15.56
80	353.15	26.67
100	373.15	37.78
120	393.15	48.89
140	413.15	60.00
160	433.15	71.11
180	453.15	82.22
200	473.15	93.33
220	493.15	104.44
240	513.15	115.56
260	533.15	126.67
280	553.15	137.78
300	573.15	148.89
320	593.15	160.00
340	613.15	171.11
360	633.15	182.22
380	653.15	193.33
400	673.15	204.44
420	693.15	215.56
440	713.15	226.67
460	733.15	237.78
480	753.15	248.89
500	773.15	260.00

Pressure Conversions Chart

PSI (lbs/ square inch)	kPa (kilo pascals)	bar	atm	mm Hg
0	0.00	0.00	0.00	0.00
10	68.95	0.69	0.68	517.15
20	137.89	1.38	1.36	1034.30
30	206.84	2.07	2.04	1551.44
40	275.79	2.76	2.72	2068.59
50	344.73	3.45	3.40	2585.74
60	413.68	4.14	4.08	3102.89
70	482.63	4.83	4.76	3620.03
80	551.58	5.52	5.44	4137.18
90	620.53	6.21	6.12	4654.33
100	689.47	6.89	6.80	5171.48
110	758.42	7.58	7.49	5688.62
120	827.37	8.27	8.17	6205.77
130	896.31	8.96	8.86	6722.92
140	965.26	9.65	9.53	7240.07
150	1034.21	10.34	10.21	7757.21
160	1103.16	11.03	10.89	8274.36
170	1172.10	11.72	11.57	8791.50
180	1241.05	12.41	12.25	9308.66
190	1309.99	13.10	12.93	9825.80
200	1378.95	13.79	13.61	10342.95
210	1447.89	14.48	14.29	10860.10
220	1516.84	15.17	14.98	11377.25
230	1585.79	15.86	15.66	11894.39
240	1654.74	16.55	16.33	12411.54
250	1723.68	17.25	17.01	12928.69
260	1792.63	17.93	17.69	13445.84
270	1861.58	18.62	18.37	13962.98
280	1930.53	19.31	19.05	14480.13
290	1999.47	19.99	19.73	14997.28
300	2068.42	20.68	20.41	15514.43
310	2137.37	21.37	21.09	16031.57
320	2206.31	22.06	21.77	16548.72
330	2275.26	22.75	22.46	17065.87
340	2344.21	23.44	23.14	17583.01
350	2413.16	24.13	23.82	18100.16
400	2757.89	27.58	27.22	20685.90
450	3102.63	31.03	30.62	23271.64
500	3447.37	34.47	34.02	25857.38
1000	6894.73	68.95	68.05	51714.75
1250	8618.41	86.18	85.06	64643.44
1500	10342.10	103.42	102.07	77572.12
1750	12065.78	120.66	119.08	90500.81
2000	13789.47	137.90	136.09	103429.50
2250	15513.15	155.13	153.10	116358.19
2500	17236.83	172.37	170.11	129286.88
2750	18960.52	189.60	187.13	142215.57
3000	20684.20	206.84	204.14	155144.26
4000	27578.93	275.79	272.18	206859.01
5000	34473.67	344.74	340.23	258573.76

Pressure = 1 atm = 1.01325 x 10^5 N/m^2 (Pa_2) = 101.325 kPa = 1.01325 bars
= 1.01325 x 10^6 dynes/cm^2
= 760 mm Hg at 0°C (torr) = 10.333 m H_2O at 4°C
=14.696 lbf/$in.^2$ (psi) = 33.9 ft H_2O at 4°C
= 29.921 in Hg at 0°C

Application Data

Area & Circumference Chart

AREA & CIRCUMFERENCE OF CIRCLES FOR GIVEN CIRCLE DIAMETERS

Dia. (inches)	Area (sq. inches)	Circumference (inches)
1/32	0.00077	0.09813
1/16	0.00307	0.19625
3/32	0.00690	0.29438
1/8	0.01227	0.39250
5/32	0.01917	0.49063
3/16	0.02760	0.58875
7/32	0.03756	0.68688
1/4	0.04906	0.78500
9/32	0.06209	0.88313
5/16	0.07666	0.98125
11/32	0.09276	1.07938
3/8	0.11039	1.17750
13/32	0.12956	1.27563
7/16	0.15025	1.37375
15/32	0.17249	1.47188
1/2	0.19625	1.57000
17/32	0.22155	1.66813
9/16	0.24838	1.76625
19/32	0.27674	1.86438
5/8	0.30664	1.96250
21/32	0.33807	2.06063
11/16	0.37104	2.15875
23/32	0.40553	2.25688
3/4	0.44156	2.35500
25/32	0.47913	2.45313
13/16	0.51822	2.55125
27/32	0.55885	2.64938
7/8	0.60102	2.74750
29/32	0.64471	2.84563
15/16	0.68994	2.94375
31/32	0.73670	3.04188
1	0.78500	3.14000
1/32	0.83483	3.23813
1/16	0.88619	3.33625
3/32	0.93909	3.43438
1/8	0.99352	3.53250
5/32	1.04948	3.63063
3/16	1.10697	3.72875
7/32	1.16600	3.82688
1/4	1.22656	3.92500
9/32	1.28866	4.02313
5/16	1.35229	4.12125
11/32	1.41745	4.21938
3/8	1.48414	4.31750
13/32	1.55237	4.41563
7/16	1.62213	4.51375
15/32	1.69342	4.61188
1/2	1.76625	4.71000
17/32	1.84061	4.80813
9/16	1.91650	4.90625
19/32	1.99393	5.00438
5/8	2.07289	5.10250
21/32	2.15338	5.20063
11/16	2.23541	5.29875
23/32	2.31897	5.39688
3/4	2.40406	5.49500
25/32	2.49069	5.59313
13/16	2.57885	5.69125
27/32	2.66854	5.78938
7/8	2.75977	5.88750
29/32	2.85252	5.98563
15/16	2.94682	6.08375
31/32	3.04264	6.18188
2	3.14000	6.28000
1/32	3.23889	6.37813
1/16	3.33932	6.47625
3/32	3.44127	6.57438
1/8	3.54477	6.67250
5/32	3.64979	6.77063
3/16	3.75635	6.86875
7/32	3.86444	6.96688
1/4	3.97406	7.06500
9/32	4.08522	7.16313
5/16	4.19791	7.26125
11/32	4.31213	7.35938
3/8	4.42789	7.45750
13/32	4.54518	7.55563
7/16	4.66400	7.65375
15/32	4.78436	7.75188
1/2	4.90625	7.85000
17/32	5.02967	7.94813
9/16	5.15463	8.04625
19/32	5.28112	8.14438
5/8	5.40914	8.24250
21/32	5.53870	8.34063
11/16	5.66979	8.43875
23/32	5.80241	8.53688
3/4	5.93656	8.63500
25/32	6.07225	8.73313
13/16	6.20947	8.83125
27/32	6.34823	8.92938
7/8	6.48852	9.02750
29/32	6.63034	9.12563
15/16	6.77369	9.22375
31/32	6.91858	9.32188
3	7.06500	9.42000
1/32	7.21295	9.51813
1/16	7.36244	9.61625
3/32	7.51346	9.71438
1/8	7.66602	9.81250
5/32	7.82010	9.91063
3/16	7.97572	10.00875
7/32	8.13288	10.10688
1/4	8.29156	10.20500
9/32	8.45178	10.30313
5/16	8.61354	10.40125
11/32	8.77682	10.49938
3/8	8.94164	10.59750
13/32	9.10799	10.69563
7/16	9.27588	10.79375
15/32	9.44530	10.89188
1/2	9.61625	10.99000
17/32	9.78874	11.08813
9/16	9.96275	11.18625
19/32	10.13831	11.28438
5/8	10.31539	11.38250
21/32	10.49401	11.48063
11/16	10.67416	11.57875
23/32	10.85584	11.67688
3/4	11.03906	11.77500
25/32	11.22381	11.87313
13/16	11.41010	11.97125
27/32	11.59792	12.06938
7/8	11.78727	12.16750
29/32	11.97815	12.26563
15/16	12.17057	12.36375
31/32	12.36452	12.46188

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Area & Circumference Chart

AREA & CIRCUMFERENCE OF CIRCLES FOR GIVEN CIRCLE DIAMETERS CONT.

Dia. (inches)	Area (sq. inches)	Circumference (inches)
4	12.56000	12.56000
1/32	12.75702	12.65813
1/16	12.95557	12.75625
3/32	13.15565	12.85438
1/8	13.35727	12.95250
5/32	13.56042	13.05063
3/16	13.76510	13.14875
7/32	13.97131	13.24688
1/4	14.17906	13.34500
9/32	14.38834	13.44313
5/16	14.59916	13.54125
11/32	14.81151	13.63938
3/8	15.02539	13.73750
13/32	15.24081	13.83563
7/16	15.45775	13.93375
15/32	15.67624	14.03188
1/2	15.89625	14.13000
17/32	16.11780	14.22813
9/16	16.34088	14.32625
19/32	16.56549	14.42438
5/8	16.79164	14.52250
21/32	17.01932	14.62063
11/16	17.24854	14.71875
23/32	17.47928	14.81688
3/4	17.71156	14.91500
25/32	17.94538	15.01313
13/16	18.18072	15.11125
27/32	18.41760	15.20938
7/8	18.65602	15.30750
29/32	18.89596	15.40563
15/16	19.13744	15.50375
31/32	19.38045	15.60188
5	19.62500	15.70000
1/32	19.87108	15.79813
1/16	20.11869	15.89625
3/32	20.36784	15.99438
1/8	20.61852	16.09250
5/32	20.87073	16.19063
3/16	21.12447	16.28875
7/32	21.37975	16.38688
1/4	21.63656	16.48500
9/32	21.89491	16.58313
5/16	22.15479	16.68125
11/32	22.41620	16.77938
3/8	22.67914	16.87750
13/32	22.94362	16.97563
7/16	23.20963	17.07375
15/32	23.47717	17.17188
1/2	23.74625	17.27000
17/32	24.01686	17.36813
9/16	24.28900	17.46625
19/32	24.56268	17.56438
5/8	24.83789	17.66250
21/32	25.11463	17.76063
11/16	25.39291	17.85875
23/32	25.67272	17.95688
3/4	25.95406	18.05500
25/32	26.23694	18.15313
13/16	26.52135	18.25125
27/32	26.80729	18.34938
7/8	27.09477	18.44750
29/32	27.38377	18.54563
15/16	27.67432	18.64375
31/32	27.96639	18.74188
6	28.26000	18.84000
1/32	28.55514	18.93813
1/16	28.85182	19.03625
3/32	29.15002	19.13438
1/8	29.44977	19.23250
5/32	29.75104	19.33063
3/16	30.05385	19.42875
7/32	30.35819	19.52688
1/4	30.66406	19.62500
9/32	30.97147	19.72313
5/16	31.28041	19.82125
11/32	31.59088	19.91938
3/8	31.90289	20.01750
13/32	32.21643	20.11563
7/16	32.53150	20.21375
15/32	32.84811	20.31188
1/2	33.16625	20.41000
17/32	33.48592	20.50813
9/16	33.80713	20.60625
19/32	34.12987	20.70438
5/8	34.45414	20.80250
21/32	34.77995	20.90063
11/16	35.10729	20.99875
23/32	35.43616	21.09688
3/4	35.76656	21.19500
25/32	36.09850	21.29313
13/16	36.43197	21.39125
27/32	36.76698	21.48938
7/8	37.10352	21.58750
29/32	37.44159	21.68563
15/16	37.78119	21.78375
31/32	38.12233	21.88188
7	38.46500	21.98000
1/32	38.80920	22.07813
1/16	39.15494	22.17625
3/32	39.50221	22.27438
1/8	39.85102	22.37250
5/32	40.20135	22.47063
3/16	40.55322	22.56875
7/32	40.90663	22.66688
1/4	41.26156	22.76500
9/32	41.61803	22.86313
5/16	41.97604	22.96125
11/32	42.33557	23.05938
3/8	42.69664	23.15750
13/32	43.05924	23.25563
7/16	43.42338	23.35375
15/32	43.78905	23.45188
1/2	44.15625	23.55000
17/32	44.52499	23.64813
9/16	44.89525	23.74625
19/32	45.26706	23.84438
5/8	45.64039	23.94250
21/32	46.01526	24.04063
11/16	46.39166	24.13875
23/32	46.76959	24.23688
3/4	47.14906	24.33500
25/32	47.53006	24.43313
13/16	47.91260	24.53125
27/32	48.29667	24.62938
7/8	48.68227	24.72750
29/32	49.06940	24.82563
15/16	49.45807	24.92375
31/32	49.84827	25.02188
8	50.24000	25.12000