Our History

In the mid 1940's Cullen Crawford founded the Crawford Fitting Company. Mr. Crawford developed & patented the original flareless fitting (nut & two ferrule system), for the Crawford Fitting Company. Thus, a new & innovative industry was born, making it far easier to make tubing connections. Since his innovation, End Users from all corners of the globe have made billions of connections. This system provides leak-proof seals and thus Mr. Crawford has been named "The Founder of the Flareless Fitting."

Our Mission

It is our mission, at Tylok International, Inc., to continuously strive for and achieve total customer satisfaction with both our products & services.

Our Goal

Tylok's aggressive goal is to establish ourselves as an industry leader & expand our market share. This is maintained in every department within the organization. Our "total effort" will guard against losing the personal touch that makes our business enjoyable & prosperous for all involved.

Products

Limited Warranty

Notice

In designing a system incorporating tube fittings & valves, it is the designer's or user's obligation & responsibility to determine the appropriate fittings & valves to be used for each application and to ensure proper installation & maintenance.

Limited Lifetime Warranty

Tylok Fittings & Valves are warranted solely against defects in material and workmanship in the performance of the specific functions for which they are designed, as set forth in the published specifications for the life of the product. Should any fitting & valve or its component fail due to a defect in material or workmanship, Tylok will replace said fitting & valve without charge upon return of the failed part and evidence of its failure being due to materials or workmanship. The Warranty above set forth is the only warranty applicable to Tylok products, and is in lieu of any and all other warranties either expressed or implied, including any warranty of merchantability or fitness. Tylok's sole responsibility or liability as a result of any loss or damage due to failure shall be to replace the failed part or fitting & valve, and it shall bear no liability for any incidental or consequential damages to person or property.

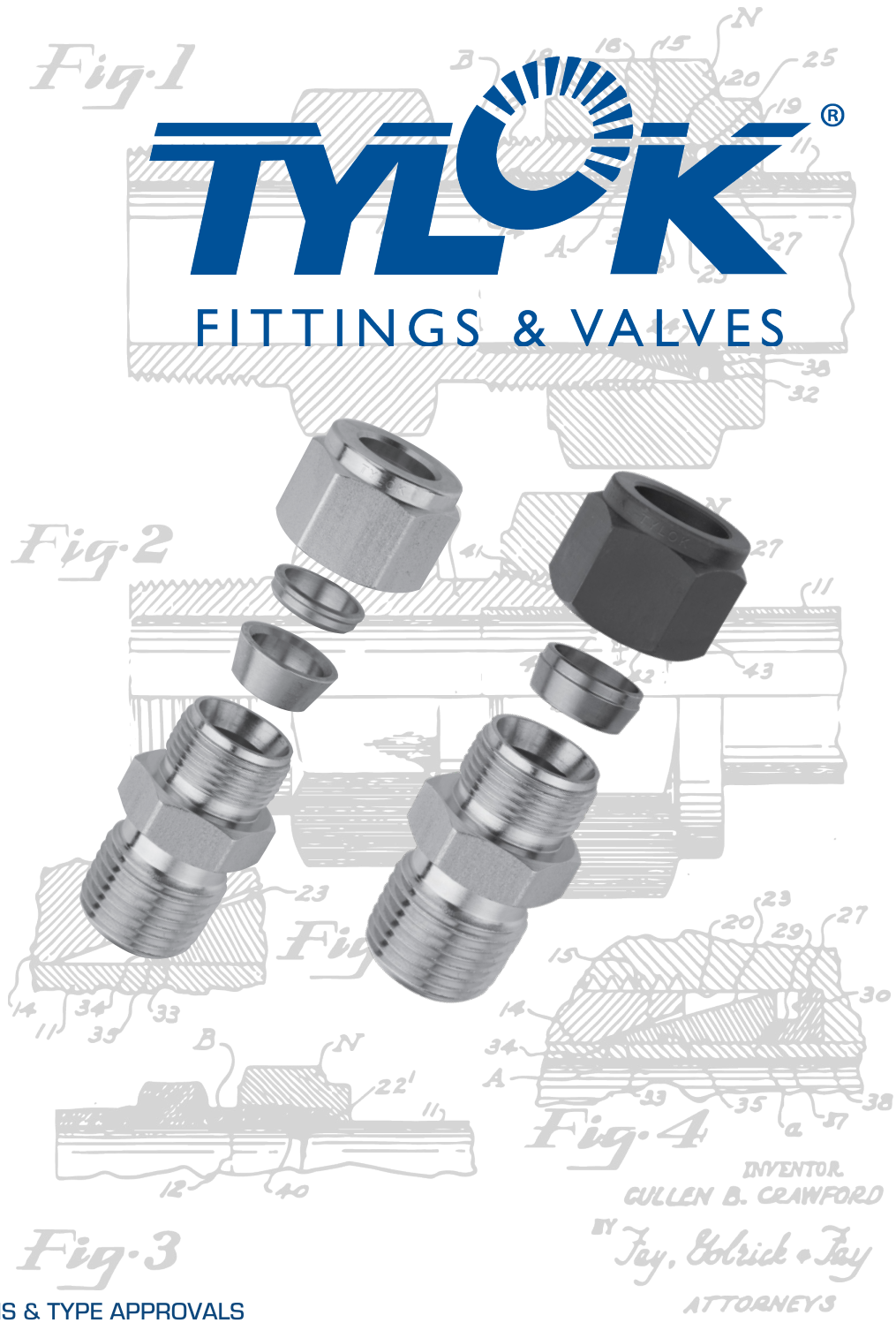
Products

TYLOK®
FITTINGS & VALVES

CBC-LOK®

CS-LOK®

TUBE FITTINGS



TYLOK®

FITTINGS & VALVES

REGISTRATIONS & TYPE APPROVALS

ISO 9001

WBENC WOMEN'S BUSINESS ENTERPRISE NATIONAL COUNCIL

Canadian Registration

ABS TYPE APPROVAL PROGRAM

TYLOK® FITTINGS & VALVES ASTM F1387

CREATION OF AN INDUSTRY

In the mid 1940's, Cullen Crawford developed and patented the original flareless fitting (nut & double ferrule system), making it easier and more efficient to make tubing connections. Based on this innovation, he founded the Crawford Fitting Company, creating an industry for compression fittings.

At Tylok, out mission is total customer satisfaction with both products & services. Our knowledgeable staff is readily available to answer questions and respond in a timely manner. We continue to develop new products that expand the Tylok brand. If you have a unique product need, Tylok would like to be your engineered-solutions provider.

INTRODUCTION

CBC-Lok® Tube Fittings are fully interchangeable with Swagelok® & Parker A-Lok®. Although it is always recommended to use all CBC-Lok® components intermixing CBC-Lok® bodies and/or components parts with that of other manufacturers will not adversely affect sealing ability. CBC-Lok® Tube Fittings are made to strict quality control standards. CBC-Lok® Tube Fittings are proudly made in the U.S.A.

CS-Lok® Tube Fittings are fully interchangeable with Parker CPI™. Although it is always recommended to use all CS-Lok® components, intermixing CS-Lok® bodies and/or component parts with those of other manufacturers will not adversely affect sealing ability. CS-Lok® Tube Fittings are made strict quality control standards. CS-Lok® Tube Fittings are proudly made in the U.S.A.

OPERATION

CBC-Lok® Tube Fittings are comprised of four components: Body, Front Ferrule (Collet), Rear Ferrule (Collet) & Nut. A leak-proof seal is obtained through proper ferrule action as the ferrules are tightened onto the tubing via axial thrust provided by the nut. The front ferrule provides the leak-proof seal, when the nut & ferrules are properly drawn up the specified number of turns. The rear ferrule grips the tubing preventing pull-off. The stainless steel nuts are silver plated and dry film lubricant is applied, reducing torque and ensuring proper sealing.

CS-Lok® Tube Fittings are comprised of three components: Body, Single Ferrule (Collet), & Nut. A leak-proof seal is obtained through proper ferrule action as the ferrules are tightened onto the tubing via axial thrust provided by the nut. The ferrule provides the leak-proof seal, when the nut & ferrule are properly drawn up the specified number of turns. The stainless steel nuts have molybdenum disulfide coating, reducing torque and ensuring proper sealing.

TY-COR™ PROCESS

Ty-Cor™ refers to the treatment that diffuses carbon into the surface of the stainless steel, thereby increasing the surface hardness without affecting the quality of the metal treated. In fact, when AISI 316 stainless steel is treated, the corrosion resistance is equal to or better than non-treated 316 stainless steel. The increase in corrosion resistance to pitting and stress corrosion is very pronounced in media that contain chlorides (e.g., sea water, bleach, HCl, etc.). The Ty-Cor™ process applied to the rear ferrule also helps eliminate galling and ensures proper sealing on the tube end make-ups.

FEATURES

CBC-Lok® Tube Fittings

- Double ferrule swaging action
- Total component interchangeability
- Heat Code traceable
- ASTM material construction

CS-Lok® Tube Fittings

- Single ferrule swaging action
- Total component interchangeability
- Heat Code traceable
- ASTM material construction

The quality system complies with the international standard ISO 9001. Tylok strives to continuously improve the effectiveness of the Quality Management System by each member within the organization.

ABS TYPE APPROVAL PROGRAM

Tylok has received the Certificate of Type Approval from the American from the American Bureau of Shipping (ABS). The following Part Families are ABS approved:
DFC - Female Connector, DMC - Male Connector, DU - Union, DELU - Elbow Union, DME - Male Elbow, and DTTT - Union Tee.

Table of Contents

Table of Contents

How to Order
CBC-LOK®/CS-LOK®

CBC-Lok®/CS-Lok® Tube Fittings are ordered as listed in this catalog by inserting the material code before the part number. CBC-Lok®/CS-Lok® Tube Fittings can be identified through the part number as to material, tube size, configuration, and thread connection. The part number describes a complete fitting assembly.
Special Configurations available upon request.

Example: A Stainless Steel Female Run Tee, 3/8" Tube Size to 1/4" Female Pipe to 3/8" Tube is designated as follows:

SS	-	6	-	D	-	TFT	-	4
Material		Tube O.D		Style		Description		Odd End Size
Chart 1		Chart 2		Chart 3		Chart 4		Chart 2

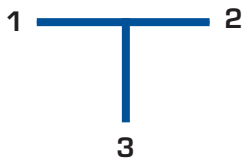


CHART 1- MATERIAL	
B	Brass
SS	Stainless Steel
S	Steel

CHART 3- STYLE	
D	CBC-Lok®
S	CS-Lok®

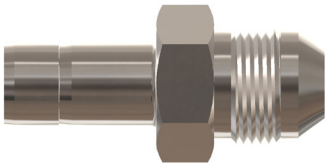
CHART 2- SIZES

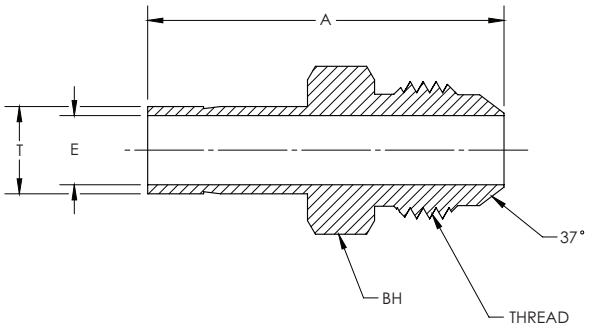
Fractional (inches)					Metric (millimeters)	
DESIGNATOR	TUBE OR HOSE O.D	PIPE THREAD (NPT)	AN/STB TUBE SIZE	PIPE THREAD BSPP/BSPT	DESIGNATOR	TUBE O.D
1	1/16	1/16-27		1/16-28	6	6 mm
2	1/8	1/8-27	5/16-24	1/8-28	8	8 mm
3	3/16				10	10 mm
4	1/4	1/4-18	7/16-20	1/4-19	12	12 mm
5	5/16				18	18 mm
6	3/8	3/8-18	9/16-18	3/8-19		
8	1/2	1/2-14	3/4-16	1/2-14		
10	5/8					
12	3/4	3/4-14	1-1/16-12	3/4-14		
14	7/8					
16	1	1-11 1/2	1-5/16-12	1-11		

CHART 4- DESCRIPTION	
ATANF	Adapter Tube to AN Flare
ATPF	Adapter Tube to Female Pipe
ATPM	Adapter Tube to Male Pipe
BHA	Bulkhead Adapter
BHFP	Bulkhead Female Pipe Connector
BHMP	Bulkhead Male Pipe Connector
BHU	Bulkhead Union
BUANF	Bulkhead to AN Flare Union
CAP	Cap
F PLUG	Fitting Plug
FC	Female Connector
MC	Male Connector
PCU	Port Connector Union
RATT	Reducer Adapter Tube to Tube
RPC	Reducing Port Connector
DRU	Reducing Union
TBW	Tube to Butt Weld Connector

CHART 4- DESCRIPTION	
TSW	Tube to Socket Weld Connector
U	Union
UANF	Tube to AN Flare Union
ELU	Union Elbow
ELU45	Union 45° Elbow
FE	Female Elbow
ME	Male Elbow
ME45	Male 45° Elbow
TBWE	Tube to Butt Weld Elbow
TSWE	Tube to Socket Weld Elbow
TFT	Female Run Tee
TMT	Male Run Tee
TTF	Female Branch Tee
TTM	Male Branch Tee
TTT	Union Tee
CR	Union Cross
N	Nut
KN	Knurled Nut

CHART 5- MODIFIERS	
BBT	Branch Bored Through
BT	Bored Through
BSPT	BSPT Male Connector
CL	Cleaned & Lubricated to ASTM G93 Level C
SPCL	Cleaned & Lubricated to CGA G-4.1-2009
ORF-###	Orifice Fittings (### designates orifice size)
ORS	O-Ring Straight Thread Male Connector
ORT	O-Ring Tapered Thread Male Connector
RS	BSPP Male Connector
STB	Straight Thread Boss Male Connector



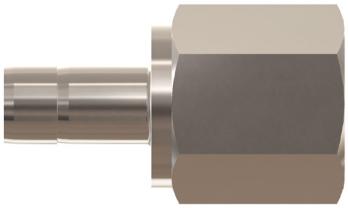


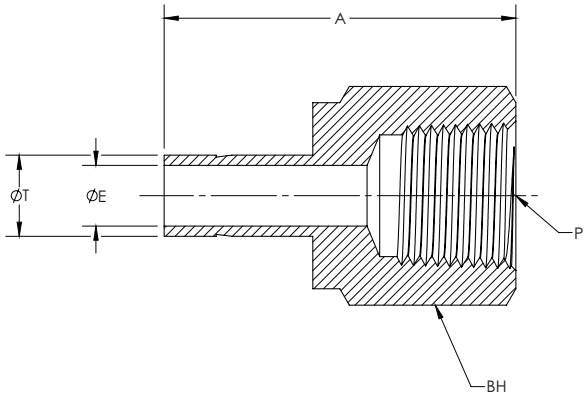
CBC PART NUMBER	INTERCHANGES WITH	CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	THREAD	A	E THRU HOLE	BH BODY HEX
4-DATANF-4	4-TA-1-4AN	-	-	1/4	7/16-20 UNJF	1.46	0.17	1/2
6-DATANF-4	6-TA-1-4AN	-	-	3/8	7/16-20 UNJF	1.53	0.17	1/2
6-DATANF-6	6-TA-1-6AN	-	-	3/8	9/16-18 UNJF	1.56	0.27	5/8
8-DATANF-8	8-TA-1-8AN	-	-	1/2	3/4-16 UNJF	1.91	0.38	13/16
12-DATANF-12	12-TA-1-12AN	-	-	3/4	1-1/16-12 UNJ	2.21	0.58	1 1/8
16-DATANF-16	16-TA-1-16AN	-	-	1	1-5/16-12 UNJ	2.58	0.80	1 3/8

NOTE: Dimensions subject to change, to be used for reference only.

DATPF/SATPF

Adapter Tube to Female Pipe

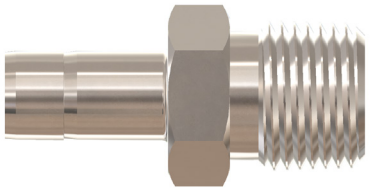


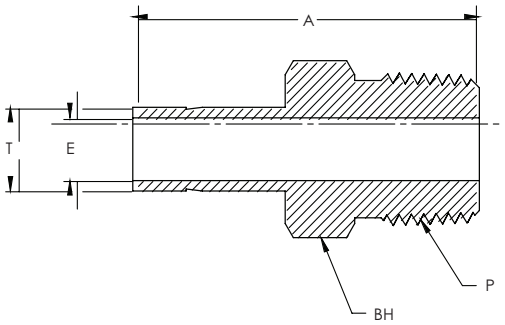


CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P PIPE END NPT	A	E THRU HOLE	BH BODY HEX
2-DATPF-2	2-TA-7-2	2FA2N	2-SATPF-2	2-2 T2HG	1/8	1/8	1.24	0.08	9/16
2-DATPF-4	2-TA-7-4	2FA4N	2-SATPF-4	2-4 T2HG	1/8	1/4	1.39	0.08	3/4
4-DATPF-2	4-TA-7-2	4FA2N	4-SATPF-2	4-2 T2HG	1/4	1/8	1.30	0.17	9/16
4-DATPF-4	4-TA-7-4	4FA4N	4-SATPF-4	4-4 T2HG	1/4	1/4	1.46	0.17	3/4
4-DATPF-6	4-TA-7-6	4FA6N	4-SATPF-6	4-6 T2HG	1/4	3/8	1.55	0.17	7/8
4-DATPF-8	4-TA-7-8	4FA8N	4-SATPF-8	4-8 T2HG	1/4	1/2	1.79	0.17	1 1/16
6-DATPF-2	6-TA-7-2	6FA2N	6-SATPF-2	6-2 T2HG	3/8	1/8	1.35	0.27	9/16
6-DATPF-4	6-TA-7-4	6FA4N	6-SATPF-4	6-4 T2HG	3/8	1/4	1.50	0.27	3/4
6-DATPF-6	6-TA-7-6	6FA6N	6-SATPF-6	6-6 T2HG	3/8	3/8	1.59	0.27	7/8
6-DATPF-8	6-TA-7-8	6FA8N	6-SATPF-8	6-8 T2HG	3/8	1/2	1.84	0.27	1 1/16
8-DATPF-4	8-TA-7-4	8FA4N	8-SATPF-4	8-4 T2HG	1/2	1/4	1.71	0.38	3/4
8-DATPF-6	8-TA-7-6	8FA6N	8-SATPF-6	8-6 T2HG	1/2	3/8	1.79	0.38	7/8
8-DATPF-8	8-TA-7-8	8FA8N	8-SATPF-8	8-8 T2HG	1/2	1/2	2.05	0.38	1 1/16
8-DATPF-12	8-TA-7-12	-	8-SATPF-12	-	1/2	3/4	2.10	0.38	1 5/16
10-DATPF-8	10-TA-7-8	10FA8N	10-SATPF-8	10-8 T2HG	5/8	1/2	2.09	0.47	1 1/16
12-DATPF-8	12-TA-7-8	12FA8N	12-SATPF-8	12-8 T2HG	3/4	1/2	2.08	0.58	1 1/16
12-DATPF-12	12-TA-7-12	12FA12N	12-SATPF-12	12-12 T2HG	3/4	3/4	2.16	0.58	1 5/16
16-DATPF-12	16-TA-7-12	16FA12N	16-SATPF-12	16-12 T2HG	1	3/4	2.39	0.80	1 5/16
16-DATPF-16	16-TA-7-16	16FA16N	16-SATPF-16	16-16 T2HG	1	1	2.53	0.80	1 5/8

NOTE: Dimensions subject to change, to be used for reference only.

DATPM/SATPM
Adapter Tube to Male Pipe



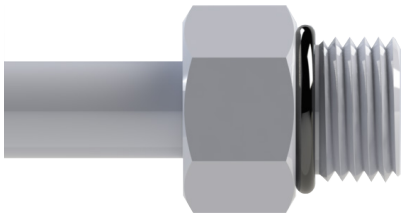


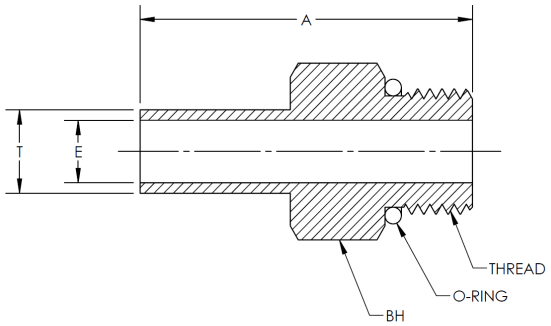
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P PIPE END NPT	A	E THRU HOLE	BH BODY HEX
2-DATPM-2	2-TA-1-2	2MA2N	2-SATPM-2	2-2 T2HF	1/8	1/8	1.16	0.08	7/16
2-DATPM-4	2-TA-1-4	2MA4N	2-SATPM-4	2-4 T2HF	1/8	1/4	1.37	0.08	9/16
4-DATPM-2	4-TA-1-2	4MA2N	4-SATPM-2	4-2 T2HF	1/4	1/8	1.25	0.17	7/16
4-DATPM-4	4-TA-1-4	4MA4N	4-SATPM-4	4-4 T2HF	1/4	1/4	1.46	0.17	9/16
4-DATPM-6	4-TA-1-6	4MA6N	4-SATPM-6	4-6 T2HF	1/4	3/8	1.49	0.17	11/16
4-DATPM-8	4-TA-1-8	4MA8N	4-SATPM-8	4-8 T2HF	1/4	1/2	1.71	0.17	7/8
5-DATPM-4	5-TA-1-4	5MA4N	5-SATPM-4	5-4 T2HF	5/8	1/4	1.50	0.22	9/16
6-DATPM-2	6-TA-1-2	6MA2N	6-SATPM-2	6-2 T2HF	3/8	1/8	1.32	0.19	7/16
6-DATPM-4	6-TA-1-4	6MA4N	6-SATPM-4	6-4 T2HF	3/8	1/4	1.55	0.27	9/16
6-DATPM-6	6-TA-1-6	6MA6N	6-SATPM-6	6-6 T2HF	3/8	3/8	1.56	0.27	11/16
6-DATPM-8	6-TA-1-8	6MA8N	6-SATPM-8	6-8 T2HF	3/8	1/2	1.78	0.27	7/8
8-DATPM-4	8-TA-1-4	8MA4N	8-SATPM-4	8-4 T2HF	1/2	1/4	1.75	0.28	9/16
8-DATPM-6	8-TA-1-6	8MA6N	8-SATPM-6	8-6 T2HF	1/2	3/8	1.78	0.38	11/16
8-DATPM-8	8-TA-1-8	8MA8N	8-SATPM-8	8-8 T2HF	1/2	1/2	2.00	0.38	7/8
8-DATPM-12	8-TA-1-12	-	8-SATPM-12	8-12 T2HF	1/2	3/4	2.00	0.38	1 1/16
10-DATPM-6	-	-	10-SATPM-6	-	5/8	3/8	1.84	0.38	11/16
10-DATPM-8	10-TA-1-8	10MA8N	10-SATPM-8	10-8 T2HF	5/8	1/2	2.06	0.47	7/8
12-DATPM-8	12-TA-1-8	12MA8N	12-SATPM-8	12-8 T2HF	3/4	1/2	2.06	0.47	7/8
12-DATPM-12	12-TA-1-12	12MA12N	12-SATPM-12	12-12 T2HF	3/4	3/4	2.06	0.58	1 1/16
12-DATPM-16	12-TA-1-16	12MA16N	12-SATPM-16	12-16 T2HF	3/4	1	2.32	0.58	1 3/8
14-DATPM-8	-	-	14-SATPM-8	-	7/8	1/2	2.13	0.47	15/16
16-DATPM-12	16-TA-1-12	16MA12N	16-SATPM-12	16-12 T2HF	1	3/4	2.31	0.63	1 1/16
16-DATPM-16	16-TA-1-16	16MA16N	16-SATPM-16	16-16 T2HF	1	1	2.60	0.80	1 3/8

NOTE: Dimensions subject to change, to be used for reference only.

DATPM-STB/SATPM-STB

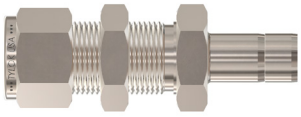
Adapter Tube to Straight Thread Boss

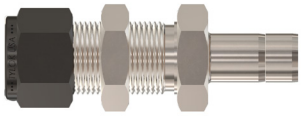


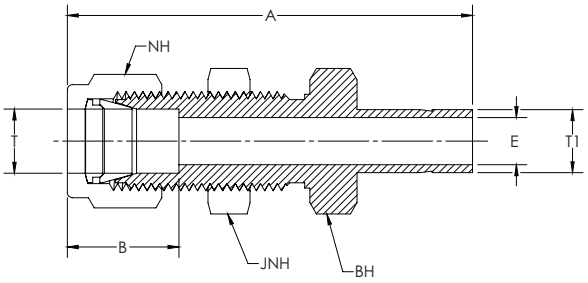


CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	THREAD	A	E THRU HOLE	O-RING	BH BODY HEX
2-DATPM-2-STB	2-TA-1-2ST	-	2-SATPM-2-STB	-	1/8	5/16-24	1.20	0.08	AS-902	7/16
4-DATPM-4-STB	4-TA-1-4ST	-	4-SATPM-4-STB	-	1/4	7/16-20	1.39	0.17	AS-904	9/16
6-DATPM-4-STB	6-TA-1-4ST	6TUHOA4	6-SATPM-4-STB	6-4 T2HOA	3/8	7/16-20	1.46	0.19	AS-904	9/16
6-DATPM-6-STB	6-TA-1-6ST	-	6-SATPM-6-STB	-	3/8	9/16-18	1.52	0.27	AS-906	11/16
6-DATPM-8-STB	6-TA-1-8ST	6TUHOA8	6-SATPM-8-STB	6-8 T2HOA	3/8	3/4-16	1.60	0.27	AS-908	7/8
8-DATPM-6-STB	8-TA-1-6ST	8TUHOA6	8-SATPM-6-STB	8-6 T2HOA	1/2	9/16-18	1.74	0.28	AS-906	11/16
8-DATPM-8-STB	8-TA-1-8ST	-	8-SATPM-8-STB	-	1/2	3/4-16	1.82	0.38	AS-908	7/8
10-DATPM-10-STB	10-TA-1-10ST	10TUHOA10	10-SATPM-10-STB	10-10 T2HOA	5/8	7/8-14	1.94	0.47	AS-910	1
12-DATPM-12-STB	12-TA-1-12ST	-	12-SATPM-12-STB	-	3/4	1-1/16-12	2.10	0.58	AS-912	1-1/4
16-DATPM-16-STB	16-TA-1-16ST	-	16-SATPM-16-STB	-	1	1-5/16-12	2.41	0.80	AS-916	1-1/2

NOTE: Dimensions subject to change, to be used for reference only.
Adapts to J1926-1 and ISO 11926-1 Straight Thread Boss.
Standard O-Ring Material is FKM, 90 durometer.





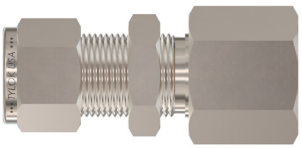


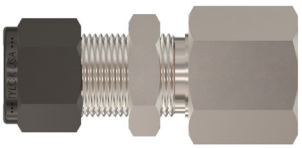
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	T1 TUBE O.D.	A	B	E THRU HOLE	JNH JAM NUT HEX	NH NUT HEX	BH BODY HEX	PANEL HOLE
4-DBHA-4	400-R1-4	4TUBC4	4-SBHA-4	4-4 T2H2BZ	1/4	1/4	2.20	0.61	0.17	5/8	9/16	5/8	29/64
6-DBHA-6	600-R1-6	6TUBC6	6-SBHA-6	6-6 T2H2BZ	3/8	3/8	2.41	0.67	0.27	3/4	11/16	3/4	37/64
8-DBHA-8	810-R1-8	8TUBC8	8-SBHA-8	8-8 T2H2BZ	1/2	1/2	2.87	0.90	0.38	15/16	7/8	15/16	49/64

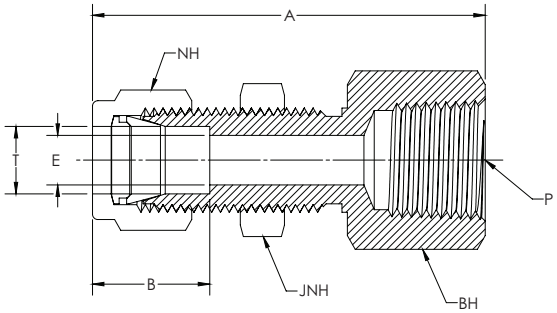
NOTE: Dimensions subject to change, to be used for reference only.

DBHFP/SBHFP

Bulkhead Female Pipe Connector





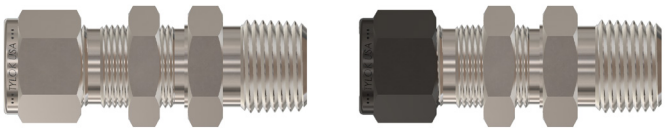


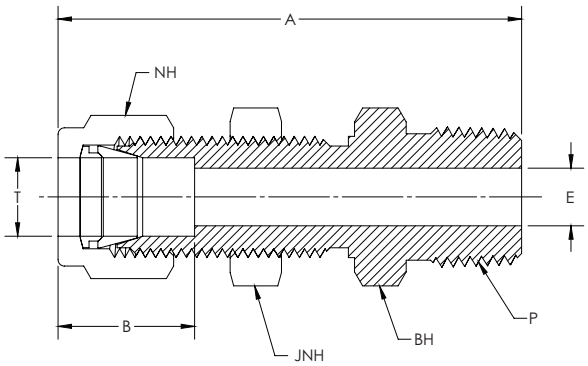
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P PIPE END NPT	A	B	E THRU HOLE	JNH JAM NUT HEX	NH NUT HEX	BH BODY HEX	PANEL HOLE
2-DBHFP-2	200-71-2	2FBC2N	2-SBHFP-2	2-2 GH2BZ	1/8	1/8	1.77	0.52	0.09	1/2	7/16	9/16	21/64
4-DBHFP-2	400-71-2	4FBC2N	4-SBHFP-2	4-2 GH2BZ	1/4	1/8	1.85	0.61	0.19	5/8	9/16	5/8	29/64
4-DBHFP-4	400-71-4	4FBC4N	4-SBHFP-4	4-4 GH2BZ	1/4	1/4	2.04	0.61	0.19	5/8	9/16	3/4	29/64
5-DBHFP-2	-	5FBC2N	5-SBHFP-2	5-2 GH2BZ	5/16	1/8	1.96	0.65	0.25	11/16	5/8	11/16	33/64
6-DBHFP-4	600-71-4	6FBC4N	6-SBHFP-4	6-4 GH2BZ	3/8	1/4	2.17	0.67	0.28	3/4	11/16	3/4	37/64
6-DBHFP-6	600-71-6	-	6-SBHFP-6	-	3/8	3/8	2.23	0.67	0.28	3/4	11/16	7/8	37/64
8-DBHFP-6	810-71-6	8FBC6N	8-SBHFP-6	8-6 GH2BZ	1/2	3/8	2.43	0.90	0.41	15/16	7/8	15/16	49/64
8-DBHFP-8	810-71-8	8FBC8N	8-SBHFP-8	8-8 GH2BZ	1/2	1/2	2.62	0.90	0.41	15/16	7/8	1 1/16	49/64
10-DBHFP-8	-	10FBC8N	10-SBHFP-8	10-8 GH2BZ	5/8	1/2	2.65	0.96	0.50	1 1/16	1	1 1/16	57/64
16-DBHFP-16	1610-71-16	16FBC16N	16-SBHFP-16	16-16 GH2BZ	1	1	3.68	1.24	0.88	1 5/8	1 1/2	1 5/8	1 21/64

NOTE: Dimensions subject to change, to be used for reference only.

DBHMP/SBHMP

Bulkhead Male Pipe Connector

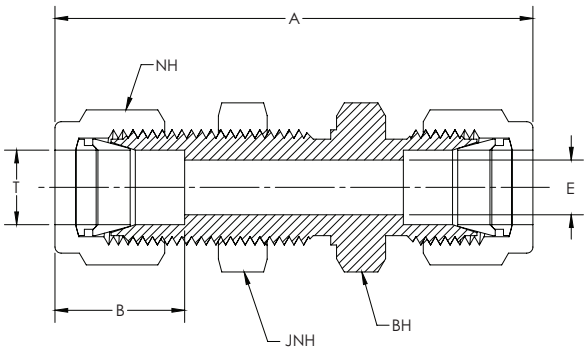




CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P PIPE END NPT	A	B	E THRU HOLE	JNH JAM NUT HEX	NH NUT HEX	BH BODY HEX	PANEL HOLE
2-DBHMP-2	200-11-2	2MBC2N	2-SBHMP-2	2-2 FH2BZ	1/8	1/8	1.83	0.52	0.09	1/2	7/16	1/2	21/64
4-DBHMP-2	400-11-2	4MBC2N	4-SBHMP-2	4-2 FH2BZ	1/4	1/8	1.95	0.61	0.19	5/8	9/16	5/8	29/64
4-DBHMP-4	400-11-4	4MBC4N	4-SBHMP-4	4-4 FH2BZ	1/4	1/4	2.13	0.61	0.19	5/8	9/16	5/8	29/64
4-DBHMP-6	-	4MBC6N	4-SBHMP-6	4-6 FH2BZ	1/4	3/8	2.17	0.61	0.19	5/8	9/16	11/16	29/64
6-DBHMP-4	600-11-4	6MBC4N	6-SBHMP-4	6-4 FH2BZ	3/8	1/4	2.26	0.67	0.28	3/4	11/16	3/4	37/64
6-DBHMP-6	600-11-6	6MBC6N	6-SBHMP-6	6-6 FH2BZ	3/8	3/8	2.26	0.67	0.28	3/4	11/16	3/4	37/64
6-DBHMP-8	600-11-8	6MBC8N	6-SBHMP-8	6-8 FH2BZ	3/8	1/2	2.51	0.67	0.28	3/4	11/16	7/8	37/64
8-DBHMP-4	810-11-4	8MBC4N	8-SBHMP-4	8-4 FH2BZ	1/2	1/4	2.49	0.90	0.28	15/16	7/8	15/16	49/64
8-DBHMP-6	810-11-6	8MBC6N	8-SBHMP-6	8-6 FH2BZ	1/2	3/8	2.49	0.90	0.38	15/16	7/8	15/16	49/64
8-DBHMP-8	810-11-8	8MBC8N	8-SBHMP-8	8-8 FH2BZ	1/2	1/2	2.71	0.90	0.41	15/16	7/8	15/16	49/64
12-DBHMP-16			12-SBHMP-12		3/4	1	3.26	0.63	0.63	1 3/16	1 1/8	1 3/8	1 1/64

NOTE: Dimensions subject to change, to be used for reference only.

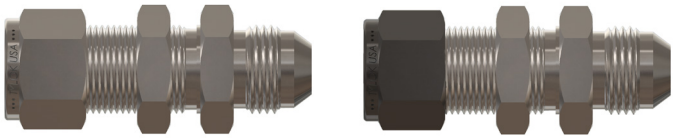
DBHU/SBHU
Bulkhead Union

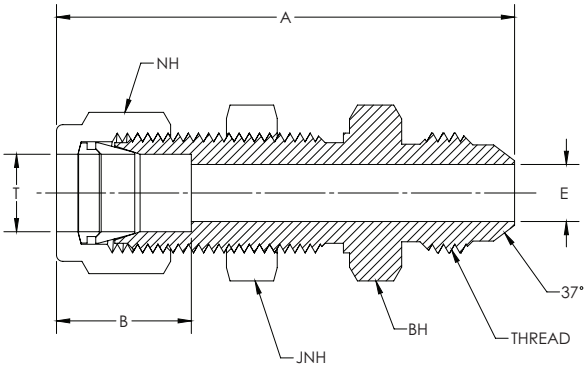


CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	A	B	E THRU HOLE	JNH JAM NUT HEX	NH NUT HEX	BH BODY HEX	PANEL HOLE
1-DBHU-1	100-61	1BC1	1-SBHU-1	1-1 WBZ	1/16	1.25	0.34	0.05	5/16	5/16	5/16	13/64
2-DBHU-2	200-61	2BC2	2-SBHU-2	2-2 WBZ	1/8	2.03	0.52	0.09	1/2	7/16	1/2	21/64
3-DBHU-3	300-61	3BC3	3-SBHU-3	3-3 WBZ	3/16	2.11	0.54	0.13	9/16	1/2	9/16	25/64
4-DBHU-4	400-61	4BC4	4-SBHU-4	4-4 WBZ	1/4	2.27	0.61	0.19	5/8	9/16	5/8	29/64
5-DBHU-5	500-61	5BC5	5-SBHU-5	5-5 WBZ	5/16	2.42	0.65	0.25	11/16	5/8	11/16	33/64
6-DBHU-6	600-61	6BC6	6-SBHU-6	6-6 WBZ	3/8	2.46	0.67	0.28	3/4	11/16	3/4	37/64
8-DBHU-8	810-61	8BC8	8-SBHU-8	8-8 WBZ	1/2	2.80	0.90	0.41	15/16	7/8	15/16	49/64
10-DBHU-10	1010-61	10BC10	10-SBHU-10	10-10 WBZ	5/8	2.86	0.96	0.50	1 1/16	1	1 1/16	57/64
12-DBHU-12	1210-61	12BC12	12-SBHU-12	12-12 WBZ	3/4	3.11	0.96	0.63	1 3/16	1 1/8	1 3/16	1 1/64
16-DBHU-16	1610-61	16BC16	16-SBHU-16	16-16 WBZ	1	3.80	1.24	0.88	1 5/8	1 1/2	1 5/8	1 21/64

NOTE: Dimensions subject to change, to be used for reference only.

DBUANF/SBUANF
Bulkhead to AN Flare Union



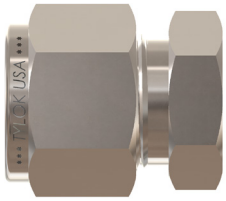


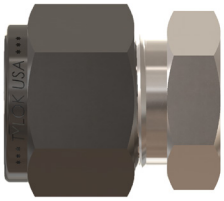
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	THREAD	A	B	E THRU HOLE	JNH JAM NUT HEX	NH NUT HEX	BH BODY HEX	PANEL HOLE
4-DBUANF-4	400-61-4AN	4XABC4	4-SBUANF-4	4-4 XH2BZ	1/4	7/16-20	2.12	0.61	0.17	5/8	9/16	5/8	29/64
6-DBUANF-6	600-61-6AN	6XABC6	6-SBUANF-6	6-6 XH2BZ	3/8	9/16-18	2.26	0.67	0.28	3/4	11/16	3/4	37/64
8-DBUANF-8	810-61-8AN	8XABC8	8-SBUANF-8	8-8 XH2BZ	1/2	3/4-16	2.59	0.90	0.39	15/16	7/8	15/16	49/64
12-DBUANF-12	1210-61-12AN	12XABC12	12-SBUANF-12	12-12 XH2BZ	3/4	1-1/16-12	3.12	0.96	0.61	1 3/16	1 1/8	1 3/16	1 1/64
16-DBUANF-16	1610-61-16AN	16XABC16	16-SBUANF-16	16-16 XH2BZ	1	1-5/6-12	3.65	1.24	0.85	1 5/8	1 1/2	1 5/8	1 21/64

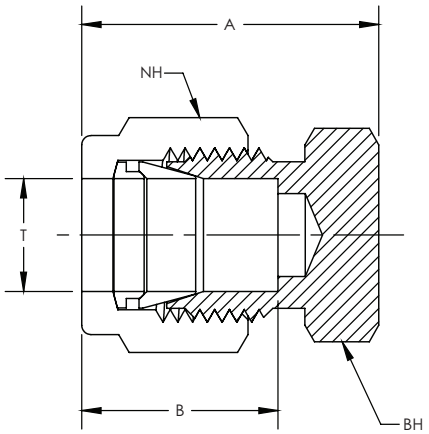
NOTE: Dimensions subject to change, to be used for reference only.

DCAP/SCAP

Cap & Metric Cap

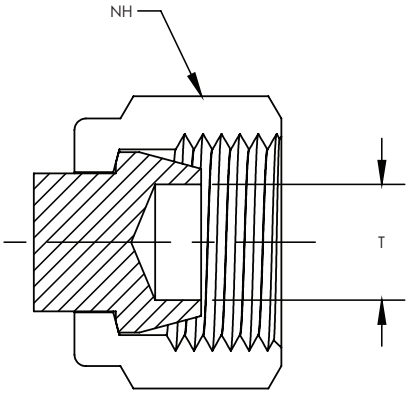






CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	A	B	NH NUT HEX	BH BODY HEX
1-DCAP	100-C	1BLEN1	1-SCAP	1 PNBZ	1/16	0.59	0.34	5/16	5/16
2-DCAP	200-C	2BLEN2	2-SCAP	2 PNBZ	1/8	0.80	0.52	7/16	7/16
3-DCAP	300-C	3BLEN3	3-SCAP	3 PNBZ	3/16	0.84	0.54	1/2	7/16
4-DCAP	400-C	4BLEN4	4-SCAP	4 PNBZ	1/4	0.92	0.61	9/16	1/2
5-DCAP	500-C	5BLEN5	5-SCAP	5 PNBZ	5/16	0.98	0.65	5/8	9/16
6-DCAP	600-C	6BLEN6	6-SCAP	6 PNBZ	3/8	1.01	0.67	11/16	5/8
8-DCAP	810-C	8BLEN8	8-SCAP	8 PNBZ	1/2	1.15	0.90	7/8	13/16
10-DCAP	1010-C	10BLEN10	10-SCAP	10 PNBZ	5/8	1.18	0.96	1	15/16
12-DCAP	1210-C	12BLEN12	12-SCAP	12 PNBZ	3/4	1.24	0.96	1 1/8	1 1/16
14-DCAP	1410-C	14BLEN14	14-SCAP	14 PNBZ	7/8	1.33	1.02	1 1/4	1 3/16
16-DCAP	1610-C	16BLEN16	16-SCAP	16 PNBZ	1	1.52	1.24	1 1/2	1 3/8

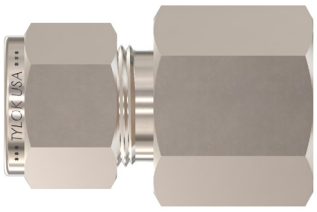
NOTE: Dimensions subject to change, to be used for reference only.

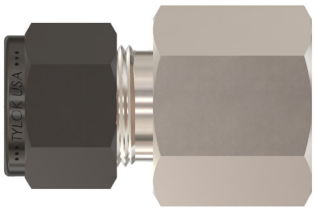


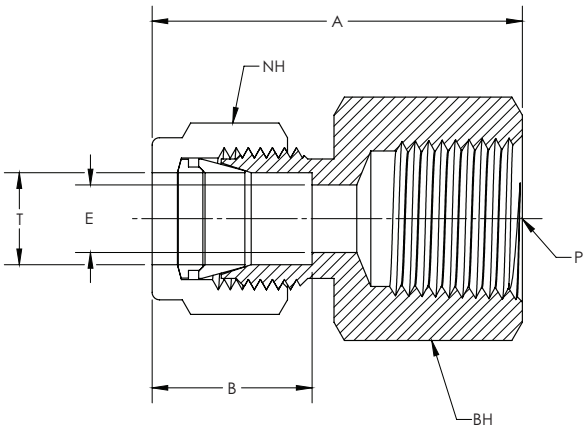
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	NH NUT HEX
1-DF PLUG	100-P	1BLP1	1-SF PLUG	1 FNZ	1/16	5/16
2-DF PLUG	200-P	2BLP2	2-SF PLUG	2 FNZ	1/8	7/16
3-DF PLUG	300-P	3BLP3	3-SF PLUG	3 FNZ	3/16	1/2
4-DF PLUG	400-P	4BLP4	4-SF PLUG	4 FNZ	1/4	9/16
5-DF PLUG	500-P	5BLP5	5-SF PLUG	5 FNZ	5/16	5/8
6-DF PLUG	600-P	6BLP6	6-SF PLUG	6 FNZ	3/8	11/16
8-DF PLUG	810-P	8BLP8	8-SF PLUG	8 FNZ	1/2	7/8
10-DF PLUG	1010-P	10BLP10	10-SF PLUG	10 FNZ	5/8	1
12-DF PLUG	1210-P	12BLP12	12-SF PLUG	12 FNZ	3/4	1 1/8
14-DF PLUG	1410-P	14BLP14	14-SF PLUG	14 FNZ	7/8	1 1/4
16-DF PLUG	1610-P	16BLP16	16-SF PLUG	16 FNZ	1	1 1/2

NOTE: Dimensions subject to change, to be used for reference only.

DFC/SFC
Female Connector

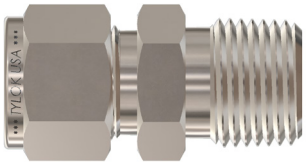


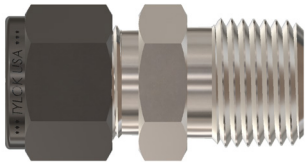


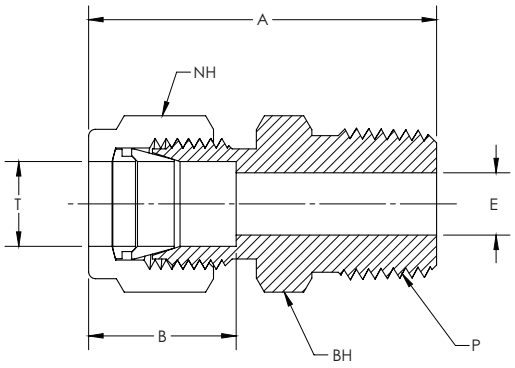


CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P PIPE END NPT	A	B	E THRU HOLE	NH NUT HEX	BH BODY HEX
2-DFC-2	200-7-2	2FSC2N	2-SFC-2	2-2 GBZ	1/8	1/8	1.14	0.52	0.09	7/16	9/16
2-DFC-4	200-7-4	2FSC4N	2-SFC-4	2-4 GBZ	1/8	1/4	1.33	0.52	0.09	7/16	3/4
2-DFC-6	-	-	2-SFC-6	-	1/8	3/8	1.39	0.52	0.09	7/16	7/8
3-DFC-2	300-7-2	3FSC2N	3-SFC-2	3-2 GBZ	3/16	1/8	1.16	0.54	0.13	1/2	9/16
3-DFC-4	-	3FSC4N	3-SFC-4	3-4 GBZ	3/16	1/4	1.35	0.54	0.13	1/2	3/4
4-DFC-2	400-7-2	4FSC2N	4-SFC-2	4-2 GBZ	1/4	1/8	1.23	0.61	0.19	9/16	9/16
4-DFC-4	400-7-4	4FSC4N	4-SFC-4	4-4 GBZ	1/4	1/4	1.42	0.61	0.19	9/16	3/4
4-DFC-6	400-7-6	4FSC6N	4-SFC-6	4-6 GBZ	1/4	3/8	1.48	0.61	0.19	9/16	7/8
4-DFC-8	400-7-8	4FSC8N	4-SFC-8	4-8 GBZ	1/4	1/2	1.67	0.61	0.19	9/16	1-1/16
5-DFC-2	500-7-2	5FSC2N	5-SFC-2	5-2 GBZ	5/16	1/8	1.27	0.65	0.25	5/8	9/16
5-DFC-4	500-7-4	5FSC4N	5-SFC-4	5-4 GBZ	5/16	1/4	1.46	0.65	0.25	5/8	3/4
5-DFC-6	-	5FSC6N	5-SFC-6	5-6 GBZ	5/16	3/8	1.52	0.65	0.25	5/8	7/8
5-DFC-8	-	-	5-SFC-8	-	5/16	1/2	1.71	0.65	0.25	5/8	1-1/16
6-DFC-2	600-7-2	6FSC2N	6-SFC-2	6-2 GBZ	3/8	1/8	1.29	0.67	0.28	11/16	5/8
6-DFC-4	600-7-4	6FSC4N	6-SFC-4	6-4 GBZ	3/8	1/4	1.48	0.67	0.28	11/16	3/4
6-DFC-6	600-7-6	6FSC6N	6-SFC-6	6-6 GBZ	3/8	3/8	1.54	0.67	0.28	11/16	7/8
6-DFC-8	600-7-8	6FSC8N	6-SFC-8	6-8 GBZ	3/8	1/2	1.73	0.67	0.28	11/16	1-1/16
6-DFC-12	600-7-12	6FSC12N	6-SFC-12	6-12 GBZ	3/8	3/4	1.89	0.67	0.28	11/16	1-5/16
8-DFC-4	810-7-4	8FSC4N	8-SFC-4	8-4 GBZ	1/2	1/4	1.59	0.90	0.41	7/8	13/16
8-DFC-6	810-7-6	8FSC6N	8-SFC-6	8-6 GBZ	1/2	3/8	1.65	0.90	0.41	7/8	7/8
8-DFC-8	810-7-8	8FSC8N	8-SFC-8	8-8 GBZ	1/2	1/2	1.84	0.90	0.41	7/8	1-1/16
8-DFC-12	810-7-12	8FSC12N	8-SFC-12	8-12 GBZ	1/2	3/4	1.90	0.90	0.41	7/8	1-5/16
8-DFC-16	810-7-16	-	8-SFC-16	-	1/2	1	2.27	0.90	0.41	7/8	1-5/8
10-DFC-4	-	-	10-SFC-4	-	5/8	1/4	1.80	0.96	0.44	1	15/16
10-DFC-6	1010-7-6	10FSC6N	10-SFC-6	10-6 GBZ	5/8	3/8	1.65	0.96	0.50	1	15/16
10-DFC-8	1010-7-8	10FSC8N	10-SFC-8	10-8 GBZ	5/8	1/2	1.83	0.96	0.50	1	1-1/16
10-DFC-12	1010-7-12	10FSC12N	10-SFC-12	10-12 GBZ	5/8	3/4	1.90	0.96	0.50	1	1-5/16
12-DFC-6	1210-7-6	-	12-SFC-6	-	3/4	3/8	1.67	0.96	0.56	1-1/8	1-1/16
12-DFC-8	1210-7-8	12FSC8N	12-SFC-8	12-8 GBZ	3/4	1/2	1.84	0.96	0.63	1-1/8	1-1/16
12-DFC-12	1210-7-12	12FSC12N	12-SFC-12	12-12 GBZ	3/4	3/4	1.90	0.96	0.63	1-1/8	1-5/16
12-DFC-16	1210-7-16	-	12-SFC-16	-	3/4	1	2.28	0.96	0.63	1-1/8	1-5/8
14-DFC-8	-	-	14-SFC-8	-	7/8	1/2	1.83	1.02	0.70	1-1/4	1-3/16
14-DFC-12	1410-7-12	14FSC12N	14-SFC-12	14-12 GBZ	7/8	3/4	1.96	1.02	0.72	1-1/4	1-3/8
16-DFC-6	-	-	16-SFC-6	-	1	3/8	2.15	1.24	0.56	1-1/2	1-3/8
16-DFC-8	1610-7-8	-	16-SFC-8	-	1	1/2	2.15	1.24	0.70	1-1/2	1-3/8
16-DFC-12	1610-7-12	16FSC12N	16-SFC-12	16-12 GBZ	1	3/4	2.12	1.24	0.88	1-1/2	1-3/8
16-DFC-16	1610-7-16	16FSC16N	16-SFC-16	16-16 GBZ	1	1	2.46	1.24	0.88	1-1/2	1-5/8

NOTE: Dimensions subject to change, to be used for reference only.



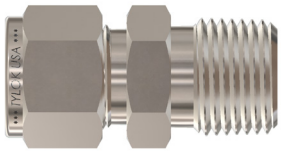


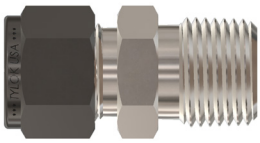


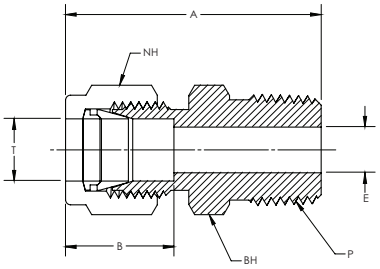
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P PIPE END NPT	A	B	E THRU HOLE	NH NUT HEX	BH BODY HEX
1-DMC-1	100-1-1	1MSC1N	1-SMC-1	1-1 FBZ	1/16	1/16	0.95	0.34	0.05	5/16	5/16
1-DMC-2	100-1-2	1MSC2N	1-SMC-2	1-2 FBZ	1/16	1/8	1.03	0.34	0.05	5/16	7/16
2-DMC-1	200-1-1	2MSC1N	2-SMC-1	2-1 FBZ	1/8	1/16	1.17	0.52	0.09	7/16	7/16
2-DMC-2	200-1-2	2MSC2N	2-SMC-2	2-2 FBZ	1/8	1/8	1.20	0.52	0.09	7/16	7/16
2-DMC-4	200-1-4	2MSC4N	2-SMC-4	2-4 FBZ	1/8	1/4	1.41	0.52	0.09	7/16	9/16
2-DMC-6	200-1-6	2MSC6N	2-SMC-6	2-6 FBZ	1/8	3/8	1.42	0.52	0.09	7/16	11/16
2-DMC-8	200-1-8	2MSC8N	2-SMC-8	2-8 FBZ	1/8	1/2	1.67	0.52	0.09	7/16	7/8
3-DMC-2	300-1-2	3MSC2N	3-SMC-2	3-2 FBZ	3/16	1/8	1.23	0.54	0.13	1/2	7/16
3-DMC-4	300-1-4	3MSC4N	3-SMC-4	3-4 FBZ	3/16	1/4	1.43	0.54	0.13	1/2	9/16
4-DMC-1	400-1-1	4MSC1N	4-SMC-1	4-1 FBZ	1/4	1/16	1.29	0.61	0.13	9/16	1/2
4-DMC-2	400-1-2	4MSC2N	4-SMC-2	4-2 FBZ	1/4	1/8	1.29	0.61	0.19	9/16	1/2
4-DMC-4	400-1-4	4MSC4N	4-SMC-4	4-4 FBZ	1/4	1/4	1.49	0.61	0.19	9/16	9/16
4-DMC-6	400-1-6	4MSC6N	4-SMC-6	4-6 FBZ	1/4	3/8	1.51	0.61	0.19	9/16	11/16
4-DMC-8	400-1-8	4MSC8N	4-SMC-8	4-8 FBZ	1/4	1/2	1.76	0.61	0.19	9/16	7/8
4-DMC-12	400-1-12	4MSC12N	4-SMC-12	4-12 FBZ	1/4	3/4	1.82	0.61	0.19	9/16	1-1/16
5-DMC-2	500-1-2	5MSC2N	5-SMC-2	5-2 FBZ	5/16	1/8	1.35	0.65	0.19	5/8	9/16
5-DMC-4	500-1-4	5MSC4N	5-SMC-4	5-4 FBZ	5/16	1/4	1.54	0.65	0.25	5/8	9/16
5-DMC-6	500-1-6	5MSC6N	5-SMC-6	5-6 FBZ	5/16	3/8	1.56	0.65	0.25	5/8	11/16
5-DMC-8	500-1-8	5MSC8N	5-SMC-8	5-8 FBZ	5/16	1/2	1.77	0.65	0.25	5/8	7/8
6-DMC-2	600-1-2	6MSC2N	6-SMC-2	6-2 FBZ	3/8	1/8	1.39	0.67	0.19	11/16	5/8
6-DMC-4	600-1-4	6MSC4N	6-SMC-4	6-4 FBZ	3/8	1/4	1.57	0.67	0.28	11/16	5/8
6-DMC-6	600-1-6	6MSC6N	6-SMC-6	6-6 FBZ	3/8	3/8	1.57	0.67	0.28	11/16	11/16
6-DMC-8	600-1-8	6MSC8N	6-SMC-8	6-8 FBZ	3/8	1/2	1.83	0.67	0.28	11/16	7/8
6-DMC-12	600-1-12	6MSC12N	6-SMC-12	6-12 FBZ	3/8	3/4	1.89	0.67	0.28	11/16	1-1/16
6-DMC-16	600-1-16	-	6-SMC-16	-	3/8	1	2.14	0.67	0.28	11/16	1-3/8
8-DMC-2	810-1-2	8MSC2N	8-SMC-2	8-2 FBZ	1/2	1/8	1.52	0.90	0.19	7/8	13/16
8-DMC-4	810-1-4	8MSC4N	8-SMC-4	8-4 FBZ	1/2	1/4	1.71	0.90	0.28	7/8	13/16
8-DMC-6	810-1-6	8MSC6N	8-SMC-6	8-6 FBZ	1/2	3/8	1.71	0.90	0.38	7/8	13/16
8-DMC-8	810-1-8	8MSC8N	8-SMC-8	8-FBZ	1/2	1/2	1.93	0.90	0.41	7/8	7/8
8-DMC-12	810-1-12	8MSC12N	8-SMC-12	8-12 FBZ	1/2	3/4	1.99	0.90	0.41	7/8	1-1/16
8-DMC-16	810-1-16	8MSC16N	8-SMC-16	8-16 FBZ	1/2	1	2.26	0.90	0.41	7/8	1-3/8
10-DMC-4	1010-1-4	-	10-SMC-4	-	5/8	1/4	1.74	0.96	0.28	1	15/16
10-DMC-6	1010-1-6	10MSC6N	10-SMC-6	10-6 FBZ	5/8	3/8	1.74	0.96	0.38	1	15/16
10-DMC-8	1010-1-8	10MSC8N	10-SMC-8	10-8 FBZ	5/8	1/2	1.93	0.96	0.47	1	15/16
10-DMC-12	1010-1-12	10MSC12N	10-SMC-12	10-12 FBZ	5/8	3/4	1.99	0.96	0.50	1	1-1/16

NOTE: Dimensions subject to change, to be used for reference only.

DMC/SMC
Male Connector

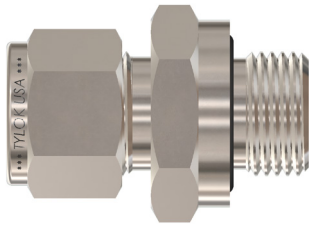


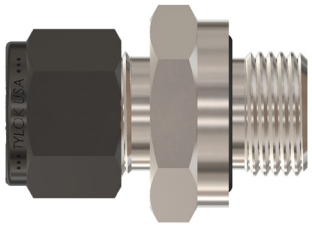


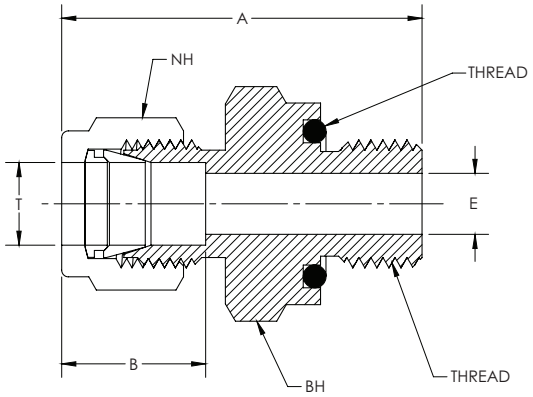


CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P PIPE END NPT	A	B	E THRU HOLE	NH NUT HEX	BH BODY HEX
12-DMC-4	1210-1-4	-	12-SMC-4	-	3/4	1/4	1.81	0.96	0.28	1-1/8	1-1/16
12-DMC-6	1210-1-6	-	12-SMC-6	-	3/4	3/8	1.81	0.96	0.38	1-1/8	1-1/16
12-DMC-8	1210-1-8	12MSC8N	12-SMC-8	12-8 FBZ	3/4	1/2	1.99	0.96	0.47	1-1/8	1-1/16
12-DMC-12	1210-1-12	12MSC12N	12-SMC-12	12-12 FBZ	3/4	3/4	1.99	0.96	0.63	1-1/8	1-1/16
12-DMC-16	1210-1-16	12MSC16N	12-SMC-16	12-16 FBZ	3/4	1	2.26	0.96	0.63	1-1/8	1-3/8
14-DMC-6		-	14-SMC-6	-	7/8	3/8	1.80	1.02	0.38	1-1/4	1-3/16
14-DMC-8	1410-1-8	-	14-SMC-8	-	7/8	1/2	1.99	1.02	0.47	1-1/4	1-3/16
14-DMC-12	1410-1-12	14MSC12N	14-SMC-12	14-12 FBZ	7/8	3/4	1.99	1.02	0.63	1-1/4	1-3/16
14-DMC-16	1410-1-16	14MSC16N	14-SMC-16	14-16 FBZ	7/8	1	2.26	1.02	0.72	1-1/4	1-3/8
16-DMC-8	1610-1-8	16MSC8N	16-SMC-8	16-8 FBZ	1	1/2	2.27	1.24	0.47	1-1/2	1-3/8
16-DMC-12	1610-1-12	16MSC12N	16-SMC-12	16-12 FBZ	1	3/4	2.27	1.24	0.63	1-1/2	1-3/8
16-DMC-16	1610-1-6	16MSC16N	16-SMC-16	16-16 FBZ	1	1	2.46	1.24	0.88	1-1/2	1-3/8
B-18-DMC-12	-	-	-	-	1-1/8	3/4	2.27	1.25	0.63	1-3/4	1-5/8
B-18-DMC-16	B-1810-1-16	-	-	-	1-1/8	1	2.46	1.25	0.88	1-3/4	1-5/8

NOTE: Dimensions subject to change, to be used for reference only.





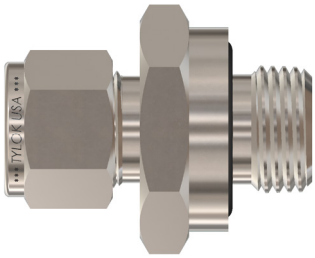


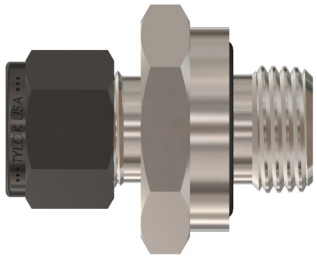
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	THREAD	A	B	E THRU HOLE	NH NUT HEX	BH BODY HEX	O-RING
2-DMC-ORS	200-1-OR2	M2SC2	2-SMC-ORS	2-2 ZHBA5	1/8	5/16-24	1.30	0.52	0.09	7/16	9/16	AS-011
4-DMC-ORS	400-1-OR4	M2SC4	4-SMC-ORS	4-4 ZHBA5	1/4	7/16-20	1.51	0.61	0.19	9/16	3/4	AS-111
6-DMC-ORS	600-1-OR6	M2SC6	6-SMC-ORS	6-6 ZHBA5	3/8	9/16-18	1.67	0.67	0.28	11/16	15/16	AS-113
8-DMC-ORS	810-1-OR8	M2SC8	8-SMC-ORS	8-8 ZHBA5	1/2	3/4-16	1.80	0.90	0.41	7/8	1-1/8	AS-116
12-DMC-ORS	1210-1-OR	12M2SC12	12-SMC-ORS	12-12 ZHBA5	3/4	1-1/16-12	2.06	0.96	0.63	1-1/8	1-1/2	AS-215
16-DMC-ORS	1610-1-OR	16M2SC16	16-SMC-ORS	16-16 ZHBA5	1	1-5/16-12	2.30	1.24	0.88	1-1/2	1-3/4	AS-219

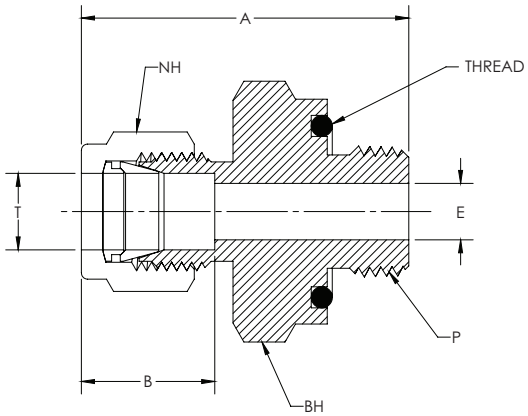
NOTE: Dimensions subject to change, to be used for reference only.
Standard O-Ring material is Buna-N, 70 durometer.

DMC-ORT/SMC-ORT

O-Ring Tapered Thread Male Connector

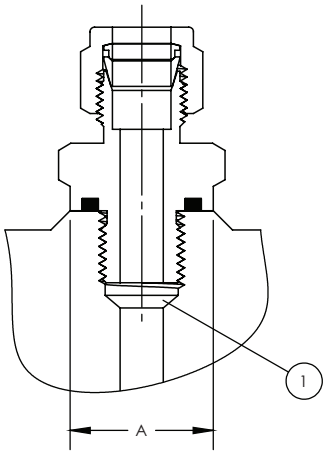






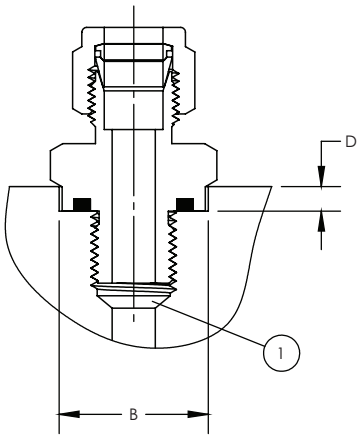
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P PIPE END NPT	A	B	E THRU HOLE	NH NUT HEX	BH BODY HEX	O-RING
4-DMC-2-ORT	400-1-2-OR	4M3SC2	4-SMC-2-ORT	4-2 ZHBF5	1/4	1/8	1.38	0.61	0.19	9/16	3/4	AS-111
4-DMC-4-ORT	400-1-4-OR	4M3SC4	4-SMC-4-ORT	4-4 ZHBF5	1/4	1/4	1.51	0.61	0.19	9/16	15/16	AS-113
6-DMC-6-ORT	600-1-6-OR	6M3SC6	6-SMC-6-ORT	6-6 ZHBF5	3/8	3/8	1.64	0.67	0.28	11/16	1-1/8	AS-116
6-DMC-8-ORT	600-1-8-OR	6M3SC8	6-SMC-8-ORT	6-8 ZHBF5	3/8	1/2	1.86	0.67	0.28	11/16	1-5/16	AS-212
8-DMC-4-ORT	-	8M3SC4	8-SMC-4-ORT	8-4 ZHBF5	1/2	1/4	1.68	0.90	0.28	7/8	15/16	AS-113
8-DMC-8-ORT	810-1-8-OR	8M3SC8	8-SMC-8-ORT	8-8 ZHBF5	1/2	1/2	1.96	0.90	0.41	7/8	1-5/16	AS-212

NOTE: Dimensions subject to change, to be used for reference only.



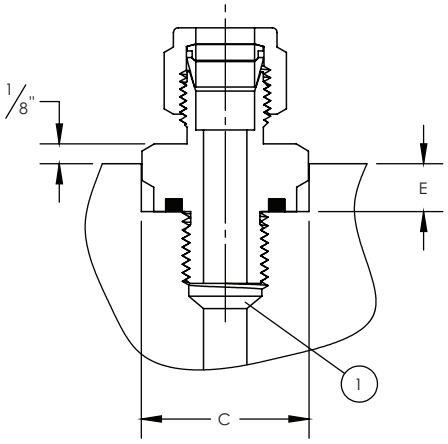
RAISED SURFACE

Minimum diameter is larger than the O-Ring sealing diameter to prevent O-Ring extrusion.



RECESSED HOLE (SHOULDER CLEARANCE)

Minimum diameter allows clearance for round shoulder of fitting into recess.



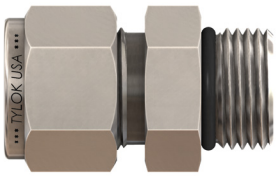
RECESSED HOLE (HEX CLEARANCE)

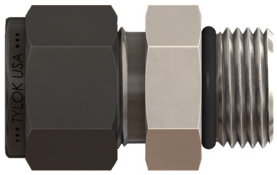
Minimum diameter allows clearance for hex of fitting into recess.

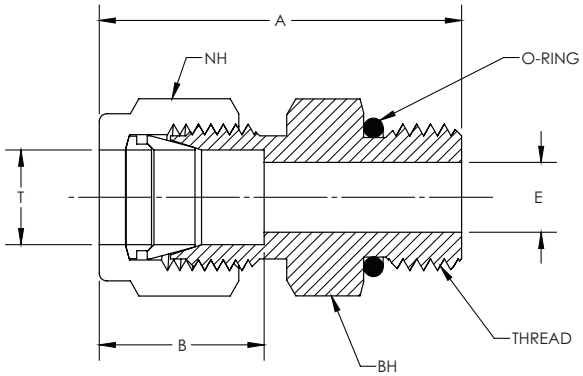
THREAD SIZE	NPT SIZE	A MIN DIA	B MIN DIA	C MIN DIA	D MAX DEPTH	E MAX DEPTH
5/16-24	-	0.50	0.59	0.66	0.09	0.16
5/16-24	-	0.50	0.59	0.66	0.09	0.22
-	1/8	0.69	0.78	0.88	0.16	0.28
3/8-24	-	0.56	0.66	0.75	0.09	0.22
7/16-20	-	0.69	0.78	0.88	0.16	0.28
-	1/8	0.69	0.78	0.88	0.16	0.28
-	1/4	0.87	0.97	1.09	0.16	0.31
1/2-20	-	0.75	0.91	1.03	0.16	0.31
9/16-18	-	0.81	0.97	1.09	0.16	0.31
-	1/4	0.87	0.97	1.09	0.16	0.31
-	3/8	1.00	1.16	1.31	0.16	0.34
-	1/2	1.22	1.34	1.53	0.22	0.44
3/4-16	-	1.00	1.16	1.31	0.16	0.34
-	1/2	1.22	134	1.53	0.22	0.44
1-1/16-12	-	1.41	1.53	1.75	0.22	0.50
1-5/16-12	-	1.69	1.78	2.03	0.22	0.56

DMC-STB/SMC-STB

Straight Thread Boss Male Connector





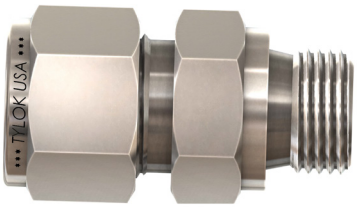


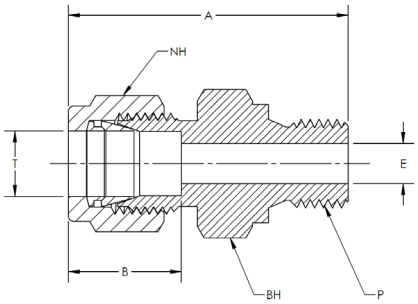
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	THREAD	A	B	E THRU HOLE	NH NUT HEX	BH BODY HEX	O-RING
4-DMC-4-STB	400-1-4ST	4M1SC4	4-SMC-4-STB	4-4 ZHBA	1/4	7/16-20	1.34	0.61	0.17	9/16	9/16	AS-904
6-DMC-4-STB	600-1-4ST	6M1SC4	6-SMC-4-STB	6-4 ZHBA	3/8	7/16-20	1.40	0.67	0.17	11/16	5/8	AS-904
6-DMC-6-STB	600-1-6ST	6M1SC6	6-SMC-6-STB	6-6 ZHBA	3/8	9/16-18	1.47	0.67	0.30	11/16	11/16	AS-906
8-DMC-6-STB	810-1-6ST	8M1SC6	8-SMC-6-STB	8-6 ZHBA	1/2	9/16-18	1.54	0.90	0.30	7/8	13/16	AS-906
8-DMC-8-STB	810-1-8ST	8M1SC8	8-SMC-8-STB	8-8 ZHBA	1/2	3/4-16	1.65	0.90	0.39	7/8	7/8	AS-908
12-DMC-12-STB	1210-1-12ST	12M1SC12	12-SMC-12-STB	12-12 ZHBA	3/4	1-1/16-12	1.93	0.96	0.61	1-1/8	1-1/4	AS-212
16-DMC-16-STB	1610-1-16ST	16M1SC16	16-SMC-16-STB	16-16 ZHBA	1	1-5/16-12	2.15	1.24	0.85	1-1/2	1-1/2	AS-916

NOTE: Dimensions subject to change, to be used for reference only.
Adapts to J1926/1 and ISO 11926-1 Straight Thread Boss.
Standard O-Ring material is FKM, 90 durometer.

DMC-RS/SMC-RS

BSPP Straight Thread Male Connector

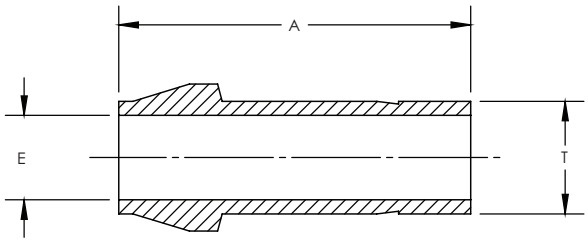




CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P BSPP THREAD SIZE	A	B	E THRU HOLE	NH NUT HEX	BH BODY HEX
2-DMC-2-RS	200-1-2RS	2MSC2R	2-SMC-2-RS	2-2R FBZ	1/8	1/8	1.31	0.52	0.09	7/16	9/16
2-DMC-4-RS	200-1-4RS	2MSC4R	2-SMC-4-RS	2-4R FBZ	1/8	1/4	1.50	0.52	0.09	7/16	3/4
2-DMC-6-RS	200-1-6RS	2MSC6R	2-SMC-6-RS	2-6R FBZ	1/8	3/8	1.53	0.52	0.09	7/16	7/8
4-DMC-2-RS	400-1-2RS	4MSC2R	4-SMC-2-RS	4-2R FBZ	1/4	1/8	1.40	0.61	0.16	9/16	9/16
4-DMC-4-RS	400-1-4RS	4MSC4R	4-SMC-4-RS	4-4R FBZ	1/4	1/4	1.59	0.61	0.19	9/16	3/4
4-DMC-6-RS	400-1-6RS	4MSC6R	4-SMC-6-RS	4-6R FBZ	1/4	3/8	1.62	0.61	0.19	9/16	7/8
4-DMC-8-RS	400-1-8RS	4MSC8R	4-SMC-8-RS	4-8R FBZ	1/4	1/2	1.70	0.61	0.19	9/16	1-1/16
6-DMC-2-RS	600-1-2RS	6MSC2R	6-SMC-2-RS	6-2R FBZ	3/8	1/8	1.49	0.67	0.16	11/16	5/8
6-DMC-4-RS	600-1-4RS	6MSC4R	6-SMC-4-RS	6-4R FBZ	3/8	1/4	1.65	0.67	0.23	11/16	3/4
6-DMC-6-RS	600-1-6RS	6MSC6R	6-SMC-6-RS	6-6R FBZ	3/8	3/8	1.68	0.67	0.28	11/16	7/8
6-DMC-8-RS	600-1-8RS	6MSC8R	6-SMC-8-RS	6-8R FBZ	3/8	1/2	1.76	0.67	0.28	11/16	1-1/16
8-DMC-4-RS	810-1-4RS	8MSC4R	8-SMC-4-RS	8-4R FBZ	1/2	1/4	1.76	0.90	0.23	7/8	13/16
8-DMC-6-RS	810-1-6RS	8MSC6R	8-SMC-6-RS	8-6R FBZ	1/2	3/8	1.79	0.90	0.31	7/8	7/8
8-DMC-8-RS	810-1-8RS	8MSC8R	8-SMC-8-RS	8-8R FBZ	1/2	1/2	1.87	0.90	0.38	7/8	1-1/16
12-DMC-8-RS	1210-1-8RS	12MSC8R	12-SMC-8-RS	12-8R FBZ	3/4	1/2	1.92	0.96	0.38	1 1/8	1-1/16
12-DMC-12-RS	1210-1-12RS	12MSC12R	12-SMC-12-RS	12-12R FBZ	3/4	3/4	2.05	0.96	0.58	1 1/8	1-5/16
16-DMC-8-RS	1610-1-8RS	16MSC8R	16-SMC-8-RS	16-8R FBZ	1	1/2	2.19	1.24	0.38	1 1/2	1-3/8
16-DMC-12-RS	1610-1-12RS		16-SMC-12-RS		1	3/4	2.27	1.24	0.58	1 1/2	1-3/8
16-DMC-16-RS	1610-1-16RS	16MSC16R	16-SMC-16-RS	16-16R FBZ	1	1	2.35	1.24	0.78	1 1/2	1-5/8

Note: BSPP threaded end requires a sealing washer.

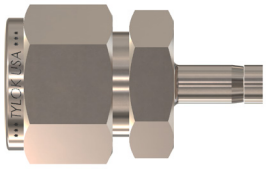
DPCU/SPCU
Port Connector Union

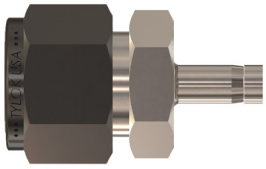


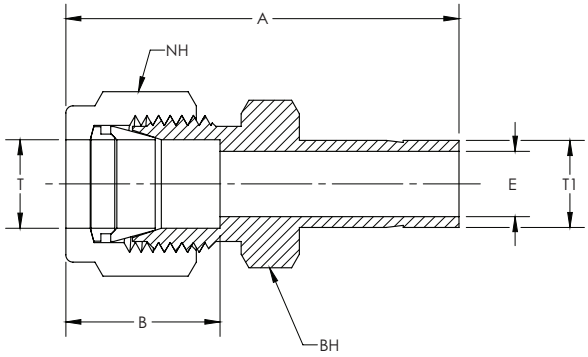
CBC PART NUMBER	INTERCHANGES WITH	CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	A	E THRU HOLE
2-DPCU	U201-PC 2PC2	2-SPCU	2-2 ZPC	1/8	1.08	0.08
4-DPCU	401-PC 4PC4	4-SPCU	4-4 ZPC	1/4	1.13	0.17
6-DPCU	601-PC 6PC6	6-SPCU	6-6 ZPC	3/8	1.28	1.27
8-DPCU	811-PC 8PC8	8-SPCU	8-8 ZPC	1/2	1.69	0.38
12-DPCU	1211-PC 12PC12	12-SPCU	12-12 ZPC	3/4	1.75	0.58
16-DPCU	1611-PC 16PC16	16-SPCU	16-16 ZPC	1	2.10	0.80

NOTE: Dimensions subject to change, to be used for reference only.

DRATT/SRATT
Reducer Adapter Tube to Tube



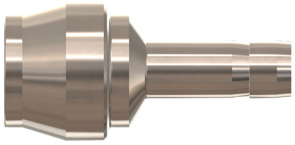


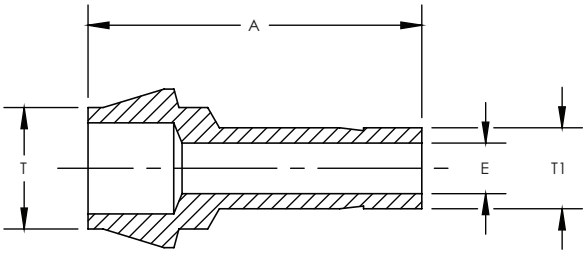


CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	T1 TUBE O.D.	A	B	E THRU HOLE	NH NUT HEX	BH BODY HEX
1-DRATT-2	100-R-2	2TUR1	1-SRATT-2	2-1 TRBZ	1/16	1/8	1.15	0.34	0.05	5/16	5/16
2-DRATT-1	200-R-1	1TUR2	2-SRATT-1	1-2 TRBZ	1/8	1/16	1.14	0.52	0.03	7/16	7/16
2-DRATT-2	200-R-2	2TUR2	2-SRATT-2	2-2 TRBZ	1/8	1/8	1.32	0.52	0.08	7/16	7/16
2-DRATT-4	200-R-4	4TUR2	2-SRATT-4	4-2 TRBZ	1/8	1/4	1.42	0.52	0.09	7/16	7/16
2-DRATT-6	200-R-6	6TUR2	2-SRATT-6	6-2 TRBZ	1/8	3/8	1.48	0.52	0.09	7/16	7/16
3-DRATT-4	300-R-4	-	3-SRATT-4	-	3/16	1/4	1.46	0.54	0.13	1/2	7/16
4-DRATT-2	400-R-2	2TUR4	4-SRATT-2	2-4 TRBZ	1/4	1/8	1.45	0.61	0.08	9/16	1/2
4-DRATT-4	400-R-4	4TUR4	4-SRATT-4	4-4 TRBZ	1/4	1/4	1.54	0.61	0.17	9/16	1/2
4-DRATT-6	400-R-6	6TUR4	4-SRATT-6	6-4 TRBZ	1/4	3/8	1.60	0.61	0.19	9/16	1/2
4-DRATT-8	400-R-8	8TUR4	4-SRATT-8	8-4 TRBZ	1/4	1/2	1.82	0.61	0.19	9/16	9/16
5-DRATT-6	500-R-6	6TUR5	5-SRATT-6	6-5 TRBZ	5/16	3/8	1.65	0.65	0.25	5/8	9/16
6-DRATT-4	600-R-4	4TUR6	6-SRATT-4	4-6 TRBZ	3/8	1/4	1.63	0.67	0.17	11/16	5/8
6-DRATT-6	600-R-6	6TUR6	6-SRATT-6	6-6 TRBZ	3/8	3/8	1.70	0.67	0.27	11/16	5/8
6-DRATT-8	600-R-8	8TUR6	6-SRATT-8	8-6 TRBZ	3/8	1/2	1.92	0.67	0.28	11/16	5/8
6-DRATT-10	600-R-10	10TUR6	6-SRATT-10	10-6 TRBZ	3/8	5/8	1.98	0.67	0.28	11/16	11/16
6-DRATT-12	600-R-12	12TUR6	6-SRATT-12	12-6 TRBZ	3/8	3/4	1.98	0.67	0.28	11/16	13/16
8-DRATT-4	810-R-4	4TUR8	8-SRATT-4	4-8 TRBZ	1/2	1/4	1.77	0.90	0.17	7/8	13/16
8-DRATT-6	810-R-6	6TUR8	8-SRATT-6	6-8 TRBZ	1/2	3/8	1.84	0.90	0.27	7/8	13/16
8-DRATT-8	810-R-8	-	8-SRATT-8	-	1/2	1/2	2.06	0.90	0.38	7/8	13/16
8-DRATT-10	810-R-10	10TUR8	8-SRATT-10	10-8 TRBZ	1/2	5/8	2.12	0.90	0.41	7/8	13/16
8-DRATT-12	810-R-12	12TUR8	8-SRATT-12	12-8 TRBZ	1/2	3/4	2.12	0.90	0.41	7/8	13/16
8-DRATT-14	-	-	8-SRATT-14	-	1/2	7/8	2.21	0.90	0.41	7/8	15/16
8-DRATT-16	810-R-16	16TUR8	8-SRATT-16	16-8 TRBZ	1/2	1	2.37	0.90	0.41	7/8	1-1/16
10-DRATT-12	1010-R-12	12TUR10	10-SRATT-12	12-10 TRBZ	5/8	3/4	2.15	0.96	0.50	1	15/16
10-DRATT-14	1010-R-14	14TUR10	10-SRATT-14	14-10 TRBZ	5/8	7/8	2.21	0.96	0.50	1	15/16
10-DRATT-16	-	-	-	-	5/8	1	2.40	0.96	0.50	1	1-1/16
12-DRATT-8	1210-R-8	8TUR12	12-SRATT-8	8-12 TRBZ	3/4	1/2	2.15	0.96	0.38	1-1/8	1-1/16
12-DRATT-16	1210-R-16	16TUR12	12-SRATT-16	16-12 TRBZ	3/4	1	2.46	0.96	0.63	1-1/8	1-1/16
14-DRATT-16	-	-	14-SRATT-16	-	7/8	1	2.54	1.02	0.72	1-1/4	1-3/16
16-DRATT-16	-	-	16-SRATT-16	-	1	1	2.82	1.24	0.80	1-1/2	1-3/8

NOTE: Dimensions subject to change, to be used for reference only.

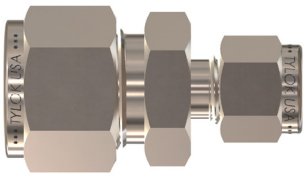
DRPC/SRPC
Reducing Port Connector

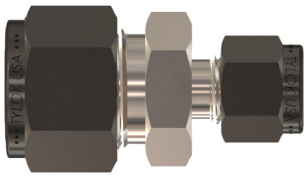


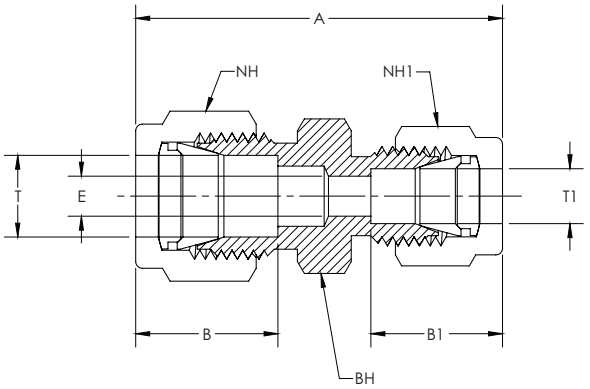


CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	T1 TUBE O.D.	A	E THRU HOLE
4-DRPC-2	401-PC-2	2PC4	4-SRPC-2	2-4 ZPC	1/4	1/8	1.08	0.08
6-DRPC-4	601-PC-4	4PC6	6-SRPC-4	4-6 ZPC	3/8	1/4	1.12	0.17
8-DRPC-4	811-PC-4	4PC8	8-SRPC-4	4-8 ZPC	1/2	1/4	1.32	0.17
8-DRPC-6	811-PC-6	6PC8	8-SRPC-6	6-8 ZPC	1/2	3/8	1.43	0.27
12-DRPC-8	1211-PC-8	8PC12	12-SRPC-8	8-12 ZPC	3/4	1/2	1.71	0.38

NOTE: Dimensions subject to change, to be used for reference only.





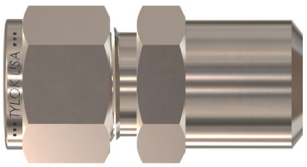


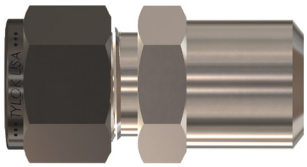
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	T1 TUBE O.D.	A	B	B1	E THRU HOLE	NH NUT HEX	NH1 NUT HEX	BH BODY HEX
2-DRU-1	200-6-1	2RU1	2-SRU-1	2-1 HBZ	1/8	1/16	1.23	0.52	0.34	0.05	7/16	5/16	7/16
4-DRU-1	400-6-1	4RU1	4-SRU-1	4-1 HBZ	1/4	1/16	1.35	0.61	0.34	0.05	9/16	5/16	1/2
4-DRU-2	400-6-2	4RU2	4-SRU-2	4-2 HBZ	1/4	1/8	1.52	0.61	0.52	0.09	9/16	7/16	1/2
4-DRU-3	400-6-3	4RU3	4-SRU-3	4-3 HBZ	1/4	3/16	1.55	0.61	0.54	0.13	9/16	1/2	1/2
5-DRU-2	500-6-2	5RU2	5-SRU-2	5-2 HBZ	5/16	1/8	1.59	0.65	0.52	0.09	5/8	7/16	9/16
5-DRU-4	500-6-4	5RU4	5-SRU-4	5-4 HBZ	5/16	1/4	1.68	0.65	0.61	0.19	5/8	9/16	9/16
6-DRU-1	600-6-1	6RU1	6-SRU-1	6-1 HBZ	3/8	1/16	1.45	0.67	0.34	0.05	11/16	5/16	5/8
6-DRU-2	600-6-2	6RU2	6-SRU-2	6-2 HBZ	3/8	1/8	1.62	0.67	0.52	0.09	11/16	7/16	5/8
6-DRU-4	600-6-4	6RU4	6-SRU-4	6-4 HBZ	3/8	1/4	1.71	0.67	0.61	0.19	11/16	9/16	5/8
6-DRU-5	600-6-5	6RU5	6-SRU-5	6-5 HBZ	3/8	5/16	1.76	0.67	0.65	0.25	11/16	5/8	5/8
8-DRU-2	810-6-2	8RU2	8-SRU-2	8-2 HBZ	1/2	1/8	1.79	0.90	0.52	0.09	7/8	7/16	13/16
8-DRU-4	810-6-4	8RU4	8-SRU-4	8-4 HBZ	1/2	1/4	1.85	0.90	0.61	0.19	7/8	9/16	13/16
8-DRU-6	810-6-6	8RU6	8-SRU-6	8-6 HBZ	1/2	3/8	1.91	0.90	0.67	0.28	7/8	11/16	13/16
10-DRU-6	1010-6-6	10RU6	10-SRU-6	10-6 HBZ	5/8	3/8	1.94	0.96	0.67	0.28	1	11/16	15/16
10-DRU-8	1010-6-8	10RU8	10-SRU-8	10-8 HBZ	5/8	1/2	2.05	0.96	0.90	0.41	1	7/8	15/16
12-DRU-4	1210-6-4	12RU4	12-SRU-4	12-4 HBZ	3/4	1/4	1.94	0.96	0.61	0.19	1-1/8	9/16	1-1/16
12-DRU-6	1210-6-6	12RU6	12-SRU-6	12-6 HBZ	3/4	3/8	2.01	0.96	0.67	0.28	1-1/8	11/16	1-1/16
12-DRU-8	1210-6-8	12RU8	12-SRU-8	12-8 HBZ	3/4	1/2	2.11	0.96	0.90	0.41	1-1/8	7/8	1-1/16
12-DRU-10	1210-6-10	12RU10	12-SRU-10	12-10 HBZ	3/4	5/8	2.11	0.96	0.96	0.50	1-1/8	1	1-1/16
16-DRU-8	1610-6-8	16RU8	16-SRU-8	16-8 HBZ	1	1/2	2.48	1.24	0.90	0.41	1-1/2	7/8	1-3/8
16-DRU-12	1610-6-12	16RU12	16-SRU-12	16-12 HBZ	1	3/4	2.49	1.24	0.96	0.63	1-1/2	1-1/8	1-3/8

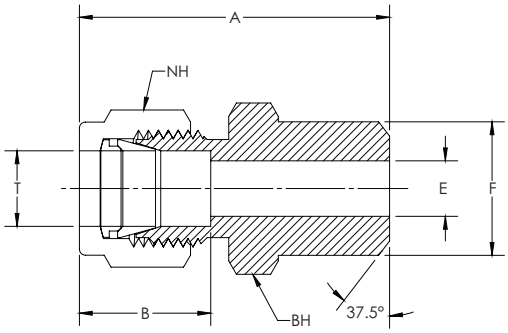
NOTE: Dimensions subject to change, to be used for reference only.

DTBW/STBW

Tube to Pipe Butt Weld Connector





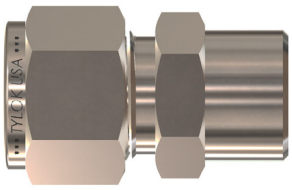


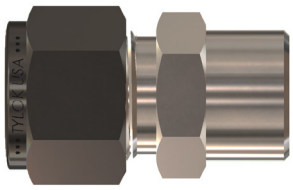
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	PIPE WELD SIZE	A	B	E THRU HOLE	F	NH1 NUT HEX	BH BODY HEX
4-DTBW-4	400-1-4W	4-1/4 ZHLW2	4-STBW-4	4-1/4 ZHBW2	1/4	1/4	1.48	0.61	0.19	0.54	9/16	9/16
6-DTBW-4	600-1-4W	6-1/4 ZHLW2	6-STBW-4	6-1/4 ZHBW2	3/8	1/4	1.58	0.67	0.28	0.54	11/16	5/8
6-DTBW-6	600-1-6W	6-3/8 ZHLW2	6-STBW-6	6-3/8 ZHBW2	3/8	3/8	1.58	0.67	0.28	0.68	11/16	3/4
6-DTBW-8	600-1-8W	6 1/2 ZHLW2	6-STBW-8	6 1/2 ZHBW2	3/8	1/2	1.83	0.67	0.28	0.84	11/16	7/8
8-DTBW-6	810-1-6W	8 3/8 ZHLW2	8-STBW-6	8 3/8 ZHBW2	1/2	3/8	1.71	0.90	0.41	0.68	7/8	13/16
8-DTBW-8	810-1-8W	8-1/2 ZHLW2	8-STBW-8	8-1/2 ZHBW2	1/2	1/2	1.93	0.90	0.41	0.84	7/8	7/8
8-DTBW-16	810-1-16W	-	8-STBW-16	-	1/2	1	2.18	0.90	0.41	1.32	7/8	1-3/8
12-DTBW-12	1210-1-12W	12-3/4 ZHLW2	12-STBW-12	12-3/4 ZHBW2	3/4	3/4	1.99	0.96	0.63	1.05	1-1/8	1-1/16
16-DTBW-12	1610-1-12W	-	16-STBW-12	-	1	3/4	2.24	1.24	0.63	1.05	1-1/2	1-3/8
16-DTBW-16	1610-1-16W	16-1 ZHLW2	16-STBW-16	16-1 ZHBW2	1	1	2.46	1.24	0.88	1.32	1-1/2	1-3/8

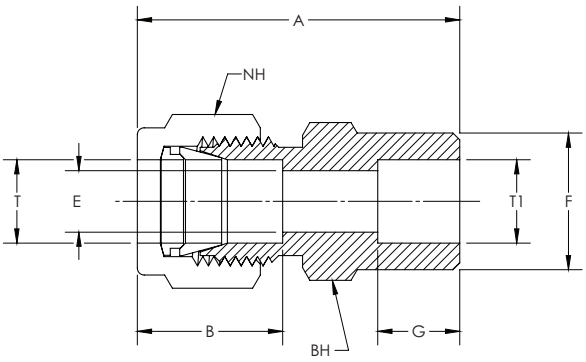
NOTE: Dimensions subject to change, to be used for reference only.
Wall Thickness at weld end is based ob schedule 80 pipe.
*Fittings may have a larger ID on weld end.

DTSW/STSW

Tube to Tube Socket Weld Connector



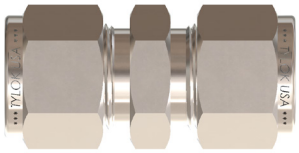


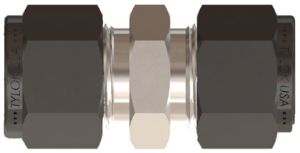


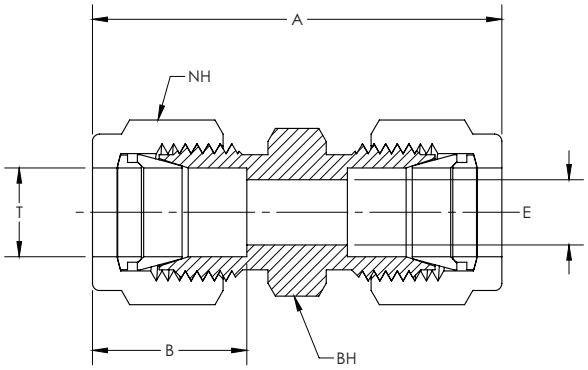
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	T1 TUBE O.D.	A	B	E THRU HOLE	F	G	NH1 NUT HEX	BH BODY HEX
4-DTSW-4	400-6-4W	4-4 ZHLW	4-STSW-4	4-4 ZHBW	1/4	1/4	1.32	0.61	0.19	0.48	0.28	9/16	1/2
8-DTSW-8	810-6-8W	8-8 ZHLW	8-STSW-8	8-8 ZHBW	1/2	1/2	1.62	0.90	0.41	0.73	0.38	7/8	13/16
12-DTSW-12	1210-6-12W1	2-12 ZHLW	12-STSW-12	12-12 ZHBW	3/4	3/4	1.71	0.96	0.63	1.04	0.44	1-1/8	1-1/16
16-DTSW-16	1610-6-16W1	6-16 ZHLW	16-STSW-16	16-16 ZHBW	1	1	2.09	1.24	0.88	1.36	0.62	1-1/2	1-3/8

NOTE: Dimensions subject to change, to be used for reference only.

DU/SU
Union





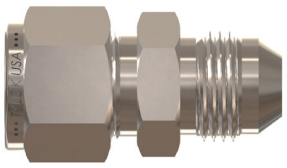


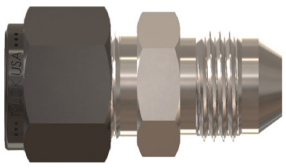
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	A	B	E THRU HOLE	NH NUT HEX	BH BODY HEX
1-DU	100-6	1SC1	1-SU	1-1 HBZ	1/16	1.00	0.34	0.05	5/16	5/16
2-DU	200-6	2SC2	2-SU	2-2 HBZ	1/8	1.41	0.52	0.09	7/16	7/16
3-DU	300-6	3SC3	3-SU	3-3 HBZ	3/16	1.47	0.54	0.13	1/2	7/16
4-DU	400-6	4SC4	4-SU	4-4 HBZ	1/4	1.61	0.61	0.19	9/16	1/2
5-DU	500-6	5SC5	5-SU	5-5 HBZ	5/16	1.72	0.65	0.25	5/8	9/16
6-DU	600-6	6SC6	6-SU	6-6 HBZ	3/8	1.78	0.67	0.28	11/16	5/8
8-DU	810-6	8SC8	8-SU	8-8 HBZ	1/2	2.02	0.90	0.41	7/8	13/16
10-DU	1010-6	10SC10	10-SU	10-10 HBZ	5/8	2.04	0.96	0.50	1	15/16
12-DU	1210-6	12SC12	12-SU	12-12 HBZ	3/4	2.11	0.96	0.63	1-1/8	1-1/16
14-DU	1410-6	14SC14	14-SU	14-14 HBZ	7/8	2.17	1.02	0.72	1-1/4	1-3/16
16-DU	1610-6	16SC16	16-SU	16-16 HBZ	1	2.58	1.24	0.88	1-1/2	1-3/8

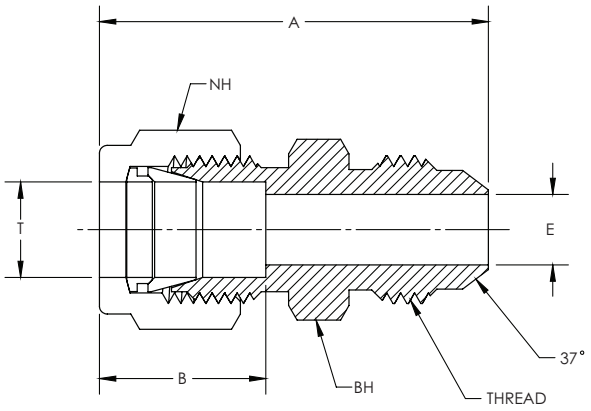
NOTE: Dimensions subject to change, to be used for reference only.

DUANF/SUANF

Tube to AN Flare Union



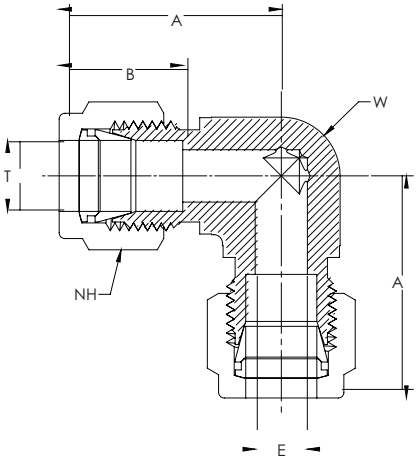




CBC PART NUMBER	INTERCHANGES WITH	CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	THREAD	A	B	E THRU HOLE	NH NUT HEX	BH BODY HEX
2-DUANF-2	200-6-2AN	2-SUANF-2	2-2 XHBZ	1/8	5/16-24 UNJF	1.25	0.52	0.06	7/16	7/16
2-DUANF-4	200-6-4AN	2-SUANF-4	4-2 XHBZ	1/8	7/16-20 UNJF	1.39	0.52	0.09	7/16	1/2
4-DUANF-4	400-6-4AN	4-SUANF-4	4-4 XHBZ	1/4	7/16-20 UNJF	1.48	0.61	0.17	9/16	1/2
5-DUANF-5	500-6-5AN	5-SUANF-5	5-5 XHBZ	5/16	1/2-20 UNJF	1.53	0.65	0.23	5/8	9/16
5-DUANF-6	-	5-SUANF-6	-	5/16	9/16-18 UNJF	1.54	0.65	0.25	5/8	5/8
6-DUANF-4	600-6-4AN	6-SUANF-4	4-6 XHBZ	3/8	7/16-20 UNJF	1.56	0.67	0.17	11/16	5/8
6-DUANF-6	600-6-6AN	6-SUANF-6	6-6 XHBZ	3/8	9/16-18 UNJF	1.56	0.67	0.30	11/16	5/8
8-DUANF-8	810-6-8AN	8-SUANF-8	8-8 XHBZ	1/2	3/4-16 UNJF	1.80	0.90	0.39	7/8	13/16
10-DUANF-10	1010-6-10AN	10-SUANF-10	10-10 XHBZ	5/8	7/8-14 UNJF	1.93	0.96	0.48	1	15/16
12-DUANF-12	1210-6-12AN	12-SUANF-12	12-12 XHBZ	3/4	1-1/16-12 UNJF	2.10	0.96	0.61	1-1/8	1-1/8
16-DUANF-16	1610-6-16AN	16-SUANF-16	16-16 XHBZ	1	1-5/16-12 UNJF	2.43	1.24	0.85	1-1/2	1-3/8

NOTE: Dimensions subject to change, to be used for reference only.

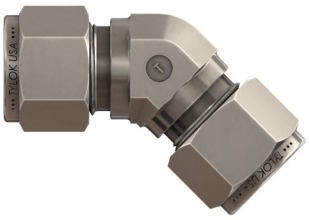
DELU/SELU
Union Elbow

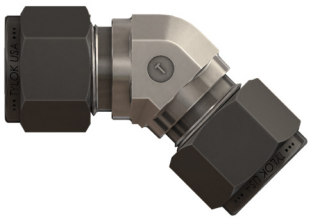


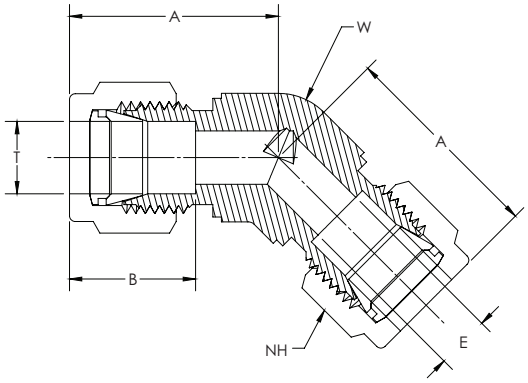
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	A	B	E THRU HOLE	NH NUT HEX	W WRENCH FLAT
1-DELU-1	100-9	1EE1	1-SELU-1	1-1 EBZ	1/16	0.80	0.34	0.05	5/16	1/2
2-DELU-2	200-9	2EE2	2-SELU-2	2-2 EBZ	1/8	0.98	0.52	0.09	7/16	1/2
3-DELU-3	300-9	3EE3	3-SELU-3	3-3 EBZ	3/16	1.00	0.54	0.13	1/2	1/2
4-DELU-4	400-9	4EE4	4-SELU-4	4-4 EBZ	1/4	1.06	0.61	0.19	9/16	1/2
5-DELU-5	500-9	5EE5	5-SELU-5	5-5 EBZ	5/16	1.18	0.65	0.25	5/8	5/8
6-DELU-6	600-9	6EE6	6-SELU-6	6-6 EBZ	3/8	1.20	0.67	0.28	11/16	5/8
8-DELU-8	810-9	8EE8	8-SELU-8	8-8 EBZ	1/2	1.42	0.90	0.41	7/8	13/16
10-DELU-10	1010-9	10EE10	10-SELU-10	10-10 EBZ	5/8	1.50	0.96	0.50	1	15/16
12-DELU-12	1210-9	12EE12	12-SELU-12	12-12 EBZ	3/4	1.57	0.96	0.63	1-1/8	1-1/16
14-DELU-14	1410-9	14EE14	14-SELU-14	14-14 EBZ	7/8	1.76	1.02	0.72	1-1/4	1-3/8
16-DELU-16	1610-9	16EE16	16-SELU-16	16-16 EBZ	1	1.95	1.24	0.88	1-1/2	1-3/8

NOTE: Dimensions subject to change, to be used for reference only.

DELU45/SELU45
Union 45° Elbow



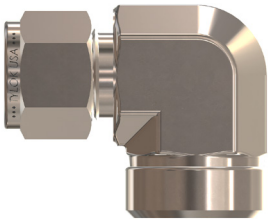


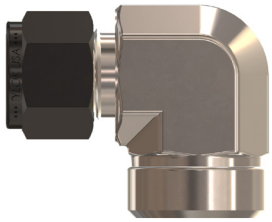


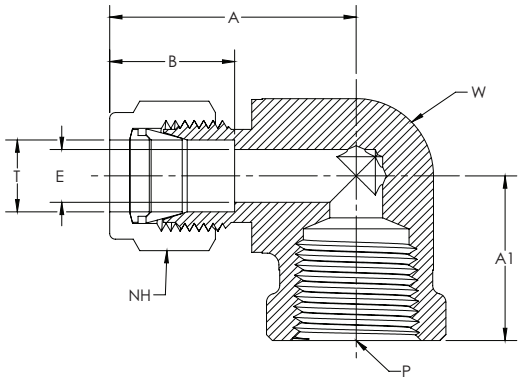
CBC PART NUMBER	INTERCHANGES WITH	CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	A	B	E THRU HOLE	NH NUT HEX	W WRENCH FLAT
4-DELU45-4	400-95	4-SELU45-4	-	1/4	0.97	0.61	0.19	9/16	1/2
6-DELU45-6	-	6-SELU45-6	-	3/8	1.11	0.67	0.28	11/16	5/8
8-DELU45-8	810-95	8-SELU45-8	-	1/2	1.26	0.90	0.41	7/8	13/16
12-DELU45-12		12-SELU45-12		3/4	1.33	0.96	0.63	1-1/8	1-1/16

NOTE: Dimensions subject to change, to be used for reference only.

DFE/SFE
Female Elbow

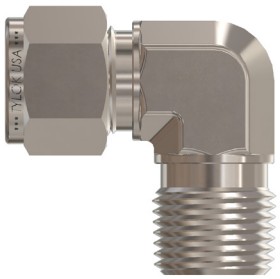


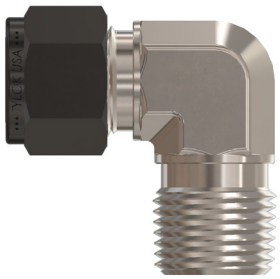


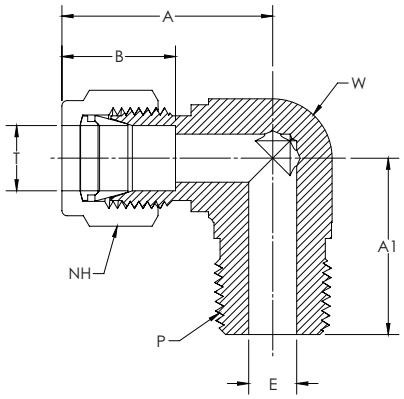


CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P PIPE END NPT	A	A1	B	E THRU HOLE	NH NUT HEX	W WRENCH FLAT
2-DFE-2	200-8-2	2FEL2N	2-SFE-2	2-2 DBZ	1/8	1/8	0.98	0.75	0.52	0.09	7/16	1/2
B-2-DFE-2	200-8-2	2FEL2N	B-2-SFE-2	2-2 DBZ	1/8	1/8	1.05	0.75	0.52	0.09	7/16	5/8
2-DFE-4	200-8-4	2FEL4N	2-SFE-4	2-4 DBZ	1/8	1/4	1.09	0.88	0.52	0.09	7/16	11/16
B-2-DFE-4	200-8-4	2FEL4N	B-2-SFE-4	2-4 DBZ	1/8	1/4	1.16	0.88	0.52	0.09	7/16	13/16
4-DFE-2	400-8-2	4FEL2N	4-SFE-2	4-2 DBZ	1/4	1/8	1.06	0.75	0.61	0.19	9/16	1/2
B-4-DFE-2	400-8-2	4FEL2N	B-4-SFE-2	4-2 DBZ	1/4	1/8	1.14	0.75	0.61	0.19	9/16	5/8
4-DFE-4	400-8-4	4FEL4N	4-SFE-4	4-4 DBZ	1/4	1/4	1.17	0.88	0.61	0.19	9/16	11/16
B-4-DFE-4	400-8-4	4FEL4N	B-4-SFE-4	4-4 DBZ	1/4	1/4	1.25	0.88	0.61	0.19	9/16	13/16
4-DFE-6	400-8-6	4FEL6N	4-SFE-6	4-6 DBZ	1/4	3/8	1.25	0.88	0.61	0.19	9/16	13/16
4-DFE-8	400-8-8	4FEL8N	4-SFE-8	4-8 DBZ	1/4	1/2	1.40	1.13	0.61	0.19	9/16	1-1/16
5-DFE-2	500-8-2	5FEL2N	5-SFE-2	5-2 DBZ	5/16	1/8	1.18	0.75	0.65	0.25	5/8	5/8
5-DFE-4	500-8-4	5FEL4N	5-SFE-4	5-4 DBZ	5/16	1/4	1.22	0.88	0.65	0.25	5/8	11/16
B-5-DFE-4	500-8-4	5FEL4N	B-5-SFE-4	5-4 DBZ	5/16	1/4	1.30	0.88	0.65	0.25	5/8	13/16
6-DFE-2	600-8-2	6FEL2N	6-SFE-2	6-2 DBZ	3/8	1/8	1.20	0.75	0.67	0.28	11/16	5/8
6-DFE-4	600-8-4	6FEL4N	6-SFE-4	6-4 DBZ	3/8	1/4	1.24	0.88	0.67	0.28	11/16	11/16
B-6-DFE-4	600-8-4	6FEL4N	B-6-SFE-4	6-4 DBZ	3/8	1/4	1.32	0.88	0.67	0.28	11/16	13/16
6-DFE-6	600-8-6	6FEL6N	6-SFE-6	6-6 DBZ	3/8	3/8	1.32	0.88	0.67	0.28	11/16	13/16
6-DFE-8	600-8-8	6FEL8N	6-SFE-8	6-8 DBZ	3/8	1/2	1.47	1.13	0.67	0.28	11/16	1-1/16
8-DFE-2	-		8-SFE-2		1/2	1/8	1.42	0.88	0.90	0.33	7/8	13/16
8-DFE-4	810-8-4	8FEL4N	8-SFE-4	8-4 DBZ	1/2	1/4	1.42	0.88	0.90	0.41	7/8	13/16
8-DFE-6	810-8-6	8FEL6N	8-SFE-6	8-6 DBZ	1/2	3/8	1.42	0.88	0.90	0.41	7/8	13/16
8-DFE-8	810-8-8	8FEL8N	8-SFE-8	8-8 DBZ	1/2	1/2	1.57	1.13	0.90	0.41	7/8	1-1/16
8-DFE-12	810-8-12		8-SFE-12		1/2	3/4	1.76	1.25	0.90	0.41	7/8	1-3/8
10-DFE-6	1010-8-6	10FEL6N	10-SFE-6	10-6 DBZ	5/8	3/8	1.50	0.88	0.96	0.50	1	15/16
10-DFE-8	1010-8-8	10FEL8N	10-SFE-8	10-8 DBZ	5/8	1/2	1.57	1.13	0.96	0.50	1	1-1/16
12-DFE-8	1210-8-8	12FEL8N	12-SFE-8	12-8 DBZ	3/4	1/2	1.57	1.13	0.96	0.63	1-1/8	1-1/16
12-DFE-12	1210-8-12	12FEL12N	12-SFE-12	12-12 DBZ	3/4	3/4	1.76	1.25	0.96	0.63	1-1/8	1-3/8
14-DFE-12	1410-8-12	14FEL12N	14-SFE-12	14-12 DBZ	7/8	3/4	1.76	1.25	1.02	0.72	1-1/4	1-3/8
16-DFE-16	1610-8-16	16FEL16N	16-SFE-16	16-16 DBZ	1	1	2.12	1.50	1.24	0.88	1-1/2	1-5/8

NOTE: Dimensions subject to change, to be used for reference only.





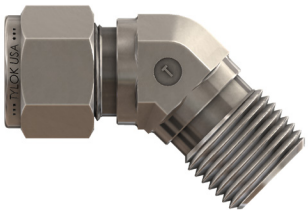


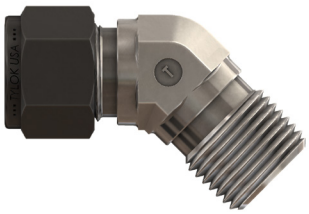
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P PIPE END NPT	A	A1	B	E THRU HOLE	NH NUT HEX	W WRENCH FLAT
1-DME-1	100-2-1	1MSEL1N	1-SME-1	1-1 CBZ	1/16	1/16	0.80	0.74	0.34	0.05	5/16	1/2
1-DME-2	100-2-2	1MSEL2N	1-SME-2	1-2 CBZ	1/16	1/8	0.80	0.74	0.34	0.05	5/16	1/2
2-DME-1	200-2-1	2MSEL1N	2-SME-1	2-1 CBZ	1/8	1/16	0.98	0.74	0.52	0.09	7/16	1/2
2-DME-2	200-2-2	2MSEL2N	2-SME-2	2-2 CBZ	1/8	1/8	0.98	0.74	0.52	0.09	7/16	1/2
2-DME-4	200-2-4	2MSEL4N	2-SME-4	2-4 CBZ	1/8	1/4	0.98	0.93	0.53	0.09	7/16	1/2
B-2-DME-4	200-2-4	2MSEL4N	B-2-SME-4	2-4 CBZ	1/8	1/4	1.05	1.00	0.52	0.09	7/16	5/8
2-DME-6	200-2-6	-	2-SME-6	-	1/8	3/8	1.09	1.03	0.52	0.09	7/16	11/16
B-2-DME-6	200-2-6	-	B-2-SME-6	-	1/8	3/8	1.16	1.11	0.52	0.09	7/16	13/16
3-DME-2	300-2-2	3MSEL2N	3-SME-2	3-2 CBZ	3/16	1/8	1.00	0.74	0.54	0.13	1/2	1/2
3-DME-4	300-2-4	3MSEL4N	3-SME-4	3-4 CBZ	3/16	1/4	1.00	0.93	0.54	0.13	1/2	1/2
B-3-DME-4	300-2-4	3MSEL4N	B-3-SME-4	3-4 CBZ	3/16	1/4	1.07	1.00	0.54	0.13	1/2	5/8
4-DME-1	400-2-1	4MSEL1N	4-SME-1	4-1 CBZ	1/4	1/16	1.06	0.74	0.61	0.13	9/16	1/2
4-DME-2	400-2-2	4MSEL2N	4-SME-2	4-2 CBZ	1/4	1/8	1.06	0.74	0.61	0.19	9/16	1/2
4-DME-4	400-2-4	4MSEL4N	4-SME-4	4-4 CBZ	1/4	1/4	1.06	0.93	0.61	0.19	9/16	1/2
B-4-DME-4	400-2-4	4MSEL4N	B-4-SME-4	4-4 CBZ	1/4	1/4	1.14	1.00	0.61	0.19	9/16	5/8
4-DME-6	400-2-6	4MSEL6N	4-SME-6	4-6 CBZ	1/4	3/8	1.17	1.03	0.61	0.19	9/16	11/16
B-4-DME-6	400-2-6	4MSEL6N	B-4-SME-6	4-6 CBZ	1/4	3/8	1.25	1.11	0.61	0.19	9/16	13/16
4-DME-8	400-2-8	4MSEL8N	4-SME-8	4-8 CBZ	1/4	1/2	1.25	1.30	0.61	0.19	9/16	13/16
4-DME-12	400-2-12	-	4-SME-12	-	1/4	3/4	1.40	1.45	0.61	0.19	9/16	1-1/16
5-DME-2	500-2-2	5MSEL2N	5-SME-2	5-2 CBZ	5/16	1/8	1.18	0.82	0.65	0.19	5/8	5/8
5-DME-4	500-2-4	5MSEL4N	5-SME-4	5-4 CBZ	5/16	1/4	1.18	1.00	0.65	0.25	5/8	5/8
5-DME-6	500-2-6	-	5-SME-6	-	5/16	3/8	1.22	1.03	0.65	0.25	5/8	11/16
B-5-DME-6	500-2-6	-	B-5-SME-6	-	5/16	3/8	1.30	1.11	0.65	0.25	5/8	13/16
6-DME-2	600-2-2	6MSEL2N	6-SME-2	6-2 CBZ	3/8	1/8	1.20	0.82	0.67	0.19	11/16	5/8
6-DME-4	600-2-4	6MSEL4N	6-SME-4	6-4 CBZ	3/8	1/4	1.20	1.00	0.67	0.28	11/16	5/8
6-DME-6	600-2-6	6MSEL6N	6-SME-6	6-6 CBZ	3/8	3/8	1.24	1.03	0.67	0.28	11/16	11/16
B-6-DME-6	600-2-6	6MSEL6N	B-6-SME-6	6-6 CBZ	3/8	3/8	1.32	1.11	0.67	0.28	11/16	13/16
6-DME-8	600-2-8	6MSEL8N	6-SME-8	6-8 CBZ	3/8	1/2	1.32	1.30	0.67	0.28	11/16	13/16
6-DME-12	600-1-12	6MSEL12N	6-SME-12	6-12 CBZ	3/8	3/4	1.47	1.45	0.67	0.28	11/16	1-1/16
8-DME-2	810-2-2	-	8-SME-2	-	1/2	1/8	1.42	0.92	0.90	0.19	7/8	13/16
8-DME-4	810-2-4	8MSEL4N	8-SME-4	8-4 CBZ	1/2	1/4	1.42	1.11	0.90	0.28	7/8	13/16
8-DME-6	810-2-6	8MSEL6N	8-SME-6	8-6 CBZ	1/2	3/8	1.42	1.11	0.90	0.38	7/8	13/16
8-DME-8	810-2-8	8MSEL8N	8-SME-8	8-8 CBZ	1/2	1/2	1.42	1.30	0.90	0.41	7/8	13/16
8-DME-12	810-2-12	8MSEL12N	8-SME-12	8-12 CBZ	1/2	3/4	1.57	1.45	0.90	0.41	7/8	1-1/16
8-DME-16	810-2-16	-	8-SME-16	-	1/2	1	1.76	1.83	0.90	0.41	7/8	1-3/8
10-DME-4	-	-	10-SME-4	-	5/8	1/4	1.50	1.19	0.96	0.28	1	15/16
10-DME-6	1010-2-6	10MSEL6N	10-SME-6	10-6 CBZ	5/8	3/8	1.50	1.19	0.96	0.38	1	15/16
10-DME-8	1010-2-8	10MSEL8N	10-SME-8	10-8 CBZ	5/8	1/2	1.50	1.38	0.96	0.47	1	15/16
10-DME-12	1010-2-12	10MSEL12N	10-SME-12	10-12 CBZ	5/8	3/4	1.57	1.45	0.96	0.50	1	1-1/16
12-DME-4	-	-	12-SME-4	-	3/4	1/4	1.57	1.25	0.96	0.28	1-1/8	1-1/16
12-DME-6	-	-	12-SME-6	-	3/4	3/8	1.57	1.25	0.96	0.38	1-1/8	1-1/16
12-DME-8	1210-2-8	12MSEL8N	12-SME-8	12-8 CBZ	3/4	1/2	1.57	1.45	0.96	0.47	1-1/8	1-1/16
12-DME-12	1210-2-12	12MSEL12N	12-SME-12	12-12 CBZ	3/4	3/4	1.57	1.45	0.96	0.63	1-1/8	1-1/16
12-DME-16	1210-2-16	-	12-SME-16	-	3/4	1	1.76	1.83	0.96	0.63	1-1/8	1-3/8
14-DME-8	-	-	14-SME-8	-	7/8	1/2	1.76	1.64	1.02	0.47	1-1/4	1-3/8
14-DME-12	1410-2-12	14MSEL12N	14-SME-12	14-12 CBZ	7/8	3/4	1.76	1.64	1.02	0.63	1-1/4	1-3/8
16-DME-8	-	-	16-SME-8	-	1	1/2	1.95	1.64	1.24	0.47	1-1/2	1-3/8
16-DME-12	1610-2-12	16MSEL12N	16-SME-12	16-12 CBZ	1	3/4	1.95	1.64	1.24	0.63	1-1/2	1-3/8
16-DME-16	1610-2-16	16MSEL16N	16-SME-16	16-16 CBZ	1	1	1.95	1.83	1.24	0.88	1-1/2	1-3/8

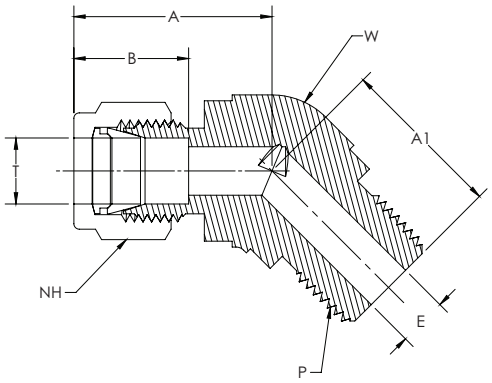
NOTE: Dimensions subject to change, to be used for reference only.

DME45/SME45

Male 45° Elbow





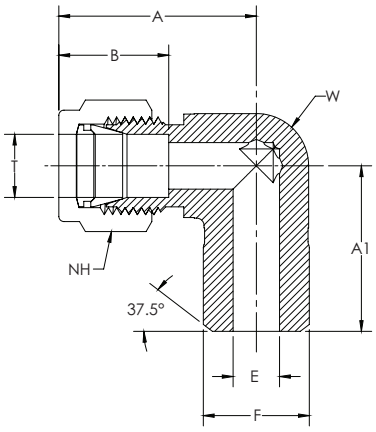


CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P PIPE END NPT	A	A1	B	E THRU HOLE	NH NUT HEX	W WRENCH FLAT
4-DME45-2	400-5-2	4MVEL2N	4-SME45-2	4-2 VBZ	1/4	1/8	0.97	0.65	0.61	0.19	9/16	1/2
4-DME45-4	400-5-4	4MVEL4N	4-SME45-4	4-4 VBZ	1/4	1/4	0.97	0.83	0.61	0.19	9/16	1/2
6-DME45-4	600-5-4	6MVEL4N	6-SME45-4	6-4 VBZ	3/8	1/4	1.11	0.90	0.67	0.28	11/16	5/8
6-DME45-6	600-5-6	6MVEL6N	6-SME45-6	6-6 VBZ	3/8	3/8	1.15	0.95	0.67	0.28	11/16	13/16
8-DME45-8	810-5-8	-	8-SME45-8	-	1/2	1/2	1.26	1.14	0.90	0.41	7/8	13/16

NOTE: Dimensions subject to change, to be used for reference only.

DTBWE/STBWE

Tube to Pipe Butt Weld Elbow

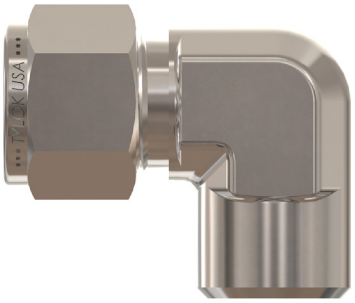


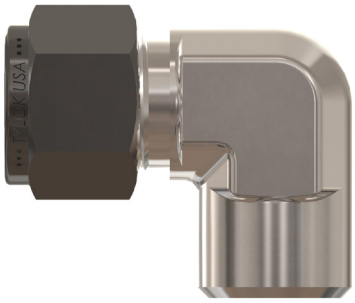
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P PIPE END NPT	A	A1	B	E THRU HOLE	F	NH1 NUT HEX	W WRENCH FLAT
6-DTBWE-4	600-2-4W	6-1/4 ZELW2	6-STBWE-4	6-1/4 ZEBW2	3/8	1/4	1.20	1.00	0.67	0.28	0.54	11/16	5/8
8-DTBWE-8	810-2-8W	8-1/2 ZELW2	8-STBWE-8	8-1/2 ZEBW2	1/2	1/2	1.42	1.31	0.90	0.41	0.84	7/8	13/16
12-DTBWE-12	1210-2-12W	12-3/4 ZELW2	12-STBWE-12	12-3/4 ZEBW2	3/4	3/4	1.57	1.48	0.96	0.63	1.05	1 1/8	1 1/16

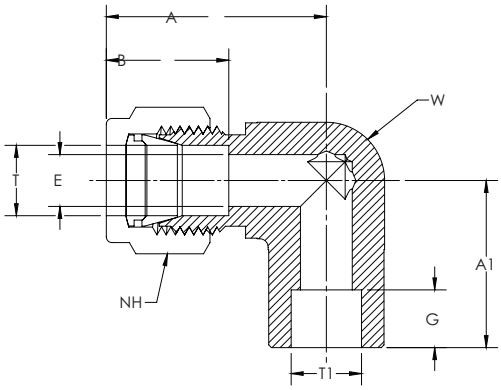
NOTE: Dimensions subject to change, to be used for reference only.
Wall Thickness at weld end is based on schedule 80 pipe.
*Fittings may have a larger ID on weld end

DTSWE/STSWE

Tube to Tube Socket Weld Elbow



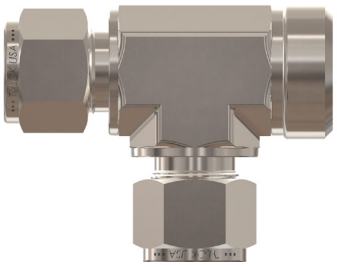


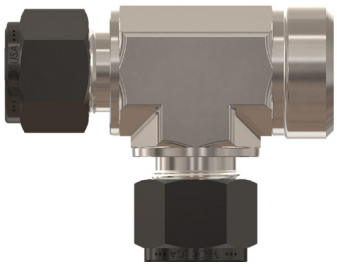


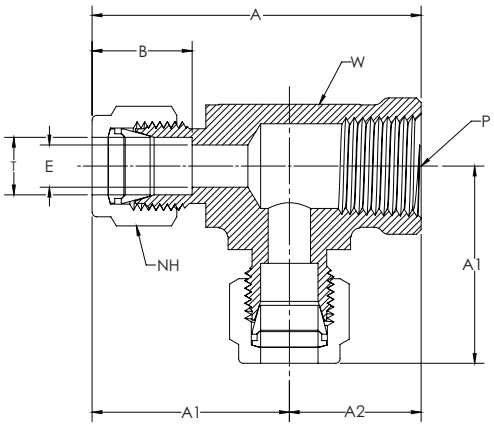
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	T1 TUBE O.D.	A	A1	B	E THRU HOLE	G	NH1 NUT HEX	W WRENCH FLAT
6-DTSWE-6	600-9-6W	6-6 ZELW	6-STSWE-6	6-6 ZEBW	3/8	3/8	1.20	0.91	0.67	0.28	0.31	11/16	5/8

NOTE: Dimensions subject to change, to be used for reference only.

DTFT/STFT
Female Run Tee



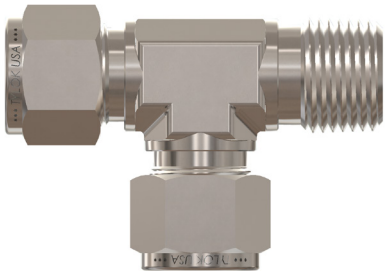


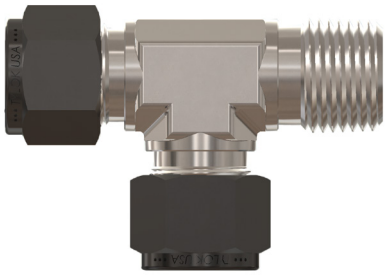


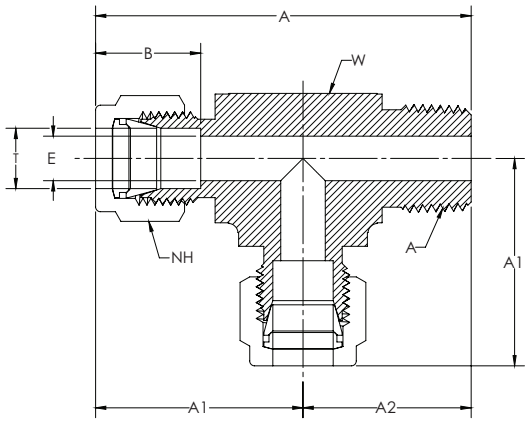
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P PIPE END NPT	A	A1	A2	B	E THRU HOLE	NH NUT HEX	W WRENCH FLAT
2-DTFT-2	200-3TFT	2FRT2N	2-STFT-2	2-2-2 MBZ	1/8	1/8	1.80	1.05	0.75	0.52	0.09	7/16	5/8
4-DTFT-2	400-3TFT	4FRT2N	4-STFT-2	4-2-4 MBZ	1/4	1/8	1.89	1.14	0.75	0.61	0.19	9/16	5/8
4-DTFT-4	400-3-4TFT	4FRT4N	4-STFT-4	4-4-4 MBZ	1/4	1/4	2.13	1.25	0.88	0.61	0.19	9/16	13/16
6-DTFT-4	600-3TFT	6FRT4N	6-STFT-4	6-4-6 MBZ	3/8	1/4	2.19	1.32	0.88	0.67	0.28	11/16	13/16
6-DTFT-6	600-3-3TFT	-	6-STFT-6	-	3/8	3/8	2.19	1.32	0.88	0.67	0.28	11/16	13/16
B-6-DTFT-6	600-3-3TFT	-	B-6-STFT-6	-	3/8	3/8	2.30	1.43	0.88	0.67	0.28	11/16	1
8-DTFT-4	-	8FRT4N	8-STFT-4	8-4-8 MBZ	1/2	1/4	2.30	1.42	0.88	0.90	0.41	7/8	13/16
8-DTFT-6	810-3TFT	8FRT6N	8-STFT-6	8-6-8 MBZ	1/2	3/8	2.30	1.42	0.88	0.90	0.41	7/8	13/16
B-8-DTFT-6	810-3TFT	8FRT6N	B-8-STFT-6	8-6-8 MBZ	1/2	3/8	2.57	1.57	1.00	0.90	0.41	7/8	1 1/16
8-DTFT-8	810-3-3TFT	8FRT8N	8-STFT-8	8-8-8 MBZ	1/2	1/2	2.70	1.57	1.13	0.90	0.41	7/8	1 1/16
10-DTFT-8	-	10FRT8N	10-STFT-8	10-8-10 MBZ	5/8	1/2	2.69	1.57	1.13	0.96	0.50	1	1 1/16
12-DTFT-12	1210-3TFT	12FRT12N	12-STFT-12	12-12-12 MBZ	3/4	3/4	3.01	1.76	1.25	0.96	0.63	1 1/8	1 3/8
16-DTFT-12	1610-3-12TFT	16FRT12N	16-STFT-12	16-12-16 MBZ	1	3/4	3.20	1.95	1.25	1.24	0.88	1 1/2	1 3/8
16-DTFT-16	1610-3TFT	16FRT16N	16-STFT-16	16-16-16 MBZ	1	1	3.62	2.12	1.50	1.24	0.88	1 1/2	1 5/8

NOTE: Dimensions subject to change, to be used for reference only.

DTMT/STMT
Male Run Tee

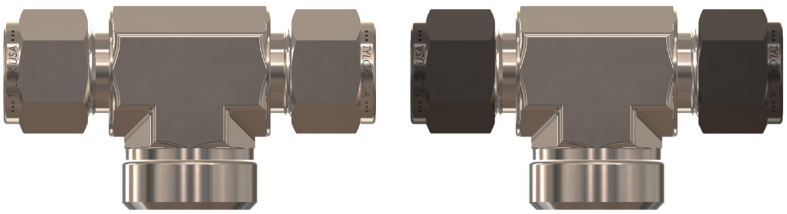


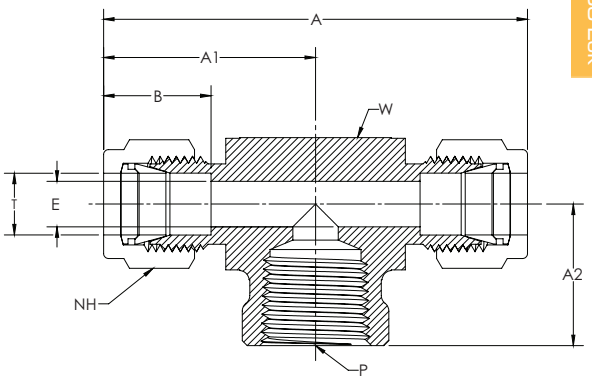




CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P PIPE END NPT	A	A1	A2	B	E THRU HOLE	NH NUT HEX	W WRENCH FLAT
2-DTMT-2	200-3TMT	2MRT2N	2-STMT-2	2-2-2 RBZ	1/8	1/8	1.72	0.98	0.74	0.52	0.09	7/16	1/2
2-DTMT-4	200-3-4TMT	2MRT4N	2-STMT-4	2-4-2 RBZ	1/8	1/4	1.99	1.05	0.94	0.52	0.09	7/16	5/8
4-DTMT-2	400-3TMT	4MRT2N	4-STMT-2	4-2-4 RBZ	1/4	1/8	1.81	1.06	0.74	0.61	0.19	9/16	1/2
4-DTMT-4	400-3-4TMT	4MRT4N	4-STMT-4	4-4-4 RBZ	1/4	1/4	2.08	1.14	0.94	0.61	0.19	9/16	5/8
5-DTMT-2	500-3TMT	5MRT2N	5-STMT-2	5-2-5 RBZ	5/16	1/8	2.01	1.19	0.82	0.65	0.19	5/8	5/8
6-DTMT-4	600-3TMT	6MRT4N	6-STMT-4	6-4-6 RBZ	3/8	1/4	2.15	1.21	0.94	0.67	0.28	11/16	5/8
6-DTMT-6	600-3-6TMT	6MRT6N	6-STMT-6	6-6-6 RBZ	3/8	3/8	2.38	1.32	1.06	0.67	0.28	11/16	13/16
8-DTMT-6	810-3TMT	8MRT6N	8-STMT-6	8-6-8 RBZ	1/2	3/8	2.48	1.42	1.06	0.90	0.41	7/8	13/16
8-DTMT-8	810-3-8TMT	8MRT8N	8-STMT-8	8-8-8 RBZ	1/2	1/2	2.72	1.42	1.30	0.90	0.41	7/8	13/16
B-8-DTMT-8	810-3-8TMT	8MRT8N	B-8-STMT-8	8-8-8 RBZ	1/2	1/2	2.95	1.57	1.38	0.90	0.41	7/8	1 1/16
10-DTMT-8	1010-3TMT	10MRT8N	10-STMT-8	10-8-10 RBZ	5/8	1/2	2.94	1.57	1.38	0.96	0.47	1	1 1/16
12-DTMT-12	1210-3TMT	12MRT12N	12-STMT-12	12-12-12 RBZ	3/4	3/4	2.95	1.57	1.38	0.93	0.63	1 1/8	1 1/16
14-DTMT-6	-	-	14-STMT-6	-	7/8	3/8	3.21	1.76	1.45	1.02	0.38	1 1/4	1 3/8
14-DTMT-8	-	-	14-STMT-8	-	7/8	1/2	3.26	1.76	1.50	1.02	0.47	1 1/4	1 3/8

NOTE: Dimensions subject to change, to be used for reference only.



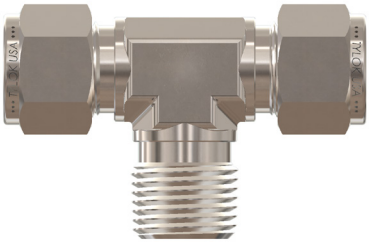


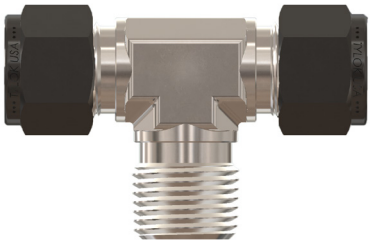
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P PIPE END NPT	A	A1	A2	B	E THRU HOLE	NH NUT HEX	W WRENCH FLAT
2-DTTF-2	200-3TTF	2FBT2N	2-STTF-2	2-2-2 OBZ	1/8	1/8	2.11	1.05	0.75	0.52	0.09	7/16	5/8
4-DTTF-2	400-3TTF	4FBT2N	4-STTF-2	4-4-2 OBZ	1/4	1/8	2.29	1.14	0.75	0.61	0.19	9/16	5/8
4-DTTF-4	400-3-4TTF	4FBT4N	4-STTF-4	4-4-4 OBZ	1/4	1/4	2.51	1.25	0.88	0.61	0.19	9/16	13/16
4-DTTF-6	-	-	4-STTF-6	-	1/4	3/8	2.51	1.25	0.88	0.61	0.19	9/16	13/16
4-DTTF-8	-	-	4-STTF-8	-	1/4	1/2	2.80	1.40	1.13	0.61	0.19	9/16	1 1/16
6-DTTF-4	600-3TTF	6FBT4N	6-STTF-4	6-6-4 OBZ	3/8	1/4	2.63	1.32	0.88	0.67	0.28	11/16	13/16
6-DTTF-6	600-3-6TTF	-	6-STTF-6	-	3/8	3/8	2.63	1.32	0.88	0.67	0.28	11/16	13/16
8-DTTF-4	810-3-4TTF	8FBT4N	8-STTF-4	8-8-4 OBZ	1/2	1/4	2.84	1.42	0.88	0.90	0.41	7/8	13/16
8-DTTF-6	810-3TTF	8FBT6N	8-STTF-6	8-8-6 OBZ	1/2	3/8	2.84	1.42	0.88	0.90	0.41	7/8	13/16
B-8-DTTF-6	810-3TTF	8FBT6N	B-8-STTF-6	8-8-6 OBZ	1/2	3/8	3.14	1.57	1.13	0.90	0.41	7/8	1 1/16
8-DTTF-8	810-3-8TTF	8FBT8N	8-STTF-8	8-8-8 OBZ	1/2	1/2	3.14	1.57	1.13	0.90	0.41	7/8	1 1/16
10-DTTF-8	1010-3TTF	10FBT8N	10-STTF-8	10-10-8 OBZ	5/8	1/2	3.14	1.57	1.13	0.96	0.50	1	1 1/16
12-DTTF-12	1210-3TTF	12FBT12N	12-STTF-12	12-12-12 OBZ	3/4	3/4	3.52	1.76	1.25	0.96	0.63	1 1/8	1 3/8
14-DTTF-6	-	-	14-STTF-6	-	7/8	3/8	3.51	1.76	1.25	1.02	0.56	1 1/4	1 3/8
14-DTTF-12	-	14BFT12N	14-STTF-12	14-14-12 OBZ	7/8	3/4	3.51	1.76	1.25	1.02	0.72	1 1/4	1 3/8
16-DTTF-12	1610-3-12TTF	16BFT12N	16-STTF-12	16-16-12 OBZ	1	3/4	3.89	1.95	1.25	1.24	0.88	1 1/2	1 3/8
16-DTTF-16	1610-3TTF	16BFT16N	16-STTF-16	16-16-16 OBZ	1	1	4.23	2.12	1.50	1.24	0.88	1 1/2	1 5/8

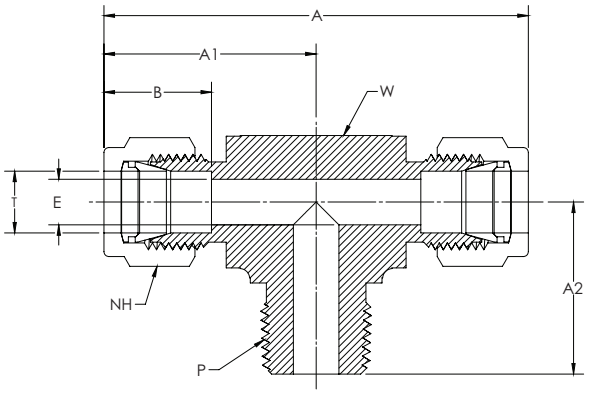
NOTE: Dimensions subject to change, to be used for reference only.

DTTM/STTM

Male Branch Tee

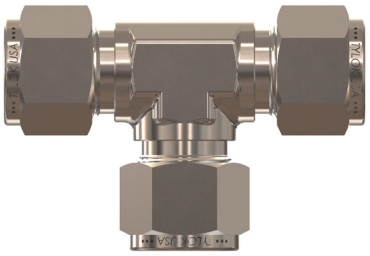


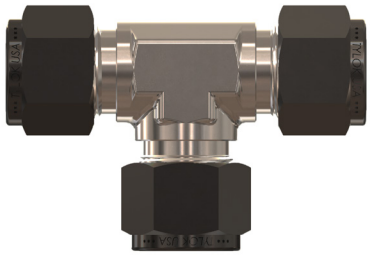


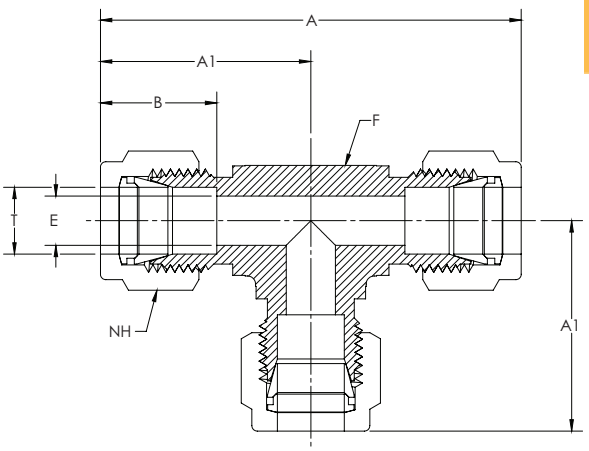


CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	P PIPE END NPT	A	A1	A2	B	E THRU HOLE	NH NUT HEX	W WRENCH FLAT
2-DTTM-2	200-3TTM	2MBT2N	2-STTM-2	2-2-2 SBZ	1/8	1/8	1.95	0.98	0.74	0.52	0.09	7/16	1/2
2-DTTM-4	200-3-4TTM	2MBT4N	2-STTM-4	2-2-4 SBZ	1/8	1/4	2.11	1.05	0.94	0.52	0.09	7/16	5/8
3-DTTM-2	300-3TTM	3MBT2N	3-STTM-2	3-3-2 SBZ	3/16	1/8	2.00	1.00	0.74	0.54	0.13	1/2	1/2
4-DTTM-2	400-3TTM	4MBT2N	4-STTM-2	4-4-2 SBZ	1/4	1/8	2.13	1.06	0.74	0.61	0.19	9/16	1/2
4-DTTM-4	400-3-4TTM	4MBT4N	4-STTM-4	4-4-4 SBZ	1/4	1/4	2.29	1.14	0.94	0.61	0.19	9/16	5/8
5-DTTM-2	500-3TTM	5MBT2N	5-STTM-2	5-5-2 SBZ	5/16	1/8	2.38	1.19	0.82	0.65	0.19	5/8	5/8
5-DTTM-4	-	5MBT4N	5-STTM-4	5-5-4 SBZ	5/16	1/4	2.38	1.19	0.94	0.65	0.25	5/8	5/8
6-DTTM-4	600-3TTM	6MBT4N	6-STTM-4	6-6-4 SBZ	3/8	1/4	2.42	1.21	0.94	0.67	0.28	11/16	5/8
6-DTTM-6	600-3-6TTM	6MBT6N	6-STTM-6	6-6-6 SBZ	3/8	3/8	2.63	1.32	1.06	0.67	0.28	11/16	13/16
8-DTTM-4	810-3-4TTM	-	8-STTM-4	-	1/2	1/4	2.84	1.42	1.11	0.90	0.28	7/8	13/16
8-DTTM-6	810-3TTM	8MBT6N	8-STTM-6	8-8-6 SBZ	1/2	3/8	2.84	1.42	1.11	0.90	0.38	7/8	13/16
B-8-DTTM-6	810-3TTM	8MBT6N	B-8-STTM-6	8-8-6 SBZ	1/2	3/8	2.84	1.42	1.06	0.90	0.38	7/8	13/16
8-DTTM-8	810-3-8TTM	8MBT8N	8-STTM-8	8-8-8 SBZ	1/2	1/2	2.84	1.42	1.30	0.90	0.41	7/8	13/16
B-8-DTTM-8	810-3-8TTM	8MBT8N	B-8-STTM-8	8-8-8 SBZ	1/2	1/2	3.14	1.57	1.38	0.90	0.41	7/8	1 1/16
10-DTTM-8	1010-3TTM	10MBT8N	10-STTM-8	10-10-8 SBZ	5/8	1/2	3.14	1.57	1.38	0.96	0.47	1	1 1/16
12-DTTM-12	1210-3TTM	12MBT12N	12-STTM-12	12-12-12 SBZ	3/4	3/4	3.14	1.57	1.38	0.96	0.63	1 1/8	1 1/16

NOTE: Dimensions subject to change, to be used for reference only.





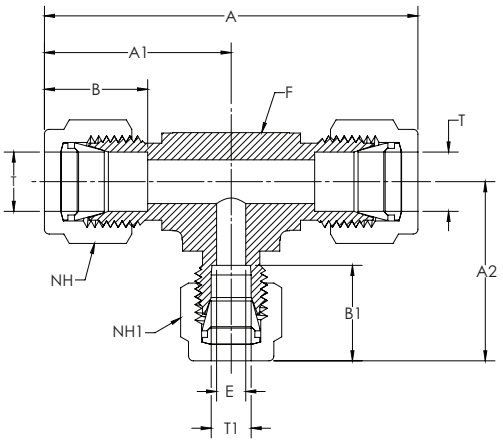


CBC PART NUMBER	INTERCHANGES WITH	CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	A	A1	A2	B	B1	E THRU HOLE	NH NUT HEX	NH1 NUT HEX	W WRENCH FLAT
1-DTTT-1	100-3 1ET1	1-STTT-1	1-1-1 JBZ	1/16	1.61	0.80	-	0.34	-	0.05	5/16	-	1/2
2-DTTT-2	200-3 2ET2	2-STTT-2	2-2-2 JBZ	1/8	1.95	0.98	-	0.52	-	0.09	7/16	-	1/2
3-DTTT-3	300-3 3ET3	3-STTT-3	3-3-3 JBZ	3/16	2.00	1.00	-	0.54	-	0.13	1/2	-	1/2
4-DTTT-4	400-3 4ET4	4-STTT-4	4-4-4 JBZ	1/4	2.13	1.06	-	0.61	-	0.19	9/16	-	1/2
5-DTTT-5	500-3 5ET5	5-STTT-5	5-5-5 JBZ	5/16	2.38	1.19	-	0.65	-	0.25	5/8	-	5/8
6-DTTT-6	600-3 6ET6	6-STTT-6	6-6-6 JBZ	3/8	2.42	1.21	-	0.67	-	0.28	11/16	-	5/8
8-DTTT-8	810-3 8ET8	8-STTT-8	8-8-8 JBZ	1/2	2.84	1.42	-	0.90	-	0.41	7/8	-	13/16
10-DTTT-10	1010-3 10ET10	10-STTT-10	10-10-10 JBZ	5/8	3.14	1.57	-	0.96	-	0.50	1	-	1 1/16
12-DTTT-12	1210-3 12ET12	12-STTT-12	12-12-12 JBZ	3/4	3.14	1.57	-	0.96	-	0.63	1 1/8	-	1 1/16
14-DTTT-14	1410-3 14ET14	14-STTT-14	14-14-14 JBZ	7/8	3.51	1.76	-	1.02	-	0.72	1 1/4	-	1 3/8
16-DTTT-16	1610-3 16ET16	16-STTT-16	16-16-16 JBZ	1	3.89	1.95	-	1.24	-	0.88	1 1/2	-	1 3/8

NOTE: Dimensions subject to change, to be used for reference only.

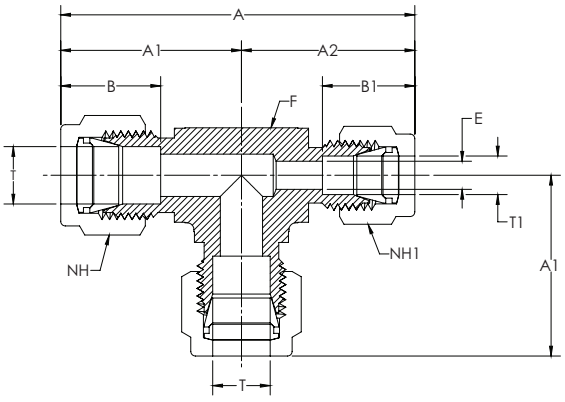
DTTT/STTT

Reducing Branch Tee, Reducing Run Tee



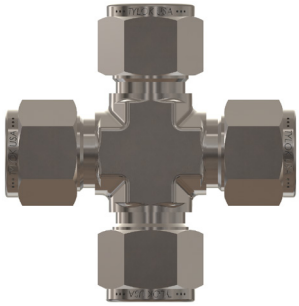
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	T1 TUBE O.D.	A	A1	A2	B	B1	E THRU HOLE	NH NUT HEX	NH1 NUT HEX	W WRENCH FLAT
4-DTTT-4-2	400-3-4-2	4-4-2 JLZ	4-STTT-4-2	4-4-2 JBZ	1/4	1/8	2.13	1.06	0.98	0.61	0.52	0.19	9/16	7/16	1/2
6-DTTT-6-4	600-3-6-4	6-6-4 JLZ	6-STTT-6-4	6-6-4 JBZ	3/8	1/4	2.42	1.21	1.14	0.67	0.61	0.19	11/16	9/16	5/8
8-DTTT-8-4	810-3-8-4	8-8-4 JLZ	8-STTT-8-4	8-8-4 JBZ	1/2	1/4	2.84	1.42	1.25	0.90	0.61	0.19	7/8	9/16	13/16
8-DTTT-8-6	810-3-8-6	8-8-6 JLZ	8-STTT-8-6	8-8-6 JBZ	1/2	3/8	2.84	1.42	1.32	0.90	0.67	0.28	7/8	11/16	13/16
12-DTTT-12-6	1210-3-12-6	12-12-6 JLZ	12-STTT-12-6	12-12-6 JBZ	3/4	3/8	3.14	1.57	1.47	0.96	0.67	0.28	1 1/8	11/16	1 1/16
12-DTTT-12-8	1210-3-12-8	12-12-8 JLZ	12-STTT-12-8	12-12-8 JBZ	3/4	1/2	3.14	1.57	1.57	0.96	0.90	0.41	1 1/8	7/8	1 1/16
16-DTTT-16-4	1610-3-16-4	16-16-4 JLZ	16-STTT-16-4	16-16-4 JBZ	1	1/4	3.89	1.95	1.59	1.24	0.61	0.19	1 1/2	9/16	1 3/8
16-DTTT-16-6	1610-3-16-6	16-16-6 JLZ	16-STTT-16-6	16-16-6 JBZ	1	3/8	3.89	1.95	1.65	1.24	0.67	0.28	1 1/2	11/16	1 3/8
16-DTTT-16-8	1610-3-16-8	16-16-8 JLZ	16-STTT-16-8	16-16-8 JBZ	1	1/2	3.89	1.95	1.76	1.24	0.90	0.41	1 1/2	7/8	1 3/8
16-DTTT-16-12	1610-3-16-12	16-16-12 JLZ	16-STTT-16-12	16-16-12 JBZ	1	3/4	3.89	1.95	1.58	1.24	0.96	0.63	1 1/2	1 1/8	1 3/8

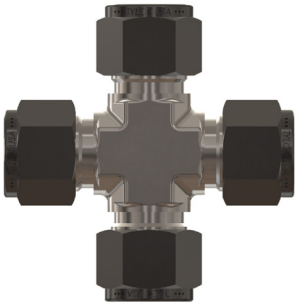
NOTE: Dimensions subject to change, to be used for reference only.

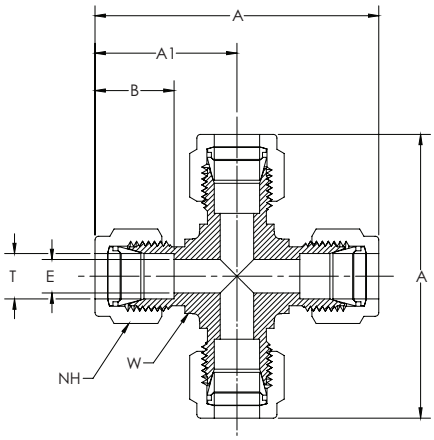


CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	T1 TUBE O.D.	A	A1	A2	B	B1	E THRU HOLE	NH NUT HEX	NH1 NUT HEX	W WRENCH FLAT
6-DTTT-4-6	600-3-4-6	6-4-6 JLZ	6-STTT-4-6	6-4-6 JBZ	3/8	1/4	2.35	1.21	1.14	0.67	0.61	0.19	11/16	9/16	5/8
6-DTTT-6-8	600-3-6-8	-	6-STTT-6-8	-	3/8	1/2	2.63	1.32	1.42	0.67	0.90	0.28	11/16	7/8	13/16

NOTE: Dimensions subject to change, to be used for reference only.



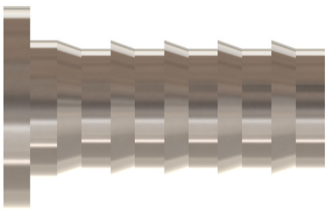


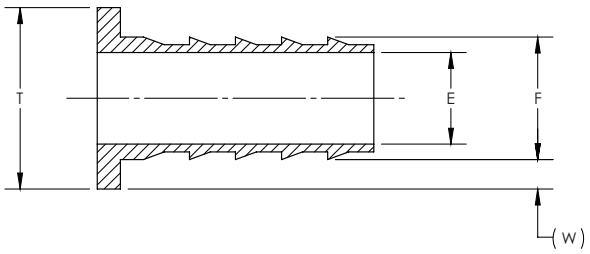


CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	A	A1	B	E THRU HOLE	NH NUT HEX	W WRENCH FLAT
2-DCR	200-4	2ECR2	2-SCR	2 KBZ	1/8	1.84	0.92	0.52	0.09	7/16	1/2
4-DCR	400-4	4ECR4	4-SCR	4 KBZ	1/4	2.11	1.06	0.61	0.19	9/16	1/2
B-4-DCR	400-4	4ECR4	B-4-SCR	4 KBZ	1/4	2.33	1.17	0.61	0.19	9/16	5/8
6-DCR	600-4	6ECR6	6-SCR	6 KBZ	3/8	2.40	1.20	0.67	0.28	11/16	5/8
8-DCR	810-4	8ECR8	8-SCR	8 KBZ	1/2	2.83	1.41	0.90	0.41	7/8	13/16
12-DCR	1210-4	12ECR12	12-SCR	12 KBZ	3/4	3.14	1.57	0.96	0.63	1 1/8	1 1/16

NOTE: Dimensions subject to change, to be used for reference only.

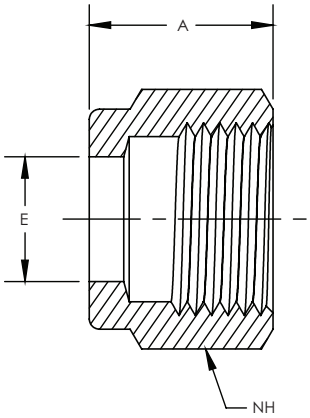
TI
Tubing Insert





CBC PART NUMBER	INTERCHANGES WITH	CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	E THRU HOLE	W REF	F TUBE ID
3-TI-2	305-2	-	-	3/16	0.09	0.031	1/8
4-TI-206	-	-	-	1/4	0.16	0.022	0.206
4-TI-3	405-3	-	-	1/4	0.14	0.031	3/16
4-TI-170	405-170	-	-	1/4	0.11	0.040	0.17
4-TI-2	405-2	-	-	1/4	0.09	0.062	1/8
5-TI-4	505-4	-	-	5/16	0.19	0.031	1/4
5-TI-3	505-3	-	-	5/16	0.13	0.062	3/16
5-TI-2	505-2	-	-	5/16	0.09	0.094	1/8
6-TI-277	605-277	-	-	3/8	0.22	0.049	0.277
6-TI-4	605-4	-	-	3/8	0.19	0.062	1/4
6-TI-3	605-3	-	-	3/8	0.13	0.094	3/16
8-TI-6	815-6	-	-	1/2	0.31	0.062	3/8
8-TI-4	815-4	-	-	1/2	0.19	0.125	1/4
10-TI-8	1015-8	-	-	5/8	0.44	0.062	1/2
10-TI-6	1015-6	-	-	5/8	0.31	0.125	3/8
12-TI-10	1215-10	-	-	3/4	0.56	0.062	5/8
12-TI-8	1215-8	-	-	3/4	0.44	0.125	1/2
16-TI-12	1615-12	-	-	1	0.69	0.125	3/4

NOTE: Dimensions subject to change, to be used for reference only.



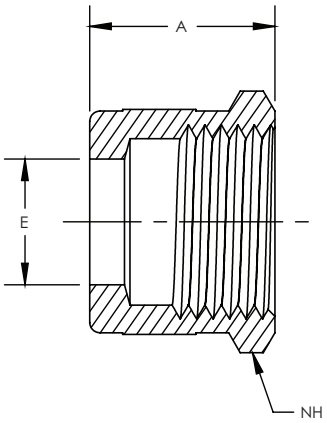
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	A	NH NUT HEX
DN-1	102-1	1NU1	SN-1	1 BZ	1/16	0.31	5/16
DN-2	202-1	2NU2	SN-2	2 BZ	1/8	0.47	7/16
DN-3	302-1	3NU3	SN-3	3 BZ	3/16	0.47	1/2
DN-4	402-1	4NU4	SN-4	4 BZ	1/4	0.50	9/16
DN-5	502-1	5NU5	SN-5	5 BZ	5/16	0.53	5/8
DN-6	602-1	6NU6	SN-6	6 BZ	3/8	0.56	11/16
DN-8	812-1	8NU8	SN-8	8 BZ	1/2	0.69	7/8
DN-10	1012-1	10NU10	SN-10	10 BZ	5/8	0.69	1
DN-12	1212-1	12NU12	SN-12	12 BZ	3/4	0.69	1 1/8
DN-14	1412-1	14NU14	SN-14	14 BZ	7/8	0.69	1 1/4
DN-16	1612-1	16NU16	SN-16	16 BZ	1	0.81	1 1/2

NOTE: Dimensions subject to change, to be used for reference only.

Tylok CS-Lok® nuts are coated with moldisulfide for reduced galling and lower installation torque.

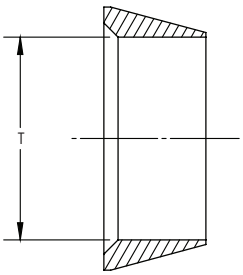
Tylok CBC-Lok® nuts are silver etched on the inside and coated with a proprietary ??? to reduce galling and lower installation torque.

DKN/SKN
Knurled Nut



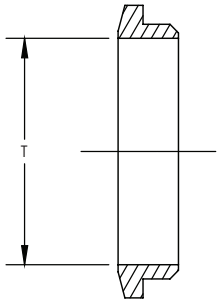
CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.	A	NH NUT HEX
DKN-1	102-1K	1 BZP	SKN-1	1 BZP	1/16	0.31	5/16
DKN-2	202-1K	2 BZP	SKN-2	2 BZP	1/8	0.47	7/16
DKN-3	302-1K	3 BZP	SKN-3	3 BZP	3/16	0.47	1/2
DKN-4	402-1K	4 BZP	SKN-4	4 BZP	1/4	0.50	9/16
DKN-5	502-1K	5 BZP	SKN-5	5 BZP	5/16	0.53	5/8
DKN-6	602-1K	6 BZP	SKN-6	6 BZP	3/8	0.56	11/16
DKN-8	812-1K	8 BZP	SKN-8	8 BZP	1/2	0.69	7/8
DKN-10	1012-1K	10 BZP	SKN-10	10 BZP	5/8	0.69	1
DKN-12	1212-1K	-	SKN-12	-	3/4	0.69	1 1/8
DKN-14	1412-1K	-	SKN-14	-	7/8	0.69	1 1/4
DKN-16	1612-1K	-	SKN-16	-	1	0.81	1 1/2

NOTE: Dimensions subject to change, to be used for reference only.



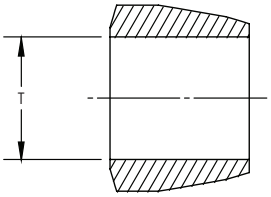
CBC PART NUMBER	INTERCHANGES WITH	T TUBE O.D.
DFC-1	103-1 1FF1	1/16
DFC-2	203-1 2FF2	1/8
DFC-3	303-1 3FF3	3/16
DFC-4	403-1 4FF4	1/4
DFC-5	503-1 5FF5	5/16
DFC-6	603-1 6FF6	3/8
DFC-8	813-1 8FF8	1/2
DFC-10	1013-1 10FF10	5/8
DFC-12	1213-1 12FF12	3/4
DFC-14	1413-1 14FF14	7/8
DFC-16	1613-1 16FF16	1

NOTE: Dimensions subject to change, to be used for reference only.



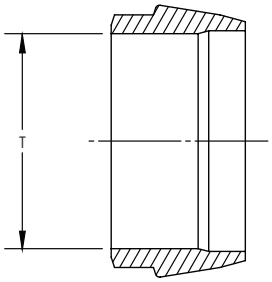
CBC PART NUMBER	INTERCHANGES WITH	T TUBE O.D.
DRC-1	104-1 1BF1	1/16
DRC-2	204-1 2BF2	1/8
DRC-3	304-1 3BF3	3/16
DRC-4	404-1 4BF4	1/4
DRC-5	504-1 5BF5	5/16
DRC-6	604-1 6BF6	3/8
DRC-8	814-1 8BF8	1/2
DRC-10	1014-1 10BF10	5/8
DRC-12	1214-1 12BF12	3/4
DRC-14	1414-1 14BF14	7/8
DRC-16	1614-1 16BF16	1

NOTE: Dimensions subject to change, to be used for reference only.



CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.
SC-1	1 TZ	1/16
SC-2	2 TZ	1/8
SC-3	3 TZ	3/16
SC-4	4 TZ	1/4
SC-5	5 TZ	5/16
SC-6	6 TZ	3/8
SC-8	8 TZ	1/2
SC-10	10 TZ	5/8
SC-12	12 TZ	3/4
SC-14	14 TZ	7/8
SC-16	16 TZ	1

NOTE: Dimensions subject to change, to be used for reference only.



COMPONENT REPLACEMENT PARTS

Collet sets and Nut/Collet sets make for easy storage and handling of nuts and collets. CBC-Lok® & CS-Lok® components are precision made and should be handled with care. The components can be ordered on an arbor, which aids in careful handling and prevents them from coming off. Pinch the end of the arbor to release the components.

COLLET /NUT & COLLET SETS

CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.
DCSET-4-10	400-SET	4 ALOK-*-SET	SCSET-4-10	4-CPI-*-SET	1/4
DCSET-6-10	600-SET	6 ALOK-*-SET	SCSET-6-10	6-CPI-*-SET	3/8
DCSET-8-10	810-SET	8 ALOK-*-SET	SCSET-8-10	8-CPI-*-SET	1/2
DCSET-12-10	-	12 ALOK-*-SET	SCSET-12-10	12-CPI-*-SET	3/4
DCSET-16-10	-	16 ALOK-*-SET	SCSET-16-10	16-CPI-*-SET	1

NOTE: Dimensions subject to change, to be used for reference only.

CBC PART NUMBER	INTERCHANGES WITH		CS PART NUMBER	INTERCHANGES WITH	T TUBE O.D.
DNCSET-4-5	400-NFSET	-	SNCSET-4-5	-	1/4
DNCSET-6-5	600-NFSET	-	SNCSET-6-5	-	3/8
DNCSET-8-5	810-NFSET	-	SNCSET-8-5	-	1/2
DNCSET-12-5	-	-	SNCSET-12-5	-	3/4
DNCSET-16-5	-	-	SNCSET-16-5	-	1

NOTE: Dimensions subject to change, to be used for reference only.

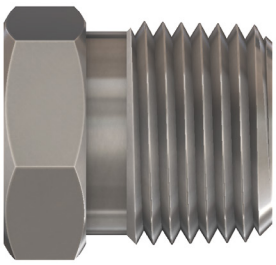
COMPONENT REPLACEMENT PARTS

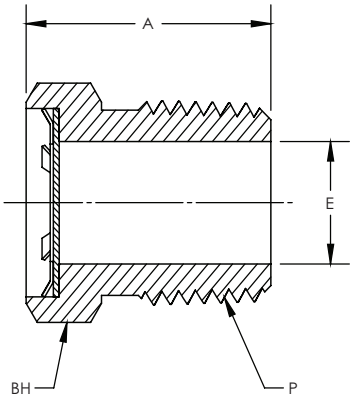
Collet sets and Nut/Collet sets make for easy storage and handling of nuts and collets. CBC-Lok® & CS-Lok® components are precision made and should be handled with care. The components can be ordered on an arbor, which aids in careful handling and prevents them from coming off. Pinch the end of the arbor to release the components.

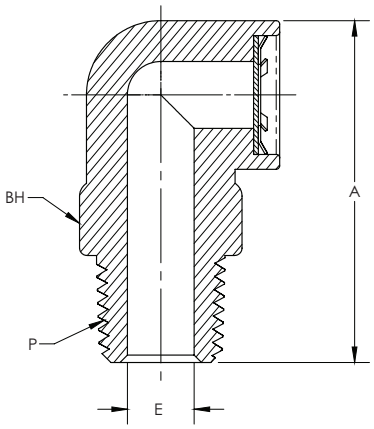
CBC PART NUMBER	T TUBE O.D.
1-DGG	1/16
2-DGG	1/8
3-DGG	3/16
4-DGG	1/4
5-DGG	5/16
6-DGG	3/8
8-DGG	1/2
10-DGG	5/8
12-DGG	3/4
14-DGG	7/8
16-DGG	1
468-DGG	1/4, 3/8, 1/2 6 mm, 12 mm

NOTE: Dimensions subject to change, to be used for reference only.

1MDF
Mud Dauber







CBC PART NUMBER	INTERCHANGES WITH		PIPE WELD SIZE	A	E THRU HOLE	BH BODY HEX
4-1MDF	MD-4	MDF	1/4	.81	.28	9/16
6-1MDF	MD-6	MDF	3/8	.81	.41	11/16
8-1MDF	MD-8	MDF	1/2	1.03	.50	7/8
PP-4-2MDF	-	-	1/4	1.44	.28	5/8
PP-6-2MDF	-	-	3/8	1.44	.28	11/16

NOTE: Dimensions subject to change, to be used for reference only.

- Tylok Mud Daubers, also known as Vent Protector fittings, protect open ends of tubing, instruments, outlet vents and exhaust lines.
- Each Vent Protector has a 300 series stainless steel 40-mesh wire screen to prevent obstructive foreign objects, such as insects, from entering and clogging a system.
- Straight Vent Protectors are available in either Stainless Steel or Brass. Add an SS or B in front of part number to specify the desired material.
- Angled Vent Protectors are available in Polypropylene (PP) only.

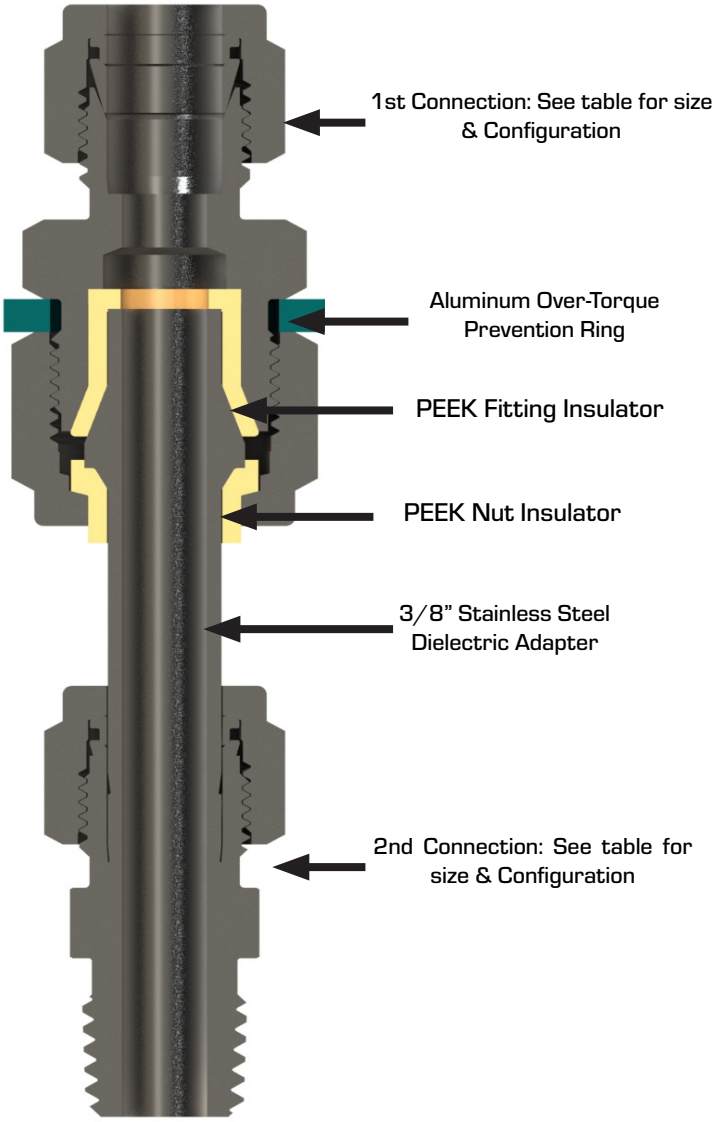
Tylok Dielectric Fittings are insulated connections used to protect sensitive electrical components from electrical current potentially carried through tubing systems.

Typical Application - Gas Transmission

A typical application for a dielectric fitting is in the transmission of natural gas. The dielectric fitting insulates electric current flow that results from Current Cathodic Protection systems, static electricity, ground currents, stray currents from instruments, etc.

Features

- Dielectric Strength x107 Ohms at 10 VDC
- Voltage Breakdown resistance 4000 VDC
- Blow-out Proof Stem
- Stainless Steel Construction
- PEEK Insulators
- Over-torque Prevention Ring
- Pressure Rating:
  - 5000 psi (344 bar) at 100°F (37°C)
- Temperature Rating:
  -40°F (-40°C) to 200°F (93°C)
- Size Range
  - 3/8", 1/4", 1/2"
- End Connections
  - Tylok Tube End straight or elbow
  - Male NPT straight or elbow
  - Female NPT straight or elbow



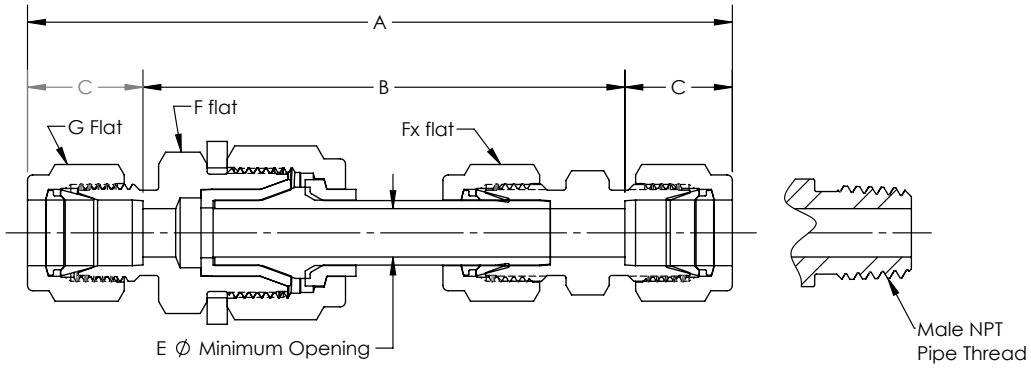
Configuration shown above: SS-6-DMC-4-DE

Dielectric Fitting

Ordering Information

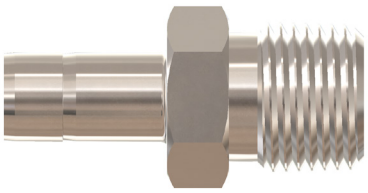
Material	1st Connection Size	Fitting Configuration	2nd Connection Size	Dielectric Identifier	Description
SS-	4 = 1/4" 6 = 3/8" 8 = 1/2"	-DU- -DRU- -DRU-	4 = 1/4" 6 = 3/8" 8 = 1/2"	-DE	Tylok Tube End Straight
SS-	4, 6, 8	-DELU-	4, 6, 8	-DE	Tube End Elbow
SS-	4, 6, 8	-DMC-	4, 6, 8	-DE	MNPT Straight
SS-	4, 6, 8	-DME-	4, 6, 8	-DE	MNPT Elbow
SS-	4, 6, 8	-DFC-	4, 6, 8	-DE	FNPT Straight
SS-	4, 6, 8	-DFE-	4, 6, 8	-DE	FNPT Elbow

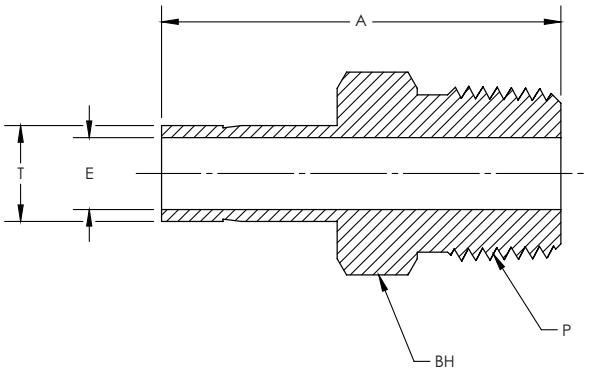
For Single Ferrule, CS-Lok, change the "D" in the configuration section to "S"



End Connection			Ordering Number	Dimensions, Inches						
Inlet / Outlet	Tube Size	Pipe Size		A	B	C	E	F	Fx	G
CBC-Lok®	1/4"	-	SS-4-DU-4-DE	4.02	2.80	0.61	0.28	0.81	0.69	0.56
	3/8"	-	SS-6-DU-6-DE	4.14	2.80	0.67				0.69
	1/2"	-	SS-8-DU-8-DE	4.38	2.58	0.90				0.88
CBC-Lok® / Male NPT	1/4"	1/4"	SS-4-DMC-4-DE	3.93	N/A	N/A				0.56
	3/8"	1/4"	SS-6-DMC-4-DE	3.99						0.69
	3/8"	3/8"	SS-6-DMC-6-DE	3.99						0.69
	1/2"	3/8"	SS-8-DMC-6-DE	4.09						0.88
CS-Lok®	1/4"	-	SS-4-SU-4-DE	4.02	2.80	0.61				0.56
	3/8"	-	SS-6-SU-6-DE	4.09	2.80	0.67				0.69
	1/2"	-	SS-8-SU-8-DE	4.38	2.58	0.90				0.88
CS-Lok®/ Male NPT	1/4"	1/4"	SS-4-SMC-4-DE	3.93	N/A	N/A				0.56
	3/8"	1/4"	SS-6-SMC-4-DE	3.99						0.69
	3/8"	3/8"	SS-6-SMC-6-DE	3.99						0.69
	1/2"	3/8"	SS-8-SMC-6-DE	4.09						0.88

DATPM
Adapter Tube to Male NPT

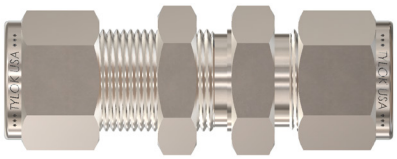


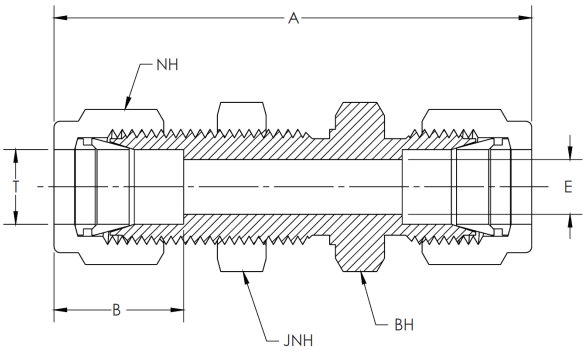


CBC PART NUMBER	INTERCHANGES WITH		T TUBE O.D. (mm.)	P PIPE END NPT (in.)	A (mm.)	E THRU HOLE (mm.)	BH BODY HEX (in.)
6MM-DATPM-2	6-MTA-1-2	M6MA1/8N	6	1/8	32.8	4.1	7/16
6MM-DATPM-4	6-MTA-1-4	M6MA1/4N	6	1/4	38.1	4.1	9/16
8MM-DATPM-4	8-MTA-1-4	M6MA1/2N	8	1/4	39.1	5.6	9/16
8MM-DATPM-6	8-MTA-1-6	M6MA3/8N	8	3/8	39.9	5.6	11/16
10MM-DATPM-4	10-MTA-1-4	M10MA1/4N	10	1/4	39.9	7.1	9/16
10MM-DATPM-6	10-MTA-1-6	M10MA3/8N	10	3/8	40.6	7.1	11/16
10MM-DATPM-8	10-MTA-1-8	M10MA1/2N	10	1/2	46.2	7.1	7/8
12MM-DATPM-4	12-MTA-1-4	M12MA1/4N	12	1/4	46.5	7.1	9/16
12MM-DATPM-8	12-MTA-1-8	M12MA1/2N	12	1/2	52.1	8.8	7/8

NOTE: Dimensions subject to change, to be used for reference only.

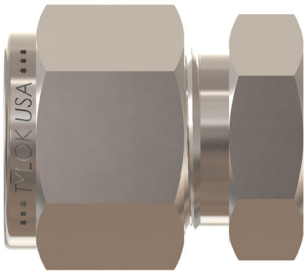
DBHU
Bulkhead Union

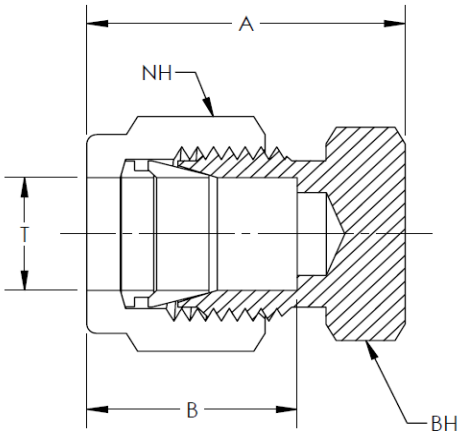




CBC PART NUMBER	INTERCHANGES WITH		T TUBE O.D. (mm.)	T1 TUBE O.D. (mm.)	A (mm.)	B (mm.)	E THRU HOLE (mm.)	NH NUT HEX (in.)	BH BODY HEX (in.)	JNH JAM NUT HEX (in.)	PANEL HOLE (mm.)	MAX PANEL THICKNESS (mm.)
6MM-DBHU	6M0-61	BCM6	6	6	57.7	15.3	4.8	9/16	5/8	5/8	11.5	10.2
8MM-DBHU	8M0-61	BCM8	8	8	61.0	16.2	6.4	5/8	11/16	11/16	13.1	11.2
10MM-DBHU	10M0-6	-	10	10	63.7	17.2	7.9	3/4	7/8	7/8	16.3	11.2
12MM-DBHU	12M0-61	BCM12	12	12	71.0	22.8	9.5	7/8	15/16	15/16	19.5	12.7
18MM-DBHU	18M0-61	BCM18	18	18	78.9	24.4	15.1	1-1/8	1-3/16	1-3/16	26.0	16.8

NOTE: Dimensions subject to change, to be used for reference only.

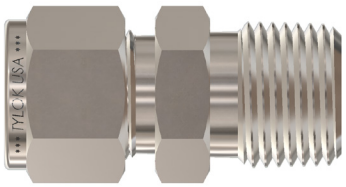


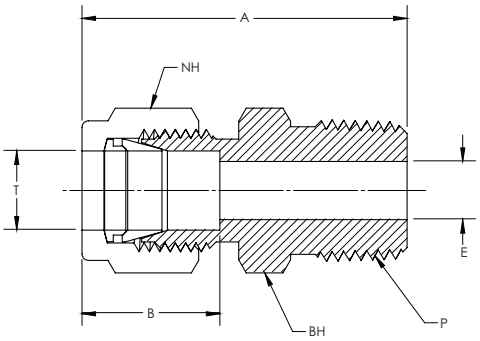


CBC PART NUMBER	INTERCHANGES WITH		T TUBE O.D. (mm.)	A (mm.)	B (mm.)	NH NUT HEX (in.)	BH BODY HEX (in.)
6MM-DCAP	6M0-C	BLENM6	6	23.1	15.3	9/16	9/16
8MM-DCAP	8M0-C	BLENM8	8	24.5	16.2	5/8	9/16
10MM-DCAP	10M0-C	BLENM10	10	26.6	17.2	3/4	11/16
12MM-DCAP	12M0-C	BLENM12	12	30.6	22.8	7/8	7/8
18MM-DCAP	18M0-C	BLENM18	18	32.2	24.4	1-1/8	1-1/16

NOTE: Dimensions subject to change, to be used for reference only.

DMC
Male Connector



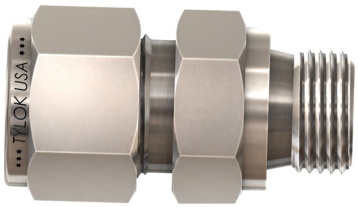


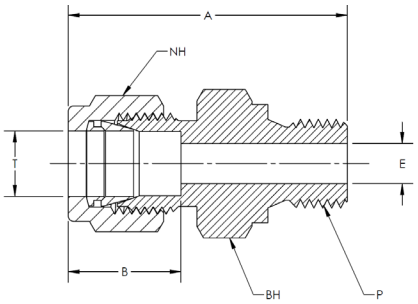
CBC PART NUMBER	INTERCHANGES WITH		T TUBE O.D. (mm.)	P PIPE END NPT (in.)	A (mm.)	B (mm.)	E THRU HOLE (mm.)	NH NUT HEX (in.)	BH BODY HEX (in.)
6MM-DMC-2	6M0-1-2	M6MSC1/8N	6	1/8	32.8	15.3	4.8	9/16	9/16
6MM-DMC-4	6M0-1-4	M6MSC1/4N	6	1/4	37.9	15.3	4.8	9/16	9/16
6MM-DMC-6	6M0-1-6	M6MSC3/8N	6	3/8	38.4	15.3	4.8	9/16	11/16
6MM-DMC-8	6M0-1-8	M6MSC1/2N	6	1/2	44.7	15.3	4.8	9/16	7/8
8MM-DMC-2	8M0-1-2	M8MSC1/8N	8	1/8	34.2	16.2	4.8	5/8	9/16
8MM-DMC-4	8M0-1-4	M8MSC1/4N	8	1/4	38.7	16.2	6.4	5/8	9/16
8MM-DMC-6	8M0-1-6	M8MSC3/8N	8	3/8	39.3	16.2	6.4	5/8	11/16
8MM-DMC-8	8M0-1-8	M8MSC1/2N	8	1/2	45.6	16.2	6.4	5/8	7/8
10MM-DMC-2	10M0-1-2	M10MSC1/8N	10	1/8	36.3	17.2	4.8	3/4	11/16
10MM-DMC-4	10M0-1-4	M10MSC1/4N	10	1/4	40.9	17.2	7.1	3/4	11/16
10MM-DMC-6	10M0-1-6	M10MSC3/8N	10	3/8	40.9	17.2	7.9	3/4	11/16
10MM-DMC-8	10M0-1-8	M10MSC1/2N	10	1/2	46.5	17.2	7.9	3/4	7/8
10MM-DMC-12	10M0-1-12	M10MSC3/4N	10	3/4	48.0	17.2	7.9	3/4	1-1/16
12MM-DMC-2	12M0-1-2		12	1/8	38.8	22.8	4.8	7/8	7/8
12MM-DMC-4	12M0-1-4	M12MSC1/4N	12	1/4	43.4	22.8	7.1	7/8	7/8
12MM-DMC-6	12M0-1-6	M12MSC3/8N	12	3/8	43.4	22.8	9.5	7/8	7/8
12MM-DMC-8	12M0-1-8	M12MSC1/2N	12	1/2	49.0	22.8	9.5	7/8	7/8
12MM-DMC-12	12M0-1-12	M12MSC3/4N	12	3/4	50.5	22.8	9.5	7/8	1-1/16
18MM-DMC-8	18M0-1-8	M18MSC1/2N	18	1/2	50.5	24.4	11.9	1-1/8	1-1/16
18MM-DMC-12	18M0-1-12	M18MSC3/4N	18	3/4	50.5	24.4	15.1	1-1/8	1-1/16

NOTE: Dimensions subject to change, to be used for reference only.

DMC-RS

BSPP Straight Thread Male Connector





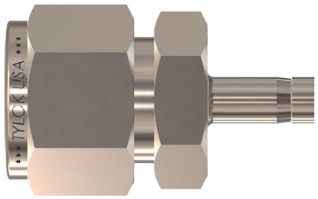
CBC PART NUMBER	INTERCHANGES WITH		T TUBE O.D. (mm.)	P BSPP THREAD SIZE (in.)	A (mm.)	B (mm.)	E THRU HOLE (mm.)	NH NUT HEX (in.)	BH BODY HEX (in.)
6MM-DMC-2-RS	6M0-1-2RS	M6MSC1/8R	6	1/8	35.6	15.3	4.0	9/16	9/16
6MM-DMC-4-RS	6M0-1-4RS	M6MSC1/4R	6	1/4	40.4	15.3	4.8	9/16	3/4
6MM-DMC-6-RS	6M0-1-6RS	M6MSC3/8R	6	3/8	41.1	15.3	4.8	9/16	7/8
6MM-DMC-8-RS	6M0-1-8RS	M6MSC1/2R	6	1/2	43.2	15.3	4.8	9/16	1-1/16
8MM-DMC-2-RS	8M0-1-2RS	M8MSC1/8R	8	1/8	36.6	16.2	4.0	5/8	9/16
8MM-DMC-4-RS	8M0-1-4RS	M8MSC1/4R	8	1/4	41.4	16.2	5.9	5/8	3/4
8MM-DMC-6-RS	8M0-1-6RS	M8MSC3/8R	8	3/8	42.2	16.2	6.4	5/8	7/8
8MM-DMC-8-RS	8M0-1-8RS	M8MSC1/2R	8	1/2	44.2	16.2	6.4	5/8	1-1/16
10MM-DMC-4-RS	10M0-1-4RS	M10MSC1/4R	10	1/4	42.2	17.2	5.9	3/4	3/4
10MM-DMC-6-RS	10M0-1-6RS	M10MSC3/8R	10	3/8	42.9	17.2	7.9	3/4	7/8
10MM-DMC-8-RS	10M0-1-8RS	M10MSC1/2R	10	1/2	45.0	17.2	7.9	3/4	1-1/16
12MM-DMC-4-RS	12M0-1-4RS	M12MSC1/4R	12	1/4	44.5	22.8	5.9	7/8	7/8
12MM-DMC-6-RS	12M0-1-6RS	M12MSC3/8R	12	3/8	45.5	22.8	7.9	7/8	7/8
12MM-DMC-8-RS	12M0-1-8RS	M12MSC1/2R	12	1/2	47.5	22.8	9.5	7/8	1-1/16
12MM-DMC-12-RS	12M0-1-12RS	M12MSC3/4R	12	3/4	52.1	22.8	9.5	7/8	1-5/16
18MM-DMC-8-RS	18M0-1-8RS	M18MSC1/2R	18	1/2	48.8	24.4	11.9	1-1/8	1-1/16
18MM-DMC-12-RS	18M0-1-12RS	M18MSC3/4R	18	3/4	52.1	24.4	15.1	1-1/8	1-5/16

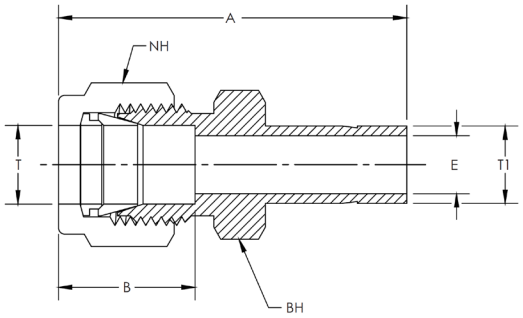
NOTE: Dimensions subject to change, to be used for reference only.

NOTE: BSPP threaded end requires a sealing washer.

DRATT

Reducer Adapter Tube to Tube, Metric to Metric





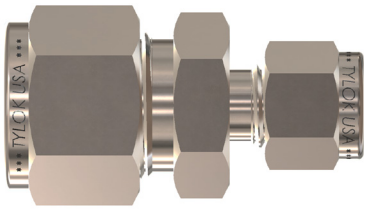
CBC PART NUMBER	INTERCHANGES WITH		T TUBE O.D. (mm.)	T1 TUBE O.D. (mm.)	A (mm.)	B (mm.)	E THRU HOLE (mm.)	NH NUT HEX (in.)	BH BODY HEX (in.)
6MM-DRATT-8MM	6M0-R-8M	M8TURM6	6	8	39.9	15.3	4.8	9/16	9/16
6MM-DRATT-10MM	6M0-R-10M	M10TURM6	6	10	40.7	15.3	4.8	9/16	9/16
6MM-DRATT-12MM	6M0-R-12M	M12TURM6	6	12	46.3	15.3	4.8	9/16	9/16
6MM-DRATT-18MM	6M0-R-18M	-	6	18	49.6	15.3	4.8	9/16	7/8
8MM-DRATT-6MM	8M0-R-6M	M6TURM8	8	6	40.3	16.2	4.1	5/8	9/16
8MM-DRATT-10MM	8M0-R-10M	M10TURM8	8	10	42	16.2	6.4	5/8	9/16
8MM-DRATT-12MM	8M0-R-12M	M12TURM8	8	12	47.6	16.2	6.4	5/8	9/16
10MM-DRATT-6MM	10M0-R-6M	M6TURM10	10	6	42.4	17.2	4.1	3/4	11/16
10MM-DRATT-8MM	10M0-R-8M	M8TURM10	10	8	43.4	17.2	5.6	3/4	11/16
10MM-DRATT-12MM	10M0-R-12M	M12TURM10	10	12	49.8	17.2	7.9	3/4	11/16
10MM-DRATT-18MM	10M0-R-18M	-	10	18	51.3	17.2	7.9	3/4	7/8
12MM-DRATT-6MM	12M0-R-6M	M6TURM12	12	6	44.9	22.8	4.1	7/8	7/8
12MM-DRATT-8MM	12M0-R-8M	-	12	8	45.9	22.8	5.6	7/8	7/8
12MM-DRATT-10MM	12M0-R-10M	M10TURM12	12	10	46.7	22.8	7.1	7/8	7/8
12MM-DRATT-18MM	12M0-R-18M	M18TURM12	12	18	53.8	22.8	9.5	7/8	7/8
18MM-DRATT-12MM	18M0-R-12M	M12TURM18	18	12	54.6	24.4	8.8	1-1/8	1-1/16

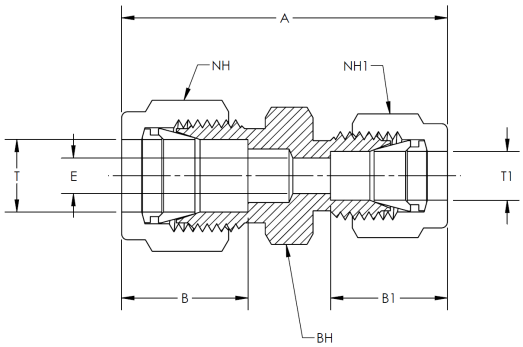
Metric to Fractional

CBC PART NUMBER	INTERCHANGES WITH		T TUBE O.D. (mm.)	T1 TUBE O.D. (in.)	A (mm.)	B (mm.)	E THRU HOLE (mm.)	NH NUT HEX (in.)	BH BODY HEX (in.)
6MM-DRATT-2	6M0-R-2	-	6	1/8	36.9	15.3	2.0	9/16	9/16
6MM-DRATT-4	6M0-R-4	4TUCM6	6	1/4	39.2	15.3	4.4	9/16	9/16
6MM-DRATT-5	6M0-R-5	5TUCM6	6	5/16	39.9	15.3	4.8	9/16	9/16
6MM-DRATT-6	6M0-R-6	6TUCM6	6	3/8	40.7	15.3	4.8	9/16	9/16
6MM-DRATT-8	6M0-R-8	8TUCM6	6	1/2	46.3	15.3	4.8	9/16	9/16
8MM-DRATT-4	8M0-R-4	-	8	1/4	40.3	16.2	4.4	5/8	9/16
8MM-DRATT-6	8M0-R-6	6TUCM8	8	3/8	42	16.2	6.4	5/8	9/16
8MM-DRATT-8	8M0-R-8	8TUCM8	8	1/2	47.6	16.2	6.4	5/8	9/16
10MM-DRATT-6	10M0-R-6	6TUCM10	10	3/8	44.2	17.2	6.8	3/4	11/16
10MM-DRATT-8	10M0-R-8	8TUCM10	10	1/2	49.8	17.2	7.9	3/4	11/16
12MM-DRATT-8	12M0-R-8	8TUCM12	12	1/2	52.3	22.8	9.3	7/8	7/8
12MM-DRATT-12	12M0-R-12	12TUCM12	12	3/4	53.8	22.8	9.5	7/8	7/8
18MM-DRATT-12	18M0-R-12	12TUCM18	18	3/4	56.1	24.4	14.7	1-1/8	1-1/16
18MM-DRATT-16	18M0-R-16	-	18	1	62.4	24.4	15.1	1-1/8	1-1/16

NOTE: Dimensions subject to change, to be used for reference only.

DRU
Reducing Union, Metric to Metric



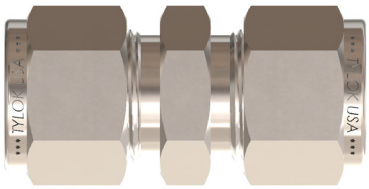


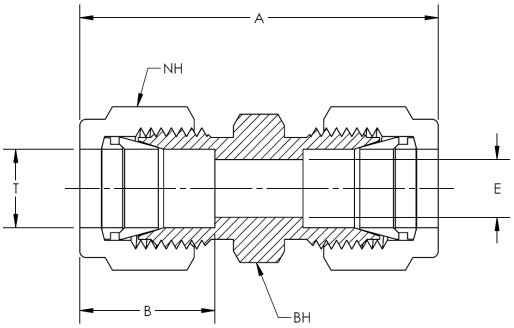
CBC PART NUMBER	INTERCHANGES WITH		T TUBE O.D. (mm.)	T1 TUBE O.D. (mm.)	A (mm.)	B (mm.)	B1 (mm.)	E THRU HOLE (mm.)	NH NUT HEX (in.)	NH1 NUT HEX (in.)	BH BODY HEX (in.)
8MM-DRU-6MM	8M0-6-6M	M8RUM6	8	6	42.3	16.2	15.3	4.8	5/8	9/16	9/16
10MM-DRU-6MM	10M0-6-6M	M10RUM6	10	6	44.5	17.2	15.3	4.8	3/4	9/16	11/16
10MM-DRU-8MM	10M0-6-8M	M10RUM8	10	8	45.1	17.2	16.2	6.4	3/4	5/8	11/16
12MM-DRU-6MM	12M0-6-6M	M12RUM10	12	6	47.0	22.8	15.3	4.8	7/8	9/16	7/8
12MM-DRU-8MM	12M0-6-8M	M12RUM8	12	8	47.8	22.8	16.2	6.4	7/8	5/8	7/8
12MM-DRU-10MM	12M0-6-10M	M12RUM10	12	10	48.7	22.8	17.2	7.9	7/8	3/4	7/8
18MM-DRU-12MM	18M0-6-12M	M18RUM12	18	12	53.5	24.4	22.8	9.5	1-1/8	7/8	1-1/16

Metric to Fractional

CBC PART NUMBER	INTERCHANGES WITH		T TUBE O.D. (mm.)	T1 TUBE O.D. (in.)	A (mm.)	B (mm.)	B1 (mm.)	E THRU HOLE (mm.)	NH NUT HEX (in.)	NH1 NUT HEX (in.)	BH BODY HEX (in.)
6MM-DRU-1	6M0-6-1	-	6	1/16	34.3	15.3	8.7	1.3	9/16	5/16	9/16
6MM-DRU-2	6M0-6-2	M6CU2	6	1/8	38.5	15.3	13.1	2.4	9/16	7/16	9/16
6MM-DRU-4	6M0-6-4	M6CU4	6	1/4	41.0	15.3	15.4	4.8	9/16	9/16	1/2
6MM-DRU-5	6M0-6-5	M6CU5	6	5/16	42.3	15.3	16.5	4.8	9/16	5/8	9/16
6MM-DRU-6	6M0-6-6	-	6	3/8	43.2	15.3	17.0	4.8	9/16	11/16	5/8
8MM-DRU-4	8M0-6-4	M8CU4	8	1/4	42.3	16.2	15.4	4.8	5/8	9/16	9/16
8MM-DRU-6	8M0-6-6	M8CU6	8	3/8	44.3	16.2	17.0	6.4	5/8	11/16	5/8
10MM-DRU-2	10M0-6-2	M10CU2	10	1/8	41.8	17.2	13.1	2.4	3/4	7/16	11/16
10MM-DRU-4	10M0-6-4	M10CU4	10	1/4	44.5	17.2	15.4	4.8	3/4	9/16	11/16
10MM-DRU-5	10M0-6-5	-	10	5/16	45.1	17.2	16.5	6.4	3/4	5/8	11/16
10MM-DRU-6	10M0-6-6	M10CU6	10	3/8	45.9	17.2	17.0	7.1	3/4	11/16	11/16
12MM-DRU-4	12M0-6-1	-	12	1/4	47.0	22.8	15.4	4.8	7/8	9/16	7/8
12MM-DRU-5	12M0-6-5	-	12	5/16	47.8	22.8	16.5	6.4	7/8	5/8	7/8
12MM-DRU-6	12M0-6-6	M12CU6	12	3/8	48.4	22.8	17.0	7.1	7/8	11/16	7/8
12MM-DRU-8	12M0-6-8	M12CU8	12	1/2	51.2	22.8	22.9	9.5	7/8	7/8	7/8
18MM-DRU-12	18M0-6-12	M18CU12	18	3/4	53.5	24.4	24.5	15.1	1-1/8	-1/8	1-1/16

NOTE: Dimensions subject to change, to be used for reference only.

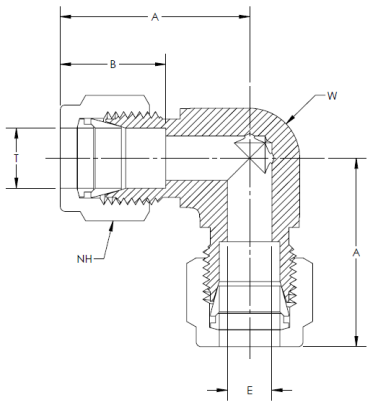




CBC PART NUMBER	INTERCHANGES WITH		T TUBE O.D. (mm.)	A (mm.)	B (mm.)	E THRU HOLE (mm.)	NH NUT HEX (in.)	BH BODY HEX (in.)
6MM-DU	6M0-6	SCM6	6	41.0	15.3	4.8	9/16	9/16
8MM-DU	8M0-6	SCM8	8	43.2	16.2	6.4	5/8	9/16
10MM-DU	10M0-6	SCM10	10	46.2	17.2	7.9	3/4	11/16
12MM-DU	12M0-6	SCM12	12	51.2	22.8	9.5	7/8	7/8
18MM-DU	18M0-6	SCM18	18	53.5	24.4	15.1	1-1/8	1-1/16

NOTE: Dimensions subject to change, to be used for reference only.

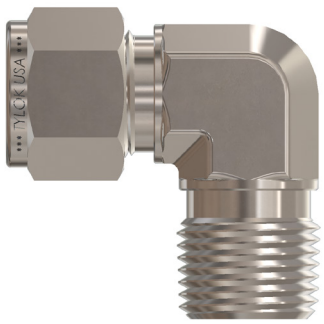
DELU
Union Elbow

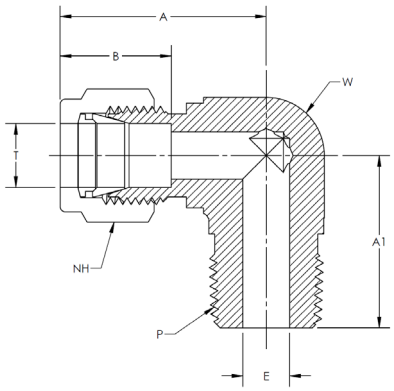


CBC PART NUMBER	INTERCHANGES WITH		T TUBE O.D. (mm.)	A (mm.)	B (mm.)	E THRU HOLE (mm.)	NH NUT HEX (in.)	W WRENCH FLAT (in.)
6MM-DELU	6M0-9	EEM6	6	27.0	15.3	4.8	9/16	1/2
8MM-DELU	8M0-9	EEM8	8	28.8	16.2	6.4	5/8	9/16
10MM-DELU	10M0-9	EEM10	10	33.0	17.2	7.9	3/4	13/16
12MM-DELU	12M0-9	EEM12	12	36.0	22.8	9.5	7/8	13/16
18MM-DELU	18M0-9	EEM18	18	39.8	24.4	15.1	1-1/8	1-1/16

NOTE: Dimensions subject to change, to be used for reference only.

DME
Male Elbow

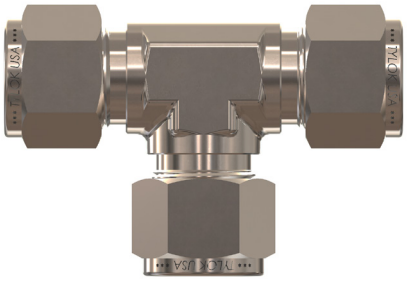


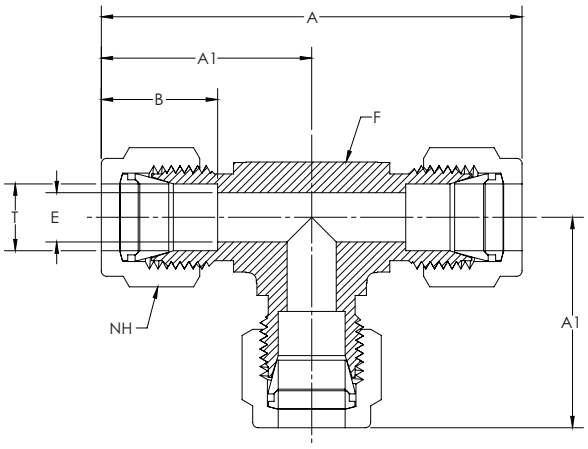


CBC PART NUMBER	INTERCHANGES WITH		T TUBE O.D. (mm.)	P PIPE END NPT (in.)	A (mm.)	A1 (mm.)	B (mm.)	E THRU HOLE (mm.)	NH NUT HEX (in.)	BH BODY HEX (in.)
6MM-DME-2	6M0-2-2	M6MSEL1/8N	6	1/8	27.0	18.8	15.3	4.8	9/16	1/2
6MM-DME-4	6M0-2-4	M6MSEL1/4N	6	1/4	27.0	23.4	15.3	4.8	9/16	1/2
6MM-DME-6	6M0-2-6	M6MSEL3/8N	6	3/8	29.8	26.2	15.3	4.8	9/16	11/16
6MM-DME-8	6M0-2-8	M6MSEL1/2N	6	1/2	31.8	33.0	15.3	4.8	9/16	13/16
8MM-DME-2	8M0-2-2	M8MSEL1/8N	8	1/8	28.8	19.8	16.2	4.8	5/8	5/8
8MM-DME-4	8M0-2-4	M8MSEL1/4N	8	1/4	28.8	24.4	16.2	6.4	5/8	5/8
8MM-DME-6	8M0-2-6	M8MSEL3/8N	8	3/8	30.6	26.2	16.2	6.4	5/8	11/16
8MM-DME-8	8M0-2-8	M8MSEL1/2N	8	1/2	32.6	33.0	16.2	6.4	5/8	13/16
10MM-DME-2	10M0-2-2	M10MSEL1/8N	10	1/8	33.0	23.4	17.2	4.8	3/4	13/16
10MM-DME-4	10M0-2-4	M10MSEL1/4N	10	1/4	33.0	27.9	17.2	7.1	3/4	13/16
10MM-DME-6	10M0-2-6	M10MSEL3/8N	10	3/8	33.0	27.9	17.2	7.9	3/4	13/16
10MM-DME-8	10M0-2-8	M10MSEL1/2N	10	1/2	33.5	33.0	17.2	7.9	3/4	13/16
12MM-DME-4	12M0-2-4	M12MSEL1/4N	12	1/4	36.0	28.2	22.8	7.1	7/8	13/16
12MM-DME-6	12M0-2-6	M12MSEL3/8N	12	3/8	36.0	28.2	22.8	9.5	7/8	13/16
12MM-DME-8	12M0-2-8	M12MSEL1/2N	12	1/2	36.0	33.0	22.8	9.5	7/8	13/16
12MM-DME-12	12M0-2-12	M12MSEL3/4N	12	3/4	39.8	36.8	22.8	9.5	7/8	1-1/16
18MM-DME-8	18M0-2-8	M18MSEL1/2N	18	1/2	39.8	36.8	24.4	11.9	1-1/8	1-1/16
18MM-DME-12	18M0-2-12	M18MSEL3/4N	18	3/4	39.8	36.8	24.4	15.1	1-1/8	1-1/16

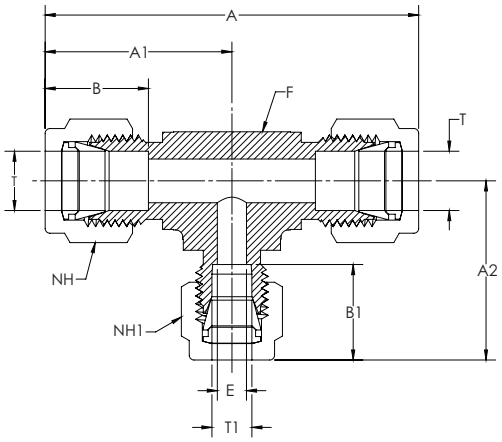
NOTE: Dimensions subject to change, to be used for reference only.

DTTT
Union Tee & Branch Tee



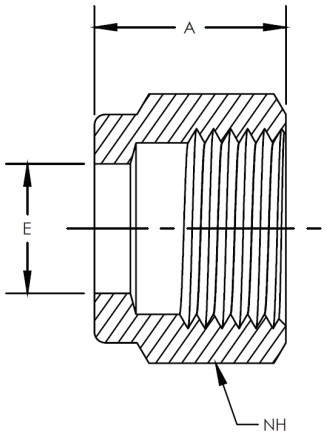


CBC PART NUMBER	INTERCHANGES WITH		T TUBE O.D. (mm.)	A (mm.)	A1 (mm.)	B (mm.)	E THRU HOLE (mm.)	NH NUT HEX (in.)	W WRENCH FLAT (in.)
6MM-DTTT	6M0-3	ETM6	6	53.9	27.0	15.3	4.8	9/16	1/2
8MM-DTTT	8M0-3	ETM8	8	59.7	29.9	16.2	6.4	5/8	5/8
10MM-DTTT	10M0-3	ETM10	10	66.0	33.0	17.2	7.9	3/4	13/16
12MM-DTTT	12M0-3	ETM12	12	72.0	36.0	22.8	9.5	7/8	13/16
18MM-DTTT	18M0-3	ETM18	18	79.6	39.8	24.4	15.1	1-1/8	1-1/16



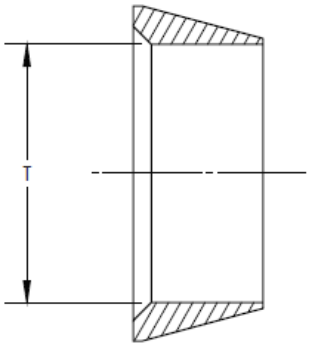
CBC PART NUMBER	INTERCHANGES WITH	T TUBE O.D. (mm.)	T1 TUBE O.D. (mm.)	A (mm.)	A1 (mm.)	A2 (mm.)	B (mm.)	B2 (mm.)	E THRU HOLE (mm.)	NH NUT HEX (in.)	NH1 NUT HEX (in.)	W WRENCH FLAT (in.)
8MM-DTTT-8MM-6MM	8M0-3-8M-6M	8	6	59.9	29.9	29.0	16.2	15.3	4.8	5/8	9/16	5/8
10MM-DTTT-10MM-6MM	10M0-3-10M-6M	10	6	66.0	33.0	31.8	17.2	15.3	4.8	3/4	9/16	13/16
12MM-DTTT-12MM-6MM	12M0-3-12M-6M	12	6	72.0	36.0	31.8	22.8	15.3	4.8	7/8	9/16	13/16
18MM-DTTT-18MM-12MM	18M0-3-18M-12M	18	12	79.8	39.9	39.9	24.4	22.8	9.5	1-1/8	7/8	1-1/16

NOTE: Dimensions subject to change, to be used for reference only.

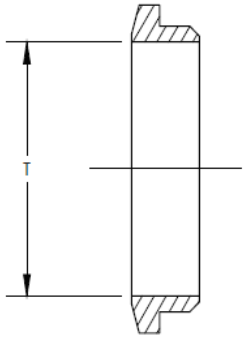


CBC PART NUMBER	INTERCHANGES WITH		T TUBE O.D. (mm.)	A (mm.)	NH NUT HEX (in.)
DN-6MM	6M2-1	NUM6	6	12.7	9/16
DN-8MM	8M2-1	NUM8	8	13.5	5/8
DN-10MM	10M2-1	NUM10	10	15.1	3/4
DN-12MM	12M2-1	NUM12	12	17.4	7/8
DN-18MM	18M2-1	NUM18	18	17.4	1-1/8

NOTE: Dimensions subject to change, to be used for reference only.



CBC PART NUMBER	INTERCHANGES WITH		T TUBE O.D. (mm.)
DFC-6MM	6M3-1	FFM6	6
DFC-8MM	8M3-1	FFM8	8
DFC-10MM	10M3-1	FFM10	10
DFC-12MM	12M3-1	FFM12	12
DFC-18MM	18M3-1	FFM18	18



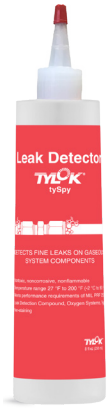
CBC PART NUMBER	INTERCHANGES WITH		T TUBE O.D. (mm.)
DRC-6MM	6M4-1	BFM6	6
DRC-8MM	8M4-1	BFM8	8
DRC-10MM	10M4-1	BFM10	10
DRC-12MM	12M4-1	BFM12	12
DRC-18MM	18M4-1	BFM18	18

NOTE: Dimensions subject to change, to be used for reference only.

TYLOK LIQUID LEAK DETECTORS

- Tylok Liquid Leak Detector detect gas leaks in hard-to-reach areas.
- Safe for oxygen systems
- Sustainable bubble action works even on very small leaks and vertical surfaces
- Flexible tube extends for hard-to-reach areas
- Formulas dries clean, without staining

Part Number	Container Size	Pull Out Tube Length
Leak Detector- 8oz.	8 fl oz. (236 ml)	12 inch (30.48cm)
Leak Detector- Gal	1 Gallon	
Leak Detector COOL- 8oz.	8 fl oz. (236 ml)	12 inch (30.48cm)
Leak Detector COOL- Gal	1 Gallon	



TYLOK LIQUID LEAK DETECTOR

- Temperature rating: Can be used over a temperature range of 27° to 200°F (-2 to 93°C).

Specifications: Meets the performance requirements of:

- MIL-PRF-25567 Leak Detector Compound, Oxygen Systems, Type I, 1 to 70°C (33 to 158°F)
- NFPA 52 Section 6-12.2 Leak Testing Compressed Natural Gas Vehicular Fuel System
- EPA Part 60, Appendix A, Method 21, Section 4.3.3 Alternative Screening Procedures Using Soap Solutions
- Nontoxic, noncorrosive, nonflammable

TYLOK LOW TEMPERATURE LIQUID LEAK DETECTOR

- Temperature rating: Can be used over a temperature range of -65° to 200°F (-54 to 93°C).

Specifications: Meets the performance requirements of:

- MIL-PRF-25567 Leak Detector Compound, Oxygen Systems, Type II, -54° to 1°C (-65 to 33°F)
- NFPA 52 Section 6-12.2 Leak Testing Compressed Natural Gas Vehicular Fuel System
- EPA Part 60, Appendix A, Method 21, Section 4.3.3 Alternative Screening Procedures Using Soap Solutions
- Noncorrosive, nonflammable

TYLUBE™ THREAD LUBRICANT

Tylube™ is an anti-gall compound to be used on stainless steel, steel and nickel-based alloys. Temperature range to 500°F. Not recommended for plastic and aluminum products.

Tylube™ is made from distilled water with inert ingredients and contains no silicones, heavy metals, chlorine or sulfur. Safe for oxygen applications.

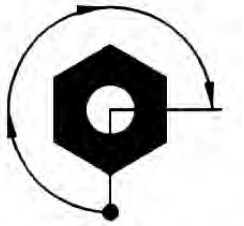
For a complete list of ingredients, request an SDS to be sure of its compatibility with your installation. Available in 8 oz. plastic bottles.

CBC-LOK®/CS-LOK® INSTALLATION INSTRUCTIONS

CBC-Lok®/CS-Lok® Tube Fittings come completely assembled & ready for use, no disassembly required. Although there are some general guidelines to follow, no special preparation of the tubing is necessary. In overhead applications, Tylok recommends using a Pre-Set Tool.

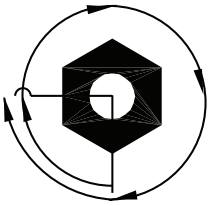
Size		Tighen # Turn(s)
1	1/16"	3/4"
2	1/8"	
3	3/16"	
4	1/4"	1-1/4"
5	5/16"	
6	3/8"	
8	1/2"	
10	5/8"	
12	3/4"	
14	7/8"	
16	1"	

SIZE #1 thru #3



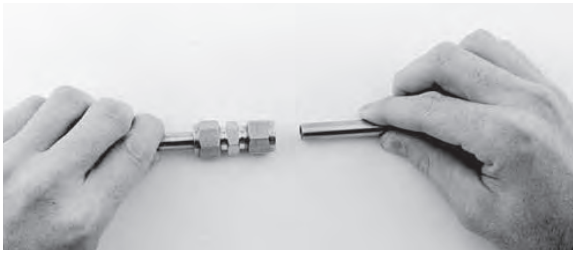
Finger tight plus 3/4 turn

SIZE #4 thru #16



Finger tight plus 1-1/4 turn

NOTE: DF Plugs, -NF (Nut & Ferrule Pre-Assemblies) require only 1/4 turn make-up.



Simply insert the tubing into the assembly, making sure the tubing seats firmly seats against the shoulder of the body and the nut is finger tight. High pressure applications and high saftey-factor systems. Further tighten the nut until the tube will not turn by hand or move axially in the fitting.

Tighten nut with wrench the additional number of turns indicated above, while holding the fitting body with a second wrench.

TO REMOVE TUBE & RE-CONNECT TUBE FITTING

Mark the location of the nut with reference to the body before disassembly. Back off the nut until it is clear of the body and remove the tubing from the fitting. For assembly, re-insert the tubing into the body until it is seated. With proper size wrench, re-tighten nut to original location by realigning previous marks. A noticeable amount or torque will develop when the nut is turned to original position. Next, rotate the nut slightly past original position to fully re-set the seal.

CBC-LOK® TUBING SELECTION & PREPARATION

Proper selection of tubing is key to the performance of the fitting. When selecting the proper wall thickness and material, all tubing should be compatible with the process fluid, temperature, application, flow, and system pressure.

For proper sealing, it is recommended that tubing and fitting be of like material to allow for positive sealing (i.e., stainless on stainless, brass on copper, steel on steel). Galvanic corrosion could occur if the tubing and fitting are not of like material, with the exception of a brass fitting on copper tubing.

When using stainless steel tubing, Tylok recommends using Type 304 or 316 fully annealed, seamless or welded redrawn meeting ASTM A213, ASTM A269 or equivalent, with a suggested maximum hardness of 80 Rb.

For copper tubing, Tylok suggests using soft annealed, seamless tubing per ASTM B75 or equivalent. Copper water tube type K or L, soft annealed (Temper O) per ASTM B88 can also be used.

When using carbon steel, all tubing should be fully annealed and conform to ASTM A-179, or equivalent, with a maximum hardness of 72 Rb.

In general, all tubing should be free of nicks, scratches, or imperfections of any kind and should be suitable for bending. Tubing that does not easily go through fitting components should not be used. It is recommended that the charts be used for tube selection. Ideally, the tube end should be cut square so that when it bottoms out inside the fitting, an extra seal is provided. Avoid installing contaminated tubing into your system. For elevated temperatures, see Tube Pressure De-rating Factors at Elevated Temperatures Chart.

CBC-Lok®/CS-Lok® Tube Fitting swage the tubing to achieve sealing. Thin wall tubing (wall thickness with working pressures highlighted in reverse text in the charts) is not recommended for Gas Service. See “Gas Service” on page 75.

When using tubing of a thinner or thicker wall than shown, it is always recommended that you consult with your local Distributor or contact Tylok International directly if there is any doubt of selecting tubing.

It is the responsibility of the Engineer to refer to the technical pages in this catalog to ensure selection of the proper tubing material, tubing compatibility with the fitting, media and tubing wall thickness.

Note: Tables, calculated to the right, are suggested maximum working pressure ratings, in accordance with ASME B31.3, but should be used for reference only. Tylok International Inc., is not responsible for its accuracy nor designs using these figures.

Following the stated recommendations will result in a safe application, free of leaks. The entire system must be considered when selecting the tube. Tylok tube fittings are designed to work to the tubing pressure ratings found in the charts below.

SUGGESTED ALLOWABLE WORKING PRESSURE TABLES (psig)

Stainless Steel

Tube Size O.D.	Tube Wall Thickness (inches)							
	.028	.035	.049	.065	.083	.095	.109	.120
1/8"	8500	10900						
3/16"	5400	7000	10200					
1/4"	4000	5100	7500	10200				
5/16"		4000	5800	8000				
3/8"		3300	4800	6500				
1/2"		2600	3700	5100	6700			
5/8"			2900	4000	5200	6000		
3/4"			2400	3300	4200	4900	5800	
7/8"			2000	2800	3600	4200	4800	
1"				2400	3100	3600	4200	4700

Note: For welded and drawn tubing, a de-rating factor must be utilized. For double welded tube, multiply the above pressure rating by .85; and of single welded tube by .80 (ASME B31.3).

Carbon Steel

Tube Size O.D.	Tube Wall Thickness (inches)							
	.028	.035	.049	.065	.083	.095	.109	.120
1/8"	8000	10200						
3/16"	5100	6600	9600					
1/4"	3700	4800	7000	9600				
5/16"		3700	5500	7500				
3/8"		3100	4500	6200				
1/2"		2300	3200	4500	5900			
5/8"			2600	3500	4600	5300		
3/4"			2100	2900	3700	4300	5100	
7/8"			1800	2400	3200	3700	4300	
1"			1500	2100	2700	3200	3700	4100

Copper

Tube Size O.D.	Tube Wall Thickness (inches)							
	.028	.035	.049	.065	.083	.095	.109	.120
1/8"	2700	3600						
3/16"	1800	2300	3400					
1/4"	1300	1600	2500	3500				
5/16"		1300	1900	2700				
3/8"		1000	1600	2200				
1/2"		800	1100	1600	2100			
5/8"			900	1200	1600	1900		
3/4"			700	1000	1300	1500	1800	
7/8"			600	800	1100	1300	1500	
1"			500	700	900	1100	1300	1500

GAS SERVICE

Extra care must be taken when tubing is used in gas service applications. Small gas molecules easily escape through minute leak paths; therefore, the tubing must be free of nicks, scratches and imperfections of any kind. When using large diameter tubing, the possibility of surface defects is increased further due to greater surface area. It is strongly recommended that the heavier wall thickness be selected. Penetration of the ferrules on thin wall tubing or soft material may not offer enough radial resistance for sealing.

Valves in reverse text are not recommended for Gas Service.

GAP GAGE

Gap Gage can be purchased to ensure the Installer and Inspector that the nut has been properly tightened.

When fitting is properly tightened, gap gage should not fit between nut and shoulder of body.

PRECAUTIONS FOR WELD END

CBC-Lok®/CS-Lok® Tube Fittings with weld ends offer the same positive sealing as all other Tylok fittings. Welding could deform the assembly, making pull ups or disassembly difficult. Some precautions should be taken:

- Remove the nut & ferrules from the fitting.
- It is important that the fitting threads and sealing surfaces be protected from weld splatter.
- A heat sink should be used to dissipate heat.
- Ensure alignment by track welding symmetrically.
- Once welded, remove the weld splatter protection and reassemble nut & ferrules on fitting.

SAFETY GUIDELINES

- Never connect, disconnect or remake a fitting with pressure in the system.
- Make sure all fittings are properly installed, reference Installation Instructions - page 73, before pressurizing the system.
- Tubing material should be softer than fitting material.
- Tylok recommends using only Tylok replacement parts.
- Although the fittings will hold to the pressure rating of the tubing, it is not recommended to go beyond this rating. Elongation could occur in the tubing, shrinking the wall thickness and causing potential harm to anyone in the area.
- Always use proper thread lubricants and sealants on tapered pipe threads.
- If process fluids are toxic and/or hazardous, exercise extra caution.
- Never bleed a system by loosening a fitting.
- For proper sealing it is recommended that the tubing and fitting be of like material.

QUALITY CONTROL

All components are manufactured & inspected to meet strict quality control standards in each phase of production. All employees are thoroughly trained to follow procedures, in accordance with the ISO 9001 Quality Standard, to ensure a quality product from the start of each job through completion.

PIPE THREAD SPECIFICATIONS

Tylok Pipe Fittings are manufactured from materials meeting applicable ASTM or ASME specifications, with pipe threads which meet or exceed ANSI B1.20.1 requirements. Strict quality control procedures are followed throughout production to provide the finest possible product.

Materials: Brass • 316 Stainless Steel • Steel

These charts are to be used as a guide only and are based on normal wall thicknesses, used for the various sizes. These ratings may vary widely from effects such as the proper use of sealants, size of stock, temperature, corrosion factors, etc. Therefore, Tylok International, Inc. assumes no responsibility for its accuracy in any individual design.

Pressure ratings for Tylok tube fittings that have differing end connection styles shall use the lowest of the pressure ratings.

Suggested Maximum Operating Pressures for Pipe Threads (psig)				
NPT Size	316 SS & Carbon Steel		Brass	
	Male	Female	Male	Female
1/16"	11000	6700	5500	3300
1/8"	10000	6500	5000	3200
1/4"	8000	6600	4000	3300
3/8"	7800	5300	3900	2600
1/2"	7700	4900	3800	2400
3/4"	7300	4600	3600	2300
1"	5300	4400	2600	2200

Tylok Instrumentation Fittings are rated at the following temperatures:	
316 Stainless	-325°F to 1000°F (-198°C to 648°C)
Brass	-40°F to 400°F (-40°C to 204°C)
Steel	-65°F to 375°F (-54°C to 190°C)

Consideration should be given to maximize temperature ratings if fittings and/or tubing are coated or plated.

TUBE PRESSURE DE-RATING FACTORS ELEVATED TEMPERATURES

The table lists de-rating factors that must be considered in applications above that of ambient temperatures.

Example:

Type 316 Stainless Steel 1/4" O.D.x.0.49" wall at 800°F is 7,500 PSI x .79 = 5,925 psig.

Therefore, the suggested allowable working pressure for 316 Stainless Steel (1/4" O.D. with .049" tube wall) at 800°F is 5,925 psig.

Temperatures		Tubing Material		
°F	°C	Carbon	304 SS	316 SS
200	93	0.95	1.00	1.00
300	149	0.90	1.00	1.00
400	204	0.87*	0.93	0.96
500	260		0.87	0.89
600	316		0.82	0.85
700	371		0.8	0.81
800	427		0.76	0.79
900	482		0.73	0.77
1000	538		0.69	0.76

* Based on 375°F (190°C) max

THERMOCOUPLE BORE THROUGH

Sizes	De-Rating Factor
1/2" & Smaller	0.75
Over 1/2" up to & including 3/4"	0.50
Larger than 3/4"	0.25

NOTE: Multiply tube pressure rating (see Suggested Allowable Working Pressure tables) by de-rating factor to determine safe working pressure.

Temperatures		Tubing Material
°F	°C	Copper
100	38	1.00
150	66	0.85
200	93	0.80
250	121	0.80
300	149	0.78
350	177	0.66
400	204	0.50

HEAT TRACEABILITY

Tylok Tube Fittings are completely heat code traceable back to the original mill heat from which they were made. Starting with the original billet, the mill creates a certificate that completely describes the chemical & physical makeup. For any one of the four components (body, front ferrule, rear ferrule, nut), the material certifications can be provided. Call Tylok and provided the heat code stamp marked on the part itself, along the part number to obtain the certificate.

RAW MATERIAL SPECIFICATIONS

Fitting Material	Bar Stock	Forging
Brass	ASTM B16 ASTM B453	ASTM B283
Stainless Steel	ASTM A276 ASTM A479 ASME SA-479 Type 316-SS	ASTM A182 ASME SA-182 Type 316-SS
Steel	ASTM A108	

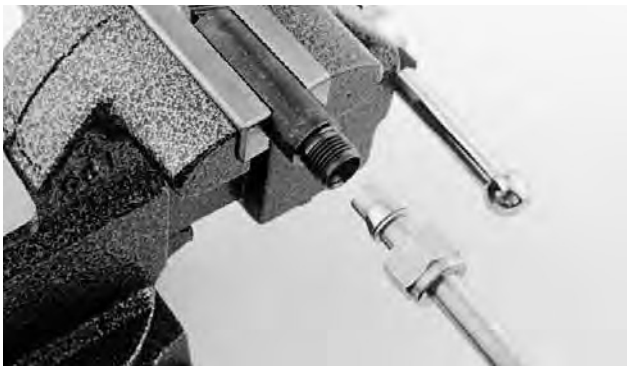
* Reference Tubing Selection & Preparation

TYLOK PRE-SET TOOL

The CBC-Lok®/CS-lok® product line offers a Pre-Set Tool when fittings need to be installed in hard to reach places. The Pre-Set Tool is designed to be used in any tabletop vise. After tightening the nut the specified number of turns, as stated in the included installation instructions, loosen the nut from the Pre-Set Tool. Once the ferrules have swaged into the tubing surface, the assembly is ready for installation. Follow the installation for re-connecting the tube fitting as stated on page 73. When ordering the CBC-Lok®/CS-Lok® Pre-Set Tool, reference the part number in the chart. The Pre-Set Tool is hardened for maximum durability. The Pre-Set Tool can be used repeatedly to set the ferrules onto the tubing for easy installation.

PART NUMBER	TUBE SIZE
1-DPST	1/16"
2-DPST	1/8"
3-DPST	3/16"
4-DPST	1/4"
5-DPST	5/16"
6-DPST	3/8"
8-DPST	1/2"
10-DPST	5/8"
12-DPST	3/4"
14-DPST	7/8"
16-DPST	1"

Place Pre-Set Tool in a vice and tighten nut specified number of turns



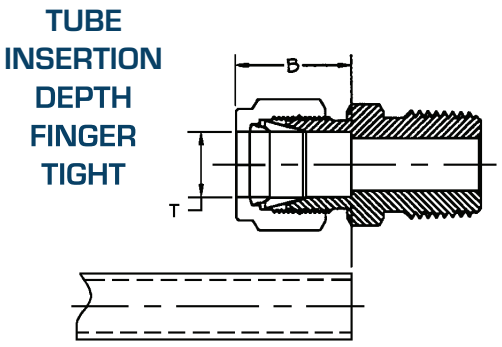
Back nut off of Pre-Set Tool. Notice the ferrules have swaged into the tubing. Now take the tubing to installation area

TUBE INSERTION CHART

Applications

TUBE INSERTION CHART

For pre-cutting tubing to length, the following chart shows the additional length inside the fitting assembly.



Tube Size	T Tube OD	B Insertion Depth
1	1/16	0.34
2	1/8	0.52
3	3/16	0.54
4	1/4	0.61
5	5/16	0.65
6	3/8	0.67
8	1/2	0.90
10	5/8	0.96
12	3/4	0.96
14	7/8	1.02
16	1	1.24

Note: Dimensions subject to change, to be used for reference only.

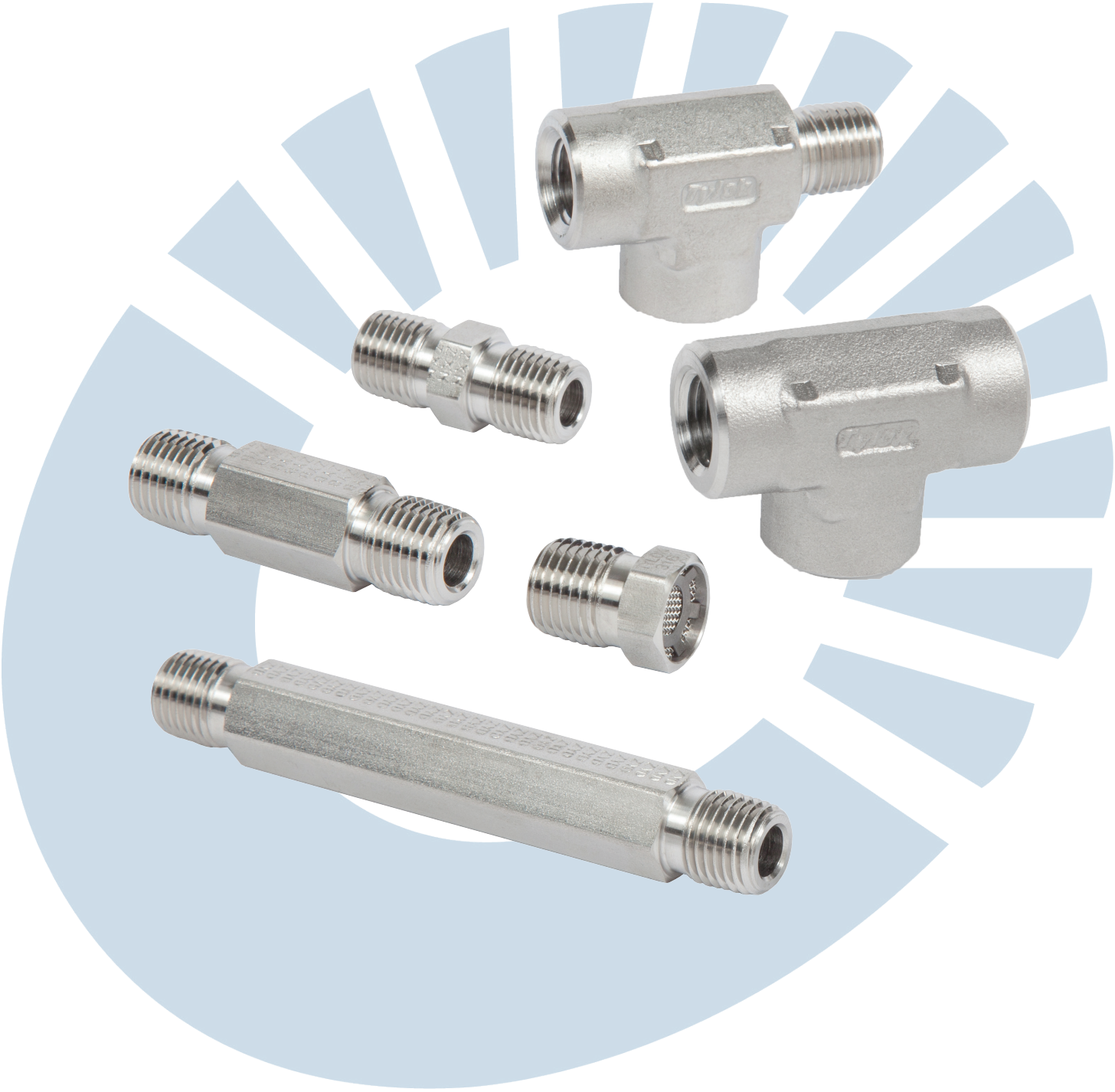
TUBING-GENERAL APPLICATIONS

Tylok Tube Fittings are designed to perform in a variety of applications that demand high performance. The CBC-Lok® & CS-Lok® product lines have been engineered to provide optimal performance. However, tubing should always be considered as an important factor in the design stages of any system. The table is provided as an reference to the Engineer in the design process. Tylok suggests the use of seamless, fully annealed tubing. Welded tubing may be used with Tylok fittings. However, due to the manufacturing of welded tubing, variables may be encountered. The media flowing through the tubing must be compatible with the tubing itself. It is always a good rule to use like tubing material on like fitting material. If this format is not followed, the ferrules may have difficulty penetrating the tubing, adversely affecting the sealing ability addition, dissimilar materials in contact may be sensitive to galvanic corrosion. Tylok recommends ordering tubing material to meet ASTM specifications to ensure that it will be dimensionally, physically, and chemically within precise limits.

Tubing Material	General Applications
Carbon Steel	Air Lines, High Pressure, High Temperature, Oil, Air, Specialty Chemicals, Hydraulic Gases
Copper	Low Temperature, Low Pressure, Water, Oil, Air, Pneumatic Controls, Lube Lines
Stainless Steel	High Pressure, High Temperature, Nitrogen, Helium, Flammable Gases, Hydraulic Gases, generally corrosive media

NOTICE

In designing a system incorporating tube fittings and valves, it is the designer's or user's obligation & responsibility to determine the appropriate fittings and valves to be used for each application and to insure proper installation and maintenance.



Instrumentation Pipe Fittings

1CLN
Close Nipple
83

1FMA
Female to Male Adapter
83

1FPC
Female Pipe Cap
83

1FPRU
Female Pipe Reducer Union
83

1FPU
Female Pipe Union
84

1HLN
Hex Long Nipple
84

1HN
Hex Nipple
84

1HRN
Hex Reducing Nipple
85

1MPP
Male Pipe Plug
85

1RAFM
Reducer Adapter - Female to Male
85

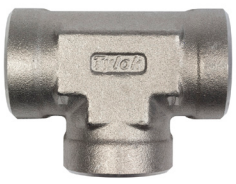
1RBMF
Reducer Bushing - Male to Female
86

2FF
Female Pipe Elbow
86

2FM
Female - Male Pipe Elbow
86

2FMR
Female - Male Reducer Pipe Elbow
87

2MM
Male Pipe Elbow
87



3FFF
All Female Pipe Elbow
87

3FFM
Pipe Tee - Female - Female - Male
88

3FMF
Pipe Tee - Female - Male - Female
88

3MMM
All Male Pipe Tee
88

4FPCR
Female Pipe Cross
88

Instrumentation Pipe Fittings

Tylok Instrumentation Pipe Fittings are offered in popular configurations such as reducing adapters, reducing bushings, pipe unions, elbows, tees, crosses, etc.

Fittings are manufactured to the same high quality standards as other Tylok Fittings. Each fitting is thoroughly cleaned to eliminate system contamination and features an attractive surface finish to enhance the appearance of modern scientific instrumentation and equipment.

Fittings are manufactured from materials meeting applicable ASTM or ASME specifications, with pipe threads which meet or exceed ANSI/ASME B1.20.1 requirements. Strict quality controls procedures are followed throughout production.

Pipe thread connections are very common in today's industry. They are relatively easy to work with because of the common sizes and dimensions throughout manufacturing. It is important to use a thread sealant.

These products range from pipe "dopes" to Teflon tape, all of which can be purchase through your local Tylok Distributor.

Design/Features

Tylok Instrumentation Pipe Fittings are manufactured to the same high quality standards as other Tylok Fittings. Each fitting is thoroughly cleaned to eliminate system contamination and features an attractive surface finish to enhance the appearance of modern scientific instrumentation and equipment.

Technical Support & Training

Tylok Instrumentation Inc. ensures all of its Distributors are trained on the proper installation of fittings and valves. Tylok Distributors are trained to provide the technical support you deserve. Additionally, our Distributors will help in finding solutions for specific applications. Contact your local Tylok Distributor for further information.

Quality Management System

SAI Global has registered Tylok International's Quality Management System to ISO 9001. The quality system complies with the international standard ISO 9001 and its technical equivalent, ANSI/ISO/ASQ 9001. Tylok strives to continuously improve the effectiveness of the Quality Management System.

Certified System™
ISO 9001

How to Order

Tylok Instrumentation Pipe Fittings are ordered as listed in this catalog by inserting the material code before the part number.

Tylok Instrumentation Pipe Fittings can be identified through the part number as to material, pipe size, configuration, and thread connection. The part number describes a complete fitting. The size nomenclature to describe a tee fitting is from left (1) to right (2) and down (3).

Special Configurations available upon request.

SS	-	6	-	1	-	RAFM	-	4
↓		↓		↓		↓		↓
Material		Pipe Size		Style		Description		Pipe Size
Chart 1		Chart 2		Chart 3		Chart 4		Chart 2

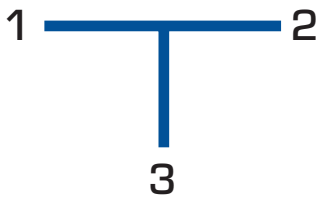


Chart 1- Material	
B	Brass
S	Steel
SS	Stainless Steel

Chart 3- Style	
1	Straight
2	Elbow
3	Tee
4	Cross

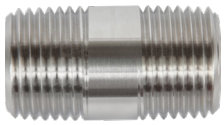
Chart 2- Pipe Size		
Designator	Pipe Thread (NPT)	Pipe Thread BSPP/BSPT
1	1/16-27	1/16-28
2	1/8-27	1/8-28
3	-	-
4	1/4-18	1/4-19
5	-	-
6	3/8-18	3/8-19
8	1/2-14	1/2-14
10	-	-
12	3/4-14	3/4-14
14	-	-
16	10-111/2	10-11

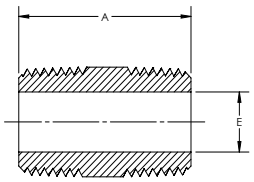
Chart 4- Description	
1FMA	Female to Male Adapter
1FPC	Female Pipe Cap
1FPRU	Female Pipe Reducer Union
1HLN	Hex Long Nipple
1HN	Hex Nipple
1HRN	Hex Reducing Nipple
1MPP	Male Pipe Plug
1RAFM	Reducer Adapter-Female to Male
1RBMF	Reducer Bushing-Male to Female

Chart 4- Description	
2FF	Female Pipe Elbow
2FM	Female-Male Pipe Elbow
2FMR	Female-Male Reducer Pipe Elbow
2MM	Male Pipe Elbow
3FFF	All Female Pipe Tee
3FMF	Pipe Tee-Female-Male-Female
3MMM	All Male Pipe Tee
4FPCR	Female Pipe Cross
1MDF	Mud Dauber Fitting

1CLN

Close Nipple

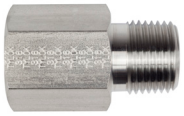


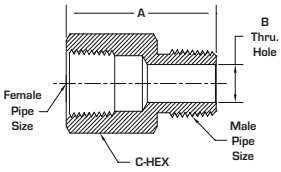


Part No.	Interchanges With	Male Pipe Size	A	E Thru Hole
2-1CLN	2-CN	1/8	0.75	0.19
4-1CLN	4-CN	1/4	1.13	0.28
6-1CLN	6-CN	3/8	1.13	0.38
8-1CLN	8-CN	1/2	1.5	0.47
12-1CLN	12-CN	3/4	1.5	0.63
16-1CLN	16-CN	1	1.88	0.88

1FMA

Female to Male Adapter

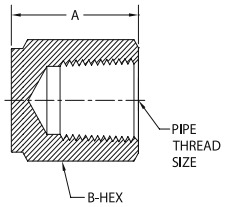




Part No.	Interchanges With	Female Pipe Size	Male Pipe Size	A	B Thru Hole	C Hex
2-1FMA	2-A	1/8	1/8	1.062	.187	9/16
4-1FMA	4-A	1/4	1/4	1.375	.281	3/4
6-1FMA	6-A	3/8	3/8	1.562	.375	7/8
8-1FMA	8-A	1/2	1/2	1.906	.468	1-1/16
12-1FMA	12-A	3/4	3/4	1.937	.625	1-5/16
16-1FMA	16-A	1	1	2.281	.875	1-5/8

1FPC

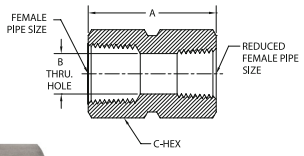
Female Pipe Cap



Part No.	Interchanges With	Pipe Thread Size	A	B Hex
2-1FPC	2-CP	1/8	.750	9/16
4-1FPC	4-CP	1/4	.906	3/4
6-1FPC	6-CP	3/8	1.031	7/8
8-1FPC	8-CP	1/2	1.343	1-1/16
12-1FPC	12-CP	3/4	1.437	1-5/16
16-1FPC	16-CP	1	1.625	1-5/8

1FPRU

Female Pipe Reducer Union

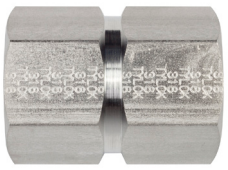


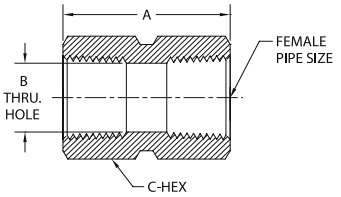
Part No.	Interchanges With	Female Pipe Size	Reduced Female Pipe Size	A	B Thru Hole	C Hex
4-1FPRU-2	4-HRCG-2	1/8	1/8	1.062	.187	9/16
6-1FPRU-4	6-HRCG-4	1/4	1/4	1.375	.281	3/4
8-1FPRU-2	8-HRCG-2	3/8	3/8	1.562	.375	7/8
8-1FPRU-4	8-HRCG-4	1/2	1/2	1.906	.468	1-1/16
8-1FPRU-6	8-HRCG-6	3/4	3/4	1.937	.625	1-5/16
12-1FPRU-4	12-HRCG-4	1	1	2.281	.875	1-5/8
12-1FPRU-8	12-HRCG-8	1/2	1/2	1.906	.468	1-1/16
16-1FPRU-8	16-HRCG-8	3/4	3/4	1.937	.625	1-5/16
16-1FPRU-12	16-HRCG-12	1	1	2.281	.875	1-5/8

Part No.	Interchanges With	Female Pipe Size	A	B Thru Hole	C Hex
2-1FPU	2-HCG	1/8	.812	.328	9/16
4-1FPU	4-HCG	1/4	1.187	.421	3/4
6-1FPU	6-HCG	3/8	1.312	.562	7/8
8-1FPU	8-HCG	1/2	1.625	.687	1-1/16
12-1FPU	12-HCG	3/4	1.687	.890	1-5/16
16-1FPU	16-HCG	1	2.000	1.125	1-5/8

1FPU

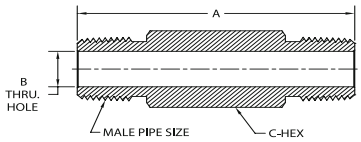
Female Pipe Union





1HLN

Hex Long Nipple

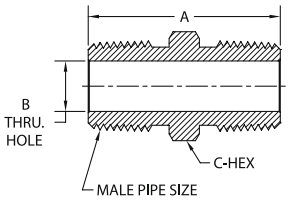


Part No.	Interchanges With	Male Pipe Size	A	B Thru Hole	C Hex
2-1HLN	2-1HLN- 2.00	1/8	* Made to Order Specify Size	.187	7/16
4-1HLN	4-1HLN- 2.00	1/4		.281	9/16
6-1HLN	6-1HLN- 2.00	3/8		.3751	1/16
8-1HLN	8-1HLN- 2.00	1/2		.468	7/8
12-1HLN	12-1HLN- 2.00	3/4		.625	1-1/16
16-1HLN	16-1HLN- 2.00	1		.875	1-3/8

Part No.	Interchanges With	Male Pipe Size	A	B Thru Hole	C Hex
1-1HN	1-HN	1/16	1.01	.125	3/8
2-1HN	2-HN	1/8	1.01	.187	7/16
4-1HN	4-HN	1/4	1.40	.281	9/16
6-1HN	6-HN	3/8	1.43	.375	11/16
8-1HN	8-HN	1/2	1.84	.468	7/8
12-1HN	12-HN	3/4	1.84	.625	1-1/16
16-1HN	16-HN	1	2.32	.875	1-3/8

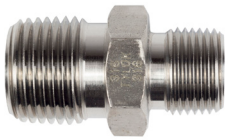
1HN

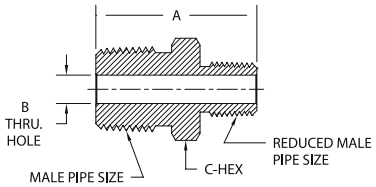
Hex Nipple



1HRN

Hex Reducing Nipple



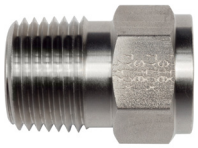


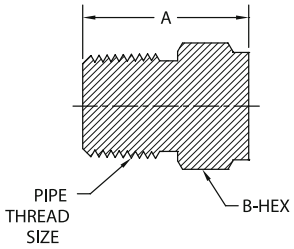
Part No.	Interchanges With	Male Pipe Size	Reduced Male Pipe Size	A	B Thru Hole	C Hex
2-1HRN-1	2-HRN-1	1/8	1/16	1.000	.125	7/16
4-1HRN-2	4-HRN-2	1/4	1/8	1.187	.187	9/16
6-1HRN-2	6-HRN-2	3/8	1/8	1.218	.1871	1/16
6-1HRN-4	6-HRN-4	3/8	1/4	1.406	.281	11/16
8-1HRN-2	8-HRN-2	1/2	1/8	1.406	.187	7/8
8-1HRN-4	8-HRN-4	1/2	1/4	1.593	.281	7/8
8-1HRN-6	8-HRN-6	1/2	3/8	1.625	.375	7/8
12-1HRN-4	12-HRN-4	3/4	1/4	1.625	.281	1-1/16
12-1HRN-8	12-HRN-8	3/4	1/2	1.812	.468	1-1/16
16-1HRN-4	16-HRN-4	1	1/4	1.906	.281	1-3/8
16-1HRN-8	16-HRN-8	1	1/2	2.093	.468	1-3/8
16-1HRN-12	16-HRN-12	1	3/4	2.093	.625	1-3/8

1MPP

Male Pipe Plug

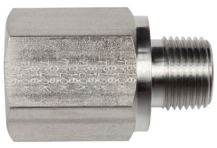
Part No.	Interchanges With	Pipe Thread Size	A	B Hex
1-1MPP	1-P	1/16	.750	3/8
2-1MPP	2-P	1/8	.750	7/16
4-1MPP	4-P	1/4	1.000	9/16
6-1MPP	6-P	3/8	1.000	11/16
8-1MPP	8-P	1/2	1.312	7/8
12-1MPP	12-P	3/4	1.375	1-1/16
16-1MPP	16-P	1	1.500	1-3/8

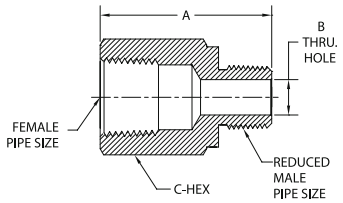




1RAFM

Reducer Adapter - Male to Female



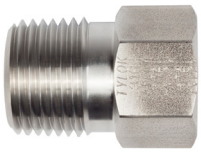


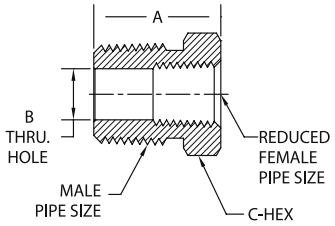
Part No.	Interchanges With	Female Pipe Size	Reduced Male Pipe Size	A	B Thru Hole	C Hex
2-1RAFM-1	2-RA-1	1/8	1/16	1.093	.125	9/16
4-1RAFM-2	4-RA-2	1/4	1/8	1.250	.187	3/4
6-1RAFM-2	6-RA-2	3/8	1/8	1.437	.187	7/8
6-1RAFM-4	6-RA-4	3/8	1/4	1.562	.281	7/8
8-1RAFM-2	8-RA-2	1/2	1/8	1.687	.187	1-1/16
8-1RAFM-4	8-RA-4	1/2	1/4	1.812	.281	1-1/16
8-1RAFM-6	8-RA-6	1/2	3/8	1.812	.375	1-1/16
12-1RAFM-4	12-RA-4	3/4	1/4	1.968	.281	1-5/16
12-1RAFM-6	12-RA-6	3/4	3/8	1.968	.375	1-5/16
12-1RAFM-8	12-RA-8	3/4	1/2	2.062	.468	1-5/16
16-1RAFM-4	16-RA-4	1	1/4	2.125	.281	1-5/8
16-1RAFM-8	16-RA-8	1	1/2	2.250	.468	1-5/8
16-1RAFM-12	16-RA-12	1	3/4	2.250	.625	1-5/8

1RBMF

Reducer Bushing-Male to Female

Part No.	Interchanges With	Male Pipe Size	Reduced Female Pipe Size	A	B Thru Hole	C Hex
2-1RBMF-1	2-RB-1	1/8	1/16	1.000	.187	7/16
4-1RBMF-2	4-RB-2	1/4	1/8	1.000	.281	9/16
6-1RBMF-2	6-RB-2	3/8	1/8	.843	.328	11/16
6-1RBMF-4	6-RB-4	3/8	1/4	1.125	.375	3/4
8-1RBMF-2	8-RB-2	1/2	1/8	1.0.62	.328	7/8
8-1RBMF-4	8-RB-4	1/2	1/4	1.0.62	.421	7/8
8-1RBMF-6	8-RB-6	1/2	3/8	1.312	.468	7/8
12-1RBMF-4	12-RB-4	3/4	1/4	1.0.62	.421	1-1/16
12-1RBMF-6	12-RB-6	3/4	3/8	1.0.62	.562	1-1/16
12-1RBMF-8	12-RB-8	3/4	1/2	1.562	.625	1-1/16
16-1RBMF-4	16-RB-4	1	1/4	1.343	.421	1-3/8
16-1RBMF-6	16-RB-6	1	3/8	1.343	.562	1-3/8
16-1RBMF-8	16-RB-8	1	1/2	1.343	.687	1-3/8
16-1RBMF-12	16-RB-12	1	3/4	1.750	.875	1-3/8

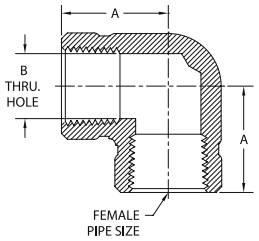




2FF

Female Pipe Elbow

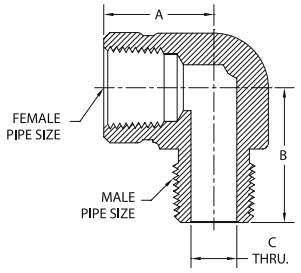
Part No.	Interchanges With	Female Pipe Size	A	B Thru Hole
2-2FF-2	2-E	1/8	.843	.328
4-2FF-4	4-E	1/4	.968	.421
6-2FF-6	6-E	3/8	1.000	.562
8-2FF-8	8-E	1/2	1.125	.687
12-2FF-12	12-E	3/4	1.437	.890



2FM

Female-Male Pipe Elbow

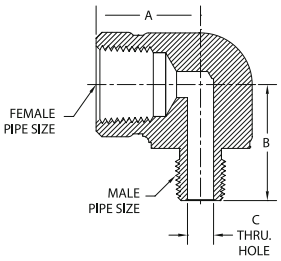
Part No.	Interchanges With	Pipe Size	A	B	C Thru Hole
1-2FM-1	1-SE	1/16	.750	.718	.125
2-2FM-2	2-SE	1/8	.843	.843	.187
4-2FM-4	4-SE	1/4	.843	1.093	.281
6-2FM-6	6-SE	3/8	1.000	1.125	.375
8-2FM-8	8-SE	1/2	1.125	1.375	.468
12-2FM-12	12-SE	3/4	1.437	1.562	.625
16-2FM-16	16-SE	1	1.906	1.906	.875



2FMR

Female-Male Reducer Pipe Elbow

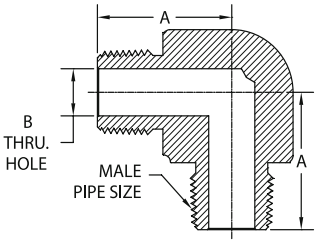
Part No.	Interchanges With	Female Pipe Size	Male Pipe Size	A	B	C Thru Hole
2-2FMR-1	2-RSE-1	1/8	1/16	.750	.750	.125
4-2FMR-2	4-RSE-2	1/4	1/8	.843	.937	.187
6-2FMR-4	6-RSE-4	3/8	1/4	1.062	1.062	.281
8-2FMR-4	8-RSE-4	1/2	1/4	1.125	1.250	.281
8-2FMR-6	8-RSE-6	1/2	3/8	1.125	1.250	.375



2MM

Male Pipe Elbow

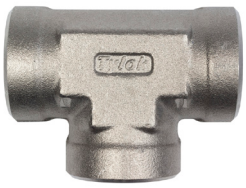
Part No.	Interchanges With	Male Pipe Size	A	B Thru Hole
2-2MM-2	2-ME	1/8	.843	.328
4-2MM-4	4-ME	1/4	.968	.421
6-2MM-6	6-ME	3/8	1.000	.562
8-2MM-8	8-ME	1/2	1.125	.687
12-2MM-12	12-ME	3/4	1.437	.890
16-2MM-16	16-ME	3/4	1.437	.890

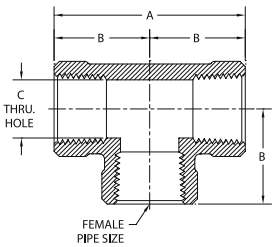


3FFF

All Female Pipe Tee

Part No.	Interchanges With	Female Pipe Size	A	B	C Thru Hole
2-3FFF-2	2-T	1/8	1.687	.843	.328
4-3FFF-4	4-T	1/4	1.687	.843	.421
6-3FFF-6	6-T	3/8	2.000	1.000	.562
8-3FFF-8	8-T	1/2	2.625	1.125	.687
12-3FFF-12	12-T	3/4	1.125	1.312	.890
16-3FFF-16	16-T	1	3.250	1.6251	.125

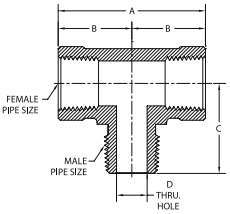




3FFM

Pipe Tee Female - Female - Male

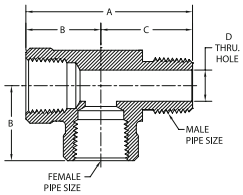
Part No.	Interchanges With	Pipe Size	A	B	C	D Thru Hole
2-3FFM-2	2-BT	1/8	1.687	.843	.843	.187
4-3FFM-4	4-BT	1/4	1.875	.937	1.000	.281
6-3FFM-6	6-BT	3/8	2.000	1.000	1.125	.375
8-3FFM-8	8-BT	1/2	2.250	1.125	1.375	.468
12-3FFM-12	12-BT	3/4	2.750	1.375	1.625	.625



3FMF

Pipe Tee - Female - Male - Female

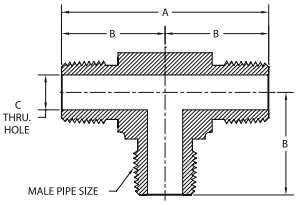
Part No.	Interchanges With	Pipe Size	A	B	C	D Thru Hole
2-3FMF-2	2-ST	1/8	1.687	.843	.843	.187
4-3FMF-4	4-ST	1/4	1.890	.843	1.046	.281
6-3FMF-6	6-ST	3/8	2.125	1.000	1.125	.375
8-3FMF-8	8-ST	1/2	2.500	1.125	1.375	.468
12-3FMF-12	12-ST	3/4	2.937	1.437	1.500	.625



3MMM

All Male Pipe Tee

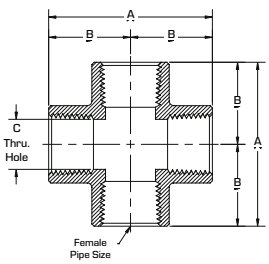
Part No.	Interchanges With	Female Pipe Size	A	B	C Thru Hole
2-3MMM-2	2-MT	1/8	1.437	.718	.187
4-3MMM-4	4-MT	1/4	1.875	.937	.281
6-3MMM-6	6-MT	3/8	2.000	1.000	.375
8-3MMM-8	8-MT	1/2	2.750	1.375	.468
12-3MMM-12	12-MT	3/4	2.750	1.375	.625



4FPCR

Female Pipe Cross

Part No.	Interchanges With	Female Pipe Size	A	B	C Thru Hole
2-4FPCR	2-CS	1/8	1.687	.843	.328
4-4FPCR	4-CS	1/4	1.687	.843	.421
6-4FPCR	6-CS	3/8	2.125	1.062	.562
8-4FPCR	8-CS	1/2	2.250	1.125	.687
12-4FPCR	12-CS	3/4	2.875	1.437	.890
16-4FPCR	16-CS	1	3.250	1.625	1.125



PIPE THREAD SPECIFICATIONS

Tylok Pipe Fittings are manufactured from materials meeting applicable ASTM or ASME specifications, with pipe threads which meet or exceed ANSI B1.20.1 requirements. Strict quality control procedures are followed throughout production to provide the finest possible product.

Materials: Brass • 316 Stainless Steel • Steel

These charts are to be used as a guide only and are based on normal wall thicknesses, used for the various sizes. These ratings may vary widely from effects such as the proper use of sealants, size of stock, temperature, corrosion factors, etc. Therefore, Tylok International, Inc. assumes no responsibility for its accuracy in any individual design.

Pressure ratings for Tylok tube fittings that have differing end connection styles shall use the lowest of the pressure ratings.

Suggested Maximum Operating Pressures for Pipe Threads (psig)

NPT Size	316 SS & Carbon Steel		Brass	
	Male	Female	Male	Female
1/16"	11000	6700	5500	3300
1/8"	10000	6500	5000	3200
1/4"	8000	6600	4000	3300
3/8"	7800	5300	3900	2600
1/2"	7700	4900	3800	2400
3/4"	7300	4600	3600	2300
1"	5300	4400	2600	2200

Tylok Instrumentation Fittings are rated at the following temperatures:	
316 Stainless	-325°F to 1000°F (-198°C to 648°C)
Brass	-40°F to 400°F (-40°C to 204°C)
Steel	-65°F to 375°F (-54°C to 190°C)

Consideration should be given to maximize temperature ratings if fittings and/or tubing are coated or plated.

TUBE PRESSURE DE-RATING FACTORS ELEVATED TEMPERATURES

The table lists de-rating factors that must be considered in applications above that of ambient temperatures.

Example:
Type 316 Stainless Steel 1/4" O.D.x.0.49" wall at 800°F is 7,500 PSI x .79 = 5,925 psig.

Therefore, the suggested allowable working pressure for 316 Stainless Steel (1/4" O.D. with .049" tube wall) at 800°F is 5,925 psig.

Temperatures		Tubing Material		
°F	°C	Carbon	304 SS	316 SS
200	93	0.95	1.00	1.00
300	149	0.90	1.00	1.00
400	204	0.87*	0.93	0.96
500	260		0.87	0.89
600	316		0.82	0.85
700	371		0.8	0.81
800	427		0.76	0.79
900	482		0.73	0.77
1000	538		0.69	0.76

* Based on 375°F (190°C) max

Temperatures		Tubing Material
°F	°C	Copper
100	38	1.00
150	66	0.85
200	93	0.80
250	121	0.80
300	149	0.78
350	177	0.66
400	204	0.50

Temperature Ratings

Tylok Instrumentation Pipe Fittings are rated at the following temperatures:

316 Stainless: -325°F to 1000°F (-198°C to 538°C) **Brass:** -40°F to 375°F (-40°C to 204°C) **Steel:** -20°F to 400°F (-28°C to 204°C)

Note: Consideration should be given to maximum temperature ratings and/or tubing are coated or plated.

Heat Traceability

Tylok Instrumentation Pipe Fittings are completely heat code traceable back to the original mill heat from which it was made. Starting with the original billet, the mill creates a certificate which completely describes the chemical & physical makeup. The material certifications can be provided when calling Tylok and giving the heat code stamp marked on the part itself, along with the part number.

Raw Material Specifications

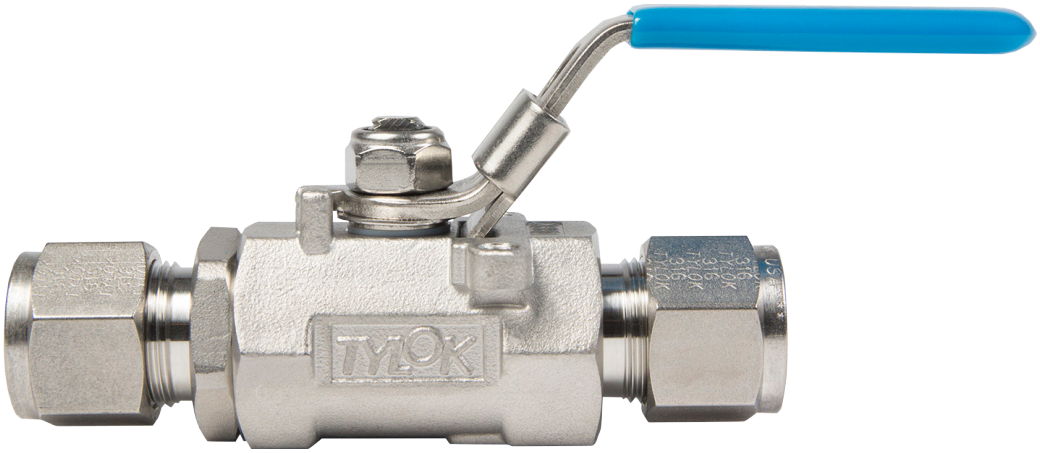
Fitting Material	Bar Stock	Forging
Brass	ASTM B16 ASTM B453	ASTM B283
Stainless Steel	ASTM A276 ASTM A479 ASME SA-479 Type 316-SS	ASTM A182 ASME SA-182 Type 316-SS
Steel	ASTM A108	

* Reference Tubing Selection & Preparation

The GP Series Ball Valve is an instrumentation valve solution for tubing & piping systems. It is available from 1/4" to 1" with tube end connections and from 1/4" to 1/2" with female pipe threads for female to female applications.

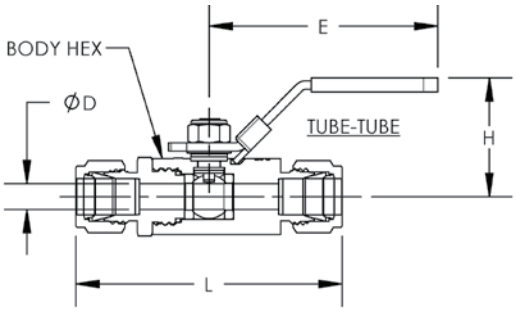
Tylok General Purpose Ball Valve Series is a moderate pressure ball valve for general service. They are designed for tight shut-off, long service life, and low operating torque.

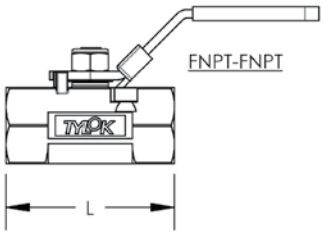
- 2,000 psig (138 bar) Pressure Rating
- 400°F (204°C) Temperature Rating
- Built-in actuator mounting holes for ease of automation
- Bi-directional flow
- Compact in size but with high flow capacity
- Locking Handle in both On and Off position
- Oval or Butterfly Handles available
  (locking devices not available on butterfly handles)

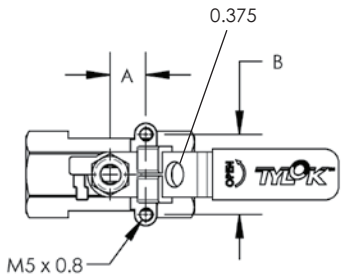


Features

- Blow out Proof Stem
- Stainless Steel Construction
- Locking Handles in On & Off positions
- Mounting Holes Available for Automation
- Material: Stainless Steel Cast CF8M
- Pressure Rating: 2000 psi (138 bar) at 100°F (38°C)
- Temperature Rating: 400°F (204°C) max.
- Seat Material: TFM 1600
- Flow Coefficient (Cv) 1.20 to 17.35
- Size Range 1/4" to 1"
- Integral Tube Fitting (Both Twin [CBC-Lok® & Single [CS-Lok®] Ferrule Designs)
- Female NPT x Female NPT
- 100% factory leak tested with Nitrogen at 1000 psi
- Maximum allowable leak rate is 0.1 std cc/min.

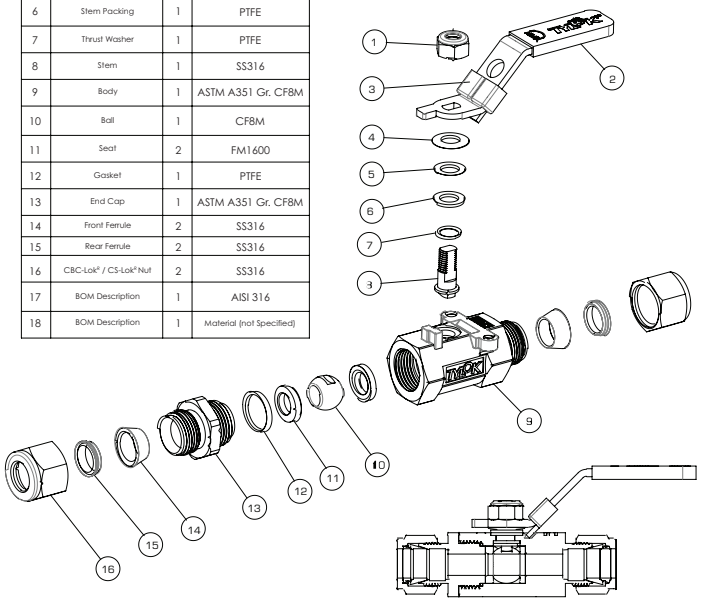


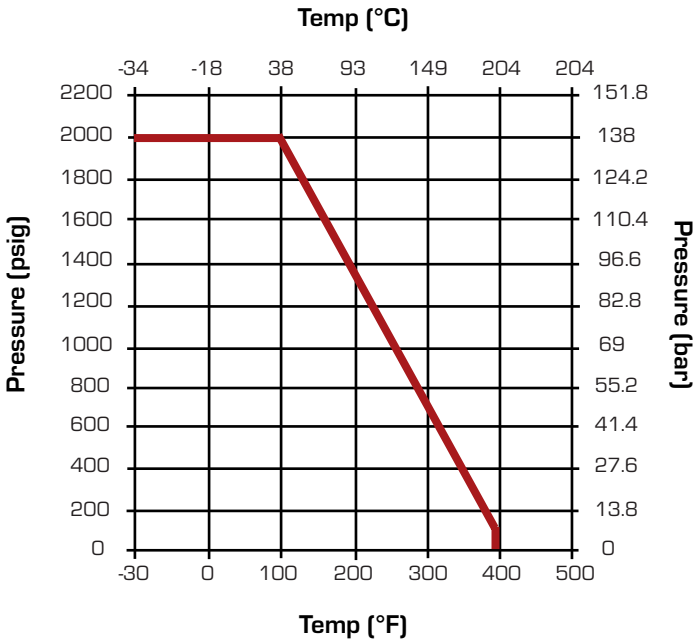




End Connection		Part No.	Cv	Orifice (ØD)	A	B	E	H	L	Body Hex
Type	Size									
Female NPT to Female NPT	1/4	SS-GP4-F4F4	1.20	.20	.50	1.12	2.44	1.38	1.89	3/4
	3/8	SS-GP6-F6F6	2.40	.28	.50	1.12	3.15	1.46	2.09	7/8
	1/2	SS-GP8-F8F8	4.27	.36	.50	1.12	3.23	1.69	2.48	1-1/16
CBC-Lok® Tube Fitting	1/4	SS-GP4-D4D4	1.25	.20	.50	1.12	2.44	1.38	2.95	3/4
	3/8	SS-GP6-D6D6	2.50	.28	.50	1.12	3.15	1.46	3.15	7/8
	1/2	SS-GP8-D8D8	9.25	.36	.50	1.12	3.23	1.69	3.75	1-1/16
	3/4	SS-GP12-D12D12	12.65	.49	.50	1.12	3.74	3.74	4.34	1-5/16
	1	SS-GP16-D16D16	17.35	.59	.87	1.37	4.02	2.05	4.91	1-5/8
CS-Lok® Tube Fitting	1/4	SS-GP4-S4S4	1.25	.20	.50	1.12	2.44	1.38	2.95	3/4
	3/8	SS-GP6-S6S6	2.50	.28	.50	1.12	3.15	1.46	3.16	7/8
	1/2	SS-GP8-S8S8	9.25	.36	.50	1.12	3.23	1.69	3.76	1-1/16
	3/4	SS-GP12-S12S12	12.65	.49	.50	1.12	3.74	3.74	4.35	1-5/16
	1	SS-GP16-S16S16	17.35	.59	.87	1.37	4.02	2.05	4.89	1-5/8

NO.	DESCRIPTION	QTY.	MATERIAL
1	Hex Lock Nut (with Nylon Insert)	1	SS304
2	Handle	1	SS304
3	Locking Device	1	SS304
4	Belleville Washer	1	SS301
5	Washer	1	SS304
6	Stem Packing	1	PTFE
7	Thrust Washer	1	PTFE
8	Stem	1	SS316
9	Body	1	ASTM A351 Gr. CF8M
10	Ball	1	CF8M
11	Seat	2	FM1600
12	Gasket	1	PTFE
13	End Cap	1	ASTM A351 Gr. CF8M
14	Front Ferrule	2	SS316
15	Rear Ferrule	2	SS316
16	CBC-Lok® / CS-Lok® Nut	2	SS316
17	BOM Description	1	AISI 316
18	BOM Description	1	Material (not Specified)






TYLOK
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TYLOK

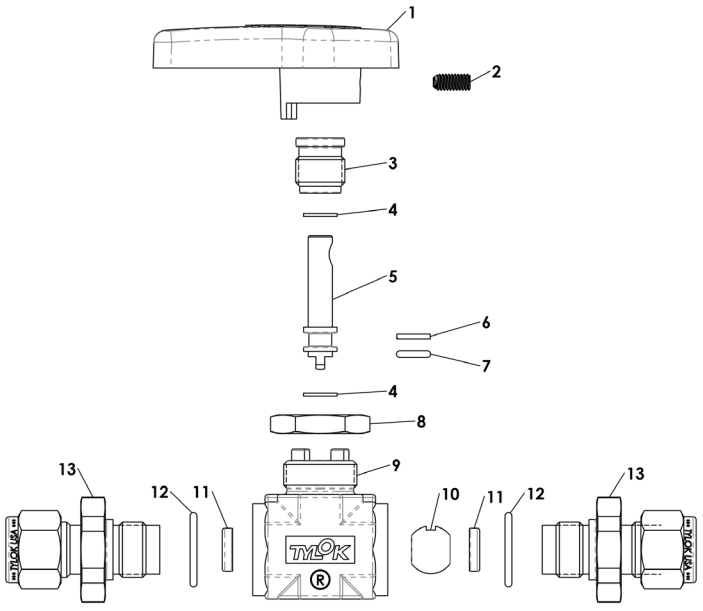
Valve Options

- Reliable, simple, operation for on-off service.
- Fast acting, one quarter turn fully opens or closes the valve.
- Maximum performance, straight through flow for minimum turbulence and pressure drop.
- Positive leak tight shut off, even with fluctuating pressures.
- Panel mounting capabilities standard
- Bi-Directional Flow.
- Handle direction indicates position of valve and flow direction.
- Micro finished ball provides positive seal.
- Free floating ball design compensates for seat wear.
- Available in CBC-Lok®, CS-Lok®, or Tylok Standard Tube Fittings and NPT pipe end connections.

Specifications	Stainless Steel	
	TFE	KEL-F
Pressure Rating	1500 psig (103 bar)	5000 psig (344 bar)
Temperature Rating	-15 to 400 °F (-26 to 204 °C)	-15 to 300 °F (-26 to 149 °C)

* For tubing and pipe working pressures see CBC-Lok® / CS-Lok® section.

#	Components	Stainless Steel	Brass
1	Handle	Nylon with Brass Insert	
2	Screw	Stainless Steel	
3	Gland Nut	316 SS	Brass
4	Stem Washer	Nylat	
5	Stem	316 Stainless Steel	
6	Stem Back-up Ring	TFE	
7	Stem O-Ring	Fluorocarbon FKM	
8	Panel Lock Nut	316 SS	Brass
9	Body	316 SS	Brass
10	Ball	316 Stainless Steel	
11	Seat	TFE, KELF-F	
12	End Connector O-Ring	Fluorocarbon FKM	
13	End Connector	316 SS	Brass

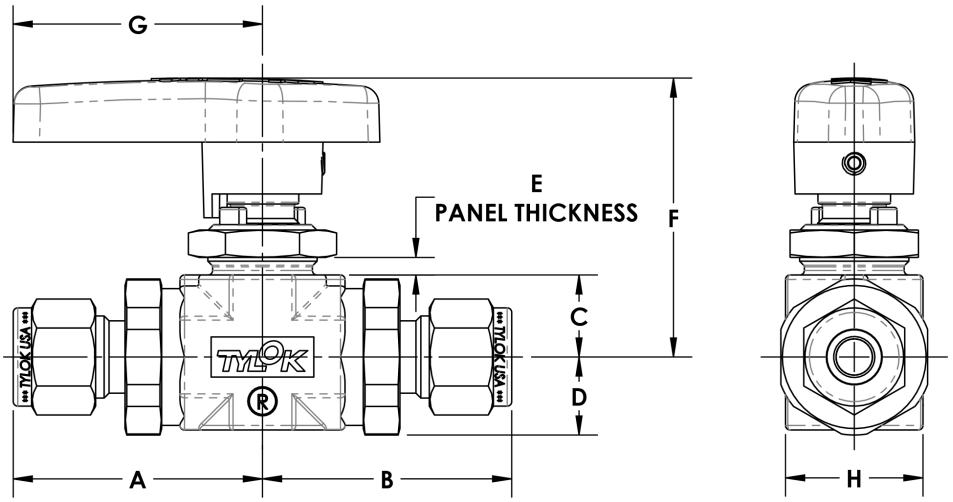


Part Number Shown:

SS-6-DTT-6-6-K

CBC-Lok® double ferrule tube ends are completely interchangeable with Swagelok® & Parker A-Lok® tube ends.

CS-Lok® single ferrule tube ends are completely interchangeable with Parker CPI® tube ends.



Valve Dimension Chart

	Basic Part Number	Connection		Orifice	Dimensions (Inches)									
		Port A	Port B	Inch (mm)	A	B	C	D	E	F	G	H	Panel Hole	Panel Nut Hex
SERIES 4	4-DTT-2-2*	1/8" CBC-Lok®		0.188 (4.8)	1.54	1.54	0.56	0.47	1/8	1.89	1.70	0.88	0.75	7/8
	4-STT-2-2*	1/8" CS-Lok®												
	4-DTT-4-4	1/4" CBC-Lok®			1.63	1.63								
	4-STT-4-4	1/4" CS-Lok®												
	4-1FF-2-2	1/8" Female NPT			1.21	1.21								
	4-1FF-4-4	1/4" Female NPT			1.46	1.46								
	4-1MM-2-2	1/8" Male NPT			1.30	1.30								
	4-1MM-4-4	1/4" Male NPT			1.49	1.49								
SERIES 6	6-DTT-4-4*	1/4" CBC-Lok®			1.65	1.65	0.56	0.54	5/32	1.91	1.70	0.94	0.75	7/8
	6-STT-4-4*	1/4" CS-Lok®												
	6-DTT-6-6	3/8" CBC-Lok®		0.250 (6.4)	1.71	1.71								
	6-STT-6-6	3/8" CS-Lok®												
	6-DTT-8-8	1/2" CBC-Lok®			1.83	1.83								
	6-STT-8-8	1/2" CS-Lok®												
	6-1FF-4-4	1/4" Female NPT			1.51	1.51								
	6-1FF-6-6	3/8" Female NPT												
	6-1FF-8-8	1/2" Female NPT			1.70	1.70								
	6-1MM-4-4	1/4" Male NPT			1.51	1.51								
	6-1MM-6-6	3/8" Male NPT												
	6-1MM-8-8	1/2" Male NPT			1.70	1.70								
SERIES 8	8-DTT-6-6*	3/8" CBC-Lok®			1.85	1.85	0.81	0.65	5/32	2.29	1.96	1.13	0.88	1-1/16
	8-STT-6-6*	3/8" CS-Lok®												
	8-DTT-8-8	1/2" CBC-Lok®		0.375 (9.5)	1.96	1.96								
	8-STT-8-8	1/2" CS-Lok®												
	8-DTT-12-12	3/4" CBC-Lok®			1.97	1.97								
	8-STT-12-12	3/4" CS-Lok®												
	8-1FF-6-6	3/8" Female NPT			1.61	1.61								
	8-1FF-8-8	1/2" Female NPT			1.78	1.78								
	8-1FF-12-12	3/4" Female NPT			1.90	1.90		0.72						
	8-1MM-6-6	3/8" Male NPT			1.65	1.65		0.65						
	8-1MM-8-8	1/2" Female NPT			1.84	1.84								

* Reduced Port

HP Series Ball Valve are ordered as listed in this catalog by inserting the material code before the part number. HP Series Valves can be identified through the part number as to material, valve series, style, valve configurations, port size, and seat material. The part number describes a complete ball valve assembly.

Special Configurations available upon request.

SS	-	8	-	D	-	FT	-	8	-	6	-	K
↓		↓		↓		↓		↓				↓
Material		Valve Series		Style		Port A / Port B		Port A / Port B Size				Seat
Chart 1		Chart 2		Chart 3		Chart 4		Chart 5				Chart 6

Chart 1- Material	
B	Brass
SS	Stainless Steel

Chart 2- Valve Series	
4	0.188" Orifice
6	0.250" Orifice
8	0.375" Orifice

Chart 3- Style	
D	CBC-Lok
S	CS-Lok
1	Tylok Standard

Chart 4- Valve Configuration		
Type	Port A	Port B
TT	Tube	Tube
MM*	Male NPT	Male NPT
FF*	Female NPT	Female NPT
MF*	Male NPT	Female NPT
FM*	Female NPT	Male NPT
TM	Tube	Male NPT
MT	Male NPT	Tube
TF	Tube	Female NPT
FT	Female NPT	Tube

Chart 5- Port Size		
Designator	Tube OD (Inches)	Pipe Thread (NPT)
TT	Tube	Tube
MM*	Male NPT	Male NPT
FF*	Female NPT	Female NPT
MF*	Male NPT	Female NPT
FM*	Female NPT	Male NPT

See dimension chart for available sizes.

Chart 6- Seat	
T	PTFE (Teflon)
K	KEL-F

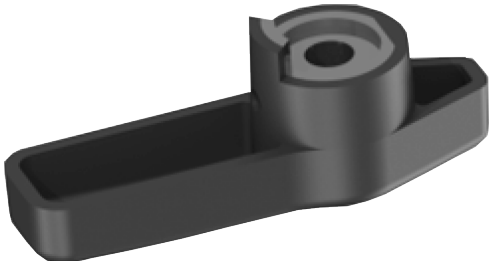
* Use Style 1 from Chart 3 for this type of configuration.

Example: B-4-DTT-4-4-T
Designates a 1500 psi brass ball valve,, 0.188" orifice with 1/4" CBC-Lok® end connections and PTFE seats.

Example: SS-6-1FF-6-4-K
Designates a 5000 psi stainless steel ball valve,, 0.250" orifice with a 3/8" Female NPT end connections for port A and a 1/4" female NPT end connection for port B and PCTFE seats.

Handles & Locking Device

Assembled standard with black handle. For other colors add the designator as a suffix to the order number.



Handle Color	Designator
Black	-BK
Red	-RD
Blue	-BL
Green	-GN
Orange	-OG
Yellow	-YW

Tylok is proud to announce a newly-redesigned handle and locking device for our HP Series Ball Valves.

The handle comes in various colors: black, red, blue, green, orange, and yellow. These color choices will make it easy to identify
different process lines and can help customers who want their valves handles to conform to ASME A13.1, Scheme for the Identification of Piping Systems.

Our new lock-out device is designed specifically to work with the new handles, and allows the valve to be locked in fully open or fully closed positions.

For example, a 1/2" stainless steel valve with 1/2" CBC-Lok Tube Ends, a PCTFE seat, lock out valve, and a green handle would have the part number: **SS-8-DTT-8-8-K-LD-GR**

To order an handle for field assembly, use the following part numbers:

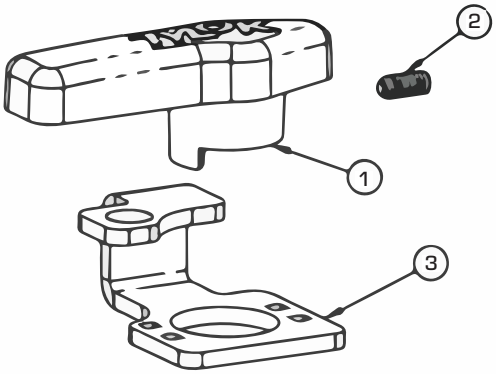
Series 4 & 6	Series 8
NY-HPBV-46-BK	NY-HPBV-8-BK
NY-HPBV-46-RD	NY-HPBV-8-RD
NY-HPBV-46-BL	NY-HPBV-8-BL
NY-HPBV-46-GN	NY-HPBV-8-GN
NY-HPBV-46-OG	NY-HPBV-8-OG
NY-HPBV-46-YW	NY-HPBV-8-YW

Lock-Out Device

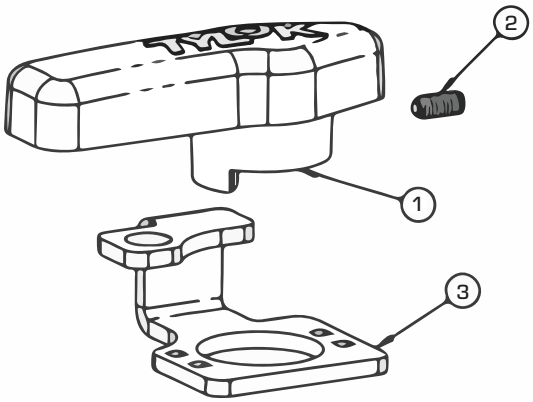
A Lock-out device allows the user to lock the valve in either the fully opened or fully closed position. Lock-out devices are available factory installed only.

Add the suffix -LD to the ordering number

Example: SS-6-DTT-6-6-K-LD



4 & 6 Series

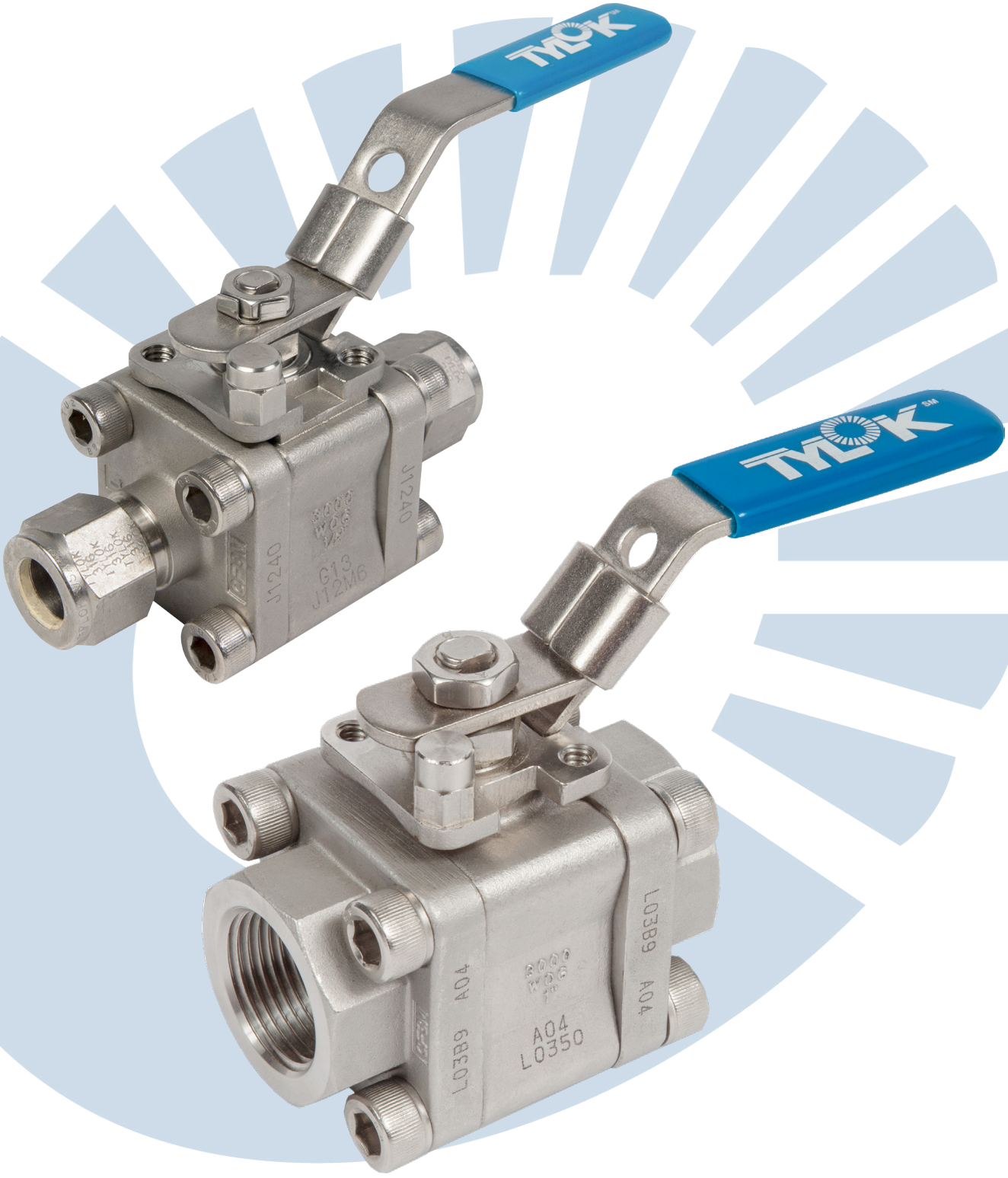


8 Series

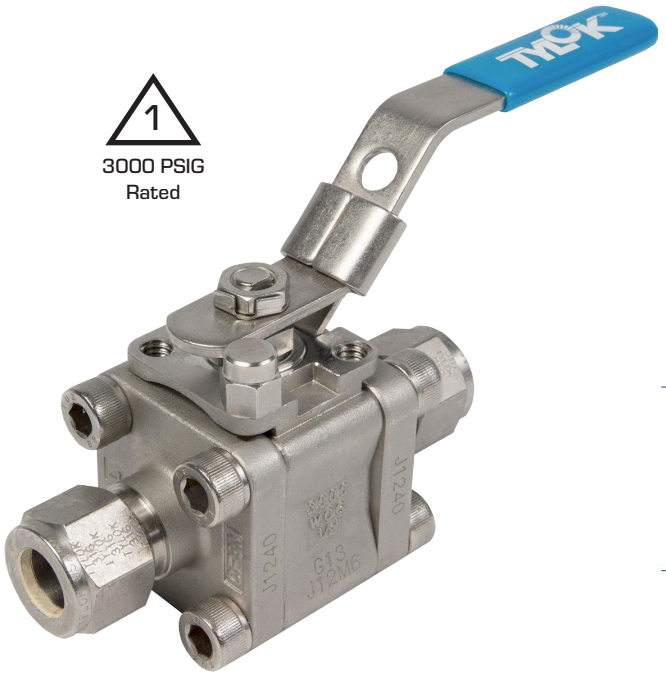
Kit Number	Description	Handle	Set Screw	Locking Bracket
KIT-46-BK*	4/6 Series Ball Valve Black Handle Kit	6-BV-16-BK	BV-16B	N/A
KIT-8-BK*	8 Series Ball Valve Black Handle Kit	8-BV-16-BK	BV-16B	N/A
-	-	-	-	-
KIT-46-HPBV-LD	4/6 Series Locking Device	N/A	N/A	SS-6-BV-17
KIT-8-HPBV-LD	8 Series Locking Device	N/A	N/A	SS-6-BV-17
-	-	-	-	-
KIT-46-HPBV-LDH**	4/6 Series Ball Valve Black Handle Kit with Locking Device	6-BV-16-BK	BV-16B	SS-6-BV-17
KIT-8-HPBV-LDH**	8 Series Ball Valve Black Handle Kit with Locking Device	8-BV-16-BK	BV-16B	SS-6-BV-17

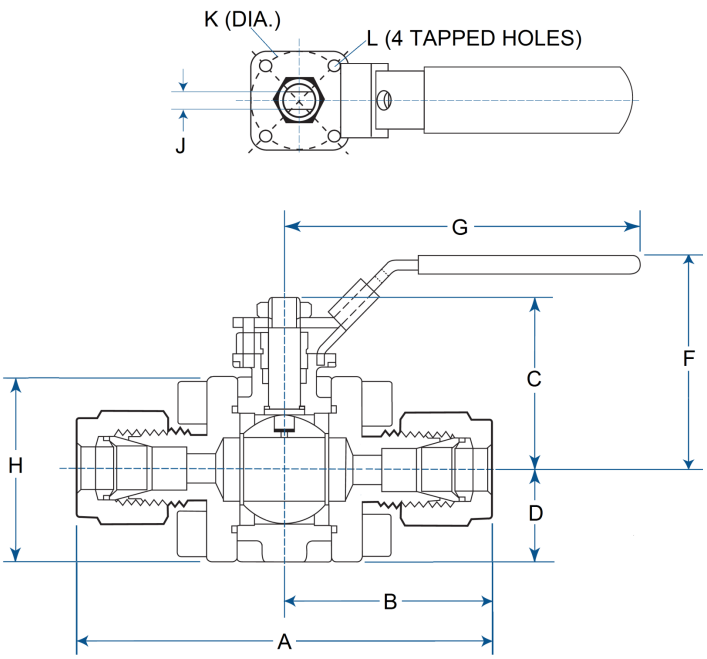
* "BK" designates black colored handle, other color handles are available and should be verified against part number.

** By default "LDH" kits contain black handles, however other color handles are available and should be verified against part number.


TYLOK
J1240
G13
J12M6
TYLOK
L0389 A04
A04
L0350
L0389 A04

3 Piece Ball Valves



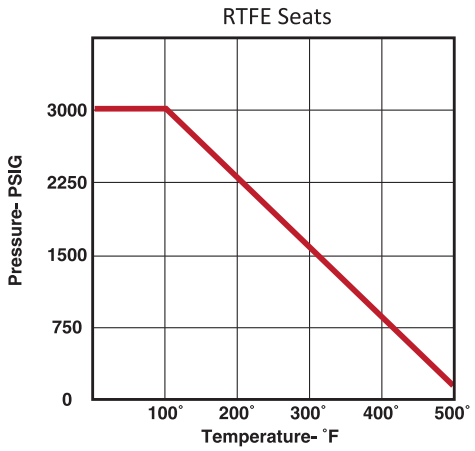


Features

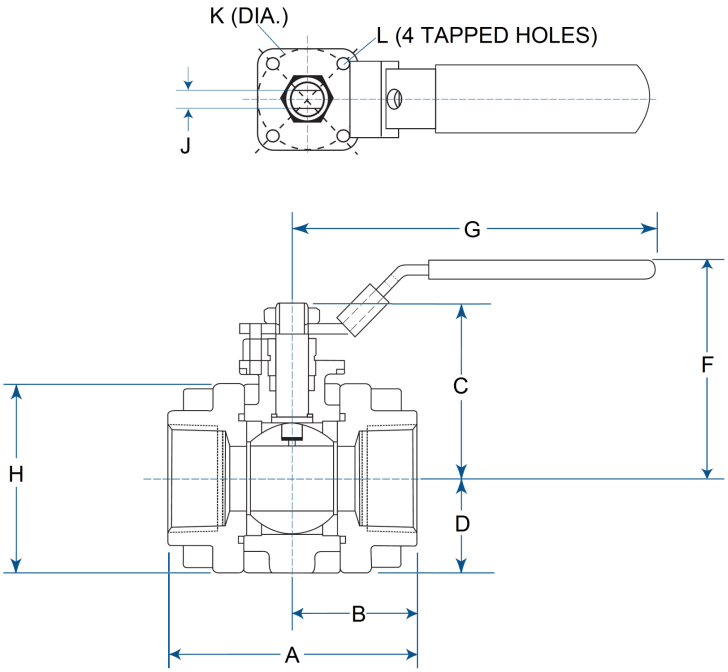
- 3 Piece, 8-Bolt construction
- Fire Safe to API 607 4th Edition & ISO 10497
- ISO 5211 4-Bolt actuator mounting pad
- NACE MR0175 Rev 2000 compliant
- Minimum 3.2 to 1 hydrostatic safety factor
- Tube ended valves come standard with -RR (Reinforced PTFE Seats & Seal).

Pressure Ratings

- CF8M with 316SS Trim. 3000 psig at 100°F
- 250 psig Saturated Steam Rating



Part Number	Connection	A	B	C	D	F	G	H	Orifice	Cv	J	K	L	PTFE Seats (in-lbs.)	PEEK Seats (in-lbs.)
4-5TT-4	1/4" CBC-LOK	3.19	1.60	1.71	0.9	2.5	4.0	1.8	0.19	1.2	0.20	1.42	1/4"-20 /UNC	100	130
4-5ZZ-4	1/4" CS-LOK														
6-5TT-6	3/8" CBC-LOK	3.19	1.60	1.71	0.9	2.5	4.0	1.8	0.28	3.8				100	130
6-5ZZ-6	3/8" CS-LOK														
8-5TT-8	1/2" CBC-LOK	4.04	2.02	1.71	0.9	2.5	4.0	1.8	0.41	7.5				100	130
8-5ZZ-8	1/2" CS-LOK														
12-5TT-12	3/4" CBC-LOK	4.04	2.02	1.83	1.1	2.6	4.0	2.1	0.57	18.0				200	250
12-5ZZ-12	3/4" CS-LOK														
16-5TT-16	1" CBC-LOK	5.36	2.68	2.34	1.2	3.0	4.8	2.4	0.81	40.0	0.28	1.65		230	300
16-5ZZ-16	1" CS-LOK														

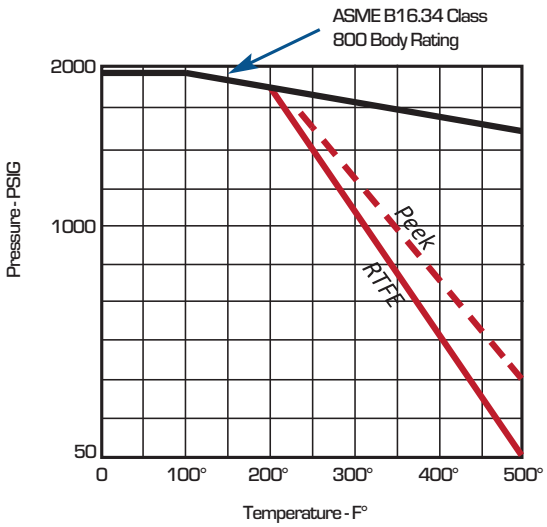


Features

- 3 Piece, 8-Bolt construction
- ASME B16.34, Class 800 Compliant
- Fire Safe to API 607 4th Edition & ISO 10497
- ISO 5211 4-Bolt mounting
- NACE MR0175 Rev 2000 compliant
- Pipe ended valves come standard with -RG (Reinforced PTFE Seats & Seals).

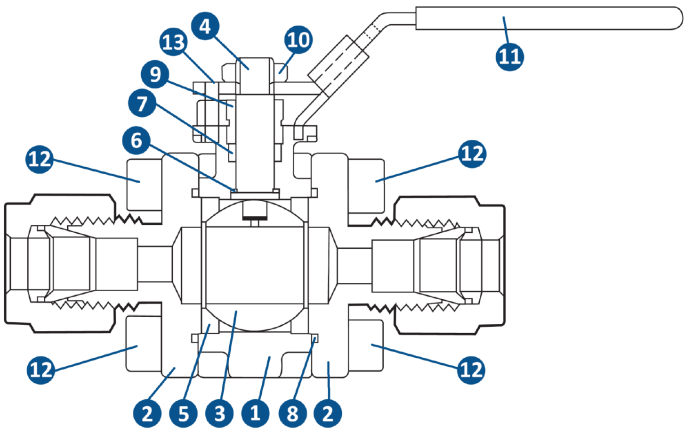
Pressure Ratings

- CF8M with 316SS Trim. 1920 psig at 100°F
- 250 psig Saturated Steam Rating



Part Number	Port Type	Connection	A	B	C	D	F	G	H	Orifice	Cv	J	K	L	PTFE Seats (in-lbs.)	PEEK Seats (in-lbs.)
4-5FF-4	Full	1/4" Female NPT	2.70	1.35	1.71	0.9	2.5	4.0	1.8	0.43	10.0	0.20	1.42	1/4"-20 UNC	100	130
6-5FF-6	Full	3/8" Female NPT														
8-5FF-8	Reduced	1/2" Female NPT	2.70	1.35	1.71	0.9	2.5	4.0	1.8	0.43	10.0	0.20	1.42		100	130
	Full (-L)		2.80	1.40	1.83	1.1	2.6		2.1	0.57	16.0	0.20			200	250
12-5FF-12	Reduced	3/4" Female NPT	3.00	1.50	1.83	1.1	2.6	4.0	2.1	0.57	25.0	0.20	1.42		200	250
	Full (-L)		3.20	1.60	2.34	1.2	3.0	4.8	2.4	0.81	40.0	0.28	1.65		230	300
16-5FF-16	Reduced	1" Female NPT	3.50	1.75	2.34	1.2	3.0	4.8	2.4	0.81	42.0	0.28	1.65		230	300
	Full (-L)		3.80	1.90	2.69	-	3.4	5.8	-	1.00	62.0	0.32	1.65		250	-

3 Piece Ball Valves



Materials of Construction (STD)			
Part	Quantity	Description	Standard Material
1	1	Body	CF8M Stainless Steel
2	2	Tailpiece	CF3M Stainless Steel
3	1	Ball	316 or CF8M Stainless Steel
4	1	Stem	316 or CF8M Stainless Steel
5	2	Seat	Peek or Reinforced PTFE
6	1	Thrust Washer	Reinforced PTFE
7	1	Packing Set	Graphite or Reinforced PTFE
8	2	Body Seal	Graphite or Reinforced PTFE
9	1	Packing Nut	316 Stainless Steel
10	1	Handle Nut	304 Stainless Steel
11	1	Handle Assy	304 Stainless Steel
12	8	Body Bolt	Stainless Steel
13	1	Handle Stop	304 Stainless Steel

3 Piece Ball Valves are ordered as listed in this catalog by inserting the material code before the part number. The standard Ball & Stem are in Stainless Steel unless otherwise requested. Full Port is only available in NPT configurations and Special cleaning and packaging is available. Contact authorized Tylok Representative for more information.

Example: A Stainless Steel, 1/2" Inlet to 1/2" Outlet, 3 Piece Ball Valve, with CBC-Lok Instrumentation Tube Ends, Reinforced PTFE Seats & Seals, with the following option: ASME B16.34 compliant is designated as follows:

SS	-	8	-	5	-	TT	-	8	-	R		R	-	K
↓		↓		↓		↓		↓		↓		↓		↓
Material		Inlet Size		Style		Description		Outlet Size		Seat		Seal		Options
Chart 1		Chart 2		Chart 3		Chart 4		Chart 2		Chart 5		Chart 6		Chart 7

Chart 1- Material	
SS	Stainless Steel

Chart 2- Valve Series	
Designator	Valve Size
4	1/4"
6	3/8"
8	1/2"
12	3/4"
16	1"

Chart 3- Style	
5	3 Piece Ball Valve, 2 way, Bi-Directional flow

Chart 4- Description		
Code	End Description	Size Range
EE	Extended Butt Weld (Schedule 80)	1/4"-1"
FF	Female NPT	1/4"-4"
II	Pipe Socket Weld	1/4"-1"
TT	Instrumentation Tube End (CBC-Lok®)	1/4"-1"
XX	Extended Pipe Socket Weld	1/4"-4"
ZZ	Instrumentation Tube End (CS-Lok®)	1/4"-1"

Chart 5- Seat	
R	Reinforced PTFE
P	PEEK

Chart 6- Seal	
G	Graphite
R	Reinforced PTFE

Chart 7- Options	
I	Oval Handle
K	ASME B.16.34 Compliant
L	* Full Port

* Tube ended valves come standard with -RR (Reinforced PTFE Seats & Seal). Pipe ended valves come standard with -RG (Reinforced PTFE Seats & Graphite Seals).


TYLOK
MADE IN USA
TYLOK
TYLOK

Design & Features

- Hard (Vee) or Delrin® Soft Seat/Tip
- Orifice sizes from 0.172 to 0.438 in.
- Flow Coefficients (Cv) from 0.37 to 2.70
- Straight or angle flow patterns
- Optional panel mount
- Handle options available
- Non-wetted stem threads

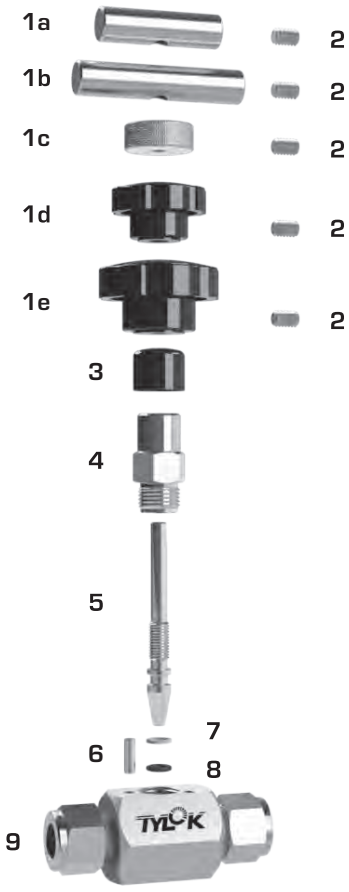
Specifications	316 Stainless		Brass		*Steel	
	Hard Seat	Soft Seat	Hard Seat	Soft Seat	Hard Seat	Soft Seat
Pressure Rating [1] psig (bar)	10,000 (689)	6,000 (413)	6,000 (413)	3,000 (206)	10,000 (689)	6,000 (413)
Temperature Rating [2] °F (°C)	-10 to 200 (-23 to 93)		-10 to 200 (-23 to 93)		-10 to 200 (-23 to 93)	

* Steel valves are Zinc, Nickel plated for corrosion resistance

- For pressure ratings of valves with the tube fitting end connections, see CBC-Lok® or CS-Lok® catalogs.
- Temperature ratings based on working temperatures of standard stem seals See O-Ring/packing options for temperature ratings of optional stem seals and soft seat valve.
- Valves with PTFE packings have a max pressure rating of 6000 psi.

Materials of Construction

#	Component	316 SS	Brass	Steel
1a	Mini "T" Handle	316 SS	N/A	Steel
1b	"T" Handle	316 SS	N/A	Steel
1c	Round Knurled Handle	316 SS	Brass	Steel
1d	1-3/8" Plastic Handle	Phenolic		
1e	1-3/4" Plastic Handle	Phenolic		
2	Set Screw	316 SS	Steel	
3	Dust Cap[1]	Vinyl		
4	Valve Bonnet	316 SS	Brass	Steel
5	Valve Stem	Chrome-plated 316 SS	316 SS	
6	Bonnet Lock Pin[1]	316 SS	N/A	Steel
7	Stem Back-up Ring	PTFE		
8	Stem O-ring	Fluorocarbon FKM		
9	Valve Body	316 SS	Brass	Steel



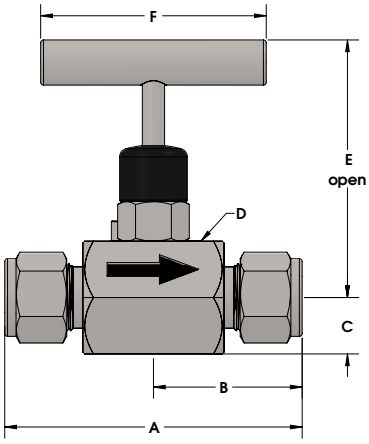
Testing

Tylok Screwed Needle Valves are 100% Helium leak tested to 1x10-4 ml/s ensuring performance and reliability

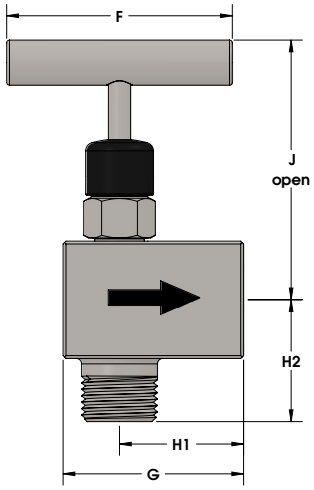
CBC-Lok® double ferrule tube ends are completely interchangeable with Swagelok® and Parker A-Lok® tube ends.

CS-Lok® single ferrule tube ends are completely interchangeable with Parker CPI® tube ends.

Straight Pattern



Angle Pattern

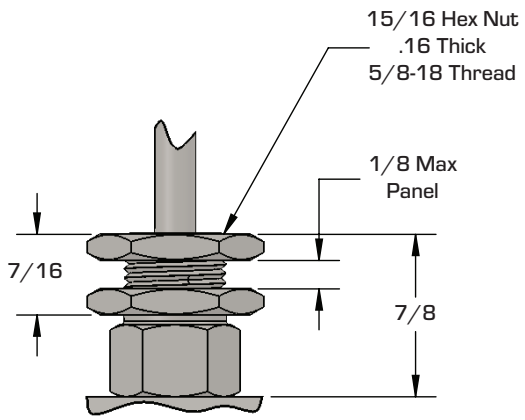


End Connections		Basic Part Number	Orifice in (mm)	Cv Hard Seat (Soft Seat/Tip)	Dimensions in. (mm)									
Inlet/ Outlet	Size in.				A	B	C	D	E	*F	G	H1	H2	J
CBC-Lok® Tube Fittings	1/4	4-6DD-4	0.172 (4.4)	0.37 (0.37)	2.46 (62.5)	1.23 (31.2)	0.33 (8.4)	3/4" SQ	2.17 (55.1)	1.81 (46)	-	-	-	-
	3/8	6-6DD-6			3.08 (78.2)	1.54 (39.1)	0.37 (9.4)		2.13 (54.1)		-	-	-	-
	1/2	8-6DD-8	0.187 (4.8)	0.44	3.30 (83.8)	1.65 (41.9)	0.63 (16)	1-1/4" HEX	3.16 (80.3)	2.50 (63.5)	-	-	-	-
CS-Lok® Tube Fittings	1/4	4-6SS-4	0.172 (4.8)	0.37 (0.37)	2.46 (62.5)	1.23 (31.2)	0.33 (8.4)	3/4" SQ	2.17 (55.1)	1.81 (46)	-	-	-	-
	3/8	6-6SS-6			3.08 (78.2)	1.54 (39.1)	0.37 (9.4)		2.13 (54.1)		-	-	-	-
	1/2	6-8SS-6	0.187 (4.8)	0.44	3.30 (83.8)	1.65 (41.9)	0.63 (16)	1-1/4" HEX	3.16 (80.3)	2.50 (63.5)	-	-	-	-
Female NPT	1/8	2-6FF-2	0.172 (4.4)	0.42 (0.42)	1.81 (46)	0.91 (23)	0.38 (9.7)	3/4" SQ	2.09 (53.1)	1.81 (46)	1.25 (31.8)	0.88 (22.4)	0.88 (22.4)	2.09 (53.1)
	1/4	4-6FF-4									1.50 (38.1)	1.13 (28.7)	1.13 (28.7)	
	3/8	6-6FF-6	0.187 (4.8)	0.44 (0.76)	2.50 (63.5)	1.25 (31.7)	0.63 (16)	1-1/4" HEX	3.16 (80.3)	2.50 (63.5)	-	-	-	-
	1/2	8-6FF-8									2.00 (50.8)	1.38 (35.1)	1.38 (35.1)	3.66 (93)
	3/4	12-6FF-12	0.438 (11.1)	2.70	4.25 (108)	2.13 (54)	1.25 (31.8)	2-1/4" HEX	4.25 (108)	4.25 (108)	-	-	-	-
	1	16-6FF-16									-	-	-	-
	1-1/4	20-6FF-20									-	-	-	-
	1-1/2	24-6FF-24									-	-	-	-
Male NPT	1/8	2-6MM-2	0.172 (4.4)	0.42 (0.42)	1.81 (46)	0.91 (23)	0.38 (9.7)	3/4" SQ	2.09 (53.1)	1.81 (46)	1.25 (31.8)	0.88 (22.4)	0.72 (18.3)	2.09 (53.1)
	1/4	4-6MM-4									1.50 (38.1)	1.13 (28.7)	0.88 (22.4)	
Male/Female NPT	1/8	2-6MF-2	0.172 (4.4)	0.42 (0.42)	1.81 (46)	0.91 (23)	0.38 (9.7)	3/4" SQ	2.09 (53.1)	1.81 (46)	1.25 (31.8)	0.88 (22.4)	0.72 (18.3)	2.09 (53.1)
	1/4	4-6MF-4									1.75 (50.8)	1.13 (28.7)	0.88 (22.4)	
	1/2	8-6MF-8	0.44 (0.76)	0.44 (0.76)	3.50 (88.9)	1.25 (31.8)	0.63 (16)	1-1/4" HEX	3.16 (80.3)	2.50 (63.5)	2.00 (50.8)	1.38 (35.1)	1.38 (35.1)	3.66 (93)
	3/4	12-6MF-12	0.438 (11.1)	2.70	5.25 (133.4)	2.13 (54)	1.25 (31.8)	2-1/4" HEX	4.25 (108)	4.25 (108)	-	-	-	-
	1	16-6MF-16									-	-	-	-
	1-1/4	20-6MF-20									-	-	-	-
	1-1/2	24-6MF-24									-	-	-	-

* Soft stem tips use a smaller length handle.

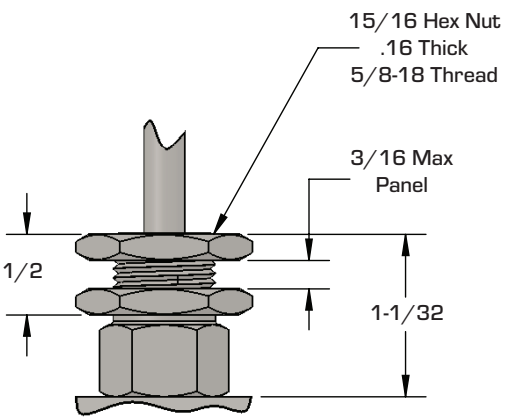
* Special configuration options are shown as general guidelines, not all options are available with every configuration.

Panel Mount Details



Dimensions for:

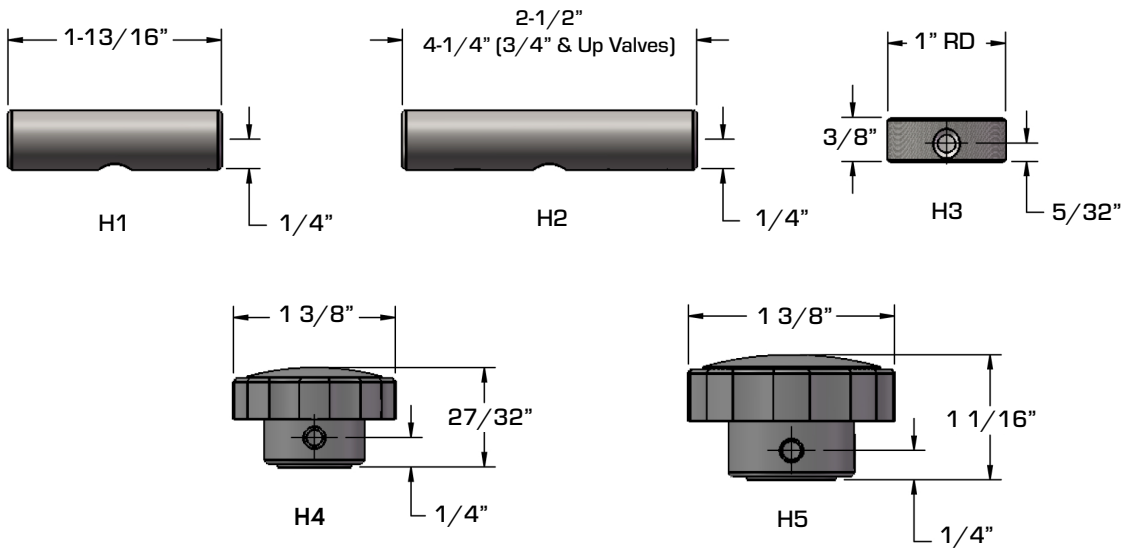
- Square Bar Stock
- 1/4" and Smaller Angle Valves



Dimensions for:

- Hex Bar Stock
- 1/2" Angle Valves

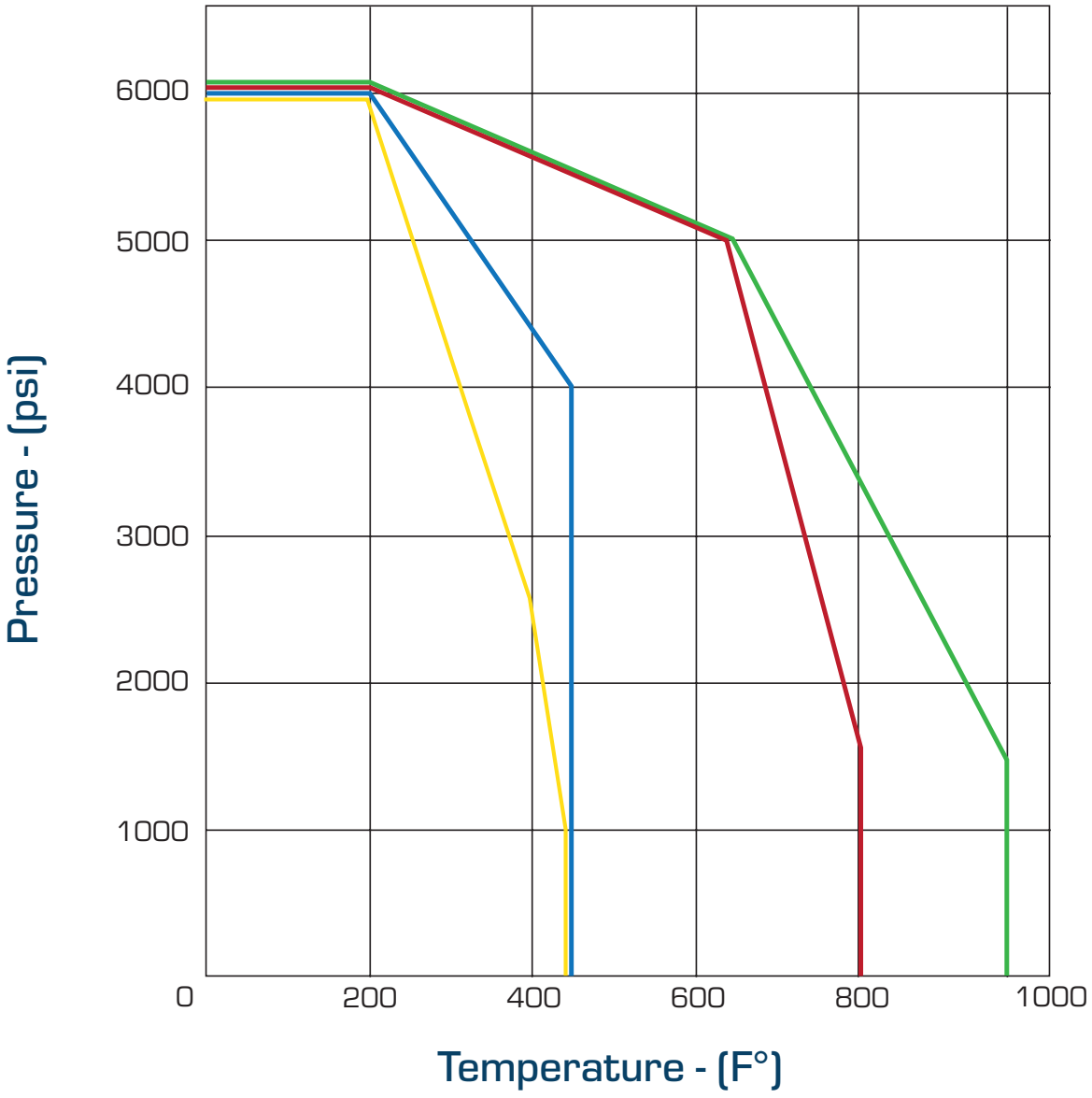
Handle Options



Standard Handles	316 SS	Brass	Steel
Square Bar Stock and 1/4" Small Angle Valves	H1	H3	H1
Hex Bar Stock and 1/2" Angle Valves	H2	N/A	H2

The handle material will always match the valve body, unless otherwise specified.

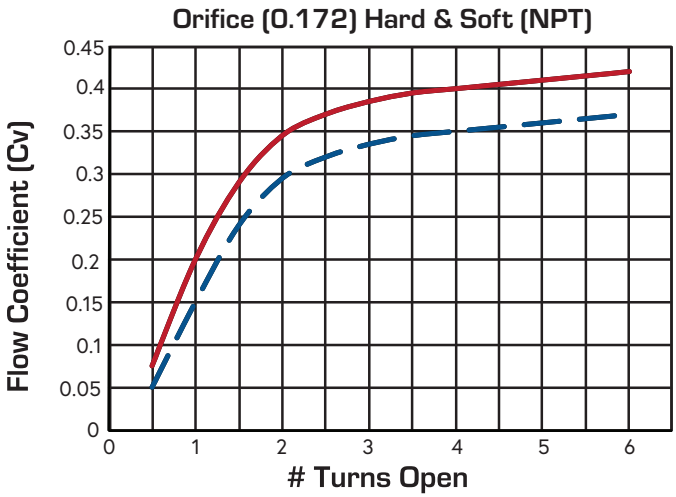
Pressure vs. Temperature

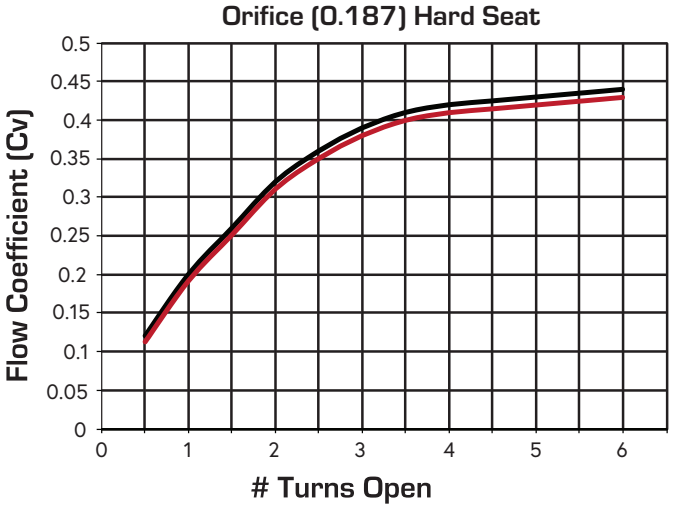


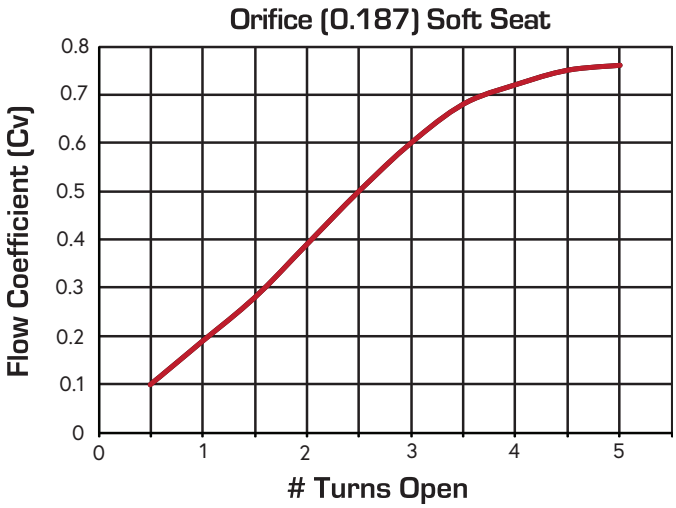
Flow Data at 100°F (37°C)

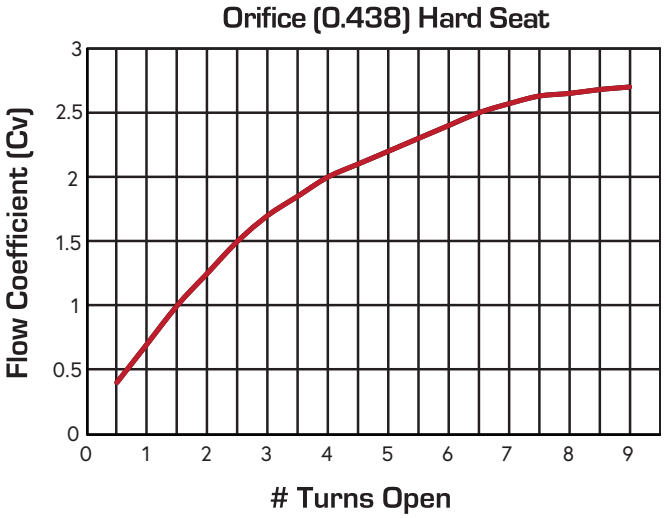
— Orifice (0.172) Hard & Soft Seat (NPT)

-- Orifice (0.172) Hard & Soft Seat (Tube Fittings)





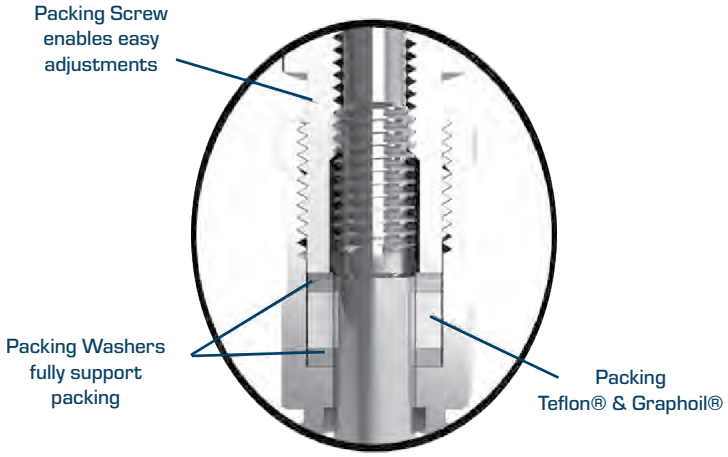




O-Ring/Packing Options

Temperature Ratings:

- -10°F to 200°F with Fluorocarbon FKM O-Ring
- -65°F to 150°F with EPDM O-Ring
- -13°F to 300°F with Kalrez® O-Ring
- -65°F to 250°F with Teflon® O-Ring
- -20°F to 400°F with Graphoil® Packing
- -200°F max with Soft Seat/Tip Valves



Screwed Needle Valves are ordered as listed in this catalog by inserting the material code before the part number.

Special configurations available upon request.

Example: A Stainless Steel Needle Valve with 1/2" CBC-Lok® Tube Fitting inlet to 1/2" CBC-Lok® Tube Fitting outlet with 2 nut panel mount option, Graphoil® Packing and 1-3/4" phenolic handle is designed as follows.

SS	-	8	-	6	-	DD	-	8	-	P2	_	G	-	H5
↓		↓		↓		↓		↓		↓		↓		↓
Material		Inlet Size		Style		Inlet/Outlet		Inlet Size		Options		Seal		Handle
Chart 1		Chart 2		Chart 3		Chart 4		Chart 2		Chart 5		Chart 6		Chart 7

Chart 1- Material	
SS	Stainless Steel
S	Steel
B	Brass

Chart 2- Valve Series	
Designator	Valve Size
2	1/8"
4	1/4"
6	3/8"
8	1/2"
12	3/4"
16	1"
20	1-1/4"
24	1-1/2"

Chart 3- Style	
6	Needle Valve

Chart 4- Inlet/Outlet Port		
Designator	Inlet	Outlet
DD	CBC-Lok® Tube Fitting	CBC-Lok® Tube Fitting
SS	CS-Lok® Tube Fitting	CS-Lok® Tube Fitting
MM	Male NPT	Male NPT
FF	Female NPT	Female NPT
MF	Male NPT	Female NPT

Chart 5- Options	
A	Angle Pattern
L	Delrin® Soft Stem/Seat
P1	Panel Mount (1 Nut)
P2	Panel Mount (2 Nut)

Chart 6- Stem Seal	
EM1	EPDM 80 O-Ring
KZ1	Kalrez® 3018 O-Ring
G	Graphoil® Packing
T	PTFE Packing

Chart 7- Handle Options	
H1	Mini "T" Handle
H2	"T" Handle
H3	Round Knurled Handle
H4	1-3/8" Phenolic Handle
H5	1-3/4" Phenolic Handle

* Fluorocarbon FKM O-Ring is standard

* See handle options section for standard handles

* Special configuration options are shown as general guidelines, not all options are available with every configuration. Consult factory for details.

Example: SS-6-6DD-6-P2-T

Designates a Stainless Steel Needle Valve with 3/8" CBC-Lok® Tube Fitting inlet to 3/8" CBC-Lok® Tube Fitting outlet with 2 nut panel mount option, and optional Teflon® Packing.

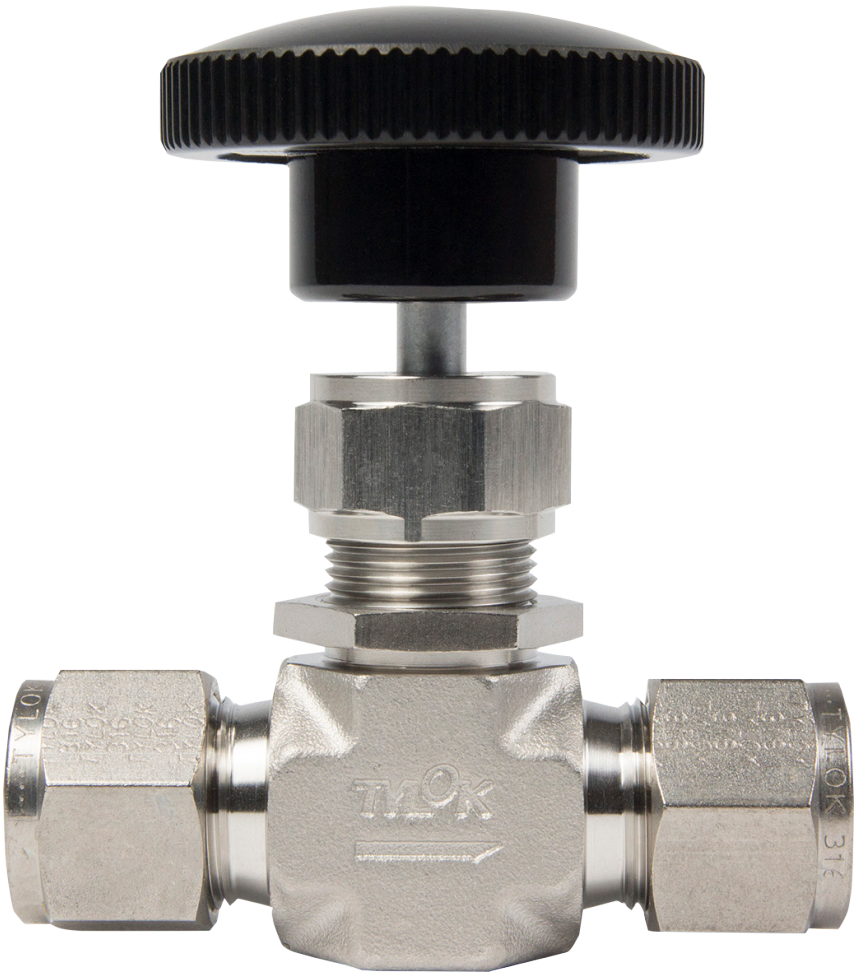
Integral Bonnet Needle Valves

Typical Applications:

- Instrument air lines
- Instrumentation panels
- Test Stands
- Analytical systems
- General flow control service
- A complete series from 1/4", 3/8", 1/2", 3/4" with integral tube end connections.
- Designed for regulation and tight shut off
- Compare with Swagelok 0, 1 and 18 Series Integral Bonnet Needle Valves
- Panel Mountable
- Live-Loaded, Chevron-Style packing

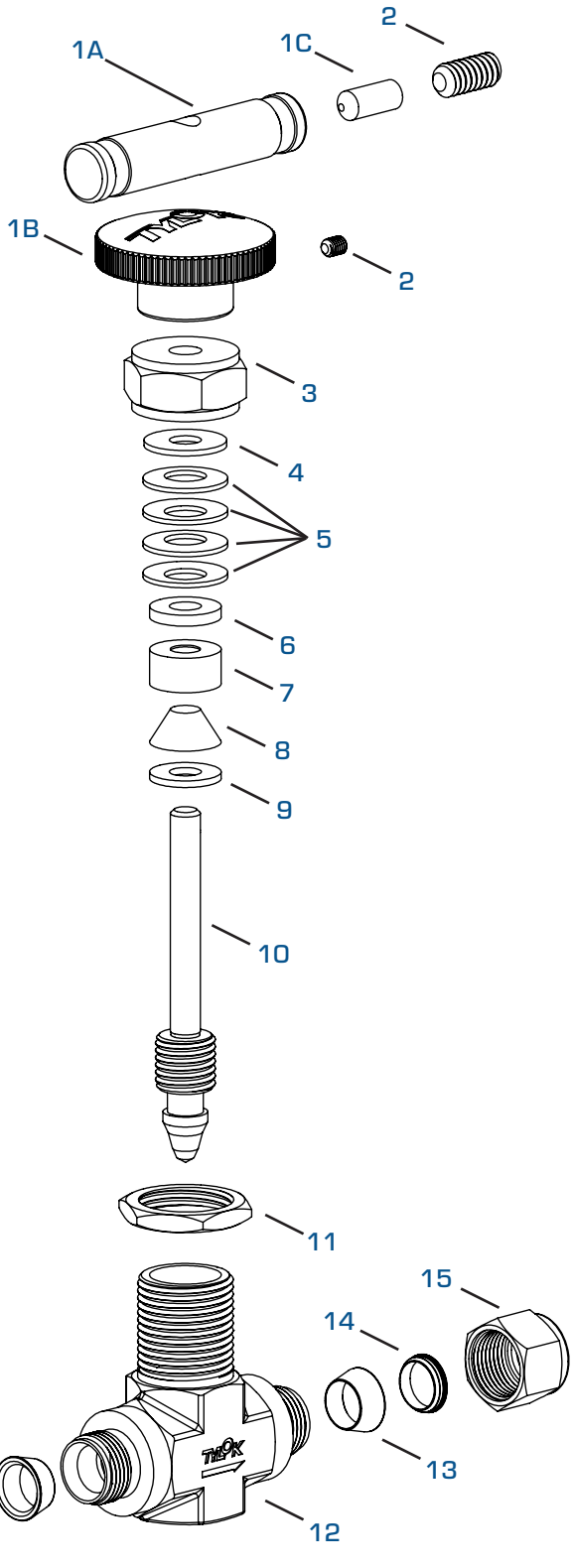
Features:

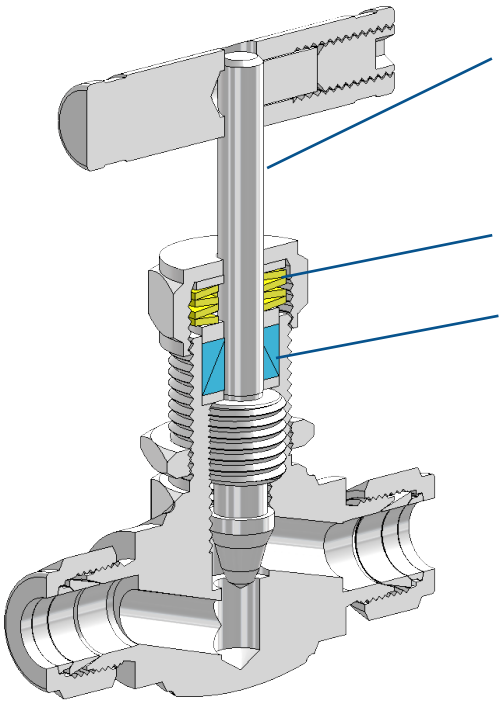
- Stainless Steel Construction
- Pressure Rating 5000 psi (345 bar)
- Temperature Rating: 400°F (204°C) max
- Packing Material: PTFE
- Flow coefficient (Cv) 0.30 to 1.80
- Integral tube fitting (both twin & single ferrule designs)
- Male NPT x Tube
- Female NPT
- Male NPT x Female NPT
- 100% factory tested with nitrogen at 1000 psi



Item	Component	Materials
1A	Tee Handle*	Aluminum
1B	Round Handle	Black Phenolic
1C	Handle Pin	Stainless
2	Set Screw	316 SS
3	Packing Nut	304 SS
4	Gland	304 SS
5	Packing Springs	304 SS
6	Packing Gland	304 SS
7	Upper Packing	TFM 1600 PTFE (Polytetrafluoroethylene)
8	Lower Packing	
9	Lower Gland	316 SS
10	Stem	Chrome-plated 316 SS
11	Panel Nut	304 SS
12	Body	316L SS
13	Front Ferrule	316L SS
14	Rear Ferrule	316L SS
15	Nut	316L SS

* 1RB Series valve are only available with Tee (Bar) handles



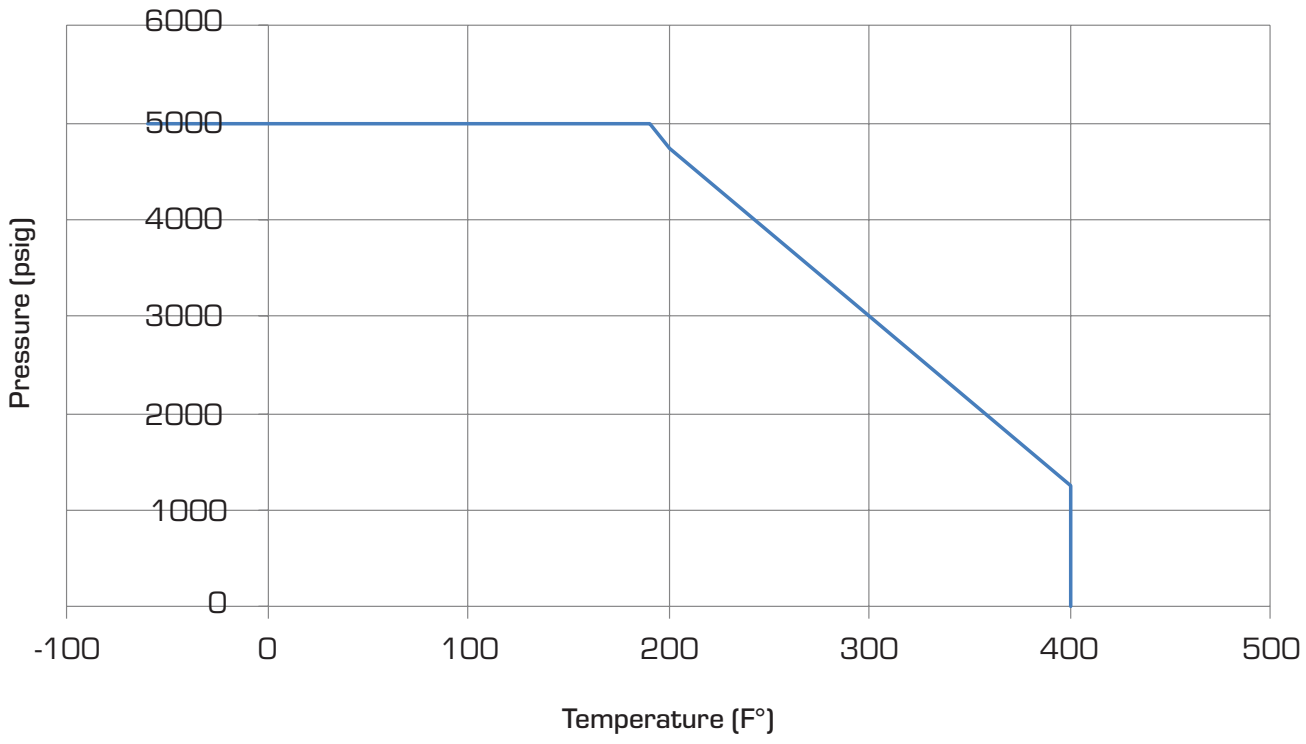


Chevron (2) piece sliding provides improved ID/OD sealing and wear compensation.

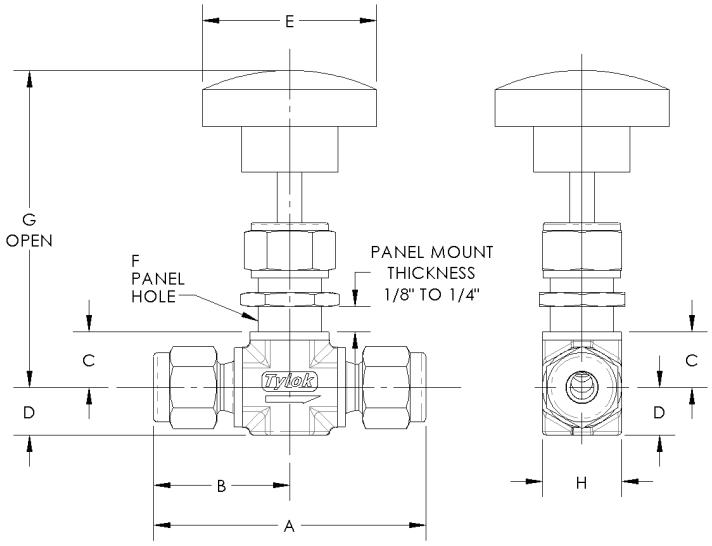
Belleville washers provide active compensation for wear, improved sealing and reduce manual adjustment.

Stem chrome plated for wear and corrosion resistance.

Temperature (F°)	Pressure (psig)
-60	5000
0	5000
100	5000
190	5000
200	4750
300	3000
400	1250
400	0



Integral Bonnet Needle Valves



End Connections		Ordering Part Number	Interchanges With	Cv	Orifice	A	B	C	D	E	F	G	H
Type	Size												
CBC-Lok® Tube Fitting	1/4	SS-1R4-D4D4	SS-1RS4	0.37	0.158	2.27	1.13	0.44	0.41	1.38	0.53	2.50	0.63
	3/8	SS-1R6-D6D6	SS-1RS6	0.73	0.250	2.58	1.29	0.50	0.56	1.88	0.78	2.97	0.88
	1/2	SS-1R6-D8D8	SS-1RS8	0.73	0.250	2.80	1.40	0.50	0.56	1.88	0.78	2.97	1.13
	1/2	SS-1R8-D8D8	SS-18RS8	1.80	0.375	3.80	1.90	0.75	0.75	3.00	1.03	3.91	1.13
	3/4	SS-1R6-D12D12	SS-18RS12	1.80	0.375	3.80	1.90	0.75	0.75	3.00	1.03	3.91	1.13
CS-Lok® Tube Fitting	1/4	SS-1R4-S4S4	N/A	0.37	0.158	2.27	1.14	0.44	0.41	1.38	0.53	2.50	0.63
	3/8	SS-1R6-S6S6	N/A	0.73	0.250	2.60	1.30	0.50	0.56	1.88	0.78	2.97	0.88
	1/2	SS-1R6-S8S8	N/A	0.73	0.250	2.81	1.40	0.50	0.56	1.88	0.78	2.97	1.13
	1/2	SS-1R8-S8S8	N/A	1.80	0.375	3.80	1.90	0.75	0.75	3.00	1.03	3.91	1.13
	3/4	SS-1R6-S12S12	N/A	1.80	0.375	3.80	1.90	0.75	0.75	3.00	1.03	3.91	1.13
Male NPT to CBC-Lok®	1/4	SS-1R4-M4D4	SS-1RM4-S4	0.37	0.158	1.95	0.82	0.44	0.38	1.38	0.53	2.50	0.63
Male NPT to CS-Lok®	1/4	SS-1R4-M4S4	N/A	0.37	0.158	1.95	0.82	0.44	0.38	1.38	0.53	2.50	0.63
Female NPT	1/4	SS-1R6-F4F4	SS-1RF4	0.37	0.158	2.12	1.06	0.55	0.50	1.88	0.53	2.97	0.63
	3/8	SS-1R8-F6F6	SS-18RF6	1.80	0.375	3.00	1.50	0.75	0.75	3.00	1.03	3.88	1.13
	1/2	SS-1R8-F8F8	SS-18RF8	1.80	0.375	3.00	1.50	0.75	0.75	3.00	1.03	3.88	1.13
Male NPT to Female NPT	1/4	SS-1R6-M4F4	SS-1RM4-F4	0.73	0.250	2.19	1.13	0.50	0.50	1.88	0.53	2.97	0.63
	1/2	SS-1R8-M8F8	SS-1RM8-F8	1.80	0.375	3.00	1.50	0.75	0.75	3.00	1.03	3.88	1.13

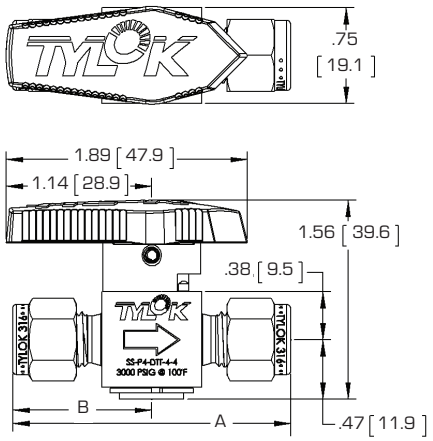
Note: In designing a system incorporating tube fittings and valves, it is the designer's or user's obligation and responsibility to determine the appropriate fittings and valves to be used for each application and to ensure proper installation and maintenance.


TYLOK
SS-P4-1FF-4-4
3000 PSIG@ 100°F
SS-P4-DTT-4-4
3000 PSIG @100°F
SS-P4-DMT-4-4
3000 PSIG@ 100°F
SS-P4-1MM-4-4-BK
3000 PSIG@ 100°F

Design & Features:

- Working Pressure up to 3000 psig (206 bar)
- 316 Stainless Steel material
- 1/8 through 3/8 inch sizes
- CBC-Lok® interchanges with Swagelok® & Parker A-Lok®
- CS-Lok® interchanges with Parker CPI®
- Positive leak tight shut off
- Every valve tested for shut off at 1000 psi (41.3 bar)
- Simple design, easy to clean and maintain
  - One piece body construction
  - Replaceable plug assembly
  - O-Ring seal to atmosphere
  - Fast acting, one quarter turn fully actuates the valve
  - Handle direction indicates valve position & flow direction

P4 Series



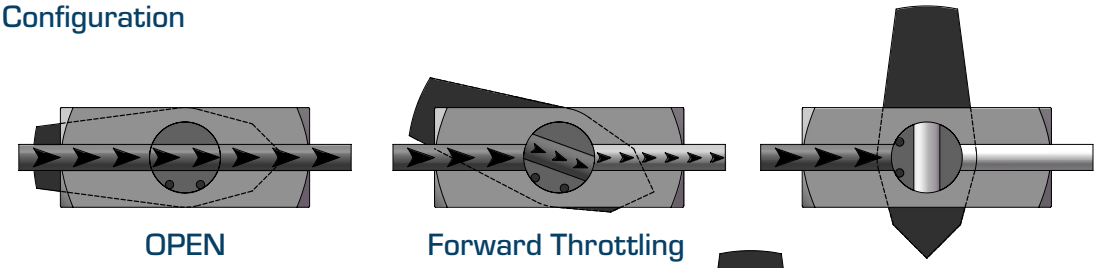
Dimensions

End Connections		Basic Part Number	Interchanges With	Series	Dimensions, in. (mm)					
Inlet/ Outlet	Size				Orifice		A[1]		B[1]	
CBC-Lok® Tube Fitting	1/8"	SS-P4-DTT-2-2	SS-2P4T	P4	0.093	(2.3)	1.99	(50.5)	0.98	(24.9)
	1/4"	SS-P4-DTT-4-4	SS-4P4T	P4	0.172	(4.4)	2.17	(55.1)	1.08	(27.4)
	3/8"	SS-P4-DTT-6-6	SS-6P4T	P4	0.172	(4.4)	2.29	(58.2)	1.14	(29.0)
CS-Lok® Tube Fitting	1/8"	SS-P4-STT-2-2	-	P4	0.093	(2.3)	1.99	(50.5)	0.98	(24.9)
	1/4"	SS-P4-STT-4-4	-	P4	0.172	(4.4)	2.17	(55.1)	1.08	(27.4)
	3/8"	SS-P4-STT-6-6	-	P4	0.172	(4.4)	2.29	(58.2)	1.14	(29.0)
Female NPT	1/8"	SS-P4-1FF-2-2	SS-2P4T4	P4	0.172	(4.4)	1.78	(45.2)	0.89	(22.6)
	1/4"	SS-P4-1FF-4-4	SS-4P4T4	P4	0.172	(4.4)	2.09	(53.1)	1.05	(26.7)
Male NPT	1/8"	SS-P4-1MM-2-2	SS-2P4T2	P4	0.172	(4.4)	1.53	(38.9)	0.76	(19.3)
	1/4"	SS-P4-1MM-4-4	SS-4P4T2	P4	0.172	(4.4)	1.90	(48.3)	0.98	(24.1)
Male NPT/ CBC-Lok® Tube Fitting	1/4"	SS-P4-DMT-4-4	SS-4P4T1	P4	0.172	(4.4)	2.03	(51.2)	0.95	(24.1)
Male NPT/ CS-Lok® Tube Fitting	1/4"	SS-P4-SMT-4-4	-	P4	0.172	(4.4)	2.03	(51.2)	0.95	(24.1)
Male NPT/ Female NPT	1/4"	SS-P4-1MF-4-4	SS-4P4T5		0.172	(4.4)	2.00	(50.8)	0.95	(24.1)

* [1] Dimensions are shown with tube fitting ends finger-tight and in standard configurations. Dimensions are subject to change.

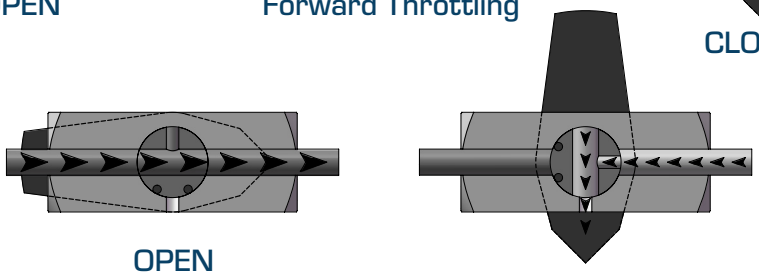
Flow Considerations

Standard Configuration



OPEN | Forward Throttling | CLOSED

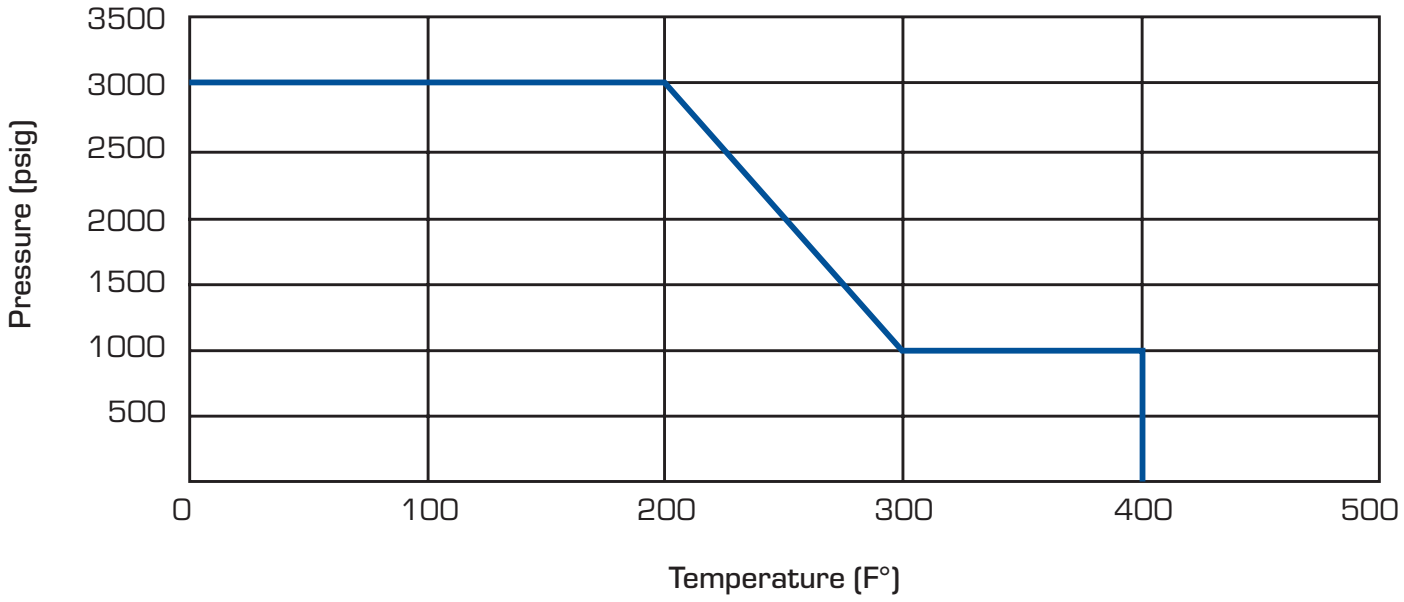
Vented Configuration

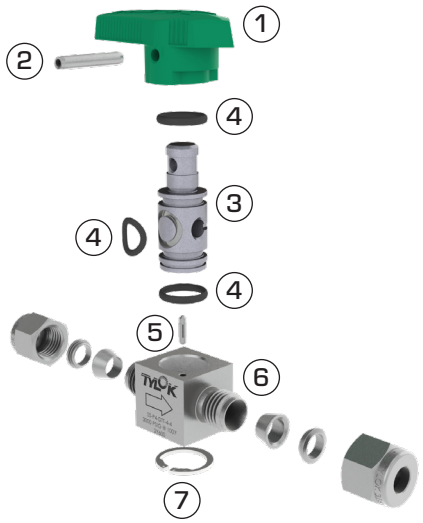


OPEN | CLOSED/ Side Vented

Temperature (F°)	Pressure (psig)
0	3000
100	3000
150	3000
200	3000
250	2000
300	1000
350	1000
400	1000
400	0

Pressure - Temperature





Component		Material (Material Grade/ASTM Specification)
1	Handle	Nylon 6/6
2	Pin	316 SS
3	Plug[2]	PTFE-coated 316 SS/A479
4	O-ring[2]	PTFE-coated Fluorocarbon FKM
5	Pin	316 SS
6	Body[2]	316 SS/A479
7	Snap Ring	PH 15-7 Mo® SS
8	Lubricant	Perfluoropolyether Based

Plug Valve Options

Downstream Vent

Vented Plug Valves allow downstream pressure to release to atmosphere when the valve is closed. They have a 150 psig (10.3 bar) maximum operating pressure.

Optional O-Ring Materials

Tylok Plug Valves ordinarily come with PTFE-coated Fluorocarbon FKM O-Rings. For a different material, add an O-Ring material designator from Chart 6 to the valve ordering number.

Optional Handle Colors

Tylok Plug Valves ordinarily come with a dark green handle. For a different color, add a handle color designator from Chart 7 to the valve ordering number.

Panel Mount

Contact manufacturer for availability.

SS	-	P4	-	D	-	TT	-	4	-	4	-	TE	-	BK
Material		Valve Series		Style		Inlet/Outlet		Port Size		Port Size		O-Ring Options		Handle Options
Chart 1		Chart 2		Chart 3		Chart 4		Chart 5		Chart 5		Chart 6		Chart 7
												*optional		*optional

Chart 1- Material	
SS	Stainless Steel

Chart 2- Valve Series	
P4	4 Series
P4V	4 Series, Vented

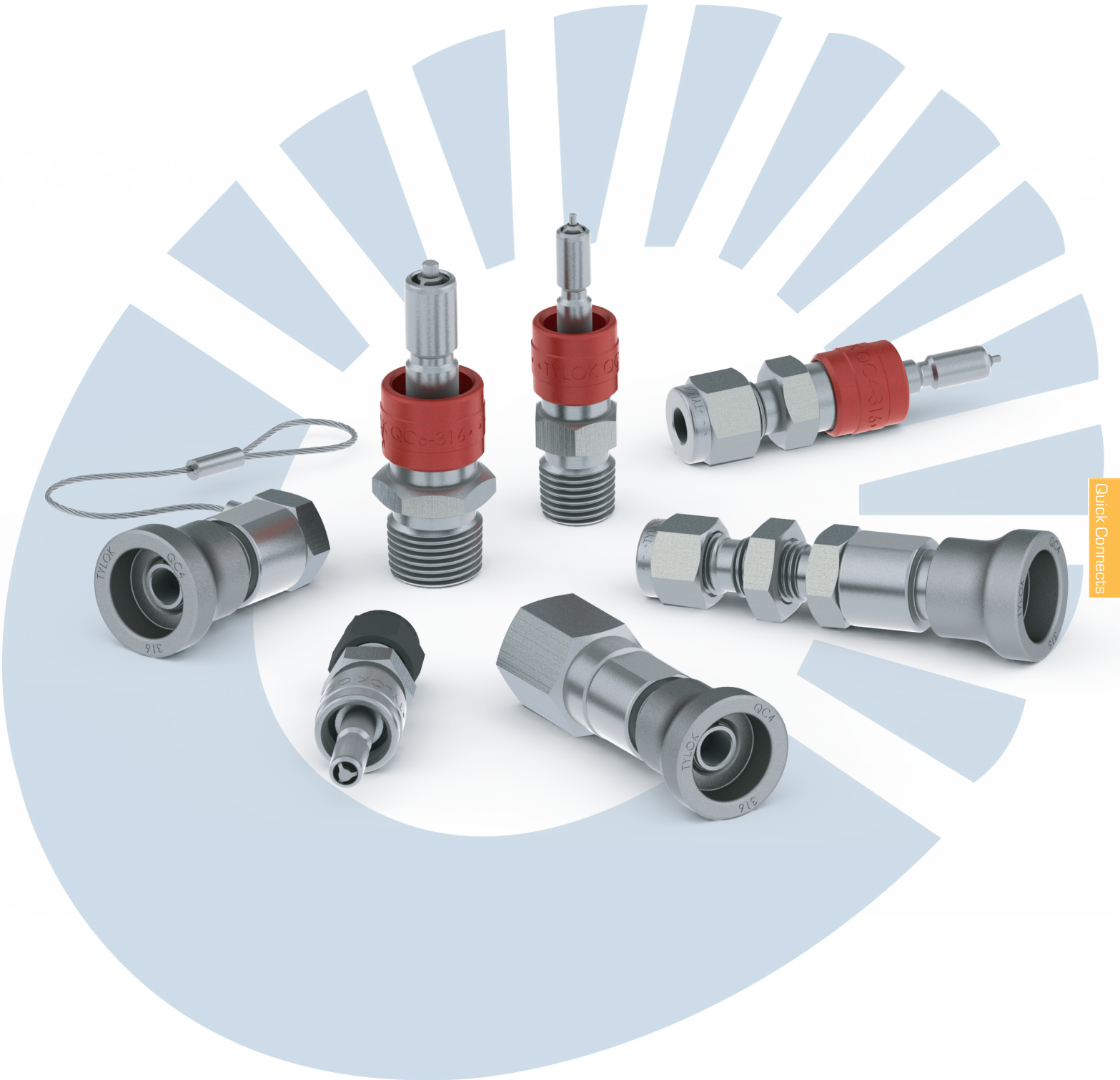
Chart 4- Inlet/Outlet Port		
Type	Port A	Port B
TT	Tube	Tube
MM*	Male NPT	Male NPT
FF*	Female NPT	Female NPT
MF*	Male NPT	Female NPT
MT	Male NPT	Tube

Chart 6- O-Ring Options	
TB	PTFE Coated Buna N
TE	PTFE Coated Ethylene Propylene
TN	PTFE Coated Neoprene

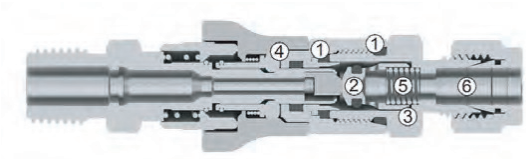
Chart 3- Style	
D	CBC-Lok®
S	CS-Lok®
1	Threaded

Chart 5- Port Size	
2	1/8"
4	1/4"
6	3/8"

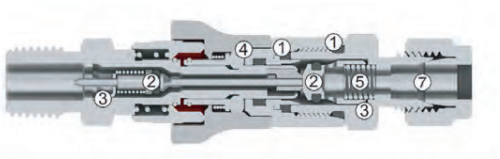
Chart 7- Handle Options	
BK	Black
BL	Blue
RD	Red

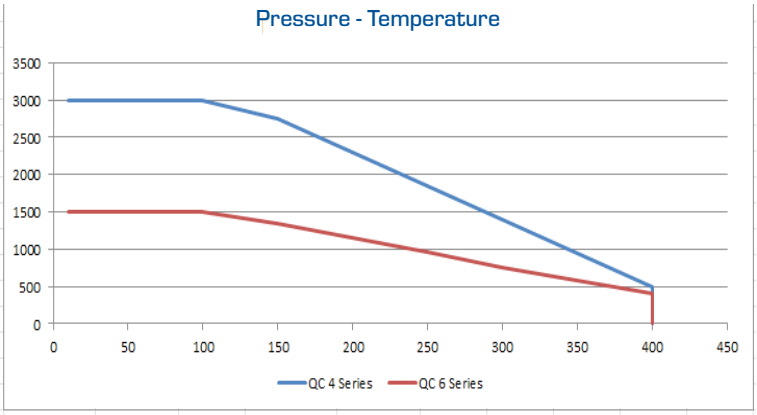

TYLOK
QC4
316

Single End Shut Off (SESO)



Double End Shut Off (DESO)



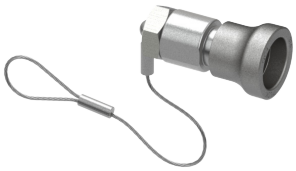


Rated Working Pressure, psi (bar)		
Body Size	1/4"	3/8"
Connected Position	3000 (207)	1500 (103)
Disconnected Position	3000 (207)	1500 (103)
Connect Under Pressure	250 (17)	250 (17)

Materials of Construction	
Machined Parts	Stainless Steel, ANSI Type 316
Springs & Retaining Rings	Stainless Steel, ANSI Type 316
Seals	FKM O-Rings (-15°F to 400°F)
Seal Lubricant	Fluorinated grease thickened with PTFE

Quick Connect Cover Accessories

Series	Fitting Size	Ordering Number	OAL		B		Flat
			in.	(mm)	in.	(mm)	in.
Dust Cap							
QC4	1/4	SS-QC4-C	1.65	(41.9)	0.92	(23.4)	5/8
QC6	3/8	SS-QC6-C	1.65	(41.9)	1.03	(26.2)	3/4



Series	Fitting Size	Ordering Number	OAL		B		Flat
			in.	(mm)	in.	(mm)	in.
Dust Plug							
QC4	1/4	SS-QC4-P	1.88	(47.8)	0.62	(15.7)	9/16
QC6	3/8	SS-QC6-P	1.84	(46.7)	0.74	(18.8)	11/16

Design/ Features

- Redundant Viton O-ring provide quick leak tight sealing in vacuum or pressure systems
- Dependable poppet valves with integral Viton O-Ring Seals are standard in all quick connect bodies and valved plugs.
- Positive valve stops prevent flow checking in the quick connect. Valve guides improve reliability by providing precise alignment to the seat.
- Smooth entrance and positive engagement, firmly gripping the plug, is ensured by Teflon® bonded locking "dogs".
- All quick connect valve springs are made 316 Stainless Steel.
- Tylok Quick Connects are 100% leak tested.

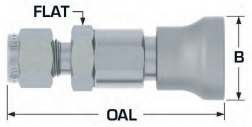
Vacuum Specifications

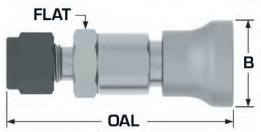
50 Millitor

= 0.05mm of Hg, absolute pressure
= 27.9 inches of Hg, gauge pressure

Instrumentation Quick Connect Bodies, Valved

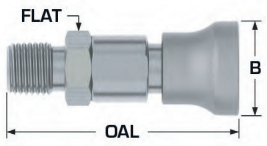
Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
CBC-Lok® Tube Fitting End								
QC4	1/8	SS-QC4-B-2D	SS-QC4-B-200	2.35	(59.7)	0.92	(23.4)	5/8
QC4	1/4	SS-QC4-B-4D	SS-QC4-B-400	2.38	(60.5)	0.92	(23.4)	5/8
QC6	3/8	SS-QC6-B-6D	SS-QC6-B-600	2.86	(72.6)	1.03	(26.2)	3/4

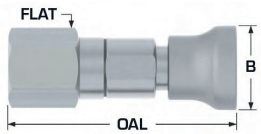




Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
CS-Lok® Tube Fitting End								
QC4	1/8	SS-QC4-B-2S	-	2.34	(59.4)	0.92	(23.4)	5/8
QC4	1/4	SS-QC4-B-4S	-	2.39	(60.7)	0.92	(23.4)	5/8
QC6	3/8	SS-QC6-B-6S	-	2.87	(72.9)	1.03	(26.2)	3/4

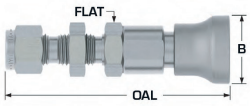
Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
Male Pipe End								
QC4	1/8	SS-QC4-B-2M	SS-QC4-B-2PM	2.06	(52.3)	0.92	(23.4)	5/8
QC4	1/4	SS-QC4-B-4M	SS-QC4-B-4PM	2.25	(57.2)	0.92	(23.4)	5/8
QC6	1/4	SS-QC6-B-4M	SS-QC6-B-4PM	2.62	(66.5)	1.03	(26.2)	3/4
QC6	3/8	SS-QC6-B-6M	SS-QC6-B-6PM	2.62	(66.5)	1.03	(26.2)	3/4

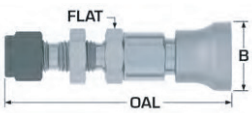




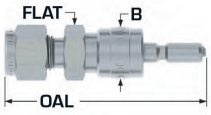
Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
Female Pipe End								
QC4	1/8	SS-QC4-B-2F	SS-QC4-B-2PF	2.20	(55.9)	0.92	(23.4)	5/8
QC4	1/4	SS-QC4-B-4F	SS-QC4-B-4PF	2.49	(63.2)	0.92	(23.4)	5/8
QC6	1/4	SS-QC6-B-4F	SS-QC6-B-4PF	2.80	(71.1)	1.03	(26.2)	3/4
QC6	3/8	SS-QC6-B-6F	SS-QC6-B-6PF	2.82	(71.6)	1.03	(26.2)	7/8

Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
CBC-Lok® Bulkhead Tube Fitting End								
QC4	1/4	SS-QC4-B1-4D	SS-QC4-B1-400	3.00	(72.6)	0.92	(23.4)	5/8
QC6	3/8	SS-QC6-B1-6D	SS-QC6-B1-600	3.25	(82.6)	1.03	(26.2)	3/4



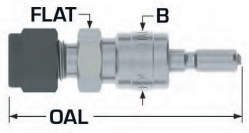


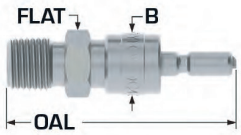
Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
CS-Lok® Bulkhead Tube Fitting End								
QC4	1/4	SS-QC4-B1-4S	-	3.01	(76.5)	0.92	(23.4)	5/8
QC6	3/8	SS-QC6-B1-6S	-	3.26	(82.8)	1.03	(26.2)	3/4



Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
CBC-Lok® Tube Fitting End								
QC4	1/8	SS-QC4-S-2D	SS-QC4-S-200	2.74	(69.6)	0.62	(15.7)	5/8
QC4	1/4	SS-QC4-S-4D	SS-QC4-S-400	2.35	(59.7)	0.62	(15.7)	9/16
QC6	3/8	SS-QC6-S-6D	SS-QC6-S-600	2.56	(65.0)	0.74	(18.8)	11/16

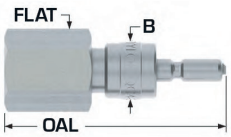
Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
CS-Lok® Tube Fitting End								
QC4	1/8	SS-QC4-S-2S	-	2.73	(69.3)	0.62	(15.7)	5/8
QC4	1/4	SS-QC4-S-4S	-	2.36	(59.9)	0.62	(15.7)	9/16
QC6	3/8	SS-QC6-S-6S	-	2.57	(65.3)	0.74	(18.8)	11/16

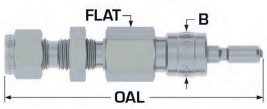




Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
Male Pipe End								
QC4	1/8	SS-QC4-S-2M	SS-QC4-S-2PM	2.03	(51.6)	0.62	(15.7)	9/16
QC4	1/4	SS-QC4-S-4M	SS-QC4-S-4PM	2.22	(56.4)	0.62	(15.7)	9/16
QC6	1/4	SS-QC6-S-4M	SS-QC6-S-4PM	2.33	(59.2)	0.74	(18.8)	3/4
QC6	3/8	SS-QC6-S-6M	SS-QC6-S-6PM	2.33	(59.2)	0.74	(18.8)	3/4

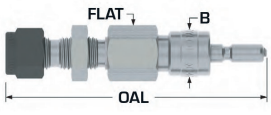
Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
Female Pipe End								
QC4	1/8	SS-QC4-S-2F	SS-QC4-S-2PF	2.09	(53.1)	0.62	(15.7)	9/16
QC4	1/4	SS-QC4-S-4F	SS-QC4-S-4PF	2.33	(59.2)	0.62	(15.7)	3/4
QC6	1/4	SS-QC6-S-4F	SS-QC6-S-4PF	2.50	(63.5)	0.74	(18.8)	3/4
QC6	3/8	SS-QC6-S-6F	SS-QC6-S-6PF	2.50	(63.5)	0.74	(18.8)	7/8





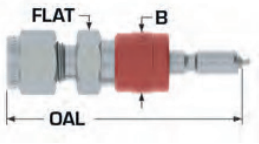
Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
CBC-Lok® Bulkhead Tube Fitting End								
QC4	1/4	SS-QC4-S1-4D	SS-QC4-S1-400	3.39	(86.1)	0.62	(15.7)	5/8
QC6	3/8	SS-QC6-S1-6D	SS-QC6-S1-600	3.61	(91.7)	0.74	(18.8)	3/4

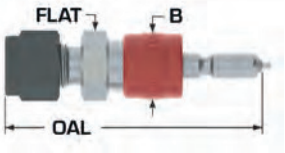
Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
CS-Lok® Bulkhead Tube Fitting End								
QC4	1/4	SS-QC4-S1-4S	-	3.40	(86.4)	0.62	(15.7)	5/8
QC6	3/8	SS-QC6-S1-6S	-	3.62	(91.9)	0.74	(18.8)	3/4



Instrumentation Quick Connect Plugs, Valved

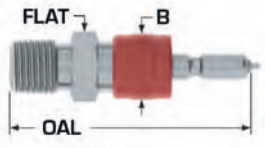
Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
CBC-Lok® Tube Fitting End								
QC4	1/8	SS-QC4-D-2D	SS-QC4-D-200	2.74	(69.6)	0.62	(15.7)	5/8
QC4	1/4	SS-QC4-D-4D	SS-QC4-D-400	2.35	(59.7)	0.62	(15.7)	9/16
QC6	3/8	SS-QC6-D-6D	SS-QC6-D-600	2.56	(65.0)	0.74	(18.8)	11/16

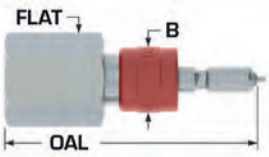




Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
CS-Lok® Tube Fitting End								
QC4	1/8	SS-QC4-D-2S	-	2.73	(69.3)	0.62	(15.7)	5/8
QC4	1/4	SS-QC4-D-4S	-	2.36	(59.9)	0.62	(15.7)	9/16
QC6	3/8	SS-QC6-D-6S	-	2.57	(65.3)	0.74	(18.8)	11/16

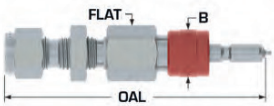
Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
Male Pipe End								
QC4	1/8	SS-QC4-D-2M	SS-QC4-D-2PM	2.03	(51.6)	0.62	(15.7)	9/16
QC4	1/4	SS-QC4-D-4M	SS-QC4-D-4PM	2.22	(56.4)	0.62	(15.7)	9/16
QC6	1/4	SS-QC6-D-4M	SS-QC6-D-4PM	2.33	(59.2)	0.74	(18.8)	3/4
QC6	3/8	SS-QC6-D-6M	SS-QC6-D-6PM	2.33	(59.2)	0.74	(18.8)	3/4

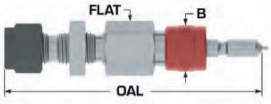




Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
Female Pipe End								
QC4	1/8	SS-QC4-D-2F	SS-QC4-D-2PF	2.09	(53.1)	0.62	(15.7)	9/16
QC4	1/4	SS-QC4-D-4F	SS-QC4-D-4PF	2.33	(59.2)	0.62	(15.7)	3/4
QC6	1/4	SS-QC6-D-4F	SS-QC6-D-4PF	2.50	(63.5)	0.74	(18.8)	3/4
QC6	3/8	SS-QC6-D-6F	SS-QC6-D-6PF	2.50	(63.5)	0.74	(18.8)	7/8

Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
CBC-Lok® Bulkhead Tube Fitting End								
QC4	1/4	SS-QC4-D1-4D	SS-QC4-D1-400	3.39	(86.1)	0.62	(15.7)	5/8
QC6	3/8	SS-QC4-D1-6D	SS-QC4-D1-600	3.61	(91.7)	0.74	(18.8)	3/4





Series	Fitting Size	Ordering Number	Interchanges With	OAL in.	OAL (mm)	B in.	B (mm)	Flat in.
CS-Lok® Bulkhead Tube Fitting End								
QC4	1/4	SS-QC4-D1-4S	-	3.40	(86.4)	0.62	(15.7)	5/8
QC6	3/8	SS-QC6-D1-6S	-	3.62	(91.9)	0.74	(18.8)	3/4

Quick Connects are ordered as listed in this catalog providing the ordering number.

Special Configurations available upon request

Example: A Stainless Steel, QC4 series quick connect body with a 1/4" CBC-Lok® Tube Fitting End.

SS	-	QC4	-	B	-	4	-	D	-	KZ
↓		↓		↓		↓		↓		↓
Material		Series		Component		End Size		Style		O-Ring
Chart 1		Chart 2		Chart 3		Chart 4		Chart 5		Chart 6

Chart 1- Material	
SS	Stainless Steel

Chart 2- Quick Coupler Series	
QC4	4 Series (1/4")
QC6	6 Series (3/8")

Chart 3- Coupler Component	
H1	Body
H2	Bulkhead Body
H3	Non-Valved Plug
H4	Non-Valved Bulkhead Plug
H5	Valved Plug
H1	Valved Bulkhead Plug
H2	Dust Cap
H3	Dust Plug

Chart 4- End Size	
2	1/8"
4	1/4"
6	3/8"

Chart 5- Options	
D	CBC-Lok
S	CS-Lok
1	Tylok Standard
M	Male NPT
F	Female NPT

Chart 6- O-Ring Options	
B	Buna N
E	EPDM
KZ	Kalrez®
N	Neoprene


TYLOK
SS-CH-D6D6-1/3
6000psig @ 100 °F
13JY0505
TYLOK
SS-CH-DAD4-1/3
TYLOK
1/3 PSI
6000PSIG@100F

CH Series Check Valves for Instrumentation

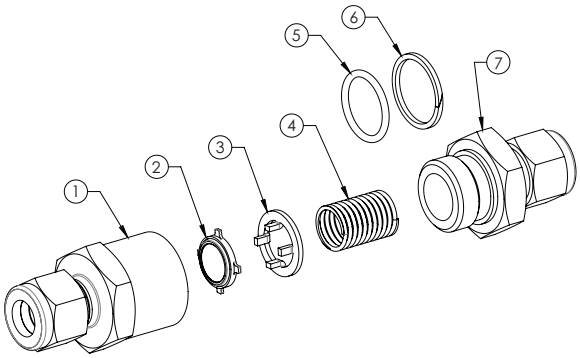
Tylok Check Valves are poppet-style valves made of 316 Stainless Steel, and feature a compact design that is perfect for instrumentation systems. These directional valves are normally closed, but open when the differential pressure between the inlet and outlet exceed the spring pressures.

Features:

- 6000 psig (413 bar) maximum pressure rating
- -10°F (-23°C) to 400°F (204°C) temperature rating
- 1/3 to 10 psig cracking pressure
- Fluorocarbon FKM Seals
- End Connections - Integral Tube Fittings
  (both twin [CBC-Lok®] & Single [CS-Lok®] ferrule designs)
- Available in sizes 1/4", 3/8", 1/2", 3/4" and 1"

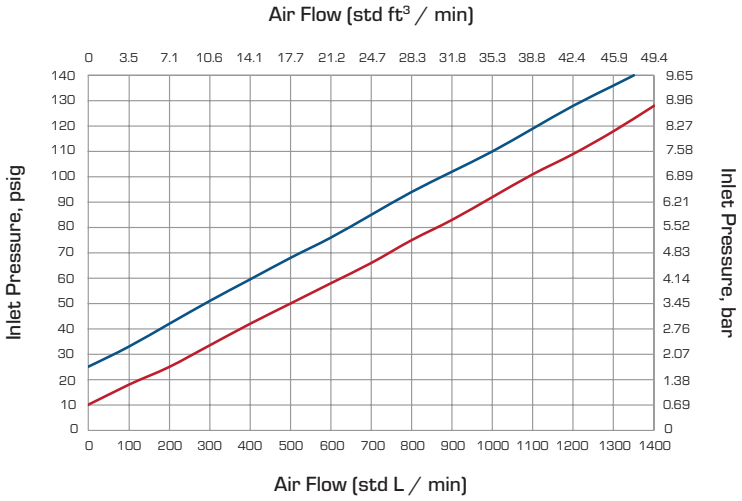
Pressure - Temperature Ratings (based on fluorocarbon FKM seals)	
Temperature °F (°C)	**Working Pressure psig (bar)**
-10°F (-23°C) to 100°F (37°C)	6000 psig (413 bar)
200°F (93°C)	5160 psig (355 bar)
250°F (121°C)	4910 psig (338 bar)
300°F (148°C)	4660 psig (321 bar)
375°F (190°C)	4280 psig (295 bar)

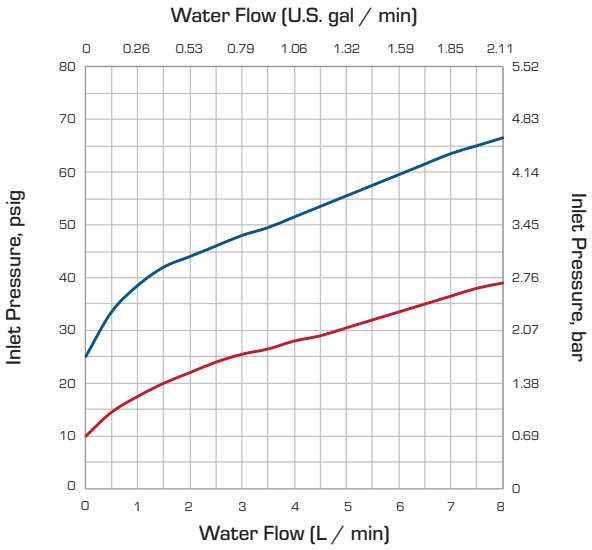
Cracking and Reseal Pressures		
Nominal Cracking Pressure psig (bar)	**Cracking Pressure Range psig (bar)**	**Reseal Pressure Range psig (bar)**
1/3 psig (0.02 bar)	1/3 to 3 psig (0.02 to 0.20 bar)	Up to 6 psig (0.41 bar) differential pressure
1 psig (0.06 bar)	1 to 4 psig (0.06 to 0.27 bar)	Up to 6 psig (0.41 bar) differential pressure
5 psig (0.34 bar)	3 to 9 psig (0.20 to 0.62 bar)	Up to 2 psig (0.14 bar) differential pressure
10 psig (0.68 bar)	7 to 15 psig (0.48 to 1.00 bar)	Up to 3 psig (0.20 bar) differential pressure
25 psig (1.07 bar)	20 to 30 psig (1.04 to 2.01 bar)	Up to 17 psig (1.02 bar) differential pressure



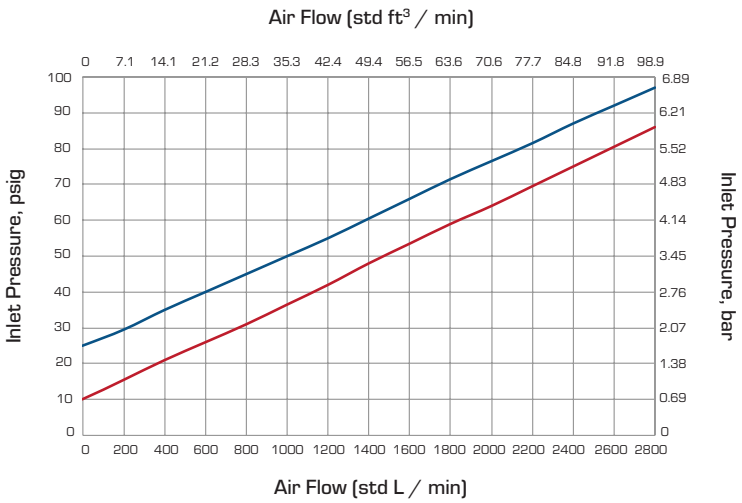
Component		Material (Material Grade/ASTM Specification)
1	Inlet Body	316SS / A479
2	Bonded Poppet	Fluorocarbon FKM - Bonded 316SS / A479
3	Poppet Stop	316SS / A240
4	Spring	302SS / A313
5	O-Ring	Fluorocarbon FKM
6	Backup Ring	PTFE / D1710
7	Outlet Body	316SS / A479

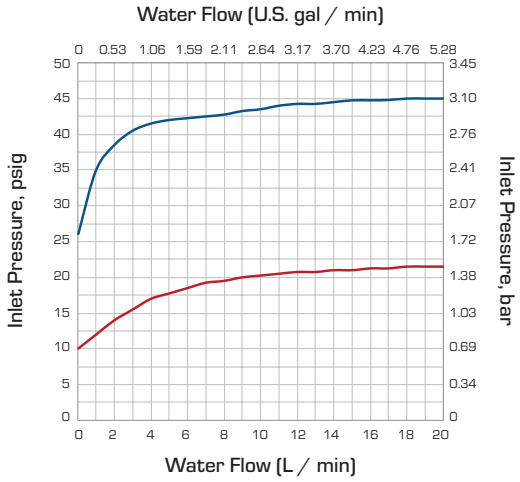
Cv = 0.67 Cracking = 1 psig Cv = 0.67 Cracking = 10 psig



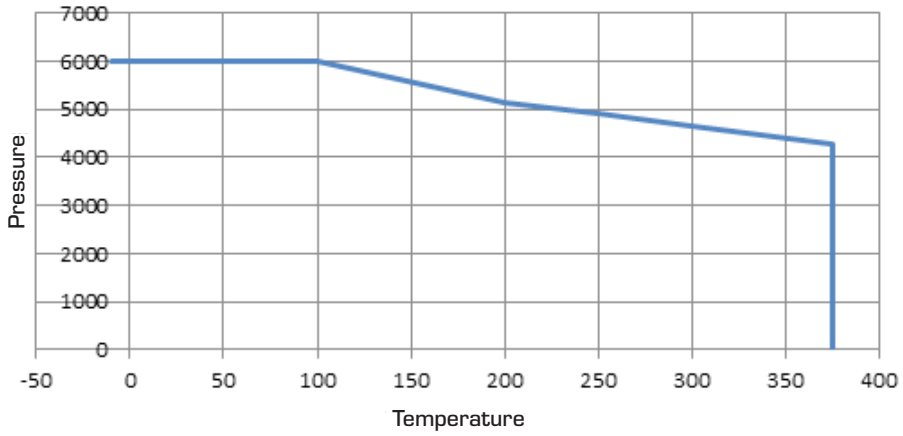


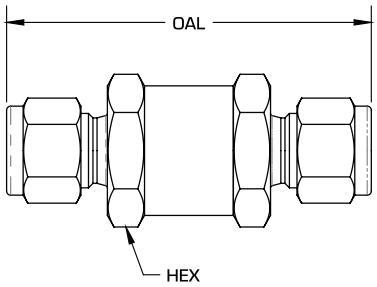
Cv = 1.8 Cracking = 1 psig Cv = 1.8 Cracking = 10 psig



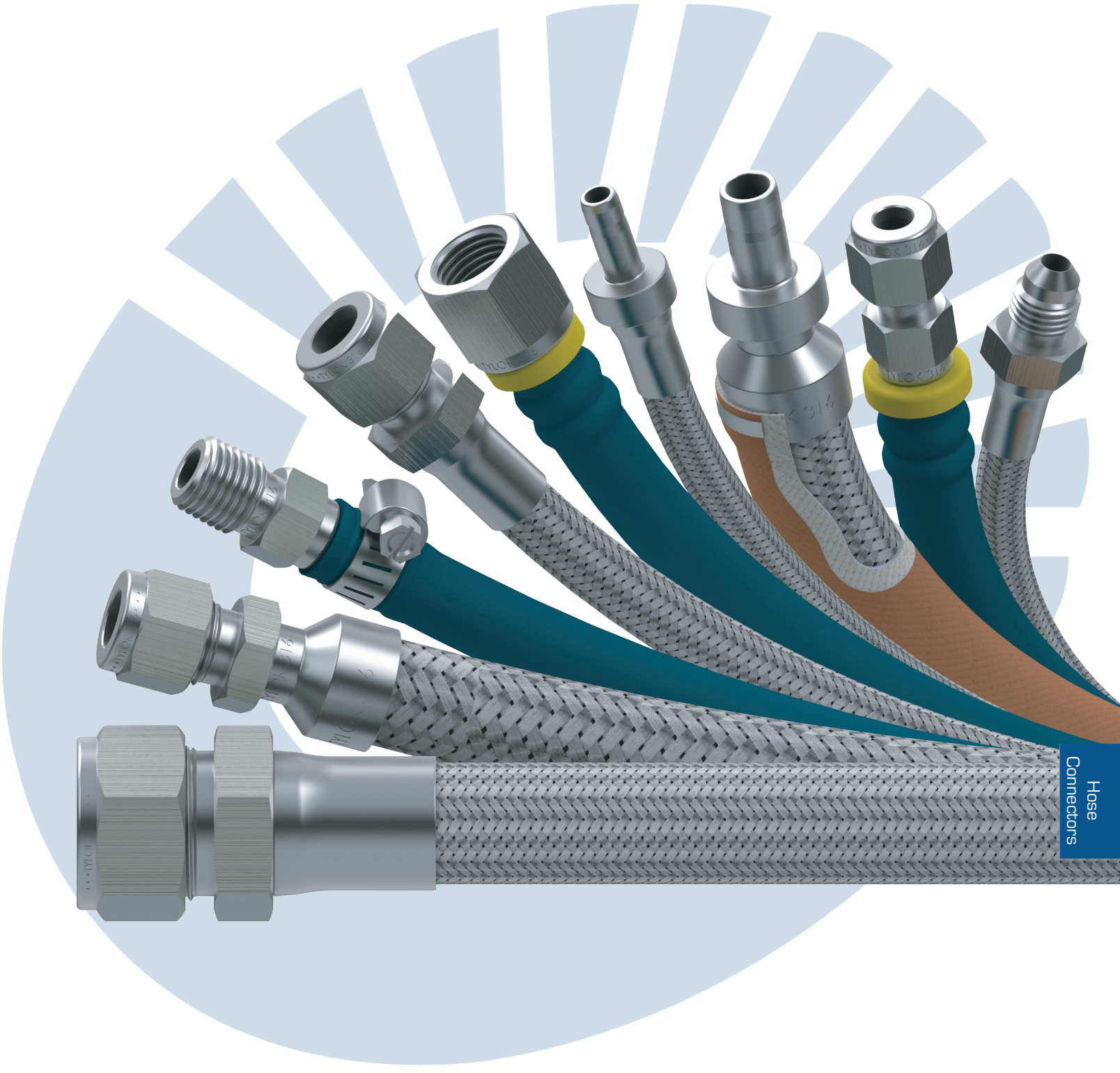


Temperature - Pressure Ratings



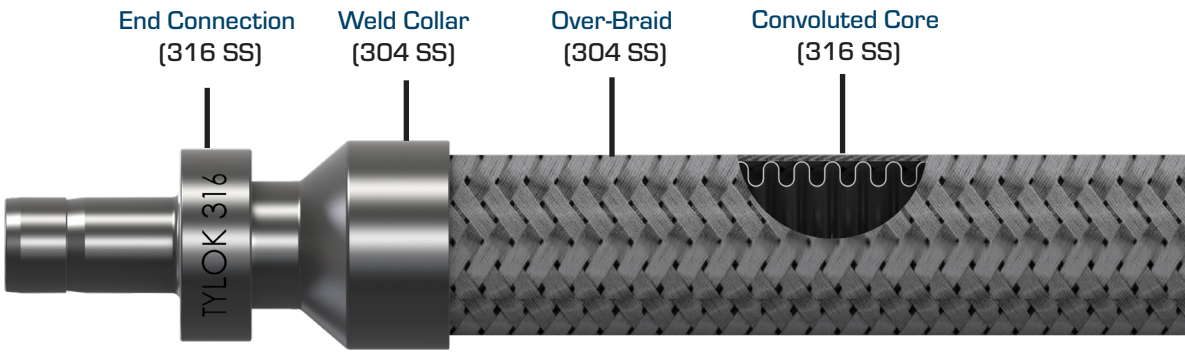


End Connection		Ordering Part Number	Interchanges With	Pressure Rating At 100°F (37°C) psig (bar)	Cv	OAL	HEX
Type	Size						
CBC-Lok® Tube Fitting	1/4	SS-CH-D4D4-	SS-CHS4-	6000 (413)	0.67	2.43	1/16
	3/8	SS-CH-D6D6-	SS-CHS6-		1.80	2.75	1
	1/2	SS-CH-D8D8-	SS-CHS8-			2.96	
	3/4	SS-CH-D12D12-	SS-CHS12-	5000 (344)	4.70	3.52	1-5/8
CS-Lok® Tube Fitting	1/4	SS-CH-S4S4-	-	6000 (413)	0.67	2.43	11/16
	3/8	SS-CH-S6S6-	-		1.80	2.75	1
	1/2	SS-CH-S8S8-	-			2.96	
	3/4	SS-CH-S12S12-	-	5000 (344)	4.70	3.52	1-5/8



Flexible Metal Hose • PTFE Lined Hose • Multi Purpose Push On Hose

Flexible Metal Hose



Design Features:

- Working pressures from vacuum to 4600 psig (317 bar)
  -L Series (standard pressure) & H Series (high pressure)
- Medium-pressure applications where permeation is unacceptable
- End Connections are available in 1/4" to 1" sizes
- Stainless Steel core for corrosion resistance
- Stainless Steel braid contains hose pressure in dynamic applications
- End Connections weld meets ASME Boiler and Pressure Vessel Code Section IX
- Assembly number and pressure rating are etched onto weld collar
- Hose covers, identification tags, and additional leak testing options are available

Testing

Every Tylok L & H series hose assembly is helium leak tested to a maximum leak rate of 1x10 -6 std cm3/s. See additional test options in the ordering section.

Available Sizes

Adapter Tube Size	Hose Size	A		Minimum Inside Diameter		Minimum Outside Diameter	
		in	(mm)	in	(mm)	in	(mm)
1/4	4	1.63	(41.3)	0.16	(4.0)	0.56	(14.3)
3/8	6	1.84	(46.8)	0.28	(7.1)	0.78	(19.8)
1/2	8	2.09	(53.2)	0.39	(9.9)	0.93	(23.2)
3/4	12	2.31	(58.7)	0.63	(15.9)	1.32	(33.5)
1	16	2.81	(71.4)	0.88	(22.2)	1.63	(41.4)

Available End Connections

Tube Adapter; CBC-Lok Tube Fitting; CS-Lok Tube Fitting; Male Pipe Fitting; Female Pipe Fitting; Male JIC, 37° Flare; Female Swivel JIC, 37° flare

Technical Data

	Hose Size Designator	Nominal Hose Size in	Nominal Hose Size (mm)	Minimum Bend Radius Static in	Minimum Bend Radius Dynamic (mm)	Temperature Range °F (°C)	Working Pressure at 70°F (21°C) psig (bar)	Burst Pressure at 70°F (21°C) psig (bar)	Hose Weight lb/ft	Hose Weight (kg/m)
L Series	4	0.47	(11.9)	1.0 (25.4)	4.5 (114)	-325 to 850 (-200 to 454)	1800 (124)	7233 (499)	0.11	(0.16)
	6	0.71	(18.0)	1.2 (30.5)	5.0 (127)	-325 to 850 (-200 to 454)	1558 (107)	6230 (430)	0.20	(0.30)
	8	0.83	(21.1)	1.5 (38.1)	5.5 (140)	-325 to 850 (-200 to 454)	1186 (82)	4743 (327)	0.22	(0.33)
	12	1.22	(31.0)	2.1 (53.3)	8.0 (203)	-325 to 850 (-200 to 454)	898 (62)	3591 (248)	0.37	(0.55)
	16	1.53	(38.9)	2.7 (68.6)	9.0 (229)	-325 to 850 (-200 to 454)	718 (50)	2872 (198)	0.50	(0.74)
H Series	4	0.52	(13.2)	1.1 (27.9)	5.0 (127)	-325 to 850 (-200 to 454)	4600 (317)	18400 (1268)	0.21	(0.31)
	6	0.70	(17.8)	1.4 (35.6)	5.5 (140)	-325 to 850 (-200 to 454)	3800 (162)	15200 (1048)	0.36	(0.54)
	8	0.82	(20.8)	1.6 (40.6)	5.7 (145)	-325 to 850 (-200 to 454)	2600 (179)	10400 (717)	0.43	(0.64)
	12	1.19	(30.2)	2.8 (71.1)	6.5 (165)	-325 to 850 (-200 to 454)	2000 (138)	8000 (552)	0.64	(0.95)
	16	1.39	(35.9)	3.5 (88.9)	7.9 (201)	-325 to 850 (-200 to 454)	1500 (103)	6000 (414)	0.78	(1.16)

Temperature °F (°C)	De-Rating Factor
-325 to 300 (-198 to 149)	1.00
400 (204)	0.93
500 (260)	0.86
600 (316)	0.81
650 (343)	0.79
700 (371)	0.77
750 (399)	0.75
800 (427)	0.74
850 (454)	0.72

Pressure Temperature De-Rating

The working pressure must be de-rated when PTFE-lined hose operates outside of ambient temperatures.

Dynamic Pressure De-Rating

Pulsating or shock pressures, like those encountered with fast-operating valves, can severely damage a hose. If your application experiences pulsating pressures, use a de-rating factor of 0.50. If your application experiences shock pressures, use a de-rating factor of 0.17.

Standard Assemblies

L Series					
SS-L4A4A4-12	1/4" Hose, 1/4" Adapter Ends, 12" OAL	SS-L6A6A6-12	3/8" Hose, 3/8" Adapter Ends, 12" OAL	SS-L8A8A8-12	1/2" Hose, 1/2" Adapter Ends, 12" OAL
SS-L4A4A4-18	1/4" Hose, 1/4" Adapter Ends, 18" OAL	SS-L6A6A6-18	3/8" Hose, 3/8" Adapter Ends, 18" OAL	SS-L8A8A8-18	1/2" Hose, 1/2" Adapter Ends, 18" OAL
SS-L4A4A4-24	1/4" Hose, 1/4" Adapter Ends, 24" OAL	SS-L6A6A6-24	3/8" Hose, 3/8" Adapter Ends, 24" OAL	SS-L8A8A8-24	1/2" Hose, 1/2" Adapter Ends, 24" OAL

H Series					
SS-H4A4A4-12	1/4" Hose, 1/4" Adapter Ends, 12" OAL	SS-H6A6A6-12	3/8" Hose, 3/8" Adapter Ends, 12" OAL	SS-H8A8A8-12	1/2" Hose, 1/2" Adapter Ends, 12" OAL
SS-H4A4A4-18	1/4" Hose, 1/4" Adapter Ends, 18" OAL	SS-H6A6A6-18	3/8" Hose, 3/8" Adapter Ends, 18" OAL	SS-H8A8A8-18	1/2" Hose, 1/2" Adapter Ends, 18" OAL
SS-H4A4A4-24	1/4" Hose, 1/4" Adapter Ends, 24" OAL	SS-H6A6A6-24	3/8" Hose, 3/8" Adapter Ends, 24" OAL	SS-H8A8A8-24	1/2" Hose, 1/2" Adapter Ends, 24" OAL

CBC-Lok® Tube Adapter[1]

Adapter Tube Size	Hose Size	A in	A (mm)	Minimum Inside Diameter in	Minimum Inside Diameter (mm)	Maximum Outside Dimension in	Maximum Outside Dimension (mm)
1/4	4	1.63	(41.3)	0.16	(4.0)	0.56	(14.3)
3/8	6	1.84	(46.8)	0.28	(7.1)	0.78	(19.8)
1/2	8	2.09	(53.2)	0.39	(9.9)	0.93	(23.6)
3/4	12	2.31	(58.7)	0.63	(15.9)	1.32	(33.5)
1	16	2.81	(71.4)	0.88	(22.2)	1.63	(41.4)

CBC-Lok® Tube Fitting[1]

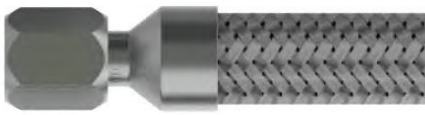
Fitting Size	Hose Size	A in	A (mm)	Minimum Inside Diameter in	Minimum Inside Diameter (mm)	Maximum Outside Dimension in	Maximum Outside Dimension (mm)
1/4	4	1.66	(42.3)	0.19	(4.7)	0.65	(16.5)
3/8	6	1.89	(48.0)	0.28	(7.1)	0.79	(20.1)
1/2	8	2.02	(51.3)	0.38	(9.5)	1.01	(25.7)
3/4	12	2.25	(57.0)	0.63	(15.9)	1.32	(33.5)
1	16	2.65	(67.2)	0.88	(22.2)	1.73	(44.0)

CS-Lok® Tube Fitting[2]

Fitting Size	Hose Size	A in	A (mm)	Minimum Inside Diameter in	Minimum Inside Diameter (mm)	Maximum Outside Dimension in	Maximum Outside Dimension (mm)
1/4	4	1.67	(42.4)	0.19	(4.7)	0.65	(16.5)
3/8	6	1.89	(48.1)	0.28	(7.1)	0.79	(20.1)
1/2	8	2.02	(51.4)	0.38	(9.5)	1.01	(25.7)
3/4	12	2.24	(56.9)	0.63	(15.9)	1.32	(33.5)
1	16	2.64	(67.0)	0.88	(22.2)	1.73	(44.0)

Female Pipe Fitting

NPT Size	Hose Size	A in	A (mm)	Minimum Inside Diameter in	Minimum Inside Diameter (mm)	Maximum Outside Dimension in	Maximum Outside Dimension (mm)
1/4	4	1.56	(39.7)	0.25	(6.4)	0.87	(22.0)
3/8	6	1.88	(47.6)	0.38	(9.5)	1.01	(25.7)
1/2	8	2.03	(51.6)	0.47	(11.9)	1.23	(31.1)
3/4	12	2.19	(55.5)	0.63	(15.9)	1.51	(38.5)
1	16	2.47	(62.7)	0.88	(22.2)	1.88	(47.7)

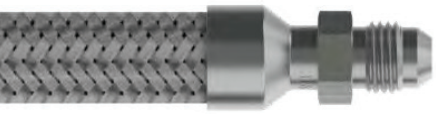


Male Pipe Fitting

NPT Size	Hose Size	A in	A (mm)	Minimum Inside Diameter in	Minimum Inside Diameter (mm)	Maximum Outside Dimension in	Maximum Outside Dimension (mm)
1/4	4	1.56	(39.7)	0.25	(6.4)	0.65	(16.5)
3/8	6	1.72	(43.6)	0.38	(9.5)	0.79	(20.1)
1/2	8	1.91	(48.4)	0.47	(11.9)	1.01	(25.7)
3/4	12	2.06	(52.4)	0.63	(15.9)	1.32	(33.5)
1	16	2.47	(62.7)	0.88	(22.2)	1.63	(41.4)

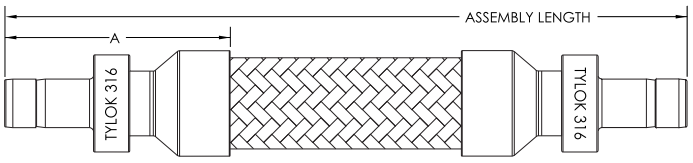
Female Swivel JIC, 37° Flare

JIC Flare Size	Hose Size	A in	A (mm)	Minimum Inside Diameter in	Minimum Inside Diameter (mm)	Maximum Outside Dimension in	Maximum Outside Dimension (mm)
1/4	4	1.37	(34.8)	0.17	(4.32)	0.65	(16.5)
3/8	6	1.61	(40.8)	0.30	(7.62)	0.79	(20.1)
1/2	8	1.73	(43.8)	0.39	(9.91)	1.01	(25.7)
3/4	12	2.03	(51.6)	0.61	(15.5)	1.44	(36.7)
1	16	2.26	(57.3)	0.84	(21.3)	1.73	(44.0)



Male JIC, 37° Flare

JIC Flare Size	Hose Size	A in	A (mm)	Minimum Inside Diameter in	Minimum Inside Diameter (mm)	Maximum Outside Dimension in	Maximum Outside Dimension (mm)
1/4	4	1.30	(33.0)	0.17	(4.32)	0.60	(15.2)
3/8	6	1.40	(35.6)	0.30	(7.62)	0.78	(19.8)
1/2	8	1.50	(38.1)	0.39	(9.91)	0.93	(23.6)
3/4	12	1.70	(43.2)	0.61	(15.5)	1.32	(33.5)
1	16	1.90	(48.3)	0.84	(21.3)	1.63	(41.4)



Example:

A 1/4" L Series Flexible Metal Hose with 1/4" CBC-Lok Tube Adapter ends, 18" overall length and optional hydrostatic test is designated as follows:

SS	-	L	-	4	-	A	-	4	-	A	-	4	-	18	-	P
↓		↓		↓		↓		↓		↓		↓		↓		↓
Chart 1		Chart 2		Chart 3		Chart 4		Chart 5		Chart 4		Chart 5		Chart 6		Chart 7
																Optional*

Chart 1- Material	
SS	Stainless Steel

Chart 2- Hose Type	
L	L Series Metal Hose
H	H Series Metal Hose

Chart 3- Hose Size	
4	1/4 in
6	3/8 in
8	1/2 in
12	3/4 in
16	1 in

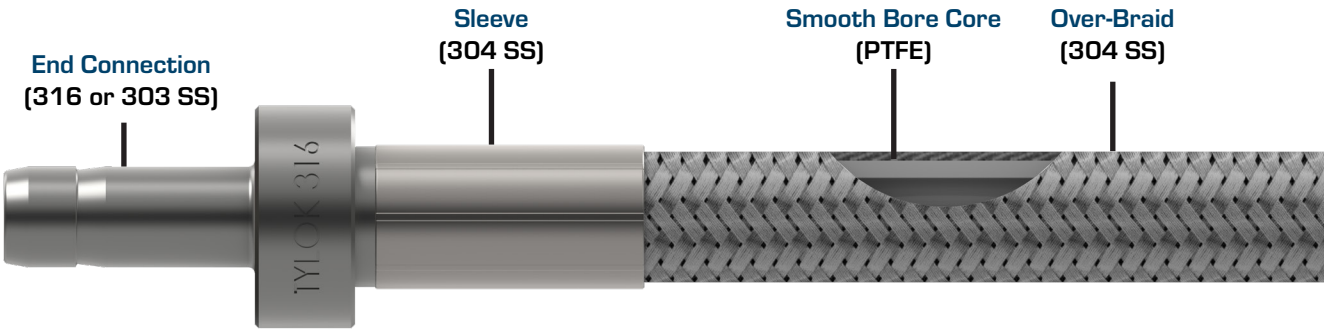
Chart 4- End Connection Type	
A	Tube Adapter
D	CBC-Lok® Tube Fitting
S	CS-Lok® Tube Fitting
M	Male Pipe Threads
F	Female Pipe Threads
AN	Male JIC, 37° Flare
AS	Female Swivel JIC, 37° Flare

Chart 5- End Connection Size	
4	1/4 in
6	3/8 in
8	1/2 in
12	3/4 in
16	1 in

Chart 6- Total Assembly Length	
6	Inches, and ordered in whole number increments

Chart 7- Options	
-TAG	Tag (customer specified text)
H	Helium Leak Test (1x10^-9 std cm^3/s)
N	Nitrogen Pressure Test
P	Hydrostatic Test

PTFE-Lined, Stainless Steel Braided Hose



Design Features:

- PTFE core made from fine powder PTFE resin.
- Stainless Steel end connections are available in 1/4" to 1" sizes.
- Custom lengths and optional cover accessories are available.
- Assembly meets or exceeds requirements of SAE 100R14.
- PTFE meets FDA 21CFR part 177.1550 for contact with food, water and beverages.
- Carbon black-filled core tube is available to provide static charge dissipation.

Testing

Tylok PTFE-lined hose assemblies are hydrostatically pressure tested at 1.5 times the working pressure, with a requirement of no visible leakage.

Available Sizes

Adapter Tube Size	Hose Size	A		Minimum Inside Diameter		Maximum Outside Dimension	
		in	(mm)	in	(mm)	in	(mm)
1/4	4	1.58	(40.1)	0.15	(3.8)	0.56	(14.2)
3/8	6	1.74	(44.2)	0.28	(7.0)	0.68	(17.3)
1/2	8	2.09	(53.1)	0.36	(9.0)	0.81	(20.5)
3/4	12	2.35	(59.7)	0.59	(15.0)	1.06	(26.9)
1	16	2.77	(70.4)	0.81	(20.6)	1.37	(34.8)

Available End Connections

Tube Adapter; CBC-Lok Tube Fitting; CS-Lok Tube Fitting; Male Pipe Fitting; Female Pipe Fitting; Male JIC,37° Flare; Female Swivel JIC, 37° flare

Technical Data

Hose Size Designator	Nominal Hose Size in	Nominal Hose Size (mm)	Minimum Bend Radius Static in	Minimum Bend Radius Dynamic (mm)	Temperature Range °F (°C)	Working Pressure at 70°F (21°C) psig (bar)	Burst Pressure at 70°F (21°C) psig (bar)	Hose Weight lb/ft (kg/m)
4	1/4	(6.4)	2.0	(50.8)	Continuous: -65 to 400 (-53 to 204) Intermittent: -100 to 500 (-73 to 260)	3000 (206)	12000 (827)	0.07 (0.10)
6	3/8	(9.5)	4.0	(101.6)		2500 (172)	10000 (689)	0.11 (0.16)
8	1/2	(12.7)	5.2	(132.1)		2000 (137)	8000 (551)	0.12 (0.18)
12	3/4	(19.0)	7.7	(195.6)		1200 (82.7)	4800 (331)	0.17 (0.25)
16	1	(25.4)	9.0	(228.6)		1000 (68.9)	4000 (275)	0.27 (0.41)

Temperature °F (°C)	De-Rating Factor
-65 to 100 (-53 to 37)	1.00
200 (93)	0.90
300 (148)	0.83
400 (204)	0.75

Pressure Temperature De-Rating

The working pressure must be de-rated when PTFE-lined hose operates outside of ambient temperatures.

Standard Assemblies

Description	OAL (in.)	Ordering Number	Interchanges With
1/4" PTFE Hose, 1/4" CBC-Lok® Tube Adapter Ends	6	SS-TH4A4A4-6	SS-4BHT-6
	12	SS-TH4A4A4-12	SS-4BHT-12
	18	SS-TH4A4A4-18	SS-4BHT-18
	24	SS-TH4A4A4-24	SS-4BHT-24
	36	SS-TH4A4A4-36	SS-4BHT-36
	48	SS-TH4A4A4-48	SS-4BHT-48
	60	SS-TH4A4A4-60	SS-4BHT-60
	72	SS-TH4A4A4-72	SS-4BHT-72
	120	SS-TH4A4A4-120	SS-4BHT-120
3/8" PTFE Hose, 3/8" CBC-Lok® Tube Adapter Ends	12	SS-TH6A6A6-12	SS-6BHT-12
	18	SS-TH6A6A6-18	SS-6BHT-18
	24	SS-TH6A6A6-24	SS-6BHT-24
	36	SS-TH6A6A6-36	SS-6BHT-36
	48	SS-TH6A6A6-48	SS-6BHT-48
	60	SS-TH6A6A6-60	SS-6BHT-60
	72	SS-TH6A6A6-72	SS-6BHT-72
1/2" PTFE Hose, 1/2" CBC-Lok® Tube Adapter Ends	12	SS-TH8A8A8-12	SS-8BHT-12
	18	SS-TH8A8A8-18	SS-8BHT-18
	24	SS-TH8A8A8-24	SS-8BHT-24
	36	SS-TH8A8A8-36	SS-8BHT-36
	48	SS-TH8A8A8-48	SS-8BHT-48
	60	SS-TH8A8A8-60	SS-8BHT-60
	72	SS-TH8A8A8-72	SS-8BHT-72
	120	SS-TH8A8A8-120	SS-8BHT-120
3/4" PTFE Hose, 3/4" CBC-Lok® Tube Adapter Ends	24	SS-TH12A12A12-24	SS-12BHT-24
	36	SS-TH12A12A12-36	SS-12BHT-36
	48	SS-TH12A12A12-48	SS-12BHT-48

Example:

What is the pressure rating of size 6 hose at 200°F (93°C)?

Technical Data gives a working pressure of 3000 psig (206 bar). Pressure Temperature De-Rating gives a de-rating factor of .90. 3000 psig x 0.90 = 2700 psig and 206 bar x 0.90 = 186 bar. The working pressure at 200°F (93°C) is 2700 psig (186 bar).

Hose & Hose Connectors

CBC-Lok® Tube Adapter[1] (316 SS)

Adapter Tube Size	Hose Size	A in	A (mm)	Minimum Inside Diameter in	Minimum Inside Diameter (mm)	Maximum Outside Dimension in	Maximum Outside Dimension (mm)
1/4	4	1.58	(40.1)	0.15	(3.8)	0.55	(14.0)
3/8	6	1.74	(44.2)	0.27	(6.9)	0.68	(17.3)
1/2	8	2.09	(53.1)	0.35	(8.9)	0.80	(20.3)
3/4	12	2.35	(59.7)	0.59	(15.0)	1.05	(26.7)
1	16	2.77	(70.4)	0.81	(20.6)	1.37	(34.8)

CBC-Lok® Tube Fitting[1] (316 SS)

Fitting Size	Hose Size	A in	A (mm)	Minimum Inside Diameter in	Minimum Inside Diameter (mm)	Maximum Outside Dimension in	Maximum Outside Dimension (mm)
1/4	4	1.65	(41.9)	0.15	(3.8)	0.65	(16.5)
3/8	6	1.81	(46.0)	0.27	(6.9)	0.80	(20.3)
1/2	8	2.07	(52.6)	0.35	(8.9)	1.02	(25.9)
3/4	12	2.29	(58.2)	0.59	(15.0)	1.30	(33.0)

[1]CBC-Lok® double ferrule tube ends are completely interchangeable with Swagelok® and Parker A-Lok® tube ends.

CS-Lok® Tube Fitting[2] (316 SS)

Fitting Size	Hose Size	A in	A (mm)	Minimum Inside Diameter in	Minimum Inside Diameter (mm)	Maximum Outside Dimension in	Maximum Outside Dimension (mm)
1/4	4	1.65	(41.9)	0.15	(3.8)	0.65	(16.5)
3/8	6	1.81	(46.0)	0.27	(6.9)	0.80	(20.3)
1/2	8	2.07	(52.6)	0.35	(8.9)	1.02	(25.9)
3/4	12	2.29	(58.2)	0.59	(15.0)	1.30	(33.0)

Female Pipe Fitting (316 SS)

NPT Size	Hose Size	A in	A (mm)	Minimum Inside Diameter in	Minimum Inside Diameter (mm)	Maximum Outside Dimension in	Maximum Outside Dimension (mm)
1/4	4	1.56	(39.6)	0.15	(3.8)	0.87	(22.1)
3/8	6	1.56	(39.6)	0.27	(6.9)	1.02	(25.8)
1/2	8	2.06	(52.3)	0.35	(8.9)	1.23	(31.3)
3/4	12	1.99	(50.5)	0.59	(15.0)	1.52	(38.7)

[2]CS-Lok® single ferrule tube ends are completely interchangeable with Parker CPI® tube ends.

Male Pipe Fitting (303 SS)

NPT Size	Hose Size	A in	A (mm)	Minimum Inside Diameter in	Minimum Inside Diameter (mm)	Maximum Outside Dimension in	Maximum Outside Dimension (mm)
1/4	4	1.52	(38.6)	0.15	(3.8)	0.65	(16.5)
3/8	6	1.68	(42.7)	0.27	(6.9)	0.79	(20.0)
1/2	8	1.98	(50.3)	0.35	(8.9)	1.01	(25.7)
3/4	12	2.26	(57.4)	0.59	(15.0)	1.23	(31.2)
1	16	2.61	(66.3)	0.81	(20.6)	1.59	(40.4)

Female Swivel JIC, 37° Flare (303 SS)

JIC Flare Size	Hose Size	A in	A (mm)	Minimum Inside Diameter in	Minimum Inside Diameter (mm)	Maximum Outside Dimension in	Maximum Outside Dimension (mm)
1/4	4	1.52	(38.6)	0.15	(3.8)	1.65	(16.5)
3/8	6	1.71	(43.4)	0.27	(6.9)	0.79	(20.0)
1/2	8	1.88	(47.8)	0.35	(8.9)	1.01	(25.7)

Male JIC, 37° Flare (316 SS)

JIC Flare Size	Hose Size	A in	A (mm)	Minimum Inside Diameter in	Minimum Inside Diameter (mm)	Maximum Outside Dimension in	Maximum Outside Dimension (mm)
1/4	4	1.56	(39.6)	0.15	(3.8)	0.58	(14.7)
3/8	6	1.52	(38.6)	0.27	(6.9)	0.72	(18.3)
1/2	8	1.89	(48.0)	0.35	(8.9)	0.93	(23.6)

Example:

A 1/4" PTFE-Lined Stainless Steel Braided Hose with 1/4" CBC-Lok Tube Adapter ends, 12" overall length and optional hydrostatic test is designated as follows:

SS	-	TH	-	4	-	A	-	4	-	A	-	4	-	12	-	P
↓		↓		↓		↓		↓		↓		↓		↓		↓
Chart 1		Chart 2		Chart 3		Chart 4		Chart 5		Chart 4		Chart 5		Chart 6		Chart 7
																Optional*

Chart 1- Material	
SS	Stainless Steel

Chart 2- Hose Type	
TH	PTFE Hose
TC	Carbon Black Filled PTFE Hose

Chart 3- Hose Size	
4	1/4 in
6	3/8 in
8	1/2 in
12	3/4 in
16	1 in

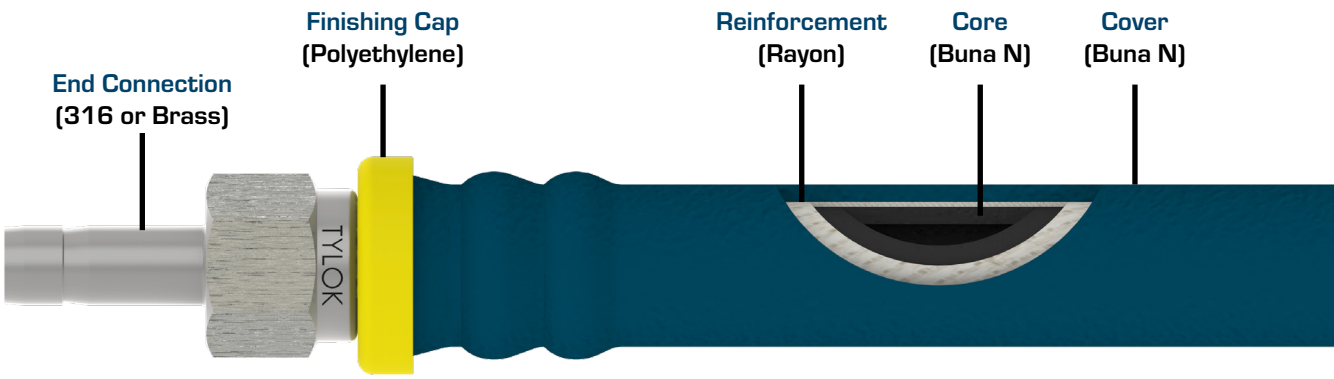
Chart 4- End Connection Type	
A	Tube Adapter
D	CBC-Lok® Tube Fitting
S	CS-Lok® Tube Fitting
M	Male Pipe Threads
F	Female Pipe Threads
AN	Male JIC, 37° Flare
AS	Female Swivel JIC, 37° Flare

Chart 5- End Connection Size	
2	1/8 in
4	1/4 in
6	3/8 in
8	1/2 in
12	3/4 in
16	1 in

Chart 6- Total Assembly Length	
6	Inches, and ordered in whole number increments

Chart 7- Options	
-TAG	Tag (customer specified text)
H	Helium Leak Test (1x10^-9 std cm^3/s)
N	Nitrogen Pressure Test
P	Hydrostatic Test

Multi-Purpose Push-On Hose



Hose Connectors

- Sizes from 1/4 to 3/4 in.

Design Features

- Flame-resistant cover meets Part 18 of 30CFR
- Single-braided reinforcement maximizes strength and hose connector retention.
- Stainless Steel and Brass HB Series hose connectors are available 1/4 to 3/4 inch sizes (sold separately).
- Assembly does not require clamps or specialized tools.
- Hose connectors are reusable.

Available End Connections

Tube Adapter; CBC-Lok Tube Fitting; CS-Lok Tube Fitting; Male Pipe Fitting; Female Pipe Fitting; Union.

Pressure Temperature De-Rating

The working pressure of multipurpose push-on hose does not de-rate when used in its normal operating range: -40 to 200 °F (-40 to 93 °C). It is not recommended that this hose be used outside of this range.

Hose Size Designator	Nominal Hose Size in (mm)	Minimum Bend Radius Static in (mm)	Temperature Range °F (°C)	Working Pressure at 70°F (21°C) psig (bar)	Hose Weight lb/ft (kg/m)
4	0.50 (12.7)	3.0 (76.2)	-40 to 200 (-40 to 93)	400 (27.6)	0.08 (0.12)
6	0.67 (17.0)	3.0 (76.2)		400 (27.6)	0.13 (0.19)
8	0.76 (19.3)	5.0 (127)		400 (27.6)	0.14 (0.21)
12	1.06 (26.9)	7.0 (178)		400 (27.6)	0.24 (0.36)

Fitting Size in.	Hose Size in.	Ordering Number	Interchanges With	A in	A (mm)	B in	B (mm)	Minimum Inside Diameter in	Minimum Inside Diameter (mm)	Maximum Outside Dimension in	Maximum Outside Dimension (mm)
CBC-Lok® Tube Adapter[1]											
1/4	1/4	-4-DATHB-4	PB4 -TA4	1.91	(48.5)	1.51	(29.2)	0.15	(3.8)	0.68	(17.3)
3/8	3/8	-6-DATHB-6	PB6 -TA6	2.00	(50.8)	0.13	(28.7)	0.24	(6.1)	0.87	(22.1)
1/2	1/2	-8-DATHB-8	PB8 -TA8	2.42	(61.5)	1.37	(34.8)	0.34	(8.7)	0.98	(24.9)
3/4	3/4	-12-DATHB-12	PB12 -TA12	3.10	(78.7)	1.43	(36.2)	0.57	(14.5)	1.27	(32.3)
CBC-Lok® Tube Fitting[1]											
1/4	1/4	-4-DTHB-4	PB4 -SL4	1.97	(50.0)	1.21	(30.7)	0.15	(3.8)	0.68	(17.3)
3/8	3/8	-6-DTHB-6	PB6 -SL6	2.11	(53.6)	1.24	(31.5)	0.27	(6.9)	0.87	(22.1)
1/2	1/2	-8-DTHB-8	PB8 -SL8	2.47	(62.7)	1.42	(36.1)	0.37	(9.5)	0.98	(24.9)
CS-Lok® Tube Adapter[2]											
1/4	1/4	-4-SATHB-4	-	1.91	(48.5)	1.51	(29.2)	0.15	(3.8)	0.68	(17.3)
3/8	3/8	-6-SATHB-6	-	2.00	(50.8)	0.13	(28.7)	0.24	(6.1)	0.87	(22.1)
1/2	1/2	-8-SATHB-8	-	2.42	(61.5)	1.37	(34.8)	0.34	(8.7)	0.98	(24.9)
3/4	3/4	-12-SATHB-12	-	3.10	(78.7)	1.43	(36.2)	0.57	(14.5)	1.27	(32.3)
CS-Lok® Tube Fitting[2]											
1/4	1/4	-4-STHB-4	-	1.97	(50.0)	1.21	(30.7)	0.15	(3.8)	0.68	(17.3)
3/8	3/8	-6-STHB-6	-	2.11	(53.6)	1.24	(31.5)	0.27	(6.9)	0.87	(22.1)
1/2	1/2	-8-STHB-8	-	2.47	(62.7)	1.42	(36.1)	0.37	(9.5)	0.98	(24.9)
Male Pipe Threads											
1/4	1/4	-4-1MPHB-4	PB4 -PM4	1.67	(42.7)	0.92	(23.4)	0.15	(3.8)	0.68	(17.3)
3/8	3/8	-6-1MPHB-6	PB6 -PM6	1.80	(45.7)	0.93	(23.9)	0.27	(6.9)	0.87	(22.1)
1/2	1/2	-8-1MPHB-8	PB8 -PM8	2.19	(55.6)	1.14	(29.0)	0.37	(9.5)	0.98	(24.9)
3/4	3/4	-12-1MPHB-12	PB12 -PM12	2.81	(71.4)	1.15	(29.2)	0.61	(15.6)	1.27	(32.3)
Female Pipe Threads											
1/4	1/4	-4-1FPHB-4	-	1.53	(38.9)	0.77	(19.6)	0.15	(3.8)	0.87	(22.0)
3/8	3/8	-6-1FPHB-6	-	1.77	(45.0)	0.90	(22.7)	0.27	(6.9)	1.01	(25.7)
1/2	1/2	-8-1FPHB-8	-	2.06	(52.3)	1.02	(25.9)	0.37	(9.5)	1.23	(31.2)
Union											
1/4	1/4	-4-1HBU	PB4 -6	2.07	(52.6)	1.31	(33.3)	0.15	(3.8)	0.68	(17.3)
3/8	3/8	-6-1HBU	PB6 -6	2.25	(57.2)	1.83	(35.1)	0.27	(6.9)	0.87	(22.1)
1/2	1/2	-8-1HBU	PB8 -6	2.61	(66.3)	1.56	(39.6)	0.37	(9.5)	0.98	(24.9)
3/4	3/4	-12-1HBU	PB12 -6	3.83	(97.3)	2.18	(55.4)	0.61	(15.6)	1.27	(32.3)

[1]CBC-Lok® double ferrule tube ends are completely interchangeable with Swagelok® and Parker A-Lok® tube ends.

[2]CS-Lok® single ferrule tube ends are completely interchangeable with Parker CPI® tube ends.

HC Series End Connections

Design Features

- Allow for easy installation of soft rubber or plastic tubing.
- Stainless Steel and Brass end connection are available in 1/4 to 3/4 inch series.
- End Connection are reusable.
- Use of hose clamp with HC Series fittings is recommended for secure connection.
- For field assembly, subtract dimension B from the desired overall assembly length for each end.

Fitting Size in.	Hose Size in.	Ordering Number	Interchanges With	A in	A (mm)	B in	B (mm)	Minimum Inside Diameter in	Minimum Inside Diameter (mm)	Maximum Outside Dimension in	Maximum Outside Dimension (mm)
CBC-Lok® Tube Adapter[1]											
1/4	1/4	-4-DATHC-4	-4-HC-A-401	1.85	(47.0)	1.06	(26.9)	0.15	(3.8)	0.51	(12.9)
3/8	3/8	-6-DATHC-6	-6-HC-A-601	1.99	(50.5)	1.10	(28.0)	0.28	(7.0)	0.65	(16.6)
1/2	1/2	-8-DATHC-8	-8-HC-A-811	2.32	(58.9)	1.38	(35.1)	0.38	(9.7)	0.80	(20.3)
3/4	3/4	-12-DATHC-12	-12-HC-A-1211	2.49	(63.3)	1.44	(36.6)	0.58	(14.7)	1.23	(31.3)
CBC-Lok® Tube Fitting[1]											
1/4	1/4	-4-DTHC-4	-4-HC-1-400	1.92	(48.8)	1.13	(28.7)	0.18	(4.6)	0.65	(16.6)
3/8	3/8	-6-DTHC-6	-6-HC-1-600	2.06	(52.3)	1.19	(30.2)	0.28	(7.1)	0.87	(22.1)
1/2	1/2	-8-DTHC-8	-8-HC-1-800	2.24	(56.9)	1.30	(33.0)	0.38	(9.7)	1.01	(25.7)
CS-Lok® Tube Adapter[2]											
1/4	1/4	-4-SATHC-4	-	1.85	(47.0)	1.06	(26.9)	0.15	(3.8)	0.51	(12.9)
3/8	3/8	-6-SATHC-6	-	1.99	(50.5)	1.10	(28.0)	0.28	(7.0)	0.55	(16.6)
1/2	1/2	-8-SATHC-8	-	2.32	(58.9)	1.38	(35.1)	0.38	(9.7)	0.80	(20.3)
3/4	3/4	-12-SATHC-12	-	2.49	(63.3)	1.44	(36.6)	0.58	(14.7)	1.23	(31.3)
CS-Lok® Tube Fitting[2]											
1/4	1/4	-4-STHC-4	-	1.92	(48.8)	1.13	(28.7)	0.18	(4.6)	0.65	(16.6)
3/8	3/8	-6-STHC-6	-	2.06	(52.3)	1.19	(30.2)	0.28	(7.1)	0.87	(22.1)
1/2	1/2	-8-STHC-8	-	2.24	(56.9)	1.30	(33.0)	0.38	(9.7)	1.01	(25.7)
Male Pipe Threads											
1/4	1/4	-4-1MPHC-4	-4-HC-1-4	1.61	(40.9)	0.82	(20.8)	0.18	(4.6)	0.65	(16.6)
3/8	3/8	-6-1MPHC-6	-6-HC-1-6	1.78	(45.2)	0.89	(22.6)	0.28	(7.1)	0.79	(20.2)
1/2	1/2	-8-1MPHC-8	-8-HC-1-8	1.95	(49.5)	1.06	(26.9)	0.40	(10.1)	1.01	(25.7)
3/4	3/4	-12-1MPHC-12	-12-HC-1-12	1.97	(50.0)	1.08	(27.4)	0.62	(15.7)	1.23	(31.3)
Female Pipe Threads											
1/4	1/4	-4-1FPHC-4	-4-HC-7-4	1.69	(42.9)	0.90	(22.9)	0.18	(4.6)	0.87	(22.1)
3/8	3/8	-6-1FPHC-6	-6-HC-7-6	1.81	(46.0)	0.92	(23.4)	0.28	(7.1)	1.01	(25.7)
1/2	1/2	-8-1FPHC-8	-8-HC-7-8	2.08	(52.8)	1.19	(30.2)	0.40	(10.1)	1.23	(31.2)

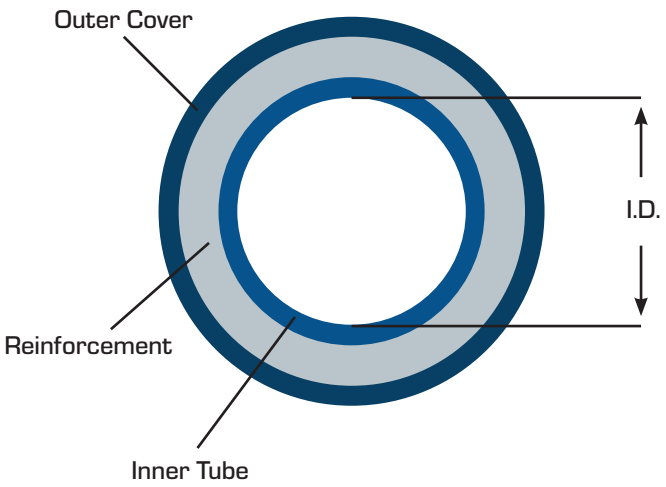
[1]CBC-Lok® double ferrule tube ends are completely interchangeable with Swagelok® and Parker A-Lok® tube ends.

[2]CS-Lok® single ferrule tube ends are completely interchangeable with Parker CPI® tube ends.

Consider the following categories below when selecting a hose:

S T A M P E D

Size | Temperature | Application | Media | Pressure | Ends | Delivery



Size

Dash Numbers is a system to indicate hose and fitting size. The dash number, is the measure of a hose's Inner Diameter (I.D.) in sixteenths of an inch.

The hose I.D. should be sized accurately to obtain the proper flow velocity. A flow that's too slow results in sluggish system performance, while a flow that's too high causes excessive pressure drops, system damage, and leaks.

Temperature

There are two temperatures you need to identify. One is the ambient temperature, which is the temperature that is outside the hose where it is being used; the other is the media temperature which is the temperature of the media conveyed through the hose.

Very high or low ambient temperatures can have affects on the hose cover and reinforcement materials, resulting in reduced service life.

Application

Before selecting a hose, it is important to consider how the hose assembly will be used. Some applications require a specific type of hose. Industry standards set specific requirements concerning construction type, size, tolerances, burst pressure, and impulse cycles of hoses.

Hose Selection

Typical Applications Include:

- Hydraulic Presses & Machinery
- Process Tool Cooling Lines
- Testing Equipment
- High Vibration Dissipation
- Portable Measurement Equipment

Media

Also consider what the hose will hold, some applications require the use of specialized oils or chemicals. The hose must be compatible with the medium used. Compatibility must cover the inner tube, the cover, hose fittings, and o-rings.

Pressure

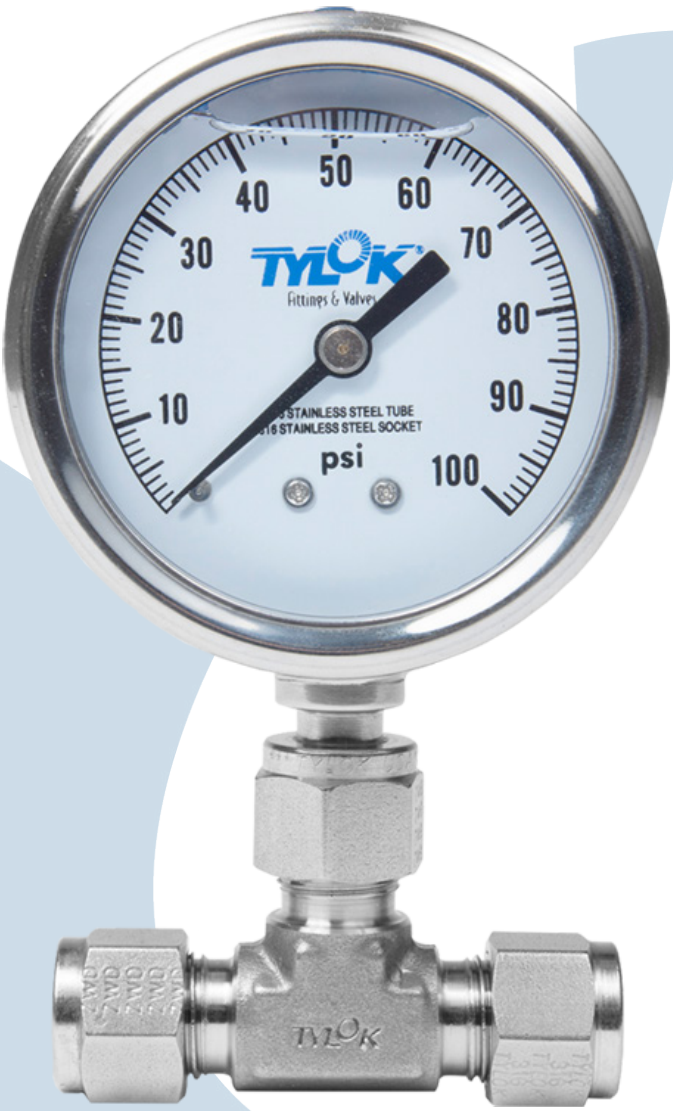
With hose pressure, it's important to know both the system working pressure and any surge pressures and spikes. Surge pressures or peak transient pressures in the system must be below the published maximum working pressure for the hose. A hose assembly is rated at the maximum working pressure of the hose and the fitting component.

End Connections

Consider the style, type, etc. as well when selecting a hose. Clarify any space constraints. Hose assemblies with elbow or union ball joints may help solve these issues.

Delivery

Special delivery requirements or specific quality, testing, and packaging needs should be decided during selection process.


10
20
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60
70
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90
100
psi
TYLOK
Fittings & Valves


10
20
30
40
50
60
70
80
90
100
psi
TYLOK
Fittings & Valves

Features and Benefits

- Gauge Orientation made easy with tube stub connection.
- NPT threads and PTFE tape eliminated from system.
- Reduces potential for improper installations as most installers screw the gauge on by hand.
- All welded design through to the bourdon tube eliminates potential leakage due to mechanical connections.
- All gauges are 100% tested
- Specials available upon request
- 2 1/2" stainless pressure gauges
- Many pressure range available
- Standard glycerin liquid filled case dry/liquid fillable cases are also available.

Liquid filled used for:

- Dampening vibration
- Dampening pressure pulsations
- Permanent lubrication

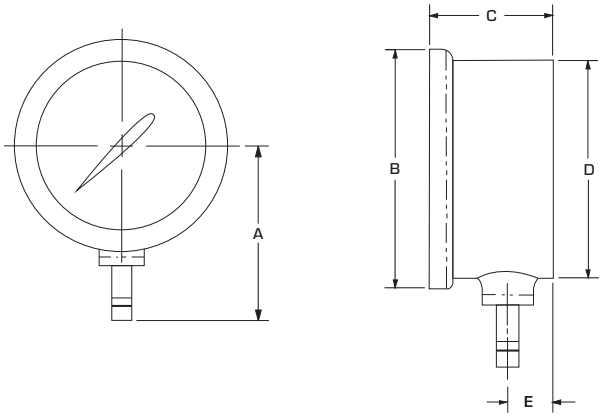
Technical Specifications

- Accuracy: ± 1.6% Full Scale
- Maximum Temperature Rating:
    - Liquid filled gauges 150°F (65°C)
    - Dry gauges 250°F (121°C)

Leak Free Connection-

Machined groove in to tube adapter ensures a positive seat for the front ferrule.

Materials of Construction	
Case	304 Stainless Steel
Ring	304 Stainless Steel
Window	Acrylic
Dial Face	Aluminum
Pointer	Aluminum
Fill Fluid	Glycerin
Movement	316 Stainless Steel
Bourdon Tube	316 Stainless Steel
End Connection	316 Stainless Steel



Gage Series	Connection Size	A	B	C	D	E
PG25-A4	1/4"	2.22	2.68	1.38	2.44	0.51
PG25-A6	3/8"	2.35	2.68	1.38	2.44	0.51

Part Number PG25-A4-(1/4") Series	Part Number PG25-A6-(3/8") Series	Range
SS-PG25-A4-30VAC	SS-PG25-A6-30VAC	30" HG to 0
SS-PG25-A4-15	SS-PG25-A6-15	0 to 15 psi
SS-PG25-A4-30	SS-PG25-A6-30	0 to 30 psi
SS-PG25-A4-60	SS-PG25-A6-60	0 to 60 psi
SS-PG25-A4-100	SS-PG25-A6-100	0 to 100 psi
SS-PG25-A4-160	SS-PG25-A6-160	0 to 160 psi
SS-PG25-A4-200	SS-PG25-A6-200	0 to 200 psi
SS-PG25-A4-300	SS-PG25-A6-300	0 to 300 psi
SS-PG25-A4-600	SS-PG25-A6-600	0 to 600 psi
SS-PG25-A4-1000	SS-PG25-A6-1000	0 to 1000 psi
SS-PG25-A4-3000	SS-PG25-A6-3000	0 to 3000 psi

NOTE: It is important that the maximum continuous operating pressure of the application not exceed 75% of the selected measurement range. A range should be selected that is approximately twice the normal working pressure.

For the best in Stainless Steel instrumentation tubing, turn to Tylok. We offer the quality, reliability, and value that you trust for over 50 years.

Tylok offers all types of Stainless Steel instrumentation tubing, ensuring accurate, straight, and distortion free cut length to the tolerances you require.

Tylok's Stainless Steel tubing is the perfect compliment to our CBC-Lok® & CS-Lok® Tube Fitting offering.

Fitting Lines

CBC-Lok® double ferrule tube fittings are completely interchangeable with tube fittings of Swagelok® and Parker A-Lok®

CS-Lok® single ferrule tube fittings are completely interchangeable with tube fittings of Parker CPI®.

Customer Care

At Tylok, we strive for total satisfaction of our customers. Your inquires will be responded to within 24 hours. Our team features a knowledgeable staff to answer your questions quickly. We have the ability to make special items for you at a reasonable price, with a fast delivery. Fast delivery is key to our success. Realizing this, delivery is constantly being measured via our ISO 9001 Quality Management System.

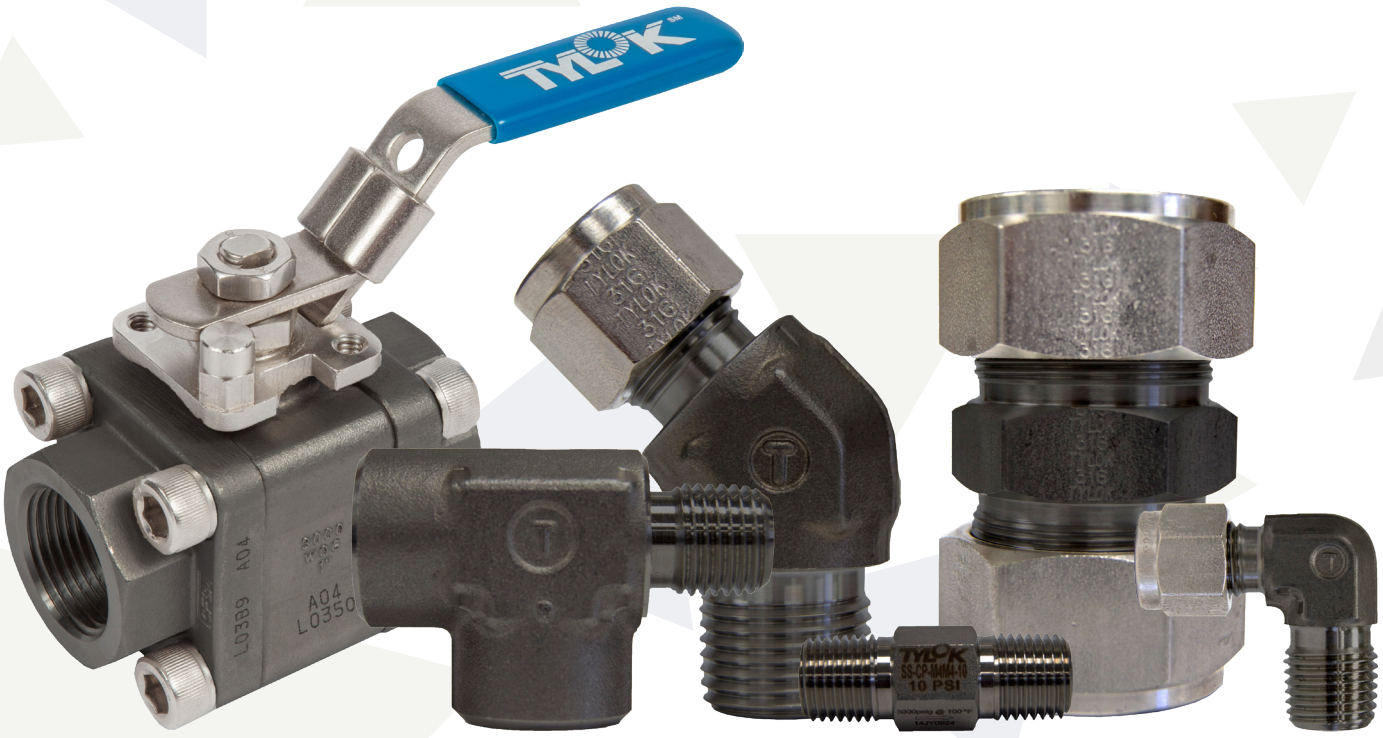
Part Number	Outside Diameter (inches)	Wall Thickness (inches)	Type	Nominal Length (feet)	Material Standard
4-T-035-S-304/L-A269	1/4	0.35	Seamless	20	A269*
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269			Seamless		
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269		0.49	Seamless		
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269			Seamless		
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269		0.65	Seamless		
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269			Seamless		
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269	3/8	0.35	Seamless		
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269			Seamless		
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269		0.49	Seamless		
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269			Seamless		
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269		0.65	Seamless		
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269			Seamless		
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269	1/2	0.35	Seamless		
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269			Seamless		
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269		0.49	Seamless		
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269			Seamless		
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269		0.65	Seamless		
4-T-035-S-304/L-A269			Welded		
4-T-035-S-304/L-A269			Seamless		
4-T-035-S-304/L-A269			Welded		

* Cold Drawn Seamless Tube, A&P Polished, ASTM A269/A213

Other Sizes Available Upon Request

TYLOK®

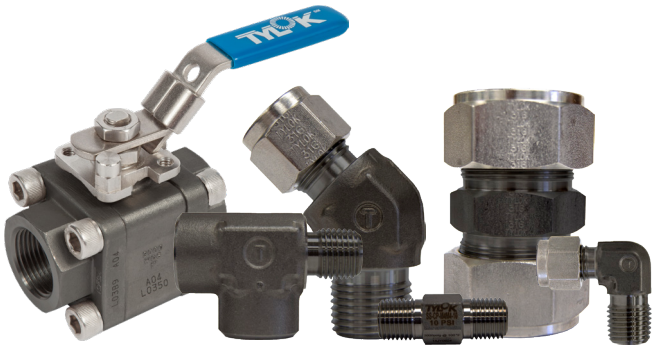
Alloy Interchangeability Solutions



Tylok AIS: Making Exotic Alloy Interchangeability & Replacement Possible.

Contents

Alloy Interchangeability Solutions



Description

Tylok Alloy Interchangeability Solutions (Tylok AIS) utilizes a tantalum diffusion process, applied by the proprietary Tantaline® CVD treatment process, to provide superior corrosion resistance, strength, and leak tightness compared to standard exotic alloy fittings in highly corrosive and aggressive environments. Tylok AIS using this Tantaline® process is a cost effective and fully interchangeable alloy substitute for achieving long term corrosion resistance and reliable sealing, with extremely short lead times.

Availability

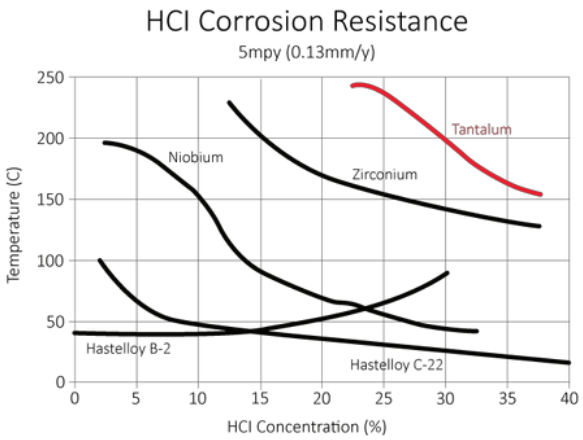
A wide range of styles & configurations are suitable for Tantaline® treatment, with very fast lead times.

- Tube Fittings
- Pipe Fittings
- Flanged Fittings
- Ball Valves
- Check Valves
- Tubing up to 30”

Benefits

The Tantaline® process uses the highest quality Chemical Vapor Deposition techniques to permanently apply a uniform, diffusion bonded alloy layer of corrosion resistant 99.9% pure tantalum onto both simple and intricate fittings and components, all while maintaining critical tolerances.

- Tantalum is the most corrosion resistant metal commercially available.
- Performs better compared to austenitic stainless steel, Hastelloy®*, titanium, and most other commercial exotic alloys.
- Cost-effective with very short lead times.
- Best option for use in highly acidic environments
- Completely interchangeable with all exotic alloys.



Market	Typical Processes	Typical Uses
Chemical Processing	Hot acids, wet and dry chlorine, sulfur compounds, sour gases containing hydrogen sulfide (H_2S) compounds.	- Pressure and/or temperature transmission instruments - Heat trace lines - Pneumatic equipment - Air supply valves - Differential Pressure cells - Sealing fittings - Racking systems - Bleachers - Knuckles - Desalination plants
Oil & Gas	Acid gases (CO_2, H_2S, SO_2), ammonia (NH_3), hydrogen cyanide (HCN), and amine derivatives.	
Pharmaceutical	Oxidizing agents including hydrogen peroxide (H_2O_2), bromine (Br_2), chlorine (Cl_2) and various cleaning chemistries.	
Semiconductor	Strong HCl etchants, corrosive Nital (alcohol + nitric acid), byproducts of Silicon deposition process.	
Mining	Strong acid leaching, pressure oxidations, heap leaching.	
Marine	Corrosive sea water with chlorides, dissolved oxygen (O_2), microbial corrosion.	

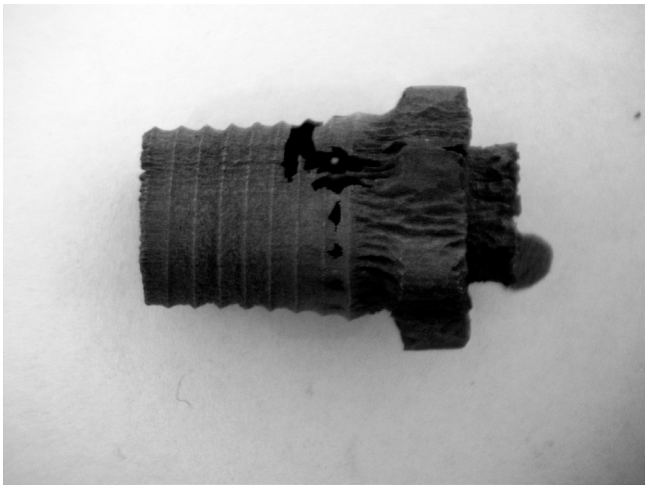
Key Technical Info.

- Completely interchangeable with any exotic and super-exotic alloy, with no galvanic interactions.
- Chemically resistant to stress corrosion cracking (SCC) and pitting in many aggressive environments.
- Tantalum remains passivated and inert to corrosion under high temperature (>200°C) acidic conditions, including concentrated hydrochloric acid (HCl) and sulfuric acid (H2SO4).***
- Superior corrosion resistance against wet, dry chlorine atmospheres, and other chlorinated environments.

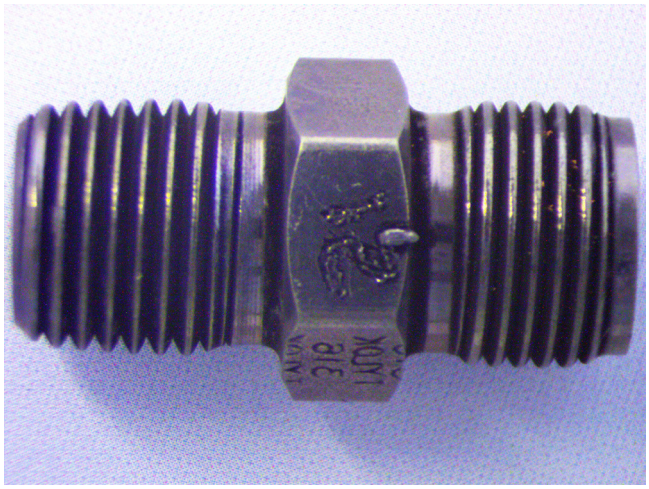
Tylok AIS: Tantalum Diffused Fittings

Components were tested in 25% HCl (aq.) @ 75 C°

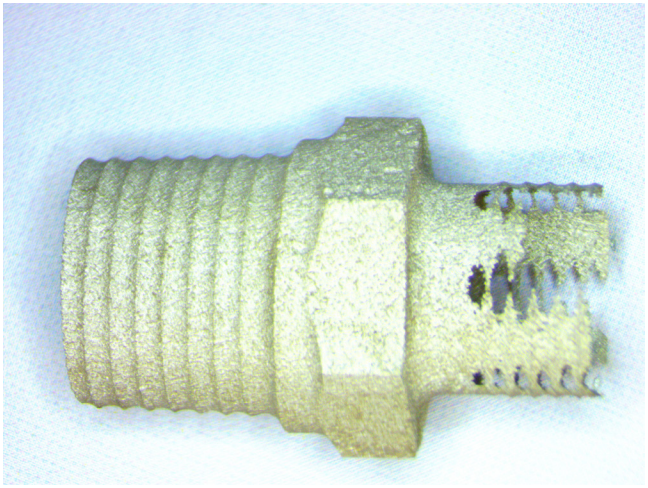
“25 h” to “24 h” on the duplex part. Submerged in boiling 28% HCl (hydrochloric acid)



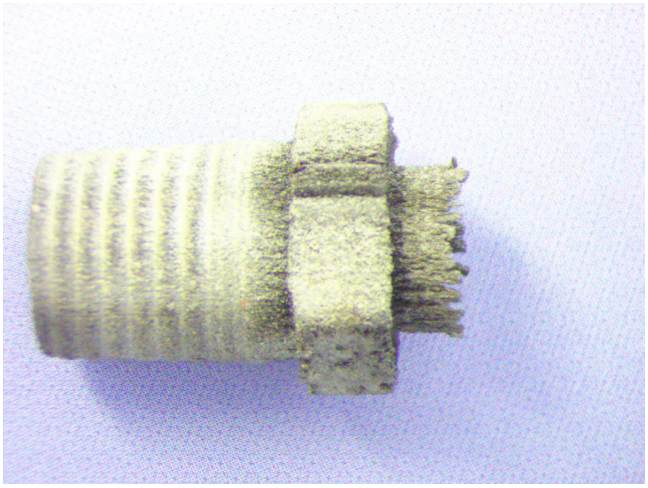
Super Duplex 2507 - 25 Hours



Tylok AIS tantalum treatment - 120 hours



Titanium 75 - 72 Hours



316l - 72 Hours

In the fitting and valve industry, intermixing alloys is complicated, and often avoided. In fact, many manufacturers specifically state that this is not recommended, and suggest that a system should be comprised of the same alloy in order to avoid potential issues, such as galvanic interactions, which could lead to a corrosive situation. This presents a logistics and cost issue for system engineers. 'Exotic' alloys, as they are often described, are specifically selected for their corrosion resistance. However, when an exotic alloy component needs replaced, or the system expanded, it often proves difficult and time consuming, if not impossible, to obtain the parts in that specific alloy. Tylok AIS (Alloy Interchangeability Solutions) aims to resolve this issue in order to get any exotic alloy system back up and running in a fast and reliable way, while keeping costs manageable. The solution that Tylok AIS is introducing is a proprietary application of tantalum diffusion, in which any stainless steel component, through this diffusion process, is embedded with an impervious, 99.9% pure, tantalum layer. This tantalum diffused component now can be completely interchanged into any exotic alloy system, with ease, and confidence, and most importantly, with speed.

Jesse A. Henning
Applied Sciences, Research and Development
Tylok International

Tantalum and Alloy Intermix in Fluid Systems

Tantalum is one of the most versatile corrosion-resistant metals known. It combines the inertness of glass, the strength and ductility of low-carbon steel, and a much higher heat-transfer capability than glass. The relatively high cost of tantalum has been a limiting factor in its use, but new fabrication techniques, in which thin linings of tantalum are used in chemical vapor deposition processing equipment, resulting in components that have all the acid corrosion resistance provided by tantalum but at a much lower cost than an all-tantalum construction.

(ASM Metals Handbook, Vol 13B, 2005)

"...when an exotic alloy component needs to be replaced, or the system expanded, it often proves difficult and timely, if not impossible, to obtain the parts in that specific alloy. Tylok AIS (Alloy Interchangeability Solutions) aims to resolve this..."

With a Tylok AIS tantalum treated fitting or valve, the substrate, or bulk of the material, is 316/316L austenitic stainless steel. The 316 alloy is a standard material of construction for fluid system components, and provides the fit, form and mechanical strength necessary for pressure containment of fluids. It is fairly corrosion resistant, particularly to marine environments or chloride containing solutions. Tylok AIS tantalum treated 316 components however, can be used in much more aggressive conditions, such as hot acid chloride environments, where materials such as alloy c-276 (UNS N10276), Alloy 22 (UNS N06022), titanium Ti alloys (UNS R50400), and zirconium Zr alloys (UNS R60702) may not be ideal.

The use of a coating is a standard method to provide corrosion control when alloys are either difficult to obtain, or insufficient in corrosion control. However, most coatings suffer from adhesion, spalling, and flaking issues, easily scraped or worn off. Tantaline®, a CVD Materials corporation, goes beyond the standard coating technologies and overcomes these common coating issues, by utilizing a proprietary chemical vapor deposition (CVD) process, in which a diffused and deposited tantalum layer acts as impervious and inseparable barrier of superior corrosion protection for the underlying substrate, 316/316L in this case. The inert tantalum surface contains the system fluid and is thick enough (approx. 50 microns) to isolate the underlying 316/316L stainless steel from the system fluid, thus maintaining the physical strength of the 316/316L without being impacted by any of the corrosive action of the fluid. The Tantaline® diffused tantalum layer is conformal, ductile, and totally adherent, with a strong diffusional interface between the stainless substrate and the tantalum layer, making adhesion complete and strong.

> "This tantalum diffused component now can be completely interchanged into any exotic alloy system, with ease, and most importantly, with speed."

Within industry, it is often pointed out that the combination of different alloys in a fluid system may provide the conditions for a corrosive failure mode called galvanic or bimetallic corrosion. Galvanic corrosion occurs when a metal is in electrical contact with a more noble metal or nonmetallic conductor in a corrosive electrolyte (the media, or fluid in most cases). When this occurs, the metals and the electrolyte create a galvanic cell. The cell has the effect of corroding one metal at the expense of the other. However, with care in materials selection, system design, and knowledge of the process conditions for the fluid system, alloys may in fact, be intermixed without detrimental effect, contrary to what is often taught from various component and fitting manufacturers.

Metals and alloys all possess different electrode potentials. Electrode potentials are a relative measure of a metal's tendency to become active in a given electrolyte. The more active or less noble, a metal is the more likely it is to form an anode (positively charged electrode) in an electrolytic environment. The less active, or more noble, a metal is the more likely it is to form a cathode (negatively charged electrode) in an electrolytic environment. The electrolyte acts as a conduit for ion migration, moving metal ions from the anode to the cathode. The anode metal, as a result, corrodes more quickly than it otherwise would, while the cathode metal corrodes more slowly and, in some cases, may not corrode at all. Alloys coupled to metals with higher electropositive potentials are the ones which may suffer galvanic corrosion.

What is often overlooked is that galvanic corrosion requires a sufficient difference in potential between the two metals to provide a significant galvanic current. Galvanic corrosion can be controlled and minimized by selecting metals in similar positions within the galvanic series. It should be noted that many standard and specialty alloys used in fluid systems are corrosion resistant alloys (CRAs) selected for their passivity and resistance to corrosion in a variety of

corrosive media. These alloys are clustered closely in the electropositive range (noble, passive) of the galvanic series (Fig. 1).

It is not uncommon for dissimilar metals to be coupled without adverse effect, especially when the electrical conductivity or oxygen content of the electrolyte is low. However, it is often desired in the design or repair process to avoid this potential completely, regardless of the possibility of a galvanic cell forming. Additionally, engineering requirements for different material properties in various parts of equipment or an installation often require the use of several alloys to accomplish their design goals. Tylok AIS tantalum fittings and valves can assist in accomplishing this design and repair challenge.

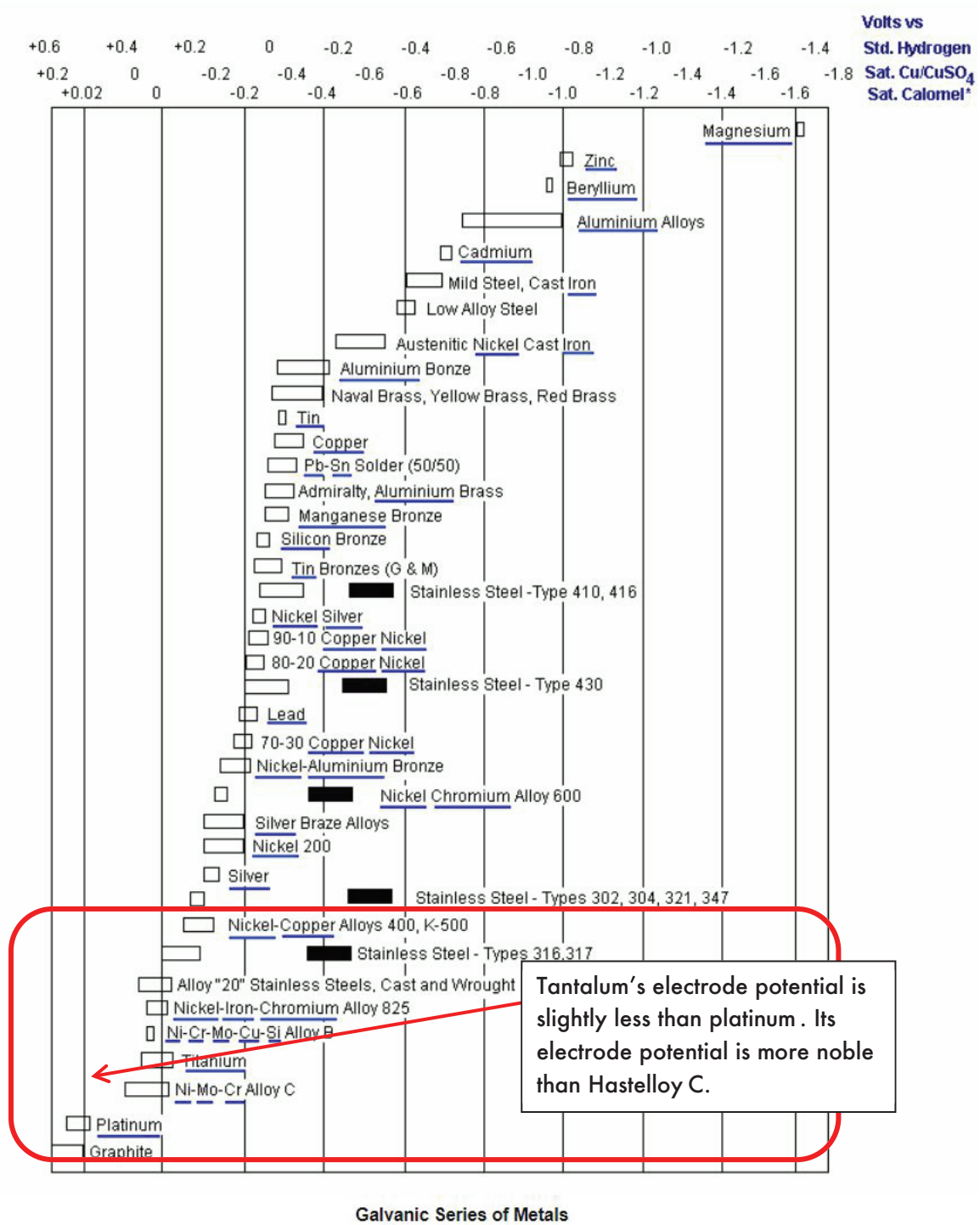
"...one can easily engineer a system utilizing a highly noble fitting or valve (such as with a tantalum diffusion) and a less noble, more cost effective tubing and have a stable, predictable system."

Another design consideration is the area ratio of cathode to anode. In a fluid system, a smaller surface area for the cathodic (more noble) material is preferable. A larger anodic surface results in a lower galvanic current and therefore, a reduced opportunity for corrosion. A system design to reduce the possibility of galvanic corrosion will maximize the area of the anodic metal and minimize that of the cathodic metal. Typically, this can be achieved through the use of more cathodic, or noble, surfaces in valves and fittings (small surface area) compared to the tubing (large surface area). With this in mind, one can easily engineer a system utilizing a highly noble fitting or valve (such as Tylok AIS with tantalum diffusion) and a less noble, more cost effective tubing and still have a stable, predictable system. The result, if engineered correctly, is a corrosion resistant system comprised of mixed alloys that is also very cost effective. Tylok AIS fittings and valves, utilizing Tantaline® and their proprietary CVD based diffusion processed tantalum, is the proven way that any system can achieve this result.

It should be noted, that the composition and conductivity of the environment will play a significant role in defining the extent and severity of any corrosion. The value of the potential for any alloy, even in sea water, can be changed by a variety of factors such as temperature, velocity, dissolved oxygen, etc. However, the relative ranking of alloys remains largely unchanged by these factors, and tantalum is still nearly a perfect solution with its highly noble ranking.

Fig. 1 Galvanic series of metals. Corrosion resistant alloys used in fluid systems are shown in the boxed region.

http://www.npl.co.uk/upload/pdf/bimetallic_20071105114556.pdf



Galvanic Series of Metals

Acknowledgements:

We would like to extend special thanks to Professor Sunniva Collins, PhD of Case Western Reserve University, who peer reviewed this white paper. With her unparalleled expertise in materials and alloys, Tylok AIS was able to produce this document with confidence.

Alloy Interchangeability Solutions

What is Tantaline® Treatment?

Tantaline® products consists of a core substrate (typically stainless steel) which is treated in our process to create an extremely rugged, uniform, inert and corrosion resistant tantalum surface, Through Tantaline® treatment, tantalum atoms are actually grown into the substrate creating an inseparable nanoscale surface alloy.

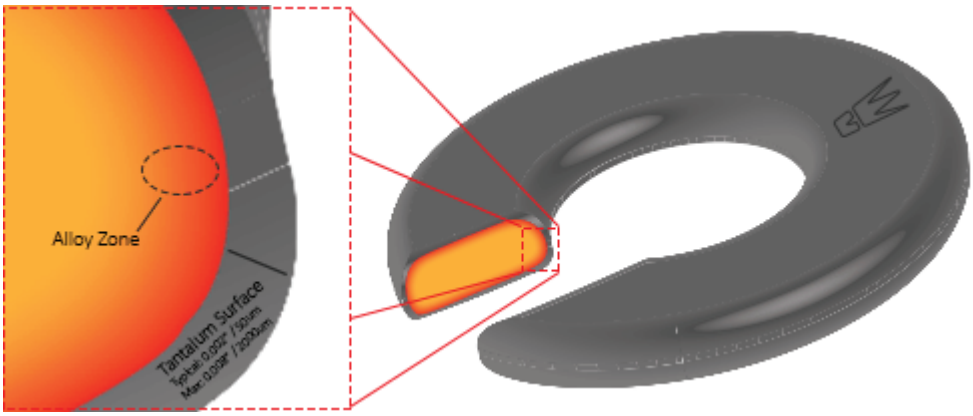
Further processing creates a tantalum surface of -50 microns (0.002") with all the characteristics and properties of pure tantalum metal. Tantaline® treatment is a gas phase process; therefore, both the internal and external surfaces of complex parts (e.g. valves, fittings, process equipment and instrumentation) can be coated.

As a result, stainless steel parts gain the superb corrosion resistance of tantalum while maintaining the mechanical of stainless steel, and thus far outperform specialty alloys like nickel alloys (Hastelloy®*, C276,C22, B2), titanium,and zirconium.

Tylok AIS Tantaline® Treatment

The Tantaline® Surface

Tantaline® has developed a tantalum surface alloy treatment that is different than sprayed or dipped tantalum coatings. Designed for high performance in aggressive applications that require corrosion protection or inertness. The alloy zone is the key for Tantaline®'s rugged tantalum surface that will not chip or spall.



Surface Hardness

The Tantaline® surface has a Rockwell B hardness of about 98, similar to 316 SS. Some other common units include:

- Rockwell B 92 - 100 (316SS is ~95)
- Measured 200 - 250 Vickers
- Rockwell C: 11 - 23
- Rockwell A: 56 - 62
- Brinell @ 300kg: 193-240

For abrasive media and applications that require harder surfaces to avoid mechanical wear, optional ceramic protective surfaces are available to improve the wear resistance of the Tantaline® surface.

Tantaline® treated products can optionally be hardened up to 1000 Vickers.

Surface Roughness

The Tantaline® process generally mirrors the surface roughness of the starting substrate material. Because the Tantaline® surface is grown at a molecular level it tends to slightly improve the surface finish and decrease the Ra value for standard materials.

The Tantaline® surface can achieve virtually any surface roughness as it can be polished using traditional polishing techniques.

Bond Strength of the Tantaline® Surface

The bond strength of the Tantaline® surface was measured by Strubridge Metallurgical Services. Standard bond strength test methods are utilized to measure the bond strength of ceramic coatings. Utilizing this technique, two mandrels are prepared with a 1" diameter flat surface that can be attached and pulled apart by an Instron. On one mandrel, a 316 stainless steel surface is treated with the Tantaline® Surface alloy. On the second mandrel surface, it is left as a blank 316 stainless steel surface. The mandrels are placed together end to end with a strong polyamidepoxy adhesive (Cytex FM1000) between them and cured. Once the adhesive is cured the mandrels are pulled apart in the Instron at a specific rate to measure the PSI needed for failure.

Baseline adhesive samples range from 10,000 - 12,000 PSI. This is the force needed to fracture the adhesive.

Tantaline® samples: glue failed at 11,282 PSI and 12,307 PSI.

As a result, it is fair to conclude that the Tantaline® surface has a bond strength at least as high as the baseline adhesive and could be even greater.

Thermal Cycling of the Tantaline® Surface

Samples were cycled 100x by heating in an oven to 250°C (482°F) and 300°C (572°F) and then quenched in room temperature water. After 100 cycles the samples were analyzed and compared to the baseline sample. Both sample groups are at the same magnification.

It could be seen from the cross-sections that no cracks or delamination were formed in the thermal cycled materials. The tantalum surface as well as the 316 stainless steel substrate are in excellent condition and show no signs of defects or distortion that may typically be seen on traditional coatings that are thermal cycled. This result was consistent on all samples.

Quality Control & Post-Treatment

Parts are inspected for surface integrity by placing the parts in boiling, concentrated HCl acid for 48 hours to verify that products are free from defects and have the anti-corrosive properties of pure tantalum.

After Tantaline® treatment, the parts are ball burnished (vibration polishing) in order to obtain a uniform and shiny appearance.

*Hastelloy® is a registered trademark of Haynes International

Alloy Interchangeability Solutions

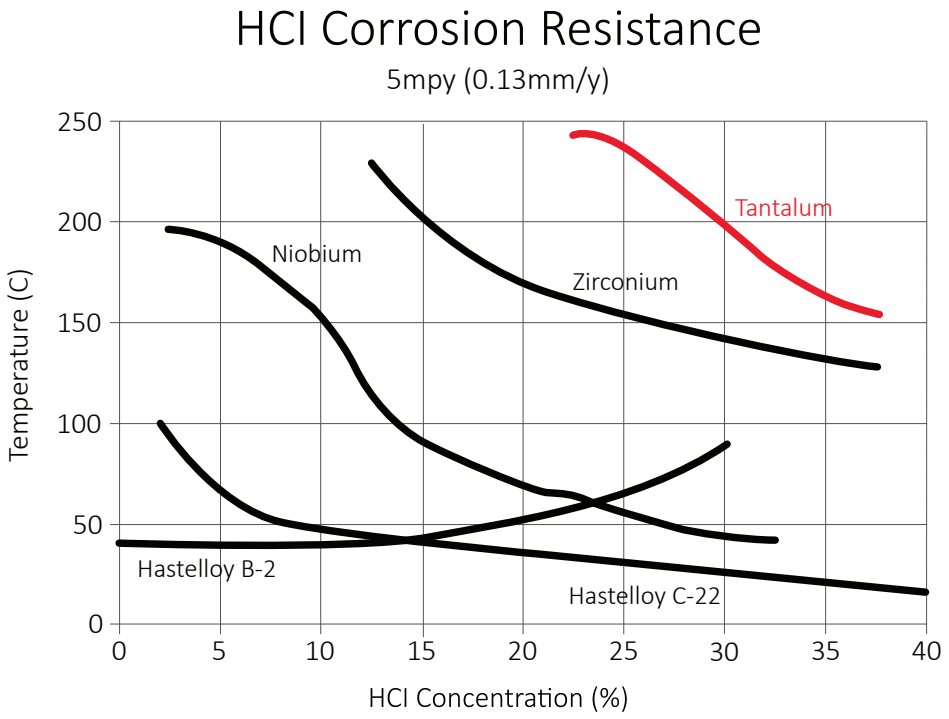
Corrosion in Sulfuric Acid (H_2SO_4)

Tantaline® has proven to be the most reliable material available for hot sulfuric acid corrosion media.

The corrosion rate of Tantaline® in sulfuric acid is negligible in any concentration from 0% to 99% up to a temperature of at least 150°C. At temperatures above 150°C, the corrosion rate of Tantaline® needs to be considered, but the corrosion rate of Tantaline® in high temperature sulfuric acid is magnitudes lower than the corrosion rates of Hastelloy®*, titanium and zirconium. Tantaline® has been applied successfully for more than 15 years in critical customer applications.

Sulfuric Acid Iso-Corrosion Curves

The Iso-corrosion curve here shows the relative corrosion resistance of several specialty alloys and exotic metals in various concentrations and temperatures of sulfuric acid (H_2SO_4). The corrosive nature of sulfuric acid, as with most acids, is highly dependent on the temperature and concentration of the solution.



Corrosion in Diluted Sulfuric Acid (0-10%)

In diluted sulfuric acid (less than 10%) the aggressiveness of the acid is limited, austenitic and duplex steels and to some extent, titanium may be a cost-efficient option in the low temperature range. At temperatures above 100°C, more corrosion resistant materials like tantalum or Hastelloy®* grades may be required.

Corrosion in Sulfuric Acid in the Concentration Range 10% to 90%

Sulfuric Acid in concentrations between 10% and 90% is known to be especially corrosive. Common type specialty metals like titanium and Hastelloy®* C276 will show rapid corrosion in sulfuric acid at temperatures lower than 100°C. Very few materials including zirconium and tantalum can be applied above the sulfuric acid boiling point. Tantaline® is the most economical option and will further maintain its corrosion resistance above the boiling point independent of the concentration up to 99% whereas zirconium will lose its corrosion resistance in sulfuric acid at concentration above approximately 75%.

Corrosion in Concentrated Sulfuric Acid

Concentrated (water-free) sulfuric acid is less corrosive than watered sulfuric acid and iron based alloys. Silicon casts iron shows low corrosion rates in 99% sulfuric acid, but will suffer from corrosion cracking when in SO_3 containing concentrated sulfuric acid (oleum).

50°C	10%	20%	30%	40%	50%	60%	70%	80%	90%
Tantalum	E	E	E	E	E	E	E	E	E
Tantaline®	E	E	E	E	E	E	E	E	E
Niobium	E	E	E	E	E	E	E	G	G
Zirconium	E	E	E	E	E	E	E	P	P
Hastelloy® C	E	E	E	E	E	E	E	G	G
Hastelloy® B	P	P	G	G	E	E	E	E	E

100°C	10%	20%	30%	40%	50%	60%	70%	80%	90%
Tantalum	E	E	E	E	E	E	E	E	E
Tantaline®	E	E	E	E	E	E	E	E	E
Niobium	P	P	P	P	P	P	P	P	P
Zirconium	E	E	E	E	E	E	E	P	P
Hastelloy® C	P	P	P	P	P	P	P	P	P
Hastelloy® B	P	P	P	P	P	P	P	P	P

150°C	10%	20%	30%	40%	50%	60%	70%	80%	90%
Tantalum	E	E	E	E	E	E	E	E	E
Tantaline®	E	E	E	E	E	E	E	E	E
Niobium	P	P	P	P	P	P	P	P	P
Zirconium	E	E	E	E	E	G	G	P	P
Hastelloy® C	P	P	P	P	P	P	P	P	P
Hastelloy® B	P	P	P	P	P	P	P	P	P

Excellent
Good
Poor

Limitations of Tantaline® in Sulfuric Acid Service

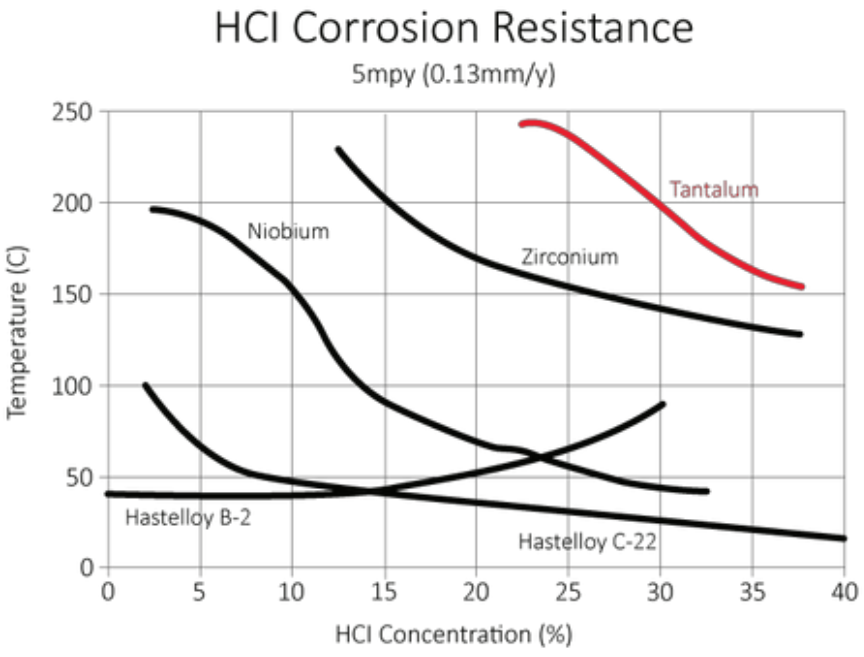
At very high concentrations of sulfuric acid (above 98%), the corrosion performance of tantalum as well as Tantaline® treated parts will decrease due to the existence of "free" SO_3. Thus, tantalum in general may not be suitable for fuming sulfuric acid (oleum).

Corrosion in Hydrochloric Acid (HCL)

Hydrochloric acid is a solution of hydrogen chloride (HCl) in water, a highly corrosive, strong mineral acid with many industrial uses.

At lower temperatures, plastic or polymer linings like PTFE or PVDF may be cost-effective way to avoid corrosion. At temperatures above 150°C, diffusion through polymer materials becomes significant and a plastic lining is in general, not suitable. At these temperatures, the mechanical properties of a polymer lining may be poor, forcing engineers to consider metal based solutions.

Due to the potentially strong reactions between chloride ions and the bases metal, the concentration and temperatures of hydrochloric acid needs to be known to determine if the metal can survive and have an acceptable corrosion rate. The Iso-corrosion chart below shows the relative corrosion resistance of several specialty alloys and exotic metals in various concentrations and temperatures of hydrochloric acid (hydrogen chloride). Such alloys will typically be applied when stainless steel shows insufficient corrosion resistance in hydrochloric acid. It can be seen that the corrosion attack of hydrochloric acid . It can be seen that the corrosion attack of hydrochloric acid, as with most acids, is highly dependent on the temperature. Chloride containing acids in many situations show a corrosive nature similar to that of hydrochloric acid at comparable acid and/or chloride concentrations.



Tylok AIS Corrosion Performance

Compared with other specialty metals and alloys like Hastelloy®*, niobium and zirconium, the corrosion resistance of tantalum metal is second to none in hydrochloric acid . Tantalum metal is an element (atomic number 73) and is considered to be the most corrosion resistant metal commercially available. At temperatures less than 150°C and a concentration less than 30% tantalum is considered to have a nil corrosion rate or less than a mil/year in chloride acid service.

For precision parts, such as valves, fittings and instrumentation where tolerances are critical to their operation, a corrosion rate 5 mil/year or larger would typically be considered unacceptable in hydrochloric acid applications.

The table here shows the relative corrosion resistance in hydrochloric acid at concentrations in the range of 5% to 35% and temperatures up to 200°C. As can be seen, Tantaline® has superior performance over niobium, zirconium and nickel based alloys.

50°C	5%	10%	15%	20%	25%	30%	35%
Tantalum	E	E	E	E	E	E	E
Tantaline®	E	E	E	E	E	E	E
Niobium	E	E	E	E	G	P	P
Zirconium	E	E	E	E	E	E	E
Hastelloy® C	E	G	P	P	P	P	P
Hastelloy® B	P	P	P	G	E	E	E

100°C	5%	10%	15%	20%	25%	30%	35%
Tantalum	E	E	E	E	E	E	E
Tantaline®	E	E	E	E	E	E	E
Niobium	E	G	P	P	P	P	P
Zirconium	E	E	E	E	E	E	E
Hastelloy® C	P	P	P	P	P	P	P
Hastelloy® B	P	P	P	P	P	P	P

150°C	5%	10%	15%	20%	25%	30%	35%
Tantalum	E	E	E	E	E	E	E
Tantaline®	E	E	E	E	E	E	E
Niobium	E	G	P	P	P	P	P
Zirconium	E	E	E	E	G	P	P
Hastelloy® C	P	P	P	P	P	P	P
Hastelloy® B	P	P	P	P	P	P	P

200°C	5%	10%	15%	20%	25%	30%	35%
Tantalum	E	E	E	E	E	G	P
Tantaline®	E	E	E	E	E	P	P
Niobium	P	P	P	P	P	P	P
Zirconium	E	E	G	P	P	P	P
Hastelloy® C	P	P	P	P	P	P	P
Hastelloy® B	P	P	P	P	P	P	P

Excellent
Good
Poor

Corrosion in Sour Gas (H_2S)

Materials for Sour Gas (H_2S)

Sour Gas at high temperatures and in mixtures of other acids (e.g. formic acids found typically in oil well stimulation environments) is extremely corrosive. In these environments, only a few materials can survive. Tantaline®'s tantalum surface alloys are immune to sour gas environments showing no measurable corrosion rate. This far exceeds the performance of traditional materials like C276 and various grades of titanium metals.

Sour Gas (H_2S) and Acid Gas Definition

Sour Gas (natural gas) or any other that is corrosive due to significant content of hydrogen sulfide (H_2S). Natural gas is considered sour if there are more than 5.7 milligrams of H_2S per cubic meter of natural gas (4ppm H_2S by volume). The natural gas that contains less amounts of hydrogen sulfide is called "sweet gas." The terms "acid gas" and "sour gas" are often used interchangeably. Strictly speaking, sour gas is any gas that contains hydrogen sulfide (H_2S) in significant amounts, whereas acid gas is any gas that contains significant amounts of acid gases such as carbon dioxide (CO_2) or hydrogen sulfide (H_2S) . Thus, carbon dioxide by itself is an acid gas but not sour gas.

Corrosion of Sour Gas Under Transportation

Natural gases that have high sulfur and carbon dioxide contents (sour and acid gas) are recognizable as being extremely corrosive and dangerous. A special corrosion resistant material will have to be applied, as carbon steel is not suitable. Also, transportation from the wellhead to the sweetening plant must be implemented carefully.

Sour Gas Corrosion in Elevated Temperature Systems

At elevated temperatures, the hydrogen sulfide acid gas may become severely corrosive. Corrosion rates in the range "inches per year" or "mils per day" have been reported on C276 (Hastelloy®*) autoclaves used in laboratories. In these systems, Tantaline® offers essentially zero corrosion rate.

Corrosion in Formic Acid (HCOOH)

Formic acid has proven to be highly corrosive at concentrations over 50% especially if contaminated by acidic oxidizing chlorides. Because of its corrosive nature at high concentrations, material selection can be a challenge.

Stainless Steel, Nickel Base Alloys and Zirconium's Corrosion in Formic Acid

Formic Acid is corrosive to many alloys including stainless steel, nickel alloys, and zirconium. Formic acid is a reducing agent, and it attacks stainless steels unless an oxidizing agent is added. Nickel base alloys perform better than SS316, but are attacked if an oxidizing agent is present. Zirconium has been applied successfully in some formic acid applications, but it is sensitive to attack from acidic oxidizing chlorides and other contaminates, such as $FeCl_3$ and $CuCl_2$. Thus, the use of zirconium is not recommended in this media and these materials should be avoided.

Tantaline®'s Immunity in Formic Acid up to 150°C

Tantaline® is the only commercially available metal that is not sensitive to corrosion attack from formic acids in any concentration up to 150°C, where impurities like $FeCl_3$ or $CuCl_2$ may be present.

Corrosion of Tantaline® in Formic Acid above 150°C

Tantaline® displays very good corrosion resistance in formic acid at temperatures in the range of 150°C to 300°C. In order to estimate that exact corrosion rate, the specific composition of the media has to be evaluated individually.

Corrosion in Acetic Acid (CH_3COOH)

Acetic acid (CH_3COOH or ethanoic acid) is a colorless liquid with a pungent, vinegar-like odor. Acetic is mainly used industrially as a precursor in the production of cellulose acetate mainly for photographic film and polyvinyl acetate for wood glue, as well as synthetic fibers and fabrics. Although it is classified as a week acid, concentrated acetic acid is corrosive and attacks the skin. Acetic acid is called Glacial Acetic Acid in water-free conditions and and causes severe corrosion issues at elevated temperatures.

The Corrosive Nature of Glacial Acetic Acid at Temperatures Higher than 120°C

At temperatures higher than 120°C, acetic acids become extremely corrosive, and specialty materials are needed in order to contain them. Zirconium has typically been the material of choice these practices, since its corrosion resistance to glacial acetic acid is good. While zirconium offers good corrosion resistance to acetic acid.

Tantaline® Testing Glacial Acetic Acid

The best solution was prepared using a reagent grade glacial acetic acid. Three test vessels consisting of new PTFE lined pressure vessels were used. Approximately 65 ml of test solution was poured into each PTFE vessel. A Tantaline® treated part was placed in the first test vessel; the second had solid tantalum; while the third vessel had zirconium 705 in it. All of the test specimens were completely immersed in the glacial acetic acid and sealed. The assembled test vessels were placed in a laboratory oven at 205°C for a period of six (6) weeks (1008 hours). The test results show that the Tantaline® treated part far outperforms both zirconium 705 and solid tantalum, withstanding corrosion fully.

- Hastelloy® is a trademark of Haynes International

Alloy Interchangeability Solutions

How is Tantaline® Treatment Superior to Other Coating Systems?

Tantaline® surface treatment have been developed to benefit from the extraordinary acid resistant properties of tantalum metal while reducing the costs compared to parts made from solid tantalum. Robust performance for Tantaline® treated parts has been well established during the use over the last 15 years in the most challenging applications. This unique chemical vapor deposition (CVD) surface treatment has proven to provide the right balance of performance, lead time, and price across a wide range of industries.

COMPARISON	Tantaline® Treatment	Tantalum Cladding
Minimum layer thickness for corrosion protection (mm)	0.01	1.00
Coating of narrow holes possible	✓	✗
Alloy zone between base and surface	✓	✗
Risk of delamination	LOW	HIGH
Risk of under corrosion	LOW	HIGH
Tension level in the surface	LOW	LOW
Risk of cracks in deposited tantalum	LOW	HIGH/LOW
Net shape parts can be handled	✓	✗
Performance/Price ratio	GOOD	POOR

Tantaline® Treatment vs. Tantalum Cladding

Tantaline®'s Surface Alloy Technology: Tantaline® Treatment

Through the evolution of acid resistant tantalum coating technologies, Tantaline®'s surface alloy has been developed. This technology has the capability of producing very repeatable and consistent pinhole-free surfaces of pure tantalum metal at a thickness between 0.002" - 0.008" (50um - 200um). Unlike line-of-sight spray tantalum coatings, Tantaline® treatment is geometry-independent, and even the most complex parts can be treated both internal and external surfaces. In addition, because of the tantalum metal is grown into the substrate and is thus alloy bonded, the typical coating modes of failure like delamination, chipping, and spalling are virtually non-existent.

Tantalum Cladding

Tantalum cladding is often used as an alternative to tantalum coatings for fabricating parts out of solid tantalum. The technology is relatively labor-intensive, and the material consumption is very high. As a result, acid resistance tantalum cladding remains cost - prohibitive and reserve or only the most aggressive applications where specialty alloys will not survive.

When cladding a part in tantalum, a tantalum foil sheet (liner) is applied to the part's surface. As a tantalum cannot be welded to stainless steel, tantalum liners are always loose. The tantalum clad is applied in relatively thick sheets (1 mm and above) since there needs to be enough material for a stable design and fabrication. Where more than one sheet/foil is connected, the tantalum has to be welded. This requires a very high temperature (exceeding 3000°C) and controlled atmosphere. The welding operation is difficult to handle and requires special workshops. When tantalum clad fails, it is often due to materials failures in the welded atmosphere. Also, there may be a risk of alloying the base material into the welding zone, as the melting temperature of e.g. a stainless substrate is far below the welding temperature of tantalum metal.

Tantalum Cladding: Advantages

The main advantage of tantalum clad is that large structures (e.g. large vessels/tanks) can be treated, and that heavy tantalum layers can be applied.

Tantalum Cladding: Disadvantages

The main disadvantages of cladding are the difficulty of fabrication and its very high costs. The costs of tantalum cladding are an order of magnitude higher than Tantaline® treatment and is, therefore, only used as a replacement for solid tantalum on large equipment. Complex parts like valves and fittings are extremely difficult to produce and protect from corrosion through tantalum cladding.

Tylok AIS Corrosion List

Alloy Interchangeability Solutions

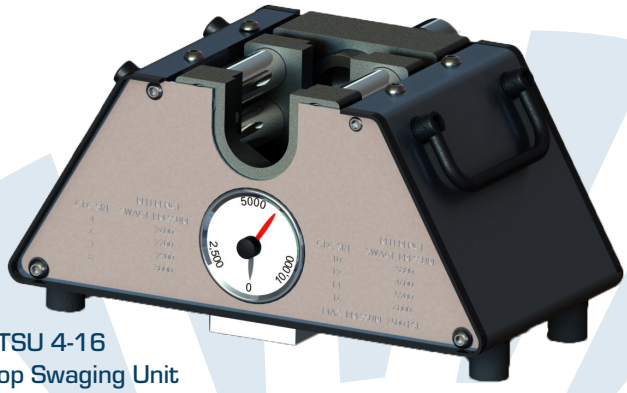
Tantaline® is unique in chemical resistance beyond the performance of titanium or nickel alloys. In general, Tantaline® valves may be used in any acid, except for fluoride and fuming sulphuric acid. Tantaline® may be applied in alkaline media, but the tantalum content in the surface may be affected, so continuous use in alkaline media is not recommended.

Media where Tantaline® show immunity:
The immunity is valid up to at least 150°C (302°F), unless otherwise noted.

Acetic acid
Acetic anhydride
Acetone
Air, <300°C (570°F)
Alcohols
Aldehydes
Aluminum chloride
Aluminum nitrate
Aluminum sulfate
Amines
Ammonium bicarbonate
Ammonium carbonate
Ammonium chloride
Ammonium nitrate
Ammonium acid phosphate
Ammonium phosphate
Ammonium sulfate
Amyl acetate or chloride
Aniline hydrochloride
Aqua regia
Barium carbonate
Barium chloride
Barium hydroxide
Barium nitrate
Benzoic acid
Body fluids
Boric acid
Bromine, dry, <300°C (570°F)
Bromine, wet
Butyric acid
Calcium bicarbonate
Calcium bisulfates
Calcium bisulfites
Calcium carbonate
Calcium chloride
Calcium hydroxide
Calcium hypochlorite
Carbolic acid
Carbon dioxide
Chloric acid
Chlorinated brine
Chlorine, dry, <250°C (480°F)
Chlorine, wet, <350°C (662°F)
Cholrine oxides
Chloroacetic acid
Chromic acid
Chrome plating solutions
Citric acid
Cleaning solutions
Copper salts
Dichloroacetic acid
Dimethylformaldehyde
Ethylene dibromide
Ethyl sulfate
Fatty acids
Ferric chloride
Ferric sulfate
Ferrous sulfate
Food stuffs
Formaldehyde
Formic acid
Fruits
Glycerine
Graphite, <1000°C
Hydroiodic acid
Hydrobromic acid
Hydrocarbons
Hydrochloric acid
Hydrogen bromide, <400°C
Hydrogen chloride, <350°C
Hydrogen iodide
Hydrogen peroxide
Hydrogen sulfide
Hydroxyacetic acid
Hypochlorus acid
Iodine, <300°C (570°F)
Ketones
Lactic acid
Lead salts
Magnesium chloride
Magnesium hydroxide
Magnesium sulfate
Maleic acid
Manganous chloride
Methyl alcohol
Methylsulfuric acid
Milk
Mineral oils
Mixed acids (sulfuric-nitric)
Motor fuels
Nickel slats
Nitric acid
Nitric acid, fuming
Nitric oxides
Nitrogen, <300°C (570°F)
Nitrous acid
Nitrosyl chloride
Organic chlorides
Organic acids
Organic esters
Organic salts
Oxalic acid
Oxygen, <300°C (570°F)
Pechloric acid
Petroleum products
Phenol
Phosphoric acid, <4ppmF, <180°C
Phosphorus, 700°C (1290°F)
Phosphorus chlorides
Phosphorus oxychlorides
Phthalic anhydride
Pickling acids, except HNO3-HF
Potassium bromide
Potassium chloride
Potassium dichromate
Potassium ferricyanide
Potassium iodine-iodine
Potassium nitrate
Potassium permanganate
Potassium sulfate
Potassium thiosulfate
Propionic acid
Refrigerants
Sea water
Silver nitrate
Sodium acetate
Sodium aluminate
Sodium bisulfate, solution
Sodium bromide
Sodium chlorate
Sodium chloride
Sodium citrate
Sodium cyanide
Sodium dichromate
Sodium hypochlorite
Sodium nitrate
Sodium nitrite
Sodium phosphate
Sodium silicate
Sodium sulfate
Sodium sulfide
Sodium sulfite
Sodium thiosulfate
Stearic acid
Succinic acid
Sugar
Sulfamic acid
Sulfur, <500°C (930°F)
Sulfur chlorides
Sulfur dioxide
Sulfuric acid, to 175°C (350°F)
Sulfurous acid
Sulfuryl chloride
Tannic acid
Tartaic acid
Thoinyl chloride
Tin salts
Zinc chloride
Zinc sulphate

Tantaline® shows limited resistance in the following media:

Air, >300°C (570°F)
Ammonia
Ammonium hydroxide
Fluoride salt
Hydrofluoric acid
Hydrogen, >300°C (570°F)
Hydrogen fluoride
Oleum (fuming sulfuric acid)
Potassium carbonate
Potassium hydroxide, dilute
Potassium hydroxide, conc
Potassium pyrosulfate, molten
Sodium bisulfate, molten
Sodium carbonate
Sodium hydroxide, dilute
Sodium hydroxide, conc
Sodium pyrosulfate, molten
Sulfur trioxide
Sulfuric acid, >175°C (350°F)



BTSU 4-16
Bench Top Swaging Unit

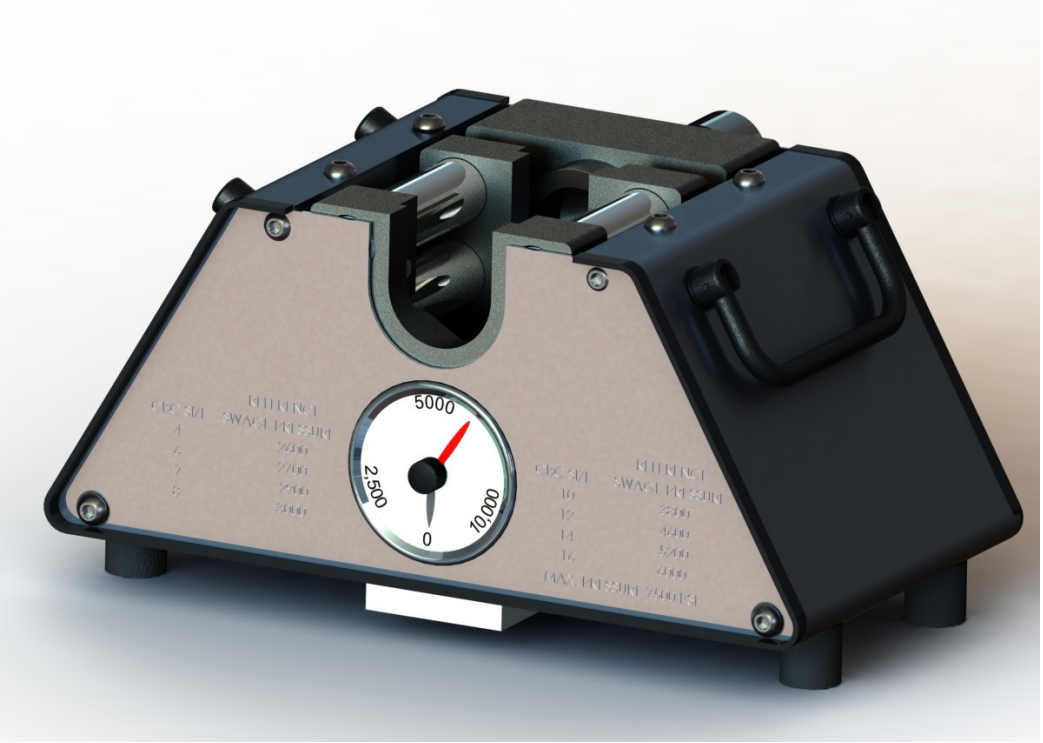
HHSU 4-10
Hand Held Swaging Unit

HHSU 4-16
Hand Held Swaging Unit

DSU 4-16
Digital Swaging Unit

Available for Rent or Purchase

BTSU Bench Top Swaging Unit



BTSU Features:

- Designed to pre-swage the nut and ferrules of either the Tylok CBC-Lok or CS-Lok style fitting onto tubing in tube sizes ranging from 1/4" to 1" for all typical wall thicknesses.
- Reduces installation torque from 30-50%, depending on the tube size, tube wall thickness, and tube hardness.
- Reduces the number of turns required to make up the fitting.

BTSU Attributes:

- The BTSU is a small compact unit that can be used on the ground, on a workbench, or held in a vice via the vice tang located on the bottom of the unit.
- The BTSU can be hydraulically powered manually for field use, or powered with an electric pump.
- The BTSU uses Threadless Quick Change Dies resulting in fast, accurate swages every time.

The Bench Top Swaging Unit comes in a water tight case that includes:

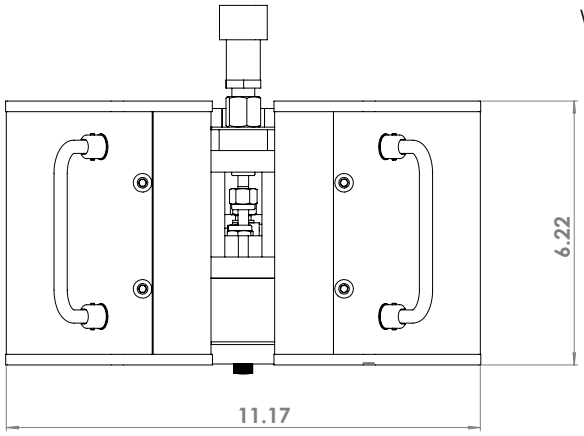
- Hand Pump
- Bench Top Swaging Unit
- Die set in sizes 1/4" thru 1"

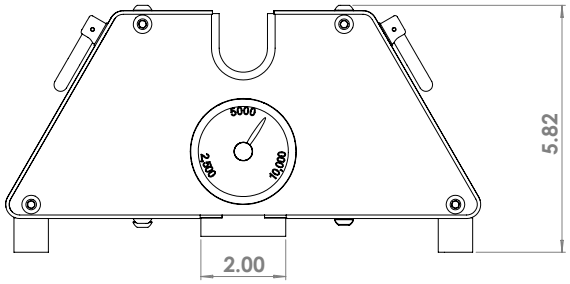
BTSU Bench Top Swaging Unit

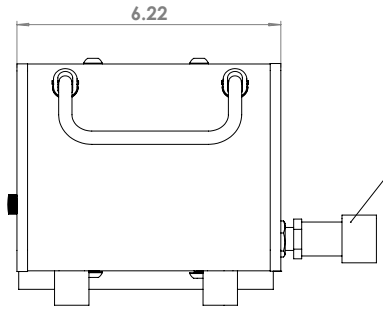
BTSU 4-16

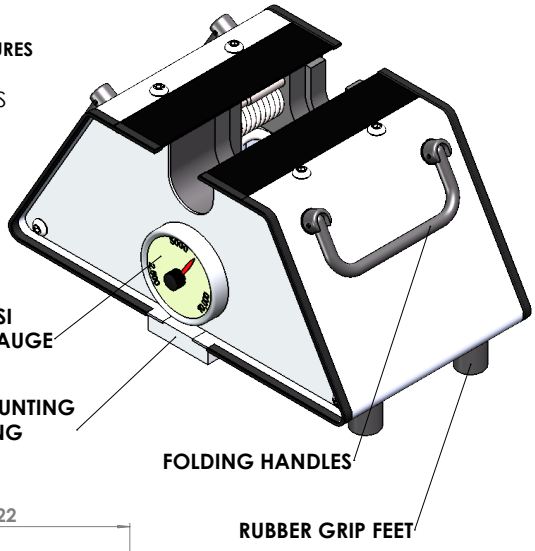
BASIC DIMENSIONS & FEATURES

WEIGHT: APROX. 13 LBS







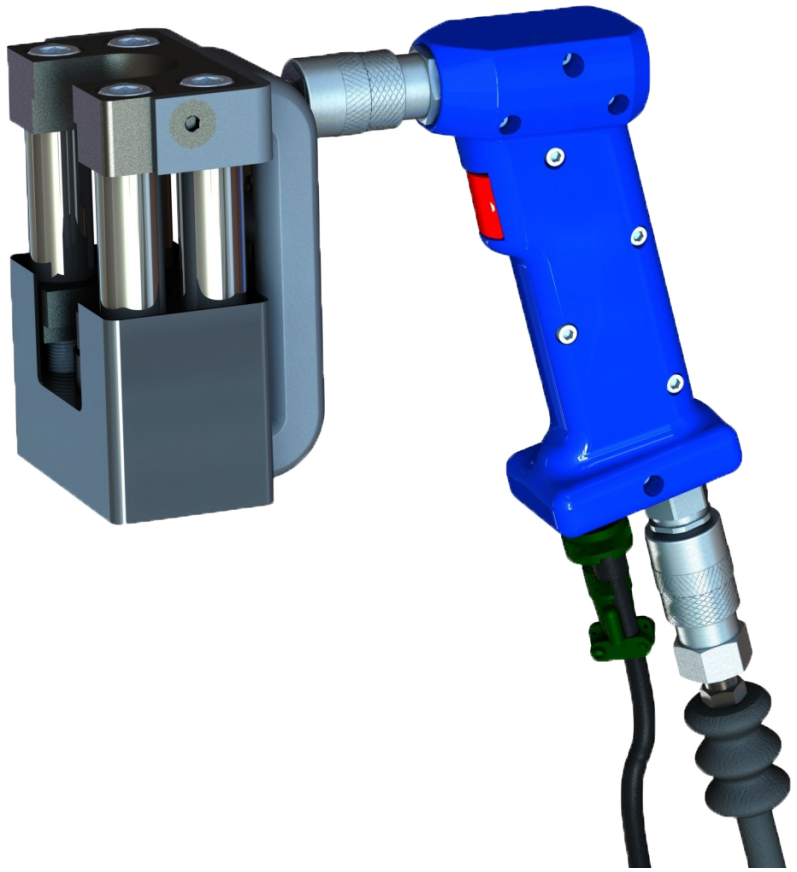


Tube Size	CBC Size	Swage Pressure Reference (psi)
1/4"	4	3400
3/8"	6	3600
7/16"	7	3800
1/2"	8	4000
5/8"	10	5000
3/4"	12	6000
7/8"	14	6800
1"	16	7400

Note: This chart is for reference to models 617.

The Swage Pressure Reference is used as a guide for preswaging, since the pressure will vary for each Tube Wall Thickness, Tube Hardness and Tube Diameter.

HHSU Hand Held Swaging Unit



HHSU Features:

- Designed to pre-swage the nut and ferrules of either the Tylok CBC-Lok or CS-Lok style fitting onto tubing in tube sizes ranging from 1/4" to 1" for all typical wall thicknesses.
- Reduces installation torque from 30-50%, depending on the tube size, tube wall thickness, and tube hardness.
- Contains a pressure regulator, enabling consistent Pre-swaging across the range of tube sizes and wall thicknesses, under 5 seconds every time

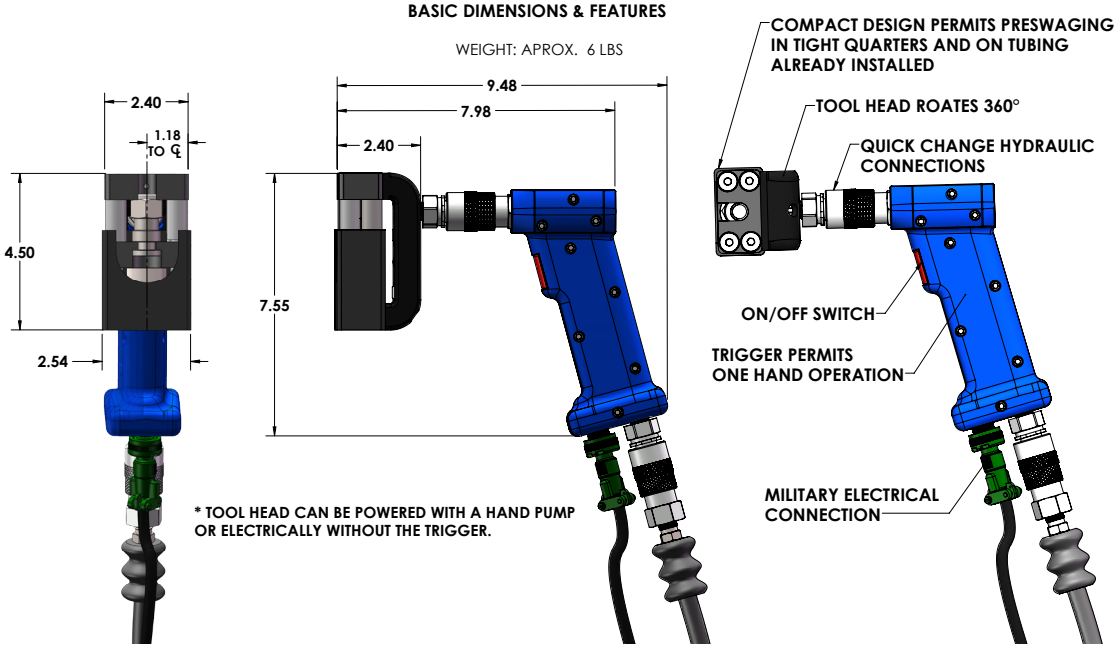
HHSU Attributes:

- The HHSU 4-16 & HHSU 4-10 are powered with an electric hydraulic pump using 110V AC.
- The HHSU 4-16 is a small compact unit that is designed to pre-swage ferrules onto tubing in tight spaces, such as inside an enclosure, underneath cabinets, or tubing runs that are closely spaced.
- The Tool Head can pivot 360° on the trigger, enabling swages in any position.
- Threadless Quick Change Dies resulting in fast accurate swages every time.

HHSU 4-10

HAND HELD SWAGING UNIT FOR PRESWAGING TUBE SIZES 1/4" TO 5/8" DIA. BASIC DIMENSIONS & FEATURES

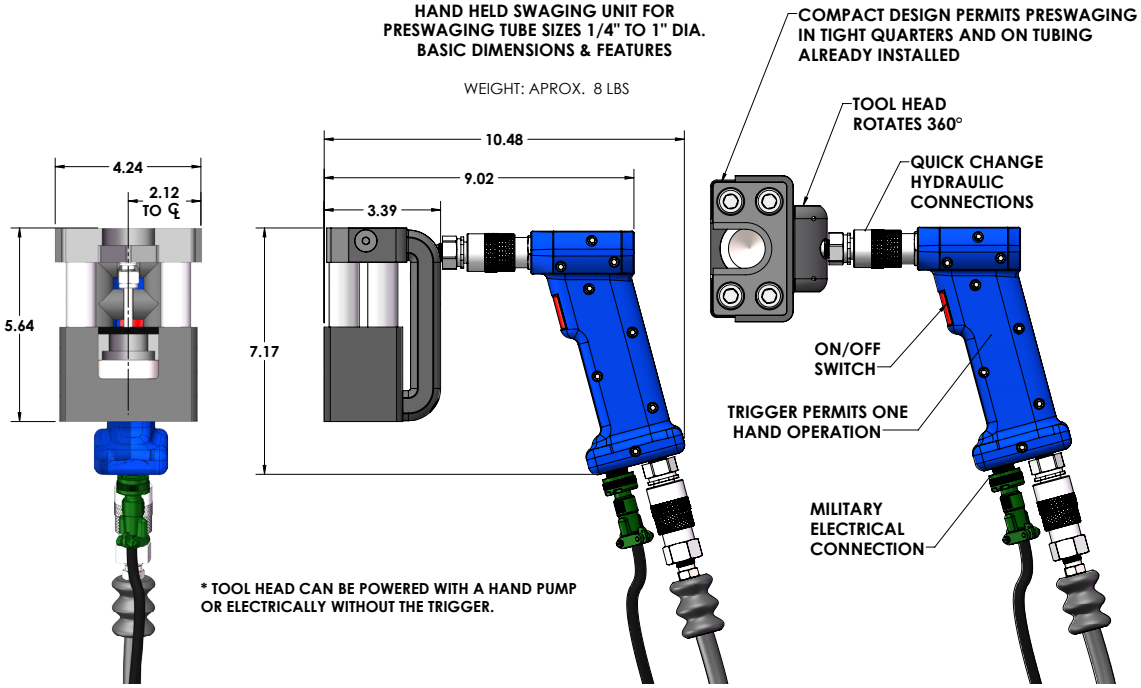
WEIGHT: APROX. 6 LBS



HHSU 4-16

HAND HELD SWAGING UNIT FOR PRESWAGING TUBE SIZES 1/4" TO 1" DIA. BASIC DIMENSIONS & FEATURES

WEIGHT: APROX. 8 LBS



DSU Digital Swaging Unit

DSU Features:

- Designed to pre-swage the nut and ferrules of either the Tylok CBC-Lok or CS-Lok style fitting onto tubing in tube sizes ranging from 1/4" to 1" for all typical wall thicknesses.
- The DSU 4-16 is a digitally controlled hydraulic press that uses 110V AC current, and produces enough force to swage all of the tubes sizes with one touch of a button.
- The DSU 4-16 is a bench top unit that is designed to give precise control over the pre-swaging process, with positioning accuracy of +/- .002".
- A Foot Switch is also included for hands free operation, permitting swages on long or awkward bends.

DSU Attributes:

- Changing tube sizes require Swage Die and Push Plate changes, which are made in seconds without any tools required.
- Pre-swaging ferrules onto the tube reduces installation torque from 30-50%, depending on the tube size, tube wall thickness and tube hardness.
- Pre-swaging reduces the number of turns required to make up the fitting. Typically about a half turn past finger tight is required to make up the fitting after pre-swaging, making installation in tight spaces easier.
- The DSU uses Threadless Quick Change Dies resulting in fast accurate swages every time.