

October 31, 2019

Attention: Joanna Karpinski
TECHNICAL STANDARDS & SAFETY AUTHORITY
345 CARLINGVIEW DRIVE
TORONTO, ON M9W 6N9

The design submission, tracking number 2019-07140, originally received on October 21, 2019 was surveyed and accepted for registration as follows:

CRN : 0A00683.92 **Accepted on:** October 31, 2019
Reg Type: ADDITION TO ACC. FITTING **Expiry Date:** October 16, 2029
Drawing No. : TRANS-O-CON FORGED BRANCH CONNECTIONS PAGE 14-19
Fitting type: MSS SP-97 FORGED BRANCH CONNECTIONS
Design registered in the name of : PHOENIX FORGE GROUP

The registration is conditional on your compliance with the following notes:

As indicated on AB-41 Statutory Declaration form and submitted documentation, the code of construction is other engineering analysis, MSS SP-97.

- *This registration is valid only for fittings fabricated at the location(s) covered by the QC certificate attached to the accepted AB-41 Statutory Declaration form.*
- *This registration is valid only until the indicated expiry date and only if the Manufacturer maintains a valid quality management system approved by an acceptable third-party agency until that date.*
- *Should the approval of the quality management system lapse before the expiry date indicated above, this registration shall become void.*

An invoice covering survey and registration fees will be forwarded from our Revenue Accounts.

If you have any question don't hesitate to contact me by phone at (780) 433-0281 ext 3306 or fax (780) 437-7787 or e-mail Wangi@absa.ca.

Sincerely,



WANG, IAN, P. Eng.
DOP Cert. No. D00009643

STATUTORY DECLARATION
Registration of Fittings

I, Kevin Miller, Quality Manager
(name of applicant) (position title) (must be in a position of authority)
of The Phoenix Forge Group
(name of manufacturer)
located at 800 Front St, Catasauque, PA 18032
(plant address)

In this space, show facsimile of manufacturer's logo or trademark as it will appear on the fitting.
See attached

do solemnly declare that the fittings listed hereunder, which are subject to the Safety Codes Act (check one)

- comply with the requirements of MSS SP-97 which specifies the dimensions, materials of construction, pressure/temperature ratings and identification marking of the fittings, or
- are not covered by the provisions of a recognized North American standard and are therefore manufactured to comply with _____ as supported by the attached data which identifies the dimensions, materials of construction, pressure/temperature ratings and the basis for such ratings, and the marking of the fittings for identification.

I further declare that the manufacture of these fittings is controlled by a quality control program which has been verified by the following authority, DNV-GL Business Assurance as being suitable for the manufacture of these fittings to the stated standard. The fittings covered by this declaration, for which I seek registration, are

Trans-O-Con[®] branch connections
(brief description of fittings)

In support of this application, the following information, calculations and/or test data are attached:

attached catalog and lab report from Fritz Engineering Laboratory

DECLARED before me at Catasauque in the County of Lehigh
(city) (province or state)
this 24 day of June, 2019
(Month) (Year)

(print) Melissa A Reimer
(a Commissioner of Oaths or Notary Public)

(sign) Melissa A Reimer
(a Commissioner of Oaths or Notary Public)

Commonwealth of Pennsylvania - Notary Seal
Melissa A. Reimer, Notary Public
Lehigh County
My commission expires April 11, 2022
Commission number 1282898
Member, Pennsylvania Association of Notaries

K Miller
(signature of applicant)

For ABSA Office Use Only:

NOTES: _____

To the best of my knowledge and belief, the application meets the requirements of the Safety Codes Act and CSA Standard B51, Clause 4.2, and is accepted for registration in Category A

Registration Number: 0A00683.92
(Signature of the Administrator/SCO)

Date Registered: OCT 31 2019 Expiry Date: Oct 16, 2029



*Commanding a Higher Standard*SM

PHOENIX FORGING COMPANY, INC.

800 FRONT STREET, CATASAUQUA, PA 18032-2343
(610) 264-2861 • FAX: (610) 266-0530
www.phoenixforge.com

Phoenix Hotform



Phoenix Forging Co



0A00683.92

Capitol Manufacturing



or



Camco Fittings



ABSA

SAFETY CODES ACT - PROVINCE OF ALBERTA
REGISTRATION OF FITTINGS

REGISTRATION NO. **0A00683.92**

DWG. NO. or CAT. NO. Trans - O - Con Forged
Branch Connections

TYPE OF FITTINGS MSS SP-97 Forged Branch
connections

OCT 31 2019
Date

INITIALS *[Signature]*
Jan Wang

Trans-O-Con® Forged Branch Connections

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PHOENIX TRANS-O-CON® transition pipe connections are used successfully in numerous types of product distribution installations. The structurally reinforced design of our products insures a connection that is equal in strength to the original pipe. Material costs and installation time can be greatly reduced by using TRANS-O-CON connections in new construction as well as for plant conversions and in maintenance operations.

Facilities now using our branch connections include: power generating stations, commercial & industrial buildings, chemical & petrochemical plants and refineries.

STRENGTH RATINGS

TRANS-O-CON connections have strength ratings equal to seamless steel pipe.

These ratings are based on the ASME Code for Pressure Piping, B31, the ASME Boiler Construction Code and ANSI/ASME B36.10.

For example, an extra-strong TRANS-O-CON applied to extra-strong pipe of the equivalent material provides 100% pipe strength. A standard weight TRANS-O-CON provides 100% pipe strength when used on standard weight pipe.

SPECIFICATIONS

TRANS-O-CON connections are manufactured according to the requirements of the ANSI standard for Steel Butt Welding Fittings (B16.9, latest modification); the ASME standard for Forged Fittings, Socket Welding and Threaded Fittings (B16.11, latest modification), the ANSI standard for Pressure Piping (B31, latest modification), and MSS SP-97.

When TRANS-O-CON connections are installed as recommended, their bursting strength exceeds the computed bursting strength of pipe or the designated weight or schedule number and material.

Certifications are provided upon request. 24-hour access to specifications through electronic MTR's on our web site.

Approval listings on file.

IDENTIFICATION AND MARKING

TRANS-O-CON connections are forged from carbon steel hot rolled bar to meet A-105 material specifications.

Every connection is individually inspected and stamped with header size, outlet size, material specification, pressure rating, manufacturer's symbol and identification number.

LABORATORY RESEARCH

0A00683.92

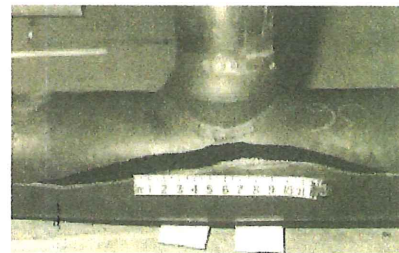
TRANS-O-CON connections have been tested to insure the strength of the branch connection equals or exceeds the actual bursting strength of the unpenetrated base material. See a test example below.



2 x 2 Header



3 x 3 Header



6 x 8 Header

QUALITY IDENTIFICATION MARKING

To insure the material integrity of our fittings, every heat of steel is analyzed by the originating mill for proper chemistry from which the steel supplier provides us with a chemistry report. A forged test bar is prepared from each heat of steel by our forge plants and is analyzed by an independent testing laboratory for compliance of mechanical properties.

Each fitting is marked per MSS SP-25 for complete traceability in order that certification can be provided as required.



Phoenix Trans-O-Con® Conventional Butt-Weld Size Range

ASME SA105 / A 350-LF 2 / MSS SP-97 / POWER PIPING ASME B31.1
 LIQUID TRANSPORTATION ASME B31.4 / ASTM A105 / NACE MRO175
 REFINING ASME B31.3 / GAS TRANSMISSION ASME B31.8
 ASME B16.9 / ASME B16.11 / ASME B1.20.1

BUTT-WELD (STD & X STRONG)					OUTLET SIZE - INCHES		
5"	6"	8"	10"	12"	14"	16"	18"
14 - 12"	36 - 24"	24 - 20"	36"	36"	36"	36"	36"
10	20 - 16	18 - 16	24"	24"	24"	30"	30"
8	14 - 12	14 - 12	20"	20"	20"	24"	24"
6	10	10	18"	18"	18"	20"	20"
5	8	8	16"	16"	16"	18"	18"
	6		14"	14"	14"	16"	
			12"	12"			
			10"				

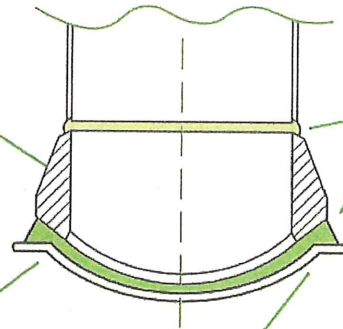
TRANS-O-CON® design provides 100% pipe strength and unrestricted fluid flow

TRANS-O-CON connections maintain the strength of the run pipe and optimize flow characteristics of the entire system. The cutaway drawing shows exactly how this is accomplished.

Additional TRANS-O-CON Advantages:

- Low Initial Cost
- Fast, Easy Installation
- No Cutting, Shaping or Beveling
- Easy to Align
- Strength and quality Properties Found **Only** in a Forged Product

• TAPERED TRANSITION FROM BRANCH TO HEADER AND HEAVY JUNCTURE MINIMIZES STRESS CONCENTRATIONS.



• SHORT HEIGHT PERMITS ACCESS TO INSIDE SURFACE TO INSPECT FOR FULL-PENETRATION WELD.

• WIDE FOOTING IMPROVES MECHANICAL STRENGTH TO WITHSTAND VIBRATIONAL STRESSES.

TRANS-O-CON® Applications

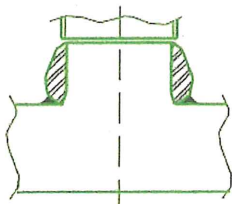
Use TRANS-O-CON connectors instead of

- Welding Tees
- Reinforced Branches
- Non-Reinforced Branches

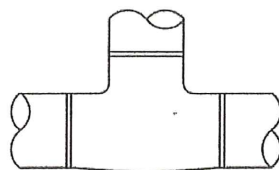
TRANS-O-CON transition pipe connections can be used in all of these applications to advantage. Not only is the cost lower, but consider the TRANS-O-CON benefits shown below.

Why TRANS-O-CON connections are better than welding tees:

- Quicker Fabrication time
- Pipe can be run before branch connections are attached
- Gradual transition from header to branch improves stress distribution
- Lower material costs



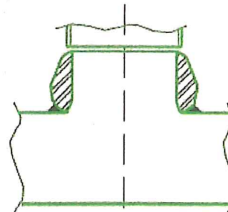
TRANS-O-CON



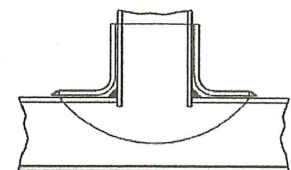
WELDING TEE

Why TRANS-O-CON connections are better than Reinforced and Non-Reinforced Miter Branches:

- Quicker installation
- Provides perfectly contoured internal joint
- Requires no shaping
- Requires less cutting and welding
- Eliminates metal-to-metal lapped surfaces and sharp corners
- Reduces overall cost of installation



TRANS-O-CON



MITER BRANCH

0A00683.92



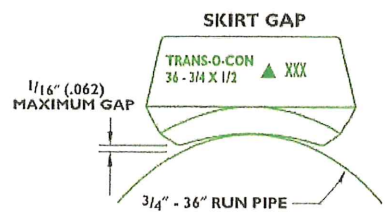
Phoenix Trans-O-Con®
Industry Standard Consolidation
Straight Bore Branch Connections

ASME SA105 / A 350-LF 2 / MSS SP-97 / POWER PIPING ASME B31.1
 LIQUID TRANSPORTATION ASME B31.4 / ASTM A105 / NACE MRO175
 REFINING ASME B31.3 / GAS TRANSMISSION ASME B31.8
 ASME B16.9 / ASME B16.11 / ASME B1.20.1

PIPE SIZES	BUTT-WELDED (STD)											
	OUTLET SIZE - INCHES											
	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"
	36 - 3/8" 1/4"	36 - 3/4" 1/2 - 3/8"	36 - 1 1/4" 1 - 1/2"	36 - 2 1/2" 2 - 3/4"	36 - 2" 3 1/2" - 1 1/4" 1"	36 - 8" 6 - 2 1/2" 2 - 1 1/2" 1 1/4"	36 - 4" 3 1/2" - 2" 1 1/2"	36 - 8" 6 - 3 1/2" 3 - 2 1/2" 2"	36 - 12" 10 - 5" 4 - 3" 2 1/2"	36 - 16" 14 - 8" 6 - 5" 4 - 3 1/2" 3"	36 - 22" 20 - 12" 10 - 8" 6 - 5" 4"	42 - 36" 34 - 26" 24 - 20" 18 - 16" 14 - 12" 10" 8" 6"
	0A00683-92											
PIPE SIZES	BUTT-WELDED (EXTRA STRONG)											
	OUTLET SIZE - INCHES											
	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"
	36 - 1/4"	36 - 1/2" 3/8"	36 - 1" 3/4" - 1/2"	36 - 2" 1 1/2" - 3/4"	36 - 2" 3" - 1 1/4" 1"	36 - 6" 5 - 2 1/2" 2 - 1 1/4"	36 - 4" 3 1/2" - 2" 1 1/2"	36 - 8" 6 - 3 1/2" 3 - 2 1/2" 2"	36 - 12" 10 - 5" 4 - 3" 2 1/2"	36 - 16" 14 - 8" 6 - 5" 4 - 3 1/2" 3"	36 - 22" 20 - 12" 10 - 8" 6 - 5" 4"	42 - 36" 34 - 26" 24 - 20" 18 - 16" 14 - 12" 10" 8" 6"
PIPE SIZES	SOCKET-WELDED (3000#)											
	OUTLET SIZE - INCHES											
	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	
	36 - 3/8" 1/4"	36 - 3/4" 1/2 - 3/8"	36 - 3/4" 1/2"	36 - 1 1/2" 1 1/4 - 3/4"	36 - 3" 2 1/2" - 1 1/4" 1"	36 - 4" 3 1/2" - 2" 1 1/2" - 1 1/4"	36 - 6" 5 - 3" 2 1/2" - 2" 1 1/2"	36 - 8" 6 - 4" 3 1/2" - 2 1/2" 2"	36 - 10" 8 - 6" 5 - 4" 3 1/2" - 3" 2 1/2"	36 - 16" 14 - 8" 6 - 5" 4 - 3 1/2" 3"	36 - 22" 20 - 12" 10 - 8" 6 - 5" 4"	FLAT SIZES available 1/8" through 6" pipe outlet. Traditional line of run pipe size available on inquiry.
PIPE SIZES	SOCKET-WELDED (6000#)											
	OUTLET SIZE - INCHES											
	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	
	36 - 1/4"	36 - 3/8"	36 - 3/4" 1/2"	36 - 1 1/4" 1 - 3/4"	36 - 3" 2 1/2" - 1 1/4" 1"	36 - 5" 4 - 1 1/2" 1 1/4"	36 - 6" 5 - 3" 2 1/2" - 2" 1 1/2"	36 - 8" 6 - 4" 3 1/2" - 2 1/2" 2"	36 - 20" 18 - 6" 5 - 3 1/2" 3 - 2 1/2"	36 - 28" 26 - 12" 10 - 6" 5 - 4" 3 1/2" - 3"	36 - 16" 14 - 10" 8 - 6" 5" 4"	Size on Size are conventional funneled inlet design.
PIPE SIZES	THREADED (3000#)											
	OUTLET SIZE - INCHES											
	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	
	36 - 1/2" 3/8 - 1/4"	36 - 1 1/4" 1 - 3/8"	36 - 3/4" 1/2"	36 - 1 1/2" 1 1/4 - 3/4"	36 - 3" 2 1/2" - 1 1/4" 1"	36 - 4" 3 1/2" - 2" 1 1/2" - 1 1/4"	36 - 6" 5 - 3" 2 1/2" - 2" 1 1/2"	36 - 8" 6 - 4" 3 1/2" - 2 1/2" 2"	36 - 10" 8 - 6" 5 - 4" 3 1/2" - 3" 2 1/2"	36 - 16" 14 - 8" 6 - 5" 4 - 3 1/2" 3"	36 - 22" 20 - 12" 10 - 8" 6 - 5" 4"	
PIPE SIZES	THREADED (6000#)											
	OUTLET SIZE - INCHES											
	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	
	36 - 1/2" 3/8 - 1/4"	36 - 1 1/4" 1 - 3/8"	36 - 3/4" 1/2"	36 - 1 1/2" 2 1/2" - 1" 3/4"	36 - 3" 2 1/2" - 1 1/4" 1 1/4" - 1"	36 - 10" 8 - 4" 3 1/2" - 2" 1 1/2" - 1 1/4"	36 - 6" 5 - 3" 2 1/2" - 2" 1 1/2"	36 - 8" 6 - 4" 3 1/2" - 2 1/2" 2"	36 - 28" 26 - 12" 10 - 6" 5 - 4" 3 1/2" - 3" 2 1/2"	36 - 14" 12 - 8" 6 - 5" 4" 3 1/2"	36 - 20" 18 - 12" 10 - 8" 6" 5" 4"	

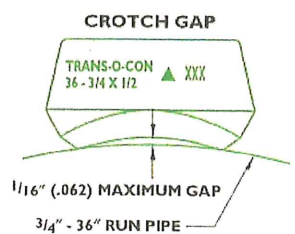
FLAT SIZES available 1/8" through 6" pipe outlet. Traditional line of run pipe size available on inquiry.

Size on Size are conventional funneled inlet design.



HOW CONDENSED SIZE WORKS:
 Each forged outlet size listed on the chart is designed to fit a range of pipe run sizes.
 For example: The 1/2" fitting marked 36-3/4" will fit each pipe run size from 3/4" to 36". There will be a maximum 1/16" gap as illustrated in diagrams. This gap is negligible when welding and has no adverse effect on the integrity of the connection.

MINIMIZE WAREHOUSE INVENTORY

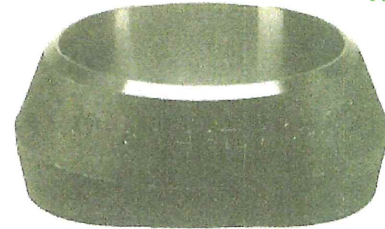




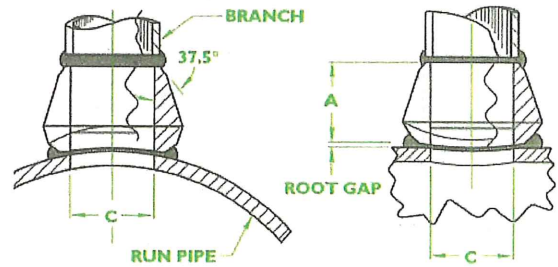
TRANS-O-CON® Butt-Weld Reducing Sizes

MSS SP-97

OUTLET SIZE (INCHES)	DIMENSIONS				APPROX. WEIGHT POUNDS	
	STANDARD		EXTRA STRONG		STANDARD	EXTRA STRONG
	A	C	A	C		
1/4"	.652	.364	.625	.302	.08	.10
3/8"	.750	.493	.750	.423	.09	.15
1/2"	.750	.622	.750	.546	.35	.40
3/4"	.875	.824	.875	.742	.40	.45
1"	1.063	1.049	1.063	.957	.50	.60
1 1/4"	1.250	1.380	1.250	1.278	.70	.80
1 1/2"	1.313	1.610	1.313	1.500	.75	.85
2"	1.500	2.067	1.500	1.939	1.29	1.35
2 1/2"	1.625	2.469	1.625	2.323	1.75	1.82
3"	1.750	3.068	1.750	2.900	2.63	2.75
4"	3.000	4.026	2.000	3.826	4.30	4.45
5"	2.125	5.047	2.125	4.813	9.59	6.39
6"	2.375	6.065	2.375	5.761	12.00	17.60
8"	2.750	7.981	3.875	7.625	23.00	34.80
10"	3.06	10.02	3.69	9.750	27.22	36.19
12"	3.38	12.00	4.06	11.750	34.00	67.00
14"	3.50	13.25	3.94	13.000	56.00	72.25
16"	3.69	15.25	4.18	15.000	76.00	102.10
18"	3.81	17.25	4.38	17.000	97.00	129.75
20"	4.00	19.25	4.69	19.000	120.00	166.00
24"	4.56	23.25	5.50	23.000	194.61	262.00



STRAIGHT THRU BORE

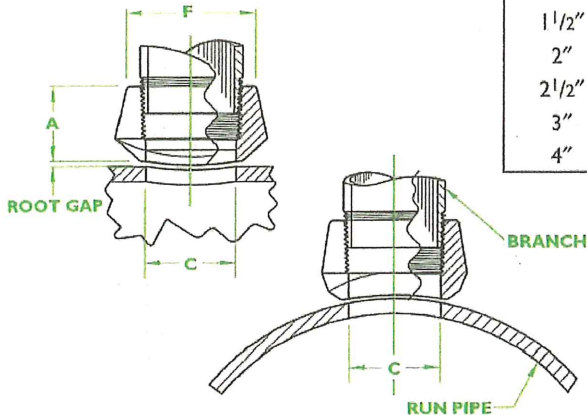


TRANS-O-CON® Threaded Reducing Sizes

MSS SP-97



0A00683.92



OUTLET SIZE (INCHES)	DIMENSIONS						APPROX. WEIGHT POUNDS	
	3000 #			6000 #			3000 #	6000 #
	A	C	F	A	C	F		
1/8"	.750	.328	.875				.10	
1/4"	.750	.437	.875				.10	
3/8"	.813	.562	1.000				.16	
1/2"	1.000	.703	1.250	1.250	.703	1.563	.25	.40
3/4"	1.063	.906	1.438	1.438	.906	1.813	.38	.70
1"	1.313	1.141	1.813	1.563	1.141	2.250	.70	1.20
1 1/4"	1.359	1.469	2.188		1.469		.90	1.50
1 1/2"	1.375	1.719	2.436	1.688	1.719	3.000	1.40	1.90
2"	1.531	2.188	2.938	2.063	2.188	3.625	1.80	5.00
2 1/2"	1.813	2.528	3.438				3.00	
3"	2.000	3.203	4.125				4.35	
4"	2.250	4.203	5.125				7.10	

NOTE: NPT Threads to B1.20.1.

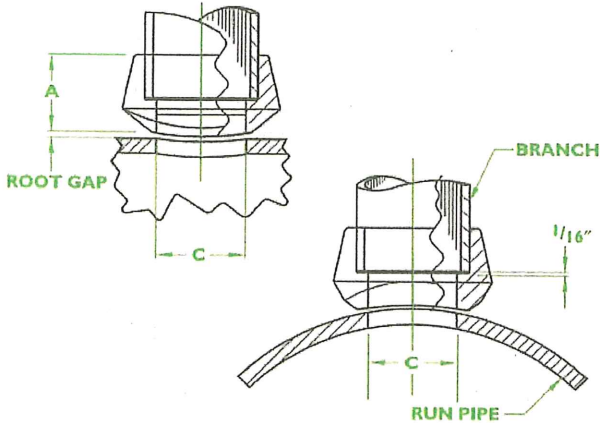


NEW FORGING TECHNOLOGY



TRANS-O-CON® Socket Reducing Sizes

MSS SP-97



OUTLET SIZE (INCHES)	DIMENSIONS				APPROX. WEIGHT POUNDS	
	3000 #		6000 #		3000 #	6000 #
	A	C	A	C		
1/8"	.750	.364			.10	
1/4"	.750	.364			.10	
3/8"	.813	.493			.16	
1/2"	1.000	.622	1.250	.464	.25	.45
3/4"	1.063	.824	1.438	.612	.38	.70
1"	1.313	1.049	1.563	.8153	.70	1.10
1 1/4"	1.359	1.380	1.625	1.160	.90	1.50
1 1/2"	1.375	1.610	1.668	1.338	1.40	1.80
2"	1.531	2.067	2.063	1.687	1.80	4.70
2 1/2"	1.563	2.469			2.75	
3"	1.750	3.068			3.80	
4"	1.875	4.026			7.25	

NOTE: Socket minimum depth per ANSI B16.11.

0A00683.92

TRANS-O-CON® Elbow & Lateral Connections

3000# for 90° long radius pipe elbows

Butt Weld / Socket / Threaded

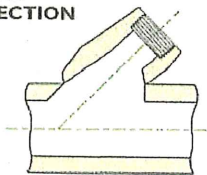
ELBOW SIZES (INCHES)	OUTLET SIZE (INCHES)	DIMENSIONS		APPROX. WEIGHT POUNDS
		C	E	
36 - 3/4"	1/2" *	1.500	1.594	.50
36 - 1"	3/4" *	1.813	1.875	.70
36 - 2"	1" *	2.250	2.188	1.15
36 - 2"	1 1/2"	3.125	2.625	2.65
36 - 3"	2"	4.188	3.185	5.25

45° LATERAL

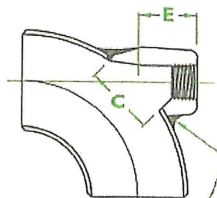
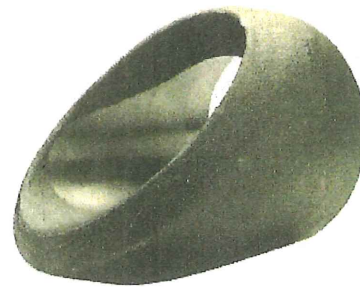
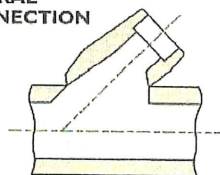
OUTLET SIZE (INCHES)	1/2" *	3/4" *	1" *	1 1/4"	1 1/2"	2"
	SIZE RANGE (INCHES)	12 - 3 2 1/2 - 1 1/4	12 - 6 5 - 3 2 1/2 - 2	12 - 6 5 - 3 2 1/2 - 2	12 - 6 5 - 3 2 1/2 - 2	12 - 10 8 - 6 5 - 4

* Available in 6000#

THREADED LATERAL CONNECTION

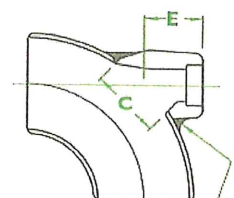


SOCKET LATERAL CONNECTION



THREADED

FULL PENETRATION WELD



SOCKET

FULL PENETRATION WELD

NOTE: Butt-Welding end dimensions to ANSI B16.9 and ANSI B 16.25.