ABSA
the pressure equipment safety authority

9410 - 20 Ave N.W.
Edmonton, Alberta, Canada T6N 0A4
Tel: (780) 437-9100 / Fax: (780) 437-7787

January 08, 2020

Attention: Catherine Diplock
PRESSURE VESSEL ENGINEERING INC
120 RANDALL DRIVE SUITE B
WATERLOO, ON N2V 1C6

The design submission, tracking number 2019-07889, originally received on November 20, 2019 was surveyed and accepted for registration as follows:

CRN : 0A09967.2 **Accepted on:** January 08, 2020

Reg Type: RENEWAL **Expiry Date:** December 19, 2029

Drawing No. : SEE SCOPE 14095S-1/14095S-2/14095S-3 Rev 8 /9/ 10 As Noted

Fitting type: PIPE FITTINGS

Design registered in the name of : PHOENIX FORGE GROUP

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

- This CRN is issued for fittings that are in strict compliance with one of the following standards: MSS SP-79, 83, 95, ASME B16.11, and Code of Construction ASME B31.3 in accordance with the Catalogue and corresponding PV Engineering Document Scope listed below:

- *CAMCO Catalogue No. 298; 14095s-1 R8*
- *Capitol Manufacturing Catalogue No. 497; 14095s-2 R9*
- *CapProducts Ltd. Catalogue No. 612; 14095s-3 R10*

- Only listed materials are covered by this CRN.

- This registration shall apply to two manufacturing locations in accordance with the Statutory Declaration; Louisiana USA and Ontario Canada

As indicated on AB-41 Statutory Declaration form and submitted documentation, the code of construction are ASME B31.3, B16.11 and other engineering analysis.

- 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.

Continued on the next page...

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January 08, 2020

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 3377 or fax (780) 437-7787 or e-mail Barut@absa.ca.

Sincerely,

V.P. Barut

BARUT, VINCE

Alberta Municipal Affairs

ABSA
the pressure equipment safety authority

AB-41 2019-06

STATUTORY DECLARATION
Registration of Fittings
Single or Multiple Fitting Designs within one Fitting Category

CAPITOL manufacturing
CAMCO, CAPPRODUCTS, CAPP

I, Guy Cuccio (name of applicant), Technical Services Manager (position title) (must be in a position of authority)

of Capitol Manufacturing, CAMCO and CapProducts Ltd., Members of the Phoenix Forge Group (name of manufacturer)

located at 1125 Capitol Road, Crowley, LA, 70526, USA AND 25 Winnipeg Street, Vanastra, Ontario, N0M 1L0, Canada (plant address)

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

☑ comply with the requirements of ASME B16.11, MSS SP-79, MSS SP-83, MSS SP-95, MSS SP-114, ASTM A733 and API 5L (title of recognized North American Standard) 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 _____ (title of code of construction or other applicable document) as supported by the attached data which identifies the dimensions, materials of construction, pressure/temperature ratings and the basis for such ratings, and the identification marking of the fittings.

I further declare that the manufacture of these fittings is controlled by a quality control program which has been verified as described in the below Table as being suitable for the manufacturing of these fittings to the stated standard, regulation, code, guideline or other applicable document. The fittings covered by the declaration for which I seek registration are as provided in the Supplementary Sheet(s) attached.

Quality Program Verification and Manufacturing Sites

A copy of the Quality Certificate from each manufacturing site must be included

Item #	Product Description, Model or Series	Quality Program	Scope of Certification	Expiry Date	Verifying Organization	Location(s) Plant Name and address
1.	See scope documents 14095s-1, 14095s-2,14095s-3	ISO 9001:2015	See Document	January 12, 2022	DNV-GL	1125 Capitol Road, Crowley, LA, 70526, USA AND 25 Winnipeg Street, Vanastra, Ontario, N0M 1L0,
2.						

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Alberta ■ Municipal Affairs

ABSA
the pressure equipment safety authority

AB-41 2019-06

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

See scope documents 14095s-1, 14095s-2, 14095s-3

Gary Cuccia
(Signature of the Declarer)

NOVEMBER 14, 2019
(Date)

DECLARED before me at Crowley (city) in the State of Louisiana (province, territory, or state)

this 14 day of November (Month), 2019 (Year)

(print) Brenda DeVillier
(a Commissioner of Oaths or Notary Public)

(sign) Brenda DeVillier
(a Commissioner of Oaths or Notary Public)

11-14-2019
(expiry date (mm/dd/yy))

Commissioner of Oaths / Notary Public in and for: LOUISIANA
(province, territory, or state)

For ABSA Office Use Only:

NOTES: **See Acceptance Letter for the comments and/or conditions of registration.**

To the best of my knowledge and belief, the application meets the requirements of the Safety Codes Act and CSA Standard B51, Part 1, Clause 4.2, and is accepted for registration in Category A.

CRN: 0A09967.2

Registered Date: JAN 08 2020

Expiry Date: DECEMBER 19, 2029

Signature:
(Signature of the Administrator/SCO)

The information you provide is necessary only for the administration of the programs as required by the Alberta Safety Codes Act and Regulations in the Pressure Equipment Discipline

PVE Engineering Document: 14095s-1 R8 **December 19, 2019**

PRESSURE VESSEL ENGINEERING SCOPE OF DESIGN VERIFICATION CAPITOL MANUFACTURING

Catalogue No. 298 Pipe Fitting – Canadian Registration Renewal – 2019

Class 2000 Stainless Steel Threaded Fittings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L

- 90 Degree Elbows: NPS 1/8" to 2"
- 45 Degree Elbows: NPS 1/8" to 2"
- Tees: NPS 1/8" to 2"
- Crosses: NPS 1/8" to 2"

Class 3000 Stainless Steel Threaded Fittings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L

- 90 Degree Elbows: NPS 1/8" to 2"
- 45 Degree Elbows: 1/8" to 2"
- Tees: NPS 1/8" to 2"
- Crosses: NPS 1/8" to 2"
- Street Elbows: NPS 1/8" to 1"
- Couplings: NPS 1/8" to 4"
- Half Couplings: NPS 1/8" to 4"
- Pipe Caps: NPS 1/8" to 4"

High Pressure Stainless Steel Hex Bushings:
Industry Standard: ASME B16.11
Material: A182 F304/F304L, F316/F316L

- NPS 1/4" to 4"

Stainless Steel Threaded Plugs:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L

- Square Head Plugs: NPS 1/8" to 4"
- Round Head Plugs: NPS 1/8" to 4"
- Hex Head Plugs: NPS 1/8" to 2"

Class 3000 Stainless Steel Threaded Reducing Couplings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L

- NPS 1/4" to 4"

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SAFETY CODES ACT - PROVINCE OF ALBERTA
REGISTRATION OF FITTINGS
REGISTRATION NO. 0 A 0 9 9 6 7 . 2
DWG. NO. or CAT. NO. *See Acceptance Letter
TYPE OF FITTINGS . Pipe Fittings
JAN 0 8 2020 INITIALS
Date
VINZENZ BARUT, P.ENG
DESIGN SURVEY ENGINEER

See Acceptance Letter for the comments and/or conditions of registration.

Class 6000 Stainless Steel Threaded Fittings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L
- 90 Degree Elbows: NPS 1/8" to 2"
- 45 Degree Elbows: NPS 1/8" to 2"
- Tees: NPS 1/8" to 2"
- Crosses: NPS 1/8" to 1-1/4"
- Couplings: NPS 1/8" to 4"
- Half Couplings: NPS 1/8" to 4"
- Pipe Caps: NPS 1/8" to 4"

Class 6000 Stainless Steel Threaded Reducing Couplings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L
- NPS 1/4" to 4"

Class 3000 Stainless Steel Threaded Unions:
Industry Standard: MSS SP-83
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L
- NPS 1/8" to 3"

Stainless Steel Swage Nipples [Threaded/Plain/Bevel Ends]:
Industry Standard: MSS SP-95
Design Code: ASME B31.3
Material: A403/SA403 F304/F304L, F316/F316L
- NPS 1/2" to 4"

Class 3000 Stainless Steel Socket-Welding Fittings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L
- 90 Degree Elbows: NPS 1/8" to 2"
- 45 Degree Elbows: NPS 1/8" to 2"
- Tees: NPS 1/8" to 2"
- Crosses: NPS 1/8" to 2"
- Couplings: NPS 1/8" to 4"
- Half Couplings: NPS 1/8" to 4"
- Pipe Caps: NPS 1/8" to 4"

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Class 3000 Stainless Steel Socket-Welding Reducer Inserts:
Industry Standard: MSS SP-79
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L

NPS
- 1/4" x 1/8"
- 3/8" x 1/4", 1/8"
- 1/2" x 3/8, 1/4, 1/8
- 3/4" x 1/2, 3/8, 1/4, 1/8
- 1" x 3/4, 1/2, 3/8, 1/4, 1/8
- 1-1/4" x 1, 3/4, 1/2, 3/8, 1/4, 1/8
- 1-1/2" x 1-1/4, 1, 3/4, 1/2, 3/8, 1/4, 1/8
- 2" x 1-1/2, 1-1/4, 1, 3/4, 1/2, 3/8, 1/4, 1/8
- 2-1/2" x 2, 1-1/2, 1-1/4, 1, 3/4, 1/2, 3/8, 1/4, 1/8
- 3" x 2-1/2, 2, 1-1/2, 1-1/4, 1, 3/4, 1/2, 3/8, 1/4, 1/8
- 4" x 3, 2-1/2, 2, 1-1/2, 1-1/4, 1, 3/4, 1/2, 3/8, 1/4, 1/8

Class 3000 Stainless Steel Socket-Welding Reducing Couplings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L
- NPS 1/4" to 4"

Class 3000 Stainless Steel Socket-Welding Unions:
Industry Standard: MSS SP-83
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L
- NPS 1/8" to 3"

Class 6000 Stainless Steel Socket-Welding Unions:
Industry Standard: MSS SP-83
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L
- NPS 1/2" to 2"

Class 6000 Stainless Steel Socket-Welding Fittings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L
- 90 Degree Elbows: NPS 1/8" to 2"
- 45 Degree Elbows: NPS 1/8" to 2"
- Tees: NPS 1/8" to 2"
- Crosses: NPS 1/2" to 2"
- Couplings: NPS 1/8" to 2"
- Half Couplings: NPS 1/8" to 2"
- Pipe Caps: NPS 1/8" to 2"

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Class 6000 Stainless Steel Socket-Welding Reducer Inserts:
Industry Standard: MSS SP-79
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L

NPS
- 1/2" x 3/8, 1/4
- 3/4" x 1/2, 3/8, 1/4
- 1" x 3/4, 1/2, 3/8, 1/4
- 1-1/4" x 1, 3/4, 1/2, 3/8, 1/4
- 1-1/2" x 1-1/4, 1, 3/4, 1/2, 3/8, 1/4
- 2" x 1-1/2, 1-1/4, 1, 3/4, 1/2, 3/8, 1/4

Class 6000 Stainless Steel Socket-Welding Reducing Couplings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L
- NPS 1/4" to 2"

Class 9000 Stainless Steel Socket-Welding Fittings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L
Couplings: NPS 1/2" to 2"
- Pipe Caps: NPS 1/2" to 2"

Class 9000 Stainless Steel Socket-Welding Reducing Couplings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L
- NPS 1/2" to 2"

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Proprietary Design - Unlisted Components:

Class 3000 Stainless Steel Socket-Welding Reducing Couplings:
Industry Standard: Proprietary Design – Unlisted Component
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L

- NPS Any with 3-1/2"

Table 1 - Class 3000 Stainless Steel Socket Weld Reducing Couplings 3.5" MAWP

Product	Large Bore NPS (in)	Large Bore Min Wall Thickness (in)	Material	Pressure (PSI) at 850 °F
Socket Weld Reducing Coupling 3.5"	3 1/2	0.348	ASTM A 182 F304	2195
	3 1/2	0.348	ASTM A 182 F304L	1885
	3 1/2	0.348	ASTM A 182 F316	2310
	3 1/2	0.348	ASTM A 182 F316L	1870

Notes:
The allowable working pressures were calculated based on allowable stress at design temperature using formulas specified in ASME B31.3 Section 304.

Class 6000 Stainless Steel Socket-Welding Fittings:
Industry Standard: Proprietary Design – Unlisted Component
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L

- NPS 2-1/2" to 4"

Table 2 - Class 6000 Stainless Steel Socket Weld Couplings, Pipe Caps and Tees MAWP

Product	Large Bore NPS (in)	Large Bore Min Wall Thickness (in)	Material	Pressure (PSI) at 850 °F
Socket Weld Coupling 2.5"	2 1/2	0.41	ASTM A 182 F304	3115
			ASTM A 182 F304L	2675
			ASTM A 182 F316	3280
			ASTM A 182 F316L	2655
Socket Weld Pipe Caps 2.5"			ASTM A 182 F304	2155
			ASTM A 182 F304L	1850
			ASTM A 182 F316	2270
			ASTM A 182 F316L	1840
Socket Weld Coupling 3"	3	0.478	ASTM A 182 F304	3080
			ASTM A 182 F304L	2650
			ASTM A 182 F316	3250
			ASTM A 182 F316L	2625
Socket Weld Pipe Caps 3"			ASTM A 182 F304	2135
			ASTM A 182 F304L	1835
			ASTM A 182 F316	2250
			ASTM A 182 F316L	1820
Socket Weld Coupling 4"	4	0.581	ASTM A 182 F304	3125
			ASTM A 182 F304L	2685
			ASTM A 182 F316	3295
			ASTM A 182 F316L	2665
Socket Weld Pipe Caps 4"			ASTM A 182 F304	2415
			ASTM A 182 F304L	2075
			ASTM A 182 F316	2545
			ASTM A 182 F316L	2060

Notes:
The allowable working pressures were calculated based on allowable stress at design temperature using formulas specified in ASME B31.3 Section 304.

Class 6000 Stainless Steel Socket-Welding Reducing Couplings:
Industry Standard: Proprietary Design – Unlisted Component
Design Code: ASME B31.3
Material: A182 F304/F304L, F316/F316L
- NPS 2-1/2" to 4"

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Table 3 - Class 6000 Stainless Steel Socket Weld Reducing Couplings MAWP

Product	Large Bore NPS (in)	Large Bore Min Wall Thickness	Material	Pressure (PSI) at 850 °F
Socket Weld Reducing Coupling 2.5"	2 1/2	0.41	ASTM A 182 F304	3115
			ASTM A 182 F304L	2675
			ASTM A 182 F316	3280
			ASTM A 182 F316L	2655
Socket Weld Reducing Coupling 3"	3	0.478	ASTM A 182 F304	3080
			ASTM A 182 F304L	2650
			ASTM A 182 F316	3250
			ASTM A 182 F316L	2625
Socket Weld Reducing Coupling 4"	4	0.581	ASTM A 182 F304	3125
			ASTM A 182 F304L	2685
			ASTM A 182 F316	3295
			ASTM A 182 F316L	2665

Notes:
The allowable working pressures were calculated based on allowable stress at design temperature using formulas specified in ASME B31.3 Section 304.

General Note:

1) No allowances were made for corrosion, erosion, mechanical loads, and/or bending moments.
2) Allowable working pressures listed are non-shock working pressures.
3) For temperatures and working pressures above those listed consult the end users piping engineer.
4) Specifying the correct pipe schedule and pressure class of fitting depends on many different factors. Therefore, it is the ultimate responsibility of the end user's piping engineer to specify the correct pipe schedule and pressure class of fitting that will safely work in his intended application.
5) The dimensions and Pressure/Temperature tables shown in this scope document are property of Pheonix Forge Group and copyrighted that must not be shared or used to quality competitors fittings.

Verification:

Prepared by: Danial Havakhor
Title: Mechanical Engineering Technologist

Reviewer by: Matt Hiskett, P.Eng
Title: Engineering Supervisor
Date: 12/19/2019
Signature:

0A09967.2

PVE Engineering Document: 14095s-2 R9 **December 19, 2019**

PRESSURE VESSEL ENGINEERING SCOPE OF DESING VERIFICATION CAPITOL MANUFACTURING

Capitol Manufacturing Catalogue No. 497 Pipe Fitting – Canadian Registration Renewal – 2019

Class 2000 Forged Carbon Steel Threaded Fittings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: ASTM A105

- 90 Degree Elbows: NPS 1/8" to 4"
- 45 Degree Elbows: NPS 1/8" to 4"
- Crosses: NPS 1/8" to 4"

Class 3000 Forged Carbon Steel Threaded Fittings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: ASTM A105

- 90 Degree Elbows: NPS 1/8" to 4"
- 45 Degree Elbows: NPS 1/8" to 4"
- Crosses: NPS 1/8" to 4"
- Street Elbow: NPS 1/8" to 2"
- Couplings: NPS 1/8" to 4"
- Half Couplings: NPS 1/8" to 4"
- Pipe Caps: NPS 1/8" to 4"
- Couplets: NPS 1/4" to 4"

Class 3000 Forged Carbon Steel Threaded Reducing Couplings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: ASTM A105

- NPS 1/4" to 4"

Class 6000 Forged Carbon Steel Threaded Fittings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: ASTM A105

- 90 Degree Elbows: NPS 1/8" to 4"
- 45 Degree Elbows: NPS 1/8" to 4" – Excluding NPS 3"
- Crosses: NPS 1/8" to 4"
- Street Elbow: NPS 1/4" to 2"
- Couplings: NPS 1/8" to 4"
- Half Couplings: NPS 1/8" to 4"
- Pipe Caps: NPS 1/8"" to 4"
- Couplets: NPS 1/4" to 4"

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Class 6000 Carbon Forged Steel Threaded Reducing Couplings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: ASTM A105

- NPS 1/4" to 4"

Forged Carbon Steel Hex Bushings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: ASTM A105

- NPS 1/4" to 4"

Forged Carbon Steel Threaded Plugs:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: ASTM A105

- Square Head Plugs: NPS 1/8" to 2"
- Round Head Plugs: NPS 1/8" to 2"
- Hex Head Plugs: NPS 1/8" to 2"
- Hex Head Refinery: NPS 1/4" to 2"

Class 3000 Forged Carbon Steel Socket Weld Fittings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: ASTM A105

- 90 Degree Elbows: NPS 1/8" to 4"
- 45 Degree Elbows: NPS 1/8" to 4"
- Crosses: NPS 1/8" to 4"
- Couplings: NPS 1/8" to 2"
- Half Couplings: NPS 1/8" to 2"
- Pipe Caps: NPS 1/8" to 4"
- Couplets: NPS 1/8" to 4"

Class 6000 Forged Carbon Steel Socket Weld Fittings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: ASTM A105

- 90 Degree Elbows: NPS 1/8" to 2"
- 45 Degree Elbows: NPS 1/8" to 2"
- Crosses: NPS 1/2" to 2"
- Couplings: NPS 1/8" to 2"
- Half Couplings: NPS 1/8" to 2"
- Pipe Caps: NPS 1/8" to 2"
- Couplets: NPS 1/8" to 3"

Class 9000 Forged Carbon Steel Socket Weld Fittings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3

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Material: ASTM A105

- 90 Degree Elbows: NPS 1/2" to 2"
- 45 Degree Elbows: NPS ½" to 2"
- Couplings: NPS ½" to 2"
- Half Couplings: NPS ½" to 2"
- Pipe Caps: NPS ½" to 2"

Class 3000 Forged Carbon Steel Socket Weld Reducing Couplings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: ASTM A105

- NPS 1/4" to 4" (Except NPS 3-1/2")

Class 6000 Forged Carbon Steel Socket Weld Reducing Couplings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: ASTM A105

- NPS 1/4" to 2"

Class 9000 Forged Carbon Steel Socket Weld Reducing Couplings:
Industry Standard: ASME B16.11
Design Code: ASME B31.3
Material: ASTM A105

- NPS 1/2" to 2"

Class 3000 Forged Carbon Steel Socket Weld Reducer Inserts:
Industry Standard: MSS SP-79
Design Code: ASME B31.3
Material: ASTM A105

- NPS 1/2in to 4in, with reductions to 1/8in.

Class 6000 Forged Carbon Steel Socket Weld Reducer Inserts:
Industry Standard: MSS SP-79
Design Code: ASME B31.3
Material: ASTM A105

- NPS:
  - 1/2 x 3/8
  - 1/2 x 1/4
  - 3/4 x 1/2
  - 3/4 x 3/8
  - 3/4 x 1/4
  - 1 x 3/4
  - 1 x 1/2
  - 1 x 3/8
  - 1 x 1/4
  - 1-1/4 x 1
  - 1-1/4 x 3/4
  - 1-1/4 x 1/2
  - 1-1/4 x 3/8
  - 1-1/4 x 1/4
  - 1-1/2 x 1-1/4
  - 1-1/2 x 1
  - 1-1/2 x 3/4
  - 1-1/2 x 1/2
  - 1-1/2 x 3/8
  - 1-1/2 x 1/4
  - 2 x 1-1/2
  - 2 x 1-1/4
  - 2 x 1
  - 2 x 3/4
  - 2 x 1/2
  - 2 x 3/8
  - 2 x 1/4
- Note: 1"x3/4"

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Class 3000 Forged Carbon Steel Threaded Unions X-Series:
Industry Standard: MSS SP-83
Design Code: ASME B31.3
Material: ASTM A105

- Threaded X-Series: NPS 1/8" to 3"
- Brass Seat X-Series: NPS 1/4" to 2"

Class 6000 Forged Carbon Steel Threaded Unions X-Series:
Industry Standard: MSS SP-83
Design Code: ASME B31.3
Material: ASTM A105

- Threaded, X-Series: NPS 1/8" to 2"

Class 3000 Forged Carbon Steel Socket Weld Unions X-Series:
Industry Standard: MSS SP-83
Design Code: ASME B31.3
Material: ASTM A105

- Socket Welding X-Series: NPS 1/2" to 2"

Class 6000 Forged Carbon Steel Socket Weld Unions X-Series:
Industry Standard: MSS SP-83
Design Code: ASME B31.3
Material: ASTM A105

~~Socket Welding X-Series: NPS 1/2" to 2"~~

Pipe Nipples:
Industry Standard: ASTM 733
Design Code: ASME B31.3
Material: ASTM A53 type F, ASTM A53 type E, ASTM A53 type S, ASTM A106 Gr B, API 5L Gr B, ASTM A333 Gr 6, ASTM A312 Type 304/304L or 316/316L

- NPS 1/8" to 8"

Swage Nipples – Threaded Both Ends:
Industry Standard: MSS SP-95
Design Code: ASME B31.3
Material: ASTM A234 Grade WPB

- NPS 1/2" to 6"

Swage Nipples – Bevelled Both Ends:
Industry Standard: MSS SP-95
Design Code: ASME B31.3
Material: ASTM A234 Grade WPB

- NPS 1/2" to 6"

Swage Nipples – Plain Both Ends:
Industry Standard: MSS SP-95
Design Code: ASME B31.3

0A09967.2

Material: ASTM A234 Grade WPB
- NPS 1/2" to 6"

Swage Nipples – Eccentric TBE, BBE, PBE:
Industry Standard: MSS SP-95
Design Code: ASME B31.3
Material: ASTM A234 Grade WPB
- NPS 3/8" to 4"

Bull Plugs:
Industry Standard: MSS SP-95
Design Code: ASME B31.3
Material: ASTM A234 Grade WPB
- Hollow, Threaded: NPS 1" to 4"
- Hollow, Welding Bevel: NPS 2-1/2", 3" and 4"
- Hollow, API 8 Round Threads: NPS 2" to 3-1/2"
- Round, Threaded: NPS 1/8" to 2"
- Hollow, Threaded, Tapped: NPS 1" to 2"
- Hex, Threaded: NPS 1/4" to 1"

Proprietary Design - Unlisted Components:

Class 6000 Forged Carbon Steel Socket Weld Fittings:
Industry Standard: Proprietary Design – Unlisted Component
Design Code: ASME B31.3
Material: ASTM A105
- 90 Degree Elbows: NPS 2-1/2", 3" and 4"
- 45 Degree Elbows: NPS 2-1/2", 3"
- Couplings: NPS 2-1/2", 3" and 4"
- Half Couplings: NPS 2-1/2", 3" and 4"
- Pipe Caps: NPS 2-1/2", 3" and 4"

Table 4 - Class 6000 Forged Carbon Steel Socket Weld Fittings MAWP

Product	Material	NPS	Pressure (PSI) at 650 °F
Class 6000, 45 deg and 90 deg Elbow	**ASTM A105**	**2 1/2**	3970
		3	3895
Class 6000, 90 deg Elbow		**4**	3735
Class 6000 Coupling and Half Coupling		**2 1/2**	3720
		3	3685
		4	3735
Class 6000 Pipe Cap		**2 1/2**	2575
		3	2455
		4	2745

Notes:
The allowable working pressures were calculated based on allowable stress at design temperature using formulas specified in ASME B31.3 Section 304.

Class 9000 Forged Carbon Steel Socket Weld Fittings:
Industry Standard: Proprietary Design – Unlisted Component
Design Code: ASME B31.3
Material: ASTM A105

- 90 Degree Elbows: NPS 1/4", 3/8", 2-1/2" and 3"
- 45 Degree Elbows: NPS 1/4", 3/8", 2-1/2"

Table 5 - Class 9000 Forged Carbon Steel Socket Weld Fittings MAWP

Product	Material	NPS	Pressure (PSI) at 650 °F
Class 9000, 45 deg and 90 deg Elbow	**ASTM A105**	**1/4**	8285
		3/8	7605
		2 1/2	5035
Class 9000, 90 deg Elbow		**3**	4465

Notes:
The allowable working pressures were calculated based on allowable stress at design temperature using formulas specified in ASME B31.3 Section 304.

Class 6000 Forged Carbon Steel Socket Weld Reducing Couplings:
Industry Standard: Proprietary Design – Unlisted Component
Design Code: ASME B31.3
Material: ASTM A105

- NPS 2-1/2" to 4"

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Table 6 - Class 6000 Forged Carbon Steel Socket Weld Reducing Couplings MAWP

Product	Material	NPS	Pressure (PSI) at 650 °F
Class 6000 Socket Weld Reducing Coupling	ASTM A105	2 1/2	3720
		3	3685
		4	3735

Notes:
The allowable working pressures were calculated based on allowable stress at design temperature using formulas specified in ASME B31.3 Section 304.

Class 9000 Forged Carbon Steel Socket Weld Reducing Couplings:
Industry Standard: Proprietary Design – Unlisted Component
Design Code: ASME B31.3
Material: ASTM A105

- NPS 1/4" to 3/8", 2-1/2"
-

Table 7 - Class 9000 Forged Carbon Steel Socket Weld Reducing Couplings

Product	Material	NPS	Pressure (PSI) at 650 °F
Class 9000 Socket Weld Reducing Coupling	ASTM A105	1/4	6530
		3/8	9720
		2 1/2	10145

Notes:
The allowable working pressures were calculated based on allowable stress at design temperature using formulas specified in ASME B31.3 Section 304.

Class 3000 Forged Carbon Steel Threaded Unions X-Series:
Industry Standard: Proprietary Design – Unlisted Component
Design Code: ASME B31.3
Material: ASTM A105

- High Speed, Acme Threads, Threaded, X-Series: NPS 1/2" to 3" (Acme thread was not found in the standard)
- High Speed, Acme Threads, O-Ring, Threaded, X-Series: NPS 1/2" to 3" (Acme thread was not found in the standard)
- Lug, Threaded X-Series: NPS 1/4" to 3"
- Lug, O-Ring, Threaded X-Series: NPS 1/2" to 3"

Table 8 - Class 3000 Forged Carbon Steel Threaded Unions X-Series MAWP

Product	Material	NPS	Pressure (PSI) at 650 °F
Class 3000 Threaded High Speed ACME Thread Lug	ASTM A105	1/4	7780
Class 3000 Threaded High Speed ACME Thread/ O-Ring/ Lug/ Lug, O-Ring		3/8	6970
		1/2	6460
		3/4	5685
		1	5280
		1 1/4	4540
		1 1/2	4420
		2	4180
		2 1/2	3895
		3	3925

Notes:
The allowable working pressures were calculated based on allowable stress at design temperature using formulas specified in ASME B31.3 Section 304.

Class 6000 Forged Carbon Steel Threaded Unions X-Series:
Industry Standard: Proprietary Design – Unlisted Component
Design Code: ASME B31.3
Material: ASTM A105
- NPS 1/2" to 2"

Table 9 - Class 6000 Forged Carbon Steel Lug, Threaded X-Series Unions MAWP

Product	Material	NPS	Pressure (PSI) at 650 °F
Class 6000 Lug, Threaded, X-Series	ASTM A105	1/2	8870
		3/4	7550
		1	7485
		1 1/4	6255
		1 1/2	5210
		2	5025

Notes:
The allowable working pressures were calculated based on allowable stress at design temperature using formulas specified in ASME B31.3 Section 304.

Class 3000 Forged Carbon Steel Socket Weld Unions X-Series:
Industry Standard: Proprietary Design – Unlisted Component
Design Code: ASME B31.3
Material: ASTM A105

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- High Speed, Acme Threads, Socket Welding, X-Series: NPS 1/2" to3" (Acme thread was not found in the standard)
- High Speed, Acme Threads, O-Ring, Socket Welding, X-Series: NPS 1/2" to 3" (Acme thread was not found in the standard)
- Lug, Socket Welding X-Series: NPS 1/2" to 3"
- Lug, O-Ring, Socket Welding X-Series: NPS 1/2" to 3"

Table 10 - Class 3000 Forged Carbon Steel Socket Weld Unions X-Series MAWP

Product	Material	NPS	Pressure (PSI) at 650 °F
Class 3000 SW High Speed ACME Thread/ O-Ring/ Lug/ Lug, O-Ring	ASTM A105	1/2	5190
		3/4	4490
		1	4270
		1 1/4	3700
		1 1/2	3400
		2	2985
		2 1/2	3200
		3	2815

Notes:
The allowable working pressures were calculated based on allowable stress at design temperature using formulas specified in ASME B31.3 Section 304.

Class 6000 Forged Carbon Steel Socket Weld Unions X-Series:
Industry Standard: Proprietary Design – Unlisted Component
Design Code: ASME B31.3
Material: ASTM A105

- NPS 1/2" to 2-1/2"

Table 11 - Class 6000 Forged Carbon Steel Lug, Socket Weld X-Series Unions MAWP

Product	Material	NPS	Pressure (PSI) at 650 °F
Class 6000 Lug, SW, X-Series	ASTM A105	1/2	8595
		3/4	7550
		1	7485
		1 1/4	6255
		1 1/2	5210
		2	5025
		2 1/2	4255

Notes:
The allowable working pressures were calculated based on allowable stress at design temperature using formulas specified in ASME B31.3 Section 304.

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Couplings – Standard Merchant, Couplings:
Industry Standard: Proprietary Design – Unlisted Component
Design Code: ASME B31.3

- Couplings, Standard Merchant: NPS 1/8" to 6"
- Standard Merchant, R&L: NPS 1/8" to 4"
- Half Couplings, Standard Merchant: NPS 1/8" to 6"
- Couplings, XH No Recess, Threaded: NPS 1/8" to 6"
- Half Couplings, XH, Recess, Taper Thread: NPS 3/4" to 12"
- Half Couplings, XH, No Recess, Taper Thread: NPS 1/4" to 6"

Table 12 - Couplings – Standard Merchant, Couplings MAWP

Product	Material	NPS	Pressure (PSI) at 650 °F
Coupling, Couplings - Standard Merchant, Full and Half, R&L	ASTM A106 Gr B	1/8	4685
		1/4	4125
		3/8	3760
		1/2	3410
		3/4	3250
		1	2660
		1 1/4	2000
		1 1/2	2165
		2	2165
		2 1/2	1820
		3	1975
		3 1/2	2145
		4	1565
		5	1835
		6	1625
		8	1640
		10	1335
		12	1400

Notes:
The allowable working pressures were calculated based on allowable stress at design temperature using formulas specified in ASME B31.3 Section 304.

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Couplings:
Industry Standard: Proprietary Design – Unlisted Component
Design Code: ASME B31.3
Material: ASTM A106 Gr B

- NPS 1 1/4" – 4"

Table 13 - Waterwell Ream & Drifted, Threaded Couplings MAWP

Product	Material	NPS	Pressure (PSI) at 650 °F
Waterwell Ream & Drifted, Threaded	ASTM A106 Gr B	1 1/4	515
		1 1/2	535
		2	575
		2 1/2	480
		3	395
		3 1/2	350
		4	310

Notes:
The allowable working pressures were calculated based on allowable stress at design temperature using formulas specified in ASME B31.3 Section 304.

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Siphons:
Industry Standard: Proprietary Design – Unlisted Component
Design Code: ASME B31.3
Material: A53F, A106 Gr B, A312 TP304, A312 TP304L, A312 TP316, A312 TP316L

- NPS 1/4 and 1/2 (Sch STD and XH)

Table 15 – Siphons, Angle, Pigtail, Straight MAWP

Product	Material	NPS	Schedule	Pressure (PSI) at 650 °F CS / 850 °F SS
Siphons, Angle, Pigtail, Straight	A53 F	1/4	STD	1845
		1/4	XH	3540
		1/2	STD	1375
		1/2	XH	2665
	A106 Gr B	1/4	STD	2190
		1/4	XH	4195
		1/2	STD	1630
		1/2	XH	3155
	A312 TP304	1/4	STD	1885
		1/4	XH	3610
		1/2	STD	1405
		1/2	XH	2720
	A312 TP304L	1/4	STD	1620
		1/4	XH	3100
		1/2	STD	1205
		1/2	XH	2335
	A312 TP316	1/4	STD	1985
		1/4	XH	3805
		1/2	STD	1480
		1/2	XH	2865
	A312 TP316L	1/4	STD	1605
		1/4	XH	3075
		1/2	STD	1195
		1/2	XH	2315

Notes:
The allowable working pressures were calculated based on allowable stress at design temperature using formulas specified in ASME B31.3 Section 304.

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General Note:

1) No allowances were made for corrosion, erosion, mechanical loads, and/or bending moments.
2) Allowable working pressures listed are non-shock working pressures.
3) For temperatures and working pressures above those listed consult the end users piping engineer.
4) Specifying the correct pipe schedule and pressure class of fitting depends on many different factors. Therefore, it is the ultimate responsibility of the end user's piping engineer to specify the correct pipe schedule and pressure class of fitting that will safely work in his intended application.
5) The dimensions and Pressure/Temperature tables shown in this scope document are property of Pheonix Forge Group and copyrighted that must not be shared or used to quality competitors fittings.

Verification:

Prepared by: Danial Havakhor
Title: Mechanical Engineering Technologist

Reviewer by: Matt Hiskett, P.Eng
Title: Engineering Supervisor
Date: 12/20/2019
Signature:

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PVEng Document No. 14095s-3 R10 **November 6, 2019**

PRESSURE VESSEL ENGINEERING SCOPE OF DESIGN VERIFICATION CAPITOL MANUFACTURING

CATALOG CapProducts Ltd. – Product Catalog Rev.612 – CANADIAN REGISTRATION RENEWAL - 2019

Carbon Steel Couplings (Standard Merchant):
Design Code: ASTM A865
Materials: A53 F, A106 Gr.B

- NPS 1/8" to 6"
  - Straight and Taper Tapped
  - Full Couplings
  - Half Couplings

Carbon Steel Couplings (XH):
Design Code: ASTM A865
Materials: A105

- NPS 1/8"-6" (XH No Recess, Threaded)
  - Full Couplings
  - Half Couplings

API Line Pipe Couplings:
Design Code: ASME B31.3
Industry Standard: API 5L
Materials: API 5L

- NPS 1/8" to 12"
  - Full Couplings

Unlisted Components:

Carbon Steel & Stainless Pipe Nipples:
Industry Code: ASTM A733-16
Design Code: ASME B31.3
Material: A53 F, A53 ERW, A106 Gr.B, A333 Gr.6, A312 304/304L, A312 316/316L

- NPS 1/8" to 8"
  - SCH40, SCHXS, SCH160, SCH XXS
  - Plain End
  - NPTF
  - BST
  - NPSM
  - NPSL
  - LH Thread
- Calculations: 14095c-6 R0
  - CS MAX TEMP: 650°F
  - SS MAX TEMP: 850°F

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Table 1 - Maximum Pressure (PSI) for Pipe Nipples

	SCH40		SCHXS		SCH160		SCHXXS	
NPS	CS	SS	CS	SS	CS	SS	CS	SS
0.125	2,285	2,335	4,310	4,400	-	-	-	-
0.250	1,845	1,885	3,540	3,610	-	-	-	-
0.375	1,585	1,620	3,085	3,150	-	-	-	-
0.500	1,375	1,405	2,665	2,720	4,155	4,240	8,315	8,485
0.750	1,195	1,220	2,290	2,340	4,165	4,250	6,955	7,095
1.000	1,065	1,090	2,040	2,080	3,640	3,715	6,315	6,440
1.250	955	975	1,800	1,835	2,825	2,885	5,335	5,445
1.500	900	920	1,695	1,730	2,925	2,985	4,885	4,985
2.000	815	835	1,550	1,585	3,085	3,145	4,285	4,370
2.500	805	820	1,495	1,525	2,470	2,520	4,350	4,440
3.000	755	770	1,405	1,435	2,525	2,575	3,925	4,005
3.500	725	740	1,345	1,375	-	-	3,665	3,740
4.000	710	720	1,310	1,335	2,530	2,580	3,480	3,550
5.000	670	685	1,235	1,260	2,505	2,555	3,170	3,235
6.000	650	660	1,265	1,290	2,490	2,540	3,140	3,200
8.000	625	635	1,175	1,200	2,505	2,555	2,400	2,450

NOTES:

1. The allowable working pressures were calculated based on the allowable stress at design temperature using formulas specified in ASME B31.3, Section 304.

Half Couplings (Standard Merchant):

Industry Code: ASTM A865
Design Code: ASME B31.3
Materials: A53 F, A106 Gr.B

- Half Couplings 1/8" – 6" (Standard Merchant)
  - Straight and Taper Tapped
    - Straight Thread = NPSC
    - Taper Thread = NPT
- Calculations: 14095c-6 R0
  - CS MAX TEMP: 650°F

Half Couplings XH:

Industry Code: ASTM A865
Design Code: ASME B31.3
Materials: A105

- Half Couplings (XH No Recess, Threaded)
- Calculations: 14095c-6 R0
  - CS MAX TEMP: 650°F

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Table 2: Maximum Pressure (PSI)

	Standard Merchant Coupling		XH Cplng
	Straight THD	NPT THD	NPT
0.125	12,290	3,340	4,070
0.250	10,510	3,055	3,725
0.375	9,235	2,880	3,510
0.500	8,610	2,695	3,290
0.750	6,835	2,645	3,240
1.000	5,740	2,165	2,640
1.250	5,375	-	3,290
1.500	4,975	-	2,205
2.000	4,200	-	3,040
2.500	-	1,565	2,565
3.000	-	1,770	2,145
3.500	-	1,960	2,370
4.000	-	1,400	2,380
5.000	-	1,680	2,045
6.000	-	1,490	1,815

NOTES:

1. The allowable working pressures were calculated based on the allowable stress at design temperature using formulas specified in ASME B31.3, Section 304.

GENREAL NOTES:

1. No allowances were made for corrosion, erosion, mechanical loads, and/or bending moments.
2. Allowable working pressures listed are non-shock working pressures.
3. For temperatures and working pressures above those listed consult the end users piping engineer.
4. Specifying the correct pipe schedule and pressure class of fitting depends on many different factors. Therefore, it is the ultimate responsibility of the end user's piping engineer to specify the correct pipe schedule and pressure class of fitting that will safely work in his/her intended application.
5. The dimensions and Pressure/Temperature tables shown in this scope document are property of Pheonix Forge Group and copyrighted that must not be shared or used to quality competitors fittings.

Verification:

Prepared by: Michael Tomlinson
Title: Mechanical Engineering Technologist

Reviewer by: Matt Hiskett, P.Eng
Title: Engineering Supervisor
Date: 11/14/2019
Signature:

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