

May 19, 2022

Attention: Scott Islip
ROUND ENGINEERING INC
10 SEGWUN ROAD
WATERDOWN, ON L8B 0K6

The design submission, tracking number 2022-02552, originally received on May 09, 2022 was surveyed and accepted for registration as follows:

CRN : 0C22350.2 **Accepted on:** May 19, 2022
Reg Type: NEW DESIGN **Expiry Date:** May 19, 2032
Drawing No. : Scope of CRN Registration, R-1689 Rev 0
Fitting type: Severe Service Check Valves
Design registered in the name of : DSS VALVES

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 are API 594 and ASME B16.34.

- It is our understanding that the fitting(s), included as the scope of this submission, that is(are) subject to the Safety Codes Act shall comply with the requirements of the indicated Standard or Code of Construction on the AB-41 Statutory Declaration as supported by the attached data which identifies the dimensions, materials of construction, press./temp. ratings and the basis for such ratings, and the identification marking of the fittings.*
- 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.

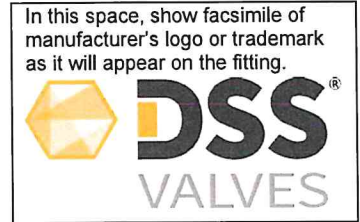
Sincerely,



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

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

I, BRADLEY OKELEY, ENGINEERING MANAGER
(name of applicant) (position title) (must be in a position of authority)
of DSS VALVES
(name of manufacturer)
located at 1800 MAYFLOWER ROAD, NILES, MI, 49120, USA
(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 API 594 which specifies the dimensions, materials of construction, pressure/temperature ratings and identification marking of the fittings, or
(title of recognized North American Standard)
- 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 identification marking of the fittings.
(title of code of construction or other applicable document)

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.	Severe Service Check Valves	ISO 9001:2015	Design, Assembly, Test	Oct. 9, 2023	PECB MS	Niles, MI, 49120, USA
2.						

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

SCOPE OF CRN, DRAWINGS, CALCULATIONS, REPORTS

Bradley Phillips (Signature of the Declarer)

April 28th, 2022 (Date)

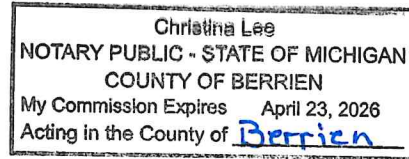
DECLARED before me at Niles in the State of Michigan

this 28th day of April, 2022

(print) Christina Lee (a Commissioner of Oaths or Notary Public)

(sign) Christina Lee (a Commissioner of Oaths or Notary Public)

04/23/2026 (expiry date (mm/dd/yy))



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

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, Part 1, Clause 4.2, and is accepted for registration in Category
CRN:
Registered Date:
Expiry Date: May 19, 2032
Signature:
(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)

2022-02552 ABSA SAFETY CODES ACT - PROVINCE OF ALBERTA ACCEPTED: CC22350 2 See acceptance letter for conditions of registration. Date: 2022-05-19 By: IAN WANG, P. Eng. DOP: D0009643 This stamp and signature have been affixed electronically to this registered design as required by Section 20(1) of the Pressure Equipment Safety Regulation, in accordance with the Electronic Transactions Act.

SCOPE OF CRN REGISTRATION

Product Description	DSS Series	Design Code	Material Specification	Report Number
Severe Service Check Valves	SSECKV	API 594, ASME B16.34	Any ASME B16.34 Table 1 Listed Material (Note 5)	R-1689 Rev. 0

Valve Manufacturing Program					
Pressure Class	Valve Type				
	API 594 Type "A"			API 594 Type "B"	
	Wafer	Lug Wafer	Double Flanged	Multibody Flanged	Multibody Butt weld
CL150	NPS 1" - 48"	NPS 1" - 48"	NPS 2"-24"	NPS 1"-36"	NPS 1"-36"
CL300	NPS 1" - 48"	NPS 1" - 48"	NPS 2"-24"	NPS 1"-36"	NPS 1"-36"
CL600	NPS 1" - 42"	NPS 1" - 42"	NPS 2"-24"	NPS 1"-36"	NPS 1"-36"
CL900	NPS 1" - 24"	NPS 1" - 24"	NPS 2"-24"	NPS 1"-36"	NPS 1"-36"
CL1500	NPS 1" - 24"	NPS 1" - 24"	NPS 2"-24"	NPS 1"-24"	NPS 1"-24"
CL2500	NPS 1" - 12"	NPS 1" - 12"	NPS 2"-12"	NPS 1"-12"	NPS 1"-12"

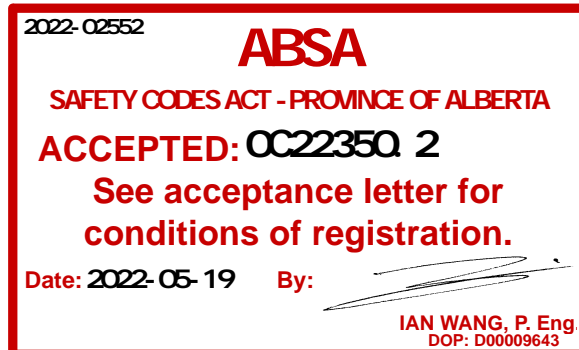
Note 1: Pressure-temperature ratings are in accordance with applicable ASME B16.34 Table 2 ratings.

Note 2: In all cases the pressure-temperature ratings of the valves may be limited by the seat and seal materials. Consult literature.

Note 3: Per ASME B16.34 para. 2.3.2. the pressure rating for service at any temperature below -20F shall be no greater than the ASME B16.34 ratings for -20°F. Products that are to operate at low temperatures shall conform to the rules of the applicable codes under which they are used.

Note 4: Pressure-temperature ratings of butt weld end valves may be limited by the butt weld end pressure rating. Butt weld end pressure ratings shall be calculated in accordance with the rules of the applicable codes under which they are used.

Note 5: See attached current listed materials found in ASME B16.34 Table 1.



This stamp and signature have been affixed electronically to this registered design as required by Section 20(1) of the Pressure Equipment Safety Regulation, in accordance with the Electronic Transactions Act.

(20)

Table 1 Material Specification List: Applicable ASTM Specifications

Material Group No.	Nominal Designation	Forgings		Castings		Plates		Bars		Tubular	
		Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade
Group 1 Materials											
1.1	C-Si	A105	...	A216	WCB	A515	70	A105	...	...	...
	C-Mn-Si	A350	LF2	...	...	A516	70	A350	LF2	A672	C 70
	C-Mn-Si	...	...	...	...	A537	Cl. 1	A696	C	A672	B 70
	3 $\frac{1}{2}$ Ni	A350	LF3	...	...	...	...	A350	LF3	...	...
	C-Mn-Si-V	A350	LF6 Cl. 1	...	...	...	...	A350	LF6 Cl. 1	...	...
1.2	C-Si	...	...	...	...	...	...	...	...	A106	C
	2 $\frac{1}{2}$ Ni	...	...	A352	LC2	A203	B	...	...	...	...
	3 $\frac{1}{2}$ Ni	...	...	A352	LC3	A203	E	...	...	...	...
	C-Mn-Si	...	...	A216	WCC	...	...	...	...	...	...
	C-Mn-Si	...	...	A352	LCC	...	...	...	...	...	...
	C-Mn-Si-V	A350	LF6 Cl. 2	...	...	...	...	A350	LF6 Cl. 2	...	...
1.3	C	...	...	...	...	...	...	A675	70	...	...
	C-Si	...	...	A352	LCB	A515	65	...	...	A672	B 65
	2 $\frac{1}{2}$ Ni	...	...	...	...	A203	A	...	...	...	...
	3 $\frac{1}{2}$ Ni	...	...	...	...	A203	D	...	...	...	...
	C-Mn-Si	...	...	...	...	A516	65	...	...	A672	C 65
	C- $\frac{1}{2}$ Mo	...	...	A217	WC1	...	...	...	...	...	...
	C- $\frac{1}{2}$ Mo	...	...	A352	LC1	...	...	...	...	...	...
1.4	C	...	...	...	...	...	...	A675	60	...	...
	C	...	...	...	...	...	...	A675	65	...	...
	C-Si	...	...	...	...	A515	60	...	...	A106	B
	C-Si	...	...	...	...	...	...	...	...	A672	B 60
	C-Mn-Si	A350	LF1	...	...	A516	60	A350	LF1	A672	C 60
	C-Mn-Si	...	...	...	...	...	...	A696	B	...	...
1.5	C- $\frac{1}{2}$ Mo	A182	F1	...	...	A204	A	A182	F1	A691	CM-70
	C- $\frac{1}{2}$ Mo	...	...	...	...	A204	B	...	...	...	...
1.6	$\frac{1}{2}$ Cr- $\frac{1}{2}$ Mo	...	...	...	...	A387	2 Cl. 1	...	...	A691	$\frac{1}{2}$ CR
	$\frac{1}{2}$ Cr- $\frac{1}{2}$ Mo	...	...	...	...	A387	2 Cl. 2	...	...	...	...
1.7	C- $\frac{1}{2}$ Mo	...	...	...	...	...	...	...	...	A691	CM-75
	$\frac{1}{2}$ Cr- $\frac{1}{2}$ Mo	A182	F2	...	...	...	...	A182	F2	...	...
	Ni- $\frac{1}{2}$ Cr- $\frac{1}{2}$ Mo	...	...	A217	WC4	...	...	...	...	...	...
	$\frac{3}{4}$ Ni-Mo- $\frac{3}{4}$ Cr	...	...	A217	WC5	...	...	...	...	...	...

Table 1 Material Specification List: Applicable ASTM Specifications (Cont'd)

Material Group No.	Nominal Designation	Forgings		Castings		Plates		Bars		Tubular	
		Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade
Group 1 Materials (Cont'd)											
1.8	1Cr- $\frac{1}{2}$ Mo	...	...	...	...	A387	12 Cl. 2	...	...	...	...
	1 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si	...	...	...	...	A387	11 Cl. 1	...	...	A691	1 $\frac{1}{4}$ CR
	2 $\frac{1}{4}$ Cr-1Mo	...	...	...	...	A387	22 Cl. 1	...	...	A691	2 $\frac{1}{4}$ CR
	2 $\frac{1}{4}$ Cr-1Mo	...	...	...	...	...	...	...	...	A335	P22
	2 $\frac{1}{4}$ Cr-1Mo	...	...	...	...	...	...	...	...	A369	FP22
1.9	1 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si	A182	F11 Cl. 2	...	...	A387	11 Cl. 2	A182	F11 Cl. 2	...	...
	1 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo	...	...	A217	WC6	...	...	A739	B11	...	...
1.10	2 $\frac{1}{4}$ Cr-1Mo	A182	F22 Cl. 3	A217	WC9	A387	22 Cl. 2	A182	F22 Cl. 3	...	...
	2 $\frac{1}{4}$ Cr-1Mo	...	...	...	...	...	...	A739	B22	...	...
1.11	3Cr-1Mo	A182	F21	...	...	A387	21 Cl. 2	A182	F21	...	...
	Mn- $\frac{1}{2}$ Mo	...	...	...	...	A302	A & B	...	...	...	...
	Mn- $\frac{1}{2}$ Mo- $\frac{1}{2}$ Ni	...	...	...	...	A302	C	...	...	...	...
	Mn- $\frac{1}{2}$ Mo- $\frac{3}{4}$ Ni	...	...	...	...	A302	D	...	...	...	...
	C-Mn-Si	...	...	...	...	A537	CL2	...	...	...	...
	C- $\frac{1}{2}$ Mo	...	...	...	...	A204	C	...	...	...	...
1.12	5Cr- $\frac{1}{2}$ Mo	...	...	...	...	A387	5 Cl. 1	...	...	A691	5CR
	5Cr- $\frac{1}{2}$ Mo	...	...	...	...	A387	5 Cl. 2	...	...	A335	P5
	5Cr- $\frac{1}{2}$ Mo	...	...	...	...	...	...	...	...	A369	FP5
	5Cr- $\frac{1}{2}$ Mo-Si	...	...	...	...	...	...	...	...	A335	P5b
1.13	5Cr- $\frac{1}{2}$ Mo	A182	F5a	A217	C5	...	...	A182	F5a	...	...
1.14	9Cr-1Mo	A182	F9	A217	C12	...	...	A182	F9	...	...
1.15	9Cr-1Mo-V	A182	F91 Type 1	A217	C12A	A387	91 Cl. 2	A182	F91	A335	P91
1.16	C- $\frac{1}{2}$ Mo	...	...	...	...	...	...	...	...	A335	P1
	C- $\frac{1}{2}$ Mo	...	...	...	...	...	...	...	...	A369	FP1
	1Cr- $\frac{1}{2}$ Mo	...	...	...	...	A387	12 Cl. 1	...	...	A691	1CR
	1Cr- $\frac{1}{2}$ Mo	...	...	...	...	...	...	...	...	A335	P12
	1Cr- $\frac{1}{2}$ Mo	...	...	...	...	...	...	...	...	A369	FP12
	1 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si	...	...	...	...	...	...	...	...	A335	P11
	1 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si	...	...	...	...	...	...	...	...	A369	FP11
1.17	1Cr- $\frac{1}{2}$ Mo	A182	F12 Cl. 2	...	...	...	...	A182	F12 Cl. 2	...	...
	5Cr- $\frac{1}{2}$ Mo	A182	F5	...	...	...	...	A182	F5	...	...
1.18	9Cr-2W-V	A182	F92	...	...	...	...	A182	F92	A335	P92
	9Cr-2W-V	...	...	...	...	...	...	...	...	A369	FP92

Table 1 Material Specification List: Applicable ASTM Specifications (Cont'd)

Material Group No.	Nominal Designation	Forgings		Castings		Plates		Bars		Tubular	
		Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade
Group 2 Materials											
2.1	18Cr-8Ni	...	...	A351	CF3	...	...	...	...	...	...
	18Cr-8Ni	A182	F304	A351	CF8	A240	304	A182	F304	A312	TP304
	18Cr-8Ni	A182	F304H	A351	CF10	A240	304H	A182	F304H	A312	TP304H
	18Cr-8Ni	...	...	...	...	...	...	A479	304	A358	304
	18Cr-8Ni	...	...	...	...	...	...	A479	304H	A376	TP304
	18Cr-8Ni	...	...	...	...	...	...	...	...	A376	TP304H
	18Cr-8Ni	...	...	...	...	...	...	...	...	A430	FP304
	18Cr-8Ni	...	...	...	...	...	...	...	...	A430	FP304H
2.2	16Cr-12Ni-2Mo	...	...	A351	CF3M	...	...	...	...	...	...
	16Cr-12Ni-2Mo	A182	F316	A351	CF8M	A240	316	A182	F316	A312	TP316
	16Cr-12Ni-2Mo	A182	F316H	A351	CF10M	A240	316H	A182	F316H	A312	TP316H
	16Cr-12Ni-2Mo	...	...	...	...	...	...	A479	316	A358	316
	16Cr-12Ni-2Mo	...	...	...	...	...	...	A479	316H	A376	TP316
	16Cr-12Ni-2Mo	...	...	...	...	...	...	...	...	A376	TP316H
	16Cr-12Ni-2Mo	...	...	...	...	...	...	...	...	A430	FP316
	16Cr-12Ni-2Mo	...	...	...	...	...	...	...	...	A430	FP316H
	18Cr-8Ni	...	...	A351	CF3A	...	...	...	...	...	...
	18Cr-8Ni	...	...	A351	CF8A	...	...	...	...	...	...
	18Cr-13Ni-3Mo	A182	F317	...	...	A240	317	...	...	A312	TP317
	19Cr-10Ni-3Mo	...	...	A351	CG8M	...	...	...	...	...	...
19Cr-10Ni-3Mo	...	...	A351	CG3M	...	...	...	...	...	...
2.3	18Cr-8Ni	A182	F304L	...	...	A240	304L	A182	F304L	A312	TP304L
	18Cr-8Ni	...	...	...	...	...	...	A479	304L	...	...
	16Cr-12Ni-2Mo	A182	F316L	...	...	A240	316L	A182	F316L	A312	TP316L
	16Cr-12Ni-2Mo	...	...	...	...	...	...	A479	316L	...	...
	18Cr-13Ni-3Mo	A182	F317L	...	...	...	...	A182	F317L	...	...
2.4	18Cr-10Ni-Ti	A182	F321	...	...	A240	321	A182	F321	A312	TP321
	18Cr-10Ni-Ti	A182	F321H	...	...	A240	321H	A479	321	A312	TP321H
	18Cr-10Ni-Ti	...	...	...	...	...	...	A182	F321H	A358	321
	18Cr-10Ni-Ti	...	...	...	...	...	...	A479	321H	A376	TP321
	18Cr-10Ni-Ti	...	...	...	...	...	...	...	...	A376	TP321H
	18Cr-10Ni-Ti	...	...	...	...	...	...	...	...	A430	FP321
	18Cr-10Ni-Ti	...	...	...	...	...	...	...	...	A430	FP321H

Table 1 Material Specification List: Applicable ASTM Specifications (Cont'd)

Material Group No.	Nominal Designation	Forgings		Castings		Plates		Bars		Tubular	
		Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade
Group 2 Materials (Cont'd)											
2.5	18Cr-10Ni-Cb	A182	F347	...	...	A240	347	A182	F347	A312	TP347
	18Cr-10Ni-Cb	A182	F347H	...	...	A240	347H	A182	F347H	A312	TP347H
	18Cr-10Ni-Cb	A182	F348	...	...	A240	348	A182	F348	A312	TP348
	18Cr-10Ni-Cb	A182	F348H	...	...	A240	348H	A182	F348H	A312	TP348H
	18Cr-10Ni-Cb	...	...	...	...	...	...	A479	347	A358	TP347
	18Cr-10Ni-Cb	...	...	...	...	...	...	A479	347H	A376	TP347
	18Cr-10Ni-Cb	...	...	...	...	...	...	A479	348	A376	TP347H
	18Cr-10Ni-Cb	...	...	...	...	...	...	A479	348H	A376	TP348
	18Cr-10Ni-Cb	...	...	...	...	...	...	...	...	A376	TP348H
	18Cr-10Ni-Cb	...	...	...	...	...	...	...	...	A430	FP347
	18Cr-10Ni-Cb	...	...	...	...	...	...	...	...	A430	FP347H
2.6	23Cr-12Ni	...	...	...	...	...	...	...	...	A312	TP309H
	23Cr-12Ni	...	...	...	...	A240	309H	...	...	A358	309H
2.7	25Cr-20Ni	A182	F310H	...	...	A240	310H	A182	F310H	A312	TP310H
	25Cr-20Ni	...	...	...	...	...	...	A479	310H	A358	310H
2.8	20Cr-18Ni-6Mo	A182	F44	A351	CK3MCuN	A240	S31254	A182	F44	A312	S31254
	20Cr-18Ni-6Mo	...	...	...	...	...	...	A479	S31254	A358	S31254
	22Cr-5Ni-3Mo-N	A182	F51	A995	CD3MN	A240	S31803	A182	F51	A789	S31803
	22Cr-5Ni-3Mo-N	...	...	...	...	...	...	A479	S31803	A790	S31803
	25Cr-7Ni-4Mo-N	A182	F53	...	...	A240	S32750	A182	F53	A789	S32750
	25Cr-7Ni-4Mo-N	...	...	...	...	...	...	A479	S32750	A790	S32750
	24Cr-10Ni-4Mo-N	...	...	A995	CE8MN	...	...	...	...	...	...
	25Cr-5Ni-3Cu-2Mo-N	...	...	A995	CD4MCuN	...	...	...	...	...	...
	25Cr-7Ni-3.5Mo-W-N	...	...	A995	CD3MWCuN	...	...	...	...	...	...
	25Cr-7.5Ni-3.5Mo-N-Cu-W	A182	F55	...	...	A240	S32760	A479	S32760	A790	S32760
2.9	23Cr-12Ni	...	...	...	...	A240	309S	...	...	...	...
	25Cr-20Ni	...	...	...	...	A240	310S	A479	310S	...	...
2.10	25Cr-12Ni	...	...	A351	CH8	...	...	...	...	...	...
	25Cr-12Ni	...	...	A351	CH20	...	...	...	...	...	...
2.11	18Cr-10Ni-Cb	...	...	A351	CF8C	...	...	...	...	...	...
2.12	25Cr-20Ni	...	...	A351	CK20	...	...	...	...	...	...

Table 1 Material Specification List: Applicable ASTM Specifications (Cont'd)

Material Group No.	Nominal Designation	Forgings		Castings		Plates		Bars		Tubular	
		Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade
Group 3 Materials											
3.1	35Ni-35Fe-20Cr-Cb	B462	N08020	...	...	B463	N08020	B462	N08020	...	...
	35Ni-35Fe-20Cr-Cb	...	...	...	...	...	...	B473	N08020	B464	N08020
	35Ni-35Fe-20Cr-Cb	...	...	...	...	...	...	...	...	B468	N08020
3.2	99Ni	B564	N02200	...	...	B162	N02200	B160	N02200	B161	N02200
	99Ni	...	...	...	...	...	...	...	...	B163	N02200
3.3	99Ni-Low C	...	...	...	...	B162	N02201	B160	N02201	...	...
3.4	67Ni-30Cu	B564	N04400	...	...	B127	N04400	B164	N04400	B165	N04400
	67Ni-30Cu	...	...	A494	M-35-1	...	...	...	...	B163	N04400
	67Ni-30Cu-S	...	...	A494	M-35-2	...	...	B164	N04405	...	...
3.5	72Ni-15Cr-8Fe	B564	N06600	...	...	B168	N06600	B166	N06600	...	...
	72Ni-15Cr-8Fe	...	...	...	...	...	...	...	...	B163	N06600
3.6	33Ni-42Fe-21Cr	B564	N08800	...	...	B409	N08800	B408	N08800	B163	N08800
3.7	65Ni-28Mo-2Fe	B462	N10665	...	...	B333	N10665	B335	N10665	...	...
	65Ni-28Mo-2Fe	...	...	...	...	...	...	B462	N10665	B622	N10665
	65Ni-28Mo-2Fe	B564	N10665	...	...	...	...	...	...	...	...
	64Ni-29.5Mo-2Cr-2Fe-Mn-W	B462	N10675	...	...	B333	N10675	B335	N10675	...	...
	64Ni-29.5Mo-2Cr-2Fe-Mn-W	...	...	...	...	...	...	B462	N10675	B622	N10675
	64Ni-29.5Mo-2Cr-2Fe-Mn-W	B564	N10675	...	...	...	...	...	...	...	...
3.8	54Ni-16Mo-15Cr	B462	N10276	...	...	B575	N10276	B462	N10276	...	...
	54Ni-16Mo-15Cr	...	...	...	...	...	...	B574	N10276	B622	N10276
	54Ni-16Mo-15Cr	B564	N10276	...	...	...	...	...	...	...	...
	60Ni-22Cr-9Mo-3.5Cb	B564	N06625	...	...	B443	N06625	B446	N06625	...	...
	62Ni-28Mo-5Fe	...	...	...	...	B333	N10001	B335	N10001	B622	N10001
	70Ni-16Mo-7Cr-5Fe	...	...	...	...	B434	N10003	B573	N10003	...	...
	61Ni-16Mo-16Cr	...	...	...	...	B575	N06455	B574	N06455	B622	N06455
	42Ni-21.5Cr-3Mo-2.3Cu	B564	N08825	...	...	B424	N08825	B425	N08825	B423	N08825
	55Ni-21Cr-13.5Mo	B462	N06022	...	...	B575	N06022	B462	N06022	B622	N06022
	55Ni-21Cr-13.5Mo	B564	N06022	...	...	...	...	B574	N06022	...	...
	55Ni-23Cr-16Mo-1.6Cu	B462	N06200	...	...	B575	N06200	B574	N06200	B622	N06200
55Ni-23Cr-16Mo-1.6Cu	B564	N06200	...	...	...	...	...	...	...	...
3.9	47Ni-22Cr-9Mo-18Fe	...	...	...	...	B435	N06002	B572	N06002	B622	N06002
	21Ni-30Fe-22Cr-18Co-3Mo-3W	...	...	...	...	B435	R30556	B572	R30556	B622	R30556
3.10	25Ni-47Fe-21Cr-5Mo	...	...	...	...	B599	N08700	B672	N08700	...	...

Table 1 Material Specification List: Applicable ASTM Specifications (Cont'd)

Material Group No.	Nominal Designation	Forgings		Castings		Plates		Bars		Tubular	
		Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade
Group 3 Materials (Cont'd)											
3.11	44Fe-25Ni-21Cr-Mo	...	...	...	...	B625	N08904	B649	N08904	B677	N08904
3.12	26Ni-43Fe-22Cr-5Mo	...	...	...	...	B620	N08320	B621	N08320	B622	N08320
	47Ni-22Cr-20Fe-7Mo	...	...	...	...	B582	N06985	B581	N06985	B622	N06985
	46Fe-24Ni-21Cr-6Mo-Cu-N	B462	N08367	A351	CN3MN	B688	N08367	B462	N08367	...	...
	46Fe-24Ni-21Cr-6Mo-Cu-N	...	...	...	...	...	...	B691	N08367	...	...
	58Ni-33Cr-8Mo	B462	N06035	...	...	B575	N06035	B462	N06035	B622	N06035
	58Ni-33Cr-8Mo	B564	N06035	...	...	...	...	B574	B06035	...	...
3.13	49Ni-25Cr-18Fe-6Mo	...	...	...	...	B582	N06975	B581	N06975	B622	N06975
	Ni-Fe-Cr-Mo-Cu-Low C	B564	N08031	...	...	B625	N08031	B649	N08031	B622	N08031
3.14	47Ni-22Cr-19Fe-6Mo	...	...	...	...	B582	N06007	B581	N06007	B622	N06007
	40Ni-29Cr-15Fe-5Mo	B462	N06030	...	...	B582	N06030	B462	N06030	...	...
	40Ni-29Cr-15Fe-5Mo	...	...	...	...	...	...	B581	N06030	B622	N06030
3.15	42Ni-2Fe-21Cr	B564	N08810	...	...	B409	N08810	B408	N08810	B407	N08810
	Ni-Mo	...	...	A494	N-12MV	...	...	...	...	...	...
	Ni-Mo-Cr	...	...	A494	CW-12MW	...	...	...	...	...	...
3.16	35Ni-19Cr-1 $\frac{1}{4}$ Si	...	...	...	...	B536	N08330	B511	N08330	B535	N08330
3.17	29Ni-20 $\frac{1}{2}$ Cr-3 $\frac{1}{2}$ Cu-2 $\frac{1}{2}$ Mo	...	...	A351	CN7M	...	...	...	...	...	...
3.18	72Ni-15Cr-8Fe	...	...	...	...	...	...	...	...	B167	N06600
3.19	57Ni-22Cr-14W-2Mo-La	B564	N06230	...	...	B435	N06230	B572	N06230	B622	N06230

Group 4 Materials

Bolting Materials [Note (1)]

Specification Number	Grade	Notes	Specification Number	Grade	Notes
A193	...	(2), (3)	B164	...	(10)-(12)
A307B	...	(4), (5)	B166	...	(10), (11)
A320	...	(2), (3), (6)	B335	N10665	(10)
A354	...	...	B335	N10675	(10)
A449	...	(7), (8)	B408	...	(10)-(12)
A453	651 and 660	(9)	B473	...	(10)
A540	...	...	B574	N10276	(10)
A564	630	(7)	B574	N06022	(10)
			B637	N07718	(10)

Table 1 Material Specification List: Applicable ASTM Specifications (Cont'd)

GENERAL NOTES:

- (a) The user is responsible for assuring that bolting material is not used beyond limits specified in governing codes or regulations.
- (b) ASME BPVC Section II materials that also meet the requirements of the listed ASTM specification may also be used.
- (c) Material limitations, restrictions, and special requirements are shown in the pressure-temperature tables, Tables 2-1.1 through 2-3.19 (Tables 2-1.1C through 2-3.19C).

NOTES:

- (1) Repair welding of bolting material is not permitted.
- (2) Where austenitic bolting materials have been carbide-solution treated but not strain hardened, they are designated Class 1 or Class 1A in ASTM A193. ASTM A194 nuts of corresponding material are recommended.
- (3) Where austenitic bolting materials have been carbide-solution treated and strain hardened, they are designated Class 2, 2B, or 2C in ASTM A193. ASTM A194 nuts of corresponding material are recommended.
- (4) For limitations of usage and strength level, see para. 5.1.2.
- (5) Bolts with drilled or undersize heads shall not be used.
- (6) For ferritic bolting materials intended for service at low temperature, ASTM A194 Grade 7 nuts are recommended.
- (7) Acceptable nuts for use with quenched and tempered steel bolts are ASTM A194 Grade 2 and 2H.
- (8) Mechanical property requirements for studs shall be the same as for bolts.
- (9) Bolting materials suitable for high-temperature service with austenitic stainless steel valve materials.
- (10) Nuts may be of the same material or may be of compatible grade of ASTM A194.
- (11) Forging quality not permitted unless the producer last heating or working these parts tests them as required for other permitted conditions in the same specification and certifies their final tensile, yield, and elongation properties to equal or exceed the requirements for one of the other permitted conditions.
- (12) Maximum operating temperature is arbitrarily set at 260°C (500°F), unless material has been annealed, solution annealed, or hot finished, because hard temper adversely affects design stress in the creep-rupture temper range.