

VISHAL STEEL (India)

13/6, Silver Cinema Building, 2nd Khetwadi Back
Road, Mumbai 400004, India
+91-22-67521137 / 23898841
info@vishalsteel.com, vishalsteelindia@yahoo.com



ASTM A403/A403M-10 Standard Specification for Wrought Austenitic

Stainless Steel Piping Fittings A403

1. Scope :-
 - 1.1 This specification covers wrought stainless steel fittings for pressure piping applications . 1.2 Several grade of austenitic stainless steel alloy are included in this specification grades are designated with a prefix , WP or CR , based on the applicable ASME or MSS dimensional and rating standard , respectively .
 - 1.3 For each of the WP stainless grades , several classes of fittings are covered , to indicate whether seamless or welded construction was utilized . Class designations are also utilized to indicate the non-destructive test method and extent of non-destructive examination (NDE) . Table 1 is a general summary of the fitting classes applicable to all WP grade of stainless steel covered by this specification . There are covered elsewhere .
 - 1.4 This specification is expressed in both inch-pound units and in SI units . However, unless the order specifies the applicable “M” specification designation (SI units), the material shall be furnished to inch-pound units .
 - 1.5 The values stated in either SI units or inch-pound units are to be regarded separately as standard . Within the text , the SI units are shown in brackets . The values stated in each system may not be exact equivalents ; therefore , each system shall be used independently of the order . Combining values from the two systems may result in non-conformance with the standard .
 - 1.6 This specification does not apply to cast steel fittings . Austenitic stainless steel castings are covered in specifications A351/A351M , A743/A743M , and A744/A744M .
2. Referenced Documents :-
 - 2.1 ASTM Standards :-

A351/A351M Specification for castings , Austenitic , for Pressure-Containing Parts A370 Test Method and Definitions for Mechanical Testing of Steel Products A743/A743M Specifications of Castings , Iron-Chromium , Iron-Chromium-Nickel , Corrosion resistant . for General Application A744/A744M Specifications of Castings , Iron-Chromium-Nickel , corrosion Resistant , for server service A751 Test Methods , Practices , and terminology for Chemical Analysis of steel Products A960/A960M Specification for Common Requirements for Wrought Steel piping fittings E112 Test Method for Determining Average Grain Size E165 Practice for Liquid Penetrant Examination for general Industry
 - 2.2 ASME Standards :-

ASME B16.9 Factory – Made Wrought Steel Butt-Welding Fittings ASME B16.9 Forged Steel Fittings , Socket – Welding and Threaded
 - 2.3 MSS Standards :-

MSS-SP-25 Standard Marking System for Valves , fittings , flanges , and Unions MSS-SP-43 Standard Practice for Light Weight Stainless Steel Butt-Welding Fittings MSS-SP-79 Socket-Welding Reducer Inserts MSS-SP-83 Steel Pipe Unions , Socket – Welding and Threaded MSS-SP-95 Swage (d) Nipples and Bull Plugs MSS-SP-97 Integrally Reinforced Forged Branch Outlet Fittings – Socket Welding , Threaded and Buttwelding Ends
 - 2.4 ASME Boiler and Pressure Vessel Code :- Section VIII Division I , Pressure Vessels Section IX , Welding Qualifications
 - 2.5 AWS Standards :-

A 5.4 Specification for Corrosion – Resisting Chromium and Chromium-Nickel Steel Covered Welding Electrodes

A 5.9 Specification for Corrosion – Resisting Chromium and Chromium-Nickel Steel Welding Rods and Bare Electrodes

A 5.11 Specification for Nickel and Nickel – Alloy Welding Electrodes for Shielded Metal Arc Welding

VISHAL STEEL (India)

13/6, Silver Cinema Building, 2nd Khetwadi Back

Road, Mumbai 400004, India

+91-22-67521137 / 23898841

info@vishalsteel.com, vishalsteelindia@yahoo.com



**ASTM A403/A403M-10
Standard Specification for Wrought Austenitic**

Stainless Steel Piping Fittings A403



2.6 ASNT :-

SNT-TC-1A (1984) Recommended Practice for Nondestructive Testing Personnel Qualification and Certification

3. Common Requirements and Ordering Information :-

TABLE 1 Fitting Classes for WP Grades

Class	Construction	Non-destructive Examination
S	Seamless	None
W	Welded	Radiography or Ultrasonic
WX	Welded	Radiography
WU	Welded	Ultrasonic

3.1 Material Furnished to this specification shall conform to the requirements of

specifications A960/A960M including any supplementary requirements that are indicates in the purchase order . Failure to company with the common requirements of Specification A960/A960M constitutes non-conformance with this specification . In case of conflict between this specification and Specification A960/A960M , this specification shall prevail .

3.2 Specification A960/A960M identifies the ordering information that should be complied with when purchasing material to this specification .

4. Material :-

4.1 The material for fittings shall consist of forgings , bars plates , or seamless or welded tubular products that conform to the chemical requirements in Table 2 . See Table 3 for a list of common names .

4.2 The steel shall be melted by one of the following processes :

4.2.1 Electric furnace (with separate degassing and refining optional) ,

4.2.2 Vacuum furnace , or

4.2.3 One of the former followed by vacuum or electroslagconsumable remelting .

4.3 If secondary melting is employed , the heat shall be defined as all ingots remelted from a primary heat .

VISHAL STEEL (India)

13/6, Silver Cinema Building, 2nd Khetwadi Back

Road, Mumbai 400004, India

+91-22-67521137 / 23898841

info@vishalsteel.com, vishalsteelindia@yahoo.com



ASTM A403/A403M-10

Standard Specification for Wrought Austenitic

Stainless Steel Piping Fittings A403



5. Manufacture :-5.1 Forming – Forging or shaping operations may be performed by hammering , pressing , extruding , upsetting , rolling , bending , fusion welding , machining , or by a combination of two or more of these operations . The forming procedure shall be so applied that it will not produce injurious defects in the fittings .
- 5.2 All fittings shall be heat treated in accordance with Section 6 .
- 5.3 Grade WP fittings ordered as Class S shall be of seamless construction and shall meet all requirements of ASME B 16.9 , ASME B 16.11 , MSS SP-79 , MSS SP-83 , MSS SP-95 , or MSS SP-97 .
- 5.4 Grade WP fittings ordered as Class shall meet the requirements of ASME B16.9 and :
- 5.4.1 Shall have all pipe welds made by mill or the fittings manufacture with the addition of filler metal radiographically examined throughout the entire length in accordance with the Code requirements stated in 5.5 , and ,
- 5.4.2 Radiographic inspection is not required on single longitudinal seam welds made by the starting pipe manufacture if made without the addition of filler metal ; and
- 5.4.3 Radiographic inspection is not required on longitudinal seam fusion welds made by the fitting manufacturer when all of the following conditions have been met :
- 5.4.3.1 no addition of filler metal ,
- 5.4.3.2 Only one welding pass per weld seam , and , 5.4.3.3 Fusion welding from one side only .
- 5.4.4 In place of radiographic examination , welds made by the fitting manufacturer may be ultrasonically examined in accordance with the code requirements stated in 5.6 .
- 5.5 Grade WP fittings ordered as Class WX shall meet the requirements of ASME B16.9 and shall have all welds , whether made by the fitting manufacture or the starting materials manufacturer , radiographically examined throughout their entire length in accordance with Paragraph UW-51 of Section VIII , Division I , of the ASME Boiler and Pressure Vessel Code .
- 5.6 Grade WP fitting ordered as Class WU shall meet the requirements of ASME B16.9 and shall have all welds , whether made by the fittings manufacture or the starting material manufacturer , ultrasonically examined throughout their entire length in accordance with appendix 12 of Section VIII , Division I , of ASME Boiler and Pressure Vessel Code .
- 5.7 The radiography or ultrasonic examination of welds for this class of fittings may be done at the option of the manufacturer , either prior to or after forming
- 5.8 Personnel performing NDE examinations shall be qualified in accordance with SNT-TC-1A .
- 5.9 Grade CR fittings shall meet the requirements of MSS SP-43 and do not require non-destructive examination .
- 5.10 All fitting shall have the welders , welding operators , and welding procedures qualified under the provisions of Section IX of the ASME Boiler and Pressure Vessel Code except that starting pipe welds made without the addition of filler metal do not require such qualification .

VISHAL STEEL (India)

13/6, Silver Cinema Building, 2nd Khetwadi Back

Road, Mumbai 400004, India

+91-22-67521137 / 23898841

info@vishalsteel.com, vishalsteelindia@yahoo.com



**ASTM A403/A403M-10
Standard Specification for Wrought Austenitic**

Stainless Steel Piping Fittings A403



- 5.11 ALL joints welded with filler metal shall be finished in accordance with the requirements of Paragraph UW-35(a) Of Section VIII , Division I , Of the ASME Boiler and Pressure Vessel Code .
- 5.12 Fittings machined from bar shall be restricted to NPS or smaller . Elbows , return bends , tees , and header tees shall not be machined directly from bar stock .
- 5.12.1 All caps machined from bar shall be examined by liquid penetrant in accordance with Supplementary Requirements S52 in Specification A960/A960M.
- 5.13 Weld build up is permitted to dimensionally correct unfilled areas produced during cold forming of stub ends . Radiographic examination of the weld buildup shall not be required provided that all the following steps are adhered to :
 - 5.13.1 The weld procedure and welders or welding operators meet the requirements of 5.10 .
 - 5.13.2 Annealing is performed after welding and prior to machining .
 - 5.13.3 All weld surface are liquid penetrant examined in accordance with Appendix 8 of Section VIII , Division 1 of the ASME Boiler and Pressure Vessel Code .
 - 5.13.4 Repair of areas in the weld is permitted , but 5.13.1 , 5.13.2 , and 5.13.3 must be repeated .
- 5.14 Stub ends may be produced with the entire lap added as weld metal to a straight pipe section provided the welding satisfies the requirements of 5.10 for qualifications and Section 6 for post weld heat treatment.
 - 5.14.1 Grade WP Class WX – Radiographic inspection of the weld is required . See 5.4 .
 - 5.14.2 Grade WP Class WX – Radiographic inspection of all welds is required See 5.5 .
 - 5.14.3 Grade WP Class WU – Ultrasonic inspection of all welds required . See 5.6 .
 - 5.14.4 Grade CR – non-destructive examination is not required . See 5.12.1 .
- 5.15 Stub ends may be produced with the entire lap added by the welding of a ring , made from plate or bar of the same alloy grade and composition , to the outside of straight section of pipe , provided the weld is double welded , is a full penetration joint , satisfies the requirements of 5.10 for qualifications and Section 6 for post weld heat treatment .
 - 5.15.1 Grade WP Class W – Radiographic inspection of the welds , made with the addition of filler metal , is required (see 5.4) .
 - 5.15.2 Grade WP Class WX – Radiographic inspection of all welds , made with or without the addition of filler metal , is required (see 5.5) .
 - 5.15.3 Grade WP Class WU – Radiographic inspection of all welds , made with or without the addition of filler metal , is required (see 5.6) .
 - 5.15.4 Grade CR non-destructive examination is not required (see 5.9) .
- 5.16 After final heat treatment , all “H-Grade” steel fittings shall have a grain size of 7 or coarser in accordance with Test Methods E112 .

TABLE 2 Chemical Requirements

Composition , %

Grade WP	Grade CR	UNS Designation	C ^B	Mn ^B	P ^B	S ^B	Si ^B	Ni	Cr	Mo	Ti	N2C ^c	Others

VISHAL STEEL (India)

13/6, Silver Cinema Building, 2nd Khetwadi Back

Road, Mumbai 400004, India

+91-22-67521137 / 23898841

info@vishalsteel.com, vishalsteelindia@yahoo.com



ASTM A403/A403M-10
Standard Specification for Wrought Austenitic

Stainless Steel Piping Fittings A403



WPXM -19	CRXM -19	S 20910	0.06	4.0- 6.0	0.045	0.030	1.00	11.5- 13.5	20.5- 23.5	1.50- 3.00	...	0.20- 0.40	....
WP 304	CR 304	S 30400	0.08	2.00	0.045	0.030	1.00	8.0- 11.0	18.0- 20.0	....	....	....	....
WP 304L	CR 304L	S 30403	0.030	2.00	0.045	0.030	1.00	8.0- 12.0	18.0- 20.0	....	....	....	....
WP 304H	CR 304H	S 30409	0.04- 0.10	2.00	0.045	0.030	1.00	8.0- 11.0	18.0- 20.0	....	....	....	....
WP 304N	CR 304N	S 30451	0.08	2.00	0.045	0.030	1.00	8.0- 11.0	18.0- 20.0	....	....	0.10- 0.16	....
WP 304 LN	CR 304 LN	S 30453	0.030	2.00	0.045	0.030	1.00	8.0- 11.0	18.0- 20.0	....	....	0.10- 0.16	....
WP 309	CR 309	S 30900	0.20	2.00	0.045	0.030	1.00	12.0- 15.0	22.0- 24.0	....	....	....	....
WP 310S	CR 310S	S 31008	0.08	2.00	0.045	0.030	1.00	19.0- 22.0	24.0- 26.0	....	....	....	....
WP S31254	CR S31254	S 31254	0.020	1.00	0.030	0.010	0.80	17.5- 18.5	19.5- 20.5	6.0- 6.5	....	0.18- 0.22	Cu 0.50- 1.00
WP 316	CR 316	S 31600	0.08	2.00	0.045	0.030	1.00	10.0- 14.0	16.0- 18.0	2.00- 3.00	....	....	....
WP 316L	CR 316L	S 31603	0.030	2.00	0.045	0.030	1.00	10.0- 14.0	16.0- 18.0	2.00- 3.00	....	....	....
WP 316H	CR 316H	S 31609	0.04- 0.10	2.00	0.045	0.030	1.00	10.0- 14.0	16.0- 18.0	2.00- 3.00	....	....	....
WP 316N	CR 316N	S 31651	0.08	2.00	0.045	0.030	1.00	10.0- 13.0	16.0- 18.0	2.00- 3.00	....	0.10- 0.16	....
WP 316 LN	CR 316 LN	S 31653	0.030	2.00	0.045	0.030	1.00	10.0- 13.0	16.0- 18.0	2.00- 3.00	....	0.10- 0.16	....
WP 317	CR 317	S 31700	0.08	2.00	0.045	0.030	1.00	11.0- 15.0	18.0- 20.0	3.0- 4.0	....	....	....
WP 317L	CR S317L	S 31703	0.030	2.00	0.045	0.030	1.00	11.0- 15.0	18.0- 20.0	3.0- 4.0	....	....	....
WP S31725	CR S31725	S 31725	0.030	2.00	0.045	0.030	1.00	13.5- 17.5	18.0- 20.0	4.0- 5.0	....	0.20	....

VISHAL STEEL (India)

13/6, Silver Cinema Building, 2nd Khetwadi Back

Road, Mumbai 400004, India

+91-22-67521137 / 23898841

info@vishalsteel.com, vishalsteelindia@yahoo.com



As ISO 9001:2008 / ISO 14001:2004 /
BS OHSAS 18001:2007 / PED APPROVED 97123/EC

ASTM A403/A403M-10
Standard Specification for Wrought Austenitic

Stainless Steel Piping Fittings A403



ASTM A403/A403M-10

WP S31726	CR S31726	S 31726	0.030	2.00	0.045	0.030	1.00	13.5-17.5	17.0-20.0	4.0-5.0	....	0.10-0.20	.....
WP S31727	CR S31727	S 31727	0.030	1.00	0.030	0.030	1.00	14.5-16.5	17.5-19.0	3.8-4.5	...	0.15-0.21	Cu 2.8-4.0
WP S32053	CR S32053	S 32053	0.030	1.00	0.030	0.010	1.00	24.0-26.0	22.0-24.0	5.0-6.0	...	0.17-0.22	...
WP 321	CR 321	S 32100	0.08	2.00	0.045	0.030	1.00	9.0-12.0	17.0-19.0	...	G	...	....
WP 321H	CR 321H	S 32109	0.04-0.10	2.00	0.045	0.030	1.00	9.0-12.0	17.0-19.0	....	H	....	....
WP S33228	CR S33228	S 33228	0.04-0.08	1.00	0.020	0.015	0.30	31.0-33.0	26.0-28.0	....	....	....	Ce 0.05-0.10 Al 0.025 Cb 0.6-1.0 Cb 0.10
WP S34565	CR S34565	S 34565	0.030	5.0-7.0	0.030	0.010	1.00	16.0-18.0	23.0-25.0	4.0-5.0	....	0.40-0.60	Cb 0.10
WP 347	CR 347	S 34700	0.08	2.00	0.045	0.030	1.00	9.0-12.0	17.0-19.0	....	....	....	....
WP 347H	CR 347H	S 34709	0.04-0.10	2.00	0.045	0.030	1.00	9.0-12.0	17.0-19.0	....	...	...	....
WP 348	CR 348	S 34800	0.08	2.00	0.045	0.030	1.00	9.0-12.0	17.0-19.0	....	...	....	Cb+ Ta= 10x (C)- 1.10 Ta 0.10 Co 0.20
WP 348H	CR 348H	S 34809	0.04-0.10	2.00	0.045	0.030	1.00	9.0-12.0	17.0-19.0	....	...	....	Cb+ Ta= 8X (C)- 1.10 Ta 0.10 Co 0.20
WP S38815	CR S38815	S 38815	0.030	2.00	0.045	0.020	5.5-6.5	13.0-17.0	13.0-15.0	0.75-1.50	...	....	Cu 0.75-1.50

VISHAL STEEL (India)

13/6, Silver Cinema Building, 2nd Khetwadi Back

Road, Mumbai 400004, India

+91-22-67521137 / 23898841

info@vishalsteel.com, vishalsteelindia@yahoo.com



As ISO 9001:2008 / ISO 14001:2004 /
BS OHSAS 18001:2007 / PED APPROVED 97123/EC

ASTM A403/A403M-10
Standard Specification for Wrought Austenitic

Stainless Steel Piping Fittings A403



TABLE 3 Common Names

Grade WP ^A	Grade CR ^A	UNS Designation	Type ^B
WPXM-19	CRXM-19	S20910	XM-19 ^c
WP304	CR304	S30400	304
WP304L	CR304L	S30403	304L
WP304H	CR304H	S30409	304H
WPN	CR304N	S30451	304N
WP304LN	CR304LN	S30453	304LN
WP309	CR309	S30900	309
WP310S	CR310S	S31008	310S
WPS31254	CR31254	S32154	....
WP316	CR316	S31600	316
WP316L	CR316L	S31603	316L
WP316H	CR316H	S31609	316H
WP316N	CR316N	S31651	316N
WP316LN	CR316LN	S31653	316LN
WP317	CR317	S31700	317
WP317L	CR317L	S31703	317L
WP31725	CR31725	S31725	317LM ^c
WP31726	CR31726	S31726	317LMN ^c
WP31727	CR31727	S31727	.....
WP32053	CR32053	S32053	.....
WP321	CR321	S32100	321
WP321H	CR321H	S32109	321H
WPS33228	CRS33228	S33228	....

VISHAL STEEL (India)

13/6, Silver Cinema Building, 2nd Khetwadi Back

Road, Mumbai 400004, India

+91-22-67521137 / 23898841

info@vishalsteel.com, vishalsteelindia@yahoo.com



**ASTM A403/A403M-10
Standard Specification for Wrought Austenitic**

Stainless Steel Piping Fittings A403



WPS34565	CRS34565	S34565	.....
WP347	CR347	S34700	347
WP347H	CR347H	S34709	347H
WP348	CR348	S34800	348
WP348H	CR348H	S34809	348H
WPS38815	CRS38815	S38815	.....
WP			

6. Heat Treatment :-

6.1 All fittings shall be furnished in the heat – treatment condition . For H grades , separate solution heat treatments are required for solution annealing ; in-process heat treatments are not permitted as a substitute for the separate solution annealing treatments . The heat – treat procedure , except for those grades listed in 6.2 , shall consist of solution annealing the fitting at the temperatures listed for each grade in Table 4 units the chromium carbides go into solution , and then cooling at a sufficient rate to prevent reprecipitation .

6.2 A solution annealing temperature above 1950 °F [1065 °C] may impair the resistance to intergranular corrosion after subsequent exposure to sensitizing conditions in 321 , 321H , 347 , and 347H . When specified by the purchaser a lower temperature stabilization or resolution anneal shall be used subsequent to the initial high temperature solution anneal (see supplementary requirements S2) .

6.3 All welding shall be done prior to heat treatment .

6.4 Fittings machined directly from solution – annealed forgings and bar stock need not be resolution annealed .

7. Chemical Composition :-

7.1 The chemical composition of each cast or heat used shall be determined and shall conform to the requirements of the chemical composition for the respective grades of material listed in Table 2 . The ranges as shown have been expanded to include variations of the chemical analysis requirements that are listed in the various specifications for starting materials (pipe , tube , plate , bar , and forgings) normally used in the manufacturing of fittings to this specification . Methods and practices relating to chemical analyses required by this specification shall be in accordance with Test Methods , Practices , and Terminology A751 . Product analysis tolerances in accordance with Specification A960/A960M are applicable .

7.2 The steel shall not contain any unspecified elements for the ordered grade to the extent

that it conforms to the requirements of another grade for which that element is a specified elements having a required minimum content .

7.3 In fittings of welded construction , the alloy content (carbon , chromium , nickel , molybdenum , columbium , and tantalum) of the deposited weld metal shall conform to that required of the base metal or for equivalent weld metal as given in the AWS filler metal specification A 5.4 or A 5.9 (Type 348 weld metal is listed in AWS A 5.9 but not in

VISHAL STEEL (India)

13/6, Silver Cinema Building, 2nd Khetwadi Back

Road, Mumbai 400004, India

+91-22-67521137 / 23898841

info@vishalsteel.com, vishalsteelindia@yahoo.com



**ASTM A403/A403M-10
Standard Specification for Wrought Austenitic**

Stainless Steel Piping Fittings A403



AWS A5.4) . Exceptions are when welding on Types 304L and 304 base metals , the deposited weld metal shall correspond , respectively , to AWS E308L(ER308L) and E308 (ER304) , when welding on Type 321 base metal , the weld metal shall correspond to AWS Type E347 n(ER347 or ER321) ; and when welding on S31725 , S31726 , S31254 or S33228 deposited weld metal shall correspond either to the alloy content of the base metal or to AWS A 5.11 E NiCrMo. 3 (UNS W86112) (AWS A5.14 Ni Cr Mo. 3 (UNS N06625)) . On S38815 base metals , the deposited weld metal and filler metal used shall be agreed upon between purchaser and manufacturer .

7.3.1 Supplementary Requirements SI may be specification may be specified where 16-8-2 filler metal is required for joining thick section of Types 316 , 321 , or 347 and has adequate corrosion resistance for the intended service .

TABLE 4 Heat Treatment

Grade WP ^A	Grade CR ^A	UNS Designation	Solution Anneal Temperature, min °F[°C]	Quench Media
WPXM-19	CRXM-19	S20910	1900[1040]	Water or other rapid cool
WP304	CR304	S30400	1900[1040]	Water or other rapid cool
WP304L	CR304L	S30403	1900[1040]	Water or other rapid cool
WP304H	CR304H	S30409	1900[1040]	Water or other rapid cool
WP304N	CR304N	S30451	1900[1040]	Water or other rapid cool
WP304LN	CR304LN	S30453	1900[1040]	Water or other rapid cool
WP309	CR309	S30900	1900[1040]	Water or other rapid cool
WP310S	CR310S	S31008	1900[1040]	Water or other rapid cool
WPS31254	CR31254	S31254	2100[1150]	Water or other rapid cool
WP316	CR316	S31600	1900[1040]	Water or other rapid cool
WP316L	CR316L	S31603	1900[1040]	Water or other rapid cool
WP316H	CR316H	S31609	1900[1040]	Water or other rapid cool
WP316N	CR316N	S31651	1900[1040]	Water or other rapid cool
WP316LN	CR316LN	S31653	1900[1040]	Water or other rapid cool
WP317	CR317	S31700	1900[1040]	Water or other rapid cool
WP317L	CR317L	S31703	1900[1040]	Water or other rapid cool
WPS31725	CRS31725	S31725	1900[1040]	Water or other rapid cool

VISHAL STEEL (India)

13/6, Silver Cinema Building, 2nd Khetwadi Back

Road, Mumbai 400004, India

+91-22-67521137 / 23898841

info@vishalsteel.com, vishalsteelindia@yahoo.com



**ASTM A403/A403M-10
Standard Specification for Wrought Austenitic**

Stainless Steel Piping Fittings A403



WPS31726	CRS31726	S31726	1900[1040]	Water or other rapid cool
WPS31727	CRS31727	S31727	1975-2155 [1080-1180]	Water or other rapid cool
WPS32053	CRS32053	S32053	1975-2155 [1080-1180]	Water or other rapid cool
WP321	CR321	S32100	1900[1040]	Water or other rapid cool
WP321H	CR321H	S32109	1925[1050]	Water or other rapid cool
WPS33228	CRS33228	S33228	2050-2160 [1120-1180]	Water or other rapid cool
WPS34565	CRS34565	S34565	2050-2140 [1120-1170]	Water or other rapid cool
WP347	CR347	S34700	1900[1040]	Water or other rapid cool
WP347H	CR347H	S34709	1925[1050]	Water or other rapid cool
WP348	CR348	S34800	1900[1040]	Water or other rapid cool
WP348H	CR348H	S34809	1925[1050]	Water or other rapid cool
WPS38815	CRS38815	S38815	1950[1065]	Water or other rapid cool

8. Tensile Properties :-

8.1 The tensile properties of the fitting material shall conform to the requirements of table 5 .

The testing and reporting shall be performed in accordance with Test Methods and Definitions A370 .

8.1.1 specimens cut either longitudinally or transversely shall be acceptable for the tensile test .

8.1.2 While Table 5 specifies elongation requirements for both longitudinal and transverse specimens it is not the intent that both requirements apply simultaneously . Instead , it is intended that only the elongation requirement that is appropriate for the specimens used be applicable .

8.2 Records of the tension test made on the starting material shall be certification that the material of the fitting meets the requirements of this specification provided that heat treatments are the same .

8.3 If the raw material was not tested , or if the heat treatment of the raw material was different than the heat treatment of the fitting , the fitting manufacturer shall perform at least one tension test per heat on material representative of the fitting , and in the same condition of heat treatment as the fitting it represents . qualification of welding procedures shall be in accordance with 5.8 .

8.4 If a tension test through the weld is desired , Supplementary Requirement S51 in Specification A960/A960M should be specified .

VISHAL STEEL (India)

13/6, Silver Cinema Building, 2nd Khetwadi Back

Road, Mumbai 400004, India

+91-22-67521137 / 23898841

info@vishalsteel.com, vishalsteelindia@yahoo.com



**ASTM A403/A403M-10
Standard Specification for Wrought Austenitic**

Stainless Steel Piping Fittings A403



TABLE 5 Tensile Requirements

All WP and CR Grades	Yield Strength , min , ksi [MPa]	Tensile Strength , min , Ksi [MPa]
304,304LN,304H,309,310S,316,316LN, 317,317L,321,321H,347,347H,348,348H	30[205]	75[515]
S31725		
S31727	36[245]	80[550]
S32053	43[295]	93[640]
304L,316L	25[170]	70[485]
304N,316N,S31726	35[240]	80[550]
XM-19	55[380]	100[690]
S31254	44[300]	94[650] to 119[820]
S33228	27[185]	73[500]
S34565	60[415]	115[795]
S38815	37[255]	78[540]

9. Hydrostatic Tests

10. Surface Quality

11. Dimensions :-

11.1 :For fittings covered by ASME B16.9 , ASME B 16.11 , MSS-SP-43 , MSS-SP-79 , MSS-SP-83 , MSS-SP-95 , or MSS – SP-97 , the sizes , shapes , and dimensions of the fittings shall be as specified in those standards .

11.1.1 Fittings of size or shape differing from these standards , but meeting all other requirements of this specification , may be furnished in accordance with Supplementary Requirement S58 Specification A960/A960M.

12. Rejection and Rehearing

13. Test Reports

14. Product Marking :-

14.1 All fittings shall have the prescribed information stamped or otherwise suitable marked on each fitting in accordance with the latest edition of MSS SP-25 . See Table 6 for marking example of grades and classes .

14.2 Marking paint or ink shall not contain harmful amount of chlorides , metals , or metallic salt , such as zinc or copper , that cause corrosive attack on heating . on wall

VISHAL STEEL (India)

13/6, Silver Cinema Building, 2nd Khetwadi Back

Road, Mumbai 400004, India

+91-22-67521137 / 23898841

info@vishalsteel.com, vishalsteelindia@yahoo.com



**ASTM A403/A403M-10
Standard Specification for Wrought Austenitic**

Stainless Steel Piping Fittings A403



thickness thinner than 0.083 in . [2.1 mm] , no metal impression stamps shall be used . Vibrating pencil marking is acceptable .

14.3 The prescribed information for butt-welding fittings shall be : the manufacturers name or trademark (see Note 1) , schedule number or nominal wall thickness designation , size , grade (see Table 2) , class , and the heat number or manufacturers heat identification . the class S marking need not be added to the material grade for threaded or socket – welded fittings .

14.4 The prescribed information for threaded or socket – welding fittings shall be : the manufacturers name or trademark (see Note 1) , pressure class or schedule number , grade (see Table 2) and class , and heat number or manufactures heat identification .

14.5 Fittings meeting the chemical and mechanical property requirements of Table 2 and Table 5 for more than one grade designation may be marked with more than one class or grade designation , such as WP304/304H ; WP304/304L ; WP304/304L/304N , WP316/316L , etc .

14.6 Bar Coding – In addition to the requirements in 14.1 , 14.2 , 14.3 ,14.4 , and 14.5 , bar coding is acceptable as a supplementary identification method . The purchaser may specify in the order a specific bar coding system to be used . The bar coding system , if applied at the discretion of the supplier , should be consistent with one of the published industry standards for bar coding . If used on small fittings , the bar code may be applied to the box or a substantially applied tag .

TABLE 6 Product Marking Examples for Grades and Classes

Grade and Class Marking	Description
CR304	Singe grade : No classes in CR grade
CR304/304L	Multiple grades , meet chemical and mechanical properties of each
WP304-S	Single grade : seamless
WP304-W	Single Grade ; welded : RT or UT pipe welds with filler metal and all fitting manufacture’s welds
WP304-WX	Single grade: welded : RT all welds with or without filler metal
WP304-WU	Single grade ; welded : UT all welds with or without filler metal
WP304-304L-S	Multiple grades : meet chemical and mechanical properties of each : seamless

15. Keywords :-

15.1 austenitic stainless steel ; corrosive service applications ; pipe fittings ; steel ; pipe applications ; pressure containing parts ; stainless steel fittings .

SUPPLEMENTARY REQUIREMENTS :- S1. Special Filler Metal

S2. Stabilization Treatment

VISHAL STEEL (India)

13/6, Silver Cinema Building, 2nd Khetwadi Back

Road, Mumbai 400004, India

+91-22-67521137 / 23898841

info@vishalsteel.com, vishalsteelindia@yahoo.com



Stainless Steel Buttweld Fittings Manufacturers in India

WP347, WP347H, WP321, WP321H, WP317L, WP316, WP316H, WP316L, WP304, 304H, WP304L (ASTM A403 & ASME SA403) - Buttweld Fittings manufacturers in India

Vishal Steel (India) is a premier worldwide supplier for all your Stainless Steel Buttweld Fittings **A403 / SA403** needs.

Trade Name	Grade	UNS #	Buttweld Fittings
304	WP304	S30400	A403* / SA403*
304L	WP304L	S30403	A403* / SA403*
304H	WP304H	S30409	A403* / SA403*
316	WP316	S31600	A403* / SA403*
316L	WP316L	S31603	A403* / SA403*
316H	WP316H	S31609	A403* / SA403*
321	WP321	S32100	A403* / SA403*
321H	WP321H	S32109	A403* / SA403*
347	WP347	S34700	A403* / SA403*
347H	WP347H	S34709	A403* / SA403*
317L	WP317L	S31703	A403* / SA403*

Materials in industry standard designations: 5S, 10S, 40S, 80S per B36.19
Special customer designated nominal and minimum wall thicknesses can also be furnished.
Non standard OD & ID are available.

This specification covers wrought stainless steel fittings for pressure piping applications. Several grades of austenitic stainless steel alloys are included in this specification. Grades are designated with a prefix, based on the applicable ASTM/ASME or MSS standards. For each of the WP stainless grades, several classes of fittings are specified, to indicate whether seamless or welded construction was utilized. Class designations are also utilized to indicate the nondestructive test method and extent of nondestructive examination. A general summary of the fitting classes applicable to all WP grades of stainless steel follows. There are no classes for the CR grades.

VISHAL STEEL (India)

13/6, Silver Cinema Building, 2nd Khetwadi Back

Road, Mumbai 400004, India

+91-22-67521137 / 23898841

info@vishalsteel.com, vishalsteelindia@yahoo.com



Stainless Steel Buttweld Fittings Manufacturers in India

WP347, WP347H, WP321, WP321H, WP317L, WP316, WP316H, WP316L, WP304, 304H, WP304L (ASTM A403 & ASME SA403) - Buttweld Fittings manufacturers in India

Fitting Classes for WP Grades

CR	Corrosion resistant grade. S through WU Classes do not apply.
WP-S	Seamless
WP-W	Welded, RT or UT all pipe starting material welds made with filler metal. All fitting manufacturer welds except as excluded in A/SA403 paragraph 5.4.3. If UT is substituted for RT, all welds must be examined 100% for their length as required by A/SA403 paragraph 5.6
WP-WX	RT all welds with or without filler metal.
WP-WU	UT all welds with or without filler metal.
WPgrade-grade-class	Insert grades (304-304L) and class (S,W,WX, or WU). Applies to fittings meeting all chemical and physical requirements of both grades.

Material furnished to A/SA403* shall conform to the requirements of Specification A960/A960M including any supplementary requirements that are indicated in the purchase order. In case of conflict between A/SA403* and Specification A960/A960M, this specification shall prevail.

Specification A960/A960M identifies the ordering information that should be complied with when purchasing material to this specification.