C&N INDUSTRIAL GROUP LIMITED

ASTM A 420 Carbon Steel & Alloy Steel Pipe Fittings

1. General introduction

ASTM A 420/ A 420M covers seamless or welded carbon steel and alloy steel fittings which are for use in pressure piping and pressure vessel service at low temperature. These fittings can be furnished in the construction of elbows, tees, reducers, end caps, plugs, nipples, outlets, union and couplings in accordance with ASME B16.9, ASME B16.11, MSS SP 79, MSS SP 83, MSS SP 95, and MSS SP 97. The ASTM A 420 fittings can be made from forgings, bars, plates, seamless or weld pipes.

2. Chemical requirements of ASTM A 420 fittings

A 420	CHEMICAL COMPOSITION %										
GRADE	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	Cb	V
WPL6	0.30	0.50-1.35	0.035	0.040	0.15-0.40	0.40	0.30	0.12	0.40	0.02	0.08
WPL9	0.20	0.40-1.06	0.030	0.030	-	1.60-2.24	-	-	0.75-1.25	-	-
WPL3	0.20	0.31-0.64	0.050	0.050	0.13-0.37	3.2-3.8	-	-	-	-	-
WPL8	0.13	0.90	0.030	0.030	0.13-0.37	8.4-9.6	-	-	-	-	-

*There are 4 steel grades covered within ASTM A 420: WPL6, WPL9, WPL3 and WPL8.

*All the values are maximum unless otherwise specified.

3. Mechanical properties of ASTM A 420 fittings

ASTM A 420	MECHANICAL PROPERTIES		
GRADE	Tensile Strength MPa	Yield Strength MPa	Elongation %
WPL6	415-655	240	22
WPL9	435-610	315	20
WPL3	450-620	240	22
WPL8	690-865	515	16

*All values provided are minimum unless otherwise specified.

*Elongation values are provided for longitudinal and standard round specimen.

4. Impact charpy test

Impact charpy test is very important and necessary for materials used in low temperature services. All materials furnished under ASTM A 420 standard shall be tested for impact resistance at the temperature for the respective grade.

CHARPY TEST REQUIREMENTS FOR ASTM A 420 WPL6, WPL3, WPL9				
Size of Specimen	Charpy V-Notch Impact Value Required for Acceptance (Ave. of 3 specimens)		Minimum Charpy V-Notch Impact Value without Requiring Reset(one specimen)	
mm	ft*lbf	J	ft*lbf	J
10 by 10.0	13.0	17.6	10.0	13.6
10 by 7.5	10.0	13.6	8.0	10.8
10 by 5.0	7.0	9.5	5.0	7.0
10 by 2.5	4.0	5.4	3.0	4.1

CHARPY TEST REQUIREMENTS FOR ASTM A 420 WPL8				
Size of Specimen	Charpy V-Notch Impact Value Required for Acceptance (Ave. of 3 specimens)		Minimum Charpy V-Notch Impact Value without Requiring Reset(one specimen)	
mm	ft*lbf	J	ft*lbf	J
10 by 10.0	25.0	33.9	20.0	27.1
10 by 7.5	21.0	28.5	17.0	23.1
10 by 5.0	17.0	23.1	14.0	19.0
10 by 2.5	8.0	10.8	6.0	8.1

5. Heat treatment for ASTM A 420 materials

All ASTM A 420 fittings shall be furnished in normalized, normalized and tempered, annealed, or quenched and tempered condition. All welding(if any) shall be completed prior to the austenitizing heat treatment. The full thickness of the material from which impact test specimens are to be obtained shall be heat treated in accordance with respective standard.

Besides, although hydraulic test is not required, all fittings shall be capable of withstanding without failure, leakage, a hydro-static test pressure equal to that prescribed for the specified matching pipe of equivalent material. The fittings shall also pass the dimensional examination and visual inspection