

ASTM A 387 Chrome Molybdenum Pressure Vessel Quality Plate

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A387 is a steel grade intended for use in boilers and pressure vessels designed for high temperature use. The grade is a chrome molybdenum low alloy steel and is available in plate form from Oakley Steel.

The ASTM A387 standard covers 10 grades of A387 – 2, 5, 9, 11, 12, 21, 21L, 22, 22L, and 91. These grades are differentiated by the amount of Chromium and Molybdenum in the alloy. The Molybdenum component is either 0.5% or 1% whilst the Chromium content ranges from 0.5% for grade 2 to 9% for grade 91.

Oakley Steel offers grades 5, 11, 12 and 22. Grade 91 isn't generally produced in Europe.

To satisfy the various engineering requirements of boiler manufacturers the different grades can be supplied as Class 1 or Class 2. Class 2 offers a higher yield and tensile strength but the chemical composition is the same for both classes. We only offer Class 2 as, generally, it will meet the design requirements of customers needing both Class 1 and Class 2 A 387 plate. Tensile strengths range from 485 - 620 MPa for grade 2 to 515-690 MPa for Grade 9.

Whilst it is possible for very thick plates to be produced that meet the requirements of the standard these usually have to be specially rolled to your requirements. For high availability the thickest plates usually on hand are 150mm thick for grade 12 and less for the other grades.

A387 is killed and plates require heat treatment before use. Generally annealing, normalising and tempering is undertaken by the mill, but where plates are supplied without heat treatment they are annealed and stress relieved.

SA 387 Grade 5

- Thickness: 5 - 80mm
- Width: 1500, 2000, 2500, 3000mm
- Length: up to 12000mm

SA 387 Grade 11

- Thickness: 6 - 60mm
- Width: 1500, 2000, 2500, 3000mm
- Length: up to 12000mm

SA 387 Grade 12

- Thickness: 3 - 150mm
- Width: 1500, 2000, 2500, 3000mm
- Length: up to 12000mm

SA 387 Grade 22

- Thickness: 4 - 120mm
- Width: 1500, 2000, 2500, 3000mm
- Length: up to 12000mm

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- Thickness: 1, 5 - 300mm
- Width: 2000, 2500, 3000mm
- Length: up to 12000mm



Carbon and low alloy boiler and pressure vessel steel plate

quality steel supplied for: oil & gas, petrochemical & process, construction & shipbuilding industries

Mechanical Properties

	A 387 Grade 5		A 387 Grade 11		A 387 Grade 12		A 387 Grade 22	
	Class 1	Class 2	Class 1	Class 2	Class 1	Class 2	Class 1	Class 2
Tensile Strength (ksi)	60 – 85	75 – 100	60 – 85	70 – 90	50 – 80	65 – 85	60 – 85	75 – 100
Tensile Strength (MPa)	415 – 585	515 – 690	415 – 585	485 – 620	380 – 550	450 – 585	415 – 585	515 – 690
Yield Strength (ksi)	30	45	35	45	33	40	30	45
Yield Strength (MPa)	205	310	240	310	230	275	205	310
Elongation in 200mm (%)	-	-	19	18	18	19	-	-
Elongation in 50mm (%)	18	18	22	22	22	22	18	18
Reduction of area in %	45	45	-	-	-	-	45	45

Chemical Properties

	Grade 5	Grade 11	Grade 12	Grade 22
Carbon				
Heat Analysis	0.15 max	0.05 – 0.17	0.05 – 0.17	0.05 – 0.15
Product Analysis	0.15 max	0.04 – 0.17	0.04 – 0.17	0.04 – 0.15
Manganese				
Heat Analysis	0.3 – 0.6	0.4 – 0.65	0.4 – 0.65	0.3 – 0.6
Product Analysis	0.25 – 0.66	0.35 – 0.73	0.35 – 0.73	0.25 – 0.66
Phosphorous				
Heat Analysis	0.035	0.035	0.035	0.035
Product Analysis	0.035	0.035	0.035	0.035
Sulphur				
Heat Analysis	0.030	0.035	0.035	0.035
Product Analysis	0.030	0.035	0.035	0.035
Silicon				
Heat Analysis	0.5 max	0.5 – 0.80	0.15 – 0.4	0.5 max
Product Analysis	0.55 max	0.44 – 0.86	0.13 – 0.45	0.5 max
Chromium				
Heat Analysis	4.00 – 6.00	1.0 – 1.5	0.8 – 1.15	2.0 – 2.5
Product Analysis	3.9 – 6.1	0.94 – 1.56	0.74 – 1.21	1.88 – 2.62
Molybdenum				
Heat Analysis	0.45 – 0.65	0.45 – 0.65	0.45 – 0.6	0.9 – 1.1
Product Analysis	0.40 – 0.7	0.40 – 0.7	0.4 – 0.65	0.85 – 1.15

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