SA/AS 1548 - PT460NRA (L0, L20) XLERPLATE® steel

Revision 2 January 2015

This literature supersedes all previous issues

Plate – PL **Pressure Vessel - PV**

GENERAL DESCRIPTION

A fully killed, fine grained, carbon-manganese steel for boiler and pressure vessel applications, with a guaranteed minimum tensile strength of 460MPa. Produced by normalised rolling. Tested in the normalised and stress relieved condition

AUSTRALIAN STANDARDS

AS 1548: 2008
AS/NZS 1365: 1996

FEATURES & BENEFITS

- Guaranteed tensile strength levels
- Grades with elevated temperature properties available
- Grades with guaranteed low temperature properties available
- Excellent weldability and formability
- This grade is recognised in the ASME material code

WARNINGS

- This material should be used in conjunction with the appropriate design and welding standards
- Guidelines for cold bending, where fracture toughness is important are given in AS 4100 and AS 1210
- This material must be normalised and/or hot formed by the customer to ensure the properties of the plate meet the requirements of the standard

NORMAL / OPTIONAL SUPPLY CONDITIONS

	Normal	Optional
Size Availability	Refer to XLERPLATE® Size schedule 4	460NRAL0 is available by enquiry only
Edge Condition	Trimmed	
Tolerances	Thickness: AS 1548: 2008 Others: AS/NZS 1365: 1996	
Ultrasonic Inspection	AS 1710: 2007 available	
Surface Inspection	BlueScope Steel	Third party
Certification	BlueScope Steel	Third party endorsed

Optional supply conditions may be subject to dimensional restrictions

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CHEMICAL COMPOSITION

Element	Guaranteed Maximum %	Typical % Thickness (mm)	
		8 ≤ t ≤ 80	80 < t ≤ 100
Carbon	0.20	0.15	0.15
Silicon	0.60	0.35	0.35
Manganese	1.70	1.35	1.35
Phosphorus	0.040	0.020	0.020
Sulfur	0.030	0.010	0.003
Chrome	0.25	0.017	0.023
Nickel	0.50	0.023	0.021
Copper	0.40	0.010	0.017
Molybdenum	0.10	0.003	0.002
Aluminium	0.100	0.035	0.035
Titanium	0.040	0.018	0.018
Niobium*	0.010	0.003	0.005

All values shown refer to the relevant Australian Standard unless otherwise stated

$$CEQ(IIW) = C + \frac{Mn}{6} + \frac{(Cr + Mo + V)}{5} + \frac{(Cu + Ni)}{15}$$

* Niobium (up to 0.030%) may be added for L20, L40, L50 grades

MECHANICAL PROPERTIES

Tensile Properties (Transverse)		Thickness (mm)			
		t ≤ 16	16 < t ≤ 40	40 < t ≤ 80	80 < t ≤ 100
Yield Strength (MPa)	Guaranteed Min	305	295	275	265
	Typical	320 - 430	310 - 420	290 - 370	290 – 350
Tensile Strength (MPa)	Required	460 - 580	460 - 580	460 - 580	460 - 580
	Typical	470 - 530	470 - 530	470 - 530	470 – 530
Elong. On 5.65$\sqrt{S_0}$ (%)	Guaranteed Min	21	21	21	21
	Typical	24 - 39	23 - 36	24 - 36	24 – 36

Charpy Impact Properties	Longitudinal on 10 x 10mm specimen	Test Temperature °C	Absorbed Energy (joules)	
			Av. Of 3	Ind.
Guaranteed Min	PT460NRA	0	31	23
Typical			40 - 110	30 – 140
Guaranteed Min	PT460NRAL0	0	51	38
Typical			55 – 110	40 – 140
Guaranteed Min	PT460NRAL20	-20	47	35
Typical			55 - 110	40 - 140

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PT460NRAH– Elevated Temp. Tensile Properties - Guaranteed Min 0.2% Proof Stress (MPa)									
Thickness (mm)	50°C	100°C	150°C	200°C	250°C	300°C	350°C	400°C	450°C
t ≤ 16	295	277	257	236	216	199	184	173	163
16 < t ≤ 40	285	268	249	228	209	192	178	167	157
40 < t ≤ 80	266	250	232	213	195	179	166	156	145
80 < t ≤ 100	256	241	223	206	188	173	160	150	141

Values correspond to the lower trend curve determined according to EN10314 with a confidence limit of around 98% (2 standard deviations below the mean)

FORMABILITY

Thickness (mm)	Long	Trans
t < 20	1.5t	1.0t
20 ≤ t ≤ 50	6.0t	4.0t
T > 50	Hot form	

Recommended min. inside radii

HARDNESS

Typical
130 – 170BHN

WELDABILITY

Group
4

Refer to WTIA Technical Note 1 or AS/NZS 1554.1.