Part 2 Materials

2.1 Range of Structural Steel Grades and Sections

These Tables cover the full range of Australian produced structural steel hot-rolled open sections manufactured in accordance with:

- **AS/NZS 3678: Structural steel – Hot-rolled plates, floorplates and slabs**
- **AS/NZS 3679.1: Structural steel – Part 1: Hot-rolled bars and sections**
- **AS/NZS 3679.2: Structural steel – Part 2: Welded I sections**

The section sizes and their respective grades listed in the Tables include:

- **Grade 300 and Grade 400 Welded Beams (WB) and Welded Columns (WC) to AS/NZS 3679.2**
- **Grade 300 Universal Beams (UB), Universal Columns (UC), Parallel Flange Channels (PFC), Taper Flange Beams (TFB), Equal Angles (EA) and Unequal Angles (UA) to AS/NZS 3679.1**
- **Grade 300 Tees cut from Universal Beams (BT) and from Universal Columns (CT).**

The grade designation (e.g. 300) is based on the nominal minimum yield stress of the steel (in MPa).

Note: Grade 300 in the Tables also refers to the 300PLUS^{TM} steels. Such steels comply with AS/NZS 3679.1– Grade 300 or AS/NZS 3679.2 - Grade 300 steels as appropriate. 300PLUS^{TM} is a registered trademark of OneSteel Limited.

2.1.1 Specifications

Hot-rolled open sections conforming with Australian Standards are regarded as high quality products and satisfy all the major design, fabrication and erection requirements for general structural conditions.

However, the Tables only apply to those open sections manufactured in accordance with AS/NZS 3678, AS/NZS 3679.1 and AS/NZS 3679.2 as appropriate.

Specifiers should also note that hot-rolled open sections not complying with these Standards may be required to be down-graded in yield stress, tensile strength and mechanical properties when designing to AS 4100 and welding to AS/NZS 1554.1.

To ensure that the assumptions, product benefits and quality of structural steel hot-rolled open sections on which these Tables are based are achieved in practice, designers should specifically nominate AS/NZS 3678, AS/NZS 3679.1 and AS/NZS 3679.2 complying products in their specifications and general notes. Such wording may be:

Unless Noted Otherwise (U.N.O) all material to be:

- Grade 250 Hot-rolled plates complying with AS/NZS 3678;
- Grade 300 Hot-rolled UB, UC, PFC, TFB, EA, UA and flat bars complying with AS/NZS 3679.1;
- Grade 300 Hot-rolled BT, CT cut from UB, UC complying with AS/NZS 3679.1;
- Grade 300 WB, WC complying with AS/NZS 3679.2.

Further information on appropriate specifications for the above products may be found in Steel Construction, Vol. 29, No. 3 [2.1] or by contacting ASI. [Ref. 2.1]

2.2 Yield tress and Tensile Strength

Table T2.1 lists the minimum yield stresses and tensile strengths for the hot-rolled open section grades covered by this publication and used for calculating the design capacities.

TABLE T2.1: Yield Stress and Tensile Strength for each Steel Grade

Steel Standard	Form	Steel Grade	Thickness of Material t mm	Yield Stress f_y MPa	Tensile Strength f_u MPa
AS/NZS 3679.2	Plate	400	see AS/NZS 3678 – Grade 400 below		
AS/NZS 3679.2	Plate	300	see AS/NZS 3678 – Grade 300 below		
AS/NZS 3679.1	Sections Flat bars	300	t < 11 11 ≤ t ≤ 17 t > 17	320 300 280	440
AS/NZS 3678	Plate	400	t ≤ 12 12 < t ≤ 20 20 < t ≤ 80	400 380 360	480
AS/NZS 3678	Plate	300	t ≤ 8 8 < t ≤ 12 12 < t ≤ 20 20 < t ≤ 50	320 310 300 280	430
AS/NZS 3678	Floorplate Plate	250	t ≤ 8 8 < t ≤ 12 12 < t ≤ 50	280 260 250	410

More detailed information on the design strengths and other mechanical properties of these steels can be found in Table 2.1 of AS 4100, the Standards listed in Table T2.1 or technical literature from the manufacturers listed in Section 2.8 [see Ref. 2.2].

2.3 Properties of Steel

The properties of steel adopted in this publication are shown in Table T2.2. Properties such as Poisson's Ratio and Coefficient of Thermal Expansion for structural steel are also listed in Table T2.2.

TABLE T2.2: Properties of Steel

Property	Symbol	Value
Elastic Modulus	E	200 x 10^3 MPa
Shear Modulus	G	80 x 10^3 MPa
Density	ρ	7850 kg/m^3
Poisson's Ratio	ν	0.25
Coefficient of Thermal Expansion	α_T	11.7 x 10^{-6} per °C