PART 2 MATERIALS

2.1 Range of Structural Steel Grades and Sections

Where applicable, these tables cover the full range of Australian produced structural steel hollow sections, manufactured in accordance with AS 1163, which are generally available and commonly used in Australia.

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

- **Grade C250 and Grade C350 Circular Hollow Sections (CHS)**
- **Grade C350 and Grade C450 Rectangular Hollow Sections (RHS)**
- **Grade C350 and Grade C450 Square Hollow Sections (SHS)**

The grade designation (e.g. C250) is based on the nominal minimum yield strength of the steel (in MPa). The prefix 'C' is used before the value of the nominal yield strength of the steel to indicate that the section is cold-formed. It should be noted that AS 1163 only considers cold-formed structural steel hollow sections. The suffix 'L0' denotes impact properties at 0°C as specified in AS 1163.

In these Tables:

- Grade "C250" refers to **both** C250 and C250L0
- Grade "C350" refers to **both** C350 and C350L0
- Grade "C450" refers to **both** C450 and C450L0

2.1.1 Specifications

Hollow sections produced in Australia are manufactured by cold-forming and high-frequency Electric Resistance Welding (ERW). The ERW process allows cold-formed hollow sections to be welded at ambient temperatures without subsequent stress relieving.

However, the Tables only apply to those hollow sections manufactured in accordance with AS 1163.

Specifiers should also note that hollow sections not complying with AS 1163 may be required to be down-graded in yield stress, tensile strength and other mechanical properties when designing to AS 4100 and welding to AS/NZS 1554.1.

To ensure the assumptions, product benefits and quality of structural steel hollow sections assumed in these Tables, designers should specifically nominate AS 1163 complying product in their specifications and general notes. Such wording may be:

Unless Noted Otherwise (U.N.O.) all CHS/RHS/SHS to be complying with AS 1163.

Further information on appropriate specifications for AS 1163 compliant product may be found in *Steel Construction,* Vol. 29, No. 3 [2.1] or by contacting AISC.

2.2 Yield Stress and Tensile Strength

Table T2.1 lists the minimum yield stresses and tensile strengths for the structural steel hollow section grades covered by this publication and used for calculating the design capacities.

TABLE T2.1: Yield Stress and Tensile Strength based on Steel Grade

Australian Standard	Steel Grade	Yield Stress f_y MPa	Tensile Strength f_u MPa
AS 1163	C250 and C250L0	250	320
	C350 and C350L0	350	430
	C450 and C450L0	450	500

More detailed information on the strengths and other mechanical properties of these steels can be found in Table 2.1 of AS 4100, AS 1163 or technical literature from the marketing departments of the manufacturers listed in Section 2.8.

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

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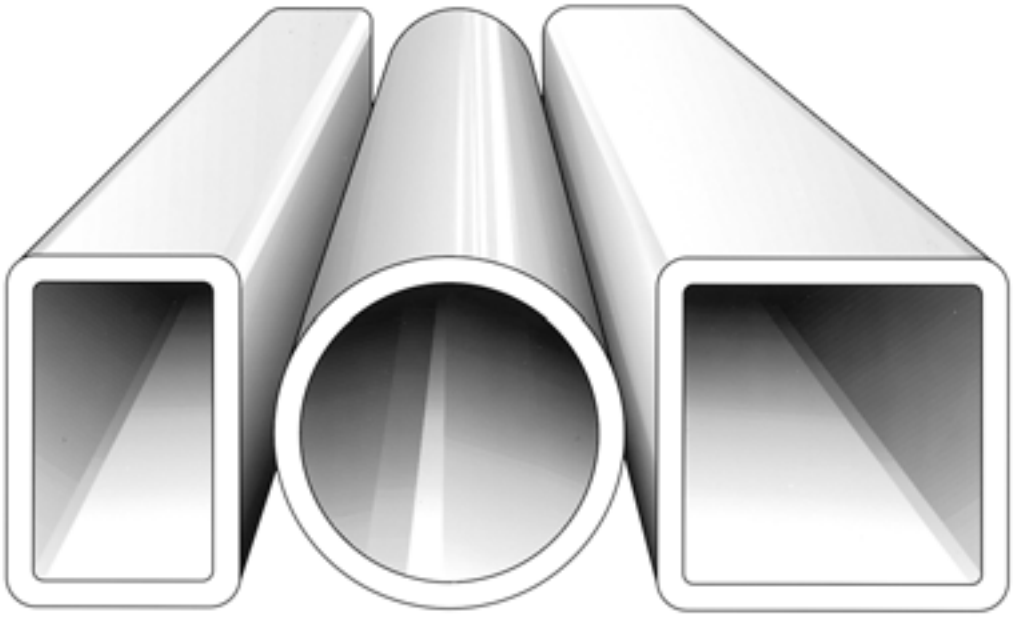

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second edition

CHS - Grade C250/C350 (to AS 1163)

RHS - Grade C350/C450 (to AS 1163)

SHS - Grade C350/C450 (to AS 1163)

LIMIT STATES EDITION TO AS 4100-1998

$S^* \leq \phi R_u$

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NOTE: SEE SECTION 2.1 FOR THE SPECIFIC MATERAL STANDARD (AS 1163) REFERRED TO BY THE SECTION TYPE AND STEEL GRADE IN THIS PUBLICATION