

Design Capacity Tables
for structural steel
Volume 1: Open sections

fifth edition - 2016



AUSTRALIAN STEEL INSTITUTE

WB, WC – Grade 300/400 (to AS/NZS 3679.2)

UB, UC – Grade 300/350 (to AS/NZS 3679.1)

PFC, TFB – Grade 300/350 (to AS/NZS 3679.1)

BT, CT – Grade 300/350 (to AS/NZS 3679.1#)

EA, UA – Grade 300/350 (to AS/NZS 3679.1)

indicates the material Standard for the source product

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**Design Capacity Tables for Structural Steel
Volume 1: Open Sections**

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Foreword

This publication has been prepared by the Australian Steel Institute. The ASI is the nation's peak body representing and serving the steel industry. The ASI achieves industry and professional development by conducting regular seminars, publishing technical manuals available through its own bookshop, operating the largest steel industry library in the Southern Hemisphere, by delivering guest lectures at colleges and universities, and hosting a range of national and state-based committees providing cross-industry representation.

Acknowledgements

The majority of data in this fifth edition has been recalculated to provide increased significant figures (as noted below), updates based on known issues or new information not present in the previous edition (in particular the new 350 Grade tables). All recalculated data has been rigorously checked against either existing data or data calculated using alternative means.

The data recalculation has been undertaken by Chris Hackney of Revolutio, using the CHECKSTEEL software (<https://www.revolutio.com.au/>). ASI gratefully acknowledges the substantial contribution made by Chris.

Selected results, where necessary, were checked using a copy of LIMSTEEL (<http://sydney.edu.au/engineering/civil/research/case/software/#limsteel>) provided by the University of Sydney. ASI gratefully acknowledges this contribution.

In the development of previous editions of this publication, the ASI acknowledges with grateful thanks the significant technical and editorial contributions made by the following organisations and people: BlueScope Steel and OneSteel in terms of assistance and funding, Arun Syam, Bruce Chapman, Karunesh Narayan, Gianluca Ranzi, Emeritus Professor Nick Trahair, Raymond Loh, Russell Watkins, Tim Hogan and Dr Tim Wilkinson.

Calculation Basis

The calculations undertaken for the data presented in this fifth edition were based on the full precision of a 64 bit microprocessor. However, the input data for the calculations generally included cross section dimensional values with an accuracy to one decimal place. The results have been presented either to three significant figures or the decimal point, whichever is greater. The results may generally be considered accurate to three significant figures based on the accuracy of the input data.

Preface

This fifth edition of the Design Capacity Tables for Structural Steel – Vol 1 (DCTv1) is a design aid to the limit states Standard AS 4100-1998 Steel Structures published by Standards Australia. The DCTv1 only considers standard open type hot-rolled sections and standard open sections manufactured from hot-rolled plate.

The general term 'open' is used to differentiate such sections from structural steel hollow sections. As noted in the previous editions, the AISC Design Capacity Tables for Structural Steel (DCT) series of publications have been split into volumes, i.e. Volume 1 considers open sections, Volume 2 considers hollow sections, Volume 3 considers simple connections to open sections while Volume 4 considers rigid connections to open sections.

The second edition of the DCTv1 reflected a change in the base grade of steel from Grade 250 to Grade 300 for most standard open sections. This left some sections (Taper Flange Beams, smaller Equal/Unequal Angles and Taper Flange Channels) listed as Grade 250 sections as the source Australian mill was still producing such sections in this grade at the time of publication. In 1997, Addendum Number 1 to the second edition of DCTv1 was released to reflect the change in these remaining sections from Grade 250 to Grade 300.

The third edition of DCTv1 combined the previous Grade 300/250 edition and its Addendum. Consequently, apart from the higher strength Grade 400 Welded Beams/Columns, all the currently specified hot-rolled structural steel sections were now listed in one edition as Grade 300. Additionally, this edition considered the changes incorporated into the 1998 version of AS 4100, general updating of information and alignment to a common format which is consistent with Volume 2.

For the fourth edition, rewriting of parts of the introductory text to each Part was undertaken for reasons of updating and clarification. In Part 2, updating of Table T2.3 was necessary to reflect current supply arrangements while extensive re-writing of Part 4 was undertaken to make the section clearer and to align one example with a separately published example. In Part 3, tables of section properties with holes in one flange were deleted since they are now incorporated in Design Guide 13 – Splice Connections where the information is directly relevant in the design of cover plate splices. In Part 8, the tables for eccentrically loaded single angles in trusses were deleted, with a view to publishing these separately with additional explanatory material. Part 9 and Part 10 were extensively re-written to reflect the publication of the Connection Series Part 1 (Simple Connections – 2007) and Part 2 (Rigid Connections – 2009). Part 10 had some material deleted that was covered in Connection Series Part 1. Parts 11 and 12 were revised to reflect material supply arrangements. Table 1 in Part 13 was revised to reflect an improved calculation basis for the torsion constant, the warping constant and the introduction of the 'monosymmetry constant'.

For the fifth edition, the primary changes to the fourth edition include the addition of a significant number of tables and graphs to document the performance of the newly entered 350 Grade material for UB and UC sections, PFC sections, cut Tee sections, angle sections and TFB sections. The tables and table numbering were also re-arranged to better reflect a logical structure for the document given the new material provided. Section 9 has been updated to reflect new welding consumable strengths in the 2012 amendment to AS 4100.

P. Key – Editor for Revisions, Fifth Edition

May 2016