

TATA STEEL



Technical Interview

Design of Welded Joints

How to design tubular steel welded joints with ease and confidence

Chris Morris, Structural Technical Advisory Engineer at Tata Steel, has worked in the field of welded joints for more than 20 years. His recognised expertise means he sits on the Connections Group of the British Construction Steelwork Association – advising members on connections and joints.

Chris answers questions about the help available to customers designing welded joints in Tata Steel's structural hollow section.

I'm designing with Tata Steel structural hollow section. How can you make my life easier?

With the aid of our free design tools, designing with our structural hollow section is not difficult. We've produced a publication, 'Design of welded joints', to help you through the design process. We developed the publication specifically for use with our premium structural hollow section products. We also offer free, related software that's simple to use.



Will your publication help to ensure trouble-free fabrication?

Yes. As the geometry, section sizes and grades determine the joint resistance, it's important to consider joint design at the analysis stage. Failure to do so often results in late changes to section sizes or joint stiffening.

Our publication allows verification that the joints' parameters are met and that there is sufficient joint capacity. This will help avoid costly and time-consuming problems when it comes to fabrication.

The publication takes you through the process step by step – looking at the performance parameters of our products before you undertake detailed design calculations.

Is the publication fully in line with European standards for welded joint design of structural tube?

Yes. First off, Celsius® 355 is designed for use with EN 1993-1-8:2005 and our 'Design of welded joints' publication is also based on this standard. It means you can use the publication with confidence. It will help you to ensure that your designs comply with the standard. It will also help you to make the most efficient use of our Celsius® 355 hot-finished structural hollows.

Is your software also in line with the Eurocodes?

Yes, the same goes for our software, 'Tata Steel tubular joints'. We've developed this software based on EN 1993-1-8:2005.

Can I be sure your design tools are up to date with the latest version of the standard?

Yes. Tata Steel is represented on EN bodies so we're close to any developments regarding Eurocodes. It means we can always be sure that our tools reflect all the latest amendments to the standard.

I'm designing to BS 5950. Can I still use Tata Steel's design tools?

Yes you can. For welded tubular joints, BS 5950 refers you to the draft version of the Eurocodes (DD ENV 1993-1-1/A1). This version has now

been superseded by EN 1993-1-8:2005. As both BS 5950 and the Eurocodes are 'ultimate limit state' design, Tata Steel's publication and related software are compatible with both codes.

What type of welded joints does your publication cover?

It covers many different types of welded joint for square, rectangular and circular hollow sections. These include T-joints, Y-joints, X-joints, K-joints, KT-joints and knee joints. UC chord K- and N-joints with tubular bracings are also included.

Our 'Design of welded joints' guide also includes advice for some joint types that aren't covered in other publications. These include unidirectional K-joints and N-joints where both bracings act in the same direction.

Your publication includes lots of formulae. Does your software make it easier to apply these?

Yes it does. All you need is Excel and Windows and you can use our free 'Tata Steel tubular joints' software. It means you can apply the formulae with ease to your designs.

What type of welded joints does the Tata Steel software cover?

We've ensured that the software covers the most common types of welded joints. It covers T-joints, Y-joints, X-joints and K-joints in either all circular hollow sections or all square/rectangular hollow sections for Celsius® 355.

Is the software easy to use?

Recent feedback from our customers highlights that both our software and our publication are user-friendly.

Writing the software was challenging, due to the complexity and variation of the equations to cover multiple conditions. We obviously wanted to make sure that the software covered welded joint scenarios in enough detail to meet engineers' requirements. But by using our knowledge and experience of welded joints, we've made sure the software is simple to use.



The 'Tata Steel tubular joints' software comes with an instruction manual covering installation and registration. It also explains how to use all of the software features in simple terms that are easy to understand.

The software has some great features. It will indicate if your welded joint design is outside the application limits – and then help you to bring it back within limits. It will also indicate if joint resistance is insufficient and guide you on what needs to be changed to increase it.

How do I access Tata Steel's 'Design of welded joints' publication?

You can download the publication from our website at:
http://www.tatasteeleurope.com/en/products_and_services/products/long/tubes/tubes_publications/

How can I obtain the 'Tata Steel tubular joints' software?

Simply email technicalmarketing@tatasteel.com requesting a copy of the software. A return email will be sent with a link to the software and simple installation instructions.

For queries on welded joints or more information about Tata Steel's free design tools for welded joint design, please contact Chris at:

E: christopher.morris@tatasteel.com

T: +44 (0)1536 404012

Tata Steel

PO Box 101, Weldon Road, Corby,

Northants NN17 5UA, United Kingdom

T: +44 (0) 1536 402121 F: +44 (0) 1536 404111

marketing@tatasteel.com www.tatasteelconstruction.com

English Language TST57:PDF:UK:12/2013

www.tatasteeleurope.com

While care has been taken to ensure that the information contained in this publication is accurate, neither Tata Steel Europe Limited, nor its subsidiaries, accept responsibility or liability for errors or for information which is found to be misleading.

Copyright 2013
Tata Steel Europe Limited