

Fasten595020030119-.xlt
From Techno Consultants Ltd
An Excel Template for Designing & Detailing
Bolts and Welds to BS5950-1: 2000

Introduction

Fasten5950 is an Excel Template for Designing & Detailing Bolts and Welds to BS5950-1: 2000. The bolts can be Ordinary, Countersunk or High Strength Friction Grip Bolts. Welds can be Fillet or Butt.

Loading the Template on to your computer

Fasten5950 is supplied as an Excel 97 Template, having .XLT as its filename extension.

To load Fasten5950 on to your computer, copy this file into Microsoft Office folder for its Templates. Generally the path to this folder in Excel 97 is:

C:\Program Files\Microsoft Office\Templates

If you are using Excel 2000, the path to this folder is:

C:\Windows\Application Data\Microsoft\Templates

To load and use the Template in Excel 97 or Excel 2000, choose:

File, New and then select the file Fasten595020030119-

If you receive an Excel Warning about running Macros and are prompted for whether to load them, answer YES to Load and Enable Macros. Fasten5950 incorporates VB Macros and to allow your computer to use them is vital for its operation.

Features

Fasten5950 gives capacities of Hexagon Head Bolts, Countersunk Bolts, High Strength Friction Grip Bolts, Fillet Welds and Butt Welds using BS5950-1: 2000

It also includes data worksheets for detailing bolts. The information includes: dimensions of bolts and nuts, washers, various bolt hole sizes, spacing of holes and back marks, bolt symbols, etc. The Tensile Stress Areas are taken from BS 4190 for Ordinary Black Bolts, BS 3692 for Precision Bolts and BS 4933 for Countersunk Bolts. The Tensile Stress Areas and Proof Loads for HSFG Bolts are taken from BS 4395: Part 1 for General Grade and BS 4395: Part 2 for Higher Grade (Parallel Shank). Scope & method details of various worksheets are described below.

Non-preloaded Hexagon Head & Countersunk Bolts

This worksheet calculates various capacities: Tensile, Single Shear, Double Shear and Bearing for various Ply thicknesses. The features are:

Bolt Heads can be: Normal or Countersunk

Bolt Grades can be: 4.6, 6.8, 8.8, 10.9 and HSFG General and HSFG Higher Grade

Shear Plane can be: Bolt Threads or Shank

When Shear Plane in the Shank is selected, a warning is displayed to remind that Threads should not be in the Shear Plane and that the use of many washers may be necessary to achieve it.

Bolt Holes can be Clearance, Over-size, Short-slotted, Long-slotted and Kidney-shaped

Bolt Diameters are: M1.6, M2, M2.5, M3, M4, M5, M6, M8, M10, M12, (M14), M16, (M18), M20, (M22), M24, (M27), M30, (M33), M36, (M39), M42, (M45), (M52), M56, (M60), M64 and (M68), the sizes in brackets being non-preferred.

Hole Edge Distance can be any user-typed value from 1.25 to 2.0 of the Bolt Hole Diameter D.

Connected Ply Grades can be: S275, S355 and S460

Connected Ply Thickness can be any User-Typed Values. They can be changed at the head row of bearing values (shown in light green cell background) to suit any value required for design.

The Combined Tension and Shear Capacity can also be calculated for each bolt diameter. For any typed value of Applied Tension F_t , the corresponding Shear Capacity F_s of Threads or Shank is displayed in the adjacent cell.

Three Colours and Font styles are used to display Bearing Capacities. Values below the single shear capacity are displayed in Red and Normal font. Values above the single shear and below the double shear capacity are displayed in Blue and Bold. Values above the double shear capacity are shown in Green and Italic.

Preloaded HSFG Bolts

This worksheet calculates: Proof Load, Tension Capacity, Slip Resistance in Single/Double Shear and After-slip Bearing Capacities of bolts in various Ply thickness. for High Strength Friction Grip Bolts. The features are:

Bolt Grades can be: General Grade to BS4604: Part 1 and Higher Grade to BS4604: Part 2

Bolt Diameters are: M12, M16, M20, M22, M24, M27, M30 and M36 for General Grade and M16, M20, M22, M24, M27, M30 and M33 for Higher Grade Bolts

Bolt Holes can be: Clearance, Oversize, Short Slotted and Long Slotted Perpendicular to Load and Long-slotted parallel to load as defined in BS5950: Part 1

Slip Factor can be 0.2, 0.3, 0.4 and 0.5, depending upon the condition of faying surfaces described in Table 35 of the Code.

Design criteria for connections can be Non-slip in service and Non-slip under factored loads

Connected Ply Grades can be: S275, S355 and S460

Connected Ply Thickness can be any User-Typed Values. They can be changed at the head row of bearing values (shown in light green cell background) to suit any value required for design. The Combined Tension and Shear Capacity can also be calculated for each bolt diameter. For any typed value of Applied Tension Ft, the corresponding Shear Capacity Fs of Threads or Shank is displayed in the adjacent cell.

To display bearing capacities 3 colours and font styles are used. The values below the single shear capacity are shown in Red and Normal font. The values above the single shear and below the double shear capacity are shown in Blue and Bold. The values above the double shear capacity are shown in Green and Italic.

Fillet Weld Capacities

Two worksheets give Fillet Weld Capacities for Steel Grades S275, S355 and S460, using E35, E42 and E50 Electrodes.

One worksheet uses the Simple Method as per clause 6.8.7.2 and the other uses the Directional Method as per Clause 6.8.7.3 of the code.

Butt Weld Capacities

Gives Capacities for Full Penetration Butt Welds. The capacities calculated are Shear and Tension/Compression strength for Steel Grades S275, S355 and S460 using E35, E42 and E50 electrodes respectively.