Maryland Metrics Technical Data Chart

British standards (BS) & codes related to steel construction

Structural steel

BS 970 : specification for wrought steels for mechanical and allied engineering purposes

BS 1449 : steel plate, sheet and strip (many sections)

(note: several sections withdrawn and replaced by BS EN's)

BS 1501 : steels for pressure purposes : plates

Part 3 : 1990 : specification for corrosion and heat-resisting steels

BS 1502 : 1982 (1990) : specification for steels for fired and unfired pressure vessels : sections and bars

BS 1639 : 1964 (1997) : methods for bend testing of metals

BS 4360 : specification for weldable structural steels


BS 5996 : 1993 : specification for acceptance levels for internal imperfections in steel plate, strip and wide flats, based on ultrasonic testing

BS 7191 : 1989 : specification for weldable structural steels for fixed offshore structures

BS 7668 : 1994 : specification for weldable structural steels. Hot finished structural hollow sections in weather resistant steels

BS EN 10002 : tensile testing of metallic materials

BS EN 10002-1 : 1990 : method of test at ambient temperature

BS EN 10020 : 1991 : definition and classification of grades of steel

BS EN 10021 : 1993 : general technical delivery requirements for steel and iron products

BS EN 10025 : 1993 : hot-rolled products of non-alloy structural steels : technical delivery conditions

BS EN 10027 : designation systems for steel

BS EN 10027-1 : 1992 : steel names, principal symbols

BS EN 10027-2 : 1992 : steel numbers

(see also dd 214)

BS EN 10028 : flat products made of steels for pressure purposes

BS EN 10028-1 : 1993 : general requirements

BS EN 10028-2 : 1993 : non alloy and alloy steels with specified elevated temperature properties

BS EN 10028-3 : 1993 : weldable fine grain steels, normalized

BS EN 10028-4 : 1995 : nickel alloy steels with specified low temperature properties

BS EN 10028-5 : 1997 : weldable fine grain steels, thermo mechanically rolled
Steel products


BS 4848: hot rolled structural steel sections


BS EN 10024: 1995: hot rolled taper flange I sections: tolerances on shape and dimensions

BS EN 10029: 1991: tolerances on dimensions, shape and mass for hot rolled steel plates 3mm thick or above

BS EN 10034: 1993: structural steel I and h sections: tolerances on shape and dimensions

Tolerances on dimensions and shape (including amendment a1 : 1997)

BS EN 10055 : 1996 : hot rolled steel equal flange tees with radiused root and toes : dimensions and tolerances on shape and dimensions

BS EN 10056-2 : 1993 : specification for structural steel equal and unequal angles : tolerances on shape and dimensions

BS EN 10067 : 1997 : hot rolled bulb flats : dimensions and tolerances on shape, dimensions and mass

BS EN 10163 : specification for delivery requirements for surface conditions of hot-rolled steel plates, wide flats and sections

BS EN 10163-1 : 1991 : general requirements

BS EN 10163-2 : 1991 : plates and wide flats

BS EN 10163-3 : 1991 : sections

BS EN 10210-2 : 1997 : hot finished structural hollow sections of non-alloy and fine grain structural steels. Tolerances, dimensions and sectional properties

BS EN 10219-2 : 1997 : cold formed structural hollow sections of non-alloy and fine grain structural steels. Tolerances, dimensions and sectional properties

BS EN 10248-2 : 1996 : hot rolled sheet piling of non-alloy steels : tolerances on shape and dimensions

BS EN 10249-2 : 1996 : cold formed sheet piling of non-alloy steels : tolerances on shape and dimensions

Euronorm 91 : 1981 : hot-rolled wide flats : tolerances on dimensions, shape and mass

**Cold rolled thin gauge sections and sheets**

BS 1449 : steel plate, sheet and strip

Section 1.9 : 1991 : specification for cold rolled narrow strip based on formability

BS 2994 : 1976 (1987) : specification for cold rolled steel sections

BS 5950 : structural use of steelwork in buildings

Part 5 : 1987 : code of practice for the design of cold rolled sections

Part 6 : 1995 : code of practice for design of light gauge profiled steel sheeting

Part 7 : 1992 : specification for materials and workmanship : cold formed sections

Part 9 : 1994 : code of practice for stressed skin design

BS EN 10048 : 1997 : hot rolled narrow steel strip : tolerances on dimensions and shape

BS EN 10130 : 1991 : cold rolled low carbon steel flat products for cold forming : technical delivery conditions

BS EN 10131 : 1991 : cold rolled uncoated low carbon and high yield strength steel flat products for cold forming

BS EN 10140 : 1997 : cold rolled narrow steel strip : tolerances on dimensions and shape


BS EN 10143 : 1993 : continuously hot dip metal coated steel sheet and strip : tolerances on dimensions and shape

BS EN 10149 : hot rolled flat products made of high yield strength steels for cold forming
BS EN 10149-1 : 1996 : general delivery conditions
BS EN 10149-2 : 1996 : delivery conditions for thermo mechanically rolled steels
BS EN 10149-3 : 1996 : delivery conditions for normalized or normalized rolled steels
BS EN 10169 : continuously organic coated (coil coated) steel flat products
BS EN 10169-1 : 1997 : general information (definitions, materials, tolerances, test methods)
BS EN 10214 : 1995 : continuously hot-dip zinc-aluminium (za) coated steel strip and sheet : technical delivery conditions
BS EN 10215 : 1995 : continuously hot-dip aluminium-zinc (az) coated steel strip and sheet : technical delivery conditions
BS EN 10238 : 1997 : automatically blast cleaned and automatically primed structural steel products
ISO 4995 : 1993 : hot rolled steel sheet of structural quality
ISO 4997 : 1991 : cold reduced steel sheet of structural quality
ISO 5951 : 1993 : hot rolled steel sheet of higher yield strength with improved formability
ISO 6316 : 1993 : hot rolled steel strip of structural quality

**Castings and forgings**

BS 3100 : 1991 : specification for steel castings for general engineering purposes
BS 4080 : specification for severity levels for discontinuities in steel castings
Part 2 : 1989 : surface discontinuities revealed by penetrant flaw detection
BS 4570 : 1985 : specification for fusion welding of castings
BS 4670 : 1971 (1987) : specification for alloy steel forgings
BS 6208 : 1990 : method for ultrasonic testing of ferritic steel castings including quality levels
BS 6615 : 1996 : specification for dimensional tolerances for metal and metal alloy castings
BS EN 1369 : 1997 : founding : magnetic particle inspection
BS EN 1560 : 1997 : founding : designation system for cast iron : material symbols and material number
BS EN 1561 : 1997 : founding : grey cast irons
BS EN 1563 : 1997 : founding : spheroidal graphite cast irons
BS EN 1564 : 1997 : founding : austempered ductile cast irons
BS EN 10213 : technical delivery conditions for steel castings for pressure purposes
BS EN 10213-1 : 1996 : general
BS EN 10213-2 : 1996 : steel grades for use at room temperature and at elevated temperatures
BS EN 10213-3 : 1996 : steels for use at low temperatures
BS EN 10213-4 : 1996 : austenitic and austenitic-ferritic steel grades
Steel construction components

BS 405 : 1987 : specification for uncoated expanded metal carbon steel sheets for general purposes

BS 1091 : 1963 (obsolescent) : specification for pressed steel gutters, rainwater pipes, fittings and accessories (superseded in part or entirely by BS EN 1462 : 1997)

BS 1245 : 1975 (1986) : specification for metal door frames (steel)

BS 1494 : specification for fixing accessories for building purposes

Part 1 : 1964 : fixings for sheet, roof and wall coverings

BS 2994 : 1976(1987) : specification for cold rolled steel sections

BS 4592 : industrial type flooring, walkways and stair treads

Part 1 : 1995 : specification for open bar gratings


Part 3 : 1987 : specification for cold formed planks

Part 5 : 1995 : specification for solid plates in steel, aluminium and glass reinforced plastics

BS 4904 : 1978 (1997) : specification for external cladding colors for building purposes

BS 5234 : partitions, including matching linings

Part 1 : 1992 : code of practice for design and installations

BS 5427 : code of practice for the use of profiled sheet for roof and wall cladding on buildings

Part 1 : 1996 : design

BS 5977 : lintels

Part 2 : 1983 : specification for prefabricated lintels

BS 6510 : 1984 : specification for steel windows, sills, window boards and doors

BS EN 1462 : 1997 : brackets for eaves gutters : requirements and testing

Reinforcement etc.

BS 4449 : 1997 : specification for carbon steel bars for the reinforcement of concrete

BS 4466 : 1989 : specification for scheduling, dimensioning, bending and cutting of steel reinforcement for concrete

BS 4482 : 1985 : specification for cold reduced steel wire for the reinforcement of concrete

BS 4483 : 1985 : specification for steel fabric for the reinforcement of concrete

BS 4486 : 1980 : specification for hot rolled and hot rolled and processed high tensile alloy steel bars for the pre-stressing of concrete

BS 5896 : 1980 : specification for high tensile steel wire and strand for the pre-stressing of concrete

BS 6744 : 1986 : specification for austenitic stainless bars for the reinforcement of concrete

BS 7123 : 1989 : specification for metal arc welding of steel for concrete reinforcement
Welding materials and processes

General

BS 499: welding terms and symbols
Part 1: 1991: glossary for welding, brazing and thermal cutting

BS EN 719: 1994: welding co-ordination. Tasks and responsibilities

BS EN 729: quality requirements for welding. Fusion welding of metallic materials

BS EN 729-1: 1995: guidelines for selection and use

BS EN 729-2: 1995: comprehensive quality requirements

BS EN 729-3: 1995: standard quality requirements

BS EN 729-4: 1995: elementary quality requirements

BS EN 24063: 1992: welding, brazing, soldering and braze welding of metals: nomenclature of processes and reference numbers for symbolic representation on drawings


Process and consumables

BS 4515: 1996: specification for welding of steel pipelines on land and offshore

BS 4570: 1985: fusion welding of steel castings

BS 5135: 1984: specification for arc welding of carbon and carbon manganese steels

BS 5465: 1987: specification for electrodes and fluxes for the submerged arc welding of austenitic stainless steels

BS 7084: 1989: specification for carbon and carbon-manganese steel tubular cored welding electrodes

BS 7123: 1989: specification for metal arc welding of steel for concrete reinforcement

BS 7475: 1991: specification for fusion welding of austenitic stainless steels

BS EN 440: 1995: welding consumables: wire electrodes and deposits for gas shielded metal arc welding of non-alloy and fine grain steels: classification

BS EN 499: 1995: welding consumables: covered electrodes for manual metal arc welding of non alloy and fine grain steels: classification

BS EN 756: 1996: welding consumables: wire electrodes and wire-flux combinations for submerged arc welding of non-alloy and fine grain steels: classification

BS EN 757: 1997: welding consumables: covered electrodes for manual metal arc welding of high strength steels: classification

BS EN 758: 1997: welding consumables: tubular cored electrodes for metal arc welding with and without a gas shield of non-alloy and fine grain steels: classification
BS EN 759 : 1997 : welding consumables : technical delivery conditions for welding filler metals : types of product, dimensions, tolerances and marking

BS EN 760 : 1996 : welding consumables : fluxes for submerged arc welding : classification

Testing and examination

BS 709 : 1983 : methods of destructive testing fusion welded joints and weld metal in steel

BS 2600 : radiographic examination of fusion welded butt joints in steel

Part 1 : 1983 : methods for steel 2mm up to and including 50mm thick

Part 2 : 1973 : methods for steel over 50mm up to and including 200mm thick


BS 2910 : 1986 : methods for radiographic examination of fusion welded circumferential butt joints in steel pipes

BS 3683 : glossary of terms used in non-destructive testing

Part 2 : 1985 : magnetic particle flaw detection

Part 3 : 1984 : radiological flaw detection

Part 4 : 1985 : ultrasonic flaw detection

BS 3923 : methods for ultrasonic examination of welds


BS 4872 : specification for approval testing of welders when welding procedure approval is not required


Part 2 : 1972 : automatic examination of fusion welded butt joints in ferritic steels


BS 7339 : 1990 : code of practice for supplementary checking of metallic materials of construction in pressurized systems

BS EN 287 : approval testing of welders for fusion welding

BS EN 287-1 : 1992 : steels

BS EN 288 : specification and approval of welding procedures for metallic materials

BS EN 288-1 : 1992 : general rules for fusion welding

BS EN 288-2 : 1992 : welding procedure specification for arc welding

BS EN 288-3 : 1992 : welding procedure tests for the arc welding of steels

BS EN 288-5 : 1995 : approval by using approved welding consumables for arc welding

BS EN 288-6 : 1995 : approval related to previous experience

BS EN 288-7 : 1995 : approval by a standard welding procedure for arc welding

BS EN 288-8 : 1995 : approval by a pre-production welding test
BS EN 970 : 1997 : non-destructive examination of fusion welds : visual examination

BS EN 25817 : 1992 : arc-welded joints in steel : guidance on quality levels for imperfections

Pd 6493 : 1991 : guidance on methods for assessing the acceptability of flaws in fusion welded structures

**Bolts and fasteners**

BS 1494 : specification for fixing accessories for building services

Part 1 : 1964 : fixings for sheet, roof and wall coverings

BS 3692 : 1967 (obsolescent) : specification for ISO metric precision hexagon bolts, screws and nuts : metric units

BS 4190 : 1967 (obsolescent) : specification for ISO metric black hexagon bolts, screws and nuts

BS 4320 : 1968 : specification for metal washers for general engineering purposes. Metric series

BS 4395 : specification for high strength friction grip bolts and associated nuts and washers for structural engineering

Part 1 : 1969 : general grade

Part 2 : 1969 : higher grade bolts and nuts and general grade washers

BS 4604 : specification for the use of high strength friction grip bolts in structural steelwork. Metric series

Part 1 : 1970 : general grade

Part 2 : 1970 : higher grade (parallel shank)


BS 4882 : 1990 : specification for bolting for flanges and pressure containing purposes

BS 4933 : 1973 (obsolescent) : specification for ISO metric black cap and countersunk head bolts and screws with hexagonal nuts

BS 6105 : 1981 : specification for corrosion-resistant stainless steel fasteners

BS 7419 : 1991 : specification for holding down bolts

BS 7644 : direct tension indicators

Part 1 : 1993 : specification for compressible washers

Part 2 : 1993 : specification for nut face and bolt face washers

BS EN 20898 : mechanical properties of fasteners

BS EN 20898-1 : 1992 : bolts, screws and studs

BS EN 20898-2 : 1994 : nuts with specified proof load values - coarse thread

BS EN 24014 : 1992 : hexagon head bolts : product grades a and b

BS EN 24016 : 1992 : hexagon head bolts : product grade c

BS EN 24017 : 1992 : hexagon head screws : product grades a and b

BS EN 24018 : 1992 : hexagon head screws : product grade c

BS EN 24032 : 1992 : hexagon nuts, style 1 : products grades a and b
Fire resistance

BS 476 : fire tests on building materials and structures
Part 20 : 1987 : method for determination of the fire resistance of elements of construction (general principles)
Part 23 : 1987 : methods for determination of the contribution of components to the fire resistance of a structure

BS 5950 : structural use of steelwork in building
Part 8 : 1990 : code of practice for fire resistant design

BS 8202 : coatings for fire protection of building elements
Part 2 : 1992 : code of practice for the use of intumescent coating systems to metallic substrates for providing fire resistance

Corrosion prevention

BS 729 : 1971 (1994) : specification for hot dip galvanized coatings on iron and steel articles
BS 1706 : 1990 (1996) : method for specifying electroplated coatings of zinc and cadmium on iron and steel
BS 2523 : 1983 (obsolescent) : specification for lead-based priming paints
BS 2569 : specification for sprayed coatings
Part 2 : 1965 (1997) : protection of iron and steel against corrosion and oxidation at elevated temperatures
BS 3698 : 1964 (1979) (obsolescent) : specification for calcium plumbate priming paints
BS 3900 : methods of test for paints
(also numbered BS EN ISO 4263 : 1995)

BS 4147 : 1980(1987) : specification for bitumen based hot-applied coating materials for protecting iron and steel, including suitable primers where required
BS 4164 : 1987 : specification for coal-tar based hot-applied coating materials for iron and steel, including a suitable primer
BS 4652 : 1995 : specification for metallic zinc-rich priming paints (organic media)
BS 4921 : 1988 (1994) : specification for sherardized coatings on iron or steel
BS 5411 : methods of test for metallic and related coatings (parts 1-16)
Structural steel design

Loading

BS 5400: steel concrete and composite bridges

Part 2: 1978: specification for loads

BS 6399: loading for buildings

Part 1: 1996: code of practice for dead and imposed loads

Part 2: 1997: code of practice for wind loads


BS 8100: lattice towers and masts

Part 1: 1986: code of practice for loading

CP3: code of basic data for the design of buildings

Chapter V: part 2: 1972: wind loads

(replaced by BS 6399: part 2: 1997, but remains current so as to allow an overlap period)
Design

BS 449 : specification for the use of structural steel in building

Part 2 : 1969 : metric units

BS 2573 : rules for the design of cranes

Part 1 : 1983 : specification for classification, stress calculations and design criteria for structures

BS 2853 : 1957 : specification for the design and testing of steel overhead runway beams

BS 4076 : 1989 : specification for steel chimneys

BS 4211 : 1994 : specification for ladders for permanent access to chimneys, other high structures, silos and bins

BS 5395 : stairs, ladders and walkways


Part 2 : 1984 : code of practice for the design of helical and spiral stairs

Part 3 : 1985 : code of practice for the design of industrial type stairs, permanent ladders and walkways

BS 5400 : steel, concrete and composite bridges

Part 3 : 1982 : code of practice for design of steel bridges

Part 5 : 1979 : code of practice for design of composite bridges

Part 9 : 1983 : bridge bearings

Part 10 : 1980 : code of practice for fatigue

BS 5427 : code of practice for the use of profiled sheet for roof and wall cladding on buildings

Part 1 : 1996 : design

BS 5500 : 1997 : specification for unfired fusion welded pressure vessels

BS 5502 : buildings and structures for agriculture

Part 11 : 1996 : guide to regulations and sources of information


Part 22 : 1993 : code of practice for design, construction and loading

Part 23 : 1990 : code of practice for fire precautions
BS 5950: structural use of steelwork in building
Part 1: 1990: code of practice for design in simple and continuous construction: hot rolled sections
Part 3: section 3.1: 1990: design of simple and continuous composite beams
Part 4: 1994: code of practice for design of floors with profiled steel sheeting
Part 5: 1987: code of practice for design of cold formed sections
Part 6: 1995: code of practice for design of light gauge profiled steel sheeting
Part 8: 1990: code of practice for fire resistant design
Part 9: 1994: code of practice for stressed skin design

BS 5973: 1993: access and working scaffolds and special scaffold structures in steel
BS 5975: 1996: code of practice for false work
BS 6180: 1995: code of practice for barriers in and about buildings
BS 7608: 1993: code of practice for fatigue design and assessment of steel structures
BS 8100: lattice towers and masts
Part 2: 1986: guide to the background and use of part 1
Part 4: 1995: code of practice for loading of guyed masts
Dd 133: 1986: code of practice for strength assessment of members of lattice towers and masts

DD ENV1993: eurocode 3: design of steel structures
DD ENV1993-1-1: 1992: general rules and rules for buildings (together with UK nad)
DD ENV1994: eurocode 4: design of composite steel and concrete structures
DD ENV1998: eurocode 8: design provisions for earthquake resistance of structures
DD ENV1998-1-1: 1996: general rules: seismic actions and general requirements for structures

ISO 10721: steel structures
ISO 10721-1: 1997: part 1: materials and design

(Will not be implemented as a British standard. This international standard establishes a common basis for drafting national standards for the use of materials in steel structures and for their design, in order to ensure adequate and consistent measures regarding safety and serviceability).
Steel fabrication and erection

BS 4604: specification for the use of high strength friction grip bolts in structural steelwork. Metric series
- Part 1: 1970: general grade
- Part 2: 1970: higher grade (parallel shank)

BS 5400: steel, concrete and composite bridges
- Part 6: 1980: specification for materials and workmanship, steel
- BS 5531: 1988: code of practice for safety in erecting structural frames
- BS 5950: structural use of steelwork in building
- Part 2: 1992: specification for materials, fabrication and erection: hot rolled sections
- Part 7: 1992: specification for materials and workmanship: cold formed sections

Steel piling

BS 4: part 1: 1993: structural steel sections: specification for hot-rolled sections

BS 449: specification for the use of structural steel in building
- Part 2: 1969: metric units

BS 5400: steel concrete and composite bridges
- Part 1: 1988: general statement

BS 5493: 1977: code of practice for protective coating of iron and steel structures against corrosion
- BS 5930: 1981: code of practice for site investigations
- BS 5950: structural use of steelwork in building
- Part 1: 1990: code of practice for design in simple and continuous construction: hot rolled sections

BS 6349: maritime structures
- Part 1: 1984: general criteria

BS 8002: 1994: code of practice for earth-retaining systems
- BS 8004: 1986: code of practice for foundations
- BS 8081: 1989: code of practice for ground anchorages

BS EN 10248: hot rolled sheet piling of non alloy steels
- BS EN 10248-1: 1996: technical delivery conditions
- BS EN 10248-2: 1996: tolerances on shape and dimensions
- BS EN 10249: cold formed sheet piling of non alloy steels
- BS EN 10249-1: 1996: technical delivery conditions
Quality assurance

BS EN ISO 9000: quality management and quality assurance standards

BS EN ISO 9001: quality systems. Model for quality assurance in design, development, production, installation and servicing

BS EN ISO 9002: quality systems. Model for quality assurance in production, installation and servicing

BS EN ISO 9003: quality systems. Model for quality assurance in final inspection and test

BS EN ISO 9004: quality management and quality assurance standards

BS EN ISO 9004-1: guidelines