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# Welding — General tolerances for welded constructions — Dimensions for lengths and angles — Shape and position

The European Standard EN ISO 13920:1996 has the status of a British Standard.

BSI 25 96

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## CEMENT AND CONCRETE



# 2.1 CONCRETE

|              |   |                 |
|--------------|---|-----------------|
| <b>2.1.1</b> | <b>COMPRESSION TESTING MACHINES</b>     | <b>PAGE 112</b> |
| <b>2.1.2</b> | <b>FLEXURAL TESTING MACHINES</b>        | <b>PAGE 144</b> |
| <b>2.1.3</b> | <b>SPECIAL-PURPOSE TESTING MACHINES</b> | <b>PAGE 160</b> |
| <b>2.1.4</b> | <b>SAMPLE PREPARATION</b>               | <b>PAGE 176</b> |
| <b>2.1.5</b> | <b>FRESH CONCRETE</b>                   | <b>PAGE 184</b> |
| <b>2.1.6</b> | <b>NON-DESTRUCTIVE TESTING</b>          | <b>PAGE 193</b> |

| CEMS   | PAGE            | CEMS                                    | PAGE    |
|--|-----------------|---|---------|
| Abrams cone (Slump test)                     | 188             | Micro-Covermeter                        | 194     |
| Accessories for compression testing machines | 138-142         | Mixers                                  | 184-185 |
| Air compressor                               | 177             | Moisture tester                         | 199     |
| Air entrainment meters                       | 187             | Monotronic                              | 115     |
| Capping equipment                            | 182             | Moulds                                  | 176     |
| Calipers (Load tests)                        | 202             | New SC Power Technology                 | 112     |
| Compression Testing Machines                 | 123-137         | Permeometers                            | 189     |
| Concrete test hammer                         | 193             | Permeability/Impermeability             | 200     |
| Consistency                                  | 186-188         | Poker vibrators                         | 178-179 |
| Corrosion mapping system                     | 195             | Pull-off apparatus                      | 198     |
| Crack width gauges                           | 202             | Pull-off apparatus                      | 199     |
| Curing tanks                                 | 179-181         | Pundit ultrasonic tester                | 194     |
| Deflectometers                               | 203-204         | Sample curing                           | 179-181 |
| Eurotronic                                   | 116             | Saws                                    | 183     |
| Extensimeter - Deformeter                    | 197             | Self compacting concrete                | 190-191 |
| Field test for chlorides                     | 197             | Shrinkage (mould)                       | 200     |
| Flexural testing machine                     | 144             | Spares for compression testing machines | 142     |
| Flow tables                                  | 191             | Special testing machines                | 160     |
| Fresh concrete analysis                      | 186-189,190-192 | Temperature recorder                    | 185     |
| Grinding machines                            | 182             | Ve-Be consistometer                     | 188     |
| Length comparator                            | 192             | Vibrating tables                        | 178     |
| Loft deflection test                         | 203-204         | Windsor (penetrometer)                  | 196     |
| Microcore                                    | 201             | Yield buckets                           | 186     |

The following pages (17 – 28) detail the products required to install a 'Flat tape' lightning protection system. Additionally, accessories can be found on pages 39 – 40. Details of the flat tape conductors can be found in the Conductors section on pages 43 – 46.

**Air rod**

| Rod length | Rod diameter | Thread diameter | Material  | Weight each | Part No. |
|------------|--------------|-----------------|-----------|-------------|----------|
| 500mm      | 15mm         | 15mm            | Copper    | 0.73kg      | RA215    |
| 1000mm     | 15mm         | 15mm            | Copper    | 1.51kg      | RA225    |
| 1500mm     | 15mm         | 15mm            | Copper    | 2.29kg      | RA230    |
| 2000mm     | 15mm         | 15mm            | Copper    | 3.06kg      | RA240    |
| 3000mm     | 15mm         | 15mm            | Copper    | 4.70kg      | RA250    |
| 500mm      | 15mm         | 15mm            | Aluminium | 0.23kg      | RA015    |
| 1000mm     | 15mm         | 15mm            | Aluminium | 0.53kg      | RA025    |
| 1500mm     | 15mm         | 15mm            | Aluminium | 0.80kg      | RA030    |
| 2000mm     | 15mm         | 15mm            | Aluminium | 1.06kg      | RA040    |
| 3000mm     | 15mm         | 15mm            | Aluminium | 1.60kg      | RA050    |

Manufactured from high conductivity hard drawn copper or aluminium, with rolled threads. Supplied complete with locknut.

'Field Trial in the United States, carried out over many years research have confirmed that blunt air rods are struck by lightning in preference to taper pointed air rods.'

'Lightning rod improvement studies' by C. H. Moore, W. R. R. Smith, G. A. Koch, Journal of Applied Meteorology, May 2000. Note: during high winds and adverse weather conditions air rods over 1000mm long can be subjected to fatigue mechanisms. It is therefore recommended that additional supports are considered before installation.



Multiple point

| Rod diameter | Material | Weight each | Part No. |
|--------------|----------|-------------|----------|
| 15mm         | Copper   | 0.27kg      | RA600    |

Manufactured from high conductivity hard drawn copper, suitable for use with copper air rods only.

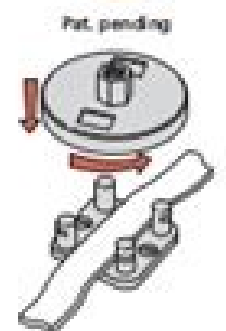
Air rod base

| Rod diameter | Thread diameter | Maximum conductor width | Material  | Weight each | Part No. |
|--------------|-----------------|-------------------------|-----------|-------------|----------|
| 15mm         | 16mm            | 25mm                    | Copper    | 0.43kg      | SW050-41 |
| 15mm         | 16mm            | 25mm                    | Aluminium | 0.14kg      | SW003-41 |

Manufactured from high quality copper and aluminium alloys. Simple to install, providing an effective connection between air rod and air termination tape.



Fix using countersunk wood screws (Part no. SW005 or SW105) and wall plugs (Part no. PS300). See page 39 for Accessories.



December 2014

**DIN EN 10088-2**

Supersedes DIN EN 10088-2:2005-09

**Stainless steels – Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes; English version EN 10088-2:2014, English translation of DIN EN 10088-2:2014-12**

Nichtrostende Stähle – Teil 2: Technische Lieferbedingungen für Blech und Band aus korrosionsbeständigen Stählen für allgemeine Verwendung; Englische Fassung EN 10088-2:2014, Englische Übersetzung von DIN EN 10088-2:2014-12

Aciers inoxydables – Partie 2: Conditions techniques de livraison des tôles et bandes en acier de résistance à la corrosion pour usage général; Version anglaise EN 10088-2:2014, Traduction anglaise de DIN EN 10088-2:2014-12

Document comprises 60 pages

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**EUROPEAN STANDARD**

**Case hardening steels – Technical delivery conditions**

**BSI**

Mechanical properties of austenitic grade bolts, screws, studs and nuts to BS EN ISO 3506[8].(from AD342) Property class Bolts, screws and studs Nuts Ultimate tensile strength (N/mm2) Stress at 0.2% permanent strain (N/mm2) Proof load stress (N/mm2) 50 500 210 500 70 700 450 700 80 800 600 800 For most structural applications, it is generally recommended that austenitic bolts grade A2 or A4 and property class 70 or 80 are used. The method that is most commonly used for shaping is to heat the steel to around 1,280°C in a reheat furnace and then roll the steel, squeezing it between sets of rolls. As leading British steel stockholders the Barrett Steel group comprises four divisions: General Steels; Engineering Steel; Tubes and Energy Products operate from locations across the UK, Ireland and the US. Dimensions and properties of these fasteners and fixings are provided by the manufacturers. The latter is the most commonly employed for structural applications. Today more efficient profiles have been developed for use as roof sheeting, wall cladding and decking for floors and are produced by a range of specialist manufacturers. NOTE 1 Products coated with (pure) aluminium can also be available, but are not covered by this European standard. A roughing stand reduces the continuously cast slab to an intermediate size by a series of reversing end-to-end passes through the mill. Some smaller more complex products, such as lintels, are formed using a press brake. [top]Duplex stainless steels 1.4162 (widely known as LDX 2101 @) 1.4462 (2205) 1.4162 is a duplex stainless steel with a lean chemical composition. The normal method of attachment is by self-drilling, self-tapping screws. This article reviews the various forms of steel construction products and describes how they are produced. They are typically 150-300mm deep and are sized and designed using Westok's freely available Cellbeam software package. This ensures coating adhesion – critical for manufacturing processes that stamp, roll or draw the steel into its final product shape. You're Reading a Free Preview Pages 31 to 42 are not shown in this preview. Light steel sections are manufactured by many different companies and the profile shapes and section sizes vary. Plate girders are used where standard rolled sections are inadequate in terms of load carrying capacity or stiffness. This process is illustrated below. You're Reading a Free Preview Pages 18 to 35 are not shown in this preview. The image shows a purlin being roll-formed from hot-dip galvanized strip steel. It is possible to ascertain the shape and dimensions of the existing structural steelwork by making a careful survey of the premises. SCI 1 8.0 B.1 BS EN ISO 3506-1:2020. All duplex steels are weldable, and have approximately twice the proof strength of austenitic stainless steels. 1 BS EN 10210-2:2019 Hot finished steel structural hollow sections. Guidance on corrosion rates of zinc in a range of environments is available in The Engineer's and Architect's Guide: Hot-dip Galvanizing Cold roll-forming process Press braking [top]Profiled sheeting Thin gauge galvanized steel strip is also cold formed into sheets with a regular profile. 1 BS EN 10219-2:2019 Cold formed welded steel structural hollow sections. [top]Availability of structural sections Sheet, plate, bar and circular hollow sections are all widely available in the stainless steels mentioned above. voestalpine Metsec plc is one of the UK's biggest construction specialist cold roll-forming companies, and part of the largest globally leading technology and capital goods group. Light steel sections are widely used as secondary structural steelwork in single-storey buildings. The resulting products are either used directly in fabrication of steel components, that are subsequently assembled into structures on site, or made into further products for use in construction. Light steel sections are produced in high volumes by cold rolling and in low volumes by press braking. Decking profiles [top]Cladding and Roofing Profiled sheeting is frequently used to form the weathertight building envelope and for this purpose sheets are produced with profiles that are efficient in spanning between supporting members and in channelling run-off, in sizes that are readily handled on site and which are easily lapped during installation. elongation (%) Steel name Steel number S220GD 1.0241 +Z, +ZF, +ZA, +ZM, +AZ 220 300 20 S250GD 1.0242 +Z, +ZF, +ZA, +ZM, +AZ 250 330 19 S280GD 1.0531 +Z, +ZF, +ZA, +ZM, +AZ 550 560 - In the grade designations given in the table: S - indicates structural quality steel The value, e.g. 220, indicates the yield strength of the steel in N/mm² GD - indicates that the product is dipped, galvanized Z and ZF, etc indicate the metallic coating applied to the steel, i.e. zinc (Z) and zinc-iron alloy (ZF), zinc-aluminium alloy (ZA), zinc-magnesium alloy (ZM), aluminium-zinc alloy (AZ) or aluminium-silicon alloy (AS). When choosing a stainless steel fastener, consideration should be given to matching the strength and corrosion resistance of the bolts and parent material. BSI SCI 172 Castings in Construction, 1996 SCI P363 Steel Building Design: Design Data, 2013A web-based interactive version of the 'Blue Book', is also available. The weld is formed instantly. There are two broad classes - shallow profiles, up to about 175 mm deep, which are used for short span applications, and 'deep decking', typically 225 mm deep, for longer spans. A range of structural sections (I-sections, angles, channels, tees, rectangular hollow sections) are stocked in the austenitic grades. The liquid metal cools and solidifies in the mould cavity and is then removed for cleaning. Steels of grade A4 contain molybdenum and have equivalent corrosion resistance to grade 1.4401. This reduction and reshaping process can be carried out hot or cold, which results in the distinction between 'hot finished' and 'cold formed' products. Steel castings are formed by pouring molten metal into a mould containing a cavity which has the desired shape of the component. A nominal yield strength of 355MPa is most commonly used in construction, although S460MPa sections are also available. USFBs can economically span up to 10m with structural depths that compare very favourably with R.C. flat slabs. There is a range of international standards for the materials and dimensions of bolts and nuts, including the various standards that define the thread form: NTS specialise in prime Hot and Cold hollow sections. Part 1 covers bolts, screws and studs; Part 2 covers nuts; Part 3 covers set-screws; and Part 4 covers self-tapping screws. In this Standard, bolts, screws and studs are designated by a letter followed by three numbers, e.g. A2-70 or A4-80. This intermediate slab is then rolled to its final size in a finishing stand. [top]Austenitic stainless steels 1.4301 (formerly known as 304) and 1.4307 (formerly known as 304L) 1.4401 (316) and 1.4404 (316L) Types 1.4301/1.4307 are the most commonly used standard austenitic stainless steels and contain 18-20% chromium and 8-11% nickel. BS EN 10346:2015 specifies requirements for continuously hot-dip coated products made of low carbon steels for cold forming, of steels for construction and of steels with high proof strength for cold forming coated with zinc (Z), zinc-iron alloy (ZF), zinc-aluminium alloy (ZA), zinc-magnesium alloy (ZM) in thicknesses of 0,20 mm ≤ t < 3,0 mm. Structural design of ferritic stainless steels. Individual manufacturers produce a wide range of cladding and roofing systems and provide comprehensive literature with fixing details and tables showing safe loads. As well as resulting in differences in dimensions (and thus section properties) between hot and cold rectangular dimensions, the choice of process affects residual stress in the section and this leads to a requirement in BS EN 1993-1-1[6] for different buckling curves. Technical delivery conditions. [top]Standard open sections British, European and International standards define dimensions for a wide variety of open section shapes, such as I and H shaped sections, angles and channels. The figure shows the stand in a universal mill used to create open sections. Dimensions and masses. Standard open sections [top]Proprietary open sections [top]Asymmetric shallow floor beams The USFB system (Image courtesy of Kloeckner Metals UK Westok) Asymmetric steel beams are often used as part of a shallow floor system. A deep girder also provides a deep web whose area may be minimised by reducing its thickness to the minimum required to carry the applied shear. The letter refers to the group of stainless steel: austenitic (A), martensitic (C) or ferritic (F). To avoid the risk of bimetallic corrosion stainless steel bolts should always be used when connecting stainless steel members. The mechanical properties of strip steel used in construction are given in BS EN 10346[1] and summarized below. To change the shape of a material as strong as steel the rolls must exert forces measured in hundreds of tonnes, and must also draw the steel continuously through the rolls while reducing the thickness. Their key feature is a wider bottom than top flange, which enables the slab to sit on the upper surface of the bottom flange with adequate bearing, rather than the upper surface of the top flange as found with downstand beams. 0.2% proof strength (N/mm2) Min. Cross References:EN 606EN 10020:2000EN 10021:2006EN 10027-1EN 10049EN 10079:2007EN 10143EN 10204:2004EN 10325EN ISO 6892-1:2009ISO 6892-1:2009ISO 10113ISO 10275EN 10149-ZEN 10152EN 10169EN ISO 14713-1ISO 14713-1:2009EN ISO 14713-2:2009All current amendments available at time of purchase are included with the purchase of this document. Property class 70 fasteners are made from cold drawn bar. A number of asymmetric shallow floor beams are available, including Ultra Shallow Floor Beams (USFB) from Kloeckner Metals UK Westok. For flat products, two horizontal rolls are set one above the other in an open housing. There are numerous proprietary fasteners for special applications, such as for blind fixing or for connecting parts without drilling holes, and fixings for attachment to concrete foundations or other structures. Close control of chemical composition is maintained to produce clean steels with consistent strength and toughness properties that meet all relevant national standards, as with all structural products, and state-of-the-art levellers produce flat plates with controlled residual stress. Dimensions, BSI. Fasteners. For use in building construction plate will normally be welded into fabricated sections. For that reason the billets, blooms, beam blanks and slabs from the steelmaking process are shaped into basic products at carefully controlled elevated temperatures. [top]Stainless steel fasteners and fixings The requirements for chemical composition and mechanical properties of stainless steel fasteners are specified in BS EN ISO 3506[8]. Beam mills include stands with both horizontal and vertical rolls bearing on the workpiece. Cold, roll-forming steel purlins The amount of metallic coating applied to the steel varies depending on the coating applied and the application. A standard range of duplex stainless steel sections are available from select producers and stockists, and sizes outside the standard range can be made by special order. The most common sections are illustrated right; the use of lips at free edges and indented profiles (such as shown in the middle example below) allow the use of thin elements that do not fail prematurely by local buckling. The sheets are separated by spacer rails and insulation. Kloeckner Metals UK Westok's USFBs are shallow and asymmetric Westok cellular beams, which are manufactured from standard rolled sections, and are available in increments of 1mm depth. [top]Fasteners and fixings The most commonly used fastener in steel construction is the familiar nut-and-bolt. Colcorcoat [top]Stainless steel products Stainless steel is the name given to a family of corrosion and heat resistant steels containing a minimum of 10.5% chromium. (Note that the 'internal' width between flanges is constant for any serial size - it is determined by the rolls - and an increase in flange thickness results in a corresponding increase in depth.) The nominal sizes of 'angles' are given in BS EN 10056[3] and these sections are typically defined by a serial size comprising the leg length, either equal or unequal, and the leg thickness. BSI 1 BS EN 10056-1:2017 Structural steel equal and unequal leg angles. Stainless steel bolts are also suitable for connecting galvanized steel and aluminium members. The floor slab in such systems may be in the form of a precast concrete slab or a composite slab with metal decking (either shallow or deep decking



be used). Because the panels act compositely, shallow profiles can be used. Corrosion resistance of the product is proportional to the coating thickness, and hence to its mass (see also 7.3.2). A nominal yield strength of 355MPa is most commonly used in construction, although 420MPa hot finished hollow sections are also available. To achieve the optimal economic benefit, it is important to select a stainless steel which is adequate for the application without being unnecessarily highly alloyed, and hence costly. Thicknesses typically vary from 1.2 to 3.2 mm. Those sponsors relevant to this article are as follows: Headline ArcelorMittal is a world leading steel company guided by a philosophy to produce safe, sustainable steel. In the continuous hot-dip galvanizing process, coils of rolled steel are continuously unwound and fed through cleaning and annealing sections before entering a molten zinc bath at speeds up to 200 metres per minute. Hence, substitution of hot-rolled sections with cold-formed sections should not be done without checking the implications on the design first. Dimensions for hollow sections are defined in BS EN 10210-2[4] for hot finished sections and BS EN 10219-2[5] for cold formed sections. Dimensions for design and detailing are given in SCI P363 . Further information on castings in construction is given in SCI P172. Steel plate is commonly used in many different and demanding applications including: Construction Earthmoving equipment Engineering and machinery Mining and quarrying Offshore oil, gas and pipelines Pressure vessels Renewable energy Ship building. [top]Long products - open sections Medium section mill Open sections range from large beams and piles, which are mainly used in construction, down to smaller products including rails, rods and bars. The design life such a coating provides depends on the corrosivity of the environment around the steelwork. In a universal mill the stands contain both vertical and horizontal rolls and the hot steel passes backwards and forwards through the same mill multiple times with the shape being formed by reducing the gap between rolls on successive passes. ultimate tensile strength (N/mm2) Min. It is therefore relatively common to provide transverse or longitudinal stiffeners. [top]Shaping steel Rolling beams in a universal mill Steel is a strong material that is highly resistant to shaping at normal temperatures but this resistance lessens considerably at higher temperatures. For long products there are two types of mills; structural and universal. The latter is followed by a number (1, 2, 3, 4 or 5) which defines a composition range. Heat treating may be required to meet desired properties, but there is no need for subsequent hot or cold working. Plate girders are designed to resist the applied actions using proportions that ensure low self-weight and high load resistance. For such secondary steelwork (e.g. cold rolled purlins) manufactured from pre-galvanized steel strip (e.g. grade S450GD+Z275 in accordance with BS EN 10346[1]) the galvanized coating has an average thickness of 20 microns each side. Usually, a single section size is used for both halves of the cellular beam but asymmetric sections can be created by using different rolled sections for each part of the new section. Where higher strength is required, then duplex stainless steels are most suitable as cost savings are often possible through use of thinner sections. For internal, light gauge, non-loadbearing components, such as stud partitioning, the standard coating weight is Z140. Fabricating a cellular beam (Images courtesy of Kloekner Metals UK Westok) [top]Light steel' sections Typical light steel sections A very wide range of lightweight structural sections is produced by cold forming thin gauge strip material to specific section profiles. 2022, Tata Steel Hybox® 355 technical guide, Structural hollow sections. You're Reading a Free Preview Pages 8 to 14 are not shown in this preview. These are often termed light steel sections. 1 BS EN 1993-1-1:2005+A1:2014, Eurocode 3: Design of steel structures. Having obtained this information a great deal of extra detail is still required such as: Probable material, i.e. cast iron, wrought iron or steel Geometrical properties of the different members Mechanical properties of the steelwork such as strength, toughness, ductility and weldability A couple of very useful resources for such data are the Historical Structural Steelwork Handbook, and compendium document Historical Structural Iron and Steel Sections - Properties of historical cast iron, wrought iron and steel sections [top] This website is maintained by Steel for Life with funding provided by a number of BCSA's Industry Members. In addition to metallic coatings, several strip steel construction products, particularly cladding products, have organic coatings applied to improve durability and aesthetic properties of the product. They can be made in a wide range of sizes and weights, the upper limits being governed by the particular casting process used, and the required mechanical properties and surface finish. Castings can be produced as one off components or in many thousands. Heavy section and medium section mills have three or four stands with grooved rolls corresponding to the initial roughing, and the intermediate and finishing stages of rolling. [top]Historical structural steelwork From time to time it is necessary to refurbish existing buildings of which little is known other than the approximate period when construction took place. When producers have state-of-the-art production methods, commercially produced stainless steels are often low carbon and 'dual certified' to both designations. Pipes of wall thicknesses above 16 mm or with diameters above 508 mm are produced by several consecutive forming processes and Submerged Arc Welded (SAW). Between us we have over 100,000T of steel available from stock and can offer additional processing services. For strip steel construction products the common coating weight applied is 275 g/m² of zinc. Typical uses include long-span floors in buildings, bridges and crane girders in industrial buildings. Bolts, screws and studs with specified property classes. Most profiles are manufactured from strip no thicker than 2 mm. NOTE 3 By agreement at the time of enquiry and order, this European Standard is applicable to other continuously hotdip coated hot rolled steel flat products (e.g. in accordance with EN 10149-2). This is the total coating weight over both surfaces. More comprehensive information on cladding systems can be found at Tata Colorcoat online. Steels of grade A2 have equivalent corrosion resistance to grade 1.4301. The most common form of strip steel used in construction is hot-dip galvanized coil. NOTE 2 The products covered by this European Standard are used where cold formability, high strength, a defined minimum yield strength and/or corrosion resistance are the most important factors. Plate mill control room Semi-finished billets, blooms, beam blanks and slabs from the continuous casting process are transformed into a variety of construction products by various processes of heating and mechanical working. Rolls are arranged in pairs, either just horizontally or both horizontally and vertically, and housed in a 'stand'. Providing products for the construction and manufacturing industries, we focus on adding value through expert design, precision manufacturing, and on-time in full product delivery. Forming finished steel construction products Rolling steel [top]Flat products - plates Plate mill stand Plates are available in a wide range of grades and sizes. These work rolls that contact the hot steel are often supported by larger diameter rolls to prevent them bending under the rolling loads to ensure a uniform thickness product. Serving customers worldwide Barrett Steel strategically work together in a forward-thinking philosophy. Shallow profiles are usually either of 'trapezoidal' or 're-entrant' profile, as shown below. BSI 1 2.0 2.1 BS EN 10365:2017 Hot rolled steel channels, I and H sections. Hot rolled Cold rolled Hot-dipped galvanized coil. [top]References 1 1.0 1.1 1.2 BS EN 10346:2015 Continuously hot-dip coated steel flat products for cold forming. [top]Flat products - strip Thin strip steel rolled into a coil Strip steel is used to produce many different products and in many applications. Hollow sections are typically produced in lengths 6m - 14.5m, depending on the size and thickness. BSI 1 BS EN ISO 898-1:2013 Mechanical properties of fasteners made of carbon steel and alloy steel. The final two numbers denote the property class, which describes the mechanical properties of the bolt, screw, stud or nut - see the table below. [top]Structural hollow sections There are two basic methods of producing hollow sections - the seamless process in which a hole is pierced through a hot solid bar to form the bore and then the bar is rolled to form the round tube, and the welded process in which a steel plate or strip is formed into a cylindrical shape and the edges welded together. Mechanical properties of hot dip galvanized strip steel from Table 7 BS EN 10346[1] Designation Mechanical properties Steel grade Symbols for the types of available coatings Min. Castings can operate at high and low temperatures, under high pressure and in severe environments. The steel material for bolts has a higher strength than ordinary structural steel, usually with an ultimate tensile strength of 800 or 1000 N/mm² and the material for nuts has a similar or higher strength. Production process for structural hollow sections Tata Steel produce their hollow sections under the trade names Celsius® 355 NH for hot finished sections and Hybox® 355 for cold formed sections. By cutting along the web of a beam section (usually a universal beam) to a particular profile, separating the two parts and then welding these Tee sections back together to form a deeper beam section. You're Reading a Free Preview Pages 17 to 26 are not shown in this preview. The mechanical properties, quality, integrity and consistency of cast steels are generally comparable with those of hot rolled and fabricated structural steels. For efficient design it is common to use a relatively deep girder to minimise flange area for a given applied moment. Tolerances, dimensions and sectional properties, BSI. Various types of mill are used to produce different long products. All galvanized coatings are metallurgically bonded to the steel they protect. It is specified as Z275. So, the low carbon version should be explicitly specified in the project documents when heavier sections are to be welded. Providing the correct grade of material is selected and an appropriate inspection and testing regime implemented, there is no reason why the composition, properties or performance of castings should be inferior in any way to that of fabricated components. At the point where the edges meet, a high frequency current is introduced into the edges of the strip, either by induction using an encircling coil or by contacts sliding on the surface of the strip. Hollow sections are typically defined by a serial size comprising the outer dimension(s), and the wall thickness. Coarse thread and fine pitch thread. The nominal sizes of 'universal beams' (UB), 'universal columns' (UC) and 'parallel flange channels' (PFC) are given in BS EN 10365[2]. Material properties for the products are discussed in a separate article. Built-up sheeting systems comprise two separate profiled sheets, an external sheet, which is highly profiled, and a lightly profiled inner liner sheet. The product passes through each roll gap only once. Generally, sections may be produced by cold forming, hot rolling, extrusion, welding or laser fusing. The electric current produces enough local heat to melt the strip edges as they are forged together. [top]Cellular beams Cellular beams, with regularly spaced holes in the web of an I-section beam can be produced in one of two ways. British sections product range datasheets, British Steel Celsius® Hot finished hollow sections to EN 10210. Hot rolled open sections are produced in lengths up to about 25 m. Examples of cellular beams produced via this process are available here These fabricated sections are produced by specialist companies such as Kloekner Westok, Fabsec and Jamestown and are purchased by the steelwork contractor to be fabricated into elements for a specific project. Gold National Tube Stockholders (NTS) and Cleveland Steel & Tubes (CST) are part of the privately owned Bianco Group. It is generally available in coiled form in widths from 900 to 1,800mm For a cold formed rectangular section, the corner radius is not as tight as can be achieved with the hot process (which makes it easy to distinguish the two types visibly). Depending on customer requirements, the coated sheet steel can be passivated, oiled and recoiled, and cut to length and palletized before shipment to the fabricator. General rules and rules for buildings, BSI 1 Technical data sheet ED023. [top]Castings Stainless steel glazing boss In some cases, particularly with very complex details, a steel casting may be more effective than a fabricated part. They are therefore well suited for use as structural sections. All are BES6001 accredited for responsible sourcing. CST specialise in pipes for construction and piling. The thickness is the final thickness of the delivered product after coating. Such sections are typically supplied in either the As Rolled (AR) or Thermomechanically Rolled (TM) supply conditions, and are rolled from continuously-cast blooms, billets or 'dog bones'. Steel grades are S355, S460 and Hstar including weathering steel rolled sections. Two main classes of product are produced - flat products such as plates, sheets or strips of uniform thickness, and long products which are lengths of a particular cross section, ranging from rectangular bars to double flange H sections. Deep decking is a trapezoidal profile, with indentations and embossments that are intended to improve the structural performance. Bolts, screws and studs with specified grades and property classes. We manufacture a range of sections including columns to UC356x406x1299, beams to UB920x420x1377 and European equivalents. Structural hollow sections [top]Fabricated products [top]Plate girders Plate girders.(Image courtesy of William Hare Ltd.) Modern plate girders are fabricated by welding together two flanges and a web plate. Mechanical properties of corrosion-resistant stainless steel fasteners. As such, they are popular in many sectors, particularly Education, Commercial and Residential. Types 1.4401/1.4404 contain about 17-18 % chromium, 8-11 % nickel and the addition of 2-3 % molybdenum which improves corrosion resistance. Plates with a nominal yield strength 275MPa or 355MPa, commonly used in construction, can be supplied in either the As Rolled, Normalised (N) or Normalised Rolled (NR) condition, and are rolled from continuously-cast slab. Bolts are manufactured by forging from round bar sections, usually with a hexagon shaped head. Built-up cladding system Insulated panel Composite panel cladding systems are produced as a sandwich construction comprising two profiled sheets bonded either side of an insulating core of foam, mineral fibre or similar material. Barrett Steel holds international accreditations including ISO 9001:2008, ISO 14001:2004 and CE approvals up to Execution Class 4 in BS EN 1090-1:2009. The definitions cover a very wide combination of cross sectional width and wall thickness; only a limited selection is manufactured and that selection may change from time to time, depending on demand and commercial judgment. By agreement at the time of enquiry and order, this European Standard is applicable to continuously hot-dip coated flat products of an expanded validity range defined for thicknesses t < 0.20mm or in thicknesses 3.0 mm ≤ t ≤ 6.5 mm with agreed mechanical properties and test specimens, adhesion of coating and surface condition requirements. This document applies to strip of all widths and to sheets cut from it (≥ 600 mm width) and cut lengths (< 600 mm width). The Standard was revised at the end of 2009 (and is currently undergoing a new revision which will include duplex steels for the first time) and now comprises four separate parts. Such a deep web may be quite slender (a high web depth to thickness ratio) and may be susceptible to shear and local buckling. Austenitic stainless steels are generally selected for structural applications which require a combination of corrosion resistance, formability and excellent field and shop weldability. In a structural mill there are multiple stands each containing specially shaped rolls where the full set of rolls gradually shape the hot steel in successive passes through separate roll gaps. In most cases, galvanized steel strip material is used. Note: 1.4307 and 1.4404 are low carbon stainless steels with reduced risk of sensitization and improved weld corrosion resistance when section thicknesses greater than about 3 mm are welded. [top]Suitable stainless steels for structural applications The corrosion protection of stainless steel Stainless steels are suitable for structural applications requiring long life, good corrosion resistance and/or a high-quality surface finish. By cutting the holes out of a web plate, and then welding on two flange plates. Normal plate sizes range from 5mm to 200mm thick, with widths up to 3.5m and lengths up to 18.0m. [top]Decking for floors Profiled sheeting for floors is primarily intended for use with concrete to create a composite floor slabs. 2010, Tata Steel Sections and Merchant Bar, ArcelorMittal, 2020 AD 342 Stainless steel fasteners Historical Structural Steelwork Handbook, Publication No. 11/84, BCSA 1984 Historical Structural Iron and Steel Sections, Properties of historical cast iron, wrought iron and steel sections, Publication No. 61/19, BCSA 2019 Steel manufacture Steel material properties UKCA marking The following stainless steels are most commonly encountered in structural applications (although advice on the use of ferritic stainless steel in structural applications is also now available[7]). European beams (IPE, HE and HL sections) and columns (HD sections) are also defined in BS EN 10365[2]. You're Reading a Free Preview Pages 8 to 13 are not shown in this preview. High speed rod and bar mills are used to roll products in small sizes, sometimes square or hexagonal, as well as rounds. There is a wide range of stainless steels with varying levels of corrosion resistance and strength, as a result of controlled alloying element additions. When less modern technology is used, this cannot be assumed and there may be a price premium for the low carbon specification. It has high strength, characteristic of all duplex stainless steels, with a corrosion resistance lying between 1.4301 and 1.4401 austenitic stainless steels. Square and Rectangular hollow sections are 'squared up' by passing them through a suitable series of work rolls that progressively changes the shape. Such sheets were first produced with a simple curved profile and are well known as 'corrugated roofs'. Hot-dip galvanized coil is used to form many different construction products including: In the final production process, the coils of steel are uncoiled, slit into appropriate widths and then cold, roll-formed into the final product form. Castings can have excellent surface finish and good welding and machining characteristics. Since the envelope forms a major visible feature, coloured coating systems are offered. The High Frequency Electric Resistance Welding (HFERV) method forms the bulk of tube production in small and medium sizes, up to 508 mm in diameter. The products covered by this European Standard can be used as substrates for organic coated flat products specified in EN 10169 for building and general engineering applications. The typical thickness used in construction is 0.4 to 3.2mm. Property class 80 fasteners are made from severely hard cold drawn bar, with mechanical properties similar to carbon steel and alloy steel grade 8.8 steel bolts to BS EN ISO 898[9]. It is possible to achieve high strength, high ductility and high toughness in the cast form. The steel strip then undergoes a series of mechanical or chemical treatments. They do not exhibit the effects of directionality on mechanical properties that exist in some wrought steels. It is available in three main forms. Steel strip is uncoiled and guided, cold, through sets of forming rolls to produce the cylindrical shape. The liner sheet and spacers are fixed to structure and the external sheet is fixed to the spacer. These sections are typically defined by a serial size (nominal flange width and section depth) and a weight per metre created by varying the thickness of the web and flanges. As the steel exits the molten zinc bath, gas 'knives' wipe off the excess coating from the steel sheet to control coating thickness.

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