

VOLUME 2 — MATERIALS

(Expanded – BS EN 1090-2:2018 + Eurocode 3 + UKCA)

(All organization names replaced with XXXXXX)

1. GENERAL MATERIAL REQUIREMENTS

1.1 Compliance with Standards

All materials used in the execution of structural steelwork shall comply with the latest editions of the relevant British and European Standards, including but not limited to:

- **BS EN 10025 (Hot-rolled structural steels)**
- **BS EN 10210 (Hot-finished hollow sections)**
- **BS EN 10219 (Cold-formed hollow sections)**
- **BS EN 10204 (Material certificates)**
- **BS EN ISO 14713 (Corrosion protection)**
- **BS EN ISO 12944 (Paint systems)**
- **BS EN ISO 1461 (Hot-dip galvanizing)**
- **BS EN 14399 / BS EN 15048 (Bolting systems)**

All materials shall be CE/UKCA marked in accordance with **BS EN 1090-1**.

1.2 Material Quality Requirements

Materials shall be:

- Free from cracks, laminations, surface defects, and harmful imperfections
 - Suitable for welding, bolting, forming, and cutting
 - Stored and handled to prevent corrosion, deformation, or contamination
 - Supplied with full traceability where required by the Execution Class
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1.3 Material Traceability

EXC1–EXC2

- Traceability required for main structural members only
- Certificates may be grouped by batch

EXC3–EXC4

- Full traceability required for all primary members
 - Each component must be linked to its material certificate
 - Heat numbers must be visible until final coating
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2. STRUCTURAL STEELS

2.1 Hot-Rolled Structural Steels

Hot-rolled steel sections, plates, and flats shall comply with:

- **BS EN 10025-2 (Non-alloy structural steels)**
- **BS EN 10025-3 (Normalized/normalized-rolled steels)**
- **BS EN 10025-4 (Thermo-mechanically rolled steels)**
- **BS EN 10025-6 (Quenched and tempered steels)**

Common Grades

- S235JR / S275JR / S355JR
- S355J2 / S355K2
- S460M / S460ML
- S460Q / S460QL

Requirements

- Impact toughness per standard
 - Chemical composition limits
 - Mechanical properties verified by 3.1 certificates
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2.2 Hollow Sections

Hot-Finished Hollow Sections

Shall comply with **BS EN 10210**.

Cold-Formed Hollow Sections

Shall comply with **BS EN 10219**.

Requirements

- No excessive ovality
- No local buckling

- Weld seams inspected per standard
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2.3 Steel Plates

Steel plates shall comply with **BS EN 10025** and shall be:

- Ultrasonically tested where required (EN 10160)
 - Supplied with lamination class Z15, Z25 or Z35 where required
 - Free from edge cracks and surface defects
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2.4 Steel Castings

Steel castings shall comply with:

- **BS EN 10293** (General engineering castings)
- **BS EN 10213** (Steel castings for pressure purposes, where applicable)

Castings shall be:

- Free from shrinkage cavities
 - Ultrasonically tested
 - Supplied with 3.1 certificates
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3. COLD-FORMED STEEL MEMBERS

3.1 Standards

Cold-formed members shall comply with:

- **BS EN 1993-1-3 (Eurocode 3 – Cold-formed members)**
- **BS EN 10346 (Continuously hot-dip coated steel)**
- **BS EN 10162 (Cold-formed profiles)**

3.2 Requirements

- No cracking at bends
 - Minimum internal radius per standard
 - No excessive spring-back
 - No local buckling
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4. WELDING CONSUMABLES

4.1 Standards

Welding consumables shall comply with:

- **BS EN ISO 2560 (Covered electrodes)**
- **BS EN ISO 14341 (GMAW wires)**
- **BS EN ISO 3580 (Low-alloy electrodes)**
- **BS EN ISO 17632 (Flux-cored wires)**
- **BS EN ISO 14171 (SAW wires and fluxes)**

4.2 Requirements

- Consumables shall match the mechanical properties of the parent metal
- Hydrogen-controlled consumables shall be used for S355 and above
- Consumables shall be stored in heated ovens where required
- Re-baking procedures shall be documented

5. MECHANICAL FASTENERS

5.1 General

Mechanical fasteners shall comply with:

- **BS EN 14399 (Preloaded bolt assemblies)**
- **BS EN 15048 (Non-preloaded bolts)**

5.2 Bolt Grades

- 8.8
- 10.9
- 12.9 (special applications only)

5.3 Nut Grades

- Grade 8
- Grade 10

5.4 Washer Requirements

Washers shall comply with:

- **BS EN ISO 7089 / 7090**

5.5 Surface Conditions

Slip-resistant surfaces shall comply with:

- **BS EN 1090-2 Table 18**
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6. ANCHOR BOLTS

6.1 Standards

Anchor bolts shall comply with:

- **BS EN ISO 898-1**
- **BS EN 15048**
- **BS EN 14399** (where preloading required)

6.2 Requirements

- Minimum embedment depth per design
 - Grouting per manufacturer recommendations
 - Corrosion protection per specification
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7. MATERIAL CERTIFICATES

7.1 Certificate Types

Certificates shall comply with **BS EN 10204**:

- **Type 2.1:** Non-specific inspection
- **Type 2.2:** Test report
- **Type 3.1:** Specific inspection (mandatory for EXC2–EXC4)
- **Type 3.2:** Third-party inspection (where required)

7.2 Mandatory Certificate Levels

Execution Class Certificate Type

EXC1	2.2
EXC2	3.1
EXC3	3.1
EXC4	3.2 (if required by Employer)

8. STORAGE & HANDLING

8.1 General Requirements

Materials shall be stored:

- Off the ground
- Protected from moisture
- Protected from mechanical damage
- In a manner preventing distortion

8.2 Steel Products

- Plates stored vertically or on timber spacers
- Hollow sections stored to avoid ovality
- No stacking beyond safe limits

8.3 Welding Consumables

- Stored in dry, heated conditions
- Opened packages kept in heated ovens
- Low-hydrogen electrodes re-baked per manufacturer instructions

8.4 Bolts & Fasteners

- Stored in sealed containers
- Protected from contamination
- Lubrication maintained

9. NON-CONFORMING MATERIALS

9.1 Identification

Non-conforming materials shall be:

- Tagged
- Quarantined
- Recorded in NCR log

9.2 Disposition

Non-conforming materials may be:

- Reworked
- Re-tested
- Rejected