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中国钢结构协会标准

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T/CSCSxxx-2025

钢结构建造质量控制标准
第 2 部分：钢材

Steel structures — Execution of structural steelwork
Part 2: Steels

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前 言

本标准参照GB/T 1.2—2020 给出的规则起草。

本标准参考了ISO 17607:2023 Execution of Structural Steelworks 的技术内容。

T/CSCS xxx —2025 《钢结构建造质量控制标准》分为如下七个部分：

——第1部分：基本要求和术语；

——第2部分：钢材；

——第3部分：制造；

——第4部分：安装；

——第5部分：焊接；

——第6部分：螺栓连接；

——第7部分：涂装。

本部分为T/CSCS xxx —2025的第2部分。

对应于ISO 17607:2023，本部分做了下列编辑性修改：

——“ISO 17607的本部分”修改为“**T/CSCS xxx**的本部分”；

——用小数点“.”代替作为小数点的逗号“,”；

——删除国际标准的前言和引言。

本部分的附录A为规范性附录，附录B为资料性附录。

本标准由中国钢结构协会管理。

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non- governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html. This document was prepared by Technical Committee ISO/TC 167, *Steel and aluminium structures*.

A list of all parts in the ISO 17607 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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钢结构建造质量控制标准—第二部分:钢材

Steel structures — Execution of structural steelwork— Part 2:Steels

1 范围

1 Scope

本文件规定了用于钢结构建造的钢材及钢产品的通用要求，这些钢材可作为整体结构或加工构件的一部分，须与T/CSCS XXX-1 配合使用。

This document defines the general requirements for the constituent products of steels and steel products used in the execution of structural steelwork as structures or as fabricated components in conjunction with ISO 17607-1.

有关钢结构建造中结构或构件的其他附加要求，详见T/CSCS XXX 系列标准的其他部分。

Additional requirements to be addressed in the execution of structural steelwork, as structures or as fabricated components, can be found in other parts of ISO 17607.

2 规范性引用文件

2 Normative references

本文件引用的下列文件，其部分或全部内容构成本文件的要求。对于注明日期的引用文件，仅适用所引用的版本；对于未注明日期的引用文件，适用其最新版本（包括任何修订）。

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies

ISO 630-1, 《结构钢— 第1部分：热轧产品的一般技术交货条件》

ISO 630-1, Structural steels —Part 1: General technical delivery conditions for hot-rolled products

ISO 630-2, 《结构钢— 第2部分：通用结构钢的技术交货条件》

ISO 630-2, Structural steels — Part 2: Technical delivery conditions for structural steels for general purposes

ISO 630-3, 《结构钢— 第3部分：细晶粒结构钢的技术交货条件》

ISO 630-3, Structural steels —Part 3: Technical delivery conditions for fine-grain structural steels

ISO 630-4, 《结构钢— 第4部分：高强度淬火和回火结构钢板和宽扁钢的技术交货条件》

ISO 630-4, Structural steels — Part 4: Technical delivery conditions for high yield strength quenched and tempered structural steel plates and wide flats

ISO 630-5, 《结构钢— 第5部分：耐大气腐蚀性能改进型结构钢的技术交货条件》

ISO 630-5, Structural steels —Part 5: Technical delivery conditions for structural steels with improved atmospheric corrosion resistance

ISO 630-6, 《结构钢— 第6部分：用于建筑的抗震改进结构钢的技术交货条件》

ISO 630-6, Structural steels —Part 6: Technical delivery conditions for seismic -improved structural steels for building

ISO 4990, 《铸钢件—一般技术交货要求》

ISO 4990, Steel castings —General technical delivery requirements

ISO 7778, 《钢材产品的厚度方向性能》

ISO 7778, Through -thickness characteristics for steel products

ISO 9477, 《通用工程和结构用途的高强度铸钢》

ISO 9477, High strength cast steels for general engineering and structural purposes

ISO 10474, 《钢及钢产品— 检验文件》

ISO 10474, Steel and steel products —Inspection documents

ISO 10799-1, 《非合金及细晶粒钢的冷成型焊接结构用空心型材— 第1部分：技术交货条件》

ISO 10799-1, Cold -formed welded structural hollow sections of non -alloy and fine grain steels — Part 1: Technical delivery conditions

ISO 10799-2, 《非合金及细晶粒钢的冷成型焊接结构用空心型材— 第2部分：尺寸和截面特性》

ISO 10799-2, Cold -formed welded structural hollow sections of non -alloy and fine grain steels — Part 2: Dimensions and sectional properties

ISO 12633-1, 《非合金及细晶粒钢的热成型结构用空心型材— 第1部分：技术交货条件》

ISO 12633-1, Hot -finished structural hollow sections of non -alloy and fine grain steels —Part 1: Technical delivery conditions

ISO 12633-2, 《非合金及细晶粒钢的热成型结构用空心型材—第2部分: 尺寸和截面特性》

ISO 12633-2, Hot -finished structural hollow sections of non -alloy and fine grain steels —Part 2:

Dimensions and sectional properties

ISO 17607-1, 《钢结构— 钢结构建造— 第1部分: 通用要求和术语》

ISO 17607-1, Steel structures —Execution of structural steelwork—Part 1: General requirements and

vocabulary

ISO/TR 20172, 《焊接— 材料分组系统— 欧洲材料》

ISO/TR 20172, Welding — Grouping systems for materials — European materials

ISO/TR 20173, 《焊接— 材料分组系统— 美国材料》

ISO/TR 20173, Welding — Grouping systems for materials — American materials

ISO/TR 20174, 《焊接— 材料分组系统— 日本材料》

ISO/TR 20174, Welding — Grouping systems for materials — Japanese materials

3 术语和定义

3 Terms and definitions

本文件中使用的术语和定义参考T/CSCS XXX-1 中的相关规定。

For the purposes of this document, the terms and definitions given in ISO 17607-1 apply

ISO 和IEC 分别维护了用于标准化工作的术语数据库, 具体地址如下:

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

—ISO 在线浏览平台: <https://www.iso.org/obp>

—ISO Online browsing platform: available at <https://www.iso.org/obp>

—IEC Electropedia: <https://www.electropedia.org/>

—IEC Electropedia: available at <https://www.electropedia.org/>

4 建造标准和质量要求

4 Execution specification and quality requirements

4.1 一般规定

4.1 General

参考T/CSCS XXX-1。

See ISO 17607-1.

4.2 建造标准

4.2 Execution specification

在满足技术等效条件的前提下，国家标准或相关文件可全部或部分替代本文件中引用的 ISO 标准或相关要求。在建造标准中应明确采用的等效国家标准或文件，并注明其与本文件要求的差异。

National standards and documents that provide technically equivalent conditions maybe used, in whole or in part, in place of referenced ISO standards or requirements of this document. In these cases, the technically equivalent national standards and documents, and deviations from the requirements of this document, shall be referenced in the execution specification.

钢材及钢产品的必要信息和技术要求在施工前应达成一致并予以确认。

The necessary information and technical requirements for structural steel and steel products shall be agreed upon and completed before commencement.

建造标准应包括下列相关项目：

The execution specification shall include the following items as are relevant:

a) 附加信息，参见附录A.1；

a) additional information, see A.1;

b) 可选项，参见附录A.2；

b) options, see A.2;

c) 与建造等级相关的要求，参见附录A.3；

c) requirements related to execution levels, see A.3;

对于已确认的建造标准，应制定相应的变更程序。

There shall be procedures for making alterations to a previously agreed execution specification.

若使用的钢材和钢产品未涵盖在国家标准或文件中，应明确其相关性能要求。

If constituent products of steels and steel products not covered by national standards or documents are to be used, their relevant properties shall be specified.

关于钢材和钢产品的国家标准和文件，参见附录B（资料性附录）。

For national standards and documents for structural steels and steel products, see Annex B (informative).

5 组成产品

5 Constituent products

5.1 标识、检验文件与可追溯性

5.1 Identification, inspection documents and traceability

对于钢材，其检验文件应符合ISO 10474 的要求，并按表1 的规定提供。

For steels, the inspection documents according to ISO 10474 shall be as listed in Table 1.

当表1 中要求提供3.1 类检验文件时，也可接受提供3.2 类文件。

Type 3.2 inspection documents are also suitable if Type 3.1 documents are listed in Table 1.

表 1 组成产品的检验文件

Table 1 — Inspection documents for constituent products

组成产品 Constituent product	检验文件 Inspection documents
结构钢 Structural steels 结构钢等级≤ 275 MPa Structural steel grade ≤275MPa 结构钢等级> 275 MPa Structural steel grade > 275MPa	2.2 ^{a, b, c} 3.1 ^{b, c}
铸钢件 Steel castings	3.1 ^d
高强度拉索 High strength cables	3.1
结构支座 Structural bearings	3.1
^a 若规定的最小屈服强度为275 MPa，且冲击功试验温度低于0 °C，应提供3.1 类检验文件。 ^a Inspection document 3.1 if specified minimum yield strength 275 MPa and specified impact energy tested at a temperature less than 0 °C. ^b 检验文件中应注明用于计算碳当量值（CEV）的相关元素含量。 ^b Elements included in the carbon equivalent value (CEV) shall be reported in the inspection document. ^c 检验文件中应列出添加特定元素，包括Al、Nb、Ti 和B。 ^c Intentionally added elements, including Al, Nb, Ti, and B, shall be reported in the inspection document.	

^d 若规定的最小屈服强度不超过355 MPa，且冲击功试验温度为20 °C，可提供2.2 类检验文件。

^d Inspection document 2.2 may be provided if specified minimum yield strength ≤ 355 MPa and specified impact energy tested at a temperature of 20 °C.

5.2 结构钢

5.2 Structural steels

对于建造等级2~4（即EXL2、EXL3和EXL4），当采用不同等级和质量的钢材产品时，每件产品应标注其等级和质量的标识。

For execution levels 2 to 4, designated EXL2, EXL3 and EXL4, if differing grades and qualities of steel products are in circulation together, each item shall be designated with a mark that identifies its grade and quality.

注1：钢材的等级和质量定义参见ISO 630系列、ISO 10799系列或ISO 12633系列的相关部分。

NOTE 1 Within the context of this clause, see the respective part in the ISO 630 series, the ISO 10799 series or the ISO 12633 series for definitions of grades and qualities of steel.

5.3 结构钢产品

5.3 Structural steel products

5.3.1 一般规定

5.3.1 General

建造标准中应明确钢材的等级和质量、附加特性及产品标准允许的必要选项。

The steel grade and quality, with additional characteristics and any required options permitted by the product standard, shall be specified in the execution specification.

结构钢应符合表2的要求，或符合国家标准或相关文件的要求。

Structural steels shall be in accordance with Table 2, or, if applicable, the requirements of the national standard or documents.

表 2 结构钢标准

Table 2 — Standards for structural steels

结构钢 Structural steels	产品标准 Product standard
通用结构钢 Structural steels for general purposes	ISO 630-2

细晶粒结构钢 Fine grain structural steels	ISO 630-3
高强度淬火和回火结构钢板 High yield strength quenched and tempered structural steel plates	ISO 630-4
改进大气腐蚀性能的结构钢 Structural steels with improved atmospheric corrosion resistance	ISO 630-5
用于建筑的抗震性能改进结构钢 Seismic-improved structural steels for building	ISO 630-6

结构空心型材应符合表3的要求，或符合国家标准或相关文件的要求。

See Annex B for selection of national standards and documents for structural steels and structural hollow sections.

表 3 结构空心型材标准

Table 3 — Standards for structural hollow sections

结构钢 Structural steels	产品标准 Product standard
非合金及细晶粒钢的冷成型焊接结构空心型材 Cold-formed welded structural hollow sections of non-alloy and fine grain steels	ISO 10799-1 ISO 10799-2
非合金及细晶粒钢的热成型结构空心型材 Hot-finished structural hollow sections of non-alloy and fine grain steels	ISO 12633-1 ISO 12633-2

结构钢和结构空心型材的国家标准和文件的选用，参见附录B。

Structural hollow sections shall be in accordance with Table 3, or, if applicable, the requirements of the national standard or documents.

钢材或组成产品应提供下列信息：

For steel materials or constituent products, information regarding the following characteristics shall be available:

- 强度（屈服强度和抗拉强度）；
- strength (yield and tensile);
- 伸长率；
- elongation;
- 断面收缩率（当建造标准有要求）；
- reduction of area requirements, if required by the execution specification;

- 尺寸和形状公差；
- tolerances on dimensions and shape;

- 冲击强度或韧性（当建造标准有要求）；
- impact strength or toughness, if required by the execution specification;

- 热处理交货状态；
- thermal heat treatment delivery condition;

- 符合ISO 7778规定的厚度方向性能要求（当建造标准有要求）；
- through thickness requirements (Z), in accordance with ISO 7778, if required by the execution specification;

- 待焊接区域内部缺陷或裂纹的限值（当建造标准有要求）。
- limits on internal discontinuities or cracks in zones to be welded, if required by the execution specification.

当钢材进行焊接，应提供下列信息之一：

In addition, if the steel is to be welded, information shall be available regarding as follows:

- 按ISO/TR 20172、ISO/TR 20173或ISO/TR 20174定义的分组体系进行分类；
- classification in accordance with the grouping system defined in ISO/TR 20172, ISO/TR 20173 or ISO/TR 20174; or

- 钢材碳当量（CEV）的最大限值；
- a maximum limit for the carbon equivalent of the steel; or

- 可计算碳当量的详细化学成分。
- its chemical composition in sufficient detail for its carbon equivalent to be calculated.

对于上述信息，应提供依据，如：用于确定性能值的测试方法所依据的标准；声明性能是否针对特定批次、铸次或热处理批；化学性能是否基于炉前分析或产品分析。

With respect to the properties listed above that are declared, the basis for the declarations shall be provided, e.g. reference standards for test methods used to establish values for declared properties; whether properties are specific to an identified lot, cast or heat; whether chemical properties are based on ladle or product analysis.

除建造标准有特殊规定，碳当量（CEV）应基于 CE_{IIW} 公式计算：

Unless otherwise stated in the execution specification, the CEV shall be based on the CE_{IIW} formula:

$$CE_{IIW} = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}$$

注1：ISO/TR 17844 提供了 CE_{IIW} 公式的有关信息。

NOTE 1 ISO/TR 17844 provides additional information on the CE_{IIW} formula.

5.3.2 钢板厚度公差

5.3.2 Thickness tolerances for plates

结构钢板的厚度公差应符合相应产品标准的要求。

Thickness tolerances for structural steel plates shall be in accordance with the applicable product standard.

当产品标准规定多个厚度公差等级时，除非建造标准另有要求，应采用规定的最低等级。

For product standards where more than one thickness tolerance class is given, the least restrictive class shall be used unless specified in the execution specification.

5.3.3 表观质量

5.3.3 Surface conditions

结构钢的表观质量应符合相应产品标准的要求。

Surface conditions for structural steel shall be in accordance with the applicable product standard.

当产品标准规定多种表观质量时，除非建造标准另有要求，应选用限制条件最少的表观质量。

For product standards where more than one surface condition is given, the least restrictive condition shall be used unless specified in the execution specification.

表面处理过程中发现的产品表面缺陷应进行检验与测试。

The inspection of the surface of product for defects revealed during surface preparation shall be included in the inspection and test plans.

钢产品在表面处理过程中，若发现表面缺陷或内部缺陷按本文件规定的方法进行修复，修复后的产品符合原产品名义性能要求时，可予以使用。

If surface imperfections or internal imperfections in steel products revealed during surface preparation are repaired using methods that are in accordance with this document, the repaired product may be used

provided that it conforms with the nominal properties specified for the original product.

5.3.4 特殊性能

5.3.4 Special properties

结构钢的特殊性能（包括交货前因加工而受影响的性能）应依据相应产品标准，在建造标准中明确规定。

Special properties for structural steels, including those affected by processing prior to delivery, shall be specified in the execution specification, in accordance with the applicable product standard.

例如：制作中矫直和弯曲可能影响钢材性能。

NOTE Cambering and bending are examples of processes that can affect steel properties.

5.4 铸钢件

5.4 Steel castings

铸钢件应符合ISO 4990或ISO 9477的要求。技术交货条件（例如等级、质量以及适用的表面处理）应在建造标准中明确规定，并包含产品标准允许的必要选项。除有特殊规定，交付铸钢件的性能应通过试验评定。

Steel castings shall conform to the requirements ISO 4990 or ISO 9477. The technical delivery conditions (e.g. grades, qualities and, if appropriate, finishes) shall be specified in the execution specification together with any required options that are permitted in the product standards that are required. Unless specified in the execution specification, the properties of delivered castings shall be evaluated by testing.

除有特殊规定，试验应包括：

Unless specified in the execution specification, the testing shall include:

a) 100%目视检测（VT）；

a) 100% visual testing (VT),

b) 生产过程中随机抽检，并进行下列破坏性试验：

b) the following destructive tests on items taken at random during production:

— 拉伸和伸长率测试（每炉一次）；

— tensile and elongation tests (one unit per melt);

— 冲击测试（每炉三次）；

- impact tests (three units per melt);
- 断面收缩测试（必要时每炉一次）；
- reduction of area test (one unit per melt, if appropriate):
- 化学成分分析（每炉一次）；
- chemical analysis (one unit per melt); and
- 截面显微组织检验（每炉一次）。
- microscopic examination of cross-sections (one unit per melt).

c) 每个生产批次随机抽取样品进行下列无损检测：

c) the following non-destructive tests on items taken at random from each manufacturing lot:

- 磁粉检测（MT）或渗透检测（PT）：每批次10%抽样，检测表面开口缺陷；
- magnetic particle testing (MT) or penetrant testing (PT) on 10% of each manufacturing lot to detect surface-breaking discontinuities; and
- 超声检测（UT）或射线检测（RT）：每批次10%抽样，检测近表面缺陷。
- ultrasonic testing (UT) or radiographic testing (RT) on 10% of each manufacturing lot to detect sub-surface discontinuities.

5.5 高强度拉索和锚具

5.5 High strength cables and sockets

高强度拉索用钢丝应为冷拉或冷轧钢丝，应明确其抗拉强度等级，必要时还应规定涂层等级。

Wires for high strength cables shall be cold drawn or cold rolled steel wires. The tensile strength grade and, if appropriate, coating class shall be specified.

高强度拉索用钢绞线应符合现行建造标准的要求，并应规定钢绞线型号和等级。

Strands for high strength cables shall be conformed to the requirements of the execution specification. The designation and class of the strand shall be specified.

应规定钢丝绳的最小破断载荷和直径，必要时还应规定防腐保护要求。

The minimum breaking load and diameter of the steel wire rope and, if appropriate, requirements related to corrosion protection shall be specified.

锚具填充材料的选择应考虑使用温度和载荷条件，确保受力钢绞线在锚具内不发生持续性滑移。

The filling material for the sockets shall be selected taking into account service temperature and actions such that continued creeping of the loaded strand through the socket is prevented

5.6 结构支座

5.6 Structural bearings

结构支座的要求应在建造标准中明确规定。

Requirements for structural bearings shall be specified in the execution specification.

6 符合性声明文件要求

6 Documents required to claim conformity to this document

6.1 一般规定

6.1 General

承包商可通过以下方式声明符合本文件要求之一：

Constructors may claim conformity with the requirements of this document either by:

采用第2条引用的ISO标准；

— adoption of the ISO standards referenced in Clause 2; or

采用第2条所列标准之外但具有技术等效条件的其他标准（参见附录B的示例）；

— adoption of other standards to those listed in Clause 2 that provide technically equivalent conditions (see examples in Annex B); or

采用提供技术等效条件的其他文件；

— adoption of other documents that provide technically equivalent conditions;

除有特殊规定，承包商应证明所选用的标准或文件与相应ISO 标准具有技术等效性。在建造之前，采用的其他标准或文件应经过标准制定方的验证和批准，并纳入建造标准。

Unless otherwise listed in the execution specification, it is the responsibility of the constructor to demonstrate that the standards or documents selected provide technically equivalent conditions to those in the corresponding ISO standards. Prior to execution, adoption of other standards or documents shall be verified and approved by specifier and shall be incorporated into the execution specifications.

注：附录B所列内容并不表明其中标准或文件已被认定为技术等效，承包商需承担等效性证明责任。

NOTE The contents of Annex B do not establish that the standards or documents listed are technically equivalent, which remains the responsibility of the constructor.

6.2 符合性声明

6.2 Declaration of conformity

声明符合本文件要求的承包商，应列出所采用的支持性标准或文件。

A constructor claiming conformity with these requirements shall list the applicable supporting standards or documents.

附录 A

Annex A

(规范性)

(normative)

与建造等级相关的附加信息、选项列表和要求

Additional information, list of options and requirements related to the execution levels

A.1 所需附加信息清单

A.1 List of required additional information

表A.1列出了在本文件中需要的附加信息，全面定义工程建造的要求，使其符合本文件的规定（即文本中使用“应规定”表述的条款）。

Table A.1 provides the additional information that is required in the text of this document as appropriate to fully define the requirements for execution of the work to be in accordance with this document (i.e., where the wording “shall be specified” is used).

表 A.1 所需附加信息

Table A.1 — Additional information required

条款 Clause	所需附加信息 Additional information required
4 — 建造标准和质量要求 4 – Execution specification and quality requirements	
4.2	不在所列标准范围内的产品特性 Properties of products not covered by listed standards
5 — 组成产品 5 – Constituent products	
5.3.1	等级和质量，以及产品标准允许的附加特性和任何所需的选项 Grade and quality, with additional characteristics and any required options permitted by the product standard
5.3.4	结构钢的特殊性能 Special properties for structural steels
5.4	钢铸件的等级、质量及（如适用）表面处理 Grades, qualities and, if appropriate, finishes for steel castings
5.5	与下列项目相关的要求： Requirements related to the following items: — 抗拉强度等级及（如适用）涂层等级； — the tensile strength grade and, if appropriate, coating class; — 钢绞线的型号和类别； — the designation and class of the strand; — 防腐保护； — corrosion protection;
5.6	结构支座的要求 Requirements for structural bearings

A.2 选项清单

A.2 List of options

表 A.2 列出了可以在建造标准中定义的条目，用于界定本文件中所述选项的工程建造要求。

Table A.2 lists the items which may be specified in the execution specification to define requirements for the execution of the work where options are given in this document.

表 A.2 可规定的选项清单

Table A.2 — List of options to be specified

条款 Clause	可规定的选项 Option(s) to be specified
4 — 建造标准和质量要求 4 – Execution specification and quality requirements	
4.2	如果需要钢材、铸件、拉索或结构支座的建造质量计划 If a quality plan for execution of the steel, castings, cable or structural bearings is required
5 — 组成产品 5 – Constituent products	
5.3.1	当涉及下列特性： If the following characteristics is applicable: — 断面收缩率要求； — reduction of area requirements; — 冲击强度或韧性； — impact strength or toughness; — 厚度方向要求（Z 向性能）； — through thickness requirements (Z) — 焊接区域内部缺陷或裂纹的限制； — limits on internal discontinuities or cracks in zones to be welded; — 碳当量（CEV）。 — the CEV.
5.3.2	厚度公差等级（若非最宽松等级） The thickness tolerance class, if not the least restrictive
5.3.3	表面状况等级（若非最宽松等级） The surface condition class, if not the least restrictive 若允许修复表面缺陷 If repairs of surface defects are permitted
5.4	钢铸件的选项 Options for steel castings 若需采用测试以外的其他评定方式 If other evaluations than testing are required 若采用其他验收标准 If other acceptance criteria are required
6 — 声明符合相关要求的文件 6 – Documents required to claim conformity to these requirements	
6.1	采用其他标准或文件 adoption of other standards or document

A.3 与建造等级相关的要求

A.3 Requirements related to the execution levels

表A.3列出了本文件引用的各建造等级的具体要求。

Table A.3 lists requirements specific to each of the execution levels referenced in this document.

表A.3中以粗体字标识的项目涉及建造控制通用体系，可针对钢结构整体工程（或某一阶段）统一选择建造等级。其他项目通常需根据具体组件或连接细节选择合适的建造等级。

Items identified in bold letters in Table A.3 relate to the general system of control of execution and are amenable to a common choice of execution level across the whole of the structural steelwork (or a phase of the structural steelwork). The other items generally demand the selection of the appropriate execution level on a component-by-component or a connection detail-by-detail basis.

表 A.3 建造等级的要求

Table A.3 — Requirements for each execution level

条款 Clauses	EXL1 ^a	EXL2	EXL3	EXL4
4 — 建造标准和质量要求 4 – Execution specification and quality requirements				
4.2 质量文件 4.2 Quality documentation	—	是 Yes	是 Yes	是 Yes
5 — 组成产品 5 – Constituent products				
5.2 标识、检验文件和可追溯性 5.2 Identification, inspection documents and traceability				
检验文件 Inspection documents	见表1 See Table 1	见表1 See Table 1	见表1 See Table 1	见表1 See Table 1
可追溯性 Traceability	—	见 ISO/IEC 17067 see ISO/IEC 17067	见 ISO/IEC 17067 see ISO/IEC 17067	见 ISO/IEC 17067 see ISO/IEC 17067
标记 Marking	—	是	是	是
^a 注：横线“—”表示文本中无具体要求。 ^a a dash "—" means no specific requirement in the text.				

附录 B

Annex B

(资料性)

(informative)

结构钢和钢产品国家标准

National standards for structural steels and steel products

B.1 概述

B.1 General

表B.1至表B.16列出了本文件引用的ISO标准对应的国家标准。

Tables B.1 to B.16 show the national standards corresponding to the ISO standard(s) referenced in this document.

注：表B.1至表B.16的内容并不表明所列标准之间存在任何技术等效性。

NOTE The contents of Tables B.1 to B.16 do not establish any technical equivalence between the standards listed.

B.2 澳大利亚/新西兰标准(AS/NZS)

B.2 Australian/New Zealand standards (AS/NZS)

B.2.1 结构钢

B.2.1 Structural steels

表 B.1 结构钢和钢产品的AS/NZS标准

Table B.1 — AS/NZS standards for structural steels and steel products

标准 Standard	等级 Grade	备注 Notes
型材、板材和棒材 Shapes, plates and bars		
AS 1548	PT430N, PT430NR, PT430T	a b
	PT460N, PT460NR, PT460T	
	PT490N, PT490NR, PT490T	
	PT540T	
AS 3597	500, 500PV	c
	600, 600PV	
	700, 700PV	
	900	
	1000	
AS/NZS 3678	250	d
	300	
	350, WR350	

	400	
	450	
AS/NZS 3679.1	300, 300L0, 300L15, 300S0	e
	350, 350L0, 350L15, 350S0	
薄板和带材 Sheet and strip		
AS/NZS 1594	HA200	f
	HA250, HU250	
	HA300, HA300/1, HU300, HU300/1	
	HA350, HW350	
	HA400	
AS/NZS 1595	CA 220	
	CA 260	
	CW300	
	CA 350	
	CA 500	
结构空心型材 Hollow structural sections		
AS/NZS 1163	C250, C250L0	e f g
	C350, C350L0	
	C450, C450L0	
铸件和锻件 Castings and Forgings		
—		
<p>a PT = 指定抗拉强度的压力容器用钢， a PT = Tensile strength specified pressure vessel steel,</p> <p>N = 轧后正火处理， N = Normalized after rolling,</p> <p>NR = 正火轧制， NR = Normalized rolling,</p> <p>T = 热机械控制轧制。 T = Thermo mechanical control rolling.</p> <p>b 不展示经过冲击测试的等级变体。 b Impact tested grade variants are not shown</p> <p>c PV = 压力容器用钢。 c PV = Pressure Vessel</p> <p>d WR = 耐候钢。 d WR = Weather Resistant</p> <p>e L = 低温冲击测试，L0 表示在0℃ 下，L15 表示在-15℃ 下进行； e L = Low temperature impact tested, L0 at 0 °C, L15 at -15 °C,</p> <p>S = 抗震等级， S = Seismic grade,</p> <p>S0 表示在0℃ 下进行冲击测试。 S0 = impact tested at 0 °C</p> <p>f C = 冷成型。 f C = Cold-formed</p> <p>g 参见ISO/TR 20173 。 g See also ISO/TR 20173</p>		

B.2.2 尺寸和公差

B.2.2 Dimensions and tolerances

表 B.2 结构钢尺寸和公差的AS/NZS标准

Table B.2 — AS/NZS standards for dimensions and tolerances of structural steels

标准 Standard	备注 Notes
AS/NZS 1365	

B.3 加拿大标准 (CSA)

B.3 Canadian standards (CSA)

B.3.1 结构钢

B.3.1 Structural steels

表 B.3 结构钢和钢产品的CSA标准

Table B.3 — CSA standards for structural steels and steel products

标准 Standard	等级 Grade	备注 Notes
型材、板材和棒材 Shapes, plates and bar		
CSA G40.21	260W, 260WT	a
	300W, 300WT	
	345WM, 345WMT	
	350A, 350AT, 350W, 350WT, 350R	
	380W, 380WT	
	400A, 400AT, 400W, 400WT	
	480A, 480AT, 480W, 480WT	
	550A, 550AT, 550W, 550WT	
	700Q, 700QT	
薄板 Sheet		
CSA G40.21	260W, 260WT	a
	300W, 300WT	
	345WM, 345WMT	
	350A, 350AT, 350W, 350WT, 350R	
	380W, 380WT	
	400A, 400AT, 400W, 400WT	
	480A, 480AT, 480W, 480WT	
	550A, 550AT, 550W, 550WT	
	700Q, 700QT	
空心结构型材 Hollow structural sections		
CSA G40.21	300W	a
	350A, 350AT, 350W, 350WT	
	380W, 380WT	
	400A, 400AT, 400W, 400WT	

	480A, 480AT, 480W, 480WT	
	550A, 550AT, 550W, 550WT	
铸件和锻件 Castings and Forgings		
—		
^a W = 可焊接的, a W = Weldable, T = 韧性等级, T = Notch-Tough, R = 耐大气腐蚀, R =Atmospheric Corrosion-Resistant, A = 耐大气腐蚀可焊接的, A =Atmospheric Corrosion-Resistant Weldable , Q = 淬火和回火的低合金（可焊接的）, Q = Quenched and Tempered Low-Alloy (weldable), M = 成分限制。 M = with composition restrictions.		

B.3.2 尺寸和公差

B.3.2 Dimensions and tolerances

表 B.4 CSA 结构钢尺寸和公差标准

Table B.4 — CSA standards for dimensions and tolerances of structural steels

标准 Standard	备注 Notes
CSA G40.20	

B.4 中国标准(GB)

B.4 Chinese standards (GB)

B.4.1 结构钢

B.4.1 Structural steels

表 B.5 结构钢和钢产品的GB标准

Table B.5 — GB standards for structural steels and steel products

标准 Standard	等级 Grade	备注 Notes
型材、板材和棒材 Shapes, plates and bars		
GB/T 700	Q195 Q235 Q275	
GB/T 714	Q345q, Q345NH Q370q, Q370NH Q420q, Q420NH Q460q, Q460NH	^a

	Q500q, Q500NH Q550q, Q550NH Q620q, Q620NH Q690q, Q690NH	
GB/T 1591	Q355N, Q355M Q390N, Q390M Q420N, Q420M Q460N, Q460M Q500M Q550M Q620M Q690M	b
GB/T 4171	Q235NH Q265GN Q295NH, Q295GNH HQ310GNH Q355NH, Q355GNH Q415NH Q460NH Q500NH Q550NH	a c
GB/T 4172	Q235NH Q295NH Q355NH Q460NH	a
GB/T 5313	Z15 Z25 Z35	
GB/T 6725	Q195 Q215 Q235 Q345 Q390 Q420 Q460 Q500 Q550 Q620 Q690 Q750	
GB/T 19879	Q235GJ Q345GJ Q390GJ Q420GJ Q460GJ Q500GJ Q550GJ Q620GJ Q690GJ	d
GB/T 20933	Q295bz Q390bz Q420bz	e
GB/T 20934	GLG345 GLG460 GLG550 GLG650 GLG750 GLG850 GLG1100	

	BLG205	
	BLG400	
	BLG725	
	BLG835	
	BLG1080	
GB/T 34560.2	Q235	
	Q275	
	Q355	
	Q450	
GB/T 34560.3	Q275N, Q275M	
	Q355N, Q355M	
	Q390N, Q390M	
	Q420N, Q420M	
	Q460N, Q460M	b
	Q500M	
	Q550M	
	Q620M	
	Q690M	
GB/T 34560.4	Q460Q	
	Q500Q	
	Q550Q	
	Q620Q	
	Q690Q	
	Q800Q	f
	Q890Q	
	Q960Q	
	Q1030Q	
	Q1100Q	
	Q1200Q	
	Q1300Q	
GB/T 34560.5	Q235W, Q235NH	
	Q295NH, Q295GNH	
	Q355W, Q355WP, Q355NH, Q355GNH	
	Q415NH	a
	Q460NH	c
	Q500NH	g
	Q550NH	
GB/T 34560.6	Q235KZ	
	Q345KZ	
	Q390KZ	h
	Q420KZ	
	Q460KZ	
薄板和带材		
Sheet and strip		
GB/T 2518		
结构空心型材		
Hollow structural sections		
GB/T 8162	Q235	
	Q275	
	Q295	
	Q345	
	Q390	
	Q420	
	Q460	
GB/T 13793	08	
	10	
	15	
	20	
	Q195	

	Q215A, Q215B Q235A, Q235B, Q235C Q275, Q275A, Q275B Q345A, Q345B, Q345C Q390A, Q390B, Q390C Q420A, Q420B, Q420C Q460C, Q460D	
GB/T 30063	Q235B, Q235C Q345B, Q345C Q390B, Q390C Q420B, Q420C Q460C, Q460 Q235GJB, Q235GJC Q345GJB, Q345GJC Q390GJB, Q390GJC Q420GJC	
GB/T 34201	10, 20 Q195 Q215 Q235 Q345A, Q345B, Q345C, Q345D, Q345E Q390A, Q390B, Q390C, Q390D, Q390E Q420A, Q420B, Q420C, Q420D, Q420E Q460C, Q460D, Q460E	
铸件和锻件 Castings and Forgings		
GB/T 7659	ZG200-400H ZG230-450H ZG270-480H ZG300-500H ZG340-550H	
GB/T 11352	ZG200-400 ZG230-450 ZG270-500 ZG310-570 ZG340-640	
^a q = 桥梁结构钢, ^a q = Bridge structure steel, NH = 耐候钢 NH = Weathering steel ^b N = 正火轧制钢, ^b N = normalized rolling steel, M = TMCP (热机械控制处理) 钢 M = TMCP (thermo mechanical control processed) steel ^e GNH = 高性能耐候钢 ^e GNH = High performance weathering steel ^d GJ = 高性能建筑结构钢 ^d GJ = High-performance building structure steel ^e bz = 钢板 ^e bz = steel plate ^f Q = 淬火和回火钢 ^f Q = Quenched and tempered steel		

^g W = 耐大气腐蚀钢, ^g W = atmospheric corrosion-resistant steel, WP = 高磷耐大气腐蚀钢 WP = High Phosphorus Atmospheric Corrosion-Resistant Steel ^h KZ = 抗震钢 ^h KZ = Aseismic steel

B.4.2 尺寸和公差

B.4.2 Dimensions and tolerances

表 B.6 结构钢尺寸和公差的GB标准

Table B.6 — GB standards for dimensions and tolerances of structural steels

标准 Standard	备注 Notes
GB/T 702	
GB/T 706	
GB/T 709	
GB/T 6728	
GB/T 11263	
GB/T 17395	
GB/T 21835	

B.5 欧洲标准 (EN)

B.5 European standards (EN)

B.5.1 结构钢

B.5.1 Structural steels

表 B.7 结构钢和钢产品的EN标准

Table B.7 — EN standards for structural steels and steel products

标准 Standard	等级 Grade	备注 Notes
型材、板材和棒材 Shapes, plates and bars		
EN 10025-2	S235JR, S235J0, S235J2 S275JR, S275J0, S275J2 S355JR, S355J0, S355J2, S355K2 S450J0	a
EN 10025-3	S275N, S275NL S355N, S355NL S420N, S420NL S460N, S460NL	b
EN 10025-4	S275M, S275ML S355M, S355ML S420M, S420ML S460M, S460ML	c
EN 10025-5	S235J0W, S235J2W S355J0WP, S355J2WP, S355J2W, S355K2W	a d
EN 10025-6	S460Q, S460QL, S460QL1	e

	S500Q, S500QL, S500QL1 S550Q, S550QL, S550QL1 S620Q, S620QL, S620QL1 S690Q, S690QL, S690QL1	
EN 10149-2	S315MC S355MC S420MC S460MC S500MC S550MC S600MC S650MC S700MC	f
EN 10149-3	S260NC S315NC S355NC S420NC	f
EN 10268	HC180Y, HC180B HC220Y, HC220I, HC220B HC260Y, HC260I, HC260B, HC260LA HC300I, HC300B, HC300LA HC340LA HC380LA HC420LA HC460LA HC500LA	g
EN 10346	S220GD S250GD S280GD S320GD S350GD S550GD	h
薄板和带材 Sheet and strip		
EN 10248-1	S240GP S270GP S320GP S355GP S390GP S430GP	
EN 10249-1	S235JR, S235J0, S235J2 S275JR, S275J0, S275J2 S355JR, S355J0, S355J2, S355K2 S450J0	a
结构空心型材 Hollow structural sections		
EN 10210-1 EN 10210-3	S235JRH S275J0H, S275J2H S275NH, S275NLH S355J0H, S355J2H, S355K2H S355NH, S355NLH S420NH, S420NLH S460NH, S460NLH	a b
EN 10219-1 EN 10219-3	S235JRH S275J0H, S275J2H S275NH, S275NLH S275MH, S275MLH S355J0H, S355J2H, S355K2H S355NH, S355NLH	a b i

	S355MH, S355MLH S420MH, S420MLH S460NH, S460NLH S460MH, S460MLH	
铸件和锻件 Castings and Forgings		
—		
^a JR = 纵向夏比V 型缺口冲击能量为27 J, 测试温度为+20 °C ^a JR = Longitudinal Charpy V-notch impacts 27 J at + 20 °C, J0 = 纵向夏比V 型缺口冲击能量为27 J, 测试温度为0 °C J0 = Longitudinal Charpy V-notch impacts 27 J at 0 °C, J2 = 纵向夏比V 型缺口冲击能量为27 J, 测试温度为-20 °C J2 = Longitudinal Charpy V-notch impacts 27 J at – 20 °C, K2 = 纵向夏比V 型缺口冲击能量为40 J, 测试温度为-20 °C K2 = Longitudinal Charpy V-notch impacts 40 J at – 20 °C +AR = 轧制状态交货 +AR = Supply in as rolled conditions +N = 正火或正火轧制状态交货 +N = Supply in normalized/normalized rolled conditions Z 级 = 提高垂直于表面的性能 Z Grade = Improved properties perpendicular to the surface ^b N = 纵向夏比V 型缺口冲击温度不低于-20 °C ^b N = Longitudinal Charpy V-notch impacts temperature not lower than -20 °C, NL = 纵向夏比V 型缺口冲击温度不低于-50 °C NL = Longitudinal Charpy V-notch impacts temperature. not lower than -50 °C Z 级 = 提高垂直于表面的性能 Z Grade = Improved properties perpendicular to the surface ^c M = 纵向夏比V 型缺口冲击温度不低于-20 °C ^c M = Longitudinal Charpy V-notch impacts temperature not lower than -20 °C, ML = 纵向夏比V 型缺口冲击温度不低于-50 °C ML = Longitudinal Charpy V-notch impacts temperature not lower than -50 °C Z 级 = 提高垂直于表面的性能 Z Grade = Improved properties perpendicular to the surface ^d W = 改进的大气抗腐蚀性能 ^d W = Improved atmospheric corrosion resistance, P = 较高的磷含量 P = Greater phosphorus content +AR = 轧制状态交货 +AR = Supply in as rolled conditions +N = 正火或正火轧制状态交货 +N = Supply in normalized/normalized rolled conditions		

Z 级= 提高垂直于表面的性能

Z Grade = Improved properties perpendicular to the surface

°Q = 纵向夏比V 型缺口冲击温度不低于-20 °C

°Q = Longitudinal Charpy V-notch impacts temp. not lower than -20 °C,

QL = 纵向夏比V 型缺口冲击温度不低于-40 °C

QL = Longitudinal Charpy V-notch impacts temp. not lower than -40 °C,

QL1 = 纵向夏比V 型缺口冲击温度不低于-60 °C

QL1 = Longitudinal Charpy V-notch impacts temp. not lower than -60°C

Z 级= 提高垂直于表面的性能

Z Grade = Improved properties perpendicular to the surface

^fM = 热机械轧制

^fM = Thermomechanically rolled

N = 正火或正火轧制

N = Normalized or normalized rolled

C = 适合冷成型

C = Suitable for cold forming

^gB = 烘烤硬化钢

^gB = Bake-hardening steel

I = 各向同性钢

I – Isotropic steel

LA = 低合金/微合金钢

LA – Low alloy / micro-alloyed steel

Y = 高强度无间隙原子钢

Y = high strength interstitial free steel

^hGD 表示用于建筑的钢材

^hGD identifies steel for construction

ⁱJR = 纵向夏比V 型缺口冲击能量为27 J，测试温度为+20 °C

ⁱJR = Longitudinal Charpy V-notch impacts 27 J at + 20 °C,

J0 = 纵向夏比V 型缺口冲击能量为27 J，测试温度为0 °C

J0 = Longitudinal Charpy V-notch impacts 27 J at 0 °C,

J2 = 纵向夏比V 型缺口冲击能量为27 J，测试温度为-20 °C

J2 = Longitudinal Charpy V-notch impacts 27 J at – 20 °C,

K2 = 纵向夏比V 型缺口冲击能量为40 J，测试温度为-20 °C

K2 = Longitudinal Charpy V-notch impacts 40 J at – 20 °C

N = 正火或正火轧制

N = Normalized or normalized rolled

NL = 纵向夏比V 型缺口冲击温度不低于-50 °C

NL = Longitudinal Charpy V-notch impacts temp. not lower than -50 °C,

M = 热机械轧制

M = Thermomechanically rolled

ML = 纵向夏比V 型缺口冲击温度不低于 -50 °C
 ML = Longitudinal Charpy V-notch impacts temp. not lower than -50 °C,

H = 中空截面
 H = Hollow section

B.5.2 尺寸和公差

B.5.2 Dimensions and tolerances

表 B.8 结构钢尺寸和公差的EN标准

Table B.8 — EN standards for dimensions and tolerances of structural steels

标准 Standard	备注 Notes
EN 10017	
EN 10024	
EN 10029	
EN 10034	
EN 10051	
EN 10055	
EN 10056-2	
EN 10058	
EN 10059	
EN 10060	
EN 10210-2	
EN 10219-2	
EN 10279	

B.6 日本标准 (JIS)

B.6 Japanese standards (JIS)

B.6.1 结构钢材

B.6.1 Structural steels

表 B.9结构钢和钢产品的JIS标准

Table B.9 — JIS standards for structural steels and steel products

标准 Standard	等级 Grade	备注 Notes
型材、板材和棒材 Shapes, plates and bars		
JIS G 3101	SS400 SS490 SS540	
JIS G 3106	SM400A, SM400B, SM400C SM490A, SM490B, SM490C SM490YA, SM490YB SM520B, SM520C SM570	a b
JIS G 3114	SMA400AW, SMA400BW, SMA400CW SMA490AW, SMA490BW, SMA490CW SMA570W	b
JIS G 3136	SN400A, SN400B, SN400C SN490B, SN490C	

JIS G 3138	SNR400A, SNR400B	
JIS G 3140	SBHS400, SBHS400W SBHS500, SBHS500W	a
JIS G 3350	SSC400	t ≤ 4.5
JIS G 3353	SWH400, SWH400L	
薄板和带材 Sheet and strip		
JIS G 3302	SGH400 SGH490	t ≤ 6.0
结构空心型材 Hollow structural sections		
JIS G 3444	STK400 STK490, SNR490B	
JIS G 3466	STKR400 STKR490	c c
JIS G 3475	STKN400W, STKN400B STKN490B	
铸件和锻件 Castings and Forgings		
JIS G 5101	SC480	
JIS G 5102	SCW410 SCW480	
JIS G 5201	SCW410CF SCW480CF SCW490CF	
<p>a: SM570, SMA570W, SBHS400, SBHS400W, SBHS500, SBHS500W 允许用于桥梁，但不允许用于建筑。其他钢材允许用于建筑。 a SM570, SMA570W, SBHS400, SBHS400W, SBHS500, SBHS400W are permitted for bridges but not permitted for buildings. All other steels are permitted for use in buildings.</p> <p>b: 除注释 1 中提到的之外，允许用于桥梁的钢材还包括 SM400A, SM400B, SM400C, SM490A, SM490B, SM490C, SM490YA, SM490YB, SM520C, SMA400AW, SMA400BW, SMA400CW, SMA490AW, SMA490BW 和 SMA490CW。 b Steels permitted for bridges are, in addition to those mentioned in Note 1, SM400A, SM400B, SM400C, SM490A, SM490B, SM490C, SM490YA, SM490YB, SM520C, SMA400AW, SMA400BW, SMA400CW, SMA490AW, SMA490BW and SMA490CW.</p> <p>c: 除了上述列出的钢材外，还包括日本标准未涵盖但经日本国土交通省批准允许用于建筑的结构钢材。例如，“冷成型矩形空心截面柱”标准 BCR295, BCP235 和 BCP325，按日本钢结构学会标准 JSS II 10 管理，比 STKR400 或 STKR490 更常用于建筑结构的柱中。 c In addition to the steels listed above, structural steels that are not included in JIS but approved by the Minister of Land, Infrastructure, Transport and Tourism are permitted for use in buildings. For example, the Minister-approved steel “cold-formed formed rectangular hollow section columns” BCR295, BCP235 and BCP325, which are regulated by the Standard of Japanese Society of Steel Construction, JSS II 10, are used more commonly than the STKR400 or STKR490 for columns in building structures.</p>		

B.6.2 尺寸和公差

B.6.2 Dimensions and tolerances

表 B.10 结构钢尺寸和公差的JIS标准
JIS standards for dimensions and tolerances of structural steels

标准 Standard	备注 Notes
JIS G 3191	
JIS G 3192	
JIS G 3193	
JIS G 3194	

B.7 俄罗斯标准 (GOST)

B.7 Russian standards (GOST)

B.7.1 结构钢

B.7.1 Structural steels

表 B.11 结构钢和钢产品的GOST标准

Table B.11 — GOST standards for structural steels and steel products

标准 Standard	等级 Grade	备注 Notes
型材、板材和棒材 Shapes, plates and bars		
GOST 380	Ст0 Ст1кп, Ст1пс, Ст1сп Ст2кп, Ст2пс, Ст2сп Ст3кп, Ст3пс, Ст3сп Ст3Гпс, Ст3Гсп Ст4кп, Ст4пс, Ст4сп Ст5пс, Ст5сп Ст5Гпс Ст6пс, Ст6сп	a d
GOST 1050	05кп 08кп, 08пс, 08 10кп, 10пс, 10 11кп 15кп, 15пс, 15 18кп 20кп, 20пс, 20 25 30 35 40 45 50, 50А 55 58 (55пп) 60, 60пп, 60 пп «селект»	a b
GOST 6713	16Д 15ХСНД 10ХСНД	c d
GOST 19281	07ГФБ, 07ГФБ-1 08ХМФчЮА 09ГСФЮ 09Г2, 09Г2-1 09Г2Д, 09Г2Д-1 09Г2С, 09Г2С-1, 09Г2СД, 09Г2СД-1 09Г2ФБ, 09Г2ФБ-1 10Г2Б, 10Г2БД 10Г2С-1, 10Г2С1, 10Г2С1Д 10Г2ФБЮ, 10Г2ФБЮ-1 10ХСНД 10ХНДП 12Г2С, 12Г2С-1 12Г2СД, 12Г2СД-1	c d

	12Г2Ф, 12Г2Ф-1, 12Г2ФД, 12Г2ФД-1 12ГСБЮ, 12ГСБЮ-1 13ХФЮ 14Г2, 14Г2-1 15Г2СФ, 15Г2СФ-1, 15Г2СФД, 15Г2СФД-1 15ГФ, 15ГФ-1, 15ГФД, 15ГФД-1 15ХСНД 17Г1С-У, 17Г1С-У-1 20ФЮ 或265, 295, 315, 325, 345, 355, 375, 390, 440, 460, 500, 550, 600, 620, 650, 700 和EN 10025-2 标准的S235, S275, S355	
GOST 27772	C235 C245 C255 C345, C345K C355, C355-1, C355K, C355П C375, C390, C390-1 C440 C550 C590	e
GOST R 55374	09Г2СД 10ХСНД 14ХГНДЦ 15ХСНД	c d
薄板和带材 Sheet and strip		
GOST 14637	Ст0 Ст2кп, Ст2пс, Ст2сп Ст3кп, Ст3пс, Ст3сп Ст3Гпс, Ст3Гсп Ст4сп Ст5пс, Ст5сп Ст5Гпс	a d
结构空心型材 Hollow structural sections		
GOST 30245	C235 C245 C255 C345, C345K C355, C355-1, C355K, C355П C375 C390, C390-1 C440 C550 C590	e
GOST R 52664	09Г2С 09ГСФ 17Г1С 17Г1СУ С 245 C345 C540	c d
GOST R 54864	C235 C245 C255 C275 C285 C345	e

	C375 C390 C440	
GOST R 58064	C245 C255 C345, C345K C355, C355-1, C355K, C355П C375 C390, C390-1 C440 C550 C590 C690	e
铸件和锻件 Castings and Forgings		
GOST 977	非合金结构钢: structural unalloyed: 15Л 20Л 25Л 30Л 35Л 40Л 45Л 50Л	c f
	结构合金钢: structural alloyed: 20ГЛ 35ГЛ 20ГСЛ 30ГСЛ 20Г1ФЛ 20ФЛ 30ХГСФЛ 45ФЛ 32Х06Л 40ХЛ 20ХМЛ, 20ХМФЛ 20ГНМФЛ 35ХМЛ 30ХНМЛ 35ХГСЛ 35НГМЛ 20ДХЛ 08ГДНФЛ 13ХНДФТЛ 12ДН2ФЛ, 12ДХН1МФЛ 23ХГС2МФЛ 12Х7Г3СЛ 25Х2ГНМФЛ 27Х5ГСМЛ 30Х3С3ГМЛ 03Н12Х5М3ТЛ, 03Н12Х5М3ТЮЛ	c d f
	用于CMEA 成员国之间法律关系的结构合金钢: structural alloy used in legal relations between the CMEA member countries: 15ГЛ 30ГЛ 45ГЛ 70ГЛ 55СЛ	c d f

	40Г1 5ΦЛ 15ΦЛ 30ХЛ 25ХГЛ 35ХГЛ 50ХГЛ 60ХГЛ 70Х2ГЛ 35ХГФЛ 40ХФЛ 30ХМЛ 40ХМЛ 40ХНЛ, 40ХН2Л 30ХГ1 5МФРЛ 75ХНМФЛ 40ГТЛ 20ГНМЮЛ	
	特殊性能合金钢 alloyed with special properties: 马氏体级 martensitic class 20Х13Л, 08Х14НДЛ 09Х16Н4БЛ 09Х17Н3СЛ 10Х12НДЛ 20Х5МЛ 20Х8БЛ 40Х9С2Л 20Х12ВНМФЛ 85Х4М5Φ2В6Л (Р6М5Л) 90Х4М4Φ2В6Л (Р6М4Φ2Л)	c d f
	特殊性能合金钢: alloyed with special properties: 马氏体-铁素体级 martensite -ferritic class 15Х13Л — 耐腐蚀性 15Х13Л — corrosion resistant	c d f
	特殊性能合金钢: alloyed with special properties: 铁素体级 ferritic grade 15Х25ТЛ	c d f
	特殊性能合金钢: alloyed with special properties: 奥氏体-马氏体级 austenitic -martensitic class 08Х15Н4ДМЛ 08Х14Н7МЛ 14Х18Н4Г4Л	c d f
	特殊性能合金钢: alloyed with special properties:	c d

	奥氏体-铁素体级 austenitic -ferritic class 12X25H5TMΦЛ 16X18H12C4TЮЛ 10X18H3ГЗД2Л 35X23H7CЛ 40X24H12CЛ 20X20H14C2Л	f
	特殊性能合金钢: alloyed with special properties: 奥氏体级 austenitic class 10X18H9Л 12X18H9ТЛ 10X18H11БЛ 07X17H16ТЛ 12X18H12M3ТЛ 55X18Г14C2ТЛ 15X23H18Л 20X25H19C2Л 18X25H19CЛ 45X17Г13H3ЮЛ	c d f
<p>^a 字母“СТ”表示“钢”。</p> <p>^a The letters «СТ» denote «Steel»</p> <p>数字表示品牌的条件编号，依据化学成分而定（一个数字表示合金中该元素的平均含量，以千分之一为单位）。</p> <p>The numbers — the conditional number of the brand depending on the chemical composition (one digit indicates its average content in the alloy in tenths of a percent)</p> <p>字母“кп”、“пс”、“сп”表示钢的脱氧程度：πкп”表示沸腾钢，πпс”表示半镇静钢，πсп”表示镇静钢。如果标记中不包含这些字母，则该钢被归类为“镇静”钢。</p> <p>The letters «кп», «пс», «сп» — the degree of deoxidation of steel: «кп» - boiling, «пс» - semi-calm, «сп» - calm. If the marking does not contain such letters, then the steel corresponds to the «calm» category</p>		
<p>^b 标记末尾的字母“A”表示高质量钢，具有低含量的有害杂质和非金属夹杂物。</p> <p>^b Letter «A» placed at the end of the marking — high quality steel with a low content of harmful impurities and non-metallic inclusions</p> <p>字母“лн”表示低淬透性钢。</p> <p>The letters «лн» — steel of reduced hardenability</p> <p>词汇“селект”表示参数波动最小的金属批次样本。</p> <p>The word «селект» — a sample of metal lots with the smallest scatter of parameters</p>		
<p>^c 数字表示品牌的条件编号，取决于碳含量（两个数字表示合金中该元素的平均含量，以百分之一为单位）。</p> <p>^c The numbers — the conditional number of the brand depending on the carbon content (two numbers indicate its average content in the alloy in hundredths of a percent)</p>		
<p>^d 标记中间的字母“A”表示氮（N）。</p> <p>^d Letter «A» placed in the middle of the marking — N (nitrogenium)</p> <p>标记末尾的字母“A”表示高质量钢，具有低含量的有害杂质和非金属夹杂物。</p> <p>Letter «A» placed at the end of the marking — high quality steel with a low content of harmful impurities and non-metallic inclusions</p> <p>字母“Б”表示铌（Nb）。</p> <p>Letter «Б» — Nb (niobium)</p>		

<p>字母“Г”表示锰（Mn），其质量分数在钢中为0.80%或以上。 Letter «Г» — Mn (manganum), manganese with its mass fraction in steel 0,80% or more.</p> <p>字母“Д”表示铜（Cu）。 Letter «Д» — Cu (cuprum)</p> <p>字母“М”表示钼（Mo）。 Letter «М» — Mo (molybdenum)</p> <p>字母“Н”表示镍（Ni）。 Letter «Н» — Ni (niccolum)</p> <p>字母“П”表示磷（P）。 Letter «П» — P (phosphorus)</p> <p>字母“Р”表示硼（B）。 Letter «Р» — B (boron)</p> <p>字母“С”表示硅（Si）。 Letter «С» — Si (silicium)</p> <p>字母“Т”表示钛（Ti）。 Letter «Т» — Ti (titanium)</p> <p>字母“У”表示强化。 Letter «У» — reinforced</p> <p>字母“Ф”表示钒（V）。 Letter «Ф» — V (vanadium)</p> <p>字母“Х”表示铬（Cr）。 Letter «Х» — Cr (chromium)</p> <p>字母“ч”表示合金中包含稀土金属，如铈、镧、钕等。 Letter «ч» — the alloy contains rare earth metals such as: cerium, lanthanum, neodymium and others</p> <p>字母“Ю”表示铝（Al）。 Letter «Ю» — Al (aluminium)</p> <p>字母后的数字表示合金元素的大致质量分数，以整数形式表示。 The numbers after the letters indicate the approximate mass fraction of the alloying element in whole units</p> <p>如果无数字，则表示该合金元素在钢中的含量最高为1.5%。 The absence of a figure means that the steel contains up to 1,5% of this alloying element</p>
<p>。字母“С”表示结构钢，在字母“С”后标注钢材的最小屈服强度。 ° Letter «С» – construction steel, after the letter «С» the minimum yield strength of the steel is indicated.</p> <p>字母“К”表示优质碳素钢。 Letter «К» – quality carbon steel.</p> <p>对于C355Π钢，在600°C时，其屈服强度σ_T至少应为200 N/mm²，瞬时抗拉强度σ_B至少应为240 N/mm²。 For C355Π steel, the yield strength σ_T at a temperature of 600 °C must be at least 200 N/mm², the temporary resistance σ_B must be at least 240 N/mm².</p>
<p>^f标记末尾的字母“Л”表示结构铸钢（用于制造铸造产品）。 ^f Letter «Л» at the end of the marking — structural casting steel (used in the manufacture of cast products)</p>

B.7.2 尺寸与公差

B.7.2 Dimensions and tolerances

表 B.12 结构钢尺寸和公差的GOST标准

Table B.12 — GOST standards for dimensions and tolerances of structural steels

标准 Standard	备注 Notes
GOST 82	
GOST 103	
GOST 535	
GOST 1051	
GOST 1577	
GOST 2590	
GOST 2591	
GOST 2879	
GOST 4543	
GOST 4781	
GOST 8239	
GOST 8240	
GOST 8278	
GOST 8281	
GOST 8282	
GOST 8283	
GOST 8509	
GOST 8510	
GOST 8731	
GOST 9034	
GOST 9045	
GOST 10551	
GOST 10705	
GOST 10706	
GOST 11269	
GOST 13229	
GOST 14918	
GOST 16523	
GOST 17066	
GOST 18662	
GOST 19425	
GOST 19771	
GOST 19772	
GOST 19903	
GOST 19904	
GOST 23118	
GOST 26429	
GOST 30245	
GOST R 52664	
GOST R 54864	
GOST R 57837	
GOST R 58064	
GOST R 58384	
GOST R 58385	

B.8 北美标准 (ASTM)

B.8 North American standards (ASTM)

B.8.1 结构钢

B.8.1 Structural steels

表 B.13 结构钢和钢产品的ASTM标准

Table B.13 — ASTM standards for structural steels and steel products

标准 Standard	等级 Grade	备注 Notes
型材、板材和棒材 Shapes, plates and bars		
ASTM A36/A36M	36 [250]	
ASTM A283/A283M	C D	
ASTM A514/A514M		
ASTM A529/A529M	50 [345] 55 [380]	
ASTM A572/A572M	42 [290] 50 [345] 55 [380] 60 [415] 65 [450]	类型 1、2 或 3 Type 1, 2, or 3
ASTM A588/A588M	A B K	
ASTM A709/A709M	36 [250] 50 [345], 类型 1、2 和 3 50 [345], Types 1, 2 and 3 50S [345S] 50W [345W], 类型 A 和 B 50W [345W], Types A and B QST 50 [QST345] QST 50S [QST345S] QST 65 [QST450] QST 70 [QST485] HPS 50W [HPS 345W] HPS 70W [HPS 485W] HPS 100W [HPS 690W]	a b
ASTM A913/A913M	50 [345] 60 [415] 65 [450] 70 [485] 80 [550]	
ASTM A992/A992M		
ASTM A1043/A1043M	36 [250] 50 [345]	
ASTM A1066/A1066M	50 [345] 60 [415] 65 [450] 70 [485] 80 [550]	
薄板和带材 Sheet and strip		
ASTM A606/A606M	45 [310] 50 [345]	类型 2、4 和 5 Types 2, 4, and 5

ASTM A1011/A1011M	SS 等级30 [205] SS Grade 30 [205] SS 等级33 [230] SS Grade 33 [230] SS 等级36 [250], 类型1 和2 SS Grade 36 [250], Types 1 and 2 SS 等级40 [275] SS Grade 40 [275] SS 等级45 [310], 类型1 和2 SS Grade 45 [310], Types 1 and 2 SS 等级50 [340] SS Grade 50 [340] SS 等级55 [380] SS Grade 55 [380] SS 等级60 [410] SS Grade 60 [410] SS 等级70 [480] SS Grade 70 [480] SS 等级80 [550] SS Grade 80 [550] HSLAS 等级45 [310], 类型1 和2 HSLAS Grade 45 [310], Classes 1 and 2 HSLAS 等级50 [340], 类型1 和2 HSLAS Grade 50 [340], Classes 1 and 2	
	HSLAS 等级55 [380], 类型1 和2 HSLAS Grade 55 [380], Classes 1 and 2 HSLAS 等级60 [410], 类型1 和2 HSLAS Grade 60 [410], Classes 1 and 2 HSLAS 等级65 [450], 类型1 和2 HSLAS Grade 65 [450], Classes 1 and 2 HSLAS 等级70 [480], 类型1 和2 HSLAS Grade 70 [480], Classes 1 and 2 HSLAS-F 等级50 [340], 类型1 HSLAS-F Grade 50 [340], Class 1 HSLAS-F 等级60 [410], 类型1 HSLAS-F Grade 60 [410], Class 1 HSLAS-F 等级70 [480], 类型1 HSLAS-F Grade 70 [480], Class 1 HSLAS-F 等级80 [550], 类型1	

	HSLAS-F Grade 80 [550], Class 1	
结构空心型材 Hollow structural sections		
ASTM A53/A53M	B	
ASTM A500/A500M	B C D	
ASTM A501/A501M	B	ERW 和无缝 ERW and seamless
ASTM A618/A618M	Ia Ib II III	ERW 和无缝 ERW and seamless
ASTM A847/A847M	50 [345] 50W [345W]	
ASTM 1065/A1065M	50 [350] 50W [350W]	
ASTM 1085/A1085M	A	
铸件和锻件 Castings and Forgings		
ASTM A216/A216M		
ASTM A668/A668M		
^a S = 型材 ^a S = Shape W = 增强的大气腐蚀抗性 W = enhanced atmospheric corrosion resistance QST = 淬火自回火钢 QST = Quenched and self-tempered HPS = 高性能钢 HPS = High-performance steel ^b 增加了非断裂关键拉伸构件 (T) 和断裂关键拉伸构件 (F) 冲击测试要求的标识 (未显示)。 ^b Added designations for Non-Fracture Critical Tension Component impact test requirements (T) and Fracture Critical Tension Component impact test requirements (F) not shown.		

B.8.2 尺寸和公差

B.8.2 Dimensions and tolerances

表 B.14 结构钢尺寸和公差的ASTM标准

Table B.14 — ASTM standards for dimensions and tolerances of structural steels

标准 Standard	备注 Notes
ASTM A6/A6M	
ASTM A568/A568M	

B.9 印度标准 (IS)

B.9 Indian standards (IS)

B.9.1 结构钢

B.9.1 Structural steels

表 B.15 结构钢和钢产品的 IS 标准

Table B.15 — IS standards for structural steels and steel products

标准 Standard	等级 Grade	备注 Notes
型材、板材和棒材 Shapes, plates and bars		
IS 2062	E 250, A BR B0 C E 275, A BR B0 C E 300, A BR B0 C E 350, A BR B0 C E 410, A BR B0 C E 450, A BR E 550, A BR E 600, A BR E 650, A BR	a
IS 11587	WR Fe 480 A WR Fe 480 B WR Fe 500	b
IS 15103	FR Fe 410 FR Fe 490	c
IS 15911	E 165 E 170 E 215	
薄板和带材 Sheet and strip		
结构空心型材 Hollow structural sections		
铸件和锻件 Castings and Forgings		
<p>a A: 不需要冲击试验, 半镇静/镇静 aA: Impact test not required, semi-killed/killed</p> <p>BR: 冲击试验可选; 如在室温下需要; 半镇静/镇静 BR: Impact test optional; if required at room temperature; semi-killed/killed</p> <p>B0: 在0°C 时强制进行冲击试验, 半镇静/镇静 B0: Impact test mandatory at 0°C, semi-killed/killed</p> <p>C: 在-20°C 时强制进行冲击试验, 镇静 C: Impact test mandatory at -20°C, killed</p> <p>^b WR: 耐候性 ^bWR: Weather Resistant</p> <p>^c FR: 耐火性 ^cFR: Fire Resistant</p>		

B.9.2 尺寸和公差

B.9.2 Dimensions and tolerances

表 B.16 结构钢尺寸和公差的 IS 标准

Table B.16 — IS standards for dimensions and tolerances of structural steels

标准 Standard	备注 Notes
IS 808	
IS 1161	
IS 1730	
IS 1732	
IS 1852	
IS 2314	
IS 3954	
IS 8910	
IS 12778	
IS 12779	

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Regional standards for steel - Europe

[3] EN 10017, Steel rod for drawing and/or cold rolling Dimensions and tolerances

[4] EN 10024, Hot rolled taper flange I sections — Tolerances on shape and dimensions

[5] EN 10025-2, Hot rolled products of structural steels — Part 2: Technical delivery conditions for non-alloy structural steels

[6] EN 10025-3, Hot rolled products of structural steels — Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels

[7] EN 10025-4, Hot rolled products of structural steels — Part 4: Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels

[8] EN 10025-5, Hot rolled products of structural steels — Part 5: Technical delivery conditions for structural steels with improved atmospheric corrosion resistance

[9] EN 10025-6, Hot rolled products of structural steels — Part 6: Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition

[10] EN 10029, Specification for tolerances on dimensions, shape and mass for hot rolled steel plates 3 mm thick or above

[11] EN 10034, Structural steel I and H sections — Tolerances on shape and dimensions

[12] EN 10051, Continuously hot-rolled uncoated plate, sheet and strip of non-alloy and alloy steels — Tolerances on dimensions and shape

[13] EN 10055, Hot rolled steel equal flange tees with radiused root and toes — Dimensions and tolerances on shape and dimensions

[14] EN 10056-2, Specification for structural steel equal and unequal leg angles — Part 2: Tolerances on shape and dimensions

[15] EN 10058, Hot rolled flat steel bars for general purposes – Dimensions and tolerances on shape and dimensions

[16] EN 10059, Hot rolled square steel bars for general purposes – Dimensions and tolerances on shape and dimensions

[17] EN 10060, Hot rolled round steel bars for general purposes – Dimensions and tolerances on shape and dimensions

[18] EN 10149-2, Specification for hot-rolled flat products made of high yield strength steels for cold forming — Part 2: Delivery conditions for thermomechanically rolled steels

[19] EN 10149-3, Specification for hot-rolled flat products made of high yield strength steels for cold forming — Part 3: Delivery conditions for normalized or normalized rolled steels

[20] EN 10210-1, Hot finished structural hollow sections of non-alloy and fine grain steels —Part 1: Technical delivery conditions

- [21] EN 10210-2, Hot finished structural hollow sections of non-alloy and fine grain steels —Part 2: Tolerances, dimensions and sectional properties
- [22] EN 10210-3, Hot finished structural hollow sections of non-alloy and fine grain steels —Part 3: Technical delivery conditions for high strength and weather resistant steels
- [23] EN 10219-1, Cold formed welded structural hollow sections of non-alloy and fine grain steels — Part 1: Technical delivery conditions
- [24] EN 10219-2, Cold formed welded structural hollow sections of non-alloy and fine grain steels — Part 2: Tolerances, dimensions and sectional properties
- [25] EN 10219-3, Cold formed welded structural hollow sections of non-alloy and fine grain steels — Part 3: Technical delivery conditions for high strength and weather resistant steels
- [26] EN 10248-1, Hot rolled steel sheet piling of non-alloy steels – Part 1: Technical delivery conditions
- [27] EN 10249-1, Cold formed steel piling of non-alloy steels – Part 1: Technical delivery conditions
- [28] EN 10268, Cold rolled steel flat products with high yield strength for cold forming — Technical delivery conditions
- [29] EN 10279, Hot rolled steel channels — Tolerances on shape, dimension and mass
- [30] EN 10346, Continuously hot-dip coated steel flat products — Technical delivery conditions

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National standards for steel – Australia / New Zealand

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- [32] AS 1548, Fine grained, weldable steel plate for pressure equipment
- [33] AS/NZS 1594, Hot-rolled steel flat products
- [34] AS/NZS 1595, Cold-rolled, unalloyed, steel sheet and strip
- [35] AS 3597, Structural and pressure vessel steel—Quenched and tempered plate
- [36] AS/NZS 3678, Structural steel – hot-rolled plates, floor plates and slabs
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- [46] GB/T 1591, High strength low alloy structural steels
- [47] GB/T 2518, Continuously hot-dip zinc-coated steel sheet and strip
- [48] GB/T 4171, Atmospheric corrosion resisting structural steel
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- [50] GB/T 5313, Steel plate with through-thickness characteristics
- [51] GB/T 6725, General requirements for cold-formed steel sections
- [52] GB/T 6728, Cold formed steel hollow sections for general structure – Dimensions, shapes, weight and permissible deviations
- [53] GB/T 7659, Steel casting suitable for welded structure
- [54] GB/T 8162, Seamless steel tubes for structural purposes
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- [58] GB/T 11352, Carbon steel castings for general engineering purpose
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- [60] GB/T 17395, Dimensions, shapes, masses and tolerances of seamless steel tubes
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- [62] GB/T 20933, Hot rolled U-sheet piles
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钢材的国家标准– 印度

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