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中国钢结构协会标准

CSCS

T/CSCSxxx-2025

# 钢结构建造质量控制标准

## 第3部分：制造

**Steel structures — Execution of structural steelwork**

**Part 3: Fabrication**

2025-0X-XX 发布

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中国钢结构协会 发布

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**Steel structures — Execution of structural steelwork**

### **Part 3: Fabrication**

**T/CSCS xxx-2025**

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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3部分。

在采用ISO 17607:2023时，本部分做了一些修改。有关技术性差异已编入正文中并在它们所涉及的条款的页边空白处用垂直单线标识。在附录B中给出了这些技术性差异及其原因的一览表，以供参考。

对应于ISO 17607:2023，本部分还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、附录 B为资料性附录。

本标准由中国钢结构协会管理。

**本部分起草单位：** xxx

**本部分主要起草人：** xxx

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# 1 范围

## 1 Scope

本文件规定了用于钢结构建造的结构或构件的通用要求，并应与 T/CSCS xxx-1 配合使用。

This document defines the general requirements for fabrication 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技术要求，详见 T/CSCS xxx 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

本文引用下列标准，其部分或全部内容构成了本标准的内容。对于标注日期的引用文件，仅适用所引用的版本；对于未标注日期的引用文件，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 286-2, *Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes — Part 2: Tables of standard tolerance classes and limit deviations for holes and shafts*

ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method*

ISO 6507-1 *Metallic materials — Vickers hardness test — Part 1: Test method*

ISO 9013, *Thermal cutting — Classification of thermal cuts — Geometrical product*

*specification and quality tolerances*

ISO 13920, *Welding — General tolerances for welded constructions — Dimensions for lengths and angles — Shape and position*

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

ISO/TR 15608, *Welding — Guidelines for a metallic materials grouping system*

### 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 通过以下网址维护其标准化专用名词数据库：

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 电子百科全书：可在 <https://www.electropedia.org/>
- IEC Electropedia: available at <https://www.electropedia.org/>

### 4 建造技术规格书

### 4 Execution specification

参考 T/CSCS xxx-1。

See ISO 17607-1.

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。在此情况下，建造技术规格书中应明确所采用的

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 may be 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.

在建造前应确认钢结构制造必要信息和技术要求。

The necessary information and technical requirements for execution of fabrication shall be agreed on and complete before commencement.

钢结构建造技术规格书要求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 C.1；  
a) additional information, see A.1;
- b) 附加信息，参见附录 C.2；  
b) additional information, see A.2;
- c) 与建造等级相关的要求，参见附录 C.3；  
c) requirements related to execution levels, see A.3;
- d) 标识和可追溯性要求，参见 T/CSCS xxx-1；  
d) identification and traceability requirements, see ISO 17607-1;
- e) 几何公差，参见第 6 条；  
e) geometrical tolerances, see Clause 6.

应制定对于已确认的建造技术规格书的变更程序。

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

## 5 准备和组装

## 5 Preparation and assembly

### 5.1 概述

#### 5.1 General

本条款规定了钢结构产品及零部件在组成构件时的标识和可追溯性、搬运和储存、切割、成型、受力螺栓孔、临时附件和组装的要求。

This clause specifies the requirements for identification and traceability, handling and storage, cutting, shaping, holing for structural bolting, temporary attachments, and assembly of steel products and sub components for inclusion into components.

注：T/CSCS xxx-5（ISO 17607-5）和 T/CSCS xxx-6（ISO 17607-6）中给出了焊接和受力螺栓孔的相关规定。  
NOTE Provisions for welding and structural bolting are given in ISO 17607-5 and ISO 17607- 6..

钢结构的制造应满足第 6 章规定的公差要求。

Structural steelwork shall be fabricated within the tolerances specified in Clause 6.

制造过程中使用的设备应进行维护，避免由于设备的折旧、磨损和故障导致制造过程不合格。

Equipment used in the fabrication process shall be maintained to ensure that use, wear and failure do not cause nonconformity in the fabrication process.

### 5.2 标识和可追溯性

#### 5.2 Identification and traceability

##### 5.2.1 标识

##### 5.2.1 Identification

有关标识，参见 T/CSCS xxx-1（ISO 17607-1）。

For identification, see ISO 17607-1.

标识的内容包括钢结构建造的执行等级 1~4（EXL1、EXL2、EXL3 和 EXL4）或建造技术规格书约定的内容。

Identification is required for execution levels 1 to 4 (EXL1, EXL2, EXL3, and EXL4) or as specified in the execution specification.

在各制造阶段，未组装的单件和零部件应采用适当的标识方式，以便正确组装。  
At all stages of fabrication, unassembled single items and constituent products shall be identifiable by a suitable method of identification for the purposes of proper assembly.

注：建造阶段包括储存、切割、打孔、组装、焊接和涂装或涂层。根据执行等级，标识可以是视觉标记、标签、同类产品的指定位置等。

NOTE Examples of fabrication stages include storage, cutting, holing, fit-up, welding and painting or coating. Depending on the execution class, identification can vary from a visual marking or tag on each piece to designated locations for similar products.

除非另有说明，单个构件或打包的同类构件的硬印、冲孔或钻孔等标记方式应满足下列要求：

The following requirements apply to hard stamped, punched or drilled marks used for marking single components or packages of similar components, unless otherwise specified:

- a) 钢材强度等级应为 500 MPa 及以下；
- a) They shall only be used for steel grades up to and including 500 MPa;
- b) 标记所在的区域不能影响产品的疲劳寿命，且应在建造技术规格书中注明。
- b) They shall only be used in areas, as specified in the execution specification, where the marking method would not affect the fatigue life.

如果禁止使用硬印、冲孔或钻孔标记，则应规定是否可以使用柔性或低应力刻印。  
If the use of hard stamps, punched or drilled marks is not permitted, it shall be specified whether soft or low stress stamps may be used.

明确说明任何不允许标识，或完工后不可看到标识的区域，并应在建造技术规格书中注明。

Any zones where identification marks are not permitted or shall not be visible after completion shall be specified in the execution specification.

在生产、运输和安装过程中，组装完成的构件也应通过适当的方法进行标识。

The assembled component as it moves through the production, shipping and erection processes shall also be identifiable by suitable methods.

所有零部件均应保留标识文件，并在建造技术规格书里约定保留期限。

Identification documents shall be retained for all constituent products. The retention period shall be specified in the execution specification.

### **5.2.2 可追溯性**

### **5.2.2 Traceability**

可追溯性参见 T/CSCS xxx-1 (ISO 17607-1)。

For traceability see ISO 17607-1.

## **5.3 搬运和储存**

## **5.3 Handling and storage**

零部件的搬运和储存条件应遵循制造商的建议。

Constituent products shall be handled and stored in conditions that are in accordance with the product manufacturer's recommendations.

如果零部件有质保期，超出质保期的零部件不得使用。对于搬运方式不当或储存时间过长，可能导致性能显著劣化的产品，使用前须检查其仍符合相关的产品标准和建造技术规格书约定。

Constituent products shall not be used beyond the shelf life specified by their manufacturer. Products that have been handled or stored in a way or for a length of time that could have led to significant deterioration shall be checked before use to ensure that they still conform with the relevant product standard and execution specification.

钢结构构件在包装、搬运和运输过程中应避免发生永久变形，并尽量减少表面损伤。应酌情采用表 5.3 中规定的搬运和储存预防措施。

Structural steel components shall be packed, handled, and transported safely so that permanent deformation does not occur, and surface damage is minimised. Handling

and storage preventive measures specified in Table 1 shall be applied as appropriate.

**表 5.3—搬运和储存损伤预防措施清单**

**Table 1 — List of handling and storage preventive measures**

<b>吊装</b> <b>Lifting</b>	
设置保护措施避免构件吊点处受损伤	Protection of components from damage at the lifting points
使用分配梁避免长构件单点起吊	Avoidance of single point lifting of long components by use of spreader beams
通过捆绑避免单个轻质构件吊装时的边缘损伤、扭转和变形等。特别注意应避免对构件接触位置、起吊点或其他大部分捆包重量集中的单个未加固边缘等区域造成局部损伤。	Bundling together lightweight components particularly prone to edge damage, twisting and distortion if handled as individual items. Care taken to avoid localized damage where components touch each other, to unstiffened edges at lifting points or other zones where a significant proportion of the weight of the bundle is imposed on a single unreinforced edge
<b>储存</b> <b>Storage</b>	
将堆放构件离开地面保持其运输或安装前清洁。	Stacking of fabricated components stored before transportation or erection clear of the ground to be kept clean
设置必要的支承避免永久变形。	Necessary supports to avoid permanent deformations
对具有表面装饰的构件采用针对性的储存措施。	Storage of materials supplied with pre-finished decorative surfaces in accordance with relevant standards
<b>防腐保护</b> <b>Protection against corrosion</b>	
避免积水	Avoidance of accumulation of water
<b>运输</b> <b>Transport</b>	
对运输过程中的成品构件采用保护措施	Special measures needed for protecting fabricated components in transit

## 5.4 切割

## 5.4 Cutting

### 5.4.1 概述

### 5.4.1 General

切割应满足本规程的几何公差、最大硬度和自由边光滑度的要求。

Cutting shall be carried out in such a way that the requirements for geometrical tolerances, maximum hardness and smoothness of free edges as specified in this document are met.

注：认可的切割工艺包括长锯、剪切、咬削、圆锯、水刀和热切割等。

NOTE Recognised cutting processes are sawing, shearing, nibbling, disc cutting, water jet techniques and thermal cutting.

只有在热切割设备不适用情况下，才应使用手动热切割。对于某些切割方法，如果切割边缘承受疲劳荷载疲劳构件的自由边（即随后不焊接），则应采取预防措施，并应在建造技术规格书中注明。

Hand thermal cutting shall be used only if it is not practical to use mechanically guided thermal cutting. For some cutting methods, precautions shall be taken if the cut edges are to be free edges (i.e. not to be subsequently welded) for components subject to fatigue, as specified in the execution specification.

如果某项工艺不满足要求，则在校正和再次检查之前不得使用。该工艺可用于一定范围内的组成产品，但产品结果必须满足要求。

If a process does not conform, it shall not be used until corrected and checked again. It may be used on a restricted range of constituent products that do produce conforming results.

带有涂层构件的切割应选择减少涂层损坏的切割方法。

If coated materials are to be cut, the method of cutting shall be selected to minimize any damage to the coating.

应去除可能造成伤害或妨碍构件正确对齐和定位的毛刺。

Burrs that can cause injury or prevent the proper alignment or bedding of sections shall be removed.

#### **5.4.2 剪切和咬削**

#### **5.4.2 Shearing and nibbling**

自由边表面应进行检查并在必要时进行平滑处理，以消除不合格项。如果在剪切或步冲后需要磨削或加工，则磨削或加工的最小深度应为 0.5 mm。第 5.6.2.2 对



冲孔的限制也适用于剪切和步冲。

The free edge surfaces shall be checked and smoothed as necessary to remove nonconformities. If grinding or machining is required after shearing or nibbling, the minimum depth of grinding or machining shall be 0,5 mm. The restrictions on punching in 5.6.2.2 also apply to shearing and nibbling.

### **5.4.3 热切割**

### **5.4.3 Thermal cutting**

应按照以下规定每年检查自动热切割工艺的能力。

The capability of automated thermal cutting processes shall be checked annually as set out below.

采用受检查的切割工艺进行四次代表性切割：

Four samples shall be produced from the constituent product to be cut by the process:

- a) 对最厚的组件直线切割；
- a) A straight cut from the thickest constituent product;
- b) 对最薄的组件直线切割；
- b) A straight cut from the thinnest constituent product;
- c) 在代表性厚度的组件上切割内凹角；
- c) A re-entrant corner from a representative thickness;
- d) 在代表性厚度的组件上切割弧线。
- d) A curved arc from a representative thickness.

每条直线样品的测量应覆盖至少 200 mm 的长度，并与所要求的切割面质量进行对比。角部和曲线样品应进行目视检查，确保边缘质量与直切的质量相当。

Measurements shall be taken on each straight sample over at least a 200 mm length and checked against the required quality of the cut surface. The corner and curved samples shall be visually inspected to establish that they produce edges of equivalent quality to the straight cuts.

或者，可以按照附录 D 的规定检查自动热切割过程的性能。

Alternatively, the capability of automated thermal cutting processes may be checked as given in Annex B.

除非另有规定，否则按照 ISO 9013 进行评定时，作为自由边（即随后不焊接）的切割面的质量要求应符合表 5.4.3 的规定。

The quality requirements for cut surfaces to be left as free edges (i.e. not to be subsequently incorporated into a weld) shall be according to Table 2 when assessed in accordance with ISO 9013, unless otherwise specified.

或者，评定切割面质量可以采用 AWS C4.1-77 系列标准中的表面粗糙度测量仪。热切割面的粗糙度通过目视比较切割面与粗糙度测量仪上表示的粗糙度评定。表面粗糙度不得大于样品 3 所示的表面粗糙度，但对于不承受计算应力的构件端部，翼缘厚度不超过 50 mm 的梁的开槽，以及厚度在 100 mm 至 200 mm 之间的材料，表面粗糙度不应超过样品 2 所示的粗糙度。

Alternatively, the reference for evaluation of cut surfaces may be the surface roughness gauge included in the AWS C4.1-77 set. When used, the roughness of thermal cut surfaces shall be evaluated by visually comparing the cut surface to the roughness represented on the roughness gauge. Surface roughness shall be no greater than that represented by Sample 3, except that for the ends of members not subject to calculated stress, copes in beams with the flange thickness not exceeding 50 mm [2 in.], and for materials over 100 mm to 200 mm [4 in to 8 in thick, surface roughness shall not exceed that represented by Sample 2.

当建造技术规格书有明确要求时，需要表面处理的自由边在涂装前应去消除表面硬化。

When required by the execution specification, free edges that are to have surface preparation before paint coating shall have the hardened surface removed.

当建造技术规格书有明确要求时，需要进行热浸镀锌的自由边应先消除表面硬化。

When required by the execution specification, free edges that are to be hot dip galvanized shall have the hardened surface removed.

注：当热切割表面热浸镀锌时，可能会发生液态金属助裂（LMAC）或液态金属脆化（LME）。请参阅 ISO 14713-2 和 DAST Richtline 022 以获取相关指导。

NOTE Liquid metal assisted cracking (LMAC), or liquid metal embrittlement (LME) can occur where surfaces are thermally cut and receive hot dip galvanizing. See ISO 14713-2 and DAST-Richtlinie 022 for guidance.

**表 5.4.3—切割面质量<sup>a</sup>**

**Table 2 — Quality of the cut surfaces<sup>a</sup>**

建造等级 Execution Level	垂直度或角度公差, $\mu$ Perpendicularity or angularity tolerance, $\mu$	剖面平均高度, $Rz5$ Mean height of the profile, $Rz5$
EXL1	切割边缘应无显著不规则性，并应去除残留的浮渣 Cut edges to be free from significant irregularities and dross shall be removed	
EXL2	范围5 Range 5	范围4 Range 4
EXL3	范围4 Range 4	范围4 Range 4
EXL4	范围4 Range 4	范围4 Range 4
<sup>a</sup> 公差范围规定参考ISO 9013 <sup>a</sup> Ranges are specified in ISO 9013		

#### 5.4.4 自由边表面的硬度

#### 5.4.4 Hardness of free edge surfaces

碳钢组 2.2 和 3（见 ISO/TR 15608）的自由边表面硬度不得超过 450（HV10）或 420 布氏硬度（HB）。在这种情况下，应检查可能导致其局部硬化的工艺（热切割、剪切、步冲和冲孔）的能力。为了使自由边表面硬度满足要求，必要时应对材料进行预热。

The hardness of free edge surfaces of carbon steel groups 2.2 and 3, as listed in ISO/TR 15608, shall be no more than 450 (HV10) or 420 Brinell (HB). In this case, processes that are likely to produce local hardness (thermal cutting, shearing, nibbling and punching) shall have their capability checked. To achieve the required hardness of free edge surfaces, preheating of material shall be applied as necessary.

除非建造技术规格书中另有规定，否则工艺能力的检查应按如下进行：

Unless otherwise specified in the execution specification, the check of the capability of the processes shall be as follows:

a) 应从工艺测试中制作四个样品，涵盖最易受到局部硬化影响的组成产品范围。

a) four samples shall be produced from procedure tests on constituent products encompassing the range of constituent products processed that are most susceptible to local hardening;

b) 每个样品应在可能受影响的位置进行四次局部硬度测试。测试应符合 ISO 6506-1 或 ISO 6507-1 的相关规定。

b) four local hardness tests shall be performed on each sample in locations likely to be affected. The tests shall be in accordance with ISO 6506-1 or ISO 6507-1.

注：焊接后硬度检查的要求包含在焊接工艺测试中（见 ISO 17607-5）。

NOTE The requirements for checking hardness after welding are included in procedure testing (see ISO 17607 5).

## **5.5 成型**

### **5.5 Shaping**

#### **5.5.1 概述**

##### **5.5.1 General**

钢可以通过热成型或冷成型工艺弯曲、压制或锻造成所需的形状，但前提是加工后的性能不低于规定的材料性能要求。

Steel may be bent, pressed or forged to the required shape either by the hot or by the cold forming processes, provided the properties are not reduced below those specified for the material to be worked.

钢的热成型、冷成型和火焰矫直的要求和建议应符合相关产品标准或钢材制造商的建议。

Requirements and recommendations for hot forming, cold forming and flame straightening of steels shall be as given in the relevant product standards or the recommendations of the steel manufacturer.

应选择合适的冷却速率以防止硬化和晶粒过度粗化。

Cooling rates should be selected to prevent hardening and excessive grain coarsening

注：请参阅 CEN/TR 10347 以获取指导。

NOTE See CEN/TR 10347 for guidance.

如果未遵循相关产品标准或钢材制造商的建议进行加工，则应按照建造技术规格书的检查程序检验工艺是否合格。

If the relevant product standards or steel manufacturer's recommendations are not followed, then the process shall be qualified by procedure testing established in execution specification.

在 5.5.2 和 5.5.3 中规定的情况下，可以通过控制加热进行起拱、矫直或成型。

Cambering, straightening or shaping by controlled application of heat may be used under the conditions specified in 5.5.2 and 5.5.3.

出现裂纹、层状撕裂或表面涂层损伤的起拱、矫直或成型构件应被视为不合格产品。

Cambered, straightened or shaped components that exhibit cracking, lamellar tearing, or damage to surface coatings shall be treated as non-conforming products.

### **5.5.2 热成型（锻造）**

#### **5.5.2 Hot forming (forging)**

热成型（锻造）应遵循相关产品标准的热成型要求和钢材制造商的建议。

Shaping by hot forming (forging) shall conform to the requirements relating to hot forming of the relevant product standard and to the recommendations of the steel manufacturer.

热力轧制或淬火回火钢材不得采用热成型工艺。

Hot forming of thermo-mechanically rolled or quenched and tempered steels shall not be used.

如果钢材制造商未提供建议：

In the absence of recommendations from the steel manufacturer:

- 对于屈服强度不超过 360 MPa 的钢材，热成型工艺应在 600 °C 至 650 °C 的温度范围内进行。温度、时间和冷却速率应与特定类型的钢材相适应。冷却

过程中，不允许在 250 °C 至 380 °C 的温度范围内进行弯曲和成型。

- For steel grades up to and including 360 MPa yield, the hot forming process shall take place in the range 600 °C to 650 °C. The temperature, timing and cooling rate shall be appropriate to the particular type of steel. During cooling, bending and forming in the range of 250 °C to 380 °C is not permitted.
- 对于屈服强度超过 360 MPa 的钢材，热成型工艺应在 750 °C 至 960 °C 的温度范围内进行，并在空气温度下冷却。应选取冷却速率防止硬化和晶粒过度粗化。如果无法满足该要求，后续应进行正火处理。
- For steel grades above 360 MPa yield, the hot forming process shall take place in the temperature range 750 °C to 960 °C with subsequent cooling at air temperature. The cooling rate should be such as to prevent hardening as well as excessive grain coarsening. If this is not practicable, a subsequent normalizing treatment shall be carried out.

### 5.5.3 火焰（热）矫直、起拱和弯曲

#### 5.5.3 Flame (heat) straightening, cambering, and curving

火焰（热）矫直、起拱或弯曲应通过局部加热的方式，加热温度不超过钢材制造商推荐的最高温度。

If flame (heat) straightening, cambering, or curving is used it shall be performed by the local application of heat, ensuring that the maximum steel temperature recommended by the steel manufacturer is not exceeded.

如果钢材制造商未提供建议：

In the absence of recommendations from the steel manufacturer:

- 对于屈服强度不超过 420 MPa 的钢材，火焰矫直的最高温度不得超过 700 °C。
- For steel grades up to and including 420 MPa yield, the maximum temperature for flame straightening shall not exceed 700 °C.
- 对于屈服强度超过 420 MPa 的钢材，火焰矫直的最高温度不得超过 650 °C。
- For steel grades above 420 MPa yield, the maximum temperature for flame straightening shall not exceed 650 °C.

对于细晶粒和热机械控制加工（TMCP）钢材，用户文件应包括以下要求：

For fine grain and the thermo-mechanically Controlled Processed (TMCP) steels, a documented procedure shall include requirements for:

- a) 钢材允许的最高温度和冷却程序；
- a) maximum steel temperature and procedure of cooling allowed;
- b) 加热方法；
- b) method of heating;
- c) 温度测量方法；
- c) method used for temperature measurements;
- d) 为工艺评定而进行的力学试验结果；
- d) results of mechanical tests carried out for the process qualification;
- e) 执行上述工艺的工人身份。
- e) identification of workers entitled to apply the process.

注：请参阅 ISO/TR 15608 以获取指导。

NOTE See ISO/TR 15608 for guidance.

对于细晶粒钢和 TMCP 钢，应根据拉伸、冲击和硬度测试的结果对工艺进行评定。对于加热区，应规定温度测量的位置以及取样的位置和方向。

For fine grain and the TMCP steels, the procedure shall be qualified based on the results of tensile, impact and hardness tests. With respect to the thermally heated zone, the location used for temperature measurement and the locations and orientation for the test samples shall be specified.

#### **5.5.4 冷成型**

#### **5.5.4 Cold forming**

##### **5.5.4.1 概述**

##### **5.5.4.1 General**

冷成型，如冷轧、冲压或弯折，应符合相关产品标准中关于冷成型性的要求。不得使用锤击方式。

Shaping by cold forming, produced either by roll forming, pressing or folding shall conform to the requirements for cold formability given in the relevant product standard. Hammering shall not be used.

除非钢材制造商建议，否则钢材冷成型加工温度不应低于 15 °C。

Unless permitted by the steel manufacturer's recommendations, cold forming shall not be performed when the steel temperature is lower than 15 °C.

注：冷成型会导致延性降低。有关在热浸镀锌之前进行冷成型规定，见 ISO 14713-2。

NOTE Cold forming leads to a reduction in the ductility. Information on cold forming prior to hot dip galvanizing is given in ISO 14713-2.

#### 5.5.4.2 钢板

#### 5.5.4.2 Steel plates

除非建造技术规格书中另有规定，否则钢板冷成型的最小内弯曲半径应符合表 5.5.4.2 的规定。

For steel plates, unless otherwise specified in the execution specification, the minimum inside bend radii to be cold-formed shall be in accordance with Table 3.

表 5.5.4.2—不同厚度和等级钢材最小内弯曲半径<sup>a</sup>

Table 3 — Minimum inside bend radii for thickness and grade<sup>a</sup>

钢材最小 屈服强度 Specified minimum yield strength of steel MPa	弯曲线垂直于最终轧制方向 Bend lines perpendicular to direction of final rolling				弯曲线平行于最终轧制方向 Bend lines parallel to direction of final rolling			
	材料厚度 Material thickness <i>t</i> (mm)							
	≤ 15	15 < ≤ 25	25 < ≤ 50	50 <	≤ 15	15 < ≤ 25	25 < ≤ 50	50 <
	< 345	1.5 <i>t</i>	1.5 <i>t</i>	1.5 <i>t</i>	2 <i>t</i>	2 <i>t</i>	2 <i>t</i>	2 <i>t</i>
345 ≤ < 460	2 <i>t</i>			2.5 <i>t</i>	3 <i>t</i>			4 <i>t</i>
460 ≤ < 690	3 <i>t</i>			3.5 <i>t</i>	4.5 <i>t</i>			5 <i>t</i>



690 ≤	1.8t	2t	4.5t	5.5t	2.7t	3.5t	7t	8t
<sup>a</sup> 在需要塑性变形能力的部位，内弯曲半径应满足以下最小值要求： <sup>a</sup> At locations where plastic deformation capacity is required, the inside bending radius shall be minimum: — 应力方向平行于弯方向时：8t; — 8t where the direction of the stress is parallel to bend line; — 应力方向垂直于弯方向时：4t。 — 4t where the direction of stress is perpendicular to bend line.								

#### 5.5.4.3 屈服强度高于 360 MPa 的钢材

#### 5.5.4.3 Steel grades higher than 360 MPa yield

在没有钢材制造商建议的情况下，对于屈服强度高于 360 MPa 的钢材，如果在冷成型后进行应力消除处理，则应满足以下两个条件：

In the absence of recommendations from the steel manufacturer, for steel grades higher than 360 MPa yield, if a stress relief treatment is carried out after cold forming, the following two conditions shall be satisfied:

- a) 温度范围：530 °C 至 580 °C；
- a) temperature range: 530 °C to 580 °C;
- b) 保温时间：每毫米材料厚度 2 分钟，至少保持 30 分钟。
- b) holding time: 2 min/mm of material thickness, but with a minimum time of 30 min.

注：在 580 °C 以上或超过一小时的应力释放处理可能会导致力学性能下降。

NOTE Stress relief treatment at more than 580 °C, or for over an hour, can lead to deterioration of the mechanical properties.

如果需要在更高的温度或更长的时间下对屈服强度高于 360 MPa 的钢材进行应力释放，则应事先与钢材制造商商定所需的力学性能最小值。

If it is required to stress relieve steel grades higher than 360 MPa at higher temperatures or for longer times, the required minimum values of the mechanical properties shall be agreed on in advance with the steel manufacturer.

#### 5.5.4.4 冷成型构件

#### 5.5.4.4 Cold formed components

对于冷成型构件，通过进一步冷成型加工应符合以下两个条件：

For cold formed components, shaping by further cold forming shall conform with the

following two conditions:

- a) 不得损害表面涂层和轮廓精度;
- a) the surface coatings and the accuracy of profile shall not be impaired;
- b) 应规定构件是否需要在成型前涂上保护膜。
- b) it shall be specified if constituent products require protective membranes to be applied before forming.

注 1: 一些涂层和面漆在成型和随后的安装过程中易磨损。

NOTE 1 Some coatings and finishes are particularly prone to abrasive damage, both during forming and subsequently during erection.

空心截面构件采用冷弯成型时, 应检查弯曲后的硬度和几何形状。

Bending by cold forming of hollow section components may be used provided that hardness and geometry of the as-bent constituent product are checked.

注 2: 冷弯成型会导致截面属性(如凹度、椭圆度和壁厚)的改变和硬度的增加。

NOTE 2 Bending by cold forming can cause alteration of section properties (e.g. concavity, ovality and wall thinning) and increased hardness.

#### 5.5.4.5 空心圆管

##### 5.5.4.5 Circular hollow sections

除非可以证明冷弯成型工艺能保持横截面几何形状, 否则圆管冷弯成型应符合以下三个条件:

For circular hollow sections, unless process specific capability can be demonstrated in terms of maintaining cross sectional geometry, bending by cold forming shall conform with the following three conditions:

- a) 型材的外径与壁厚之比不超过 15;
- a) the ratio of the overall diameter of the tube to the wall thickness does not exceed 15;
- b) 弯曲半径(在型材中心线处)不小于  $1.5d$  和  $d+100\text{ mm}$  两者中的较大值, 其中  $d$  为型材的外径;
- b) the bend radius (at the centreline of the tube) is not less than  $1.5d$  or  $d+100\text{ mm}$ , whichever is the larger, in which  $d$  is the overall diameter of the tube;

c) 纵向焊缝距离弯曲中心线所在平面的距离不超过  $d/5$ 。

c) the longitudinal seam weld in the cross-section is positioned no further than  $d/5$  from the centreline of the bend, measured in the direction of the plane of the bend.

## 5.6 受力螺栓孔

### 5.6 Holing for structural bolting

#### 5.6.1 开孔

##### 5.6.1 Execution of holing

###### 5.6.1.1 方法

###### 5.6.1.1 Methods

螺栓孔或销钉孔可采用任意工艺（如钻孔、冲孔、水切割、激光、等离子或其他热切割），但必须满足以下要求：

Holes for bolts or pins may be formed by any process (e.g. drilling, punching, water jet, laser, plasma, or other thermal cutting) provided that this leaves a finished hole such that:

- 应满足切割面关于局部硬度和切面质量相关的要求；
- cutting requirements relating to local hardness and quality of cut surface are fulfilled;
- 所有对应的螺栓孔或销钉孔必须对齐，以确保螺栓或销钉能够在垂直于接触面的方向上自由穿入。
- all matching holes for bolts or pins register with each other such that the bolts or pins can be inserted freely through the assembled members in a direction at right angles to the faces in contact.

螺栓或销钉圆孔应采用机械引导切割、全尺寸钻孔、预冲小于实际尺寸 3 mm 孔后再扩孔至标准尺寸，或直接全尺寸冲孔。

A round hole for a bolt or pin shall be cut with mechanical guidance, drilled full size, sub-punched 3 mm undersize and reamed to size, or punched full size.

槽形孔应采用机械引导切割、一次性冲孔，或通过冲孔或钻两个相邻孔后再进行切割来完成。

A slotted hole shall be either cut with mechanical guidance, punched in one operation, or formed by punching or drilling two adjacent holes and completed by cutting.

#### 5.6.1.2 冲孔

#### 5.6.1.2 Punching

除非建造技术规格书中另有规定，否则螺栓孔可以通过冲孔一次成型，无需扩孔，但以下情况除外：

Unless otherwise specified in the execution specification, bolt holes may be formed by punching without reaming except in

- 抗拉强度为 690 MPa 或更高、厚度超过 13 mm 的淬火回火钢；
- quenched and tempered steel of 690 MPa tensile strength or greater with a thickness greater than 13 mm;
- 厚度大于 13 mm 的材料中的塑性铰位置；
- plastic hinge locations in materials with a thickness greater than 13 mm;
- 承受疲劳合作的区域；
- areas subject to fatigue;
- 螺栓等级高于 8.8 级的搭接节点；
- lap joints where the bolts are above Grade 8.8;
- 设计为抗滑移的节点。
- joints designed to be slip resistant.

建造技术规格书应标识受疲劳、塑性铰转动影响的区域或抗滑移的节点区域。

The execution specification shall identify areas subject to fatigue, plastic hinge rotation, or with slip resistant joints.

如果不允许采用未处理的冲孔，则可以先采用冲孔的方式制作比实际尺寸至少小 2 mm 的孔，然后再扩孔或钻孔，以消除所有冲孔对表面的影响。

Where untreated punched bolt holes are not permitted, holes may be punched at least

2 mm less than full size and then reamed or drilled until all trace of the original punched surface has been removed.

在拼接处，所有构件的配合面上的螺栓孔的冲孔方向应相同。

At splices, the bolt holes in mating surfaces shall be punched in one direction in all components.

#### 5.6.1.3 热切割（激光、等离子、火焰）

#### 5.6.1.3 Thermal cutting (laser, plasma, oxyfuel)

承受静力荷载的螺栓连接节点可以采用机械引导热切割方式。如果建造技术规格书允许，热切割螺栓孔也可用于承受疲劳荷载的抗滑移节点。

Thermally cut bolt holes produced by mechanically guided means are permitted in statically loaded bolted joints. If permitted by the execution specification, bolt holes may be thermally cut in slip-resistant joints subject to fatigue loading.

热切割不得用于通过剪切/承压方式承受疲劳荷载的塑性铰区域，也不得用于开敞式螺栓孔。

Thermal cutting shall not be used in plastic hinging regions, where fatigue loading relies on shear/bearing transfer, or for open bolt holes.

手工热切割仅可作为柱底板上螺栓孔的现场整改。对于其他螺栓孔，如果建造技术规格书允许，可以在静荷载节点中采用手工热切割孔。

Hand thermal cutting shall not be used for a bolt hole except as a site rectification measure for holes in column base plates. For other bolt holes, thermally cut holes may be produced freehand in statically loaded joints if permitted by the execution specification.

热切割可用于直径 30 mm 或以上的其他螺栓孔、地脚螺栓、模板分离器、设备管道，以及金属附件、室内外装修、混凝土浇筑等的螺栓孔。热切割形成的这些螺栓孔的粗糙度不得超过 100  $\mu\text{m}$  Rz，孔径的公差应在 $\pm 2$  mm 以内。允许出现深度不超过 1.5 mm 的偶发性凹痕。

Thermal cutting may be used for other bolt holes 30 mm or larger in diameter, for foundation bolts, form separators and equipment piping, and for bolt holes for metal

attachments, interior and exterior finish work, concrete placement, etc. The roughness of these bolt holes made by thermal cutting shall not exceed 100  $\mu\text{m}$  Rz, and the accuracy of the bolt hole diameter shall be within  $\pm 2$  mm. Occasional gouges not more than 1.5 mm in depth are permitted.

#### 5.6.1.4 水刀切割

#### 5.6.1.4 Water jet cutting

除非建造技术规格书中另有规定, 否则水刀切割孔应满足 5.4.3 条和图 5.6.2 的要求。

Unless otherwise specified in the execution specification, water jet cut holes shall satisfy the requirement of 5.4.3 and Figure 1.

#### 5.6.1.5 工艺验证

#### 5.6.1.5 Verification of method

开孔工艺应按照如下措施至少每年检查一次:

The capability of holing processes shall be checked at least annually as follows:

- 受检工艺制作的样品应涵盖螺栓孔直径、板件厚度和加工等级等;
- a representative number of samples shall be produced from procedure tests on constituent product encompassing the range of bolt hole diameters, constituent product thickness and grades processed;
- 应使用通/断量规检查每个螺栓孔两端的尺寸。孔径公差应符合 5.6.2 条中的规定。
- bolt hole sizes shall be checked at both ends of each hole using go/no go gauges.

Holes shall conform with the tolerance as specified in 5.6.2.

如果工艺检查不满足要求, 在改正之前不得使用。但在螺栓孔尺寸满足要求时, 可以用于有限范围的结构。

If the process does not conform, it shall not be used until corrected. It may be used on a restricted range of constituent products and bolt hole sizes that do produce conforming results.

#### 5.6.1.6 沉孔

#### 5.6.1.6 Countersinking

当对多层进行沉孔时，在沉孔过程中应将各层牢牢地固定在一起。

When countersinking through more than one ply, the plies shall be held firmly together during countersinking.

#### 5.6.1.7 毛刺

#### 5.6.1.7 Burrs

组装前，应清除螺栓孔中的毛刺。

Burrs shall be removed from bolt holes before assembly.

对抗滑移连接，当在喷砂后使用磨光机去除或减少螺栓孔周围使用的毛刺时，必须执行以下操作之一：

For slip-resistant joints, when a grinder is used on the periphery of bolt holes for the removal or reduction of burrs after blasting, either:

- a) 重新喷砂处理螺栓孔附近的磨光区域，或
- a) the ground area adjacent to the bolt hole(s) shall be re-blasted, or
- b) 保持磨光后的表面裸露，直至产生红锈。
- b) the as-ground surface shall be exposed until red rust generation has occurred.

如果建造技术规格书中有相关规定，则允许在所有节点的接触面上残留高度不超过 1.5 mm 的毛刺。高度超过 1.5 mm 的毛刺必须从所有节点的接触面上去除或减少到 1.5 mm 及以下。

If specified in the execution specification, burrs less than or equal to 1,5 mm in height are permitted to remain on faying surfaces of all joints. Burrs larger than 1,5 mm in height shall be removed or reduced to 1,5 mm or less from the faying surfaces of all joints.

如果螺栓孔是通过将构件夹紧在一起一次操作完成钻孔，而这些构件在钻孔后不会分离，则仅需去除或减少外表面的毛刺。

If bolt holes are drilled in one operation through parts clamped together which would

not otherwise be separated after drilling, removing or reduction of burrs is necessary only from the outside surfaces.

#### 5.6.1.8 孔对准

#### 5.6.1.8 Hole alignment

所有用于螺栓组装或销钉的配合孔应相互对齐, 以便直径与螺栓或销钉等直径的量规或钻头可以在垂直于接触面的方向上自由穿入组装件。

All matching holes for bolting assemblies or pins shall align with each other so that a gauge or drift, equal in diameter to that of the bolts, or the bolts or pins can be inserted freely through the assembled members in a direction perpendicular to the faces in contact.

不允许采用长圆孔的螺栓孔应明确标识且不得用于对准。

Bolt holes for which elongation is not permitted shall be identified and not be used for alignment.

除了过大或槽形孔外, 当重叠板上的螺栓孔错位不超过 2 mm 时, 可以通过适度的扩孔来调整孔位以容纳螺栓。任何一个方向的允许的最大扩孔范围如下:

Except for oversize or slotted holes, when bolt holes on overlapping plates are out of alignment by 2 mm or less, holes may be enlarged to admit bolts by a moderate amount of reaming. The limitations on maximum allowable extent of reaming in any one direction shall be:

- a) 对于 M16 及更小的螺栓, 当连接主要承受剪力时, 扩孔范围为 0.5 mm;
- a) 0,5 mm for M16 and smaller where the connection is predominantly in shear;
- b) 对于大于 M16 的螺栓, 当连接主要承受剪力时, 扩孔范围为 1.0 mm;
- b) 1,0 mm for larger than M16 where the connection is predominantly in shear;
- c) 对于 M24 及更小的螺栓, 当连接主要承受拉力时,, 扩孔范围为 1.0 mm;
- 如果使用硬垫片, 扩孔范围可以增加至 2.0 mm;
- c) 1,0 mm for M24 and smaller where the connection is predominantly in tension.

Where a hardened washer is used, the extent of reaming may be increased to 2,0 mm;



d) 对于大于 M24 的螺栓，当连接主要承受拉力时，扩孔范围为 2.0 mm。如果使用厚硬垫片或垫板，扩孔范围可以增加至 3.0 mm。

d) 2,0 mm for larger than M24 where the connection is predominantly in tension. Where a thick hardened washer or plate washer is used, the extent of reaming may be increased to 3,0 mm.

注 1：优先通过扩孔或空心铣刀来校正错位。

NOTE 1 Correction of misalignment by reaming or using a hollow milling cutter is preferred.

当重叠板上的螺栓孔错位超过上述扩孔限制时，应按照建造技术规格书的规定采取校正措施。

When bolt holes on overlapping plates are out of alignment by more than the reaming limitations noted above, the corrective measure shall be as specified in the execution specification.

当不可避免的采用扩孔及使用空心铣刀以外的切割方法校正错位时，应特别检查形成的所有螺栓孔的内部光洁度是否符合 5.6.2 条的规定。

When correction of misalignment by cutting methods other than reaming or using a hollow milling cutter is unavoidable, the internal finish of all bolt holes formed by these other methods shall be specifically checked for consistency with 5.6.2.

如果已经验证荷载传递路径符合建造技术规格书，则对齐螺栓孔可以采用大孔或槽形孔。

Realigned bolt holes are acceptable with the oversize or slotted hole requirements, provided the load path has been verified to conform with the execution specification.

注 2：一般来说，扩大螺栓孔仅适用于抗滑移连接。抗剪连接的槽型孔仅用于垂直于荷载方向的连接。抗滑移连接的槽型孔不受荷载方向的限制。通常情况下，校正错位会导致连接强度降低。

NOTE 2 Generally, bolt holes enlarged to oversize dimensions are acceptable only for slip-resistant joints. Slotted holes in shear-bearing joints are acceptable only when loaded in the direction normal to the load. Slotted holes in slip-resistant joints are acceptable without regard for loading direction. In many cases, corrections for misalignment can result in a reduction of strength.

### 5.6.2 螺栓和销钉孔径的公差（包括宽度和表面粗糙度）

#### 5.6.2 Tolerances on hole diameter for bolts and pins (including width and surface roughness)

除非建造技术规格书中另有规定，则冲孔或钻孔螺栓孔应符合以下公差要求：

Unless otherwise specified in the execution specification, punched or drilled bolt holes shall conform with the following:

- a) 螺栓孔：采用国际单位制为 $\pm 0.5$  mm（采用美制单位为 $+1/32$  in,  $-0$  in）；
- a) holes:  $\pm 0.5$  mm for bolt holes made to SI units ( $+ 1/32$ ,  $- 0$  inch for bolt holes made to US customary units),
- b) 配合螺栓和配合销钉的孔：服役 ISO 286-2 的 H11 级别要求；
- b) bolt holes for fit bolts and fitted pins: class H11 in accordance with ISO 286-2;

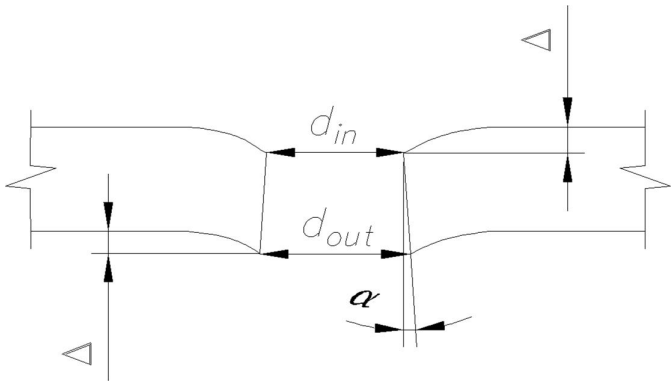
除非建造技术规格书中另有规定，否则热切割和水刀切割螺栓孔应符合以下要求：

Unless otherwise specified in the execution specification, thermal cut and waterjet cut bolt holes shall conform with the following:

- a) 对于圆形螺栓孔，实际孔径不得超过公称孔径 1 mm；
- a) for circular bolt holes, the actual hole size shall not exceed the nominal hole size by more than 1 mm;
- b) 对于槽形螺栓孔，槽的宽度不得超过公称宽度 1 mm；
- b) for slotted bolt holes, the width of the slot shall not exceed the nominal width by more than 1 mm;
- c) 螺栓孔周围允许存在深度不超过 1.5 mm 的凿痕；
- c) gouges not exceeding 1,5 mm deep are permitted about the perimeter of the bolt hole;
- d) 螺栓孔的表面粗糙度不得超过  $25 \mu\text{m Rq}$ 。
- d) the surface roughness profile of the bolt hole shall not exceed  $25 \mu\text{mRq}$ .

螺栓孔直径应取入口和出口直径的平均值。锥角（ $\alpha$ ）和平面偏差（ $\Delta_1$ 、 $\Delta_2$ ）不得超过图 1 中给出的值。

The bolt hole diameter shall be taken as the average of entry and exit diameters. The taper angle ( $\alpha$ ) and the deviation from flat surface ( $\Delta_1$ ,  $\Delta_2$ ) shall not exceed that given in Figure 1.



符号:

Key

$d_{in}$ 、 $d_{out}$	入口和出口的孔径 measured hole diameter at entry and exit points
$\alpha$	锥角角度 $\leq 4^\circ$ (即 7%) taper angle $\leq 4^\circ$ (i.e. 7%)
$\Delta_1$ 、 $\Delta_2$	平面偏差 deviation from flat surface
$\text{Max} (\Delta_1 \text{ 或 } \Delta_2) \leq \max (D/10; 2 \text{ mm})$	
$D = (d_{in} + d_{out})/2$	

图 5.6.2—凿孔、冲孔、热切割或水刀切割孔的允许变形

Figure 1 — Permitted distortions of gouged, punched, thermally cut, or water jet cut holes

### 5.7 临时附件

### 5.7 Temporary attachments

所有用于制造或安装的临时附件的连接均应符合本文件的规定和建造技术规格书中的任何特殊规定，包括应明确有关疲劳的要求。

All connections for temporary attachments provided for fabrication or erection

purposes shall meet the requirements of this document and any special requirements in the execution specification, including those related to fatigue, which shall be specified.

## **5.8 组装检查**

### **5.8 Assembly check**

应使用尺寸模板、精确的三维测量或通过预拼装检查多个加工构件之间在交界处的连接配合。如有必要，预拼装应符合建造技术规格书的规定。

The fit between fabricated components that are inter-connected at multiple connection interfaces shall be checked using dimensional templates, accurate three-dimensional measurements or by trial assembly. Trial assembly, if required, shall be as specified in the execution specification.

## **6 几何公差**

### **6 Geometrical tolerances**

#### **6.1 公差类型**

##### **6.1 Tolerance types**

几何公差应在建造技术规格书中注明。

Geometrical tolerances shall be specified in the execution specification.

附录 E、F 和 G 中提供的信息可用于建造技术规格书要求的几何公差。

Information provided in Annexes C, D and E may be used to specify the geometrical tolerances in the execution specification.

附录 E、F 和 G 中给出了每个国家的几何公差类型和要求以及不同类型允许公差的定量值，分别用于：

The types and requirements for geometrical deviations and the quantitative values for different types of permitted deviations are given per country in Annexes C, D, and E for:

- 建筑;
- Buildings;
- 桥梁;
- Bridges;
- 吊车梁;
- Crane runways;

给出的允许公差不包括构件自重产生的弹性变形。

The permitted deviations given do not include elastic deformations induced by the self-weight of the components.

对几何形状特殊的公差要求可以用既有的定量的方式,也可采用其他类型。如果建造技术规格书中要求特殊公差,应提供以下信息:

Special tolerances may be specified either for geometrical deviations already defined with quantitative values or for other types of geometrical deviations. If special tolerances are required in the execution specification, the following information shall be given as appropriate:

- 已定义公差的修正值;
- amended values for tolerances already defined;
- 要控制的几何公差的定义参数和允许值;
- defined parameters and permitted values for the geometrical deviations to be controlled;
- 明确特殊公差适用于所有构件,还是仅适用于特定结构。
- whether these special tolerances apply to all relevant components or only to particular components that are specified.

在各种情况下,要求均应适用于最终验收。如果加工构件将构成现场安装结构的一部分,则除加工构件的公差外,还应满足安装后结构的最终检查规定的公差。

In each case, the requirements shall apply for final acceptance testing. If fabricated components are to form parts of a structure to be erected on site, the tolerances

specified for the final checking of the erected structure shall be met in addition to those for the fabricated components.

## 6.2 替代标准

### 6.2 Alternative criteria

如果建造技术规格书要求:

If required by the execution specification,:

a) 对于焊接构件, 应符合 ISO 13920 规定的等级:

a) for welded components, the following classes in accordance with ISO 13920 apply:

1) 长度和角度尺寸: C 级;

1) class C for length and angular dimensions;

2) 直线度、平面度和平行度: G 级;

2) class G for straightness, flatness and parallelism;

b) 对于非焊接构件, 同样应符合(a)中规定;

b) for non-welded components the same criteria as in (a) apply;

c) 对 ISO 13920 未涵盖的其他情况, 对于尺寸  $d$ , 可使用  $d/500$  或 5 mm 中较大值作为允许公差 $\pm\Delta$ 。

c) in other cases not covered by ISO 13920, for a dimension  $d$ , a permitted deviation  $\pm \Delta$  equal to the greater of  $d / 500$  or 5 mm may be used.

## 7 检查、检验和校正

### 7 Inspection, testing, and correction

#### 7.1 概述

#### 7.1 General

应按照建造技术规格书的要求对钢结构进行检查、检验和校正。

Inspection, testing and corrections shall be undertaken on the structural steelwork in

accordance with requirements in the execution specification.

注 1：一般要求见 T/CSCS xxx-1。

NOTE 1 See ISO 17607-1 for general requirements.

注 2：有关焊缝检查、检验和校正的要求，参阅 T/CSCS xxx-5。

NOTE 2 See ISO 17607-5 for requirements related to weld inspection, testing, and correction.

注 3：有关螺栓检查、检验和校正的要求，参阅 T/CSCS xxx-6。

NOTE 3 See ISO 17607-6 for requirements related to bolting inspection, testing, and correction.

## 7.2 车间校正

### 7.2 Shop corrections

车间校正适用于修复制造过程中发现的不合格项目。所有车间校正应遵循书面维修程序。维修程序应遵循并满足建造技术规格书中引用的国家标准的所有适用要求。

Shop corrections shall apply to repair of discontinuities identified during fabrication. All shop corrections shall follow written repair procedures. Repair procedures shall follow and meet all the applicable requirements of the national standards referenced in the execution specification.

对于建造等级 EXL1 和 EXL2，所有修复无需批准即可进行。

For execution levels EXL1 and EXL2, all repairs may be conducted without any approval.

对于执行等级 EXL3，除非建造技术规格书中另有说明，否则以下内容需要符合经过批准或预先批准的维修程序，并应记录在案：

For EXL3, the following require approved or pre-approved repair procedures, unless noted otherwise in the execution specification, and shall be documented:

- a) 深入母材的焊接缺陷；
- a) welds defects that require excavation into parent materials;
- b) 未融入最终焊缝的引弧和定位焊；
- b) arc strikes and tack welds not incorporated into a final weld;

- c) 检测到平面和层状不连续性;
- c) detected planar and laminar discontinuities;
- d) 需要通过焊接改善粗糙度的切割边;
- d) roughness requiring welded restoration of cut edges;
- e) 深度超过 5 mm 的缺口或凿痕;
- e) notches or gouges more than 5 mm deep;
- f) 公称横截面积减少 2%以上的缺口或凿痕;
- f) notches or gouges where the nominal cross-sectional area is reduced by more than 2%;
- g) 建造技术规格书中规定的任何其他项目。
- g) any other items specified in the execution specification.

对于建造等级 EXL4, 所有维修程序应在开工前获得批准, 并应记录在案。

For EXL4, all repair procedures shall be approved prior to commencing the work and shall be documented.

### 7.3 验收标准

#### 7.3 Acceptance criteria

验收标准应在建造技术规格书中给出。

The acceptance criteria shall be given in the execution specification.

### 7.4 不合格项的处理

#### 7.4 Action on nonconformity

对不合格项的处理应符合 T/CSCS xxx-1 的规定。应采用本文件规定的方法进行校正。

Action on nonconformity shall be in accordance with ISO 17607-1. Corrections shall be carried out using methods that are in accordance with this document.

如果移交的构件存在未校正的不合格项和待处理项, 应记录在案。



If a component is handed over with uncorrected nonconformities, awaiting action, these shall be documented.

## 8 建筑外露结构钢

### 8 Architecturally exposed structural steel

建筑外露结构钢（AESS）应符合 T/CSCS xxx-1 的规定。

Requirements of architecturally exposed structural steel (AESS) are addressed in ISO 17607-1.

## 9 符合本文件要求的文件

### 9 Documents required to claim conformity to these requirements

#### 9.1 概述

#### 9.1 General

施工单位可以通过以下方式声明符合本文件的要求：

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

- 采用本文件中引用的 ISO 标准；
- adoption of the ISO standards referenced in this document, as applicable; or
- 或采用与本文件所列 ISO 标准之外但具有技术等效条件的其他标准；
- adoption of other standards that provide technically equivalent conditions to the ISO documents listed in this document, as applicable; or
- 或采用与本文件所列 ISO 标准之外但具有技术等效条件的其他文件。
- adoption of other documents that provide technically equivalent conditions to the ISO documents listed in this document, as applicable.

除非建造技术规格书中另有规定，施工单位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。

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.

采用其他标准或文件前，应经过规范制定方的验证和批准，并写入建造技术规格书。

Prior to execution, adoption of other standards or documents shall be verified and approved by the specifier and shall be incorporated into the execution specifications.

## **9.2 符合性声明**

### **9.2 Declaration of conformity**

声明符合本文件要求的施工单位，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

(资料性)

### 本文件与 ISO 17607:2023 结构变化对照一览表

表 A.1 给出了本文件与 ISO 17607: 2023 结构变化对照一览表。

**表 A.1—本文件与 ISO 17607:2023 结构变化对照情况**

本文件章条编号	ISO 17607:2023章条编号
附录A	—
附录B	—
附录C	附录A
附录D	附录B
附录E	附录C
附录F	附录D
附录G	附录E

## 附录 B

(资料性)

### 本文件与 ISO 17607:2023 技术差异及其原因一览表

表 B.1 给出了本文件与 ISO 17607: 2023 技术差异及其原因一览表。

表 B.1—本文件与 ISO 17607:2023 技术差异及其原因

本文件的章条编号	技术差异	原因
2	增加规范性引用文件 GB/T 2975、GB/T 8170、GB/T 10623、GB/T 22066、JJG 139、JJG 475、JJG 762, JJG 1063, 我国标准GB/T 12160、GB/T 16825.1代替ISO 9513、ISO 7500-1	以符合国情，方便使用
3	增加引用GB/T 10623界定的术语，将"斜率的标准偏差、斜率的相对标准偏差"两个术语改为表1相应符号的脚注	以符合国情，方便使用
6.3	增加引用了GB/T 2975，给出钢产品的取样和制样要求	以符合国情，方便使用

## 附录 C

### Annex A

(规范性)

(normative)

与建造等级相关的补充信息、选项清单和要求

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

#### C.1 所需补充信息清单

##### A.1 List of required additional information

表 C.1 提供了本文件正文中所需的补充信息，以充分定义根据本文件建造工作的要求（例如，使用“应”时）。

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 (e.g. where the wording “shall be specified” is used).

表 C.1—补充信息

**Table A.1 — Additional information**

条款 clause	所需补充信息 Additional information required
<b>4-建造技术规格书</b> <b>4 – Execution specification</b>	
<b>4</b>	实施建造所需的必要信息和技术要求 necessary information and technical requirements for execution of fabrication
<b>5-准备和组装</b> <b>5 – Preparation and assembly</b>	
<b>5.2-标识和可追溯性</b> <b>5.2 – Identification and traceability</b>	
<b>5.2.1</b>	是否可以使用软性或低应力刻章 whether soft or low stress stamps may be used
<b>5.2.1</b>	任何不允许有标识或完工后不可见的区域 any zones where identification marks are not permitted or shall not be visible after completion

5.2.1	标识文件的保存期限 retention period for identification documents
<b>5.3-搬运和储存</b> <b>5.3 – Handling and storage</b>	
5.3	搬运和储存的预防措施 preventive measures for handling and storage
<b>5.4-切割</b> <b>5.4 – Cutting</b>	
5.4.3	热浸镀锌时硬化表面的去除 removal of hardened surface when hot dip galvanized
<b>5.5-成型</b> <b>5.5 – Shaping</b>	
5.5.3	温度测量的位置以及测试样品的位置和方向 the location used for temperature measurement and the locations and orientation for the test samples
5.5.4.4	组成产品在成型前是否需要保护膜 if constituent products require protective membranes to be applied before forming
<b>5.6-受力螺栓孔</b> <b>5.6 – Holing for structural bolting</b>	
5.6.1.2	受疲劳及塑料铰转动影响的区域以及防滑节点区域 areas subject to fatigue or plastic hinge rotation, with slip-resistant joints
5.6.1.8	当重叠板上的螺栓孔错位超过扩孔限制时 when bolt holes on overlapping plates are out of alignment by more than the reaming limitations
5.6.1.8	根据过大或槽形孔要求重新对准孔 re-aligned holes with the oversize or slotted hole requirements
<b>5.7-临时附件</b> <b>5.7 – Temporary attachments</b>	
5.7	为制造或安装目的而提供的临时附件的连接 connections for temporary attachments provided for fabrication or erection purposes
<b>5.8-组装检查</b> <b>5.8 – Assembly check</b>	
5.8	加工构件的组装检查 assembly check of fabricated components
<b>6-几何公差</b> <b>6 – Geometrical tolerances</b>	
6.1	制造几何公差 geometrical tolerances for fabrication
<b>7-检查、测试和校正</b> <b>7 – Inspection, testing, and correction</b>	
7.1	检查、测试和校正 inspection, testing, and correction
7.2	维修程序

	repair procedures
7.3	验收标准 acceptance criteria
9-声称符合要求所需的文件 9 – Documents required to claim conformity to these requirements	
9.1	采用其他标准或文件 adoption of other standards or documents

## C.2 选项清单

### A.2 List of options

表 C.2 列出了建造技术规格书中已经给出了要求，但本文件中提供了选项的项目。

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 C.2—选项清单

Table A.2 — List of options

条款 Clause	待指定选项 Option(s) to be specified
5-准备和组装 5 – Preparation and assembly	
5.2.1	如果特定建造等级不需要标识 if identification is not required for specific execution level
5.4.3	切割面的质量要求 quality requirements for cut surfaces
5.4.3	待热浸镀锌或在喷涂前进行表面处理的自由边 free edges that are to be hot dip galvanized or have surface preparation before coating
5.4.4	检查工艺能力：自由边表面的硬度 check of the capability of the processes: hardness of free edge surfaces
5.5.1	钢材成型评定程序 qualification procedure for shaping of steel
5.5.3	温度测量的位置以及细晶粒钢和TMCP钢试样的位置和方向 location used for temperature measurement and the locations and orientation for the test samples of fine grain and the TMCP steels
5.5.4.2	冷成型钢板的最小内弯曲半径 minimum inside bend radii of steel plates to be cold-formed
5.5.4.2	定义要求塑性变形能力的位置 define locations where plastic deformation capacity is required

5.6.2	冲孔或钻孔公差 punched or drilled holes tolerance
5.6.2	热切割和水刀切割孔公差 thermal cut and waterjet cut holes tolerance
5.6.1.3	在静荷载节点中通过机械引导装置产生的热切割螺栓孔 thermally cut bolt holes produced by mechanically guided means in statically loaded joints
5.6.1.3	在静荷载节点中手工热切孔 thermally cut holes produced freehand in statically loaded joints
5.6.1.4	水刀切割孔 water jet cut holes
5.6.1.7	毛刺高度 burrs height
5.8	预拼装 trial assembly
<b>6-几何公差</b> <b>6 – Geometrical tolerances</b>	
6.1	特殊公差 special tolerances
6.2	替代标准 alternative criteria
<b>7-检查、检验和校正公差</b> <b>7 – Inspection, testing, and correction tolerances</b>	
7.3	批准或预先批准的维修程序 approved or pre-approved repair procedures
<b>附录D-自动热切割工艺能力检查程序</b> <b>Annex B - Procedure for checking capability of automated thermal cutting process</b>	
D.1	切割面质量的验证 verification of the quality of the cut surfaces
<b>附录E-几何公差-建筑物</b> <b>Annex C – Geometric tolerances – Buildings</b>	
	特殊公差 special tolerances
<b>附录G-几何公差-吊车梁</b> <b>Annex E – Geometric tolerances – Crane runways</b>	
	特殊公差 special tolerances

## C.3 与建造等级相关的要求

### A.3 Requirements related to the execution levels

本条款列出了本文件中引用的各建造等级的具体要求。

This clause lists requirements specific to each of the execution levels referenced



in this document.

表 C.3 中以粗体字母标识的项目的建造等级，适用于整个钢结构工程（或钢结构工程的某一阶段）。其他项目通常要求根据各个构件或连接细节选择适当的建造等级。

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 C.3—各建造等级的要求**

**Table A.3 — Requirements to each execution level**

<b>条款 Clauses</b>	<b>EXL1</b>	<b>EXL2</b>	<b>EXL3</b>	<b>EXL4</b>
<b>5-准备和组装 5 – Preparation and assembly</b>				
<b>5.2-标识和可追溯性 5.2 – Identification and traceability</b>				
5.2.1 标识 5.2.1 Identification	是	是	是	是
5.2.2 可追溯性 5.2.2 Traceability	ISO 17607-1	ISO 17607-1	ISO 17607-1	ISO 17607-1
<b>5.4-切割 5.4 – Cutting</b>				
5.4.3 热切割和水切割 5.4.3 Thermal and water jet cutting	表2	表2	表2	表2
<b>7-检查、测试和校正 7 – Inspection, testing, and correction</b>				
7.2 车间校正 7.2 Shop corrections	可在没有任何批准的情况下进行维修 repairs can be conducted without any approval	可在没有任何批准的情况下进行维修 repairs can be conducted without any approval	部分维修需要经过批准或预先批准程序 Some repairs require approved or pre approved procedures	所有维修程序应在开工前获得批准 all repair procedures shall be approved prior to commencing the work

## 附录 D

### Annex B

(规范性)

(normative)

#### 自动热切割工艺能力检查程序

#### Procedure for checking capability of automated thermal cutting process

### D.1 概述

#### B.1 General

本附录提供了根据本文件和 ISO 9013 执行的自动热切割工艺测试和评定的程序和指南。

This annex provides procedures and guidance for testing and assessment of automated thermal cutting processes that shall be carried out in accordance with this document and ISO 9013.

本程序适用于所有自动热切割工艺，包括激光和等离子切割。

This procedure may be applied to all automated thermal cutting processes including laser and plasma cutting.

注：激光和等离子切割控制可能需要一些不同或额外的参数。

NOTE Some different or additional parameters can be needed for control of laser and plasma cutting.

自动热切割工艺能力的检查程序的依据是 ISO 15607 中关于焊接程序规范和鉴定的一般规则。

The basis for the procedure for checking the capability of automated thermal cutting processes follows the general rules for specification and qualification of welding procedures in ISO 15607.

本程序基于准备初步切割程序规范（pCPS），并验证使用该 pCPS 生产的切割面的质量，以最终确定切割程序资格记录（CPQR）。然后将 CPQR 用作使用切割程序规范（CPSs）控制生产中的切割操作。

The procedure is based on preparing a preliminary cutting procedure specification (pCPS) and verifying the quality of the cut surfaces produced using this pCPS to finalise a cutting procedure qualification record (CPQR). This CPQR is then used as the basis for control of cutting operations in production using cutting procedure specifications (CPSs).

表 D.1.1 给出了 pCPS 和 CPS 的示例。表 D.1.2 给出了 CPQR 的示例。

Table B.1 gives an example of a pCPS and CPS. Table B.2 gives an example of a CPQR.

CPQR 具有适用的资格范围。以下变量的范围已给出：

The CPQR includes a range of qualification within which it may be used. Ranges are given for the following variables:

- 材料组
- group of material;
- 材料厚度；
- material thickness;
- 气体压力；
- pressures of gases;
- 切割速度和高度（焊炬尖端到钢材表面）；
- cutting speed and height (torch tip to steel surface);
- 预热温度。
- preheat temperature.

除非建造技术规格书中另有规定，否则切割面的质量验证可在作为测试调查员和评估员的负责焊接协调员的授权下进行。应出具测试报告，总结基于 CPQR 的测试结果。

Unless otherwise specified in the execution specification, the verification of the quality of the cut surfaces may be done under the authority of the responsible welding coordinator acting as test investigator and assessor. A test report shall be

produced summarizing the results of tests upon which the CPQR is based.

**表 D.1.1—初步切割工艺规范（pCPS）示例**

**Table B.1 — Example of a preliminary cutting procedure specification (pCPS)**

切割工艺： Cutting process:	
切割机制造商： Manufacturer of the cutting machine:	
切割类型： Type of cut:	
割炬名称： Designation of the cutting torch:	
切割喷嘴的名称： Designation of the cutting nozzle:	
割炬/喷嘴制造商： Manufacturer of the cutting torch/nozzle:	
标准： Standard:	
材料组： Material group:	
材料厚度： Thickness of the material:	
燃气类型： Type of fuel gas:	
加热氧气压力 <sup>a</sup> ： Heating oxygen pressure <sup>a</sup> :	
燃料气压力： Fuel gas pressure <sup>a</sup> :	
切割氧气压力： Cutting oxygen pressure <sup>a</sup> :	
加热火焰的调整： Adjustment of the heating flame:	
切割速度： Cutting speed:	
切割高度： Cutting height:	
预热温度： Preheat temperature:	
切割角度（如果坡口不垂直）： Angle of cut (if bevel not perpendicular):	
热处理（热处理后）： Thermal follow-up treatment (post-heat treatment):	
预热/后热割炬类型：	

Type of pre-/post-heating torch:	
加热割炬的名称: Designation of the heating torch:	
加热割炬制造商: Manufacturer of the heating torch:	
预热燃气类型: Type of preheating fuel gas:	
氧气/压缩空气压力: Oxygen/ compressed air pressure:	
燃气压力: Fuel gas pressure:	
a 割炬入口处测量的压力 <sup>a</sup> Pressure measured at the inlet of the torch	
<p>制造商保证，附图所示的热切割样品是按照上述规定生产的。</p> <p>The manufacturer warrants that the thermal cut sample shown in attached drawing was produced under the above-named specifications.</p> <p style="text-align: center;">-----</p> <p>制造商、负责焊接协调员的姓名、签名和日期</p> <p>Manufacturer, name of the Responsible Welding Coordinator with signature and date</p>	

**表 D.1.2—切割工艺评定记录（CPQR）示例**

**Table B.2 — Example of cutting procedure qualification record (CPQR)**

(p) CPS编号: (p)CPS-No.:		CPQR编号: CPQR-No.:			
热切割样品制造商: Manufacturer of the thermal cut sample:					
制造商地址: Manufacturer's address:		附录 Appendices	1	切割参数 Cutting parameters	页码 page
标准: Standard:			2	材料试验报告 Material test report	页码 page
生产日期: Date of manufacture:			3	检验报告 Inspection report	页码 page
制造商: Manufacturer:					
切割工艺评定记录规范 Specifications of the cutting procedure qualification record					

切割工艺： Cutting process:	
切割机制造商： Manufacturer of the cutting machine:	
切割类型： Type of cut:	
割炬名称： Designation of the cutting torch:	
切割喷嘴的名称： Designation of the cutting nozzle:	
割炬/喷嘴制造商： Manufacturer of the cutting torch/nozzle:	
标准： Standard:	
材料组： Material group:	
材料厚度（mm）： Thickness of the material (mm):	
燃气类型： Type of fuel gas:	
加热氧气压力 <sup>a</sup> ： Heating oxygen pressure <sup>a</sup> :	
燃气压力： Fuel gas pressure <sup>a</sup> :	
切割氧气压力 <sup>a</sup> ： Cutting oxygen pressure <sup>a</sup> :	
加热火焰的调整： Adjustment of the heating flame:	
切割速度： Cutting speed:	
切割高度： Cutting height:	
预热温度： Preheat temperature:	
热随访处理： Thermal follow-up treatment:	
预热/热后割炬类型： Type of pre-/post-heating torch:	
加热割炬的名称： Designation of the heating torch:	
加热割炬制造商： Manufacturer of the heating torch:	
燃气类型：	

Type of fuel gas:	
氧气/压缩空气压力: Oxygen/ compressed air pressure:	
燃气压力: Fuel gas pressure:	
<sup>a</sup> 割炬入口处测量的压力 <sup>a</sup> Pressure measured at the inlet of the torch	
该记录证实热切割样品的制备、生产和测试均符合ISO 17607-3（年份）：EXL2/EXL3/EXL4 5.4.3和5.4.4的规定 This record confirms that the manufacturing of the thermal cut sample was satisfactorily prepared, produced and tested in accordance with the requirements of 5.4.3 and 5.4.4 of ISO 17607-3 (Year): EXL2 / EXL3 / EXL4	
签发地点和日期: Place and date of issue:	
制造商焊接协调员：姓名、日期及签名: Manufacturer's Welding Coordinator: Name, date, and signature:	
检验员或检验机构：姓名、日期及签名（如果非制造商焊接协调员）： Examiner or examining body: Name, date and signature (if other than manufacturer's Welding Coordinator):	

## D.2 资格审查程序说明

### B.2 Description of the qualifying procedure

#### D.2.1 概述

##### B.2.1 General

试样的切割应按照初步切割工艺规范（pCPS）进行，其中应说明与工艺相关的所有参数和影响因素。

Cutting of the test pieces shall be conducted in accordance with a preliminary cutting procedure specification (pCPS) where all of the parameters and influences relevant to the process are stated.

根据 ISO 9013，可以确定垂直度和角度公差、平均表面粗糙度以及切割边缘的硬度。如果切割工艺仅用于垂直切割，则无需确定角度公差。在这种情况下，建议采用图 D.2.1 所示的试样。如果切割工艺用于坡口切割，则需要确定角度公差。

In accordance with ISO 9013, the perpendicularity and angularity tolerance, the average surface roughness as well as the hardness of the edges of cut may be determined. If the cutting process is to be used only for perpendicular cuts, then

the angularity tolerance does not need to be determined. In this case, the use of a test piece as shown in Figure B.1 is recommended. If the cutting process is to be used for bevel cuts, then the angularity tolerance needs to be determined.

注:如果使用坡口切割进行焊接准备, 在随后对表面进行修整的情况下坡口切割的角度公差并不重要。

NOTE If bevel cuts are used to make welding preparations, it is possible that the angularity tolerance of a bevel cut will not be critical if the surface is subsequently dressed.

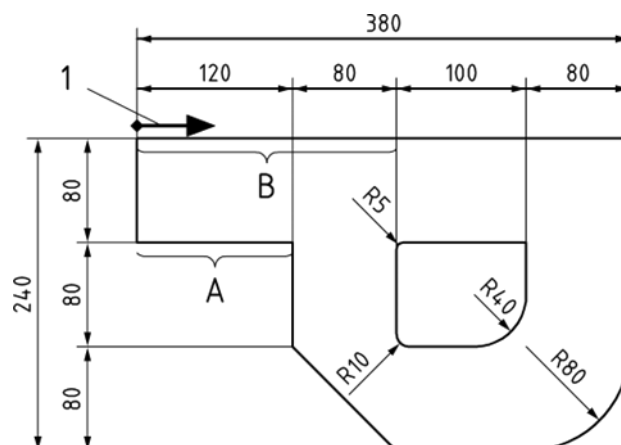
试样应具有直切、锐角和曲线弧。曲线弧和锐角区域的切割边缘质量应分别达到直切面的垂直度和角度公差以及表面粗糙度的可接受要求。上述参数应在直切区域确定, 尤其应在行进速度最高的区域进行硬度测试。

The test piece(s) shall have a straight cut, a sharp-edged corner as well as a curve-shaped bend. The edges of cut in the areas of the curve-shaped bend as well as of the sharp-edged corner shall have an acceptable quality in the area of the straight cut in relation to the perpendicularity and angularity tolerance respectively as well as to surface roughness. The above parameters shall be determined in the areas of the straight cut with the hardness test having to be particularly conducted in the areas with the highest travel speed, respectively.



尺寸单位: mm

Dimensions in millimetres



符号:

Key

1 切割起点和方向

1 Start point and direction of cutting

注: 表面轮廓测量应在至少 200 mm 长的直线区域 B 上进行, 硬度则在每个样品的区域 A 和 B 上测量, 并根据要求的质量等级进行比对。锐角和曲线样品需通过目视检查, 以确保其边缘与直切的标准相当。

NOTE Surface profile measurements are taken on the straight area B over at least a 200 mm length and hardness are measured in area A and B on each sample and checked against the required quality class. The sharp corner and curved samples are inspected visually to establish that they produce edges of equivalent standard to the straight cuts.

图 D.2.1—推荐的试样形状和测量位置

Figure B.1 — Recommended shape of test piece and location of measurements

## D.2.2 平均表面粗糙度 $R_{Z5}$

### B.2.2 Average surface roughness $R_{Z5}$

平均表面粗糙度  $R_{Z5}$  应按照 ISO 9013 确定。

The average surface roughness  $R_{Z5}$  shall be determined in accordance with ISO 9013.

在直焰切割的代表点处, 应在最大长度为 40 mm 的范围内, 沿槽口路径的横向测量表面粗糙度。

At a spot representative of the straight flame cut the surface roughness shall be measured transverse of the groove path across a length of maximum 40 mm.

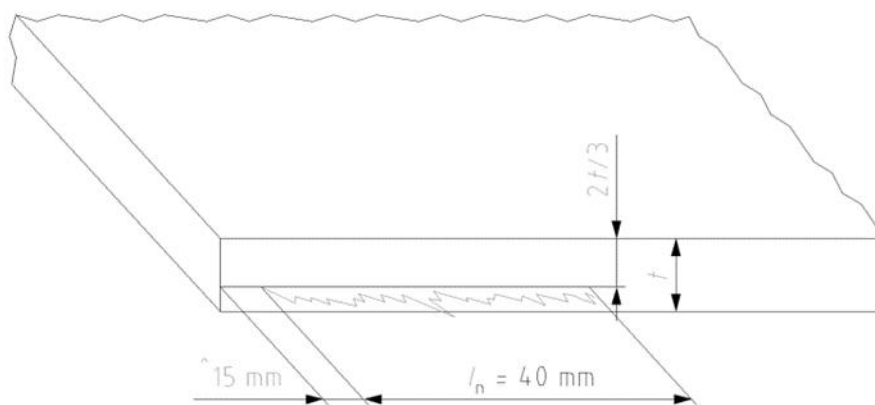


图 D.2.2.1—推荐的试件形状和测量位置

Figure B.2 — Recommended shape of test piece and location of measurements

应使用五个相邻的单次测量的单轮廓元素的算术平均值（图 D.2.2.2 所示的  $Z_{t1}$  至  $Z_{t5}$ ）来计算平均表面粗糙度  $R_{Z5}$ 。

The arithmetic average of the single profile elements of five adjacent single measurements ( $Z_{t1}$  to  $Z_{t5}$  as shown in Figure B.3) shall be used to calculate the average surface roughness  $R_{Z5}$ .

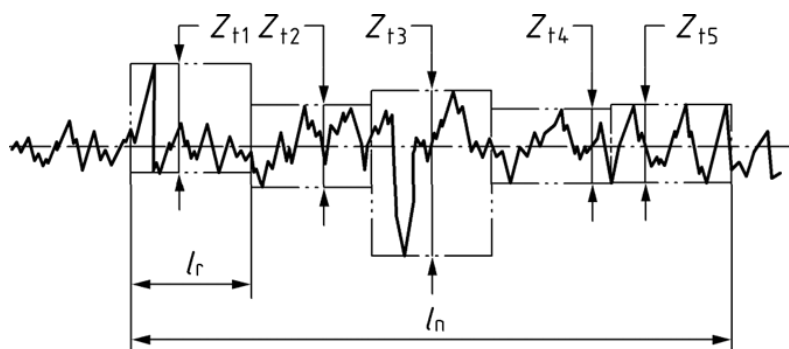


图 D.2.2.2—平均表面粗糙度  $R_{Z5}$  的测定

Figure B.3 — Determination of the average surface roughness  $R_{Z5}$

为了确定平均表面粗糙度  $R_{Z5}$ ，应使用适用于高粗糙度的表面粗糙度测量仪。应提供充分且稳定的装置接触面。

To determine the average surface roughness  $R_{Z5}$ , a surface roughness tester suitable for high roughnesses shall be used. A sufficient and stable contact surface of the device shall be provided.

对于厚度( $t$ )<6 mm 的板材, 应使用夹具将表面光滑的附加条带与切割边缘齐平地固定在待测试板材的两侧, 以确保充分接触。

For plate thicknesses, ( $t$ )<6 mm additional strips with a smooth surface shall be attached flush with the cut edge to the sides of the plate surfaces of the test piece to be tested using a clamp, to ensure sufficient contact.

应确定并记录表面粗糙度  $R_{Z5}$  的最高值以及板上边缘的相应距离。

The highest value of surface roughness  $R_{Z5}$  with the respective distance of the upper edge of the plate shall be determined and recorded.

或者, 评定切割面的参考文件应为 AWS C4.1-77 套件中包含的表面粗糙度测量仪。应通过目视比较切割面与粗糙度测量仪的粗糙度来评定热切割面的粗糙度。表面粗糙度不得大于样本 3 所示的表面粗糙度, 但对于不承受计算应力的构件端部、翼缘厚度不超过 50 mm [2 in.] 的梁的开槽, 以及厚度位于 100 mm 至 200 mm [4 in 至 8 in] 的材料, 表面粗糙度不应超过样本 2 所示的表面粗糙度。

Alternatively, the reference document for evaluation of cut surfaces shall be the surface roughness gauge included in AWS C4.1-77 set. The roughness of thermal cut surfaces shall be evaluated by visually comparing the cut surface to the roughness represented on the roughness gauge. Surface roughness shall be no greater than that represented by Sample 3, except that for the ends of members not subject to calculated stress, copes in beams with the flange thickness not exceeding 50 mm [2 in.], and for materials over 100 mm to 200 mm [4 in. to 8 in.] thick, surface roughness shall not exceed that represented by Sample 2.

### **D.2.3 垂直度和角度公差**

#### **B.2.3 Perpendicularity and angularity tolerance**

垂直切割和坡口切割的垂直度和角度公差 ( $u$ ) 应根据 ISO 9013 确定。也可使用测量显微镜在直焰切割的代表性位置 (预期的最高测量值) 的横截面上确定垂直度或角度公差 ( $u$ )。在准备横截面时, 应提供切割边缘无毛刺。

The perpendicularity and angularity tolerance ( $u$ ) shall be determined in accordance with ISO 9013 with respect to both vertical and bevel cuts. At a

representative spot (highest measured value to be expected) of the straight flame cut the perpendicularity or angularity tolerance ( $u$ ) may also be determined using a measuring microscope in a transverse section. When preparing the transverse section an edge of the cut free of burrs shall be provided.

为了在测量过程中获得更好的对比度，可以使用合适的蚀刻剂蚀刻试件。视板材厚度而定，可进行多次蚀刻，形成一个图形并进行测量。应记录切割厚度的减小量 ( $\Delta a$ )，以限制需要测量的区域。

For a better contrast during the measurement, the test piece may be etched using a suitable etching agent. Depending on the plate thickness, several exposures may be completed to form one figure and measured. The reduction of thickness of the cut ( $\Delta a$ ) shall be recorded, which limits the area to be measured.

#### **D.2.4 硬度测试**

#### **B.2.4 Hardness test**

火焰切割边缘的硬度测试应按照 ISO 6507-1 和 ISO 6506-1 进行。

The hardness test on the flame cut edge shall be performed in accordance with ISO 6507-1 and ISO 6506-1.

用于硬度测量的试样应具有平坦、平行的接触面。火焰切割边缘的磨削应采用粒度 600 进行。火焰切割表面的磨削应使得火焰切割表面的一些凹痕仍然可见。硬度测试应在靠近上下边缘以及板厚中心的区域进行（见图 D.2.4）。

The test pieces for the measurement of the hardness shall have plane, parallel contact surfaces. Grinding of the flame cut edges shall be conducted using grain size 600. The flame cut surface shall be ground such that some indentations of the flame cut surface are still visible. Hardness measurements shall be taken in the areas near the upper and lower edges as well as the centre of the plate thickness (see Figure B.4).

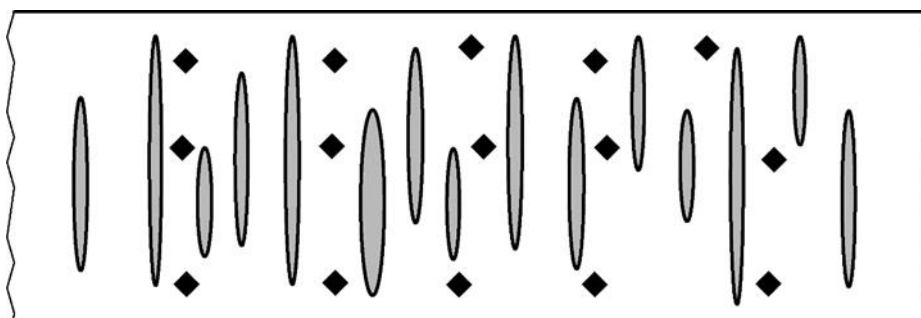


图 D.2.4—地焰切割面上的测量位置

Figure B.4 — Measurement locations on ground flame cut surface

根据板材的厚度，沿横截面应进行 5 次或 15 次硬度测量（见表 D.2.4）。在板材表面附近进行硬度测试时，应遵循 ISO 6507-1 和 ISO 6506-1 规定的最小距离要求，并注意表面的熔化情况。

Depending on the plate thickness, either 5 or 15 measurements of the hardness distributed across the cross-section shall be conducted (see Table B.3). During the hardness test near the plate surfaces, the minimum distance in accordance with ISO 6507-1 and ISO 6506-1 as well as the melting of the surfaces shall be observed.

表 D.2.4—硬度测量的次数和区域

Table B.3 — Number and area of hardness measurements

板材厚度 $t$ (mm) Plate thickness $t$ (mm)	硬度测量 Hardness measurements
$t \leq 5$	5次，板厚中心 5 at centre of the plate thickness
$t > 5$	5次，靠近板上侧 5, near upper side of the plate  5次，靠近板的下侧 5, near lower side of the plate  5次，板厚的中心 5, at centre of the plate thickness

## D.3 资格范围

### B.3 Range of qualification

#### D.3.1 材料组

##### B.3.1 Material groups

由于不同材料的硬化性能不同，应采用表 D.3.1 以确定有效范围。

Due to the hardening behaviour of the different materials, Table B.4 shall be used to determine the range of validity.

无论表 D.3.1 如何规定，对于在有效范围内但碳当量高于试样的材料，可能需要调整预热温度，以确保切割面硬度的增加在可接受范围内。

Independent of Table B.4, the preheating temperature can need adjustment for materials within the range but having a higher carbon equivalent than the test piece, to ensure that the increase in hardness of the cut surface is acceptable.

表 D.3.1—材料组

Table B.4 — Material groups

试样 Test piece ISO/TR 15608中的材料组 material group from ISO/TR 15608	范围 Range 符合ISO/TR 15608规定的材料组 material groups in accordance with ISO/TR 15608
1	1 <sup>a</sup> 、2 <sup>b</sup>
1.4	1 <sup>b</sup> 、2 <sup>b</sup>
2	1.1、2 <sup>b</sup>
3	1 <sup>a</sup> 、2 <sup>b</sup> 、3 <sup>b</sup>
<p><sup>a</sup> 除1.4外，适用于具有相同或确定更低的最小屈服强度的钢材。</p> <p><sup>a</sup> Except for 1.4 and valid for steel with the same or lower determined minimum yield strength.</p> <p><sup>b</sup> 适用于具有相同或确定更低的最小屈服强度的钢材。</p> <p><sup>b</sup> Valid for steel with the same or lower determined minimum yield strength.</p>	

#### D.3.2 材料厚度

##### B.3.2 Material thickness

最薄和最厚试样的测试应确保该厚度范围内的所有材料厚度都得到验证。

Testing of the thinnest and the thickest test piece shall qualify all material thicknesses within this scope of thickness.

### **D.3.3 气体压力**

#### **B.3.3 Pressures of gases**

在以下范围内有效:

The qualification is valid within the following ranges:

- 加热氧气压力: +0% / -20%;
- heating oxygen pressure: +0% / -20%;
- 燃料气体压力: + / -5%;
- fuel gas pressure: +/-5%;
- 切割氧气压力: +0% / -15%。
- cutting oxygen pressure: +0% / -15%.

### **D.3.4 切割速度和高度**

#### **B.3.4 Cutting speed and height**

在以下范围内有效:

The qualification is valid within the following ranges:

- 切割速度: +10% / -0%;
- cutting speed: +10% / -0%;
- 割炬尖端与板材之间的切割高度: + / -10%。
- cutting height between cutting head tip and plate: +/-10%.

### **D.3.5 预热温度**

#### **B.3.5 Preheat temperature**

在以下范围内有效:

The qualification is valid within the following range:

- 预热温度: + / -10%。
- preheat temperature: +/-10%.

## D.4 测试报告

### B.4 Test report

测试报告应包括以下信息：

The test report shall comprise the following information:

- 参考本文件，即 ISO 17607-3:20 和 ISO 9013;
- reference to this document, i.e. ISO 17607-3:20 and ISO 9013;
- 切割规范 pCPS 的编号;
- number of the cutting specification pCPS;
- 试样标识;
- marking of the test piece;
- 材料规格;
- material specification;
- 板厚;
- plate thickness;
- 试样的类型和几何形状;
- type and geometry of test piece;
- 火焰切割边缘测试位置的草图（如有必要）;
- sketch with testing positions on the flame cut edge (if necessary);
- 测量仪器;
- measuring instruments;
- 进行的测试和评定标准;
- tests conducted and assessment criteria;
- 测试结果;
- test results;
- 测试结果评定。



— evaluation of the test results.

## 附录 E

### Annex C

(信息性)

(informative)

### 几何公差-建筑物

#### Geometric tolerances - Buildings

#### E.1 概述

#### C.1 General

建筑物几何公差的允许公差分为九类：

Permitted deviations for geometrical tolerances in buildings are divided into nine categories:

- 焊接型材
- Welded profiles
- 压制型材
- Press-braked profiles
- 焊接型材翼缘
- Flanges of welded profiles
- 焊接箱形截面翼缘
- Flanges of welded box sections
- 型材或箱形截面的腹板加劲肋和十字形节点
- Web stiffeners and cruciform joints of profiles or box sections
- 构件
- Components
- 紧固件孔、槽口和切边
- Fastener holes, notches and cut edges

- 立柱拼接和底板
- Column splices and baseplates
- 格构件
- Lattice components

允许公差详见：

Permitted deviations are given in:

- 表 E.1：欧洲；
- Table C.1: Europe;
- 表 E.2：澳大利亚/新西兰；
- Table C.2: Australia / New Zealand;
- 表 E.3：加拿大；
- Table C.3: Canada;
- 表 E.4：中国；
- Table C.4: China;
- 表 E.5：日本；
- Table C.5: Japan;
- 表 E.6：俄罗斯联邦；
- Table C.6: Russian Federation;
- 表 E.7：英国；
- Table C.7: United Kingdom;
- 表 E.8：美国。
- Table C.8: United States.

## **E.2 欧洲允许公差**

### **C.2 Selection criteria**

除非另有说明，表 E.1 的参考标准为 EN 1090-2:2018。

Unless otherwise noted, the reference standard for Table C.1 is EN 1090-2: 2018.

Definitions specific to Table C.1 are:

表 E.1 中的具体定义如下:

Definitions specific to Table C.1 are:

**a) 基本公差:**

a) Essential tolerances:

基本公差对于结构的承载力和稳定性至关重要, 因此必须满足。

Essential tolerances are essential for the mechanical resistance and stability of the completed structure and are therefore to be fulfilled.

**b) 功能公差:**

b) Functional tolerances:

功能公差是指为了满足组装和外观等其他标准所需的公差。

Functional tolerances are those required to fulfil other criteria such as fit-up and appearance.

**c) 一级公差:**

c) Class 1:

除非建造技术规格书范中另有规定, 否则应采用公差等级 1。

Tolerance Class 1 shall be applied unless otherwise specified in the execution specification.

**d) 二级公差:**

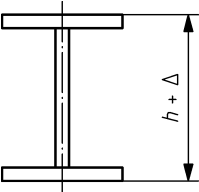
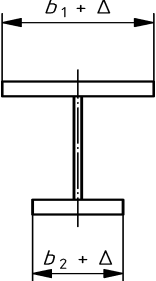
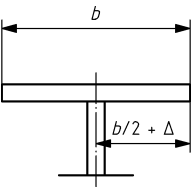
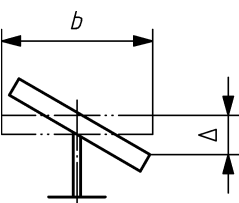
d) Class 2:

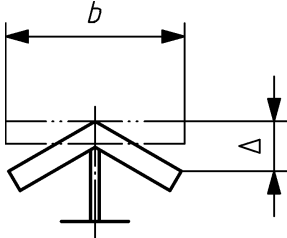
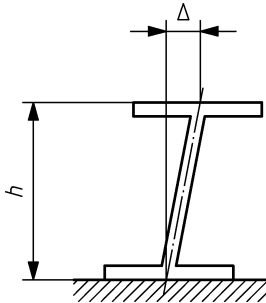
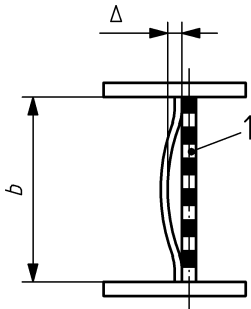
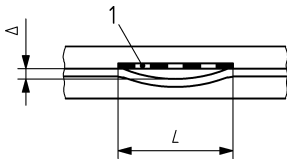
在更小的公差偏差要求中可以采用二级公差代替一级公差, 如安装玻璃幕墙。

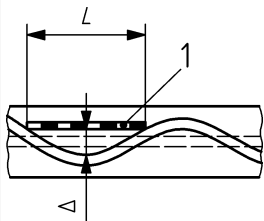
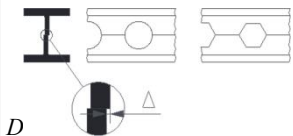
Tolerance Class 2 can substitute Class 1 if smaller tolerance deviations are required, for example if glazed facades are to be fitted.

表 E.1——欧洲

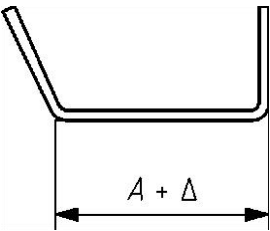
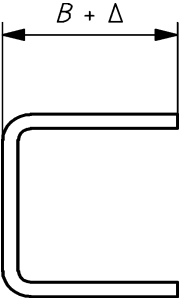
Table C.1 – Europe

1. 焊接型材 1. Welded profiles					
编号 No	标准 Criterion	参数 Parameter	基本公差允许公差Δ Essential tolerances Permitted deviation Δ	功能公差允许公差Δ Functional tolerances Permitted deviation Δ	
			一级和二级 Class 1 and 2	一级 Class 1	二级 Class 2
1.1	高度 Depth 	总高度 $h$ : Overall depth $h$ : $h \leq 900\text{mm}$ $900 < h \leq 1800\text{mm}$ $h > 1800\text{mm}$	$-\Delta = h/50$ (注意负号) (note negative sign)	$\Delta = \pm 3\text{mm}$ $\Delta = \pm h/300$ $\Delta = \pm 6\text{mm}$	$\Delta = \pm 2\text{mm}$ $\Delta = \pm h/450$ $\Delta = \pm 4\text{mm}$
1.2	翼缘宽度 Flange width 	宽度 $b = b_1$ 或 $b_2$ Width $b = b_1$ or $b_2$	$-\Delta = b/100$ (注意负号) (note negative sign)	$+\Delta = b/100$ 但 $ \Delta  \geq 3\text{mm}$	$+\Delta = b/100$ 但 $ \Delta  \geq 2\text{mm}$
1.3	腹板偏心 Web eccentricity 	腹板位置: Position of web: • 一般情况 • general case • 与结构支承接触的翼缘部分 • flange parts in contact with structural bearings	无要求 No requirement	$\Delta = \pm 5\text{mm}$ $\Delta = \pm 3\text{mm}$	$\Delta = \pm 4\text{mm}$ $\Delta = \pm 2\text{mm}$
1.4	翼缘垂直度 Squareness of flanges 	腹板位置: Position of web: • 一般情况 • general case • 与结构支座接触的翼缘部分	无要求 No requirement	$\Delta = \pm b/100$ 但 $ \Delta  \geq 5\text{mm}$ $\Delta = \pm b/400$	$\Delta = \pm b/100$ 但 $ \Delta  \geq 3\text{mm}$ $\Delta = \pm b/400$

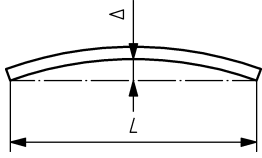
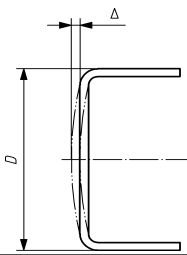
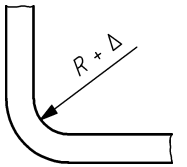
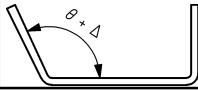
		<ul style="list-style-type: none"> <li>flange parts in contact with structural bearings</li> </ul>			
1.5	翼缘平整度 Flatness of flanges 	不平整: Out of flatness: 一般情况 general case 与结构支座接触的翼缘部分 flange parts in contact with structural bearings	无要求 No requirement	$\Delta = \pm b/150$ 但 $ \Delta  \geq 3\text{mm}$ $\Delta = \pm b/400$	$\Delta = \pm b/150$ 但 $ \Delta  \geq 2\text{mm}$ $\Delta = \pm b/400$
1.6	支座垂直度 Squareness of bearings 	无腹板加劲肋构件支座处的腹板垂直度 Vertically of web at supports, for components without bearing stiffeners	$\Delta = \pm h/200$ 但 $ \Delta  \geq t_w$ ( $t_w$ =腹板厚度) ( $t_w$ = web thickness)	$\Delta = \pm h/300$ 但 $ \Delta  \geq 3\text{mm}$	$\Delta = \pm h/500$ 但 $ \Delta  \geq 2\text{mm}$
1.7	腹板曲率 Plate curvature  1 标距 1 gauge length	腹板高度b上的变形Δ Derivation Δ over plate height b	if $b/t \leq 80$ 如果 $b/t \leq 80$ $\Delta = \pm b/200$ if $80 < b/t \leq 200$ 如果 $80 < b/t \leq 200$ $\Delta = \pm b^2/(16000t)$ if $b/t > 200$ 如果 $b/t > 200$ $\Delta = \pm b/80$ but $ \Delta  \geq t$ 但 $ \Delta  \geq t$ ( $t$ = 板厚) ( $t$ = plate thickness)	$\Delta = \pm b/100$ 但 $ \Delta  \geq 5\text{mm}$	$\Delta = \pm b/150$ 但 $ \Delta  \geq 3\text{mm}$
1.8	腹板扭曲 Web distortion 	与腹板高度b（见1.7）相等的标距L上的偏差Δ。 Deviation Δ on gauge length L equal to web height b (see (1.7)). 注：对于锥形或腹板高度b	$\Delta = \pm b/100$ 但 $ \Delta  \geq t$ ( $t$ = 腹板厚度) ( $t$ = plate thickness)	$\Delta = \pm b/100$ 但 $ \Delta  \geq 5\text{mm}$	$\Delta = \pm b/150$ 但 $ \Delta  \geq 3\text{mm}$

		<p>可变的构件，允许公差与测量位置的平均腹板高度有关。</p> <p>NOTE: For components that are tapered or have variable web height <math>b</math> the permitted deviation is related to the mean web height at the location of the gauge.</p>			
1.9	<p>腹板起伏</p> <p>Web undulation</p> 	<p>与腹板高度<math>b</math>（见1.7）相等的标距<math>L</math>上的偏差<math>\Delta</math>。</p> <p>Deviation <math>\Delta</math> on gauge length <math>L</math> equal to web height <math>b</math> (see (1.7)).</p> <p>注：对于锥形或腹板高度<math>b</math>可变的构件，允许公差与测量位置的平均腹板高度有关。</p> <p>NOTE: For components that are tapered or have variable web height <math>b</math> the permitted deviation is related to the mean web height at the location of the gauge.</p>	<p><math>\Delta = \pm b/100</math></p> <p>但</p> <p><math> \Delta  \geq t</math></p> <p>(<math>t</math> = 腹板厚度)</p> <p>(<math>t</math> = plate thickness)</p>	<p><math>\Delta = \pm b/100</math></p> <p>但</p> <p><math> \Delta  \geq 5\text{mm}</math></p>	<p><math>\Delta = \pm b/150</math></p> <p>但</p> <p><math> \Delta  \geq 3\text{mm}</math></p>
1.10	<p>开口公称直径为<math>D</math>的浇筑梁和蜂窝梁[由板材或热轧型材制成]</p> <p>Castellated beams and cellular beams [fabricated either from plate or from hot-rolled sections] with openings of inscribed nominal diameter</p> 	<p>腹板立柱错位:</p> <p>Misalignment of web post:</p> <p>公称半径为<math>r</math>的开孔沿厚度方向的重叠:</p> <p>across thickness overlap for opening of nominal radius <math>r</math>:</p> <p><math>r = D/2 &lt; 200\text{mm}</math></p> <p><math>r = D/2 \geq 200\text{mm}</math></p>	<p>无要求</p> <p>No requirement</p>	<p><math>\Delta = 2\text{mm}</math></p> <p><math>\Delta = 2\text{mm}</math></p> <p><math>\Delta = r/100</math></p> <p>and</p> <p>且</p> <p><math>\Delta \leq 5\text{mm}</math></p>	<p><math>\Delta = 2\text{mm}</math></p> <p><math>\Delta = 2\text{mm}</math></p> <p><math>\Delta = r/100</math></p> <p>and</p> <p>且</p> <p><math>\Delta \leq 5\text{mm}</math></p>

注：例如 $\Delta = \pm d/100$ 但 $|\Delta| \geq t$ 的注释表示 $|\Delta|$ 取 $d/100$ 和 $t$ 中的较大值。

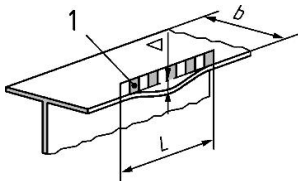
NOTE Notations such as $\Delta = \pm d/100$ but $ \Delta  \geq t$ mean that $ \Delta $ is the larger of $d/100$ and $t$ .					
2. 压制型材					
2. Press-braked profiles					
编号 No	标准 Criterion	参数 Parameter	基本公差允许公差 $\Delta$ Essential tolerances Permitted deviation $\Delta$	功能公差允许公差 $\Delta$ Functional tolerances Permitted deviation $\Delta$	
			一级和二级 Class 1 and 2	一级 Class 1	二级 Class 2
2.1	内部构件宽度 Internal element width 	弯折之间的宽度 $A$ (厚度为 $t$ 的构件) : Width $A$ between bends (component of thickness $t$ ): $t < 3\text{mm}$ : 长度 $< 7\text{m}$ Length $< 7\text{m}$ 长度 $\geq 7\text{m}$ Length $\geq 7\text{m}$ $t \geq 3\text{mm}$ : 长度 $< 7\text{m}$ Length $< 7\text{m}$ 长度 $\geq 7\text{m}$ Length $\geq 7\text{m}$	$-\Delta = A/50$ (注意负号) (note negative sign)	$\Delta = \pm 3\text{mm}$ $\Delta = -3\text{mm}/$ $+ 5\text{mm}$  $\Delta = \pm 5\text{mm}$ $\Delta = -5\text{mm}/$ $+ 9\text{mm}$	$\Delta = \pm 2\text{mm}$ $\Delta = -2\text{mm}/$ $+ 4\text{mm}$  $\Delta = \pm 3\text{mm}$ $\Delta = -3\text{mm}/$ $+ 6\text{mm}$
2.2	外露构件宽度 Outstanding element width 	弯折和自由边之间的宽度 $B$ (厚度为 $t$ 的构件) : Width $B$ between a bend and a free edge (component of thickness $t$ ): 磨边: Mill edge $t < 3\text{mm}$ $t \geq 3\text{mm}$  切边: Sheared edge $t < 3\text{mm}$	$-\Delta = B/80$ (注意负号) (note negative sign)	$\Delta = -3\text{mm}/$ $+ 6\text{mm}$ $\Delta = -5\text{mm}/$ $+ 7\text{mm}$  $\Delta = -2\text{mm}/$ $+ 5\text{mm}$ $\Delta = -3\text{mm}/$ $+ 6\text{mm}$	$\Delta = -2\text{mm}/$ $+ 4\text{mm}$ $\Delta = -3\text{mm}/$ $+ 5\text{mm}$  $\Delta = -1\text{mm}/$ $+ 3\text{mm}$ $\Delta = -2\text{mm}/$ $+ 4\text{mm}$

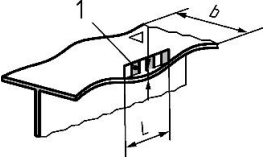
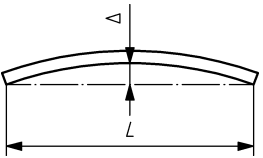


		$t \geq 3\text{mm}$			
2.3	用于无约束状态下构件的直线度 Straightness for component to be used unrestrained 	直线度偏差Δ Deviation Δ from straightness	$\Delta = \pm L/1000$	无要求 (见6.3) No requirement (see 6.3)	—
2.4	平整度 Flatness 	凸起或凹陷 Convexity or concavity	无要求 No requirement	$\Delta = \pm D/50$	$\Delta = \pm D/100$
2.5	弯曲半径 Bend radius 	内部弯曲半径R Internal bend radius R	无要求 No requirement	$\Delta = \pm 2\text{mm}$	$\Delta = \pm 1\text{mm}$
2.6	形状 Shape 	相邻构件夹角θ Angle θ between adjacent components	无要求 No requirement	$\Delta = \pm 3^\circ$	$\Delta = \pm 2^\circ$

### 3. 焊接型材翼缘

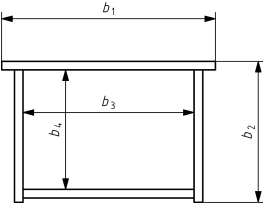
#### 3. Flanges of welded profiles

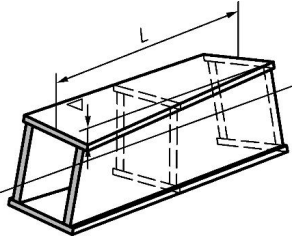
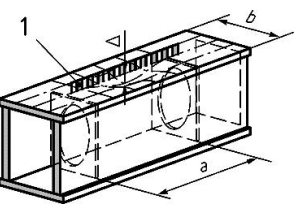
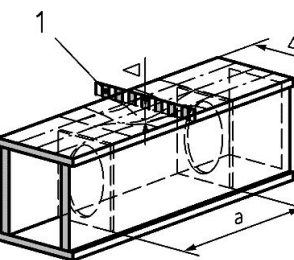
编号 No	标准 Criterion	参数 Parameter	基本公差允许公差Δ Essential tolerances Permitted deviation Δ	功能公差允许公差Δ Functional tolerances Permitted deviation Δ	
			一级和二级 Class 1 and 2	一级 Class 1	二级 Class 2
3.1	I型截面翼缘变形 Flange distortion of I section 	标距L上的偏差Δ, 其中 $L = \text{翼缘}$ , $b = \text{宽度}$ Deviation Δ on gauge length L where $L = \text{flange}$ and $b = \text{width}$	$\Delta = \pm b/150$ if $b/t \leq 20$ 如果 $b/t \leq 20$ $\Delta = \pm b^2/(3000t)$ if $b/t > 20$ 如果 $b/t > 20$ $t = \text{翼缘厚度}$	$\Delta = \pm b/100$	$\Delta = \pm b/150$

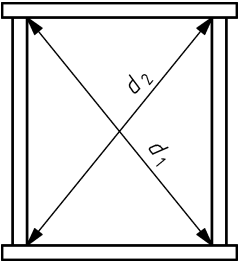
	1 标距 1 gauge length		$t = \text{flange thickness}$		
3.2	I型截面翼缘起伏 Flange undulation of I section  1 标距 1 gauge length	标距 $L$ 上的偏差 $\Delta$ , 其中 $L =$ 翼缘, $b =$ 宽度 Deviation $\Delta$ on gauge length $L$ where $L =$ flange and $b =$ width	$\Delta = \pm b/150$ if $b/t \leq 20$ 如果 $b/t \leq 20$ $\Delta = \pm b^2/(3000t)$ if $b/t > 20$ 如果 $b/t > 20$ $t =$ 翼缘厚度 $t =$ flange thickness	$\Delta = \pm b/100$	$\Delta = \pm b/150$
3.3	用于无约束状态下构件的直线度 Straightness for component to be used unrestrained 	直线度偏差 $\Delta$ Deviation $\Delta$ from straightness	$\Delta = \pm L/1000$	$\Delta = \pm L/1000$	$\Delta = \pm L/1000$

#### 4. 焊接箱形截面翼缘

#### 4. Flanges of welded box sections

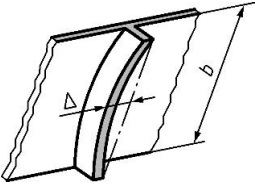
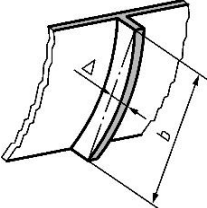
编号 No	标准 Criterion	参数 Parameter	基本公差允许公差 $\Delta$ Essential tolerances Permitted deviation $\Delta$	功能公差允许公差 $\Delta$ Functional tolerances Permitted deviation $\Delta$	
			一级和二级 Class 1 and 2	一级 Class 1	二级 Class 2
4.1	截面尺寸 Section dimension 	内部或外部尺寸偏差 Deviation in internal or external dimension $b < 900\text{mm}$ $900 \leq b < 1800\text{mm}$ $b \geq 1800\text{mm}$ $b = b_1, b_2, b_3 \text{ or } b_4$ $b = b_1, b_2, b_3 \text{ 或 } b_4$	$-\Delta = b/100$ (注意负号) (note negative sign)	$\Delta = \pm 3\text{mm}$ $\Delta = \pm b/300$ $\Delta = \pm 6\text{mm}$	$\Delta = \pm 2\text{mm}$ $\Delta = \pm b/450$ $\Delta = \pm 4\text{mm}$
4.2	扭转 Twist	长度为 $L$ 的构件总偏差 $\Delta$ Overall deviation $\Delta$ in a piece of length $L$	无要求 No requirement	$\Delta = \pm L/700$ but $ \Delta  \geq 4 \text{ mm}$ and $ \Delta  \leq 10 \text{ mm}$ $\Delta = \pm L/700$ 但 $ \Delta  \geq 4\text{mm}$ 且 $ \Delta  \leq 10\text{mm}$	$\Delta = \pm L/1000$ but $ \Delta  \geq 3 \text{ mm}$ and $ \Delta  \leq 8 \text{ mm}$ $\Delta = \pm L/1000$ 但 $ \Delta  \geq 3\text{mm}$ 且 $ \Delta  \leq 8\text{mm}$

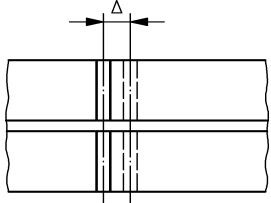
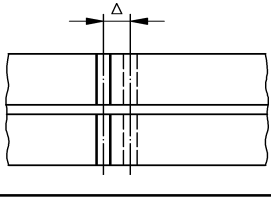
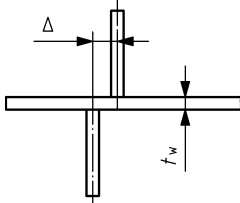
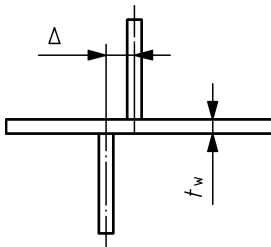
					
4.3	<p>腹板或加劲肋之间的板面平面外缺陷，一般情况</p> <p>Out-of-plane imperfection of plate panel between web or stiffener, general case</p>  <p>关键</p> <p>Key</p> <p>1 长度为L的直边规</p> <p>1 straight edge gauge of length L</p>	<p>垂直于板平面的偏差Δ</p> <p>Deviation Δ perpendicular to the plane of the plate</p> <p>if <math>a \leq 2b</math>, <math>L = a</math></p> <p>如果 <math>a \leq 2b</math>, 则 <math>L = a</math></p> <p>if <math>a &gt; 2b</math>, <math>L = 2b</math></p> <p>如果 <math>a &gt; 2b</math>, 则 <math>L = 2b</math></p>	<p><math>\Delta = \pm a/250</math></p> <p><math>\Delta = \pm b/125</math></p>	<p><math>\Delta = \pm a/250</math></p> <p><math>\Delta = \pm b/125</math></p>	<p><math>\Delta = \pm a/250</math></p> <p><math>\Delta = \pm b/125</math></p>
4.4	<p>腹板或加劲肋之间的板面的平面外缺陷（横向受压的特殊情况——除非另有规定该特殊情况，否则采用一般情况）</p> <p>Out-of-plane imperfections of plate panel between webs or stiffeners (special case with compression in the transverse direction – the general case applies unless this special case is specified)</p>  <p>关键</p> <p>Key</p> <p>1 长度为L的直边规</p>	<p>垂直于板平面的偏差Δ</p> <p>Deviation Δ perpendicular to the plane of the plate</p> <p>if <math>b \leq 2a</math>, <math>L = b</math></p> <p>如果 <math>b \leq 2a</math>, 则 <math>L = b</math></p> <p>if <math>b &gt; 2a</math>, <math>L = 2a</math></p> <p>如果 <math>b &gt; 2a</math>, 则 <math>L = 2a</math></p>	<p><math>\Delta = \pm b/250</math></p> <p><math>\Delta = \pm a/125</math></p>	<p><math>\Delta = \pm b/250</math></p> <p><math>\Delta = \pm a/125</math></p>	<p><math>\Delta = \pm b/250</math></p> <p><math>\Delta = \pm a/125</math></p>

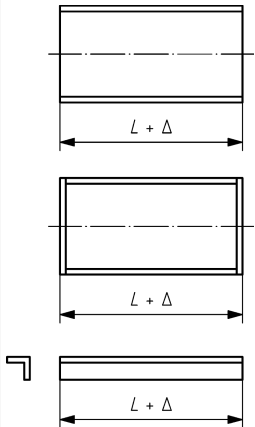
	1 straight edge gauge of length L				
4.5	方正度 Squareness  $(d_1+d_2)_{act} = (d_1+d_2)_{\text{实际值}}$ $(d_1+d_2)_{act} = (d_1+d_2)_{\text{actual}}$ $(d_1+d_2)_{nom} = (d_1+d_2)_{\text{公称值}}$ $(d_1+d_2)_{nom} = (d_1+d_2)_{\text{nominal}}$	隔板位置处对角线尺寸差 $\Delta$ : Difference $\Delta$ between diagonal dimensions at diaphragm positions: $\Delta =  (d_1-d_2)_{act} - (d_1-d_2)_{nom} $ hence 因此 $\Delta =  d_1-d_2 _{act}$ 如果 $d_1$ 和 $d_2$ 名义相等 if $d_1$ and $d_2$ are nominally the same)	无要求 No requirement	$\Delta = \frac{(d_1-d_2)_{nom}}{400}$ 但 $ \Delta  \geq 6\text{mm}$	$\Delta = \frac{(d_1-d_2)_{nom}}{600}$ 但 $ \Delta  \geq 4\text{mm}$

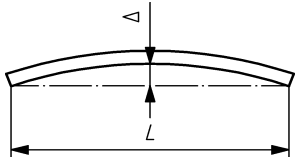
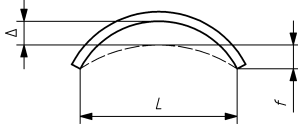
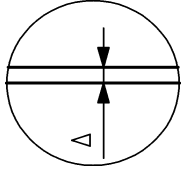
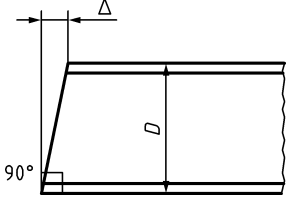
#### 5. 型材或箱形截面的腹板加劲肋和十字节点

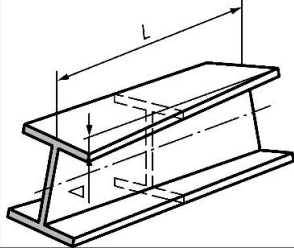
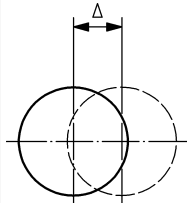
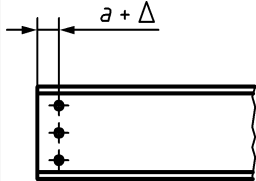
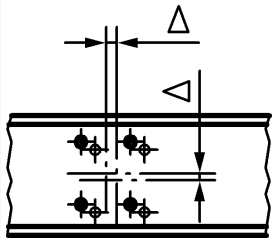
#### 5. Web stiffeners and cruciform joints of profiles or box sections

编号 No	标准 Criterion	参数 Parameter	基本公差允许公差 $\Delta$ Essential tolerances Permitted deviation $\Delta$	功能公差允许公差 $\Delta$ Functional tolerances Permitted deviation $\Delta$	
			一级和二级 Class 1 and 2	一级 Class 1	二级 Class 2
5.1	平面内直线度 In-plane straightness 	腹板平面内直线度偏差 $\Delta$ Deviation $\Delta$ from straightness in the plane of the plate	$\Delta = \pm b/250$ 但 $ \Delta  \geq 4\text{mm}$	$\Delta = \pm b/250$ 但 $ \Delta  \geq 4\text{mm}$	$\Delta = \pm b/375$ 但 $ \Delta  \geq 2\text{mm}$
5.2	平面外直线度 Out-of-plane straightness 	腹板平面法向的直线度偏差 $\Delta$ Deviation $\Delta$ from straightness normal to the plane of the web	$\Delta = \pm b/500$ 但 $ \Delta  \geq 4\text{mm}$	$\Delta = \pm b/500$ 但 $ \Delta  \geq 4\text{mm}$	$\Delta = \pm b/750$ 但 $ \Delta  \geq 2\text{mm}$
5.3	腹板加劲肋的位置 Location of web stiffeners	距预定位置的距离 $\Delta$ Distance $\Delta$ from intended location	$\Delta = \pm 5\text{mm}$	$\Delta = \pm 5\text{mm}$	$\Delta = \pm 3\text{mm}$

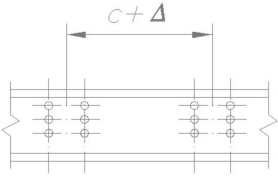
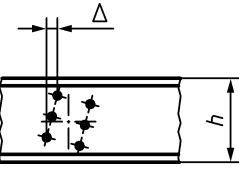
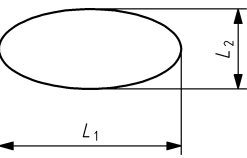
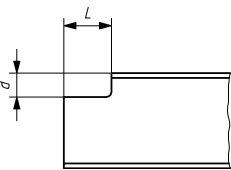
					
5.4	支座处腹板加劲肋的位置 Location of web stiffeners at support 	距预定位置的距离Δ Distance Δ from intended location	$\Delta = \pm 3\text{mm}$	$\Delta = \pm 3\text{mm}$	$\Delta = \pm 2\text{mm}$
5.5	腹板加劲肋偏心 Eccentricity of web stiffeners 	一对加劲肋之间的偏心: Eccentricity between a pair of stiffeners: 注: 对于十字形节点, 错位偏心率限制在 $\pm t/2$ , 其中 $t$ 是附着在腹板两侧的板的厚度的较大值 NOTE: For cruciform joints, the misalignment eccentricity is limited to $\pm t/2$ where $t$ is the larger of the thicknesses of the two plates attached either side of the web	$\Delta = \pm t_w/2$	$\Delta = \pm t_w/2$	$\Delta = \pm t_w/3$
5.6	支座处腹板加劲肋的偏心 Eccentricity of web stiffeners at supports 	一对加劲肋之间的偏心: Eccentricity between a pair of stiffeners: 注: 对于十字形节点, 错位偏心度限制在 $\pm t/2$ , 其中 $t$ 是附着在腹板两侧的板的厚度的较大值 NOTE: For cruciform joints, the misalignment eccentricity is limited to $\pm t/2$ where $t$ is the larger of the thicknesses of the two	$\Delta = \pm t_w/3$	$\Delta = \pm t_w/3$	$\Delta = \pm t_w/4$

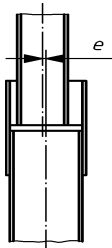
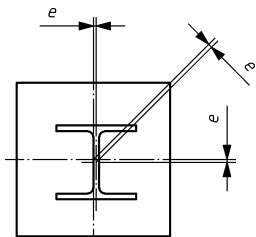
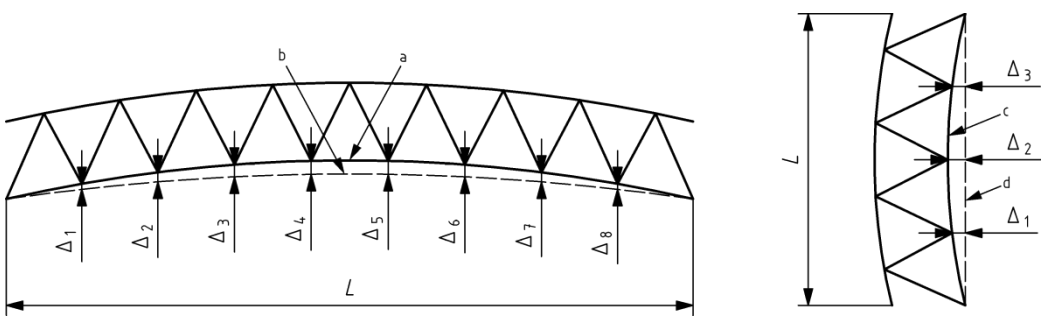
		plates attached either side of the web			
注：例如 $\Delta = \pm d/100$ 但 $ \Delta  \geq 5\text{mm}$ 的注释表示 $ \Delta $ 取 $d/100$ 和 $5\text{mm}$ 中的较大值。 NOTE Notations such as $\Delta = \pm d/100$ but $ \Delta  \geq 5\text{ mm}$ mean that $ \Delta $ is the larger of $d/100$ and $5\text{ mm}$ .					
6. 构件 6. Components					
编号 No	标准 Criterion	参数 Parameter		功能公差允许公差 $\Delta$ Functional tolerances Permitted deviation $\Delta$	
				一级 Class 1	二级 Class 2
6.1	长度 Length 	在中心线（或在角处）测量的切割长度： 一般情况 Cut length measured on the centreline (or on the corner for an angle): general case 端部将全面接触支承 ends ready for full contact bearing 注：包括焊接端板（如适用）的测量长度 $L$ NOTE: Length $L$ measured including welded end plates as applicable.	No requirement 无要求 No requirement 无要求	$\Delta = \pm (L/5000 + 2\text{mm})$ $\Delta = \pm 1\text{mm}$	$\Delta = \pm (L/10000 + 2\text{mm})$ $\Delta = \pm 1\text{mm}$
6.2	可调整相邻构件进行充分补偿处的长度 Length, where sufficient compensation with adjacent component is possible	在中心线上测量的切割长度。 Cut length measured on centreline.	无要求 No requirement	$\Delta = \pm 50\text{mm}$	$\Delta = \pm 50\text{mm}$
6.3	直线度 Straightness	与加工或压制型材矩形轴的距离 $\Delta$ Distance $\Delta$ from rectangular axes of a fabricated or press braked	无要求 No requirement	$\Delta = \pm L/1000$ 但 $ \Delta  \geq 5\text{mm}$	$\Delta = \pm L/1000$ 但 $ \Delta  \geq 3\text{mm}$

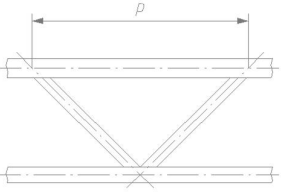
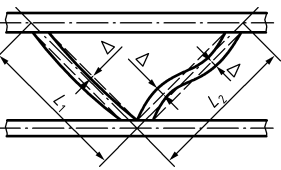
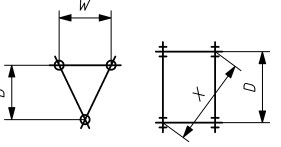
		section			
6.4	<p>平面图上的起拱度或预期曲率</p> <p>Camber or intended curvature on plan</p> 	<p>中间长度处的偏移量 <math>f</math></p> <p>Offset <math>f</math> at mid-length</p> <p>垂直起拱度应在构件侧放时测量。</p> <p>Vertical camber should be measured with the member on its side.</p>	No requirement 无要求	$\Delta = \pm L/500$ 但 $ \Delta  \geq 6\text{mm}$	$\Delta = \pm L/1000$ 但 $ \Delta  \geq 4\text{mm}$
6.5	<p>全接触支承表面处理</p> <p>Surfaces finished for full contact bearing</p> 	<p>直边与表面之间的间隙 <math>\Delta</math>。</p> <p>Gap <math>\Delta</math> between straight edge and surface.</p> <p>注：未规定表面粗糙度标准</p> <p>NOTE: No surface roughness criterion is specified</p>	No requirement 无要求	$\Delta = 0.5\text{mm}$ 高点不应超过 0.5mm $\Delta = 0,5\text{ mm}$ high spots not to be proud by more than 0,5 mm	$\Delta = 0.25\text{mm}$ 高点不应超过 0.25mm $\Delta = 0,25\text{ mm}$ high spots not to be proud by more than 0,25 mm
6.6	<p>端部方正度</p> <p>Squareness of ends</p> 	<p>与纵轴的垂直度:</p> <p>Squareness to longitudinal axis:</p> <p>端部设计为完全接触支承</p> <p>ends intended for full contact bearing</p> <p>端部不用于完全接触支承</p> <p>ends not intended for full contact bearing</p>	<p>无要求</p> <p>No requirement</p> <p>无要求</p> <p>No requirement</p>	$\Delta = \pm D/1000$  $\Delta = \pm D/100$	$\Delta = \pm D/1000$  $\Delta = \pm D/300$ 但 $ \Delta  \leq 10\text{mm}$
6.7	<p>扭转</p> <p>Twist</p>	<p>长度 <math>L</math> 上的总偏差 <math>\Delta</math></p> <p>Overall deviation <math>\Delta</math> in a piece of length <math>L</math></p> <p>注：关于箱形截面，见表4。</p> <p>NOTE: For box sections,</p>	No requirement 无要求	$\Delta = \pm L/700$ 但 $ \Delta  \geq 4\text{mm}$ 且 $ \Delta  \leq 20\text{mm}$	$\Delta = \pm L/1000$ 但 $ \Delta  \geq 3\text{mm}$ 且 $ \Delta  \leq 15\text{mm}$

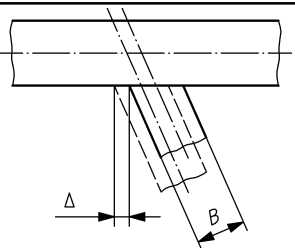
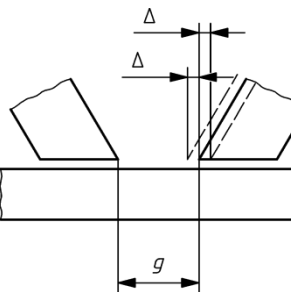
		see Table 4.			
<p>注：例如<math>\Delta = \pm d/100</math>但<math> \Delta  \geq 5\text{mm}</math>的注释表示<math> \Delta </math>取<math>d/100</math>和<math>5\text{mm}</math>中的较大值。</p> <p>NOTE Notations such as <math>\Delta = \pm d/100</math> but <math> \Delta  \geq 5\text{ mm}</math> mean that <math> \Delta </math> is the larger of <math>d/100</math> and <math>5\text{ mm}</math>.</p>					
7. 紧固件孔、槽口和切边					
7. Fastener holes, notches and cut edges					
编号 No	标准 Criterion	参数 Parameter	基本公差允许公差 $\Delta$ Essential tolerances Permitted deviation $\Delta$	功能公差允许公差 $\Delta$ Functional tolerances Permitted deviation $\Delta$	
			一级和二级 Class 1 and 2	一级 Class 1	二级 Class 2
7.1	紧固件孔的位置 Position of holes for fasteners 	一组孔中单个孔的中心线与其预期位置的偏差 $\Delta$ Deviation $\Delta$ of centreline of an individual hole from its intended position within a group of holes	$\Delta = \pm 2\text{mm}$	$\Delta = \pm 2\text{mm}$	$\Delta = \pm 1\text{mm}$
7.2	紧固件孔的位置 Position of holes for fasteners 	直径为 $d_0$ 的单个孔与切割端之间距离 $a$ 的偏差 $\Delta$ : Deviation $\Delta$ in distance $a$ between an individual hole of diameter $d_0$ and a cut end: if $a < 3d_0$ 如果 $a < 3d_0$ if $a < 3d_0$ 如果 $a < 3d_0$	$-\Delta = 0\text{mm}$ (注意负号) (note negative sign) $\Delta = \pm 3\text{mm}$	$-\Delta = 0\text{mm}$ $+\Delta = 3\text{mm}$ $\Delta = \pm 3\text{mm}$	$-\Delta = 0\text{mm}$ $+\Delta = 2\text{mm}$ $\Delta = \pm 2\text{mm}$
7.3	孔群位置 Position of hole group 	孔群与预期位置的偏差 $\Delta$ Deviation $\Delta$ of a hole group from intended position	$\Delta = \pm 2\text{mm}$	$\Delta = \pm 2\text{mm}$	$\Delta = \pm 1\text{mm}$



7.4	孔群间距 Spacing of hole groups 	孔群中心间距 $c$ 的偏差 $\Delta$ : Deviation $\Delta$ in spacing $c$ between centres of hole groups: 一般情况 general case 其中单件由两组紧固件连接 where a single piece is connected by two groups of fasteners	无要求 No requirement	$\Delta = \pm 5\text{mm}$ $\Delta = \pm 2\text{mm}$	$\Delta = \pm 2\text{mm}$ $\Delta = \pm 1\text{mm}$
7.5	孔群扭转 Twist of hole group 	扭转 $\Delta$ : Twist $\Delta$ : 如果 $h \leq 1000\text{mm}$ if $h \leq 1000\text{mm}$ 如果 $h > 1000\text{mm}$ if $h > 1000\text{mm}$	无要求 No requirement	$\Delta = \pm 2\text{mm}$ $\Delta = \pm 4\text{mm}$	$\Delta = \pm 1\text{mm}$ $\Delta = \pm 2\text{mm}$
7.6	孔洞的椭圆化 Ovalisation of holes 	$\Delta = L_1 - L_2$	无要求 No requirement	$\Delta = \pm 1\text{mm}$	$\Delta = \pm 0.5\text{mm}$
7.7	槽口 Notches 	槽口深度和长度偏差 $\Delta$ : Deviation $\Delta$ of notch depth and length: 深度 $d$ depth $d$ 长度 $L$ length $L$	无要求 No requirement	$\Delta = 0\text{mm}$ $+\Delta \leq 3\text{mm}$ $\Delta = 0\text{mm}$ $+\Delta \leq 3\text{mm}$	$\Delta = 0\text{mm}$ $+\Delta \leq 2\text{mm}$ $\Delta = 0\text{mm}$ $+\Delta \leq 2\text{mm}$
8.立柱拼接和底板 8. Column splices and baseplates					
编号 No	标准 Criterion	参数 Parameter	基本公差允许公差 $\Delta$ Essential tolerances Permitted deviation $\Delta$	功能公差允许公差 $\Delta$ Functional tolerances Permitted deviation $\Delta$	
			一级和二级	一级	二级

			Class 1 and 2	Class 1	Class 2
8.1	立柱拼接 Column splice 	任意轴的非预期偏心率 $e$ Non-intended eccentricity $e$ about either axis	无要求 No requirement	5mm	3mm
8.2	底板 Baseplate 	任何方向上的非预期偏心率 $e$ Non-intended eccentricity $e$ in any direction	无要求 No requirement	5mm	3mm
9.格构件 9. Lattice components					
编号 No	标准 Criterion	参数 Parameter	基本公差允许公差 $\Delta$ Essential tolerances Permitted deviation $\Delta$	功能公差允许公差 $\Delta$ Functional tolerances Permitted deviation $\Delta$	
			一级和二级 Class 1 and 2	一级 Class 1	二级 Class 2
9.1	直线度和起拱度 Straightness and camber 				
	关键: Key: a 实际起拱度 a actual camber b 预期起拱度 b intended camber c 实际基准线	每个面板点相对于直线 或预期起拱度或曲率的 偏差 Deviation at each panel point, relative to a straight line or to the intended camber or curvature	$\Delta = \pm L/500$ 但 $ \Delta  \geq 12\text{mm}$	$\Delta = \pm L/500$ 但 $ \Delta  \geq 12\text{mm}$	$\Delta = \pm L/500$ 但 $ \Delta  \geq 6\text{mm}$

	c actual line d 预期基准线 d intended line				
9.2	面板尺寸 Panel dimensions 	面板点中心线交点之间的 单个距离 $p$ 的偏差 Deviation of individual distances $p$ between intersections of centrelines at panel points  面板点位置的累积偏差 $\sum p$ Cumulative deviation $\sum p$ of panel point position	无要求 No requirement  无要求 No requirement	$\Delta = \pm 5\text{mm}$  $\Delta = \pm 10\text{mm}$	$\Delta = \pm 3\text{mm}$  $\Delta = \pm 6\text{mm}$
9.3	支承构件的直线度 Straightness of bracing components 	支承长度 $L_i$ ( $L_1$ 或 $L_2$ ) 的 直线度偏差 Deviation of bracing lengths $L_i$ ( $L_1$ or $L_2$ ) from straightness	$\Delta = \pm L_i/1000$ 但 $ \Delta  \geq 4\text{mm}$	$\Delta = \pm L_i/1000$ 但 $ \Delta  \geq 4\text{mm}$	$\Delta = \pm L_i/1000$ 但 $ \Delta  \geq 3\text{mm}$
9.4	横截面尺寸 Cross-section dimensions 	如果距离 $D$ 、 $W$ 和 $X$ 的偏 差: Deviation of distances $D$ 、 $W$ and $X$ if: $s \leq 300\text{mm}$ $300 < s < 1000\text{mm}$ $s \geq 1000\text{mm}$ 其中 $s = D$ 、 $W$ 或 $X$ (视情 况而定) where $s = D$ , $W$ or $X$ as appropriate	无要求 No requirement	$\Delta = \pm 3\text{mm}$ $\Delta = \pm 5\text{mm}$ $\Delta = \pm 10\text{mm}$	$\Delta = \pm 2\text{mm}$ $\Delta = \pm 4\text{mm}$ $\Delta = \pm 6\text{mm}$
9.5	相贯节点 Intersecting joints	偏心率 (相对于指定偏心 率) Eccentricity (relative to specified eccentricity)	无要求 No requirement	$\Delta =$ $\pm(B/20 + 5)$ mm	$\Delta =$ $\pm(B/20 + 5)$ mm

					
9.6	间隙节点 Gap joints 	支承构件之间的间隙 $g$ : Gap $g$ between bracing components: $g \geq (t_1 + t_2)$ 其中 $t_1$ 和 $t_2$ 是支架的壁厚 where $t_1$ and $t_2$ are the wall thicknesses of braces	无要求 No requirement	$\Delta = \pm 5\text{mm}$	$\Delta = \pm 3\text{mm}$
注：诸如 $\Delta = \pm L/500$ 但 $ \Delta  \geq 12\text{mm}$ 的注释表示 $ \Delta $ 取 $L/500$ 和 $12\text{mm}$ 中的较大值。 NOTE Notations such as $\Delta = \pm L/500$ but $ \Delta  \geq 12\text{ mm}$ mean that $ \Delta $ is the larger of $L/500$ and $12\text{ mm}$ . 诸如 $ \Delta  = t_1 + t_2$ ，但 $ \Delta  \leq 5\text{mm}$ 表示需要两个值中的较小值。 Notation such as $ \Delta  = t_1 + t_2$ but $ \Delta  \leq 5\text{ mm}$ means that the smaller of the two values is required.					

### E.3 澳大利亚和新西兰允许公差

### C.3 Tolerances for Australia and New Zealand

除非另有说明，表 C.2 的参考标准为 AS/NZS 5131:2020。

Unless otherwise noted, the reference standard for Table C.2 is AS/NZS 5131:2020.

表 E.2 的具体定义如下：

Definitions specific to Table C.2 are:

a) 基本公差：

a) **Essential tolerances:**

满足结构在设计能力和稳定性方面的设计假设所需的几何公差的基本限值（见 AS 4100、AS/NZS 5100.6 和 NZS 3404）。

Basic limit for a geometrical tolerance necessary to satisfy the design assumptions for a structure in terms of design capacity and stability (see AS 4100, AS/NZS 5100.6 and NZS 3404).

**b) 功能公差:**

**b) Functional tolerances:**

功能公差是指为了满足组装和外观等其他标准所需的公差。

A tolerance which can be required to meet a function other than those of an essential tolerance, such as for appearance or fit-up.

**c) 一级公差:**

**c) Class 1:**

除非建造技术规格书中另有规定，否则应采用一级公差。

Tolerance Class 1 shall be applied unless otherwise specified in the execution specification.

**d) 二级公差:**

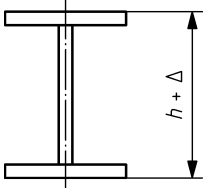
**d) Class 2:**

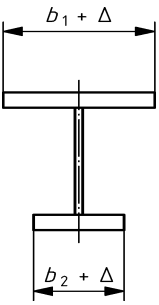
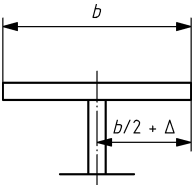
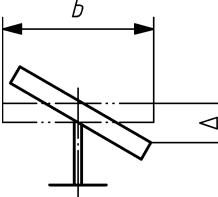
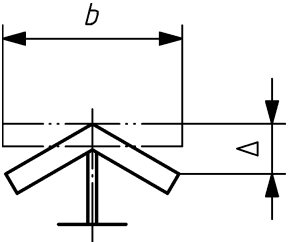
在更小的公差偏差要求中可以采用二级公差可以代替一级公差，如安装玻璃幕墙。

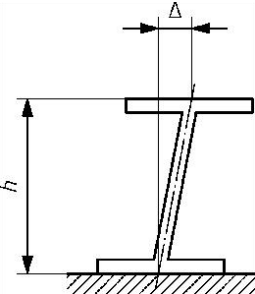
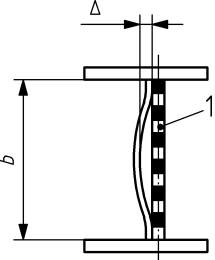
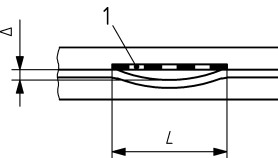
Tolerance Class 2 can substitute for Class 1 if smaller tolerance deviations are required, for example if glazed facades are to be fitted.

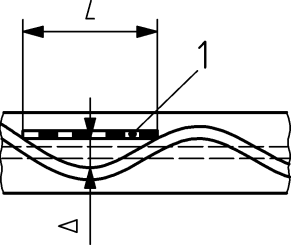
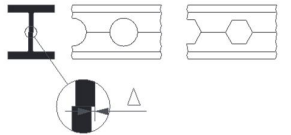
**表 E.2——澳大利亚和新西兰**

**Table C.2 – Australia and New Zealand**

1. 焊接型材					
1. Welded profiles					
编号 No	标准 Criterion	参数 Parameter	基本公差允许公差Δ Essential tolerances Permitted deviation Δ	功能公差允许公差Δ Functional tolerances Permitted deviation Δ	
			一级和二级 Class 1 and 2	一级 Class 1	二级 Class 2
1.1	高度 Depth 	公称高度 (h) 上的偏差 (Δ) Deviation (Δ) from nominal depth (h) $h \leq 900\text{mm}$ $900 < h \leq 1800\text{mm}$	$\Delta = 3\text{mm}$ $\Delta = \pm \left[ 3 + \frac{(d-900)}{300} \right] \text{mm}$ $\Delta = 6\text{mm}$	$\Delta = \pm 3\text{mm}$ $\Delta = \pm h/300$ $\Delta = \pm 6\text{mm}$	$\Delta = \pm 2\text{mm}$ $\Delta = \pm h/450$ $\Delta = \pm 4\text{mm}$

		$h > 1800\text{mm}$			
1.2	翼缘宽度 Flange width 		$\Delta = 6\text{mm}$	$+\Delta = b/100$ but 但 $ \Delta  \geq 3\text{mm}$	$+\Delta = b/100$ but 但 $ \Delta  \geq 2\text{mm}$
1.3	腹板偏心 Web eccentricity 		$\Delta = 6\text{mm}$ 一般情况 generally $\Delta = 3\text{mm}$ 支座位置 bearing location	$\Delta = \pm 5\text{mm}$  $\Delta = \pm 3\text{mm}$	$\Delta = \pm 4\text{mm}$  $\Delta = \pm 2\text{mm}$
1.4	翼缘垂直度 Squareness of flanges 	$b \leq 600\text{mm}$  $b > 600\text{mm}$	$\Delta \leq 3\text{mm}$  $\Delta \leq (b/200)\text{mm}$	$\Delta = \pm b/100$ 但 $ \Delta  \geq 5\text{mm}$ $\Delta = \pm b/100$ 但 $ \Delta  \geq 5\text{mm}$	$\Delta = \pm b/100$ 但 $ \Delta  \geq 3\text{mm}$ $\Delta = \pm b/100$ 但 $ \Delta  \geq 3\text{mm}$
1.5	翼缘平整度 Flatness of flanges 	不平整: Out of flatness: $b \leq 450\text{mm}$ $b > 600\text{mm}$ 一般情况 general case 与结构支座接触的翼缘部分 flange parts in contact with structural bearings	$\Delta \leq (b/150)\text{mm}$ $\Delta = 3\text{mm}$ 无要求 No requirement  无要求 No requirement	$\Delta = \pm b/150$ 但 $ \Delta  \geq 3\text{mm}$ $\Delta = \pm b/400$	$\Delta = \pm b/150$ 但 $ \Delta  \geq 2\text{mm}$ $\Delta = \pm b/400$
1.6	支座垂直度 Squareness of bearings	无腹板加劲肋构件支座处的腹板垂直度 Vertically of web at supports, for components without bearing stiffeners	$\Delta = \pm 3\text{mm}$  $\Delta = \pm h/200$	$\Delta = \pm h/300$ , 但 $ \Delta  \geq 3\text{mm}$	$\Delta = \pm h/500$ , 但 $ \Delta  \geq 2\text{mm}$

		$h \leq 900\text{mm}$  $h > 900\text{mm}$			
1.7	<p>腹板曲率 Plate curvature</p>  <p>1 标距长度 1 gauge length</p>	<p>腹板高度<math>b</math>上的偏差<math>\Delta</math> Derivation <math>\Delta</math> over plate height <math>b</math></p> <p>无腹板加劲肋的构件 Unstiffened web</p> <p>Stiffened web</p> <p>一般情况 General case</p>	$\Delta = \pm b/150$  $\Delta = \pm b/100$	$\Delta = \pm b/100$ 但 $ \Delta  \geq 5\text{mm}$	$\Delta = \pm b/150$ 但 $ \Delta  \geq 3\text{mm}$
1.8	<p>腹板扭曲 Web distortion</p>  <p>1 标距长度 1 gauge length</p>	<p>与腹板高度<math>b</math>（见1.7）相等的标距<math>L</math>上的偏差<math>\Delta</math>。 Deviation <math>\Delta</math> on gauge length <math>L</math> equal to web height <math>b</math> (see (1.7)).</p> <p>注：对于锥形或腹板高度<math>b</math>可变的构件，允许公差与测量位置的平均腹板高度有关。 NOTE: For components that are tapered or have variable web height <math>b</math> the permitted deviation is related to the mean web height at the location of the gauge.</p>	$\Delta = \pm b/100$ 但 $ \Delta  \geq t$ ( $t$ = 板厚)	$\Delta = \pm b/100$ 但 $ \Delta  \geq 5\text{mm}$	$\Delta = \pm b/150$ 但 $ \Delta  \geq 3\text{mm}$
1.9	<p>腹板起伏 Web undulation</p>	<p>与腹板高度<math>b</math>（见1.7）相等的标距<math>L</math>上的偏差<math>\Delta</math>。 Deviation <math>\Delta</math> on gauge length <math>L</math> equal to web height <math>b</math>. See (1.7).</p>	$\Delta = \pm b/100$ 但 $ \Delta  \geq t$ ( $t$ = 板厚)	$\Delta = \pm b/100$ 但 $ \Delta  \geq 5\text{mm}$	$\Delta = \pm b/150$ 但 $ \Delta  \geq 3\text{mm}$

		<p>注：对于锥形或腹板高度<math>b</math>可变的构件，允许公差与测量位置的平均腹板高度有关。</p> <p>NOTE: For components that are tapered or have variable web height <math>b</math> the permitted deviation is related to the mean web height at the location of the gauge.</p>			
1.10	<p>开口公称直径为<math>D</math>的浇筑梁和蜂窝梁[由板材或热轧型材制成]</p> <p>Castellated beams and cellular beams [fabricated either from plate or from hot-rolled sections] with openings of inscribed nominal diameter <math>D</math></p> 	<p>腹板立柱错位： 公称半径为<math>r</math>的开孔沿厚度方向的重叠：</p> <p>Misalignment of web post: across thickness overlap for opening of nominal radius <math>r</math>:</p> <p><math>r = D/2 &lt; 200\text{mm}</math> <math>r = D/2 \geq 200\text{mm}</math></p>	无要求 No requirement	无要求 No requirement	无要求 No requirement

注：例如 $\Delta = \pm d/100$ 但 $|\Delta| \geq t$ 的注释表示 $|\Delta|$ 取 $d/100$ 和 $t$ 中的较大值。

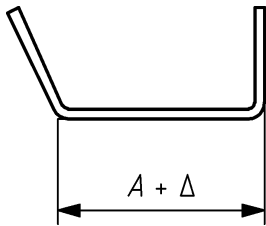
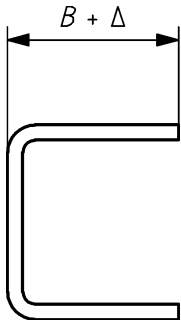
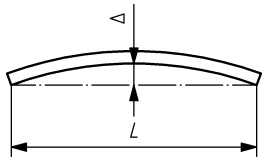
NOTE Notations such as  $\Delta = \pm d/100$  but  $|\Delta| \geq t$  mean that  $|\Delta|$  is the larger of  $d/100$  and  $t$ .

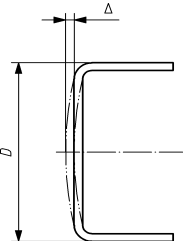
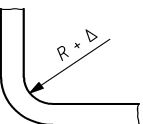
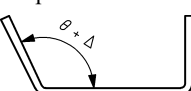
## 2. 压制型材

### 2. Press-braked profiles

编号 No	标准 Criterion	参数 Parameter	基本公差允许公差 $\Delta$ Essential tolerances Permitted deviation $\Delta$	功能公差允许公差 $\Delta$ Functional tolerances Permitted deviation $\Delta$	
			一级和二级 Class 1 and 2	一级 Class 1	二级 Class 2
2.1	内部构件宽度 Internal element width	<p>弯折之间的宽度<math>A</math>（厚度为<math>t</math>的构件）：</p> <p>Width <math>A</math> between bends (component of thickness <math>t</math>):</p> <p><math>t &lt; 3\text{mm}</math>:</p>	<p><math>-\Delta = A/50</math> (注意负号) (note negative sign)</p>	<p><math>\Delta = \pm 5\text{mm}</math> <math>\Delta = -5\text{mm}/+9\text{mm}</math>  <math>\Delta = \pm 3\text{mm}</math></p>	<p><math>\Delta = \pm 2\text{mm}</math> <math>\Delta = -2\text{mm}/+4\text{mm}</math>  <math>\Delta = \pm 3\text{mm}</math></p>

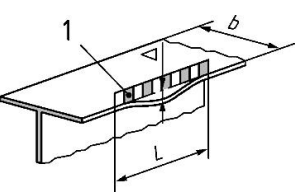
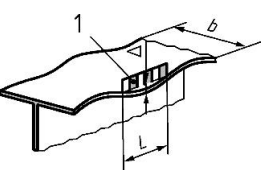


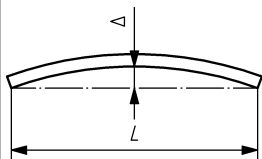
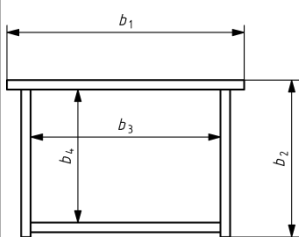
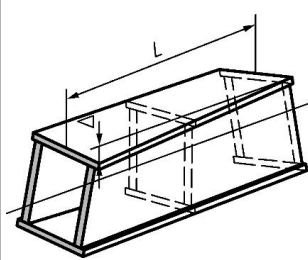
		长度 < 7m Length < 7 m 长度 ≥ 7m Length ≥ 7 m  $t \geq 3\text{mm}$ : 长度 < 7m Length < 7 m 长度 ≥ 7m Length ≥ 7 m		$\Delta = -3\text{mm}/$ $+ 5 \text{ mm}$	$\Delta = -3\text{mm}/$ $+ 6 \text{ mm}$
2.2	外露构件宽度 Outstand element width  	弯折和自由边之间的宽度 $B$ (厚度为 $t$ 的构件): Width $B$ between a bend and a free edge (component of thickness $t$ ): 磨边: Mill edge:  $t < 3\text{mm}$  $t \geq 3\text{mm}$ 剪切边: Sheared edge:  $t < 3\text{mm}$  $t \geq 3\text{mm}$	$-\Delta = B/80$ (注意负号) (note negative sign)	$\Delta = -3\text{mm}/$ $+ 6 \text{ mm}$ $\Delta = -5\text{mm}/$ $+ 7 \text{ mm}$  $\Delta = -2\text{mm}/$ $+ 5 \text{ mm}$ $\Delta = -3\text{mm}/$ $+ 6 \text{ mm}$	$\Delta = -2\text{mm}/$ $+ 4 \text{ mm}$ $\Delta = -3\text{mm}/$ $+ 5 \text{ mm}$  $\Delta = -1\text{mm}/$ $+ 3 \text{ mm}$ $\Delta = -2\text{mm}/$ $+ 4 \text{ mm}$
2.3	用于无约束状态下构件的直线度 Straightness for component to be used unrestrained  	直线度偏差 $\Delta$ Deviation $\Delta$ from straightness	无要求 No requirement	$\Delta = \pm L/750$ 但 $ \Delta  \geq 5\text{mm}$	$\Delta = \pm L/750$ 但 $ \Delta  \geq 3\text{mm}$
2.4	平整度 Flatness	凸起或凹陷 Convexity or concavity	无要求 No requirement	$\Delta = \pm D/50$	$\Delta = \pm D/100$

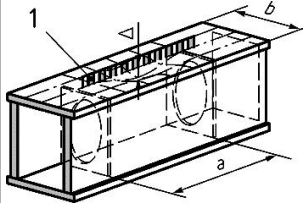
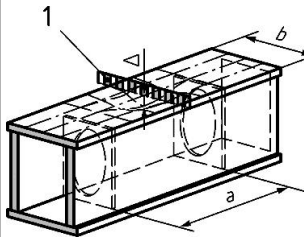
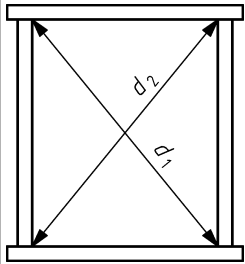
					
2.5	弯曲半径 Bend radius 	内部弯曲半径 $R$ Internal bend radius $R$	无要求 No requirement	$\Delta = \pm 2\text{mm}$	$\Delta = \pm 1\text{mm}$
2.6	形状 Shape 	相邻构件夹角 $\theta$ Angle $\theta$ between adjacent components	无要求 No requirement	$\Delta = \pm 3^\circ$	$\Delta = \pm 2^\circ$

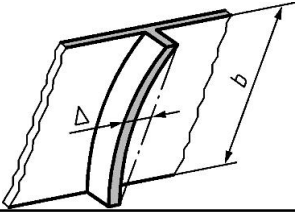
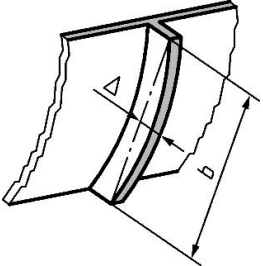
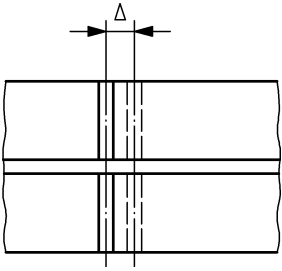
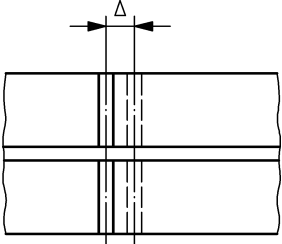
### 3. 焊接型材翼缘

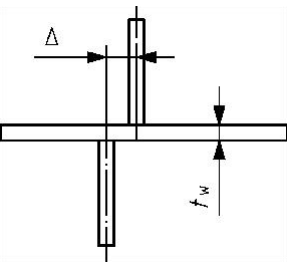
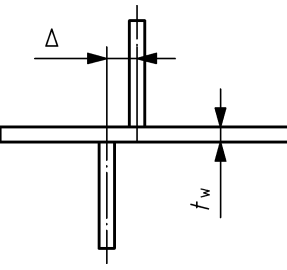
#### 3. Flanges of welded profiles

编号 No	标准 Criterion	参数 Parameter	基本公差允许公差 $\Delta$ Essential tolerances Permitted deviation $\Delta$	功能公差允许公差 $\Delta$ Functional tolerances Permitted deviation $\Delta$	
			一级和二级 Class 1 and 2	一级 Class 1	二级 Class 2
3.1	I型截面翼缘变形 Flange distortion of I section  1 标距长度 1 gauge length	标距 $L$ 上的偏差 $\Delta$ , 其中 Deviation $\Delta$ on gauge length $L$ , where $L$ = 翼缘 $L$ = flange $b$ = 宽度 $b$ = width	如果 $b/t \leq 20$ if $b/t \leq 20$ $\Delta = \pm b/150$ 如果 $b/t > 20$ if $b/t > 20$ $\Delta = \pm b_2/ (3000t)$ $t$ = 翼缘厚度 $t$ = flange thickness	$\Delta = \pm b/100$	$\Delta = \pm b/150$
3.2	I型截面翼缘起伏 Flange undulation of I section  1 标距长度 1 gauge length	标距 $L$ 上的偏差 $\Delta$ , 其中 Deviation $\Delta$ on gauge length $L$ , where $L$ = 翼缘 $L$ = flange $b$ = 宽度 $b$ = width	如果 $b/t \leq 20$ if $b/t \leq 20$ $\Delta = \pm b/150$ 如果 $b/t > 20$ if $b/t > 20$ $\Delta = \pm b_2/ (3000t)$ $t$ = 翼缘厚度 $t$ = flange thickness	$\Delta = \pm b/100$	$\Delta = \pm b/150$
3.3	用于无约束状态下构件的直	直线度偏差 $\Delta$	$\Delta = \pm L/1000$	$\Delta = \pm L/1000$	$\Delta = \pm L/1000$

	<p>线度</p> <p>Straightness for component to be used unrestrained</p> 	Deviation $\Delta$ from straightness			
<p>4. 焊接箱形截面翼缘</p> <p>4. Flanges of welded box sections</p>					
编号 No	标准 Criterion	参数 Parameter	基本公差允许公差 $\Delta$ Essential tolerances Permitted deviation $\Delta$	功能公差允许公差 $\Delta$ Functional tolerances Permitted deviation $\Delta$	
			一级和二级 Class 1 and 2	一级 Class 1	二级 Class 2
4.1	<p>截面尺寸</p> <p>Section dimension</p> 	<p>内部或外部尺寸偏差:</p> <p>Deviation in internal or external dimension:</p> <p><math>b \leq 300\text{mm}</math></p> <p><math>300 &lt; b \leq 900\text{mm}</math></p> <p><math>900 &lt; b \leq 1800\text{mm}</math></p> <p><math>b &gt; 1800\text{mm}</math></p> <p><math>b = b_1, b_2, b_3 \text{ or } b_4</math></p> <p><math>b = b_1, b_2, b_3 \text{ 或 } b_4</math></p>	<p><math>\Delta = - (b/100) + 3\text{mm}</math></p> <p><math>\Delta = \pm 3\text{mm}</math></p> <p><math>\Delta = \pm b/300</math></p> <p><math>\Delta = \pm 6\text{mm}</math></p>	<p><math>\Delta = \pm 3\text{mm}</math></p> <p><math>\Delta = \pm b/300</math></p> <p><math>\Delta = \pm 6\text{mm}</math></p>	<p><math>\Delta = \pm 2\text{mm}</math></p> <p><math>\Delta = \pm b/450</math></p> <p><math>\Delta = \pm 4\text{mm}</math></p>
4.2	<p>扭转</p> <p>Twist</p> 	<p>长度为L的构件总偏差<math>\Delta</math></p> <p>Overall deviation <math>\Delta</math> in a piece of length <math>L</math></p>	<p>无要求</p> <p>No requirement</p>	<p><math>\Delta = \pm L/700</math>, 但<math> \Delta  \geq 4\text{mm}</math> 且<math> \Delta  \leq 10\text{mm}</math></p>	<p><math>\Delta = \pm L/1000</math>, 但<math> \Delta  \geq 3\text{mm}</math> 且<math> \Delta  \leq 8\text{mm}</math></p>
4.3	<p>腹板或加劲肋之间的板面平面外缺陷, 一般情况</p> <p>Out-of-plane imperfection of plate panel between web or stiffener, general case</p>	<p>垂直于腹板平面的偏差<math>\Delta</math>:</p> <p>Deviation <math>\Delta</math> perpendicular to the plane of the plate:</p> <p>如果<math>a \leq 2b</math>, 则<math>L = a</math></p> <p>if <math>a \leq 2b</math>, <math>L = a</math></p>	<p><math>\Delta = \pm a/250</math></p> <p><math>\Delta = \pm b/125</math></p>	<p><math>\Delta = \pm a/250</math></p> <p><math>\Delta = \pm b/125</math></p>	<p><math>\Delta = \pm a/250</math></p> <p><math>\Delta = \pm b/125</math></p>

	 <p>1 straight edge gauge of length <math>L</math> 1 长度为<math>L</math>的直边规</p>	<p>如果<math>a &gt; 2b</math>, 则<math>L = 2b</math> if <math>a &gt; 2b</math>, <math>L = 2b</math></p>			
4.4	<p>腹板或加劲肋之间的板面平面外缺陷（横向压缩的特殊情况——除非另有规定，否则一般情况适用）</p> <p>Out-of-plane imperfections of plate panel between webs or stiffeners (special case with compression in the transverse direction – the general case applies unless this special case is specified)</p>  <p>1 长度为<math>L</math>的直边规 1 straight edge gauge of length <math>L</math></p>	<p>垂直于板平面的偏差<math>\Delta</math>: Deviation <math>\Delta</math> perpendicular to the plane of the plate:</p> <p>如果<math>a \leq 2b</math>, 则<math>L = a</math> if <math>a \leq 2b</math>, <math>L = a</math></p> <p>如果<math>a &gt; 2b</math>, 则<math>L = 2a</math> if <math>a &gt; 2b</math>, <math>L = 2a</math></p>	<p><math>\Delta = \pm b/250</math></p> <p><math>\Delta = \pm a/125</math></p>	<p><math>\Delta = \pm b/250</math></p> <p><math>\Delta = \pm a/125</math></p>	<p><math>\Delta = \pm b/250</math></p> <p><math>\Delta = \pm a/125</math></p>
4.5	<p>方正度 Squareness</p>  <p><math>(d_1 + d_2)_{act} = (d_1 + d_2)</math> 实际值 <math>(d_1 + d_2)_{act} = (d_1 + d_2)</math> actual <math>(d_1 + d_2)_{nom} = (d_1 + d_2)</math> 公称值 <math>(d_1 + d_2)_{nom} = (d_1 + d_2)</math> nominal</p>	<p>隔板位置处对角线尺寸差<math>\Delta</math>: Difference <math>\Delta</math> between diagonal dimensions at diaphragm positions: <math>\Delta =  (d_1 - d_2)_{act} - (d_1 - d_2)_{nom} </math> 因此 hence <math>\Delta =  d_1 - d_2 _{act}</math> 如果<math>d_1</math>和<math>d_2</math>名义相等 if <math>d_1</math> and <math>d_2</math> are nominally the same</p>	<p><math>\Delta = \frac{(d_1 - d_2)_{nom}}{400}</math> 但<math> \Delta  \geq 5\text{mm}</math></p>	<p><math>\Delta = \frac{(d_1 - d_2)_{nom}}{400}</math> 但<math> \Delta  \geq 6\text{mm}</math></p>	<p><math>\Delta = \frac{(d_1 - d_2)_{nom}}{600}</math> 但<math> \Delta  \geq 4\text{mm}</math></p>

5. 型材或箱形截面的腹板加劲肋和十字节点					
5. Web stiffeners and cruciform joints of profiles or box sections					
编号 No	标准 Criterion	参数 Parameter	基本公差允许公差Δ Essential tolerances Permitted deviation Δ	功能公差允许公差Δ Functional tolerances Permitted deviation Δ	
			一级和二级 Class 1 and 2	一级 Class 1	二级 Class 2
5.1	平面内直线度 In-plane straightness 	腹板平面内直线度偏差Δ Deviation Δ from straightness in the plane of the plate	$\Delta = \pm b/250$ 但 $ \Delta  \geq 4\text{mm}$	$\Delta = \pm b/250$ 但 $ \Delta  \geq 4\text{mm}$	$\Delta = \pm b/375$ 但 $ \Delta  \geq 2\text{mm}$
5.2	平面外直线度 Out-of-plane straightness 	腹板平面法向的直线度 偏差Δ Deviation Δ from straightness normal to the plane of the web	$\Delta = \pm b/500$ 但 $ \Delta  \geq 4\text{mm}$	$\Delta = \pm b/500$ 但 $ \Delta  \geq 4\text{mm}$	$\Delta = \pm b/750$ 但 $ \Delta  \geq 2\text{mm}$
5.3	腹板加劲肋的位置 Location of web stiffeners 	距预定位置的距离Δ Distance Δ from intended location	$\Delta = \pm 5\text{mm}$	$\Delta = \pm 5\text{mm}$	$\Delta = \pm 3\text{mm}$
5.4	支座处腹板加劲肋的位置 Location of web stiffeners at support 	距预定位置的距离Δ Distance Δ from intended location	$\Delta = \pm 3\text{mm}$	$\Delta = \pm 3\text{mm}$	$\Delta = \pm 2\text{mm}$

5.5	腹板加劲肋偏心 Eccentricity of web stiffeners 	一对加劲肋之间的偏心: Eccentricity between a pair of stiffeners: 注: 对于十字形节点, 错位偏心率限制在 $\pm t/2$ , 其中 $t$ 是附着在腹板两侧的板的厚度的较大值 NOTE: For cruciform joints, the misalignment eccentricity is limited to $\pm t/2$ where $t$ is the larger of the thicknesses of the two plates attached either side of the web.	$\Delta = \pm t_w/2$	$\Delta = \pm t_w/2$	$\Delta = \pm t_w/3$
5.6	支座处腹板加劲肋的偏心 Eccentricity of web stiffeners at supports 	一对加劲肋之间的偏心: Eccentricity between a pair of stiffeners: 注: 对于十字形节点, 错位偏心率限制在 $\pm t/2$ , 其中 $t$ 是附着在腹板两侧的板的厚度的较大值 NOTE: For cruciform joints, the misalignment eccentricity is limited to $\pm t/2$ where $t$ is the larger of the thicknesses of the two plates attached either side of the web.	$\Delta = \pm t_w/3$	$\Delta = \pm t_w/3$	$\Delta = \pm t_w/4$

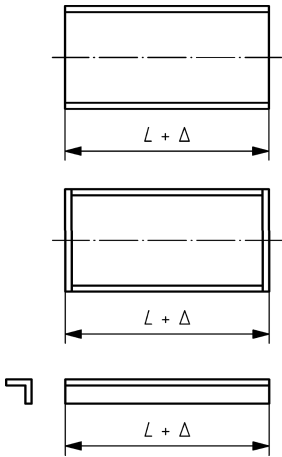
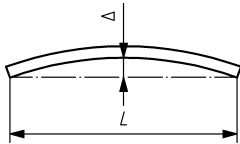
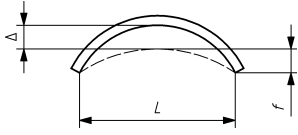
注: 例如 $\Delta = \pm d/100$ 但 $|\Delta| \geq 5\text{mm}$ 的注释表示 $|\Delta|$ 取 $d/100$ 和 $5\text{mm}$ 中的较大值。

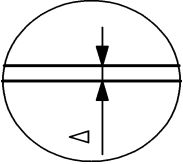
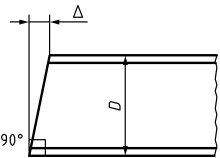
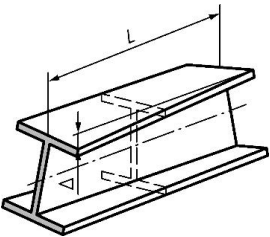
NOTE Notations such as  $\Delta = \pm d/100$  but  $|\Delta| \geq 5\text{ mm}$  mean that  $|\Delta|$  is the larger of  $d/100$  and  $5\text{ mm}$ .

## 6. 构件

### 6. Components

编号 No	标准 Criterion	参数 Parameter	基本公差允许公差Δ Essential tolerances Permitted deviation Δ	功能公差允许公差Δ Functional tolerances Permitted deviation Δ	
			一级和二级 Class 1 and 2	一级 Class 1	二级 Class 2
6.1	长度	在中心线 (或在角处) 测	无要求	$\Delta =$	$\Delta =$

	<p>Length</p> 	<p>量的切割长度: Cut length measured on the centreline (or on the corner for an angle): 一般情况 general case 端部将全面接触支承 ends ready for full contact bearing 注: 包括焊接端板 (如适用) 的测量长度 <math>L</math> NOTE: Length <math>L</math> measured including welded end plates as applicable.</p>	<p>No requirement 无要求 No requirement</p>	<p><math>\pm (L/5000 + 2\text{mm})</math> <math>\Delta = \pm 1\text{mm}</math></p>	<p><math>\pm (L/10000 + 2\text{mm})</math> <math>\Delta = \pm 1\text{mm}</math></p>
6.2	<p>可调整相邻构件进行充分补偿处的长度 Length, where sufficient compensation with adjacent component is possible</p>	<p>在中心线上测量的切割长度 Cut length measured on centreline</p>	<p>无要求 No requirement</p>	<p><math>\Delta = \pm 50\text{mm}</math></p>	
6.3	<p>直线度 Straightness</p> 	<p>与加工或压制型材矩形轴的距离 <math>\Delta</math> Distance <math>\Delta</math> from rectangular axes of a fabricated or press braked section</p>	<p>无要求 No requirement</p>	<p><math>\Delta = \pm L/750</math> 但 <math> \Delta  \geq 5\text{mm}</math></p>	<p><math>\Delta = \pm L/750</math> 但 <math> \Delta  \geq 3\text{mm}</math></p>
6.4	<p>平面图上的起拱度或预期曲率 Camber or intended curvature on plan</p> 	<p>中间长度处的偏移量 <math>f</math> Offset <math>f</math> at mid-length 垂直起拱度应在构件侧放时测量。 Vertical camber should be measured with the member on its side.</p>	<p>无要求 No requirement</p>	<p><math>\Delta = \pm L/500</math> 但 <math> \Delta  \geq 6\text{mm}</math></p>	<p><math>\Delta = \pm L/1000</math> 但 <math> \Delta  \geq 4\text{mm}</math></p>
6.5	<p>全接触支承表面处理 Surfaces finished for full contact bearing</p>	<p>直边与表面之间的间隙 <math>\Delta</math>。 Gap <math>\Delta</math> between straight</p>	<p>无要求 No requirement</p>	<p><math>\Delta = 0.5\text{mm}</math> 高出部分不得超过 <math>0.5\text{mm}</math></p>	<p><math>\Delta = 0.25\text{mm}</math> 高出部分不得超过 <math>0.25\text{mm}</math></p>

		edge and surface.  注：未规定表面粗糙度标准。 NOTE: No surface roughness criterion is specified.		high spots not to be proud (do not protrude) by more than 0,5 mm	high spots not to be proud (do not protrude) by more than 0,5 mm
6.6	端部方正度 Squareness of ends 	与纵轴的垂直度: Squareness to longitudinal axis: 端部设计为完全接触支承 ends intended for full contact bearing 端部不用于完全接触支承 ends not intended for full contact bearing	无要求 No requirement  无要求 No requirement	$\Delta = \pm D/1000$  $\Delta = \pm D/100$	$\Delta = \pm D/1000$ $\Delta = \pm D/300$ 但 $ \Delta  \leq 10\text{mm}$
6.7	扭转 Twist 	长度 $L$ 上的总偏差 $\Delta$ Overall deviation $\Delta$ in a piece of length $L$  注：关于箱形截面，见表4。 NOTE: For box sections, see Table 4.	无要求 No requirement	$\Delta = \pm L/700$ 但 $ \Delta  \geq 4\text{mm}$ 且 $ \Delta  \leq 20\text{mm}$	$\Delta = \pm L/1000$ 但 $ \Delta  \geq 3\text{mm}$ 且 $ \Delta  \leq 15\text{mm}$

注：例如 $\Delta = \pm d/100$ 但 $|\Delta| \geq 5\text{mm}$ 的注释表示 $|\Delta|$ 取 $d/100$ 和 $5\text{mm}$ 中的较大值。

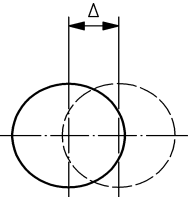
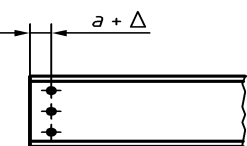
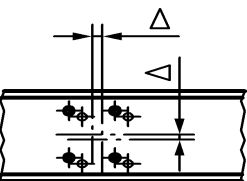
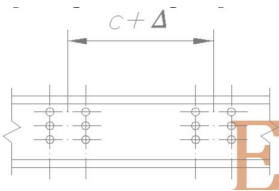
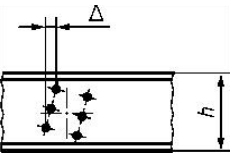
NOTE Notations such as  $\Delta = \pm d/100$  but  $|\Delta| \geq 5\text{ mm}$  mean that  $|\Delta|$  is the larger of  $d/100$  and  $5\text{ mm}$ .

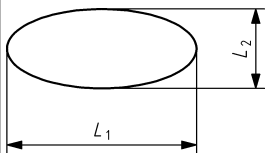
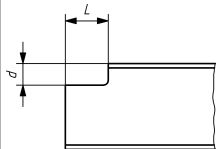
## 7. 紧固件孔、槽口和切边

### 7. Fastener holes, notches and cut edges

编号 No	标准 Criterion	参数 Parameter	基本公差允许公差 $\Delta$ Essential tolerances Permitted deviation $\Delta$	功能公差允许公差 $\Delta$ Functional tolerances Permitted deviation $\Delta$	
			一级和二级 Class 1 and 2	一级 Class 1	二级 Class 2
7.1	紧固件孔的位置 Position of holes for fasteners	一组孔中单个孔的中心线与其预期位置的偏差 $\Delta$ Deviation $\Delta$ of centreline	$\Delta = \pm 2\text{mm}$	$\Delta = \pm 2\text{mm}$	$\Delta = \pm 1\text{mm}$

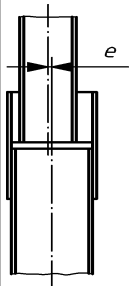
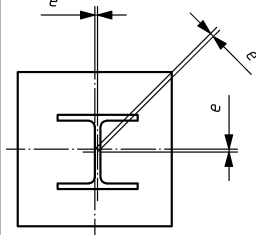


		of an individual hole from its intended position within a group of holes			
7.2	紧固件孔的位置 Position of holes for fasteners 	单个孔和切割端之间距离 $a$ 的偏差 $\Delta$ Deviation $\Delta$ in distance $a$ between an individual hole and a cut end	$\Delta = -0\text{mm}$ $\Delta = +3\text{mm}$	$\Delta = \pm 3\text{mm}$	$\Delta = \pm 2\text{mm}$
7.3	孔群位置 Position of hole group 	孔群与预期位置的偏差 $\Delta$ Deviation $\Delta$ of a hole group from intended position	$\Delta = \pm 2\text{mm}$	$\Delta = \pm 2\text{mm}$	$\Delta = \pm 1\text{mm}$
7.4	孔群间距 Spacing of hole groups 	孔群中心间距 $c$ 的偏差 $\Delta$ : Deviation $\Delta$ in spacing $c$ between centres of hole groups: 一般情况 general case 其中单件由两组紧固件连接 where a single piece is connected by two groups of fasteners	无要求 No requirement	$\Delta = \pm 5\text{mm}$ $\Delta = \pm 2\text{mm}$	$\Delta = \pm 2\text{mm}$ $\Delta = \pm 1\text{mm}$
7.5	孔群扭转 Twist of hole group 	扭转 $\Delta$ Twist $\Delta$ 如果 $h \leq 1000\text{mm}$ if $h \leq 1000\text{mm}$ 如果 $h > 1000\text{mm}$ if $h > 1000\text{mm}$	无要求 No requirement	$\Delta = \pm 2\text{mm}$ $\Delta = \pm 4\text{mm}$	$\Delta = \pm 1\text{mm}$ $\Delta = \pm 2\text{mm}$
7.6	孔洞的椭圆化 Ovalisation of holes	$\Delta = L_1 - L_2$	无要求 No requirement	$\Delta = \pm 1\text{mm}$	$\Delta = \pm 0.5\text{mm}$

					
7.7	槽口 Notches 	槽口深度和长度偏差Δ: Deviation Δ of notch depth and length:  深度 <i>d</i> depth <i>d</i>  长度 <i>L</i> length <i>L</i>	无要求 No requirement	Δ = 0mm +Δ ≤ 3mm Δ = 0mm +Δ ≤ 3mm	Δ = 0mm +Δ ≤ 2mm Δ = 0mm +Δ ≤ 2mm

## 8. 立柱拼接和底板

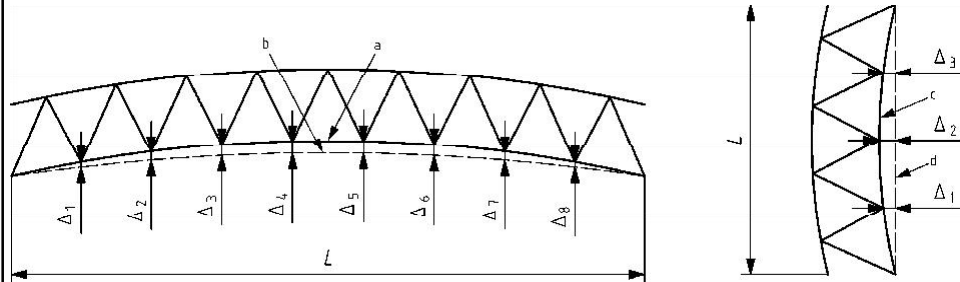
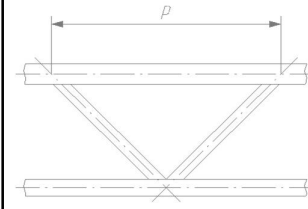
### 8. Column splices and baseplates

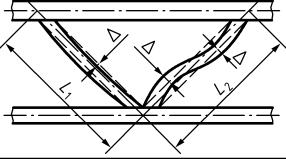
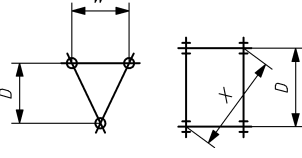
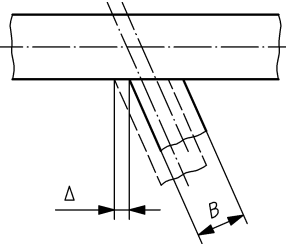
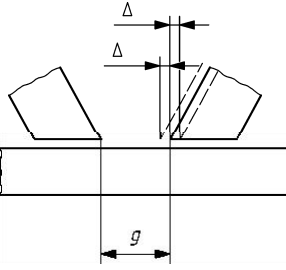
编号 No	标准 Criterion	参数 Parameter	基本公差允许公差Δ Essential tolerances Permitted deviation Δ	功能公差允许公差Δ Functional tolerances Permitted deviation Δ	
			一级和二级 Class 1 and 2	一级 Class 1	二级 Class 2
8.1	立柱拼接 Column splice 	任意轴的非预期偏心率 <i>e</i> Non-intended eccentricity <i>e</i> about either axis	无要求 No requirement	5mm	3mm
8.2	底板 Baseplate 	任何方向上的非预期偏心率 <i>e</i> Non-intended eccentricity <i>e</i> in any direction	无要求 No requirement	5mm	3mm

## 9. 格构件

### 9 Lattice components

编号	标准	参数	基本公差允许公差Δ	功能公差允许公差Δ
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No	Criterion	Parameter	Essential tolerances	Functional tolerances	
			Permitted deviation $\Delta$	Permitted deviation $\Delta$	
			一级和二级 Class 1 and 2	一级 Class 1	二级 Class 2
9.1	直线度和起拱度 Straightness and camber				
注：焊接后测量的偏差，构件侧面平放。 Note: Deviations measured after welding, with the component lying flat on its side.					
关键： Key: a 实际起拱弧度 a actual camber b 预期起拱弧度 b intended camber c 实际基准线 c actual line d 预期基准线 d intended line		每个面板点相对于直线 或预期起拱度或曲率的 偏差 Deviation at each panel point, relative to a straight line or to the intended camber or curvature	$\Delta = \pm L/500$ 但 $ \Delta  \geq 12\text{mm}$	$\Delta = \pm L/500$ 但 $ \Delta  \geq 12\text{mm}$	$\Delta = \pm L/500$ 但 $ \Delta  \geq 6\text{mm}$
9.2	面板尺寸 Panel dimensions	 面板点中心线交点之间的 单个距离 $p$ 的偏差 Deviation of individual distances $p$ between intersections of centrelines at panel points  面板点位置的累积偏差 $\Sigma p$ Cumulative deviation $\Sigma p$ of panel point position	无要求 No requirement  无要求 No requirement	$\Delta = \pm 5\text{mm}$  $\Delta = \pm 10\text{mm}$	$\Delta = \pm 3\text{mm}$  $\Delta = \pm 6\text{mm}$

9.3	支承构件的直线度 Straightness of bracing components 	支承长度 $L_i$ ( $L_1$ 或 $L_2$ ) 的 直线度偏差 Deviation of bracing lengths $L_i$ ( $L_1$ or $L_2$ ) from straightness	$\Delta = \pm L_i/750$ 但 $ \Delta  \geq 4\text{mm}$	$\Delta = \pm L_i/500$ 但 $ \Delta  \geq 6\text{mm}$	$\Delta = \pm L_i/1000$ 但 $ \Delta  \geq 3\text{mm}$
9.4	横截面尺寸 Cross-section dimensions 	如果距离 $D$ 、 $W$ 和 $X$ 的偏 差: Deviation of distances $D$ , $W$ , and $X$ if: $s \leq 300\text{mm}$ $300 < s < 1000\text{mm}$ $s \geq 1000\text{mm}$ 其中 $s = D$ 、 $W$ 或 $X$ (视情 况而定) where $s = D$ , $W$ , or $X$ as appropriate	无要求 No requirement	$\Delta = \pm 3\text{mm}$ $\Delta = \pm 5\text{mm}$ $\Delta = \pm 10\text{mm}$	$\Delta = \pm 2\text{mm}$ $\Delta = \pm 4\text{mm}$ $\Delta = \pm 6\text{mm}$
9.5	相贯节点 Intersecting joints 	偏心率 (相对于指定偏 心率) Eccentricity (relative to specified eccentricity)	无要求 No requirement	$\Delta =$ $\pm (B/20 + 5)$ mm	$\Delta =$ $\pm (B/40 + 3)$ mm
9.6	间隙节点 Gap joints 	支承构件之间的间隙 $g$ : Gap $g$ between bracing components: $g \geq (t_1 + t_2)$ 其中 $t_1$ 和 $t_2$ 是支架的壁厚 where $t_1$ and $t_2$ are the wall thicknesses of braces	无要求 No requirement	$\Delta = \pm 5\text{mm}$	$\Delta = \pm 3\text{mm}$
注: 诸如 $\Delta = \pm L/500$ 但 $ \Delta  \geq 12\text{mm}$ 的注释表示 $ \Delta $ 取 $L/500$ 和 $12\text{mm}$ 中的较大值。 NOTE: Notations such as $\Delta = \pm L/500$ but $ \Delta  \geq 12\text{ mm}$ mean that $ \Delta $ is the larger of $L/500$ and $12\text{ mm}$ . 诸如 $ \Delta  = t_1 + t_2$ , 但 $ \Delta  \leq 5\text{mm}$ 表示需要两个值中的较小值。 Notation such as $ \Delta  = t_1 + t_2$ but $ \Delta  \leq 5\text{ mm}$ means that the smaller of the two values is required.					

## E.4 加拿大允许公差

### C.4 Tolerances for Canada

表 E.3 的参考标准为 CSA W59:2018 和 CSA S16:2019。

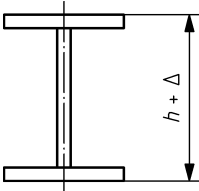
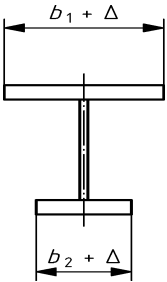
The reference standard for Table C.3 is CSA W59: 2018 and CSA S16: 2019.

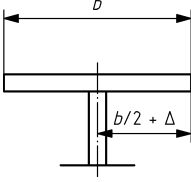
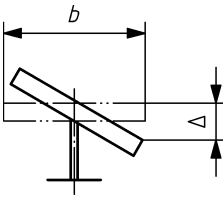
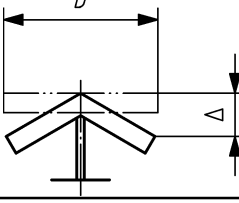
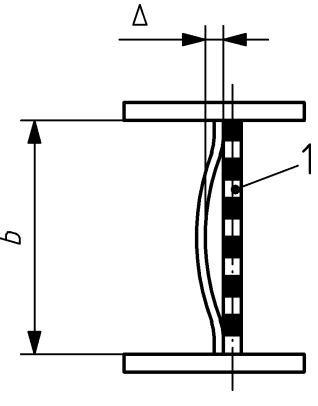
允许公差是指允许的偏差范围，包括相对于公称尺寸和几何形状的公差，例如切割长度、端部加工、斜角切割以及制造件的直线度偏差，如起拱度和弯曲。

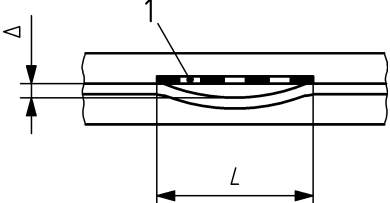
Fabrication tolerances are tolerances allowed from the nominal dimensions and geometry, such as cutting to length, finishing of ends, cutting of bevel angles, and out-of-straightness such as camber and sweep for fabricated members.

表 E.3：加拿大

Table C.3 – Canada

1.焊接型材			
1. Welded profiles			
编号 No	标准 Criterion	参数 Parameter	允许公差 Tolerance
1.1	高度 Depth 	公称高度 ( $h$ ) 上的偏差 ( $\Delta$ ) Deviation ( $\Delta$ ) from nominal depth ( $h$ ) $h \leq 900\text{mm}$ $900 < h \leq 2000\text{mm}$	$\Delta = +5\text{mm}$ (以上) $\Delta = -3\text{mm}$ (以下) $\Delta = +5\text{mm}$ (以上) $\Delta = -5\text{mm}$ (以下)
1.2	翼缘宽度 Flange width 	公称宽度 ( $b$ ) 上的偏差 ( $\Delta$ ) : Deviation ( $\Delta$ ) from nominal width ( $b$ ): $h \leq 900\text{mm}$ $900 < h \leq 2000\text{mm}$	$\Delta = +6\text{mm}$ (以上) $\Delta = -5\text{mm}$ (以下) $\Delta = +6\text{mm}$ (以上) $\Delta = -5\text{mm}$ (以下)
1.3	腹板偏心 Web eccentricity	腹板中心线与翼缘中心线之间的横向偏差 Lateral deviation between centreline of web and	最大 $\Delta = \pm 6\text{mm}$ 。 $\Delta = \pm 6 \text{ mm max.}$

		centreline of flange	
1.4	翼缘垂直度 Squareness of flanges 	—	$\Delta \leq b/100$ or 6mm $\Delta \leq b/100$ 或6mm, 以较大者为准 whichever is greater
1.5	翼缘平整度 Flatness of flanges 	—	$\Delta \leq b/100$ or 6mm $\Delta \leq b/100$ 或6mm, 以较大者为准 whichever is greater
1.6	支座垂直度 Squareness of bearings 	—	—
1.7	腹板曲率 Plate curvature  1 标距长度 1 gauge length	静态加载非管状结构 Statically loaded nontubular structures 腹板两侧的中间加劲肋: Intermediate stiffeners on both sides of web: $b/t < 150$ $b/t \geq 150$ 仅在腹板一侧设置中间加劲肋: Intermediate stiffeners on one side only of web: $b/t < 100$ $b/t \geq 100$ 无中间加劲肋: No intermediate stiffeners: $b/t \geq 100$	$\Delta \leq b/100$ $\Delta \leq b/80$ $\Delta \leq b/100$ $\Delta \leq b/67$ $\Delta \leq b/150$
		周期性加载的非管状结构 Cyclically loaded nontubular structures 腹板两侧的中间加劲肋: Intermediate stiffeners on both sides of web: 内部梁: Interior girders:	$\Delta \leq b/115$ $\Delta \leq b/92$

		$b/t < 150$ $b/t \geq 150$ 封檐板梁: Fascia girders: $b/t < 150$ $b/t \geq 150$ 仅在腹板一侧设置中间加劲肋: Intermediate stiffeners on one side only of web: 内部梁: Interior girders: $b/t < 100$ $b/t \geq 100$ 封箱梁 Fascia girders $b/t < 100$ $b/t \geq 100$ 无中间加劲肋 No intermediate stiffeners	$\Delta \leq b/130$ $\Delta \leq b/105$ $\Delta \leq b/100$ $\Delta \leq b/67$ $\Delta \leq b/120$ $\Delta \leq b/80$ $\Delta \leq b/150$
1.8	腹板扭曲 Web distortion  1 标距长度 1 gauge length	静载荷 Static loading 腹板两侧中间加劲肋 Intermediate stiffeners on both sides of web $t$ = 腹板厚度, mm $t$ = web thickness, mm $D$ = 腹板高度, mm $D$ = depth of web, mm $d$ = 最小面板尺寸, mm $d$ = least panel dimension, mm	$\Delta \leq 6\text{mm}$

		$t = 16, D < 2400, d = 600$ $D \geq 2400, d = 480$	
		$t = 8, D < 1200, d = 800$ $D \geq 1200, d = 640$ $t = 9, D < 1350, d = 800$ $D \geq 1350, d = 640$ $t = 10, D < 1500, d = 800$ $D \geq 1500, d = 640$ $t = 12, D < 1800, d = 800$ $D \geq 1800, d = 640$ $t = 14, D < 2100, d = 800$ $D \geq 2100, d = 640$ $t = 16, D < 2400, d = 800$ $D \geq 2400, d = 640$	$\Delta \leq 8\text{mm}$
		$t = 8, D < 1200, d = 1000$ $D \geq 1200, d = 800$ $t = 9, D < 1350, d = 1000$ $D \geq 1350, d = 800$ $t = 10, D < 1500, d = 1000$ $D \geq 1500, d = 800$ $t = 12, D < 1800, d = 1000$ $D \geq 1800, d = 800$ $t = 14, D < 2100, d = 1000$ $D \geq 2100, d = 800$ $t = 16, D < 2400, d = 1000$ $D \geq 2400, d = 800$	$\Delta \leq 10\text{mm}$
		$t = 8, D < 1200, d = 1200$ $D \geq 1200, d = 960$ $t = 9, D < 1350, d = 1200$ $D \geq 1350, d = 960$ $t = 10, D < 1500, d = 1200$ $D \geq 1500, d = 960$ $t = 12, D < 1800, d = 1200$ $D \geq 1800, d = 960$ $t = 14, D < 2100, d = 1200$ $D \geq 2100, d = 960$ $t = 16, D < 2400, d = 1200$ $D \geq 2400, d = 960$	$\Delta \leq 12\text{mm}$



	$t = 8, D < 1200, d = 1120$ $t = 9, D < 1350, d = 1120$ $t = 10, D < 1500, d = 1400$ $D \geq 1500, d = 1120$ $t = 12, D < 1800, d = 1400$ $D \geq 1800, d = 1120$ $t = 14, D < 2100, d = 1400$ $D \geq 2100, d = 1120$ $t = 16, D < 2400, d = 1400$ $D \geq 2400, d = 1120$	$\Delta \leq 14\text{mm}$
	$t = 8, D < 1200, d = 1280$ $t = 9, D < 1350, d = 1280$ $t = 10, D < 1500, d = 1280$ $t = 12, D < 1800, d = 1600$ $D \geq 1800, d = 1280$ $t = 14, D < 2100, d = 1600$ $D \geq 2100, d = 1280$ $t = 16, D < 2400, d = 1600$ $D \geq 2400, d = 1280$	$\Delta \leq 16\text{mm}$
	$t = 8, D < 1200, d = 1440$ $t = 9, D < 1350, d = 1440$ $t = 10, D < 1500, d = 1440$ $t = 12, D < 1800, d = 1800$ $D \geq 1800, d = 1440$ $t = 14, D < 2100, d = 1800$ $D \geq 2100, d = 1440$ $t = 16, D < 2400, d = 1800$ $D \geq 2400, d = 1440$	$\Delta \leq 18\text{mm}$
	$t = 8, D < 1200, d = 1600$ $t = 9, D < 1350, d = 1600$ $t = 10, D < 1500, d = 1600$ $t = 12, D < 1800, d = 1600$ $t = 14, D < 2100, d = 2000$ $D \geq 2100, d = 1600$ $t = 16, D < 2400, d = 2000$ $D \geq 2400, d = 1600$	$\Delta \leq 20\text{mm}$
	$t = 8, D < 1200, d = 1760$ $t = 9, D < 1350, d = 1760$	$\Delta \leq 22\text{mm}$

		$t = 10, D < 1500, d = 1760$ $t = 12, D < 1800, d = 1760$ $t = 14, D < 2100, d = 1760$ $t = 16, D < 2400, d = 2200$ $D \geq 2400, d = 1760$	
		$t = 8, D < 1200, d = 1920$ $t = 9, D < 1350, d = 1920$ $t = 10, D < 1500, d = 1920$ $t = 12, D < 1800, d = 1760$ $t = 14, D < 2100, d = 1920$ $t = 16, D < 2400, d = 2400$ $D \geq 2400, d = 1920$	$\Delta \leq 24\text{mm}$
		$t = 8, D < 1200, d = 2080$ $t = 9, D < 1350, d = 2080$ $t = 10, D < 1500, d = 2080$ $t = 12, D < 1800, d = 2080$ $t = 14, D < 2100, d = 2080$ $t = 16, D < 2400, d = 2080$	$\Delta \leq 26\text{mm}$
		静载荷 Static loading 腹板一侧的中间加劲肋 Intermediate stiffeners on one side of web $t =$ 腹板厚度, mm $t =$ web thickness, mm $D =$ 腹板高度, mm $D =$ depth of web, mm $d =$ 最小面板尺寸, mm $d =$ least panel dimension, mm	
		$t = 8, D < 800, d = 600$ $D \geq 800, d = 402$ $t = 9, D < 900, d = 600$ $D \geq 900, d = 402$ $t = 10, D < 1000, d = 600$ $D \geq 1000, d = 402$ $t = 12, D < 1200, d = 600$ $D \geq 1200, d = 402$ $t = 14, D < 1400, d = 600$ $D \geq 1400, d = 402$	$\Delta \leq 6\text{mm}$

		$t = 16, D < 1600, d = 600$ $D \geq 1600, d = 402$	
		$t = 8, D < 800, d = 800$ $D \geq 800, d = 536$ $t = 9, D < 900, d = 800$ $D \geq 900, d = 536$ $t = 10, D < 1000, d = 800$ $D \geq 1000, d = 536$ $t = 12, D < 1200, d = 800$ $D \geq 1200, d = 536$ $t = 14, D < 1400, d = 800$ $D \geq 1400, d = 536$ $t = 16, D < 1600, d = 800$ $D \geq 1600, d = 536$	$\Delta \leq 8\text{mm}$
		$t = 8, D < 800, d = 670$ $t = 9, D < 900, d = 670$ $t = 10, D < 1000, d = 1000$ $D \geq 1000, d = 670$ $t = 12, D < 1200, d = 1000$ $D \geq 1200, d = 670$ $t = 14, D < 1400, d = 1000$ $D \geq 1400, d = 670$ $t = 16, D < 1600, d = 1000$ $D \geq 1600, d = 670$	$\Delta \leq 10\text{mm}$
		$t = 8, D < 800, d = 804$ $t = 9, D < 900, d = 804$ $t = 10, D < 1000, d = 804$ $t = 12, D < 1200, d = 1200$ $D \geq 1200, d = 804$ $t = 14, D < 1400, d = 1200$ $D \geq 1400, d = 804$ $t = 16, D < 1600, d = 1200$ $D \geq 1600, d = 804$	$\Delta \leq 12\text{mm}$
		$t = 8, D < 800, d = 938$ $t = 9, D < 900, d = 938$ $t = 10, D < 1000, d = 938$ $t = 12, D < 1200, d = 938$ $t = 14, D < 1400, d = 1400$	$\Delta \leq 14\text{mm}$

	$D \geq 1400, d = 938$ $t = 16, D < 1600, d = 1400$ $D \geq 1600, d = 938$	
	$t = 8, D < 800, d = 1070$ $t = 9, D < 900, d = 1070$ $t = 10, D < 1000, d = 1070$ $t = 12, D < 1200, d = 1070$ $t = 14, D < 1400, d = 1070$ $t = 16, D < 1600, d = 1600$ $D \geq 1600, d = 1070$	$\Delta \leq 16\text{mm}$
	$t = 8, D < 800, d = 1210$ $t = 9, D < 900, d = 1210$ $t = 10, D < 1000, d = 1210$ $t = 12, D < 1200, d = 1210$ $t = 14, D < 1400, d = 1210$ $t = 16, D < 1600, d = 1210$	$\Delta \leq 18\text{mm}$
	$t = 8, D < 800, d = 1340$ $t = 9, D < 900, d = 1340$ $t = 10, D < 1000, d = 1340$ $t = 12, D < 1200, d = 1340$ $t = 14, D < 1400, d = 1340$ $t = 16, D < 1600, d = 1340$	$\Delta \leq 20\text{mm}$
	$t = 8, D < 800, d = 1470$ $t = 9, D < 900, d = 1470$ $t = 10, D < 1000, d = 1470$ $t = 12, D < 1200, d = 1470$ $t = 14, D < 1400, d = 1470$ $t = 16, D < 1600, d = 1470$	$\Delta \leq 22\text{mm}$
	$t = 8, D < 800, d = 1610$ $t = 9, D < 900, d = 1610$ $t = 10, D < 1000, d = 1610$ $t = 12, D < 1200, d = 1610$ $t = 14, D < 1400, d = 1610$ $t = 16, D < 1600, d = 1610$	$\Delta \leq 24\text{mm}$
	$t = 8, D < 800, d = 1740$ $t = 9, D < 900, d = 1740$ $t = 10, D < 1000, d = 1740$ $t = 12, D < 1200, d = 1740$	$\Delta \leq 26\text{mm}$

		$t = 14, D < 1400, d = 1740$ $t = 16, D < 1600, d = 1740$	
		循环加载 Cyclic loading 腹板两侧的中间加劲肋 Intermediate stiffeners on both sides of web 内部大梁 Interior girders $t =$ 腹板厚度, mm $t =$ web thickness, mm $D =$ 腹板高度, mm $D =$ depth of web, mm $d =$ 最小面板尺寸, mm $d =$ least panel dimension, mm	
		$t = 8, D < 1200, d = 690$ $D \geq 1200, d = 552$ $t = 9, D < 1350, d = 690$ $D \geq 1350, d = 552$ $t = 10, D < 1500, d = 690$ $D \geq 1500, d = 552$ $t = 12, D < 1800, d = 690$ $D \geq 1800, d = 552$ $t = 14, D < 2100, d = 690$ $D \geq 2100, d = 552$ $t = 16, D < 2400, d = 690$ $D \geq 2400, d = 552$	$\Delta \leq 6\text{mm}$
		$t = 8, D < 1200, d = 920$ $D \geq 1200, d = 736$ $t = 9, D < 1350, d = 920$ $D \geq 1350, d = 736$ $t = 10, D < 1500, d = 920$ $D \geq 1500, d = 736$ $t = 12, D < 1800, d = 920$ $D \geq 1800, d = 736$ $t = 14, D < 2100, d = 920$ $D \geq 2100, d = 736$ $t = 16, D < 2400, d = 920$ $D \geq 2400, d = 736$	$\Delta \leq 8\text{mm}$

	$t = 8, D < 1200, d = 1150$ $D \geq 1200, d = 920$ $t = 9, D < 1350, d = 1150$ $D \geq 1350, d = 920$ $t = 10, D < 1500, d = 1150$ $D \geq 1500, d = 920$ $t = 12, D < 1800, d = 1150$ $D \geq 1800, d = 920$ $t = 14, D < 2100, d = 1150$ $D \geq 2100, d = 920$ $t = 16, D < 2400, d = 1150$ $D \geq 2400, d = 920$	$\Delta \leq 10\text{mm}$
	$t = 8, D < 1200, d = 1100$ $t = 9, D < 1350, d = 1100$ $t = 10, D < 1500, d = 1380$ $D \geq 1500, d = 1100$ $t = 12, D < 1800, d = 1380$ $D \geq 1800, d = 1100$ $t = 14, D < 2100, d = 1380$ $D \geq 2100, d = 1100$ $t = 16, D < 2400, d = 1380$ $D \geq 2400, d = 1100$	$\Delta \leq 12\text{mm}$
	$t = 8, D < 1200, d = 1290$ $t = 9, D < 1350, d = 1290$ $t = 10, D < 1500, d = 1290$ $t = 12, D < 1800, d = 1610$ $D \geq 1800, d = 1290$ $t = 14, D < 2100, d = 1610$ $D \geq 2100, d = 1290$ $t = 16, D < 2400, d = 1610$ $D \geq 2400, d = 1290$	$\Delta \leq 14\text{mm}$
	$t = 8, D < 1200, d = 1470$ $t = 9, D < 1350, d = 1470$ $t = 10, D < 1500, d = 1470$ $t = 12, D < 1800, d = 1470$ $t = 14, D < 2100, d = 1840$ $D \geq 2100, d = 1470$ $t = 16, D < 2400, d = 1840$	$\Delta \leq 16\text{mm}$

		$D \geq 2400, d = 1470$	
		$t = 8, D < 1200, d = 1660$ $t = 9, D < 1350, d = 1660$ $t = 10, D < 1500, d = 1660$ $t = 12, D < 1800, d = 1660$ $t = 14, D < 2100, d = 2070$ $D \geq 2100, d = 1660$ $t = 16, D < 2400, d = 2070$ $D \geq 2400, d = 1660$	$\Delta \leq 18\text{mm}$
		$t = 8, D < 1200, d = 1840$ $t = 9, D < 1350, d = 1840$ $t = 10, D < 1500, d = 1840$ $t = 12, D < 1800, d = 1840$ $t = 14, D < 2100, d = 1840$ $t = 16, D < 2400, d = 2300$ $D \geq 2400, d = 1840$	$\Delta \leq 20\text{mm}$
		$t = 8, D < 1200, d = 2020$ $t = 9, D < 1350, d = 2020$ $t = 10, D < 1500, d = 2020$ $t = 12, D < 1800, d = 2020$ $t = 14, D < 2100, d = 2020$ $t = 16, D < 2400, d = 2020$	$\Delta \leq 22\text{mm}$
		$t = 8, D < 1200, d = 2210$ $t = 9, D < 1350, d = 2210$ $t = 10, D < 1500, d = 2210$ $t = 12, D < 1800, d = 2210$ $t = 14, D < 2100, d = 2210$ $t = 16, D < 2400, d = 2210$	$\Delta \leq 24\text{mm}$
		$t = 8, D < 1200, d = 2390$ $t = 9, D < 1350, d = 2390$ $t = 10, D < 1500, d = 2390$ $t = 12, D < 1800, d = 2390$ $t = 14, D < 2100, d = 2390$ $t = 16, D < 2400, d = 2390$	$\Delta \leq 26\text{mm}$
		循环加载 Cyclic loading 腹板两侧中间加劲肋 intermediate stiffeners on both sides of web	

		筋膜梁 Fascia girders $t$ = 腹板厚度, mm $t$ = web thickness, mm $D$ = 腹板高度, mm $D$ = depth of web, mm $d$ = 最小面板尺寸, mm $d$ = least panel dimension, mm	
		$t = 8, D < 1200, d = 780$ $D \geq 1200, d = 630$ $t = 9, D < 1350, d = 780$ $D \geq 1350, d = 630$ $t = 10, D < 1500, d = 780$ $D \geq 1500, d = 630$ $t = 12, D < 1800, d = 780$ $D \geq 1800, d = 630$ $t = 14, D < 2100, d = 780$ $D \geq 2100, d = 630$ $t = 16, D < 2400, d = 780$ $D \geq 2400, d = 630$	$\Delta \leq 6\text{mm}$
		$t = 8, D < 1200, d = 1040$ $D \geq 1200, d = 840$ $t = 9, D < 1350, d = 1040$ $D \geq 1350, d = 840$ $t = 10, D < 1500, d = 1040$ $D \geq 1500, d = 840$ $t = 12, D < 1800, d = 1040$ $D \geq 1800, d = 840$ $t = 14, D < 2100, d = 1040$ $D \geq 2100, d = 840$ $t = 16, D < 2400, d = 1040$ $D \geq 2400, d = 840$	$\Delta \leq 8\text{mm}$
		$t = 8, D < 1200, d = 1050$ $t = 9, D < 1350, d = 1300$ $t = 10, D < 1500, d = 1300$ $D \geq 1500, d = 1050$ $t = 12, D < 1800, d = 1300$ $D \geq 1800, d = 1050$	$\Delta \leq 10\text{mm}$



		$t = 14, D < 2100, d = 1300$ $D \geq 2100, d = 1050$ $t = 16, D < 2400, d = 1300$ $D \geq 2400, d = 1050$	
		$t = 8, D < 1200, d = 1260$ $t = 9, D < 1350, d = 1260$ $t = 10, D < 1500, d = 1260$ $t = 12, D < 1800, d = 1560$ $D \geq 1800, d = 1260$ $t = 14, D < 2100, d = 1560$ $D \geq 2100, d = 1260$ $t = 16, D < 2400, d = 1560$ $D \geq 2400, d = 1260$	$\Delta \leq 12\text{mm}$
		$t = 8, D < 1200, d = 1470$ $t = 9, D < 1350, d = 1470$ $t = 10, D < 1500, d = 1470$ $t = 12, D < 1800, d = 1470$ $t = 14, D < 2100, d = 1820$ $D \geq 2100, d = 1470$ $t = 16, D < 2400, d = 1820$ $D \geq 2400, d = 1470$	$\Delta \leq 14\text{mm}$
		$t = 8, D < 1200, d = 1680$ $t = 9, D < 1350, d = 1680$ $t = 10, D < 1500, d = 1680$ $t = 12, D < 1800, d = 1680$ $t = 14, D < 2100, d = 2080$ $D \geq 2100, d = 1680$ $t = 16, D < 2400, d = 2080$ $D \geq 2400, d = 1680$	$\Delta \leq 16\text{mm}$
		$t = 8, D < 1200, d = 1890$ $t = 9, D < 1350, d = 1890$ $t = 10, D < 1500, d = 1890$ $t = 12, D < 1800, d = 1890$ $t = 14, D < 2100, d = 1890$ $t = 16, D < 2400, d = 2340$ $D \geq 2400, d = 1890$	$\Delta \leq 18\text{mm}$
		$t = 8, D < 1200, d = 2100$ $t = 9, D < 1350, d = 2100$	$\Delta \leq 20\text{mm}$

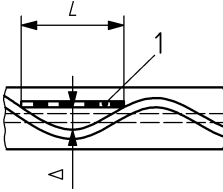
	$t = 10, D < 1500, d = 2100$ $t = 12, D < 1800, d = 2100$ $t = 14, D < 2100, d = 2100$ $t = 16, D < 2400, d = 2100$	
	$t = 8, D < 1200, d = 2310$ $t = 9, D < 1350, d = 2310$ $t = 10, D < 1500, d = 2310$ $t = 12, D < 1800, d = 2310$ $t = 14, D < 2100, d = 2310$ $t = 16, D < 2400, d = 2310$	$\Delta \leq 22\text{mm}$
	$t = 8, D < 1200, d = 2520$ $t = 9, D < 1350, d = 2520$ $t = 10, D < 1500, d = 2520$ $t = 12, D < 1800, d = 2520$ $t = 14, D < 2100, d = 2520$ $t = 16, D < 2400, d = 2520$	$\Delta \leq 24\text{mm}$
	$t = 8, D < 1200, d = 2730$ $t = 9, D < 1350, d = 2730$ $t = 10, D < 1500, d = 2730$ $t = 12, D < 1800, d = 2730$ $t = 14, D < 2100, d = 2730$ $t = 16, D < 2400, d = 2730$	$\Delta \leq 26\text{mm}$
	循环加载 Cyclic loading 腹板一侧的中间加劲肋 Intermediate stiffeners on one side of web 内部大梁 Interior girders $t$ = 腹板厚度, mm $t$ = web thickness, mm $D$ = 腹板高度, mm $D$ = depth of web, mm $d$ = 最小面板尺寸, mm $d$ = least panel dimension, mm	
	$t = 8, D < 800, d = 600$ $D \geq 800, d = 402$ $t = 9, D < 900, d = 600$ $D \geq 900, d = 402$	$\Delta \leq 6\text{mm}$

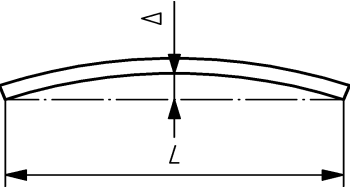
		$t = 10, D < 1000, d = 600$ $D \geq 1000, d = 402$ $t = 12, D < 1200, d = 600$ $D \geq 1200, d = 402$ $t = 14, D < 1400, d = 600$ $D \geq 1400, d = 402$ $t = 16, D < 1600, d = 600$ $D \geq 1600, d = 402$	
		$t = 8, D < 800, d = 800$ $D \geq 800, d = 536$ $t = 9, D < 900, d = 800$ $D \geq 900, d = 536$ $t = 10, D < 1000, d = 800$ $D \geq 1000, d = 536$ $t = 12, D < 1200, d = 800$ $D \geq 1200, d = 536$ $t = 14, D < 1400, d = 800$ $D \geq 1400, d = 536$ $t = 16, D < 1600, d = 800$ $D \geq 1600, d = 536$	$\Delta \leq 8\text{mm}$
		$t = 8, D < 800, d = 670$ $t = 9, D < 900, d = 670$ $t = 10, D < 1000, d = 1000$ $D \geq 1000, d = 670$ $t = 12, D < 1200, d = 1000$ $D \geq 1200, d = 670$ $t = 14, D < 1400, d = 1000$ $D \geq 1400, d = 670$ $t = 16, D < 1600, d = 1000$ $D \geq 1600, d = 670$	$\Delta \leq 10\text{mm}$
		$t = 8, D < 800, d = 804$ $t = 9, D < 900, d = 804$ $t = 10, D < 1000, d = 804$ $t = 12, D < 1200, d = 1200$ $D \geq 1200, d = 804$ $t = 14, D < 1400, d = 1200$ $D \geq 1400, d = 804$ $t = 16, D < 1600, d = 1200$	$\Delta \leq 12\text{mm}$

		$D \geq 1600, d = 804$	
		$t = 8, D < 800, d = 938$ $t = 9, D < 900, d = 938$ $t = 10, D < 1000, d = 938$ $t = 12, D < 1200, d = 938$ $t = 14, D < 1400, d = 1400$ $D \geq 1400, d = 938$ $t = 16, D < 1600, d = 1400$ $D \geq 1600, d = 938$	$\Delta \leq 14\text{mm}$
		$t = 8, D < 800, d = 1070$ $t = 9, D < 900, d = 1070$ $t = 10, D < 1000, d = 1070$ $t = 12, D < 1200, d = 1070$ $t = 14, D < 1400, d = 1070$ $t = 16, D < 1600, d = 1600$ $D \geq 1600, d = 1070$	$\Delta \leq 16\text{mm}$
		$t = 8, D < 800, d = 1210$ $t = 9, D < 900, d = 1210$ $t = 10, D < 1000, d = 1210$ $t = 12, D < 1200, d = 1210$ $t = 14, D < 1400, d = 1210$ $t = 16, D < 1600, d = 1210$	$\Delta \leq 18\text{mm}$
		$t = 8, D < 800, d = 1340$ $t = 9, D < 900, d = 1340$ $t = 10, D < 1000, d = 1340$ $t = 12, D < 1200, d = 1340$ $t = 14, D < 1400, d = 1340$ $t = 16, D < 1600, d = 1340$	$\Delta \leq 20\text{mm}$
		$t = 8, D < 800, d = 1470$ $t = 9, D < 900, d = 1470$ $t = 10, D < 1000, d = 1470$ $t = 12, D < 1200, d = 1470$ $t = 14, D < 1400, d = 1470$ $t = 16, D < 1600, d = 1470$	$\Delta \leq 22\text{mm}$
		$t = 8, D < 800, d = 1610$ $t = 9, D < 900, d = 1610$ $t = 10, D < 1000, d = 1610$ $t = 12, D < 1200, d = 1610$	$\Delta \leq 24\text{mm}$

		$t = 14, D < 1400, d = 1610$ $t = 16, D < 1600, d = 1610$	
		$t = 8, D < 800, d = 1740$ $t = 9, D < 900, d = 1740$ $t = 10, D < 1000, d = 1740$ $t = 12, D < 1200, d = 1740$ $t = 14, D < 1400, d = 1740$ $t = 16, D < 1600, d = 1740$	$\Delta \leq 26\text{mm}$
		循环加载 Cyclic loading 腹板一侧的中间加劲肋 Intermediate stiffeners on one side of web 筋膜梁 Fascia girders $t$ = 腹板厚度, mm $t$ = web thickness, mm $D$ = 腹板高度, mm $D$ = depth of web, mm $d$ = 最小面板尺寸, mm $d$ = least panel dimension, mm	
		$t = 8, D < 800, d = 720$ $D \geq 800, d = 480$ $t = 9, D < 900, d = 720$ $D \geq 900, d = 480$ $t = 10, D < 1000, d = 720$ $D \geq 1000, d = 480$ $t = 12, D < 1200, d = 720$ $D \geq 1200, d = 480$ $t = 14, D < 1400, d = 720$ $D \geq 1400, d = 480$ $t = 16, D < 1600, d = 720$ $D \geq 1600, d = 480$	$\Delta \leq 6\text{mm}$
		$t = 8, D < 800, d = 640$ $t = 9, D < 900, d = 640$ $t = 10, D < 1000, d = 960$ $D \geq 1000, d = 640$ $t = 12, D < 1200, d = 960$ $D \geq 1200, d = 640$	$\Delta \leq 8\text{mm}$

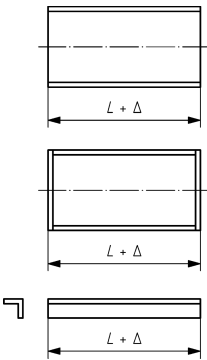
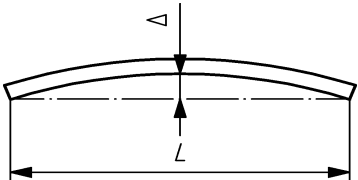
	$t = 14, D < 1400, d = 960$ $D \geq 1400, d = 640$ $t = 16, D < 1600, d = 960$ $D \geq 1600, d = 640$	
	$t = 8, D < 800, d = 800$ $t = 9, D < 900, d = 800$ $t = 10, D < 1000, d = 800$ $t = 12, D < 1200, d = 1200$ $D \geq 1200, d = 800$ $t = 14, D < 1400, d = 1200$ $D \geq 1400, d = 800$ $t = 16, D < 1600, d = 1200$ $D \geq 1600, d = 800$	$\Delta \leq 10\text{mm}$
	$t = 8, D < 800, d = 960$ $t = 9, D < 900, d = 960$ $t = 10, D < 1000, d = 960$ $t = 12, D < 1200, d = 960$ $t = 14, D < 1400, d = 960$ $t = 16, D < 1600, d = 1440$ $D \geq 1600, d = 960$	$\Delta \leq 12\text{mm}$
	$t = 8, D < 800, d = 1120$ $t = 9, D < 900, d = 1120$ $t = 10, D < 1000, d = 1120$ $t = 12, D < 1200, d = 1120$ $t = 14, D < 1400, d = 1120$ $t = 16, D < 1600, d = 1120$	$\Delta \leq 14\text{mm}$
	$t = 8, D < 800, d = 1280$ $t = 9, D < 900, d = 1280$ $t = 10, D < 1000, d = 1280$ $t = 12, D < 1200, d = 1280$ $t = 14, D < 1400, d = 1280$ $t = 16, D < 1600, d = 1280$	$\Delta \leq 16\text{mm}$
	$t = 8, D < 800, d = 1440$ $t = 9, D < 900, d = 1440$ $t = 10, D < 1000, d = 1440$ $t = 12, D < 1200, d = 1440$ $t = 14, D < 1400, d = 1440$ $t = 16, D < 1600, d = 1440$	$\Delta \leq 18\text{mm}$

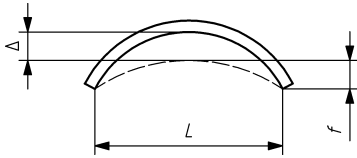
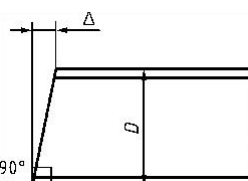
		$t = 8, D < 800, d = 1600$ $t = 9, D < 900, d = 1600$ $t = 10, D < 1000, d = 1600$ $t = 12, D < 1200, d = 1600$ $t = 14, D < 1400, d = 1600$ $t = 16, D < 1600, d = 1600$	$\Delta \leq 20\text{mm}$
		$t = 8, D < 800, d = 1760$ $t = 9, D < 900, d = 1760$ $t = 10, D < 1000, d = 1760$ $t = 12, D < 1200, d = 1760$ $t = 14, D < 1400, d = 1760$ $t = 16, D < 1600, d = 1760$	$\Delta \leq 22\text{mm}$
		$t = 8, D < 800, d = 1920$ $t = 9, D < 900, d = 1920$ $t = 10, D < 1000, d = 1920$ $t = 12, D < 1200, d = 1920$ $t = 14, D < 1400, d = 1920$ $t = 16, D < 1600, d = 1920$	$\Delta \leq 24\text{mm}$
		$t = 8, D < 800, d = 2080$ $t = 9, D < 900, d = 2080$ $t = 10, D < 1000, d = 2080$ $t = 12, D < 1200, d = 2080$ $t = 14, D < 1400, d = 2080$ $t = 16, D < 1600, d = 2080$	$\Delta \leq 26\text{mm}$
1.9	腹板起伏 Web undulation  1 标距长度 1 gauge length	见1.8腹板扭曲（如上） See 1.8 Web distortion (above)	
1.10	开口公称直径为 $D$ 的浇筑梁和蜂窝梁 [由板材或热轧型材制成] Castellated beams and cellular beams (fabricated either from plate or from hot-rolled sections) with openings of inscribed nominal diameter $D$		无要求 No requirement

			
<b>2. 压制型材</b> <b>2. Press-braked profiles</b>			
编号 No	标准 Criterion	参数 Parameter	允许误差 Tolerance
2.1	内部构件宽度 Internal element width		无要求 No requirement
2.2	外露构件宽度 Outstand element width		无要求 No requirement
2.3	用于无约束状态下构件的直线度 Straightness for component to be used unrestrained		无要求 No requirement
2.4	平整度 Flatness		无要求 No requirement
2.5	弯曲半径 Bend radius		无要求 No requirement
2.6	形状 Shape		无要求 No requirement
<b>3. 焊接型材翼缘</b> <b>3. Flanges of welded profiles</b>			
编号 No	标准 Criterion	参数 Parameter	允许误差 Tolerance
3.1	I型截面翼缘变形 Flange distortion of I section		无要求 No requirement
3.2	I型截面翼缘起伏 Flange undulation of I section		无要求 No requirement
3.3	用于无约束状态下构件的直线度 Straightness for component to be used unrestrained 	桁架中柱和受压构件的直线度： Straightness of columns and compression members in trusses: 长度14m及以下 Length of 14 m and under 长度超过14m Length over 14 m 梁和梁的直线度（未规定拱度）。 Beam and girder straightness (No camber	无要求 No requirement $\Delta \leq (L/1000)$ , 但不超过10mm but not over 10 mm $\Delta \leq 10 + (L-14000) / 1000$ $\Delta \leq L/1000$



		specified).	
<b>4. 焊接箱形截面翼缘</b> <b>4. Flanges of welded box sections</b>			
编号 No	标准 Criterion	参数 Parameter	允许误差 Tolerance
4.1	截面尺寸 Section dimension		无要求 No requirement
4.2	扭转 Twist		无要求 No requirement
4.3	腹板或加劲肋之间的板面平面外缺陷， 一般情况 Out-of-plane imperfection of plate panel between web or stiffener, general case		无要求 No requirement
4.4	腹板或加劲肋之间的板面的平面外缺陷（横向受压的特殊情况——除非另有规定该特殊情况，否则采用一般情况） Out-of-plane imperfections of plate panel between webs or stiffeners (special case with compression in the transverse direction – the general case applies unless this special case is specified)		无要求 No requirement
4.5	方正度 Squareness		无要求 No requirement
<b>5. 型材或箱形截面的腹板加劲肋和十字形节点</b> <b>5. Web stiffeners and cruciform joints of profiles or box sections</b>			
编号 No	标准 Criterion	参数 Parameter	允许误差 Tolerance
5.1	平面内直线度 In-plane straightness		无要求 No requirement
5.2	平面外直线度 Out-of-plane straightness		无要求 No requirement
5.3	腹板加劲肋的位置 Location of web stiffeners		无要求 No requirement

5.4	支座处腹板加劲肋的位置 Location of web stiffeners at support		无要求 No requirement
5.5	腹板加劲肋偏心 Eccentricity of web stiffeners		无要求 No requirement
5.6	支座处腹板加劲肋的偏心 Eccentricity of web stiffeners at supports		无要求 No requirement
<b>6.构件</b> <b>6. Components</b>			
编号 No	标准 Criterion	参数 Parameter	允许误差 Tolerance
6.1	长度 Length 	两端都处理过以便接触承载的构件长度 Length of members with both ends finished for contact bearing.  端部未处理以便接触承载且要与结构中其他钢构件连接的构件: Members without ends finished for contact bearing that are to be framed to other steel parts of the structure: $L \leq 10\text{mm}$ $L > 10\text{mm}$	$\pm 1\text{mm}$  $\pm 2\text{mm}$ $\pm 4\text{mm}$
6.2	可调整相邻构件进行充分补偿处的长度 Length, where sufficient compensation with adjacent component is possible		无要求 No requirement
6.3	直线度 Straightness 	未规定起拱度或曲度的焊接梁或大梁 Welded beams or girders without specified camber or sweep  桁架中的焊接柱和受压构件 Welded columns and compression members in trusses $L \leq 14000\text{mm}$ $L > 14000\text{mm}$	$\Delta \leq L/1000, \text{ mm}$  $\Delta \leq L/1000 \leq 10\text{mm}$ $\Delta \leq 10 + (L-4000)/1000, \text{mm}$
6.4	平面图上的起拱度或预期曲率 Camber or intended curvature on plan	具有规定起拱度的梁和主梁 Beams and girders with specified camber  梁和主梁的起拱度 Beam and girder camber	$\Delta \leq 6 + L/4000, \text{ mm}$

	 <p>（顶部翼缘嵌入混凝土中，没有设计混凝土拱腋） (top flange is embedded in concrete without a designed concrete haunch) 跨中 At midspan <math>L &lt; 30\text{m}</math> <math>L \geq 30\text{m}</math> 在内部支座处 At interior supports 在中间点 At intermediate points, where <math>a =</math> 从检查点到最近支架的距离（单位：m） <math>a =</math> distance in metres from inspection point to nearest support <math>S =</math> 跨度长度（m） <math>S =</math> span length in metres <math>b = 10\text{mm}</math> 对于跨度 <math>&lt; 30\text{m}</math> <math>b = 10\text{ mm}</math> for spans <math>&lt; 30\text{ m}</math> <math>b = 20\text{mm}</math> 对于跨度 <math>\geq 30\text{m}</math> <math>b = 20\text{ mm}</math> for spans <math>\geq 30\text{ m}</math></p>	$\Delta = 0, +10\text{mm}$ $\Delta = 0, +40\text{mm}$ $\Delta = \pm 3\text{mm}$ $\Delta = \pm[4(a)b(1-a/S)]/S$	
6.5	全接触支承表面处理 Surfaces finished for full contact bearing		无要求 No requirement
6.6	端部方正度 Squareness of ends 		$\Delta = 0.016D$
6.7	扭转 Twist		无要求 No requirement
7. 紧固件孔、槽口和切边 7. Fastener holes, notches and cut edges			
编号 No	标准 Criterion	参数 Parameter	允许误差 Tolerance
7.1	紧固件孔的位置 Position of holes for fasteners		无要求 No requirement
7.2	紧固件孔的位置		无要求

	Position of holes for fasteners		No requirement
7.3	孔群位置 Position of hole group		无要求 No requirement
7.4	孔群间距 Spacing of hole groups		无要求 No requirement
7.5	孔群扭转 Twist of hole group		无要求 No requirement
7.6	孔洞的椭圆化 Ovalisation of holes		无要求 No requirement
7.7	槽口 Notches		无要求 No requirement
<b>8. 立柱拼接和底板</b> <b>8. Column splices and baseplates</b>			
<b>编号</b> <b>No</b>	<b>标准</b> <b>Criterion</b>	<b>参数</b> <b>Parameter</b>	<b>允许误差</b> <b>Tolerance</b>
8.1	立柱拼接 Column splice		无要求 No requirement
8.2	底板 Baseplate		无要求 No requirement
<b>9. 格构件</b> <b>9. Lattice components</b>			
<b>编号</b> <b>No</b>	<b>标准</b> <b>Criterion</b>	<b>参数</b> <b>Parameter</b>	<b>允许误差</b> <b>Tolerance</b>
9.1	直线度和起拱度 Straightness and camber		无要求 No requirement
9.2	面板尺寸 Panel dimensions		无要求 No requirement
9.3	支承构件的直线度 Straightness of bracing components		无要求 No requirement
9.4	横截面尺寸 Cross-section dimensions		无要求 No requirement
9.5	相贯节点 Intersecting joints		无要求 No requirement
9.6	间隙节点 Gap joints		无要求 No requirement

## E.5 中国允许公差

### C.5 Tolerances for China

表 E.4 的参考标准为 GB 50205:2020。

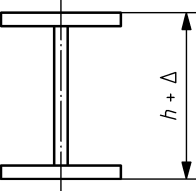
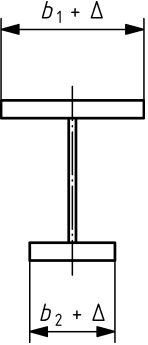
The reference standard for Table C.4 is GB 50205: 2020.

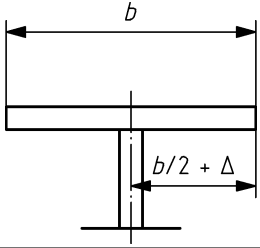
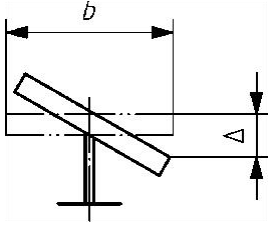
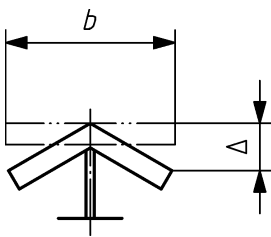
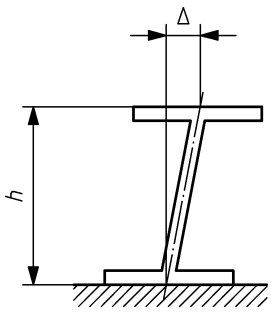
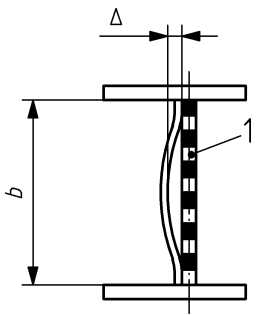
注：GB 50205-2020 是钢结构施工质量验收标准。

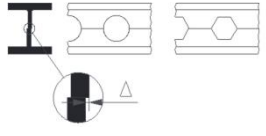
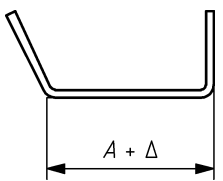
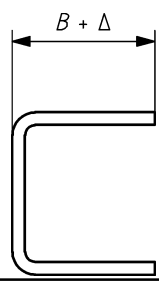
NOTE GB 50205-2020 is a standard for acceptance of construction quality of steel structures.

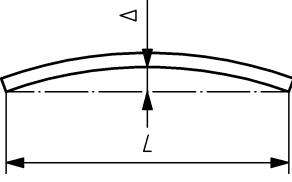
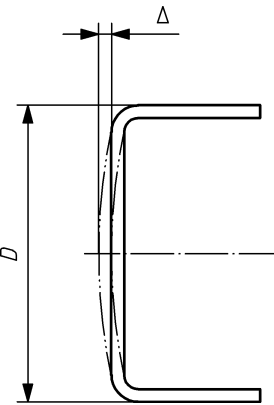
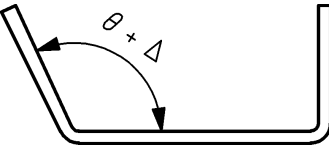
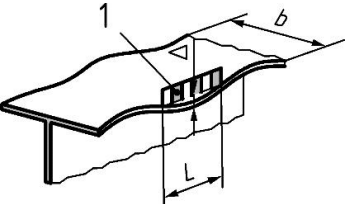
表 E.4——中国

Table C.4 – China

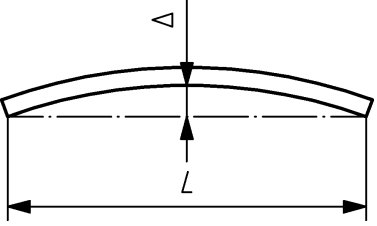
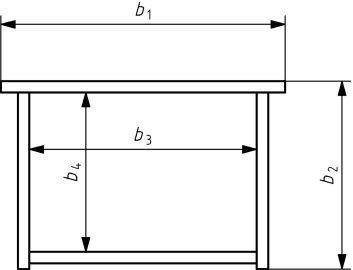
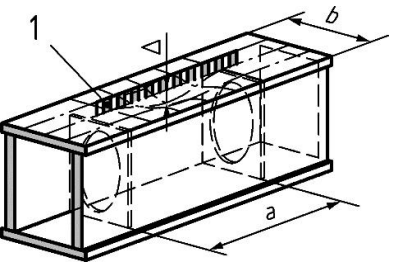
1. 焊接型材			
1. Welded profiles			
编号 No	标准 Criterion	参数 Parameter	允许公差 Tolerance
1.1	高度 Depth 	总高度 $h$ : Overall depth $h$ : $H < 500\text{mm}$ $500 \leq h \leq 1000\text{mm}$ $H > 1000\text{mm}$	$\Delta = \pm 2\text{mm}$ $\Delta = \pm 3\text{mm}$ $\Delta = \pm 4\text{mm}$
1.2	翼缘宽度 Flange width 	宽度 $b = b_1$ 或 $b_2$ Width $b = b_1$ 或 $b_2$	$\Delta = \pm 3\text{mm}$
1.3	腹板偏心 Web eccentricity	腹板位置: Position of web: 一般情况 General case 与结构支承接触的翼缘部分 Flange parts in contact with	$\Delta_{\text{max}} = 2\text{mm}$ $\Delta_{\text{max}} = 2\text{mm}$

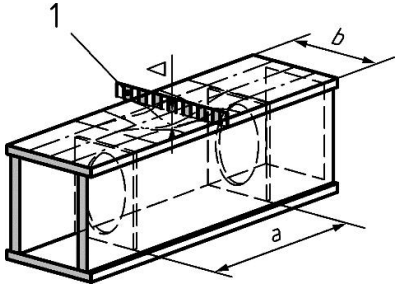
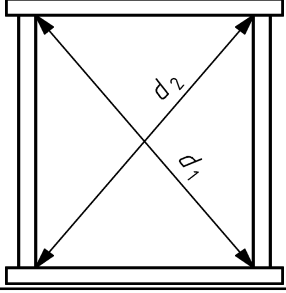
		structural bearings	
1.4	<p>翼缘垂直度 Squareness of flanges</p> 	<p>腹板位置: Position of web:</p> <p>一般情况 General case</p> <p>与结构支座接触的翼缘部分 Flange parts in contact with structural bearings</p>	$\Delta = b/100$ $\Delta_{\max} = 3\text{mm}$ $\Delta = b/100$ $\Delta_{\max} = 3\text{mm}$
1.5	<p>翼缘平整度 Flatness of flanges</p> 	<p>翼缘不平整: Out of flatness:</p> <p>一般情况 General case</p> <p>与结构支座接触的翼缘部分 Flange parts in contact with structural bearings</p>	$\Delta = b/100$ $\Delta_{\max} = 3\text{mm}$ $\Delta = b/100$ $\Delta_{\max} = 3\text{mm}$
1.6	<p>支座垂直度 Squareness of bearings</p> 	<p>宽度 <math>b</math> Width <math>b</math></p>	$\Delta = b/10$ $\Delta_{\max} = 3\text{mm}$
1.7	<p>腹板曲率 Plate curvature</p> 	<p>腹板高度 <math>b</math> 上的偏差 <math>\Delta</math> Derivation <math>\Delta</math> over plate height <math>b</math></p> <p>腹板厚度 <math>t</math>: thickness of web <math>t</math>:</p> <p><math>t \leq 6\text{mm}</math>  <math>6 &lt; t &lt; 14\text{mm}</math>  <math>t \geq 14\text{mm}</math></p>	$\Delta_{\max} = 4\text{mm}$ $\Delta_{\max} = 3\text{mm}$ $\Delta_{\max} = 2\text{mm}$

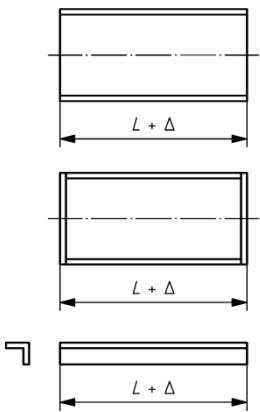
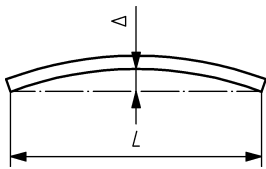
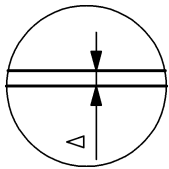
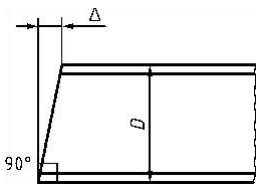
	1 标距长度 1 gauge length		
1.8	腹板扭曲 Web distortion	—	无要求 No requirement
1.9	腹板起伏 Web undulation	—	无要求 No requirement
1.10	开口公称直径为 $D$ 的浇筑梁和蜂窝梁[由板材或热轧型材制成] Castellated beams and cellular beams [fabricated either from plate or from hot rolled sections] with openings of inscribed nominal diameter $D$ 	厚度 $t$ 的组成部分 Component of thickness $t$	$\Delta = t/10$ $\Delta_{\max} = 3\text{mm}$
<b>2. 压制型材</b> <b>2. Press-braked profiles</b>			
编号 No	标准 Criterion	参数 Parameter	允许公差 Tolerance
2.1	内部构件宽度 Internal element width 		$\Delta = \pm 2\text{mm}$
2.2	外露构件宽度 Outstanding element width 		$\Delta = \pm 2\text{mm}$
2.3	用于无约束状态下构件的直线度 Straightness for component to be used unrestrained	每3000mm范围内的允许公差 $\Delta$ Each 3000 mm in scope $\Delta$	$\Delta = 6\text{mm}$

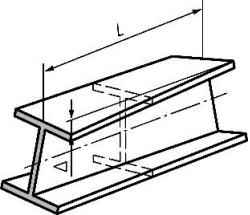
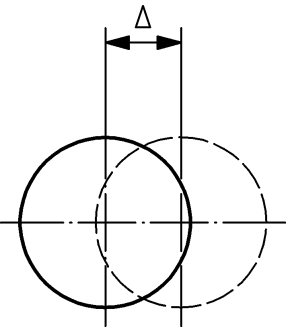
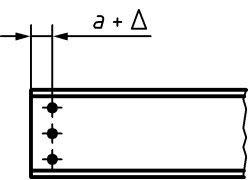
			
2.4	平整度 Flatness 		$\Delta = 1.5\text{mm}$
2.5	弯曲半径 Bend radius		无要求 No requirement
2.6	形状 Shape 		$\Delta_{\text{max}} = 2.0^\circ$
<b>3. 焊接型材翼缘</b> <b>3. Flanges of welded profiles</b>			
编号 No	标准 Criterion	参数 Parameter	允许公差 Tolerance
3.1	I型截面翼缘变形 Flange distortion of I section		无要求 No requirement
3.2	I型截面翼缘起伏 Flange undulation of I section  1 标距长度 1 gauge length		$\Delta = L/250$ $\Delta_{\text{max}} = 5\text{mm}$
3.3	待使用构件的直线度不受限制	直线度偏差 $\Delta$	$\Delta = L/1000$

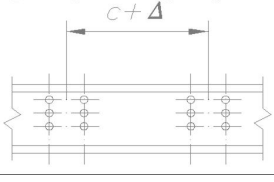
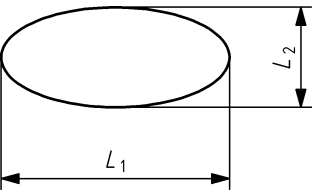
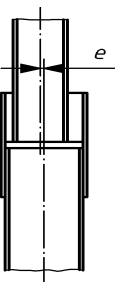
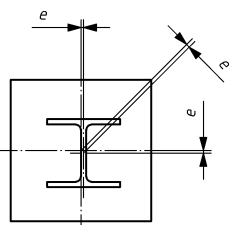


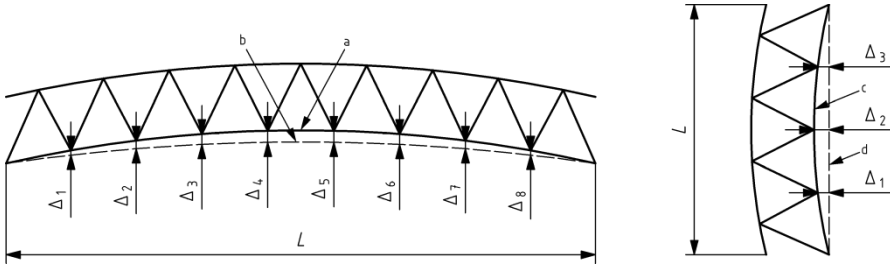
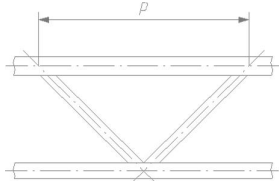
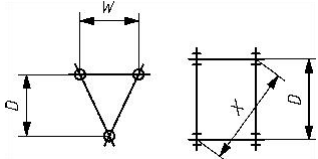
	Straightness for component to be used unrestrained 	Deviation $\Delta$ from straightness	$\Delta_{\max} = 10\text{mm}$
4. 焊接箱形截面翼缘 4. Flanges of welded box sections			
编号 No	标准 Criterion	参数 Parameter	允许公差 Tolerance
4.1	截面尺寸 Section dimension 	内部或外部尺寸偏差 Deviation in internal or external dimension $b = b_1, b_2, b_3 \text{ or } b_4$ $b = b_1, b_2, b_3 \text{ 或 } b_4$	$\Delta = \pm 2\text{mm}$
4.2	扭转 Twist		无要求 No requirement
4.3	腹板或加劲肋之间的板面平面外缺陷，一般情况 Out-of-plane imperfection of plate panel between web or stiffener, general case  1 标距长度 1 gauge length	垂直于板平面的偏差 $\Delta$ Deviation $\Delta$ perpendicular to the plane of the plate	$\Delta = a/250$ $\Delta_{\max} = 8\text{mm}$
4.4	腹板或加劲肋之间的板面的平面外缺陷（横向受压的特殊情况——除非另有规定该特殊情况，否则采用一般情况） Out-of-plane imperfections of plate panel between webs or stiffeners (special case with compression in the transverse direction – the general case applies unless this special case is specified)	垂直于板平面的偏差 $\Delta$ Deviation $\Delta$ perpendicular to the plane of the plate	$\Delta = a/250$ $\Delta_{\max} = 8\text{mm}$

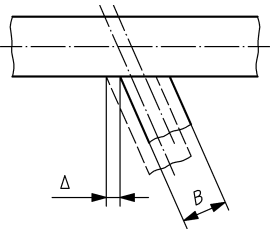
	 <p>1 标距长度 1 gauge length</p>		
4.5	方正度 Squareness 	隔板位置处对角线尺寸差 $\Delta$ Difference $\Delta$ between diagonal dimensions at diaphragm positions	$\Delta_{\max} = 3 \text{ mm}$
5. 型材或箱形截面的腹板加劲肋和十字形节点 5. Web stiffeners and cruciform joints of profiles or box sections			
编号 No	标准 Criterion	参数 Parameter	允许公差 Tolerance
5.1	平面内直线度 In-plane straightness		无要求 No requirement
5.2	平面外直线度 Out-of-plane straightness		无要求 No requirement
5.3	腹板加劲肋的位置 Location of web stiffeners		无要求 No requirement
5.4	支座处腹板加劲肋的位置 Location of web stiffeners at support		无要求 No requirement
5.5	腹板加劲肋偏心 Eccentricity of web stiffeners		无要求 No requirement
5.6	支座处腹板加劲肋的偏心 Eccentricity of web stiffeners at supports		无要求 No requirement
6. 构件 6. Components			
编号 No	标准 Criterion	参数 Parameter	允许公差 Tolerance
6.1	长度		$\Delta = \pm 3 \text{ mm}$

	<p>Length</p> 		
6.2	<p>可调整相邻构件进行充分补偿处的长度 Length, where sufficient compensation with adjacent component is possible</p>		<p>无要求 No requirement</p>
6.3	<p>直线度 Straightness</p> 		<p><math>\Delta = L/1000</math> <math>\Delta_{\max} = 10\text{mm}</math></p>
6.4	<p>平面图上的起拱度或预期曲率 Camber or intended curvature on plan</p>		<p>无要求 No requirement</p>
6.5	<p>全接触支承表面处理 Surfaces finished for full contact bearing</p> 		<p><math>\Delta = 0.3\text{mm}</math></p>
6.6	<p>端部方正度 Squareness of ends</p> 	<p>长度 <math>L</math> Length <math>L</math></p>	<p><math>\Delta = L/1500</math> <math>\Delta_{\max} = 2\text{mm}</math></p>
6.7	<p>扭转 Twist</p>	<p>总高度 <math>h</math> Overall depth <math>h</math></p>	<p><math>\Delta = h/250</math> <math>\Delta_{\max} = 5\text{mm}</math></p>

			
<b>7. 紧固件孔、槽口和切边</b> <b>7. Fastener holes, notches and cut edges</b>			
编号 No	标准 Criterion	参数 Parameter	允许公差 Tolerance
7.1	紧固件孔的位置 Position of holes for fasteners 	一组孔中任意两个孔的偏差Δ: Deviation Δ of any two holes within a group of holes: $\leq 500\text{mm}$ 501-1200mm 1201-3000mm > 3000mm  相邻两组端偏差Δ: Deviation Δ of end holes of two adjacent groups: $\leq 500\text{mm}$ 501-1200mm 1201-3000mm > 3000mm	$\Delta = \pm 1\text{mm}$ $\Delta = \pm 1.5\text{mm}$ 无要求 No requirement 无要求 No requirement  $\Delta = \pm 1.5\text{mm}$ $\Delta = \pm 2\text{mm}$ $\Delta = \pm 2.5\text{mm}$ $\Delta = \pm 3\text{mm}$
7.2	紧固件孔的位置 Position of holes for fasteners 		$\Delta = \pm 1\text{mm}$
7.3	孔群位置 Position of hole group		无要求 No requirement
7.4	孔群间距 Spacing of hole groups		$\Delta = \pm 2\text{mm}$

			
7.5	孔群扭转 Twist of hole group		无要求 No requirement
7.6	孔洞的椭圆化 Ovalisation of holes 		$\Delta_{\max} = 2\text{mm}$
7.7	槽口 Notches		无要求 No requirement
8. 立柱拼接和底板 8. Column splices and baseplates			
编号 No	标准 Criterion	参数 Parameter	允许公差 Tolerance
8.1	立柱拼接 Column splice 		$\Delta_{\max} = 1\text{mm}$
8.2	底板 Baseplate 		$\Delta_{\max} = 5\text{mm}$
9. 格构件 9. Lattice components			
编号 No	标准 Criterion	参数 Parameter	允许公差 Tolerance

9.1	直线度和起拱度 Straightness and camber  <p>注意焊接后测量的偏差，构件侧面平放。</p> <p>Note Deviations measured after welding, with the component lying flat on its side.</p>		
	符号: Key: a 实际起拱度 a actual camber b 预期起拱度 b intended camber c 实际基准线 c actual line d 预期基准线 d intended line	设计中不需要拱形 Arching is not required in the design  设计中需要起拱 Arching is required in design	$\Delta_{\max} = -5\text{mm}$ $\Delta_{\max} = 10\text{mm}$  $ \Delta _{\max} = L/5000$
9.2	面板尺寸 Panel dimensions 	面板点中心线交点之间的单个距离p的偏差: Deviation of individual distances p between intersections of centrelines at panel points: $p \leq 5000\text{mm}$ $p > 5000\text{mm}$	$ \Delta _{\max} = 2\text{mm}$ $ \Delta _{\max} = 3\text{mm}$
9.3	支承构件的直线度 Straightness of bracing components		—
9.4	横截面尺寸 Cross-section dimensions 	距离偏差D、W: Deviation of distances D, W: $H \leq 5000\text{mm}$ $H > 5000\text{mm}$ $B \leq 5000\text{mm}$ $B > 5000\text{mm}$	$ \Delta _{\max} = 2\text{mm}$ $ \Delta _{\max} = 3\text{mm}$ $ \Delta _{\max} = 2\text{mm}$ $ \Delta _{\max} = 3\text{mm}$
9.5	相贯节点 Intersecting joints	$B \leq 200\text{mm}$ $B > 200\text{mm}$	$\Delta_{\max} = 2\text{mm}$ $\Delta_{\max} = 2\text{mm}$

			
9.6	间隙节点 Gap joints		无要求 No requirement

## E.6 日本允许公差

### C.6 Tolerances for Japan

表 E.5 的参考标准为 JASS6:2018。

The reference standard for Table C.5 is JASS6: 2018.

a) 本款所示的公差分为极限公差和控制公差。

a) The tolerances shown in this subclause are classified into limit tolerances and control tolerances.

b) 极限公差是验收标准的最大或最小值，通常不得超过。

b) The limit tolerance is a maximum or minimum value for the acceptance criteria and shall not be exceeded, as a rule.

c) 控制公差是一个目标值，被定义为制造或安装的标准，以便 95%或更多的产品可以被接受，在尺寸精度的接收检查中，一个可接受的值来判断每个产品，以判断检验批是被接受还是被拒绝。

c) The control tolerance is a target value defined as a criterion for fabrication or erection so that 95% or more products may be accepted and in the receiving inspection of dimensional accuracy, an accepted value to judge each product with the purpose of judging whether the inspection lot will be accepted or rejected.

d) 当在接收检验中超过尺寸精度的极限公差时，通常应拒收产品并重新制造。但是，当无法重新制造时，应进行相当于重新制造的补救工作，并重新检查产品。

d) When the limit tolerance of dimensional accuracy is exceeded in the receiving inspection, the product shall be rejected and re-fabricated, as a rule. However, when

re-fabrication is impossible, remedial works equivalent to re-fabrication shall be made and the product shall be re-inspected.

e) 当超过控制公差但在极限公差范围内时，不需要修理或报废产品。在使用控制公差作为验收标准的抽样检查中，当被检查的批次被拒收时，应检查同一批次的所有剩余产品。

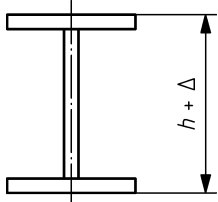
e) When the control tolerances are exceeded but are within the limit tolerances, repair or scrapping of product shall not be required. In sampling inspection using the control tolerance as the acceptance criteria, when the inspected lot is rejected, all the remaining products of the same lot shall be inspected

f) 尽管有检验批，但对于超过极限公差的产品，应与工程师进行讨论，并采取补救工作、重新制造或其他必要措施。

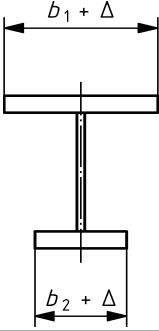
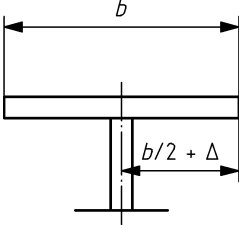
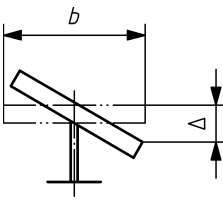
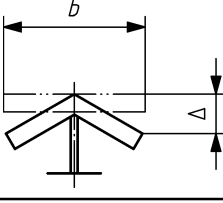
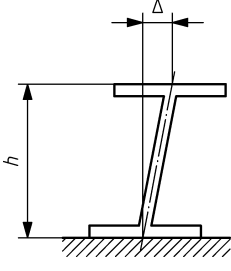
f) In spite of the inspection lot, with regard to the products that exceed the limit tolerance, discussion with the engineer, and remedial work, re-fabrication or other necessary measures shall be taken.

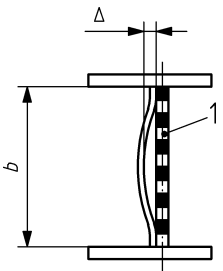
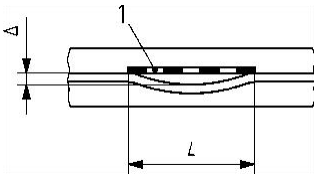
表 E.5: 日本

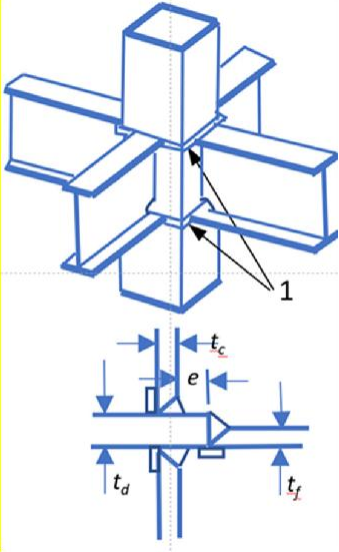
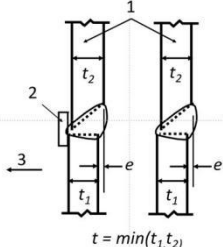
Table C.5 – Japan

1. 焊接型材				
1.Welded profiles				
No 编号	标准 Criterion	参数 Parameter	JASS6--附加规则6 JASS6 - additional rules 6	
			极限公差 Limit tolerance	控制公差 Control tolerance
1.1	高度 Depth 	总高度 $h$ : Overall depth $h$ : $h < 800\text{mm}$ $h \geq 800\text{mm}$	$\Delta = \pm 3\text{mm}$ $\Delta = \pm 4\text{mm}$	$\Delta = \pm 2\text{mm}$ $\Delta = \pm 3\text{mm}$
1.2	翼缘宽度 Flange width	宽度 $b = b_1$ 或 $b_2$ Width $b = b_1$ 或 $b_2$	$\Delta = \pm 3\text{mm}$	$\Delta = \pm 2\text{mm}$

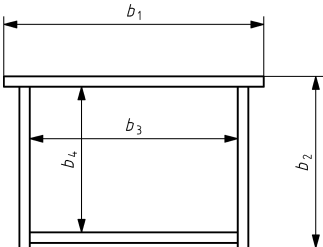
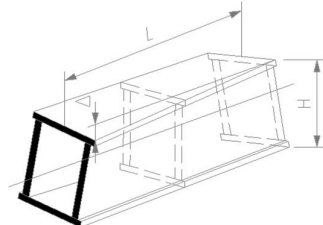


				
1.3	腹板偏心 Web eccentricity 	一般情况 General case	$\Delta = \pm 3\text{mm}$	$\Delta = \pm 2\text{mm}$
1.4	翼缘垂直度 Squareness of flanges 		follow item 1.5 遵循第1.5项	follow item 1.5 遵循第1.5项
1.5	翼缘平整度 Flatness of flanges 	一般情况 General case  节点部分 Joint portion	$\Delta = \pm 3b/100$ 但 $ \Delta  \leq 3\text{mm}$ $\Delta = \pm 3b/200$ 但 $ \Delta  \leq 1.5\text{mm}$	$\Delta = \pm 2b/100$ 但 $ \Delta  \leq 2\text{mm}$ $\Delta = \pm b/100$ 但 $ \Delta  \leq 1\text{mm}$
1.6	支座垂直度 Squareness of bearings 		遵循第1.4项 follow item 1.4	遵循第1.4项 follow item 1.4
1.7	腹板曲率 Plate curvature	腹板高度 $b$ 上的偏差 $\Delta$ Derivation $\Delta$ over plate height $b$	$\Delta = \pm b/100$ 但 $ \Delta  \leq 6\text{mm}$	$\Delta = \pm b/150$ 但 $ \Delta  \leq 4\text{mm}$

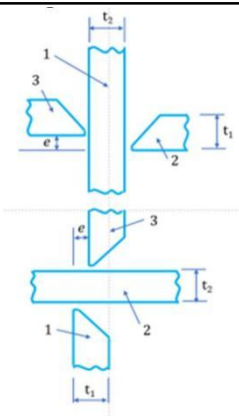
	 <p>1 标距长度 1 gauge length</p>			
1.8	<p>Web distortion 腹板扭曲</p>  <p>1 gauge length 1 标距长度</p>	<p>与腹板高度<math>b</math> (见1.7) 相等的标距<math>L</math>上的偏差<math>\Delta</math> Deviation <math>\Delta</math> on gauge length <math>L</math> equal to web height <math>b</math> (see item 1.7)</p>	<p><math>\Delta = \pm L/100</math> 但<math> \Delta  \leq 6\text{mm}</math></p>	<p><math>\Delta = \pm L/150</math> 但<math> \Delta  \leq 4\text{mm}</math></p>
1.9	<p>Web undulation 腹板起伏</p>		<p>无要求 No requirement</p>	
1.10	<p>开口公称直径为<math>D</math>的浇筑梁和蜂窝梁[由板材或热轧型材制成] Castellated beams and cellular beams [fabricated either from plate or from hot-rolled sections] with openings of inscribed nominal diameter <math>D</math></p>		<p>无要求 No requirement</p>	
1.11	<p>贯通式隔板结构焊接详图 Welding detail of through diaphragm structure</p>	<p>梁翼缘应焊接在隔板厚度内, 包括其平整度和垂直度。 Beam flange shall be welded inside the thickness of the diaphragm, including its flatness and squareness.</p> <p><math>t_d</math> = 隔板厚度 <math>t_d</math> = thickness of diaphragm plate</p> <p><math>t_f</math> = 梁或梁翼缘的厚度 <math>t_f</math> = thickness of beam or girder flange</p>	<p>无要求 No requirement</p>	

	 <p>Key 关键 1 横隔板 1 Diaphragm plate</p>	<p><math>t_c</math> = 柱厚度 <math>t_c</math> = thickness of column</p> <p><math>e</math> = 隔板伸出立柱长度 <math>e</math> = extension of diaphragm plate beyond column</p>		
1.12	<p>任一柱面的非预期偏心率 Non-intended eccentricity about either column surface</p>  <p>Key 1 柱翼缘 1 column flange 2 背衬条 2 backing bar 3 朝向立柱内侧面 3 toward inside face of column</p>	<p>任一柱面的非预期偏心率<math>e</math> Non-intended eccentricity <math>e</math> about either column surface</p> <p><math>t \leq 15\text{mm}</math></p> <p><math>t &gt; 15\text{mm}</math></p>	<p><math>e \leq 1.5\text{mm}</math></p> <p><math>e \leq t/10</math>, 且<math>e \leq 3\text{mm}</math></p>	<p><math>e \leq 1\text{mm}</math></p> <p><math>e \leq t/15</math>, 且<math>e \leq 2\text{mm}</math></p>
1.13	<p>边缘和焊接构件错位 Misalignment of edges and welded assemblies</p>	<p>边缘和焊接构件错位<math>e</math> Misalignment of edges and welded assemblies <math>e</math></p>	<p><math>e \leq 3\text{mm}</math></p>	<p><math>e \leq 2\text{mm}</math></p>

				
2. Press-braked profiles 2.压制型材				
No 编号	标准 Criterion	参数 Parameter	JASS6--附加规则6 JASS6 - additional rules 6	
			极限公差 Limit tolerance	控制公差 Control tolerance
2.1	内部构件宽度 Internal element width		无要求 No requirement	
2.2	外露构件宽度 Outstand element width		无要求 No requirement	
2.3	用于无约束状态下构件的直线度 Straightness for component to be used unrestrained		无要求 No requirement	
2.4	平整度 Flatness		无要求 No requirement	
2.5	弯曲半径 Bend radius 	冷轧成型方管 Cold roll formed square pipe  冷压成型方管 Cold press formed square pipe  在其他情况下, R'应不超过10t, 且在弯曲后需要确认其性能 In other case, R' shall be not more than 10t without confirming property after bending.	$R' = 2.5t$ $\Delta = 0.5t$ (6mm ≤ t ≤ 25mm)  $R' = 3.5t$ $\Delta = 0.5t$ (6mm ≤ t ≤ 19mm)  $\Delta = 0.4t$ (19mm < t ≤ 40mm)	
2.6	形状 Shape		无要求 No requirement	
3. 焊接型材翼缘				

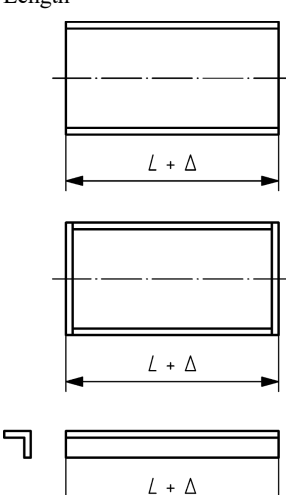
3.Flanges of welded profiles				
No 编号	标准 Criterion	参数 Parameter	JASS6--附加规则6 JASS6 - additional rules 6	
			极限公差 Limit tolerance	控制公差 Control tolerance
3.1	I型截面翼缘变形 Flange distortion of I section		无要求 No requirement	
3.2	I型截面翼缘起伏 Flange undulation of I section		无要求 No requirement	
3.3	用于无约束状态下构件的直线度 Straightness for component to be used unrestrained		无要求 No requirement	
4. 焊接箱形截面翼缘 4.Flanges of welded box sections				
No 编号	标准 Criterion	参数 Parameter	JASS6--附加规则6 JASS6 - additional rules 6	
			极限公差 Limit tolerance	控制公差 Control tolerance
4.1	截面尺寸 Section dimension 	$b < 800\text{mm}$  $b \geq 800\text{mm}$ $b = b_1, b_2, b_3 \text{ or } b_4$ $b = b_1, b_2, b_3 \text{或} b_4$	$\Delta = \pm 3\text{mm}$  $\Delta = \pm 4\text{mm}$	$\Delta = \pm 2\text{mm}$  $\Delta = \pm 3\text{mm}$
4.2	扭转 Twist 	长度为L高度为H的构件总偏差Δ Overall deviation Δ in a piece of length L and height H	$\Delta = \pm 9H/1000$ 但 Δ  ≤ 8mm	$\Delta = \pm 6H/1000$ 但 Δ  ≤ 5mm
4.3	腹板或加劲肋之间的板面平面外缺陷，一般情况 Out-of-plane imperfection of plate panel between web or stiffener, general case		无要求 No requirement	

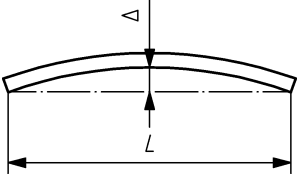
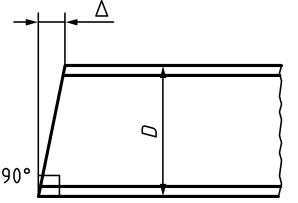
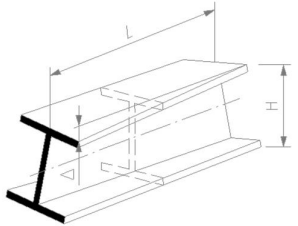
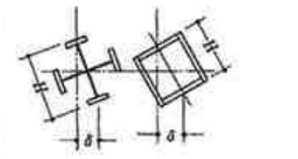
4.4	腹板或加劲肋之间的板面的平面外缺陷（横向受压的特殊情况——除非另有规定该特殊情况，否则采用一般情况）  Out-of-plane imperfections of plate panel between webs or stiffeners  (special case with compression in the transverse direction – the general case applies unless this special case is specified)		无要求  No requirement	
4.5	方正度  Squareness		无要求  No requirement	
5. Web stiffeners and cruciform joints of profiles or box sections				
5.型材或箱形截面的腹板加劲肋和十字形节点				
No 编号	标准  Criterion	参数  Parameter	JASS6--附加规则6  JASS6 - additional rules 6	
			极限公差  Limit tolerance	控制公差  Control tolerance
5.1	平面内直线度  In-plane straightness		无要求  No requirement	
5.2	平面外直线度  Out-of-plane straightness		无要求  No requirement	
5.3	腹板加劲肋的位置  Location of web stiffeners		无要求  No requirement	
5.4	支座处腹板加劲肋的位置  Location of web stiffeners at support		无要求  No requirement	
5.5	腹板加劲肋偏心  Eccentricity of web stiffeners		无要求  No requirement	
5.6	支座处腹板加劲肋的偏心  Eccentricity of web stiffeners at supports		无要求  No requirement	
5.7	隔板和翼缘错位  Misalignment of diaphragm and flange	隔板和翼缘 $e$ 错位：  Misalignment of diaphragm and flange $e$ :  $t_1 \geq t_2$	$e \leq t_1/5$ ,  且 $e \leq 4\text{mm}$	$e \leq t_2/15$ ,  且 $e \leq 3\text{mm}$

	 <p>关键 Key</p> <p>1 柱翼缘 1 Column flange</p> <p>2 梁翼缘 2 Beam flange</p> <p>3 隔板 3 Diaphragm plate</p>	$t_1 < t_2$	$e \leq t_1/4,$ 且 $e \leq 5\text{mm}$	$e \leq t_1/5,$ 且 $e \leq 4\text{mm}$
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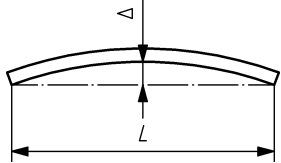
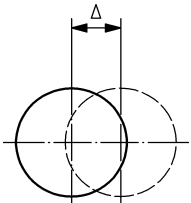
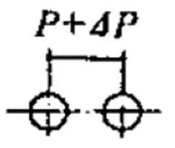
## 6. Components

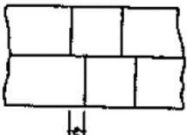
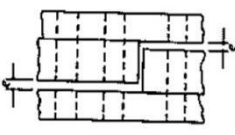
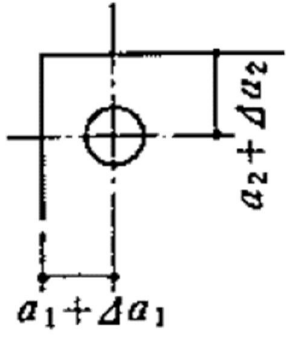
### 6.构件

No 编号	标准 Criterion	参数 Parameter	JASS6--附加规则6 JASS6 - additional rules 6	
			极限公差 Limit tolerance	控制公差 Control tolerance
6.1	长度 Length 	梁: Beam:  柱: Column:  $L < 10\text{m}$  $L \geq 10\text{m}$	$\Delta = \pm 5\text{mm}$   $\Delta = \pm 5\text{mm}$  $\Delta = \pm 6\text{mm}$	$\Delta = \pm 3\text{mm}$   $\Delta = \pm 3\text{mm}$  $\Delta = \pm 4\text{mm}$
6.2	可调整相邻构件进行充分补偿处的长度 Length, where sufficient		无要求 No requirement	

	compensation with adjacent component is possible			
6.3	直线度 Straightness 	注：不包括轧制或热加工 NOTE: Does not include rolled or hot finished	$\Delta = \pm L/1000$ , 但 $ \Delta  \leq 8\text{mm}$	$\Delta = \pm L/1500$ , 但 $ \Delta  \leq 5\text{mm}$
6.4	Camber or intended curvature on plan 平面图上的起拱度或预期曲率		无要求 No requirement	
6.5	全接触支承表面处理 Surfaces finished for full contact bearing		无要求 No requirement	
6.6	端部方正度 Squareness of ends 	接触钢 Steel in contact	$\Delta = \pm 2.5D/1000$	$\Delta = \pm 1.5D/1000$
6.7	扭转 Twist 	长度 $L$ 和高度 $H$ 上的整体偏差 $\Delta$ Overall deviation $\Delta$ in a piece of length $L$ and height $H$	无要求 No requirement	
6.8	立柱扭转 Torsion of column 	—	$\delta \leq 9D/1000$ , 且 $\delta \leq 8\text{mm}$	$\delta \leq 6D/1000$ , 且 $\delta \leq 5\text{mm}$
6.9	梁的直线度（6.3表示柱的直线度） Straightness of Beam (6.3 shows straightness of column)	—	$\Delta = \pm 1.5L/1000$ 但 $ \Delta  \leq 15\text{mm}$	$\Delta = \pm L/1000$ 但 $ \Delta  \leq 10\text{mm}$



				
7. 紧固件孔、槽口和切边 7.Fastener holes, notches and cut edges				
No 编号	标准 Criterion	参数 Parameter	JASS6——附加规则6 JASS6 – additional rules 6	
			极限公差 Limit tolerance	控制公差 Control tolerance
7.1	紧固件孔的位置 Position of holes for fasteners 	孔中心错位Δ Misalignment of hole center Δ	$\Delta \leq 1.5\text{mm}$	$\Delta \leq 1\text{mm}$
7.2	紧固件孔的位置 Position of holes for fasteners		无要求 No requirement	
7.3	孔群位置 Position of hole group		无要求 No requirement	
7.4	孔群间距 Spacing of hole groups		无要求 No requirement	
7.5	孔群扭转 Twist of hole group		无要求 No requirement	
7.6	孔洞的椭圆化 Ovalisation of holes		无要求 No requirement	
7.7	槽口 Notches		无要求 No requirement	
7.8	孔距差 Difference of hole pitch 		无要求 No requirement	$-1\text{mm} \leq \Delta P \leq 1\text{mm}$
7.9	孔错位 Misalignment of holes		$e \leq 1.5\text{mm}$	$e \leq 1\text{mm}$

				
7.10	<p>高强度螺栓连接摩擦面间隙</p> <p>Gap in friction surface of high strength bolted joint</p> 		$e \leq 1\text{mm}$	$e \leq 1\text{mm}$
7.11	<p>沿力轴和垂直于力轴方向的边缘距离</p> <p>Edge distance along axis of force and in direction perpendicular to axis of force</p> 	<p>边缘距离满足《钢结构设计标准》和《高强度螺栓连接设计与制造指南》的最低要求</p> <p>Edge distance to satisfy the minimum requirements of “Design Standard for Steel Structures” and “Guidebook on Design and Fabrication of High Strength Bolted Connections”</p>	$\Delta a_1 \geq -3\text{mm}$ $\Delta a_2 \geq -3\text{mm}$	$\Delta a_1 \geq -2\text{mm}$ $\Delta a_2 \geq -2\text{mm}$
8. Column splices and baseplates				
8.立柱拼接和底板				
No 编号	标准 Criterion	参数 Parameter	JASS6--附加规则6	
			JASS6 - additional rules 6	
			极限公差 Limit tolerance	控制公差 Control tolerance
8.1	立柱拼接 Column splice		无要求 No requirement	
8.2	底板 Baseplate		无要求 No requirement	
9. 格构件				
9.Lattice components				
No	标准	参数	JASS6--附加规则6	

编号	Criterion	Parameter	JASS6 - additional rules 6	
			极限公差 Limit tolerance	控制公差 Control tolerance
9.1	直线度和起拱度 Straightness and camber		无要求 No requirement	
9.2	面板尺寸 Panel dimensions		无要求 No requirement	
9.3	支承构件的直线度 Straightness of bracing components		无要求 No requirement	
9.4	横截面尺寸 Cross-section dimensions		无要求 No requirement	
9.5	相贯节点 Intersecting joints		无要求 No requirement	
9.6	间隙节点 Gap joints		无要求 No requirement	

## E.7 俄罗斯联邦允许公差

### C.7 Tolerances for Russian Federation

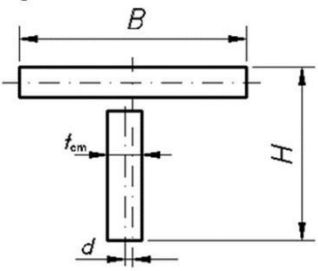
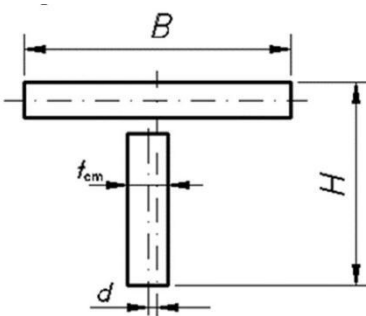
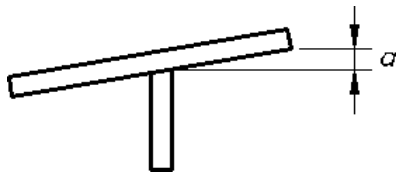

表 E.6 的参考标准是州际标准 GOST 23118 《建筑钢结构通用规范》。

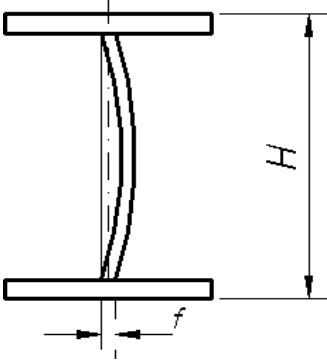
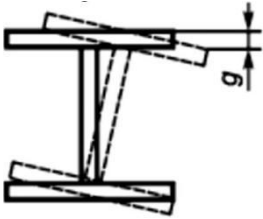
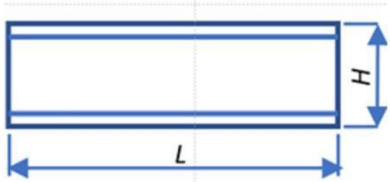
The reference standard for Table C.6 is the interstate standard GOST 23118 Building steel structures, General specifications.

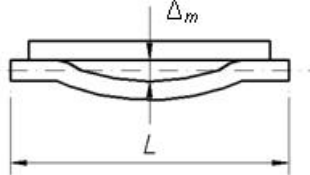
表 E.6：俄罗斯联邦

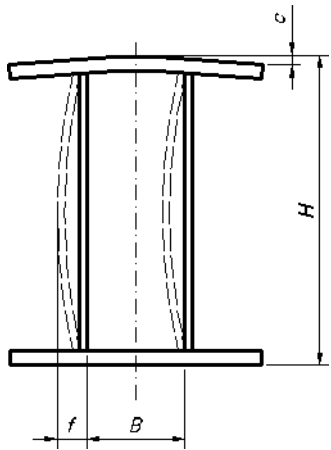
Table C.6– Russian Federation

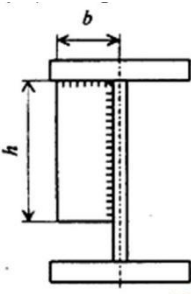
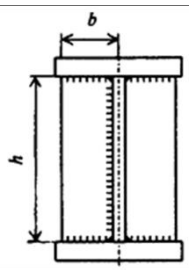
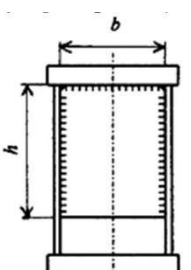
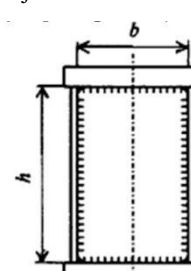
1. 焊接型材 1.Welded profiles			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
1.1	高度 Depth	高度偏差 $H$ Deviation in height $H$  腹板 $d$ 相对于翼缘轴线的位移 Displacement of the web $d$ relative to the axis of the flange	$\pm 3\text{mm}$  $\leq 0.5t_{\text{cm}}$

			
1.2	<p>翼缘宽度 Flange width</p> 	<p>翼缘宽度偏差 <math>B</math> Deviation in width of the flange <math>B</math></p> <p>腹板相对于翼缘轴线 <math>d</math> 的位移 Displacement of the web relative to the axis of the flange <math>d</math></p>	<p><math>\pm 3\text{mm}</math></p> <p><math>\leq 0.5t</math></p>
1.3	<p>腹板偏心 Web eccentricity</p> 	<p>T形和I形截面 <math>a</math> 中腹板相对于翼缘的错位: Misalignment of the web relative to the flange in T and I-sections <math>a</math>:</p> <p>在节点和支承点处 at the joints and points of abutment</p> <p>在其他位置 in other places</p>	<p><math>0.005 B</math></p> <p><math>0.01 B</math></p>
1.4	<p>翼缘垂直度 Squareness of flanges</p> 	<p>焊接I型截面梁翼缘的蘑菇形状 <math>c</math>: Mushroom shape of the flange of the welded I-beam <math>c</math>:</p> <p>在节点和连接点 at the joints and junction points</p> <p>在其他地方 in other places</p> <p>吊车梁上弦翼缘的错位或蘑菇形状变形 Misalignment or mushrooming of the flange of the upper chords of crane beams</p>	<p><math>0.005 B</math></p> <p><math>0.01 B</math></p> <p><math>0.005 B</math></p>
1.5	<p>翼缘平整度 Flatness of flanges</p>		<p>无要求 No requirement</p>
1.6	<p>支座垂直度 Squareness of bearings</p>	<p>梁腹板无筋肋弯曲拱高 <math>f</math> arrow of the bend of the unreinforced ribs of the beam web <math>f</math></p>	<p><math>0.003H</math></p> <p><math>0.006 H</math></p>

		加劲肋加固腹板的弯曲拱高 bend arrow for a web reinforced with stiffeners  吊车梁腹板弯曲拱高 arrow of a bend for the web of crane beams	$0.003 H$
1.7	腹板曲率 Plate curvature		无要求 No requirement
1.8	腹板扭曲 Web distortion 扭转（梁的螺旋度） Twisting (helicalness of the beam) 	扭转（梁的螺旋度） $g$ Twisting (helicalness of the beam) $g$	$0.001L$ , 但 $\leq 10\text{mm}$
1.9	腹板起伏 Web undulation		无要求 No requirement
1.10	现浇梁和蜂窝梁 Castellated beams and cellular beams		无要求 No requirement
1.11	梁在平面内和平面外的最大允许挠度 Maximum permissible deflections of a beam in and out of a plane 	沿长度 $L$ along the length $L$  高度 $H$ in height $H$  $L$ 处梁长度的最大偏差可达16000mm（含） Maximum deviation of the beam length at $L$ up to 16000 mm inclusive  梁端垂直度 Perpendicularity of the ends of the beam	$0.001L$ $0.001H$ $+ 20\text{mm}$ $0.0007H$
2. 压制型材 2. Press-braked profiles			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
2.1	内部构件宽度 Internal element width	冷成型型材见GOST R 58384（第4节） For cold-formed profiles, see GOST R 58384 (section 4)	

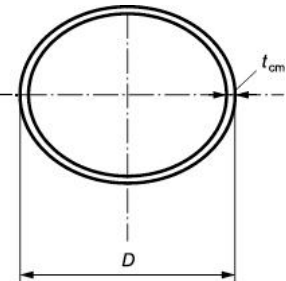
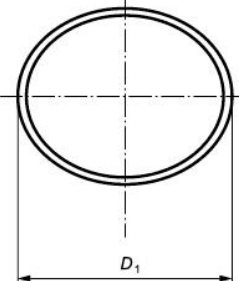
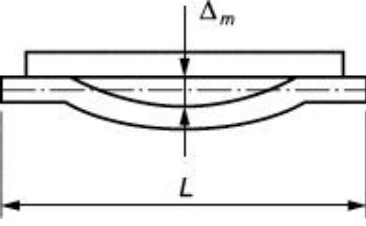
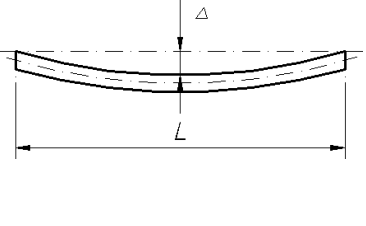
2.2	外露构件宽度 Outstand element width		
2.3	用于无约束状态下构件的直线度 Straightness for component to be used unrestrained		
2.4	平整度 Flatness		
2.5	弯曲半径 Bend radius		
2.6	形状 Shape		
3. 焊接型材翼缘 3.Flanges of welded profiles			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
3.1	I型截面翼缘变形 Flange distortion of I section		无要求 No requirement
3.2	I型截面翼缘起伏 Flange undulation of I section		无要求 No requirement
3.3	用于无约束状态下构件的直线度 Straightness for component to be used unrestrained 	翘曲零件-钢板和钢尺之间的间隙Δ <sub>m</sub> Warping parts - the gap Δ <sub>m</sub> between the sheet and a steel ruler	1.5mm
4. 焊接箱形截面翼缘 4.Flanges of welded box sections			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
4.1	截面尺寸 Section dimension	腹板高度 <i>H</i> 和翼缘宽度 <i>B</i> 的偏差 Deviation in the height <i>H</i> of the webs and the width <i>B</i> of the flanges  蘑菇形翼缘 Mushroom-shaped flanges	3mm  $0.015B \leq t_{st}$  $0.015H \leq t_{st}$

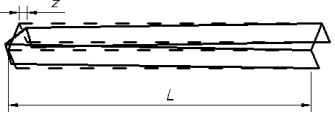
		梁腹板弯曲 $f$ Beam web bend $f$	
4.2	扭转 Twist		无要求 No requirement
4.3	腹板或加劲肋之间的板面平面外缺陷，一般情况 Out-of-plane imperfection of plate panel between web or stiffener, general case		无要求 No requirement
4.4	腹板或加劲肋之间的板面平面外缺陷 Out-of-plane imperfections of plate panel between webs or stiffeners		无要求 No requirement
4.5	方正度 Squareness		无要求 No requirement
<b>5. 型材或箱形截面的腹板加劲肋和十字形节点</b> <b>5. Web stiffeners and cruciform joints of profiles or box sections</b>			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
5.1	平面内直线度 In-plane straightness		无要求 No requirement
5.2	平面外直线度 Out-of-plane straightness		无要求 No requirement
5.3a	腹板加劲肋的位置（两侧相邻） Location of web stiffeners (adjoining on both sides)	宽度和高度 width and height  相邻面偏差角的正切值，不超过 tangent of the angle of deviation of adjoining sides, no more	±5mm   0.002

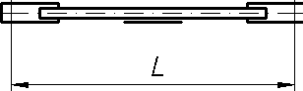
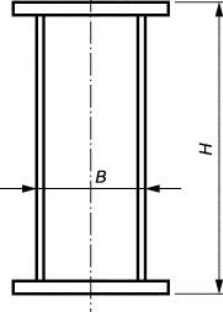
			
5.3b	<p>腹板加劲肋的位置（三侧相邻的加劲肋和角撑板）</p> <p>Location of web stiffeners (stiffeners and gussets adjoining on three sides)</p> 	<p>宽度</p> <p>Width</p> <p>高度</p> <p>Height</p> <p>相邻边偏差角的切线</p> <p>tangent of the angle of deviation of adjoining sides</p>	<p><math>\pm 5\text{mm}</math></p> <p>from -2 mm to -4 mm</p> <p>从-2mm到-4mm</p> <p>0.001</p>
5.3c	<p>腹板加劲肋的位置（三侧相邻的隔板）</p> <p>Location of web stiffeners (diaphragms adjacent on three sides)</p> 	<p>宽度</p> <p>Width</p> <p>高度</p> <p>Height</p> <p>相邻边偏差角的切线</p> <p>tangent of the angle of deviation of adjoining sides</p>	<p>from -2 mm to -4 mm</p> <p>从-2mm到-4mm</p> <p><math>\pm 5\text{mm}</math></p> <p>0.001</p>
5.3d	<p>腹板加劲肋的位置（四边相邻的隔板）</p> <p>Location of web stiffeners (diaphragms adjacent on four sides)</p> 	<p>宽度和高度</p> <p>width and height</p> <p>相邻边偏差角的切线</p> <p>tangent of the angle of deviation of adjoining sides</p>	<p>from -2 mm to -4 mm</p> <p>从-2mm到-4mm</p> <p>0.001</p>
5.4	<p>支座处腹板加劲肋的位置</p> <p>Location of web stiffeners at support</p>		<p>无要求</p> <p>No requirement</p>
5.5	<p>腹板加劲肋偏心</p>		<p>无要求</p>

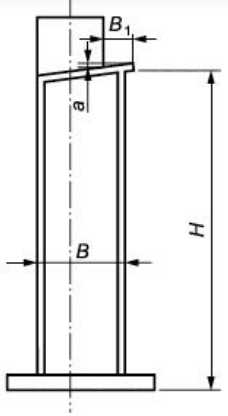
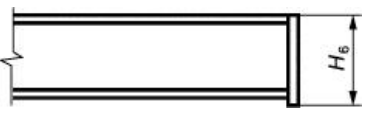
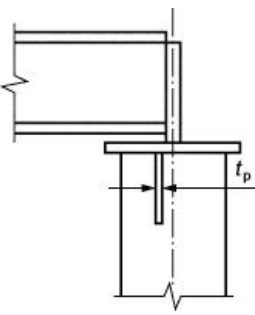


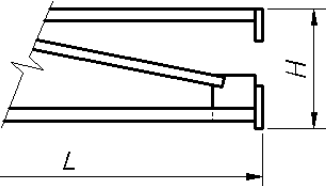
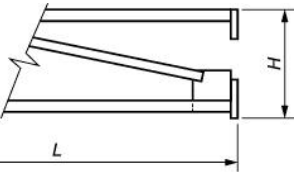
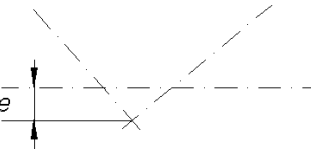
	Eccentricity of web stiffeners		No requirement
5.6	支座处腹板加劲肋的偏心 Eccentricity of web stiffeners at supports		无要求 No requirement
5.7a	具有重叠元素的角撑板 Gussets with overlapping elements	宽度和高度 width and height 任意两侧偏转角的切线 tangent of the angle of deflection of any two sides	$\pm 10\text{mm}$ 0.004
5.7b	复合型材的板材部分, 宽度 Sheet parts of composite sections, in width	翼缘 Flanges 腹板 Webs	$\pm 5\text{mm}$ $\pm 2\text{mm}$
5.7c	焊接图和管壳的钣金零件 Sheet metal parts of weld maps and pipe shells	宽度 Width 长度 Length 对角线不等式 ( $D$ ) inequality of the diagonals ( $D$ )	$\pm 3\text{mm}$ $\pm 3\text{mm}$ 0.001
5.7d	由成型型材和复合型材制成的零件, 重叠 Parts from shaped profiles and composite sections, overlapped	长度 Length 端部偏离轮廓轴线的角度切线 tangent of the angle of deviation of the end from the axis of the profile	$\pm 10\text{mm}$ 0.004
5.7e	由成型型材和复合型材制成的零件, 两端对接 Parts from shaped profiles and composite sections, docked with two ends	长度 Length 邻接端偏离轮廓轴线的角度切线 tangent of the angle of deviation of the abutting ends from the axis of the profile	$\pm 3\text{mm}$ 0.0007
5.7f	通过端面传递力时成型型材和复合型材的细节 Details from shaped profiles and composite sections when transferring force through the end face	长度 Length 支架相对于轮廓轴的偏转角度切线 tangent of the angle of deflection of the support from the profile axis	$\pm 3\text{mm}$ 0.0007
<b>6. 构件</b> <b>6.Components</b>			

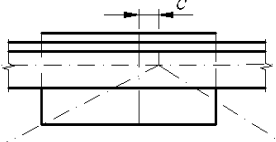
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
6.1a	管道外周偏差 $P$ Deviation of the outer perimeter of the pipe $P$ 	管道外周与理论尺寸的偏差 $P = \pi D$ Deviation of the outer perimeter of the pipe $P = \pi D$ from the theoretical size	$\pm 0.75t$
6.1b	管段椭圆度 Ovality of the pipe section 	代替加劲肋 in places of stiffeners  在未用加劲肋加固的地方 in places not reinforced with stiffeners	$\pm 0.01D_1$  $\pm 0.02D_1$
6.2	可调整相邻构件进行充分补偿处的长度 Length, where sufficient compensation with adjacent component is possible		无要求 No requirement
6.3a	零件曲率 Curvature of parts 	钢板和钢尺之间的间隙 $\Delta_m$ Gap between the sheet and the steel ruler $\Delta_m$	1.5mm
6.3b	直线度 Straightness 	拉伸绳与拐角边缘、货架或通道壁、工字梁、长度为 $L$ 的矩形和圆形管道之间的间隙 $\Delta$ Gap $\Delta$ between the stretched string and the edge of the corner, the shelf or the wall of the channel, I-beam, rectangular and round pipes of length $L$	$0.001L$ , 但 $\leq 10\text{mm}$
6.3c	钣金件边缘线偏差 Deviations of lines of	对接焊接中带现场节点的构件	0 mm to 5 mm

	edges of sheet metal parts	of elements with field joints in butt welding 在T形截面、拐角和衬里上的接缝重叠时也是如此 the same when joint overlap, in T section, in the corner and on the linings	0mm至5mm $\leq 10\text{mm}$
6.3d	弯曲偏差 Deviations in bending	模板与轧制板、架子、折弯的外壳型材表面之间的间隙: Gap between the template and the surface of rolled sheet, shelf, obushkom profile folded in a: —低温条件 — cold condition —高温状态 — hot state	2mm 1.5mm
6.3e	椭圆度 (直径差异) 整体片材结构中的圆形 (结构直径为 $D$ ) Ellipticity (difference in diameters) of a circle in overall sheet structures (with a structure diameter $D$ )	节点外侧 outside the joints 在装配节点处at the assembly joints	0.005 $D$ 0.003 $D$
6.4	平面图上的起拱度或预期曲率 Camber or intended curvature on plan		无要求 No requirement
6.5	全接触支承表面处理 Surfaces finished for full contact bearing		无要求 No requirement
6.6	端部方正度 Squareness of ends		无要求 No requirement
6.7	扭转 Twist 	构件长度 $L$ 的扭转 $z$ (螺旋) Twisting $z$ (helical) of the element length $L$	0.001 $L$ , 但 $\leq 10\text{mm}$
7. 紧固件孔、槽口和切边 7.Fastener holes, notches and cut edges			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
7.1	螺栓构件的尺寸公差 Dimensional tolerance for bolted elements	剪切、摩擦和摩擦剪切连接: Shear, friction, and friction-shear connections	3mm

		with: $L \leq 6000\text{mm}$ $L > 6000\text{mm}$	5mm
7.2	紧固件孔的位置 Position of holes for fasteners		无要求 No requirement
7.3	孔群位置 Position of hole group		无要求 No requirement
7.4	孔群间距 Spacing of hole groups		无要求 No requirement
7.5	孔群扭转 Twist of hole group		无要求 No requirement
7.6	孔洞的椭圆化 Ovalisation of holes		无要求 No requirement
7.7	槽口 Notches		无要求 No requirement
<b>8. 立柱拼接和底板</b> <b>8.Column splices and baseplates</b>			
No 编号	标准 Criterion	参数 Parameter	允许公差 Parameter
8.1	立柱拼接 Column splice		无要求 No requirement
8.2	底板 Baseplate	宽度和长度 Width and length 长度不超过1米的板面与尺子之间的间隙 The gap between the ruler and the surface of the slab for a length of not more than 1 m	$\pm 5\text{mm}$ 0.3mm
8.3	架子和柱子高度 $H$ 偏差 Deviation in height $H$ of racks and columns 	安装在一层和两层 Mounted in one and two tiers  三层或更多层相同 The same in three and more tiers  端部相对于架子宽度的不垂直度 Non-perpendicularity of the ends relative to the width of the rack  翼缘端面闭合不平整 The non-flatness of the closing of the end	5mm  3mm  $0.0007B$  0.3mm

		surfaces of the flanges	
8.4	高度公差 Height tolerance 	立柱底板、立柱到桌子、控制台、横梁等支承面的距离 $H$ 。 Distance $H$ from the base plate of the column, column to the supporting surface of tables, consoles, traverses, etc.  控制台、桌子、横梁支承面不垂直（沿支承面的宽度） Non-perpendicularity in the supporting surface of consoles, tables, traverses (along the width of the supporting surface)	3mm       0.001 $B_1$
8.5	传力时梁高偏差 Beam height deviation during force transfer 	通过支承肋 Through supporting ribs  穿过底板 Through base plates	±2mm   ±5mm
8.6	支承肋和加劲隔板的偏移 Offset of supporting ribs and stiffening diaphragms 	在柱、梁的支承节点、框架节点（肋厚 $t_p$ ）的横向集中荷载传递过程中，支承肋和刚度隔板的位移 Displacement of supporting ribs and stiffness diaphragms during the transfer of concentrated loads in the traverses of columns, support nodes of beams, frame nodes (with rib thickness $t_p$ )  确保墙体稳定性的加劲肋和隔板的位移和偏离设计轴线 Displacement and deviation from the design axis of the stiffeners and diaphragms that ensure the stability of the wall	0.25 $t_p$      ±10mm
9 格构件 9.Lattice components			

No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
9.1	直线度和起拱度 Straightness and camber	—	—
9.2a	面板尺寸 Panel dimensions 	格构线性尺寸偏差: Deviation of the linear dimensions of lattice structures: 现场连接处有垫片或与衬里焊接时, 装配单元长度 $L$ 的偏差 deviation of the length $L$ of assembly units in the presence of gaskets in the field connections or when welded with lining 支架高度 $H$ 的偏差 deviation of the height $H$ on the supports 节点处的偏差 the same at the joints 其他地方的偏差 the same in other places	5mm  3mm  3mm  10mm
9.2b	面板尺寸 (支承端) Panel dimensions (at support ends) 	通过端部支承肋传递支承力的桁架: Trusses with the transfer of the support force through the end support ribs: 肋支承面与上弦 $H$ 外表面的偏差 Deviation from the supporting surface of the rib to the outer surface of the upper chord $H$	5mm
9.3	构件的直线度 Straightness of components		无要求 No requirement
9.4	横截面尺寸 Cross-section dimensions		无要求 No requirement
9.5	相贯节点 Intersecting joints 	对于由矩形管、工字梁和槽钢、立柱和立柱制成的结构, 格栅构件相对于皮带轴线 $b$ 的错位, 相对于垂直轴线的错位 Misalignment of lattice elements relative to the belt axis $b$ for structures made of rectangular pipes, I-beams and channels, posts and columns, misalignment relative to the vertical axis	0.04 $B$  0.03 $B$

		拐角结构也是如此 The same for corner structures	
9.6	间隙节点 Gap joints 	格构节点节点板和连接系杆、梁等的节点板的偏差 $c$ 。 Deviations $c$ of nodal gussets of lattice structures and gussets for joining ties, beams, etc.	$\pm 5\text{mm}$

## E.8 英国允许公差

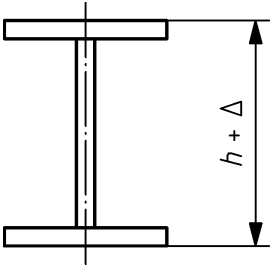
### C.8 Tolerances for United Kingdom

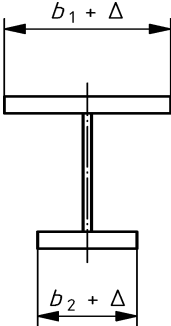
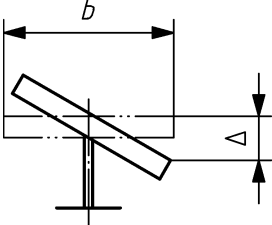
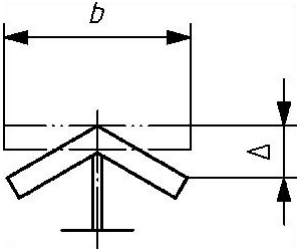
表 E.7 的参考标准是 BCSA 国家钢结构规范，第 7 版，2021 年。

The reference standard for Table C.7 is BCSA National Structural Steelwork Specification, 7th Ed, 2021.

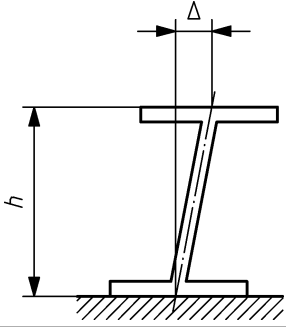
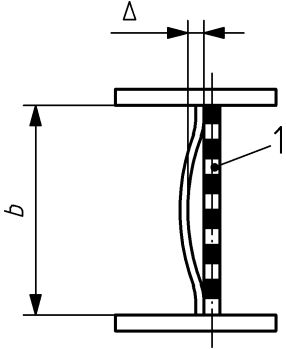
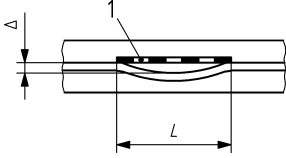
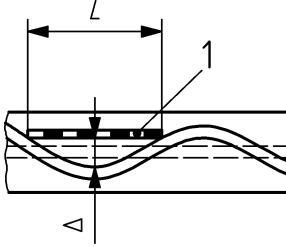
表 E.7——英国

Table C.7 – United Kingdom

1. 概述 1.General			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
1.1	高度 Depth 	O中心线上的总高度 $h$ : verall depth $h$ on centreline: $h \leq 900\text{mm}$ $900 < h \leq 1800\text{mm}$ $h > 1800\text{mm}$	$\Delta = \pm 3\text{mm}$ $\Delta = \pm h/300$ $\Delta = \pm 6\text{mm}$
1.2	翼缘宽度 Flange width	宽度 $b_1$ 或 $b_2$ Width $b_1$ or $b_2$	$-\Delta = b/100$ $+\Delta = b/100, \text{or } 3\text{mm},$ $+\Delta = b/100, \text{或 } 3\text{mm},$ 取较大者 whichever is greater

			
1.3	腹板偏心 Web eccentricity		无要求 No requirement
1.4	翼缘垂直度 Squareness of flanges 	腹板位置: Position of web:  一般情况 general case  在建造技术规格书中确定的位置与结构 支座接触的翼缘部分 flange parts in contact with structural bearings in locations identified in the execution specification	$\Delta = \pm b/100$  $\Delta = \pm b/400$
1.5	翼缘平整度 Flatness of flanges 	不平整: Out of flatness:  一般情况 general case  在建造技术规格书中确定的位置与结构 支座接触的翼缘部分 flange parts in contact with structural bearings in locations identified in the execution specification	$\Delta = \pm b/100$ or 5mm, $\Delta = \pm b/100$ 或5mm, 以较大者为准 whichever is greater $\Delta = \pm b/400$
1.6	支座垂直度 Squareness of bearings	翼缘与腹板的垂直度 Squareness of flanges to web	$\Delta = \pm h/300$ or 3mm, $\Delta = \pm h/300$ 或3mm, 以较大者为准 whichever is greater



			
1.7	<p>腹板曲率 Plate curvature</p>  <p>1 标距长度 1 gauge length</p>	<p>腹板高度<math>b</math>上的变形<math>\Delta</math> Derivation <math>\Delta</math> over plate height <math>b</math></p> <p>其中 where</p> <p><math>t</math> = 腹板厚度 <math>t</math> = plate thickness</p> <p><math>b/t \leq 80</math> <math>80 &lt; b/t \leq 200</math> <math>b/t &gt; 200</math></p>	$\Delta = \pm b/200$ $\Delta = \pm b_2/ (16000t)$ $\Delta = \pm b/80, \text{ or } t,$ $\Delta = \pm b/80 \text{ 或 } t,$ <p>以较大者为准 whichever is greater</p>
1.8	<p>腹板扭曲 Web distortion</p>  <p>1 gauge length 1 标距长度</p>	<p>在标距<math>L</math>（等于腹板高度<math>b</math>）上的偏差<math>\Delta</math> Deviation <math>\Delta</math> on gauge length <math>L</math> equal to web height <math>b</math></p> <p>其中 where</p> <p><math>t</math> = 腹板厚度 <math>t</math> = plate thickness</p>	$\Delta = \pm b/100 \text{ or } t,$ $\Delta = \pm b/100 \text{ 或 } t,$ <p>以较大者为准 whichever is greater</p>
1.9	<p>腹板起伏 Web undulation</p>  <p>1 标距长度 1 gauge length</p>	<p>在标距<math>L</math>（等于腹板高度<math>b</math>）上的偏差<math>\Delta</math> Deviation <math>\Delta</math> on gauge length <math>L</math> equal to web height <math>b</math></p> <p>其中 where</p> <p><math>t</math> = 腹板厚度 <math>t</math> = plate thickness (见允许公差1.7)</p>	$\Delta = \pm b/100 \text{ or } t,$ $\Delta = \pm b/100 \text{ 或 } t,$ <p>以较大者为准 whichever is greater</p>
1.10	<p>开口公称直径为<math>D</math>的现浇梁和蜂窝梁[由板材或热轧型材制</p>	<p>腹板立柱沿厚度方向上的错位: Misalignment of web post across</p>	$\Delta = 2\text{mm}$

成]	Castellated beams and cellular beams [fabricated either from plate or from hot-rolled sections] with openings of inscribed nominal diameter $D$	thickness: 公称半径为 $r$ 的开孔沿厚度方向的重叠: Misalignment of overlap for opening of nominal radius $r$ : $r = D/2 < 200\text{mm}$ $r = D/2 \geq 200\text{mm}$	$\Delta = 2\text{mm}$ $\Delta = r/100$ , And $\Delta \leq 5\text{mm}$ 且 $\Delta \leq 5\text{mm}$
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注：例如 $\Delta = \pm d/100$ 但 $|\Delta| \geq t$ 的注释表示 $|\Delta|$ 取 $d/100$ 和 $t$ 中的较大值。

NOTE Notations such as  $\Delta = \pm d/100$  but  $|\Delta| \geq t$ , mean that  $|\Delta|$  is the larger of  $d/100$  and  $t$ .

## 2. 压制型材

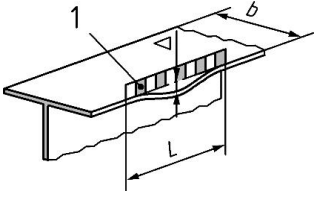
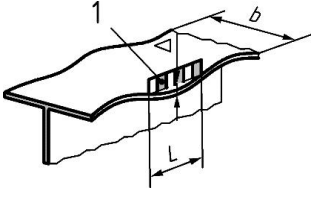
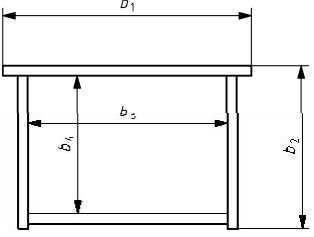
### 2. Press-braked profiles

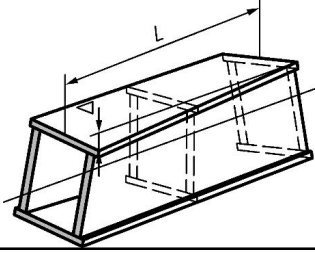
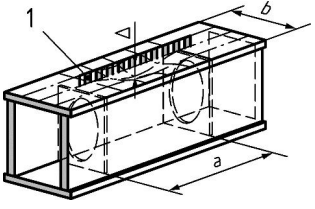
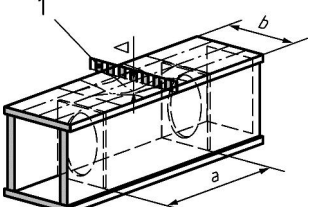
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
2.1	内部构件宽度 Internal element width	关于压制冷成型型材， 请参考EN 1090-2:2018表8.2 For press braked cold formed profiles, refer to EN 1090-2:2018 Table 8.2	
2.2	外露构件宽度 Outstand element width		
2.3	用于无约束状态下构件的直线度 Straightness for component to be used unrestrained		
2.4	平整度 Flatness		
2.5	弯曲半径 Bend radius		
2.6	形状 Shape		

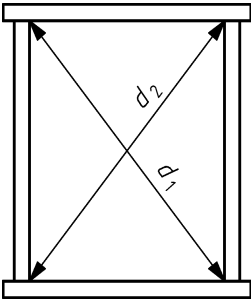
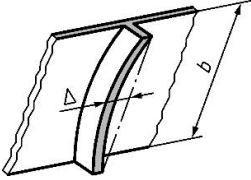
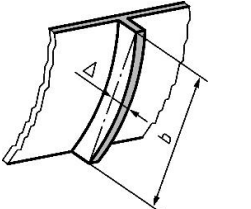
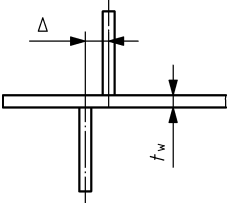
## 3. 焊接型材翼缘

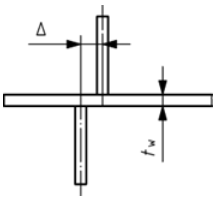
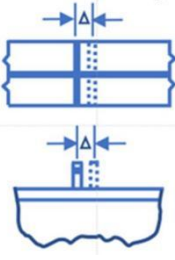
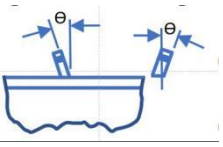
### 3. Flanges of welded profiles

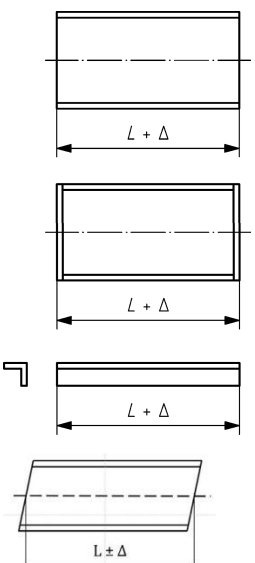
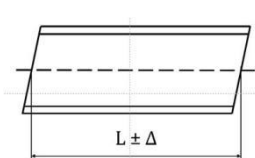
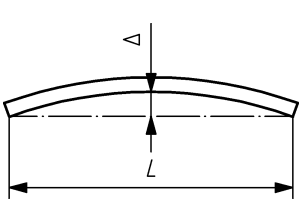
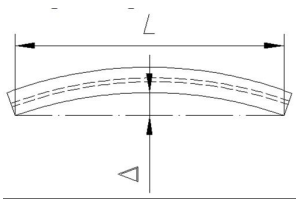
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
3.1	翼缘变形 Flange distortion	标距 $L$ 上的偏差 $\Delta$ ， Deviation $\Delta$ on gauge length $L$ ， 其中 Where	

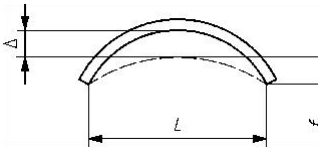
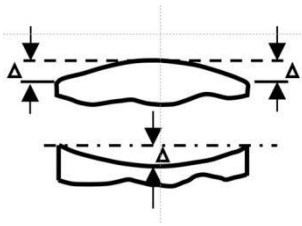
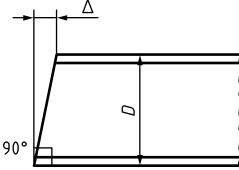
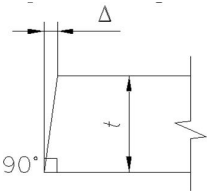
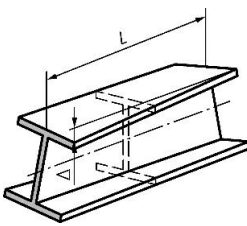
	 <p>1 标距长度 1 gauge length</p>	<p><math>L = \text{长度}</math> <math>L = \text{length}</math> <math>b = \text{翼缘宽度}</math> <math>b = \text{flange width}</math> <math>t = \text{翼缘厚度}</math> <math>t = \text{flange thickness}</math> <math>b/t \leq 20</math> <math>b/t &gt; 20</math></p>	<p><math>\Delta = \pm b/150</math> <math>\Delta = \pm b_2/ (3000t)</math></p>
3.2	<p>翼缘起伏 Flange undulation</p>  <p>1 gauge length 1 标距长度</p>	<p>标距<math>L</math>上的偏差<math>\Delta</math>, Deviation <math>\Delta</math> on gauge length <math>L</math>, where 其中 <math>L = \text{长度}</math> <math>L = \text{length}</math> <math>b = \text{翼缘宽度}</math> <math>b = \text{flange width}</math> <math>t = \text{翼缘厚度}</math> <math>t = \text{flange thickness}</math> <math>b/t \leq 20</math> <math>b/t &gt; 20</math></p>	<p><math>\Delta = \pm b/150</math> <math>\Delta = \pm b_2/ (3000t)</math></p>
3.3	<p>待使用构件的直线度不受限制 Straightness for component to be used unrestrained</p>		<p>无要求 No requirement</p>
<p>4. 焊接箱形截面翼缘 4.Flanges of welded box sections</p>			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
4.1	<p>截面尺寸 Section dimension</p> 	<p>内部或外部尺寸偏差 Deviation in internal or external dimension <math>b = b_1, b_2, b_3 \text{ or } b_4</math> <math>b = b_1, b_2, b_3 \text{ 或 } b_4</math> <math>b \leq 300\text{mm}</math> <math>300\text{mm} &lt; b \leq 900\text{mm}</math> <math>900 &lt; b &lt; 1800\text{mm}</math> <math>b \geq 1800\text{mm}</math></p>	<p><math>\Delta = +3\text{mm}, -(b/100)</math> <math>\Delta = \pm 3\text{mm}</math> <math>\Delta = \pm b/300</math> <math>\Delta = \pm 6\text{mm}</math></p>
4.2	<p>扭转 Twist</p>	<p>长度为<math>L</math>的构件总偏差<math>\Delta</math> Overall deviation <math>\Delta</math> in a piece of length <math>L</math></p>	<p><math>\Delta = \pm L/700, \text{ or } 4 \text{ mm},</math> 以较大者为准, 最大可达<math>10\text{mm}</math> <math>\Delta = \pm L/700, \text{ 或 } 4\text{mm},</math> whichever is greater, up to a maximum</p>

			of 10 mm
4.3	<p>腹板或加劲肋之间的板面平面外缺陷，一般情况</p> <p>Out-of-plane imperfection of plate panel between web or stiffener, general case</p>  <p>1 长度为L的直边规 1 straight edge gauge of length L</p>	<p>对于宽度为<b>b</b>的面板，加劲肋隔板之间的距离为<b>a</b>。</p> <p>For a panel of width <b>b</b> with distance <b>a</b> between stiffener diaphragms.</p> <p>垂直于板材平面的变形，在整个宽度上相对于直尺横向&lt;D或相对于量规纵向&lt;长度<b>b</b>的D。</p> <p>Distortion perpendicular to the plane of the plate transversely over whole width relative to straight edge &lt; <i>D</i> or longitudinally with respect to a gauge &lt; <i>D</i> of length <i>b</i>.</p> <p>If <math>a \leq 2b, L = a</math> 如果 <math>a \leq 2b</math>，则 <math>L = a</math></p>	$\Delta = \pm a/250$
4.4	<p>腹板或加劲肋之间的板面平面外缺陷（横向受压的特殊情况）</p> <p>Out-of-plane imperfections of plate panel between webs or stiffeners (special case with compression in the transverse direction –</p>  <p>1 straight edge gauge of length <i>L</i> 1 长度为L的直边规</p>	<p>垂直于板平面的偏差Δ:</p> <p>Deviation Δ perpendicular to the plane of the plate:</p> <p>If <math>a &gt; 2b, L = 2a</math> 如果 <math>a &gt; 2b</math>， <math>L = 2a</math></p> <p>注：如果建造技术规格书中有规定，则特殊情况仅适用于横向压缩箱形截面。</p> <p>NOTE: The special case only applies for compression of the box section in the transverse direction if specified in the execution specification.</p>	$\Delta = \pm a/125$
4.5	<p>方正度</p> <p>Squareness</p>	<p>隔板位置处对角线尺寸差Δ:</p> <p>Difference Δ between diagonal dimensions at diaphragm positions:</p>	<p><math>\Delta = (d_1 + d_2)</math> 公称值/400, 或6mm, 以较大者为准</p> <p><math>\Delta = (d_1 + d_2)\text{nom}/400</math>, or 6 mm, whichever is greater</p>

		<p>(nom = 公称值, act = 实际值) 在隔板位置处。</p> <p>(nom = nominal, and act= actual) at diaphragm positions.</p> <p><math>\Delta =  (d_1 - d_2)_{act} - (d_1 - d_2)_{nom} </math></p>	
<b>5. 型材或箱形截面的腹板加劲肋和十字形节点</b> <b>5. Web stiffeners and cruciform joints of profiles or box sections</b>			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
5.1	平面内直线度 In-plane straightness 	焊接后板材平面直线度偏差Δ Deviation Δ from straightness in the plane of the plate after welding	$\Delta = \pm b/250$ 或4mm, 以较大者为准 $\Delta = \pm b/250$ , or 4 mm, whichever is greater
5.2	平面外直线度 Out-of-plane straightness 	焊接后腹板平面法向的直线度偏差Δ Deviation Δ from straightness normal to the plane of the web after welding	$\Delta = \pm b/500$ 或4mm, 以较大者为准 $\Delta = \pm b/500$ , or 4 mm, whichever is greater
5.3	腹板加劲肋的位置 Location of web stiffeners		无要求 No requirement
5.4	支座处腹板加劲肋的位置 Location of web stiffeners at support		无要求 No requirement
5.5	腹板加劲肋偏心 Eccentricity of web stiffeners 	一对非承重加劲肋之间的偏心 Eccentricity between a pair of non bearing stiffeners	$\Delta = \pm 5\text{mm}$
5.6	支座处腹板加劲肋的偏心 Eccentricity of web stiffeners at	一对加劲肋之间的偏心: Eccentricity between a pair of stiffeners:	固定在厚度为 $t_w$ 的腹板上的一对轴承加劲肋之间的错位Δ

	supports 		Misalignment $\Delta$ between a pair of bearing stiffeners fixed to a web of thickness $t_w$ $\Delta = \pm t_w/2$ , 但在支承位置限制在 $\pm t_w/3$ $\Delta = \pm t_w/2$ generally, but restricted to $\pm t_w/3$ at support positions
5.7	配件位置 Position of fittings 	通常，相对于主要构件上的放线点，与预期位置的偏差 $\Delta$ 。 Deviation $\Delta$ from the intended position, generally, relative to the setting-out point on the primary component.  位置对力不重要的配件和附件 Fittings and attachments whose location is not critical to the force	$\Delta = \pm 3\text{mm}$  $\Delta = \pm 5\text{mm}$
5.8	配件对齐 Alignment of fittings 	相对于预期局部方向的角偏差 $\theta$ （图中假设为正方形）。 Angular deviation $\theta$ relative to intended local orientation (assumed square in figure).	$\theta = 1/60$
a 对于十字形节点，错位偏心率限制在 $\pm t/2$ ，其中 $t$ 是连接在腹板两侧的两块板的厚度中的较大者，见第4条（安装）。 aFor cruciform joints, the misalignment eccentricity is limited to $\pm t/2$ where $t$ is the larger of the thicknesses of the two plates attached either side of the web, see Clause 4 (Erection).			
<b>6. 构件</b> <b>6.Components</b>			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
6.1	长度 Length	在中心线（或在角处）测量的切割长度： Cut length measured on the centreline(or on the corner for an angle): 注：包括焊接端板（如适用）的测量长度 $L$ NOTE: Length $L$ measured including welded end plates as applicable.	$\Delta = \pm (L/5000 + 2\text{mm})$  $\Delta = \pm 1\text{mm}$

		<p>一般情况 general case</p> <p>端部将全面接触支承 ends ready for full contact bearing</p>	
6.2	<p>可调整相邻构件进行充分补偿处的长度 Length, where sufficient compensation with adjacent component is possible</p> 	<p>在中心线上测量的切割长度 Cut length measured on centreline</p>	<p><math>\Delta = \pm (L/5000 + 2\text{mm})</math></p> <p>如果可以与下一个相邻构件进行足够的间隙补偿, 则这可能会增加到最大 50mm。</p> <p>This may be increased up to a maximum of 50 mm if sufficient clearance compensation with next adjacent component is possible.</p>
6.3	<p>直线度 Straightness</p> 	<p>与加工或压制型材矩形轴的距离Δ Distance Δ from rectangular axes of a fabricated or press-braked section</p>	<p><math>\Delta = \pm L/1000</math></p>
6.3a	<p>翼缘平直度 Flange straightness</p> 	<p>单个翼缘的直线度 Straightness of individual flanges</p>	<p><math>\Delta = \pm L/1000</math></p> <p>如果建造技术规格书中有规定, 则短于3000mm的梁上允许至少3mm。</p> <p>At least 3 mm allowable on beams shorter than 3 000 mm if specified as restrained in the execution specification.</p>
6.4	<p>平面图上的起拱度或预期曲率 Camber or intended curvature on plan</p>	<p>中间长度处的偏移量f Offset f at mid-length</p> <p>垂直起拱度应在构件侧放时测量。 Vertical camber should be measured with</p>	<p><math>-\Delta = 0</math></p> <p><math>+\Delta = L/500</math>, 或 6mm,</p> <p>取较大者</p> <p><math>+\Delta = L/500</math>, or 6 mm,</p>

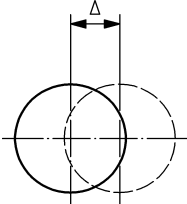
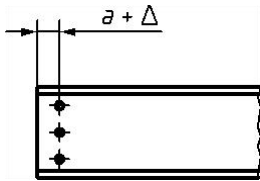
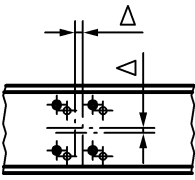
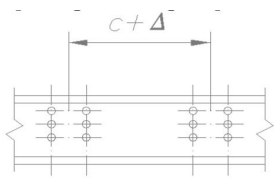
		the member on its side.	whichever is greater
6.5	全接触支承表面处理 Surfaces finished for full contact bearing	参见6.5a中的平面度 See Flatness in 6.5a	
6.5a	平整度 Flatness 	建造技术规格书中规定用于全接触轴承的表面与沿任何方向铺设的直尺之间的最大间隙Δ Maximum gap Δ between the surface and a straight edge laid in any direction for surfaces specified for full contact bearing in the execution specification	通常, Δ = 0.5mm, 局部高点不超过表面上方0.5mm Generally, Δ = 0,5 mm with local high spots not projecting more than 0,5 mm above the surface
6.6	端部方正度 Squareness of ends 	与纵轴的垂直度: Squareness to longitudinal axis: 端部设计为完全接触轴承 ends intended for full contact bearing  端部不用于完全接触轴承 ends not intended for full contact bearing	$\Delta = \pm D/1000$  $\Delta = \pm D/100$
6.6a	板材或角钢的剪切或裁剪边缘 Sheared or cropped edges of plates or angles  Note: based on $t$ , not $D$ 注: 基于 $t$ , 而非 $D$	偏离90°边缘 Deviation from a 90° edge	$\Delta = \pm t/10$ , up to a maximum of 3 mm 最大3mm
6.7	扭转 Twist 	长度为 $L$ 的构件的整体扭转Overall twist in a component of length $L$	$\Delta = \pm L/700$ , or 4 mm, whichever is greater, up to a maximum of 20 mm $\Delta = \pm L/700$ , 或4mm, 以较大者为准, 最大20mm
注: $\Delta = \pm d/100$ 但 $ \Delta  \geq 5\text{mm}$ , 表示 $ \Delta $ 是 $d/100$ 和5mm中的较大值。			

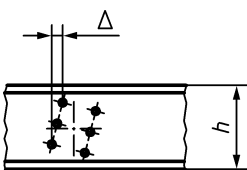
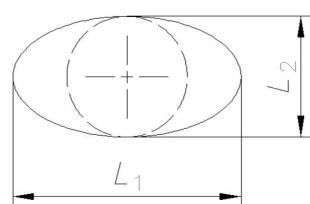
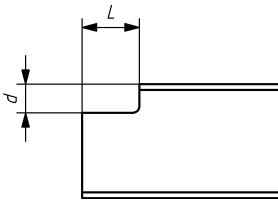
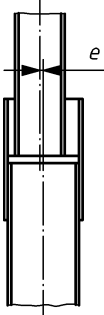


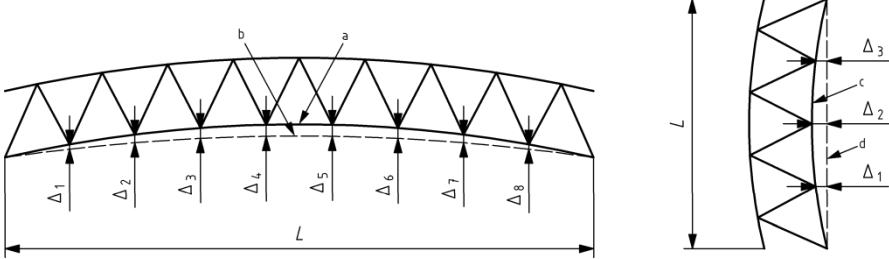
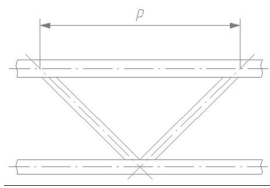
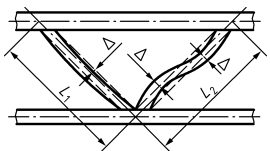
NOTE Notations such as  $\Delta = \pm d/100$  but  $|\Delta| \geq 5 \text{ mm}$  mean that  $|\Delta|$  is the larger of  $d/100$  and 5 mm.

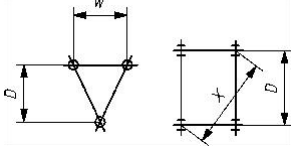
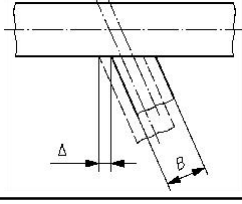
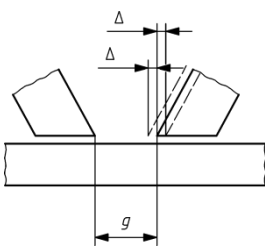
## 7. 紧固件孔、槽口和切边

### 7. Fastener holes, notches and cut edges

No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
7.1	紧固件孔的位置 Position of holes for fasteners 	一组孔中单个孔的中心线与其预期位置的偏差 $\Delta$ Deviation $\Delta$ of centreline of an individual hole from its intended position within a group of holes	$\Delta = \pm 2 \text{ mm}$
7.2	紧固件孔的位置 Position of holes for fasteners 	直径为 $d_0$ 的单个孔与切割端之间距离 $a$ 的偏差 $\Delta$ : Deviation $\Delta$ in distance $a$ between an individual hole of diameter $d_0$ and a cut end: 如果 $a < 3d_0$ If $a < 3d_0$  如果 $a \geq 3d_0$ If $a \geq 3d_0$	$\Delta = + 3 \text{ mm}, - 0 \text{ mm}$  $\Delta = \pm 3 \text{ mm}$
7.3	孔群位置 Position of hole group 	孔群与预期位置的偏差 $\Delta$ Deviation $\Delta$ of a hole group from intended position	$\Delta = \pm 2 \text{ mm}$
7.4	孔群间距 Spacing of hole groups 	孔群中心间距 $c$ 的偏差 $\Delta$ : Deviation $\Delta$ in spacing $c$ between centres of hole groups: 一般情况 general case 其中单件由两组紧固件连接 where a single piece is connected by two groups of fasteners	$\Delta = \pm 5 \text{ mm}$ $\Delta = \pm 2 \text{ mm}$
7.5	孔群扭转	扭转 $\Delta$ :	

	Twist of hole group 	Twist $\Delta$ : $h \leq 1000\text{mm}$ $h > 1000\text{mm}$	$\Delta = \pm 2\text{mm}$  $\Delta = \pm 4\text{mm}$
7.6	孔洞的椭圆化 Ovalisation of holes 	$\Delta = L_1 - L_2$	$\Delta = \pm 1\text{mm}$
7.7	槽口 Notches 	槽口深度和长度偏差 $\Delta$ : Deviation $\Delta$ of notch depth and length: 深度 $d$ Depth $d$  长度 $L$ Length $L$	$\Delta = 0\text{mm}$ $+\Delta \leq 3\text{mm}$ $\Delta = 0\text{mm}$ $+\Delta \leq 3\text{mm}$
8. 立柱拼接和底板 8.Column splices and baseplates			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
8.1	柱拼接处的偏心 Eccentricity at Column splice 	任意轴的非预期偏心率 $e$ Non-intended eccentricity $e$ about either axis	$e \leq 5\text{mm}$
8.2	底板 Baseplate	任何方向上的非预期偏心率 $e$ Non-intended eccentricity $e$ in any direction	$e \leq 5\text{mm}$
9. 格构件 9.Lattice components			

No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
9.1	直线度和起拱度 Straightness and camber  <p>注意焊接后测量的偏差，构件侧面平放。            Note Deviations measured after welding, with the component lying flat on its side.</p>		
	关键： Key: a 实际起拱度 a actual camber b 预期起拱度 b intended camber c 实际基准线 c actual line d 预期基准线 d intended line	每个面板点相对于直线或预期起拱度或曲率的偏差 Deviation at each panel point, relative to a straight line or to the intended camber or curvature	$\Delta = \pm L/500$ 或 12mm, 以较大者为准 $\Delta = \pm L/500$ or 12 mm, whichever is greater
9.2	面板尺寸 Panel dimensions 	面板点中心线交点之间的单个距离p的偏差 Deviation of individual distances $p$ between intersections of centrelines at panel points  面板点位置的累积偏差 $\Sigma p$ Cumulative deviation $\Sigma p$ of panel point position	$\Delta = \pm 5\text{mm}$  $\Delta = \pm 10\text{mm}$
9.3	支承构件的直线度 Straightness of bracing components 	支承长度 $L_i$ ( $L_1$ 或 $L_2$ ) 的直线度偏差 Deviation of bracing lengths $L_i$ ( $L_1$ or $L_2$ ) from straightness	$\Delta = \pm L_i/1000$ 或 4mm, 以较大者为准 $\Delta = \pm L_i / 1000$ or 4 mm, whichever is greater

9.4	横截面尺寸Cross-section dimensions 	距离 $D$ 、 $W$ 和 $X$ 的偏差， 其中 $s = D$ 、 $W$ 或 $X$ （视情况而定）： Deviation of distances $D$ , $W$ , and $X$ , where $s = D$ , $W$ , or $X$ as appropriate: $s \leq 300\text{mm}$ $300 < s < 1000\text{mm}$ $s \geq 1000\text{mm}$	$\Delta = \pm 3\text{mm}$ $\Delta = \pm 5\text{mm}$ $\Delta = \pm 10\text{mm}$
9.5	相贯节点 Intersecting joints 	偏心率（相对于预期偏心率） Eccentricity (relative to intended eccentricity)	$\Delta = \pm (B/20 + 5) \text{ mm}$
9.6	间隙节点 Gap joints 	支承构件之间的间隙 $g$ ： Gap $g$ between bracing components: $g \geq (t_1 + t_2)$ 其中 $t_1$ 和 $t_2$ 是支架的壁厚 where $t_1$ and $t_2$ are the wall thicknesses of braces	$\Delta = \pm 5\text{mm}$

## E.9 美国允许公差

## C.9 Tolerances for United States

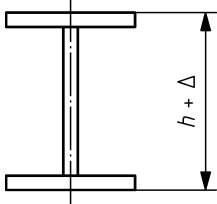
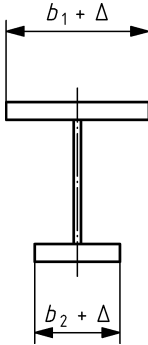
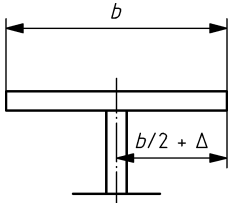
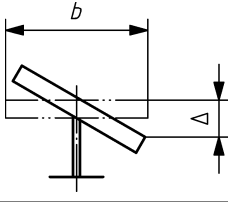
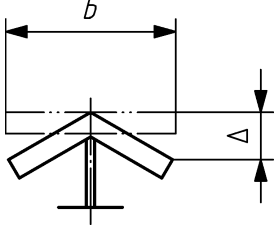
表 E.8 的参考标准是 AISC 303:2016 标准实施规范、ASTM A6:2019 和 AWS D1.1/D1.1:2020。

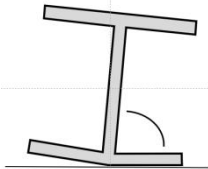
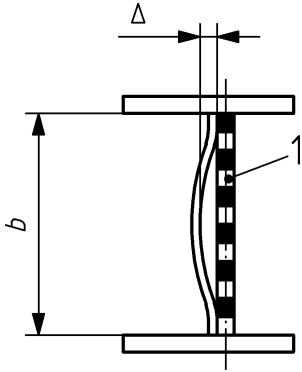
The reference standards for Table C.8 are AISC 303:2016 Code of Standard Practice, ASTM A6:2019, and AWS D1.1/D1.1:2020.

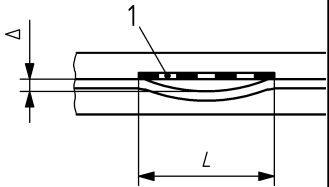
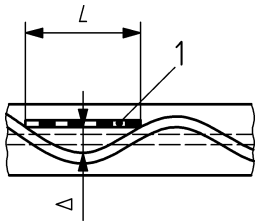
表 E.8——美国

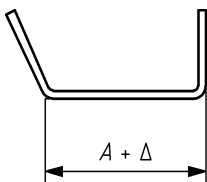
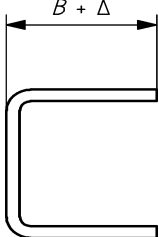
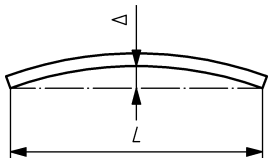
Table C.8 – United States

1. 焊接型材			
1.Welded profiles			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance

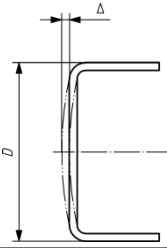
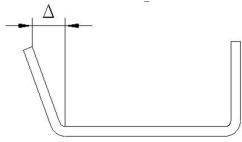
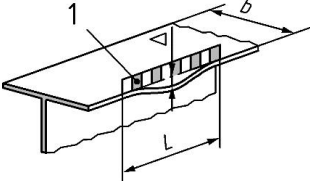
1.1	<p>高度</p> <p>Depth</p> 	<p>深度达36in[1m] (含)</p> <p>For depths up to 36 in [1 m] inclusive</p> <p>深度超过36in[1m]至72in[2m] (含)</p> <p>For depths over 36 in [1 m] to 72 in [2 m] inclusive</p> <p>深度超过72in[2m]</p> <p>For depths over 72 in [2 m]</p>	<p><math>\pm 1/8 \text{ in} [3 \text{ mm}]</math></p> <p><math>\pm 3/16 \text{ in} [5 \text{ mm}]</math></p> <p><math>+ 5/16 \text{ in} [8 \text{ mm}]</math></p> <p><math>- 3/16 \text{ in} [5 \text{ mm}]</math></p>
1.2 <sup>2</sup>	<p>翼缘宽度</p> <p>Flange width</p> 		<p><math>+ 1/4 \text{ in}, - 3/16 \text{ in} [+6 \text{ mm}, -5 \text{ mm}]</math></p>
1.3	<p>腹板偏心</p> <p>Web eccentricity</p> 		<p><math>\Delta = \pm 1/4 \text{ in} [\pm 6 \text{ mm}]</math></p>
1.4	<p>翼缘垂直度</p> <p>Squareness of flanges</p> 		<p><math>\Delta \leq 1\%</math></p> <p>翼缘总宽度<math>b</math>或<math>1/4 \text{ in} [6 \text{ mm}]</math>,</p> <p>以较大者为准</p> <p>the total flange width <math>b</math> or <math>1/4 \text{ in} [6 \text{ mm}]</math>, whichever is greater</p>
1.5	<p>翼缘平整度</p> <p>Flatness of flanges</p> 		<p><math>\Delta \leq 1\%</math></p> <p>翼缘总宽度<math>b</math>或<math>1/4 \text{ in} [6 \text{ mm}]</math>,</p> <p>以较大者为准</p> <p>the total flange width <math>b</math> or <math>1/4 \text{ in} [6 \text{ mm}]</math>, whichever is greater</p>

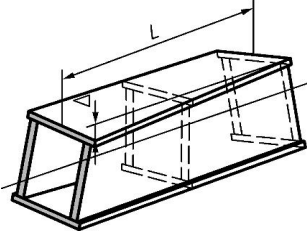
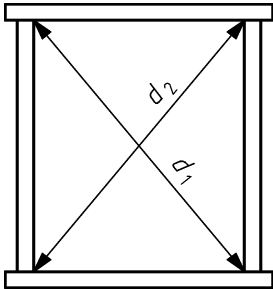
1.6	支座垂直度 Squareness of bearings		无要求 No requirement
1.6a	支座与腹板之间的角度 Angle between bearing surface and web 	支座与腹板之间角度 Angle between bearing surface and web	$\leq 90^\circ$
1.7	腹板曲率 Plate curvature  <p>1 标距长度 1 gauge length 主梁端部见b See b for ends of girders</p>	静载非管状结构 Statically Loaded Nontubular Structures $b$ = 腹板高度; $d$ = 最小面板尺寸 $b$ = web depth; $d$ = least panel dimension	
		腹板两侧的中間加劲肋 Intermediate stiffeners on both sides of web $b/t < 150$ $b/t \geq 150$ 仅在腹板一侧设置中间加劲肋 Intermediate stiffeners on one side $b/t < 100$ $b/t \geq 100$ 无中间加劲肋 No intermediate stiffeners $b/t \geq 100$	$\Delta = d/100$ $\Delta = d/80$ $\Delta = d/100$ $\Delta = d/67$ $\Delta = b/150$
		周期性加载的非管状结构 Cyclically loaded nontubular structures	
		腹板两侧的中間加劲肋 Intermediate stiffeners on both sides of web 内部大梁 Interior girders $b/t < 150$ $b/t \geq 150$ 封檐板梁 Fascia girders $b/t < 150$ $b/t \geq 150$	$\Delta = d/115$ $\Delta = d/92$ $\Delta = d/130$ $\Delta = d/105$ $\Delta = d/100$ $\Delta = d/67$

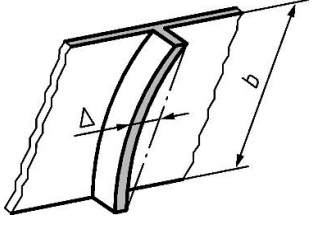
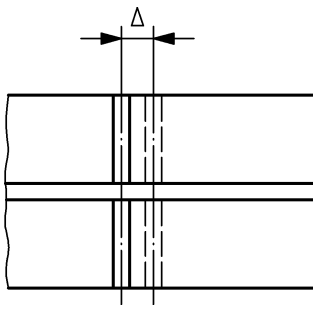
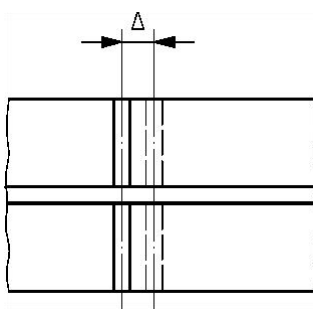
		仅在腹板一侧设置中间加劲肋 Intermediate stiffeners on one side only of web 内部大梁 Interior girders $b/t < 100$ $b/t \geq 100$ 封檐板梁 Fascia girders $b/t < 100$ $b/t \geq 100$ 无中间加劲肋 No intermediate stiffeners	$\Delta = d/120$ $\Delta = d/80$ $\Delta = d/150$
1.8	腹板扭曲 <sup>a</sup> Web distortion <sup>a</sup>  1 标距长度 1 gauge length	包含在案例1.7中 Included in case 1.7	
1.9	腹板起伏 Web undulation  1 标距长度 1 gauge length	包含在案例1.7中 Included in case 1.7	
1.10	开口公称直径为D的现浇梁和蜂窝梁[由板材或热轧型材制成] Castellated beams and cellular beams [fabricated either from plate or from hot-rolled sections] with openings of inscribed nominal diameter D		无要求 No requirement

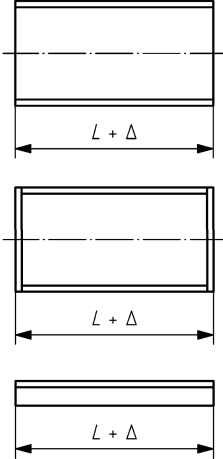
<p>注 来源: AWS D1.1/D1.1M:2020, 除非另有说明</p> <p>NOTE Source: AWS D1.1/D1.1M:2020 Unless otherwise noted</p> <p><sup>a</sup>当发生在已钻孔或二次冲孔和扩孔的主梁末端时, AWS D1.1/D1.1M:2020第7.22.6.2或7.22.6.3款允许公差两倍的腹板变形是令人满意的; 无论是在组装过程中还是在现场螺栓拼接的模板上; 前提是, 当拼接板用螺栓连接时, 腹板具有适当的尺寸公差。</p> <p><sup>a</sup>Web distortions of twice the allowable tolerances of AWS D1.1/D1.1M:2020, subclauses 7.22.6.2 or 7.22.6.3 are satisfactory when occurring at the end of a girder that has been drilled, or sub-punched and reamed; either during assembly or to a template for a field bolted splice; provided, when the splice plates are bolted, the web assumes the proper dimensional tolerances.</p>			
<p><b>2. 压制型材</b></p> <p><b>2. Press-braked profiles</b></p>			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
2.1	<p>内部构件宽度</p> <p>Internal element width</p> 		$\Delta = \pm 1/32\text{in}[\pm 1\text{mm}]$
2.2	<p>外露构件宽度</p> <p>Outstand element width</p> 		$\Delta = +1/8\text{in}[+3\text{mm}],$ $-1/16\text{in}[-2\text{mm}]$
2.3	<p>用于无约束状态下构件的直线度</p> <p>Straightness for component to be used unrestrained</p> 		$\Delta = 1/8\text{in}/10\text{ft}$ $[\Delta = 3\text{mm}/3\text{m}]$
2.4	<p>平整度</p> <p>Flatness</p>		$\Delta = \pm 1/16\text{in}[\pm 2\text{mm}]$

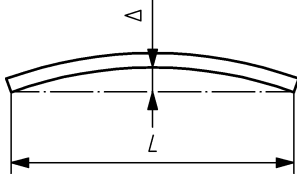
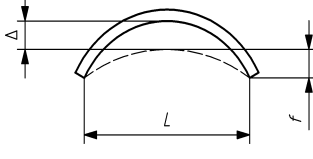


			
2.5	弯曲半径 Bend radius		无要求 No requirement
2.6	形状 Shape		无要求 No requirement
2.6a	偏离正方形 Offset from square 		$\Delta = \pm 1/16\text{in}[\pm 2\text{mm}]$
资料来源: AISI S240表5-1 Source: AISI S240 Table 5-1			
3. 焊接型材翼缘 3.Flanges of welded profiles			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
3.1	I型截面翼缘变形 Flange distortion of I section  1 标距长度 1 gauge length		$\Delta = 1/4\text{in}[6\text{mm}]$
3.2	I型截面翼缘起伏 Flange undulation of I section		无要求 No requirement
3.3	待使用构件的直线度不受限制 Straightness for component to be used unrestrained		无要求 No requirement
4. 焊接箱形截面翼缘 4.Flanges of welded box sections			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance

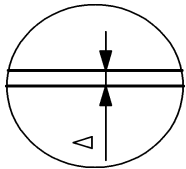
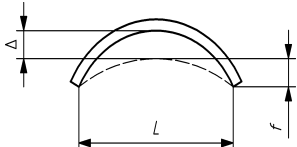
4.1	截面尺寸 Section dimension		无要求 No requirement
4.2	扭转 Twist 	AWS D1.1/D1.1M第7.22条未涵盖的箱形构件的扭转和构件的其他尺寸公差由承包商和业主单独确定并共同商定，同时适当考虑安装要求。 Twist of box members and other dimensional tolerances of members not covered by AWS D1.1/D1.1M clause 7.22 are individually determined and mutually agreed upon by the Contractor and the Owner with proper regard for erection requirements.	
4.3	腹板或加劲肋之间的板面平面外缺陷，一般情况 Out-of-plane imperfection of plate panel between web or stiffener, general case		无要求 No requirement
4.4	腹板或加劲肋之间的板面的平面外缺陷（横向受压的特殊情况——除非另有规定该特殊情况，否则采用一般情况） Out-of-plane imperfections of plate panel between webs or stiffeners (special case with compression in the transverse direction – the general case applies unless this special case is specified)		无要求 No requirement
4.5	方正度 Squareness 	AWS D1.1/D1.1M第7.22条未涵盖的箱形构件的扭转和构件的其他尺寸公差由承包商和业主单独确定并共同商定，同时适当考虑安装要求。 Twist of box members and other dimensional tolerances of members not covered by AWS D1.1/D1.1M clause 7.22 are individually determined and mutually agreed upon by the Contractor and the Owner with proper regard for erection requirements.	

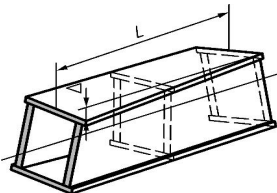
5. 型材或箱形截面的腹板加劲肋和十字形节点			
5.Web stiffeners and cruciform joints of profiles or box sections			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
5.1	平面内直线度 In-plane straightness 	中间加劲肋: Intermediate stiffeners: —适用于深度不超过6ft[1.8m]的主梁 — for girders up to 6 ft [1.8 m] deep  —对于深度超过6ft[1.8m]的主梁, 应当考虑框架内的构件 — for girders over 6 ft [1.8 m] deep, with due regard for members that frame into them	$\Delta = 1/2\text{in}[12\text{mm}]$  $\Delta = 3/4\text{in}[20\text{mm}]$
5.2	平面外直线度 Out-of-plane straightness		无要求 No requirement
5.3	腹板加劲肋的位置 Location of web stiffeners		无要求 No requirement
5.4	支座处腹板加劲肋的位置 Location of web stiffeners at support 	轴承加劲肋的直线度: Straightness of bearing stiffeners:  适用于深度不超过6ft[1.8m]的主梁 for girders up to 6 ft [1.8 m] deep  适用于深度超过6ft[1.8m]的主梁 for girders over 6 ft [1.8 m] deep	$\Delta = 1/4\text{in}[6\text{mm}]$  $\Delta = 1/2\text{in}[12\text{mm}]$
5.4a	轴承加劲肋的位置 Location of bearing stiffeners 	加劲肋的实际中心线应位于从理论中心线位置测量的加劲肋厚度范围内 The actual centreline of the stiffener is to lie within the thickness of the stiffener as measured from the theoretical centreline location	
5.5	腹板加劲肋偏心		无要求

	Eccentricity of web stiffeners		No requirement
5.6	支座处腹板加劲肋的偏心 Eccentricity of web stiffeners at supports		无要求 No requirement
5.7	负载点处的轴承 Bearing at points of loading	<p>轴承加劲肋的支承端应与腹板成直角，且至少75%的加劲肋支承横截面积与翼缘内表面接触。当翼缘抵靠钢底座或阀座时，翼缘的外表面应在腹板和加劲肋投影面积的75%内安装在0.010in[0.25mm]以内，在剩余的25%投影面积内安装不超过1/32in[1mm]。</p> <p>The bearing ends of bearing stiffeners are to be square with the web and have at least 75% of the stiffener bearing cross-sectional area in contact with the inner surface of the flanges. The outer surface of the flanges when bearing against a steel base or seat is to fit within 0.010 in [0,25 mm] for 75% of the projected area of web and stiffeners and not more than 1/32 in [1 mm] for the remaining 25% of the projected area.</p>	
<b>6. 构件</b> <b>6.Components</b>			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
6.1	长度 Length 	$L \leq 30 \text{ ft (9 000 mm)}$ in length 长度 $L \leq 30\text{ft}$ (9000mm)  $L > 30 \text{ ft (9 000 mm)}$ in length 长度 $> 30\text{ft}$ (9000mm)	$\Delta = \pm 1/16\text{in}[\pm 2\text{mm}]$  $\Delta = \pm 1/8\text{in}[\pm 3\text{mm}]$
6.2	可调整相邻构件进行充分补偿处的长度 Length, where sufficient compensation with adjacent component is possible	—	—
6.3 <sup>1</sup>	直线度 Straightness	W和HP形状，高度约等于翼缘宽度，用作立柱	

		<p>W and HP shapes with depth approximately equal to flange width, used as columns</p> <p><math>L &lt; 30\text{ft}[9\text{m}]</math></p> <p><math>L \geq 30\text{ ft [9 m]} \text{ and } \leq 45\text{ ft [15 m]}</math></p> <p><math>L \geq 30\text{ft}[9\text{m}] \text{ 且 } \leq 45\text{ft}[15\text{m}]</math></p> <p><math>L &gt; 45\text{ft}[15\text{m}]</math></p> <p>梁和大梁 Beams and girders (未指定起拱度) (No camber specified) 除受压构件外的直构件 Straight members other than compression members 直受压构件Straight compression members</p>	<p><math>\Delta = 1/8\text{in} \times L \text{ (ft) } / 10</math></p> <p><math>\Delta = [1\text{ mm} \times L \text{ (m) } ]</math></p> <p><math>\Delta = 3/8\text{in}[10\text{mm}]</math></p> <p><math>\Delta = 3/8\text{in} + [1/8\text{in} \times (L \text{ (ft) } - 45) ] / 10</math></p> <p><math>\Delta = [10\text{mm} + (1\text{mm} \times (L(\text{m}) - 15))]</math></p> <p><math>\Delta = 1/8\text{in} \times L \text{ (ft) } / 10</math></p> <p><math>\Delta = [1\text{mm} \times L \text{ (m) } ]</math></p> <p><math>\Delta =</math> 等于或小于适用ASTM标准中为结构形状规定的值</p> <p><math>\Delta =</math> equal to or less than that specified for structural shapes in the applicable ASTM standards</p> <p><math>\Delta =</math> 横向支承点之间轴向长度的1/1000</p> <p><math>\Delta = 1/1000</math> of the axial length between points that are to be laterally supported</p>
6.4 <sup>2</sup>	<p>平面图上的起拱度或预期曲率 Camber or intended curvature on plan</p> 	<p>跨中梁和梁起拱度（典型梁） Beam and girder camber (Typical girder) at midspan</p> <p><math>L &lt; 100\text{ft}[30\text{m}]</math></p> <p><math>L \geq 100\text{ft}[30\text{m}]</math></p> <p>内部支承 at interior supports 在中间点，其中 at intermediate points, where</p> <p><math>a =</math> 从检查点到最近支架的距离，单位为ft（m） <math>a =</math> distance in feet (meters) from inspection point to nearest support</p> <p><math>S =</math> 对于跨度小于100ft[30m]的情况： <math>S =</math> span length in feet (meters)</p> <p><math>b = 3/4\text{ in [10 mm]}</math></p> <p>对于跨度<math>\geq 100\text{ft}[30\text{m}]</math>的情况： <math>b = 1-1/2\text{ in [40 mm]}</math></p> <p>for spans <math>\geq 100\text{ ft [30 m]}</math>:</p>	<p><math>\Delta = -0, +3/4\text{in}[-0, +20\text{mm}]</math></p> <p><math>\Delta = -0, +1-1/2\text{in}[-0, +40\text{mm}]</math></p> <p><math>\Delta = \pm 1/8\text{in}[\pm 3\text{mm}]</math></p> <p><math>\Delta = \pm [4 (a) b (1-a/S) ] / S</math></p> <p><math>\Delta = -0, +3/8\text{in}[-0, +10\text{mm}]</math></p> <p><math>\Delta = -0, +1-1/2\text{in}[-0, +40\text{mm}]</math></p> <p><math>\Delta = \pm 1/8\text{in}[\pm 3\text{mm}]</math></p>

	<p>梁起拱度（顶部翼缘嵌入混凝土中，没有设计的混凝土拱腋）</p> <p>Beam and girder camber (top flange is embedded in concrete without a designed concrete haunch)</p> <p>at midspan:</p> <p>跨中:</p> <p>— where <math>L &lt; 100 \text{ ft}</math> [30 m]</p> <p>— 其中 <math>L &lt; 100\text{ft}</math>[30m]</p> <p>— where <math>L \geq 100 \text{ ft}</math> [30 m]</p> <p>—其中 <math>L \geq 100\text{ft}</math>[30m]:</p> <p>at interior supports:</p> <p>在中间点，其中</p> <p>at intermediate points, where</p> <p><math>a</math> = 从检查点到最近支架的距离，单位为ft（m）</p> <p><math>a</math> = distance in feet (meters) from inspection point to nearest support</p> <p><math>S</math> = 对于跨度小于100ft[30m]的情况:</p> <p><math>S</math> = span length in feet (meters) for spans <math>&lt; 100 \text{ ft}</math> [30 m],</p> <p><math>S</math> = 对于跨度大于100ft[30m]的情况,</p> <p><math>b = 3/8 \text{ in}</math> [10 mm]</p> <p>for spans <math>\geq 100 \text{ ft}</math> [30 m],</p> <p><math>b = 3/4 \text{ in}</math> [20 mm]</p> <p>在中部弦高处测得的曲率变化应小于或等于适用的ASTM标准中规定的在强方向上的起拱度和在弱方向上的弯曲允许的直线度变化，无论是在理论弧线的内部还是外部。</p> <p>Variation in curvature measured at the middle ordinate <math>\leq</math> the permissible variations in straightness as specified in applicable ASTM standards for camber in the strong direction and sweep in the weak direction, inside or outside of the theoretical arc (more ...)</p>	$\Delta = \pm[4(a)b(1-a/S)]/S$ $\Delta = -0, +1/2\text{in}[-0, +12\text{mm}]$ $\Delta = -0, +1/2\text{in}+$ <p>(1/8 per 10 ft or fraction thereof)</p> <p>(每10ft或其分数部分的1/8in)</p> $[\Delta = -0, +13\text{mm}+$ <p>(3 mm per 3 000 mm or fraction thereof)]</p> <p>(每3000mm或其分数部分的3mm)]</p>
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		<p>对于合同文件中规定的具有起拱度的梁，制造商收到的具有规定起拱度75%的梁不需要进一步拱度。</p> <p>For beams that are specified in the contract documents with camber, beams received by the fabricator with 75% of the specified camber require no further cambering.</p> <p>梁, <math>L \leq 50\text{ft}</math> (15000mm)</p> <p>Beams, <math>L \leq 50\text{ ft}</math> (15 000 mm)</p> <p>梁, <math>L &gt; 50\text{ft}</math> (15000mm)</p> <p>Beams, <math>L &gt; 50\text{ ft}</math> (15 000 mm)</p>	
6.5	<p>全接触支承表面处理</p> <p>Surfaces finished for full contact bearing</p> 	<p>无加劲肋的主梁应承受外翼缘表面腹板投影面积在0.010in[0.25mm]以内，腹板和翼缘之间的夹角在承载长度内不得超过90°</p> <p>Girders without stiffeners are to bear on the projected area of the web on the outer flange surface within 0,010 in [0,25 mm] and the included angle between web and flange is not to exceed 90° in the bearing length</p>	
6.6	<p>端部方正度</p> <p>Squareness of ends</p>		<p>无要求</p> <p>No requirement</p>
6.7	<p>Twist</p> <p>扭转</p>		<p>无要求</p> <p>No requirement</p>
6.8	<p>长度变化</p> <p>Variation in length</p> 	<p>弦长L的变化</p> <p>Variation in the chord length <math>L</math></p>	<p>与上述第6.1项相同</p> <p>same as item 6.1 above</p>
<p>来源：AISC标准实施规范第6.4节，ASTM A6/A6M，AWS D1.1/D1.1M，第7.22条</p> <p>Sources: AISC Code of Standard Practice Section 6.4, ASTM A6/A6M, AWS D1.1/D1.1M, clause 7.22</p>			
<p><b>7. 紧固件孔、槽口和切边</b></p> <p><b>7.Fastener holes, notches and cut edges</b></p>			
No 编号	标准 Criterion	参数 Parameter	允许公差 Tolerance
7.1	紧固件孔的位置		无要求

	Position of holes for fasteners		No requirement
7.2	紧固件孔的位置 Position of holes for fasteners 		$\Delta = 1/4\text{in}[6\text{mm}]$
7.3	孔群位置 Position of hole group		无要求 No requirement
7.4	孔群间距 Spacing of hole groups		无要求 No requirement
7.5	孔群扭转 Twist of hole group		无要求 No requirement
7.6	孔洞的椭圆化 Ovalisation of holes		无要求 No requirement
7.7	槽口 Notches		无要求 No requirement
<b>8. 立柱拼接和底板</b> <b>8.Column splices and baseplates</b>			
<b>No 编号</b>	<b>标准 Criterion</b>	<b>参数 Parameter</b>	<b>允许公差 Tolerance</b>
8.1	立柱拼接 Column splice		无要求 No requirement
8.2	底板 Baseplate		无要求 No requirement
<b>9. 格构件</b> <b>9.Lattice components</b>			
<b>No 编号</b>	<b>标准 Criterion</b>	<b>参数 Parameter</b>	<b>允许公差 Tolerance</b>
9.1	直线度和起拱度 Straightness and camber		无要求 No requirement
9.2	面板尺寸 Panel dimensions		无要求 No requirement
9.3	支承构件的直线度 Straightness of bracing components		无要求 No requirement



9.4	横截面尺寸 Cross-section dimensions		无要求 No requirement
9.5	相贯节点 Intersecting joints		无要求 No requirement
9.6	间隙节点 Gap joints		无要求 No requirement

## 附录 F

### Annex D

(信息性)

(informative)

几何公差-桥梁

**Geometric tolerances – Bridges**

#### F.1 概述

##### D.1 General

桥梁几何公差的允许公差参考以下国家标准：

Permitted deviations for geometrical tolerances in bridges are referenced in national standards in:

- 表 F.1：欧洲；
- Table D.1: Europe;
- 表 F.2：澳大利亚/新西兰；
- Table D.2: Australia / New Zealand;
- 表 F.3：加拿大；
- Table D.3: Canada;
- 表 F.4：中国；
- Table D.4: China;
- 表 F.5：日本；
- Table D.5: Japan;
- 表 F.6：俄罗斯联邦；
- Table D.6: Russian Federation;
- 表 F.7：英国；
- Table D.7: United Kingdom;

- 表 F.8: 美国;
- Table D.8: United States;

## F.2 欧洲允许公差

### D.2 Tolerances for Europe

除非另有说明，表 F.1 内标准为主要参考依据。

Unless otherwise noted, the standard indicated in Table D.1 is the main reference.

表 F.1—欧洲

Table D.1 – Europe

标准 Standard	名称 Title	备注 Notes
EN 1090-2	《钢结构与铝结构施工—第 2 部分：钢结构技术要求》 Execution of steel structures and aluminium structures - Part 2: Technical requirements for steel structures 表 B7 表 B13 表 B21	表 B21 包含部分项目，其余 则针对现场焊接。 Table B21 contains some items, and others are for welding on site.

## F.3 澳大利亚及新西兰允许公差

### D.3 Tolerances for Australia and New Zealand

除非另有说明，表 F.2 内标准为主要参考依据。

Unless otherwise noted, the standard indicated in Table D.2 is the main reference.

表 F.2—澳大利亚与新西兰

Table D.2 – Australia and New Zealand

标准 Standard	名称 Title	备注 Notes
AS/NZS 5131	《钢结构工程——制造与安装》 Structural steelwork – Fabrication and erection	引用自 AS/NZS 5100.6 《桥梁设计——第 6 部分：钢与组合结构施工》 Referenced from AS/NZS 5100.6 Bridge design – Part 6: Steel and composite construction

## F.4 加拿大允许公差

### D.4 Tolerances for Canada

除非另有说明，表 F.3 内标准为主要参考依据。

Unless otherwise noted, the standard indicated in Table D.3 is the main reference.

表 F.3—加拿大

Table D.3 –Canada

标准 Standard	名称 Title	备注 Notes
CSA S6	《加拿大公路桥梁设计规范》 Canadian Highway Bridge Design Code	
CSA W59	《焊接钢结构（金属电弧焊）》 Welded Steel Construction (Metal Arc Welding)	

## F.5 中国允许公差

### D.5 Tolerances for China

除非另有说明，表 F.4 内标准为主要参考依据。

Unless otherwise noted, the standard indicated in Table D.4 is the main reference.

表 F.4—中国

Table D.4 – China

标准 Standard	名称 Title	备注 Notes
GB 50205	《钢结构工程施工质量验收标准》 Standard for acceptance of construction quality of steel structures	

## F.6 日本允许公差

### D.6 Tolerances for Japan

除非另有说明，表 F.5 内标准为主要参考依据。

Unless otherwise noted, the standard indicated in Table D.5 is the main reference.

表 F.5—日本

Table D.5 – Japan

标准 Standard	名称 Title	备注 Notes
日本道路协会 (JARA) Japan Road Association	《日本公路桥梁设计规范，第一部分 通用》 Japanese Design Specifications for Highway Bridges, Part I Common	2017
日本道路协会 (JARA) Japan Road Association	《日本公路桥梁设计规范，第二部分 钢桥》 Japanese Design Specifications for Highway Bridges, Part II Steel Bridges	2017

## F.7 俄罗斯联邦允许公差

### D.7 Tolerances for Russian Federation

吊车梁的允许公差依据建造技术规格书确定。

Crane runways are established by execution specification.

吊车梁无具体标准。

No specific standard for crane runways.

表 F.6—俄罗斯联邦

Table D.6 – Russian Federation

标准 Standard	名称 Title	备注 Notes
—	—	—

## F.8 英国允许公差

### D.8 Tolerances for United Kingdom

除非另有说明，表 F.7 内标准为主要参考依据。

Unless otherwise noted, the standards indicated in Table D.7 are the main reference.

表 F.7—英国

Table D.7 – United Kingdom

标准 Standard	名称 Title	备注 Notes
EN 1090-2	《钢结构和铝结构的施工》 第 2 部分：钢结构的技术要求 Execution of steel structures and aluminium structures - Part 2: Technical requirements for steel structures	
PD 6705-2	《钢和铝的结构用途》第 2 部分 符合 EN 1090-2 的钢桥施工 Structural use of steel and aluminium: Part 2: Execution of steel bridges conforming to EN 1090-2	
	《公路工程合同文件手册 第一卷：公路工程规范 第 1800 系列——结构钢工程》 Manual of Contract Documents for Highway Works Volume 1 Specification for Highway Works Series 1800 - Structural Steelwork	

## F.9 美国允许公差

## D.9 Tolerances for United States

除非另有说明，表 F.8 内标准为主要参考依据。

Unless otherwise noted, the standards indicated in Table D.8 are the main references.

表 F.8—美国

Table D.8 – United States

标准 Standard	名称 Title	备注 Notes
铁路桥梁, AREMA 3.1.7	《铁路工程手册》，第 15 章 Manual for Railway Engineering, Chapter 15	
公路桥梁， 以下情况除外	《AASHTO 桥梁施工规范》 AASHTO Bridge Construction Specification	
焊接部件 AASHTO/AWS D1.5M/D1.5	《AWS 桥梁焊接规范》 AWS Bridge Welding Code	

## 附录 G

### Annex E

(信息性)

(informative)

#### 几何公差-吊车梁

#### Geometric tolerances – Crane runways

### G.1 概述

#### E.1 General

吊车梁的几何公差允许公差如下：

Permitted deviations for geometrical tolerances in crane runways are given in:

- 表 G.1: 欧洲;
- Table E.1: Europe;
- 表 G.2: 澳大利亚/新西兰;
- Table E.2: Australia / New Zealand;
- 表 G.3: 加拿大;
- Table E.3: Canada;
- 表 G.4: 中国;
- Table E.4: China;
- 表 G.5: 日本;
- Table E.5: Japan;
- 表 G.6: 俄罗斯联邦;
- Table E.6: Russian Federation;
- 表 G.7: 英国;
- Table E.7: United Kingdom;

- 表 G.8: 美国;
- Table E.8: United States.

## G.2 欧洲允许公差

### E.2 Tolerances for Europe

除非另有说明, 表 G.1 的参考标准为 EN 1090-2。表 G.1 中具体的定义如下:

Unless otherwise noted, the reference standard for Table E.1 is EN 1090-2.

Definitions specific to Table E.1 are:

#### a) 基本公差:

#### a) Essential tolerances:

基本公差对于结构的承载力和稳定性至关重要, 因此必须满足。

Essential tolerances are essential for the mechanical resistance and stability of the completed structure and are therefore to be fulfilled.

#### b) 功能公差:

#### b) Functional tolerances:

功能公差是指为了满足其他标准, 如组装和外观而设定的公差。

Functional tolerances are those required to fulfil other criteria such as fit-up and appearance.

#### c) 一级公差:

#### c) Class 1:

除非建造技术规格书中另有规定, 否则应采用一级公差。

Tolerance Class 1 shall be applied unless otherwise specified in the execution specification.

#### d) 二级公差:

#### d) Class 2:

在更小的公差偏差要求中可以采用二级公差代替一级公差, 如安装玻璃幕墙。

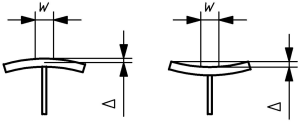
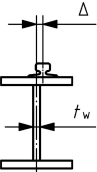
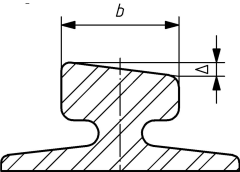
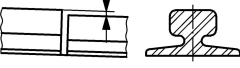
Tolerance Class 2 can substitute Class 1 if smaller tolerance deviations are required,



for example if glazed facades are to be fitted.

表 G.1—欧洲

Table E.1 – Europe

编号 No	标准 Criterion	参数 Parameter	功能公差 <sup>a</sup> Functional tolerances <sup>a</sup> 允许公差Δ Permitted deviation Δ	
			一级 Class 1	二级 Class 2
1	起重梁上翼缘的平整度 Flatness of top flange of a crane beam 	轨道中心宽度 $w$ 范围内平整度, $w$ 为轨道宽度与轨道轨心两侧各 10 mm 之和。 Out of flatness over a central width $w$ equal to the rail width plus 10 mm either side of rail in nominal position	$\Delta = \pm 1 \text{ mm}$	$\Delta = \pm 1 \text{ mm}$
2	轨道相对于腹板的偏心距离 Eccentricity of rail relative to web 	$t_w \leq 10 \text{ mm}$ $t_w > 10 \text{ mm}$	$\Delta = 5 \text{ mm}$ $\Delta = 0.5 t_w$	$\Delta = 5 \text{ mm}$ $\Delta = 0.5 t_w$
3	轨道的坡度 Slope of rail 	横截面上表面的坡度 Slope of top surface of cross-section	$\Delta = \pm b/100$	$\Delta = \pm b/100$
4	轨道的水平度 Level of rail 	轨道节点处顶部的台阶 Step in top of rail at joint	$\Delta = \pm 1 \text{ mm}$	$\Delta = \pm 0.5 \text{ mm}$
5	轨道的边缘 Edge of rail	节点处边缘的台阶 Step in edge of rail at joint	$\Delta = \pm 1 \text{ mm}$	$\Delta = \pm 0.5 \text{ mm}$

				
<sup>a</sup> 基本公差无规定 <sup>a</sup> No essential tolerance specified				

### G.3 澳大利亚及新西兰允许公差

#### E.3 Tolerances for Australia and New Zealand

除非另有说明，表 G.2 的参考标准为 AS/NZS 5131:2016。。表 G.2 中具体的定义如下：

Unless otherwise noted, the reference standard for Table E.2 is AS/NZS 5131:2016..

Definitions specific to Table E.2 are:

##### 1) 基本公差:

##### 1) Essential tolerances:

基本限值是指在设计强度和稳定性方面，为满足结构设计假设所必须的几何公差的最小要求（见 AS 4100、AS/NZS 5100.6 以及 NZS 3404）。

Basic limit for a geometrical tolerance necessary to satisfy the design assumptions for a structure in terms of design capacity and stability (see AS 4100, AS/NZS 5100.6 and NZS 3404).

##### 2) 功能公差:

##### 2) Functional tolerances:

除基本公差外，为了满足外观或组装等其他功能可能需要的公差。

A tolerance which can be required to meet a function other than those of an essential tolerance, such as for appearance or fit-up.

##### 3) 一级:

##### 3) Class 1:

除非建造技术规格书中另有规定，否则应适用一级公差。

Tolerance Class 1 shall be applied unless otherwise specified in the execution

specification.

#### 4) 二级:

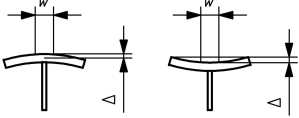
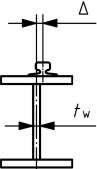
#### 4) Class 2:

在更小的公差偏差要求中可以采用二级公差代替一级公差，如安装玻璃幕墙。

Tolerance Class 2 can substitute for Class 1 if smaller tolerance deviations are required, for example if glazed facades are to be fitted.

表 G.2—澳大利亚及新西兰

Table E.2 – Australia and New Zealand

编号 No	标准 Criterion	参数 Parameter	功能公差 <sup>a</sup> Functional tolerances <sup>a</sup> 允许公差Δ Permitted deviation Δ	
			一级 Class 1	二级 Class 2
1a	起重梁上翼缘的平整度 Flatness of top flange of a crane beam 	轨道中心宽度 $w$ 范围内平整度, $w$ 为轨道宽度与轨道轨心两侧各 10 mm 之和。 Out of flatness over a central width $w$ equal to the rail width plus 10 mm either side of rail in nominal position	$\Delta = \pm 1 \text{ mm}$	$\Delta = \pm 1 \text{ mm}$
2a	轨道相对于腹板的偏心距离 Eccentricity of rail relative to web 	$t_w \leq 10 \text{ mm}$ $t_w > 10 \text{ mm}$	$\Delta = 5 \text{ mm}$ $\Delta = 0.5t_w$	$\Delta = 5 \text{ mm}$ $\Delta = 0.5t_w$
<sup>a</sup> 该标准与表 E.1 – 欧洲类似 <sup>a</sup> This criterion is similar to the one provided in Table E.1 – Europe.				

## G.4 加拿大允许公差

### E.4 Tolerances for Canada

表 G.3 的参考标准为 CSA W59-18 以及 CSA S16:19。

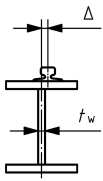
The reference standards for Table E.3 are CSA W59-18 and CSA S16:19.

允许公差是指允许偏离公称尺寸和几何形状的公差，例如长度切割、端部加工、斜角切割，以及制造件的起拱度和侧向偏差（如横弯和纵弯）。

Fabrication tolerances are tolerances allowed from the nominal dimensions and geometry, such as cutting to length, finishing of ends, cutting of bevel angles, and out-of-straightness such as camber and sweep for fabricated members.

表 G.3—加拿大

Table E.3 – Canada

编号 No	标准 Criterion	参数 Parameter	允许公差 Tolerance
1	轨道相对于腹板的偏心距离 Eccentricity of rail relative to web 		$\Delta \leq 9 \text{ mm}$ 以及 75%腹板厚度的较小值 $\Delta \leq 9 \text{ mm, or } 75\% \text{ of web thickness, whichever is less}$

## G.5 中国允许公差

### E.5 Tolerances for China

表 G.4 的参考标准为 GB 50205-2020。

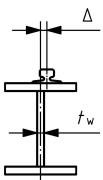
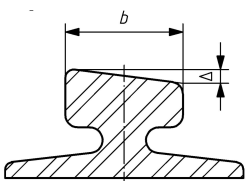
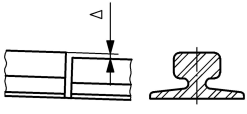
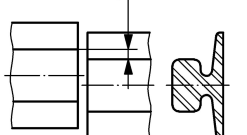
The reference standard for Table E.4 is GB 50205-2020.

注：GB 50205-2020 为钢结构施工质量验收标准。

NOTE GB 50205-2020 is a standard for acceptance of construction quality of steel structures.

表 G.4—中国

Table E.4 – China

编号 No	标准 Criterion	参数 Parameter	允许公差 Tolerance
1	轨道相对于腹板的偏心距离 Eccentricity of rail relative to web 		$\Delta = t_w/2$
2	轨道的坡度 Slope of rail 		$\Delta = b/100$
3	轨道的水平度 Level of rail 		$\Delta_{\text{Max}} = 1 \text{ mm}$
4	轨道的边缘 Edge of rail 		$\Delta_{\text{Max}} = 1 \text{ mm}$

## G.6 日本允许公差

### E.6 Tolerances for Japan

吊车梁的几何公差依据建造技术规格书确定。

Crane runways are established by execution specification.

表 G.5—日本

Table E.5 – Japan

编号 No	标准 Criterion	参数 Parameter	允许公差 Tolerance
1			建造技术规格书 execution specification

## G.7 俄罗斯联邦允许公差

### E.7 Tolerances for Russian Federation

吊车梁的几何公差依据建造技术规格书确定。

Crane runways are established by execution specification.

表 G.6—俄罗斯联邦

Table E.6 – Russian Federation

编号 No	标准 Criterion	参数 Parameter	允许公差 Tolerance
1			建造技术规格书 execution specification

## G.8 英国允许公差

### E.8 Tolerances for United Kingdom

表 G.7 的参考标准是 BCSA 国家钢结构规范，第 7 版，2021 年。

The reference standard for Table E.7 is BCSA National Structural Steelwork Specification, 7th Ed, 2021.

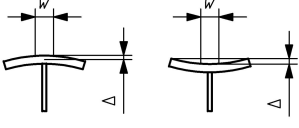
公差定义见注释。

See footnotes for definition of tolerances.

表 G.7—英国

Table E.7 – United Kingdom

编号 No	标准 Criterion	参数 Parameter	允许公差 <sup>a</sup> Tolerance <sup>a</sup>
1	吊车梁上翼缘的平整度 Flatness of top flange of a crane beam	轨道中心宽度 $w$ 范围内平整度， $w$ 为轨道宽度与轨道轨心两侧各 10 mm 之和。	$\Delta = \pm 1 \text{ mm}$

		Out of flatness over a central width $w$ equal to the rail width plus 10 mm either side of rail in nominal position	
2	轨道相对于腹板的偏心距离 Eccentricity of rail relative to web	查看安装公差 See erection tolerances	
3	轨道的坡度 Slope of rail	查看安装公差 See erection tolerances	
4	轨道的水平度 Level of rail	查看安装公差 See erection tolerances	
5	轨道的边缘 Edge of rail	查看安装公差 See erection tolerances	
<sup>a</sup> 基本公差无规定 <sup>a</sup> No essential tolerance specified.			

## G.9 美国允许公差

### E.9 Tolerances for United States

表 G.8 的参考文件是 AISC 设计指南 7 工业建筑设计。

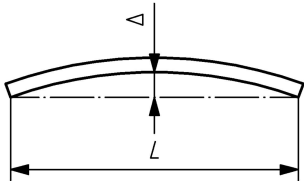
The reference document for Table E.8 is AISC Design Guide 7 Industrial Building Design.

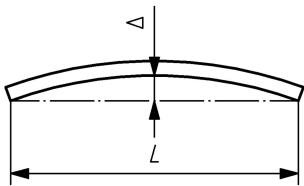
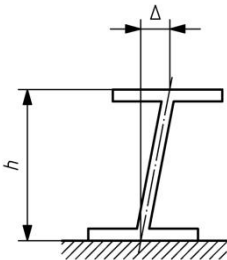
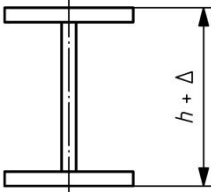
表 G.8 的参考标准为 AISC 303:2016 标准实施规范, ASTM A6/A6M:2019 和 AWS D1.1/D1.1M:2020。

The reference standards for Table E.8 are AISC 303:2016 Code of Standard Practice, ASTM A6/A6M:2019, and AWS D1.1/D1.1M:2020.

表 G.8—美国

Table E.8 – United States

编号 No	标准 Criterion	参数 Parameter	允许公差 Tolerance
1	直线度 (横摆) Straightness (Sweep) 	偏差 $\Delta$ Offset $\Delta$	$\Delta = 1/4$ in in 50 ft [ $\Delta = 6$ mm in 15 m]

2	直线度（起拱） Straightness (Camber) 	与设计起拱度的偏差Δ Offset Δ from design camber	$\Delta = 1/4 \text{ in in } 50 \text{ ft}$ $[\Delta = 6 \text{ mm in } 15 \text{ m}]$
3	梁端垂直度 Squareness at girder ends 	距梁端不超过 18 in. (500 mm) Within 18 inches [500 mm] of the girder end	Flange flat and normal to the web 翼缘平整且垂直于腹板
4	高度 Depth 		$\Delta = 1/8 \text{ in } [3 \text{ mm}]$



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