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Rolled steels for general structure

一般结构用轧制钢材

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Foreword 前言

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry based on the provision of Article 14, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act in response to a proposal for revision of Japanese Industrial Standard with a draft being attached, submitted by The Japan Iron and Steel Federation (JISF), an accredited standards development organization. This edition replaces the previous edition (**JIS G 3101:2017**), which has been technically revised. 本日本工业标准由经济产业大臣根据工业标准化法第 14 条第 1 款的规定，根据该法第 16 条的规定比照适用，以应对由认可的标准制定组织日本钢铁联盟 (JISF) 提交的修订日本工业标准的提案，并附有草案。本版取代了经过技术修订的上一版 (JIS G 3101:2017)。

However, **JIS G3101:2017** may be applied in the **JIS** mark certification based on the relevant provisions of Article 30, paragraph (1), etc. of the Industrial Standardization Act until 20 December 2021. 但是，JIS G3101:2017 可以根据工业标准化法第 30 条第 (1) 款等的相关规定在 JIS 标志认证中适用，直至 2021 年 12 月 20 日。

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Rolled steels for general structure

一般结构用轧制钢材

Introduction 简介

This Japanese Industrial Standard has been prepared based on **ISO 630-1** : 2011, Edition 1, and **ISO 630-2** : 2011, Edition 2, with some modifications of the technical contents. 本日本工业标准根据 ISO 630-1 : 2011 第 1 版和 ISO 630-2 : 2011 第 2 版，对技术内容进行了一些修改。

Annex JA and Annex JB are unique to **JIS** and not given in the corresponding International Standard. The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JC. 附录 JA 和附录 JB 是 JIS 独有的，在相应的国际标准中没有给出。两侧的竖线和虚线下划线表示与相应国际标准的变化。附件 JC 中给出了带有解释的修改列表。

1 Scope 范围

This Standard specifies requirements for the hot rolled steels used for general structures such as bridges, ships and rolling stocks (hereafter referred to as steel products) and hot extruded sections. 本标准规定了用于桥梁、船舶和机车车辆等一般结构的热轧钢材（以下简称钢材）和热挤压型材的要求。

The quality requirements specific to hot extruded sections are given in Annex **JB**. 热挤压型材的特定质量要求在附录 JB 中给出。

NOTE The International Standards corresponding to this Standard and the symbol of degree of correspondence are as follows. 与本标准对应的国际标准及对应等级符号如下。

ISO 630-1 - 2011 Structural steels-Part1: General technical delivery conditions for hot-rolled products 结构钢-第 1 部分：热轧产品的一般交货技术条件

ISO 630-2 - 2011 Structural steels -Part2 : Technical delivery conditions for structural steels for general purposes (Overall evaluation : MOD) 结构钢-第 2 部分：通用结构钢的交货技术条件（总体评价：MOD）

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standards and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**. 此外，根据 ISO/IEC 指南 21-1，表示相关国际标准与 JIS 内容对应程度的符号有 IDT（相同）、MOD（修改）和 NEQ（非等效）。

2 Normative references 参考文献

Part or all of the provisions of the following standards, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied. 下列标准的部分或者全部条款，通过本标准的引用而成为本标准的条款。应采用下列标准的最新版本（包括修订版）。

JIS G0202 Glossary of terms used in iron and steel (Testing) 钢铁中使用的术语表（测试）

JIS G0203 Glossary of terms used in iron and steel (Products and quality) 钢铁中使用的术语表（产品和质量）

JIS G0320 Standard test method for heat analysis of steel products 钢产品热分析的标准试验方法

JIS G0404 Steel and steel products-General technical delivery requirements 钢铁及钢铁制品交货一般技术要求

JIS G0415 Steel and steel products-Inspection documents 钢及钢制品-检验文件

JIS G0416 Steel and steel products -Location and preparation of samples and test pieces for mechanical testing 钢和钢制品-机械试验样品和试件的位置和制备

JIS G3191 Dimensions, mass and permissible variations of hot rolled steel bars and bar in coil 热轧钢筋和盘卷棒材的尺寸、质量和允许偏差

JIS G3192 Dimensions, mass and permissible variations of hot rolled steel sections 热轧型钢的尺寸、质量和允许偏差

JIS G3193 Dimensions, shape, mass and permissible variations of hot rolled steel plates, sheets and strips 热轧钢板、薄板和钢带的尺寸、形状、质量和允许偏差

JIS G3194 Dimensions, shape, mass and permissible variations of hot rolled flat steel 热轧扁钢的尺寸、形状、质量和允许偏差

JIS Z2241 Metallic materials —Tensile testing—Method of test at room temperature 金属材料-拉伸试验-室温试验方法

JIS Z2248 Metallic materials — Bend test 金属材料-弯曲试验

3 Terms and definitions 术语和定义

For the purpose of this Standard, the following terms and definitions, and those given in **JIS G 0202** and **JIS G0203** apply. 就本标准而言，下列术语和定义以及 JIS G 0202 和 JIS G0203 中给出的术语和定义适用。

3.1 steel bar 钢棒

product manufactured by hot rolling steel into a bar 将钢材热轧制成棒材的产品

Note to entry 1 Depending on its cross-section, a steel bar may be a round bar (3.2), square bar (3.3), or hexagonal bar (3.4). 根据横截面的不同, 钢筋可以是圆棒(3.2)、方棒(3.3)或六角棒(3.4)。

Note to entry 2 Steel bars include bars in coil (3.5). 钢筋包括成卷棒材(3.5)

3.2 round bar 圆棒

steel bar (3.1) having a round cross-section 具有圆形横截面的棒材

3.3 square bar 方棒

steel bar (3.1) having a square cross-section, with or without rounded edges 具有方形横截面, 没有圆边的棒材

3.4 hexagonal bar 六角棒

steel bar (3.1) having a hexagonal cross-section 具有六边形横截面的棒材

3.5 bar in coil 成卷棒材

steel bar (3.1) wound into a coil without cutting to length 未切割并成卷的棒材

3.6 hot extrusion 热挤压

Forming of a steel product by extruding heated billets through a die 通过模具挤压加热的钢坯来形成钢产品

3.7 Forging ratio 锻造比

ratio of the cross-sectional area of a cast slab or a bloom to that after extrusion 铸坯或大方坯的横截面积与挤压后的横截面积之比

4 Symbols of grade and applicable dimensions 牌号及适用尺寸

The steel products are classified into four grades, and their symbols and applicable dimensions are as given in Table 1. 钢材分为四个等级, 其牌号及适用尺寸见表 1。

Table 1 Symbols of grade and applicable dimensions 牌号及适用尺寸

Symbol of grade 牌号	Shape of steel product 钢制品形状	Applicable dimensions 适用尺寸
SS330	Plate/sheet, strip in coil, flat and bar 钢板/薄板、钢卷、扁钢和棒材	—
SS400	Plate/sheet, strip in coil, section, flat and bar 钢板/薄板、钢卷、型材、扁钢和棒材	—
SS490		
SS540	Plate/sheet, strip in coil, section and flat 钢板/薄板、钢卷、型材和棒材	≤40 mm in thickness ^{a)}

	Bar	≤40 mm in diameter or distance across flats 直径或宽度≤40 mm
Note a) The thickness of sections shall be t or t_2 in Table 3 and t_2 in Table 4 of JIS G3192. 截面厚度应为 JIS G3192 表 3 中的 t 或 t_2 和表 4 中的 t_2 。		

5 Chemical composition 化学成分

Steel products shall be tested in accordance with 9.1, and their heat analysis values shall conform to Table 2. 钢材按 9.1 进行试验，其熔炼分析值应符合表 2 的规定。

Table 2 Chemical composition 化学成分

Unit- %

Symbol of grade	C	Mn	P	S
SS330	—	—	≤0.050	≤0.050
SS400				
SS490				
SS540	≤0.30	≤1.60	≤0.040	≤0.040
Elements in the table with no limit values or elements not given in the table may be added as necessary. 表中无限值的元素或表中未给出的元素，可根据需要添加。				

6 Mechanical properties 机械性能

The steel products shall be tested in accordance with 9.2, and satisfy the yield point or proof stress, tensile strength, elongation and bendability requirements in Table 3. Requirements for sections with a leg length under 70mm and flats with a width under 50mm shall be as follows. 钢材按 9.2 进行试验，满足表 3 中的屈服点或屈服强度、拉伸强度、延伸率和弯曲性要求。直径 70mm 以下的型材和宽度 50mm 以下的扁钢要求如下：

a) For sections with a leg length under 40mm, requirements in Annex JA shall apply. For sections with a leg length 40mm or over to and excluding 70mm, requirements in Annex JA may be applied. 对于直径小于 40mm 的，适用附录 JA 中的要求。对于直径为 40 毫米到 70 毫米（不包括 70 毫米）的，可以应用附录 JA 中的要求。

b) For flats with a width under 40mm, requirements in Annex JA shall apply. For flats with a width 40 mm or over to and excluding 50mm, requirements in Annex JA may be applied. 对于宽度小于 40mm 的单位，应适用附件 JA 中的要求。对于宽度为 40 毫米或以上至 50 毫米（不包括 50 毫米）的平面，可适用附件 JA 中的要求。

In a bend test, if performed, the test piece shall be free from cracks, on its outside surface. 在弯曲试验中，如果进行了试验，试件的外表面上不应有裂纹。

NOTE For the details of bend test see 9.2.1. 弯曲试验详见 9.2.1。

7 Shape, dimensions, mass and tolerances 外形、尺寸、重量和公差

The shape, dimensions, mass and tolerances of steel products shall be in accordance with **JIS G3191, JIS G3192, JIS G3193 and JIS G3194**. 钢材的形状、尺寸、重量及公差应符合 JIS G3191、JIS G3192、JIS G3193、JIS G3194 的规定。

Tolerances on width and length, unless otherwise specified, shall be as follows. 除非特别规定，宽度和长度公差如下：

- a) For width of cut-edged plates/sheets and strips in coil, Tolerance A given in Table 7 of **JIS G3193** shall apply. 切边钢板/薄板和钢卷宽度公差，适用 JIS G3193 表 7
- b) For length of plates/sheets, the tolerances given in Table 8 of **JIS G3193** shall apply. 钢板/薄板和钢卷长度公差，适用 JIS G3193 表 8

Table 3 Mechanical properties 机械性能

Symbol of grade 牌号	Yield point or proof strength 屈服强度 N/mm ²				Tensile strength 抗拉强度 N/mm ²	Elongation 延伸率			Bendability 弯曲性能		
	Thickness a) mm					Thickness a) mm	Test piece	%	Bending angle	Inner radius 内径	Test piece c)
	≤16	>16 ≤40	>40 ≤100	>100							
SS330	>205	>195	>175	>165	330 to 430	≤5 in thickness of plates/sheets, strips in coil and flats	No. 5	≥26	180°	0.5 x thickness	No. 1
						>5 ≤16 in thickness of plates/sheets, strips in coil and flats	No. 1A	≥21			
						>16 ≤50 in thickness of plates/sheets, strips in coil and flats	No. 1A	≥26			
						>40 in thickness of plates/sheets and flats	No. 4	≥28 b)			
						≤25 in diameter or distance across flats of bars	No. 2	≥25	180°	0.5 x diameter or distance across flats	No. 2
						>25 in diameter or distance across flats of bars	No. 14A	≥28			
SS400	>245	>235	>215	>205	400 to 510	≤5 in thickness of plates/sheets, strips in coil, flats and sections	No. 5	≥21	180°	1.5 x thickness	No. 1
						>5 ≤16 in thickness of plates/sheets, strips in coil, flats and sections	No. 1A	≥17			
						>16 ≤50 in thickness of plates/sheets, strips in coil, flats and sections	No. 1A	≥21			
						>40 in thickness of plates/sheets, flats and sections	No. 4	≥23 b)			

						≤ 25 in diameter or distance across flats of bars No. 2 ≥ 20	180°	1.5 x diameter or distance across flats	No. 2					
					> 25 in diameter or distance across flats of bars No. 14A ≥ 22									
SS490	> 285	> 275	> 255	> 245	490 to 610	≤ 5 in thickness of plates/sheets, strips in coil, flats and sections No. 5 ≥ 19	180°	2.0 x thickness	No. 1					
						$> 5 \leq 16$ in thickness of plates/sheets, strips in coil, flats and sections No. 1A ≥ 15								
						$> 16 \leq 50$ in thickness of plates/sheets, strips in coil, flats and sections No. 1A ≥ 19								
						> 40 in thickness of plates/sheets, flats and sections No. 4 ≥ 21 b)								
											≤ 25 in diameter or distance across flats of bars No. 2 ≥ 18	180°	2.0 x diameter or distance across flats	No. 2
										> 25 in diameter or distance across flats of bars No. 14A ≥ 20				
SS540	> 400	> 390			> 540	≤ 5 in thickness of plates/sheets, strips in coils, flats and sections No. 5 ≥ 16	180°	2.0 x thickness	No. 1					
						$> 5 \leq 16$ in thickness of plates/sheets, strips in coil, flats and sections No. 1A ≥ 13								
						$> 16 \leq 40$ in thickness of plates/sheets, strips in coil, flats and sections No. 1A ≥ 17								
										≤ 25 in diameter or distance across flats of bars No. 2 ≥ 13	180°	2.0 x diameter or distance across flats	No. 2	
									$> 25 \leq 40$ in diameter or distance across flats of bars No. 14A ≥ 16					

NOTE 1 N/mm² = 1 MPa

Note a) Thickness shall be : thickness at the location of test piece for section; diameter for round bars; and distance across flats for square and hexagonal bars.厚度应为：截面试样处的厚度；圆棒材的直径；方形和六角棒材的跨平面距离。

Note b) For the elongation of No. 4 test piece of steel plate/sheet of thickness over 90 mm, subtract 1 from the values of this table for each increment of 25 mm or its fraction in thickness. The number subtracted shall not exceed 3.厚度大于 90mm 的 4 号钢板试件的延伸率，厚度每增加 25mm，从该表中的数值中减去 1，减去的数不得超过 3。

Note c) For the bend test of steel products of thickness 5 mm or under, No. 3 test piece may be used.厚度 5mm 及以下钢材的弯曲试验，可采用 3 号试件。

8 Appearance 外观

The appearance of steel products shall be in accordance with Clause 9 of JIS G3191, Clause 9 of JIS G3192, Clause 7 of JIS G3193 and Clause 8 of JIS G3194.钢材外观应符合 JIS G3191 第

9 款、JIS G3192 第 9 款、JIS G3193 第 7 款和 JIS G3194 第 8 款的规定。

9 Tests 检验

9.1 Chemical analysis 化学分析

The chemical analysis shall be as follows.化学分析如下：

a) **General requirements and sampling method** 基本要求和取样方法

General requirements for chemical analysis and sampling method for heat analysis shall be in accordance with Clause 8 of **JIS G 0404**.化学分析基本要求和熔炼分析取样方法应符合 JIS G0404 第 8 条款规定。

b) **Analysis method** 分析方法

The heat analysis method shall be in accordance with **JIS G0320**.分析方法依据 JIS G0320。

9.2 Mechanical tests 机械试验

9.2.1 General 基本

General requirements for mechanical tests shall be in accordance with Clauses 7 and 9 of **JIS G0404**. The sampling method shall be in accordance with Class A in 7.6 of **JIS G 0404**.机械试验的一般要求应符合 JIS G0404 第 7 和第 9 条的规定。取样方法按 JIS G 0404 第 7.6 条 A 级规定。

The bend test may be omitted unless it is specified by the purchaser.除非买方规定，弯曲试验可以省略。

Note: Even when the test is omitted at the discretion of the manufacturer, the Products are still required to satisfy the specified bendability.即使制造商自行决定省略测试，产品仍需满足规定的弯曲性。

9.2.2 Number of tensile and bend test pieces 拉伸和弯曲试验试样数量

The number of tensile and bend test pieces shall be as follows.拉伸和弯曲试样数量如下：

a) **Plates/sheets (excluding cut lengths), and flats** 钢板/薄板（不包括切割长度）和扁钢

Take one test piece from each lot of plates/sheets or flats which belong to the same heat, and of which the maximum thickness is within two times the minimum thickness. When the mass of one lot exceeds 50t, take two test pieces from each lot. When the mass of one plate/sheet exceeds 50t, take one test piece from each plate/sheet.从属于同一炉次的每批钢板/薄板或扁材中取 1 块试样，其最大厚度为最小厚度的两倍以内。当同一批次重量超过 50t 时，每批取 2 个试样。当每个钢板/薄板的重量超过 50t 时，每个钢板/薄板取 1 个试样。

b) **Strips in coil and cut lengths therefrom** 钢卷并从中切割长度

Take one test piece from each lot of strips in coil or cut lengths belonging to the same heat and rolled to the same thickness. When the mass of one lot exceeds 50 t, take two test pieces from each lot. 每批钢卷取 1 个试样，或属于同一炉次并轧制成相同的厚度的切段中取 1 个试样。当重量超过 50 t 时，每批取 2 个试样。

c) **Sections 型材**

Take one test piece from each lot of sections belonging to the same heat and rolled to the same sectional profile, of which the maximum thickness is within two times the minimum thickness. When the mass of one lot exceeds 50t, take two test pieces from each lot. 从同一炉次或轧制成同一截面型材的每批型材中取 1 个试样，其最大厚度在最小厚度的两倍以内。当重量超过 50t 时，每批取 2 个试样。

d) **Bars 棒材**

Take one test piece from each lot of bars belonging to the same heat and rolled to the same sectional profile, of which the maximum diameter (distance across flats) is within two times the minimum diameter (distance across flats). When the mass of one lot exceeds 50t, take two test pieces from each lot. 属于同一炉次并轧制成相同截面轮廓的每批棒材中取 1 个试样，其最大直径（跨平面距离）在最小直径（跨平面距离）的两倍以内。当质量超过 50 吨，每批取 2 个试样。

e) **Heat treated steel products 热处理钢制品**

Take the number of test pieces specified in **a), b), c) or d)** from each lot of products grouped according to heat treatment conditions. 从按热处理条件分组的每批产品中，取 a)、b)、c) 或 d) 中规定的试件数量。

9.2.3 Location of tensile and bend test pieces 拉伸和弯曲试样的位置

The location of tensile and bend test pieces shall be in accordance with **JIS G0416**. The centre of test pieces across the width of a plate/sheet, strip in coil and flat shall be 1/4 of the width from the edge of the width or as near this location as possible. 拉伸和弯曲试样的位置应符合 JIS G0416 的规定。钢板/薄板、钢卷和扁钢试样中心应在宽度 1/4 处或尽可能靠近该位置。

9.2.4 Test pieces 试样

Tensile and bend test pieces shall be as follows. 拉伸和弯曲试样如下：

a) Tensile test pieces shall be No. 1A, 2, 4, 5, 14A or 14B specified in **JIS Z2241**. 拉伸试样应为 JIS Z2241 规定的 No. 1A、2、4、5、14A 或 14B。

b) Bend test pieces shall be No.1,2 or3 specified in **JIS Z2248**.弯曲试样应为 JIS Z2248 规定的 No.1、2 或 3。

9.2.5 Test methods 试验方法

The tensile test and the bend test shall be as follows.拉伸和弯曲试验方法如下：

- a) The tensile test shall be performed in accordance with **JIS Z2241**.拉伸试验按 JIS Z2241 进行。
- b) The bend test shall be performed in accordance with **JIS Z2248** using the bending and inner radius as given in Table 3.弯曲试验应按照 JIS Z2248 使用表 3 中给出的弯曲角度和内半径进行。

10 Inspection 检验

The inspection shall be as follows.检验如下：

- a) General requirements of inspections are specified in **JIS G0404**.检验要求按照 JIS G0404。
- b) Chemical composition shall conform to the requirements in Clause 5.化学成分符合条款 5 要求。
- c) Mechanical properties shall conform to the requirements in Clause 6.机械性能符合条款 6 要求。
- d) Shape, dimensions and mass shall conform to the requirements in Clause 7.形状、尺寸和重量符合条款 7 要求。
- e) Appearance shall conform to the requirements in Clause 8.外观符合条款 8 要求。

11 Reinspection 复检

Steel products having failed the mechanical .tests may be retested in accordance with 9.8 of **JIS G0404** to be further judged for acceptance.机械试验不合格的钢材可按 JIS G0404 第 9.8 条进行复验，进一步判定合格。

12 Marking 标识

Each piece or bundle of steel products having passed the inspection shall be marked with the following information by a suitable means. Part of the following particulars may be omitted upon agreement between the purchaser and the manufacturer, as far as the identification of the product is possible.检验合格的每件或每捆钢材，应以适当的方式标明下列信息。经供需双方协商同意，下列细节部分可省略，只要产品的标识是可能的。

- a) Symbol of grade 牌号

NOTE In some cases, an additional mark specified by the order or the agreement between the purchaser and the manufacturer is suffixed to the symbol of grade to facilitate identification by the purchaser.在某些情况下，订单或购方与制造商之间的协议规定的附加标记后附于等级符号，以方便购方识别。

b) Heat number or inspection number 炉号或检验编号

c) Dimensions 尺寸

The marking of dimensions shall be in accordance with Clause 4 of **JIS G3191**. Clause 4 of **JIS G3192**, Clause 3 of **JIS G3193** and Clause 4 of **JIS G3194**. 尺寸标识应符合 JIS G3191 第 4 条、JIS G3192 第 4 条、JIS G3193 第 3 条、JIS G3194 第 4 条规定。

d) Quantity in or mass of each bundle (for plates/sheets and strips in coil) 每捆或者每卷的重量

e) Manufacturer's name or its identifying brand 制造商名称及其商标

13 Report 报告

Unless otherwise specified, the manufacturer shall submit an inspection document to the purchaser. The report shall be in accordance with Clause 13 of **JIS G0404**. Unless otherwise specified in the order, the type of the inspection document shall be in accordance with 5.1 of **JIS G0415**. 除另有规定外，制造厂应向需方提交检验文件。报告应符合 JIS G0404 第 13 条的规定。除订单另有规定外，检验文件的类型应符合 JIS G0415 的 5.1。

Where an alloy element(s) other than specified in Table 2 has been added, the analysis value(s) of the added element(s) shall be indicated in the report. 添加表 2 规定以外的合金元素的，报告中应注明添加元素的分析值。

Annex JA (normative)

Mechanical properties of sections with a leg length under 40 mm and of flats with a width under 40 mm

直径小于 40 mm 型材和宽度小于 40 mm 扁材的力学性能

Sections with a leg length under 40 mm and flats with a width under 40 mm shall be tested in accordance with 9.2, and conform to the yield point or proof stress, tensile strength, elongation and bendability requirements given in Table JA.1. 直径小于 40 毫米的型材和宽度小于 40 毫米的扁材应按照 9.2 进行试验，并符合表 JA.1 中给出的屈服强度、拉伸强度、延伸率和弯曲性要求。

Table JA.1 Mechanical properties of sections with a leg length under 40 mm and of flats with a width under 40 mm

直径小于 40 mm 型材和宽度小于 40 mm 扁材的力学性能

Symbol of grade 牌号	Yield point or proof strength 屈服强度 N/mm ²		Tensile strength 抗拉强度 N/mm ²	Thickness a) mm	Tensile test piece 拉伸试样	Elongation 延伸率 %	Bendability 弯曲性能		
	Thickness ^{a)} mm						Bending angle 角度	Inner radius 内径	Test piece b)
	≤16	>16≤40							
SS330	>205	>195	330 to 430	≥3 ≤5	No. 5	≥26	180°	0.5 x thickness	No. 1
					No. 14B	≥26			
				>5 ≤16	No. 5	≥33			
					No. 14B	≥30			
>16 ≤40	No. 5	≥41							
	No. 14B	≥30							
SS400	>245	>235	400 to 510	>3 ≤5	No. 5	≥21	180°	1.5 x thickness	No. 1
					No. 14B	≥21			
				>5 ≤16	No. 5	≥27			
					No. 14B	≥24			
>16 ≤40	No. 5	≥33							
	No. 14B	≥24							
SS490	>285	>275	490 to 610	>3 ≤5	No. 5	≥19	180°	2.0 x thickness	No. 1
					No. 14B	≥19			
				>5 ≤16	No. 5	≥24			
					No. 14B	≥22			
>16 ≤40	No. 5	≥30							
	No. 14B	≥22							
SS540	>400	>390	>540	>3 ≤5	No. 5	≥16	180°	2.0 x thickness	No. 1
					No. 14B	≥16			
				>5 ≤16	No. 5	≥21			
					No. 14B	≥19			
>16 ≤40	No. 5	≥27							
	No. 14B	≥20							

NOTE 1 N/mm² = 1 MPa

Note a) For sections, the thickness shall be that at the location of test pieces.

Note b) For bend test of steel products of thickness 5 mm or under, No. 3 test piece may be used. 厚度 5mm 及以下钢材的弯曲试验，可采用 3 号试件。

Annex JB (normative)

Quality requirements for hot extruded sections

热挤压型材质量要求

JB.1 Application 应用

This Annex specifies the quality requirements for hot extruded sections of specially ordered shape to be used for construction components, coupling components for steel sheet piles, steel pipe sheet piles and the like. 本附件规定了用于建筑构件、钢板桩、钢管板桩等连接构件的特殊订制形状的热挤压型材的质量要求。

Hot extruded sections shall be applied by agreement between the purchaser and the manufacturer. 热挤压型材应经买方和制造商协商使用。

JB.2 Symbols of grade and applicable dimensions 牌号和适用尺寸

Hot extruded sections are classified into two grades, and their symbols and applicable dimensions shall be as given in Table JB.1. 热挤压型材分为两个等级，其符号和适用尺寸见表 JB.1。

Table JB.1 Symbols of grade and applicable dimensions of hot extruded sections
热挤压型材牌号及适用尺寸

Symbol of grade 牌号	Applicable dimension 适用尺寸
SS400	≥5 mm in thickness
SS490	≤250 mm in leg length or height

JB.3 Manufacturing method 制造方法

Hot extruded sections shall be produced by hot extrusion at a minimum forging ratio of 4. 热挤压型材应以最小锻造比为 4 的热挤压方式生产。

JB.4 Chemical composition 化学成分

Hot extruded sections shall be tested in accordance with 9.1, and their heat analysis values shall conform to Table 2. 热挤压型材按 9.1 进行试验，其分析值应符合表 2 的规定。

JB.5 Mechanical properties 机械性能

JB.5.1 Location of tensile and bend test pieces 拉伸和弯曲试样位置

The location of tensile and bend test pieces of hot extruded sections shall be as agreed between the purchaser and the manufacturer. The No. 4 tensile test pieces shall be taken from 1/4 of the thickness; if this is impracticable, they shall be taken from a position as close to this as possible. 热挤压型材的拉伸和弯曲试样的位置应由供需双方商定。4 号拉伸试样应取厚度的 1/4 处，如不能取，则尽量取近此位置。

JB.5.2 Tensile test and bend test properties 拉伸和弯曲试验性能

Hot extruded sections shall be tested in accordance with the test method for sections given in 9.2,

and satisfy the yield point or proof stress, tensile strength, elongation and bendability requirements for sections given in Table 3 and Table JA.I. Where No. 1A test piece cannot be taken due to the specific geometry of the hot extruded section, No. 5 test piece may be taken.热挤压型材应按 9.2 规定的型材试验方法进行试验，并满足表 3 和表 JA.1 规定的型材的屈服强度、拉伸强度、延伸率和弯曲性要求。因热挤压段的特殊几何形状不能取 1A 试件时，可取 5 号试件。

Elongation requirements for hot extruded sections are given in Table JB.2.热挤压型材的延伸率要求见表 JB.2。

Table JB.2 Elongation of hot extruded sections 热挤压型材延伸率

Symbol of grade 牌号	Elongation 延伸率		
	Thickness mm	Test piece 试样	%
SS400	≤5	No. 5	≥21
	>5 ≤16	No. 1A	≥17
		No. 5	≥27
	>16 ≤50	No. 1A	≥21
		No. 5	≥33
>40	No. 4	≥23 ^{a)}	
SS490	≤5	No. 5	≥19
	>5 ≤16	No. 1A	≥15
		No. 5	≥24
	>16 ≤50	No. 1A	≥19
		No. 5	≥30
>40	No. 4	≥21 ^{a)}	

Note a) For the elongation of steel plates/sheets with a thickness over 100 mm, subtract 1 from the elongation values of this table for each increment of 25 mm or its fraction in thickness. The number subtracted shall not exceed 3.对于厚度超过 100mm 的钢板/薄板的延伸率，每增加 25mm 或其厚度分数，从该表的延伸率值中减去 1，减去的数不得超过 3。

JB.6 Shape, dimensions and tolerances 形状和尺寸公差

The shape of the hot extruded section shall be specified by the purchaser. If extrusion into the ordered shape is not possible, the purchaser shall specify a change of shape upon agreement with the manufacturer.热挤压型材的形状应由买方规定。如果不可能挤压成订购的形状，买方应在与制造商协商后指定形状的变化。

NOTE:Hot extruded sections are mainly used as components specified in designing documents that are based on technical standards such as standard specifications for building operations and common specifications for port construction work.热挤压型材主要用作设计文件中指定的组件，这些文件基于技术标准，例如建筑操作标准规范和港口建设工作通用规范。

The tolerances on shape and dimensions of hot extruded sections shall be as given in Table JB.3.热挤压型材的形状和尺寸公差应按表 JB.3 给出。

Table JB.3 Tolerances on shape and dimensions 形状和尺寸公差

		Unit* mm
Division		Tolerance
Leg length, height and thickness 直径、高度、厚度	<50	±1.5
	≥50 <100	±2.0
	≥100 <200	±3.0
	≥200	±4.0
Length 长度	≤7 m	+40 0
	>7 m	For plus tolerance, add 5 mm to the above plus tolerance for each increment of 1 m or its fraction in length. Minus tolerance shall be 0 mm.
Squareness of cross-section 横截面大小	≤100 mm in maximum leg length 最大直径≤100mm	≤1.6
	>100 mm in maximum leg length 最大直径>100mm	≤3.0
Bendability 弯曲性能		≤0.5 % of length ^{a)}
Upon agreement between the purchaser and the manufacturer, the full spread of the above tolerance range may be moved to the plus or minus side, provided the lower limit when the range is moved to the plus side is not above zero and the upper limit when it is moved to the minus side is not below zero.经供需双方同意，上述公差范围的全差可移至正或负侧。当移至正侧时，下限不大于零；移至负侧时，上限不低于零。 Note a) Applicable to vertical and horizontal bending.适用于垂直和水平弯曲。		

JB.7 Appearance 外观

The appearance of hot extruded sections shall be in accordance with Clause 9 of JIS G 3192.热挤压型材的外观应符合 JIS G 3192 第 9 条款的规定。

JB.8 Inspection 检验

The inspection of hot extruded sections shall be in accordance with Clause 10.热挤压型材的检验应符合第 10 条款的规定。

JB.9 Reinspection 复检

The reinspection of hot extruded sections shall be in accordance with Clause 11.热挤压型材的复检应符合第 11 条款的规定。

JB.10 Marking 标识

The marking of hot extruded sections shall be in accordance with Clause 12.热挤压型材的标记应符合第 12 条款的规定。

JB.11 Report 报告

The report of hot extruded sections shall be in accordance with Clause 13.热挤压型材的报告应符合第 13 条款的规定。

Annex JC (informative)

Comparison table between JIS and corresponding International Standards JIS 与相应国际标准对照表

JIS G 3101		ISO 630-1 : 2011, ISO 630-2 : 2011, (MOD)		
a) No. of clause (JIS) JIS 条款号	b) No. of clause (corresponding International Standard) 参考国际标准条款号	c) Classification by clause 按条款分类	d) Detail and justification of technical deviation 技术偏差的细节和理由	e) Future measures for the technical deviation 技术偏差的未来措施
3	ISO 630-1 3	Addition 新增	JIS adds definitions of terms relevant to products uniquely specified in JIS. JIS 增加了与 JIS 中唯一指定的产品相关的术语定义。	JIS corresponds to manufacturing methods used in Japan. JIS 对应于日本使用的制造方法。
4	ISO 630-2 4	Alteration 修订	Steel grade designation in JIS is based on tensile strength while designation in ISO is based on yield point. JIS 中的钢种名称基于抗拉强度，而 ISO 中的名称基于屈服点。	Difference in designation system. No harmonization measures will be taken. 指定系统的差异。不会采取任何协调措施。
5	ISO 630-2 6	Deletion 删除	ISO specifies more elements. ISO 指定了更多元素。	Most of JIS specifications have been incorporated into ISO. 大多数 JIS 规范已被纳入
6	ISO 630-2 6	Addition 新增	JIS adds bendability requirements .JIS 增加了弯曲性要求。	JIS requirements are stricter than ISO. JIS 要求比 ISO 更严格。
7	ISO 630-1 6	Addition 新增	JIS specifies details of dimensional and shape requirements different from ISO. JIS 规定了与 ISO 不同的尺寸和形状要求的细节。	Difference in commercial practices. No harmonization measures will be taken. 商业惯例的差异。不会采取任何协调措施。
8	ISO 630-1 6	Alteration 修订	JIS does not permit local insufficiency in plate thickness caused by removal of surface flaws, while ISO does. JIS 不允许因去除表面缺陷而导致板厚局部不足，而 ISO 允许。	JIS requirements are stricter than ISO. JIS 要求比 ISO 更严格。
9.1	ISO 630-1 9	Alteration 修订	JIS refers to other JIS for analysis requirements. JIS 依据其他 JIS 分析要求。	JIS specifies the heat analysis method to be adopted. JIS 规定了要采用的热分析方法。
9.2	ISO 630-2 8	Alteration 修订	JIS and ISO use slightly different test units, but specify the same location of test pieces. JIS 和 ISO 使用的测试单位略有不同，但指定了相同的测试件位置。	Harmonization between JIS and ISO has progressed as ISO has incorporated proposals from JIS. 随着 ISO 采用了 JIS 的建议，JIS 和 ISO 之间的协调取得了进展。

JIS G 3101		ISO 630-1 : 2011, ISO 630-2 : 2011, (MOD)		
a) No. of clause (JIS) JIS 条款号	b) No. of clause (corresponding International Standard) 参考国际标准条款号	c) Classification by clause 按条款分类	d) Detail and justification of technical deviation 技术偏差的细节和理由	e) Future measures for the technical deviation 技术偏差的未来措施
11	ISO 630-1 7.3	Addition 新增	JIS adds a matter to be agreed between the purchaser and the manufacturer. JIS 增加了需要由购方和制造方商定的事项。	Difference in commercial practices. No harmonization measures will be taken. 商业惯例的差异。不会采取任何协调措施。
12	ISO 630-1 10	Addition 新增	ISO does not include "heat number" in the information to be marked, or provide specific instruction for marking dimensions. ISO 没有在要标记的信息中包含“炉号”，也没有提供标记尺寸的具体说明。	Difference in commercial practices. No harmonization measures will be taken. 商业惯例的差异。不会采取任何协调措施。
13	ISO 630-1 7.1	Alteration 修订	JIS refers to another JIS for report requirements. JIS 参考了其他 JIS 标准报告要求。	Difference in commercial practices. No harmonization measures will be taken. 商业惯例的差异。不会采取任何协调措施。
Annex JA		Addition 新增	JIS specifies non-proportional test pieces as well while ISO only specifies proportional test pieces. JIS 也规定了非比例试件，而 ISO 只规定了比例试件。	The specification is of unique necessity to Japan. No harmonization measures will be taken. 该规范对日本具有独特的必要性。不会采取任何协调措施。
Annex JB		Addition 新增	JIS adds product requirements intended only for building structures in Japan. JIS 增加了仅针对日本建筑结构的产品要求。	The specification is of unique necessity to Japan. No harmonization measures will be taken. 该规范对日本具有独特的必要性。不会采取任何协调措施。
<p>NOTE 1 Symbols in sub-columns of classification by clause in the above table indicate as follows :</p> <p>— Deletion : Delete the specification item(s) or content(s) of International Standard(s).删除国际标准的规范项或内容。</p> <p>— Addition : Add the specification item(s) or content(s) which are not included in International Standard(s).增加国际标准中未包含的规范项或内容。</p> <p>— Alteration : Alter the specification content(s) or structure of International Standard(s).改变国际标准的规范内容或结构。</p> <p>NOTE 2 Symbol of overall degree of correspondence between JIS and International Standard(s) in the above table indicates as follows :</p> <p>— MOD : Modify International Standard(s).修改国际标准。</p>				