DIN EN 10025-3

DIN

ICS 77.140.10; 77.140.50

This standard, together with DIN EN 10025-2, February 2005 edition, supersedes DIN EN 10113-2, April 1993 edition.

该标准与DIN EN 10025-2,2005年2月版一起替代1993年4月版的DIN EN 10113-2

Hot rolled products of structural steels
结构钢热轧产品

Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels

English version of DIN EN 10025-3

第3部分：DIN EN 10025-2标准可焊接细晶粒结构钢热轧产品技术交付条件，英文版

Warmgewalzte Erzeugnisse aus Baustahlen - Teil 3: Technische Lieferbedingungen fur normalgegluhte/normalisierend gewalzte schweiBgeeignete Feinkombaustahle

A comma is used as the decimal marker.

在本文中小数点符号采用逗号。

National foreword 国家标准前言

This standard has been prepared by ECISS/TC 10.
The responsible German body involved in its preparation was the *Normenausschuss Eisen und Stahl* (Steel and Iron Standards Committee), Technical Committee *Stahle fur den Stahlbau.*

本标准由ECISS/TC 10编制。
德国编制的负责单位是钢铁标准委员会技术委员会

Amendments 修订

This standard differs from DIN EN 10113-2, April 1993 edition, in that it has been completely revised.

本标准不同于1994年3月版的DIN EN 10025，该版本已经完全修订。

Previous editions 以前的版本

DIN 17102: 1983-10; DIN EN 10113-2:1993-04.

Document comprises 24 pages.
该文件共24页

EUROPEAN STANDARD欧洲标准 EN 10025-3
NORME EUROPEENNE
EUROPAISCHE NORM November 2004 2004年11月

ICS 77.140.10; 77.140.50

Supersedes EN 10113-1 :1993 and EN 10113-2 : 1993.

替代EN 10113-1 :1993和 EN10113-2 : 1993.

English version

Hot rolled products of structural steels

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Produits lamines a chaud en aciers de construction - Partie 3: Conditions techniques de livraison pour les aciers de construction soudable a grains fins a t'etat normalise/laminage normalise

Warmgewalzte Erzeugnisse aus Baustahlen -Teil 3: Technische Lieferbedingungen fur normalgegliihte/ normalisierend gewalzte schweiBgeeignete Feinkornbaustahle

This European Standard was approved by CEN on 2004-04-01.
CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

该欧洲标准在2004-04-01得到了CEN的批准。CEN各个成员国受CEN/CENELEC内部规定的约束，规定了该欧洲标准作为国家标准的状态，不允许有任何变更。

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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CEN

European Committee for Standardization
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Foreword 前言

This document (EN 10025-3:2004) has been prepared by Technical Committee ECISS/TC 10 "Structural steels - Grades and qualities", the secretariat of which is held by NEN.

本文件（EN 10025-3：2004）由技术委员会 ECISS/TC 10 "结构钢 - 钢号和质量等级"制定，其秘书处由NEN管理。

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2005, and conflicting national standards shall be withdrawn at the latest by May 2005.

无论是以相同的文本发布,还是签注的文件,该欧洲标准具有国家标准的地位，其最新版本为2005年5月版，而不一致的国家标准应当在2005年5月撤销。

This document supersedes together with EN 10025-1:2004, EN 10113-1:1993, *Hot-rolled products in weldable Fine grain structural steels - Part 1: General delivery conditions* and EN 10113-2:1993 *Hot-rolled products in weldable fine grain structural steels - Part 2; Delivery conditions for normalized/normalized rolled steels.*

本文件与EN 10025-1：2004一起替代EN 10113-1：1993，*可焊接细晶粒结构钢热轧产品 - 第1部分：基本交付条件及EN 10113-2：1993可焊接细晶粒结构钢热轧产品- 第2部分：正火/非正火轧钢交付条件。*

The titles of the other parts of this document are:

本文件其它部分的标题是：

Part 1: General technical delivery conditions;

Part 2: Technical delivery conditions for non-alloy structural steels;

Part 4: Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels;

Part 5: Technical delivery conditions for structural steels with improved atmospheric corrosion resistance;

Part 6: Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition.

第1部分：基本技术交付条件;

第2部分：碳素结构钢技术交付条件

第4部分：形变热轧可焊接细晶粒结构钢技术交付条件;

第5部分：改进的耐大气腐蚀的结构钢技术交付条件

第6部分：淬火或退火条件下高屈服强度结构钢扁钢产品的技术交付条件

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of the EU Construction Products Directive (89/106/EEC). For relationship with the EU Construction Products Directive, see informative Annex ZA of EN 10025-1:2004.

本文件按照欧洲委员会和欧洲自由贸易协会对CEN的要求编制，并支持欧盟建筑产品规定（89/106/EEC）的基本要求。对于与欧盟建筑产品规定（89/106/EEC）的关系，见EN 10025-1:2004.提示性附录ZA。

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

根据CEN/CENELEC内部规定，下列国家的国家标准组织受该欧洲标准的约束：奥地利，比利时，捷克，丹麦，爱沙尼亚，芬兰，法国，德国，希腊，匈牙利，冰岛，爱尔兰，意大利，拉脱维亚，立陶宛，卢森堡公国，马耳他，荷兰，挪威，波兰，葡萄牙，斯洛伐克，斯洛文尼亚，西班牙，瑞典，瑞士，和英国。

1 Scope 范围

Part 4 of this document, in addition to Part 1, specifies requirements for flat and long products of hot rolled weldable fine grain structural steels in the normalized/normalized rolled delivery condition in the grades and qualities given in Tables 2 to 4 (chemical composition) and Tables 5 to 7 (mechanical properties) in thickness ≤ 250 mm for grades S275, S355 and S420 and in thickness ≤200 mm for grade S460.

In addition to EN 10025-1:2004 the steels specified in this document are especially intended for use in heavily loaded parts of welded structures such as, bridges, flood gates, storages tanks, water supply tanks, etc., for service at ambient and low temperatures.

除了第1部分，本文件第4部分规定了对表2至4（化学成份）和表5至7（机械性能）当中对于厚度≤250 毫米的S275，S355和S420及厚度≤ 200 毫米的S460各种钢号和质量等级正火/非正火轧制交付条件下的热轧可焊接细晶粒结构钢扁材和长材产品的要求.

除了 EN 10025-1：2004，本文件指定的钢特别适用于焊接结构的重载部件，诸如：桥梁，泄洪闸，储罐，供水池等。适合于环境温度和低温使用环境。

2 Normative references 规范性参考资料

The following referenced documents are indispensable for the application 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.

下述标准文件包含的条文，通过在本标准中引用而构成本标准的条文。若引用的标准文件标有日期，则在此日期以后对此引用标准文件的增补和修订均不适用于本标准。若引用的文件不标日期，则本标准应采用该引用标准文件（包括任何修订）的最新版本

2.1 General standards 通用标准

EN 1011-2, Welding - Recommendations for welding of metallic materials - Part 2: Arc welding of ferritic steels.

EN 10020, Definition and classification of grades of steel.

EN 10025-1:2004, Hot rolled products of structural steels • Part 1: General technical delivery conditions.

EN 10027-1, Designation systems for steels - Part 1: Steel names, principal symbols.

EN 10027-2, Designation systems for steels - Part 2: Numerical system.

EN 10163-1, Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections -Part 1: General requirements.

EN 10163-2, Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections -Part 2: Plates and wide flats.

EN 10163-3, Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections -Part 3: Sections.

EN 10164, Steel products with improved deformation properties perpendicular to the surface of the product -Technical delivery conditions.

EN 10221, Surface quality classes for hot-rolled bars and rods - Technical delivery conditions.

CR 10260, Designation systems for steels - Additional symbols.

EN 1011 -2， 焊接-金属材料的焊接建议–第2部分：铁素体钢的电弧焊。

EN 10020， 钢号的定义和分类。

EN 10025-1：2004，结构钢热轧产品–第1部分：基本技术交付条件。

EN 10027-1，钢的代号体系-第1部分：钢的名称，主要符号。

EN 10027-2，钢的代号体系–第2部分：数值体系。

EN 10163-1，热轧钢板，宽扁材和型材表面条件的交付要求 -第1部分：基本要求。

EN 10163-2，热轧钢板，宽扁材和型材表面条件的交付要求 -第2部分：板材和宽扁材。

EN 10163-3，热轧钢板，宽扁材和型材表面条件的交付要求 -第3部分：型钢。

EN 10164，与产品表面垂直的变形性能经过改进的钢产品 -技术交付条件。

EN 10221，热轧钢筋和钢棒的表面质量等级 - 技术交付条件。

CR 10260，钢的代号体系-其它符号。

2.2 Standards on dimensions and tolerances (see 7.7.1) 尺寸和公差标准（见 7.7.1）

EN 10017, Non-alloy steel rod for drawing and/or cold rolling - Dimensions and tolerances.

EN 10024, Hot rolled taper flange I sections - Tolerances on shape and dimensions.

EN 10029, Hot rolled steel plates 3 mm thick or above - Tolerances on dimensions, shape and mass.

EN 10034, Structural steel I and H sections - Tolerances on shape and dimensions.

EN 10048, Hot rolled narrow steel strip - Tolerances on dimensions and shape.

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

EN 10055, Hot-rolled steel equal flange tees with radiused root and toes - Dimensions and tolerances on shape and dimensions.

EN 10056-1, Structural steel equal and unequal leg angles - Part 1: Dimensions.

EN 10056-2, Structural steel equal and unequal leg angles - Part 2: Tolerances on shape and dimensions.

EN 10058, Hot rolled flat steel bars for general purposes - Dimensions and tolerances on shape and dimensions.

EN 10059, Hot rolled square steel bars for general purposes - Dimensions and tolerances on shape and dimensions.

EN 10060, Hot rolled round steel bars for general purposes - Dimensions and tolerances on shape and dimensions.

EN 10061, Hot rolled hexagon steel bars for general purposes - Dimensions and tolerances on shape and dimensions.

EN 10067, Hot rolled bulb flats - Dimensions and tolerances on shape, dimensions and mass.

EN 10162, Cold rolled steel sections - Technical delivery conditions - Dimensional and cross-sectional tolerances.

EN 10279, Hot rolled steel channels - Tolerances on shape and dimensions.

EN 10017，拉拔和/或冷成形钢棒材-尺寸和公差。

EN 10024，热轧锥形凸缘I 型材 - 形状和尺寸公差。

EN 10029，3 毫米厚或以上热轧钢板 -尺寸，形状和质量公差。

EN 10034，结构钢 I和H 型材 - 形状和尺寸公差。

EN 10048，热轧窄钢带 - 尺寸和形状公差。

EN 10051，非合金和合金钢的连续热轧不镀膜钢板，钢片和钢带-尺寸和形状公差。

EN 10055，带有剩余根脚的等凸缘T字热轧钢 - 尺寸及形状和尺寸公差。

EN 10056-1，等角边及不等角边结构钢- 第1部分：尺寸。

EN 10056-2，等角边及不等角边结构钢- 第2部分：形状和尺寸公差。

EN 10058，一般用途的热轧扁钢棒材-尺寸及形状和尺寸公差。

EN 10059，一般用途热轧方钢棒材- 尺寸及形状和尺寸公差。

EN 10060，一般用途的热轧圆钢棒材 - 尺寸及形状和尺寸公差。

EN 10061，一般用途的热轧六角钢棒材- 尺寸及形状和尺寸公差。

EN 10067，热轧圆头扁钢- 尺寸及形状，尺寸和质量公差。

EN 10162， 冷轧钢型材- 技术交付条件 -尺寸和横截面公差。

EN 10279，热轧钢槽钢-形状，尺寸和质量公差。

2.3 Standards on testing 试验标准

EN 10160, Ultrasonic testing of steel flat product of thickness equal to or greater than 6 mm (reflection method).

EN 10306, Iron and steel - Ultrasonic testing of H beams with parallel flanges and IPE beams.

EN 10308, Non-destructive testing - Ultrasonic testing of steel bars.

EN ISO 643, Steels - Micrographic determination of the apparent grain size (ISO 643:2003).

EN 10160，厚度等于或大于6 毫米扁钢产品的超声探伤试验（反射式探伤法）。

EN 10306，钢铁 - 带有平行凸缘和IPE柱工字钢的超声探伤。

EN 10308，非破坏性试验-钢棒材的超声探伤。

EN ISO 643，钢–表观晶粒大小的显微镜测定（ISO 643：2003）

3 Terms and definitions 术语和定义

For the purposes of this document, the terms and definitions given in EN 10025-1:2004 and the following apply.

在EN 10025-12004当中给出的，以及下面的术语和定义适用于本文件。

3.1
normalizing rolling
rolling process in which the final deformation is carried out in a certain temperature range leading to a material condition equivalent to that obtained after normalizing so that the specified values of the mechanical properties are retained even after normalizing

NOTE In international publications for both the normalizing rolling, as well as the thermomechanical rolling, the expression "controlled rolling" may be found. However in view of the different applicability of the products a distinction of the terms is necessary.

正火轧制
轧制过程最终变形在某一温度范围进行从而是材料达到相当于正火之后的状态，使材料的特定机械性能值甚至达到正火之后的指标要求。

注：无论正火轧制，还是形变热轧，在国际出版物中，可以发现关于“受控轧制”方面的内容。但是，考虑到产品的不同适用性，需要对各种术语进行明确的区分。

3.2
fine grained steels
steels with fine grain structure with an equivalent index of ferritic grain size > 6 determined in accordance with EN ISO 643

细晶粒钢
具有按照EN ISO 643确定的铁素体晶粒大小≥6相当指标的细晶粒结构钢。

4 Classification and designation分类和代号

4.1 Classification分类

4.1.1 Main quality classes主要质量等级

The steel grades S275 and S355 specified in this document shall be classified as non-alloy quality steels and the steel grades S420 and S460 specified in this document shall be classified as alloy special steels according to EN 10020.

根据EN10020，本文件指定的钢号S275和S355可以分类为碳素钢，而本文件钢号S420和S460可以被分类为合金特钢。

4.1.2 Grades and qualities钢号和质量等级

This document specifies four steel grades S275, S355, S420 and S460.

All the steel grades may be supplied in the following qualities as specified at the time of the enquiry and order:

- with specified minimum values of impact energy at temperatures not lower than -20 °C, designated as N;
- with specified minimum values of impact energy at temperatures not lower than -50 °C, designated as NL.

本文件规定了四个钢号S275，S355，S420和S460。

所有钢号都可以按照询价和订购时指定的下列质量要求供货：

- 具有温度不低于-20 °C 确定的最低冲击能值，该供货状态指定为N；
- 具有温度不低于-50 °C 确定的最低冲击能值，该供货状态指定为 NL。

4.2 Designation代号

4.2.1 The designation shall be in accordance with EN 10025-1. 产品代号应满足EN 10025-1的要求。

NOTE For a list of corresponding former designations and the former designations from EN 10113-2:1993 see Annex A, Table A. 1.

注：对于与以前代号的对照列表和EN 10113-2：1993原来的代号，见附录 A， 表 A. 1。

4.2.2 The designation shall consist of:

- number of this document (EN 10025-3);
- steel name or the steel number; the steel name consisting of:
  - symbol S (for structural steel);
  - indication of the minimum specified yield strength for thickness ≤ 16 mm expressed in MPa[1]);

产品代号包括：

- 本文件编号（EN 10025-3）；
- 钢的名称或钢的编号；钢的名称包括：
  - 符号S（结构钢）；
  - 厚度≤16 毫米钢指定的最低屈服强度，单位MPa1）；

1) 1 MPa= 1 N/mm^2

- delivery condition N;
- capital letter L for the quality with specified minimum values of impact energy at temperatures not lower than -50 °C.

EXAMPLE Normalized structural steel (S) with a specified minimum yield strength at ambient temperature of 355 MPa[1]), and with a specified minimum value of impact energy at -50 °C:

Steel EN 10025-3 - S355NL

or

Steel EN 10025-3-1.0546

- 交付条件 N；
- 大写字母L适用于在温度低于-50 ° C具有指定的最低冲击能值。

例如正火结构钢（S）在355 MPa1和环境温度下具有指定的最低屈服强度，同时在-50 °C 具有指定的最低冲击能值：

钢EN 10025-3 - S355NL

或

钢EN 10025-3-1.0546

5 Information to be supplied by the purchaser买方提供的信息

5.1 Mandatory information强制性信息

The information that shall be supplied by the purchaser at the time of the order is specified in EN 10025-1. In addition to EN 10025-1 the following information shall be supplied by the purchaser at the time of the order:

在订购时买方必须提供的信息见EN 10025-1当中的规定，除了EN 10025-1，下列信息也必须提供：

[1)] 1 MPa= 1 N/mm^2.

g) whether products have to be submitted to specific or non-specific inspection and testing and which inspection document is required (see 8.2); 是否必须提交特定的或非特定的产品检验和测试，需要那些检验文件（见8.2）；

5.2 Options 选项

A number of options are specified in Clause 13. In the event that the purchaser does not indicate his wish to implement any of these options, the supplier shall supply in accordance with the basic specification.

许多选项在条款13当中进行了规定。当买方 订购时没有指明任何选项，供货方将按基本技术规格供货。

6 Manufacturing process 生产过程

6.1Steel making process 炼钢工艺

The steel making process shall be in accordance with EN 10025-1. If specified at the time of the order the steel making process shall be reported to the purchaser, with the exception of steel S185.

See option 1.

炼钢工艺必须满足EN 10025-1的要求。如果在订购时指定，那么必须将炼钢工艺汇报给买方，钢S185除外。

见选项1。

6.2 Grain structure 晶粒结构

The steels shall have a fine grain structure containing sufficient amounts of nitrogen binding elements (see Table 2).

钢含有足够量的与氮结合元素的细晶粒结构（见 表 2）。

6.3 Delivery conditions 交付条件

The products shall be supplied normalized or in an equivalent condition obtained by normalizing rolling as defined in Clause 3.

产品应当按照条款3确定的正火或相当于正火轧制的状态供货。

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1) 1 MPa = 1 N/mm^2

7 Requirements 要求

7.1 General概述

The following requirements apply when sampling, preparation of test pieces and testing specified in Clauses 8, 9 and 10 are carried out.

当需要进行第8，9和10条款规定的采样， 试件的制备和试验时，必须满足下面的要求。

7.2 Chemical composition化学成份

7.2.1 The chemical composition determined by ladle analysis shall comply with the specified values of Table 2. On special request of the purchaser the manufacturer shall inform the purchaser at the time of the enquiry and order which of the alloying elements appropriate to the steel grade required will be deliberately added to the material to be delivered.

See option 29.

根据钢包分析确定的化学成份必须满足表2当中的规定值。对于买方的特殊要求，制造商应在买方在询价和订购时告知那些合金元素适合于交付材料特别添加而达到适当钢材品级的要求。

见选项 29。

7.2.2 The limits applicable for the product analysis are given in Table 3. The manufacturer shall inform the purchaser at the time of the enquiry and order which of the alloying elements appropriate to the steel grade required will be deliberately added to the material to be delivered. The product analysis shall be earned out when specified at the time of the order.

See option 2.

产品分析的限制见表3。制造商应在买方在询价和订购时告知那些合金元素适合于交付材料特别添加而达到适当钢材品级的要求。 在订购指定时应进行产品分析。

见选项 2。

7.2.3 The maximum carbon equivalent values based on the ladle analysis, given in Table 4 shall apply. For the carbon equivalent value formula see 7.2.3 of EN 10025-1:2004. 钢包分析的最大碳当量值，见表4，应满足。关于碳当量值公式，见EN 10025-1：2004的7.2.3。

7.2.4 When products are supplied with a control on Si e.g. for hot-dip zinc-coating so that there could be a need to increase the content of other elements like C and Mn to achieve the required tensile properties, the maximum carbon equivalent values of Table 4 shall be increased as follows:

- for Si ≤ 0,030 %, increase CEV by 0,02 %;
- for Si ≤ 0,25 %, increase CEV by 0,01 %.

当产品供货要求对硅含量进行控制时，例如热浸镀锌，实现增加其它元素例如碳和锰含量以达到所要求的抗拉性能，表6当中的最大碳当量值的增加具体如下：

- 对于Si≤ 0，030 %的产品，增加CEV0，02 %；
- 对于Si ≤ 0，25 %的产品，增加CEV0，01 %。

7.3 Mechanical properties 机械性能

7.3.1 General 概述

7.3.1.1 Under the inspection and testing conditions as specified in Clauses 8, 9 and 10 and in the delivery condition as specified in 6.3 the mechanical properties shall comply with the values given in Tables 5 to 7,8and 9. 按照条款8，9，和10规定动作饿检验和试验条件及6.3当中规定的交付条件，产品的机械性能必须满足表5至表7。

7.3.1.2 For flat products the nominal thickness applies. For long products of irregular section the nominal thickness of that part from which the samples are taken applies (see Annex A of EN 10025-1:2004). 对于扁钢产品，必须达到标称厚度要求。对于不规则剖面的长材产品，试验样品必须在具有标称厚度的部分采集（见EN10025-1：2004的附录A）。

7.3.2 Impact properties抗冲击性能

7.3.2.1 The verification of the impact energy value shall be carried out in accordance with EN 10025-1.

冲击能值必须按照EN 10025-1要求检验核实。

Furthermore the verification of the impact energy value shall be carried out, unless otherwise agreed (see 7.3.2.2 and 7.3.2.3) with longitudinal test pieces for:

- Nat -20 °C:
- NLat-50°C.

另外除非协议另有规定，否则冲击能值必须进行检验（见 7.3.2.2和7.3.2.3），采用纵向试件：

- Nat -20 °C：
- NLat-50°C。

7.3.2.2 Another temperature (given in Tables 6 and 7) may be agreed at the time of the order.

See option 3.

其它温度（见表6和7）可在订购时协议确定。

见选项 3。

7.3.2.3 If agreed at the time of the enquiry and order transverse impact energy values as given in Table 7 shall apply instead of longitudinal values,

See option 30.

如果在询价和订购时协议确定，那么表7当中的横向冲击能值应满足替代纵向值的要求。

见选项 30。

7.3.3 Improved deformation properties perpendicular to the surface改进的与产品表面垂直的变形性能

If agreed at the time of the order flat and long products shall comply with one of the requirements of EN 10164.

See option 4,

如果在订购时协议确定，那么扁材和长材产品应满足EN 10164的要求。见选项 4。

7.4 Technological properties 工艺性能

7.4.1 Weldability 可焊接性

The steels specified in this document shall be suitable for welding.

General requirements for arc welding of the steels specified in this document shall be as given in EN 1011-2

NOTE With increasing product thickness and strength level cold cracking can occur. Cold cracking is caused by the following factors in combination:

- the amount of diffusible hydrogen in the weld metal;
- a brittle structure of the heat affected zone;
- significant tensile stress concentrations in the welded joint.

本文中规定的钢材应适用于焊接。
本文中所规定的弧形焊接的基本要求见EN 1011-2。

注：随着产品厚度和强度的增加，可能出现冷裂问题。冷裂纹主要是由于下列各种原因共同作用造成的：

- 焊接金属内扩散氢气的量；
- 热影响区的脆性结构；
- 焊缝内出现显著地拉应力集中。

7.4.2 Formability 可成形性

NOTE Recommendations regarding hot and cold forming are laid down in ECSC IC 2.

注：冷成形和热成形方面的建议见ECSC IC 2。

7.4.2.1 Hot forming 热成形

Only products ordered and supplied in the normalized or normalized rolled condition shall comply with the requirements of Tables 7, 8 and 9 if hot forming is carried out after delivery (see 7.3.1.2).

如果交付后热成形，那么只有在正火或正火轧制状态订购和交货的产品应满足表7，8和9的要求（见7.3.1.2）。

NOTE Cold forming leads to reduction in the ductility. Furthermore it is necessary to draw the attention to the risk of brittle fracture in connection with hot-dip zinc-coating.

注：冷成形造成延展性下降。另外，必须特别注意热浸镀锌时脆裂的危险。

7.4.2.2 Cold formabillty可冷成形性

7.4.2.2.1 General概述

NOTE Cold forming leads to reduction in the ductility. Furthermore it is necessary to draw the attention to the risk of brittle fracture in connection with hot-dip zinc-coating.

注：冷成形造成延展性下降。另外，必须特别注意热浸镀锌时脆裂的危险。

7.4.2.2.2 Flangeability 可弯折性

If specified at the time of the order plate, sheet, strip and wide flats ordered and supplied in the normalized condition with a nominal thickness ≤ 16 mm shall be suitable for flanging without cracking with the following minimum bend radii:

2 times the nominal thickness with the axis of the bend in transverse direction and 2,5 times the nominal thickness in longitudinal direction for the steel grades S275 and S355;

如果在订购时指明，那么标称厚度≤ 16 毫米的按照正火状态订购和供货的钢板，薄钢板，钢带，宽扁材必须具有下列最低弯曲半径以适合于弯折而无裂纹的要求。

对于钢号 S275 和S355，横向轴弯曲达到2倍标称厚度，而纵向达到标称厚度的2.5倍；

- 4 times the nominal thickness with the axis of the bend in transverse direction and .5 times the nominal thickness in longitudinal direction for the steel grades S420 and S460.

See option 11a.

- 对于钢号 S420和S460，横向轴弯曲达到标称厚度的4倍，而纵向达到0.5倍的标称厚度。

见选项 11a。

7.4.2.2.3 Roll forming滚轧成形

If specified at the time of the order plate, sheet and strip with a nominal thickness £ 8 mm shall be suitable for the production of sections by cold rolling (for example according to EN 10162), with the same minimum bend radii as given in 7.4.2.2.1.

See option 12.

NOTE The products suitable for roll forming are also suitable for the manufacture of cold-finished square and rectangular hollow sections.

如果在订购时指明，那么标称厚度 < 8 毫米的钢板，薄钢板和钢带应适合于冷轧型材（例如根据EN 10162）的生产，具有7.4.2.2.1给出的相同的最小弯曲半径。

见选项 12.

注：适合于滚轧成形的产品也适合于生产冷加工精整方形或矩形空心型钢。

7.4.3 Suitability for hot-dip zinc-coating 热浸镀锌的适合性

Hot-dip zinc-coating requirements shall be agreed between manufacturer and purchaser.

EN ISO 1461 and EN ISO 14713 should be used to set these coating requirements. The definition of suitability classes based upon chemical analysis limitations as laid down in Table 1 can be used for guidance purposes.

热浸镀锌要求应当经过制造商和买方之间协议确定。

这些镀层必须满足EN ISO 1461和EN ISO 14713的要求。基于化学分析限值确定的适合性等级见表1。

Table 1 • Classes for the suitability for hot-dip zinc-coating based on the ladle analysis (for guidance)

Classes	Elements % by mass		
	Si	Si + 2,5 P	P
Class 1	≤ 0,030	≤ 0,090	-
Class 2 [a]	≤0,35	-	-
Class 3	0,14 ≤Si ≤0,25	-	≤ 0,035
[a] Class 2 applies only for special zinc alloys.			

表1-基于钢包分析确定的热浸镀锌适合性等级（用作参考信息）

等级	元素的质量百分比%		
	Si	Si + 2.5P	P
1级	≤ 0，030	≤ 0，090	-
2级[a]	≤0，35	-	-
3级	0.14≤Si≤0，25	-	≤0，035
[a] 2级只适合于特定的锌合金。			

For class 1 the maximum carbon equivalent value of Table 4 shall be increased by 0,02. For class 3 the maximum carbon equivalent value of Table 4 shall be increased by 0,01 (see 7.2.4).

See option 5.

NOTE Product shape, composition of the zinc bath, other hot-dip treatment settings and other factors should be considered when agreeing upon hot-dip zinc-coating requirements.

对于适合性等级1级，表4当中的最大碳当量值应增加0，02。对于3级，最大碳当量值增加0，01（见7.2.4）。

见选项5.

注：产品形状，镀锌浴的成份，其它热浸处理和其它影响因素在协商确定热浸镀锌要求时必须考虑。

7.5 Surface properties表面性能

7.5.1 Strip钢带

The surface condition should not impair an application appropriate to the steel grade if adequate processing of the strip is applied.

如果对钢带进行了充分的处理，那么其表面条件就不会损害特定钢号产品的应用。

7.5.2 Plates and wide flats 板材和宽扁材

EN 10163 parts 1 and 2 shall apply for the permissible surface discontinuities and for the repair of surface defects by grinding and/or welding. Class A, subclass 1 of EN 10163-2 shall apply, unless otherwise agreed at the time of the order.

See option 15.

对于板材和宽扁材，EN 10163的第1和2部分规定了允许的表面不连续性并可通过打磨和/或焊接对表面缺陷进行修复。除非在订购时特别指明，否则必须满足EN 10163-2当中A-1级的表面质量要求。

见选项15。

7.5.3 Sections型钢

EN 10163 parts 1 and 3 shall apply for the permissible surface discontinuities and for the repair of surface defects by grinding and/or welding. Class C, subclass 1 of EN 10163-3 shall apply, unless otherwise agreed at the time of the order.

See option 16.

对于型钢，允许的表面不连续性及通过打磨和/或焊接对表面缺陷进行的修复应满足EN 10163第1和3部分的要求。除非在订购时特别指明，否则必须满足EN 10163-3当中C-1级的表面质量要求。

见选项16。

7.5.4 Bars and rods钢筋和钢棒

EN 10221 applies for the permissible surface discontinuities and for the repair of surface defects by grinding and/or welding. Class A of EN 10221 shall apply, unless otherwise agreed at the time of the order.

See option 17.

对于钢筋和钢棒，EN 10221规定了允许的表面不连续性及通过打磨和/或焊接对表面缺陷进行的修复。在订购时。除非在订购时特别指明，否则必须满足EN 10221当中A级的表面质量要求。

见选项17。

7.6 Internal soundness内部质量

The permissible level of internal imperfections shall be in accordance with EN 10025-1.

See option 6 (for flat products).

See option 7 (for H beams with parallel flanges and IPE beams).

See option 8 (for bars).

允许的内部缺陷水平必须满足EN 10025-1的要求。

见选项6（适用于扁钢产品）。

见选项7（适用于带有平行凸缘和IPE柱的H柱型材）。

见选项8（适用于钢筋）。

7.7 Dimensions, tolerances on dimensions and shape, mass 尺寸， 尺寸和形状公差，质量

7.7.1 Dimensions, tolerances on dimensions and shape shall be in accordance with the requirements given in the order by reference to the relevant documents according to 2.2 and according to 2.2 and 7.7.1 of EN 10025-1:2004.

For hot rolled plate tolerances the basic requirements shall be in accordance with EN 10029, including thickness tolerances to class A, unless otherwise agreed at the time of the order.

See option 18.

For plates cut from continuously hot rolled strip, the thickness tolerances shall be in accordance with EN 10051.

参照2.2相关文件, 以及EN 10025-1：2004当中2.2和7.7.1的内容,按照定单当中要求确定产品的尺寸，尺寸和形状公差。

关于热轧钢板的公差，除非在订购时有协议特别指明，否则必须满足EN 10029的基本要求，包括厚度公差达到A级要求。

见选项18.

对于从连续热轧钢带上裁切的钢板，厚度公差必须满足EN 10051的要求。

7.7.2 The nominal mass shall comply with EN 10025-1. 产品的标称质量应满足EN 10025-1的要求。

8 Inspection检验

8.1 General概述

The products shall be delivered with specific and testing to indicate compliance with the order and this document.

产品在特定的检验和测试状态下交货，并指明满足定单和本文件的要求。

8.2 Type of inspection and inspection document 检验类型和检验文件

The type of inspection and inspection document required shall comply with EN 10025-1.

所要求的检验类型和检验文件应满足EN 10025-1的要求。

See option 9.

见选项9。

8.3 Frequency of testing 测试次数

8.3.1 Sampling采样

The verification of the mechanical properties shall be carried out by cast. 机械性能按照浇铸状态进行检验。

8.3.2 Test units测试单元

8.3.2.1 The test unit shall contain products of the same form, grade and of the same thickness range as
specified in Table 5 for the yield strength.

For verifying the mechanical properties the following test unit shall apply:

- 40 tonnes or part thereof.

测试单元应含有适用于屈服强度试验的表5所指定的相同类型，等级，相同的厚度范围。

为了检验机械性能，可采用下面的测试单元：

- 40 公吨或其中的一部分。

8.3.2.2 If specified at the time of the order for flat products the impact properties only or the impact properties and the tensile properties shall be verified out of each parent plate or coil.

See option 13.

See option 14.

如果在订购时指定，那么对于扁钢产品，只有对每张母钢板或卷材的抗冲击性能或抗冲击性能和抗拉伸性能进行检验测试。

见选项 13。

见选项 14。

8.3.3 Verification of chemical composition 化学成份的确认

The verification of the chemical composition shall be in accordance with EN 10025-1. See option 2.

化学成份的确认必须满足EN 10025-1的要求。

见选项2。

8.4 Tests to be carried out for specific inspection为特定检验进行的测试

BAA The following tests shall be carried out:

- for all products the ladle analysis;
- for all products the tensile test;
- for all products the impact test.

应进行下列测试：

— 适用于所有产品的钢包分析；

— 适用于所有产品的拉伸试验；

— 适用于所有产品的抗冲击试验。

8.4.2 At the time of the order the following additional tests can be agreed:

a) for all products the impact test at another temperature or on transverse test pieces (see 7.3.2.2 and 7.3.2.3);

See option 3.

See option 30.

b) the product analysis (see 8.3.3.2 of EN 10025-1:2004).

See option 2.

在订购时，下列附加试验通过协议确定：

a) 对于所有产品，抗冲击试验在其它的温度或横向试验工件 （见7.3.2.2和7.3.2.3）；

见选项3。

见选项30。

b)进行产品分析（见EN 10025-1：2004的8.3.3.2）。

见选项2。

9 Preparation of samples and test pieces 样品和试件的制备

9.1 Selection and preparation of samples for chemical analysis 化学分析用样品的选择和制备

The preparation of samples for product analysis shall be in accordance with EN 10025-1.

产品分析所用样品的制备必须满足EN 10025-1的要求。

9.2 Location and orientation of samples and test pieces for mechanical tests 机械试验样品和试件的位置和取向

9.2.1 General 概述

The location and orientation of samples and test pieces for mechanical tests shall be in accordance with EN 10025-1.

机械试验所用样品和试件的位置和取向必须满足EN 10025-1的要求。

9.2.2 Preparation of samples 样品的制备

In addition to EN 10025-1 the samples shall be taken:

- from any product of the test unit.

除了EN 10025-1，样品应按照下面的要求制备：

- 从测试单元内的任何产品；

9.2.3 Preparation of test pieces 试件的制备

The preparation of test pieces for mechanical tests shall be in accordance with EN 10025-1.

机械试验所用试件的制备必须满足EN 10025-1的要求。

9.2.4 Impact test pieces 抗冲击试验

In addition to EN 10025-1 the following requirement applies: EN 10025-1，还必须满足下列要求：

- impact test pieces shall be taken from 1/4*t* position for plates with nominal thickness≥ 40 mm. 抗冲击试件应当取自标称厚度≥ 40 毫米钢板的1/4t 位置。

9.3 Identification of samples and test pieces 样品和试件的标记

The identification of samples and test pieces shall be in accordance with EN 10025-1.

样品和试件的标记必须满足EN 10025-1的要求。

10 Test methods 试验方法

10.1 Chemical analysis 化学分析

The chemical analysis shall be in accordance with EN 10025-1.

按照EN 10025-1的要求进行化学分析。

10.2 Mechanical tests 机械试验

The mechanical tests shall be in accordance with EN 10025-1.

按照EN 10025-1的要求进行机械试验。

10.3 Ultrasonic testing 超声探伤

Ultrasonic testing shall be carried out in accordance with EN 10025-1.

按照EN 10025-1的要求进行超声探伤。

10.4 Retests 重新测试

The retests shall be in accordance with EN 10025-1.

按照EN 10025-1的要求进行重新测试。

11 Marking, labelling, packaging 标志，标签和包装

The marking, labelling and packaging shall be in accordance with EN 10025-1. See

option 10.

In addition to EN 10025-1 if specified at the time of the enquiry and order there shall be either no die stamping or only die stamping in positions indicated by the purchaser.

See option 31.

标志，标签和包装必须满足EN 10025-1的要求。
见选项10。

除了EN 10025-1，如果在询价和订购时指明，在产品上既可以无冲压打印记号，也可以只在买方指定的位置冲压打印记号。
见选项 31.

12 Complaints 诉讼

Any complaints shall be dealt with in accordance with EN 10025-1.

任何诉讼都必须按照EN 10025-1的要求处理。

13 Options (see 5.2) 选项 （见 5.2）

The following options of EN 10025-1:2004 apply:

EN 10025-1:2004 适用的下列选项:

1) The steel making process shall be indicated (see 6.1).

2) Product analysis shall be carried out; the number of samples and the elements to be determined shall be as agreed (see 7.2.2, 8.3.3 and 8.4.2).

3) At which temperature the impact properties shall be verified (see 7.3.2.2 and 8.4.2).

4) Products shall comply with one of the improved properties perpendicular to the surface of EN 10164 (see 7.3.3).

5) The product shall be suitable for hot-dip zinc-coating (see 7.4.3).

6) For flat products in thickness a 6 mm the freedom from internal defects shall be verified in accordance with EN 10160 (see 7.6 and 10.3).

7) For H beams with parallel flanges and IPE beams the freedom from internal defects shall be verified in accordance with EN 10306 {see 7.6 and 10.3).

8) For bars the freedom from internal defects shall be verified in accordance with EN 10308 (see 7.6 and 10.3).

9) Inspection of surface condition and dimensions shall be witnessed by the purchaser at the manufacturer's works (see 8.2).

10) The type of marking required (see Clause 11).

In addition to the options of EN 10025-1:2004 the following options apply to products according to EN 10025-3:

11) Sheet, plate, strip and wide flats with a nominal thickness < 16 mm shall be suitable for flanging without cracking (see 7.4.2.2.1).

12) Plate, sheet and strip with nominal thickness < 8 mm shall be suitable for the production of sections by cold rolling with bend radii given in 7.4.2.2.1 (see 7.4.2.2.2).

13) For flat products out of each parent plate or coil the impact properties only shall be verified (see 8.3.2.2).

14) For flat products out of each parent plate or coil the impact properties and the tensile properties shall be verified (see 8.3.2.2).

15) For plates and wide flats the permissible surface discontinuities and for the repair of surface defects by grinding and/or welding another class than class A, subclass 1 of EN 10163-2 applies (see 7.5.2).

16) For sections the permissible surface discontinuities and for the repair of surface defects by grinding and/or welding another class than class C, subclass 1 of EN 10163-3 applies (see 7.5.3).

17) For bars and rods the permissible surface discontinuities and for the repair of surface defects by grinding and/or welding another class than class A of EN 10221 applies (see 7.5.4).

18) Other tolerances than class A of EN 10029 for hot rolled plates apply (see 7.7.1).

29) The manufacturer shall inform the purchaser at the time of the enquiry and order which of the alloying elements appropriate to the steel grade required will be deliberately added to the material to be delivered (see 7.2.1).

30) The impact properties shall be verified on transverse V-notch test pieces (see 7.3.2.3 and 8.4.2).

31) Die stamping is not allowed or the position for die stamping shall be as indicated by the purchaser (see Clause 11).

32）For railway applications a maximum S content of 0,010 % for ladle analysis and 0,012 % for product analysis is required (see Tables 2 and 3, footnote[b]).

1) 炼钢工艺的相关质量应该说明（见 6.1）。
2) 进行产品分析；样品和部件的数目应当满足协议要求（见7.2.2，8.3.3 和8.4.2）。
3) 质量JR的抗冲击性能应当进行验证（见7.3.2.2 和8.4.2）。
4) 相关质量的产品应当满足 EN 10164当中指定的改进垂直于产品表面性能的要求（见 7.3.3）。
5) 产品应适合于热浸镀锌 （见7.4.3）。
6) 对于厚度6毫米的扁钢产品，按照EN 10160的要求核实无内部缺陷(见 7.6和10.3)。
7) 对于带有平行凸缘的工字钢和IPE梁，必须按照EN 10306 （见 7.6 和10.3）的要求核实无内部缺陷。
8) 对于钢筋，按照EN 10308 （见 7.6 和10.3）的要求核实无内部缺陷。
9) 在制造商工厂进行的表面状态和尺寸检验必须有买方人员到场见证（见 8.2.2）。
10) 所要求的标志类型（见 11.1）。

除了EN 10025-1：2004选项，根据EN 10025-2，产品还必须满足下列选项的要求：

11) 标称厚度 ≤ 30毫米的薄钢板， 钢板， 钢带， 宽扁材和扁材（宽度 < 150毫米）必须适合于弯折而无裂纹的要求（见7.4.2.2.2）。
12) 标称厚度≤ 8毫米的钢板和钢带，必须具有适合于冷轧型材生产的弯曲半径，具体见表13 （见7.4.2.2.3）。
13) 对于J2和K2扁钢产品，只需要对每张母板或卷材的抗冲击性能进行检验（见8.3.2.2）。
14) 对于J2和K2扁钢产品，需要对每张母板或卷材的抗冲击性能和抗拉伸性能进行检验（见8.3.2.2）。
15) 对于板材和宽扁材，除了必须满足EN 10163-2当中A-1级的表面质量要求，允许的表面不连续性并可通过打磨和/或焊接对表面缺陷进行修复还必须满足其它等级的要求（见7.5.2）。
16) 对于型材，除了必须满足EN 10163-3当中C-1级的表面质量要求，允许的表面不连续性并可通过打磨和/或焊接对表面缺陷进行修复还必须满足其它等级的要求（见7.5.3）。
17) 对于钢筋和钢棒，除了必须满足EN 10221当中A级的表面质量要求，允许的表面不连续性并可通过打磨和/或焊接对表面缺陷进行修复还必须满足其它等级的要求（见7.5.4）。
18) 除了EN 10029的A级公差，热轧钢板还必须满足其它公差要求（见7.7.1）。

29)制造商应在买方在询价和订购时告知那些合金元素适合于交付材料特别添加而达到适当钢材品级的要求（见 7.2.1）。

30)抗冲击性能应在横向V-切口试件上进行测试（见 7.3.2.3和8.4.2）。

31)不允许进行冲压或冲压的位置由买方指明（见第11条款）。

32)对于铁路应用场合，要求钢包分析最高硫含量达到0，010 %，而产品分析达到0，012 %（见 表 2和3， 脚注b）。

Table 2 - Chemical composition of the ladle analysis for normalized steel

表 2 – 正火钢钢包分析化学成份

Designation代号		C % max. 最大碳百分含量	Si % max. 最大硅百分含量	Mn % 最大锰百分含量	P % max. [a] 最大磷百分含量	S % max. [a b] 最大硫百分含量	Nb % max. 最大铌百分含量	V % max. 最大钒百分含量	Al_{total}. % min. [c] 最大总铝百分含量	Ti % **max.** 最大钛百分含量	Cr % max. 最大铬百分含量	Ni % max. 最大镍百分含量	Mo % max. 最大钼百分含量	Cu % max. [d] 最大铜百分含量	N % max. 最大氮百分含量
According EN 10027-1 and CR 10260 根据EN 10027-1 和 CR 10260	According EN 10027-2 根据EN 10027-2														
S275N	1.0490	0,18	0,40	0,50-1,50	0,030	0,025	0,05	0,05	0,02	0,05	0,30	0.30	0,10	0,55	0,015
S275NL	1.0491	0,16			0,025	0.020									
S355N	1.0545	0,20	0,50	0,90-1,65	0,030	0,025	0.05	0,12	0.02	0,05	0.30	0.50	0,10	0,55	0,015
S355NL	1.0546	0,18			0,025	0,020									
S420N	1.8902	0,20	0,60	1,00-1,70	0,030	0.025	0,05.	0,20	**0,02**	0.05	**0,30**	**0,80**	0,10	0,55	0,025
S420NL	1.8912				0,025	0,020									
S460N[e]	1.8901[e]	0,20	0,60	1,00-1,70	0,030	0,025	0,05	0.20	0,02	0,05	0,30	0,80	0,10	0,55	0,025
S460NL[e]	1.8903[e]				0,025	0,020									

[a] For long products the P and S content can be 0,005 % higher.

对于长材产品，磷和硫的含量可以超过0，005 %。

[b] For railway applications a maximum S content of 0,010 % may be agreed at the time of enquiry and order.

对于铁路应用场合，最大硫含量0,010 %可以在询价和订购时协议确定。

See option 32见选项32。

[c] If sufficient other N-binding elements are present the minimum total Al content does not apply.

如果存在足够的其它氮结合元素，那么最低总铝含量不满足要求。

[d] Cu content above 0,40 % may cause hot shortness during hot forming.

铜含量超过0. 40 %会导致热成形过程中的热收缩问题。

[e] V + Nb + Ti≤ 0,22 % and Mo + Cr ≤ 0,30 %.

V + Nb + Ti≤0,22 % 而 Mo + Cr ≤0,30 %.

Table 3 - Chemical composition of the product analysis based on Table 2

表 3 – 基于表2进行产品分析的化学成份

Designation代号		C % max. 最大碳百分含量	Si % max. 最大硅百分含量	Mn % 最大锰百分含量	P % max.[a] 最大磷百分含量	S % max.[a b] 最大硫百分含量	Nb % max. 最大铌百分含量	V % max. 最大钒百分含量	Al_{total} % min.[c] 最大总铝百分含量	Ti % **max.** 最大钛百分含量	Cr % max. 最大铬百分含量	Ni % max. 最大镍百分含量	Mo % max. 最大钼百分含量	Cu % max.[d] 最大铜百分含量	N % max. 最大氮百分含量
According EN 10027-1 and CR 10260 根据EN 10027-1 和CR 10260	According EN 10027-2 根据EN 10027-2														
S275N	1.0490	0,20	0,45	0,45-1,60	0.035	0,030	0,06	0.07	0,015	0,06	0,35	0,35	0,13	0,60	0,017
S275NL	1.0491	0,18			0,030	0,025									
S355N	1.0545	0,22	0,55	0,85-1,75	0,035	0.030	0,06	0,14	0,015	0.06	0.35	0.55	0,13	0,60	0.017
S355NL	1.0546	0,20			0,030	0.025									
S420N	1.8902	0,22	0,65	0,95- 1,80	0,035	0.030	0,06	0,22	0,015	0,06	0.35	0,85	0,13	0,60	0.027
S420NL	1.8912				0,030	0.025									
S460N[e]	1.8901[e]	0,22	0.65	0,95-1,80	0,035	0.030	0,06	0.22	0,015	0.06	0.35	0,85	0,13	0.60	0,027
S46ONL[e]	1.8903[e]				0,030	0,025									

[a] For long products the P and S content can be 0,005 % higher.

对于长材产品，磷和硫的含量可以超过0，005 %。

[b] For railway applications a maximum S content of 0,012 % may be agreed at the time of enquiry and order.

对于铁路应用场合，最大硫含量0,012 % 可以在询价和订购时协议确定。

See option 32. 见选项32。

[c] If sufficient other N-binding elements are present the minimum total Al content does not apply.

如果存在足够的其它氮结合元素，那么最低总铝含量不满足要求。

[d] Cu content above 0,45 % may cause hot shortness during hot forming.

铜含量超过0. 45 %会导致热成形过程中的热收缩问题。

[e] V + Nb + Ti ≤ 0.26 % and Mo + Cr ≤ 0,38 %.

V + Nb + Ti≤0,26 % 而 Mo + Cr ≤ 0,38 %.

Table 4 • Maximum CEV based on the ladle analysis for normalized steel

表 4 • 正火钢钢包分析的最大CEV

Designation代号		Maximum CEV in % for normal product thickness in mm 标称产品厚度（单位毫米）的最大CEV		
According EN 10027-1 and CR 10260 根据EN 10027-1 和 CR 10260	According EN 10027-2 根据EN 10027-2	≤ 63	>63 ≤ 100	>100 ≤ 250
S275N[a]	1.0490[a]	0,40	0,40	0,42
S275NL[a]	1.0491[a]			
S355N [a]	1.0545[a]	0,43	0,45	0,45
S355NL[a]	1.0546[a]			
S420N	1.8902	0,48	0,50	0,52
S420NL	1.8912			
S460N	1.8901	0,53	0,54	0,55
S460NL	1.8903			

[a] For the optional increase of elements which influence the CEV see 7.4.3.
可以选择提高对CEV影响的元素，见7.4.3。

Table 5 - Mechanical properties at ambient temperature for normalized steel

表 5-正火钢在环境温度的机械性能

Designation代号		Minimum yield strength *Rhe*[a] MPa[b]最低屈服强度								Tensile strength R_m[a] Mpa[b]拉伸强度			Minimum percentage elongation after fracture[a] % 断裂最低伸长百分率					
According EN 10027-1 and CR 10260 根据EN 10027-1 和 CR 10260	According EN 10027-2 根据EN 10027-2	Nominal thickness 标称厚度 mm								Nominal thickness 标称厚度mm			L_0- 5,65 VS_o Nominal thickness 标称厚度mm					
		≤ 16	>16 ≤ 40	> 40 ≤ 63	>63 ≤ 80	> 80 ≤100	> 100 ≤ 150	> 150 ≤ 200	>200 ≤ 250	≤ 100	> 100 ≤ 200	>200 ≤ 250	≤16	>16 ≤40	> 40 ≤ 63	>63 ≤ 80	> 80 ≤200	>200 ≤250
S275N S275NL	1.0490 1.0491	275	265	255	245	235	225	215	205	370至510	350至480	350至480	24	24	24	23	23	23
S355N S355NL	1.0545 1.0546	355	345	335	325	315	295	285	275	470至630	450至600	450至600	22	22	22	21	21	21
S420N S420NL	1.8902 1.8912	420	400	390	370	360	340	330	320	520至680	500至650	500至650	19	19	19	18	18	18
S460N S460NL	1.8901 1.8903	460	440	430	410	400	380	370	-	540至720	530至710	-	17	17	17	17	17	-

[a] For plate, parallel strip and wide flats widths ≥600 mm the direction transverse it) to the rolling direction applies. For all other products the values apply for the direction 对于宽度≥600毫米的钢板，钢带和宽扁材，数值适用于与轧制方向垂直的方向，对于所有其它产品，数值适用于与轧制方向平行的方向。

[b] 1 MPa =1 N/mm^2

Table 6 - Minimum values of impact energy for impact tests on longitudinal V-notch test pieces for normalized steel

表 6 -正火钢纵向V切口试件抗冲击试验的最低冲击能值

Designation代号		Minimum values of impact energy in J at test temperatures, in °C 在测试温度℃下最低冲击能值（单位J）						
According EN 10027-1 and CR 10260 根据EN 10027-1 和 CR 10260	According EN 10027-2 根据EN 10027-2	+ 20	0	-10	-20	-30	-40	-50
S275N S355N S420N S460N	1.0490 1.0545 1.8902 1.8901	55	47	43	40[a])	-	-	-
S275NL S355NL S420NL S460NL	1.0491 1.0546 1.8912 1.8903	63	55	51	47	40	31	27
[a] This value corresponds with 27J at - 30 °C (see Eurocode 3) 该数值对应于- 30 °C条件下的冲击能值27J								

Table 7 - Minimum values of impact energy for impact tests on transverse V-notch test pieces for normalized steel, when the impact test on transverse test pieces is agreed at the time of the order

表 7 -当订购时协议确定在横向试件上进行抗冲击试验时，正火钢横向V-切口试件抗冲击试验的最低冲击能值

See option 30见选项 30

Designation代号		Minimum values of impact energy in J at test temperatures, in °C在测试温度℃下最低冲击能值（单位J）						
According EN 10027-1 and CR 10260 根据EN 10027-1 和 CR 10260	According EN 10027-2 根据EN 10027-2	+ 20	0	-10	-20	-30	-40	-50
S275N S355N S420N S460N	1.0490 1.0545 1.8902 1.8901	31	27	24	20			
S275NL S355NL S420NL S460NL	1.0491 1.0546 1.8912 1.8903	40	34	30	27	23	20	16

Designation 代号		Equivalent former designations in对应原代号							
according EN 10025-3 根据EN 10025-3		According EN 10113-2:1993 根据EN 10113-2:1993		According EU 113-72 根据EU 113-72	Germany according to DIN 德国，根据DIN	France according to NF A 36-201 法国，根据NF A 36-201	United Kingdom according to BS 4360 英国，根据BS 4360	Italy according to UNI 意大利，根据UNI	Sweden according to SS 14 followed by number steel grade 瑞典，根据SS14，后接
S275N	1.0490	S275N	1.0490	Fe E 275 KG N	SIE285	-	-	Fe E 275 KG N	
S275NL	1.0491	S275NL	1.0491	Fe E 275 KT N	TSIE285	-	43EE	Fe E 275 KT N	-
S355N	1.0545	S355N	1.0545	Fe E 355 KG N	StE355	E355R	-	Fe E 355 KG N	2134-01
S355NL	1.0546	S355NL	1.0546	Fe E 355 KT N	TStE355	E 355 FP	50EE	Fe E 355 KT N	2135-01
S420N	1.8902	S420N	1.8902	Fe E 420 KG N	StE42O	E420R	-	-	
S420NL	1.8912	S420NL	1.8912	Fe E 420 KT N	TStE420	E 420 FP	-	-	-
S460N	1.8901	S460N	1.8901	Fe E 460 KG N	StE460	E460R		Fe E 460 KG N	
S460NL	1.8903	S460NL	1.8903	Fe E 460 KT N	TStE460	E 460 FP	55EE	Fe E 460 KT N	-

Annex B附录 B
(informative) （提示性）

List of national standards which correspond with EURONORMS referenced

与所参照EURONORMS标准对应的国家标准列表

Until the following EURONORMS are transformed into European Standards, they may be either implemented or reference made to the corresponding national standards as listed in Table B.1.

NOTE Standards listed in Table B.1 are not supposed to be strictly similar although they deat with the same subjects.

当下列EURONORMS 转化为欧洲标准后，这些标准即可实施，也可供参考，具体见表B.1当中对应的国家标准。

注：虽然涉及相同的课题，但表B.1列举的标准不必完全类似。

Table B.1 —EURONORMS with corresponding national standards
表 B.1 —EURONORMS与对应的国家标准

EURONORM	Corresponding national standard in 在下列国家对应的国家标准									
	Germany 德国	France 法国	United Kingdom 英国	Spain 西班牙	Italy 意大利	Belgium 比利时	Portugal 葡萄牙	Sweden 瑞典	Austria 奥地利	Norway 挪威
19[a]	DIN 1025 T5	NF A 45 205	BS 4	UNE 36-526	UNI 5398	NBN 533	NP-2116	SS 21 27 40	M 3262	-
53[a]	DIN 1025 T2 DIN 1025 T3 DIN 1025 T4	NFA 45201	BS 4	UNE 36-527 UNE 36-528 UNE 36-529	UNI 5397	NBN 633	NP-2117	SS 21 27 50 SS 21 27 51 SS 21 27 52	-	NS 1907 NS 1908
54[a]	DIN 1026-1	NF A 45 007	BS 4	UNE 36-525	UNI-EU 54	NBN A 24-204	NP-338	-	M 3260	-
ECSC IC 2	SEW 088	NF A 36 000	BS 5135	-	-	-	-	SS 06 40 25	-	-

[a] This EURONORM is formally withdrawn, but there are no corresponding EN's.
该EURONORM已经正式撤销，但还没有相应的EN标准。

Bibliograph 参考文献

[1] *EN ISO 1461, Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods (ISO 1461:1999). EN ISO 1461， 钢铁加工件的热浸镀锌-技术规范和试验方法 （ISO 1461：1999）。*

[2] *EN ISO 14713, Protection against corrosion of iron and steel structures - Zinc and aluminium coatings - Guidelines (ISO 14713:1999). EN ISO 14713，钢铁结构的防腐保护- 锌和铝镀层- 导则（ISO 14713：1999）。*

[3] *ECSC IC 2 (1983)2) , Weldable fine-grained structural steels - Recommendations for processing, in particular for welding. ECSC IC 2 （1983）2)可焊接细晶粒结构钢- 各种加工方面的建议，尤其焊接方面。*

2) Until ECSC IC 2 is transformed into a CEN Technical Report, it can either be implemented or reference made to the corresponding national standards, the list of which is given in Annex B to this document.
在 ECSC IC 2被转换成CEN 技术报告之后，该文件附录B列举的相应国家标准既可施行，也可作为参考资料。