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Replacing GB/T 14977-1994

General requirement for surface condition of hot-rolled steel plates

热轧钢板表面质量的一般要求

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Foreword

This Standard is modified from EN 10163-2: 2004 “Delivery requirements surface condition hot-rolled steel plates, wide flats wide flats and sections - Part 2: Plates and wide flats.”

Compared with EN 10163-2: 2004, the main technical differences are as follows:

-- Added the provisions of 5.3.1.2.1 and 5.3.1.2.3 to the defect section;

-- Added specific provisions on welding repair time and pile height;

-- Added Chapter 6 “numerical amendments";

This Standard replaces GB/T 14977-1994 “General requirement for surface condition of hot-rolled steel plates”. Compared with the previous standard, the main changes are as follows:

-- Extended the applicable scope of the standard to 3mm ~ 400mm steel plates;

-- Added Chapter 2 “Normative references";

-- Added Chapter 4 “Classification", which classifies the surface quality into two categories, and each of the category is further divided into three grades;

-- Added the general requirements for the surface of steel plates;

-- Amended the determination of the affected area of discontinuity on the surface;

-- Deleted 4.2.1 from the previous standard;

-- Added 5.3.2.2.1 in category A defects;

-- Provided detailed provisions on the repair of defects;

-- Made specific requirements on welding repair.

The Appendix A and Appendix B to this standard are informative.

This Standard was proposed by the China Iron and Steel Industry Association.

This Standard shall be under the jurisdiction of the National Steel Standardization Technical Committee.

General requirement for surface condition of hot-rolled steel plates

1 Scope

This standard specifies the terms and definitions, classification, requirements, and numerical rounding off of the surface quality of hot-rolled steel plates.

This standard is applicable to single sheet hot-rolled steel plates with thickness of 3mm ~ 400mm and shear steel plates made from hot-rolled coils, hereinafter referred to as steel plates.

2 Normative references

The provisions in the following documents become the provisions of this standard by reference to this standard. For dated references, only the edition cited applies. All subsequent amendments (excluding corrigendum) or revised editions shall not apply to this standard, however, The parties agreed upon under this standard are encouraged to study the possibility of using the latest edition of those documents. For undated references, the latest edition of the referenced document applies.

YB/T 081 Rule for rounding off of numeric values and judgement of testing values for technical standards of metallurgy

3 Terms and definitions

3.1 Imperfections

Surface discontinuity of depth and/or area not greater than the specified limit value, except for cracks, shells and seams.

3.2 Defects

Include all cracks, shells and seams, and surface discontinuities of depth and/ or area greater than the specified limit value.

Note: Common surface discontinuities are specified in Appendix A (Informative).

5.1.4 If a contract or a product standard refers to this standard but do not specify the requirements of surface quality category and grade, it shall be deemed to be Class A Grade 1.

5.2 Determination of depth and affected area of surface discontinuity

5.2.1 Determination of depth

In order to distinguish the imperfections and defects of the surface discontinuities, determine the depth of the representative surface discontinuity if necessary. The measurement shall be carried out from the surface of the product. Remove the representative surface discontinuity by grinding before determining the depth.

5.2.2 Determination of affected area

If necessary, determine the affected area of discontinuity on the surface as specifications below.

5.2.2.1 Isolated surfaces discontinuity: At 20mm distance from the perimeter of the discontinuity, draw a continuous line or a rectangle to determine the affected area, as shown in Figure 1.

5.2.2.2 Aggregated surface discontinuity: Draw a continuous line at 20mm distance from the perimeter of the set of discontinuities, or draw a rectangle with its longitudinal and horizontal edges 20mm from the set of discontinuities; if the distance of the surface discontinuities to the edge of the plate is less than 20mm, the edge of the plate shall prevail, as shown in Figure 2.

5.2.2.3 Strip surface discontinuity: Draw a rectangle with its longitudinal and horizontal edges 20mm from the set of discontinuities; if the distance of the surface discontinuities to the edge of the plate is less than 20mm, the edge of the plate shall prevail, as shown in Figure 3.

5.2.2.4 Multiple surface discontinuities with distance within 40mm to one another can be regarded as an aggregated surface discontinuity (including aggregated surface discontinuity and stripe surface discontinuity).

25 ≤ t < 40	0.9
40 ≤ t < 60	1.1
60 ≤ t < 80	1.3
80 ≤ t < 150	1.6
150 ≤ t < 250	1.9
250 ≤ t ≤ 400	2.2

5.4.1.4 Class B

The remaining thickness of the steel plate after repair shall not be less than the minimum thickness of the plate.

5.4.2 Repair welding

5.4.2.1 General requirements

5.4.2.1.1 Before welding, thoroughly remove the harmful defects on the steel plate. The depth of the removal shall be within 30% of the nominal thickness of the plate.

5.4.2.1.2 Before welding the edge of the plate, the depth of the groove measured from the inner edge shall be less 30mm than the nominal thickness at most.

5.4.2.1.3 There shall not be any defects at the edge of the welded part that will affect use of the plate, such as incomplete fusion, undercut cracked or others. The pile height shall be 1.5mm higher than the rolled surface and remove the pile by grinding or leveling; after process, the thickness of the ground area shall be higher than the minimum thickness of the steel plate.

5.4.2.1.4 For the steel plate delivered by heat treatment, corresponding heat treatment shall be conducted after welding repair.

5.4.2.1.5 After welding repair, it shall be inspected by ultrasonic, X-ray, magnetic particle or penetration. When the buyer does not specify the method, it is at the discretion of the manufacturer.

5.4.2.1.6 If it is stipulated in the contract, the manufacturer shall provide a report with a sketch for all the repair cleanup, showing the size and location of the defect and the full details of the welding process, including welding consumables, non-destructive inspection and post-weld heat treatment.

5.4.2.2 Classification and limitation of welding repair

5.4.2.2.1 Grade 1: A single welding area shall not be greater than 0.125 m^2 or 2% of the inspection area (use the greater value). When the distance between the grinding and welding areas is less than the average width of the treated area, it shall be regarded as one area.

Appendix A

(Informative)

Descriptions of common surface discontinuities

A.1 Roll-in Scale and Pitting

Appear on the rolled surface of the in various shapes, thickness and frequency.

The roll-in oxidized iron scale is usually caused by insufficient removal of the oxidized iron before, during hot rolling or during heat treatment.

A.2 Indentation and roll marks

These defects may be distributed irregularly or at fixed intervals throughout the length and width of the piece.

Indentation (dent) and hot roll marks (bump) are generally considered to be caused by natural wear of the pressing rollers or transfer rollers.

A.3 Scratches, grooves

Mechanical scratches on the surface, most of which are parallel or perpendicular to the rolling direction. They are likely to be slightly rolled and rarely contain oxidized iron. It is caused by friction in relative motion between the piece and the equipment.

A.4 Spills, slivers

Irregular and scaly fine surface defects. It is an extension along the rolling direction. Its severity depends on the amount of deformation. At some parts they are still connected to the base metal shown as fine shell particles.

A.5 Blisters

Blisters exist beneath the surface with different in shapes and sizes. They appear during hot rolling.

A.6 Sand patches

Small non-metallic interior foreign substance extending in rolling direction with obvious color.

A.7 Cracks

A thin line with of the broken surface.

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