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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**General requirement for surface condition of hot-rolled steel
sheet and plate
(English Translation)**

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1 Scope

This document specifies the classification, requirements, numerical rounding of surface quality for hot-rolled steel sheets and plates.

This document is applicable to hot-rolled steel sheets and plates rolled in single sheets with a thickness of 3 mm ~ 400 mm and sheared steel plates cut from hot-rolled coils, hereinafter referred to as "steel plates".

2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions 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.

GB/T 8170 Rules of rounding off for numerical values & expression and judgement of limiting values

GB/T 19866 Specification and qualification of welding procedures for metallic materials - General rules (GB/T 19866-2005, ISO 15607.2003, IDT)

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Imperfections

Surface discontinuities, excluding cracks, shell and seams, which has a depth and/or area not exceeding the specified limits.

Note: Surface discontinuities requiring repair are considered defects.

3.2

Defects

All cracks, shell and seams (regardless of depth and/or area) and surface discontinuities with a depth and/or area exceeding the specified limits.

Note: Descriptions of common surface discontinuities can be found in Appendix C.

4 Classification

Surface quality is divided into two categories, A and B, each further divided into three grades. 1, 2, 3.

Category A. Surface quality shall comply with the requirements of 5.3.1 and 5.4.1.2.

The remaining thickness of surface discontinuities and ground areas may be less than the minimum allowable thickness of the steel plate.

Category B. Surface quality shall comply with the requirements of 5.3.2 and 5.4.1.3.

The remaining thickness of surface discontinuities and ground areas shall not be less than the minimum allowable thickness of the steel plate.

Grade 1. Welding repair is permitted after chipping and/or grinding, meanwhile it shall comply with the requirements of 5.4.2.2.1.

Grade 2. Welding repair is permitted only with mutual agreement and specified in the contract, meanwhile it shall comply with the requirements of 5.4.2.2.2.

Grade 3. Welding repair is not permitted.

Note: The classification and requirements of surface quality are shown in Table D.1 of Appendix D.

When the surface quality category and grade are not specified in the product standard or contract, Category A, Grade 1 shall be delivered.

5.1 General requirements for steel plate surfaces

Regardless of whether the steel plate is delivered with or without mill scale removed, the manufacturer shall take necessary measures to ensure that the surface quality of the steel plate meets the requirements. The manufacturer may only consider visually observable surface discontinuities. Mill scale produced during rolling and heat treatment may conceal surface discontinuities.

If the purchaser requires that all visually observable surface discontinuities be identified,

evaluated, repaired (if necessary) before delivery, the order shall specify products with mill scale removed.

If the purchaser discovers defects in the material during subsequent mill scale removal or processing, meanwhile the defects are caused by the manufacturer, THEN, the manufacturer is allowed to repair and resubmit the material according to the requirements of the product standard.

5.2.1 Depth measurement

To distinguish between surface discontinuities and defects, the depth of representative surface discontinuities shall be measured on the product surface if necessary. The depth is measured after removing the representative surface discontinuity by grinding.

5.2.2 Measurement of affected area

If necessary, the affected area of surface discontinuities shall be measured according to the following requirements.

- a) Isolated surface discontinuities. Draw a continuous line 20 mm from the periphery of the surface discontinuity, or draw a rectangle 20 mm from its edge, to determine the affected area, as shown in Figure 1.
- b) Clustered surface discontinuities. Draw a continuous line 20 mm from the periphery of this group of surface discontinuities, or draw a rectangle whose vertical and horizontal sides are 20 mm from the connecting line of this group of surface discontinuities. If this group of surface discontinuities is less than 20 mm from the edge of the steel plate, the edge of the steel plate shall be used as the reference, as shown in Figure 2.
- c) Strip-shaped surface discontinuities. Draw a rectangle whose vertical and horizontal sides are 20 mm from the connecting line of this group of surface discontinuities. If this group of surface discontinuities is less than 20 mm from the edge of the steel plate, the edge of the steel plate shall be used as the reference, as shown in Figure 3.
- d) Multiple surface discontinuities (including clustered surface discontinuities and strip-shaped surface discontinuities) with an edge distance of less than 40 mm can be considered as a single clustered surface discontinuity.

Units are in millimeters

Appendix C (Informative)

Description of common surface discontinuities

C.1 Rolled-in scale and pitting

Appears on the rolled surface in various shapes, thicknesses, frequencies.

Rolled-in scale is usually caused by insufficient removal of scale before, during, or after hot rolling.

C.2 Indentations and roll marks

Marks that appear periodically due to damage to the rolls or pinch rolls.

Indentations (depressions) or roll marks (protrusions) may be distributed at fixed intervals or irregularly along the entire length and width of the rolled product.

Indentations may be caused by the rolls or protrusions on the rolls.

C.3 Scratches and grooves

Mechanical abrasions of varying widths, depths, lengths on the surface, mostly parallel or perpendicular to the rolling direction.

They may have slight curling and rarely contain scale. This damage is caused by friction during relative movement between the rolled product and the equipment.

C.4 Spills and slivers

Irregular and flaky small surface discontinuities.

Spills extend along the rolling direction, whose extent depends on the amount of deformation. In some areas, they are still connected to the base metal, appearing as small scab-like particles.

C.5 Blisters

Blisters are located below the surface, varying in shape and size, appear during hot rolling.

C.6 Hot tears

Material discontinuities of varying direction, length, width, depth in the surface area, occurring in a preferred direction, (or) distributed within a limited area.

Hot tears occur during the processing of ingots, blooms, continuously cast slabs, are

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