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GB/T 4171-2008

Atmospheric corrosion resisting structural steel

耐候结构钢

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Foreword

This standard refers to EN 10025-5:2004 "Hot rolled products of structural steels - Part 5. Technical delivery conditions for structural steels with improved atmospheric corrosion resistance", ISO 4952:2006 "Structural steels with improved atmospheric corrosion resistance", ISO 5952:2005 "Continuously hot-rolled steel sheet of structural quality with improved atmospheric corrosion resistance", ASTM A242/A242M-04 "Standard specification for high-strength low-alloy steel", ASTM A588/A588M-05 "Standard specification for high-strength low-alloy structural steel, up to 50 ksi [345 MPa] minimum yield point, with atmospheric corrosion resistance", ASTM A606-04 "Standard specification for steel, sheet and strip, high-strength low-alloy, hot-rolled and cold-rolled, with improved atmospheric corrosion resistance", ASTM A871/A871M-03 "Standard specification for high-strength low-alloy structural steel plate with atmospheric corrosion resistance", JIS G 3114:2004 "Hot-rolled atmospheric corrosion resisting steels for welded structure", JIS G 3125:2004 "Superior atmospheric corrosion resisting rolled steel", combines the development and application conditions of domestic atmospheric resistance steel, AND integrate and revise GB/T 4171-2000 "Superior atmospheric corrosion resisting structural steel", GB/T 4172-2000 "Atmospheric corrosion resisting steel for welded structure", and

GB/T 18982-2003 "Corrosion resistant steel plates and strips for container". This standard replaces GB/T 4171-2000 "Superior atmospheric corrosion resisting structural steel", GB/T 4172-2000 "Atmospheric corrosion resisting steel for welded structure", and GB/T 18982-2003 "Corrosion resistant steel plates and strips for container". As compared with the above three standards, in this standard, the following main technical contents are modified. - RE-DEVELOP the standard name; - RE-DEVELOP the steel designation; - RE-ESTABLISH the chemical composition and mechanical properties of each designation; - ADD an appendix to assess the relative level of atmospheric corrosion resistance. Appendix A, B, C and D of this standard are informative appendixes. This standard was proposed by the China Iron and Steel Association. This standard shall be under the jurisdiction of the National Steel Standardization Technical Committee. The main drafting organizations of this standard. Anshan Iron and Steel Co., Ltd., Metallurgical Industry Information Standards Research Institute, Guangzhou Zhujiang Iron and Steel Co., Ltd., Shougang Corporation, Anyang Iron and Steel Group Co., Ltd. The main drafters of this standard. Guan Jichun, Pu Zhimin, Wang Xiaohu, Li Liejun, Li Kexin, Wei Xian. This Standard replaces the standard previously issued as follows: - GB/T 4171-84, GB/T 4171-2000; - GB/T 4172-84, GB/T 4172-2000; - GB/T 18982-2003. Atmospheric corrosion resisting structural steel

1 Scope

China's national standard for atmospheric corrosion resisting structural steel. It specifies the terms and definitions, the classification and the requirements. Weathering steel works by a mechanism that sounds contradictory: it rusts, and the rust protects it. Small additions of copper, chromium, nickel and phosphorus change the character of the corrosion product, so that instead of the loose flaking scale of ordinary steel it forms a dense adherent patina that seals the surface and slows further attack to a rate that becomes negligible. A structure built from it needs no paint for its life, which removes the recurring cost that dominates the ownership of any exposed steelwork. The conditions matter: the patina only forms properly where the surface is alternately wetted and dried, so steel that stays permanently damp, is buried, or is exposed to salt does not develop it and corrodes normally - which is the failure mode of every weathering steel structure that has failed.

This standard specifies the dimension, shape, mass and allowable deviations, technical requirements, test methods, inspection rules, packaging, marking and quality certificates of atmospheric corrosion resisting structural steels. This standard applies to hot-rolled and cold-rolled steel plates, strips and sections with atmospheric corrosion properties for vehicles, bridges, containers, buildings, towers and other structures. The atmospheric corrosion resisting structural steels can also be used to produce the structural parts for bolted, riveted and welded connection.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard; however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 222 Permissible tolerances for chemical composition of steel products

GB/T 223.3 Methods for chemical analysis of iron, steel and alloy - The diantipyrylmethane phosphomolybdate gravimetric method for the determination of phosphorus content

GB/T 223.5 Steel and iron - Determination of acid-soluble silicon and total silicon content - Reduced molybdosilicate spectrophotometric method

GB/T 223.9 Iron steel and alloy - Determination of aluminum content - Chrom azurol S photometric method

GB/T 223.11 Iron steel and alloy - Determination of chromium content - Visible titration or potentiometric titration method

GB/T 223.14 Methods for chemical analysis of iron, steel and alloy - The N-Benzoyl-N-phenylhydroxylamine extraction photometric method for the determination of vanadium content

3 Terms and definitions

The following terms and definitions are used in this standard.

3.1 Atmospheric corrosion resisting steel It refers to the steel to which a small amount of alloying elements such as Cu, P, Cr, Ni, etc., are added to form a protective layer on the metal substrate surface to improve atmospheric corrosion resistance properties.

4 Classification and code

4.1 Classification As for the classification and application of each designation, SEE Table 1.

5 Order content

During ordering, the user purchaser shall provide the following information.

6 Dimension, shape, mass and allowable deviation

6.1 Dimensions As for the product supply dimension range of different designations, SEE Table

2. Through negotiation between the supplier and the purchaser, it can supply the products

of other specifications than those in Table 2. Table 2 in millimeters

6.2 Allowable deviations of dimensions

6.2.1 The dimensions, shapes, mass and allowable deviations of the hot-rolled steel plate and strip shall comply with the provisions of GB/T 709.

7.1 Steel designation and chemical composition

7.1.1 The designation and chemical composition of the steel (melting analysis) shall be as specified in Table 3.

7.2 Smelting method The steel is subjected to converter or electric furnace smelting, AND in the form of killed steel. Unless the purchaser has special requirements, the smelting method shall be chosen by the supplier.

7.3 Supply Status Hot-rolled steel is supplied under hot-rolled, controlled rolling or normalized state; the steel of designation Q460NH, Q500NH and Q550NH can be supplied under quenched and annealed state; AND the cold-rolled steel is generally supplied under annealed state.

7.4 Mechanical properties and process performance

7.5 Other requirements As required by the purchaser through negotiation between the supplier and the purchaser AND indicated in the contract, it may add the following inspection items.

7.6 Surface quality

7.6.1 The surface of steel shall have no defects such as cracks, scarring, folds, pinhole, inclusions and delamination which may affect use. If there are such defects, it is allowed to clear them, BUT the clearing depth shall not exceed half of the steel thickness tolerance. The clearing part shall be smooth and free from edges or corners. It is not allowed to transversely remove the surface defects from the steel profiles.

8 Test methods

8.1 The appearance of steel shall be visually inspected.

8.2 The dimensions and shape of the steel shall be measured by appropriate measurement tools.

8.3 The inspection items, sample quantities, sampling methods and test methods for each batch of steel shall comply with the requirements in Table 7.