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PEOPLE'S REPUBLIC OF CHINA**

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**Structural steel plate for wind power tower
(English Translation)**

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Table of Contents

Foreword...	3
1 Scope...	4
2 Normative references...	4
3 Classification and designation...	6
4 Ordering content...	6
5 Dimensions, shape, weight and tolerances...	7
6 Technical requirements...	7
7 Test methods...	12
8 Inspection rules...	12
9 Packaging, marking and quality certification...	13
10 Cross reference between national and international designations...	14
Annex A (Informative) Reference table of designations...	15

1 Scope

This Standard specifies the designation, ordering content, dimensions, shape, weight and tolerances, technical requirements, test methods, inspection rules, packaging, marking and quality certification of structural steel plates for wind power tower.

This Standard applies to structural steel plates for wind power tower with the thickness of 6 mm ~ 100 mm.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition dated applies to this document. For undated references, the latest edition of the referenced documents (including all amendments) applies to this document.

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

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 aluminium content - Chrom azurol S photometric method

GB/T 223.12, Methods for chemical analysis of iron, steel and alloy - The sodium carbonate

separation-diphenyl carbazide photometric method for the determination of chromium content

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

GB/T 223.16, Methods for chemical analysis of iron, steel and alloy - The chromotropic acid photometric method for the determination of titanium content

GB/T 223.19, Methods for chemical analysis of iron steel and alloy - The neocuproine-chloroform extraction photometric method for the determination of copper content

GB/T 223.23, Iron, steel and alloy - Determination of nickel content - The dimethylglyoxime spectrophotometric method

GB/T 223.26, Iron, steel and alloy - Determination of molybdenum content - The thiocyanate spectrophotometric method

GB/T 223.37, Methods for chemical analysis of iron, steel and alloy - The indophenol blue photometric method for the determination of nitrogen content after distillation separation

GB/T 223.40, Iron, steel and alloy - Determination of niobium content by the sulphochlorophenol S spectrophotometric method

GB/T 223.62, Methods for chemical analysis of iron, steel and alloy - The butyl acetate extraction photometric method for the determination of phosphorus content

GB/T 223.63, Methods for chemical analysis of iron, steel and alloy - The sodium (potassium) periodate photometric method for the determination of manganese content

GB/T 223.67, Iron, steel and alloy - Determination of sulfur content - Methylene blue spectrophotometric method

GB/T 223.69, Iron, steel and alloy - Determination of carbon contents - Gas- volumetric method after combustion in the pipe furnace

GB/T 223.78, Methods for chemical analysis of iron, steel and alloy - Curcumin spectrophotometric method for the determination of boron content

GB/T 228.1, Metallic materials - Tensile testing - Part 1 . Method of test at room temperature

GB/T 229, Metallic materials - Charpy pendulum impact test method

GB/T 232, Metallic materials - Bend test

GB/T 247, General rule of package, mark and certification for steel plates (sheets) and strips

GB/T 709, Dimension, shape, weight and tolerances for hot rolled sheets and strips

GB/T 2970, Method for ultrasonic testing of thicker steel plates

GB/T 2975, Steel and steel products - Location and preparation of samples and test pieces for mechanical testing

Q690FT D, E $\leq 0.50 \leq 0.52 \leq 0.54 \leq 0.25$

Table 5 - Designation and carbon equivalent of steel plates delivered in the condition of quenching + tempering

Designation Delivery condition Quality grade

Carbon equivalent (CEV)/%

Thickness/mm

$\leq 40 > 40 \sim 100$

Q460FT

Quenching + tempering

C, D, E, F $\leq 0.48 \leq 0.50$

Q550FT D, E $\leq 0.55 \leq 0.60$

Q620FT D, E $\leq 0.56 \leq 0.62$

Q690FT D, E $\leq 0.58 \leq 0.65$

6.4.1 Tensile test

Tensile test properties of steel plates shall be as specified in Table 6.

6.4.2.1 The impact temperature and impact absorbed energy of Charpy V-notch impact

test of steel plates shall be as specified in Table 6.

6.4.2.2 For steel plates with the thickness not less than 12 mm, take standard samples of 10 mm x 10 mm x 55 mm as the impact samples; for steel plates with the thickness less than 12 mm, take samples of 7.5 mm x 10 mm x 55 mm or 5 mm x 10 mm x 55 mm. The impact absorbed energy shall be not less than 75% or 50% of the values specified in Table 6 respectively. The use of samples of larger dimensions is preferred.

6.4.2.3 The impact test result of steel plates is calculated as the arithmetic mean value of a group of three samples. One test value is allowed to be less than the specified value but shall not be less than 70% of the specified value. Or else, another three samples shall be taken from the same steel plate for test; the arithmetic mean value of the test results of 6

samples in succession are not less than the specified value. The test results of two samples are allowed to be less than the specified value, but only one sample whose test result is less than 70% of the specified value.

6.4.3 The reduction percentage of cross section in the thickness direction of Z-direction

steel shall be as specified in GB/T 5313.

6.4.4 When the purchaser requires bending test, bending test shall be as specified in Table 6. If the supplier can guarantee it, bending test can be omitted.

6.5 Surface quality

6.5.1

The surface of steel plates shall be free from bubbles, scars, cracks, folds, inclusions, tail scales, etc. Steel plates shall not be layered.

6.5.2

The surface of steel plates shall be free from thin oxide scales and rust which impede the inspection of surface defects; surface roughness which is caused by falling off of oxide scales; scratches, indentations and other local defects. But their depth shall not be greater than half of the tolerance for thickness and the minimum thickness of steel plates shall be ensured.

6.5.3

The surface defects of steel plates are allowed to be repaired and removed by grinding, but the minimum thickness of steel plates shall be ensured, and the removing spots shall be smooth without sharp edges.

6.5.4

Surface quality can be as specified in GB/T 14977, as agreed on by the supplier and the purchaser.

6.6 Special requirements

6.6.1

As agreed on by the supplier and the purchaser, non-destructive testing for be carried out for steel plates. The inspection method can be as specified in GB/T 2970 or JB/T 4730.3. The reference standard and grade shall be stated in agreements or contracts.

6.6.2

As agreed on by the supplier and the purchaser, other items of inspection can also be carried out for steel plates.