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

GB/T 28415-2023

Fire-resistant structural steel plate, sheet and strip

耐火结构用钢板和钢带

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Foreword

This document was issued on 6 August 2023 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 March 2024.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

1 Scope

GB/T 28415-2023 covers steel plate, sheet and strip intended to hold its strength in a fire - the way the designation is composed, the ordering content, the size, shape and weight, the technical requirements, the test methods, the inspection rules, and the packaging, marking and quality certificate. Fire-resistant structural steel is defined here as steel to which a certain content of alloying elements such as molybdenum and chromium has been added, and the designation is assembled from the letter Q for yield strength, the specified lower limit of the upper yield strength, and the letters FR for fire resistance, so the grade mark itself tells a fabricator what the material is meant to do rather than leaving it to the mill certificate. That matters because ordinary structural steel gives up strength as it heats, and the usual answer - coating, encasement, sprayed protection - costs money on every member and has to survive the life of the building; a steel that keeps a defined part of its strength at elevated temperature changes that calculation. Inspection and acceptance are carried out by the supplier's quality inspection department. Used by steel mills, structural fabricators, and the designers and checking engineers who set fire protection for steel

frames.

This document specifies designation expression method, ordering content, size, shape, weight, technical requirements, test methods, inspection rules, packaging, marking and quality certificates of fire-resistant structural steel plates, sheets and strips.

This document applies to steel plates with a thickness of no more than 150 mm and steel sheets and strips with a thickness of no more than 25.4 mm and sheared steel plates (hereinafter referred to as steel plates, sheets and strips) that are mainly used to manufacture general structures and engineering structures with fire resistance.

2 Normative references

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.

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 diantipyryl methane phosphomolybdate gravimetric method for the determination of phosphorus content

GB/T 223.9, Iron, steel and alloy -- Determination of aluminium content -- Chrome azurol S photometric method

GB/T 223.11, Iron, steel and alloy -- Determination of chromium content -- Visual 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

GB/T 223.17, Methods for chemical analysis of iron, steel and alloy -- The diantipyrylmethane photometric method for the determination of titanium content

GB/T 223.18, Methods for chemical analysis of iron steel and alloy -- The sodium thiosulfate separation iodometric 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 223.40, Iron, steel and alloy -- Determination of niobium content by the sulphochlorophenol S spectrophotometric method

GB/T 223.60, Methods for chemical analysis of iron, steel and alloy -- The perchloric acid dehydration gravimetric method for the determination of silicon content

GB/T 223.63, Iron, steel and alloy -- Determination of manganese content -- Sodium (potassium) periodate spectrophotometric method

GB/T 223.68, Methods for chemical analysis of iron, steel and alloy -- The potassium iodate titration method after combustion in the pipe furnace for the determination of sulfur content

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

GB/T 223.79, Iron and steel -- Determination of multi-element contents -- X-ray fluorescence spectrometry (Routine method)

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

GB/T 228.2, Metallic materials -- Tensile testing -- Part 2: Method of test at elevated 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 tolerance for hot-rolled steel strip, plate and sheet

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

GB/T 4336, Carbon and low-alloy steel -- Determination of multi-element contents -- Spark discharge atomic emission spectrometric method (routine method)

GB/T 5313, Steel plate with through-thickness properties

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

GB/T 14977, General requirement for surface condition of hot-rolled steel plates

GB/T 17505, Steel and steel products -- General technical delivery requirements

GB/T 20066, Steel and iron -- Sampling and preparation of samples for the determination of chemical composition

GB/T 20123, Steel and iron -- Determination of total carbon and sulfur content Infrared absorption method after combustion in an induction furnace (routine method)

GB/T 20125, Low-alloy steel -- Determination of multi-element contents -- Inductively coupled plasma atomic emission spectrometric method

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 fire-resistant structural steel

The steel that a certain content of alloying elements such as Mo, Cr, etc. is added to the steel to improve the fire resistance.

4 Designation expression method

4.1 The designation of fire-resistant structural steel consists of the initial letter "Q" in Chinese pinyin of the word "Qu" representing yield strength, the specified lower limit value of the upper yield strength, the initial letter "FR" of English representing "fire resistance" and the quality grade (codenamed B, C, D or E).

NOTE: Q+ specifies the lower limit value of upper yield strength + FR, referred to as "steel grade".