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

GB/T 713.3-2023

**Steel plate, sheet and strip for pressure equipments - Part 3:
Low alloy steel with specified low temperature properties**

承压设备用钢板和钢带 第3部分：规定低温性能的低合金钢

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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 713.3-2023 is Part 3 of the Chinese series on steel plate, sheet and strip for pressure equipment, and covers low alloy steels with specified low temperature properties. These are the grades for equipment that has to hold pressure while cold: LNG receiving terminals, air separation plants, ethylene crackers and ammonia storage. Steel loses toughness as it cools and can pass from ductile to brittle behaviour over a narrow range, so what is bought here is not strength but a guaranteed impact energy at a stated sub-zero temperature. The standard sets the designation, the order content, the dimensions, shape and mass, the technical requirements, the test methods, the inspection rules and the packaging, marking and quality certificate provisions. It took effect on 1 March 2024.

This document stipulates the designation representation, order content, size, shape, weight, technical requirements, test methods, inspection rules, packaging, marking and quality certificate of low alloy steel plates with specified low temperature properties for

pressure equipment.

This document is applicable to the manufacture of low-alloy steel plates (hereinafter referred to as steel plates) - with an operating temperature of not less than -70 °C and a thickness of 5 mm ~ 120 mm - for pressure equipment.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

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 223.9, Iron, steel and alloy - Determination of aluminium content - Chromazurol 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 223.17, Methods for chemical analysis of iron, steel and alloy - The diantipyrylmethane photometric method for the determination of titanium 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 223.63, Methods for chemical analysis of iron, steel and alloy - The sodium (potassium) periodate photometric method for the determination of manganese content

GB/T 223.68, 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 223.76, Methods for chemical analysis iron, steel and alloy - The flame atomic absorption spectrometric method for the determination of vanadium 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 713.1, Steel plate, sheet and strip for pressure equipments - Part 1: General requirements

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 6803, Test method for drop-weight test to determine nil-ductility transition temperature of ferritic steels

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

NB/T 47013.3, Nondestructive testing of pressure equipments - Part 3: Ultrasonic

testing

3 Terms and definitions

For the purposes of this document, the terms and definitions given in GB/T 713.1 apply.

4 Designation representation

4.1 When named by strength: the designation of steel consists of the Chinese Pinyin initial "Q" of "Qu" (yield) representing the yield strength, the specified minimum lower yield strength value, and the Chinese Pinyin initials "DR" of "Di" (low) and "Rong" (vessel) representing the low temperature pressure vessel.

Example: Q420DR. Where:

Q - the Chinese Pinyin initial of "Qu" (yield) representing the yield strength;

420 - the specified minimum lower yield strength, in megapascals (MPa);

DR - the Chinese Pinyin initials of "Di" (low) and "Rong" (vessel).

4.2 When named by chemical composition: the designation of steel consists of two digits representing the average carbon content, the chemical element symbol representing alloy element letter, and the Chinese pinyin initials "DR" of "Di" (low) and "Rong" (vessel) representing the low temperature pressure vessel.

Example: 11MnNiMoDR. Where:

11 - average carbon content (in parts per 10,000);

MnNiMo - manganese, nickel, molybdenum alloy element letters;

DR - the Chinese Pinyin initials of "Di" (low) and "Rong" (vessel).

5 Order content

The order content of steel plates shall comply with the regulations of GB/T 713.1.

6 Size, shape, weight

The size, shape, and weight of steel plates shall comply with the regulations of GB/T 713.1.

7.4.3 The lateral expansion value shall be measured in the impact test of designations Q420DR and Q460DR, and the lateral expansion value shall not be less than 0.53 mm.