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Pre-Hardening High Speed Tool Steel

预硬化高速工具钢

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Standardization Administration of PRC.

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Foreword

This Standard was drafted as per the rules specified in GB/T 1.1-2009.

This Standard was proposed by China Iron and Steel Industry Association.

This Standard shall be under the jurisdiction of National Technical Committee for Standardization of Steel (SAC/TC 183).

Drafting organizations of this Standard: Heye Special Steel Co., Ltd.; Yantai Better Alloy Material Manufacturing Co., Ltd.; Shijiazhuang Jinfeng Special Steel Products Co., Ltd.; Shanghai Tool Works Co., Ltd.; and China Metallurgical Information and Standardization Institute.

Chief drafting staffs of this Standard: Zhang Beibei, Yao Fengchen, Wang Jianhua, Zhu Xinfa, Dai Qiang, Yan Chengming, and Wu Lizhi.

Pre-Hardening High Speed Tool Steel

1 Scope

This Standard specifies the hardness, size, shape, technical requirements, test methods, inspection rules, package, marking and quality certificate, etc. of the pre-hardening high-speed tool steel bars and wires.

This Standard is applicable to the pre-hardening high-speed tool steel bars and wires (hereinafter referred to as steel) with a diameter of 1.0mm~15.0mm, and polishing or cold drawing surface.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 223.5 Steel and Iron - Determination of Acid-Soluble Silicon and total Silicon Content - Reduced Molybdosilicate Spectrophotometric Method

GB/T 223.8 Methods for Chemical Analysis of Iron, Steel and Alloy - The Sodium Fluoride Separation-EDTA Titration Method for the Determination of Aluminum Content

GB/T 223.11 Iron, Steel and Alloy - Determination of Chromium Content - Visual Titration or Potentiometric Titration Method

GB/T 223.13 Methods for Chemical Analysis of Iron, Steel and Alloy - The Ammonium Ferrous Sulfate Titration Method for the Determination of Vanadium 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 223.22 Methods for Chemical Analysis of Iron, Steel and Alloy - The Nitroso-R-Salt Spectrophotometric Method for the Determination of Cobalt 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 223.43 Iron, Steel and Alloy - Determination of Tungsten Content - Gravimetry Method and Spectrophotometric Method

GB/T 223.59 Iron, Steel and Alloy - Determination of Phosphorus Content - Bismuth Phosphomolybdate Blue Spectrophotometric Method and Antimony Phosphomolybdate Blue 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 224 Determination of Depth of Decarburization of Steels

GB/T 230.1 Metallic Materials - Rockwell Hardness Test - Part 1: Test Method

GB/T 2101 General Requirement of Acceptance Packaging Marking and Certification for Section Steel

GB/T 2103 General Requirements for Acceptance, Packing, Marking and Quality Certification of Steel Wire

GB/T 4336 Carbon and Low-Alloy Steel - Determination of Multi-Element Contents -Spark Discharge Atomic Emission Spectrometric Method (Routine Method)

GB/T 4340.1 Metallic Materials - Vickers Hardness Test - Part 1：Test Method

GB/T 9943 High-Speed Tool Steel

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

Table 6 – Qualification Level of Heat-Treatment Metallurgical Structure

Main uses of steel	Steel diameter mm	Quenching grain size [a] Level	Overheating degree [b] Level No greater than	Tempering degree [c] Level No greater than
Straight-shank drill bit	≤3	10~12	1	2
	>3~15	9.5~11	2	2
Centre drill	≤4	10~12	1	2
Tap	3~15	10~11.5	1	2
Push rod, punch, punch needle, valve needle	1~15	9~12	1	2

[a] If the high-speed tool steel is manufactured by the powder metallurgy method, the quenching grain size shall be Level-10 or finer; when the grain size is rated, it can abide by the S-G grain size.

[b] The qualification level for the overheating degree of the power metallurgy manufactured high-speed tool steel shall be Level-1 or finer.

[c] W6Mo5Cr4V2Co5, W2Mo9Cr4VCo8, W6Mo5Cr4V3, W6Mo5Cr4V2Al, W6Mo5Cr4V3Co8's qualification level for Tempering degree shall be Level-1.

6.6 Surface quality

6.6.1 The surface of the polished steel shall be clean and bright; be free of cracks, hair lines, concave surfaces, scratches, black spots, crusting, folding or the like defects.

6.6.2 The surface of the unpolished steel shall be smooth; be free of cracks, crusting, folding, drawing-cracks, or the like defects. The oxide film (no shedding), individual pitting, scratches, pits and the like defects with depth not exceeding half the nominal diameter are allowed to exist. The spiral patterns not exceeding the permissible tolerance of the nominal diameter are allowed to exist. The ends shall not have burrs.

7 Inspection Methods

7.1 The test methods for various inspection items of the steel shall conform to the provisions of Table 7.

Table 7 – Inspection Items, Sampling Position, Sampling Quantity and Test Methods

SN	Inspection item	Sampling quantity	Sampling position	Test methods
1	Chemical composition	1 piece/furnace	GB/T 20066	See 7.2
2	Hardness	3 pieces/batch	Ends of different steels	GB/T 230.1, GB/T 4340.1
3	Decarburization layer	3 pieces/batch	Ends of different steels	GB/T 224
4	Quenching grain size Overheating degree Tempering degree	3 pieces/batch	Ends of different steels	JB/T 9986

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