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Test Method for Rockwell Hardness of Carbon Materials

炭素材料洛氏硬度测定方法

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Foreword

This document was drafted in accordance with the rules provided in GB/T 1.1-2020 *Directives for Standardization - Part 1: Rules for the Structure and Drafting of Standardizing Documents*.

Please be noted that certain content of this document may involve patents. The institution issuing this document does not undertake the responsibility of identifying these patents.

This document was proposed by China Iron & Steel Association.

This document shall be under the jurisdiction of National Technical Committee on Steel of Standardization Administration of China (SAC/TC 183).

The drafting organizations of this document: SINOSTEEL New Materials Co., Ltd.; Shanghai Research Institute of Materials Co., Ltd.; China Metallurgical Information and Standardization Institute.

The main drafters of this document: Yang Hui, Xu Jianping, Wang Xiaoyuan, Mao Yuzhen, Wang Wendong, Wu Jie, Wang Fei, Wang Yanlong, Zhou Wenyu, Xu Hanchun.

Test Method for Rockwell Hardness of Carbon Materials

1 Scope

This document describes the principle, instrument and equipment, specimens, test procedures, precision and test report of the test method for Rockwell hardness of carbon materials.

This document is applicable to the determination of Rockwell hardness of carbon materials with aggregate particles less than 0.8 mm. Other carbon materials may take this as a reference.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 230.2 Metallic Materials - Rockwell Hardness Test - Part 2: Verification and Calibration of Testing Machines and Indenters

GB/T 1427 Sample Method of Carbon Material

GB/T 8170 Rules of Rounding off for Numerical Values & Expression and Judgement of Limiting Values

JJG 112 Metallic Rockwell Hardness Testing Machines (Scales A, B, C, D, E, F, G, H, K, N, T)

JJG 884 Plastic Rock Well Hardness Testing Machine

3 Terms and Definitions

The following terms and definitions are applicable to this document.

3.1 Rockwell hardness

HR

A method of testing and expressing the hardness of a material.

3.2 Rockwell scale

Different combinations that are formed in accordance with the indenter and test force used.

NOTE: usually Rockwell scale has A, B, C, H, K, L, etc., for example, 80HRL means that the Rockwell hardness tested with L scale is 80HR.

requirements.

6.2.2 The parallelism deviation of the specimens shall not be greater than 0.10 mm/100 mm.

6.2.3 Under the conditions allowed by the material, the roughness of both end surfaces of the processed specimen $Ra \leq 3.2 \mu\text{m}$.

6.2.4 The surface of the processed specimen shall be free of visible cracks, edge-off, unfilled corners, bulges, pits, holes and other defects.

7 Test Procedures

7.1 Test Preparation

7.1.1 Level the equipment and check the workbench to make sure it is free of dust and dirt. Check the indenter to make sure it is not rusty or scratched.

7.1.2 In accordance with the stipulations of GB/T 230.2, JJG 112 or JJG 884, calibrate the equipment.

7.2 Test Process

7.2.1 Place the specimen on the specimen placing table of the equipment, keep it stable, and adjust the operating panel of lifting, so that the indenter contacts the surface of the specimen to be tested.

7.2.2 Continue to slowly adjust the operating panel of lifting, until the equipment indenter starts to load the initial test force on the specimen. The initial test force loading time is less than 2 s, then, load the main test force. The main test force loading time is 1 s ~ 8 s, and the total test force holding time is 2 s ~ 6 s, finally, release the main test force and maintain the initial test force. After the test is completed, read and record the value.

7.2.3 Unload the initial test force, adjust the operating panel of lifting, and adjust the position of the specimen to other points to be tested. Repeat 7.2.1 and 7.2.2. Each specimen is tested at least 5 times at different positions on the surface to be tested and take the average value. The distance between the centers of two adjacent indentations or the distance from the center of the indentation to the edge of the specimen shall be greater than the diameter of the Rockwell scale indenter, and the test shall be conducted on the same surface of the specimen.

7.2.4 The results shall retain one decimal place. The rounding-off of the numerical values shall be carried out in accordance with the stipulations of GB/T 8170.

8 Precision

The deviation of parallel test is not greater than $\pm 3 \text{ HRL}$ (Scale L). The precision of other scales shall take the stipulations of GB/T 230.1 as a reference.

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Contact: Wayne Zheng, Sales@ChineseStandard.net

Linkin: <https://www.linkedin.com/in/waynezhengwenrui/>

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