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**Implementation specification for estimating Weibull distribution
parameters of tensile strength for carbon materials**

炭素材料抗拉强度威布尔分布参数估计实施规范

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

This document was proposed by the China Iron and Steel Association.

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Weibull distribution of tensile strength of carbon materials Parameter Estimation Implementation Specification

1 Scope

This document specifies the implementation steps for estimating the parameters of the Weibull distribution of carbon material tensile strength and describes the corresponding verification methods.

This document applies to the estimation of Weibull modulus and Weibull characteristic strength of carbon materials for tensile strength.

He Weibull parameter estimation of uniaxial strength properties was used in reference.

2 Normative references

GB/T 3358.1

GB/T 8170

GB/T 8721

GB/T 34987

3 Terms and definitions

The terms and definitions defined in GB/T 3358.1 apply to this document.

4.1 Requirements for obtaining test data

Multiple tensile strength data are measured according to GB/T 8721 or other applicable standards.

Note 1. The number of samples shall be determined by the parties using this document through separate negotiation based on specific requirements.

Note 2. This document does not specify the sampling of samples. The specific sampling method shall be determined by the parties using this document through separate negotiation based on specific requirements.

4.2 Analysis process requirements

4.2.1 When the continuous variable (x) of the tensile strength of carbon materials satisfies the two-parameter Weibull distribution, its probability density function $f(x)$ is as shown in formula (1). $f(x) = \frac{m}{Sc} \left(\frac{x}{Sc}\right)^{m-1} \exp\left(-\left(\frac{x}{Sc}\right)^m\right)$, $x > 0$ (1) Where.

m --- Weibull modulus, dimensionless, reflects the discreteness of material strength. The higher the value, the smaller the discreteness.

Sc --- Weibull characteristic strength, the unit is megapascal (MPa), which reflects the strength of the material.

The cumulative distribution function P_f of tensile strength (σ) failure probability is shown in formula (2). $P_f = 1 - \exp\left(-\left(\frac{\sigma}{Sc}\right)^m\right)$, $\sigma > 0$ (2)