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

GB/T 30064-2025

Replacing GB/T 30064-2013

**Metallic materials - Method of constraint loss correction of
CTOD fracture toughness for fracture assessment of steel
components**

金属材料 钢构件断裂评估中裂纹尖端张开位移 (CTOD) 断裂韧度的拘束损失修正方法

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document replaces GB/T 30064-2013 "Crack Tip Opening Displacement (CTOD) Fracture Toughness in Fracture Assessment of Steel Components of Metallic Materials".

The "Method for Correcting Constraint Loss of Degrees" differs from GB/T 30064-2013 in that, apart from structural adjustments and editorial changes, the main technical changes are as follows.

as follows.

- a) A new Chapter 7, "Applicable Conditions," has been added (see Chapter 7);
- b) The crack size and applicable plate thickness range for CSCP and ESCP plates have

been modified (see 9.3.1, 8.3.1 in the 2013 version);

c) For CSCP and ESCP boards, $t=25\text{mm}$ has been added as a reference thickness (see 9.3.2);

d) Added a β_0 curve applicable to $R_Y=0.98$ (see 9.3.2 and 9.3.3).

This document adopts ISO 27306:2016 "Metallic materials, steel members, fracture assessment - Crack tip opening displacement (CTOD) fracture".

A method for correcting the restraint loss of toughness.

The following minimal editorial changes have been made to this document.

---Added a note on the correspondence between Chinese standards and international standards (see B.3.2.1);

---Added explanation of index number (see B.4.2).

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

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

This document is under the jurisdiction of the National Steel Standardization Technical Committee (SAC/TC183).

1 Scope

In fracture assessment of cracked steel structures, it is generally assumed that the fracture toughness test specimen's fracture resistance is equal to the structural member's fracture resistance, but...

This assumption often leads to overly conservative fracture assessment results. This is because when a member is primarily subjected to tensile loads, the crack tip is attached to...

The loss of plastic restraint in the near region is due to the stress on the fracture toughness specimen, which, due to the bending load, results in a loss of plastic restraint in the region near the crack tip.

This results in a highly constrained stress state. In recent years, high-strength steels with a high yield-to-tensile strength ratio have been widely developed.

In applications, the impact of restraint loss is very significant for this type of high-strength steel.

This document describes a method for adjusting the crack CTOD (crack displacement error) of fracture toughness specimens obtained from laboratory tests by taking constraint loss into account.

The fracture toughness (tip opening displacement) is converted into the equivalent CTOD of the component. This method is also applicable to using stress intensity factor or J integral.

Fracture assessment of the line (see Chapter 9).

This document applies to unstable fractures in ferritic structural steels caused by crack-like defects or fatigue cracks. Significant [conditions] precede the unstable fracture.

The case of ductile crack propagation does not apply to this document.

The CTOD fracture toughness of structural steel was tested according to the corresponding procedures specified in ISO 12135. Fracture assessment of cracked members.

Typically, a method approved by a relevant organization is used, such as the Failure Assessment Diagram (FAD). This document does not detail the fracture assessment method.

This document is applicable to eliminating the over-conservatism often found in traditional fracture mechanics methods, and accurately evaluating the fracture toughness of structural steel.

Estimate the instability fracture initiation limit of structural members. This document also applies to the reasonable determination of material fracture toughness (acceptance values) to meet design requirements for steel structures.

Requirements related to fracture performance of components.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

ISO 12135 Unified method of testing for quasi-static fracture toughness of metallic materials.

Note: GB/T 21143-2025 Uniform test method for quasi-static fracture toughness of metallic materials (ISO 12135:2021, MOD)

3 Terms and Definitions

The terms and definitions defined in ISO 12135 and the following terms and definitions apply to this document.

toughnessspecimen

The fracture driving force of a standard fracture toughness specimen (three-point bending or compact tension specimen) that meets the requirement of $0.45 \leq (a_0/W) \leq 0.55$.