

# INTERNATIONAL STANDARD

# ISO 12135

First edition  
2002-12-01

---

---

## **Metallic materials — Unified method of test for the determination of quasistatic fracture toughness**

*Matériaux métalliques — Méthode unifiée d'essai pour la détermination de  
la ténacité quasi statique*



Reference number  
ISO 12135:2002(E)

© ISO 2002

**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

© ISO 2002

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.ch](mailto:copyright@iso.ch)  
Web [www.iso.ch](http://www.iso.ch)

Printed in Switzerland

# Contents

Page

Foreword .....	vii
<b>1 Scope .....</b>	<b>1</b>
<b>2 Normative references .....</b>	<b>1</b>
<b>3 Terms and definitions .....</b>	<b>1</b>
<b>4 Symbols and designations .....</b>	<b>3</b>
<b>5 General requirements .....</b>	<b>5</b>
<b>6 Determination of fracture toughness for stable and unstable crack extension .....</b>	<b>28</b>
<b>7 Determination of resistance curves <math>\delta\text{-}\Delta a</math> and <math>J\text{-}\Delta a</math> and initiation toughness <math>\delta_{0,2BL}</math> and <math>J_{0,2BL}</math> and <math>\delta_i</math> and <math>J_i</math> for stable crack extension .....</b>	<b>36</b>
<b>8 Test report .....</b>	<b>42</b>
<b>Annex A (informative) Determination of <math>\delta_i</math> and <math>J_i</math> .....</b>	<b>47</b>
<b>Annex B (normative) Crack plane orientation .....</b>	<b>52</b>
<b>Annex C (informative) Example test reports .....</b>	<b>54</b>
<b>Annex D (normative) Stress intensity factor coefficients and compliance relationships .....</b>	<b>63</b>
<b>displacement <math>V_{M1}</math> .....</b>	<b>65</b>
<b>Annex E (informative) Measurement of load-line displacement <math>q</math> in the three-point bend test .....</b>	<b>68</b>
<b>Annex F (informative) Derivation of pop-in equations .....</b>	<b>73</b>
<b>Annex G (informative) Analytical methods for the determination of <math>V_p</math> and <math>U_p</math> .....</b>	<b>75</b>
<b>Annex H (informative) Guidelines for single-specimen methods .....</b>	<b>77</b>
<b>Annex I (normative) Power-law fits to crack extension data <sup>[39]</sup> .....</b>	<b>91</b>
<b>Bibliography .....</b>	<b>92</b>