TECHNICAL REPORT

ISO/TR 23602

First edition 2005-07-01

Toughness of chain steels

Résistance des aciers pour chaînes



Reference number ISO/TR 23602:2005(E)

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 2005

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.org
Web www.iso.org

Published in Switzerland

Contents

		•
Forew	ord	v
1	Scope	.1
2	Normative references	.1
3	Types of chain and extraction of specimens	.2
4	Materials, chemical composition and heat-treatment	.2
5	Tensile tests on chains	.2
6	Conventional tensile tests on standard specimens	3
7	Notch impact tests	.3
8	Fracture mechanics tests on notched chain links with slits	4
9	Fracture mechanics tests on notched three-point bend specimens with slits and fatigue cracks	6
10	Correlation between the load-bearing capacity of chain links containing slits and material toughness	7
11	Fracture mechanics derivation of chain links	7
12	Load-bearing and brittle fracture transition concept — Requirements	.8
13	Correlation of test results with data from the literature	.9
14	Summary	.9
Figure	1 — Results $C_{\rm v}$ tests: Standard specimen (EN 10045)	11
Figure	2 — Load-time diagram for instrumented $C_{\rm V}$	13
Figure	3 — Crack arrest load as function of temperature	14
Figure	4 — Noncrystalline area in $C_{\rm v}$ — Test	15
Figure	5 — Load–COD diagram for TPB specimens with fatigue crack and eroded slits material type T, $T = -40 ^{\circ}\text{C}$	16
Figure	6 — Load–COD diagram for TPB specimens with fatigue crack and eroded slits material grade VH, $T = -40 ^{\circ}\text{C}$	17
Figure	7 — Comparison of pre-cracked and eroded chain link material grade VH, $T = -40 ^{\circ}\text{C}$	18
Figure	8 —Chain link specimen	19
Figure	9 — Clip gauge fixed in chain link	20
Figure	10 — Calibration of clip gauge for COD measurement	21
Figure	11 — Test specimen at –40 °C, three links	21
Figure	12 — Effect of slit size on loadability of chain, $T = -40 ^{\circ}\text{C}$	22
Figure	13 — Load–COD diagram for tension tests on chains with eroded slit, $T = -40$ °C, $a/d = 0.22$	23
Figure	14 — Load–COD diagram for tension tests on chains with eroded slit, $T = -40$ °C, $a/d = 0.43$	24
Figure	15 — Load–COD diagram for tension tests on chains with eroded slit, $T = -40$ °C, $a/d = 0.64$	25
Figure	16 — Stable crack growth chain Type T, $a/d = 0.22$ — Marked by heat tinting	26
Figure	17 — Effect of slit size on absorbed energy of chains, $T = -40 ^{\circ}\text{C}$	27

Page