

NATIONAL STANDARD OF CANADA NORME NATIONALE DU CANADA

CAN/ULC-61236-14 (CEI/IEC 61236:2010, MOD)

La norme internationale **CEI/IEC 61236:2010, (deuxième édition, 2010-10)** a été adoptée avec les exigences propres au Canada (MOD), et porte la désignation **CAN/ULC-61236-14** la troisième Edition. Elle a été approuvée comme Norme nationale du Canada par le Conseil canadien des normes.

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Travaux sous tension – Selles, manchons et leurs accessoires

ICS 13.260, 29.240.20, 29.260.99

Live working – Saddles, stick clamps and their accessories

ICS 13.260, 29.240.20, 29.260.99



Numéro de référence
Reference Number
CEI/IEC 61236:2010

**Commission Electrotechnique Internationale
International Electrotechnical Commission**

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Il est recommandé aux personnes qui ont besoin d'utiliser des normes de se servir des NNC. Ces normes font l'objet d'examen périodiques; c'est pourquoi l'on recommande aux utilisateurs de se procurer l'édition la plus récente de la norme auprès de l'OEN qui l'a publiée.

La responsabilité d'approuver les normes comme NNC incombe au :

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Those who have a need to apply standards are encouraged to use NSCs. These standards are subject to periodic review. Users of NSCs are cautioned to obtain the latest edition from the SDO that publishes the standard.

The responsibility for approving standards as NSCs rests with:

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Le but premier visé par cette norme est énoncé au paragraphe qui en définit le domaine d'application. Il importe de préciser qu'il incombe à l'utilisateur de décider si la norme convient à ses besoins particuliers.

The intended primary application of this Standard is stated in its scope. It is important to note that it remains the responsibility of the user of the Standard to judge its suitability for this particular application.

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NORME NATIONALE DU CANADA

NATIONAL STANDARD OF CANADA

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(CEI/IEC 61236:2010, MOD)

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manchons et leurs accessoires**

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This list represents the membership at the time the Committee balloted on the final text of this edition. Since that time, changes in the membership may have occurred.

CAN/ULC-61236-14 (CEI/IEC 61236:2010, MOD)

Travaux sous tension – Selles, manchons et leurs accessoires

PRÉFACE ULC

Ce document constitue la Troisième édition de la norme, CAN/ULC-61236-14 (CEI/IEC 61236:2010, MOD), Travaux sous tension – Selles, manchons et leurs accessoires, laquelle constitue une adoption, avec les exigences propres au Canada, de la norme internationale de la Commission Électrotechnique Internationale, CEI/IEC 61236 (deuxième édition, 2010-10)

Au Canada, il y a deux langues officielles, le français et l'anglais. Tous les avertissements de sécurité doivent être en français et en anglais. Il importe de signaler que certaines autorités canadiennes peuvent exiger que des marquages et/ou des directives d'installation supplémentaires soient dans les deux langues officielles.

Cette troisième Edition de la norme nationale du Canada remplace désormais la deuxième Edition.

Cette édition de la norme a été approuvée par le Comité ULC sur les travaux sous tension et a été approuvée en tant que Norme nationale du Canada par le Conseil canadien des normes.

Il est possible que certains éléments de la présente norme canadienne soient sujets à des droits en matière de brevet. Normes ULC n'est pas tenu de signaler dans quelles circonstances ces droits en matière de brevet peuvent s'appliquer.

La révision de cette norme débutera dans les 5 ans suivant la date de publication, à moins que la norme soit désignée comme entrant dans une catégorie stabilisée, auquel cas la révision commencera dans le délai approprié défini par Normes ULC.

La présente norme est destinée à être utilisée à des fins d'évaluation de la conformité.

Une grande partie du financement nécessaire au processus d'adoption de cette norme nationale du Canada a été assurée par l'association canadienne de l'électricité (ACE) que nous tenons à remercier.

Mai 2014

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CAN/ULC-61236-14 (CEI/IEC 61236:2010, MOD)

Live working – Saddles, stick clamps and their accessories

ULC PREFACE

This is the Third Edition of the Standard CAN/ULC-61236-14 (CEI/IEC 61236:2010, MOD), Live working – Saddles, stick clamps and their accessories, which is an adoption, with Canadian Deviations, of the international standard by International Electrotechnical Commission, CEI/IEC 61236:2010 (Second Edition 2010-10).

In Canada there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

The requirements of Third Edition of this National Standard now supersede the Second Edition.

This Edition of the Standard has been formally approved by the ULC Committee on Live Working and has been approved as a National Standard of Canada by the Standards Council of Canada.

Attention is drawn to the possibility that some of the elements of this Canadian standard may be the subject of patent rights. ULC Standards shall not be held responsible for identifying any or all such patent rights.

The initiation of the review of this Standard will commence within 5 years of the date of publication, unless the Standard is identified as fitting within a stabilized category, whereby the review will commence within the appropriate time frame set out by ULC Standards.

This Standard is intended to be used for conformity assessment.

Major funding in support of the adoption process of this National Standard of Canada was provided by the Canadian Electricity Association (CEA), whose assistance is acknowledged with thanks.

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Exigences propres au Canada

4.1 Exigences (Généralités)

Ajouter le paragraphe suivant :

« Les selles, les manchons et les accessoires connexes visés par la présente norme sont conçus pour fonctionner correctement à une température comprise entre -40 °C et +55 °C. »

4.5 Marquage

[Reviser le quatrième alinéa :

« Les outils qui prétendent à la conformité à toute norme CEI traitant des travaux sous tension doivent au moins être indiqués par les marquages suivants:

- symbole CEI 60417-5216 (2002-10) – Approprié aux travaux sous tension; double triangle;
- numéro de la norme CEI applicable, immédiatement adjacent au symbole (IEC 6XXXX).»

comme suit:]

“Les outils qui prétendent à la conformité à toute norme CAN/ULC traitant des travaux sous tension doivent au moins être indiqués par le numéro de la norme CAN/ULC applicable.”

[Supprimer: – symbole CEI 60417-5216 (2002-10) – Approprié aux travaux sous tension; double triangle;

– numéro de la norme CEI applicable, immédiatement adjacent au symbole (IEC 6XXXX).]

ANNEXE A

[Supprimer Annexe A]

ANNEXE D

– Inclure l'annexe D présentée à titre informatif comme suit :

Annexe D (informative)

Entretien et vérifications périodiques en cours de service

D.1 Généralités

Les éléments suivants visent à orienter les utilisateurs en ce qui a trait à l'inspection des selles, des manchons et des accessoires connexes pendant leur utilisation.

D.2 Choix des caractéristiques appropriées d'un outil

D.2.1 Température d'utilisation

La norme ne contient aucun renseignement quant à la plage de température pour laquelle un outil est conçu ou aux limites de température recommandées relativement à son utilisation.

Les utilisateurs devraient tenir compte des limites de température de travail attendues au moment de choisir les caractéristiques nominales d'un outil.

D.2.2 Facteur de sécurité

La présente norme fournit des exigences essentielles dont doit tenir compte chaque utilisateur en fonction de ses besoins. En conséquence, on considère généralement que le facteur de surcharge de 2,5 indiqué pour les essais (réalisés à la température ambiante du laboratoire d'essai) est la valeur minimale.

Les utilisateurs peuvent examiner la possibilité d'augmenter le facteur de sécurité en cas d'utilisation d'un outil pour lever ou pour protéger le positionnement des travailleurs.

D.3 Vérification préalable à l'utilisation

Il est fortement recommandé d'inspecter visuellement chaque outil avant son utilisation.

D.4 Vérification périodique

D.4.1 Outils au fonctionnement mécanique seulement

Il est recommandé de soumettre ces outils aux essais décrits à la section D.4.3. au moins une fois tous les cinq ans.

D.4.2 Outils utilisés en présence de travailleurs

Lorsque la sécurité des travailleurs est directement liée à l'utilisation de certains types d'outils, il est recommandé de soumettre ces outils aux essais décrits à la section D.4.3. au moins une fois tous les trois ans.

D.4.3 Procédure d'essai périodique

La réalisation par un utilisateur d'essais périodiques des outils en service exige de nombreux montages d'essai différents et coûteux. En pratique, la réalisation des vérifications périodiques suivantes a été jugée appropriée :

- Examens visuel et fonctionnel de l'outil
- Vérification des dimensions de ses caractéristiques essentielles (orifices, boulonnage, etc.)
- Essais non destructifs des soudures, le cas échéant (inspection visuelle, ressuage, rayons X, ultrasons, etc.)
- Examen visuel du caractère lisible du marquage

Canadian Deviations

4.1 REQUIREMENTS (GENERAL)

Add the following paragraph:

“The saddles, stick clamps and their accessories covered by this standard shall be designed to function properly within the temperature range of –40 °C to + 55 °C.”

4.5 MARKING

[Amend the fourth paragraph:

”Tools for which compliance with any IEC standard dealing with live working is claimed, shall be indicated by the following marking, as a minimum:

- symbol IEC 60417-5216 (2002-10) – Suitable for live working; double triangle;
- number of the relevant IEC standard immediately adjacent to the symbol (IEC 6XXXX).”

to read:]

“Tools for which compliance with any CAN/ULC standard dealing with live working is claimed, shall be indicated by the number of the relevant CAN/ULC standard.”

- [Delete: – symbol IEC 60417-5216 (2002-10) – Suitable for live working; double triangle;
- number of the relevant IEC standard immediately adjacent to the symbol (IEC 6XXXX).”]

ANNEX A

[Delete Annex A]

ANNEX D

- To include informative Annex D as follows:

Annex D (informative) **In-service care and periodic checking**

D.1 General

The following is to provide guidance to the users for the inspection of saddles, stick clamps and their accessories when in service.

D.2 Selection of the proper characteristics of a tool

D.2.1 Working temperature

No consideration is given in the standard to the range of temperature for which a tool is designed or to the temperature limits recommended for its use.

Users should take into consideration the expected limits of the working temperature when selecting the rated characteristics of a tool.

D.2.2 Safety factor

This standard provides essential requirements that may be supplemented by each user according to its needs. According to that, the overload factor of 2,5 specified for the tests (performed at the ambient temperature of the test laboratory) is understood in general as being a minimum value.

Users may consider increasing the safety factor in case of a tool used to lift or secure the positioning of the workers.

D.3 Check before use

It is strongly recommended that each tool be checked visually before use.

D.4 Periodic checking

D.4.1 Tools with a mechanical function only

It is recommended to submit these tools at least once every 5 years to the tests described in D.4.3.

D.4.2 Tools used when workers are involved

When the safety of the workers is directly associated with the use of some types of tools, it is recommended to submit these tools at least once every 3 years to the test described in D.4.3.

D.4.3 Periodic testing procedure

For a user to perform mechanical periodic tests of the tools in use would ask for numerous different and costly test set-ups. In practice, it has been found appropriate to perform the following checks on a periodic basis:

- Visual and functional check of the tool;
- Dimensional check of its critical characteristics (holes, bolting, etc.);
- Nondestructive tests for welds where relevant (ex: visual inspection, liquid penetrant testing, X rays, ultrasonic, etc.)
- Visual check of the marking for legibility.



INTERNATIONAL STANDARD

NORME INTERNATIONALE

Live working – Saddles, stick clamps and their accessories

Travaux sous tension – Selles, manchons et leurs accessoires

IEC 61236:2010



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IEC 61236

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Live working – Saddles, stick clamps and their accessories

Travaux sous tension – Selles, manchons et leurs accessoires

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LIVE WORKING – SADDLES, STICK CLAMPS AND THEIR ACCESSORIES

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International Standard IEC 61236 has been prepared by IEC technical committee 78: Live working.

This second edition cancels and replaces the first edition published in 1993. It constitutes a technical revision.

It includes the following significant technical changes from the previous edition:

- clarification of the requirements and of the test provisions;
- addition of a test for the durability of marking;
- application of conformity assessment for products having completed the production phase, according to IEC 61318:2007 (Ed. 3).

The text of this standard is based on the following documents:

Enquiry draft	Report on voting
78/850/CDV	78/867/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

The requirements provided in this standard are essential requirements. Each user of this standard may supplement it with their own requirements. These will cover, for example, required mechanical performance and conditions of interchangeability with equipment already in service. In such cases, caution should be taken to maintain or improve the performance of the products.

This International Standard has been prepared in accordance with the requirements of IEC 61477.

The products covered by this standard may have an impact on the environment during some or all stages of its life cycle. These impacts can range from slight to significant, be of short-term or long-term, and occur at the global, regional or local level.

Except for a disposal statement in the instructions for use, this standard does not include requirements and test provisions for the manufacturers of the product, or recommendations to the users of the product for environmental improvement. However, all parties involved in the product's design, manufacture, packaging, distribution, use, maintenance, repair, reuse, recovery and disposal are encouraged to take account of environmental considerations.

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LIVE WORKING – SADDLES, STICK CLAMPS AND THEIR ACCESSORIES

1 Scope

This International Standard is applicable to saddles, stick clamps and their accessories, used for live working.

The products designed and manufactured according to this standard contribute to the safety of the users provided they are used by skilled persons, in accordance with safe methods of work and the instructions for use.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60417, *Graphical symbols for use on equipment*

IEC 61318:2007, *Live working – Conformity assessment applicable to tools, devices and equipment*

IEC 61477, *Live working – Minimum requirements for the utilization of tools, devices and equipment*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61318 and the following apply.

3.1.1

accessory

supplemental metal device used with saddles and stick clamps to carry out the live work

3.1.2

family of devices

devices which have the same function (utilization, use, etc.)

3.1.3

rated value

value of a quantity used for specification purposes, established for a specified set of operating conditions of a component, device, equipment, or system

[IEC 60050-151:2001, 151-16-08]

3.1.4

saddle

metal device fixed to a pole, cross-arm or tower and used with a stick clamp to hold or guide support sticks and other equipment

[IEC 60743:2008, 10.3.1 and IEC 60050-651:1999, 651-09-06, modified]

3.1.5

stick clamp

metal device used with a stick or saddle to hold or guide a support stick

[IEC 60743:2008, 10.3.6, modified]

3.1.6

type of device

devices which have the same design and application and are of similar dimensions

3.2 Symbols

T_N rated torque given by the manufacturer for a device or a part of a device and for testing purposes

F_{TN} rated tensile force given by the manufacturer for a device or a part of a device and for testing purposes

F_{BN} rated bending force given by the manufacturer for a device or a part of a device and for testing purposes

F_{GN} rated slippage force given by the manufacturer for a device and for testing purposes

4 Requirements

4.1 General

The following requirements have been prepared in order that the saddles, stick clamps and their accessories covered by this standard are designed and manufactured to contribute to the safety of the users, provided they are used by persons skilled for live working, in accordance with safe methods of work and the instructions for use.

NOTE Appropriate measures should be taken to minimize the weight and size of the equipment to optimize handling.

4.2 Dimensional requirements

For each type of device, the manufacturer shall indicate the dimensions or operating ranges related to the specific functions of the device, in particular the dimensions of acceptable supports for the saddles, and the specified diameters of acceptable tubes and rods for stick clamps shall be indicated.

4.3 Mechanical requirements

For each type of device, the manufacturer shall give the rated values as outlined in Table 1.

Table 1 – Mechanical ratings for each type of device

Type of device	Rated values			
	Bending F_{BN}	Tensile F_{TN}	Torque T_N	Slippage F_{GN}
Chain (strap) binder		- Whole device - Locking device	Tightening device	
Ring saddle with rigid bracket	- Whole device - Locking device	Chain (strap) and locking device		
Ring saddle with chain bracket	Locking device	- Whole device - Chain (strap) and locking device	Tightening device	
Lift-type saddle	- Whole device - Locking device	- Chain (strap) and locking device - Shackle		
Pole-type saddle	- Whole device ^a - Locking device	Chain (strap) and locking device		
Saddle extension	Whole device			
Tower-type saddle	Whole device ^a		Mounting bolts	
Crossarm-type saddle	Whole device ^a		Mounting bolts	
Block saddle	Whole device			
Tower-arm yoke	Whole device		Mounting bolts	
Platform pivot attachment	Whole device			
Saddles and accessories for hydraulic tension puller	- Saddle for triangular yoke - Saddle for rectangular yoke - Insulating rope gin	- Assembly - Tenon extension - Block anchoring point		
Stick clamp	Whole device	Assembly ^b	Mounting bolts	Whole device
Rigid support-stick stirrup	Whole device			Whole device
Swivel support-stick stirrup		Whole device		Whole device
Offset eye	Whole device			
^a The manufacturer shall give the values F_{BN} for these devices with and without saddle extension.				
^b Applicable to stick clamps designed to be coupled.				

4.4 Protection against corrosion

Metallic parts shall be protected against corrosion, either by their composition or by a suitable surface treatment.

For each type of device, the manufacturer shall demonstrate that the metallic parts are corrosion resistant.

4.5 Marking

Each device shall be marked with the following permanent items of marking:

- manufacturer's name or trade mark;
- type reference;
- year and, if possible, month of manufacture;
- rating (or capacity if requested by the customer);



- symbol IEC 60417-5216:2002-10 – Suitable for live working; double triangle (Annex A);

NOTE The exact ratio of the height of the figure to the base of the triangle is 1,43. For the purpose of convenience, this ratio can be between the values of 1,4 and 1,5.

- number of the relevant IEC standard immediately adjacent to the symbol (IEC 61236).

Information or characteristics not required at the work site, such as year of publication of the standard, shall be provided by other means (bar codes, microchips, etc.) or shall be provided on the packaging.

4.6 Instructions for use

Each device shall come with the manufacturer's instructions for use and care. These instructions shall be prepared in accordance with the general provisions given in IEC 61477.

These instructions shall include at least

- maximum mechanical rating;
- recommended application(s);
- recommendations for cleaning, storage, transportation, periodic testing, refinishing and disposal.

5 Tests

5.1 General

This standard provides testing provisions to demonstrate compliance of the product with the requirements of Clause 4. These testing provisions are primarily intended to be used as type tests for validation of the design input. Where relevant, alternative means (calculation, examination, tests, etc.), are specified within the test subclauses for the purpose of saddles, stick clamps and their accessories having completed the production phase.

To show compliance with this standard, the manufacturer shall prove that the type tests have been carried out successfully on at least three devices for each type.

However, when the differences between several types of device are limited in number, tests that are unaffected by the differing characteristics of the devices can be carried out on a single type of device, and the results can be used for the other device types.

The different type tests, and the order in which these tests are performed are given in Annex B.

The tests in Tables B.1, B.2, B.3 and B.4 of Annex B shall be performed, following the specified order.

NOTE In Tables B.1, B.2, B.3 and B.4 the numbers within parentheses provide reference to the Subclause where the relevant test is explained. For some families of devices, columns are divided in sub-columns equal to the number of mechanical tests to be applied to these devices (these may be destructive). These sub-columns also show the sequence of tests to be applied (for an example see Table B.5).

Any device failing to pass any one of the tests mentioned in Tables B.1, B.2, B.3 and B.4 of Annex B shall result in the design being rejected.

5.2 Visual and functional inspection

Each device shall be visually inspected to detect manufacturing defaults and to check proper functioning.

The test shall be considered as passed if each device shows compliance with the requirements included in 4.3, 4.4, 4.5 and 4.6 where applicable.

5.3 Dimensional check

Each device shall be measured to ensure that its dimensions match the manufacturer's rated dimensions.

5.4 Durability of marking

The durability of the marking shall be verified by thoroughly cleaning the marking for at least 1 min with a piece of lint-free cloth dampened with water and then rubbing it vigorously for a further minimum of 1 min with a piece of lint-free cloth dampened with isopropanol ($\text{CH}_3\text{-CH(OH)-CH}_3$).

NOTE 1 It is the employer's duty to ensure that any relevant legislation and any specific safety instructions regarding the use of isopropanol are fully observed.

The test shall be considered as passed if the marking remains legible and the letters do not smear.

The surface of the device may change. No signs of loosening shall be present for labels.

NOTE 2 Marking made by moulding or engraving need not be subjected to this test.

5.5 Mechanical tests

5.5.1 General test provisions and pass criteria

The tensile, bending, and slippage force and the torque values shall be progressively applied in increments at a rate of $(0,1 \pm 0,025) F_{\text{TN}}/\text{s}$, F_{BN}/s , F_{GN}/s and T_{N}/s until the values of $1,25 F_{\text{TN}}$, $1,25 F_{\text{BN}}$, $1,25 F_{\text{GN}}$ and $1,25 T_{\text{N}}$ are reached.

Each value shall then be maintained for 1 min before the results are noted.

The test shall be considered as passed if no visible signs of damage are observed on the device and no slippage occurs.

These force and torque values shall then be increased again at the same rate as above until the values of $2,5 F_{\text{TN}}$, $2,5 F_{\text{BN}}$, $1,5 F_{\text{GN}}$ and $2,5 T_{\text{N}}$ are reached. Each value shall be maintained for 1 min before the results are noted again.

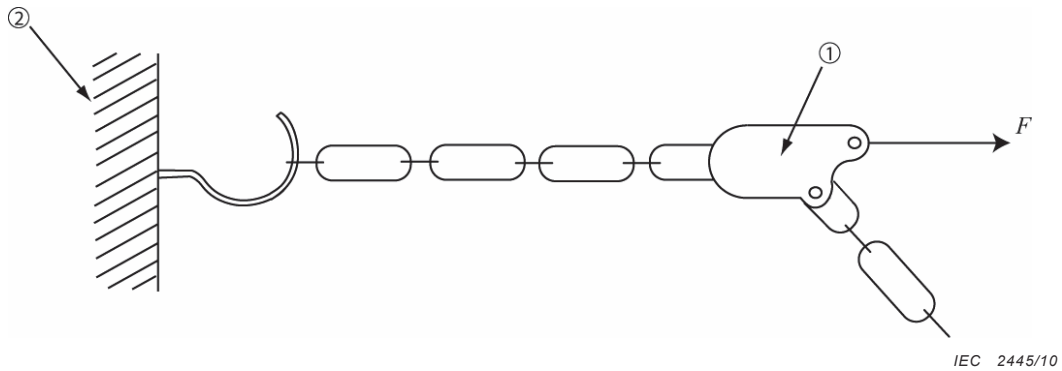
The test shall be considered as passed if no permanent deformation or breakage is observed on the device and no slippage occurs.

5.5.2 Specific test provisions

5.5.2.1 Locking device with chain or strap

5.5.2.1.1 Tensile test

The locking device with chain or strap shall be attached to a fixed support (see Figure 1). Refer to 5.5.1 for the tensile test provisions and pass criteria.



Key

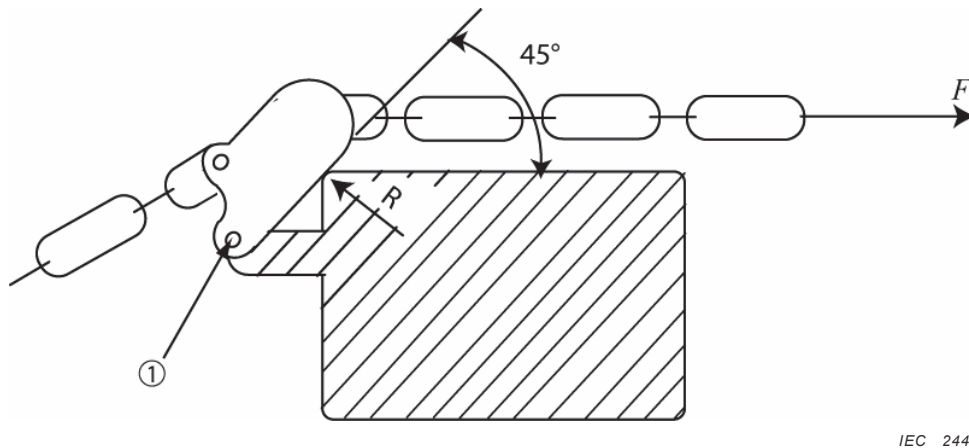
- 1 locking device
- 2 fixed support

Figure 1 – Locking device with chain or strap – tensile test

5.5.2.1.2 Bending test

The locking device with chain or strap shall be fixed on a support at an angle of 45° to the direction of the force F (see Figure 2). A load equal to $0,9 F_{TN}$ shall be progressively applied in increments at a rate of $(0,1 \pm 0,025) F_{TN}/s$ and shall then be maintained for 1 min before the results are noted.

The test shall be considered as passed if no visible signs of damage is observed on the device.



Key

- 1 fixing-pin point
- R radius of curvature = 5 mm

Figure 2 – Locking device with chain or strap – bending test

5.5.2.2 Chain (strap) binder

5.5.2.2.1 Tensile test

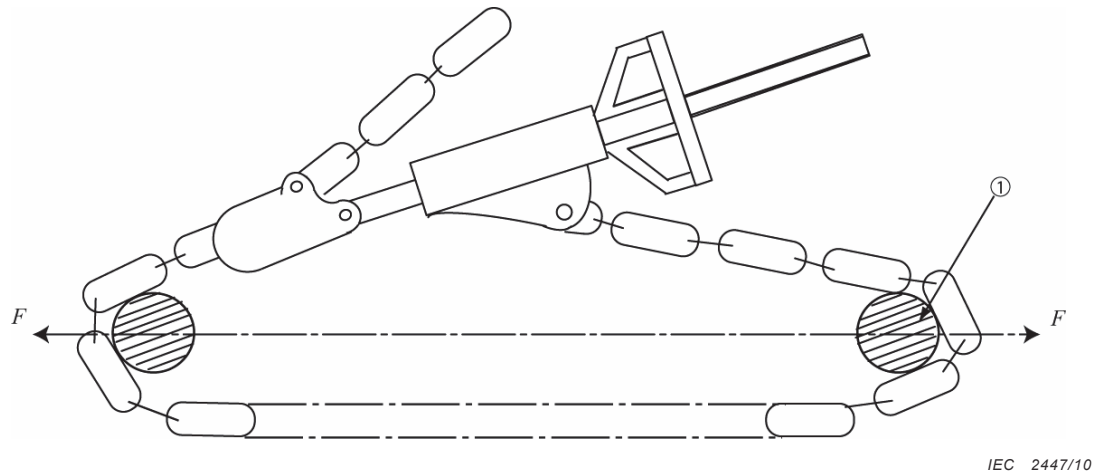
The binder shall be in a full tightened position. The end of the chain (strap) shall be locked in the locking device to obtain a loop (see Figure 3). The tensile force shall be applied by means of two 30 mm diameter rods. It shall be applied progressively in increments at a rate of $(0,1 \pm 0,025) F_{TN}/s$ until it reaches $1,25 F_{TN}$ and shall then be maintained for 1 min before the results are noted.

The test shall be considered as passed if no visible signs of damage are observed on the device.

The force shall then be increased again until it reaches $2,5 F_{TN}$.

The test shall be considered as passed if no permanent deformation or breakage is observed on the device.

NOTE The 1,25 and 2,5 coefficients are applicable to each leg of the loop. Therefore, the total force applied is doubled ($2,5 F_{TN}$ and $5 F_{TN}$).



Key

1 30 mm diameter rod

Figure 3 – Chain (strap) binder – tensile test

5.5.2.2.2 Bending test on the locking device

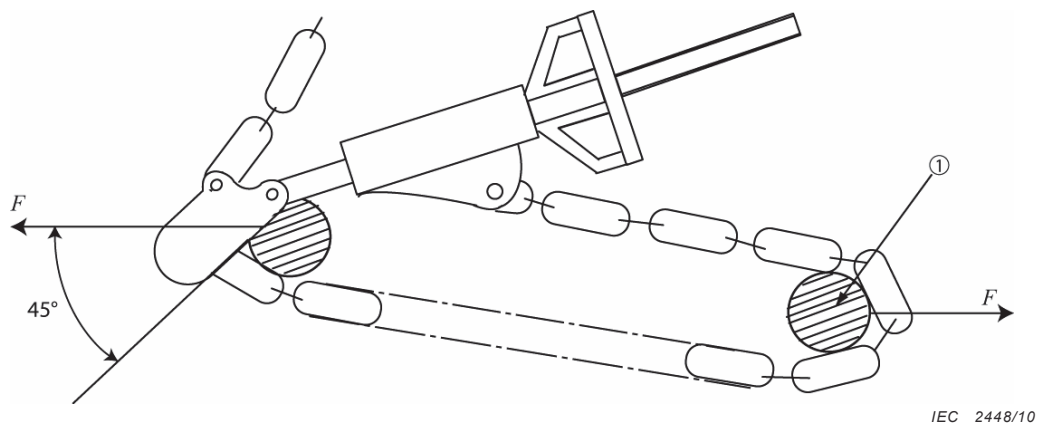
The previous test shall be resumed after having fixed the locking device on a support (a rod with a flat part) at an angle of 45° to the direction of the force F (see Figure 4).

A force F equal to $0,9 F_{TN}$ is applied. The force shall be increased progressively in increments at a rate of $(0,1 \pm 0,025) F_{TN}/s$ until it reaches $2,5 F$ and shall then be maintained for 1 min before the results are noted.

The test shall be considered as passed if no visible signs of damage is observed on the device.

The force shall then be repeated until it reaches $5 F$.

The test shall be considered as passed if no permanent deformation or breakage is observed on the device.



Key

1 30 mm diameter rod

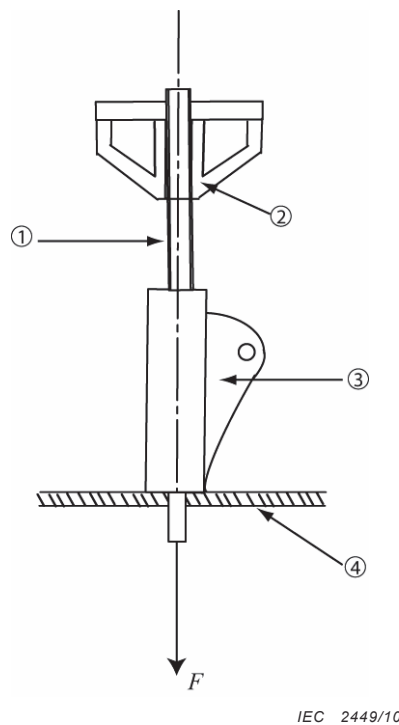
Figure 4 – Locking device – bending test

5.5.2.2.3 Test on the retractable spring of the hand wheel type binder

The hand wheel shall be fully retracted and the body of the tightening device shall be maintained in a vertical position (see Figure 5).

A vertical tensile force F shall be applied on the tightening device rod.

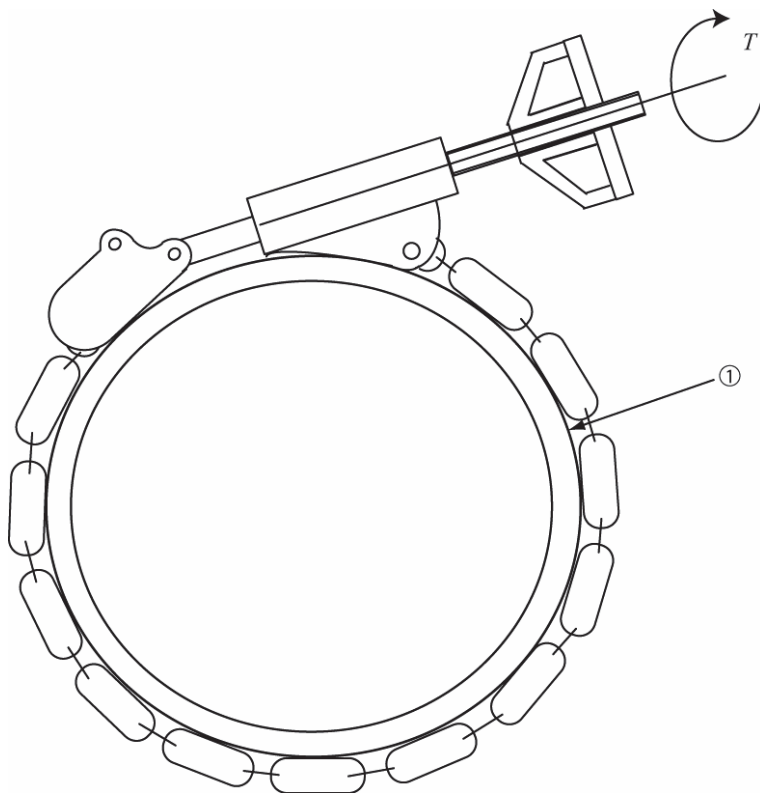
The test shall be considered as passed if the value of the force to achieve full compression of the spring is greater than 120 N, but less than 180 N.

**Key**

- 1 rod
- 2 hand-wheel in retracted position
- 3 body of the tightening device
- 4 support

Figure 5 – Test on the retractable spring**5.5.2.2.4 Torque test**

The chain (strap) binder shall be set on a 160 mm diameter metallic cylinder (see Figure 6). The chain (strap) binder shall be maintained in position by the retractable spring of the tightening device. Refer to 5.5.1 for the torque test provisions and pass criteria.



IEC 2450/10

Key

- 1 cylinder 160 mm diameter

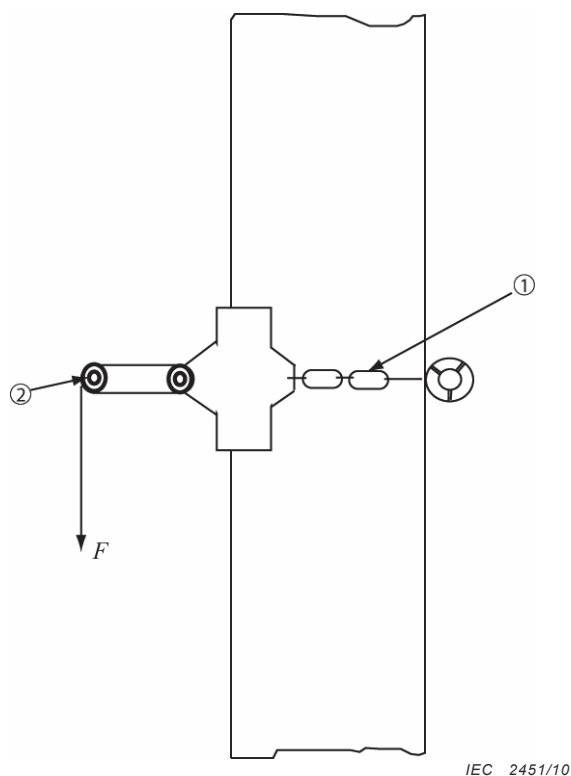
Figure 6 – Chain (strap) binder – torque test

5.5.2.3 Ring saddle with rigid bracket

5.5.2.3.1 Bending test on the whole saddle

The saddle shall be set on a metal support or the support agreed to by the manufacturer and the customer (wood, concrete, fibreglass or metal) with a chain (strap) binder. Where applicable, the hand wheel shall then be tightened with a torque of (30 ± 3) N·m (see Figure 7).

Refer to 5.5.1 for the bending test provisions and pass criteria.

**Key**

- 1 chain binder of the whole saddle
- 2 force applied on the extreme part of the rigid bracket

Figure 7 – Ring saddle with rigid bracket – bending test**5.5.2.3.2 Tensile test on the chain (strap) and locking device**

(See 5.5.2.2.1)

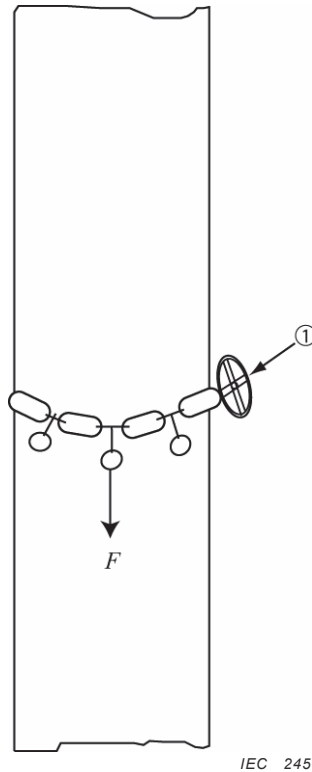
5.5.2.3.3 Bending test on the locking device

(See 5.5.2.2.2)

5.5.2.4 Ring saddle with chain bracket**5.5.2.4.1 Tensile test on the whole saddle**

The saddle shall be set on a metal support or the support agreed to by the manufacturer and the customer (wood, concrete, fibreglass or metal) with a chain (strap) binder. Where applicable, the hand wheel shall then be tightened to a torque of (30 ± 3) N·m (see Figure 8).

The tensile force F shall be applied on one of the rings. Refer to 5.5.1 for the tensile test provisions and pass criteria.



IEC 2452/10

Key

- 1 tightened hand-wheel (30 ± 3) N·m

Figure 8 – Ring saddle with chain bracket – tensile test

5.5.2.4.2 Additional tests for ring saddles with chain bracket

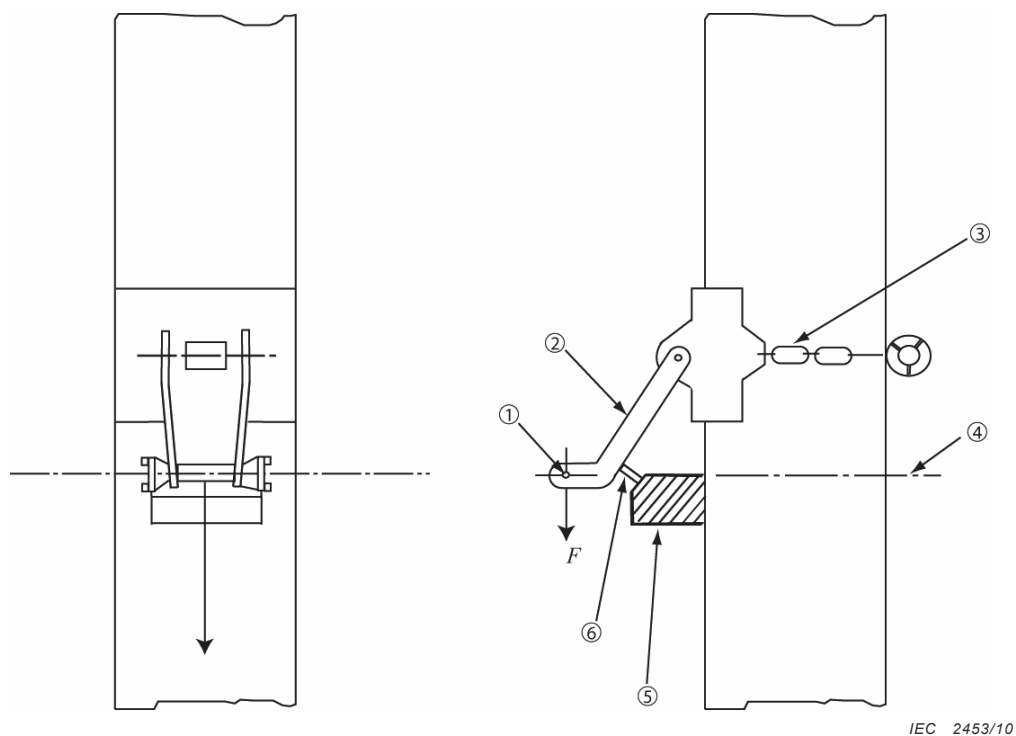
- Tensile test on the locking device (see 5.5.2.2.1)
- Bending test on the locking device (see 5.5.2.2.2)
- Test on the retractable spring (see 5.5.2.2.3)
- Torque test (see 5.5.2.2.4)

5.5.2.5 Lift-type saddle

5.5.2.5.1 Bending test on the whole saddle

The saddle shall be set on a metal support or the support agreed to by the manufacturer and the customer (wood, concrete, fibreglass or metal) with a chain (strap) binder. Where applicable, the hand wheel shall then be tightened with a torque of (30 ± 3) N·m. The extremity of the handle shall be supported horizontally by the handle prop resting against a hard wood block between the handle prop and the support (see Figure 9).

Refer to 5.5.1 for the bending test provisions and pass criteria.

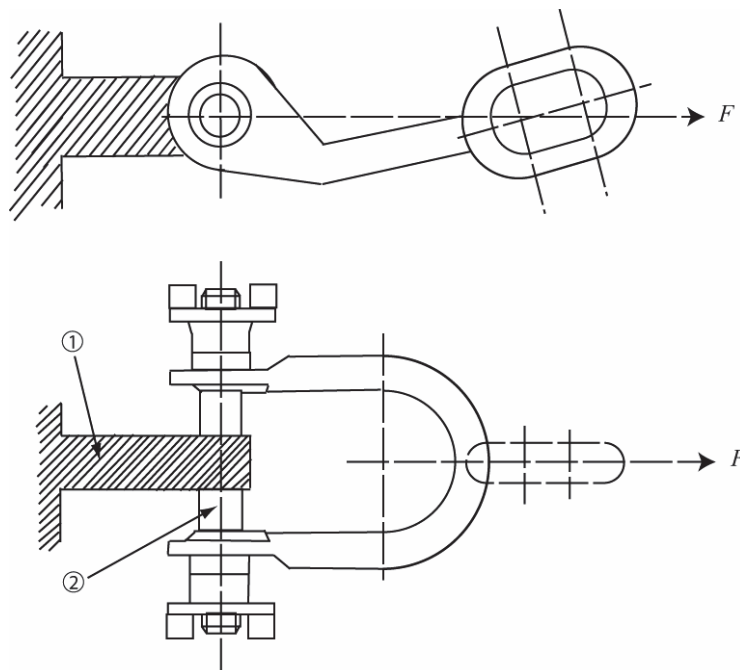
**Key**

- | | |
|-----------------------|-------------------|
| 1 axis of the shackle | 4 horizontal axis |
| 2 handle | 5 hard wood block |
| 3 fastening device | 6 handle prop |

Figure 9 – Lift-type saddle – bending test**5.5.2.5.2 Tensile test on the shackle (butt ring)**

The shackle, with pin, shall be placed on a tensile test bench (see Figure 10). The pin of the shackle shall be fixed by a tenon of the same width as that of the handle.

Refer to 5.5.1 for the tensile test provisions and pass criteria.



IEC 2454/10

Key

- 1 tenon support
- 2 axle of the shackle

Figure 10 – Shackle – tensile test

5.5.2.5.3 Additional tests for lift-type saddles

- Tensile test on the chain (strap) and locking device (see 5.5.2.2.1)
- Bending test on the locking device (see 5.5.2.1.2)

5.5.2.6 Pole-type saddle

5.5.2.6.1 Bending test on the whole saddle

The saddle shall be set on a metal support or the support agreed to by the manufacturer and the customer (wood, concrete, fibreglass or metal) with a chain (strap) binder. Where applicable, the hand wheel shall then be tightened to a torque of (30 ± 3) N·m (see Figure 11).

Refer to 5.5.1 for the bending test provisions and pass criteria.