IEC 60529

Edition 2.0 2013-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

AMENDMENT 2
AMENDEMENT 2

Degrees of protection provided by enclosures (IP Code)

Degrés de protection procurés par les enveloppes (Code IP)

SIST Preview
(https://ecommerce.sist.si)
IEC 60529:1989/AMD2:2013
https://ecommerce.sist.si/catalog/standards/sist/bc0df9ec-e79c-49f7-94cc-591c2a0250ce/iec-60529-1989-amd2-2013



IEC 60529:1989/A2:2013

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2013 IEC, Geneva, Switzerland

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 IEC or IEC's member National Committee in the country of the requester.
If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.
Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

Useful links:

IEC publications search - www.iec.ch/searchpub

The advanced search enables you to find IEC publications by a variety of criteria (reference number, text, technical committee,…).
It also gives information on projects, replaced and withdrawn publications.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary (IEV) on-line.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available on-line and also once a month by email.

Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

SIST Preview (https://ecomm...) 60529:1989/A... e79c-4... ...nd2-2013

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Liens utiles:

Recherche de publications CEI - www.iec.ch/searchpub

La recherche avancée vous permet de trouver des publications CEI en utilisant différents critères (numéro de référence, texte, comité d'études,…).
Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (VEI) en ligne.

Just Published CEI - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications de la CEI. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

IEC 60529

Edition 2.0 2013-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

AMENDMENT 2
AMENDEMENT 2

Degrees of protection provided by enclosures (IP Code)

Degrés de protection procurés par les enveloppes (Code IP)

SIST Preview
(https://ecommerce.sist.si)
IEC 60529:1989/AMD2:2013
https://ecommerce.sist.si/catalog/standards/sist/bc0df9ec-e79c-49f7-94cc-591c2a0250ce/iec-60529-1989-amd2-2013

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX K

ICS 13.260; 29.020

ISBN 978-2-8322-1027-7

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

® Registered trademark of the International Electrotechnical Commission
Marque déposée de la Commission Electrotechnique Internationale

FOREWORD

This amendment has been prepared by IEC technical committee 70: Degrees of protection provided by enclosures.

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

FDIS	Report on voting
70/122/FDIS	70/123/RVD

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

The committee has decided that the contents of this amendment and the base 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.

The contents of the corrigendum of January 2019 have been included in this copy.

SIST Preview
(https://ecommerce.sist.si)

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

IEC 60529:1989/AMD2:2013
https://ecommerce.sist.si/catalog/standards/sist/[illegible]/iec-60529-1989-amd2-2013

INTRODUCTION TO AMENDMENT 2

This Amendment 2 introduces a new degree of protection IP X9 whereas no modifications of the existing degrees of protection are made.

Thus neither additional tests nor modifications of the existing certificates should be requested in case of enclosures providing a different IP code.

CONTENTS

Add the following new subclause title:

14.2.9 Test for second characteristic numeral 9 with a spray nozzle

Add the following new figure titles:

Figure 7 – Fan jet nozzle dimensions

Figure 8 – Fan jet nozzle resulting dimensions of spraying hole for checking purpose

Figure 9 – Fan jet nozzle examples

Figure 10 – Set-up for measuring the impact force of the water jet for determining the protection against high-pressure and temperature water jet, degree of protection against ingress of water IP X9

Figure 11 – Impact force distribution

Figure 12 – Test device to verify protection against high pressure and temperature water jet for small enclosures

4.1 Arrangement of the IP Code

Replace the sixth line by the following:

(numerals 0 to 9, or letter X)

SIST Preview
(https://ecommerce.sist.si)

4.2 Elements of the IP Code and their meanings

Add, in the line "Second characteristic numeral":

IEC 60529:1989/AMD2:2013
https://ecommerce.sist.si/catalog/standards/sist/bc0d9ec-e79c-49f7-94cc-591c2a0250ce/iec-60529-1989-amd2-2013

	9	High pressure and temperature water jet		

4.3 Examples for the use of letters in the IP Code

Replace the last line by the following:

IPX5/IPX7/IPX9 – giving three degrees of protection by an enclosure against water jets, temporary immersion and high pressure and temperature water jet for a "versatile" application.

6 Degrees of protection against ingress of water indicated by the second characteristic numeral

Replace the second paragraph by the following:

The tests for the second characteristic numeral are carried out with fresh water. The actual protection may not be satisfactory if cleaning operations with high pressure and temperature water jet outside the requirements of second characteristic numeral 9 and/or solvents are used.

Replace the seventh paragraph by the following

An enclosure designated with second characteristic numeral 7 or 8 only is considered unsuitable for exposure to water jets (designated by second characteristic numeral 5 or 6) and need not comply with requirements for numeral 5 or 6 unless it is multiple coded. An enclosure designated with second characteristic numeral 9 only is considered unsuitable for exposure to water jets (designated by second characteristic numeral 5 or 6) and immersion in water (designated by second characteristic numeral 7 or 8) and need not comply with requirements for numeral 5, 6, 7 or 8 unless it is multiple coded as follows:

Replace the table after the seventh paragraph by:

Enclosure passes test for:		**Designation and marking**	**Range of application**
Water jets second characteristic numeral	**Temporary/continuous immersion second characteristic numeral**		
5	7	IPX5/IPX7	Versatile
5	8	IPX5/IPX8	Versatile
6	7	IPX6/IPX7	Versatile
6	8	IPX6/IPX8	Versatile
9	7	IPX7/IPX9	Versatile
9	8	IPX8/IPX9	Versatile
5 and 9	7	IPX5/IPX7/IPX9	Versatile
5 and 9	8	IPX5/IPX8/IPX9	Versatile
6 and 9	7	IPX6/IPX7/IPX9	Versatile
6 and 9	8	IPX6/IPX8/IPX9	Versatile
–	7	IPX7	Restricted
–	8	IPX8	Restricted
9	–	IPX9	Restricted
5 and 9	–	IPX5/IPX9	Versatile
6 and 9	–	IPX6/IPX9	Versatile

SIST Preview
(https://ecommerce.sist.si)
IEC 60529:1989/AMD2:2013
https://ecommerce.sist.si/catalog/standards/sist/bc4df9ec-e79c-49f7-94cc-3...2a0250ce/iec-60529-1989-amd2-2013

Replace the last paragraph before Table 3 by the following:

Enclosures for “restricted” application indicated in the last column are considered suitable only for the conditions to which they were tested.

Add, at the end of Table 3, the following new line:

9	Protected against high pressure and temperature water jets	Water projected at high pressure and high temperature against the enclosure from any direction shall not have harmful effects	14.2.9

14 Tests for protection against water indicated by the second characteristic numeral

14.1 Test means

Add, at the end of Table 8, the following new line:

9	Fan jet nozzle Figure 7 Test of small enclosure on turntable Figure 12 Turntable speed (5 ± 1) r/min Spray at 0°, 30°, 60°, 90° Or Test of large enclosures as per intended use Spray from all practical directions Distance (175 ± 25) mm	(15 ± 1) l/min	 30 s per position 1 min/m^2 at least 3 min	 14.2.9 a) 14.2.9 b)

14.2 Test conditions

Replace the second paragraph by the following:

Details concerning compliance of degrees of protection – in particular for second characteristic numerals 5/6/9 (water jets) and numerals 7/8 (immersion) – are given in Clause 6.

SIST EN 60529:A2
(https://ecommerce.sist.si)

Replace the last sentence of the fourth paragraph by:

IEC 60529:1989/AMD2:2013
https://ecommerce.sist.si/catalog/standards/sist/bc0d9ec-e79c-49f7-94cc-591c2a0250ce/iec-60529-1989-amd2-2013

For IPX7 and IPX9 details of the water temperature are given in 14.2.7 and 14.2.9 respectively.

Add the following new subclause:

14.2.9 Test for second characteristic numeral 9 by high pressure and temperature water jetting

The test is made by spraying the enclosure with a stream of water from a standard test nozzle as shown in Figures 7, 8 and 9.

The set-up for measuring the impact force of the water jet is given in Figure 10.

The distribution force shall be verified at upper and lower limits of distance tolerance range (see Figure 11).

During the test a) or b) of the enclosure, the water temperature shall be (80 ± 5) °C.

a) For small enclosures (largest dimension less than 250 mm), the enclosure shall be mounted on the test device shown in Figure 12.

   – turntable speed: 5 r/min ± 1 r/min

   – spray positions: 0°, 30°, 60°, 90°

   The test duration is 30 s per position.

b) For large enclosures (largest dimension greater than or equal to 250 mm), the enclosure shall be mounted as per intended use. The entire exposed surface area of the enclosure shall be subjected to the spray at some point during the test procedure.

– spray positions: the enclosure shall be sprayed from all practical directions covering the entire surface area and the spray shall be, as far as possible, perpendicular to the sprayed surface.

– distance between nozzle and sample under test shall be 175 ± 25 mm.

The test duration is 1 min/m^2 of the calculated surface area of the enclosure (excluding any mounting surface), with a minimum duration of 3 min.

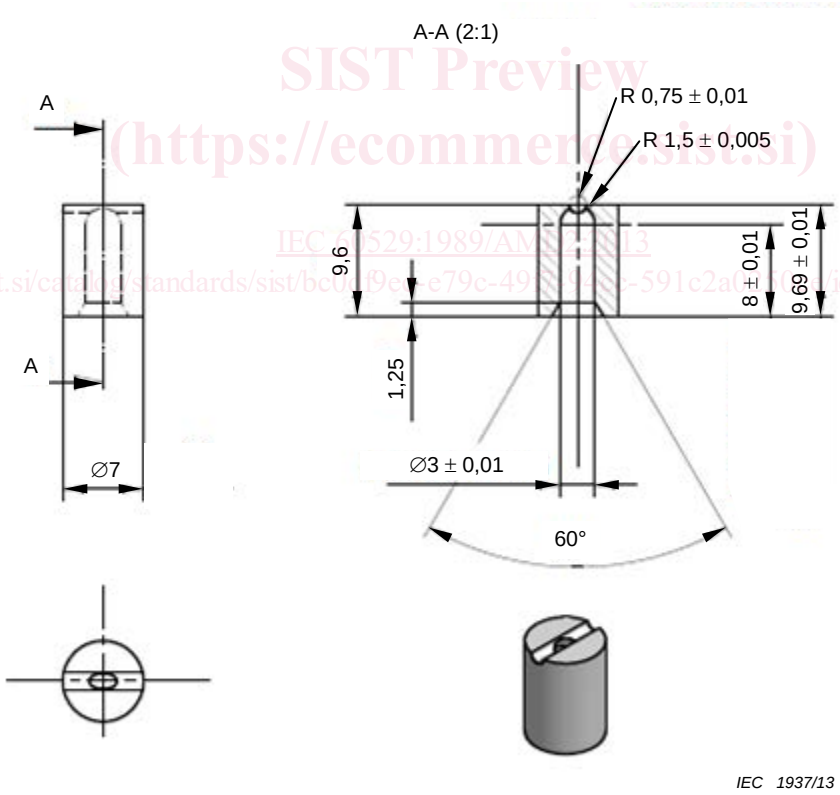
14.3 Acceptance conditions

Replace the first paragraph by the following:

After testing in accordance with the appropriate requirements of 14.2.1 to 14.2.9, the enclosure shall be inspected for ingress of water.

Add, after Figure 6, the following new figures:

Dimensions in millimetres

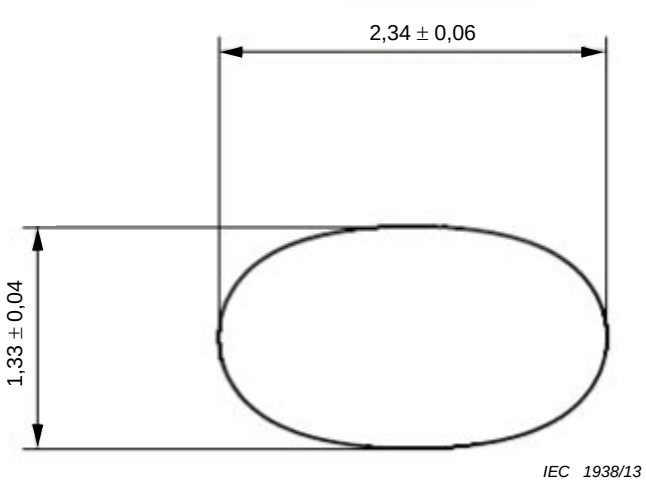


SIST Preview
(https://ecommerce.sist.si)
IEC 60529:1989/AMD2:2013
https://ecommerce.sist.si/catalog/standards/sist/bc0...e79c-49...-591c2a...iec-60529-1989-amd2-2013

NOTE The dimension 9,69 ±0,01 refers to the centre of the radius R0,75 ±0,01.

Figure 7 – Fan jet nozzle dimensions

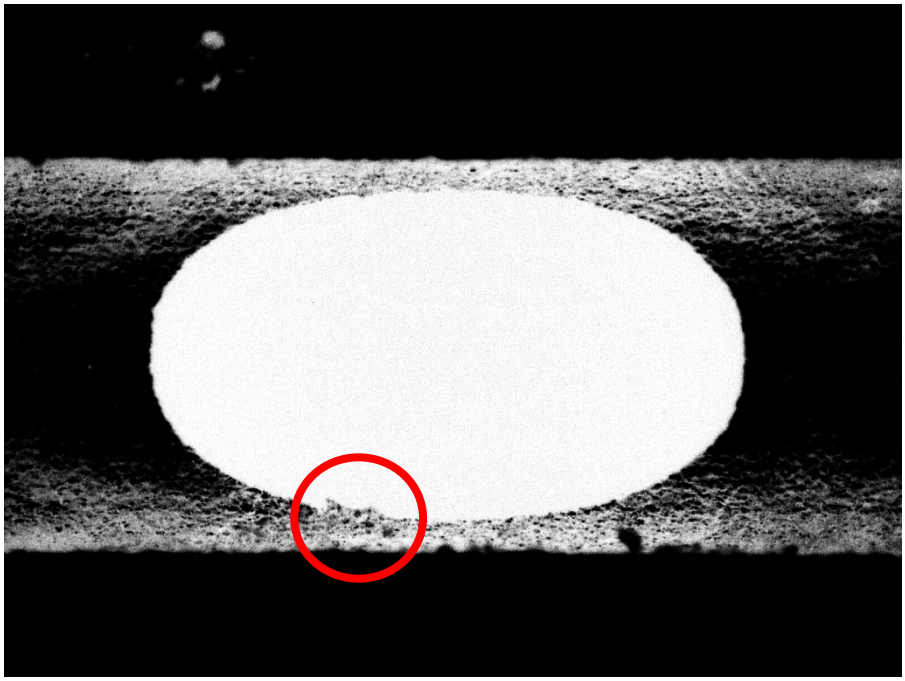
Dimensions in millimetres



NOTE A magnification of 100 times the edge of the nozzle should show a regular profile (see for example Figure 9).

Figure 8 – Fan jet nozzle resulting dimensions of spraying hole for checking purpose

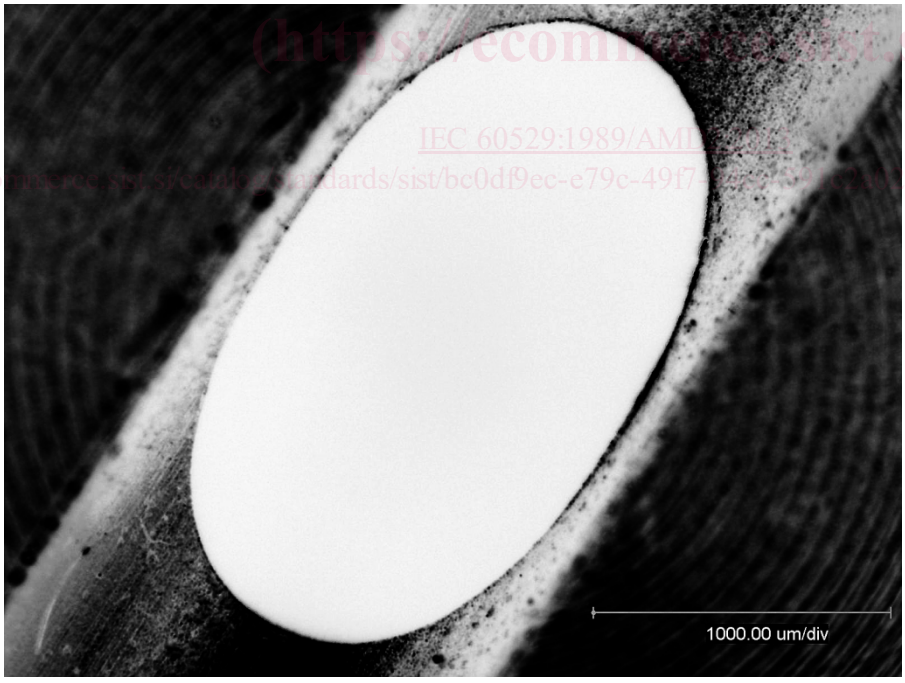
SIST Preview
(https://ecommerce.sist.si)
IEC 60529:1989/AMD2:2013
https://ecommerce.sist.si/catalog/standards/sist/bc0df9ec-e79c-49f7-94cc-591c2a0250ce/iec-60529-1989-amd2-2013



Bad surface finish

IEC 1939/13

SIST Preview
(https://ecommerce.sist.si)
IEC 60529:1989/AMD2:2013
https://ecommerce.sist.si/catalog/standards/sist/bc0df9ec-e79c-49f7-...-50ce/iec-60529-1989-amd2-2013

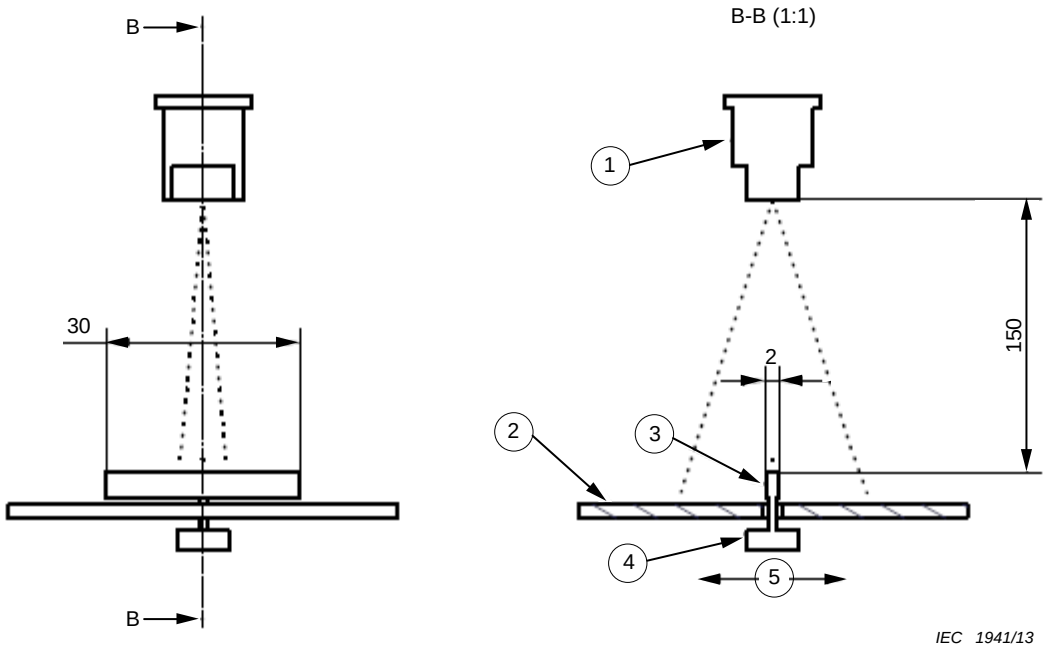


Good surface finish

IEC 1940/13

Figure 9 – Example of different quality achievements of the surface finish of the fan jet nozzle

Dimensions in millimetres



Key

1 fan jet nozzle:
adjustment of the flow – rate between (15 ± 1) l/min to reach a distribution impact force of 0,9 – 1,2 N. Water temperature during verification (20 ± 5) °C.

2 cover plate

3 impact plate 2 mm × 30 mm

4 force sensor

5 distribution forces directions (see also Figure 11)

SIST Preview
(https://ecommerce.sist.si)
IEC 60529:1989/AMD2:2013
https://ecommerce.sist.si/catalog/standards/sist/4b...-60529-1989-amd2-2013

Figure 10 – Set-up for measuring the impact force of the water jet for determining the protection against high pressure and temperature water jet, degree of protection against ingress of water IP X9

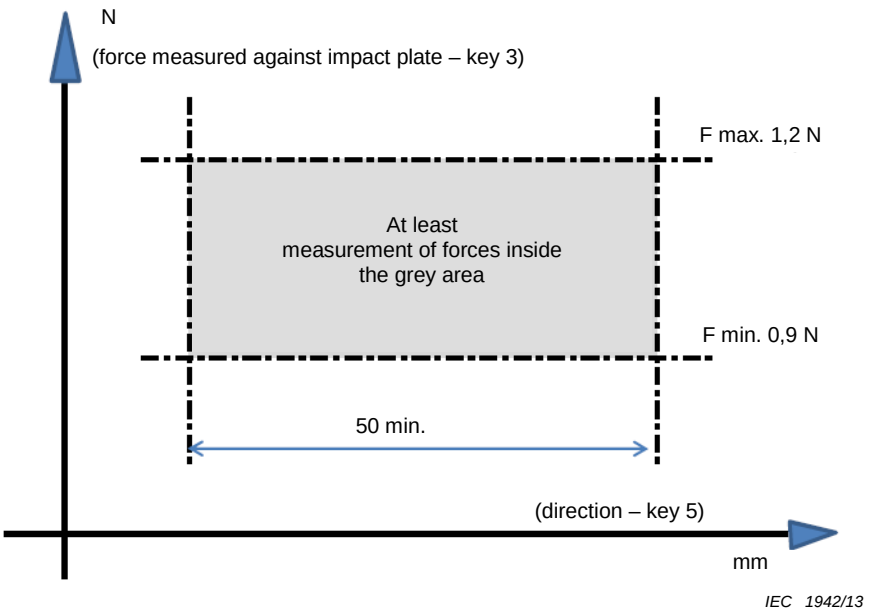


Figure 11 – Impact force distribution