



UL 62841-2-4

STANDARD FOR SAFETY

Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 2-4: Particular Requirements For Hand-Held Sanders And Polishers Other Than Disc Type

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UL Standard for Safety for Hand-Held Motor-Operated Electric Tools – Safety – Part 2-4: Particular Requirements for Sanders and Polishers Other Than Disk Type, UL 62841-2-4

First Edition, Dated November 30, 2015

Summary of Topics

This revision of ANSI/UL 62841-2-4 dated July 15, 2022 is being issued to update the title page to reflect the most recent designation as a Reaffirmed American National Standard (ANS). No technical changes have been made.

This standard is an adoption of IEC UL 62841-2-4, Edition 1, published June 2014. There are no technical national differences for this standard.

As noted in the Commitment for Amendments statement located on the back side of the title page, UL and CSA are committed to updating this harmonized standard jointly. However, the revision pages dated July 15, 2022 will not be jointly issued by UL and CSA as these revision pages only address UL ANSI approval dates.

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

The requirements are substantially in accordance with Proposal(s) on this subject dated May 20, 2022.

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CSA Group
CAN/CSA-C22.2 No. 62841-2-4:15
First Edition
(IEC 62841-2-4:2014, MOD)



Underwriters Laboratories Inc.
UL 62841-2-4
First Edition

Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 2-4: Particular Requirements For Hand-Held Sanders And Polishers Other Than Disc Type

November 30, 2015

(Title Page Reprinted: July 15, 2022)

This national standard is based on publication IEC 62841-2-4, First Edition (2014).



ANSI/UL 62841-2-4-2017 (R2022)



Commitment for Amendments

This standard is issued jointly by the Canadian Standards Association (operating as "CSA Group") and Underwriters Laboratories Inc. (UL). Comments or proposals for revisions on any part of the standard may be submitted to CSA or UL at any time. Revisions to this standard will be made only after processing according to the standards development procedures of CSA and UL. CSA and UL will issue revisions to this standard by means of a new edition or revised or additional pages bearing their date of issue.

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This Standard is subject to review within five years from the date of publication, and suggestions for its improvement will be referred to the appropriate committee. The technical content of IEC and ISO publications is kept under constant review by IEC and ISO. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include "Proposal for change" in the subject line: Standard designation (number); relevant clause, table, and/or figure number; wording of the proposed change; and rationale for the change.

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This ANSI/UL Standard for Safety consists of the First Edition including revisions through July 15, 2022. The most recent designation of ANSI/UL 60745-2-4 as a Reaffirmed American National Standard (ANS) occurred on July 15, 2022. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface. The National Difference Page and IEC Foreword are also excluded from the ANSI approval of IEC-based standards.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at <https://csds.ul.com>.

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Preface

This is the harmonized CSA Group and UL Standard for Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 2-4: Particular Requirements For Hand-Held Sanders And Polishers Other Than Disc Type. It is the First edition of CAN/CSA-C22.2 No. 62841-2-4 and the First edition of UL 62841-2-4. This harmonized Standard has been jointly revised on July 28, 2017. For this purpose, CSA Group and UL are issuing revision pages dated July 28, 2017.

This harmonized standard is based on IEC Publication 62841-2-4: First edition Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 2-4: Particular Requirements For Hand-Held Sanders And Polishers Other Than Disc Type issued 06-2014.

This harmonized standard was prepared by CSA Group and Underwriters Laboratories Inc. (UL). The efforts and support of the International Harmonization Committee (IHC) for the adoption of the IEC series of standards for Hand-Held, Motor-Operated, and Transportable Tools and Lawn and Garden Machinery UL are gratefully acknowledged.

This standard is considered suitable for use for conformity assessment within the stated scope of the standard.

This standard was reviewed by the CSA Subcommittee on Safety of Hand-Held Motor-Operated Electric Tools, under the jurisdiction of the CSA Technical Committee on Consumer and Commercial Products and the CSA Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the CSA Technical Committee.

This standard has been approved as a National Standard of Canada by the Standards Council of Canada (SCC).

Application of Standard

Where reference is made to a specific number of samples to be tested, the specified number is to be considered a minimum quantity.

Note: Although the intended primary application of this standard is stated in its scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.

This CAN/CSA-C22.2 No. 62841-2-4 Standard for Safety for Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 2-4: Particular Requirements For Hand-Held Sanders And Polishers Other Than Disc Type is to be used in conjunction with the First edition of CAN/CSA-C22.2 No. 62841-1. The requirements for hand-held sanders and polishers other than disc type are contained in this Part 2 Standard and CAN/CSA-C22.2 No. 62841-1. Requirements of this Part 2 Standard, where stated, amend the requirements of CAN/CSA-C22.2 No. 62841-1. Where a particular subclause of CAN/CSA-C22.2 No. 62841-1 is not mentioned in CAN/CSA-C22.2 No. 62841-2-4, the CAN/CSA-C22.2 No. 62841-1 subclause applies.

This UL Standard 62841-2-4 Standard for Safety for Standard for Safety for Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 2-4: Particular Requirements For Hand-Held Sanders And Polishers Other Than Disc Type, is to be used in conjunction with the First edition of UL 62841-1. The requirements for hand-held sanders and polishers other than disc type are contained in this Part 2 Standard and UL 62841-1. Requirements of this Part 2 Standard, where stated, amend the requirements of UL 62841-1. Where a particular subclause of UL 62841-1 is not mentioned in UL 62841-2-4, the UL 62841-1 subclause applies.

Level of harmonization

This standard adopts the IEC text with editorial national differences.

This standard is published as an equivalent standard for CSA Group and UL.

An equivalent standard is a standard that is substantially the same in technical content, except as follows: Technical national differences are allowed for codes and governmental regulations as well as those recognized as being in accordance with NAFTA Article 905, for example, because of fundamental climatic, geographical, technological, or infrastructural factors, scientific justification, or the level of protection that the country considers appropriate. Presentation is word for word except for editorial changes.

All national differences from the IEC text are included in the CSA Group and UL versions of the standard. While the technical content is the same in each organization's version, the format and presentation may differ.

Reasons for Differences From IEC

Differences from the IEC are being added in order to address safety and regulatory situations present in the US and Canada.

Interpretations

The interpretation by the standards development organization of an identical or equivalent standard is based on the literal text to determine compliance with the standard in accordance with the procedural rules of the standards development organization. If more than one interpretation of the literal text has been identified, a revision is to be proposed as soon as possible to each of the standards development organizations to more accurately reflect the intent.

IEC Copyright

For CSA Group, the text, figures, and tables of International Electrotechnical Commission Publication IEC 62841-2-4 Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 2-4: Particular Requirements For Hand-Held Sanders And Polishers Other Than Disc Type, copyright 2014, are used in this standard with the consent of the International Electrotechnical Commission. The IEC Foreword is not a part of the requirements of this standard but is included for information purposes only.

These materials are subject to copyright claims of IEC and UL. No part of this publication may be reproduced in any form, including an electronic retrieval system, without the prior written permission of UL. All requests pertaining to the Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 2-4: Particular Requirements For Hand-Held Sanders And Polishers Other Than Disc Type UL 62841-2-4 Standard should be submitted to UL.

NATIONAL DIFFERENCES

National Differences from the text of International Electrotechnical Commission (IEC) Publication 62841-2-4 (Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 2-4: Particular Requirements For Hand-Held Sanders And Polishers Other Than Disc Type) copyright 2014 are indicated by notations (differences) and are presented in bold text. The national difference type is included in the body.

There are five types of National Differences as noted below. The difference type is noted on the first line of the National Difference in the standard. The standard may not include all types of these National Differences.

DR – These are National Differences based on the **national regulatory requirements**.

D1 – These are National Differences which are based on **basic safety principles and requirements**, elimination of which would compromise safety for consumers and users of products.

D2 – These are National Differences from IEC requirements based on existing **safety practices**. These requirements reflect national safety practices, where empirical substantiation (for the IEC or national requirement) is not available or the text has not been included in the IEC standard.

DC – These are National Differences based on the **component standards** and will not be deleted until a particular component standard is harmonized with the IEC component standard.

DE – These are National Differences based on **editorial comments or corrections**.

Each national difference contains a description of what the national difference entails. Typically one of the following words is used to explain how the text of the national difference is to be applied to the base IEC text:

Addition / Add - An addition entails adding a complete new numbered clause, subclause, table, figure, or annex. Addition is not meant to include adding select words to the base IEC text.

Modification / Modify - A modification is an altering of the existing base IEC text such as the addition, replacement or deletion of certain words or the replacement of an entire clause, subclause, table, figure, or annex of the base IEC text.

Deletion / Delete - A deletion entails complete deletion of an entire numbered clause, subclause, table, figure, or annex without any replacement text.

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FOREWORD

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRIC MOTOR-OPERATED HAND-HELD TOOLS, TRANSPORTABLE TOOLS AND LAWN AND GARDEN MACHINERY – SAFETY – PART 2-4: PARTICULAR REQUIREMENTS FOR HAND-HELD SANDERS AND POLISHERS OTHER THAN DISC TYPE

The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.

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4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.

5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.

6) All users should ensure that they have the latest edition of this publication.

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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62841-2-4 has been prepared by IEC technical committee 116: Safety of motor-operated electric tools.

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

FDIS	Report on voting
116/164/FDIS	116/178/RVD

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.

This Part 2-4 is to be used in conjunction with the first edition of IEC 62841-1:2014.

This Part 2-4 supplements or modifies the corresponding clauses in IEC 62841-1, so as to convert it into the IEC Standard: Particular requirements for hand-held sanders and polishers other than disc type.

Where a particular subclause of Part 1 is not mentioned in this Part 2-4, that subclause applies as far as reasonable. Where this standard states "addition", "modification" or "replacement", the relevant text in Part 1 is to be adapted accordingly.

The following print types are used:

- requirements: in roman type
- *test specifications: in italic type;*
- Notes: in smaller roman type

The terms defined in Clause 3 are printed in **bold typeface**.

Subclauses, notes and figures which are additional to those in Part 1 are numbered starting from 101.

A list of all parts of the IEC 62841 series, under the general title: *Electric motor-operated hand-held tools, transportable tools and lawn and garden machinery – Safety*, can be found on the IEC website.

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.

NOTE The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 36 months from the date of publication.

101DV DE Modification: Add the following to the IEC Foreword:

The numbering system in the standard uses a space instead of a comma to indicate thousands and uses a comma instead of a period to indicate a decimal point. For example, 1 000 means 1,000 and 1,01 means 1.01.

102DV DE Modification: Add the following to the IEC Foreword:

For this Standard, all references to “Part 1” refer to CAN/CSA-C22.2 No. 62841-1 and UL 62841-1.

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HAND-HELD MOTOR-OPERATED ELECTRIC TOOLS – SAFETY –

PART 2-4: PARTICULAR REQUIREMENTS FOR SANDERS AND

POLISHERS OTHER THAN DISK TYPE

1 Scope

This clause of Part 1 is applicable, except as follows:

Addition:

This part of IEC 62841 applies to hand-held **sanders** and **polishers** with the exception of disc-type tools covered by IEC 62841-2-3.

Tools covered by this standard include but are not limited to **belt sanders**, **drum sanders** or **polishers**, **reciprocating sanders** or **polishers**, **orbital sanders** or **polishers**, and **random orbit sanders** or **polishers**.

2 Normative references

This clause of Part 1 is applicable.

3 Terms and definitions

This clause of Part 1 is applicable, except as follows:

Addition:

3.101 **sander**: tool intended to remove surface material using an abrasive medium

3.102 **polisher**: tool equipped with a disc or pad intended for polishing

3.103 **belt sander**: **sander** equipped with an endless abrasive belt

3.104 **drum sander or polisher**: **sander** or **polisher** equipped with a rotating cylindrical working surface, oriented either inline or at an angle with the motor axis

Note 1 to entry: **Drum polishers** are also known as burnishing machines.

Note 2 to entry: **Drum sanders** with a drum in line with the axis of the motor are also known as spindle sanders or inline sanders.

3.105 **orbital sander or polisher**: **sander** or **polisher** equipped with a plate, which performs an orbital oscillating motion parallel to the work surface

Note 1 to entry: Orbital sanders or polishers are also known as oscillating sanders or polishers

3.106 **random orbit sander or polisher**: **sander** or **polisher** equipped with a plate positioned eccentrically on the driving spindle which can rotate freely around its axis parallel to the work surface

3.107 **reciprocating sander or polisher**: **sander** or **polisher** equipped with a plate which performs a reciprocating motion parallel to the work surface

4 General requirements

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable, except as follows:

5.17 Addition:

The mass of the tool includes the dust extraction adapter, if any.

6 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

7 Classification

This clause of Part 1 is applicable.

8 Marking and instructions

This clause of Part 1 is applicable, except as follows:

8.3 Addition:

For **belt sanders** and **drum sanders** and **polishers**, the direction of rotation shall be indicated on the tool by an arrow, raised or sunk, or by any other means no less visible and indelible.

8.14.1 Addition:

For **belt sanders** and **drum sanders**, the additional safety instructions as specified in [8.14.1.101](#) shall be given. This part may be printed separately from the "General Power Tool Safety Warnings".

8.14.1.101 Belt sander and drum sander safety warnings

Hold the power tool by insulated gripping surfaces, because the sanding surface may contact its own cord. Cutting a "live" wire may make exposed metal parts of the power tool "live" and could give the operator an electric shock.

9 Protection against access to live parts

This clause of Part 1 is applicable.

10 Starting

This clause of Part 1 is applicable.

11 Input and current

This clause of Part 1 is applicable.

12 Heating

This clause of Part 1 is applicable.

13 Resistance to heat and fire

This clause of Part 1 is applicable.

14 Moisture resistance

This clause of Part 1 is applicable.

15 Resistance to rusting

This clause of Part 1 is applicable.

16 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

17 Endurance

This clause of Part 1 is applicable, except as follows:

17.2 Replacement of the third paragraph, except for **belt sanders** and **drum sanders** and **polishers**:

Orbital sanders and **polishers**, **random orbit sanders** and **polishers**, and **reciprocating sanders** and **polishers** are operated for 24 h at a voltage equal to 1,1 times the highest rated voltage or 1,1 times the upper limit of the rated voltage range, and then for 24 h at a supply voltage equal to 0,9 times the lowest rated voltage or 0,9 times the lower limit of the rated voltage range. The 24 h of operation need not be continuous. If applicable, the tool is adjusted to the maximum attainable speed.

The tools are operated while the platen, fitted with abrasive paper in reverse position or a polishing bonnet as applicable, is resting under the weight of the tool on a steel plate. The abrasive paper should be replaced as required to avoid direct contact between platen and steel plate. These tools are only tested in the upright position where the platen is horizontal.

18 Abnormal operation

This clause of Part 1 is applicable, except as follows:

18.8 [Table 4](#) Replacement.

Table 4
Required performance levels

Type and purpose of SCF	Minimum Performance Level (PL)
Power switch – prevent unwanted switch-on for belt sanders , drum sanders and polishers	b
Power switch – prevent unwanted switch-on for random orbit sanders and polishers	a
Power switch – prevent unwanted switch-on for other sanders and polishers	Not an SCF
Power switch – provide desired switch-off for belt sanders , drum sanders and polishers and random orbit sanders and polishers	b
Power switch – provide desired switch-off for other sanders and polishers	Not a SCF
Provide desired direction of rotation for belt sanders , drum sanders and polishers	a
Any speed limiting device	Not a SCF
Prevent exceeding thermal limits as in Clause 18	a

19 Mechanical hazards

This clause of Part 1 is applicable, except as follows:

19.1 Replacement of the first paragraph:

Moving and dangerous parts other than the abrasive belt and belt rollers of **belt sanders** shall, as far as is compatible with the use and working of the tool, be so positioned or enclosed to provide adequate protection against personal injury. The requirements for the abrasive belt and belt rollers of **belt sanders** are specified in [19.1.101](#), [19.1.102](#) and [19.1.103](#).

19.1.101 **Belt sanders** shall be designed to minimise the risk due to the nip hazard from the roller closest to the operator without limiting the intended functionality of the tool.

Compliance is checked by the following tests 1 and 2.

1) An test rod with 8 mm diameter, applied parallel to the axis of the roller, shall not be able to enter the in-feed nip between the roller and the abrasive belt. As the rod is attempted to be inserted into this area, the abrasive belt shall not be displaced in any way that would allow the entry of the rod. See [Figure 101](#).

2) The abrasive belt is removed. A steel ball with 7 mm diameter is placed all along the infeed gap between the intended belt contact surface of the roller and the belt housing enclosure with the tool turned upside down in the most unfavourable position, see [Figure 102](#). The steel ball shall not move under its own weight into the gap between the roller and the belt housing beyond the line of complete passage as shown in [Figure 102](#).

19.1.102 **Belt sanders** shall be designed to limit access to in-feed nip locations from roller(s) other than those closest to the operator without limiting the intended functionality of the tool.

In-feed nip locations are regarded to be located either

between the intended belt contact surface of the roller and the belt housing enclosure

or

between the intended belt contact surface of the roller and the abrasive belt.

Access shall be limited by either a) or b) as follows:

a) The chain distance between any in-feed nip location and the closest point on a handle or grasping surface identified in accordance with 8.14.2 b) 6) shall be at least 100 mm.

Compliance is checked by measurement.

b) If a stick-type auxiliary handle is mounted to the side with its axis perpendicular to the direction of movement of the abrasive belt, it shall be provided with a flange having a height not less than 12 mm above the grasping surface between the grasping area and the in-feed nip location.

Compliance is checked by inspection and by measurement.

19.1.103 The ends of rollers that extend past the edge of the intended belt contact surface shall be smooth and free of sharp edges.

Compliance is checked by inspection.

19.6 This subclause is not applicable.

20 Mechanical strength

This clause of Part 1 is applicable, except as follows:

20.5 This subclause is not applicable for **sanders** and **polishers** except for **belt sanders** and **drum sanders**.

21 Construction

This clause of Part 1 is applicable, except as follows:

21.18.1 *Addition:*

For **sanders** other than **belt sanders** and **drum sanders**, power switches other than momentary power switches are permitted.

21.30 This subclause is not applicable for **sanders** and **polishers** except for **belt sanders** and **drum sanders**.

21.35 This subclause is applicable for:

- **belt sanders** and **random orbit sanders** with a sanding contact surface exceeding 100 cm²;
- **drum sanders** other than spindle sanders;
- other **sanders**, with a sanding contact surface exceeding 200 cm², unless they are intended to process only metal in accordance with 8.14.2 b) 4).

22 Internal wiring

This clause of Part 1 is applicable.

23 Components

This clause of Part 1 is applicable.

24 Supply connection and external flexible cords

This clause of Part 1 is applicable.

25 Terminals for external conductors

This clause of Part 1 is applicable.

26 Provision for earthing

This clause of Part 1 is applicable.

27 Screws and connections

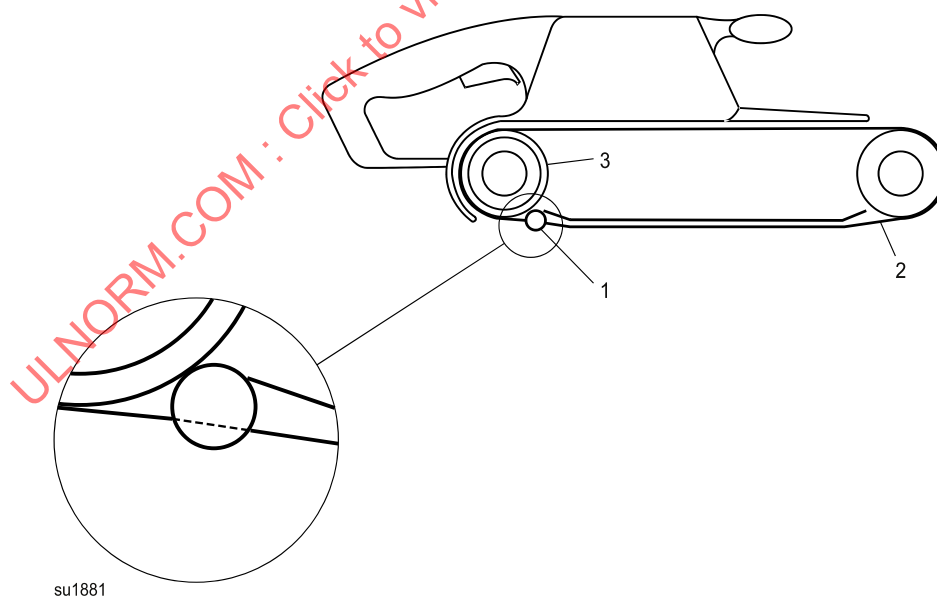
This clause of Part 1 is applicable.

28 Creepage distances, clearances and distances through insulation

This clause of Part 1 is applicable.

Figure 101

Rod test for the in-feed nip between the belt and roller

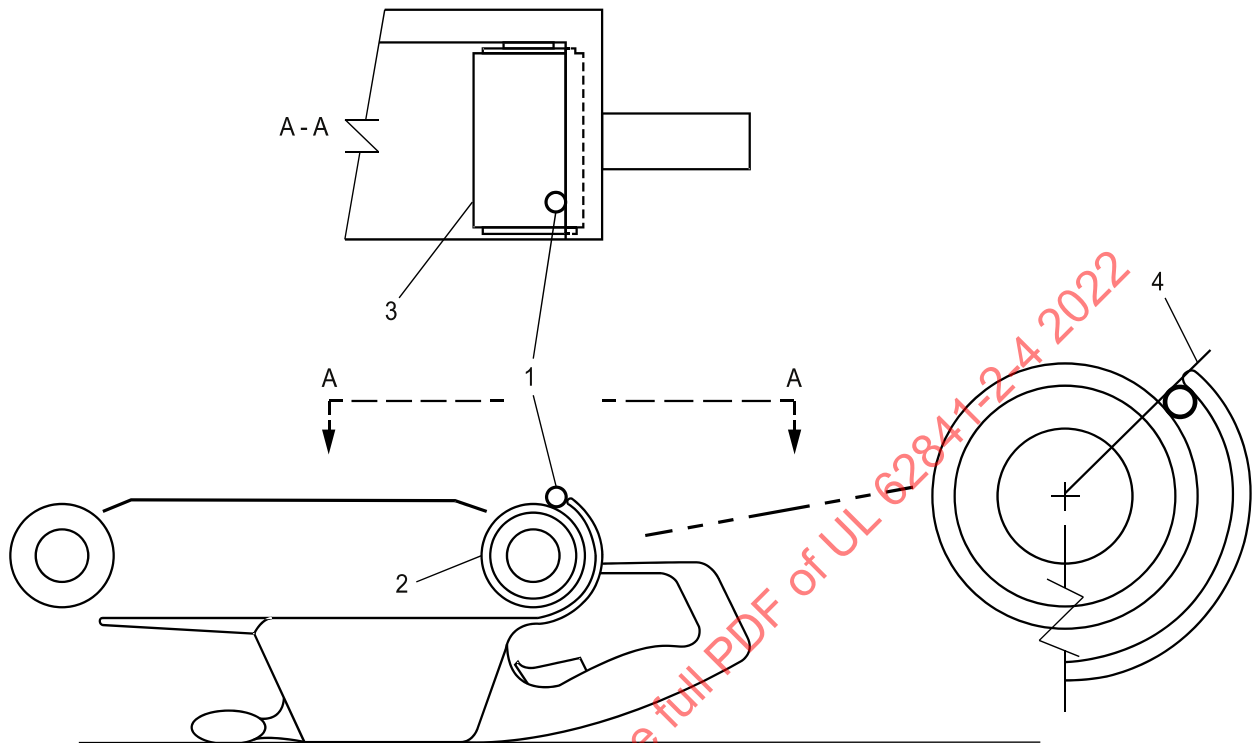


Key

1 rod with 8 mm diameter

2 abrasive belt

3 roller closest to the operator

Figure 102**Steel ball test for the in-feed nip between the belt housing enclosure and roller**

su1882

Key

- 1 steel ball with 7 mm diameter
- 2 roller closest to the operator
- 3 intended belt contact surface of the roller
- 4 line of complete passage

Annexes

The annexes of Part 1 are applicable except as follows.

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