

Graphic technology - Safety requirements for graphic technology equipment and systems - Part 4: Converting equipment and systems (ISO 12643-4:2023)

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>See Eesti standard EVS-EN ISO 12643-4:2023 sisaldab Euroopa standardi EN ISO 12643-4:2023 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 13.12.2023.</p> <p>Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN ISO 12643-4:2023 consists of the English text of the European standard EN ISO 12643-4:2023.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 13.12.2023.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
---	---

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile [standardiosakond@evs.ee](mailto:standardiosakond@evs.ee).

ICS 37.100.10

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele. Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis-ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardimis-ja Akrediteerimiskeskusega: Koduleht [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation and Accreditation. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation and Accreditation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation and Accreditation: Homepage [www.evs.ee](http://www.evs.ee); phone +372 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

English Version

Graphic technology - Safety requirements for graphic technology equipment and systems - Part 4: Converting equipment and systems (ISO 12643-4:2023)

Technologie graphique - Exigences de sécurité pour les systèmes et l'équipement de technologie graphique - Partie 4: Systèmes et équipement de façonnage (ISO 12643-4:2023)

Graphische Technik - Sicherheitsanforderungen an Ausrüstungen und Systeme der graphischen Technik - Teil 4: Ausrüstungen und Systeme der Papierverarbeitung (ISO 12643-4:2023)

This European Standard was approved by CEN on 19 November 2023.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

## European foreword

This document (EN ISO 12643-4:2023) has been prepared by Technical Committee ISO/TC 130 "Graphic technology" in collaboration with Technical Committee CEN/TC 198 "Printing and paper machinery - Safety" the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2024, and conflicting national standards shall be withdrawn at the latest by June 2026.

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

This document supersedes EN 1010-5:2005 and EN 1010-4:2004+A1:2009.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

## Endorsement notice

The text of ISO 12643-4:2023 has been approved by CEN as EN ISO 12643-4:2023 without any modification.

# Contents

Page

Foreword.....	viii
Introduction.....	x
<b>1 Scope.....</b>	<b>1</b>
<b>2 Normative references.....</b>	<b>1</b>
<b>3 Terms and definitions.....</b>	<b>2</b>
<b>4 Significant hazards.....</b>	<b>8</b>
<b>5 Equipment and interrelation between this document and ISO 12643-1:2023.....</b>	<b>8</b>
5.1 General.....	8
5.2 Machines used primarily in a converting operation.....	8
5.3 Machines used in both printing and converting processes.....	8
<b>6 Machinery for the production of corrugated board.....</b>	<b>9</b>
6.1 All machines.....	9
6.1.1 Emergency stop.....	9
6.1.2 Control zones with stop/safe pushbuttons.....	9
6.1.3 Steam pipes.....	10
6.2 Unwinding stations.....	10
6.2.1 General.....	10
6.2.2 Chucking cones and lifting arms.....	10
6.2.3 Braking systems.....	10
6.3 Splicers.....	10
6.3.1 Guarding hazard points.....	10
6.3.2 Dancer roller.....	11
6.3.3 Splicers.....	11
6.3.4 Knife.....	12
6.3.5 Pneumatic and hydraulic control systems.....	12
6.3.6 Frame edges.....	12
6.3.7 Splicers in elevated positions.....	12
6.3.8 Warning lights.....	12
6.4 Preheater.....	12
6.4.1 In-running nips.....	12
6.4.2 In-running nips between preheating cylinder and cross beams.....	13
6.4.3 Wrap roller and rotating arms.....	13
6.4.4 Hot surfaces.....	14
6.4.5 Walkways.....	14
6.5 Single facer.....	14
6.5.1 In-running nips.....	14
6.5.2 Corrugating rollers.....	15
6.5.3 Hazard points during roller change.....	15
6.5.4 In-running nip between pressure roller or pressing belt and corrugating roller.....	15
6.5.5 Pressing belt breakage.....	16
6.5.6 Walkway.....	16
6.5.7 In-running nips between glue rollers.....	16
6.5.8 Hazard points between movable gluing unit and fixed machine parts.....	17
6.5.9 Moveable glue units.....	17
6.5.10 Inclined belt conveyor.....	18
6.5.11 In-running nips between pulleys and fixed machine parts.....	19
6.5.12 Steam pipes.....	19
6.5.13 Warning signs.....	19
6.5.14 Noise enclosures.....	19
6.6 Bridge.....	19
6.6.1 Slots.....	19

6.6.2	Fall-off protection.....	19
6.6.3	Access stairs.....	19
6.6.4	Passage height underneath the bridge.....	20
6.7	Braking and web aligning systems.....	20
6.8	Gluing machine.....	20
6.8.1	Steps and handles.....	20
6.8.2	Hazard points.....	20
6.8.3	Pressing device.....	20
6.9	Heating and pulling section.....	20
6.9.1	In-running nips.....	20
6.9.2	Hazard points.....	21
6.9.3	Heating plates.....	21
6.9.4	Preventing the weighting device from falling.....	21
6.9.5	Web threading in the heating section.....	21
6.10	Transition point from gluing machine to heating and pulling section.....	23
6.11	Rotary shear unit.....	23
6.11.1	Rotary shear.....	23
6.11.2	Knife driving shaft.....	23
6.11.3	Guarding a non-powered movement of the rotary shear.....	23
6.11.4	Waste removal.....	23
6.12	Pulling unit.....	23
6.13	Slitter-scorer units.....	24
6.13.1	Automatic positioning.....	24
6.13.2	Movement of slitting and scoring units under hold-to-run control.....	24
6.14	Web diverter.....	24
6.15	Cut-off.....	25
6.16	Stacker devices.....	25
6.16.1	Whole-body access.....	25
6.16.2	Guarding of downstackers.....	26
6.16.3	Maintenance and inspection.....	28
6.16.4	Guarding of upstackers.....	29
6.16.5	Roller conveyors.....	30
<b>7</b>	<b>Folder gluer machines.....</b>	<b>30</b>
7.1	Entire machine.....	30
7.1.1	Emergency stop.....	30
7.1.2	Power-driven shafts.....	30
7.1.3	Power-driven format setting.....	30
7.1.4	Reaching of hazard points between format-limiting parts.....	31
7.2	Feeder.....	31
7.3	Folding section.....	31
7.3.1	Roller tracks.....	31
7.3.2	Folding hooks.....	32
7.4	Gluing section.....	33
7.5	Folding belts.....	33
7.6	Pressure rollers.....	34
7.6.1	In-running nips between pressure rollers in the area between machine frame and format-limiting parts.....	34
7.6.2	In-running nips between pressure rollers in the area between format-limiting parts.....	34
7.7	Ejection module.....	35
7.8	Pressing and gathering device (pressing band).....	35
7.8.1	Pulleys.....	35
7.8.2	Pressure rollers.....	35
<b>8</b>	<b>Pre-feeders.....</b>	<b>36</b>
8.1	Feeding and transfer bridge.....	36
8.2	All pre-feeders with pile carrier plate.....	36
8.2.1	Opening for pallet movement.....	36

8.2.2	Guarding on feeding and transfer bridges .....	37
8.2.3	Rotating shafts .....	37
8.2.4	Guarding hazards created by automatic format setting .....	37
8.2.5	Guarding hazards when moving pre-feeder .....	37
8.3	Pre-feeder with pile turner .....	37
8.3.1	Opening for pallet movement .....	37
8.3.2	Guarding on feeding and transfer bridge .....	38
8.3.3	Guarding transport belts .....	38
8.3.4	Guarding hazards created by automatic format setting .....	38
8.3.5	Guarding hazards when moving pre-feeder .....	38
<b>9</b>	<b>In-line machines .....</b>	<b>40</b>
9.1	Entire machine .....	40
9.1.1	Moving units together .....	40
9.1.2	Separating units .....	41
9.1.3	Rotary tools on separated units .....	41
9.1.4	Travel wheels .....	41
9.2	Feeding unit .....	41
9.2.1	Slide-in rollers .....	41
9.2.2	Side aligning devices .....	41
9.2.3	Hopper side lays .....	41
9.2.4	Feed rollers .....	41
9.3	Printing unit .....	42
9.3.1	Rotating rollers and drive elements .....	42
9.3.2	Separated units .....	42
9.3.3	Guarding of rollers .....	43
9.4	Slitter-scorer unit, rotary die-cutter .....	43
9.4.1	Automatic format setting .....	43
9.4.2	Waste removal .....	43
9.4.3	Waste discharge conveyor belts .....	43
9.5	Separators .....	44
9.6	Folding unit (folding box gluer) .....	44
9.7	Taping unit .....	44
9.8	Stitching unit .....	44
<b>10</b>	<b>Automatic flatbed die-cutting machines .....</b>	<b>44</b>
10.1	Entire machine .....	44
10.1.1	Tool .....	44
10.1.2	Automatic die-cutting devices .....	44
10.2	Punching section .....	45
10.2.1	Hazard points between sheet feeding grippers and feeding table .....	45
10.2.2	Die-cutting tools .....	45
10.3	Breaking section .....	45
10.4	Blank separating section, blank delivery .....	45
10.4.1	Guarding sheet gripper from unintentional hand access .....	45
10.4.2	Area below blank separating section, blank delivery .....	45
10.5	Trimming and delivery of gripper edge .....	54
<b>11</b>	<b>Roller press die-cutters .....</b>	<b>54</b>
<b>12</b>	<b>Tube winding machines .....</b>	<b>54</b>
12.1	Ply reels .....	54
12.2	In-running nip between winding belt and winding mandrel .....	54
12.3	In-running nips on shaft bearings .....	56
12.4	In-running nips .....	56
12.5	Tube cutting and sawing section .....	57
12.6	Tube transfer .....	57
<b>13</b>	<b>Machinery for the production of envelopes .....</b>	<b>57</b>
13.1	Emergency stop device .....	57
13.2	Interlocks .....	57

13.2.1	Interlocking with guard locking.....	57
13.2.2	Requirements regarding the unlocking of interlocking guards with guard locking.....	58
13.3	Printing unit guarding.....	58
13.4	Form cutting section.....	59
13.5	Driven guide rollers.....	59
13.5.1	Guarding in-running nips.....	59
13.5.2	Delivery side guards.....	59
13.6	Window cutting section.....	59
13.7	Scraper gluing unit.....	59
13.8	Separating cutting section.....	59
13.9	Bottom flap folding section.....	59
13.10	Transport rolls.....	60
13.11	Staggering wheel.....	60
13.11.1	Guarding staggering wheel hazards.....	60
13.11.2	Guarding in-running nips between paper guide supports and staggering wheel.....	60
13.12	Roller gluing unit.....	60
13.12.1	Guarding in-running nips.....	60
13.12.2	Feeding aperture.....	60
13.13	Separation roller before aligner section.....	61
13.14	Seal flap folding section.....	62
13.15	Separating disc delivery.....	62
13.16	Starting the machine with interlocking guards open.....	62
<b>14</b>	<b>Handkerchief machines.....</b>	<b>63</b>
14.1	Emergency stop devices.....	63
14.2	Starting the machine with interlocking guards open.....	63
14.3	Star-type unwinding (Turret unwinding).....	63
14.4	Longitudinal folding section.....	64
14.5	Product inspection station.....	64
14.6	Ejection.....	64
14.7	Packing station.....	64
<b>15</b>	<b>Noise.....</b>	<b>64</b>
<b>16</b>	<b>Verification of the safety requirements and/or protective/risk reduction measures.....</b>	<b>64</b>
<b>17</b>	<b>Instruction handbook.....</b>	<b>70</b>
17.1	General.....	70
17.2	Corrugated board machinery.....	70
17.2.1	Threading paper web.....	70
17.2.2	Residual risks relating to hot parts.....	70
17.2.3	Hearing protection.....	70
17.2.4	Tubes used for material reels.....	70
17.2.5	Residual risks on conveyor belts.....	70
17.2.6	Warning for hot surfaces.....	70
17.2.7	Instructions for use of personal protection equipment when changing knives.....	70
17.2.8	Instructions for mechanical device on downstackers and upstackers.....	70
17.2.9	In-line machines.....	71
17.2.10	Instructions for personal protection equipment when working with hot surfaces.....	71
17.3	Folding box gluers.....	71
17.4	Machines for the production of envelopes.....	71
17.4.1	General.....	71
17.4.2	Dosing and ductor rollers.....	71
17.5	Machines for the production of handkerchiefs.....	71
17.5.1	Fault-finding and trouble-shooting by means of stroboscopes.....	71
17.5.2	Hot parts.....	71



17.6	Noise .....	72
<b>Annex A</b>	<b>(informative) List of significant hazards .....</b>	<b>73</b>
<b>Annex B</b>	<b>(informative) Example of a noise declaration for a paper converting machine according to the specifications of EN 13023:2003+A1:2010, ISO 12643-1:2023 and this document .....</b>	<b>78</b>
<b>Bibliography</b> .....		<b>79</b>

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 130, *Graphic technology*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 198, *Printing and paper machinery — Safety*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 12643-4:2010), which has been technically revised.

The main changes are as follows:

- in [Clause 3](#), terms and definitions, in particular concerning corrugated board machinery, have been added;
- a new [Clause 4](#) has been added and subsequent clauses have been renumbered;
- throughout the document, requirements related to hazards dealt with in ISO 12643-1:2023 have been deleted (e.g. Safeguarding automatic reel loading in [6.2](#));
- in [Clause 6](#), the requirements for machinery for the production of corrugated board, e.g. terminological amendments, has been revised;
- [Figure 14](#) has been updated;
- in [6.3.3](#), the description of measures to safeguard the movable splicer module have been revised;
- in [6.8.2](#), an exception to the continued running of glue rollers in the gluing unit in case of an emergency stop has been added;
- in [6.16.1](#), limitation of the speed of the conveyor belt to 45 m/min, if access is required for production reasons, has been specified;

- [Clause 7](#) has been revised;
- in [Clause 8](#), the requirement to safeguard entry into the pile carrier plate with ESPDs has been amended;
- in [9.2.4](#), requirement for residual pile monitoring as safety device set to PL d / SIL 2, and a figure showing the safeguarding of hazard points outside the sidelays on feeders has been added;
- in [Clause 10](#), requirements on safeguarding the delivery on automatic flatbed die-cutting machines (sheet gripper system, analog ISO 12643-2:2023) have been added;
- in [Clause 13](#), a subclause on requirements for interlocks has been added;
- [Clause 14](#), which is also applicable to machinery for the production of interfolded facial tissues, has been added (taken and adapted from EN 1010-5);
- a new [Clause 15](#) has been added;
- in [Clause 16](#), a table on the verification of the safety requirements and/or protective/risk reduction measures has been added;
- a new [Annex A](#) with a list of significant hazards has been added;
- in [Annex B](#), an example of noise declaration for paper converting machines has been added.

This document is intended to be used in conjunction with ISO 12643-1:2023.

A list of all parts in the ISO 12643 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

This document is a type-C standard as stated in ISO 12100:2010.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e. g. trade unions, organizations for people with special needs);
- service providers, e. g. for maintenance (small, medium and large enterprises);
- consumers (in the case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

The purpose of this document is to reduce the risk of injury to operating personnel working on converting equipment.

During the development of this document, existing relevant standards of other countries were taken into consideration. In cases where it was known that there is a national requirement that differs from this document, that has been noted.

This document was developed to harmonize the following US and European safety standards:

- ANSI/PMMI B155.1<sup>[8]</sup>
- EN 1010 4<sup>[9]</sup>
- EN 1010-5<sup>[10]</sup>

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

The full set of requirements for graphic technology equipment and systems are those given in the part of ISO 12643 applicable to that type, together with the relevant requirements from ISO 12643-1:2023, to the extent specified in the Scope of the applicable part of ISO 12643.

This document supplements and modifies the general requirements of ISO 12643-1:2023. Where a requirement of this document conflicts with a requirement of ISO 12643-1:2023 the requirement of this document will take precedence.

# Graphic technology — Safety requirements for graphic technology equipment and systems —

## Part 4: Converting equipment and systems

### 1 Scope

This document deals with all significant hazards, hazardous situations or hazardous events relevant to converting equipment and systems used in the corrugated board, package printing, converting and graphic technology industries (see [Clause 5](#)), when it is used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer.

This document is applicable to converting equipment not covered by other parts of ISO 12643.

This document is not applicable to the machinery or machinery components manufactured before the date of its publication.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 12643-1:2023, *Graphic technology — Safety requirements for graphic technology equipment and systems — Part 1: General requirements*

ISO 13849-1:2023, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 13850:2015, *Safety of machinery — Emergency stop function — Principles for design*

ISO 13854:2017, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

ISO 13855:2010, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body*

ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

ISO 14119:2013, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

ISO 14122-3:2016, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails*

IEC 60529:1989+AMD1:1999, *Degrees of protection provided by enclosures (IP code)*

IEC 61496-1:2020, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests*

IEC 61496-2:2020, *Safety of machinery — Electro-sensitive protective equipment — Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs)*

IEC 62061:2021, *Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100:2010, ISO 12643-1:2023 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

#### 3.1 access height

<automatic flatbed die-cutting machine delivery zone> dimension of the maximum opening into the area below the sheet gripper, measured between the access level and the lower edge of fixed machine parts

Note 1 to entry: Examples for the access level are floor, fixed platform or footboard.

Note 2 to entry: Examples for fixed machine parts are fixed guard, fixed cover or fixed parts such as a sheet stop.

Note 3 to entry: See [Figure 27](#).

#### 3.2 bridge

transport system positioned in an upper level (e.g. above the single facer, splicer or gluing unit) serving as storage facility

Note 1 to entry: The inclined belt conveyor feeds the single faced corrugated board to the bridge where it is deposited in loops and subsequently fed to the following machines

#### 3.3 corrugating machine corrugated board machinery

machinery which produces board consisting of one or more layers of fluted paper glued to one or more layers of flat paper or board and which produces the fluted web to be glued in-line by means of two corrugating rollers

Note 1 to entry: An example of a corrugating machine is shown in [Figure 1](#).