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

Part 1: General requirements

Technologie graphique — Exigences de sécurité pour les systèmes et l'équipement de technologie graphique —

Partie 1: Exigences générales

Reference number
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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).

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. ISO shall not be held responsible for identifying any or all such patent rights.

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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.

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 third edition cancels and replaces the second edition (ISO 12643-1:2009), which has been technically revised.

The main changes compared to the previous edition are as follows:

— in 5.3.2, the requirements for guards (fixed guards with hinges, inclusion of examples of fastening devices, e.g. rotary clamping closures, adaptation to ISO 13857:2019) have been revised;

— former 6.5.5 (interlocking with guard locking) has been deleted (related machine-specific requirements are provided in the subsequent parts of ISO 12643 series);

— in 5.3.6, the requirements for hold-to-run controls have been revised;

— in 5.3.8, the requirements for reel unwinding devices, rewinding devices and reel transport systems have been revised (monitoring of the chucking cones, adaptation of the requirements to smaller machinery, monitoring of the circumferential speed with regard to overwinding, area protection, protective devices at rewinding devices with manual or automatic reel change);

— in 5.3.10, the requirements for pile carrier movements at feeders and deliveries have been revised;

— in 5.4.2, the requirements for explosion and fire protection have been revised;

— in 5.4.8.2, the requirements for UV radiation to the cited EN 12198-1:2000 have been adapted: no distinction between UVA and UVB/UVC anymore, reference to effective UV radiation;

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— a new subclause (5.4.10) about doctor blades has been added;

— in 5.7.2, information that touch sensitive control devices shall not be used for initiating safety functions has been clarified;

— in 5.7.2.3, colours for controls have been adapted;

— in 5.7.2.5.1.2, the comprehensive requirements for emergency stop devices have been replaced by reference to IEC 60204-1:2016/AMD 1:2021 and ISO 13850:2015 (references to safety functions of IEC 61800-5-2, e.g. STO);

— in 5.7.6, the requirements of ESPDs to IEC 61496-1:2020 and IEC 61496-2:2020 has been adapted; likewise, the heights of the light beams for a 3-beam solution have been adapted;

— in 5.8, the requirements to fixed and portable control station have been adapted;

— in 5.10, the requirements for control systems has been revised:

  — the term "irreversible injuries" has been introduced;

  — an overview table of the performance levels defined in the document has been inserted;

— in Clause 6, detailed listings of the validation methods for all safeguarding measures has been added;

— in 8.3.1, the requirements for instruction handbook with regard to noise emission values and hearing protection have been amended;

— Annex A has been revised and has been converted to a normative annex;

— the list of significant hazards has been moved to Annex B;

— the noise comparison values in Annex D has been added;

— a normative Annex F on occurrence of a hazardous explosive atmosphere has been added;

— an informative Annex G on the relationship between protection zones against explosion and equipment to be used has been added.

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.

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Introduction

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

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 organisations, 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 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 and in Clause 5 of this document.

When requirements of this type-C standard are different from those which are stated in type-A or 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.

This document was developed to harmonize the requirements of the following U.S. and European safety standards:

— EN 1010-1:2004+A1:2010;

— EN 1010-2:2006+A1:2010;

— EN 1010-3:2002+A1:2009;

— EN 1010-4:2004+A1:2009;

— EN 1010-5:2005;

— ANSI B65-1:2011;

— ANSI B65-2:2011;

— ANSI B65-3:2011;

— ANSI B65-5:2011.

Requirements specific to prepress and press equipment and systems, binding and finishing equipment and systems, converting equipment and systems, corrugated board manufacturing equipment and systems and stand-alone platen presses that are not included in this document, are given in subsequent parts of ISO 12643 that contain additional requirements specific to that type of equipment.

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

Part 1: General requirements

1 Scope

This document provides safety specifications for the design and construction of new equipment used in prepress systems, printing press systems, binding and finishing systems, converting systems, corrugated board manufacturing systems and stand-alone platen presses. It is applicable to equipment used in stand-alone mode, or in combination with other machines, including ancillary equipment, in which all the machine actuators (e.g. drives) of the equipment are controlled by the same control system.

The requirements given in this document are applicable to the equipment covered by ISO 12643 (all parts), unless otherwise noted. This document is intended to be used in conjunction with the applicable part of ISO 12643 that contains additional requirements specific to a particular type of equipment.

This document addresses recognized significant hazards specific to equipment and systems in the following areas:

— mechanical;

— electrical;

— slipping, tripping, falling;

— ergonomics;

— noise;

— UV and laser radiation;

— fire and explosion;

— thermal;

— substances and material used for processing;

— failure, malfunction of control system;

— other types of emissions [e.g. ozone, ink mist, volatile organic compounds (VOCs), etc.].

This document is not applicable to:

— equipment manufactured before the date of its publication;

— ordinary office equipment for digital printing and paper processing, such as digital printers, copiers, sorters, binders and staplers, which is intended for use outside the printing and paper industry;

— winder-slitters and sheeters in paper finishing (sheeters with unwinders);

— office-type collating machines equipped with friction feeders;

— mail processing machines;

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— machines used for filling packages (such as machines for shaping, filling, and closing the package); and

— textile printing presses.

The safety principles established in this document can also be applicable to the design of equipment within areas of technology that are not specified in ISO 12643 (all parts).

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 3691-4:2020, *Industrial trucks — Safety requirements and verification — Part 4: Driverless industrial trucks and their systems*

ISO 3864-1:2011, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings*

ISO 3864-2:2016, *Graphical symbols — Safety colours and safety signs — Part 2: Design principles for product safety labels*

ISO 3864-3:2012, *Graphical symbols — Safety colours and safety signs — Part 3: Design principles for graphical symbols for use in safety signs*

ISO 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 4414:2010, *Pneumatic fluid power — General rules and safety requirements for systems and their components*

ISO 7010:2019, *Graphical symbols — Safety colours and safety signs — Registered safety signs*

ISO 7731:2003, *Ergonomics — Danger signals for public and work areas — Auditory danger signals*

ISO 11553-1:2020, *Safety of machinery — Laser processing machines — Part 1: Laser safety requirements*

ISO/TR 11688-1:1995, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning*

ISO 11689:1996, *Acoustics — Procedure for the comparison of noise-emission data for machinery and equipment*

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

ISO 13732-1:2006, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces*

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

ISO 13849-2:2012, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation*

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

ISO 13851:2019, *Safety of machinery — Two-hand control devices — Principles for design and selection*

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*

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ISO 13856-1:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 1: General principles for design and testing of pressure-sensitive mats and pressure-sensitive floors*

ISO 13856-2:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 2: General principles for design and testing of pressure-sensitive edges and pressure-sensitive bars*

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 14120:2015, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

ISO 14122-1:2016, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of fixed means and general requirements of access*

ISO 14122-2:2016, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways*

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

ISO 14122-4:2016, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders*

ISO 19353:2019, *Safety of machinery — Fire prevention and fire protection*

IEC 60079-0:2017, *Explosive atmospheres — Part 0: Equipment — General requirements*

IEC 60079-1:2014, *Explosive atmospheres — Part 1: Equipment protection by flameproof enclosures "d"*

IEC 60079-2:2014, *Explosive atmospheres — Part 2: Equipment protection by pressurized enclosure "p"*

IEC 60079-5:2015+AMD1:2022, *Explosive atmospheres — Part 5: Equipment protection by powder filling "q"*

IEC 60079-6:2015+AMD1:2020, *Explosive atmospheres — Part 6: Equipment protection by liquid immersion "o"*

IEC 60079-7:2015+AMD1:2017, *Explosive atmospheres — Part 7: Equipment protection by increased safety "e"*

IEC 60079-10-1:2020, *Explosive atmospheres — Part 10-1: Classification of areas — Explosive gas atmospheres*

IEC 60079-10-2:2015, *Explosive atmospheres — Part 10-2: Classification of areas — Combustible dust atmospheres*

IEC 60079-11:2011, *Explosive atmospheres — Part 11: Equipment protection by intrinsic safety "i"*

IEC 60079-13:2017, *Explosive atmospheres — Part 13: Equipment protection by pressurized room "p" and artificially ventilated room "v"*

IEC 60079-14:2013, *Explosive atmospheres — Part 14: Electrical installations design, selection and erection*

IEC 60079-15:2017, *Explosive atmospheres — Part 15: Equipment protection by type of protection "n"*

IEC 60079-18:2014+AMD1:2017, *Explosive atmospheres — Part 18: protection by encapsulation "m"*

IEC 60079-25:2020, *Explosive atmospheres — Part 25: Intrinsically safe electrical systems*

IEC 60079-26:2021, *Explosive atmospheres — Part 26: Equipment with Equipment Protection Level (EPL) Ga*

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IEC 60079-28:2015, *Explosive atmospheres — Part 28: Protection of equipment and transmission systems using optical radiation*

IEC 60079-31:2022, *Explosive atmospheres — Part 31: Equipment dust ignition protection by enclosure "t"*

IEC 60079-33:2012, *Explosive atmospheres — Part 33: Equipment protection by special protection 's'*

IEC 60204-1:2016+AMD1:2021, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60825-1:2014, *Safety of laser products — Part 1: Equipment classification and requirements*

IEC 60947-2:2016+COR1:2016+A1:2019, *Low-voltage switchgear and controlgear — Part 2: Circuit-breakers*

IEC 60947-3:2020, *Low-voltage switchgear and controlgear — Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*

IEC 60947-5-1:2016+COR1:2016, *Low-voltage switchgear and controlgear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices*

IEC 60947-5-3:2013, *Low-voltage switchgear and controlgear — Part 5-3: Control circuit devices and switching elements — Requirements for proximity devices with defined behaviour under fault conditions (PDDB)*

IEC 61010-1:2010+COR:2011+A1:2016, modified+A1:2016/COR1:2019, *Safety requirements for electrical equipment for measurement, control, and laboratory use — Part 1: General requirements*

IEC 61310-1:2007, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals*

IEC 61310-2:2007, *Safety of machinery — Indication, marking and actuation — Part 2: Requirements for marking*

IEC 61310-3:2007, *Safety of machinery — Indication, marking and actuation — Part 3: Requirements for the location and operation of actuators*

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*

ISO 80079-36:2016, *Explosive atmospheres — Part 36: Non-electrical equipment for explosive atmospheres — Basic method and requirements*

ISO 80079-37:2016, *Explosive atmospheres — Part 37: Non-electrical equipment for explosive atmospheres — Non-electrical type of protection constructional safety ''c'', control of ignition sources ''b'', liquid immersion ''k''*

EN 1127-1:2019, *Explosive atmospheres — Explosion prevention and protection — Part 1: Basic concepts and methodology*

EN 12198-1:2000+A1:2008, *Safety of machinery — Assessment and reduction of risks arising from radiation emitted by machinery — Part 1: General principles*

EN 13023:2003+A1:2010, *Noise measurement methods for printing, paper converting, paper making machines and auxiliary equipment — Accuracy grades 2 and 3*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13849-1:2023, ISO 12100:2010 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 http://www.electropedia.org/

3.1
actuator
part of a device to which an external action is to be applied

Note 1 to entry: The actuator can take the form of a handle, knob, pushbutton, roller, plunger, trip wire, pressure-sensitive mat, etc.

Note 2 to entry: There are some actuating means that do not require an external actuating force, but only an action; e.g. light beams. Such actuating means are not considered to be actuators.

Note 3 to entry: See also the definition for *machine actuator* (3.35).

3.2
armed condition
machine status in which machine motion can be automatically initiated

Note 1 to entry: *Zero speed* (3.87) is considered to be an armed condition.

3.3
audible alarm
horn, bell or other distinctive audible warning device that sounds to indicate impending machine motion

3.4
auxiliary device
mechanism or machine, either built-in or attached, used for the production process

Note 1 to entry: Examples for auxiliary devices are:

— continuous flow drying devices,

— pre-melter on a binder,

— gluers,

— perforating units,

— die cutters,

— numbering devices,

— imprinters,

— registration systems,

— prefolder,

— prefeeder,

— breakers (i.e. blank sheet separator), etc.

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3.5
barrier guard
guard (3.24) that reduces or prevents physical access to a hazard zone by closing off access to an area containing one or more hazards

EXAMPLE A perimeter fence or tunnel guard.

3.6
binding and finishing system
combination of machines functioning in an integrated configuration to turn an incomplete printed product into a finished product by means of one or more processes, such as cutting, folding, binding, stitching, gluing, wrapping, etc.

3.7
bypass
temporary, time-limited suppression of one or more *safety functions* (3.64) through the use of safety-relevant parts of a control system

3.8
chucking cones
rotating parts of shaftless winding and unwinding devices, which are inserted into the ends of the core of the roll and enable the winding or unwinding of the roll of material

3.9
contact/pressure roller
<reel rewinding devices**>** driven or non-driven roller that is in contact with the material reel and is used to guide and ensure the winding hardness of the flat web that is to be rewound

3.10
continuous run
machine motion at a sustained speed until changed by the operator

3.11
control station
assembly of one or more control actuators that initiates or stops machine movement or potential of machine movement [torque at *zero speed* (3.87)], or places the machine in the *armed condition* (3.2)

3.12
control zone
control configuration of single or multiple machine motions using the same control devices

3.13
doctor blade
blade that wipes the excess (surface) ink from a gravure cylinder or anilox roller before printing or the excess coating from a cylinder during finishing operations

[SOURCE: ISO 12637-3:2009, 32]

3.14
drive
mechanism, divided into the following two general categories, which causes a machine or any of its elements to move:

— drives with no stored energy, such as direct-motor drives;

— drives having stored energy, such as motor-flywheel-clutch drives and hydraulic-pneumatic drives

3.15
electrical hazard
source of potential injury or death from electric shock or burn

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3.16
electro-sensitive protective device
ESPD
assembly of devices and/or components working together for protective tripping or presence-sensing purposes (person, part of person, object) using non-contact detection means

Note 1 to entry: Light curtain, light beam, ultrasonic proximity sensor, vision-based protective devices, scanner, etc.

3.17
emergency stop command
change of signal state, the direct result of actuation of an *emergency stop device* (3.18)

3.18
emergency stop device
manually actuated control device used to initiate an *emergency stop function* (3.19)

[SOURCE: ISO 13850:2015, 3.3]

3.19
emergency stop function
safety function (3.64) initiated by a mechanism actuated by a single human motion and intended to halt machine activity in order to avoid injury to persons, damage to machinery or damage to work in progress

3.20
emergency stop pushbutton
emergency stop device (3.18) comprising an extended mushroom-head or palm-type actuator, positive opening contact element(s) and an engagement or latching-in feature

3.21
explosive atmosphere
mixture with air, under atmospheric conditions, of *combustible* (3.89) substances in the form of gas, vapour, or dust which, after ignition, permits self-sustaining propagation

[SOURCE: IEC 60079-0:2017, 3.38, modified — “flammable” substituted by “combustible”.]

3.22
exposing device
machinery used for creating images by exposing photo-sensitive material such as printing plates or printing formes

3.23
fixed guard
guard (3.24) that is securely affixed by fasteners that require a tool(s) to remove in order to gain access to an area with a *significant hazard* (3.68)

3.24
guard
physical barrier that restricts access to a *significant hazard* (3.68)

3.25
hazardous area
<explosive atmospheres> area in which an *explosive atmosphere* (3.21) is present, or can be expected to be present, in quantities such that special precautions for the construction, installation and use of equipment are required

Note 1 to entry: IEC 60079-10-1:2020 gives a classification of hazardous areas containing explosive gas atmospheres.

Note 2 to entry: IEC 60079-10-2:2015 gives a classification of hazardous areas containing explosive dust atmospheres.

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Note 3 to entry: For the purposes of this document, an area is a three-dimensional region or space.

[SOURCE: IEC 60079-0:2017, 3.2, modified — Note 3 to entry has been added.]

3.26
hazard point
location of a hazard on a machine where a person can be injured

3.27
hazard zone
any area within and/or around machinery in which a person is exposed to risk of injury or damage to health

[SOURCE: ISO 12100:2010, 3.11, modified — "exposed to a hazard" has been substituted by "exposed to risk of injury or damage to health".]

3.28
hold-to-run control
control that starts and maintains machine motion only as long as the control is activated

Note 1 to entry: Hold-to-run control, in some countries, is known as inching/jogging (not necessarily related to measurement).

3.29
inch
jog
<operation of machinery> machine motion requiring maintained activation engagement of a *hold-to-run control* (3.28) and which will continue, until the control is released, at a limited maximum operating speed or until a pre-determined displacement has been reached

3.30
infrequently used working area
area in which an activity is carried out, such as observation, *make-ready* (3.38), jam clearing, minor servicing, crossing inserting hoppers or conveyer belts, etc., that is routine, repetitive, integral to (but not necessarily during) production, and is done only on an occasional basis

3.31
irreversible injury
injury leading to severe permanent health damage or at least 6 months functional impairment

[SOURCE: Decision 2010/15/EU[62]]

3.32
disabling injury
injury leading to loss of limbs or death or disability >10 %

[SOURCE: Decision 2010/15/EU[62]]

3.33
in-running nip
in-going nip
area created either by two rotating components that are rotating inward, or by one component rotating toward an adjacent surface

Note 1 to entry: See Figure 4 for examples of in-running nips.

3.34
interlock
⟨for safeguarding⟩ arrangement that interconnects guard(s) or device(s) with the control system and/or all or part of the electrical energy distributed to the machine

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3.35
machine actuator
power mechanism of the machine used to effect motion (for example, motor, solenoid, pneumatic or hydraulic cylinder)

[SOURCE: IEC 60204-1:2016+AMD1:2021, 3.1.39]

3.36
maintained-contact control
control that remains in an open or closed state after its activation

3.37
maintenance
operation required to ensure that the machine remains in acceptable operating condition and that is usually performed when the machine is not available for production

Note 1 to entry: Maintenance (for example, repairing or replacing broken, worn or damaged parts; performing lubrication; preventive servicing) is performed by qualified maintenance personnel, or operators, who have been trained about the types of hazards in the area in which their tasks are to be performed and about how these hazards can be avoided. Such maintenance is performed with energy isolated, when possible.

3.38
make-ready
task preceding a production run, such as adjusting ink controls for proper colour, plate alignment for proper registration, adjusting pressures, measurement with quality control devices, etc.

3.39
manual control device
mechanism comprising part of the actuating system to which a manual action is applied

3.40
manually fed
feeding of material where substrate is placed into and/or removed from the machine by hand

3.41
mechanical hazard
hazard that could result in injury to a person created by motion of machinery, components or material

EXAMPLE Crushing and shearing points; trapping points; *in-running nips* (3.33); cutting, punching and impact points; gear, chain and worm drives; V-belt, flat belt, cord and rope drives; pulling and supporting elements on continuous conveyors; spoke wheels and fly wheels; shafts and shaft ends; rollers; slides; push rods and similar parts, tools and clamping devices.

3.42
momentary-contact control
control that is opened or closed only during its actuation

3.43
motion zone
area defined by any machine component, or group of machine components, which is driven directly by the system drive motor(s) or *machine actuator(s)* (3.35), or indirectly by other means

3.44
movable guard
guard (3.24) that does not require a tool to move or remove it to gain access to a *significant hazard* (3.68)

3.45
nip guard
guard (3.24) located at an *in-going nip* (3.33)

EXAMPLE Nip bar, finger bar, finger guard.

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3.46
normal operation
functions and conditions that usually exist during set-up, *make-ready* (3.38), production and minor servicing, adjusting and cleaning performed by operators, but not including *maintenance* (3.37) operations

3.47
operating position
location where normal functions (make-ready and other routine, repetitive tasks) requiring control of the main drive motor(s) are performed

3.48
permissive period
time interval during which machine motion can be initiated

3.49
personnel warning light
red or green light used to indicate the ready, running and *safe conditions* (3.62) of the machine relative to personnel safety

Note 1 to entry: These lights are not the same as *machine status light* (3.71).

3.50
portable control station
control device (not in a fixed position) that transmits signals using a cableless system or flexible cord

Note 1 to entry: The cord can be permanently connected or plugged-in.

3.51
positive opening
contact separation as the direct result of a specified movement of the *actuator* (3.1) through non-resilient members, such as those not dependent on springs

3.52
raised workplace
area where functions are regularly performed, and are at least 0,5 m above access level

3.53
ready condition
status of a machine in which motion can be initiated by the operator

3.54
reel rewinding device
reel rewinding unit
part of a machine used for rewinding the processed web-type material

3.55
reel rewinding devices with automatic reel change
devices for changing the web from the (full) material reel to a new material reel (core) for rewinding that is carried out in an automated reel changing unit, e.g. in the form of a high-speed impact cutting process

Note 1 to entry: The web is continuously fed to the automatic reel rewinding device.

3.56
reel rewinding devices with manual reel change
devices for changing the web from the (full) material reel to the new material reel (core) for rewinding that is carried out manually while the material reel stands still

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3.57
reel stand
equipment which allow the winding or unwinding of the material

3.58
reel unwinding device
reel unwinding unit
part of a machine used for unrolling web-type material for processing

3.59
remote access
connection to the processor of a machine for the purpose of conducting diagnostics, data extraction, software updates, etc. from either a local or remote location

3.60
residual pile monitoring system
device that monitors the feed stack to detect when it gets close to being empty

3.61
routine and regular access
repetitive access to a *hazard point* (3.26) that is required during normal production activity

3.62
safe condition
machine status in which movement which is likely to cause injury is prevented, which can apply to the entire machine or to one or more motion zones, and which exists only when one or more *stop/safe pushbuttons* (3.74) is/are actuated or *emergency stop device(s)* (3.18) also meeting the criteria of stop/safe pushbutton(s) is/are actuated

3.63
safety distance
minimum distance a protective device is required to be placed from a *hazard zone* (3.27)

[SOURCE: ISO 13857:2019, 3.2]

3.64
safety function
function of a machine whose failure can result in an immediate increase of risk(s)

[SOURCE: ISO 12100:2010, 3.30]

3.65
separating element
part on feeders of sheets, blanks or similar materials that separates the individual sheets, blanks

3.66
sheet-fed
material supply, in which the substrate is fed in separate sheets, either manually or mechanically

3.67
side lays
assembly with adjustable side stoppers on which incoming sheets are aligned laterally

3.68
significant hazard
hazard that could result in *irreversible injuries* (3.31) or *disabling injuries* (3.32) or death

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3.69
smooth cylinder
smooth roller
elongated body, solid or hollow, with a circular cross-section having a smooth surface with either of the following:

a) grooves no more than 4 mm deep (measured in the radial direction) and no more than 8 mm wide (measured in the circumferential direction), with no sharp or cutting edges (see Figure 1); or

b) grooves no more than 4 mm wide (measured in the circumferential direction), with no sharp or cutting edges

Note 1 to entry: "Cylinders" includes plate cylinders, blanket cylinders, impression cylinders, etc. Ink rollers, dampening water rollers or distribution drums are not considered to be cylinders as defined in this document.

Dimensions in millimetres

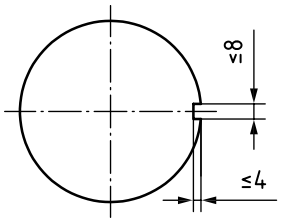


Figure 1 — Smooth roller/cylinder

3.70
splicer
machine which cut processed material and join (splice) new material together

3.71
machine status light
light that indicates machine status or machine process condition

Note 1 to entry: Status lights are not the same as *personnel warning lights* (3.49).

3.72
stop control device
manually actuated control intended to stop machine motion during *normal operation* (3.46)

3.73
stop/safe function
safety function (3.64) initiated by a mechanism actuated by a single human motion and intended to halt machine activity in order to avoid injury to persons, damage to machinery or damage to work in progress and to place the machine in a *safe condition* (3.62)

3.74
stop/safe pushbutton
manually actuated control used to initiate a *stop/safe function* (3.73) and comprised of an extended mushroom-head or palm-type actuator, positive opening contact element(s) and engagement or latching-in feature

3.75
substrate
material on which the process is conducted

EXAMPLE Board, corrugated board, plastic film, aluminium foil, sheet metal and photographic paper

Note 1 to entry: The process can refer to printing, laminating, varnishing, etc.

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3.76
support roller
bearer drum
driven or non-driven rollers used to drive or support the material reel

Note 1 to entry: As a rule, support rollers/bearer drums are under the rewinding roll.

3.77
tool
implement, such as a key (e.g. double bit key, three-square socket key, square socket key) or wrench, designed to operate a fastener

Note 1 to entry: An item such as a coin or fingernail file is not considered to be a tool.

3.78
touch-sensitive control device
TSCD
electronic input device, controlled by touching, lifting off or moving across a sensitive surface or display with one or more fingers or a stylus/pen, whose actuation generates a position and/or selection signal

EXAMPLE Touchpads, touchscreens, digitalization boards.

Note 1 to entry: In contrast to contact-based operating elements (switches, push buttons) reliable generation of the operating signals by the TSCD depends on the dedicated software and hardware used in the TSCD. Furthermore, the control points are not at a fixed position and cannot be felt.

3.79
trip device
protective device where actuation initiates the stopping action

3.80
trip nip bar
movable protective bar located at an in-running nip which, when actuated, initiates stopping action

3.81
troubleshooting
procedure for rectifying of operational failures, such as clearing blockages

3.82
two-hand control
safety device that consists of two *manual control devices* (3.39) which requires simultaneous actuation by a single operator to initiate potentially hazardous machine motion

3.83
unit
device
part of a larger machine with a specific function or purpose

Note 1 to entry: These terms can be used interchangeably for processes related to press equipment and systems

3.84
warning period
time interval during which machine motion is prevented and a warning is given to personnel that machine motion is about to occur

3.85
web-fed
material supply, in which the substrate is fed from a roll or a pack of continuous stock

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3.86
cableless motion control
wireless control
transmission of commands and signals between a machine-control system and the control station(s) using means other than a physical connection

EXAMPLE Radio, infra-red.

3.87
zero speed
condition of machine movement in which the drive control system is actively holding the machine at a position and while machine movement is not discernible, machine movement can be initiated without warning

Note 1 to entry: Zero speed is considered to be an *armed condition* (3.2).

3.88
glow temperature
minimum ignition temperature of a dust layer or a dust cloud

3.89
combustible
capable of being ignited and burned

[SOURCE: ISO 13943:2017, 3.52]

3.90
flammable
capable of *flaming combustion* (3.91) under specified conditions

[SOURCE: ISO 13943:2017, 3.180]

3.91
flaming combustion
combustion in the gaseous phase, usually with emission of light

[SOURCE: ISO 13943:2017, 3.52]

3.92
zone
<explosive atmospheres> *hazardous areas* (3.25) classified into zones based upon then frequency of the occurrence and the duration of an *explosive atmosphere* (3.21)

[SOURCE: IEC 60079-14:2013, 3.2.6]

3.93
service temperature
maximum or minimum temperature reached at specific points of the equipment when the equipment is operating at rated conditions, including ambient temperature and any external sources of heating or cooling

Note 1 to entry: Equipment can reach different service temperatures in different parts.

[SOURCE: ISO 80079-36:2016, 3.8, modified — The symbol T_s has been omitted.]

4 Significant hazards

For the list of significant hazards covered by this document, see Annex B.

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