

BUREAU OF INDIAN STANDARDS

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**ग्राफ़िक प्रौद्योगिकी — ग्राफ़िक प्रौद्योगिकी उपकरण और
सिस्टम के लिए सुरक्षा अपेक्षाएँ
भाग 1 सामान्य अपेक्षाएँ**

(ISO 12643-1 का पहला पुनरीक्षण)

Draft Indian Standard

**GRAPHIC TECHNOLOGY — SAFETY REQUIREMENTS FOR
GRAPHIC TECHNOLOGY EQUIPMENT AND SYSTEMS
PART 1 GENERAL REQUIREMENTS**

(First Revision of ISO 12643-1)

ICS 37.100.10

Printing Machinery Sectional
Committee, MED 25

Last date of comment is
07 December 2024

NATIONAL FOREWORD

(Adoption clause to be added later)

The Indian Standard supersedes IS/ISO 12643-1 : 2009 ‘Graphic Technology — Safety Requirements for Graphic Technology Equipment and Systems Part 1 General Requirements’.

The main changes are as follows:

- a) 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;
- b) 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);
- c) In **5.3.6**, the requirements for hold-to-run controls have been revised;

- d) 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);
- e) In **5.3.10**, the requirements for pile carrier movements at feeders and deliveries have been revised;
- f) In **5.4.2**, the requirements for explosion and fire protection have been revised;
- g) 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;
- h) A new sub clause (**5.4.10**) about doctor blades has been added;
- j) In **5.7.2**, information that touch sensitive control devices shall not be used for initiating safety functions has been clarified;
- k) In **5.7.2.3**, colours for controls have been adapted;
- m) In **5.7.2.5.1.2**, the comprehensive requirements for emergency stop devices have been replaced by reference to IEC 60204-1:2016/AMD 1:2021 and ISO 13850:2015 (references to safety functions of IEC 61800-5-2, e.g. STO);
- n) 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;
- p) In **5.8**, the requirements to fixed and portable control station have been adapted;
- q) 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;
- r) In clause **6**, detailed listings of the validation methods for all safeguarding measures has been added;
- s) In **8.3.1**, the requirements for instruction handbook with regard to noise emission values and hearing protection have been amended;
- t) Annex A has been revised and has been converted to a normative annex;
- u) The list of significant hazards has been moved to Annex B;
- v) The noise comparison values in Annex D has been added;
- w) A normative Annex F on occurrence of a hazardous explosive atmosphere has been added; and
- y) An informative Annex G on the relationship between protection zones against explosion and equipment to be used has been added.

This standard is published in various parts. Other parts in this series are:

- Part 2 Prepress and press equipment and systems
- Part 3 Binding and Finishing Equipment and Systems
- Part 4 Converting Equipment and Systems
- Part 5 Manually-fed stand-alone platen presses

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain terminologies and conventions are, however, not identical to those used in Indian Standard. Attention is particularly drawn to the following:

- a) Wherever the words ‘International Standard’ appear, referring to this standard, they should be read as ‘Indian Standard’.
- b) Comma (,) has been used as a decimal marker, while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standard for which Indian Standard also exist. The corresponding Indian Standard, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 3864-1 : 2011, Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings	IS 16449 (Part 1) : 2018/ ISO 3864-1 : 2011, Graphical symbols — Safety colours and safety signs: Part 1 design principles for safety signs and safety markings	<i>Identical</i>
ISO 4413 : 2010, Hydraulic fluid power — General rules and safety requirements for systems and their components	IS 10481 : 2020/ ISO 4413 : 2010, Hydraulic Fluid Power — General Rules and Safety Requirements for Systems and their Components (<i>second revision</i>)	<i>Identical</i>
ISO 4414 : 2010, Pneumatic fluid power — General rules and safety requirements for systems and their components	IS 12725 : 2021/ ISO 4414 : 2010, Pneumatic Fluid Power — General Rules and Safety Requirements for Systems and their Components (<i>second revision</i>)	<i>Identical</i>
ISO 7010 : 2019, Graphical symbols — Safety colours and safety signs — Registered safety signs	IS 16451 : 2023/ISO 7010 : 2019, Graphical Symbols — Safety Colours and Safety Signs — Registered Safety Signs (<i>first revision</i>)	<i>Indigenous</i>
ISO 7731 : 2003, Ergonomics — Danger signals for public and work areas — Auditory danger signals	IS 17102 : 2019/ ISO 7731 : 2003, Ergonomics - Danger signals for public and work areas - Auditory danger signals	<i>Identical</i>

ISO 12100 : 2010, Safety of machinery — General principles for design — Risk assessment and risk reduction	IS 16819 : 2018/ ISO 12100 : 2010, Safety of machinery - General principles for design - Risk assessment and risk reduction	<i>Identical</i>
ISO 13849-2 : 2012, Safety of machinery — Safety-related parts of control systems — Part 2: Validation	IS 16810 (Part 2) : 2018/ ISO 13849-2 : 2012, Safety of machinery - Safety related parts of control systems: Part 2 validation	<i>Identical</i>
ISO 13850 : 2015, Safety of machinery - Emergency stop function - Principles for design	IS 16818 : 2018/ ISO 13850 : 2015, Safety of machinery - Emergency stop function - Principles for design	<i>Identical</i>
ISO 13851 : 2019, Safety of Machinery — Two-Hand Control Devices — Principles for Design and Selection (first revision)	IS 16817 : 2020/ ISO 13851 : 2019, Safety of Machinery — Two-Hand Control Devices — Principles for Design and Selection (<i>first revision</i>)	<i>Identical</i>
ISO 13854 : 2017, Safety of machinery - Minimum gaps to avoid crushing of parts of the human body	IS 16816 : 2019/ ISO 13854 : 2017, Safety of machinery - Minimum gaps to avoid crushing of parts of the human body	<i>Identical</i>
ISO 13855 : 2010, Safety of machinery - Positioning of safeguards with respect to the approach speeds of parts of the human body	IS 16815 : 2019/ ISO 13855 : 2010, Safety of machinery - Positioning of safeguards with respect to the approach speeds of parts of the human body	<i>Identical</i>
ISO 13857 : 2019 Safety of Machinery — Safety Distances to Prevent Hazard Zones Being Reached by Upper and Lower Limbs	IS 16814 : 2021/ ISO 13857 : 2019, Safety of Machinery — Safety Distances to Prevent Hazard Zones Being Reached by Upper and Lower Limbs	<i>Identical</i>
ISO 14119 : 2013, Safety of machinery - Interlocking devices associated with guards - Principles for design and selection	IS 16812 : 2018/ ISO 14119 : 2013, Safety of machinery - Interlocking devices associated with guards - Principles for design and selection	<i>Identical</i>
ISO 14120 : 2015, Safety of Machinery — Guards — General Requirements for the Design and Construction of Fixed and Movable Guards	IS 16811 : 2018/ ISO 14120 : 2015, Safety of Machinery — Guards — General Requirements for the Design and Construction of Fixed and Movable Guards	<i>Identical</i>
ISO 14210 : 2015, Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards	IS 16811 : 2018/ ISO 14210 : 2015, Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards	<i>Identical</i>
ISO 14122-1 : 2016, Safety of machinery - Permanent means of access to machinery: Part 1	IS 16809 (Part 1) : 2018/ ISO 14122-1 : 2016, Safety of machinery - Permanent means of	<i>Identical</i>

choice of fixed means and general requirements of access	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	IS 16809 (Part 2) : 2018/ ISO 14122-2 : 2016, Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways	<i>Identical</i>
ISO 14122-3 : 2016, Safety of machinery - Permanent means of access to machinery: Part 3 stairs, stepladders and guard - Rails	IS 16809 (Part 3) : 2018/ ISO 14122-3 : 2016, Safety of machinery - Permanent means of access to machinery: Part 3 stairs, stepladders and guard - Rails	<i>Identical</i>
ISO 14122-4 : 2016, Safety of machinery - Permanent means of access to machinery: Part 4 fixed ladders	IS 16809 (Part 4) : 2018/ ISO 14122-4 : 2016, Safety of machinery - Permanent means of access to machinery: Part 4 fixed ladders	<i>Identical</i>
ISO 19353 : 2019, Safety of Machinery — Fire Prevention and Fire Protection (<i>first revision</i>)	IS 16807 : 2020/ ISO 19353 : 2019, Safety of Machinery — Fire Prevention and Fire Protection (<i>first revision</i>)	<i>Identical</i>
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	IS 16835 (Part 1) : 2018/ 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	<i>Identical</i>
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	IS 16835 (Part 2) : 2018/ 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	<i>Identical</i>
IEC 60079-0 : 2017, Explosive atmospheres — Part 0: Equipment — General requirements	IS/IEC 60079-0 : 2017, Explosive Atmospheres Part 0 Equipment — General Requirements (<i>third revision</i>)	<i>Identical</i>
IEC 60079-1 : 2014, Explosive atmospheres — Part 1: Equipment protection by flameproof enclosures “d”	IS/IEC 60079-1 : 2014, Explosive Atmospheres Part 1 Equipment Protection by Flameproof Enclosures “d” (<i>first revision</i>)	<i>Identical</i>
IEC 60079-2 : 2014,	IS/IEC 60079-2 : 2014,	<i>Identical</i>

Explosive atmospheres — Part 2: Equipment protection by pressurized enclosure “p”	Explosive atmospheres: Part 2 equipment protection by pressurized enclosure "P" (<i>first revision</i>)	
IEC 60079-10-2 : 2015, Explosive atmospheres — Part 10-2: Classification of areas — Combustible dust atmospheres	IS/IEC 60079-10-2 : 2015, Explosive atmospheres: Part 10 classification of areas: Sec 2 explosive dust atmospheres (<i>first revision</i>)	<i>Identical</i>
IEC 60079-11 : 2011, Explosive atmospheres — Part 11: Equipment protection by intrinsic safety “i”	IS/IEC 60079-11 : 2011, Explosive Atmospheres Part 11 Equipment Protection by Intrinsic Safety “i” (<i>first revision</i>)	<i>Identical</i>
IEC 60079-14 : 2013, Explosive atmospheres — Part 14: Electrical installations design, selection and erection	IS 16724 : 2018/IEC 60079-14 : 2013, Explosive Atmospheres — Electrical Installations Design, Selection and Erection	<i>Modified/Technically Equivalent</i>
IEC 60079-15 : 2017, Explosive atmospheres — Part 15: Equipment protection by type of protection “n”	IS/IEC 60079-15 : 2017, Explosive Atmospheres Part 15 Equipment Protection by Type of Protection	<i>Identical</i>
IEC 60079-18 : 2014+AMD1 : 2017, Explosive atmospheres — Part 18: protection by encapsulation “m”	IS/IEC 60079-18 : 2014, Explosive Atmospheres Part 18 Equipment Protection by Encapsulation “m” (<i>second revision</i>)	<i>Identical</i>
IEC 60079-25 : 2020, Explosive atmospheres — Part 25: Intrinsically safe electrical systems	IS/IEC 60079-25 : 2020, Explosive Atmospheres Part 25 Intrinsically Safe Electrical Systems (<i>second revision</i>)	<i>Identical</i>
IEC 60079-5:2015+AMD1:2022, Explosive atmospheres — Part 5: Equipment protection by powder filling “q”	IS/IEC 60079-5 : 2015, Explosive atmospheres — Part 5: Equipment protection by powder filling “q”	<i>Identical</i>
IEC 60079-6:2015+AMD1 : 2020, Explosive atmospheres — Part 6: Equipment protection by liquid immersion “o”	IS/IEC 60079-6 : 2016 + AMND 1 : 2020, Explosive atmospheres — Part 6: Equipment protection by liquid immersion “o”	<i>Identical</i>
IEC 60079-7 : 2015+AMD1 : 2017, Explosive atmospheres — Part 7: Equipment protection by increased safety “e”	IS/IEC 60079-7 : 2017, Explosive atmospheres - Part 7: Equipment protection by increased safety "e" (<i>second revision</i>)	<i>Identical</i>
IEC 60079-13 : 2017, Explosive atmospheres — Part 13: Equipment protection by pressurized room “p” and artificially ventilated room “v”	IS/IEC 60079-13 : 2017, Explosive Atmospheres Part 13 Equipment Protection by Pressurized Room "p" and	<i>Identical</i>

	Artificially Ventilated Room "v" (<i>first revision</i>)	
IEC 60079-28 : 2015, Explosive atmospheres — Part 28: Protection of equipment and transmission systems using optical radiation	IS/IEC 60079-28 : 2015, Explosive atmospheres: Part 28 protection of equipment and transmission systems using optical radiation (<i>first revision</i>)	<i>Identical</i>
IEC 60204-1: 2016+AMD1 : 2021, Safety of machinery — Electrical equipment of machines — Part 1: General requirements	IS 16504 (Part 1) : 2019/ IEC 60204-1 : 2016, Safety of Machinery — Electrical Equipment of Machines Part 1 General Requirements (<i>first revision</i>)	<i>Identical</i>
IEC 61010-1 : 2010 + COR :2 011+A1 : 2016 modified +A1:2 016/COR 1 : 2019, Safety requirements for electrical equipment for measurement, control, and laboratory use — Part 1: General requirements	IS 17724 (Part 1) : 2023/ IEC 61010-1: 2010 + AMD1:2016 + COR1:2019, MOD, Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use Part 1 General Requirements	<i>Identical</i>
IEC 61310-1 : 2007, Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals	IS 16503 (Part 1) : 2017/ IEC 61310-1 : 2007, Safety of Machinery - Indication, Marking and Actuation Part 1 Requirements for Visual, Acoustic and Tactile Signals	<i>Identical</i>
IEC 61310-2 : 2007, Safety of machinery — Indication, marking and actuation — Part 2: Requirements for marking	IS 16503 (Part 2) : 2017/ IEC 61310-2 : 2007, Safety of Machinery - Indication, Marking and Actuation Part 2 Requirements for Marking	<i>Identical</i>
IEC 61310-3 : 2007, Safety of machinery — Indication, marking and actuation — Part 3: Requirements for the location and operation of actuators	IS 16503 (Part 3) : 2017/ IEC 61310-3 : 2007, Safety of Machinery - Indication, Marking and Actuation Part 3 Requirements for the Location and Operation of Actuators	<i>Identical</i>
IEC 61496-1 : 2020, Safety of machinery — Electro- sensitive protective equipment — Part 1: General requirements and tests	IS 16502 (Part 1) : 2023/ IEC 61496-1 : 2020, Safety of Machinery – Electro Sensitive Protective Equipment Part 1 General Requirements and Tests	<i>Identical</i>
IEC 61496-2 : 2020, Safety of machinery — Electro- sensitive protective equipment — Part 2: Particular requirements for equipment using active Opto-	IS 16502 (Part 2) : 2023/ IEC 61496-2:2020, Safety of Machinery – Electro Sensitive Protective Equipment Part 2 Particular Requirements for Equipment Using	<i>Identical</i>

electronic protective devices (AOPDs)	Active Opto-Electronic Protective Devices (AOPDs) (First Revision)	
IEC 62061 : 2021, Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems	IS 16501 : 2023/ IEC 62061 : 2021, Safety of Machinery - Functional Safety of Safety-Related Control Systems (<i>first revision</i>)	<i>Identical</i>
IEC 60079-26 : 2021, Explosive atmospheres — Part 26: Equipment with Equipment Protection Level (EPL) Ga	IS/IEC 60079-26 : 2021, Explosive Atmospheres Part 26 Equipment with Separation Elements or Combined Levels of Protection (<i>second revision</i>)	<i>Identical</i>
IEC 60079-28 : 2015, Explosive atmospheres — Part 28: Protection of equipment and transmission systems using optical radiation	IS/IEC 60079-28 : 2015, Explosive Atmospheres PART 28 Protection of Equipment and Transmission Systems Using Optical Radiation (<i>first revision</i>)	<i>Identical</i>
IEC 60079-31 : 2022, Explosive Atmospheres Part 31 Equipment Dust Ignition Protection by Enclosure “t”	IS/IEC 60079-31 : 2022, Explosive Atmospheres Part 31 Equipment Dust Ignition Protection by Enclosure “t” (<i>second revision</i>)	<i>Identical</i>
IEC 60079-33 : 2012, Explosive atmospheres — Part 33: Equipment protection by special protection ‘s’	IS/IEC 60079-33 : 2012, Explosive Atmospheres Part 33 Equipment Protection by Special Protection “s”	<i>Identical</i>
IEC 60947-2 : 2016 + COR 1:2016 +A 1 : 2019, Low-voltage switchgear and controlgear — Part 2: Circuit breakers	IS/IEC 60947-2 : 2016, Low-Voltage Switchgear and Controlgear Part 2 Circuit-Breakers (<i>first revision</i>)	<i>Identical</i>
IEC 60947-3 : 2020, Low-voltage switchgear and control gear — Part 3: Switches, disconnectors, switch disconnectors and fuse-combination units	IS/IEC 60947-3 : 2020, Low-Voltage Switchgear and Control gear Part 3 Switches, Disconnectors, Switch Disconnectors and Fuse-Combination Units (<i>second revision</i>)	<i>Identical</i>
IEC 60947-5-1 : 2016+COR1: 2016, Low-voltage switchgear and control gear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices	IS/IEC 60947-5-1 : 2016, Low-Voltage Switchgear and Control gear Part 5 Control Circuit Devices and Switching Elements Section 1 Electromechanical Control Circuit Devices (<i>second revision</i>)	<i>Identical</i>
ISO 80079-36 : 2016, Explosive atmospheres — Part 36: Non-electrical equipment for	IS/ISO/IEC 80079-36 : 2016, Explosive Atmospheres Part 36 Non-electrical Equipment for	<i>Identical</i>

explosive atmospheres — Basic method and requirements	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"	IS/ISO/IEC 80079-37 : 2016, Explosive Atmospheres Part 37 Non-electrical Equipment for Explosive Atmospheres — Non Electrical Type of Protection Constructional Safety “c”, Control of Ignition Source “b”, Liquid Immersion “k”	<i>Identical</i>

The technical committee has reviewed the provisions of the following International Standard referred in this adopted standard and has decided that it is acceptable for use in conjunction with this standard:

<i>International Standard</i>	<i>Title</i>
ISO 13849-1 : 2023	Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design
ISO 3691-4 : 2020	Industrial trucks Safety requirements and verification Part 4: Driverless industrial trucks and their systems
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 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 13732-1 : 2006	Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces
IEC 60825-1 : 2014	Safety of laser products — Part 1: Equipment classification and requirements
IEC 60079-10-1 : 2020	Explosive atmospheres — Part 10-1: Classification of areas — Explosive gas atmospheres
IEC 60947-5-3 : 2013	Low-voltage switchgear and control gear — Part 5-3: Control circuit devices and switching elements — Requirements for proximity devices with defined behaviour under fault conditions (PDDDB)
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

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded-off value should be the same as that of the specified value in this standard.

NOTE— The technical content of the document has not been enclosed as these are identical with the corresponding ISO standard. For details, please refer the corresponding **ISO 12643-1 : 2023** or kindly contact:

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