INTERNATIONAL STANDARD

ISO 20607

First edition
2019-06

Safety of machinery — Instruction handbook — General drafting principles

Sécurité des machines — Notice d'instructions — Principes rédactionnels généraux

Reference number
ISO 20607:2019(E)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

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 documents 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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.

This document was prepared by Technical Committee ISO/TC 199, *Safety of machinery*.

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.

Introduction

This document is a type-B 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.

In addition, this document is intended for standardization bodies elaborating type-C standards.

The requirements of this document can be supplemented or modified by a type-C standard.

For machines which are covered by the scope of a type-C standard and which have been designed and built according to the requirements of that standard, the requirements of that type-C standard take precedence.

The structure of safety standards in the field of machinery is as follows.

a) **Type-A standards** (basic safety standards) give basic concepts, principles for design and general aspects that can be applied to machinery;

b) **Type-B standards** (generic safety standards) dealing with one or more safety aspect(s), or one or more type(s) of safeguards that can be used across a wide range of machinery:

   — type-B1 standards on particular safety aspects (for example, safety distances, surface temperature, noise);

   — type-B2 standards on safeguards (for example, two-hand control devices, interlocking devices, pressure-sensitive devices, guards);

c) **Type-C standards** (machine safety standards) dealing with detailed safety requirements for a particular machine or group of machines.

This type-B standard is written to provide guidance to machine manufacturers on how to provide an instruction handbook. According to ISO 12100:2010, 6.4.1.1, drafting information for use is an integral part of the design of a machine. Information for use consists of communication links, such as texts, words, signs, signals, symbols or diagrams, used separately or in combination to convey information to the user. Information for use is intended for professional and/or non-professional users. Instructions are a key part of the information for use of a machine. This document provides safety specifications for machinery that is more specific than IEC/IEEE 82079-1.

The instruction handbook drafted in accordance with this document is intended to inform the user in such a manner that after reading it, he/she is aware of how the machine can be used safely according to its intended use during its life cycle, considering also aspects of reasonably foreseeable misuse.

The objective fulfilled by this document is to improve the safety specifications and readability/ease of use of the instruction handbook of the machine.

Safety of machinery — Instruction handbook — General drafting principles

1 Scope

This document specifies requirements for the machine manufacturer for preparation of the safety-relevant parts of an instruction handbook for machinery.

This document:

— provides further specifications to the general requirements on information for use given in ISO 12100:2010, 6.4.5; and

— deals with the safety-related content, the corresponding structure and presentation of the instruction handbook, taking into account all phases of the life cycle of the machine.

NOTE 1 The strategy for risk reduction at the machine is given in ISO 12100:2010, Clause 6, and includes inherently safe design measures, safeguarding and complementary risk reduction measures as well as information for use.

NOTE 2 Annex A contains a correspondence table between ISO 12100:2010, 6.4, and this document.

NOTE 3 Information for conception and preparation of instructions in general is available in IEC/IEEE 82079-1.

This document establishes the principles which are indispensable to provide information on residual risks.

This document does not address requirements for declaration of noise and vibration emissions.

This document is not applicable to machinery 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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100 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
instruction handbook
part of the information for use provided by a machine manufacturer to the machine user that contains instructions and advice concerning the use of the machinery during all phases of its life cycle

Note 1 to entry: Instruction handbook is a subset of information for use. For more information, see ISO 12100:2010, 6.4.

3.2
integrator
entity who designs, provides, manufactures or assembles an integrated manufacturing system and is in charge of the safety strategy, including the protective measures, control interfaces and interconnections of the control system

Note 1 to entry: The integrator may be a manufacturer, assembler, engineering company or the user.

[SOURCE: ISO 11161:2007, 3.10]

3.3
risk reduction measure
action or means to eliminate hazards or reduce risks

Note 1 to entry: The term "risk reduction measure"used in this document corresponds to the term "protective measure" used in ISO 12100.

EXAMPLE Inherently safe design; protective devices; personal protective equipment; information for use and installation; organization of work; training; application of equipment; supervision.

[SOURCE: ISO/IEC Guide 51:2014, 3.13, modified — The synonymous term has been deleted and Note 1 to entry has been added.]

3.4
vulnerable user
user at greater risk of harm from products or systems, due to age, level of literacy, physical or mental condition or limitations, or inability to access product safety information

[SOURCE: ISO/IEC Guide 51:2014, 3.16, modified — The term "consumer" has been replaced by "user" in the term and in the definition.]

4 Principles and general information

4.1 General

The purpose of the instruction handbook is to provide the user with such information that the machinery concerned can be effectively and safely used during the life cycle of the machine, also considering reasonably foreseeable misuse. When the instruction handbook is being prepared, the communication process “read – think – use” should be followed in order to achieve the maximum effect for the reader.

NOTE For general principles of design of instruction handbooks see also IEC/IEEE 82079-1:2019, 6.3.

The instruction handbook shall follow sequential operations, as applicable.

The instruction handbook shall provide the target group(s) with information on:

— intended use;

— the machine itself and, as appropriate, its parts and components;

— relevant phases of the life cycle of the machine according to ISO 12100;

— hazards that have been identified and risk reduction measures that have been applied in conjunction with activities the user is expected to perform (human machine interaction); and

— residual risks, as these can require risk reduction by the user of the machine.

4.2 Target group for the instruction handbook

Target groups consisting of persons who interact directly with the machine and the task(s) they perform shall be identified.

Target groups that can interact with the machine shall be described in the instruction handbook and typically include, but are not limited to:

a) installers (for example, system integrators);

b) operators;

c) maintenance personnel or technicians;

d) cleaning personnel;

e) dismantling personnel.

4.3 Information needs

The instruction handbook shall take into account the specific needs, foreseeable knowledge and technical vocabulary of the target group intended to use the machine.

4.4 Comprehensible terminology and wording

The instruction handbook shall be:

a) comprehensible by using preferably standardized terms, well recognized technical terms or explaining special technical terms and expressions, if used;

b) as simple and as brief as possible by using, for example

- language-independent instructions to support the text (pictograms, pictures, drawings etc.);
- short and simple sentences;
- where synonyms are available, use only one term;
- tables and listings;
- chronological, logical and sequential writing;
- repetition, where necessary;
- diagrams, charts;

c) expressed in consistent terms and units (for example, SI quantities);

d) drafted using the active voice;

e) easily translatable.

NOTE For guidance and examples on formulation, see Annex C.

4.5 Presentation of the instruction handbook

The instruction handbook may be presented as a single document or as a set of separate documents, for example, for the following reasons:

- instructions intended for different target groups (see 4.2);
- a single document is too large or complex;
- document is addressing different life phases of the machine.

When providing information for different target groups in a single document the information shall be clearly separated so that a user does not accidently refer to information which does not apply.

4.6 Information from component or subsystem suppliers

Where information from component or subsystem suppliers is necessary for the instruction handbook, it shall either:

— be incorporated directly in the instruction handbook; or

— provide the relevant parts of the original instruction handbook of components/subsystems from suppliers and making appropriate references therein.

4.7 Legibility

Text and graphical symbols shall be legible for the target group(s).

NOTE For examples of recommended text font sizes and graphical symbol heights, see Annex B.

4.8 Warnings, hazard and safety symbols used in the instruction handbook

Warnings, hazard and safety symbols shall be distinguishable from other content of the instruction handbook.

When signs (pictograms) and/or written warnings are used to indicate important messages their meaning shall be clearly explained.

NOTE 1 Annex C provides guidance on wording.

NOTE 2 Terms often used in instruction handbooks are "DANGER", "WARNING", "CAUTION" without or in combination with pictograms. For the definitions of these terms and more information about colours for coding, see ISO 3864-2.

NOTE 3 For safety signs and symbols, see ISO 7000 and ISO 7010.

4.9 Structuring

The instruction handbook should be structured in a such a way that the information can be quickly located, for example, by using sections, chapters, sub-clauses, headings, numbers, highlighting, colors.

NOTE See Clause 5 for a recommended structure.

Instruction handbooks shall be presented in a such a way that the reader can determine if they are complete (for example, using a table of contents and the numbering of pages).

4.10 Residual risks

4.10.1 General

Based on the risk assessment and the risk reduction measures the manufacturer of the machine shall inform and warn the target group, if relevant, for each residual risk. General statements about residual risks shall be avoided.

NOTE The information on residual risks form the basis for further risk reduction measures to be introduced by the user of the machine.

Explanations on the risks and appropriate warnings shall be given.

4.10.2 Signals and warning devices provided with the machine

The instruction handbook shall describe signals and warning devices provided with the machine and explain their meaning.

4.11 IT security vulnerabilities

Where applicable, the instruction handbook shall provide information concerning IT security vulnerabilities. See ISO/TR 22100-4:2018, 10.4.

5 Content and structure of the instruction handbook

5.1 General

The essential information, relevant for the user, shall be structured in an instruction handbook (see Table 1 for an example). Table 1 does not take into account all different target groups, but is a template for information that can be placed in an instruction handbook for the machine concerned. From this, a writer can create a specific instruction handbook for a particular target group. An instruction handbook for a user/operator need not contain all the sections of Table 1.

Table 1 — Instruction handbook content example

Section	Content
Basic parts of an instruction handbook (see 5.2.1)	Title page Table of contents Introduction to/purpose of this instruction handbook
Safety (see 5.2.2)	General safety information and general safety instructions
Machine overview (see 5.2.3)	Machine description Intended use Key machine specifications Controls and displays descriptions Floor plan/layout
Transportation, handling and storage (see 5.2.4)	Transporting, handling and storing the machine and/or the components
Assembly, installation and commissioning (see 5.2.5)	Assembly/integration of the machine Positioning of the machine Mechanical, pneumatic, hydraulic and electrical installation Check and test of safety systems Installation check Commissioning
Original equipment manufacturer settings (see 5.2.6)	Mechanical settings and synchronization Safety-related (setting) parameters Pneumatic, hydraulic, electrical and vacuum settings Other settings
Operation (see 5.2.7)	Operating modes Machine start-up and shut-down Sequence or chronology of operations Other operating instructions, if applicable
Product or capacity changeover (see 5.2.8)	General product or capacity changeover information Product-specific set-up information
Inspection, testing and maintenance (see 5.2.9)	Maintenance instructions

Table 1 *(continued)*

Section	Content
Cleaning and sanitizing (see 5.2.10)	Cleaning and/or sanitizing of the machine
Fault finding/ troubleshooting and repair (see 5.2.11)	General fault finding/troubleshooting and repair information Troubleshooting chart (electrical engineering) Troubleshooting of electrical sensors, vacuum systems, pneumatic systems and hydraulic systems
Dismantling, disabling and scrapping (see 5.2.12)	Dismantling, disabling and scrapping instructions
Documents and drawings (see 5.2.13)	Documents, drawings and parts list
Index, glossary, annexes	See 5.2.14 to 5.2.16

5.2 Instruction handbook content

5.2.1 Basic parts of an introduction handbook

5.2.1.1 General

The following information shall be included in the instruction handbook, as applicable:

a) title page;

- — date of issue, version of publication of the instruction handbook;
- — machine designation (model and/or type);
- — sufficient information to identify the machine(s) to which the handbook applies (e.g. identification number, serial number(s), period of application);

b) table of contents;

c) introduction to/purpose of this instruction handbook;

d) how to read and apply the instruction handbook;

e) name of the manufacturer and contact details (postal address, phone numbers, email address, website);

f) type of instruction handbook (for example, operation, maintenance, control software, user guide);

g) date of manufacture;

h) markings in order to indicate compliance with mandatory/legal requirements;

i) list of used abbreviations;

j) symbols and signs for text markings.

If an instruction handbook consists of more than one part, each part is given its own title page as defined above. Identification of this information shall be in a prominent place.

If an instruction handbook consists of more than one part, each part shall be identified in relation to the other parts (for example, part 2 of 5 parts). The following subjects shall be included, as applicable:

— addressed target groups;

— abilities/skills required by the target group(s);

— reader's guide/marking conventions/structure of the instruction handbook.

5.2.1.2 Table of contents

The table of contents shall show the structure of the instruction handbook and serves as a navigation aid within the document.

The instruction handbook shall have a table of contents, if it exceeds 12 pages unless the size or form (for example, instruction card) makes this unnecessary.

Instruction handbooks shall have numbered pages or electronic equivalent (e.g. links).

The table of contents shall also indicate unnumbered text elements such as preface, abbreviated instructions, reader instructions, register/index and appendices, as applicable.

The table of contents can be created in various ways, for example:

a) a full table of contents of the instruction handbook with:

   1) the chapters and sections of the first three levels of the subdivision; and

   2) the page number or electronic equivalent where each chapter and section begins;

b) a simplified table of contents with a full table of contents for each part;

c) the table of contents should reflect each target group and lifecycle phase.

In a simplified table of contents, there should at least the first level of subdivision with the corresponding page numbers/electronic equivalents.

5.2.2 Safety

5.2.2.1 General

General safety requirements, not restricted to specific tasks, shall be provided together in a specific part of the instruction handbook, preferably in the “Safety” clause. For specific tasks described in the instruction handbook, safety information shall be included where the task is described.

5.2.2.2 General rules for preparation of the “Safety” clause

a) warnings about potentially hazardous situations that can occur during intended use of the machine;

b) warnings regarding potentially hazardous situations arising from reasonably foreseeable misuse;

c) residual risks to be described;

d) general warnings and precautions to be included.

The following topics shall be added, if relevant:

— substances and emissions that can create risk for the persons that can be involved in the machine operations;

— warnings, where the use of the machine can negatively influence electrically controlled medical devices, such as pacemakers;

— content related to the safety of the user groups. Attention should be given to protect vulnerable user groups (e.g. children, elderly people);

— personal protective equipment to be used for specific tasks;

— safety symbols, safety signs and/or pictograms used in and on the machine, including an image of them;

— location of safety symbols, safety signs and/or pictograms on the machine;

— instructions for renewing of safety symbols, safety signs and/or pictograms on the machine, if necessary.

Standardized symbols (see, for example, ISO 7010, IEC 61310) shall be used to indicate important messages such as cautions, warnings and safety instructions.

5.2.2.3 Emergency situations

Where applicable, the instruction handbook shall include information to address specific emergency situations, such as:

a) the operating method to be followed in the event of accident or breakdown;

b) the type of fire-fighting equipment to be used; and

c) a warning of possible emission or leakage of hazardous substance(s) and, if applicable, an indication of means for fighting their effects.

5.2.3 Machine overview

The instruction handbook shall include a general description of the machine. The following information shall be included, where applicable:

a) machine description;

b) graphical description (for example, floor plan, drawings, images);

c) intended use including the type of material/products that can be processed by the machine;

d) specific applications that are prohibited;

e) key machine specifications, such as:

   — length, width and height;

   — mass;

   — operating speed;

   — characteristics of the power supply;

   — limits for intended operating conditions, such as temperature, relative humidity and air pressure;

   — intended life limit of the machine;

   — lifetime (mission time) of components, where relevant for safety aspects;

f) control and display descriptions;

g) requirements regarding (work)place or environment in which the machine is foreseen to be used (for example, indoors, outdoors, clean room, potentially explosive atmosphere).

5.2.4 Transportation, handling and storage

The following information shall be included in the instruction handbook for transportation, handling and storage of the machine and/or the components, if relevant:

— physical characteristics such as dimensions during transportation, mass and centre of gravity of the machine, gripping/lifting points to be used;

— recommended transportation and handling method including required skills and equipment;

— environmental conditions for storage, such as limits for temperature, relative humidity and avoidance of direct sunlight.

5.2.5 Assembly, installation and commissioning

5.2.5.1 Assembly of the machine

Machines that are not assembled or installed by the manufacturer or under the manufacturer's responsibility shall contain the following instructions, if relevant:

— requirements and procedures for assembly and mounting (for example, temporary support or safeguarding, appropriate climatic conditions);

— requirements for testing, where necessary;

— use of special tools and equipment;

— information on safe disposal of packaging materials and preservation measures.

5.2.5.2 Positioning of the machine

Machines that are not positioned by the manufacturer or under the manufacturer's responsibility shall contain the following instructions, if relevant:

— minimum requirements for placing (for example, floor characteristics, point load, dynamic load, levelling, alignment);

— minimum requirements for fixing and anchoring the machine;

— requirements for accessibility around the machine (for example, for maintenance, cleaning, sanitizing, work spaces).

5.2.5.3 Installation

The instruction handbook shall include information for mechanical, pneumatic, hydraulic and electrical installations, and in particular the required characteristics of the energy supply (for example, mechanical, pneumatic, hydraulic, electrical).

Other information to include in the instruction handbook, if relevant, are:

— characteristics of necessary fluids including hazardous substances;

— necessity for an additional exhaust extraction system and its characteristics.

5.2.5.4 Checking and testing of safety systems

The instruction handbook shall include procedures for checking and testing safety systems.

Machines where the installation check is not performed by the manufacturer or under the manufacturer's responsibility shall include procedures for checking the correct installation, if relevant.

Each safety relevant check shall be described with the following content:

— what to be checked;

— how to check;

— criteria for acceptance/non-acceptance;

— action required in case of non-acceptance.

5.2.5.5 Commissioning

If the machine is not commissioned by the manufacturer or under the manufacturer's responsibility, the instruction handbook shall include procedures for commissioning and first use of the machine, such as:

— specific risks and hazards, and precautions to be taken;

— information about special procedures for commissioning, if required;

— securing and packaging materials that shall be removed (also consider protective films, strips, etc.);

— necessary tools and equipment;

— procedures, such as adjustments, testing, measuring and reporting; and

— inspections.

5.2.6 Original equipment manufacturer settings

The instruction handbook shall include instructions regarding original equipment manufacturer settings where accessible for the machine user, such as:

— mechanical settings and synchronization;

— safety-related (setting) parameters;

— pneumatic, hydraulic, electrical and vacuum settings; and

— other settings.

5.2.7 Operation

The instruction handbook shall include instructions regarding operating safety considerations, such as:

— intended use;

— residual risks;

— information regarding safety relevant emissions [see ISO 12100:2010, 6.4.5.1 c) 4)];

— actuation of controls;

— setting and adjustment;

— operating modes;

— location of the intended operator positions;

— error messages from the control system and location of the error;

— personal protective equipment needed to be used;

— an indication of training requirements;

— checking of hazard area for the absence of persons;

— procedures for starting, control during operation, stopping, emergency situation, reset and restarting (including relevant safety-related parts);

— conversions or tool changes;

— procedures for clearing jams or blockages without creating hazards;

— information regarding the operational environment;

— information about vibration emission of hand-held machines and hand-guided machinery;

— illustrations that clarify and/or provide insight into key functions and risk reduction measures;

— recommendations for removal of waste;

— machine start-up and shut-down;

— sequence or chronology of operations; and

— other operating instructions, if applicable.

Operations that must be carried out by more than one person shall be prescribed. Appropriate warning shall be provided about the consequences if the recommended sequence of operations is not followed.

The operator shall be informed of possible error messages and indications of warning components such as perceptible indication of normal and abnormal operation and recognition of signals.

Signals or displays intended to indicate imminent risk of hazardous situations shall be stated in a comprehensible and unambiguous manner.

5.2.8 Product or capacity changeover

The instruction handbook shall include instructions and safety requirements on foreseeable product or capacity changeover, if applicable:

— product or workpiece size changes;

— tool changes;

— material changes;

— energy changes;

— equipment changes;

— data changes;

— process changeover; and

— procedures to restore operation.

The instruction handbook shall include product-specific set-up information.

5.2.9 Inspection, testing and maintenance

The instruction handbook shall include general maintenance instructions and safety-relevant information, such as:

— intended lifetime for the machine and its components;

— nature, frequency and criteria for inspections;

— specification of the spare parts, in particular those affecting the safety of the machine;

— characteristics of the substances to be used;

— instructions on how to safely perform maintenance operations:

  — instructions relating to maintenance operations which require technical knowledge or particular skills and, hence, need to be carried out exclusively by skilled persons (for example, maintenance staff, specialists);

  — instructions relating to maintenance actions (replacement of parts, etc.) which do not require specific skills and hence may be carried out by other persons (for example, operators);

— drawings and diagrams enabling maintenance personnel to carry out their task rationally (especially fault-finding tasks);

— an overview of necessary tools, replaceable resources, and cleaning equipment needed for maintenance;

— energy control procedures [for example, isolation, dissipation and/or restraint (containment), marking and span-of-control];

— procedures to restore operation;

— replacement parts identification;

— a timetable for necessary maintenance with references on the appropriate procedures, where applicable;

— any restrictions on maintenance that may be performed by the manufacturer because of safety reasons only.

Specific risks and hazards during maintenance shall be taken into account.

Information on the recommended spare parts to ensure a safe operation of the machine shall be given or referenced.

All safety relevant inspection, testing and maintenance for the whole machine and its accessories shall be described in one single section, with relevant information on:

a) what to be inspected/tested/maintained;

b) frequency of the inspections/tests/maintenance;

c) how to inspect/test/maintain;

d) criteria for acceptance or non-acceptance;

e) action required in case of non-acceptance.

5.2.10 Cleaning and sanitizing

The instruction handbook shall include instructions and information to clean and/or sanitize a machine to an appropriate level for the application, such as:

— tools, equipment and/or characteristics of cleaning agents required;

— personal protective equipment required;

— specific mode of operation;

— required energy isolation or control;

— cleaning and sanitizing procedures; and

— procedures to restore operation.

5.2.11 Fault finding/troubleshooting and repair

The instruction handbook shall include instructions and information for general fault finding/troubleshooting and repair, such as:

— fault identification and location for repair;

— troubleshooting; and

— procedures to repair the machine and restore operation.

The fault list should be based on certain logic. For example, first faults that are easy to resolve, or the most common faults first, see Table 2.

Table 2 — Fault list example

Fault message	Fault	Possible cause or procedure for detecting the fault	Solution	Performed by (unskilled/skilled/certified)
…	…	…	…	…
…	…	…	…	…

Where necessary, add special notes about faults, precautionary measures and safety instructions.

The instruction handbook shall include instructions for reporting specific or unexpected faults or failures to the manufacturer.

5.2.12 Dismantling, disabling and scrapping

The instruction handbook shall include instructions for dismantling, disabling and scrapping of a machine, if applicable:

— preventive measures (technical and organizational);

— energy control procedures [for example, isolation, dissipation and/or restraint (containment)];

— special tools and equipment;

— special risk reduction measures;

— required personal protective equipment;

— sequence or chronology for decommissioning.

Scrapping instructions shall describe the actions the user has to perform at the end of the life cycle of a machine or part, with instructions for dismantling, disposal, recycling and/or destruction, with safety instructions and precautions against risks and hazards to health and the environment.

5.2.13 Documents and drawings

The instruction handbook shall include, or reference, necessary documents and drawings, such as:

— electrical, hydraulic, pneumatic schematics, as appropriate;

— parts lists;

— components supplier instruction handbooks; and

— safety-relevant documents, drawings, data sheets and declarations.

5.2.14 Index

An instruction handbook should include an index, where applicable. Reference to this index should be included in the table of contents.

5.2.15 Glossary

If necessary, an instruction handbook should include a glossary of technical terms used, including synonyms and the meaning of the acronyms.

5.2.16 Annexes

An instruction handbook may include annexes, such as for:

— auxiliary/associated equipment;

— description of tools to be used;

— detailed technical specifications;

— list of spare parts;

— instruction handbooks for supplied components;

— assembly drawings and diagrams;

— pneumatic, electrical, hydraulic or other relevant diagrams;

— tuning or adjustments lists;

— statutory declarations.

6 Language and formulation/style guide

6.1 General

This clause provides instructions for writing clear texts in instruction handbooks. Using the proper writing style and right vocabulary ensures that the reader can easily use the information.

NOTE 1 Annex C contains a number of examples.

NOTE 2 IEC/IEEE 82079-1 contains more detailed guidance.

6.2 Language version(s)

The instruction handbook shall be provided in the language(s) as agreed with the customer. When providing the instruction handbook, the manufacturer shall be aware of applicable legal requirements of the country in which the machine is placed on the market and/or put into service the first time.

6.3 Formulation guidance for instructions

Instructions shall begin with a goal, for example, “Mounting the wheel”, “Changing the oil”. The goal shall be formatted as a headline and presented in the table of content, if applicable.

The writing style and vocabulary shall be tailored to the target group (see 4.3). The text of instruction handbooks shall be formulated so that the user can easily understand it thanks to consistent, accurate, unambiguous, complete, logical, concise and simple writing (see Annexes B and C).

6.4 Simple wording for instructions

Instructions shall be described in one of the following ways:

— writing instructions in a sequential order, preferably one below the other;

— writing one instruction per sentence. Only two instructions per sentence may be given if they are to be performed simultaneously.

Each instruction can consist of four parts:

a) the number of the instruction or other typographic means to indicate the order of the instructions (start with number 1, not 0);

b) the wording of the instruction;

c) the explanation, i.e. the purpose or reason for the instruction; and

d) the effect of the instruction in order to check the operation of the requested function:

   1) describing the result of an instruction, where necessary;

   2) describing the status of the machine or process following the completion of an instruction, where necessary;

   3) with several results, explaining the situations each instruction brings about;

   4) describing the end of an instruction and also how an abnormal termination can be detected.

The following specific instruction requirements shall be fulfilled:

— use the imperative;

— avoiding words that can change the chronology such as “after”, “before”;

— avoiding words that weaken the instruction;

— avoiding negative words;

— keeping descriptive sentences as short as possible;

— addressing only one subject per paragraph;

— splitting information into subtopics in separate paragraphs, if one paragraph is insufficient;

— always using the same word for a particular part or action;

— making instructions as specific as possible;

— using the same spelling everywhere.

6.5 Warnings

If applicable, a warning shall identify:

a) the signal word;

b) the nature or type of hazard;

c) any possible injury or damage;

d) how such injury or damage can be avoided.

NOTE 1 Appropriate signal words are DANGER, WARNING and CAUTION. See ISO 3864-2.

NOTE 2 See also ISO 7000 and ISO 7010.

7 Forms of publication

The instruction handbook shall be provided in the form(s) as agreed with the customer. When providing the instruction handbook, the manufacturer shall be aware of applicable legal requirements of the country in which the machine is placed on the market and/or put into service the first time.

In principle, the instruction handbook can be provided in one or more of the following forms:

a) as a paper publication;

b) via an electronic storage medium made available with the machine;

c) by accessing an external server, website or storage location with information who to access available with the machine;

d) by accessing an internal server or storage location;

e) by means of visual and/or auditory forms (human-machine interface, video, internet-based, or audio recording).

Annex A
(informative)

Correspondence between ISO 12100:2010, 6.4, and this document

For the correspondence between ISO 12100:2010, 6.4, and this document, see Table A.1.

Table A.1 — Correspondence

ISO 12100:2010	This document	ISO 12100:2010	This document
6.4.1.1	4.2	6.4.5.1 d)	5.2.3, 5.2.7
6.4.1.2	4.1	6.4.5.1 e)	5.2.9
6.4.1.3	4.1	6.4.5.1 f)	5.2.12
6.4.2 a)	Out of scope	6.4.5.1 g)	5.2.2.3
6.4.2 b)	Whole document	6.4.5.1 h)	5.2.9
6.4.2 c)	Out of scope	6.4.5.2 a)	4.7
6.4.2 d)	Out of scope	6.4.5.2 b)	6.2
6.4.3 a)	Out of scope	6.4.5.2 c)	4.4 b)
6.4.3 b)	Out of scope	6.4.5.2 d)	4.4 b)
6.4.3 c)	Out of scope	6.4.5.2 e)	4.10, B.2, B.4
6.4.3 d)	Out of scope	6.4.5.2 f)	5.2.1.1 b)
6.4.3, second paragraph	5.2.9	6.4.5.2 g)	Out of scope
6.4.4 a)	Out of scope	6.4.5.3 a)	5.2.1.1 a)
6.4.4 b)	Out of scope	6.4.5.3 b)	4.1
6.4.4 c)	Out of scope	6.4.5.3 c)	4.4 b), 6.3
6.4.5.1 a)	5.2.4	6.4.5.3 d)	Reference to IEC/ IEEE 82079-1 in Clause 1, Note 3
6.4.5.1 b)	5.2.5.1, 5.2.5.2, 5.2.5.5	6.4.5.3 e)	Clause 7
6.4.5.1 c)	5.2.3		

Annex B
(informative)

Presentation and formatting

B.1 Font and font size

The font and font size of printed information should be sufficiently clear and large to ensure legibility. For continuous text in printed instruction handbooks, 8-point font to 14-point font should be used. The x-height of a font should be at least 1,5 mm. Precautions, warnings and safety instructions should stand out compared to the normal font. One or more functions such as bold, italic, font size, should be used. Text in capital letters should be avoided as much as possible. Text should not be underlined as this can make words less legible. See Table B.1.

Table B.1 — Minimum recommended text font sizes and heights of safety signs and graphical symbols according to IEC/IEEE 82079-1:2019, Table 4

Product/ information document size	Location and role of instruction	High contrast dark text on light background	Low contrast colours or white on	Complex character sets (e.g. Kanji)	Other remarks	Safety signs and graphical symbols	
						Symbols generally	Safety signs
Instructions viewed from up to 1 m distance on floor-standing products	critical on product markings	14 pt bold BE68.3 1,0QGO aeocld	16 pt bold BE68.3 1,0QGO aeocld	—	Consider using large print fonts specially developed to help people with visual impairments to read signs and labels at 30 cm to 100 cm	As applicable. Otherwise according to viewing distance from which attention needs to be attracted or the symbol needs to be recognized. Less than 15 mm height unlikely to be sufficient for critical on-product markings.	
	text	14 pt	16 pt	—			
Instructions on desk-top products, information in printed manuals or single-fold leaflets and documents intended for printing by user	critical on product markings	14 pt bold BE68.3 1,0QGO aeocld	16 pt bold BE68.3 1,0QGO aeocld	—			
	headings	12 pt BE68.3 1,0QGO aeocld	14 pt BE68.3 1,0QGO aeocld	—	Serif fonts may be used (but sans-serif preferred)	5 mm minimum height (or 14 pt) e.g. ☺	10 mm minimum height e.g. ⃠
	continuous text	10 pt BE68.3 1,0QGO aeocld	12 pt BE68.3 1,0QGO aeocld	—		Do not use safety signs or graphical symbols in less than 14 pt continuous text.	

[a] Except for the general warning sign (ISO 7010-W001) accompanying a text warning, which may be: 5 mm minimum as marking ⚠ and 3 mm minimum in headings to text. ⚠

NOTE The term "point" (abbreviated here to "pt") is a unit of measurement of type sizes and spacing.

Table B.1 *(continued)*

Product/ information document size	Location and role of instruction	High contrast dark text on light background	Low contrast colours or white on	Complex character sets (e.g. Kanji)	Other remarks	Safety signs and graphical symbols	
						Symbols generally	Safety signs
Hand-held products and multi-fold instruction sheets	critical on product markings	12 pt BE68.3 1,0QGO aeocld	12 pt BE68.3 1,0QGO aeocld	9 pt with 150 % line spacing 電気 規格	Serif fonts may be used (but sans-serif preferred)	5 mm minimum height	10 mm minimum height
	headings, decimals	10 pt BE68.3 1,0QGO aeocld	12 pt BE68.3 1,0QGO aeocld		Use only sans-serif fonts at this level and below	minimum 5 mm preferred 4 mm/12 pt if very simple	10 mm minimum height[a]
	continuous text	9 pt BE68.3 1,0QGO aeocld	Not advised for text smaller than 12 pt		**Electronic, audio or LARGE-PRINT media should be available on demand** (e.g. from website or point of sale)	Do not use safety signs or graphical symbols in less than 14 pt continuous text.	
Very small products and packaging (e.g. with printable surface less than 10 cm^2	markings, headings, warning messages, decimals	8 pt BE68.3 1,0QGO aeocld		8 pt with 150 % line spacing 電気 規格		minimum 5 mm preferred or 3 mm, if very simple ☺	10 mm minimum height[a]
	continuous text	6 pt BE68.3 1,0QGO aeocld				Do not use any symbols in less than 10 pt continuous text.	

[a] Except for the general warning sign (ISO 7010-W001) accompanying a text warning, which may be: 5 mm minimum as marking ⚠ and 3 mm minimum in headings to text. ⚠

NOTE The term "point" (abbreviated here to "pt") is a unit of measurement of type sizes and spacing.

B.2 Emphasizing information

In every instruction handbook, a way should be employed to indicate information of special interest, in particular, precautions, warnings and safety instructions. Attention should be focused on emphasized information in instruction handbooks in a sufficiently prominent manner. A method that stands out should be considered (for example, right at the beginning and/or under a headline that attracts attention), which distinguishes the emphasized information and is used commonly or consistently in practice.

A conventional method is the use of bold and italic letters, the use of lines and frames, or the use of colours. The marking methodology should be described in the preface so that users are able to understand text or images.

Avoid too much emphasizing. Too much highlighting or too many emphasized elements disctract the reader from reading the information.