INTERNATIONAL STANDARD

ISO 6750

Third edition
2005-09-01

Earth-moving machinery — Operator's manual — Content and format

Engins de terrassement — Manuel de l'opérateur — Présentation et contenu

Reference number
ISO 6750:2005(E)

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Published in Switzerland

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 6750 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 3, *Operation and maintenance*.

This third edition cancels and replaces the second edition (ISO 6750:1984), which has been technically revised.

Introduction

In the preparation of this International Standard consideration has been given to the fact that user manuals are expected to be available for both operators and mechanics. Operators need to have available a manual giving guidance for the correct use and routine basic preventive maintenance of the machine and its equipment and attachment(s). It is accordingly expected that such a manual be clear and simple to understand, that it contain warnings for foreseeable hazards as well as definitions of terms, and that the units, symbols and pictorials used comply with the relevant International Standards.

This edition has been prepared such that it is aligned with the similar technical area covered by ISO 3600.

Earth-moving machinery — Operator's manual — Content and format

1 Scope

This International Standard specifies the content and gives guidance on the format of operator's manuals for earthmoving machinery as defined in ISO 6165. It is intended to assist manufacturers of the machinery in the drafting and presentation of these manuals.

2 Normative references

The following referenced documents are indispensable for the application 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 6014, *Earth-moving machinery — Determination of ground speed*

ISO 6165, *Earth-moving machinery — Basic types — Vocabulary*

ISO 6405-1, *Earth-moving machinery — Symbols for operator controls and other displays — Part 1: Common symbols*

ISO 6405-2, *Earth-moving machinery — Symbols for operator controls and other displays — Part 2: Specific symbols for machines, equipment and accessories*

ISO 6746-1, *Earth-moving machinery — Definitions of dimensions and codes — Part 1: Base machine*

ISO 6746-2, *Earth-moving machinery — Definitions of dimensions and codes — Part 2: Equipment and attachments*

ISO 6747, *Earth-moving machinery — Tractor-dozers — Terminology and commercial specifications*

ISO 6749, *Earth-moving machinery — Preservation and storage*

ISO 7096, *Earth-moving machinery — Laboratory evaluation of operator seat vibration*

ISO 7131, *Earth-moving machinery — Loaders — Terminology and commercial specifications*

ISO 7132, *Earth-moving machinery — Dumpers — Terminology and commercial specifications*

ISO 7133, *Earth-moving machinery — Tractor-scrapers — Terminology and commercial specifications*

ISO 7134, *Earth-moving machinery — Graders — Terminology and commercial specifications*

ISO 7135, *Earth-moving machinery — Hydraulic excavators — Terminology and commercial specifications*

ISO 7136, *Earth-moving machinery — Pipelayers — Terminology and commercial specifications*

ISO 7457, *Earth-moving machinery — Determination of turning dimensions of wheeled machines*

ISO 8811, *Earth-moving machinery — Rollers and compactors — Terminology and commercial specifications*

ISO 8812, *Earth-moving machinery — Backhoe loaders — Definitions and commercial specifications*

ISO 9244, *Earth-moving machinery —Safety signs and hazard pictorials — General principles*

ISO 10261, *Earth-moving machinery — Product identification numbering system*

ISO 13539, *Earth-moving machinery — Trenchers — Definitions and commercial specifications*

ISO 15219, *Earth-moving machinery — Cable excavators — Terminology and commercial specifications*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6165 and the following apply.

3.1
left-hand side
side which is on the left when an observer is facing in the normal forward direction of travel of the machine

[ISO 3600:1996, definition 3.1]

3.2
right-hand side
side which is on the right when an observer is facing in the normal forward direction of travel of the machine

[ISO 3600:1996, definition 3.2]

3.3
operator's manual
document describing and illustrating the safe operation, maintenance and safety precautions related to an earthmoving machine

3.4
jobsite organization
rules and procedures for the jobsite that coordinate machines and people working together

EXAMPLE Safety instructions, traffic patterns, restricted areas, operator and jobsite training, machine and vehicle marking, restrictions on travelling in reverse, communication systems.

4 Content of operator's manual

4.1 General

The operator's manual(s) shall

a) contain provisions for the need for a well-trained and competent operator as well as a description of the circumstances under which personnel protection equipment is necessary,

b) include instructions clearly requiring the operator to immediately remedy faults that would compromise safety,

c) provide information on the intended use of the machine (see 4.6),

d) give the manufacturer's instructions for operation and maintenance of the machine and the equipment and attachments permitted by the manufacturer to be used with it, including the precautions to be taken for minimizing hazards,

e) include a warning concerning unauthorized changes to the machine, and against its unintended use and misuse,

f) require the operator to read and understand the manual before operating the machine,

g) require the operator to be informed about the worksite conditions,

h) provide the necessary information for the operator concerning the stability of the machine (working on firm supporting ground, deviations such as soft and uneven ground, etc.) and its use under special hazardous conditions such as toxic gases, while describing the measures the operator is to take to eliminate or reduce the hazard,

i) stipulate that the machine should be used within the context of the appropriate jobsite organization, in coordination with other machines, vehicles and people on the jobsite, and recommend that the machine user evaluate the specific jobsite where the machine is to be used and address any risks specific to that jobsite not covered in the machine operator's manual(s), and

j) provide all information related to personal safety, which shall be identified by the ISO warning symbol (safety alert, see Figure 1 and ISO 9244).

4.2 Identification of manual(s)

An operator's manual or manuals drafted in accordance with this International Standard shall be identified as that manual(s) relevant to a specific machine by the following information on the front cover:

— manufacturer or distributor of machine;

— model/type designation of machine;

— name or type of publication;

— part number or publication number by which the manual(s) can be ordered;

— printing or publication date.

4.3 Categories of information

4.3.1 The categories of information given in this International Standard cover the whole range of information that the user of a machine is likely to need. Manuals shall be organized so as to present the appropriate information in a logical sequence that allows easy access to the user of the manual(s).

4.3.2 The operator's manual(s) shall give safety precautions and an explanation of the controls and operating instructions in its front portion. The extent of the information provided will depend on the type of machine and the specified duties of the operator.

4.3.3 For machines that involve on-site erection/assembly, an assembly instruction is required that includes the procedures for the initial set-up of the machine. If any special tools or testing and calibration equipment are required, this shall be stated in the operator's manual(s).

4.4 Machine identification

4.4.1 Model/type designation number

This information shall enable the operator to identify readily the machine to which the operator's manual(s) relates.

4.4.2 Product Identification Number (PIN)

The operator's manual(s) shall provide information that enables the operator to locate and identify the placement of the PIN (see ISO 10261), as well as any additional information necessary for initial communication with the manufacturer.

4.5 Introduction

4.5.1 The introduction to the operator's manual(s) shall explain the importance of the manual being provided with the machine (also applies to second-hand machines).

4.5.2 It shall contain an explanation of the safety alert symbol (see ISO 9244), in accordance with Figure 1.

	**This safety alert system identifies important safety messages in this manual.** **When you see this symbol, be alert, your safety is involved, carefully read the message that follows, and inform other operators.**

Figure 1 — Safety alert symbol

4.6 Intended use

This section of the manual shall define the intended use of the machine and its approved attachments. Use in any other way is to be considered as contrary to the intended use. If the machine is designed for use with interchangeable equipment/attachments, the type(s) of equipment/attachment(s) suitable for the machine and their proper use shall be clearly identified.

Danger zones around the machine shall be prescribed and notification given that the unauthorized presence of persons in a danger zone is not permitted.

4.7 Contents

A table of contents shall be provided in the manual(s) identifying the main categories of information and where they can be found. Page numbers for the beginning of each major section shall be clearly indicated.

At least the contents specified in 4.7.1 to 4.7.7 shall be included in the operator's manual(s). Wherever appropriate, cross-references to other categories/sections of the manual(s) shall be made so that the same information is not repeated unnecessarily.

4.7.1 Foreword

The foreword shall give information to the effect that the manual

— is intended as a guide for safe and correct use and maintenance of the machine,

— is always to be kept in the machine for handy reference,

— is to be read carefully before the starting and operating of the machine for the first time and before the carrying out of maintenance, and

— is to be replaced immediately if lost, damaged or unreadable.

4.7.2 Machine description and illustration

This section of the manual(s) shall include a detailed description of the base machine (see ISO 6746-1) and its systems, workings and the optional equipment and attachment(s) (see ISO 6746-2) permitted by the manufacturer to be used with the machine. Furthermore, the following shall be considered:

— presentation and nomenclature of major components, e.g. engine, transmission, brake systems, steering system, pressure vessels, operator's enclosure;

— presentation of equipment, its functions, location and relationship with the machine;

— illustration(s) showing the location of product and component plates, e.g. PIN number, cab number, engine number, axle number;

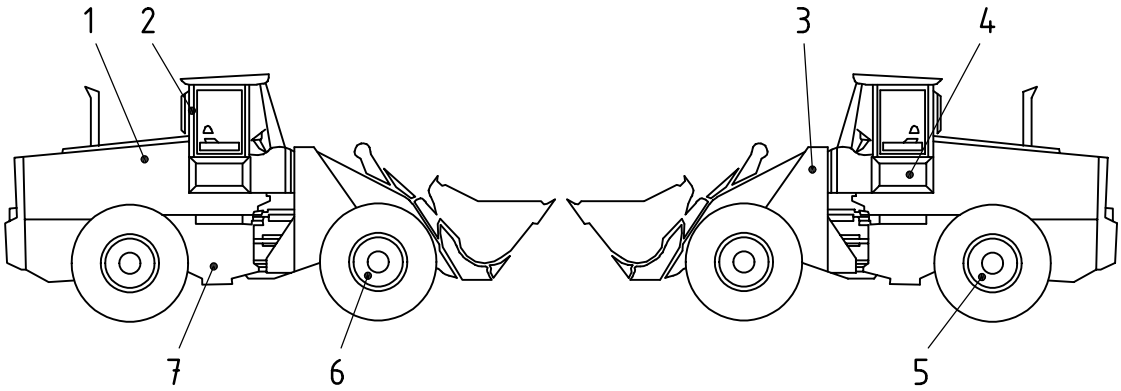
— illustration(s) showing the location of safety signs and other instructions;

— the layout of panels, e.g. switches, gauges, control lamps, hour meter;

Where appropriate, components shall be identified, and terms unique to a particular type of earth-moving machine defined, utilizing the terms and definitions according to the respective terminology/commercial specification standard(s) listed in Clause 2 of this International Standard.

4.7.2.1 Product and component plates

The operator's manual(s) shall indicate the location and content of the product and component plate(s) that appear on the machine. Figure 2 illustrates an example.



Key

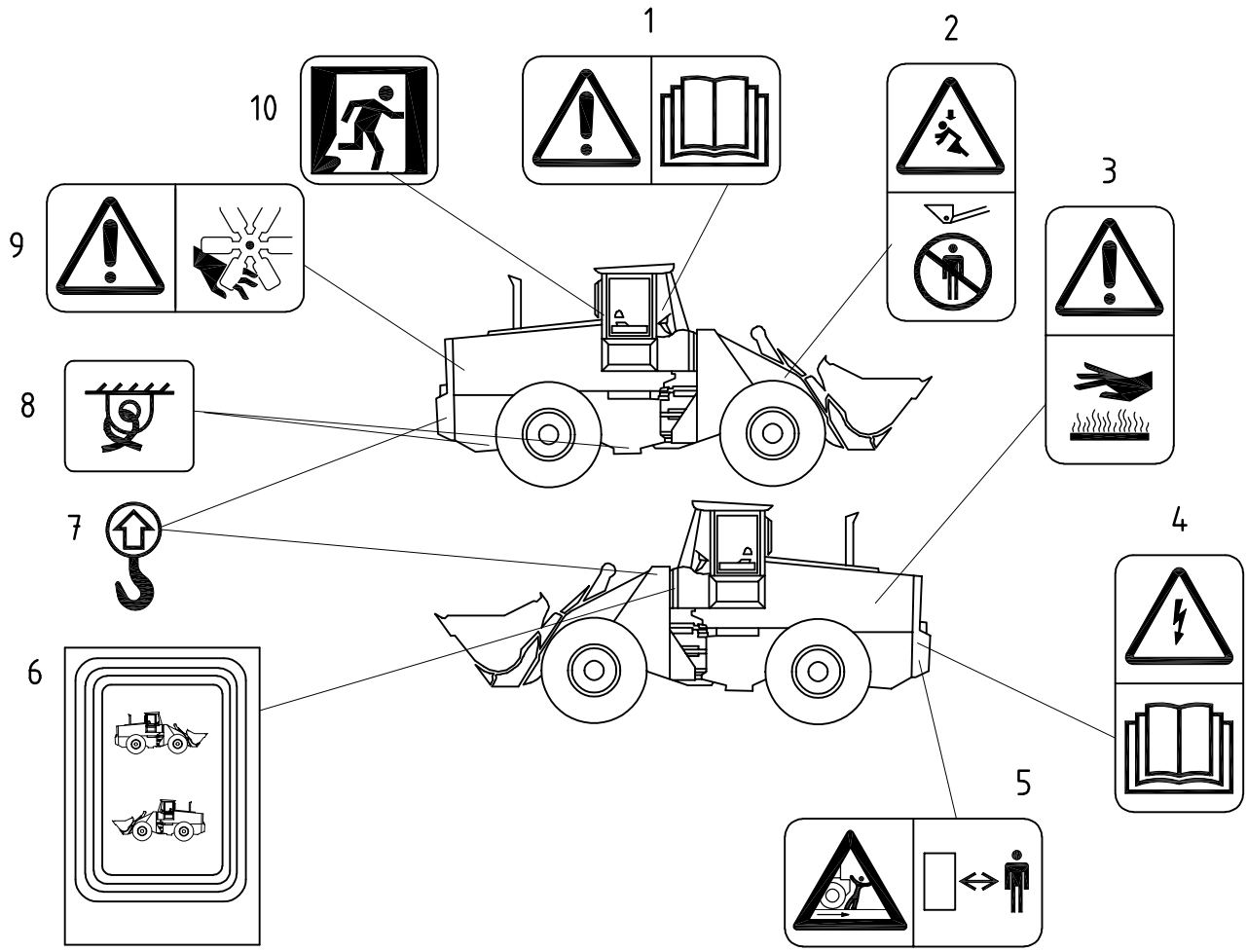
1 engine plate with, for example, type designation, product and serial number
2 operator protection system plate with, for example, model, certification and operator protection system serial number
3 product plate: with PIN and, for example, model/type designation
4 seat plate, in accordance with ISO 7096
5 component plate, rear drive axle, with, for example, product and serial number
6 component plate, front drive axle, with, for example, product and serial number
7 component plate, transmission, with, for example, product and serial number

Figure 2 — Example of how to indicate location and content of product/component plates

4.7.2.2 Safety signs and other instructions

The operator's manual(s) shall indicate the location and content of safety signs and other instructions that appear on the machine. Figure 3 illustrates an example.

The manual(s) shall state that decals, plates, and instructions which have disappeared, been damaged, painted over, worked loose or are no longer legible, are to be replaced.



Key

1 read operator's manual
2 crushing hazards
3 hot surfaces
4 connecting jump leads to battery terminals — read operator's manual
5 reversing machine
6 lubrication and service chart
7 lifting points/eyelets
8 tying down points
9 cutting hazard
10 emergency exit

NOTE Symbols and instructions can be added as applicable.

Figure 3 — Example of how to indicate location and content of safety signs and other instructions

4.7.3 Information on machine operation

The operator's manual shall have a section that includes

— general specifications and machine description,

— detailed illustrations and explanations of controls and displays for purpose, function and mode of operation (see example, Figure 2),

— illustrations and explanation of symbols on the machine,

— permitted attachment(s),

— distributor/dealer address,

— approved electrical, hydraulic and structural attachment points (including performance rating), and

— instructions for proper and safe operation of the machinery or equipment.

4.7.4 Operating instructions

The manual shall provide the operator with instructions for the intended use of the machine as well as on avoidance of its misuse and abuse. These operating instructions shall furnish important rules and advice in respect of the following:

— inspection of the machine before use to ensure that maintenance and safety related elements are in proper order;

— reading and understanding how to use the machine;

— properly adjusting mirrors and ensuring that visibility is not impaired;

— inspecting the ROPS and seat belt system if the machine is so equipped;

— inspection and use of all necessary safety related equipment related to the operation of the machine;

— checking of all control devices;

— following start up procedures;

— being alert for malfunctions;

— taking appropriate measures with respect to the machine work site and personnel;

— proper shut-down procedures;

— understanding the use of fire extinguishers or other emergency equipment on the machine;

— machine use on slopes or in confined areas.

4.7.5 Periodic maintenance schedule

This section of the manual shall include those safety rules related to the maintenance work of the machine. It shall include warning against interference that would affect the warranty of the machine. Instructions shall be given that the machine be placed on a level surface and in a “servicing position”, which includes the following safety procedures:

— connecting the frame joint lock (if any);

— lowering the attachment to the ground — in the case of machines having raised equipment, e.g. lift arms, dumper bodies, these shall be locked by mechanical means.

— applying the parking brake.

— stopping the engine and removal of the ignition key.

— releasing pressure in vessels and lines before removal of any plugs.

— blocking the wheels.

— switching off battery main switch(es).

— attaching a warning tag to the instrument panel to inform other service staff about ongoing maintenance.

4.7.5.1 Maintenance instructions for the operator

This section of the manual shall include safety rules applicable when the operator is checking and attending to maintenance of the machine. The operator shall have sufficient knowledge and training to carry out maintenance. For safety reasons, the operator shall be advised to use protective clothing when appropriate.

4.7.5.2 Periodic maintenance schedule

The operator's manual(s) shall include a schedule of periodic maintenance showing the measures to be taken at the respective service intervals. The manual(s) shall instruct the operator to carry out the prescribed maintenance at the recommended service intervals. The periodic maintenance instructions shall be given using the standard symbols in accordance with ISO 6405-1 and ISO 6405-2.

4.7.6 Preservation and storage

4.7.6.1 General

This section of the manual shall provide the operator with instructions and information, precautions to be taken, and any tools or special equipment required, to prepare the machine for long- and short-term storage. Storage requirements, supplies and services needed, periodic inspections, tests, limitations of storage life, storage temperature(s), etc. should be explained.

NOTE *Short-term storage* covers periods up to two months and *long-term storage* periods exceeding two months (see ISO 6749).

4.7.6.2 Prior to long-term storage

The following instructions shall be given, to be carried out prior to long-term storage.

— Wash the machine and touch up the paint finish to avoid rusting.

— Treat exposed parts with anti-rust agent, lubricate the machine thoroughly and apply grease to unpainted surfaces such as lifting and tilting cylinders. Pull the pistons in the hydraulic cylinders in as far as possible (if appropriate).

— Inflate the tyres to the recommended tyre pressure.

— Fill the fuel tank and the hydraulic oil tank to the maximum marks.

— Check the anti-freeze properties and drain fluids as appropriate.

— Cover the exhaust pipe (when parked outdoors for some time).

4.7.6.3 After long-term storage

Procedures for preparing the machine for use after its long-term storage shall be specified (see also ISO 6749).

4.7.7 Machine — Technical data

The operator's manual shall specify all major data relating to the functioning of the machine. As a minimum the following shall be specified, as applicable, using the terms defined according to this International Standard and those listed in Clause 2:

— electrical system (battery, bulbs, fuses, etc.);

— cab (ROPS, TOPS or FOPS protective structures, heating and ventilation, operator seat, and if tested according to applicable standards);

— machine capacity with relevant drawing(s) for, e.g. lifting height, reach, overall length, maximum height, clearance circle, tipping load, load capacity (payload), permissible load on front, rear and bogie axle(s), excavating depth, machine and component masses, ground speed (see ISO 6014), turning dimensions (see ISO 7457), with different attachments and equipment where applicable;

— fluid capacity when changing/filling and total volume in, e.g. engine including filter, transmission and torque converter including filter, front/rear axles including hub reduction gears, hydraulic systems, hydraulic tank, fuel tank, cooling system, water tank, oil-bath pre-cleaner and air-pressure vessel capacity.

5 Use of terms related to security

The indications “DANGER”, “WARNING” and “CAUTION” shall be used for safety-related information where personal injury can be involved. Instructions are provided in ISO 9244. Instructions identified as “IMPORTANT” and “NOTE” may be used to emphasize important points in the manuals.

Annex A
(informative)

Format of operator's manual

A.1 General consideration

This annex provides guidance on the presentation and format of operator's manuals for earth-moving machinery.

A.1.1 Paper size

The preferred paper size is A4 (210 mm × 297 mm). Where appropriate, a different size book may be used, e.g. A5 (210 mm × 148 mm).

A.1.2 Covers

The cover of the manual(s) should have the same size as the pages of the manual(s) and preferably be made of stiff, durable material resistant to oil, lubricants or water.

A.1.3 Notes

One or two blank pages can be included at the back of the manual(s) for notes on individual conditions.

A.2 Presentation of the text

A.2.1 General

The manual(s) should be written in a style and language which can be readily understood by the operator. Manuals should be available in the language of each country where the machine is sold.

A.2.2 Style of text

The text of the operator's manual(s) should be brief and simple and adapted to the category of operators who will use the manuals. Sentences should be short and direct. Words used should be explained or defined each time if there is a risk of misunderstanding.

Instructions should be positive and given in the imperative. Negative statements should only be used sparingly.

A.3 Typographic design

A.3.1 Type size

The type size of the main text should not be less than 10 points.

A.3.2 Columns

Text on A4 format paper should usually be presented in two columns and that on A5 format paper in a single column.

A.3.3 Headings

Headings should be used consistently throughout the manual(s). Headings should be in a larger type size than the text and in a bolder typeface or an alternative colour. To avoid confusing the reader, the number of levels should be kept to a minimum; normally three levels will provide sufficient subdivision of topics.

A.4 Text conventions

A.4.1 General

Consistent forms of language spelling, numbering, symbols, etc. should be used throughout the manual(s).

A.4.2 Terminology and dimension(s)

Dimensional drawings in accordance with ISO 6746-1 and ISO 6746-2 and terms in accordance with the relevant terminology/commercial specifications standards should be used consistently throughout the manual(s).

A.4.3 Symbols

Graphical symbols for operator controls and displays should conform to ISO 6405-1 and ISO 6405-2. All terms and symbols should be defined.

A.4.4 Upper case letters

Words set in upper case letters should be used sparingly. It is usually preferable to use bold lower case letters to emphasize key words or phrases. When referring to controls which have identifying titles on them (e.g. STOP control), then upper case letters may be used.

A.4.5 Measurements and quantities

All measurements and quantities should be expressed in *International System of Units* (*SI*) units, followed, where appropriate, by an equivalent alternative in parentheses.

A.4.6 Numbers

All numbers should be written in Arabic numerals. When a sentence starts with a number, the number should be expressed in words or the sentence reordered to move the number from the beginning of the sentence. Numbers consisting of more than four digits (except dates) should be shown in groups of three, e.g. 21 000.

A.5 Illustrations

A.5.1 General

Illustrations with supporting text are, in general, a “user-friendly” way of presenting technical information. Illustrations should be as simple as possible with no superfluous information. Good illustrations provide relief in what could be a difficult document for the reader. It is important that no words appear on the illustrations.

Use numbers, letters or symbols on the illustration, with an explanation for each number, letter or symbol used in the text of the manual(s). Where an illustration appears in the text of the manual(s) it should be referred to as a “figure”. Illustrations, diagrams, graphs, and tables should be used in preference to written text. They should be clear simple and be placed adjacent to the corresponding reference.

Machines, attachments and equipment should be illustrated from the right towards the left.

A.5.2 Use of colour

Colour should be used only if it is necessary to clarify complicated diagrams. Techniques such as shading, cross-hatching, and screening should be used in preference to colour. If colours are used, primary colours are preferable, while avoiding the use of red and green in combination.

A.5.3 Charts

Information which is required frequently, or which is easier to explain in flow form, should be included as charts. These should be accompanied by a glossary of abbreviations, symbols, and any unfamiliar terms.

A.5.4 Tables

Tables should be presented with the minimum number of lines required for clarity. A title and number should be provided for each table.

A.6 Alphabetical index

An alphabetical index with page numbers should be included, at the end of the manual(s). The index should conform to the relevant provisions of ISO 999.

Bibliography

[1] ISO 999:1996, *Information and documentation — Guidelines for the content, organization and presentation of indexes*

[2] ISO 3600:1996, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Operator's manuals — Content and presentation*

ICS 53.100

Price based on 13 pages