International Standard ISO 6750

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Earth-moving machinery — Operation and maintenance — Guide to the format and content of manuals

Engins de terrassement — Emploi et entretien — Guide pour la présentation et le contenu des manuels techniques

First edition — 1981-08-15

UDC 621.878/.879 : 62-7 **Ref. No. ISO 6750-1981 (E)**

Descriptors : earth handling equipment, operating requirements, documents, handbooks.

Price based on 15 pages

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 6750 was developed by Technical Committee ISO/TC 127, *Earth-moving machinery*, and was circulated to the member bodies in March 1980.

It has been approved by the member bodies of the following countries :

Australia	Finland	Romania
Austria	Germany, F. R.	South Africa, Rep. of
Belgium	India	Sweden
Brazil	Italy	United Kingdom
Bulgaria	Japan	USA
Czechoslovakia	Pakistan	USSR
Egypt, Arab. Rep. of	Poland	

No member body expressed disapproval of the document.

Annex B of this International Standard cancels and replaces ISO 3542-1975.

Printed in Switzerland

Earth-moving machinery — Operation and maintenance — Guide to the format and content of manuals

0 Introduction

In preparing this International Standard consideration has been given to the fact that drivers, operators and mechanics may have received only a short training in a language in which they are not proficient.

A manual must therefore

a) be simple to understand and have adequate explanatory notes;

b) incorporate the use of internationally recognised symbols;

c) be easy to use, compact and made of durable hard-wearing material.

1 Scope and field of application

This International Standard establishes guidelines on the general rules necessary for the preparation and presentation of manuals for earth-moving machinery as defined in ISO 6165.

2 References

ISO 4510, *Earth-moving machinery — Maintenance and adjustment tools.*

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

ISO 6405, *Earth-moving machinery — Symbols — Operator controls and others.*[1)]

ISO 6746/1, *Earth-moving machinery — Commercial nomenclature — Definitions of dimensions and symbols — Part 1 : Basic machines.*[1)]

ISO 6746/2, *Earth-moving machinery — Commercial nomenclature — Definitions of dimensions and symbols — Part 2 : Equipment.*[1)]

ISO 6749, *Earth-moving machinery — Operation, maintenance, preservation and storage*[1)].

1) At present at the stage of draft.

3 Presentation of the manuals

3.1 General

The presentation of the manuals is important. They are working tools which should be both convenient and complete.

The text shall be simple and adapted to the category of individuals who will use the manuals with all information being explicit and comprehensive.

The words used shall be explained or defined each time if there is a risk of misunderstanding.

Illustrations, diagrams, graphs and tables shall be used in preference to written text. They shall be clear, simple and be placed adjacent to the corresponding reference.

The terms, definitions, units and symbols shall comply with the relevant International Standards.

Prominence shall be given to safety in operation, routine servicing and maintenance, and field and workshop repairs. All information related to personnel safety should be in bold type and identified by the ISO warning (safety alert) symbol.

Items for the manuals may be included or deleted at a manufacturer's discretion, relative to an individual type of machine and its application.

3.2 Number of books

The manuals should be published as one or more books. A typical arrangement would be :

- Operator Manual : contains those items pertinent to the starting, stopping and operation of the machine.
- Lubrication Manual : contains those items pertinent to the selection and application of fuels, coolants, and lubricants essential to the proper operation of the machine.
- Maintenance Manual : contains those items pertinent to cleaning, replacing, and adjusting that would normally be carried out at the work site.

— Parts Manual : contains the identification of all items supplied as replacement parts.

— Workshop Manual : contains those items pertinent to the removal, disassembly, repair, installation and testing of all machine components that would normally be carried out in a workshop.

— Specification Manual : includes all relevant dimensions and technical data.

The choice of the volume and grouping of the books should be suitable for the type of product, its normal application and personnel requirements. It is often appropriate to split the maintenance and lubrication manuals into sections dealing with individual systems.

Whilst the majority of earth-moving machines are delivered to site ready to work, there are some machines (for example, large hydraulic excavators and heavy bulk haulage units) that involve substantial on-site erection/assembly. For these machines a separate erection manual is recommended.

3.3 Size of books

The pages shall be easily readable and adequately illustrated. Recommended size is 210 mm × 297 mm (8 1/2 in × 11 in). Where appropriate, a smaller sized book may be used.

3.4 Cover of the manuals

The cover and the pages of the manuals shall preferably be made of a material which resists the action of oil, lubricants or water. The cover shall be of an appropriate size to protect the internal pages.

3.5 Preliminary information

The following information shall be given on the front or back cover, or on the first pages of the manuals :

a) title of manual;

b) reference number of manual;

c) designation (type) of machine;

d) type (model) and/or series of machine;

e) serial number or numbers of machine, or where appropriate, range of serial numbers covered;

f) year of manufacture (where appropriate);

g) name and full address of manufacturer and/or distributor;

h) table of contents;

j) alphabetical index may be given at the end of the manual (optional).

4 Contents of the operator manual

This manual shall cover at least the topics specified in 4.1 to 4.4.7. Where appropriate, cross-reference to other parts of the manuals should be made so that the same information is not repeated unnecessarily.

4.1 Machine data

The following information relevant to operation of the machine shall be included :

a) a general view of the machine and its attachments (drawings or photographs) of sufficient size to be quite clear, showing nomenclature of major components, their functions, locations and relationships with the whole machine (lubrication, filling and drain points are included in the Lubrication Manual; see 5.2);

b) operating instructions;

c) the prime mover (power plant);

d) illustration showing the location of the different serial numbers (chassis, engine, winch, etc.);

e) the location of the hour-meter (illustration);

f) layout of instrument panel and position of operator's controls (illustration).

4.2 General safety rules

Typical of the items which shall be included are the following :

a) regarding the machine (for example, chocking the wheels, greasing shall not be carried out when the engine is running);

b) regarding the site (for example, do not stop machine on a slope which is liable to collapse);

c) regarding securing the machine to prevent accidental setting in motion, engine starting, etc.;

d) regarding the working clothes (for example, wear a safety helmet, do not wear oil stained or damaged garments).

4.3 Operator's controls

The following information shall be included :

a) description of the operator's controls and direction of movement;

b) layout of the controls with respect to the operator at his post;

c) identification of instrumentation;

d) identification of all symbols used (see ISO 6405).

4.4 Operation and use

4.4.1 General

The information given under this heading should be edited under the assumption that it may be read by an operator who has only recently completed his training. Therefore, repeat instructions generally considered as known, but easily forgotten, such as :

a) do not rest your foot on the clutch pedal;

b) do not speed engine when it is cold.

Earth-moving machinery is often exported and the risk exists that the manual will not be translated. Therefore, use a large number of photographs, diagrams and views in perspective to facilitate comprehension. Wherever possible, manuals should always be translated into the language of the country of use.

The information in 4.4.2 to 4.4.7 shall be included.

4.4.2 Commissioning, starting and stopping

Give all the useful information regarding the different preliminary checks, the instructions and the safety controls that must precede putting a new machine (or where applicable a used machine) into operation such as :

a) list of the checks and verifications to be performed prior to starting the machine :

- fluid levels and inspection for leaks;
- loose, worn and missing parts;
- removal of built-up material on tracks, axles, etc.;
- tyre pressure and condition of tracks, etc.;

b) sequential order of operations to start the engine :

- position of the controls;
- starting the engine at various ambient temperatures and in adverse climatic conditions;

c) sequential order of operations to stop the machine :

- operations to halt machine;
- operations to park machine (positions of controls and attachments);
- period of idling;
- operations to stop engine;
- locking.

4.4.3 Daily operation

The role of different operating controls and how to use them, as follows :

a) list of checks and verifications to be performed prior to operating the machine :

- instrumentation checks (oil pressure, etc.);
- warm-up;
- functional checks (steering, brakes, etc.);

b) list of checks and verifications to be performed while operating the machine :

- instrumentation checks;
- function of warning devices;
- operator safety warnings;

c) advice on efficient operation :

- safety precautions (see 4.2);
- selection of gears;
- steering;
- operation of attachments;
- operation techniques;
- stopping and parking;
- operating adjustment (for example, dozer angle);
- daily precautions after work.

4.4.4 Mounting and dismounting of equipment and attachments

Include only those items that an operator can handle. Attachments requiring the assistance of skilled workshop mechanics are included in the Workshop Manual (see clause 8) :

a) operation to be performed;

b) necessary tool kit;

c) precautions to be taken.

4.4.5 Movement of machine between work sites

Indicate matters of specific relevance, for example :

a) driving on the road (for example, follow the traffic regulations with respect to construction machinery);

b) method of loading and securing for transportion by road vehicle, railway truck or other modes of transport;

c) method of slinging, including sling points;

d) method of towing (see 6.4).

4.4.6 Special conditions of use

Emphasize precautions necessitated by hazards likely to be encountered, of which the following are typical :

a) precautions to be taken during cold weather :

— refer to Lubrication Manual regarding lubricants, hydraulic fluids, coolants, etc.;

— special precautions (for example, electrical equipment, starting motor, etc.);

— operations to warm up machine;

b) precautions to be taken during hot weather;

c) precautions to be taken for utilization in water, mud etc.;

d) precautions to be taken for utilization in dusty atmospheres;

e) precautions to be taken for other special conditions, for example, high altitude or corrosive atmospheres, etc.

4.4.7 Preservation and storage

Brief guidance shall be given to enable machine users to store machines for short periods in the field. Typical information would be :

a) replace and secure all weatherproof covers;

b) change all lubricants and fluids that may have deteriorated with use;

c) check anti-freeze properties or drain fluid as appropriate;

d) check that storage site is not subject to flooding or other natural hazard;

e) wherever practicable run prime movers and operate all motions at regular intervals;

f) for guidance for storage for longer periods refer to ISO 6749.

5 Contents of the Lubrication Manual (including details of fuels and other fluids)

This manual shall cover at least the topics specified in 5.1 to 5.4. Where appropriate, cross-reference to other parts of the manuals should be made so that the same information is not repeated unnecessarily.

5.1 Data for fuels, lubricants, hydraulic fluids, coolants, etc.

The following information shall be included and should normally be located in an annex :

a) specifications of the fuels, lubricants, hydraulic fluids, coolants etc. to be used. Their designation should be made in accordance with the International Standards in force;

b) tank and circuit capacities (in litres).

A typical table for lubricants is given in table 1.

Table 1 — Example of lubrication table

Part	Capacity l	Temperature of the air °C	Recommended ISO classification	Standard symbol reference mark
Engine	18	below 10	ISO ...[1]	—
		above 10	detergent ISO...[1]	—

1) Relevant classification.

NOTE — It is desirable that this table should be repeated outside the manual either on a plasticized folding sheet in a pocket-case or on a metal sheet to be fixed on the machine or by any other means having the same durability.

5.2 Lubrication schedule

This schedule shall cover lubrication requirements indicating time intervals at which these are to be carried out (see annex B). It shall include a diagram (a typical example is shown in annex C).

NOTE — It shall preferably also be published on a plasticized folding sheet in a pocket case or on a metal sheet fixed on the machine or by any other means having the same durability.

The diagram shall indicate the points of lubrication and filling and drain points on an outline of the machine. Each reference point shall preferably be accompanied by the symbol of the lubricant to be employed and by the symbol indicating the frequency of the operation.

Also, the diagram shall be accompanied by tables which regroup the lubrication operations by periods (every 10 h, every 50 h etc.).

In each table, these operations shall be classified by the characteristics of the lubricant to be used (grease, oil) and the symbols included.

Each operation shall be described in a simple text accompanied by illustrations indicating the procedure and the tools needed.

The reference marks identifying the lubrication points shall be the same as those on the lubrication diagram.

Table 2 — Typical column heading — Maintenance table

Operation and location	Every 10 hours or every shift	Every 50 hours or every week	Every 100 hours	Etc.

5.3 Lubrication safety and other precautions

The following is typical of the information which should be included :

a) daily reading of the hour-meter (it is this operation which determines the time of the lubrication operations);

b) safety precautions :

— general recommendations regarding safety while lubricating a machine (for example, do not grease a machine which is parked not according to manufacturer's instructions);

— take precautions to prevent fire;

— include precautions to prevent maintenance personnel being injured with hot oil and dangerous chemicals;

c) other precautions :

— avoid mixing lubricants; flush before refilling;

— ensure the machine is level before filling sumps, tanks etc.;

— oil should only be changed with the engine hot;

— clean carefully all lubricating fittings, breathers, oil check windows etc.;

— change/clean all filters as appropriate;

— check the condition of the sealing gaskets (do not forget to put them back);

— when an engine is drained, clearly mark it so that it is not operated before it is refilled;

— analyse drained lubricant if appropriate.

5.4 Routine servicing of systems — Hydraulic, electric, cooling (engine) fuel

Emphasize precautions specific to these systems.

6 Contents of the Maintenance Manual

This manual shall cover the elementary maintenance and adjustments which are possible with the tool set supplied with the machine or tools which are normally available to the operator, and which can be performed in the field by the operator or by his team.

6.1 Maintenance

The maintenance operations and their frequency shall be grouped in a table, typical column headings of which are shown in table 2. In order to simplify the work and to decrease the time involved, the frequency should correspond whenever possible to the frequency indicated on the lubrication table; those frequencies will be determined so that several operations may be performed at the same time (see annex B).

Where necessary the tabular information should be amplified by description :

a) component or part (use the terms of the alphabetical index) together with drawing or photograph;

b) the procedure of the operation and the troubles which may ensue if the instruction is not followed;

c) the tools required with reference to ISO 4510.

6.2 *Safety during maintenance operations*

Typical of the precautions which should be included for observation by the operator and field service team are the following :

a) regarding the machine (for example, chocking the wheels, parking, etc.);

b) regarding the site (for example, do not work on a machine on a slope which is liable to collapse);

c) ensure buckets, blades, etc. are lowered to ground and/or blocked in position.

6.3 Wear limit

The wear limit of the parts which are considered to be normal wear items and which can be measured without machine dismantling (for example, cutting edges, teeth, rolling gear, etc.) shall be given in a table with the column headings as presented in table 3.

Table 3 — Typical column headings — Parts : wear limit

Designation	Reference	Original size	Wear Limit size	Reference of the control gauges

Where appropriate, refer to the gauges supplied by the manufacturer. For wear limits for precision dimensions see Workshop Manual (see 8.1).

Table 4 — Table format — Codification of main troubles

Trouble	Location	Probable cause(s)	Remedy
Engine does not start readily	Air intake Fuel system	Filter blocked Dirty—defective injectors	Clean/Replace Clean/Replace
Gear engagement difficult	Clutch	Wear	Adjustment

6.4 Field repairs — Codification of main troubles

Define the incidents discernible when starting or driving, working with the help of measuring devices (for example, instruments, tyre gauge, etc.) at the disposal of the operator or site foreman and using the tools supplied with the machine or normally available to the operator. These tools would normally be selected from those included in ISO 4510. Classify these troubles in a table covering each component in turn (engine, tracks, etc.) for example as in table 4.

In addition, the procedure shall be specified to prepare the machine for towing etc. in case of breakdown, including where appropriate the method of towing.

6.5 Operator's tool kit

Only tools in ISO 4510 available to the operator or to the field servicing team for the routine maintenance and servicing of the machine shall be included.

7 Contents of the Parts Manual

This manual shall include clear identification and ease of location for all items supplied as replacement parts or assemblies. It is the source of reference for operators, servicemen, workshop mechanics and parts supply personnel when ordering parts or assemblies and performing maintenance functions.

7.1 General content

The following information should be included :

a) index of major assemblies, showing page number and/or section;

b) illustration of product, identifying major assemblies and applicable page number and/or section;

c) details of all constituent units of the machine including identification of replacement parts and assemblies;

d) identification of all parts and part numbers on a diagram, photograph etc. by arrow or other suitable method;

e) where practicable, a numerical list or lists of all part numbers preferably grouped by major assemblies or pages. Where indexed separately, include a cross-reference to the page number on which the part is shown;

f) list of such materials as sealing compounds etc. for use in hydraulic and other fluid systems, stating part number where appropriate;

g) when parts which comply exactly with an International or national standard are used, the appropriate standard reference, in addition to the manufacturer's identification, should be shown;

h) part numbers of available assemblies such as engine, transmission, clutch, cylinder, pump, valve etc. shall be listed, together with their components, for "unit exchange" performed in the field.

7.2 Form of constituent illustrations

Each figure shall be identified by a suitable figure reference number and title (for example, figure 101 Engine Mount). The presentation should preferably be a clear axonometric or other pictorial view, using "exploded" techniques where clarity and understanding would be improved. Separate enlarged views of intricate and complicated areas of the illustration shall be provided as "detail views". Each part or assembly shall be suitably designated with the part or index number to allow convenient reference to the parts list or index.

7.3 Format of Parts List

A typical column heading layout would be as shown as in table 5 :

Table 5 — Typical column headings — Parts list

Figure reference number (1)	Part number (2)	Quantity (3)	Description (4)	Master drawing No, Remarks, etc. (5)

The quantity shown in column 3 shall be, for assemblies, the total quantity per machine, and for component parts, the quantity used per assembly.

The description in column 4 should be brief and where practicable, shall conform to the recognized ISO definition or International Standard. Reference should be made to the master drawing, recorded in column 5 for full details of size, specification, etc.

8 Contents of the Workshop Manual

This manual shall cover repair and maintenance which does not fall within the category of routine service and maintenance (see 6.1 to 6.5). This would include all major repairs and overhauls whether carried out in the workshop or field, and would normally be carried out by skilled specialist mechanics. Also included should be mounting procedures for all optional attachments to be fitted by skilled workshop personnel (attachments for fitment by the operator are covered by 4.4.4).

8.1 Repair procedure

Give sectionalized illustrated repair instructions by major assembly and system covering the following :

a) troubleshooting procedures;

b) sequential disassembly and assembly including relevant torques, preload, and other assembly specifications;

c) specification of parts and assemblies for which precision checking of wear is necessary including allowable wear limits;

d) specification of workshop tools and fixtures.

8.2 Test and inspection procedures

List the workshop test etc. procedures appropriate to the machine, including :

a) details of any special test equipment, gauges etc.;

b) test and inspection programme;

c) designation of any International or national standard with which the test or inspection complies;

d) details of any adjustments specific to the test or inspection, etc.

8.3 Safety — General

The following are typical of the items to be included for observation by skilled workshop personnel :

a) ensure buckets, blades etc. are lowered to ground and/or blocked in position;

b) ensure all heavy frames and structures are adequately supported and secured during work on major units;

c) observe appropriate precautions when welding relative to bearings, battery and electric circuit;

9 Contents of the Specification Manual

This manual shall include all relevant dimensions and technical and commercial data to assist the user's technical and operational personnel to make a proper assessment and to enable the user to obtain a high standard of operational performance and reliability. Realistic basic dimensions are particularly important. The relevant International or national standard(s) to which the machine, or its constituent parts, has been built should be stated when applicable.

9.1 Content

A schedule from which the content of typical data for this manual may be selected is given in annex A.

Annex A

Schedule of typical technical data (See 9.1)

(This annex forms part of the standard.)

A.1 General identification

Trade mark or name of the machine

Type of machine

International or National Standard(s) to which the machine (or its Constituent parts) has been built

Serial number and product range

Name and address of manufacturer

Year of manufacture

Rated capacity of standard equipment

Maximum depth and width of excavation with standard equipment

Additional equipment that can be fitted to the machine (see A.3 and A.4)

A.2 Characteristics of the basic machine

A.2.1 General dimensions

These may be presented in table or dimensioned diagram or both, with standard equipment (see ISO 6746/1 and /2).

A.2.2 Type of mounting

State whether crawler or wheeled.

A.2.2.1 Crawler

Dimensions between sprocket axis and the idler axis

Length of track on ground

Transverse width over tracks

Number and size of track shoes

Brief details of sprockets, rollers and idlers

A.2.2.2 Wheeled

Type of suspension and wheelbase

Number of and disposition of axles, driving and non-driving

Number, sizes, types and inflation pressure of tyres

Type of steering mechanism

Stabilizer supports or outriggers :

- number;
- position;
- method of operation;
- dimensions with outriggers extended including bearing area.

Running and parking braking systems

Directional (including turning) indication system

Details of towing system if fitted

A.2.3 Prime mover

A.2.3.1 Internal Combustion Engine

Name of manufacturer

Type of engine

Model of engine

Serial number of engine

Number of cylinders

Bore

Stroke

Total cylinder capacity (displacement)

Rated power (indicate selected standard) specifying ambient conditions

Type of fuel filter and element replacement designation

Type of lubricant filter and element replacement designation

Type of air cleaner and any replaceable element details

Type of diesel fuel injection pump or carburettor

Type of d.c. generator or alternator rating

Type of starting system, including rating of starter

Type of cooling system

Fuel tank capacity

A.2.3.2 Electric motor

Name of manufacturer

Type of motor, and category of frame protection

Frame size and designation

Serial number

Voltage

Full load current

Frequency

Phase connections

Power output (indicate selected standard) specifying ambient conditions

Normal operating speed

Type of rotor

Method of starting

A.2.4 Rotating structure (where applicable)

Method of attachment to and rotation on main frame

Details of rotate (slew) drive and transmission

System of swing control

Counterweight

- location;
- unit constituents and chart showing counterweight content relative to load;
- assembly on machine and split for transport.

A.2.5 Main power transmission accessories

A.2.5.1 Mechanical

Types of clutches and brakes

Drive chain replacements, details of sprockets, spur wheels etc.

Belt replacements, details of Vee pulleys, etc.

A.2.5.2 Hydrodynamic

Torque converter make and type

A.2.5.3 Hydrostatic — Make and type of pumps and motors

Hydraulic pumps; indicate the following for each pump :

- rotation speed;
- rated capacity of the pump;
- service operating pressure (for regulator type pump specify the system of flow control);
- distributors and manifolds : brief description.

Cylinders :

- type used, fixed or variable displacement;
- operating pressure.

Hydraulic motors :

— speed range, power and torque;

— operating pressure.

A.2.5.4 Cooling media

Rating, make, type and serial numbers of heat exchangers and other devices for oil cooling

A.2.6 Auxiliary circuits and transmissions

Schematic diagram of the auxiliary hydraulic circuits of the machine and of the various equipment

Piping :

general description of the piping system, including valves, etc,;

Cooling system :

rating, make and type of heat exchangers or coolers;

Mechanical auxiliary transmissions :

give details of belts, pulleys, gears, etc.;

Other types of auxiliary transmissions :

description of the type utilized (electric, pneumatic, hydraulic, etc.) giving details of control valves switchgear, etc.

A.2.7 Air and electrical components

Compressor make and type

Compressor rating, operating pressure and speed

Details of air valves and controls

Battery type and capacity

Details of electrical controls and equipment

Schematic diagram of the air piping layout and/or electrical circuits of the machine and the various equipment

A.2.8 Winch (if fitted)

Make, type and serial number

Model

Maximum line pull through range of operating speeds (i.e speed/load characteristic)

Rated maximum speed

Rope line specification

A.2.9 Safety devices

Audible and visual alarms, cut-outs, etc.

A.2.10 Requirements to comply with traffic regulations

For machines to carry payload on road

For machines to travel, unloaded, between work locations

A.3 Characteristics of the equipment

A.3.1 Equipment of the jib (boom) and type of articulated arm

Type of jib (boom) indicating main dimensions

Range of extension and operation

Type of arm(s)

Operating clearance with the principal dipper or buckets for each combination of jib and arms

Fixings for the mounting of cylinders and oil piping

Buckets and accessories that can be mounted on each type of arm indicating width, section, capacity and bucket mass

System of control

A.3.2 Equipment of the telescopic jib type

Maximum and minimum length of the jib from pivot point to accessory mounting point

Method of control of extension/retraction

Method of horizontal rotation and elevation of the jib

Buckets and accessories that can be mounted at the end of the jib and of its extensions, indicating width, section, capacity and bucket mass

A.3.3 Equipment for jib hoisting with cable

Maximum and minimum length of the jib from pivot point

Method of securing the jib

Devices operating the rope : cylinders or mechanically or hydraulically driven winch

Rope attachment to hook or winch drum

Rating table or chart showing permissible loads throughout operating range

Specification of rope or cable

A.3.4 Other attachments

Brief specification of those equipments that can be mounted on the fixing points on the basic machine

Grab buckets :

- overall dimensions and capacity;
- mass of empty bucket;
- mechanism for opening and closing;
- details of oil feed or rope operation;

— system of rotation of bucket.

Bull or angle-dozer, scraper, grader or other blade details

Ripper, etc.

A.4 General characteristics of the machine

A.4.1 Mass (working)

Base machine (net) including full fuel and oil tanks etc.

Attachments (listed separately, see table 6)

Table 6 — List of accessories or equipment

Attachments or equipment			
Back hoe	Bulldozer	Loader	etc.

Total net mass of machine (equipped as specified)

A.4.2 Approximate shipping mass

A.4.3 Overall shipping dimensions

A.4.4 Main outline dimensions of machine in working order

Preferably show on diagram

A.4.5 Wheel or crawler loading

Include tyre pressure or mean crawler ground pressure or ground pressure under outriggers for rated loading

A.4.6 Travel characteristics

Speeds for various gear ratios

Turning circle (where appropriate)

Tyre or crawler ground pressure when rigged for travelling unloaded

Any special features regarding stability of the machine, including maximum incline for travelling unloaded.

A.4.7 Operation of rotating structure

Rotational speed

Radius of tail swing

A.4.8 Tank sump and gearcase capacity table or chart

Fuel

Engine crankcase

Machine body sump

Torque converter

Gear and axle boxes

Transmission and/or chain case

Air compressor

Heat exchanger or cooler including all pipework etc.

Radiator, including all hoses, pipework etc.

Coolant etc. additive, for example anti-freeze

Capacity of hydraulic system including pipework, pumps, motors, cylinders, etc. and reservoir tank

Annex B

Recommended lubrication intervals (See 5.2)

(This annex forms part of the standard.)

The recommended lubrication intervals are given below.

The designer should attempt to eliminate service intervals that are outside these time periods.

A minimum of maintenance at extended periods is the recommended goal for lubrication intervals.

Recommended intervals :

10 h or each shift

50 h or 1 week[1)]

100 h

250 h

500 h

1 000 h or 6 months[1)]

2 000 h

5 000 h

1) Whichever occurs first.