INTERNATIONAL STANDARD

ISO 20474-9

First edition
2008-12-15

Earth-moving machinery — Safety —

Part 9: Requirements for pipelayers

Engins de terrassement — Sécurité —

Partie 9: Exigences applicables aux tracteurs poseurs de canalisations

Reference number
ISO 20474-9:2008(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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 20474-9 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 2, *Safety, ergonomics and general requirements*.

ISO 20474 consists of the following parts, under the general title *Earth-moving machinery — Safety*:

— *Part 1: General requirements*

— *Part 2: Requirements for tractor-dozers*

— *Part 3: Requirements for loaders*

— *Part 4: Requirements for backhoe-loaders*

— *Part 5: Requirements for hydraulic excavators*

— *Part 6: Requirements for dumpers*

— *Part 7: Requirements for scrapers*

— *Part 8: Requirements for graders*

— *Part 9: Requirements for pipelayers*

— *Part 10: Requirements for trenchers*

— *Part 11: Requirements for earth and landfill compactors*

— *Part 12: Requirements for cable excavators*

— *Part 13: Requirements for rollers*

— *Part 14: Information on national and regional provisions* [Technical Specification]

Introduction

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

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

Provisions that are applicable for Australia, EU, Japan or the USA, and which are mandatory for compliance with specific governmental laws, directives or regulations in force in the particular country or region, are given in ISO/TS 20474-14.

NOTE Other countries or regions may also have regional requirements.

Earth-moving machinery — Safety —

Part 9: Requirements for pipelayers

1 Scope

This part of ISO 20474 gives the safety requirements specific to pipelayers as defined in ISO 6165. It is intended to be used in conjunction with ISO 20474-1, which specifies general safety requirements common to earth-moving machine families, and with ISO/TS 20474-14, which gives information on provisions that are mandatory in particular countries or regions. The specific requirements given in this part of ISO 20474 take precedence over the general requirements of ISO 20474-1.

This part of ISO 20474 deals with all significant hazards, hazardous situations and events relevant to the earth-moving machinery within its Scope when used as intended or under conditions of misuse reasonably foreseeable by the manufacturer (see also ISO/TS 20474-14). It specifies the appropriate technical measures for eliminating or reducing risks arising from significant hazards, hazardous situations or events during commissioning, operation and maintenance. It is not applicable to machines manufactured before the date of its publication.

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 3411, *Earth-moving machinery — Physical dimensions of operators and minimum operator space envelope*

ISO 4308-1, *Cranes and lifting appliances — Selection of wire ropes — Part 1: General*

ISO 6165:2006, *Earth-moving machinery — Basic types — Identification and terms and definitions*

ISO 6393, *Earth-moving machinery — Determination of sound power level — Stationary test conditions*

ISO 6394, *Earth-moving machinery — Determination of emission sound pressure level at operator's position — Stationary test conditions*

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

ISO 7597, *Forged steel lifting hooks with point and eye for use with steel chains of grade T(8)*

ISO 8813, *Earth-moving machinery — Lift capacity of pipelayers and wheeled tractors or loaders equipped with side boom*

ISO 9244, *Earth-moving machinery — Machine safety labels — General principles*

ISO 10968, *Earth-moving machinery — Operator's controls*

ISO 19472, *Machinery for forestry — Winches — Dimensions, performance and safety*

ISO 20474-1:2008, *Earth-moving machinery — Safety — Part 1: General requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 20474-1 and ISO 7136, and the following, apply.

3.1
pipelayer
self-propelled crawler or wheeled machine, having pipe-laying equipment with main frame, a load-hoist mechanism, vertically pivotable side boom, and counterweight, primarily designed to handle and lay pipes

[ISO 6165:2006, definition 4.11]

4 Safety requirements and/or protective measures

4.1 General

Pipelayers shall comply with the safety requirements and/or protective measures of ISO 20474-1, in as far as those are not modified by the specific requirements of this clause.

4.2 Operator's station

4.2.1 Cab

ISO 20474-1:2008, 4.3.1, shall apply, with the exception that pipelayers need not be equipped with a cab.

Nevertheless, the pipelayer shall be designed and built so that an operator's cab can be fitted. Moreover, the manufacturer shall be able to provide the cab on demand.

4.2.2 Window(s)

ISO 20474-1:2008, 4.3.2.7 and 4.3.2.9, shall apply, with the addition that pipelayers equipped with a cab shall be provided with a motorized wiper(s) and washer in the lifting direction.

4.2.3 Heating and ventilation

ISO 20474-1:2008, 4.3.2.6, shall apply if a cab is fitted.

4.2.4 Operator's seat

For mandatory national and/or regional provisions, see ISO/TS 20474-14.

4.2.5 Operator's protection

ISO 20474-1:2008, 4.3.3, is not applicable for pipelayers.

4.3 Stability and lifting equipment

4.3.1 General

ISO 20474-1:2008, 4.11, shall apply, with the following additions (4.3.2.1 to 4.3.2.5).

4.3.2 Lifting equipment

4.3.2.1 General

Lifting equipment shall be in accordance with ISO 8813.

4.3.2.2 Load lowering speed

A device to control the lowering speed of the boom and the hook shall be fitted so that under normal working conditions the operator can control movement and stop the load. This device shall not prevent the deliberate release of the free fall of the load hook (hook winch only).

4.3.2.3 Pipe-laying brakes

The pipe-laying system shall be fitted with brakes which can be released by controls and automatically applied when the operator stops actuating or when the power source fails. The brakes shall be designed to withstand 1,5 times the rated lift capacity under conditions specified by the manufacturer.

4.3.2.4 Hooks

Hooks shall withstand a test load of twice the working load limit (WLL) without permanent deformation and a breaking force (BF) of four times the WLL according to ISO 7597.

Hooks also used for applications other than pipelaying (e.g. transport or holding of special tooling equipment) shall have a safety latch that is in accordance with ISO 7597.

For mandatory national and/or regional provisions, see ISO/TS 20474-14.

4.3.2.5 Ropes

Ropes shall be selected in accordance with ISO 4308-1.

4.4 Rear-mounted winch

4.4.1 General

If a pipelayer is equipped with a rear-mounted winch, ISO 19472 should be used as guidance for design.

4.4.2 Mounting

The means for securing a winch to the machine structure shall be designed to withstand a force of twice the maximum line-pull that can be exerted by the rope, without permanent deformation.

4.4.3 Controls

The winch controls shall be located at the operator's station and shall be in accordance with ISO 10968.

4.4.4 Protection

Provision shall be made to allow fitting for protection when a rear-mounted winch is fitted.

Machines equipped with a rear winch shall have adequately sized protective screens (minimum 6 mm woven wire mesh with an opening of 45 mm $\times$ 45 mm) or equivalent protection between the operator and the winch.

The screen width and height shall cover at least the rear of the minimum space envelope as specified in ISO 3411.

4.5 Noise

4.5.1 Sound power level

The sound power level for pipelayers shall be measured in accordance with ISO 6393.

4.5.2 Emission sound pressure level at operator's station

The emission sound pressure level at the operator's station for pipelayers shall be measured in accordance with ISO 6394.

See also ISO 20474-1:2008, 4.13.2.2.

5 Verification of safety requirements and/or protective measures

ISO 20474-1:2008, Clause 5, shall apply.

6 Information for use

6.1 Safety labels

ISO 20474-1:2008, 6.1, shall apply, with the addition of a specific safety label when a winch is fitted, using the appropriate symbol in accordance with ISO 9244 (see also ISO 6405-2:1993, symbol no. 18).

6.2 Operator's manual

ISO 20474-1:2008, 6.2, shall apply, with the following additions:

— specific instructions for operators in how to work as a team (e.g. coordination, communication);

— instructions for operation of the side boom;

— instructions for operation and safe use of winches, if fitted;

— criteria for the need to fit a cab.

6.3 Machine marking

ISO 20474-1:2008, 6.3, shall apply, with the addition of marking of the maximum rated bare drum pull force of the winch, if fitted, in accordance with ISO 19472.

Annex A
(informative)

Illustrations

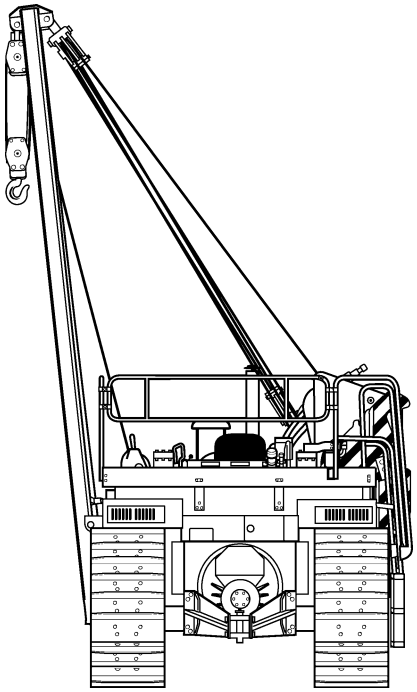

Figure A.1 — Crawler pipelayer

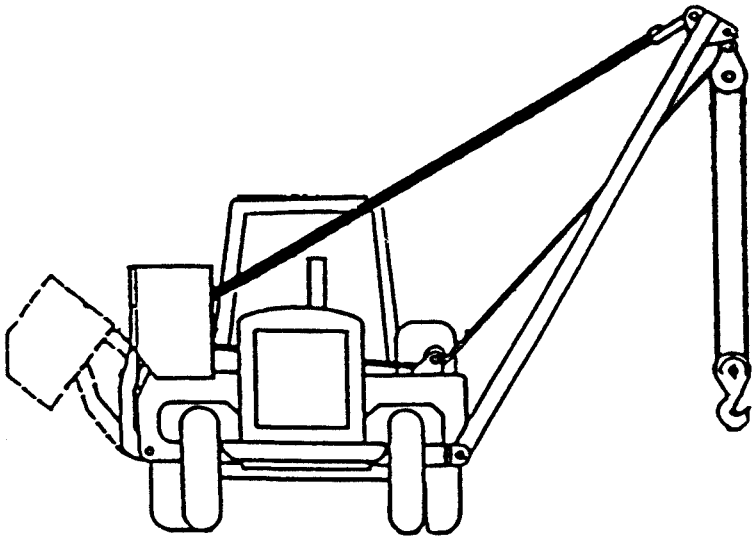

Figure A.2 — Wheeled pipelayer

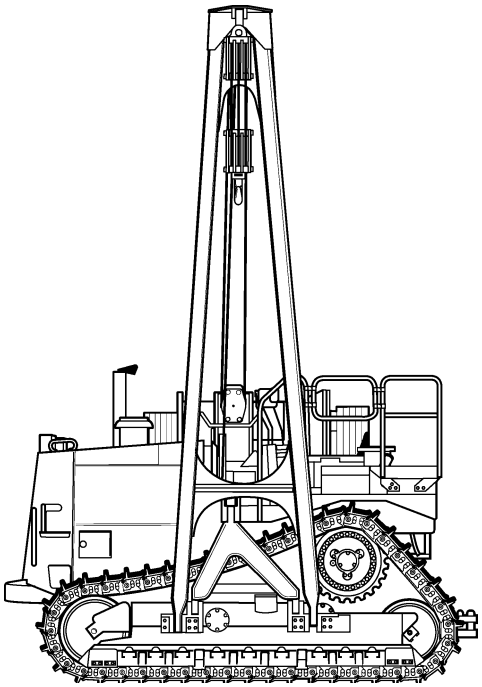

Figure A.3 — Pipelayer — Side view

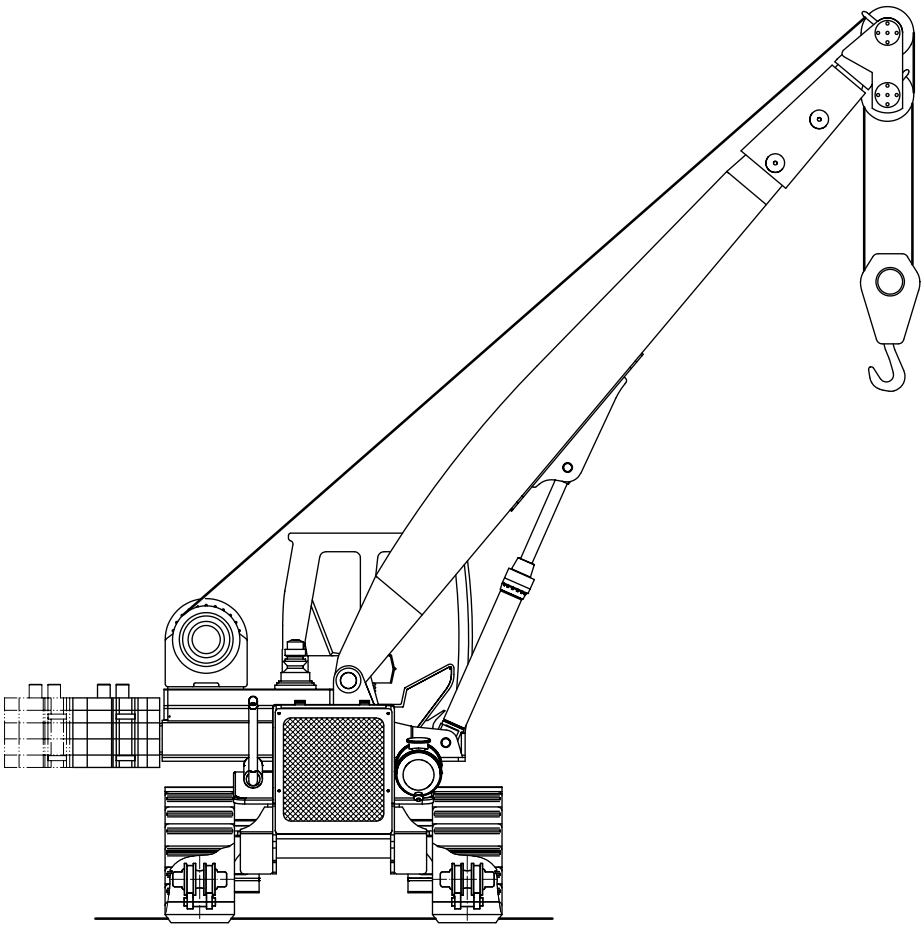

Figure A.4 — Crawler pipelayer with rotating upper structure

Bibliography

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

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

[3] ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology*

[4] ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles*

ICS 53.100

Price based on 7 pages