SLOVENSKI STANDARD
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Stroji za zemeljska dela - Varnost - 9. del: Zahteve za stroje za polaganje cevi

Earth-moving machinery - Safety - Part 9: Requirements for pipelayers

Engins de terrassement - Sécurité - Partie 9 : Prescriptions applicables aux poseurs de canalisations

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Earth-moving machinery - Safety - Part 9: Requirements for pipelayers

Engins de terrassement - Sécurité - Partie 9 : Prescriptions applicables aux poseurs de canalisations

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 474-9:2017) has been prepared by Technical Committee CEN/TC 151 “Construction equipment and building material machines - Safety”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 474-9:2006+A1:2009.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

For bibliographic references, see prEN 474-1:2017.

prEN 474 ”Earth-moving machinery — Safety” comprises the following parts:

— 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

This European Standard is intended for use in combination with part 1 of the series.

Introduction

This part of prEN 474 is a type C standard as stated in EN ISO 12100:2010.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this European Standard.

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

1 Scope

This part of prEN 474 deals with all significant hazards, hazardous situations and events relevant to pipelayers as defined in EN ISO 6165:2012 when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4).

The requirements of this part are complementary to the common requirements formulated in prEN 474-1:2017.

This part does not repeat the requirements from prEN 474-1:2017 but adds or replaces the requirements for application for pipelayers.

This part specifies the appropriate technical measures to eliminate or reduce risks arising from the significant hazards, hazardous situations and events during commissioning, operation and maintenance of pipelayers.

This part specifies additional requirements for rear mounted winches.

Pipelayers with rotating upper structure are excluded from the scope of this document. This European Standard is not applicable to pipelayers manufactured before the date of publication of this European Standard by CEN.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

prEN 474-1:2017, *Earth-moving machinery — Safety — Part 1: General requirements*

EN 1032+A1:2008, *Mechanical vibration — Testing of mobile machinery in order to determine the vibration emission value*

EN 1677-1+A1:2008, *Components for slings — Safety — Part 1: Forged steel components, Grade 8*

EN 1677-2+A1:2008, *Components for slings — Safety — Part 2: Forged steel lifting hooks with latch, Grade 8*

EN ISO 3411:2007, *Earth-moving machinery — Physical dimensions of operators and minimum operator space envelope (ISO 3411:2007)*

EN ISO 7096:2008, *Earth-moving machinery — Laboratory evaluation of operator seat vibration (ISO 7096:2000)*

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

ISO 16625:2013, *Cranes and hoists — Selection of wire ropes, drums and sheaves*

ISO 6393:2008, *Earth-moving machinery — Determination of sound power level — Stationary test conditions*

ISO 6394:2008, *Earth-moving machinery — Determination of emission sound pressure level at operator's position — Stationary test conditions*

ISO 6405-2:1993, *Earth-moving machinery — Symbols for operator controls and other displays — Part 2: Specific symbols for machines, equipment and accessories*

ISO 8813:1992, *Earth-moving machinery — Lift capacity of pipelayers and wheeled tractors or loaders equipped with side boom*

ISO 10968:2004, *Earth-moving machinery — Operator's controls*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 474-1:2017, EN ISO 12100:2010 and the following apply.

Note 1 to entry: Terminology for pipelayers is specified in ISO 7136:2006 and illustrated in Annex B of this European Standard.

Note 2 to entry: Definitions used in EN and ISO standards referred to in this European Standard are also valid for this document.

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

[Source: EN ISO 6165:2012]

4 List of additional significant hazards

See Annex A.

NOTE Annex A (normative) contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this European Standard, identified by risk assessment as significant for this type of machinery and which require action to eliminate or reduce the risk.

5 Safety requirements and/or measures

5.1 General

Pipelayers shall comply with the requirements of prEN 474-1:2017, as far as not modified or replaced by the requirements of this part.

5.2 Operator's station

5.2.1 Window(s)

prEN 474-1:2017, 5.3.2.5 shall apply with the addition that pipelayers shall be provided with motorised wiper(s) and washer in the travelling and lifting (e.g. side boom application) directions.

5.2.2 Operator's seat

Pipelayers with measured RMS-values on Z-axis, in accordance with EN 1032:2003+A1:2008, higher than 0,5 m/s² shall be equipped with a suspended seat complying with EN ISO 7096:2008 class EM6. As an alternative without testing the machine, the pipelayers shall be equipped with a suspended seat complying with EN ISO 7096:2008 class EM6.

NOTE RMS means root mean square.

5.3 Stability and lifting equipment

5.3.1 General

prEN 474-1:2017, 5.11 shall apply with the additions given in 5.3.2:

5.3.2 Lifting equipment

5.3.2.1 General

Lifting equipment shall meet the requirements in ISO 8813:1992.

5.3.2.2 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.

5.3.2.3 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.

5.3.2.4 Hooks

Hooks shall withstand a test load of 2 times the working load limit (WLL) without permanent deformation and a breaking force (BF) of 4 times the WLL according to EN 1677-1:2008 and EN 1677-2+A1:2008.

Hooks also used for applications other than pipelaying (e.g. transport or holding of special tooling equipment) shall have a safety latch according to EN 1677-2+A1:2008

Handles shall be provided on hook blocks to remove the need to approach the trapping areas.

5.3.2.5 Ropes

Ropes shall be selected according to ISO 16625:2013.

5.4 Rear mounted winch

5.4.1 General

If a pipe-layer is equipped with a rear mounted winch, ISO 19472:2006 should be used as guidance for design.

5.4.2 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.

5.4.3 Controls

The winch controls shall be located at the operator's station and shall fulfil the requirements in ISO 10968:2004.

5.4.4 Protection against back-lash of the rope

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

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

The screen width and height shall be covering at least the rear of the minimum space envelope as specified in EN ISO 3411:2007 (see Figure 5).

5.5 Noise

5.5.1 Sound power level

prEN 474-1:2017, 5.13.2.1 shall apply as follows:

The sound power level for pipelayers shall be measured according to ISO 6393:2008.

5.5.2 Emission sound pressure level at operator's station

prEN 474-1:2017, 5.13.2.2 shall apply as follows:

The emission sound pressure level at operator's station for pipelayers shall be measured according to ISO 6394:2008.

6 Information for use

6.1 Warning signs

prEN 474-1:2016, 7.1 shall apply with the addition of a specific warning sign using a symbol according to ISO 6405-2:1993 if a winch is fitted.

6.2 Operation manual

prEN 474-1:2016, 7.2 shall apply with the following additions:

6.2.1 specific instructions to the operators how to work in a team (e.g. co-ordination, communication);

6.2.2 instruction for operation of the side boom;

6.2.3 instruction for operation and safe use of winches, if fitted;

6.2.4 criteria for when a cab needs to be fitted.

6.3 Machine marking

prEN 474-1:2017, 7.3 shall apply with the addition of the marking of the maximum pull force of the winch, if fitted.

Annex A
(normative)

List of additional significant hazards – Pipelayers

The list of hazards in prEN 474-1:2017, Annex A, applies with the following additions:

Table A.1 — List of additional significant hazards

No. [a]	Hazard	Relevant clauses of this European Standard
	Hazards, hazardous situations and hazardous events	
1	**Mechanical hazards** due to: machine parts or working tools, e.g.: mass and stability, mechanical strength	 5.3, 5.4
1.1	Crushing hazards	5.2.1
4	**Hazards generated by noise**	5.5
8	**Hazards generated by neglecting ergonomic principles in machinery design** as, e.g. hazards from:	
8.7	Inadequate design, location or identification of manual controls	5.4.3
8.10	Inadequate guards and protection devices	5.4.4
16	Loss of stability/overturning the machine	
	Additional hazards, hazardous situations and hazardous events due to mobility	
19	**Linked to operator's station on the machine**	
19.5	Insufficient visibility from the operator's station(s)	5.2.2
19.7	Inadequate seating	5.2.2
24	**Insufficient instructions for the operator** (operation manual, signs, warnings, and markings)	Clause 6
27	**Mechanical hazards and hazardous events** due to:	
27.1	Inadequate mechanical strength - inadequate working coefficient	5.3.2
27.2	Lowering speed and brakes	5.3.2.2, 5.3.2.3
27.3	Hooks and ropes	5.3.2.4, 5.3.2.5
[a] Number refers to prEN 474–1:2017, Annex A.		