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Oprema za vrtanje in temeljenje - Varnost - 4. del: Oprema za izdelavo membranskih sten (ISO/DIS 20770-4:2025)

Drilling and foundation equipment - Safety - Part 4: Diaphragm walling equipment (ISO/DIS 20770-4:2025)

Geräte für Bohr- und Gründungsarbeiten - Sicherheit - Teil 5: Geräte für Schlitzwandarbeiten (ISO/DIS 20770-4:2025)

Machines de forage et de fondation - Sécurité - Partie 4: Machines pour parois moulées (ISO/DIS 20770-4:2025)

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DRAFT International Standard

ISO/DIS 20770-4

Drilling and foundation equipment — Safety —

Part 4: Diaphragm walling equipment

Machines de forage et de fondation — Sécurité —

Partie 4: Machines pour parois moulées

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Foreword

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This document was prepared by Technical Committee ISO/TC 195, *Building construction machinery and equipment*, Subcommittee SC 3, *Drilling and foundation machinery and equipment*.

A list of all parts in the ISO 20770 series can be found on the ISO website.

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.

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ISO/DIS 20770-4:2025(en)**Introduction**

This document is a type C standard as stated in ISO 12100:2010.

The machinery concerned and the extent to which hazards are covered are indicated in the scope of this standard.

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 drilling and foundation equipment that have been designed and built according to the requirements of this type C standard.

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Drilling and foundation equipment — Safety —

Part 4: Diaphragm walling equipment

1 Scope

This document, together with part 1, deals with all significant hazards for diaphragm walling equipment when they are used as intended and under the conditions of misuse which are reasonably foreseeable by the manufacturer associated with the whole life time of the machine (see [Annex B](#)).

The requirements of this part are complementary to the common requirements formulated in ISO 20770-1:____.

This document does not repeat the requirements from ISO 20770-1:____, but adds or replaces the requirements for application for diaphragm walling equipment.

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.

EN 474-5:2022, *Earth-moving machinery — Safety — Part 5: Requirements for hydraulic excavators*

EN 474-12:2022, *Earth-moving machinery — Safety — Part 12: Requirements for cable excavators*

EN 13000:2010+A1:2014, *Cranes — Mobile cranes*

<https://standards.iteh.ai/> ISO 6395:2008, *Earth-moving machinery — Determination of sound power level — Dynamic test conditions*

ISO 6396:2008, *Earth-moving machinery — Determination of emission sound pressure level at operator's position — Dynamic test conditions*

ISO 11886, ____¹⁾, *Drilling and foundation machinery — Soil or soil and rock mixture drilling and foundation machines — Commercial specifications*

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

ISO 20770-1, ____²⁾, *Drilling and foundation equipment — Safety — Part 1: Common requirements*

ISO 20770-3, ____³⁾, *Drilling and foundation equipment — Safety — Part 3: Foundation equipment*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100:2010, ISO 11886:____ and the following apply.

1) At the stage of preparation : ISO/DIS 11886:2023

2) Currently at stage CD

3) Currently at stage CD

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ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 diaphragm wall

structural retaining wall or cut-off wall, both of which can be impermeable and constructed in-situ in the ground as a series of contiguous panels

Note 1 to entry: Panels are typically narrow but deep and are cut between surface guide walls and can depend on a slurry or mud suspension for temporary ground support. Structural walls are typically of reinforced concrete with the concrete placed from the bottom of the panel upwards to displace the slurry or mud suspension.

Note 2 to entry: There are other diaphragm wall techniques, for example continuous trenchers; these techniques use machines and cutting tools such as digging chain or wheel disc, which are covered by EN 474-10:2022.

3.2 diaphragm walling rig

carrier machine equipped with cutting tool to cut panels for *diaphragm walls* (3.1)

Note 1 to entry: The diaphragm walling rig is either:

- a complete machine satisfying this document, or
- a carrier machine able to withstand dynamic loads as specified in 4.2 with interchangeable equipment in the form of diaphragm wall cutting tools, which can be provided by different suppliers or manufacturers.

Note 2 to entry: The carrier machine is, e.g.:

- foundation equipment as defined in ISO 20770-3:____; or
- a crane as defined in EN 13000:2010+A1:2014; or
- a cable excavator as defined in EN 474-12:2022; or
- a hydraulic excavator as defined in EN 474-5:2022.

3.3 diaphragm wall cutting tool

tool for cutting panels for diaphragm walls

Note 1 to entry: Diaphragm wall cutting tools can either be:

- *diaphragm wall grab* (as defined in ISO 11886:____, 3.4.4.1);
- *diaphragm wall cutter* (as defined in ISO 11886:____, 3.4.4.3).

Note 2 to entry: Diaphragm wall cutting tools can be rope suspended and guided by frames or kelly bars.

3.4 recovery

extraction of a diaphragm wall cutting tool

Note 1 to entry: For example, grab or cutter when it is stuck in the panel.

3.5 triggering of free-fall

action (manual or automatic) that causes the starting of the free-fall

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4 Safety requirements and/or protective/risk reduction measures

4.1 General

Diaphragm walling equipment shall comply with the requirements of ISO 20770-1:_____ except as modified or replaced by the requirements of this part of the standard.

For the compatibility between the diaphragm walling equipment and the carrier machine, see [4.9](#).

4.2 Requirements for strength and stability

4.2.1 General

ISO 20770-1:_____, 4.2 applies with the following additions:

4.2.2 Loads from diaphragm wall cutting tools

When calculating stability in accordance with ISO 20770-1:_____ the following shall be taken into account:

- weight of the diaphragm wall cutting tools (including any hose and cable handling system and their mounts);
- weight of the excavated material, slurry or suspension materials and any material adhering to the tool;
- loads applied to the tools during tool extraction;
- all loads induced by rope suspended components acting at the point where the rope is leaving the upper pulley.

4.2.3 Stability of diaphragm walling rig

4.2.3.1 General

Diaphragm walling equipment can have diaphragm wall cutting tools either rope suspended or guided by frames or kelly bars rigidly connected to the carrier machine.

In both cases a general method for calculating stability shall be used, see [4.2.3.2](#) below.

For rope suspended cutting tools, a simplified method for calculating stability may be used, see [4.2.3.3](#) below which differs from ISO 20770-1:_____, 4.2.3.

The simplified method ensures the equipment is stable only when the working platform is horizontal. Therefore it cannot be used when working on slopes and travelling.

4.2.3.2 General method for calculating stability

The required stability angle as mentioned in ISO 20770-1:_____, 4.2.3.5 shall be as stated in [Table 2](#) below:

Table 1 — Required stability angle, dynamic influences included

	Stability class NC (normal conditions)	Stability class SC (special conditions)
Travelling	8 degrees	5 degrees + β (see c) below)
Operating and tramming	5 degrees	2,5 degrees + β (see c) below) ^a
Recovery	3,5 degrees	1 degree + β (see c) below)

^a A static stability angle of 5 degrees + β (see c) below) calculated without dynamic accelerations and wind loads is also required.

NC and SC are the stability classes (see explanations below).