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Swimming pool equipment - Part 11: Additional specific safety requirements and test methods for moveable pool floors and moveable bulkheads

Schwimmbadgeräte - Teil 11: Zusätzliche besondere sicherheitstechnische Anforderungen und Prüfverfahren für höhenverstellbare Zwischenböden und bewegliche Beckenabtrennungen

Équipement de piscine - Partie 11 : Exigences de sécurité et méthodes d'essai complémentaires propres aux fonds de bassins mobiles et cloisons mobiles

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Swimming pool equipment - Part 11: Additional specific safety requirements and test methods for moveable pool floors and moveable bulkheads

Équipement de piscine - Partie 11 : Exigences de sécurité et méthodes d'essai complémentaires propres aux fonds de bassins mobiles et cloisons mobiles

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 136.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 13451-11:2016) has been prepared by Technical Committee CEN/TC 136 “Sports, playground and other recreational facilities and equipment”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13451-11:2014.

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.

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

In relation to EN 13451-11:2014, the following significant changes have been made:

- normative references have been updated;
- requirements for the recessed ledges and steps have been modified;
- safety requirements for the prevention of interference with the circulation system have been added;
- not any people on the movable floor or bulkhead when in operation have been added;
- a new Annex A of all thinkable hazards have been added;

The EN 13451 series, *Swimming pool equipment*, consists of the following parts:

- *Part 1: General safety requirements and test methods*
- *Part 2: Additional specific safety requirements and test methods for ladders, stepladders and handle bends*
- *Part 3: Additional specific safety requirements and test methods for inlets and outlets and water/air based water leisure features*
- *Part 4: Additional specific safety requirements and test methods for starting platforms*
- *Part 5: Additional specific safety requirements and test methods for lane lines*
- *Part 6: Additional specific safety requirements and test methods for turning boards*
- *Part 7: Additional specific safety requirements and test methods for water polo goals*
- *Part 10: Additional specific safety requirements and test methods for diving platforms, diving springboards and associated equipment*
- *Part 11: Additional specific safety requirements and test methods for moveable pool floors and moveable bulkheads*

Introduction

The structure of safety standards in the field of machinery is as follows:

- a) type-A standards (basic standards) giving basic concepts, principles for design, and general aspects that can be applied to machinery;
- b) type-B standards (generic safety standards) dealing with one or more safety aspects or one or more types of safeguards that can be used across a wide range of machinery:
 - type-B1 standards on particular safety aspects (e.g. safety distances, surface temperature, noise);
 - type-B2 standards on safeguards (e.g. two-hand controls, interlocking devices, pressure-sensitive devices, guards);
- c) type-C standards (machinery safety standards) dealing with detailed safety requirements for a particular machine or group of machines.

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

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

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.

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1 Scope

This European Standard specifies the safety requirements and the means of their verification for the design and construction of moveable pool floors and moveable bulkheads for use in classified swimming pools as specified in EN 15288-1 and EN 15288-2.

This part of the EN 13451 series, when used with EN 13451-1, deals with the significant hazards, hazardous situations and events, as listed in Annex A, relevant to this equipment when used as intended and under the conditions of misuse reasonably foreseeable by the manufacturer during normal operation and service.

When requirements of this part of the EN 13451 series are different from those which are stated in EN 13451-1, the requirements of this part of the EN 13451 series take precedence over the requirements of EN 13451-1 for machines that have been designed and built according to the requirements of this part of the EN 13451 series.

The requirements of this part of the EN 13451 series take priority over those in EN 13451-1.

This document doesn't apply to installations or equipment intended to move people into or out of a pool tank.

This part of the EN 13451 series is not applicable to equipment which is manufactured before the date of its publication as EN.

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.

EN 13451-1:2011, *Swimming pool equipment - Part 1: General safety requirements and test methods*

EN 13451-4, *Swimming pool equipment — Part 4: Additional specific safety requirements and test methods for starting platforms*

EN 13451-5, *Swimming pool equipment — Part 5: Additional specific safety requirements and test methods for lane lines*

EN 15288-1:2008+A1:2010, *Swimming pools — Part 1: Safety requirements for design*

EN 15288-2, *Swimming pools - Part 2: Safety requirements for operation*

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

EN ISO 13850, *Safety of machinery - Emergency stop function - Principles for design (ISO 13850)*

EN ISO 13857, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13451-1:2011 and the following apply.

prEN 13451-11:2016 (E)

3.1 moveable pool floor
adjustable floor designed to change the water depth of the pool

3.2 open side of a moveable pool floor
open side of a moveable floor not moving alongside a pool wall

3.3 water depth
usable depth measured between water surface and the upper surface of a moveable floor

3.4 moveable bulkhead
moveable structure, providing a solid partition to divide a pool into sections

3.5 closure device
flexible device used to close gaps between the moveable floor/bulkhead and pool wall/floor

Note 1 to entry: For example, flexible lips, rubber gaskets, etc. can be used.

4 Classification of movable pool floors and movable bulkheads

For the classification, see Table 1.

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Table 1 — Classification

	Moveable pool floors	Moveable bulkheads
Type 1	Moveable floors bearing loads by buoyancy only.	Moveable bulkheads bearing loads by buoyancy only
Type 2	Moveable floors bearing loads by drive systems supported by the pool structure.	Moveable bulkheads bearing loads by drive systems supported by the pool structure.

5 List of significant hazards

Table A.1 shows all the significant hazards, hazardous situations and events identified by risk assessment as significant for this type of equipment and which require action to eliminate or reduce the risk. Table A.1 also indicates where they are dealt with in this European Standard.

For a particular floor or bulkhead, a risk assessment should be carried out by the manufacturer to identify any additional significant hazards so that suitable protective measures can be taken. Additional hazards are outside the scope of this standard. EN ISO 12100 describes procedures for the identification and evaluation of hazards.

6 Safety requirements and/or protective measures

6.1 General

Machinery shall comply with the safety requirements and/or protective measures of this clause. In addition, the machine shall be designed according to the principles of EN ISO 12100 for relevant but not significant hazards, which are not dealt with by this document.

Unless specified otherwise, machinery shall comply with the requirements of EN ISO 13850 and EN ISO 13857.

Hatches for service or cleaning in the moveable pool floor or the moveable bulkhead shall be minimum of 600 mm for a dry situation, or 800 mm for a wet situation.

The pool design shall ensure good water treatment throughout the pool regarding the moveable floor and or the moveable bulkhead. The design of water circulation should take into account the need of equal flow in different pool areas when only a part of the complete pool is to be fitted with a moveable floor or bulkhead.

Specific hazards and risks related to accessible elements (cables, gears, pulley, lamps, ladders and products placed into the pool) dedicated to the floor/bulkheads movements/positions shall be assessed when existing and should be taken into account in the risk assessment.

NOTE It may be necessary to tighten the construction tolerances of the structure and finishes within the basin in order to meet the tolerances set out within this European Standard.

6.2 Moveable pool floors

6.2.1 General

The gradient of a moveable floor positioned at a water depth $\leq 1\,350$ mm shall be $\leq 6,6$ %.

NOTE It is necessary to pay special attention to the construction tolerances of the structure and/or finishes within the basin in order to meet the specification of EN 13451-1 within this European Standard.

In presence of a moveable pool floor, the pool water treatment system should be specifically designed considering possible changes in designation (e.g. a swimmers pool used as non-swimmers pool).

To check the correct water distribution of the complete installation a dye test shall be carried out in accordance with EN 15288-1 and EN 15288-2 with the moveable floor in 2 positions:

- the lowest operating position; and
- 1/3 of the operating water depth measured from water surface.

Compliance with the dye test is achieved when colouring of the water in the pool tank above the moveable floor is attained in accordance with the requirements of EN 15288-1 and EN 15288-2 after the dye is seen to clearly flow through the moveable floor.

NOTE It is likely that the cooperation of the pool builder will be required to achieve a suitable system.

Moveable floors shall allow inspection, cleaning and maintenance of the area underneath the moveable floor.

6.2.2 Structural integrity

The structural integrity of moveable floors shall be verified using the following independently assessed criteria:

- a vertical uniformly distributed load of 600 N/m²;
- a concentrated vertical load of 2 000 N/m² over a square area of 1 m² at any point;
- a concentrated vertical load of 2 000 N/m² over a square area of 2 m × 2 m focussed in front of the means of exit and similar areas.

prEN 13451-11:2016 (E)**6.2.3 Inadvertent movements**

Abnormal movements of a moveable floor (e.g. caused by restoration of the power supply following an interruption) shall be prevented.

The risks arising from small foreseeable movements during use and maintenance in water shall be prevented.

6.2.4 Prevention of entrapment

Gaps on the surface of a moveable floor shall be ≤ 8 mm. The gap between the rigid part of a moveable floor and the pool shall be ≤ 50 mm. When the gap is greater than 8 mm a closure device shall be used to reduce the gap to ≤ 8 mm wide.

A closure device shall not prevent the pulling back of a finger or toe should a finger or toe be able to pass between the flexible closure device and the swimming pool walls, it shall also be possible to pull back the finger or toe.

The movement of the rigid part of the moveable floor or moveable bulkhead is to be limited to avoid entrapment or other harm of a finger or toe.

To achieve this, the design shall be as follows:

- The closure device shall have a shape which will not cut, entrap or injure (e.g. round shaped profiles).
- The horizontal movement of the moveable floor or moveable bulkhead when positioned in the operating mode shall be limited to 50 % of the flexibility of the closure device.

In the case of recessed ladders, the moveable floor's working positions should abut against the vertical surface of the recessed ledges/steps in order to avoid entrapment.

These closure devices shall pass the test defined in 7.2.

6.2.5 Slip resistance

When the water depth is $\leq 1\ 350$ mm the slip resistance of the walkable area of a moveable floor shall comply with rating group 18° according to EN 13451-1:2011, Table 1.

6.2.6 Prevention of falling off

When a moveable floor has an open end, the hazards connected with falling off this end shall be prevented

- by the use of a moveable bulkhead, enclosing at least the whole area from the surface of the moveable floor up to the water surface or, if this is not practicable, by the use of a highly visible floating line, conforming to EN 13451-5, installed over the moveable floor surface, 1 m in front of the floor open end. Furthermore, the area 100 mm wide from the open end of the moveable floor edge shall be distinguishable by a contrasting colour.

NOTE It could be advisable to increase the antiskid characteristics of the area 1 m wide from the moveable floor edge, or to change the floor finishing in the same area (e.g. tactile warning).

If a moveable bulkhead is used to separate the area of a moveable floor, a suitable interlocking system shall be installed to ensure that both components are set in their proper positions before it is open to use. The integrity of the interlock shall fulfil PL (EN ISO 13849-1) and/or SIL (EN 62061).

6.2.7 Prevention of swimming underneath

When a moveable floor has an open end, access by the users of the pool to the area underneath the floor shall be prevented by:

- a moveable bulkhead positioned at the open side of the moveable floor; or
- a self-acting tamper proof protection, e.g. a lid or flap, to physically prevent access to the area between the pool bottom and the moveable floor in all working positions of the moveable floor.

When a moveable floor is equipped with a self-acting tamper proof protection and the adjacent pool wall has a recessed safety ledge:

- the recessed safety ledge should be closed at every position where the closing protection crosses the safety ledge to avoid entrapment risks;
- at the positions where the safety ledge is closed the pool edge should have a finger hold or handrail, according to EN 15288-1:2008+A1:2010, 5.6.2.1 and 5.6.2.2;
- at the positions where the safety ledge is closed a different coloured marking of the pool edge could be considered;
- in the area of movement/intersection of the tamper proof protection there shall be no safety step.

6.2.8 Prevention of hazards during movement of the floor

The speed of a moveable floor shall be ≤ 500 mm/min.

A visual warning to prevent the use of the pool shall be given during the movement of the floor, and as long as the moveable floor is not locked in its working position.

NOTE Under certain circumstances, additional signals (e.g. audible signals) can be given.

Users shall be allowed in the pool only when the moveable floor is in its working position, ready for use. When the area of the moveable floor is enclosed by a moveable bulkhead in its working position, the above requirements apply only to the section where the moveable floor is installed.

The instructions of the manufacturer/importer/supplier shall be followed (see Annex B).

6.2.9 Prevention of hazards coming from water depth

The actual water depth in the area of the moveable floor shall be automatically and obviously displayed to the users approaching the moveable floor and standing on it. Water depth shall be displayed during pool operation.

If the floor can be tilted, it shall be fitted with displays, showing at least the lower and the higher water depth.

In larger installations, particular consideration should be given to the installation of intermediate water depth displays. We will note the signs for water depths as mentioned in EN 15288-1 should apply also when there is a movable floor, this means signs in the gutter or near the gutter stating f.i. "water depth 0 to 2 m".

6.2.10 Prevention of hazards coming from diving

The use of starting platforms in the area of a moveable floor shall be prevented when the water depth is not suitable according to EN 13451-4.

When a moveable floor is installed into a multi-functional pool, e.g. a diving pool, climbing or sliding pool, and the minimum water depth for the activity stated in the EN 13451 series is not provided, the