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Protective elements for unenclosed in-ground private swimming pools for individual or collective use

Protective barriers and means of access to the pool

Safety requirements and test methods

E: Protective elements for in-ground, barrier-free, private or collective use swimming pools
 - Safety barriers and means of access to pool - Safety requirements and test methods D:
 Schutzelemente für offene eingebettete Privatschwimmbäder für Familien- oder Gemeinschaftszwecke - Schutzbarrieren und Schwimmbeckenzugangsmittel - Sicherheitsanforderungen und Prüfverfahren

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by decision of the Director General of AFNOR on 30 April 2004 to take effect on 5 May 2004.

Replaces the approved standard NF P 90-306 of December 2003.

Correspondence At the date of publication of this document, there is no European or inter-national work dealing with the same subject.

Analysis

This document defines the minimum safety requirements, test methods and consumer information for protective barriers and means of access to the pool (in-ground, partially or totally embedded) of private unenclosed in-ground swimming pools for individual or collective use in order to prevent the involuntary immersion of children under the age of five.

Descriptors

International Technical Thesaurus: sports facility, leisure facility, swimming pool, safety, accident prevention, child, protective device, access, requirement, material, design, height, risk, locking device, mechanical strength, tear strength, artificial ageing test, dimension measurement, tensile test, torsion test, operating procedure, fatigue test, impact test, instruction, consumer information, technical notice, marking, pictogram.

Changes Compared with the document that was replaced, some articles/paragraphs have been added (field of application, normative references, definition of removable element, general information on materials, general information on the means of access to the pool and unlocking system, purchasing information, product marking and bibliography, product marking and bibliography), certain requirements and test methods have been reformulated (wood, metals, plastics, glass, textiles, recessed support point, figure of the recessed support point, edges, protruding elements and angles, closing and locking, unlocking, manual system, automatic system, resistance of protective barriers, mechanical resistance to tearing, artificial ageing, height measurement), some articles/paragraphs have been deleted (meshes, edges, metal wires and tips, test methods for checking the sharpness of edges, the sharpness of tips, wire flexibility), new articles/paragraphs have been inserted (plastic, requirement for extruded mesh, welded plastic mesh and netting, tensile tests, hard impact tests on glass filling), and new figures have been inserted (minimum height, hump support point, height measurement).

Corrections

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Protective elements for in-ground pools for individual or useAFNOR P91C

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Foreword

This document is part of a set of four documents relating to protective elements for unenclosed in-ground private swimming pools for individual or collective use:

- *barriers and their means of access to the pool ;*
- *alarm systems ;*
- *covers ;*
- *shelters (light structures and/or verandas).*

All protective devices are considered in the standards to be in the locked position (for barriers, covers and shelters) or in the normal operating state (for alarms) in accordance with the manufacturer's instructions.

These devices can also be used to secure above-ground pools.

Although the purpose of this document is to assist in the design of a product and to set out the requirements for safety, it is recognised that, in any human activity, risk factors can never be totally eliminated. This document is not a substitute for common sense or individual responsibility. Nor is it intended to replace the vigilance of parents and/or responsible adults, which remains the essential factor in protecting children under five.

1 Field of application

This document defines the minimum safety requirements and test methods as well as consumer information for protective barriers and their means of access.

This document concerns protective barriers and their means of access to the pool (in-ground, partially or totally embedded) intended to limit access to private unenclosed in-ground pools for individual or collective use by children under the age of five.

These devices can also be used to secure above-ground pools.

The test requirements described in this document correspond to maintaining product safety for a minimum of three years.

2 Normative references

This document incorporates by dated or undated reference provisions of other publications. These normative references are cited where appropriate in the text and the publications are listed below. For dated references, subsequent amendments or revisions to any of these publications apply to this document only if incorporated by amendment or revision. For undated references, the latest edition of the publication referred to applies (including amendments).

NF EN 410, *Glass in building - Determination of the luminous and solar characteristics of glazings* (classification index: P 78-457).

NF EN 513, *Unplasticised polyvinyl chloride (PVC-U) profiles for the manufacture of windows and doors*
— *Determination of resistance to artificial ageing* (classification index: P 24-504).

NF EN 1176-1, *Playground equipment - Part 1: Safety requirements and general test methods* (classification index: S 54-201-1).

NF EN 1875-3, *Textile supports coated with rubber or plastic - Determination of resistance to tearing - Part 3: Method using trapezoidal specimens* (classification index: G 37-128-3).

NF EN 1876-2, *Rubber or plastic coated textile substrates - Low temperature tests - Part 2: Impact test on loop* (classification index: G 37-111-2).

NF EN 12150-1, *Glass in building - Thermally toughened soda-lime silicate safety glass - Part 1: Definition and description* (classification index: P 78-221).

NF EN 12600, *Glass in building - Pendulum test - Impact test method and classification of flat glass* (classification index: P 78-223).

NF EN 29073-3, *Textiles - Test methods for nonwovens - Part 3: Determination of tensile strength and elongation* (classification index: G 07-171-3).

NF EN ISO 178, *Plastics - Determination of bending properties* (classification index: T 51-001).

NF EN ISO 179-1, *Plastics - Determination of Charpy impact strength - Part 1: Non-instrumented impact test* (classification index: T 51-035-1).

NF EN ISO 306, *Plastics - Thermoplastics - Determination of Vicat softening temperature (VST)* (classification index: T 51-021).

NF EN ISO 1421, *Textile supports coated with rubber or plastic - Determination of breaking strength and elongation at break* (classification index: G 37-103).

NF EN ISO 4628-2, *Paints and varnishes - Assessment of coating degradation - Designation of the quantity and size of defects and the intensity of uniform changes in appearance - Part 2: Assessment of the degree of blistering* (classification index: T 30-140-2).

NF EN ISO 4892-1, *Plastics - Methods of exposure to laboratory light sources - Part 1 General guide* (classification index: T 51-195-1).

NF EN ISO 4892-2, *Plastics - Methods of exposure to laboratory light sources - Part 2 Xenon arc sources* (classification index: T 51-195-2)¹⁾.

NF EN ISO 7391-2, *Plastics - Polycarbonate (PC) for moulding and extrusion - Part 2: Preparation of specimens and determination of properties* (classification index: T 51-032-2)¹⁾.

NF EN ISO 7823-1, *Plastics - Poly(methyl methacrylate) sheets - Types, dimensions and characteristics - Part 1: Cast sheets* (classification index: T 54-401-1).

NF EN ISO 7823-2, *Plastics - Poly(methyl methacrylate) sheets - Types, dimensions and characteristics - Part 2: Extruded sheets* (classification index: T 54-401-2).

NF EN ISO 8256, *Plastics - Determination of impact tensile strength* (classification index: T 51-111)¹⁾.

NF EN ISO 12543, *Glass in building - Laminated glass and laminated safety glass* (classification index: P 78-211 to P 78-216).

NF EN ISO 13934-1, *Textiles - Properties of fabrics in tension - Part 1: Determination of maximum force and elongation at maximum force by the tape method* (classification index: G 07-129-1).

NF ISO 7724-1, *Paints and varnishes - Colorimetry - Part 1: Principles* (classification index: T 36-004-1).

NF ISO 7724-2, *Paints and varnishes - Colorimetry - Part 2: Measurement of colour* (classification index: T 36-004-2).

1) *Under review.*

NF ISO 7724-3, *Paints and varnishes - Colorimetry - Part 3: Calculation of colour differences* (classification index: T 36-004-3).

NF ISO 9227, *Corrosion tests in artificial atmospheres - Salt spray tests* (classification index: A 05-101).

NF B 52-001, *Rules for the use of wood in construction - Visual classification for structural use of the main softwood and hardwood species.*

NF C 15-100, *Low-voltage electrical installations - Rules.*

NF G 07-148, *Essais des tissus - Détermination de la résistance au déchirement en force vive - Déchirure amorcée (mouton pendulaire de forte capacité).*

NF P 08-301, *Vertical structures - Impact resistance tests - Impact bodies - Principle and general procedures for impact tests.*

NF P 78-201, DTU 39 - *Travaux de bâtiment - Travaux de miroiterie-vitrerie - Partie 1 : Cahier des clauses techniques - Partie 2 : Cahier des clauses spéciales.*

NF T 54-405-1:2002, *Extruded or coextruded unplasticised poly(vinyl chloride) (PVC-U) profiles for outdoor use - Specifications and test methods - Part 1: Compact PVC-U.*

ASTM D 1925 :1970, *Test Method for yellowness index of plastics* (Note: 1. Editorial change. Reapproved :1998).

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

private swimming pool for individual use

private swimming pool reserved for the personal use of a family

3.2

private swimming pool for collective use

any private swimming pool that is not for individual use is considered to be for collective use, with the exception of swimming establishments covered by the law of 24 May 1951

3.3

protective barrier and means of access

a device designed to be installed around a swimming pool to prevent children under the age of five from entering the pool

The protective barrier can be combined with the wall(s) of a building, dwelling or fence delimiting the area in which the pool is located, provided that these walls do not allow access to the pool through their height or their own openings.

NOTE A hedge alone is not considered a protective barrier.

3.4

means of access

mobile device enabling the protective barrier to be crossed

NOTE In the following, the term "protective barrier" includes the protective barrier and the means of access.

3.5**removable element**

part or component intended to be removed from the barrier without the use of a tool

NOTERemovable opening and unlocking systems are not considered to be removable elements (within the meaning of this standard, clause 5.7) because they can be used to secure the pool.

3.6**tool**

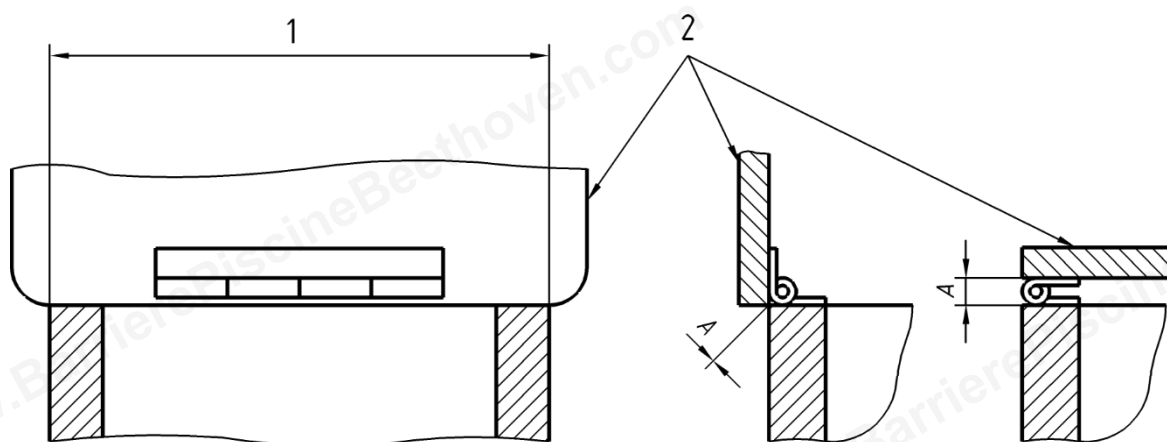
screwdriver, coin or any other object that can be used to operate a screw, clip or similar fastening device

3.7**coating**

all layers of material formed or deposited on the base material or barrier, including paints, varnishes, lacquers, inks, polymers or other similar substances, whether or not they contain metallic particles, however they have been applied to the barrier and can be removed by scraping with a sharp blade

3.8**hinge line**

line running along or parallel to the line projected by the axis of rotation, as shown in Figure 1

**Legend**

1 Hinge line

2 Lid

A Space between assembled edges

Figure 1 - Definition of a hinge line

4 Materials**4.1 General**

If the protective barrier and its means of access are made of more than one material, the following requirements apply to each material.

The materials used in their manufacture must be visually clean and free from infestation. The material is examined with the naked eye, without magnification.

4.2 Cladding and other materials (solution-dyed)

Generally speaking, the materials used in the protective barrier and the means of access must comply with the French or European reference standards in force when they exist (see Article 2 of this document) and/or with the regulations in force.

4.3 Wood

Wooden elements must have a durability compatible with the class of use ²⁾ of the parts concerned according to their exposure to humidity, i.e. generally class 4, unless a particular evacuation of the conditions of use allows class 3. This durability may be natural or conferred by treatment.

Wooden elements must also comply with the classification rules of standard NF B 52-001 and belong to at least class ST II of this standard.

4.4 Metals

Tests are carried out in accordance with standard NF ISO 9227 on all metal parts involved in barrier safety, such as floor fixings, metal reinforcement structures and hardware (screws, springs, locks and hinges, slide fasteners, etc.).

At the end of these tests, after 96 hours' exposure to salt spray, all the products must meet the visual requirements described below.

Coated and uncoated metal parts must withstand exposure to a neutral salt spray, in accordance with standard NF ISO 9227.

At the end of the corrosion test :

- steel parts, whether coated or not, must not show more than one spot of red rust per 650 mm² of significant surface area, with no spot larger than 2 mm in any direction;
- white rust is accepted on zinc-galvanised, electro-galvanised or dichromated parts;
- anodised, lacquered or plastic-coated aluminium parts must not show any corrosion pitting, white salts or blackening;
- Brass parts, whether coated or not, may show tarnishing or surface degradation of the coating, but any dezincification of the material resulting in the appearance of copper-red corrosion patches on the brass surface is not permitted;
- the degree of blistering of organic coatings must not exceed density 2, and the size of any blister must not exceed size 3 as designated in ISO 4628-2.

After 96 hours of exposure to salt spray, the test is continued for up to 240 hours for safety devices such as locks, hinges, pivoting, sliding or rotating mechanisms. At the end of the tests, these safety devices must function perfectly.

In the case of aluminium, the external parts must be anodised, lacquered or plastic-coated.

4.5 Plastics for structures and filler elements rigid

4.5.1 Accessories

Aesthetic or comfort accessories (plugs, trims, finishing parts, etc.) that cannot affect safety are not covered by the standards and tests. However, their choice is the responsibility of the manufacturer and assemblers.

²⁾ In the revised standards NF EN 335-1 and NF EN 335-2, the term "biological risk class" is replaced by the term "use class".

4.5.2 Plastics for rigid PVC-based structures and infills - U

The vinyl compositions used for the manufacture of structural profiles and rigid fillings must meet the characterisation and ageing resistance requirements of standard NF T 54-405-1:2002. The requirements of standard NF T 54-405-1:2002 concerning colour retention (paragraph 4.3.5.3) are not taken into account.

Accelerated ageing tests can be carried out in the absence of natural ageing tests, with the following particularities:

- the exposure conditions are those defined in standard NF EN 513, with an exposure time of 4,000 h.
- the change in mechanical resistance to tensile impact is measured in accordance with standard NF EN ISO 8256, type 5 specimen.

After ageing, the arithmetic mean of the results obtained from 10 test specimens must be greater than or equal to 250 kJ/m². No individual value should be less than or equal to 120 kJ/m².

This test may exceptionally result in a value qualified as an outlier to be eliminated when this value is more than three standard deviations below the mean, the mean and standard deviation being calculated on the nine other results.

In the case of transparent or translucent vinyl compositions, accelerated ageing tests are required.

Processed products must be made from the vinyl compositions defined above and meet the requirements of paragraphs 4.3.3.1, 4.3.3.4 and 4.3.3.5 of standard NF T 54-405-1:2002.

4.5.3 Plastics for rigid structures and filling elements based on other polymers

4.5.3.1 General

The compositions used to manufacture structural sections and rigid infills must meet the requirements of the material standards where they exist (see Article 2 of this document).

In the absence of the latter, the polymer must be identified and in particular :

- VICAT softening temperature according to NF EN ISO 306;
- modulus of elasticity in flexion in accordance with standard NF EN ISO 178.

PMMA must comply with the requirements of standards NF EN ISO 7823-1 and NF EN ISO 7823-2.

PC must comply with standard NF EN ISO 7391-2.

4.5.3.2 Translucent and transparent polymers

Filling elements made of translucent or transparent rigid plastic must be able to withstand the specifications in this document with regard to their appearance, suitability for use and durability.

4.5.3.2.1 Impact resistance

Impact resistance is measured in accordance with NF EN ISO 179-1/1eU.

Table 1 - Initial impact resistance

Features	Specification	Test method
Impact resistance	No values < 10 kJ/m ²	NF EN ISO 179-1/1eU

4.5.3.2.2 Resistance to artificial weathering

Artificial climatic ageing is carried out in accordance with standards NF EN ISO 4892-1 and NF EN ISO 4892-2 (Method A) using a simulated ageing chamber.

The operating conditions of the simulated ageing chamber equipped with a Xenon arc source must be as follows:

- control irradiance at 340 nm :
0.50 W/(m² .nm) ;
- black body temperature measured at the standard black panel: (65 ± 3) °C ;
(102 ± 0.5) min ;
- duration of watering of samples on exposed surfaces: (18 ± 0.5) min.

The exposure time of the samples in the simulated ageing chamber must correspond, in the wavelength range from 290 nm to 800 nm, to an irradiance dose of 6 GJ/m², i.e. an exposure time of 3,000 h for the control irradiance level specified above.

Resistance to artificial climatic ageing is assessed after simulated ageing by measurements :

- variation in light transmission in accordance with standard NF EN 410 ;
- variation in colorimetric characteristics in accordance with standards NF ISO 7724-1, NF ISO 7724-2 and NF ISO 7724-3 ;
- variation in the yellowing index in accordance with ASTM D 1925 ;
- Charpy impact resistance in accordance with NF EN ISO 179-1/1eU.

The criteria listed above are measured only on the wall of the filling element that has received the UV protection coating.

To be declared compliant, the weathering resistance of the filling elements must meet the requirements of Table 2.

Table 2 - Resistance to weathering

Features	Specifications	Test methods
Variation in light transmission	$\Delta\tau_{nh} \leq 3$	NF EN 410
Variation in the yellow index	$\Delta YI \leq 4$ for colourless tone $\Delta YI \leq 5$ for other colours	ASTM D 1925
Variation in colour difference	$\Delta E \leq 3.8$	NF ISO 7724-1, 2 and 3
Charpy impact test after ageing	No variation > 20% from initial value	NF EN ISO 179-1/1eU

4.5.3.3 Opaque polymers other than PMMA, PC

Natural ageing tests must be carried out on these polymers over a period of three years, with exposure conditions complying with those defined in standard NF T 54-405-1.

In parallel, accelerated ageing tests can be carried out under the exposure conditions defined in standard NF EN 513, with an exposure time of 4,000 h.

For both types of ageing, natural or accelerated, the impact resistance measured in accordance with standard NF EN ISO 179-1 must not vary by more than 20%.

4.6 Glasses

Glass products used to fill protective barriers must be :

- either hardened in accordance with standard NF EN 12150 and classified as at least 1C3 in accordance with standard NF EN 12600 ;
- or laminated in compliance with standard NF EN ISO 12543 classified as a minimum of 3B3 in accordance with standard NF EN 12600.

At the end of the test defined in 7.11.2 (soft body impact test), there must be no debris or parts that could cause injury or be picked up by a child (screws, end cap, etc.).

At the end of the test defined in 7.11.3 (hard body impact test on glass infills), the structure, both its constituent parts and their connections to each other and to the structure, must retain all its performance, including its appearance.

4.7 Textiles, coated or extruded plastic mesh, welded plastic mesh, nets and flexible plastics

4.7.1 General

Materials must comply with French or European reference standards. The tests must be carried out before and after the ageing tests on the samples of finished products, excluding decorative elements which do not affect safety and are described in paragraph 7.3 (artificial climatic ageing tests).

Textiles, coated or extruded plastic mesh, welded plastic mesh and nets must not have a mesh cross-section greater than 5 mm × 5 mm.

4.7.2 Mechanical resistance to tearing

4.7.2.1 For non-end users

The requirements relating to mechanical resistance to tearing must comply with the tests described in 7.2.1 (mechanical resistance to tearing tests for uncoated textiles and plastic mesh), which determine the behaviour of the material under the action of a live force.

4.7.2.2 For coatings, extrusions or flexible plastics

The requirements relating to mechanical resistance to tearing must comply with the tests described in 7.2.2 (mechanical resistance to tearing tests for coated or extruded textiles and plastic mesh) which determine the behaviour of the material under the action of a live force.

4.7.3 Cold resistance for coated fabrics and plastic mesh coated

For coated fabrics and coated plastic mesh, following the test defined in standard NF EN 1876-2, no breakage or tearing should occur at -15°C.

4.8 Welded wire mesh with metal cores

Welded wire mesh with metal cores must not have meshes larger than a cross-section of 5 mm × 5 mm or must conform to the configuration shown in Figure 7 and meet the general requirements described in this document.

5 Requirements for the design and construction of the barrier and means of access

5.1 General requirements

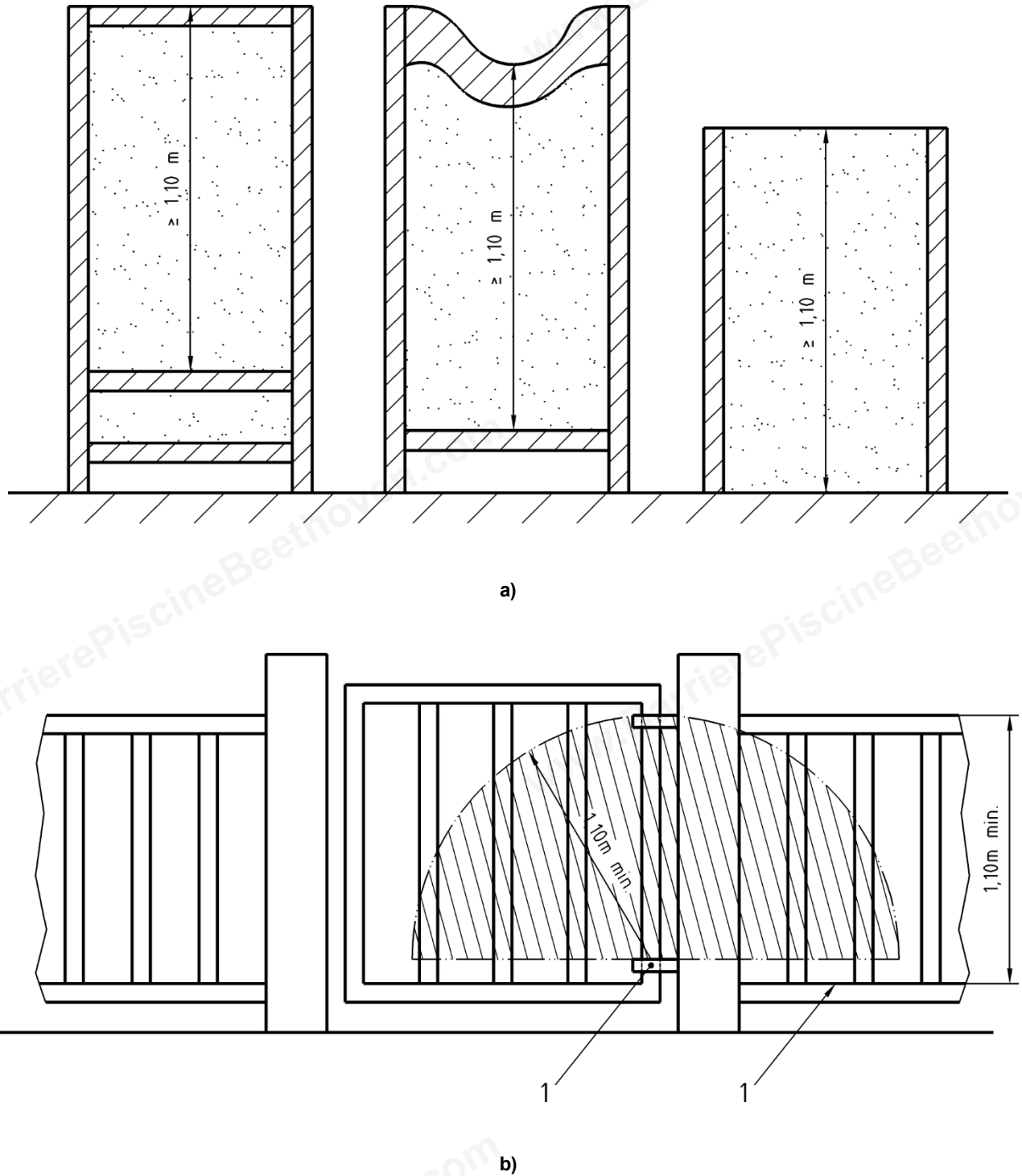
The protective barrier must be constructed in such a way as to prevent children under the age of five from climbing over it or unintentionally opening the means of access.

To enable older users to pass through without risk, the protective barrier must include a childproof means of access for children under five and be safe for all users, whether adults or children.

Figure 7 summarises the dimensional requirements defined below.

5.2 Height minimum

The minimum height between two support points, or between the highest support point and the lowest part of the upper level of the barrier or means of access, as measured in 7.5 (measurement of height), must always be greater than or equal to 1.10 m (Figure 2).



Legend

1 Point of support

Figure 2 - Examples of how to determine the minimum height

5.3 Support points

5.3.1 Support points in hollow

Any opening whose lower part is limited by a horizontal, inclined or rounded element that allows at least 5 mm of the template defined in Figure 3 to pass through is considered to be a recessed support point. The template must be presented in all positions: vertical, horizontal and inclined.

This 5 mm distance is marked on the template either by a groove, a shoulder or an indelible line of paint (Figure 3).

Dimensions in millimetres

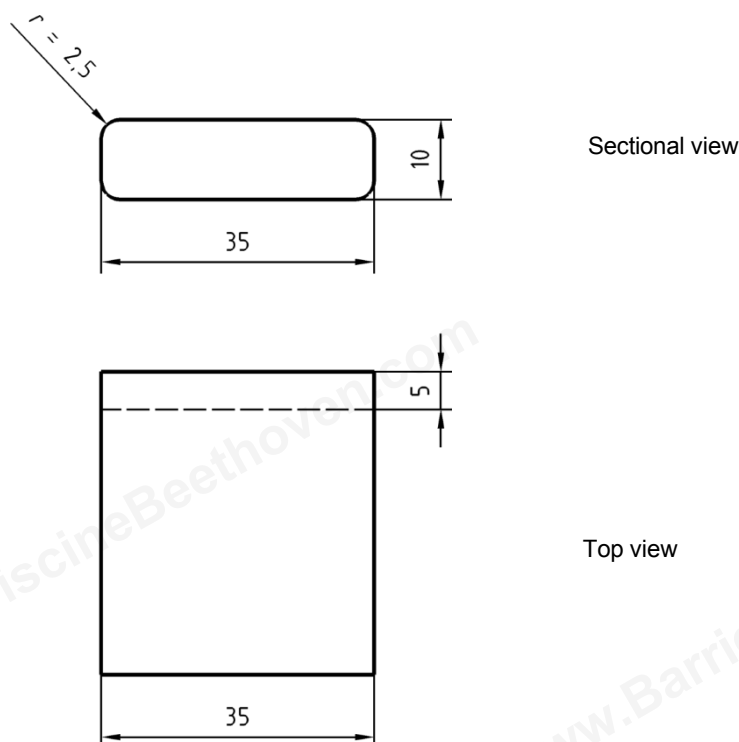
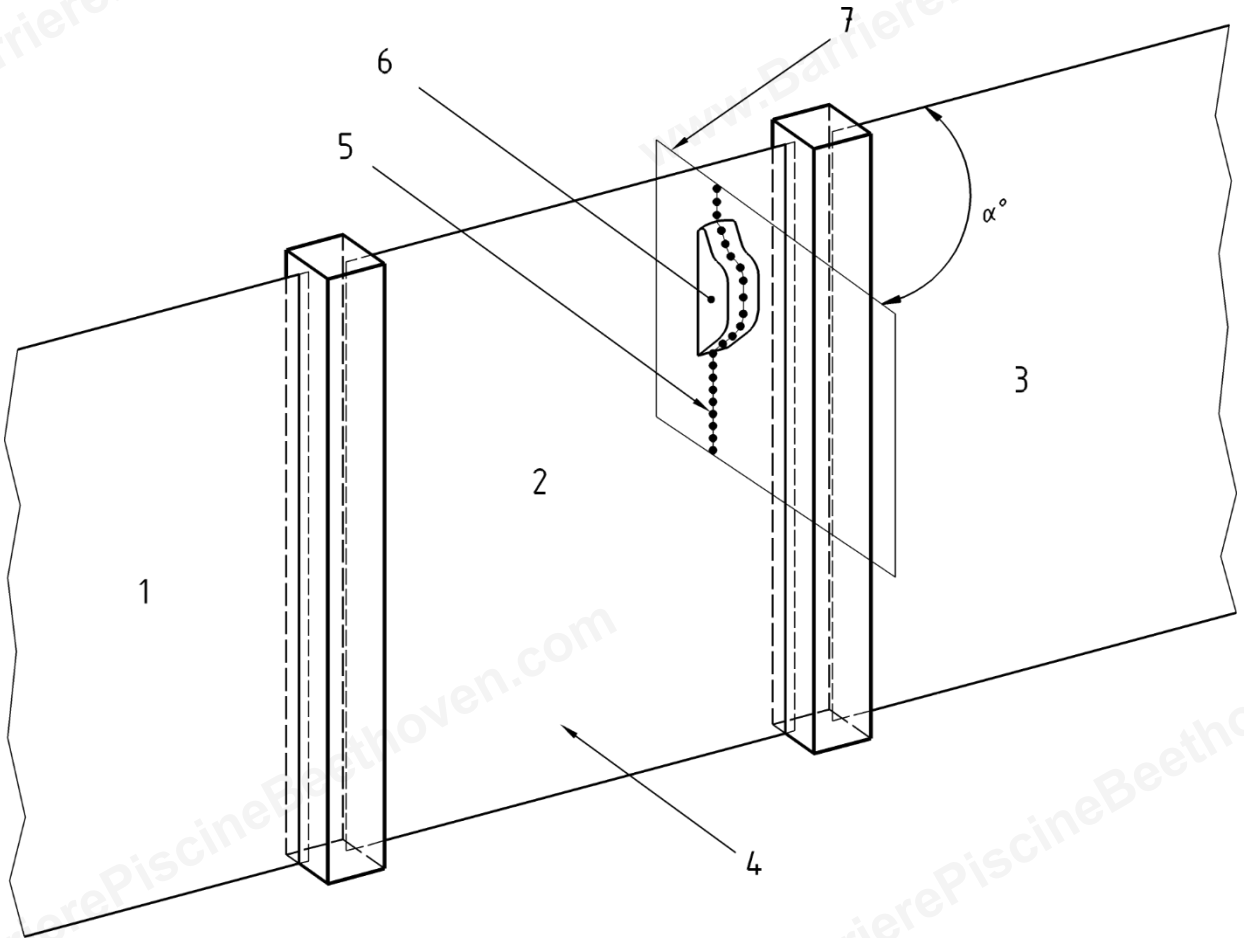


Figure 3 - Support point template

5.3.2 Support points at

5.3.2.1 Illustration



Legend

- 1 Element 1
- 2 Element 2
- 3 Element 3
- 4 Face to face
- 5 Contour
- 6 Growth
- 7 Control plan

Figure 4 - General diagram

5.3.2.2 Contour

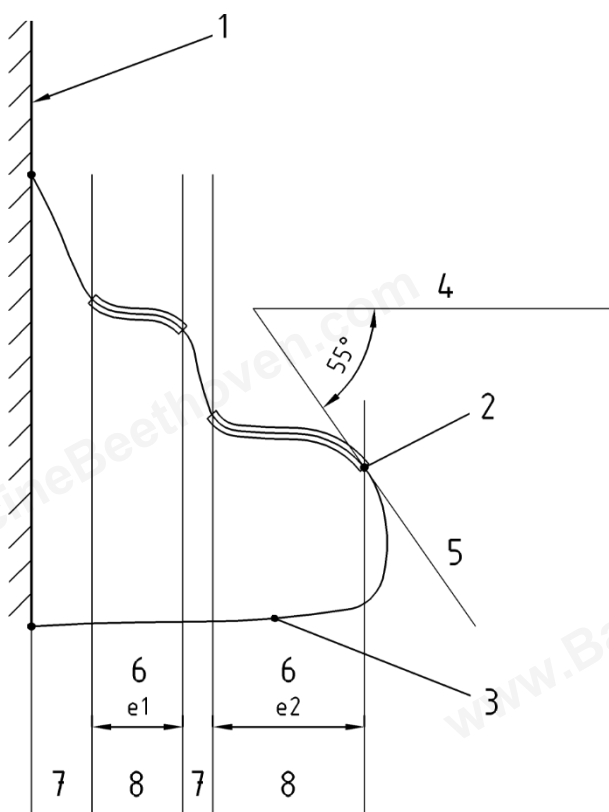
In the control plane, the envelope curve of all the protrusions appearing in this plane constitutes the contour. The contour is read from the face to be inspected outwards.

5.3.2.3 Control plan

In the appropriate control zone, a vertical plane intersecting the protrusions.

5.3.2.4 Potential support area

A set of consecutive points forming part of the contour. Each of these points has a tangent inclined at an angle of less than 55° to the horizontal. Overhanging faces are not potential support zones (Figure 5).



Legend

- 1 Face to face
- 2 Contour point
- 3 Overhanging face
- 4 Horizontal
- 5 Tangent
- 6 Emerging
- 7 Healthy zone
- 8 Potential support area

Figure 5 - Definition of zones

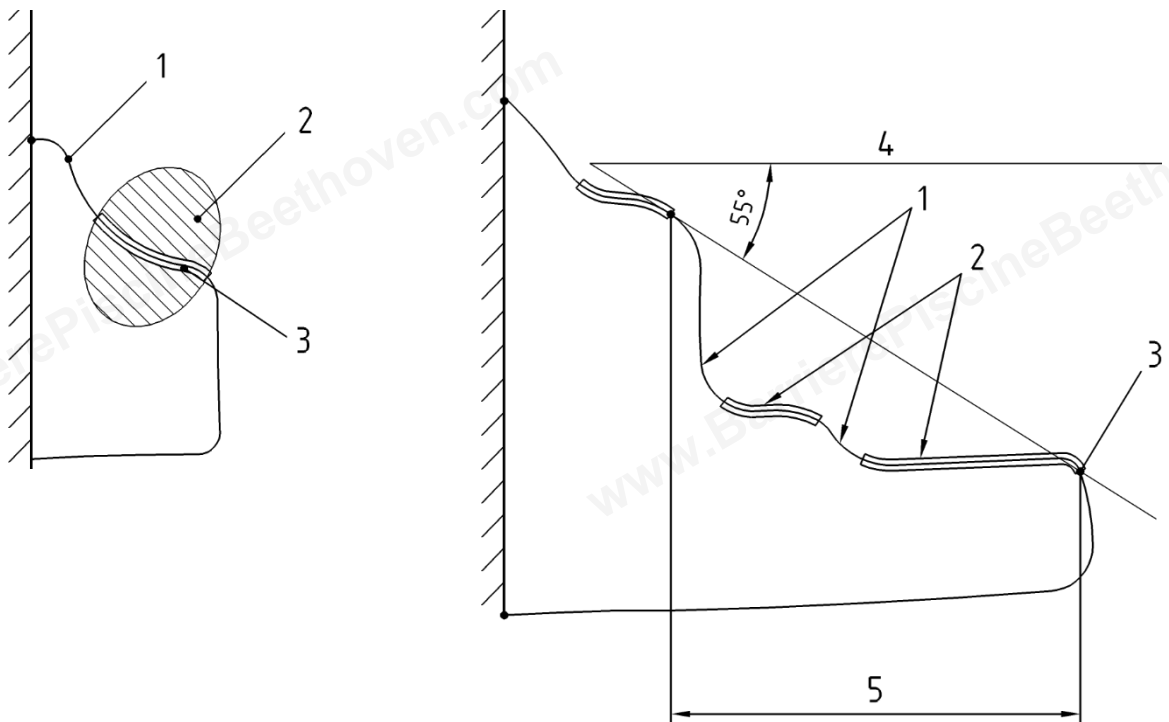
5.3.2.5 Healthy zone

All the points on the contour that do not form part of any potential support zone (Figure 5).

5.3.2.6 Type of hump support point

The following are considered as support points :

- all contiguous potential contact points whose emergence from the end of a healthy zone is greater than 15 mm (type 1 hump contact point).
- all potential contiguous contact points whose emergence from the end of a healthy zone is greater than 5 mm and whose surface area is greater than 175 mm² (type 2 hump contact point). The minimum surface area of 175 mm² is defined as the projection of the fulcrum onto a horizontal plane.
- all zones consisting of one or more healthy zones and potential support zones, the tangent of which at two points, not intersecting the contour, is inclined at an angle of less than 55° to the horizontal, meeting one or more of the following conditions (type 3 hump support point - Figure 6) :
 - the clearance between the 2 points of contact of the tangent is greater than 15 mm.
 - the projected surface of the support point, delimited by the 2 points of contact of the tangent, is greater than 175 mm² and the emergence between these two points is greater than 5 mm.



Legend

- 1 Contour
- 2 Projected surface area
- 3 Potential support area

a)

Legend

- 1 Healthy zone
- 2 Potential support area
- 3 Point of contact
- 4 Horizontal
- 5 Emergence

b)

Figure 6 - Illustration of the type 3 hump support point

5.4 Balusters

The bars must not have any raised edges.

5.5 Edges, corners, protruding elements and angles

Edges, edges, protruding parts and accessible corners must not present a risk of injury. Edges are considered potentially dangerous if they are sharp.

NOTE In case of doubt, to check whether an edge is sharp, the edge acuity test described in standard NF EN 71-1 can be carried out.

Metal or glass edges are considered potentially dangerous if they are sharp. Surfaces must be smooth and free of burrs (tactile control).

5.6 Wedging

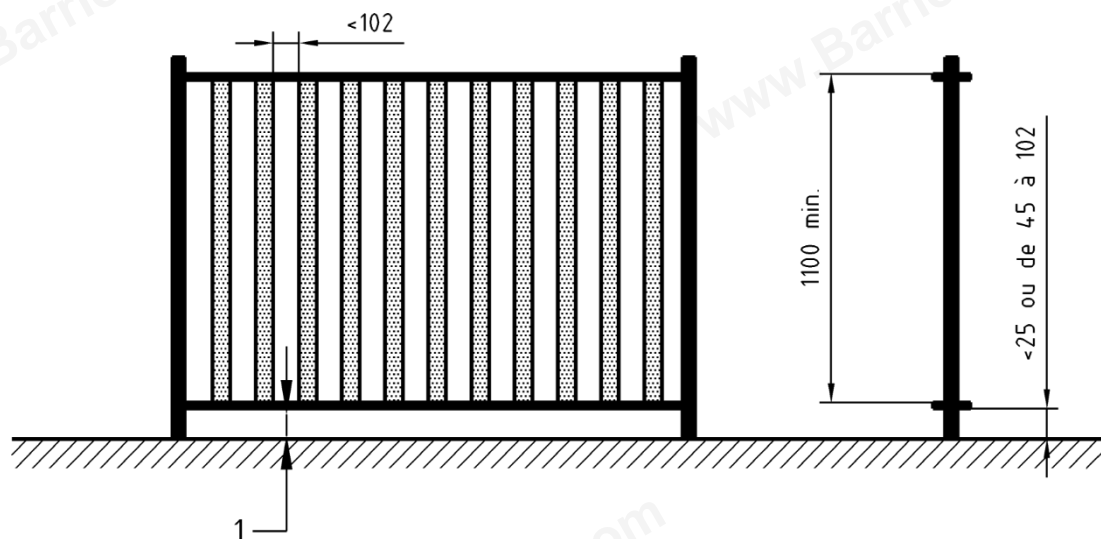
The protective barrier and its means of access must not injure children who try to climb over them: the risk of entrapment must be avoided.

At the end of the test described in paragraph 7.7 (jamming), the requirement is met if the probe in Figure 10 does not penetrate under a force of 100 N between the elements of the protective barrier or between the protective barrier and the external elements.

The ground clearance of the protective barrier (and means of access) must be less than 25 mm or between 45 mm and 102 mm (Figure 7), without allowing the probe defined in Figure 10 to pass through. These values must be maintained when the protective barrier is subjected to vertical pressure at the top as applied in 7.5 (Height measurement - Figure 8).

Where netting is used, the mesh and its fastening system must not exceed a cross-section of 5 mm × 5 mm.

All V-shaped or partially circumscribed openings located at the top must not be more than 45 mm wide or must comply with the requirements of standard NF EN 1176-1 (paragraph 4.2.7.2 and Appendix D.2.2).



Legend

1 Less than 25 mm or between 45 mm and 102 mm

Figure 7 - Summary of dimensional requirements for protective barriers

5.7 Removable elements or

All detachable elements within the space (0 m/1.50 m) from the floor must be tested. The requirements are as follows:

- a) the removable parts of the barriers and means of access must not, whatever their position, enter completely into the test cylinder specified in 7.6 (cylinder for small parts) and must not have the effect of making it easier for young children to climb over the protective barrier when dismantled or detached without the aid of a tool;
- b) when tested in accordance with the small element torsion tests described in clause 7.8, and the small element tensile tests described in clause 7.9 of this standard, barriers and means of access shall not produce any element which, in any position, can enter completely into the test cylinder defined in clause 7.6, nor have accessible sharp edges or accessible sharp points.

5.8 Means of access to the pool and unlocking system

5.8.1 Closing and locking

5.8.1.1 General

The means of access may be pivoting, sliding vertically or laterally, rotating, rolling, etc. When pivoting, the opening must be towards the outside of the pool. When it pivots, it must open towards the outside of the pool.

If an interlock is automated by remote energy: electric, pneumatic, etc., a formal indication of the interlock must be provided (indicator light, audible indicator, etc.).

5.8.1.2 Requirements

In the case of electrical interlocking, the system must comply with the requirements of the Low Voltage Directive, the EMC Directive and standard NF C 15-100.

In the event of a power failure, the means of access must remain locked from the outside and must be operable by an adult.

Whichever system is chosen, it must remain possible to unlock inside the protected area. The means of access must be manual or automatic.

The means of access must be manually or automatically lockable.

In the case of automatic closing, the locking must be automatic.

The automatic closing and locking mechanism of the means of access must be set to allow people to pass through without risk.

For collective use, access to the pool must be secured after any crossing. Closing and locking must be automatic.

5.8.1.3 Unlocking

5.8.1.3.1 General requirements

To prevent the risk of unlocking by children under the age of five or unintentional unlocking, the unlocking system must require at least one manual action of a force of at least 20 N (applied to the point furthest from the axle for the rotating parts) to be released and, as an option :

- require at least two consecutive actions on the release system to free it, the second being dependent on the first being performed and maintained; or
- require two separate but simultaneous actions acting according to different principles; or
- have two release devices at least 1 000 mm apart which must be actuated simultaneously; or
- be inaccessible to a child under the age of five with an unlocking system at a developed length of more than 1.50 m (measured from the ground outside the protected area).

The use of a tool such as a token, key or magnetic card is not considered to be an action as defined above.

NOTE The movement of opening the means of access is not considered to be an unlocking action.

The release system must be easy for adults to operate.

5.8.1.3.2 *Manual system*

For manual systems, the system must operate before and after 1,000 opening/closing operations.

The unlocking force must be at least 20 N, applied to the point furthest from the axle.

5.8.1.3.3 *Automatic system*

The following tests are carried out when the means of access is halfway open.

For automatic systems, the system must operate before and after 50,000 manoeuvres.

The unlocking force must be at least 20 N, applied to the point furthest from the shaft. For self-closing systems, the system must operate after 50,000 operations.

The unlocking force must be at least 20 N, applied to the point furthest from the axle.

5.9 Moving parts (sliding mechanisms and hinges)

Barriers fitted with sliding mechanisms or comprising two parts articulated by one or more

6 Resistance

6.1 Protective barriers sealed, fixed or driven into the ground

At the end of the test described in paragraph 7.11.2 (soft-body impact test), no area of entrapment must be observed in accordance with the requirements of paragraph 5.6 (entrapment). In addition, residual deterioration must not facilitate access. The functionality of the protective barrier must be retained, in particular its height above the ground.

On completion of the test described in paragraph 7.12 (pull-out test), driven-in protective barriers must meet the requirements of paragraph 5.6 (wedging).

The protective barrier must be permanently anchored to the ground.

6.2 Protective barriers installed at .

On completion of the test described in paragraph 7.12.2 (soft-body impact test), the protective barriers placed on the ground must not move.

Following the test described in paragraph 7.12 (pull-out test), the protective barriers installed on the ground must meet the requirements of paragraph 5.6 (wedging).

7 Test methods

7.1 General

Unless otherwise specified, the tests must be carried out on the protective barrier elements and the means of access installed in accordance with the manufacturer's instructions.

For the height measurement defined in 7.5, and the dynamic test defined in 7.11, the protective barrier must be made up of at least one element on either side of the barrier element to be tested or the means of access and arranged in a linear fashion on the same plane, without corner returns. All possible configurations (combination of modules) must be tested.

For flexible barriers, tests can only be carried out by hooking the ends onto the test posts in accordance with the manufacturer's instructions.

The tests must be carried out in the order specified in the requirements.

7.2 Mechanical resistance to tearing

7.2.1 For non-coated textiles and plastic mesh

Tear resistance characterisation tests must be carried out in accordance with NF G 07-148, with a minimum tear force of 70 N, excluding decorative elements that do not affect safety.

7.2.2 For coated or extruded textiles and plastic mesh

Tear strength characterisation tests must be carried out in accordance with NF EN 1875-3, with a minimum tear strength of 70 N, excluding decorative elements which do not affect safety.

7.3 Weathering test artificial

Natural ageing tests must be carried out on coated or extruded fabrics, knitted fabrics and coated plastic meshes for a period of three years, the exposure conditions being in accordance with those defined in standard NF T 54-405-1.

The tensile characteristics are monitored at the end of the three years of exposure and must meet the requirements indicated in paragraph 7.4 (tensile tests).

At the same time, accelerated ageing tests can be carried out in accordance with the NF EN ISO 4892-1 and NF EN ISO 4892-2 (method A) using a simulated ageing chamber.

The operating conditions of the simulated ageing chamber, equipped with a xenon arc source, must be as follows:

- control irradiance at 340 nm :
0.50 W/(m² .nm) ;
(102 ± 0.5) min ;
- watering time for samples on exposed surfaces: (18 ± 0.5) min.

The exposure time of the samples in the simulated ageing chamber must correspond, in the wavelength range from 290 nm to 800 nm, to an irradiance dose of 4.8 GJ/m² , i.e. an exposure time of 2,500 h for the control irradiance level specified above.

Resistance to artificial climatic ageing is assessed after simulated ageing by measuring the tensile characteristics, which must meet the requirements indicated in paragraph 7.4 (tensile tests).

7.4 Tensile tests

The tests must be carried out before and after the ageing test defined in paragraph 7.3, and in accordance with the requirements of standard NF EN ISO 1421 for coated fabrics, standard NF EN ISO 13934-1 for woven fabrics and standard NF EN 29073-3 for non-woven fabrics.

The energy measured during these tests must be greater than 57 J (sum of tests in both directions) with a minimum of 11 J in the weaker direction. Energy is measured by calculating the area under the tensile curve.

7.5 Measure height

The height of the protective barrier is measured between two successive support points on the same element.

The 17.5 kg load (Figure 8) is applied in equilibrium to two support points located 375 mm and 625 mm from the axis of the first column.

Loads should be distributed as shown in Figure 8 (one load placed every metre), with a support point possibly placed on the adjacent element. The loads must be maintained for 30 s.

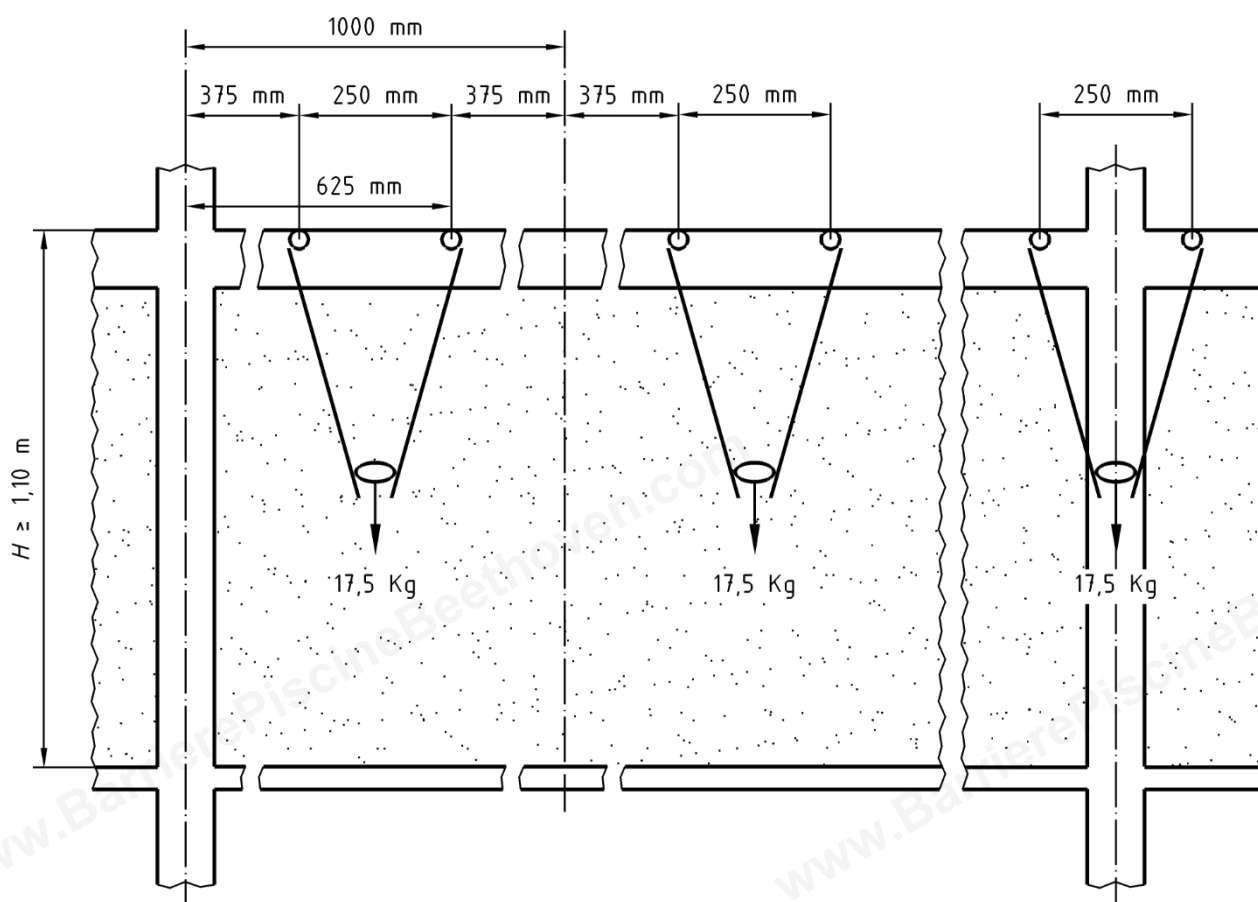


Figure 8 - Determining the height

7.6 Cylinder for small elements

Place the element, without compressing it and in every possible orientation, in a cylinder with the dimensions shown in Figure 9.

Dimensions in millimetres

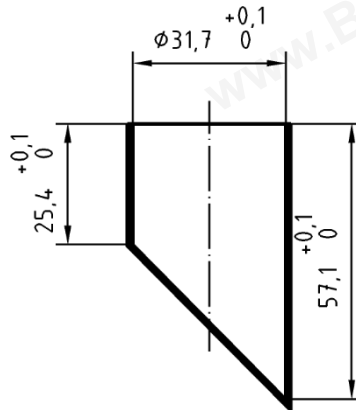


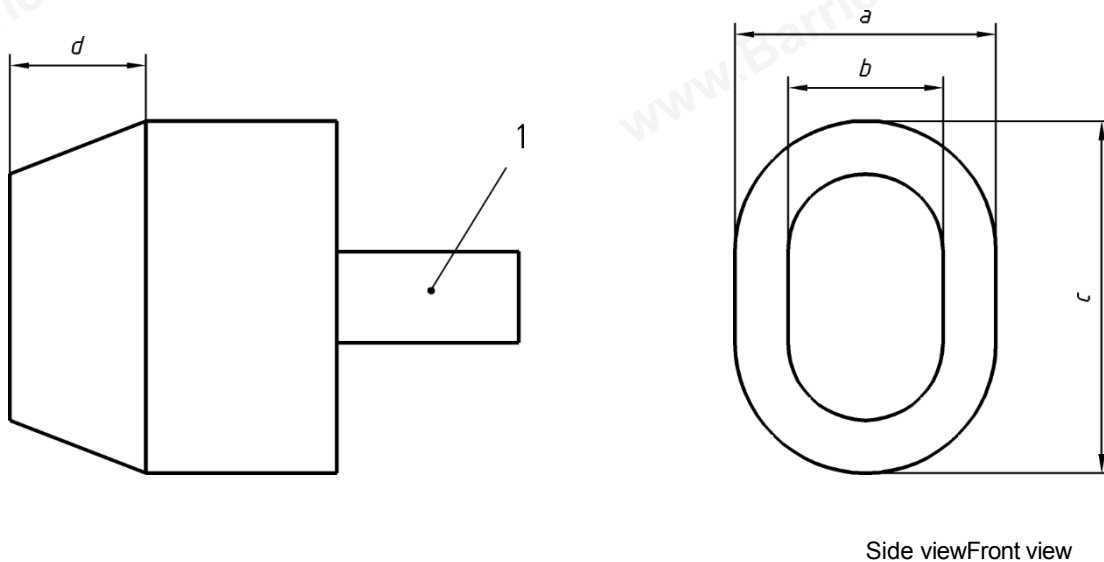
Figure 9 - Test cylinder for small components

Determine whether the element fits completely into the cylinder.

7.7 Wedging

7.7.1 Equipment

Small torso" probe as shown in Figure 10, which corresponds to a child aged between 18 and 24 months.



Legend

- 1 Handle
- a = 102 mm
- b = 48 mm

- c = 143 mm
- d = 27 mm

Figure 10 - "Small torso" probe

7.7.2 Operating mode

Apply the probe illustrated in Figure 10 successively to each opening, using a force of 100 N. Record the passage of the probe through the aperture in a report.

7.8 Torsion test for small elements

If a component can be gripped between the thumb and forefinger, apply the twisting force progressively clockwise on the component for 5 s until :

- a) 180° rotation from the original position; or
- a) a torque of 0.34 Nm.

Maintain the maximum rotation or torque required for 10 seconds. Allow the element under test to return to its initial relaxed state. Repeat the test counter-clockwise.

Protruding parts, parts or assemblies rigidly attached to an accessible rod or shaft designed to rotate with the components in question, must be tested by immobilising the rod or shaft to prevent any rotation.

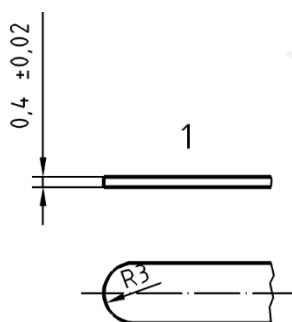
If a part assembled by a screw loosens during the application of the required torque, continue to apply the required torque until it is exceeded, or until the part disassembles, or until it becomes obvious that the part will not disassemble.

7.9 Tensile test for small elements

7.9.1 Equipment

- Tensile testing machine or dead weight device capable of applying forces of at least 90 N with an accuracy of 2 N.
- Jaws and fasteners.
- Thickness gauge, with a thickness of (0.4 ± 0.02) mm and an insertion edge radius of approximately 3 mm (Figure 11).

Dimensions in millimetres



Legend

1 Broken edges

Figure 11 - Thickness gauge

7.9.2 Operating mode

7.9.2.1 General

The tensile test should be carried out after the torsion test, on the same element of the barrier. Determine whether the element to be tested can be gripped:

- by inserting the feeler gauge between the component and the underlying layer or barrier body, at an angle of between 0° and 10° to the barrier surface and with a force of (10 ± 1) N. If the gauge can be inserted by more than 2 mm, the component is considered grippable.
- by being able to grip the item between thumb and forefinger. If the item can be grasped between thumb and forefinger, it is considered grippable.

If it is grippable, fit suitable jaws behind the element, taking care not to damage the attachment mechanism or the body of the barrier.

Attach the barrier element to the testing apparatus and apply a tensile force to the element to be tested using jaws or other devices.

Apply a force of (90 ± 2) N when the largest accessible dimension is greater than 6 mm. Apply the force gradually over 5 s. Hold for 10 s.

Determine whether the element has come loose.

7.9.2.2 Protective elements

Apply a tensile force of (90 ± 2) N to the element to be tested. See if the element detaches from the barrier.

7.10 Endurance of the unlocking system

7.10.1 Endurance of manual systems

Endurance tests on the release system are carried out simultaneously for 1,000 cycles.

7.10.2 Endurance of automatic systems

If more than one operation is required, each is tested separately or simultaneously for 50,000 cycles.

7.11 Test dynamic

7.11.1 General

The element of the protective barrier is held on the ground in conditions equivalent to the conditions of use. The test is carried out on the filling of the protective barrier in the running section (guardrail, rail, panel, etc.).

7.11.2 Body impact test soft

7.11.2.1 Principle of the test

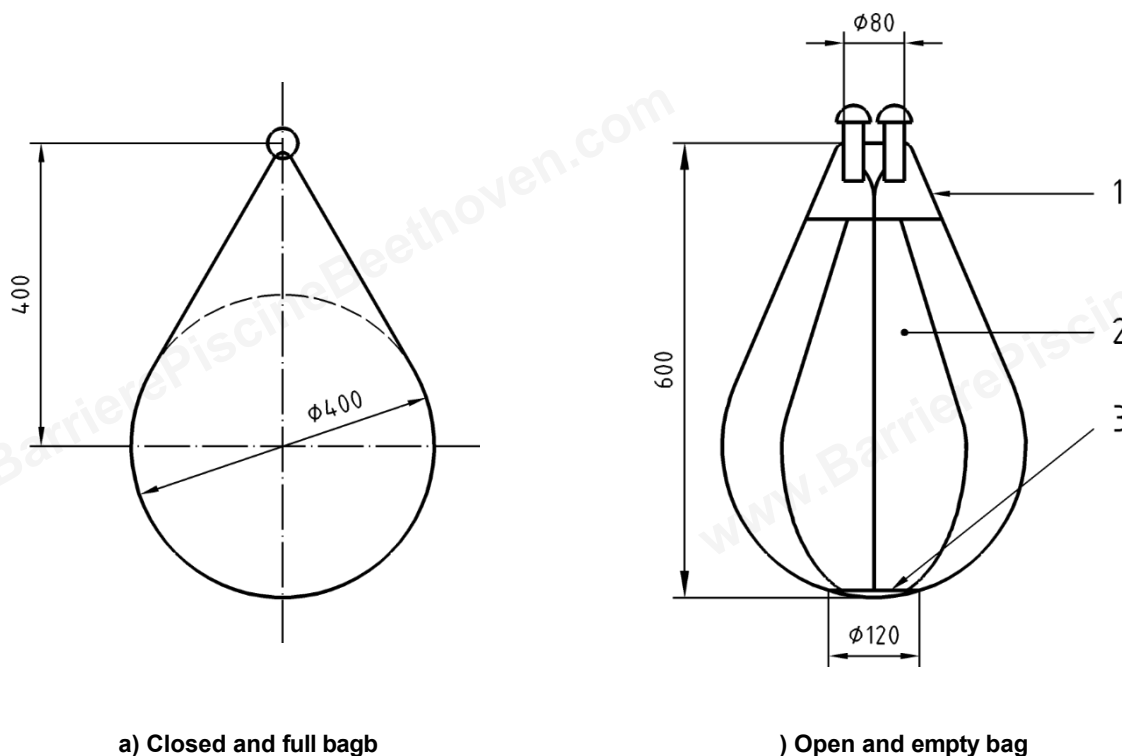
The test consists of subjecting the protective barrier element, the posts and the means of access to the action of shocks conventionally represented by the pendular fall of impact bodies defined in standard NF P 08-301.

7.11.2.2 Characteristics of the test piece

Large soft bodies are defined in NF P 08-301 as follows:

- The large soft body is a spheroconical bag with a mass of 50 kg (Figure 12).
- This bag is made up of eight canvas spindles, assembled and sewn together.
- The dimensions of the filled bag are those of a volume consisting of a sphere with a diameter of 400 mm, inscribed in a cone with a vertex 400 mm from the centre of the sphere.
- The bottom of the bag is reinforced with a sewn-on leather cap 120 mm in diameter.
- The top of the bag is slightly truncated to create an 80 mm diameter opening. This opening is reinforced by a stitched leather edging to which four equidistant rings are attached, which are attached to a suspension ring.
- The bag is filled with hardened glass beads with a diameter of 3 mm (usually used for grinding paints) and weighed at (50 ± 0.5) kg.
- To prevent the beads from spilling onto the ground in the event of an accidental rupture of the bag's seams, it is advisable to line the inside of the bag with a polyethylene bag with a bladder.

Dimensions in millimetres



Legend

- 1 Leather edging
- 2 Eight canvas spindles
- 3 Leather back

Figure 12 - 50 kg spheroconical bag

7.11.2.3 Performing the test

The external shock to be applied is a large soft body shock of 150 J. This corresponds to a 50 kg mass dropped pendularly from a height of 0.30 m, as shown in Figure 13.

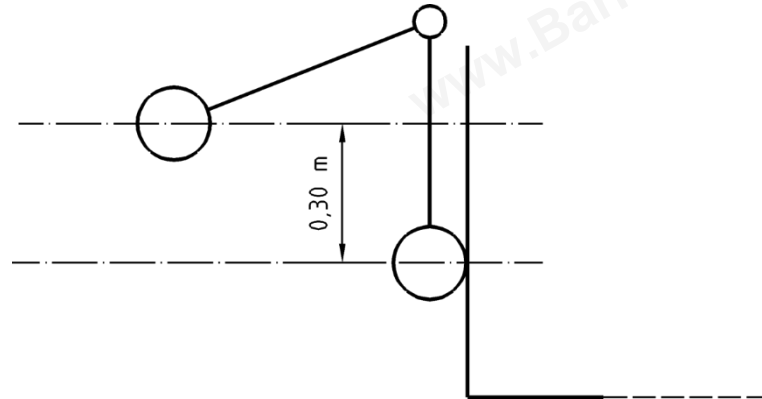


Figure 13 - Pendulum shock

The impact must be at the geometric centre of the filling element being tested and at 0.8 m from the ground for posts.

The impact body is suspended from an anchor point approximately 2.50 m above the point of impact. At rest, the impact body is in tangential contact with the point of impact. The impact body is then moved away from the point of impact in such a way that the impact body falls in a pendulum movement without initial velocity by the height required to obtain the required energy at the chosen point of impact.

The movement of the impact body and wire rope must not be hindered by any obstacle other than the filling itself.

NOTE 1 Heights are determined by considering the position of the centre of gravity of the impact body.

NOTE 2 After impact, any rebound of the impact body must not be followed by a second contact with the test item.

In the case of a protective barrier placed on the ground without anchoring, carry out the test five times as defined above, at the top of the post, with a value of 150 J.

In all cases, the diameter of any indentations is noted, any damage observed and any residual deformation recorded.

7.11.3 Hard body impact test on glass fillings

Pool barrier fillings must retain their performance.

This requirement is deemed to have been met if the wall retains all its performance, including its appearance, when subjected to the impact of a 0.5 kg ball dropped pendularly from a height of 0.20 m (D 0.5/1 J).

The impact body is suspended from an anchor point located approximately 1.75 m above the point of impact.

The point of impact is located on the centre of the geometry and close to the corners, approximately 0.25 m from the bisector of the element being tested.

A single shock is performed.

In the case of a non-symmetrical element, the test is carried out on both sides of the element.

7.12 Test

The barrier is installed according to the manufacturer's instructions. A force of 120 N is applied vertically to the end of the post.

8 Instructions for the consumer

8.1 General principles

The protective barrier must be accompanied by installation and operating instructions, which also contain safety and maintenance advice.

The installation and operating instructions must be marked "Please read carefully and retain for future reference".

The manufacturer/supplier must provide information at the time of purchase, installation instructions where applicable, instructions for use, safety advice specific to each piece of equipment and a maintenance guide.

All these documents must be marked "**Please read carefully and retain for future reference**".

All these documents must identify the equipment to which they relate:

- the name and contact details of the person responsible for placing the product on the market (manufacturer or importer) or the distributor;
- a telephone number where the consumer can obtain further explanations, if necessary;
- the name and reference of the model.

All instructions and advice must be legible, clear, understandable by the purchaser/user and written in French.

When notices and guides contain several pages, they must be paginated.

To improve comprehension, the use of illustrations is recommended. Illustrations should be placed in such a way that they can be seen while the text is being read.

Visuals must not contradict the requirements included in this document. Prohibitions, warnings and cautions must be highlighted.

8.2 Information at

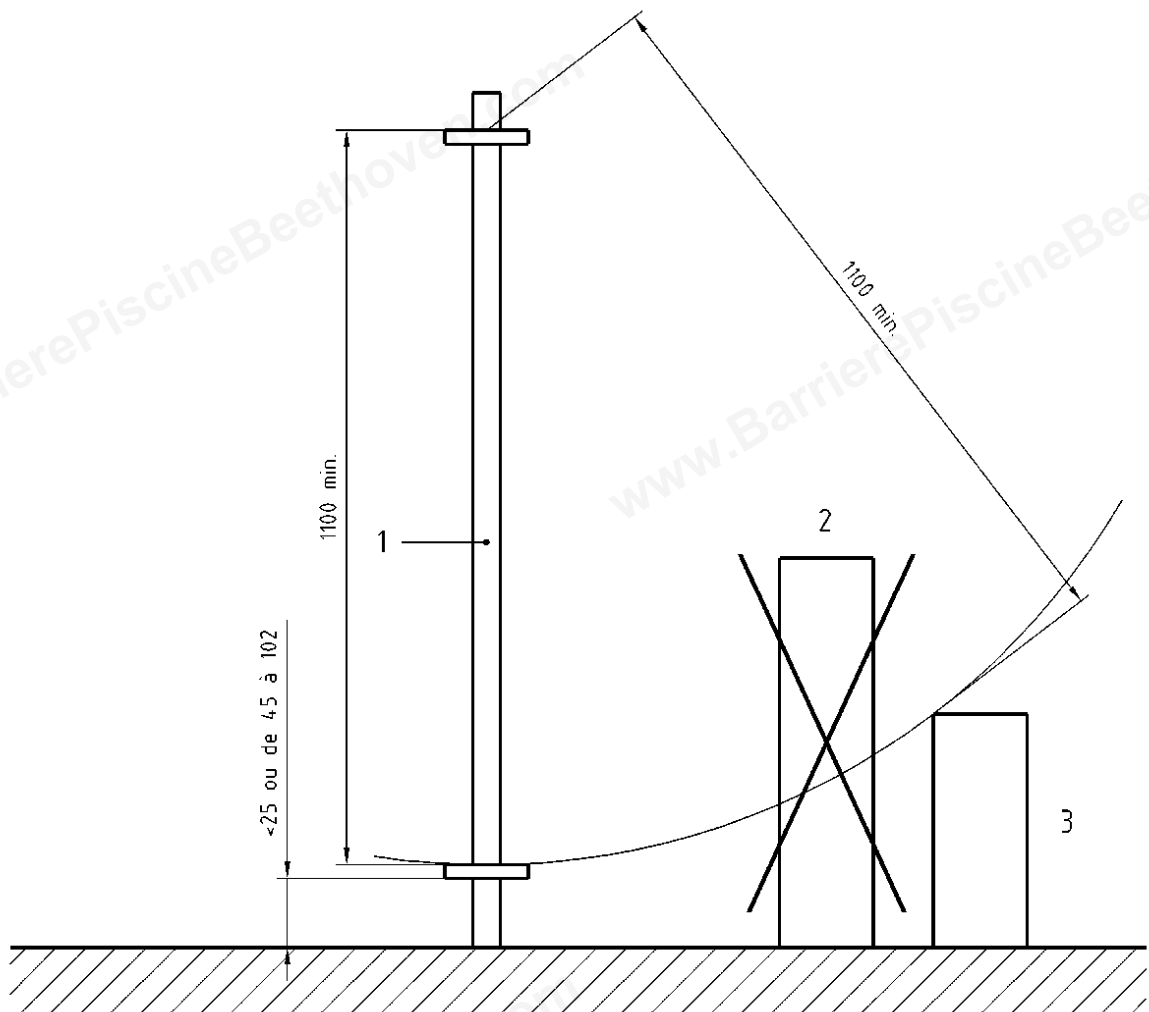
To enable the buyer to make a choice, the purchase information must be available in advance and indicate :

- one of the following indications: "Protective barriers for swimming pools" or "This barrier can be used as a protective barrier for swimming pools" ;
- the use of the barrier depending on the means of access: individual use or collective use ;
- the following statement: "This barrier is intended to restrict access to the swimming pool to children under the age of five";
- the reference to this document ;
- the height of the protective barrier ;
- the following recommendation: "It is recommended that the protective barrier is installed at least one metre from the water surface. For private pools for individual use, it is recommended not to install the barrier too far from the pool so as not to lose the barrier's effectiveness";
- the list of components of the protective barrier ;
- the anchoring method ;
- the following warning: "When the protective barrier is combined with one or more walls, these walls must not allow access to the pool through their height (minimum 1.10 m between support points) or their own openings (doors and windows closed by a childproof device)";
- the nature and duration of the manufacturer's warranty.

8.3 Installation instructions and

The installation and operating instructions must include all the information required for correct and complete installation, and in particular the following information:

- soil preparation and anchoring methods depending on the type of soil ;
- the following recommendation: "It is recommended that the protective barrier is installed at least one metre from the water surface. For private pools for individual use, it is recommended not to install the barrier too far from the pool so as not to lose the barrier's effectiveness";
- a bill of materials for all parts and a description of the assembly stages in chronological order ;
- if necessary, the list of tools required for assembly ;
- explanations of the locking/unlocking system for the means of access ;
- recommendations on installing the protective barrier ;
- the following recommendation: "It is imperative to replace any component (or set of components) that has deteriorated";
- maintenance instructions (see 8.4) and safety instructions (see 8.5) ;
- the following indication: "Avoid the presence of any fixed support point (low wall, etc.). Ensure that there are no moving parts on either side of the barrier within a radius of 1.10 m (see Figure 14)".



Legend

- 1 Barrier
- 2 Not acceptable
- 3 Acceptable

Figure 14 - Perimeter around the barrier

8.4 Maintenance tips

The recommendation to regularly check that the locking system is working properly and how to remedy a fault must be included.

The following recommendation must be included: "It is imperative to replace any damaged component or set of components as soon as possible. Only use parts approved by the supplier/installer".

8.5 Safety tips

8.5.1 General Council of safety

General safety advice must contain at least the following information:

- the following warning: "Swimming pools can be a serious hazard for your children. Drowning can happen very quickly. Children near a swimming pool require your constant vigilance and active supervision, even if they know how to swim";
- "This barrier is not a substitute for common sense or individual responsibility. Nor is it intended to replace the vigilance of responsible adults, who remain the essential factor in protecting young children". The means of access must be systematically closed if you are away from home, even for a short time;
- Take all measures to prevent access to the pool by young children, until the barrier or means of access has been repaired in the event of a malfunction or the barrier has been dismantled to prevent the pool from being made safe;
- The following warning: "The presence of a parent and/or responsible adult is essential when the pool is open" coupled with the pictogram emphasising the duty of adults to supervise young children. An example of the pictogram is shown in Figure 15.

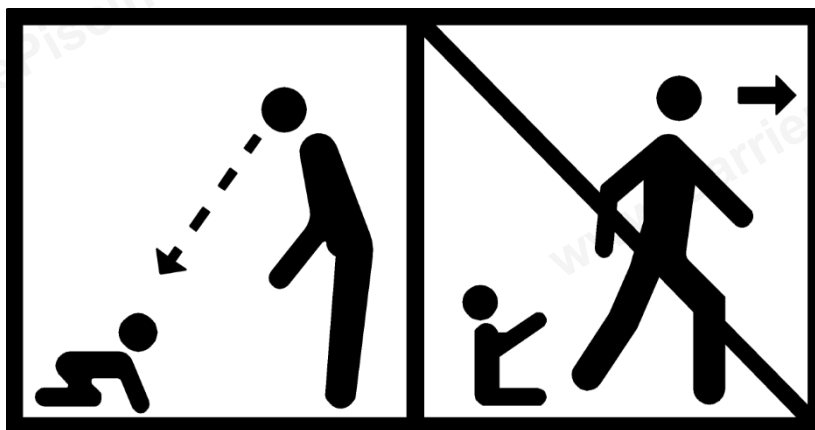


Figure 15 - Example of a pictogram

- the following advice: "Learn lifesaving techniques";
- the following advice: "Memorise the first aid numbers and display them near the pool":
 - Fire brigade (18 for France) ;
 - SAMU (15 for France) ;
 - Poison control centre.

8.5.2 Safety tips for barriers

Safety advice specific to barriers must contain at least the following information:

- This barrier is not a substitute for common sense or individual responsibility. Nor is it intended to replace the vigilance of parents and/or responsible adults, who remain the essential factor in protecting young children.
- Warning: "Caution! Safety is only guaranteed when the means of access is closed and locked.
- The means of access must be systematically closed in the event of even a momentary absence of supervision.
- Take all measures to prevent access to the pool by young children if the barrier or means of access is repaired or removed.
- Warning: "Check that there are no objects near the barrier that could encourage or facilitate climbing the barrier".
- Warning: "The closing of the means of access for self-closing systems must be systematically checked.

8.6 Marking

All protective barriers must display the following information legibly, visibly and indelibly:

- "This barrier complies with NF P 90-306;
- the name of the manufacturer or importer or its company name ;
- a statement identifying the model;
- affix the following warning clearly visible on both sides of the means of access
:
"ACCESS LOCKED = SECURITY" in bold font 24 ;
- the following warning on the means of access itself: "Check the lock and remain vigilant";
- information enabling the product to be traced (batch number, serial number, year of manufacture for

Appendix A

(informative)

Applicable regulations

Article L 221-1 of the French Consumer Code.

Law no. 2003-9 of 3 January 2003 on swimming pool safety.

Decree no. 2003-1389 of 31 December 2003 on swimming pool safety and amending the Construction and Housing Code.

Electromagnetic compatibility regulations. Low voltage regulations.

Council Directive 91/338/EC of 18 June 1991 amending for the tenth time Directive 76/769/EEC on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations.

Directive 2002/61/EC of the European Parliament and of the Council of 19 July 2002 amending for the nineteenth time Council Directive 79/769/EEC relating to restrictions on the marketing and use of certain dangerous substances and preparations (azocolourants).

Commission Directive 2003/2/EC of 6 January 2003 on the marketing and use of arsenic (tenth adaptation to technical progress of Council Directive 79/769/EEC).

Commission Directive 2003/3/EC of 6 January 2003 relating to restrictions on the marketing and use of "blue colourant" (twelfth adaptation to technical progress of Council Directive 79/769/EEC).

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 - [2] NF EN 71-1/A5, *Safety of toys - Part 1: Mechanical and physical properties - Amendment 5* (classification index: S 51-212/A5).
 - [3] NF EN 71-3:1995, *Safety of toys - Part 3: Migration of certain components* (classification index: S 51-214).
 - [4] NF EN 335-1, *Durability of wood and wood-based materials - Definition of classes of risk³⁾ of biological attack - Part 1: General* (classification index: B 50-100-1).
 - [5] NF EN 335-2, *Durability of wood and wood-based materials - Definition of classes of risk³⁾ of biological attack - Part 2: Application to solid wood* (classification index: B 50-100-2).
 - [6] NF EN 572-2, *Glass in building - Basic products: soda-lime silicate glass - Part 2: Ice* (classification index: P 78-103).
 - [7] NF EN 1670, *Building hardware - Corrosion resistance - Requirements and test methods* (classification index: P 26-433).
 - [8] NF EN ISO 105-B04, *Textiles - Dye fastness tests - Part B04: Fastness of dyes to artificial weathering: xenon arc lamp* (classification index: G 07-012-4).
 - [9] NF EN ISO 4674-2, *Textile substrates coated with rubber or plastics - Determination of tear resistance - Part 2: Sheep-pendulum method* (classification index: G 37-128-2).
 - [10] NF EN ISO 5981, *Textile supports coated with rubber or plastic - Determination of resistance to wrinkling due to simultaneous application of torque and friction* (classification index: G 37-110).
 - [11] NF EN ISO 6508-1, *Metallic materials - Rockwell hardness test - Part 1: Test method (grades A, B, C, D, E, F, G, H, K, N, T)* (classification index: A 03-153-1).
 - [12] NF EN ISO 13937-1, *Textiles - Tearing properties of fabrics - Part 1: Determination of the tearing force using the ballistic pendulum method (Elmendorf)* (classification index: G 07-149).
 - [13] NF B 32-500, *Safety glass for glazing - General - Terminology*.
 - [14] NF B 50-100-4, *Durabilité du bois et des matériaux dérivés du bois - Définition des classes de risque d'atta- que biologique - Partie 4 : Déclaration nationale sur la situation des agents biologiques*.
 - [15] NF B 50-105-3, *Durabilité du bois et des matériaux dérivés du bois - Bois massif traité avec produit de préservation - Partie 3 : Performances de préservation des bois et attestation de traitement - Adaptation à la France métropolitaine*.
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 - [17] NF G 07-145, *Essais des tissus - Détermination de la résistance au déchirement sur dynamomètre - Déchirure au clou*.
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 - [19] NF P 01-013, *Testing of guardrails - Methods and criteria*.
 - [20] NF P 90-307, *Éléments de protection pour piscines enterrées non closes privatives à usage individuel ou collectif - Systèmes d'alarmes - Exigences de sécurité et méthodes d'essai*.
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[22] NF P 90-309, *Éléments de protection pour piscines enterrées non closes privatives à usage individuel ou collectif - Abris (structures légères et/ou vérandas) - Exigences de sécurité et méthodes d'essai.*

[23] ISO 4287-2, *Surface roughness - Terminology - Part 2: Measurement of surface roughness parameters.*

[24] ISO 12550, *Design and use of insulating glass units.*