

## **Information for professionals - SAFETY**

### **What are safety standards?**

The safety standards that govern public playgrounds are EN 1176-1, -2, etc and EN 1177. Occasionally the name of the standard begins with "SFS-EN", which indicates that the European standard in question has been adopted in the Finnish standard as it is. Safety standards are also sometimes referred to as "safety norms". In this document, EN 1176-x refers to all published parts of the EN 1176 standard.

The safety standards include around 500 instructions on the composition of playground equipment, on structures erected on site, and on maintenance. These have been ratified in Finland and represent the generally accepted principles for looking after playgrounds. As long as the safety standards are followed, the manufacturer of the playground equipment, the designer or the owner of the playground cannot be held liable for negligence in the event of accidents.

Separate norms exist for playgrounds built on private property and these are included in the Safety of Toys standard, EN 71-8. The straightforward installation instructions provided in this standard can also be used when erecting playground equipment that has been designed for public use in domestic situations.

### **What types of playground are governed by EN 1176-x and 1177?**

The safety standards EN 1176-x and 1177 govern public playgrounds including public parks, children's nurseries, school playgrounds, church playgrounds and communal gardens on housing estates.

These safety standards do not cover amusement parks, water parks, skate parks, sports facilities or domestic situations. Please note: a normal playground may nevertheless exist within one of these facilities such as alongside an outdoor swimming pool.

The safety standards do cover playgrounds built within the communal areas of housing estates. However, the standards do not extend to private gardens that belong to individual residents (self-governed).

The safety standards do not cover playgrounds in private gardens of detached or semi-detached houses to which there is no public access. Erecting a sign to ban public access is not sufficient. The safety standards do not apply at public events where a supervised play area is provided for children - a climbing wall or a trampoline, for example.

### **What products and structures do the safety standards cover?**

The safety standards apply equally to play equipment and to all other products in the playground on which children play even if these are designed for other purposes. Such products include garden swings, benches and tables, boxes storing sand for

preventing slipperiness in the winter, lampposts, storage boxes for toys and litterbins, for example.

The safety standards also apply to all structures erected on site. These include safety zones for the playground equipment, safety surfaces, fences, sheds, playhouses, gazebos, pergolas, handrails and embankments, for example.

The safety standards do not include specific instructions on natural rocks and trees located within the playground. In this respect the safety standards can only be enforced as far as applicable. The safety standards do not apply to products and structures such as carpet beating stands, garden swings or fences if these are located outside the playground.

In order to avoid accidents and with responsibility issues in mind, a playground should be clearly defined and all other products except playground equipment removed from the vicinity of the playground. Ways of clearly defining a playground include fences, flowerbeds, paths and borders of gravelled areas. The safety standards do not cover loose toys inside the playground such as buckets and pedal cars. The safety of such products is covered by the Safety of Toys standard, EN 71.

## **Responsibilities of the parties involved**

### a) Responsibilities of the playground's designer

The designer is responsible for ensuring that the design meets the requirements of existing laws, decrees, and orders issued by the relevant authorities. The designer is liable for damage incurred by the customer as defined in the terms of the contract, if this damage is caused by mistakes or negligence. Liability for damage incurred by third parties cannot be set out in the contract. The designer is responsible for fulfilling the requirements set on safety zones around the finished playground equipment and for ensuring that the size and construction of safety surfaces meet the relevant requirements. As far as the designed elements and structures erected on site are concerned, the designer is responsible for ensuring that the constructions meet the safety requirements put forward in the EN standards governing playgrounds.

### b) Responsibilities of the manufacturer of the playground equipment

The manufacturer is responsible for ensuring that the playground equipment meets the safety requirements put forward in the EN standards governing playgrounds.

The requirements cover the following issues:

- solidity of the construction
- access to the equipment
- prevention of falling
- surface treatment of the equipment
- moving parts
- climbing ropes
- risk of entrapment
- safety zones

- foundations
- testing.

Due to statutory liability, factory-made equipment is recommended.

### c) Responsibilities of the playground's owner/builder

The owner/builder of the playground is responsible for organising inspections and maintenance for the playground and the playground equipment. In the case of playground equipment being modified, liability issues relating to safety only remain unchanged provided that the playground's original designers inspect and approve the proposed changes. If not, liability will transfer to the person responsible for changing the plans.

The safety standards specify that the owner of the playground or the body governing the playground must be in possession of a maintenance programme which is used to ensure that the condition of the playground remains in conformity with the safety standards at all times. In addition to financial compensation, accidents resulting from negligence can at worst lead to personal criminal prosecution. The principal condition for producing the maintenance programme is naturally that the playground conforms to the safety standards right from the beginning. An acceptance inspection must be performed in connection with the handover of new playgrounds. In old playgrounds, all repairs must be preceded by a safety inspection.

### **Maintenance programme**

The maintenance programme must determine the kind of maintenance visits that will be made to the playground and how often. The owner of the playground must appoint the people responsible for maintenance measures and produce instructions for dealing with potential accidents as well as update the programme on a yearly basis. The safety standards specify three different kinds of mandatory maintenance visits. The most important visits are the regular scheduled inspections by a maintenance engineer and any associated repairs. The standards specify that these kinds of inspections must take place at least once every three months. More frequent visits must be arranged if necessary. The inspection must cover all playground equipment, safety surfacing and other structures in the playground, making sure that they are all intact and functioning properly. Maintenance engineers, children's nursery staff and other staff are responsible for carrying out minor day-to-day maintenance measures if needed. For example, if a bench is moved into a safety zone around playground equipment or if there are broken bottles in the playground, the playground must be returned to its original state immediately.

Once a year the playground must be subjected to a thorough inspection that aims to identify repairs that need to take place during the following 12-month period. The anticipated repair needs are recorded in the maintenance plan and taken into account in the budget. The instructions in case of accidents include instructions for directing the injured to treatment and measures that must be adopted in the playground in the event of an accident, such as preventing the use of the equipment or dismantling it.

## **Day-to-day maintenance**

Loose furniture and toys inside the playground must be returned to their designated places. There must be no loose objects inside the safety zones around the playground equipment. The benches cannot be moved if they are fixed to the ground.

Loose stones, planks of wood, sticks and other loose objects must be moved permanently away from the vicinity of the playground. Special attention should be paid to shards of glass and other dangerous waste.

If animal droppings are found in the playground, these must be cleared away. Special attention should be paid to the sandpit. If children bring objects that belong to another structure into the playground, such as cobbles or concrete blocks, these must be fixed in place permanently. A repair plan must be produced when necessary.

If playground equipment shows cracks, protruding nails or damaged components and these cannot be repaired, the equipment must be declared out of use.

The ground underneath swings, at the bottom of slides and around roundabouts wears easily in use. The resulting indentations must be levelled regularly, ensuring that there is always at least 20 cm of gravel at the bottom of the indentation. This recurring safety risk and maintenance expense can be eradicated by installing an anti-wear base.

## **General rules on safety zones**

A sufficiently large area of open space must be reserved around playground equipment in case a child falls or jumps off the equipment. In the safety standards this area is known as a fall zone and in professional terminology as a safety zone. The exact size and shape of the safety zone suitable for each piece of playground equipment is indicated in the drawings.

The general rule, barring a few exceptions, is that the safety zones of different pieces of equipment can overlap, that is, encroach on one another. However, the actual piece of equipment itself must not be inside the safety zone of another piece of equipment. In such a case, the minimum distance depends on the piece of equipment that requires a larger safety zone.

Exceptions to the aforementioned general rule include equipment in which the entire body of a child is in powerful motion. Examples of such equipment include swings, roundabouts, the bottom of slides and cableways. The safety zones of these kinds of equipment must not overlap with other safety zones.

CHANGES TO SAFETY STANDARDS IN 2008: Seesaws are now also considered to possess such momentum that the safety zones around them must not encroach on each other.

Access routes inside the playground must be designed so that they do not encroach on safety zones. The development of potential shortcuts must be taken into account

and prevented.

## **Dimensions of safety zones**

The size of a safety zone depends, barring a few exceptions, on the free fall height as shown in the picture. These safety margins must also be observed in connection with equipment other than playground equipment if these structures are used for climbing and jumping. Examples of such structures include natural boulders, breast walls, elevations and fences.

When the fall height is less than 60 cm, a safety zone is not required. When the fall height is between 60 and 150 cm, the safety zone must measure 150 cm. When the fall height is more than 150 cm, the safety zone must measure  $\frac{2}{3}$  of the fall height plus 50 cm. Fall heights in excess of 300 cm are prohibited in playground equipment as well as all other structures located inside the playground area.

Sample calculation: When the fall height is 210 cm, the safety zone must measure  $2 \times \frac{210}{3} + 50 = 190$  cm.

Exceptions to normal safety zones: swings, spring products, seesaws, roundabouts, slides and cableways.

## **The 60 cm rule**

The 60 cm fall height features in three places in the safety standards:

- 1.** If small children have not been prevented from being able to climb up onto the structures, all platforms must be equipped with solid walls of at least 70 cm in height. If the height differences between the platforms are less than 60 cm, there is no need for walls (e.g. breast walls).
- 2.** No safety zones are required when the fall height is less than 60 cm. This applies equally to natural boulders and playground equipment barring a few exceptions. For more information, please see: Spring and carousel products.
- 3.** When the fall height is less than 60 cm, a base that somewhat softens impact is sufficient. Only completely solid materials are forbidden. Mineral ash is an acceptable base material. A base made of mineral ash can accommodate playground equipment of less than 60 cm in height as well as other structures such as natural boulders.

Usually playgrounds are designed so that a play area reserved for small children is separated from the area designed for older children. As the equipment designed for small children usually measures less than 60 cm in height, different base materials can be used in different parts of the playground. The area reserved for small children can be built on a base of mineral ash whilst gravel is used in the area designed for older children. The area reserved for smaller children can then accommodate low-rising playground equipment such as sandpits, spring products, spinning tops, small roundabouts, playhouses and table groupings.

## **Choosing and positioning swings**

If the playground is open to children of all ages and only has one swing, the swing frame must have a divider in the middle. A variety of seats can then be chosen for the frame. The safety standards specify that each section between two swing posts must only be made up of seats designed for the same age group. Cradle seats and flat seats cannot be used together in swing frames that do not include a divider. The same applies to cradle seats and tyre seats. If the playground has two separate swing sets, the seats designed for smaller children should be used in one and the seats designed for older children in the other. We recommend that the only frames installed in new playgrounds are ones with dividers. This way the choice of seats will always be in compliance with the safety standards.

CHANGES TO SAFETY STANDARDS IN 2008\*: A divider is no longer required.

The swing set should be positioned so that its safety zone does not overlap with an access route or the safety zone of another piece of equipment. Any shortcuts that may develop in the playground should also be taken into consideration. Access should be restricted and steered by means of fences, flowerbeds and bollards, if necessary. Bollards are also useful as markers when ploughing snow. To minimise trespassing, swing sets are usually positioned in a corner or near the edges of the playground.

## **Wear underneath the swing**

Due to children pushing off the ground with their feet to get more speed, the ground underneath the swing wears easily if the base comprises loose gravel. This indentation often represents a major accident risk. There is often a hard piece of rock or a solid root at the bottom of the indentation on which a child can hit his or her head. In springtime the indentation tends to fill up with water. Levelling the worn area regularly is a matter of responsibility and costs. An anti-wear base can be placed under the swing to prevent wear. Suitable bases include anti-wear mats or 45 mm thick safety tiles. The shock-absorbance properties of the anti-wear base must correspond to the fall height of the swing, which means that wooden bases and other hard materials are forbidden.

## **Spring and carousel products**

### **Spring products**

Swing products are an exception to the general safety zone rules and require a 100 cm safety zone around them. The distance is measured from the outermost part of the product when the spring is fully extended. The current safety standards allow overlap between the safety zones of spring products. When the seat of a spring product is less than 60 cm off the ground, the product can be set on mineral ash. A shock-absorbent base is not required.

CHANGES TO SAFETY STANDARDS IN 2008\*: The safety zones around spring products must not overlap.

### **Roundabouts**

Due to centrifugal force, roundabouts are an exception to the general safety zone rules and require a 200 cm safety zone around them (300 cm for disc roundabouts). Due to the high momentum of carousel products, their safety zones must not overlap with those of other items of playground equipment. When the roundabout's fall height is less than 60 cm, the product can be set on mineral ash.

CHANGES TO SAFETY STANDARDS IN 2008\*: The fall height of roundabouts is always at least one metre. Mineral ash is therefore not a suitable base material.

The common problem with roundabouts is that pushing off the ground to gain speed wears a groove around the product. Positioning a roundabout on gravel without an anti-wear base is not a functional solution.

### **Choosing the base**

The base of a piece of playground equipment must be shock-absorbent. The most usual bases include gravel, safety tiles and mineral ash. The safety standards also recognise other bases. Completely solid bases are forbidden. Nevertheless, the playground can feature hard surfaces on access routes, for example.

The type and thickness of the shock-absorbent base depends on the fall height of the equipment. Bases made of mineral ash and softer materials can be used with low-rising playground equipment (with a fall height of less than 60 cm). Mineral ash softens impacts somewhat but is not completely solid. Forbidden solid materials include concrete, asphalt, natural rock, brick and rubble.

When the fall height is between 60 and 100 cm, acceptable bases include grass, well-tended natural topsoil and softer materials such as unsorted natural sand. If natural topsoil is used, it must not contain any hard particles, such as stones or roots.

When the fall height is in excess of 100 cm, the base must be either gravel or safety tiles. When the fall height is less than 230 cm, the layer of gravel must be at least 40 cm thick. When the fall height is in excess of 230 cm, the layer of gravel must be at least 50 cm thick.

CHANGES TO SAFETY STANDARDS IN 2008\*: The layer thickness required of gravel and other suitable base materials is dropped by 10 cm.

Safety tile manufacturers must provide information on the fall heights acceptable with different tile thickness levels.

### **Safety zones around swings and safety surfaces**

The length of the safety zone in the swing direction depends on the chosen base

material. In swing sets that conform to the dimensions given in the safety standard, the widthways edge of the safety zone is the line of the inside edge of the outermost posts of the swing frame. This fact is particularly important when dimensioning the area in which safety tiles will be used. Precise measurements can yield significant savings; safety tiles often cost more than the swing set itself.

Due to the high momentum of swings, the safety zones of other playground equipment must not encroach on the safety zone around swings. This also applies to all other structures that are located near the swing set and are used for climbing. Examples of such structures include fences, embankments, large natural boulders and benches. They must either measure less than 60 cm in height or be located sufficiently far away from the edge of the safety zone around the swing set.

The most commonly used and cost-effective base material for swings is gravel. Due to its resistance to compacting, gravel does not provide support for materials placed directly next to it. This is why the edges of the gravelled area must be supported with planks of wood, for example, or bevelled off, forming a 45-degree ramp. The ramp must be located outside the safety zone. Depending on the local soil, a layer of filter fabric can be placed underneath the gravel. The potential need for drainage must also be taken into account.

Another common base material for swings is safety tiling. The thickness of the tiles depends on the fall height of the playground equipment. The base is sealed with chippings and levelled with mineral ash. The edges of the tiled area must be sufficiently loose to accommodate the substantial thermal motion typical of the tiles.

## **Safety information in the playground**

Public playgrounds must be equipped with a sign providing instructions on how to act in an emergency. The sign must include the national emergency number and the address of the playground in case an ambulance needs to be called. The sign must also include contact details for the people responsible for maintaining the playground. If a piece of playground equipment becomes damaged or is vandalised to the point of being in a state of dangerous disrepair, the customers of the playground must be able to inform the people responsible for maintenance.

Engraved and screw-mounted plastic signs are the most common. They are easy to replace in the event of vandalism or if any of the information needs to be updated. The sign can be mounted on a freestanding post or attached to another suitable structure.

We recommend that a safety information sign be erected in playgrounds located on housing estates as well. The residents can also be notified of the relevant information by some other means if the residents' association considers this alternative method more effective in terms of the children's safety.

The playground manager must have prepared an emergency plan that will be adopted

in the event of an accident as well as a maintenance plan that ensures that the playground remains safe at all times. Having these plans at the ready is also important from the perspective of the playground manager's personal liability.

## **Fencing**

The fence around a playground must be constructed in such a way that it is difficult for children to get out of the playground by either climbing over the fence or crawling under it. Moreover, the fence must be constructed so as to discourage climbing and children must not be able to get their head trapped between its constituent parts.

According to information compiled from interviews with nursery school staff, fences that measure less than one metre in height are insufficient. Children can easily climb over such fences especially in the winter when snow takes away some of the height. A height between 1 and 1.3 metres is considered adequate. Children usually tend to escape the playground from a specific point such as where a toy storage box makes climbing easier, where a bench is positioned next to the fence or where the protective border around flowerbeds connects to the peripheral fence. Children also find their way under fences. Usually a gap of no more than 10 cm is allowed underneath a fence. Children can also dig a hole underneath the fence. The problem is at its most prominent on steep inclines. Wire mesh fences are particularly badly suited to places where the ground level varies a lot. Slatted fences follow the contours of the ground more successfully.

The fence must not have horizontal levels that facilitate climbing. The best kind of fence is one with vertical slats with the only horizontal levels located at the very bottom and the very top of the fence. Climbing is more difficult when the slats are narrow and if the horizontal levels are on the outside of the fence. Narrow horizontal levels are better than wide ones. Horizontal levels can also be bevelled.

Children like climbing and balancing on fences. The top edge of the fence must be such that it discourages sitting or standing. The best kind of top edge is narrow and profiled. The shape of the top edge and the interval of the slats must nevertheless be such that children cannot get their necks trapped. The safety standards provide detailed instructions for the design of these elements.

## **Gravel**

The purpose of gravel is to minimise head injury as a result of impact. The most important requirement set on gravel is that it must not compact. The gravel must remain loose and soft as time goes by. To achieve this, it is best to use gravel where fine matter accounts for a very small portion or has been washed away altogether. Of traditional types of gravel, the gravel found in drainage channels is the best example of this.

CHANGES TO SAFETY STANDARDS IN 2008\*: The thickness of the supplementary layer has been reduced from 20 cm to 10 cm.

### **Tips for installation work**

All structures erected inside the playground must conform to the EN 1176-x and EN 1177 safety standards.

CHANGES TO SAFETY STANDARDS IN 2008\*: The EN 1177 standard will be revised so that it only applies to testing the shock-absorbance properties of base materials. It will no longer include any safety requirements for playground equipment or bases.

Any decisions made in connection with installation regarding changes to the make, model or location of playground equipment must be run past the designer. Otherwise the liability for the safety of the playground structures transfers to the person who decided on the change. If the installation instructions are in conflict with the plan, the contractor must contact the designer before beginning installation work.

An acceptable inspection must be performed in the playground before opening it to the public.

The instructions for installation, use and maintenance supplied with the playground equipment must be handed over to the contractor.

The playground's safety information sign must be positioned in clear view. The sign must include the national emergency number, the address of the playground in case an ambulance needs to be called, as well as the contact details of the people responsible for maintaining the playground.

#### ***Instructions:***

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