

|                                   |  |                          |
|-----------------------------------|--|--------------------------|
| NIVEKO s.r.o.                     | <b>Background information for NIVEKO<br/>pools</b> | Version:<br>2/2019<br>UK |
| Responsible: technical department |  | Date: 6.9.2019           |

Dear Customer,

Thank you for the trust you have shown by purchasing a NIVEKO pool. You have obtained a quality product satisfying all exacting current requirements.

A professional team participated in the manufacture of your pool; thanks to their experience, expertise and first-class technical background, they did their utmost to meet your ideas and requirements in the best possible way.

All of our pools bear attributes of manual manufacture, thanks to which you obtain an individual product made just for you.

We are proud that our products are made in the Czech Republic.

We wish you many happy and agreeable moments with your NIVEKO pool.

#### **IMPORTANT NOTICE!**

Please pay sufficient attention to the information given in this installation documentation. Not observing them may result in substantial and irretrievable damage to the pool, or even loss of guarantee on the manufacturer's part!

**The installation documentation is used as general recommendations which ALWAYS include specific information for construction readiness, which you will receive from a representative of the NIVEKO s.r.o. company.**

## 1. NIVEKO pool design

Pools from the NIVEKO company are made from homogenous, modified especially for NIVEKO plastic plates by using welding technology. Thanks to their composition, these plates are ideal for the manufacture of pools. They contain protective elements to prevent the negative effects of UV radiation and the influences of pool chemicals. Throughout their cross-section, the plates are totally homogenous and fully coloured, which provides for a long service life and stability of the pool.

The pool skeleton is made of a special reinforced structure. The used material and statically supported structure of the entire skeleton are unique and specific for NIVEKO pools. The special pool design ensures high shape stability and long service life of the entire pool.

## 2. Operating temperature and chemical environment in the pool

The normal operating temperature in the pool must be maintained within the range of +18°C to +32°C. If necessary, a short-term increase in the water temperature to +35°C is possible; however, always consult the pool manufacturer about this in advance!

### **IMPORTANT NOTICE!**

If the indicated temperature has substantially been exceeded for a long period, the pool will not be impaired functionally, but permanent and irretrievable changes may occur to its aesthetic character (possible deformations of walls or the bottom).

For NIVEKO pools, only use disinfectants intended for use in private and public pools and suitable for the used material. It is necessary to observe the recommended disinfectant concentration and dosing specified by the manufacturer.

**CAUTION!** If built-in stainless-steel components or other parts of the pool are used, only use agents which do not act aggressively on this stainless-steel material.

If chlorine disinfectant is used, maintain the long-term concentration of free chlorine below 1.5 mg/l; for a short period, this can be increased to a concentration of 3.0 mg/l.

### **IMPORTANT NOTICE!**

If the recommended values of free chlorine concentration have been exceeded for a long period, the colour shade of the pool may change and the pool equipment components may become damaged! Then this change is irretrievable.

On a long-term basis, the pH value in the pool must be maintained within the range of pH 6.5 – 8.0. Please ensure the operational pH value is in accordance with SPATA Standards.

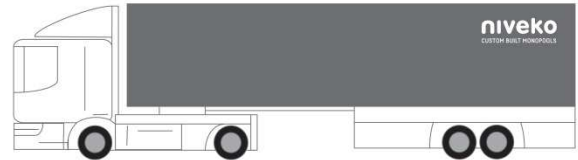
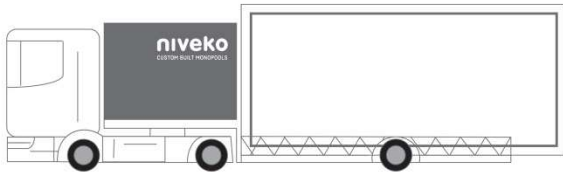
### 3. Dimensional tolerance

The NIVEKO pool is an unique product made from a thermoplastic material that requires many hours of manual labour. Although the strictest rules of technological procedures are observed during its manufacture, its dimensional tolerance may fall within a maximum range of  $\pm 2$  mm per 1mb of the pool as a result of different temperatures during the manufacture and when being installed. In this case, it is not a defect but a result of the thermoplastic properties of the material used.

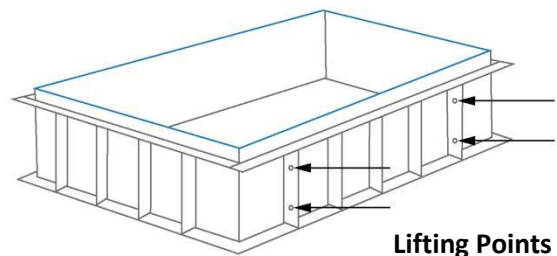
## 4. Transport and handling

### 4.1. One piece pool - transport and handling

In most cases, a special semi-trailer or trailer is used to transport our pools; the pool is transported in the vertical position on it. If a larger pool is delivered, the individual parts are transported on a standard truck semi-trailers.



Once the pool has been unloaded from the semi-trailer or trailer on the installation site, it is necessary to ensure suitable handling equipment (a crane) first to tilt the pool from the vertical to its horizontal position, and then to place it in the prepared excavation. To suspend and handle the pool, the handling crane slings and a special handling balance beam are exclusively used. To fix the slings to the pool, it is necessary to use the handling shackles, which are to be installed in the marked holes in the pool supporting structure. These fixing points are designated “LIFTING POINT” (see the arrows in the illustration). In total, there are eight of them on the pool body.

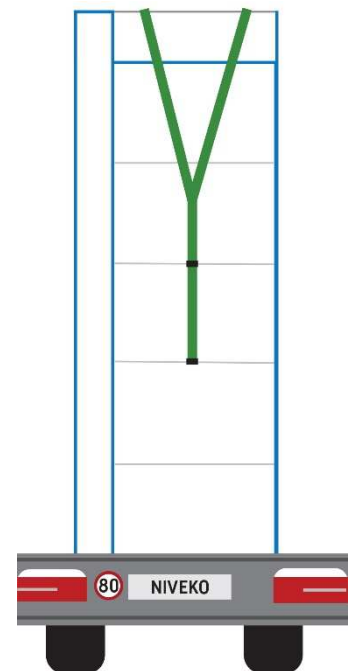


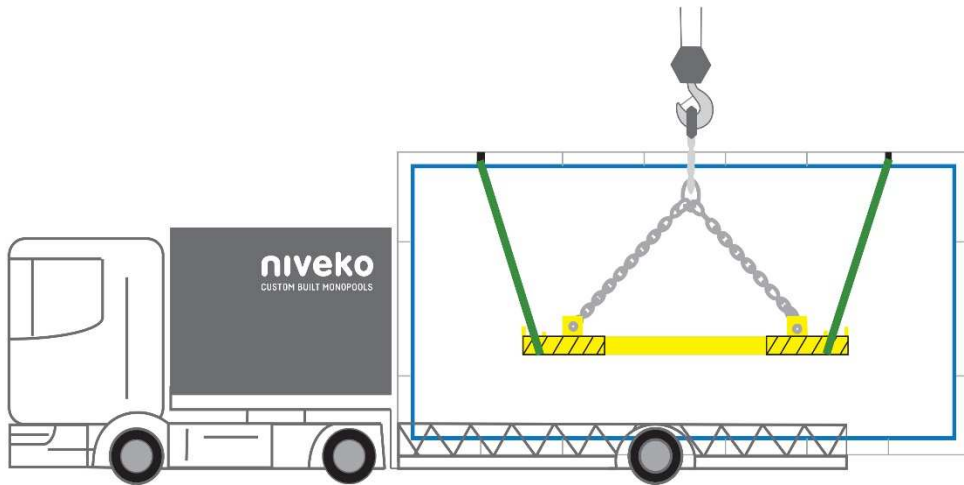
**Lifting Points**

The transport set with the pool can only move on hard surfaces. Therefore, it is necessary to provide suitable handling equipment (crane) with a sufficient jib radius with regard to the distance between the possible place of arrival and the excavation site for the pool installation!

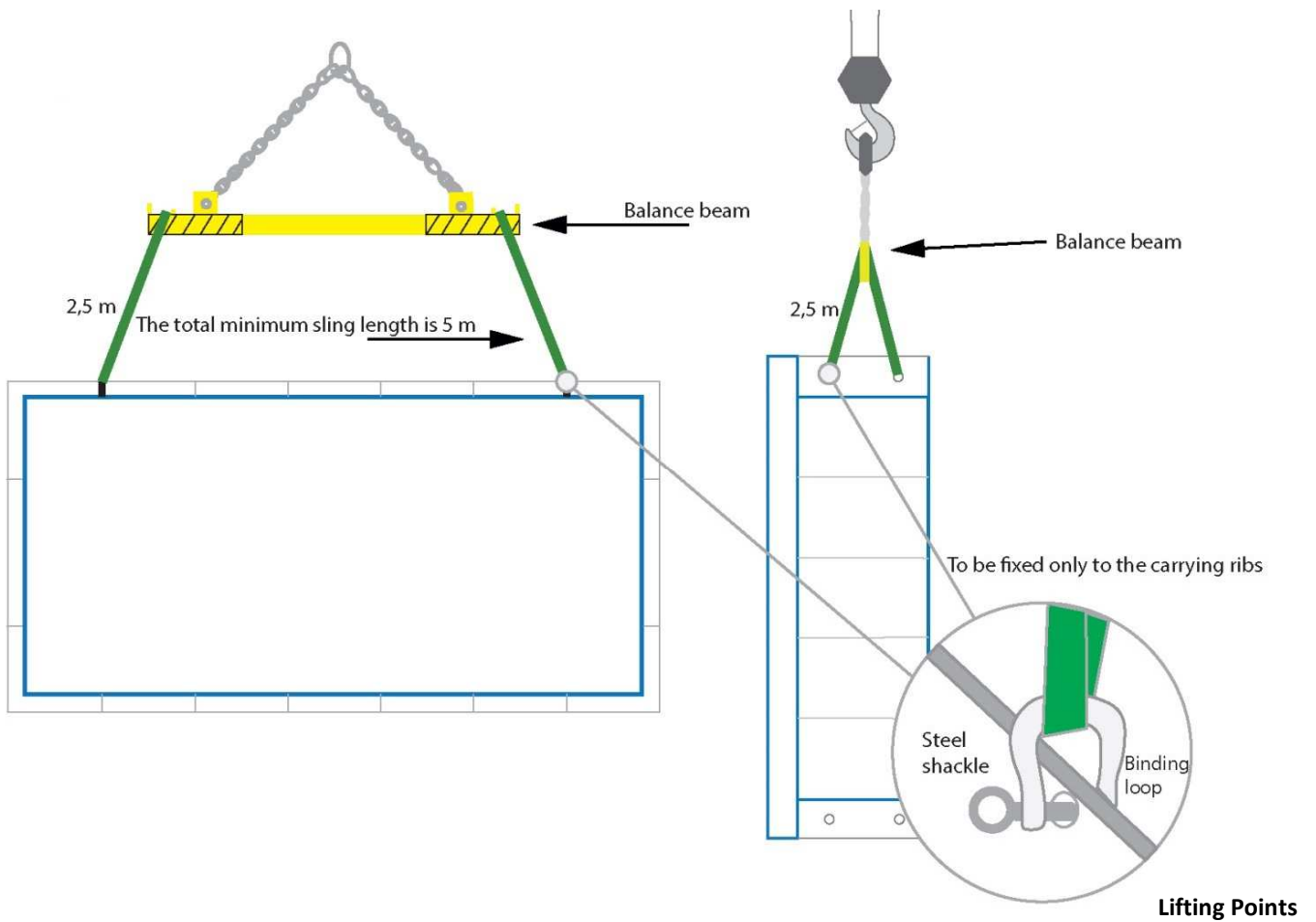
When a pool is delivered to the site it is already fitted with vertical harnesses to manipulate the pool off the truck semi-trailer. The free ends of the harnesses, which are secured in place during transport, need to be released to enable them to be attached to the rocker arm. It is also essential to check that the stirrups have not come loose and so the harnesses are connected to the pool securely enough to enable it to be safely lifted.

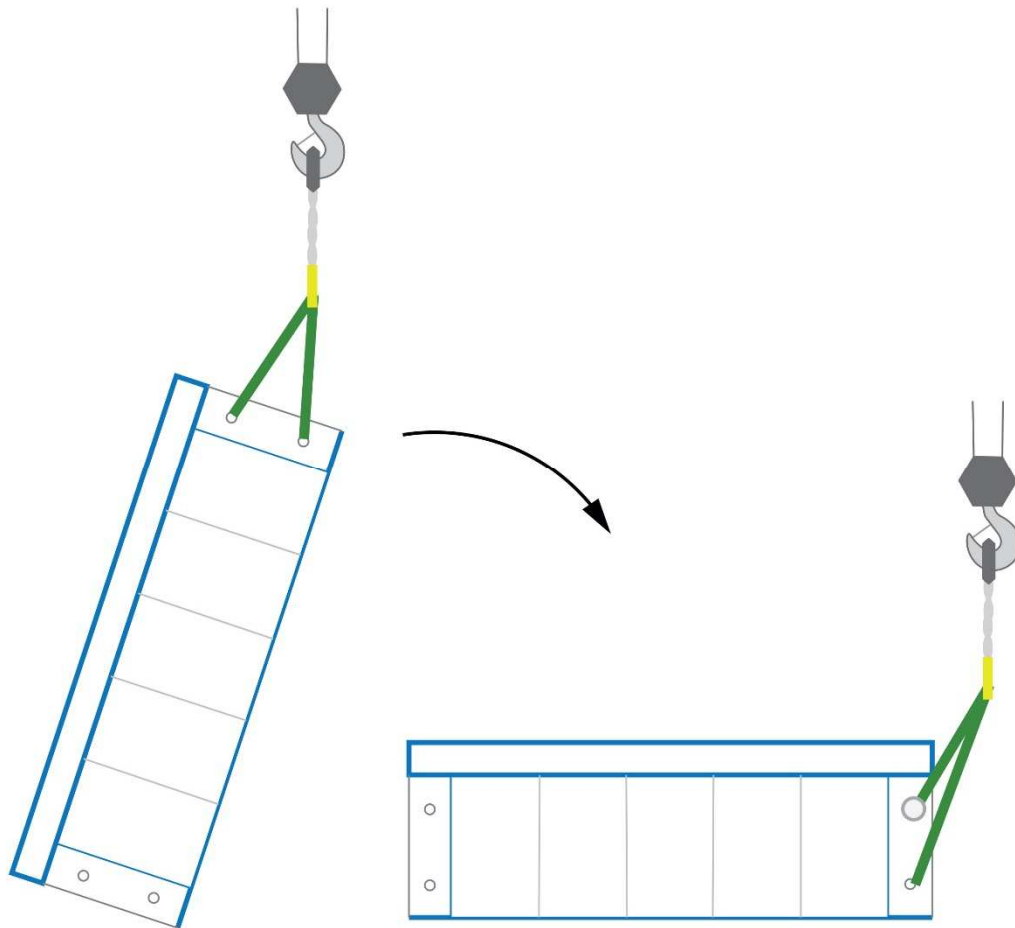
After the pool has been taken off the semi-trailer and placed into a horizontal position, another two harnesses are attached to the pool to enable it to be placed horizontally in the final position.



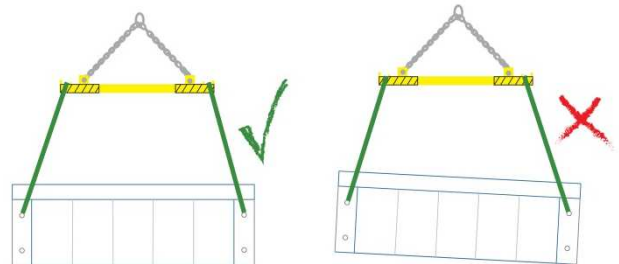


## 4.2. Pool handling in vertical position



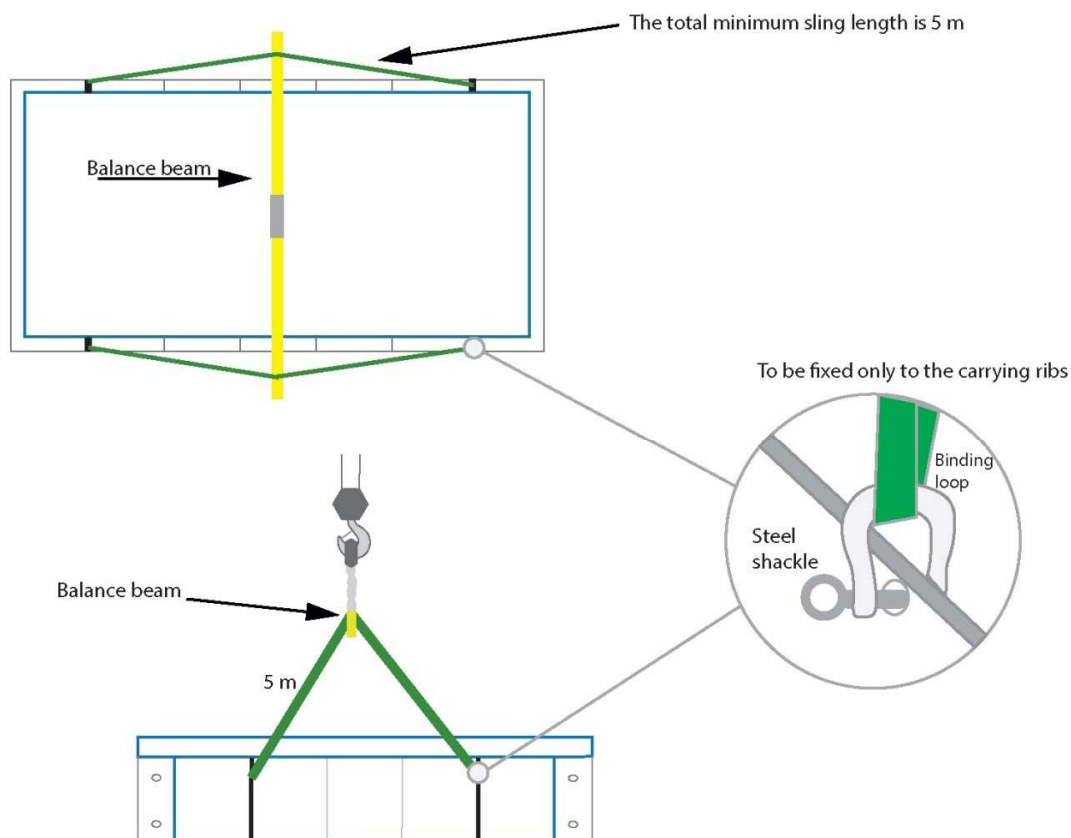


**CAUTION!** The pool can only be handled if maintained in the horizontal position. The handling equipment operator is always responsible for correct and safe fastening of the pool and its other parts. Pay increased attention when handling the pool at temperatures below +5°C. Improper handling may result in damage to the pool body or other products, which are significantly more brittle and subject to damage at low temperatures.



**CAUTION!** If the pool and other pool components are handled overhead, no persons are allowed to remain under them!

### 4.3. Pool handling in horizontal position



Lifting Points

### 4.4. Pool installed by sections - Handling of pool parts

While the individual pool parts are being handled, the movements of the handling equipment are directly coordinated by the NIVEKO s.r.o. company representative on the site. The individual parts must be bound by means of crane textile slings. Parts bound in this way must always be uniformly balanced. The handling equipment operator is always responsible for correct and safe fastening of the pool parts and other components during handling. The customer or his/her representative must provide for unloading of all the parts from the transport vehicle into the excavation.

## 5. Requirements for connected technologies

For the functional connection of the pool, in general, the following must be prepared:

- Electrical power supply
- Pressure water source (drinking water recommended)
- Gravitational sewerage

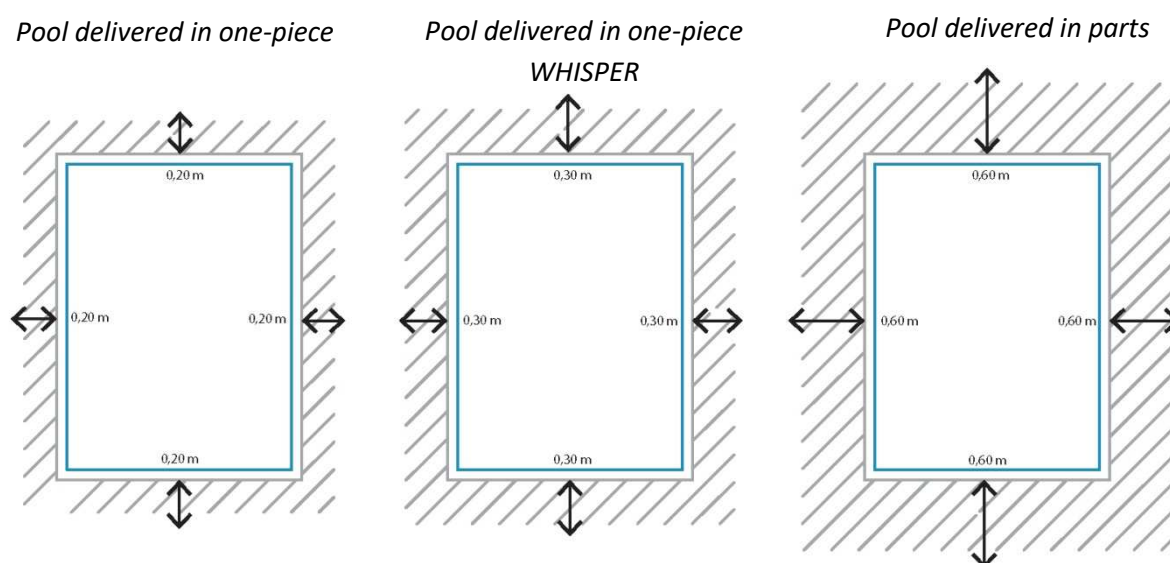
The indicated requirements apply to the most sophisticated equipment of the pool and ARE NOT a condition for all implementations! With regard to the high degree of individualization of pools delivered by the NIVEKO company, no generally valid recommendations can be given for all implementations. You will always be informed of specific requirements for the connection of technologies for the given implementation in a timely manner by the NIVEKO company representative, who will hand over to you the documentation for the construction readiness, which is available upon request. The investor shall provide for the connection of the technologies to the networks at his/her own expense in conformity with legislative requirements.

## 6. Pool embedment

### 6.1. Excavation dimensions

The decisive factor for determining the correct excavation dimensions is whether the pool is delivered in one piece (no other installation works are necessary on the outside of the pool) or if it is delivered in parts and completed on site. In this case, more space must be provided on the outside of the pool.

As a general rule, if the pool is delivered in one piece, the minimum excavation dimension in each direction must always be 0.20 m greater than the maximum EXTERNAL dimensions of the pool! In the case of the whisper wall type, the minimum value is 0.30 m in each direction. For pools assembled from parts, the value is 0.6 m. Exact specifications of the excavation dimensions are indicated in the construction readiness document, which is available upon request.



**CAUTION!** Never reduce the required excavation / base plate dimensions as against the specifications for the construction readiness of the pool. Assumed savings in excavation and preparatory works will result in the impossibility to correctly install the pool with possible subsequent loss of the guarantee.

**CAUTION!** Unless implementation of the construction works (incl. the excavation) has been contractually ordered from the NIVEKO company, the customer bears full responsibility for the execution of construction and excavation works.

**The above-mentioned rules are general; they can vary on the basis of individually processed documentation for construction readiness, which is available upon request.**

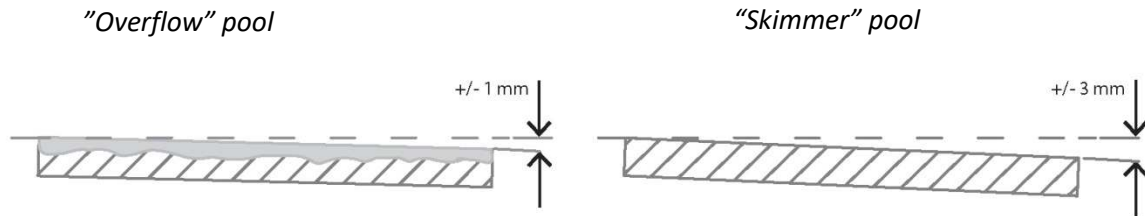
### 6.2. Base plate

**CAUTION!** The minimum dimensions of the base plate (see also chapter 6.1.) are specified in the complex documentation for construction readiness delivered by the NIVEKO company! By not observing the required dimensions and correct design of the base plate and its levelling, the customer assumes responsibility for possible loss of the guarantee!



The static load capacity of the ferro-concrete plate is determined according to the geological conditions at the installation site and must conform to the minimum load (to a depth of 1.5 m with pools) of  $1,650 \text{ kg/m}^2$ , without the weight of the actual ferro-concrete plate and the concrete for embedding the skeleton.

The required base plate levelling for an overflow pool is  $\pm 1 \text{ mm}$ ; self-levelling backfilling can be used here. For skimmer pools, the required levelling is  $\pm 3 \text{ mm}$ .

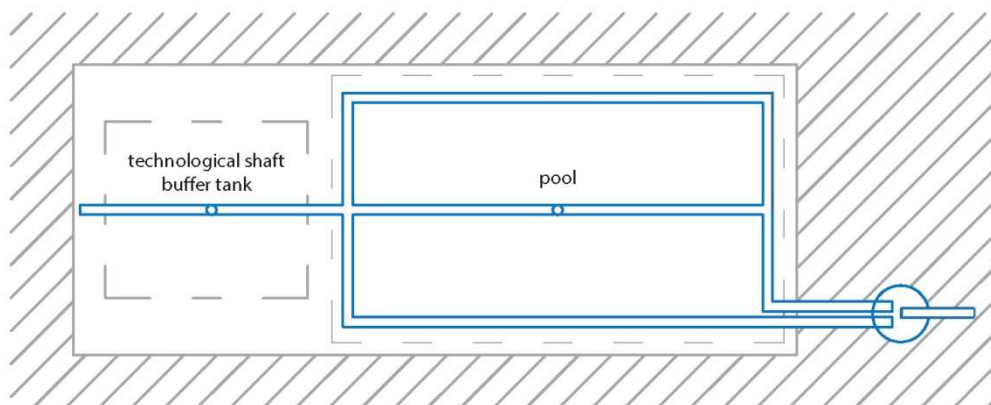
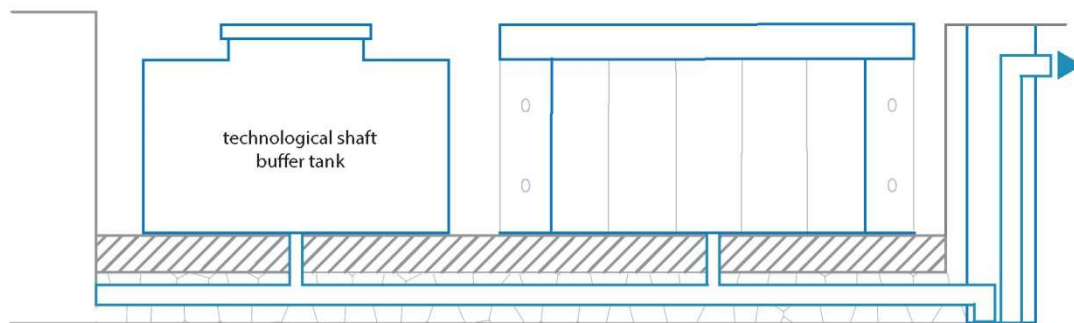


**CAUTION!** Unless implementation of the construction works (incl. base plate construction) has been contractually ordered from the NIVEKO company, the customer bears full responsibility for the quality and design of the concrete plate!

**CAUTION!** The pool must always be mounted on extruded XPS insulation plates of a thickness of 30 mm, or 50 mm!

### 6.3. Drainage / ground water

Each base plate prepared for mounting of the NIVEKO pool must be drained through water-bearing subsoil of sufficient thickness and a system of drainage piping leading into a pump sump, from which the collected ground water must be cleared so that this water cannot raise the bottom of the pool or shaft. We recommend that this drainage layer will be created in the foundation subsoil without regular occurrence of ground water.



**CAUTION!** Pools of this type are not intended for excavations where ground water occurs. The ground water must not reach the level of the pool or shaft bottom. The drainage system must always provide for permanent drainage of possible ground water from the area of the mounted pool and shaft. To prevent possible damage to the pool or shaft, the ground water level and correct function of the drainage system must be checked regularly.

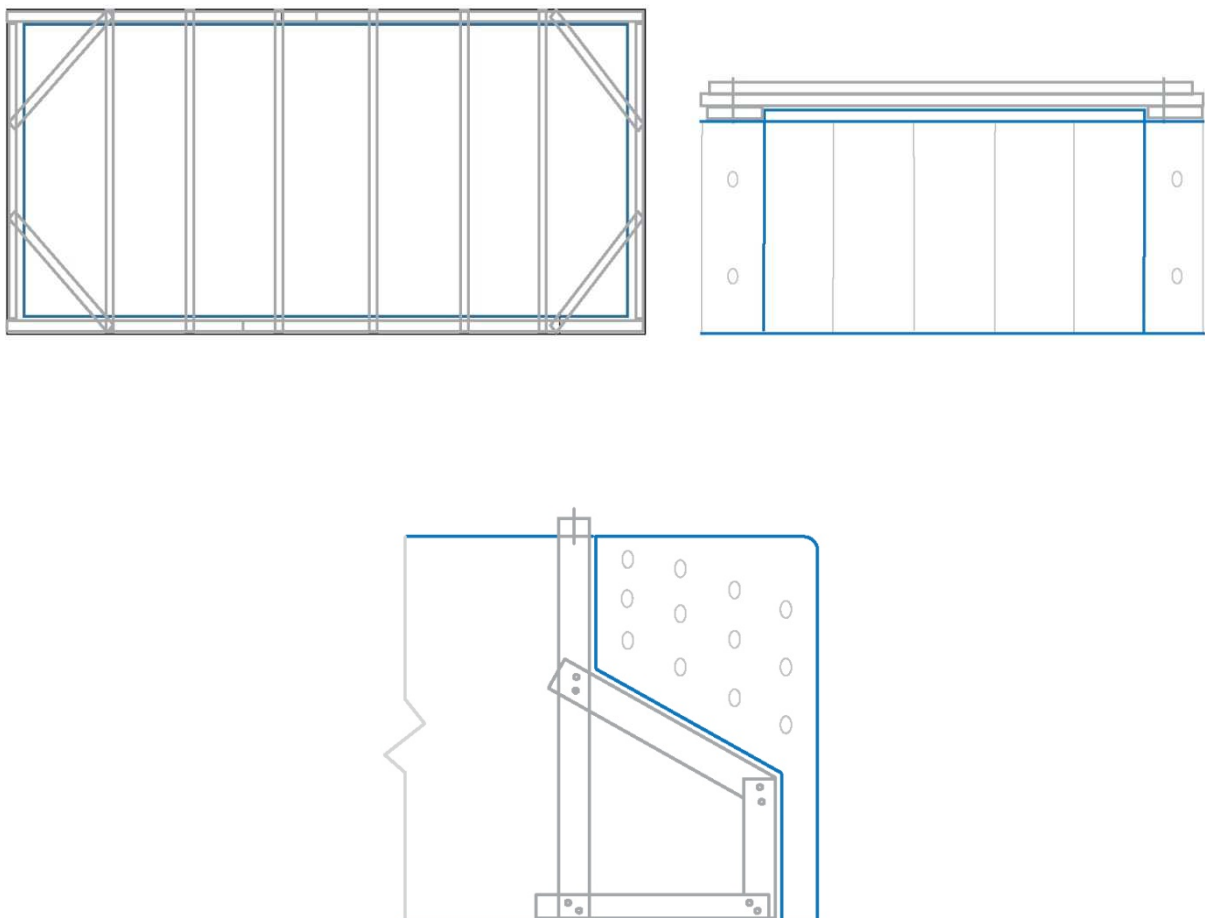
## 6.4. Fixing/strutting and provision of flatness of the pool walls before concreting

Thanks to the properties of NIVEKO pools made from this material are very elastic and flexible depending on temperature changes, which brings with it numerous advantages during actual pool operation. Owing to these properties, however, such pools are not able to keep the required shape in the case of one-sided pressure on the water or concrete shell side.

Before the actual concreting, it is therefore necessary to fix the pool in the required shape by means of a strutting frame. Before concreting, it is also necessary to statically support the shape of the wall with the roll-shaft with which the pool may be equipped to hinder its deformation. For this purpose, wood bunks are the best to be used. The possible appearance of such a strutting frame is shown in the illustration below. The fixing frame for NIVEKO Pools is always offered from the NIVEKO company.

**CAUTION!** Unless the fixing frame is correctly mounted on the pool, the pool may be concreted in an undesirable shape and thus be irretrievably aesthetically degraded.

*Frame fixing during concreting*



**CAUTION!** Once the pool has been laid on the base plate, it is always necessary to check whether the fixing frame has not been released or the shape of its walls has not changed undesirably as a result of, for instance, handling or transport. Any unevenness of the wooden frame must be corrected before concreting – to be checked and ensured by the customer/dealer.

**CAUTION!** Once the pool has been laid on the base plate, it is necessary without delay to connect the pipes of the built-in equipment and immediately fill the pool with water to a level of 30 – 40 cm, in which way the pool is stabilized and its bottom loaded against possible corrugating caused by elevated temperature and solar radiation.

**TIP!** During construction works, the pool must be protected against possible damage in a suitable way – for instance, with a covering foil, tarpaulin, etc., to prevent construction materials from falling into the pool. The cover foil can be delivered by the NIVEKO company together with the pool.

**CAUTION!** If persons move inside the pool in the construction stage, the internal parts of the pool must be protected against scratching, for instance, by unsuitable dirty shoes, etc.!

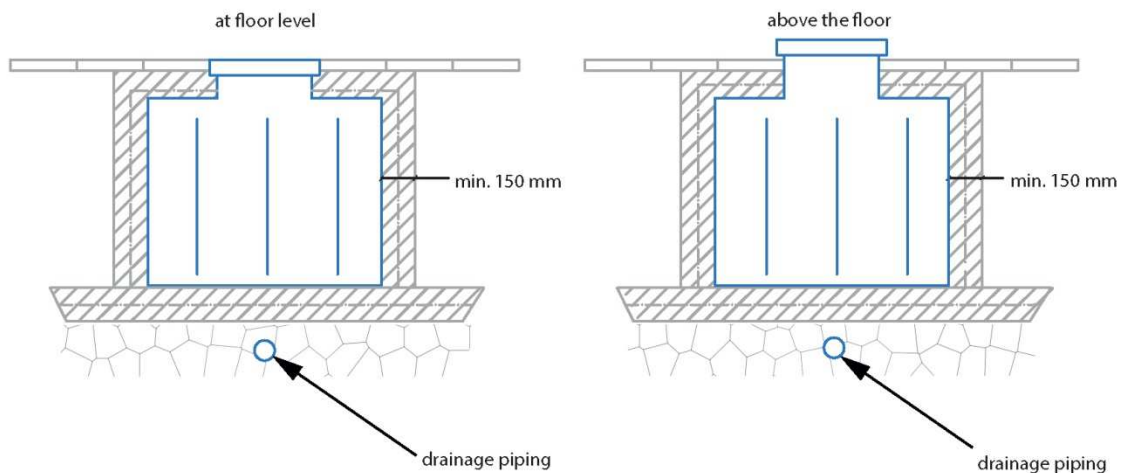
**CAUTION!** The fixing frame must be removed no later than two weeks after the pool is mounted. Otherwise, there is a risk of the pool skeleton being damaged owing to possible expansion of the wooden frame.

## 6.5. Mounting of technological shafts

As a rule, the pool delivery also includes a shaft for the technological and machine equipment. Each shaft must be strutted before being backfilled/embedded in concrete – preferably by means of wooden barks, both the walls and the ceiling! The quantity and location of the struts should ensure planeness of the walls and the ceiling.

### **Shafts embedded in concrete**

Once they have been laid on the base plate, these shafts must be secured by means of internal strutting of the walls and ceiling in conformity with standard construction rules – to be provided by the supplier of the construction works. Then embed the shaft in concrete completely, within the entire height with a minimum covering of 15 cm from the external shell of the shaft. Use of a concrete mixture of the C12/15 concrete class is recommended, with moist consistency and low aggregate fraction with the addition of reinforcing rebar, such as concrete grids 150 x 150 x 6. The supplier of the construction works must always provide suitable reinforcement for the given implementation.

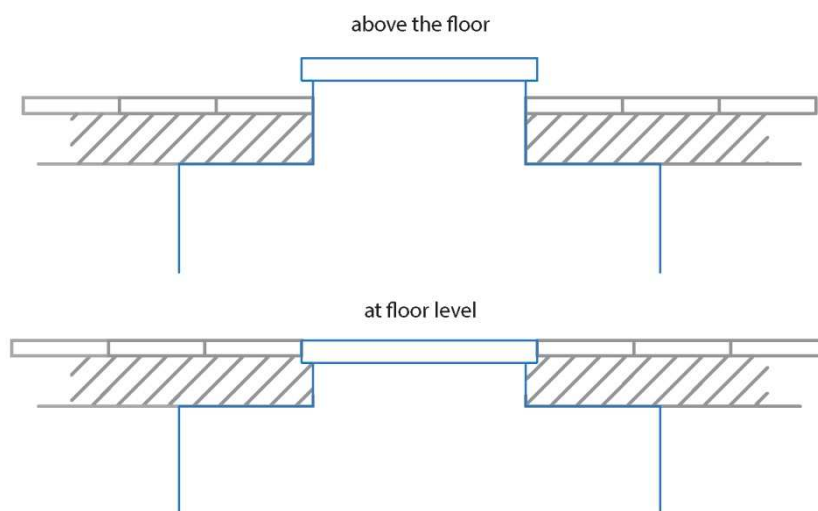


**CAUTION!** Before starting any backfilling/concreting of the shaft, please verify that all of the necessary piping and cable connections have been made and that a tightness as well as functional test has been executed!

**TIP!** We recommend that the shaft should be always insulated against freezing and possible damage to the technology (optional item).

#### Paving and special shaft covers

If the shaft is equipped with a cover intended for precise mounting in modified terrain, the so-called paving cover, or another special cover/lid, it is necessary to check its precise mounting before concreting so that it fits in the surrounding terrain/pavement (height/gradient). The covers are manufactured to precisely match the required dimensions and checked during the final inspection; with regard to the specific conditions of each implementation and frequent time delays between the shaft delivery and its final concreting, however, it is **ALWAYS NECESSARY** to check whether the cover matches the shaft precisely and, if necessary, adapt it before the shaft is embedded in concrete.



**CAUTION!** This activity must be provided by the supplier of the construction works or it is necessary to ask the NIVEKO company representative for it upon consultation!

**CAUTION!** Before the actual concreting, properly check the correct shape and planeness of the pool and shaft walls!

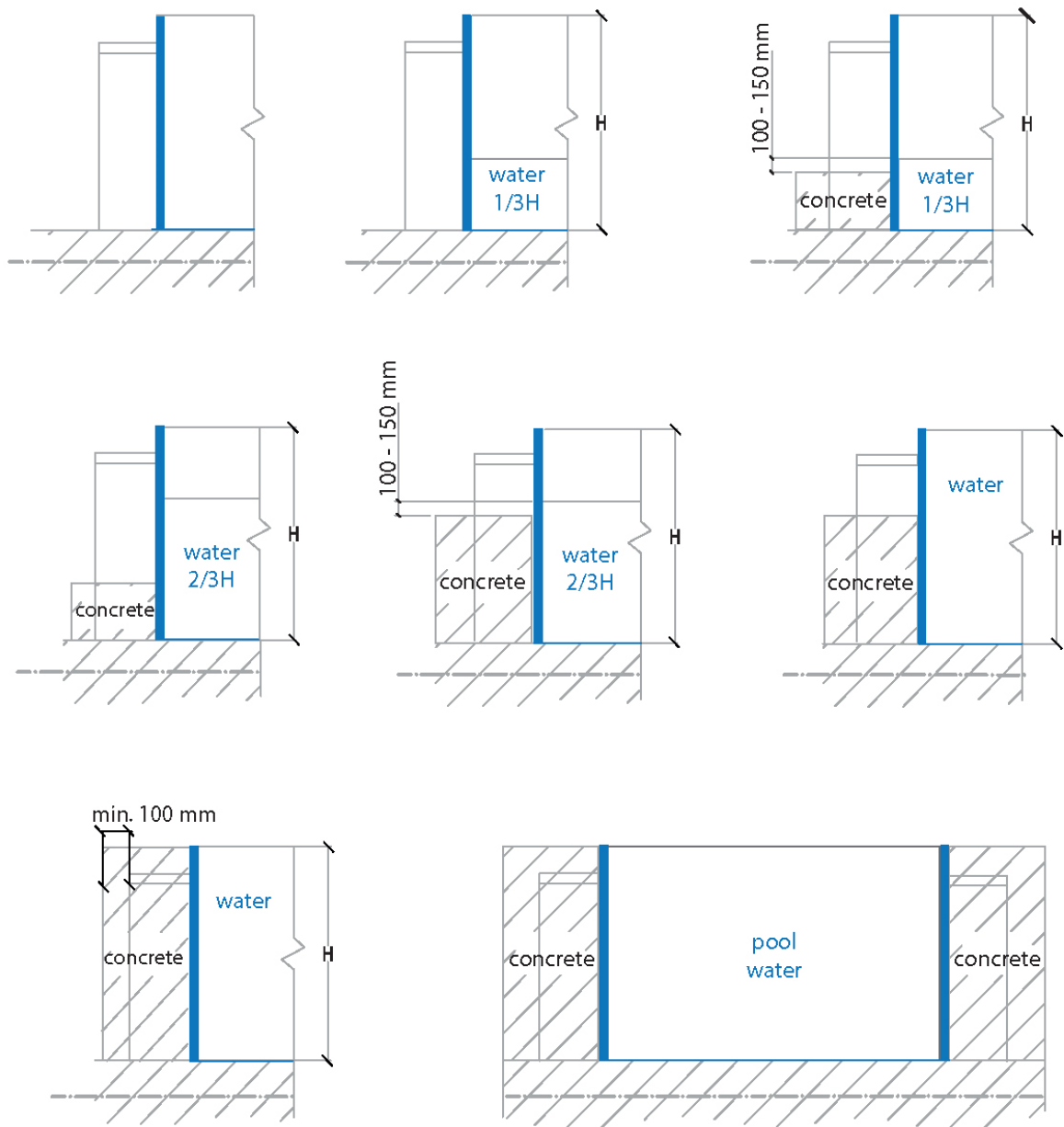
## 6.6. Concreting procedure

Concreting of the entire pool is done in 3 stages, when it is first always necessary to fill water to 1/3 of the pool depth, and then perform uniform concreting along the entire shell perimeter. Repeat this procedure up to the upper part of the pool with regard to the surface finish of the pool surroundings (pavement, facing, grass).

**CAUTION!** Never use any compacting or vibration devices for concreting!

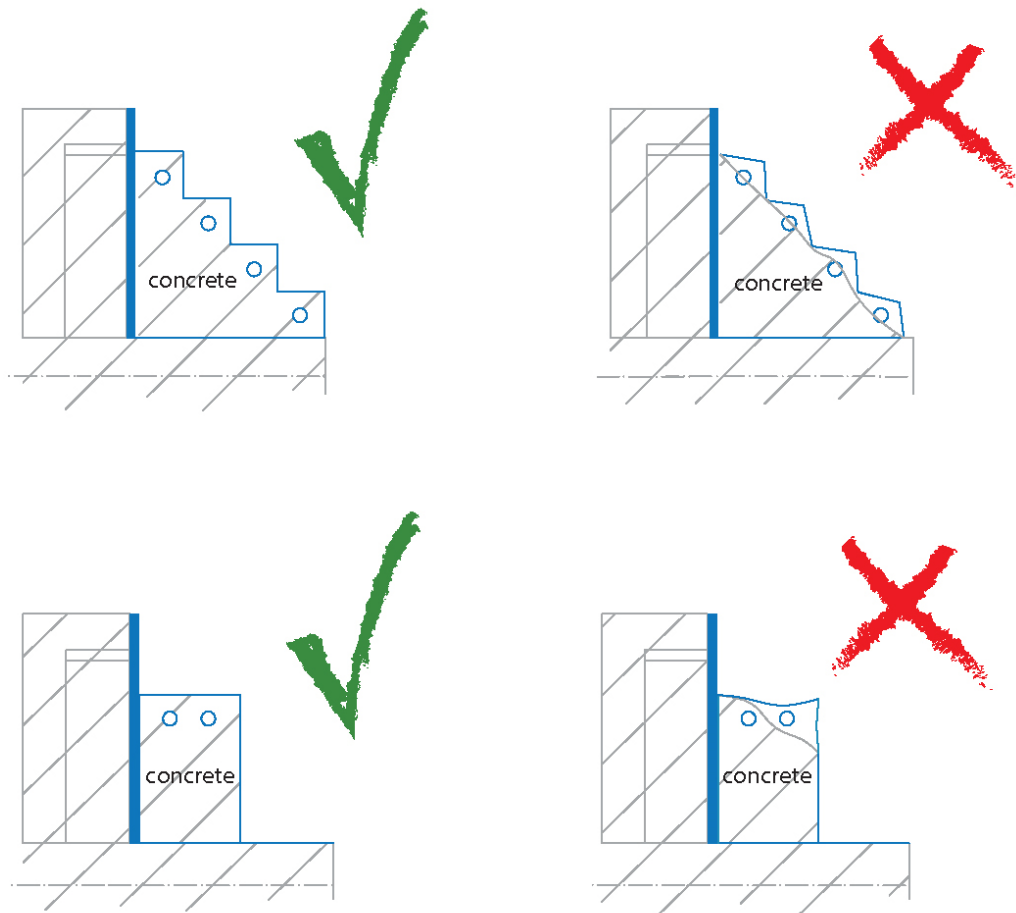
**CAUTION!** For the entire period from delivery to concreting, the NIVEKO pools must be covered with a sheet that stops direct solar radiation to prevent excessive deformation!

## Concreting stages



## Concreting of stairs, benches and shallows

**CAUTION!** When concreting stairs, benches or an optional shallow, it is necessary to attend to proper concreting of their foundation so that there are no remaining air pockets without concrete – **there is a risk of deformation of the shells and treads with subsequent loss of the guarantee!**



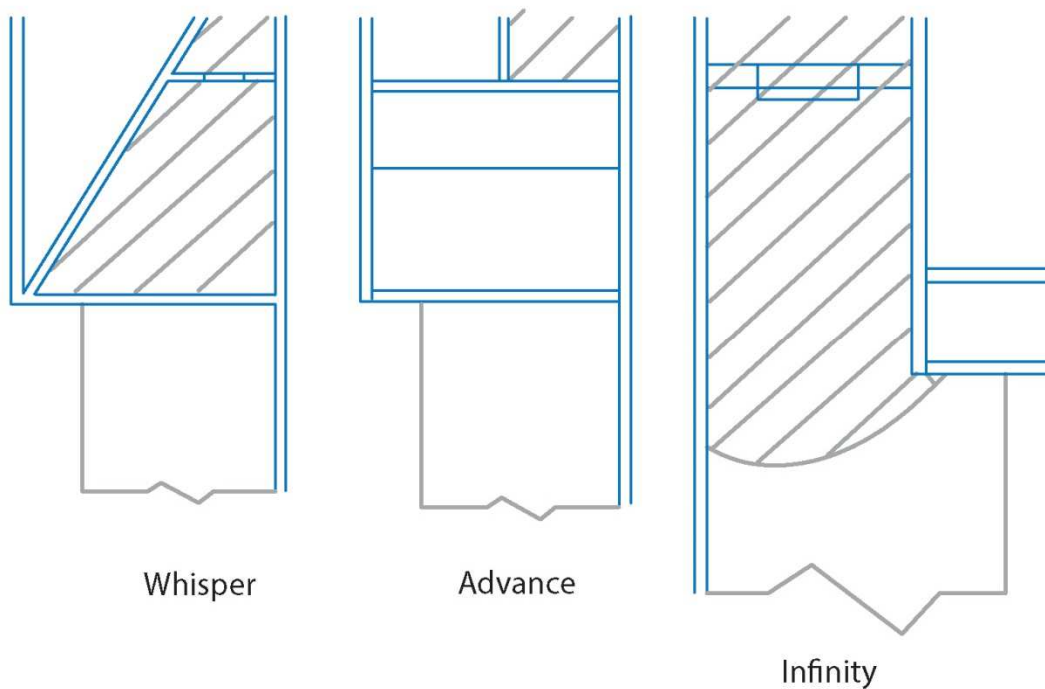
### Concrete mix

For the actual concreting, we recommend usage of the class C12/15 concrete mix with moist consistency and small aggregate fraction. To concrete the space under the stairs, bench or shallow, we recommend using a slurry to liquid concrete mix, which must fill up the entire space without the creation of air pockets– it must be compacted manually. The same method of concreting must then be applied if the internal elements of pool walls of some types must be concreted, such as parts of the WHISPER or INFINITY trough.

### Alternative concrete fillers

The properties and strength of the used concreting in the final state must conform to the properties and parameters of the recommended class C12/15 concrete mix in the minimum coverage recommended. Moreover, it must enable filling of all spaces and joining holes on the pool skeleton so that the final connection of the pool skeleton and the concrete mix is the same as if the recommended C12/15 concrete were used. To adhere to all of the necessary parameters, particularly with regard to statics and strength, it is necessary to follow the recommendations of the given alternative mix manufacturer.





### Concrete shell cover

As a general rule, the minimum covering of the concrete shell is specified at 10 cm from the external pool structure (external parts of ribs or concrete skeleton gutter). Primarily, the concreting procedure should take into consideration the actual dimensions, depth or shape of the pool and shafts.

During manufacture, the pool body is equipped with basic reinforcement in its skeleton. Before concreting, it is necessary to apply the reinforcing concrete grids 150x150x6 to the external face of the pool with a sufficient overlap; this can advantageously be used for subsequent binding to the concrete of the surrounding treated terrain. The supplier of the construction works must always provide suitable reinforcement for the given implementation.

### CAUTION!

Material, from which the pool skeleton is made, is a thermoplastic material which is very sensitive to the ambient temperature. If there is no water in the pool (during cleaning, for instance) and it is exposed to solar radiation or high temperatures, mild corrugation of the bottom and walls are caused by the material expansion during thermal absorption which is a normal phenomenon. For this reason, **the pool body MUST NOT be left empty or partly empty for more than 6 hours at a maximum outside temperature of +25 °C.** The minimum water level in the pool must be maintained at a depth of 30 – 50 cm. In this way, irretrievable deformation of the pool bottom and walls can be prevented. By not observing these recommendations, the customer assumes responsibility for possible loss of the guarantee!