Installation Procedure

for CALYPSO

Swimming Pools of Glass Reinforced Plastic

- **OLYMP**
- **IKAROS**
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Technical Report

1. Introduction

This documentation deals with the construction of family flat swimming pools CALYPSO with integrated staircase.

2. Source Materials Used for Preparing the Documentation

- Consultation of the manufacturer
- Consultation of the pool technology supplier
- Technical documentation
- Consultation of the authorised inspector of electric equipment/appliances.

3. Description

The pool is designed as a monolithic unit comprising an integrated inner staircase. The structure of pool wall consists of six layers of material in total. The first, face layer (called "Aquaguard") should provide appearance and protects the bearing layer. It is applied by spraying directly on the mould, to take its mirror finish. This material is very hard, fragile and resistant to the effects of chemically treated pool water, even at a higher temperature. Below that layer there is a bearing layer of polyvinyl ester resin reinforced with three fiberglass mat plies providing the pool body with form stability, strength and elasticity, and osmosis resistance, as well. That layer is covered with a sprayed-on coat; which will protect the pool body against the effects of ground moisture acting from the rear.

The outer layer consists of sprayed-on polyurethane foam that enhances rigidity and strength of the pool body, acting as thermal insulation at the same time.

Taking account of the production technology and employed materials the permitted manufacturing level tolerance amounts to 12 mm on the entire pool length, measured at the horizontal level of the pool rim.

The whole swimming pool is made of materials that are safe in terms of health protection and hygiene.

Standard Pool Equipment:
(The following is not a part of supply and should be ordered separately.)

- Sand filter unit of the minimum capacity of 6 m^3 per hour
- Skimmer + two return water jets

The following technology may be supplied on customer's request:

- Underwater pool lights
- Counter current (swim) jets
- Water heater exchanger system
- Electric heating system incl. control
- Solar heating system, heat pump (air/water system).

Machine Room

The machine room should be located at the minimum distance of 3.5 m from the pool edge. It should house a filter unit including its control system, a chlorination system, a transformer for

pool lights and, possibly, other equipment such as the systems of electric heating, heat exchangers and heat pump and the solar system control unit. In addition, the supply of water should be provided for pool refilling as well as a sewer connection. It is recommended to provide the floor of machinery room with an emergency drain.

4. Construction Works

Preparatory Works

Within the framework of preparatory activities the customer shall make sure of the bearing capacity of underlying bed and that the pool will be supported on grown earth, not on made-up ground or fill. If in doubts, the opinion of a specialist – structural engineer should be sought

Moreover, it is absolutely necessary the customer to get himself (herself) an expert opinion of local hydrogeological conditions prevailing on the construction site. Groundwater level on the site shall be verified and it shall be established, whether the groundwater level is season-dependent, or not. Evaluation of underlying bed is very important, too, particularly in respect of its absorbability (care should be taken of the presence of clays). Also the way of surface water runoff from surrounding land should be taken into consideration in relation to the underlying bed in the period of thaw in spring, or at the time of storm rainfall. Stormwater runoff from roofs and adjacent compacted areas should be taken into account, too.

All the information the customer should pass over to the specialised building firm (contractor) that shall propose and implement suitable measures for site drainage.

In this respect the installation of a drain providing water runoff from the pool body or the construction of a sump fitted with a submersible pump and a level switch appear to be appropriate measures. (See Figs. A, B at the footer of this Technical Report.)

The relative orientation of the pool to the house or terrace is important, too. It is absolutely necessary to define the line (such as an edge of the house, terrace, pavement) to which the pool length is to be parallel. Further, the basic (zero) level shall be determined of the construction, i.e., the altitude, which the elevations of all construction modifications related to the pool installation will be referenced to.

Excavation Works

The excavation for the pool should be carried out in accordance with applicable drawing documentation. Keep in mind, please, the better the design dimension of excavation are maintained, the lower will be the cost of concreting works. Inclination of the walls of the pit should be established on an individual basis taking account of the concerned soil properties (grade). Rough excavation can be made using appropriate machinery, but the final digging and excavation trimming shall be made by hand. The excavated soil has to be removed from the site and in no case it can be used for backfilling the pool. The area surrounding the construction pit shall be cleared of any excavated material which could otherwise slide back to the pit or cause its wall to collapse. Enough free space for handling shall be left around the construction pit.

Concrete Sub-Base

First, all the surface of the construction pit bottom (subject to the quality of its bearing ground) should be covered with gravel bedding on which a reinforced concrete slab will be built of about 120 – 150 mm thickness. To provide good concrete quality the use of concrete mix of C16/20 grade supplied by a concrete mixing plant is strongly recommended. The net of "kari" type of 150 x 150 mm mesh, wire of ∅ 6.3 mm, should be used for concrete reinforcement.

Simultaneously with the bottom the bearing plate for staircase shall be built in compliance with applicable drawing documentation. In concreting the bottom bearing plate its horizontal planeness shall be strictly observed in both directions, as any deviation would manifest itself after filling the pool with water.

Pool Installation

After the reinforced concrete slab has cured the pool body will be installed in the construction pit. One day before installation, at the latest, boards of extruded polystyrene of 20 mm thickness shall be stuck on the concreted bottom. After the pool body has been placed in the pit, technological equipment shall be installed according to client's requirements and the pool filled with water up to the height level of 25 cm max.

Then the staircase shall be completely underpinned. Neither polystyrene, nor polyurethane foam shall be placed below particular staircase steps. Before underpinning the stairs the upper pool rim shall be checked for planeness, in the staircase area in particular. Before underpinning it is helpful to support the staircase with a suitable brace (such as a T-brace made of a joist and a board). Then, rim planeness should be measured and possible deviations, if any, put right with wood wedges placed between the brace foot and supporting concrete.

Pool Body Filling and Backfilling

After fitting the pool body with required technological equipment, underpinning the staircase and filling the pool with water up to 25 cm, the pool outer perimeter will be gradually backfilled and the pool filled with water at the same time.

Moistened concrete of C 16/20 grade mixed with all-in aggregate of 4/16 mm size fraction shall be used for pool backfilling. The pool body should be carefully backfilled, particular layers being placed evenly in individual layers of about 25-30 cm thickness, max. The skimmer body should be underpinned, too.

On the outer pool wall the recommended thicknesses of particular layers are marked in red colour. The concrete mix must not be rammed or compacted by vibrators. No concrete mix supplied directly from a mixer truck shall be used. The pool perimeter shall not be backfilled at one go, as there is a danger of pool wall and upper rim deformation. Immediately after placing the first 25 cm layer the walls in the upper pool parts shall be fixed by means of two planks whose both ends are cut in L-shape and fitted with soft lining (a piece of geotextile, e.g.). Wall fixing will help to provide wall flatness during backfilling and in no case it can serve as a brace resisting to the pressure of water and concrete. The points for brace installation are marked on the outer pool body surface in red colour. Then, simultaneously with filling the pool with water, it shall be backfilled up to the height of about 50 cm. Employing an aluminium straight edger, the planeness of side walls should be frequently checked. In the course of backfilling the longitudinal straightness of the side rim shall be checked using a string line. After the backfill height of 50 cm has been achieved, the process will be suspended up to the following day, at least. On the next day backfilling of pool walls will continue using moistened concrete mix up to the height of 75 cm, approx., the pool being filled with water to the same level at the same time. Side wall planeness should be continuously checked as described above. In the check the side wall shall come into contact with the aluminium straight edger along its entire length. The correct position and planeness of the braced staircase shall be monitored in order its undesirable settlement to be avoided.

After the third concrete layer has cured, usually on the third day, the next 25 cm thick layer shall be placed, i.e., up to the height of 100 cm. In the following days the operation of stepwise backfilling/filling will continue in the same way until the level of 25 cm below the upper rim is achieved. In any case, each additional concrete layer may be put down only after the previous one has already cured. Water shall be added to the pool at the same rate, always up to the corresponding red mark found on the pool outer surface.

In case the pool is installed with an elevation above adjacent ground level, the difference shall be adjusted by a reinforced concrete collar built around the whole perimeter of the pool. In case the swimming pool is installed in a slope, it has to be secured by building an abutment wall of reinforced concrete. Such measure should be consulted and designed by a structural engineer in advance. In case the pool is to be installed in the ground of non-cohesive soil, the backfilling concrete mix shall be reinforced by welded steel netting. Two layers of "kari" net shall be placed in the space between the pool side wall and the pit wall,

the inner one should reach up to the half of wall height and the outer one should be placed at the distance of 80 mm from the inner net and reach up to the pool rim. The steel net of 150 mm x 150 mm mesh and wire of ∅ 6.3 mm should be used. The pool shall be backfilled with concrete mix in the same way as described hereinbefore.

Completing Works

After the swimming pool has been backfilled with moistened concrete and pool technological equipment tested for operability, surrounding areas shall get necessary treatment and pavement will be laid around the pool. In principle, flagstone or ceramic tiles employed for the purpose shall be frost resistant and slip-free, even in wet conditions.

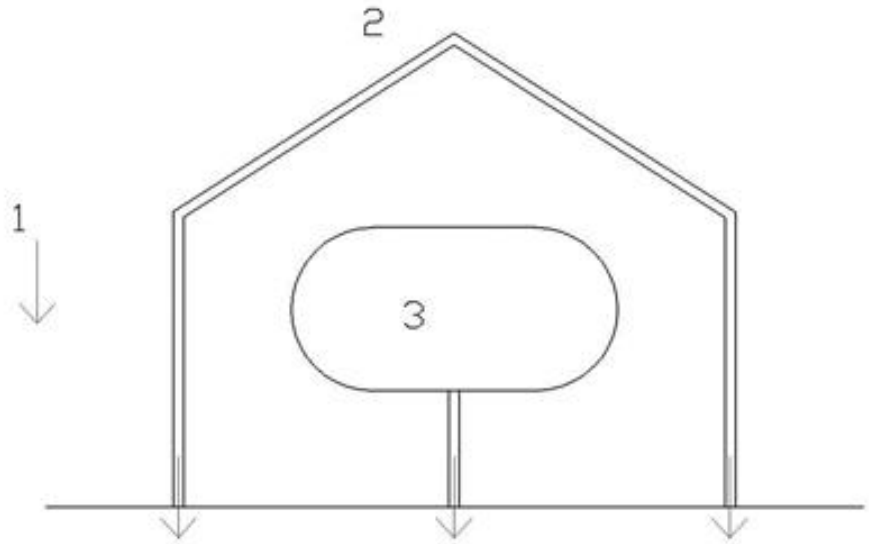
As it is necessary to provide robust and reliable attachment of travel rails for possible installation of a mobile roof in future, the pool coping and surrounding pavement as well as the area of possible rail extension shall be firmly attached (using adhesive) to the concrete base.

5. Swimming Pool Operation and Environmental Impact:

Ordinary tap water or water delivered by a tank truck should be used for filling the pool. In either case treated potable water is involved. The pool filter system operates in a closed circuit; water wasted from periodical washing of sand in the filter unit (once in every 10 days, approx.) should be drained in the public sewer.

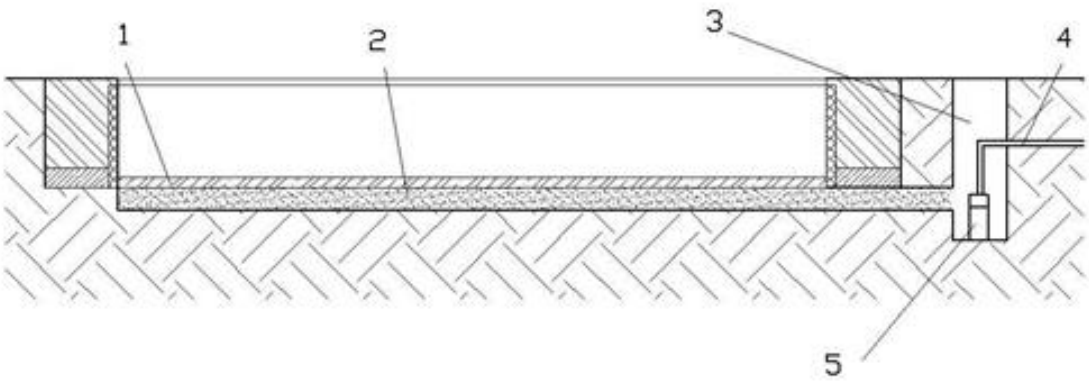
The use of special cleaning and disinfecting agents (products of specialized pool chemistry) should be used for swimming pool/water maintenance. The operation of pool will not have any negative environmental impact.

Figure A



1 - Slope
2 – Gravel, drain hose
3 – Swimming pool

Figure B



1 - Concrete
2 – Gravel subbase
3 – Pumping sump
4 – Stormwater sewer
5 – Pump with a level switch

Process of Construction in Illustrations

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1. Swimming pool concrete subbase – the drain and, possibly, the sump with a pump should be prepared.
2. Extruded polystyrene boards of 20 mm thickness placed on the concrete layer
3. Installation and orientation of the pool in relation to the house, terrace, etc.
4. Fitting the pool with technologic equipment
5. Test of the technology and first filling of the pool up to the max. height of 30 cm
6. Underpinning of the skimmer, stairs and, possibly, the bench
7. Fixing the pool walls and backfilling the pool in layers, each of 25 cm thickness
8. Stepwise filling of the pool with water at simultaneous **slow backfilling** with concrete keeping the two at the same level.
9. Concreting the adjacent area of the pool and paving the surface with flagstone or ceramic tiles
10. In case the installation of mobile roof is considered, it is the best opportunity for building foundation for the roof rail track.

!Important!

Do not forget:

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1. Before installing the technological equipment, support the staircase that is hanging in air!
2. The stairs, bench and skimmer shall be underpinned before backfilling.
3. A firm flat horizontal surface shall be used for long-term storage of the pool in order any deformation of its bottom to be avoided. The staircase shall be supported at the same time.
4. In the course of backfilling, the process of concrete placement in the layer by layer fashion shall be respected, as indicated by marks on the pool outer surface.