The following pages include a typical specification. This specification is intended to be used as part of a project or as stand-alone specification for the installation of a swimming pool.

1. - It is the intent of this specification to describe the installation of a complete reinforced PVC membrane lining system specifically designed and formulated for use in swimming pools. The system shall consist of two layers of flexible PVC totally encapsulating a polyester inner reinforcement in combination with required accessory items to complete the installation. The several membranes shall be welded together at the site. Upon completition the system shall provide a waterproof, yet flexible membrane, complete with all necessary fittings, attachments and profiles.

2. - This specification includes the following components:

Flexible PVC membranes

Anti slip membrane

Geotextile for separation Special profiles

Edge sealants

Adhesives

Flanges

3. - Related work responsibilities generally include the following:

a) Provide and maintain appropriate and suitable environmental conditions, including temporary heat shelter and weather protection for the completition of the work.

b) Surface preparation beyond the scope of normal surface patching of concrete, surface repair or cleaning of the existing surfaces prior to system installation.

c) Perimeter sealant, caulking, or other sealing except sealants that is integral to the PVC membrane system.

d) Removal and reinstallation of deck and accessory equipment.

e) Provide means for storage and disposal of scrap material, coating debris, and other material in close proximity to pool area.

f) Electrical work, including grounding of the pool, installation or underwater lights or other components, or any related electrical work.

g) Temporary facilities, including electrical power close to installation site.

h) Provide temporary water at 50 PSI minimum for cleaning, rinsing, and test purposes, as well as facilities for draining pool and maintaining workable conditions within the pool area.

g) Final cleaning of pool area outside of the PVC membrane system.

I) Provide and maintain all necessary barricades, signs, lights, flares and other security as required to protect workmen and the public.

j) Drain pool, coordinate to ensure proper hydrostatic relief is maintained. Closely monitor water table around the pool to minimize hydrostatic damage to pool shell.

k) Immediately after installation, protect pool from damage, contamination, spatter and spillage caused by construction work of other trades. This shall include covering of pool with protective materials when necessary, and responsibility for prompt repair or corrective measures in the event of damage.

4) Scheduling

Coordinate all work activities and installation of the PVC membrane system with other building components and the work activities of other trades.

5) Delivery, storage and handling

a) The PVC membrane shall be delivered to the job site adequately packaged to prevent damage. Unloading and storage shall be executed by the contractor. The material shall be not stacked or stored in any manner which could cause damage or deformity.

6) Project side conditions

Surface preparation shall be completed prior to the commencement of the installation. The surface shall be necessary reasonably smooth without oil or tar-based material present. The surface must be free of angular materials, bubbles, voids and large cracks. These irregularities shall be filled with suitable patching material or covered with galvanized or stainless steel sheet.

When the lining consists refurbishing already existing swimming pools, covered with any kind of material, perform adequate disinfection of the whole surface before setting the new membrane to avoid the development of moulds and bacteria that could attack the new membrane.

7) Products

a) Ensure that all materials used are compatible with the swimming pool environment.

b) Flexible reinforced PVC membrane: The flexible PVC membrane shall be installed or the dimensions detailed on the drawings and as required. The membrane shall consist of 2 layers of laminated PVC, with polyester mesh reinforcement. The membrane shall be not less than 1.5 mm thick according to the technical data sheet provided by Haogenplast.

c) Slip resistant membrane

A slip resistant reinforced PVC membrane, identical in chemical and physical properties to the reinforced PVC membrane, which includes specifically embossed surface suitable high traffic areas, shall be installed

d) Separator fleece

The interior surface of the swimming pool shall be covered with a polyester fleece separator weighing at least 300 go/sqm. The fleece separator must be resistant to freeze, thaw, moisture, soil-chemical abrasion. All fleece separators shall be guaranteed to be free of foreign materials, which could potentially be damaging to the liner.

8) Necessary tooling

The following tools are necessary to fix our swimming pool membranes:

Building tools
Scissors and cutter
Full blade and “hawk-beak” shaped
Ruler
Special glue
Bottle to contain liquid PVC
Level
Hot air welding device like Leister Type
Appropriated nozzles
Silicone rubber and brass roller
Hammer drill
Welding tester
Metal brush
Cable holder

9) Sequence of the work

a) Attached the fleece to the pool wall and/or the bottom with the appropriate adhesives in the amounts adequate to secure the fleece.

b) The flexible reinforced PVC membrane shall be securely welded to PVC coated steel, which has been attached to the pool surface with aluminum drive rivets approximately 10 cm on the center.

c) Install PVC coated steel or shaped galvanized sheet as necessary to form angles, edges, corners, or other transitions.

d) Weld the flexible reinforced PVC membrane. The joints shall be hot air welded with a minimum of 5 cm of overlap. Probe all seems with a hand-held lance to ensure complete welding. Completely close the seam using a PVC edge sealing compound.

To correctly perform the welding, the edges of the membrane must absolutely be clean and dry to avoid the development of bubbles, due to the steam generated by the hot welding.

The welding speed is about 80 cm/min. The temperature fit for obtaining a perfect welding, generally varies between 450 and 500°C. The working temperature could vary according to the atmospheric conditions on the building site (humidity, temperature, wind, etc). Please never install a membrane with an ambient temperature lower than 10°C.

e) All seams in the membrane shall be one piece, single overlap seams. Patching and overlaying of multiple layers of the membrane material is not acceptable. All material sections are to be applied in full roll widths and lengths except where pool conditions dictate otherwise. No scrap or short-

roll material is to be utilized in the membrane installation. To minimize visible seams, the membrane is to be applied to the pools in horizontally

oriented sheets. Applying the membrane to the pool in vertically oriented sheets is not acceptable. Any areas of the membrane which are damaged during installation are to be completely removed and replaced with new material. There are to be no visible patches on the complete membrane.

f) Apply special markings, target, lines, etc. as indicated on the drawings or as specified. The owner's representative is to provide detailed instructions as to necessary markings.

g) After installation of the PVC membrane, apply an appropriate elastomeric sealant all transitions to flanges or other construction materials, utilizing only sealants suitable for submerged application, and compatible with the flexible reinforced PVC membrane.

H) All inlets, outlets, drains, underwater lights, skimmers, stanchion posts, and other required membrane penetrations shall be fitted with rigid PVC compression flanges securely anchored to the pool structure to ensure a watertight seal.

I)The PVC membrane shall be continues throughout recessed steps and other recessed areas in the pool wall.

j) It is compulsory to check all the performed welding. The method consists in sliding the welding tester on all welding lines. Apply an adequate

pressure to detect possible weak points or insufficient adhesion of the welding.

10) Adjusting and Cleaning

After installation is complete broom clean all surfaces. Remove all scraps, debris, or construction material and dispose of properly.

11) Field quality control

a) Limit access to the project site to minimize possibility of damage to the membrane. Materials and equipment shall not be dragged across the surface of the liner or allowed to slide down the slopes. All parties working on the liner shall wear soft soled shoes. Immediately following installation, verify completion and testing of all seams. Retesting may be necessary to ensure complete sealing.

b) Upon completion of installation and testing, the completed PVC membrane system shall be hydrostatically tested by filling the pool of water feature to the typical operating level and operating all systems for a period of 6 hours without evidence of leakage.