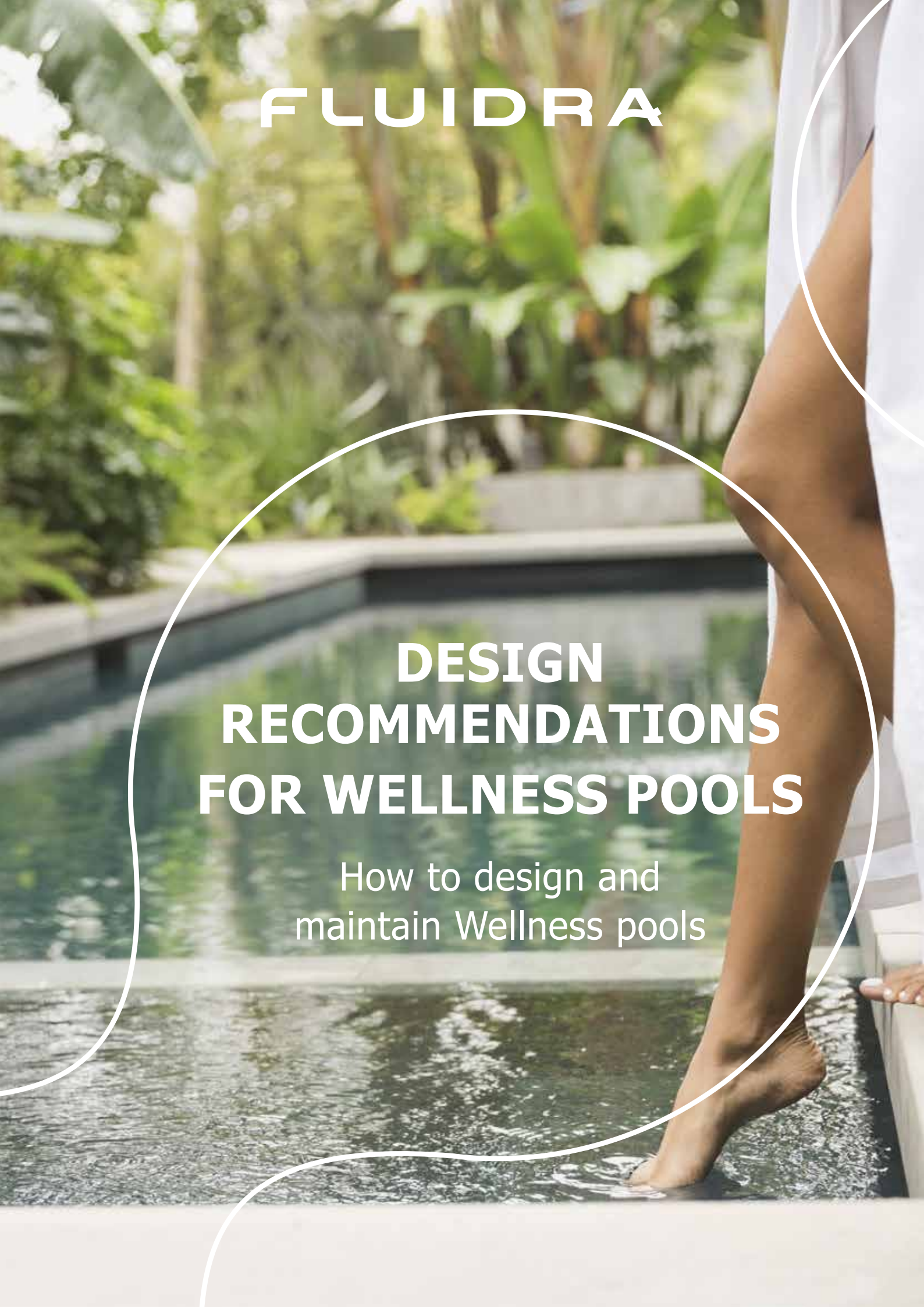


A person's legs, wearing a white robe, are visible on the right side of the frame, standing on the edge of a pool. The background is a lush, green garden with various plants and trees. The pool water is dark and reflects the surrounding greenery. The overall scene is serene and suggests a wellness or spa environment.

FLUIDRA

DESIGN RECOMMENDATIONS FOR WELLNESS POOLS

How to design and
maintain Wellness pools

DESIGN RECOMMENDATIONS FOR WELLNESS POOLS

01

Introduction

02

The core influence of design

03

Water care: essential information

04

**Hygiene and sanitation standards
for wellness pools**

05

Wellness Pool Design and Use

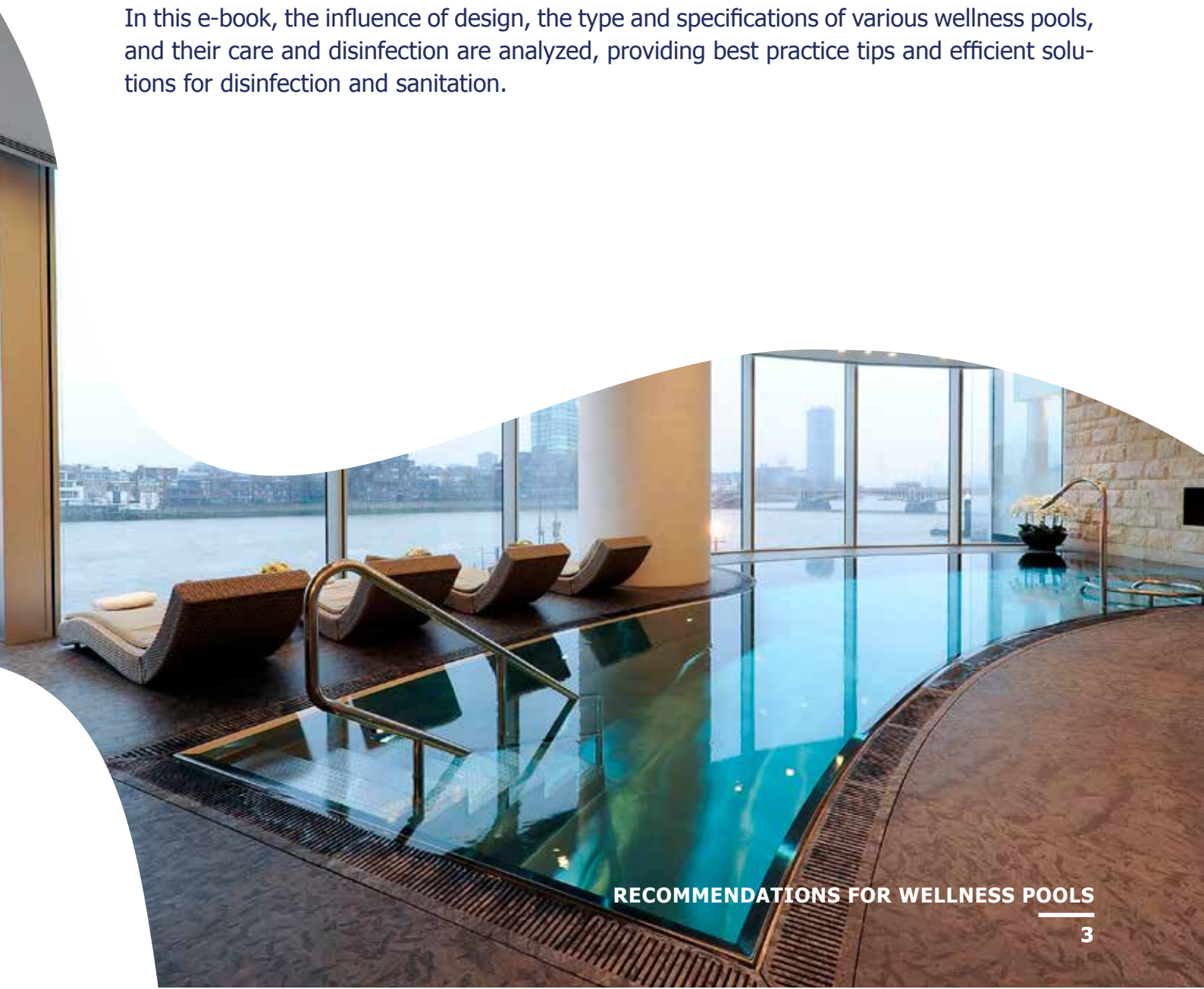
01

INTRODUCTION

Wellness pools are a centerpiece for many locations, from spas to fitness centers and hotels. They come in a variety of specifications and allow visitors to have immersive, relaxing, and beneficial experiences that forge a positive connection between them and the establishment they are in.

This is why designing the best functioning wellness pools and enabling them to be maintained and disinfected effectively and efficiently is absolutely crucial for growing business in this domain.

In this e-book, the influence of design, the type and specifications of various wellness pools, and their care and disinfection are analyzed, providing best practice tips and efficient solutions for disinfection and sanitation.



02

THE CORE INFLUENCE OF DESIGN

How the pool's design can influence the look and feel of a spa

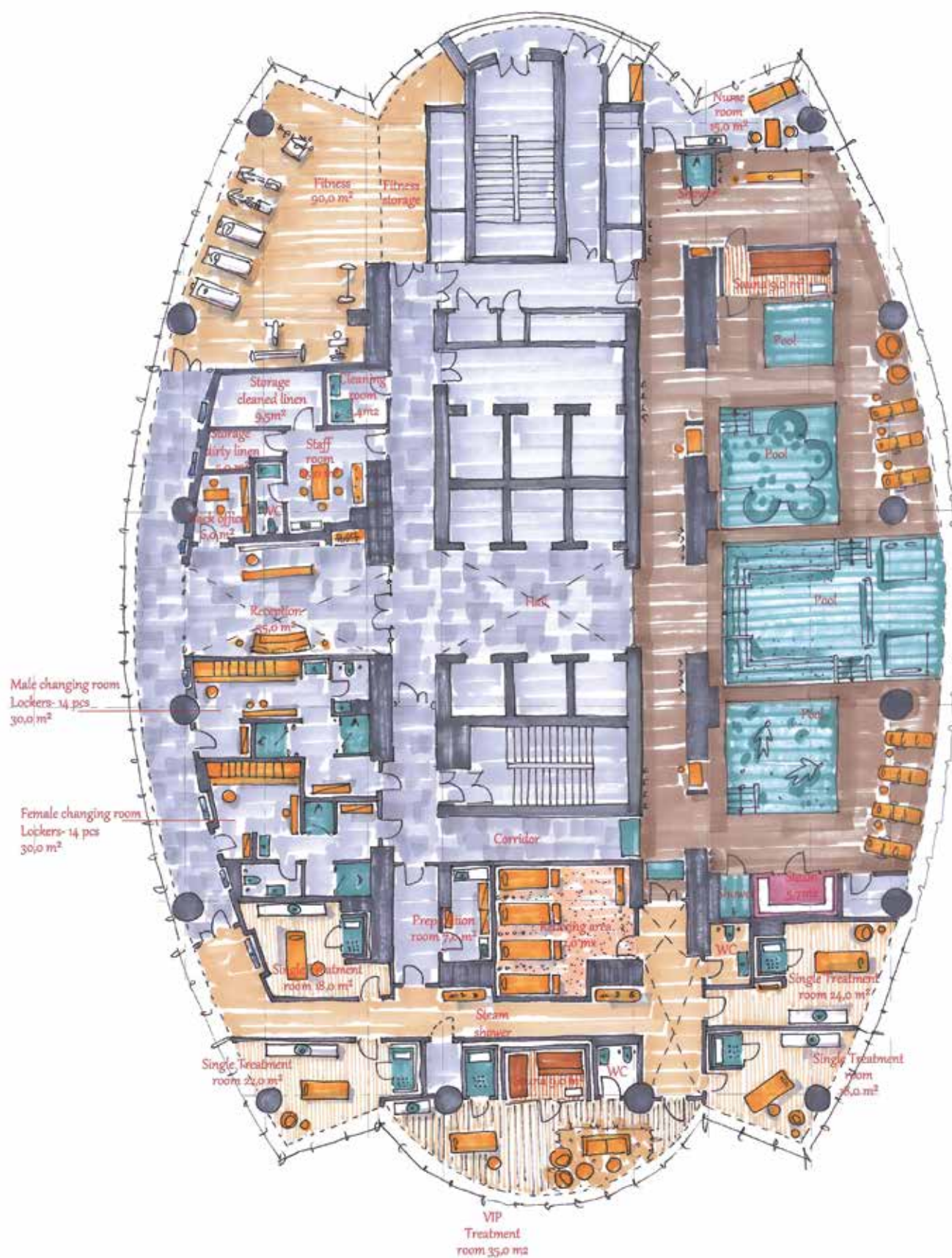
Wellness pools play a central role in making wellness centers into places where guests can get away from it all. Their design is therefore essential when it comes to achieving the best results for spas and their visitors.

From a design perspective, the water area in a spa or wellness center has the unique advantage of being highly customizable. First, it can respond to technical and functional requirements such as particular design features, fitting into designated spaces, and include treatment options.

Second, it can include special features and roles that the wellness center manager or owner wants to add. For example, a facility can become the flagship element of a hotel or resort, even the core identity of a wellness center or sports club.

Finally, water features can accommodate a multitude of designs, from neutral, minimalist and modern styles to an Asian Zen feel, or a themed style (Arabian, Roman, outdoor cave, etc.).





03

WATER CARE:
ESSENTIAL INFORMATION**3.1 Looking After the Water's Quality and Cleanliness**

One of the key elements of looking after a wellness pool is ensuring perfect water quality. Maximum care is required when filtering and treating water to ensure the right recirculation for the flow of water.

The benefits of the right water care are multiple:

- Keeps water clean and clear.
- Adds and disperses the necessary **agents** for the disinfection process.
- Eliminates significant amounts of water replacement, a process that results in high consumption and high energy costs.

To ensure the best level of water care, the ideal method is called inverse recirculation.

One of the key elements of looking after a wellness pool is ensuring perfect water quality.

3.2 Inverse Recirculation: How it works

For inverse recirculation, multiple nozzles placed all along the basin inject water into the basin. The nozzles must be set up uniformly equidistant intervals. A fan shape is thus created from the bottom of the pool through the perimetral overflows, from which excess water is collected (and with it, the supernatant particles). All collected water volume is directed into the tank, where it can be filtered, heated and treated with chemicals..

Each basin will have several floor drains that are normally closed, and which will comply with the specifications of applicable security legislations.

The filtration system is made up of filters and pumps, valves and piping. The sand filters must be surrounded by bobbin wound coiling.

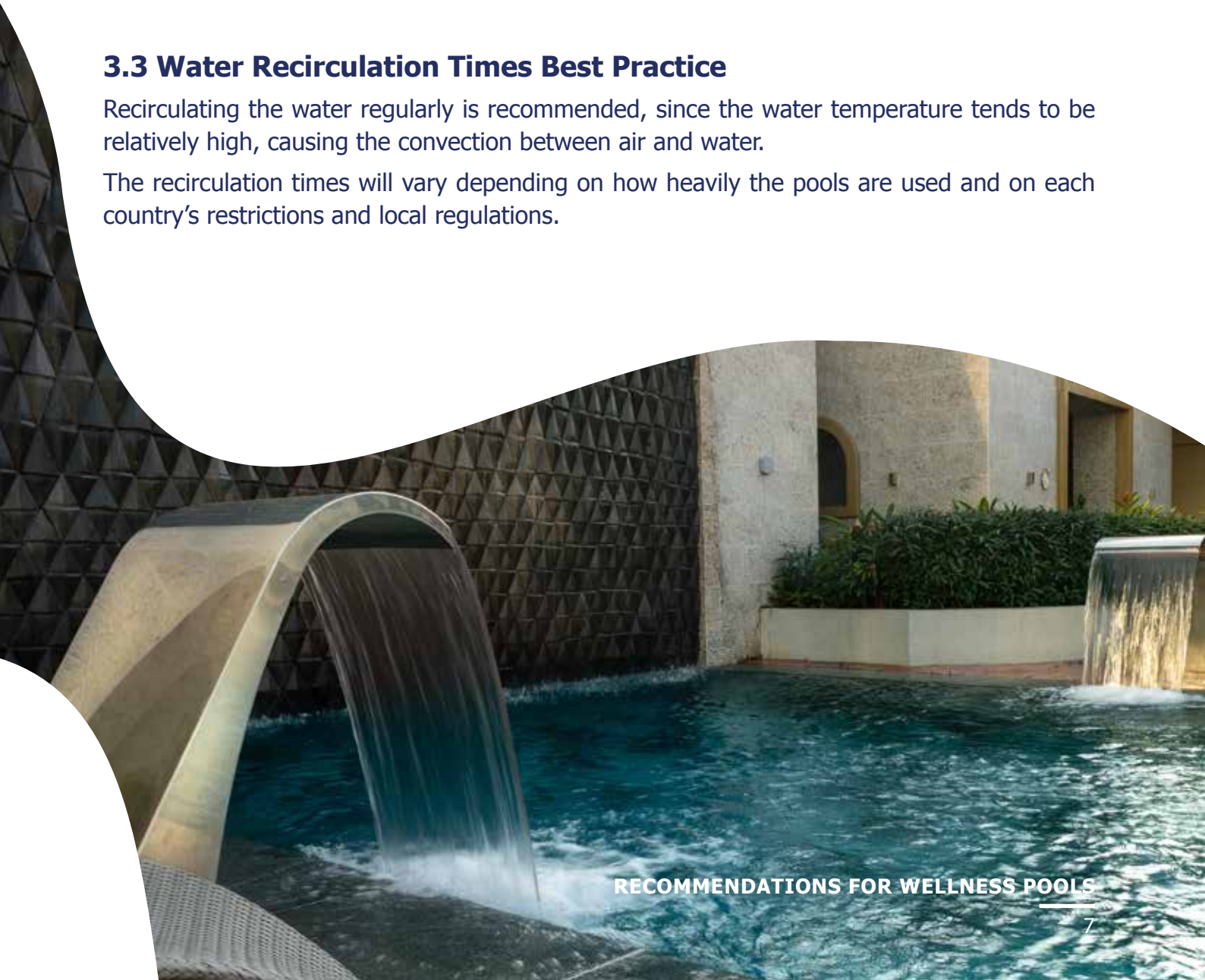
To ensure the chemical treatment is conducted accurately, a micro-processed system should be added to manage the metering, regulation of the free chlorine and pH, while linked to a computer software for continuous monitoring. To this end, dosing pumps will be installed to inject sodium hypochlorite, acid and flocculant. For the best storage of these chemical products, they should be placed in a polyester tank.

All installation activities will be performed in compliance with APQ regulations. The recirculation flow and installation specifications will be detailed in the hydraulic schematics and drawings.

3.3 Water Recirculation Times Best Practice

Recirculating the water regularly is recommended, since the water temperature tends to be relatively high, causing the convection between air and water.

The recirculation times will vary depending on how heavily the pools are used and on each country's restrictions and local regulations.



04

HYGIENE AND SANITATION STANDARDS FOR WELLNESS POOLS

To ensure that the optimal level of hygiene and sanitation is maintained for all wellness pools, the following steps should be followed:

- Each basin will have a large drain for the quick evacuation of sediments and residue within the water. This system should be protected by grids.
- Equipment should be made available to maintain and analyze the water quality. This includes the measurement of free chlorine, pH and temperature, as well as dosed chlorine and acid pumps.
- Each pool will have its own filtration system to ensure optimal water quality.
- Check valves will be placed at the point where the water enters the pool from the general public supply to prevent reflux and keeping water from the basin from entering the water supply network:
 - Treated water will flow by the bottom of the basin with perimeter overflow (reverse recirculation).
 - Fresh water will be supplied into the basin in minimum increments, enough to guarantee a steady water quality level and to maintain the volume of water that the recirculation system needs to run correctly.
 - A metering system will be installed to measure the water volume from filtration, refreshing, etc.

4.1 Pre-filtering and pumping system

The water collected at the surface via the canals installed all along the basin should be connected to a specially designed compensation tank which serves to suction the circulation pumps for the regeneration circuit. One or more pre-filters must be installed right at the pump entry connection point to protect the pumps from any residue which may get into the from the water in the pools.

More pumps and pre-filters may be needed depending on the strength required for the recirculation flow. The recirculation flow is essential for keeping the water in the pool homogenous, and the possible combinations of all these flows will eventually be adapted for each use of the pool.

A compensation tank will be used to combine the volume from the pumps. To calculate its volume, the following parameters must be considered:

- Pumping system immersion limit.
- Minimum distance from the center of the pipes to the floor.
- Minimum distance from the center of the pump pipes.

- Minimum distance from the pipe center to the walls.
- Necessary useful volume of the compensation tank for filter washing.
- Necessary useful volume of the compensation tank for the users. The tank level will be controlled by a level sensor unit to automate the inflow.
- Stop the pumping system in the event of low water level; the water is below the minimum level of immersion.
- Opening and closing of the water supply at the minimum level for filter washing.

The basin will include a fresh water supply circuit equipped with a solenoid valve and a Woltman type water meter. The basin will also include a circuit directly connected to the drain.

4.2 Filtration and Water Treatment

Proper filtration is essential for all wellness pools. Different types of filters can be used, **but sand filters are recommended**, as described below.

Sand filters (pressure and sand-filled)

The water's low turbidity allows the adoption of high filtration speeds and the use of fine granulated sand (0.4 - 0.8 mm).

To have perfectly clear water, a coagulation reagent must be included with the filter. A tiny dose of aluminum sulphate (flocculant) should be added before filtering, in order to coagulate the colloidal suspension substances retained in the upper part of the filter. If this precaution is not taken, there is a risk that these cross the bed from the filter without being trapped.

At the same time, it is worth noting that chlorine consumption will increase (or any other disinfectant in general) if a coagulant is not used as a result of the combination of chlorine and non-retained particles. A high consumption of disinfectant is harmful because of the high level of chloride in the pool and the creation of undesirable organic compounds.

Sand filters are easy to maintain and clean, which makes them very convenient. Other types of filters or beds (absorbent types such as coal, perlite, etc.) lead to an increase in organic bodies in their interior over time, so are discouraged.

General considerations

Unlike diatomic filters, sand filters have a filter bed which regenerates quickly and easily once it is full. A simple water wash upstream is required (as opposed to a filtration flow), for a maximum 3 to 5 minutes, and 100% of the bed will be recovered without the need to change or add new sand.

It could be argued that a bed of sand cleaned correctly only needs to be replaced by friability (even produced by the shock of the large particles at time of washing), which is obviously insignificant in the lifecycle of a pool.

Silica sand has been the most used material for filtration and is found in most of today's filters. The effective size used for the treatment of pool water is c. 0.4-0.8 mm. The characteristics of silica sand make it the best candidate for use in filtration thanks to how it behaves during the process.

Selecting filter beds

The following aspects are essential when choosing the right type of filter bed:

- **Granulometry:** characterized by a curve representing the percentage by weight of the grains passing through the network of a succession of standard sieves.
- **Effective cut (TE):** corresponds to the percentage 10 of the previous curve and determines, to a large extent, the quality of the filtrate, together the following two items.
- **Uniformity coefficient:** list of size corresponding to percentages 60 and 10 of the previous curve.
- **Grain shape:** angular (crushed material) or round (river or sea sand); similar qualities of filtered water can be obtained with an angular material smaller than large, rounded material.

For the same granulometry, the increase in load loss is smaller with large angles than with rounded material. This is because large angles easily couple to each other, as opposed to round grains which leave gaps.

- **Friability:** through testing, the materials used in filtration can be chosen without the risk of them appearing until the washing operations. Its importance depends on the type of filter operation. Thus, a friable material should be rejected, especially in the case of a filter that works from top to bottom and is washed with water, as the material formed will cause a jam on the surface.
- **Loss by acid attack:** if it's obvious that the bed cannot tolerate a major loss by acid attack, because the water may be unbalanced as per the Langerier's index.
- **Volumic mass of the grains in the filter:** apparent bulk density in air and water, by which the volumes occupied in the air and water are known for a given mass of material.

Silica sand behaves best given all the elements above. Unlike perlite, silica sand doesn't need to be regenerated or replaced, as a simple wash with water in an upward flow (as opposed to the flow of filtration) for 3 to 5 minutes will recycle it to 100%.

4.3 Systems for Disinfection and UV Treatment

Disinfection is a particularly important phase of treatment, a crucial step when it comes to preventing the transmission of contagious diseases among swimmers and avoiding the development of microscopic algae that muddy the water.

Micro-processed units are used to measure and regulate free chlorine and pH, and can be linked to a continuous software connection. This feeds into the dosing pumps for the injection of sodium hypochlorite, acid, and flocculant.

A separate room will be built to store these chemicals, which must be properly ventilated and stored in a waterproof container to prevent any accidental leakage. UV equipment will also be included to provide 100% of the filtration rate.

UV treatment

Wellness pools require extra care when it comes to treatment, since users come to these pools to enjoy the best possible experiences in the water, which needs to be of the highest quality.

The advantages of using UV-C technology are that this sort of equipment is fully automatic and has extremely low installation and maintenance costs. They are also superior to other similar systems:

- They treat 100% of the water in the pool.
- They achieve complete disinfection without bad smells or inflammatory effects on the eyes, thanks to the drastic reduction of chloramines.
- They save money due to lower chemical costs.
- They are environmentally friendly systems:
 - Less new water supplied (thereby saving on water renewal).



- Forming fewer by-products in the water.
- Not adding chemicals to water.

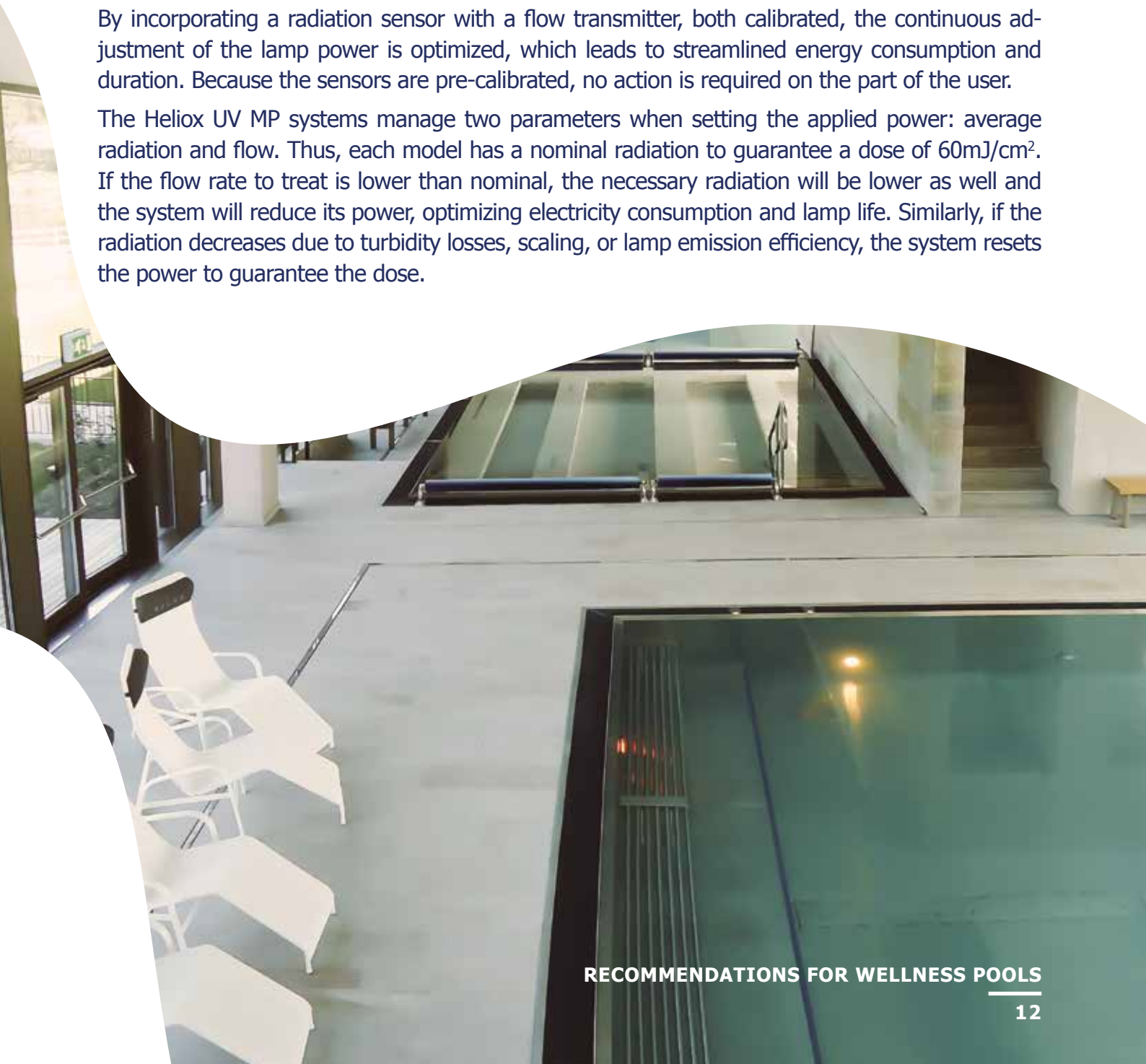
UV light is emitted naturally from the sun, located in the strip of 100-400 nm (nanometers) of wavelength, between X-rays and visible light. Short-wave UV radiation (UV-C, 200-280 nm) is of particular interest due to its germicidal capacity, which implies effective inactivation of bacteria and other pathogenic microorganisms. This radiation is applied to the treatment of wastewater, drinking water and aquaculture, and more recently, to swimming pools.

Heliox UV MP equipment (medium pressure) is intended for use in public swimming pools. These lamps cover a wide spectrum, covering all UV light, which effectively eliminates chloramines (<0.6 ppm) in the pool water and effectively disinfects by activating microorganisms (99.9%), including those resistant to chlorine.

The proposed control architecture for Heliox UV MP systems presents a series of features that allow the highest levels of reliability, energy efficiency and scalability.

By incorporating a radiation sensor with a flow transmitter, both calibrated, the continuous adjustment of the lamp power is optimized, which leads to streamlined energy consumption and duration. Because the sensors are pre-calibrated, no action is required on the part of the user.

The Heliox UV MP systems manage two parameters when setting the applied power: average radiation and flow. Thus, each model has a nominal radiation to guarantee a dose of 60mJ/cm². If the flow rate to treat is lower than nominal, the necessary radiation will be lower as well and the system will reduce its power, optimizing electricity consumption and lamp life. Similarly, if the radiation decreases due to turbidity losses, scaling, or lamp emission efficiency, the system resets the power to guarantee the dose.



05

WELLNESS POOL
DESIGN AND USE**The main types of wellness pools and their core requirements**

This chapter describes the design recommendations for the main types of wellness pools:

- Lap / Exercise Pool
- Hydrotherapy / Vitality Pool
- Cold Plunge Pool
- Hydromassage Pool (Spa)
- Hydromassage Beds Pool
- Floatation Tanks
- Footbath



5.1 Lap / Exercise Pool

A lap pool provides the key benefit of exercise and fitness. Swimming and exercising in a pool are an ideal way to work muscles and sore joints. Moreover, swimming is the lowest-impact aerobic exercise available, and it is extremely inclusive.

Lap pools are built in stainless steel with hot-dip galvanised steel, modular panels with reinforced PVC liner or in concrete. Concrete pools can be finished in non-slip tiles or reinforced PVC liner.

The temperature should be kept at approximately 28°C.



5.2 Hydrotherapy / Vitality Pool

Hydrotherapy pools help to relax the mind and body, relieve tired and aching muscles, increase range of joint movement, cleanse and detox the skin, and improve blood circulation.

These types of pools should be built from stainless steel or concrete. Concrete pools can be finished in non-slip tiles or reinforced PVC liner.

Hydrotherapy pools are kept at around 34-38°C and their depth is between 1-1.2 m.

Additional elements that can be featured with these pools include waterfalls, swan-neck fountains and neck massagers, as well as air effects such as massage nozzles, hydromassage jets, air beds and hot tubes.



5.3 Cold Plunge Pool

A cold plunge stimulates blood circulation. It can also alleviate joint pains and benefit the immune system.

The best materials for cold plunge pools are stainless steel or concrete. Concrete pools can be finished in non-slip tiles or reinforced PVC liner. Their temperature is relatively low: 14°C approximately. Cold plunge pools are usually 1.2 m deep.



5.4 Hydromassage pool (SPA)

Spa pools relax the mind and body, relieve tired and aching muscles, increase range of joint movement, cleanse and detox the skin and can increase blood circulation.

These pools are built with the same materials used for other pools: stainless steel or concrete. Concrete pools can be finished in non-slip tiles. Fluidra also offers a number of prefabricated spas to choose from.

The temperature for a spa pool should be around 38°C and the depth between 1.0-1.2 m.

Additional elements can also be included, such as hydromassage jets and hydromassage benches, for an optimal experience.



5.5 Hydromassage beds pool

A hydromassage bed pool can help relax the mind and body, while relieving tired and aching muscles, increasing range of joint movement, cleansing and detoxing the skin, and increasing blood circulation.

These pools should be built in stainless steel or concrete. Concrete pools can be finished in non-slip tiles or reinforced PVC liner.

Fluidra offers a range of prefabricated spa pool models.

We recommend a temperature of 38°C approximately and a depth ranging from 0.40 - 0.50 m.

Hydromassage beds can be added to these pools and we have different options available, as well as built-in stainless-steel models.

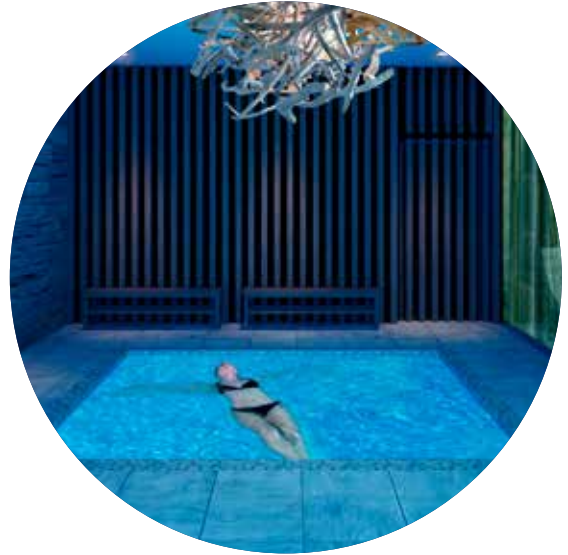


5.6 Floatation Tank

A floatation tank is ideal for pain relief and reducing stress. Magnesium-rich salts are absorbed in the skin, relieving aching muscles and de-stressing. The most important element of the tank is the addition of magnesium sulphate (salts), which is dissolved in the tank.

The following materials are best for floatation tanks: concrete, stainless steel (>316). The area around can be finished with non-slip tiles (mosaic or larger format), stainless steel, or PVC liner.

Floatation tanks must be kept at a temperature of 38°C approximately. They are usually 1.0 - 1.2 m deep.



5.7 Footbath

Footbaths stimulate blood circulation and contribute to stress relief. They also help soothe aching joints. With a depth of only 0.2 m, footbaths feature pebbles on the walkway to massage the users' feet.

They should be built with concrete, bricks, and blocks, while finishes include tiles (mosaic or larger format) and natural stones.

Footbaths need to be kept in a temperature range of 14°C to 38°C approximately.





"This information contains general recommendations that must be taken into consideration on a case-by-case basis. This information is not an instruction manual and cannot be considered as such for any purpose. Any implementation or installation to be made must be made by a professional and under the appropriate guidelines. In this regard, each user is responsible for the application it makes of the information contained herein. Fluidra will not be responsible for its use. Consequently, under no circumstances will Fluidra be liable or responsible for any claim, damages or loss that may arise as a consequence of the use of this information".

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