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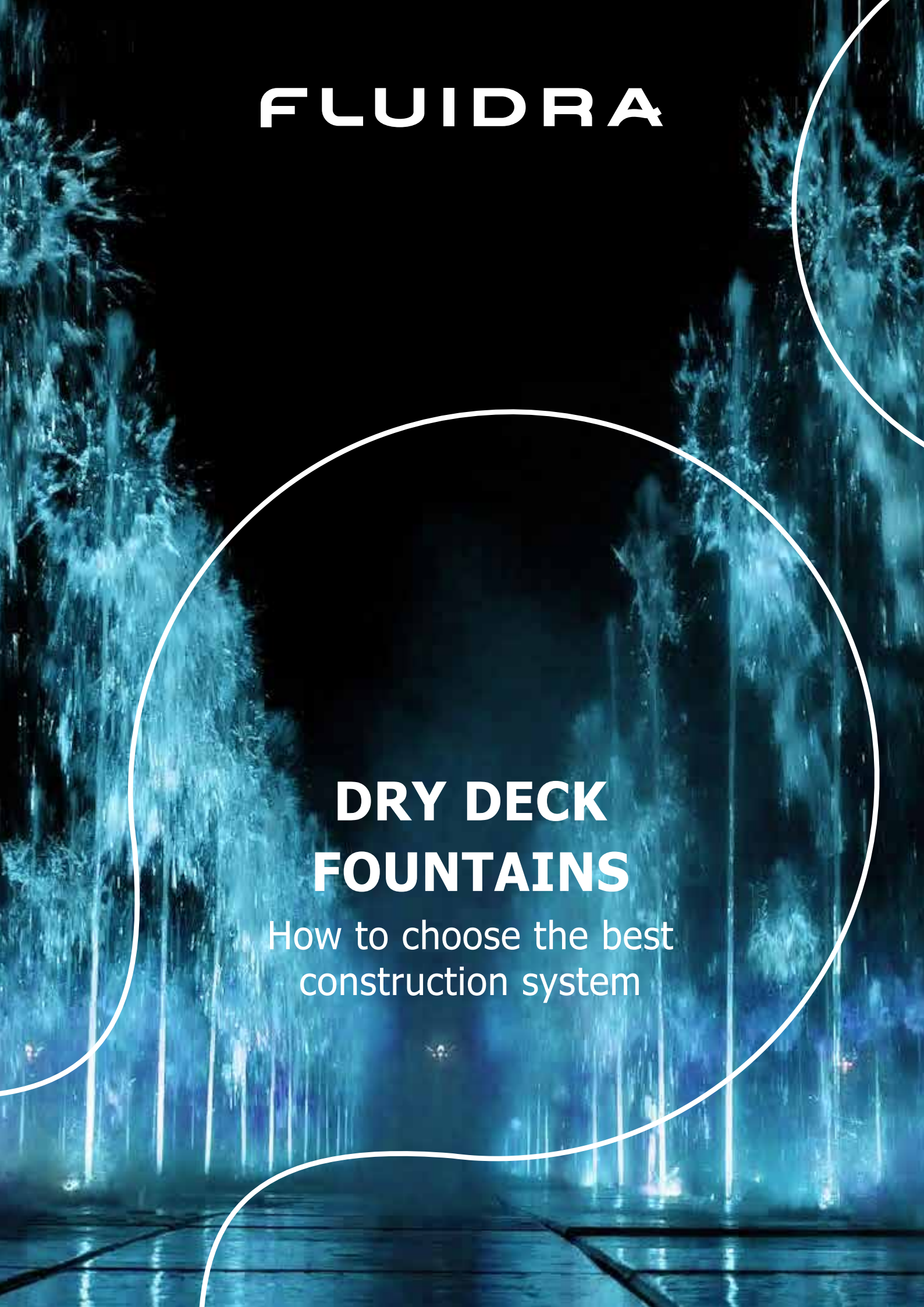
DRY DECK FOUNTAINS

How to choose the best construction system



DRY DECK FOUNTAINS

01 INTRODUCTION

A dry deck fountain is a common sight in any modern city. Seemingly from nowhere, jets of water shoot into the sky in a dazzling combination of light and speed. People are greeted by the sight of children running and giggling in these fountains during the hot **summer months.**

Fountains were not always for fun, though. They were first designed as a way to safely **collect and distribute water** to ancient Egyptian and Sumerian populations. By the time Ancient Rome rose to the fore, fountains were a public display of **wealth and power.** These sources of water gave the impression that Rome was an empire so powerful it could provide for all its citizens. Even if they were not being used for drinking, **ornamental fountains** offered a powerful **political** message.

All across the European, Arabic and Asian world, fountains became **ornamental wonders.** People would travel from afar to see how these marvels of engineering **defied gravity** by shooting water into the air. However, it was the European Renaissance that saw the greatest innovations, including the first dry deck fountain as **far back as 1600**.

These attractions started growing in **popularity** and **complexity** in our towns and cities over the past few decades and city planners and parks management teams have been incorporating them into their designs ever since. Dry deck fountains have become more ornate, intricate and appealing, with engineers creating ever more inventive designs. This originality is what draws people of all ages in to enjoy fountains in more ways than ever before.

02 WHAT IS A DRY DECK FOUNTAIN?

There are two sides to the dry deck fountain: night and day. In the daytime, it is a place where families can **play and have** fun as well as being **ornamental**. At night, however, they transform into a stunning light and water show, providing a dramatic backdrop for everyone to enjoy.

At its most basic, this type of fountain is constructed of a number of high-speed, adjustable, **vertical jets of water.** A dry deck fountain can be augmented with a range of dazzling lights or musical accompaniment. The pattern of the jets can be arranged so they seem to be **dancing in sync** with the music.

These effects make the dry deck fountain the center of attention in a town square, avenue, hotel, or municipal park. The fountain draws families from all walks of life to it with its magical combination of synchronized patterns of water with **lights, color and music**. These elements dance together for the pleasure of the spectators.

03

HOW DOES A DRY DECK FOUNTAIN WORK?

The dry deck fountain is a wide surface made up of jets distributed in a **predetermined pattern**. The project manager will decide how the jets are positioned depending on the desired visual effect. Each individual jet will have a **switch system** that allows it to stop and start at extremely fast, precise moments.

They can also be **programmed independently** to choreograph the jet's **power**, thus controlling the water's height with frequency inverters and solenoid valves.

Each nozzle has a precise working **water pressure** to reach **1.5 and 4.5 meters** of height. Beneath these jets, there is a pump system delivering a working pressure of 30-35 meters of water. It will be calibrated to various measurements such as the **location**, space size, **manometric value** and geometric drops in pressure. The calculation of the flow from the pump to the jets must be based on the **type and diameter** of the nozzle, the number of nozzles and the height of water.

Each individual jet will have a switch system that allows it to stop and start at extremely fast, precise moments

04 CONSTRUCTION SYSTEM ALTERNATIVES

There are two major types of dry deck fountains. The first, which is more common, is the **dry deck fountain with niche**. The second is a **vessel fountain** or floating pavement.

Dry deck fountain with niche

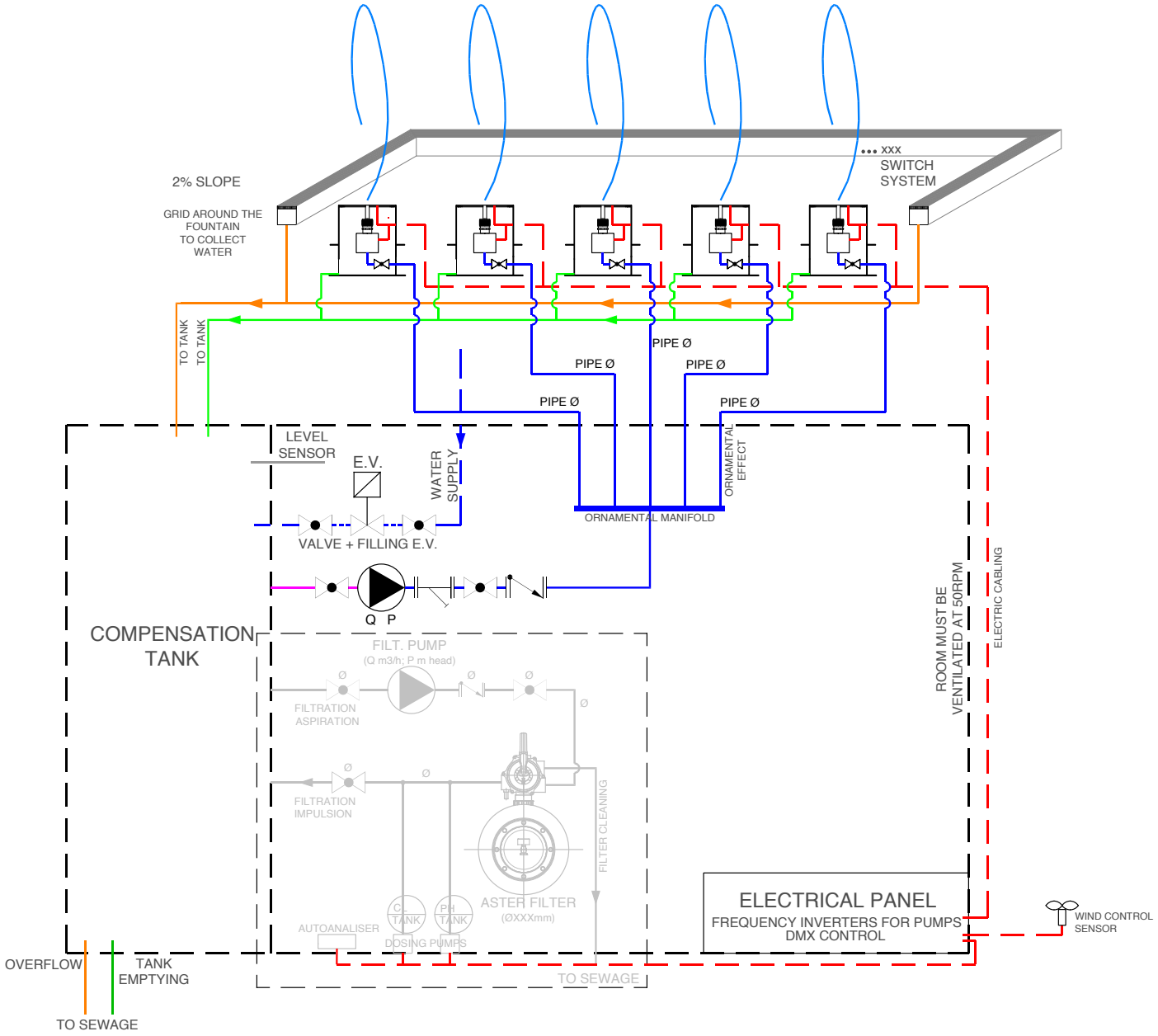
This kind of fountain is made of stainless steel or concrete niches that are installed under the pavement. These niches have the capacity to store operational elements such as the switch system, nozzle, lights, regulation valve, etc. With this kind of fountain, the pumps are located in a separate technical room.

The water supply for this type of fountain is stored in a compensation tank. The amount of water held in this tank is calculated by the sum of the flow of all the jets, ensuring that there is enough water for each individual jet.

The filtration system consists of sand filters, a certain number of pumps per filter and valves and pipes that control the flow of the water.

This system also includes a level sensor with an automatic pump that gauges and controls the water level in the tank. It is a safety measure that maintains the ideal water level in the system and helps prevent flooding and overflow.

This type of fountain is extremely strong and water is not stored directly beneath it. It can support the weight of vehicles and its height can be adjusted if needed. It does require a perimeter grill that drains the water around the fountain and returns it to the compensation tank in the technical room.



P&ID of a Dry Deck Fountain with Niche

Floating pavement dry deck fountain

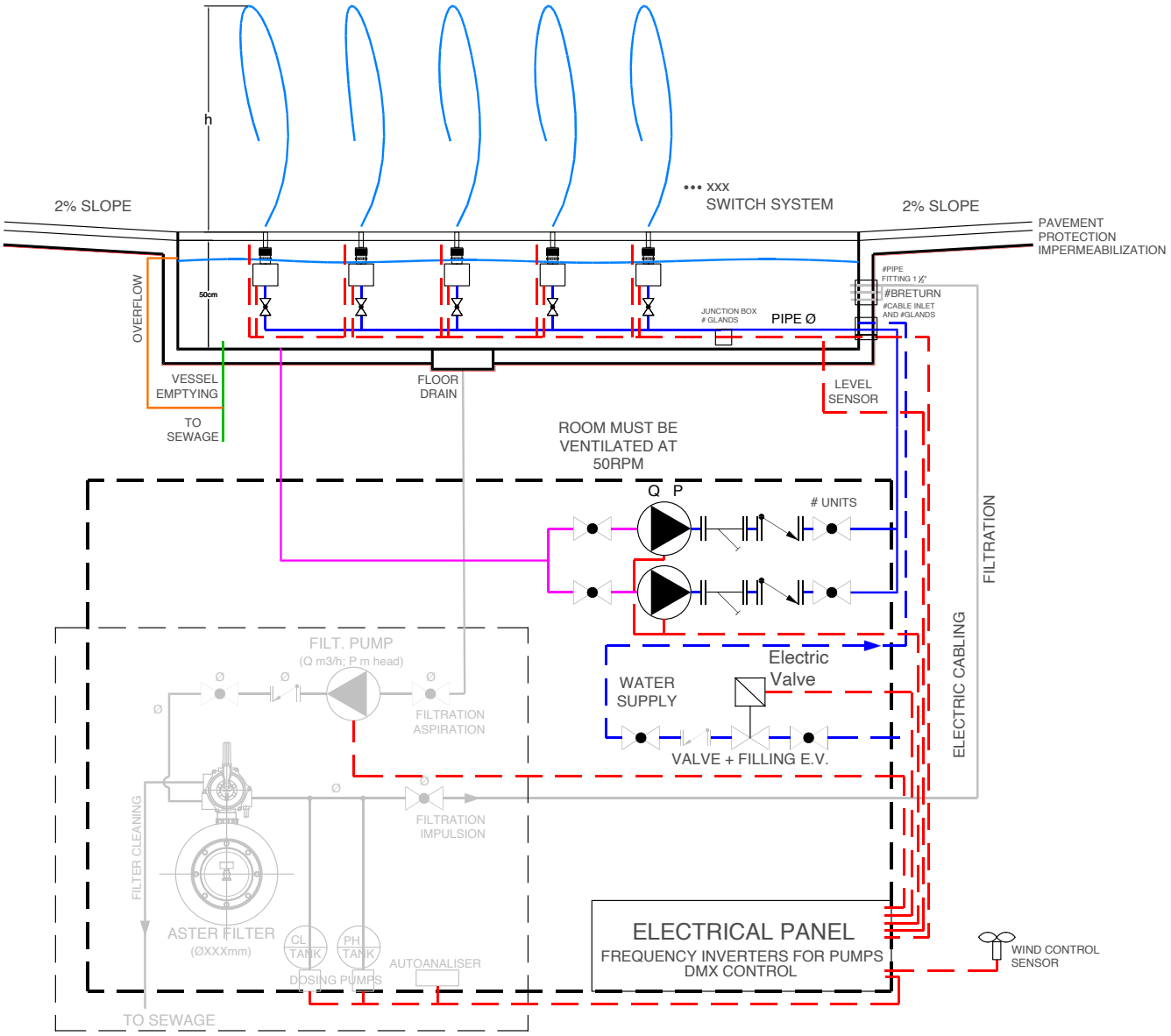
This dry deck fountain is similar to the first except water is stored directly beneath the jets in a vessel. It would be a great choice for projects where **limitations of space and weight** are a concern. The controlling elements like switches are stored at water level and the nozzle jets directly onto the pavement. In this case, the pumps are located either in a separate technical room or directly beneath the fountain, in the vessel.

The **size of the system** is dictated by the size of the surface. The depth of the **vessel** is calculated accordingly and should have a depth of approximately 0.5 to 0.6 meters. This corresponds to the volume of water that will be **filtered** into the jets and onwards to the ornamental display.

Similar to the niche fountain, the **floating pavement fountain** has a filtration system. The system uses sand filters, but the amount depends on the volume of the vessel. There is a certain number of **pumps per filter** and valves and pipes that control the flow of the water.

This system also includes a l**evel sensor** with an automatic pump that gauges and controls the water level in the tank. It is a safety measure that maintains the **ideal water level** in the system and **helps prevent flooding** and overflow.

This system is ideal for areas where space is limited. This is because the pumps can be stored in the **vessel itself** instead of a separate technical room. However, the vessel may require a bit **more height** compared to the niche fountain.



P&ID of a Dry Deck Fountain Floating Pavement

05 WHAT EQUIPMENT DOES A DRY DECK FOUNTAIN REQUIRE?

5.1 Spear nozzle

The spear nozzle is the most **versatile nozzle** available for this kind of project. The system delivers streams of water to these vertical nozzle-type jets. They have a **Ø12 mm - Ø16 mm** diameter and a maximum height of **1 to 4 meters**. These jets guarantee **safety and accuracy** for people running between the spurts of water or watching the display.

Spear Nozzle- AISI304 Stainless Steel

5.2 Switch systems

The chosen nozzle will require a switch system attached to it. This part is what makes the fountain **dynamic, interactive and fun**. It controls the flow of each individual jet, switching it on and off to correspond with the pre-programmed pattern. There are two options here, the **Switch S System** and the **Switch L System**. The L system includes a niche which is ideally suited to the vessel fountain system. They are connected to an independent **power supply,** the output of which depends on the number of switches in the system.

Switch System L – Switch Niche

5.3 Pumping system

The system of pumps must be perfectly installed and **calibrated** to ensure that the right amount of **water** is entering the system. The pumps provide high pressure, which guarantees **precision**. For vessel fountains, the pump may be **submersible** and will therefore need to be adjusted for pressure.

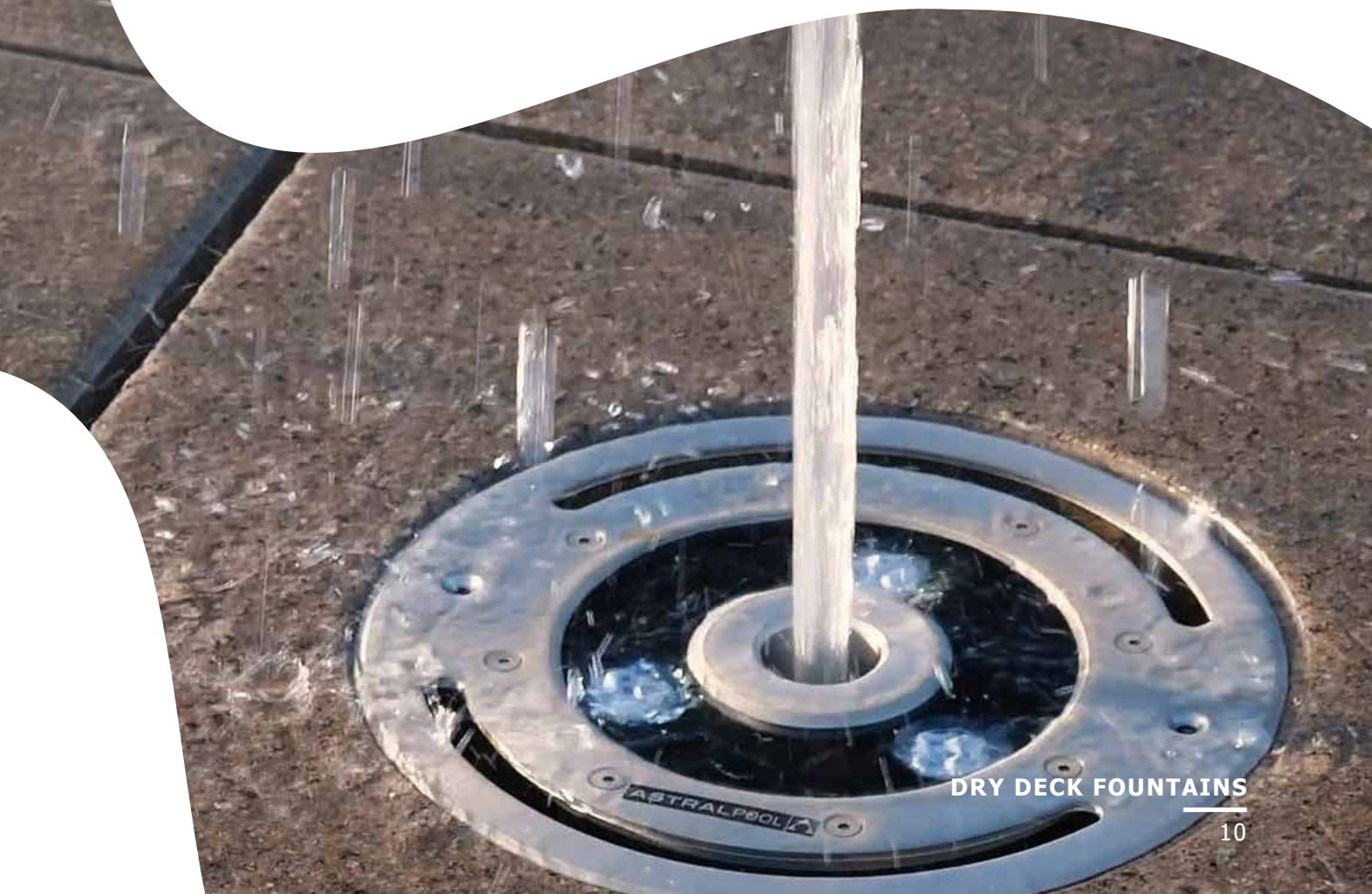
The pump has a built-in prefilter that prevents **dust and microparticles** from entering the system and interrupting the jets. This is an **extra precaution** designed to reduce the possibility of breakdowns.

NB Pump

5.4 Dry deck fountain lighting

Alongside the dramatic hydraulics, lights can be used to great effect to **enliven and transform** the fountain display. Each individual jet can be illuminated by a stand-alone light source. This could be the LED DMX RGB+W or the RGB high-power submersible which has an IP-68 **waterproof** rating and an IK7 **impact resistance** rating. This light is crated from polished stainless steel and special protective glass sources.

The **power** of these lights combined with their **protective features** mean they can illuminate the entire height of the jet without fear of breaking. The LEDs are placed directly around the nozzle which ensures that each jet can be **lit independently** from the others.



5.5 Complementary products

1. Level control sensor

The system includes a sensor that, as mentioned, prevents **overflowing** or **flooding** the tank or vessel system. It works as a safety measure to reduce the risk of the system breaking down. The sensor works directly with the level control unit so that action can be taken if an **excess of water** is detected.

Level Control Sensors

2. Anemometer (wind control)

The anemometer measures **prevailing wind conditions.** It can either adjust the flow of jets depending on the strength of the wind or shut them off entirely. It calculates the best height of the jet according to wind conditions to prevent unsuspecting passers-by from getting wet.

The **anemometer** includes its own wind control unit.

Anemometer

WIND TYPE	ORNAMENTAL FOUNTAIN BEHAVIOUR
Light wind conditions	The fountain works normally
Strong wind conditions	The height of the water jets its reduced to half
Very strong wind conditions	The fountain stops working until wind conditions are better

Note: In order to reduce the height of the water, frequency inverters will need to be installed in the pumps.

3. Electrical valve

This is an **electromechanical valve** designed to control the passage of water through the conduit or pipe. It is located in the **fountain fill system**. The valve is opened and closed by a solenoid coil.

Electrical valve

4. Syncronorm control and interactivity

This is where the **magic** happens. Syncronorn is a product that helps design and control the pattern of lights, colors and sound and the way they **interact**. Furthermore, it offers the potential to **program different shows**, features and lighting environments plus different parameters, patterns and movements. The designer can adapt the show to requirements and include **synchronized music**. The movements of the fountain can be set to automatically follow the flow of the music.

5. Interactivity sensors

Dry deck fountains can be installed with sensors that respond to **human pressure and touch**. These sensors, which sense when a person is playing among the jets, can respond in a range of programmed ways. They can **increase or reduce** the pressure of the jets, turn them off entirely or **surprise** the user and soak them in an instant! They can also be programmed to respond in a more choreographed pattern, depending on the fountain's needs.

06 FINAL CONSIDERATIONS

Equipment room

Large equipment used to control the fountain must be kept in an enclosed room near the fountain. This equipment will include the individual controls, the filtration systems, the pumps, control panels and electrical connections. The room must be wide and well-ventilated enough to accommodate all this equipment.

Filtration and water treatment

It is extremely important that ornamental fountains provide the right hygiene **safeguards** to prevent the spread of microorganisms in the water (e.g., Legionnaire's disease). The water will need to be stored for approximately **five hours**, so any assessments should take this into account. The chemical product application system must be automated and effective enough to keep the water clean for this amount of time. The following products make it possible to ensure **optimal water quality** and freshness:

Aster Filter

Controller pH / Redox

Construction recommendations

Well designed vessels have a minimum impact on the surrounding area for several reasons.

1. All cable and pipe exits and entrances will be **concealed** by special wall passes to ensure that the vessels are **watertight**.
2. Visible trenches have to be reduced to a **minimum**. All the installations and components have to be kept inside the basin, **respecting** the immediate environment during construction and thereafter.
3. All installations with submersible pumps will go inside the vessel for each impulsion system and will be **hidden from view**. It will only be accessible for **maintenance** and finished with a stain-less-steel frame and 'tramex' grill cover.
4. To minimize impact, placing the electrical panels inside an existing technical room is recommended.

"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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