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Zero Gravity Pump

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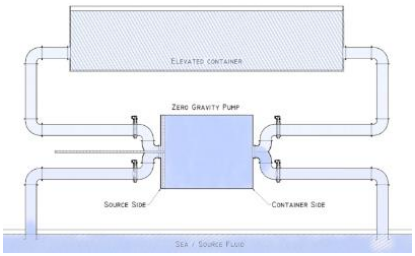
Data center cooling

Cooling your data-center with a Zero Gravity Pump will require an elevated container next to the facilities.

Cooling fluid is then collected from the elevated container horizontally to your facility.

The example below is not a real-world example, but will give us some indications of cooling efficiency using seawater (free cooling).



Heat dissipation in the elevated container

Let's use a very simplified and ideal theoretical example and assume that your data center cooling needs to dissipate heat from an **80-Megawatt** facility. One cubic meter of water will dissipate 1,16 kW of heat by a temperature increase of one degree.

By collecting water from the sea at a specific depth, and holding the temperature in the water between 7-10 degrees Celsius you need to replace the water every hour.

We assume a 10-meter elevation (1 bar hydrostatic pressure or pump head).

This results in a power calculation where the traditional **1.2 Megawatts** (@60% efficiency) are required to circulate 27000 m3 of water to the elevated container every hour.

For the Zero Gravity Pump, this is dependent on piping, and with a DN1600 (80m), the pressure drop is around **31.91mbar**.

At this pressure drop, the power will theoretically be reduced to **39.13 Kilowatt,** for circulation, and we can use more than 80 kilowatts for valve operation to gain a 90% efficient circulation.

This will enable a theoretical cooling efficiency at 99%

$$Watts = \frac{Joule}{S}$$

A water heating calculator

Pump power calculator

Pressure drop calculator

Advantages

The Zero Gravity Pump enables an open vertical circulation, where the horizontal piping may have close to zero pressure rating. This will enable both cost-efficiency in the vertical circulation in combination with a very cost-efficient horizontal cooling water distribution.