Air Admittance Valve

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Introduction

For any system which drains wastewater from a property to function correctly, the soil and waste pipes need to be ventilated. Without ventilation, air pressure changes inside the pipework due to the operation of domestic appliances would cause waste traps on the appliances to lose their water seal. Air admittance valve can be used on primary stack or near to the water drainage.

Air admittance valve manufacturers design and test their products to **EN 12380 Air admittance valves for drainage systems.** Requirements, test methods and evaluation of conformity considering the requirements for the use and installation of valves to **EN 12056-2** gravity drainage systems inside buildings.

Wavin has two types of AAV products in their portfolio. Products differ according to their capacity and diameter as below.

Mini Vent (ABS) – Ø32-63mm diameters
Air capacity: 7,5L/s

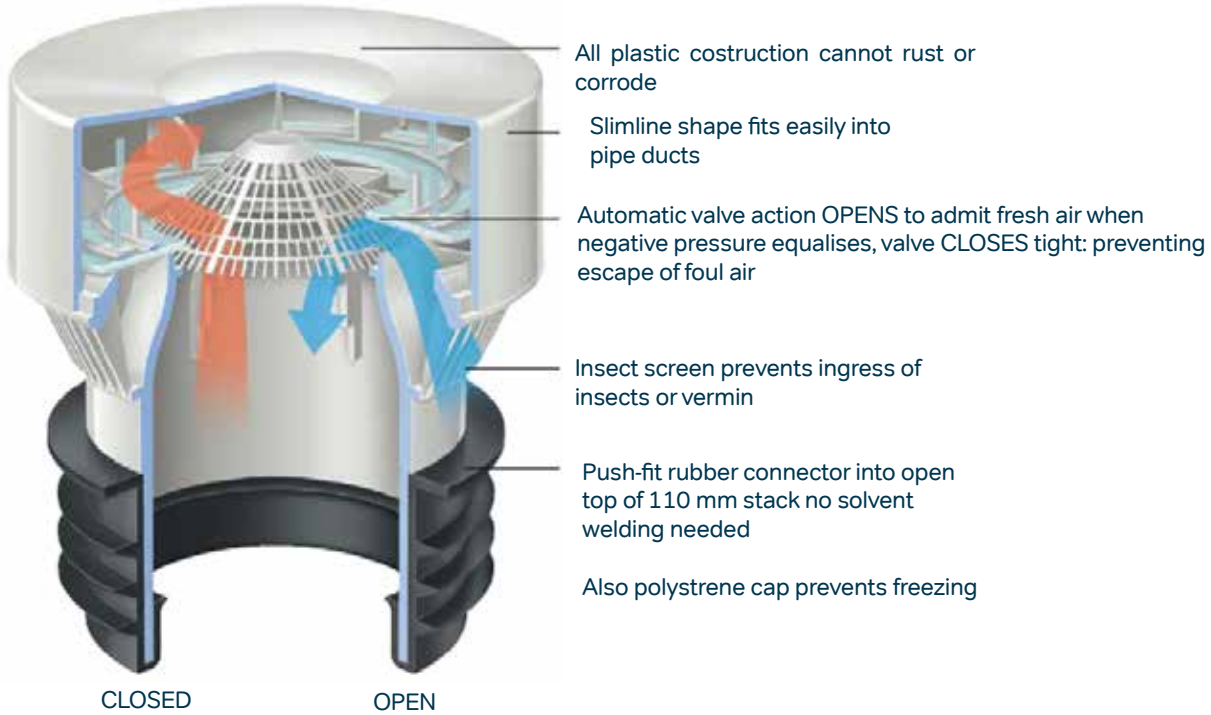
Maxi Vent (ABS) – Ø75-110mm diameters
Air capacity: 32L/s

*Products are Studor branded.

Function

Air admittance valves are designed to fit to a vertical pipe inside the building. The valve houses a seal, usually manufactured from EDPM or Silicon Rubber, which lifts and falls in response to negative pressure caused by WC flushing and the draining of appliances. This simple mechanical principle allows air to flow into the drainage system, thereby breaking the vacuum, which would otherwise create a siphon in the traps. At the same time, the valve prevents the escape of foul air back into the appliance.

Figure 1: Air admittance valves function and properties

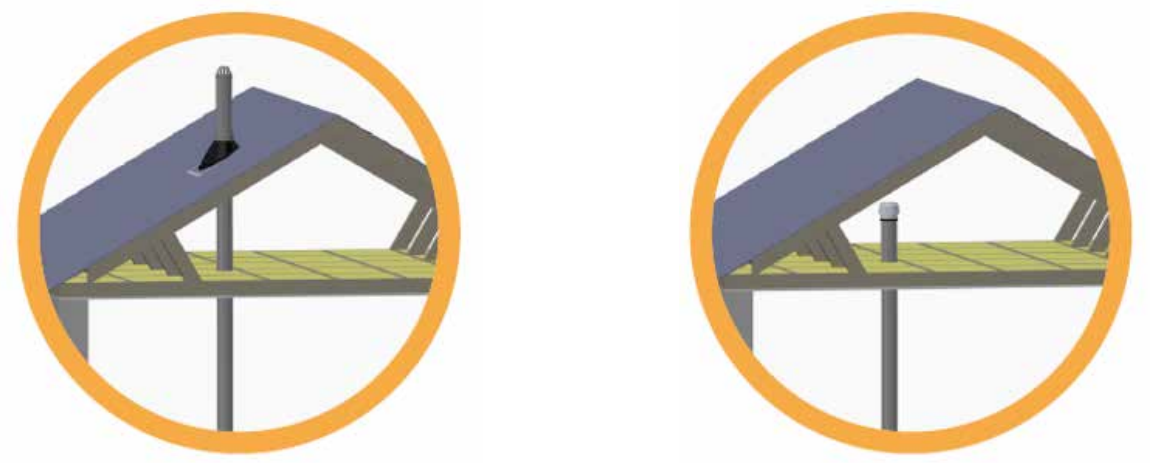


EN 12380 uses a designation system for valves according to their operating temperature and location with respect to connect appliances. This is shown in the table below

Determining factor	Range/Position	Designation
Permitted to be located below flood level of connected appliances	Yes	A
	No	B
Operating Temperature Range	Between -20°C - +60°C	I
	Between 0°C- +60°C	II
	Between 0°C- +20°C	III

Advantages

Air admittance valves (AAVs) are installed directly on to the soil stack without the need for a hole to be made in the property roof, reducing the amount of pipework required and the costs of making the roof good, and minimizing future risk of weather damage and water ingress. AAVs are normally located in the roof space and can provide the same ventilation capacity as an open system. They are particularly suitable for installation on stub stacks – a short stack from ground floor appliances which avoids the need for a full house height pipe.



Typical soil stack

AAV terminating in roof space

Figure 2: Primary soil stack application types

- When the air admittance valve is used, the roof is not punctured. When the roof is not punctured, the risks that may occur due to water leakage is eliminated.
- The grills located inside and outside the cap prevent foreign objects entering from outside. The valve needs to be used indoors.
- It is resistant to frost and since it is inside the roof, there is no risk of clogging in snowy weather.
- There is no need to install a secondary vent system. Thus, both material and labor are saved. It provides design convenience for architects and engineers.
- There is no such thing as insufficient air capacity in the system. Therefore, the water of the water siphons does not leak back due to negative pressure and no odor occurs in closed spaces.
- In the event of a fire, the conventional vent system acts as a chimney and increases the speed of fire spread. The use of an AAV prevents the chimney effect.

Installation

Air addmitance valves with rubber seals should be installed by attaching them to straight cut wastewater pipes of appropriate diameter. The S&W pipes can be PVC pipe which was prodcued according to EN1329-1 standard or PP pipes which was produced according to EN1451-1 standard. AAV needs to be installed vertically.

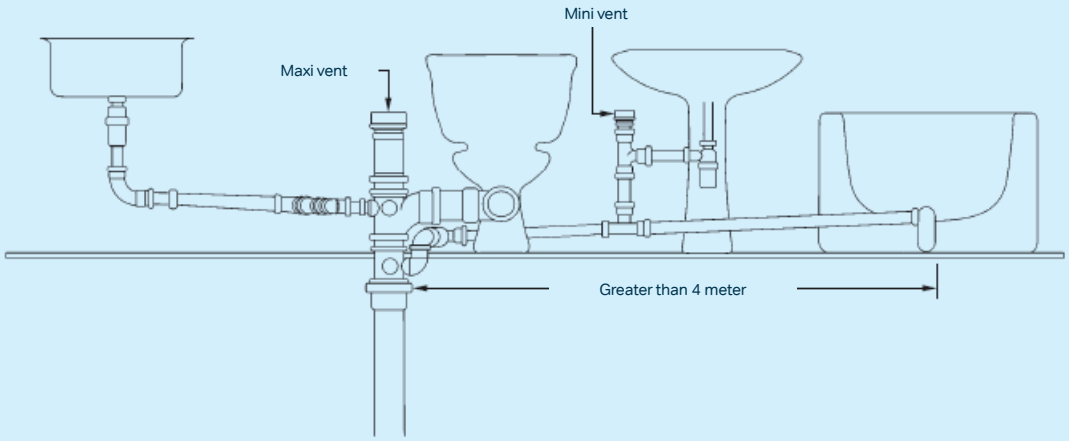
Pipe deburred and valve pushed directly onto pipe

Figure 3: Product Installation

Large diameter air admittance valves can be used for primary soil stack ventilation and small diameters can be used for ventilation of wastewater outlets such as toilets, sinks, showers. Each wastewater pipe must be ventilated enough to balance the negative pressure. Adequate pipe ventilation is required on branch pipes to prevent the risk of self-siphonage (i.e. the loss of a water seal in the trap due to too much water, flowing at full bore with inadequate ventilation, inducing a negative pressure).

Branch pipe ventilation can be achieved by installing a small air AAV on an upstand, fitting anti-siphon water traps or waterless traps. The options are shown schematically below.

a: Ventilated by Studor Maxi-Vent and Mini-Vent valves



b: Unventilated

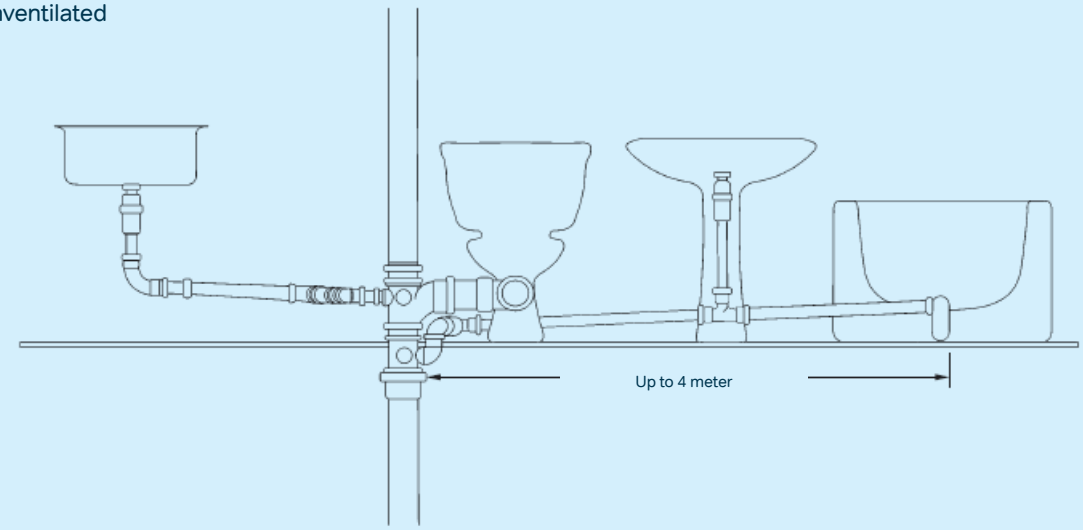
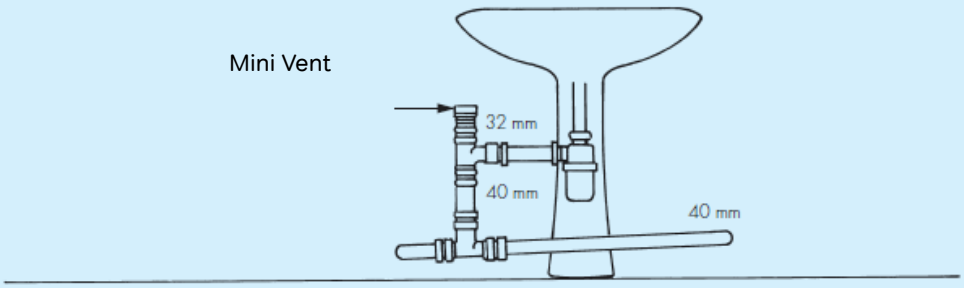


Figure 4: Application example: If the distance between the main column and the wastewater point is longer than 4 meters, an air admittance valve should be used in the branch line (a).

a: Installation to prevent selfsiphonage



b: Installation to prevent induced siphonage

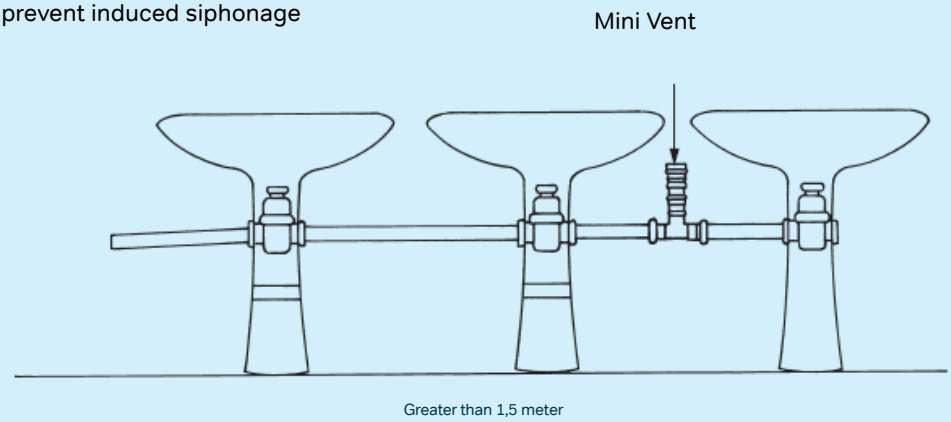


Figure 5: Installation Example (a) and (b)

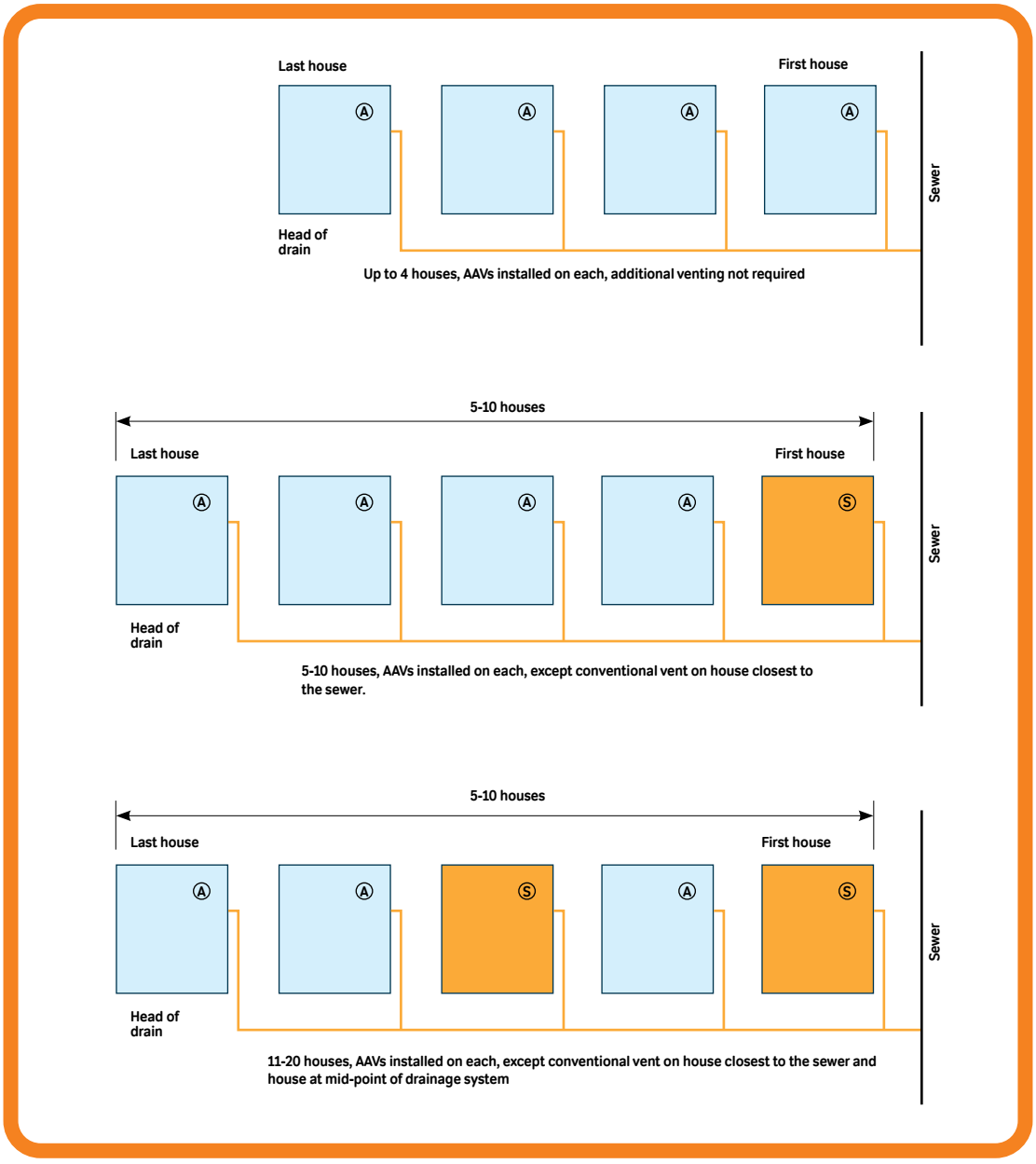
Installation Checklist:

- The AAV must be accessible. It must be removable if necessary.
- There needs to be clearance around the valve for proper airflow.
- The wastewater pipe should be cut properly and after clearing the debris, AAV should be installed vertically and leak-proof.
- If installed in the attic, it should be installed at least 150 mm above the roof insulation.
- Maxi Vent should be placed at least 200 mm above the last branch on the column, and Mini Vent should be placed vertically at least 100 mm above the ventilated pipe. (Figure 4)
- No freeze risk.
- If it is installed on the soil stack, its level should be above the highest wastewater drain.
- According to the EN12056-2 standard; if the wastewater outlets are 4 meters away from the main wastewater column, the air in the system is insufficient and a secondary ventilation system or air admittance valve must be used. (Figure 4)
- In order to prevent water from leaking back from the water siphons, an air admittance valve must be used at a distance of 1.5 meters from the siphon. (Figure 5)
- Air admittance valves do not require periodic maintenance. If damaged, they must be replaced.
- The products are manufactured from traditional drainage system materials. Repeated opening and closing will not adversely affect the sealing or operation of the valves. When applied correctly, the products will not be subject to significant deterioration and will have a lifespan equivalent to the lifespan of the drainage system they are installed in.

Sewer Connection

In a multiple housing situation, if all houses were fitted with an AAV, there is a risk that flows in underground drainage could create excessive back pressures on each connected dwelling. Evidence of this would be 'bubbling' and rising water levels in WCs and other appliance traps. To manage this risk, it is recommended that the house closest to the main sewer.

Number of Housing	Up to three flats in height	Multi story dwellings and non-domestic building
1-4	Additional drain venting not required	Conventional drain venting to be provided if more than one such building, each equipped with the valves, is connected to a common drain which isnot itself vented by means of a ventilation stack or a discharge stack not fitted with a valve
5-10	Conventional ventilation (open-topped or discharge stack) to be provided at the vent stack closest to the main drain sewer	
11-20	Conventional ventilation (open-topped or discharge stack) to be provided at the vent closest to the main drain sewer and at the midpoint of the system	

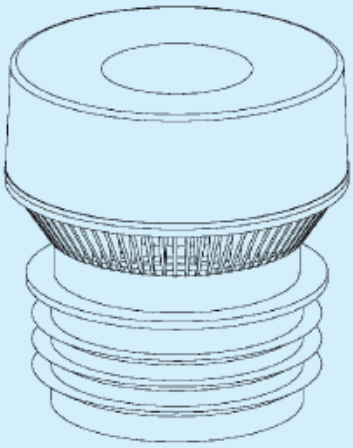


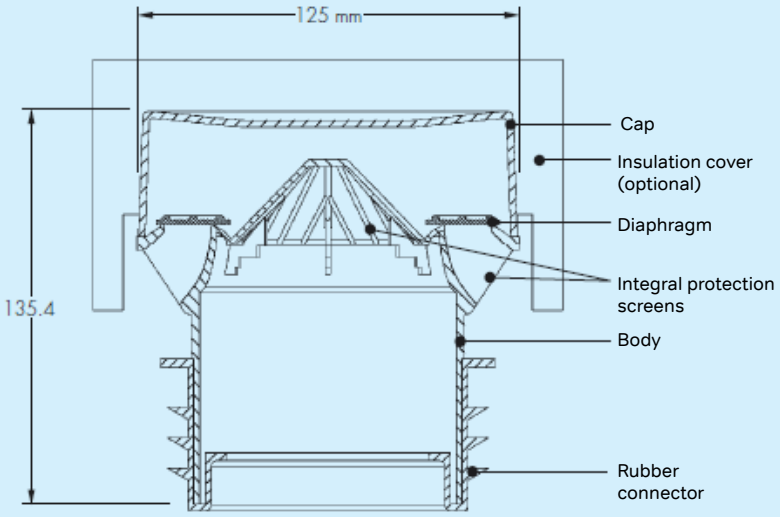
Ⓢ Stack open to atmosphere

Ⓐ Stack with AAV

Product Drawing and Dimensions

Maxi Vent Air Admittance Valve for Ø75-110mm diameters

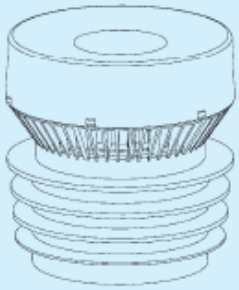


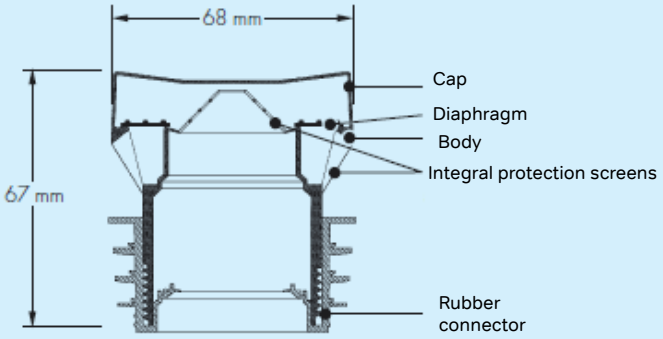


Performance Parameter	
Temperature Range	-20 °C to +60 °C
Opening Pressure	-70Pa
Max. Pressure Rating Tightness	10,000 Pa (1m/40" H2O = Pa or higher

Materials	
Maxi Vent Cap & Body	ABS
Maxi Vent Diaphragm	Synthetic Rubber
Connector	TPE

Maxi Vent Air Admittance Valve for Ø32-63mm diameters





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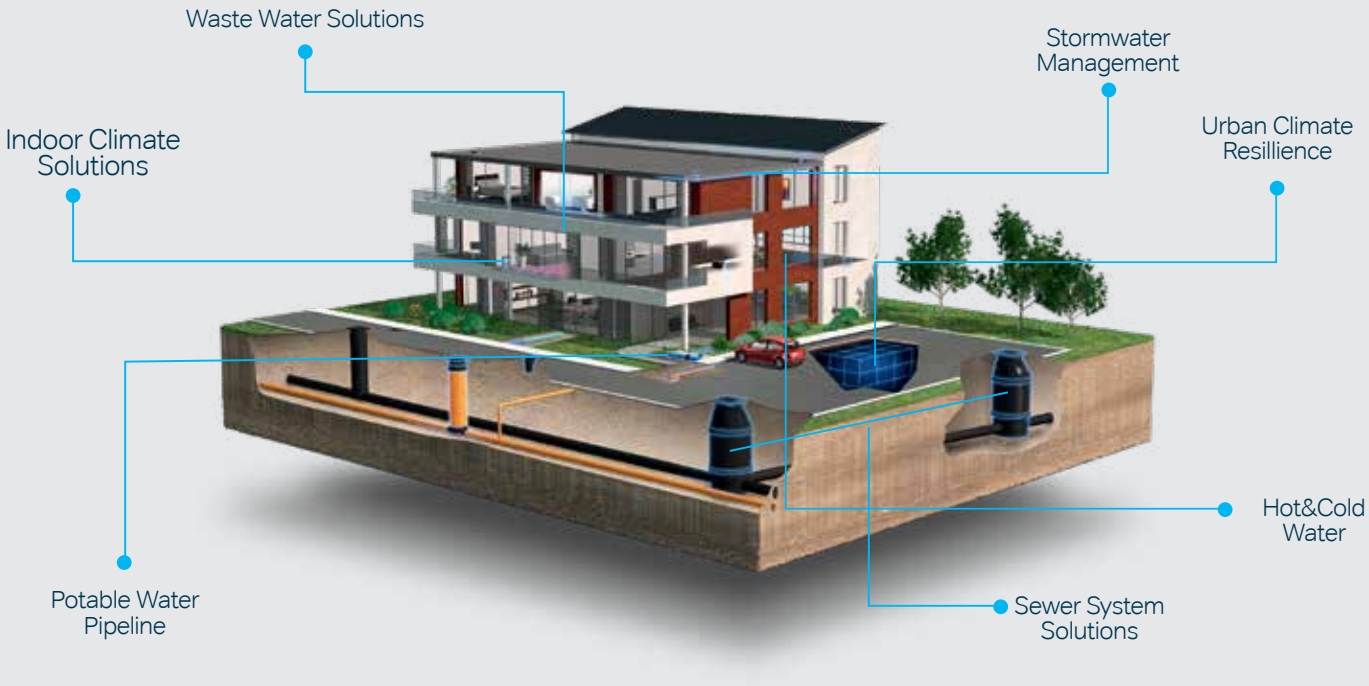

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