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CPD Article

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WC Pan with Integrated Cistern

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Introduction

In the development and creation of innovative bathroom solutions, as well as in addressing the desire for optimum use of space within the bathroom environment, the WC with integrated pan is revolutionary. It incorporates a concealed cistern inside the WC pan, therefore dispensing with the installation of cistern and flush plate into the wall. This simplifies the installation process significantly - reducing time and cost, offers a greater flexibility of positioning, and with a total projection of only 592.5mm, saves space too. It is fully approved by the Water Regulations Advisory Scheme (WRAS certificate number 1307332) and is available in wall-hung and back-to-wall versions.

Key Learning outcomes

- From a design perspective, understand how the WC pan with integrated cistern differs from any other WC;
- Understand the benefits of this type of WC to bathroom design;
- Learn how the technology behind its flush mechanism works;
- Understand the environmental benefits offered by a WC with integrated cistern;
- Learn how this type of WC is installed;
- Understand how the WC performs in case of a water or power cut.

1.0 The Design Aspects

This type of WC has been designed to accommodate the cistern inside the pan itself. Water is stored in a space that would otherwise be hollow, allowing the pan to retain the shape and size of a standard WC, with a projection of 592.5mm and width of 400mm.

The flush plate and flush mechanism are positioned at the interior back of the pan and the flush buttons on the lid can be positioned either on the left or on the right hand side.

Benefits to Bathroom Design:

A WC pan with integrated cistern allows for greater flexibility when planning the bathroom layout. Since cistern and flush plate do not need to be built into a wall, this type of WC can be positioned against partition walls or underneath window frames for instance.

Manoeuvrability in small bathroom spaces can also be enhanced with this product, as no space is wasted boxing out for a concealed cistern.



WC with integrated cistern

2.0 The Flush Mechanism

The flush mechanism inside the WC with integrated cistern utilises an innovative and patented air injection technology, offering a dual-flush system that operates in four steps:

- 1. Choose the desired flush (3L or 4.5L) and press the corresponding button
- 2. An air pump within the pan is activated and emits a flow of air that pushes the water from the internal tank
- 3. The water rises up to provide a flush, expelling the selected volume of water from the internal tank
- 4. The internal tank refills from the mains until reaching its optimum water level.

Despite the air pump being inside the pan, there is no risk of pressure build up since the turbine is an open turbine (not a sealed unit). Furthermore, the air in the cistern, which is within the tank itself, is always at atmospheric pressure due to the apertures in the rim of the pan. Additional pressure is created only when the flush is in operation, at which time it is very low – the maximum pressure being just 0.2 bar.

The combination of the air injection technology and the design of the pan reduces water consumption, allowing this type of WC to flush efficiently with only 3 / 4.5 litres. The optimised flush is electronically controlled to push the exact amount of water required to flush the WC, while the apertures in the rim of the pan have also been designed for optimum flush performance and angled in a way that allows the water to clean the bowl more efficiently at reduced water volumes.

Unlike conventional WCs, there are no seals between the cistern and the pan, since the cistern is integrated in the pan itself. This eliminates the risk of leaks caused by failure of the seals, therefore lowering maintenance demands.



3.0 Installation

Installation of the WC with integrated cistern is simple; the main difference to a conventional WC is that an electrical supply is required to operate the flush. Bathroom projects usually involve some form of electrical work, whether it is lighting or underfloor heating, so the electrics required for this type of WC can easily be done at the same time. A template is provided with the product to allow for the correct positioning of the WC pan (outlet type: horizontal) and its small junction box in relation to the pipes.

The range of inlet pressure is 50 kPa (0.5 bar) ~1000 kPa (10 bar) and it is not recommended to install the In-Tank in places outside of this range.

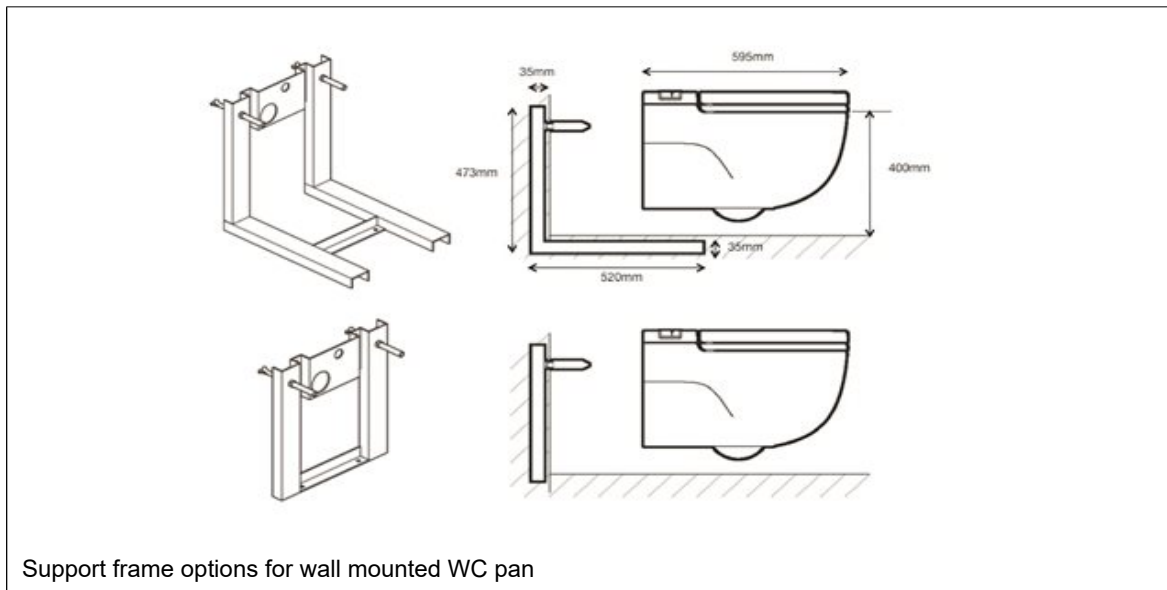
The wall-hung option of this WC requires a support frame to be fitted inside the wall to support the weight of the pan, whereas the back-to-wall option only needs to be bolted to the wall. For the wall-hung pan there are two types of frames available:

- An I-shaped frame is recommended for solid walls, such as brick walls;
- An L-shaped frame is recommended for stud walls.

Conventional concealed cisterns measure approximately 120mm in depth, and if a frame is required, this dimension will go up to at least 140mm. The support frame for the WC with integrated cistern, on the other hand, is only 35mm deep, making it ideal for installation on partition walls or in smaller bathrooms where there is no space to box out for a concealed cistern.

It is necessary to have the product on site before starting to tile the walls and floor, as the frame is included with the product and will need to be embedded into the wall and floor (just wall if I-shaped frame is being used). A complete fixing kit is provided with the product, and comprehensive installation instructions and a pre-installation checklist are also available on request.

Field trials have shown that by comparison to conventional WCs, up to four hours of installation time can be saved when installing the WC with integrated cistern, as the studwork for boxing in a concealed cistern is not required for this product. There is also no need to connect (and subsequently test) a cistern to the pan, as the cistern is incorporated within the pan.



Support frame options for wall mounted WC pan

4.0 What happens if there is a water or power cut?

The cistern inside the pan has a capacity of 10 litres, allowing the toilet to flush three times with 3L or two times with 4.5L if the water supply fails.

Furthermore, the WC is equipped with an additional power supply based on supercapacitors (EDLC), which store energy and, in the event of a power cut, allow the WC to remain operative for a number of flushes:

- On a 3L flush: between 7 and 9 flushes
- On a 4.5L flush: between 4 and 6 flushes

Supercapacitors are everlasting (unlike batteries), so there is no need to replace them during product life.

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