

Technical Bulletin 9

Base of Stack Design Considerations

As the waste water discharge in a drainage stack reaches the base of the stack, it will need to change direction to flow horizontally into either a high-level collector drain or into the below-ground drainage system.

The flow velocity in the horizontal drainage pipework will be controlled by the installed gradient and pipe diameter; this will be appreciably less than the velocity of the vertical drainage stack.

At the base of the drainage stack the waste water discharge undergoes a rapid de-acceleration in velocity, creating an increase in the depth of the flow at the change of direction. This increase in depth is generally sufficient to fill the cross sectional area of the pipe.

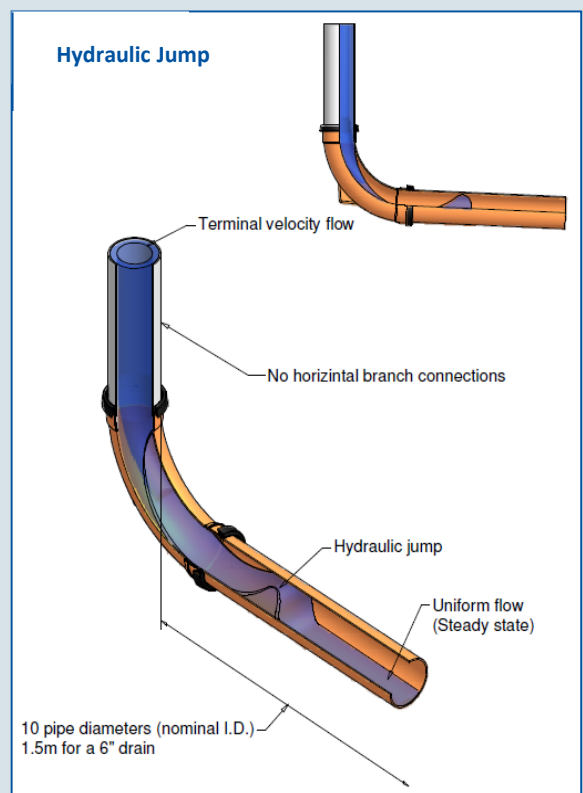
This phenomenon is known as the 'hydraulic jump'. The distance at which the hydraulic jump occurs varies from immediately at the stack change of direction, up to 10 times the diameter of the stack downstream.

This is dependent upon:

- The entrance velocity.
- Depth of water that may already exist within the horizontal drainage pipe.
- Roughness co-efficient of the pipe.
- Pipe diameter.
- Pipe gradient.
- Bend formation at the base of the stack.

The surged flow condition will extend until the frictional resistance of the pipe reduces the velocity to the designed flow condition.

To mitigate the air fluctuation problems associated at the base of the drainage stack, BS EN 12056-2 recommends that the following design details are incorporated.



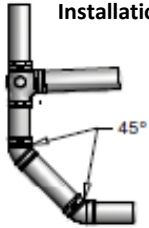
For further assistance please contact our Technical Team on:

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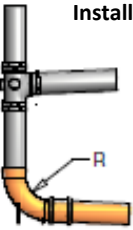
TERRAIN

Base of Stack Requirements

Base of stack Preferred Installation



Base of stack Alternative Installation



R = Min twice internal diameter (IDx2)

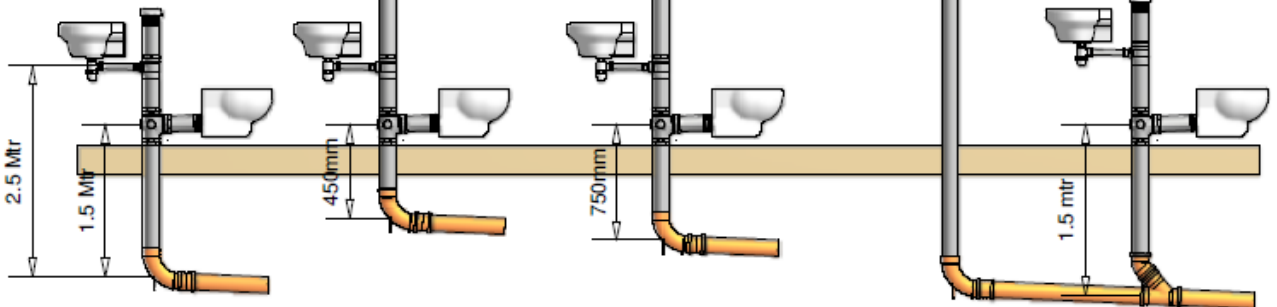
Single dwelling Max 3 Storeys

5 Storey Building

Multi Storey building

For buildings over 20 storeys, it will be necessary to connect more than the ground floor into a separate stack, this will be dependent upon the height of the building.

Stub Stack



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