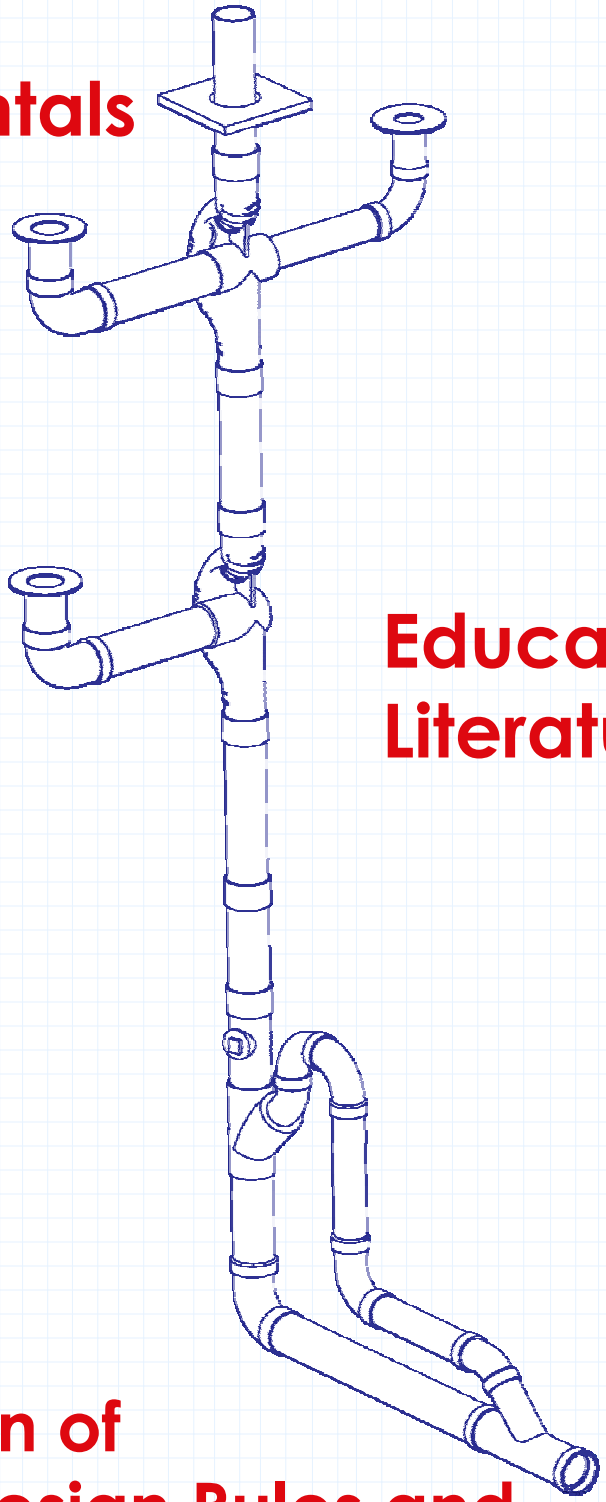
ProVent Systems® Plumbing Fundamentals



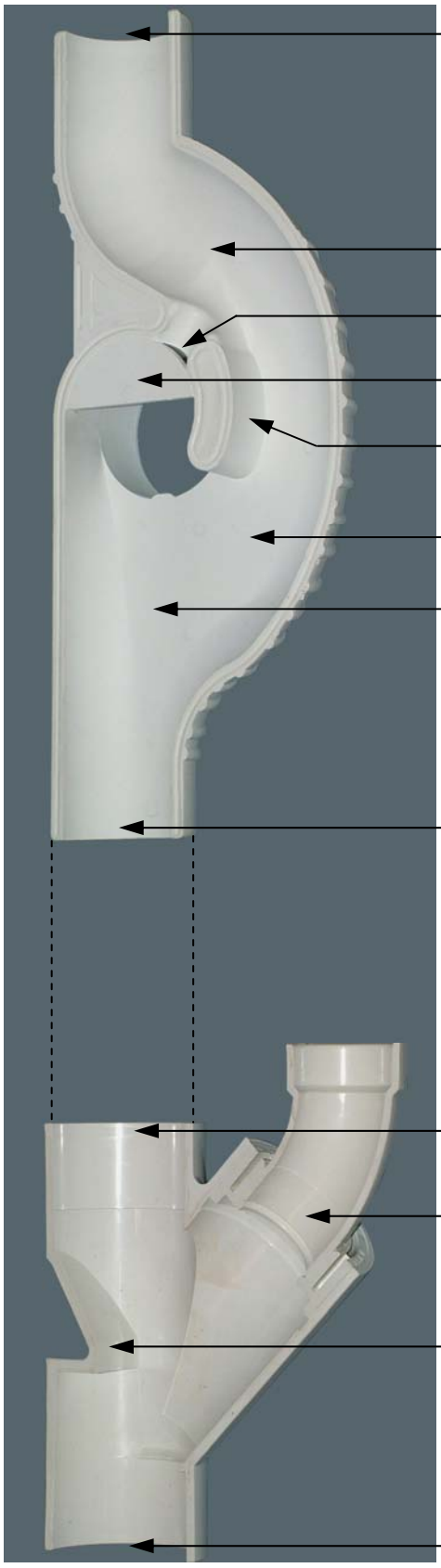
Educational Literature

Comparison of ProVent® Design Rules and The International Plumbing Code

Guide to Contents

Interior View of the ProVent Fittings

Shows How Fittings Control Flow Velocity in the Stack



Stack Inlet

Velocity Offset

Branch Vent

StackVent

Branch Baffle

Separation Shield

Velocity Offset

Collection Chamber

Stack Outlet

Inlet

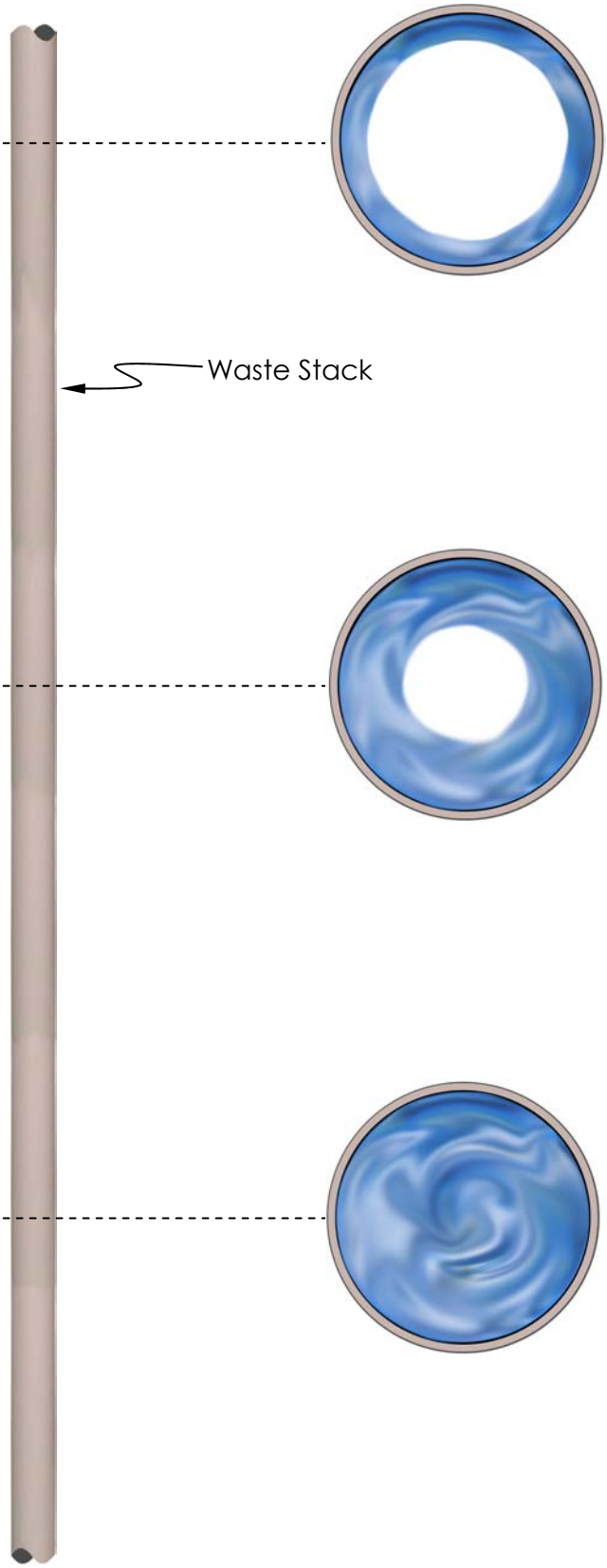
Relief Vent
(Controls Back Pressure)

BaseVent

Nose Baffle
(Controls Velocity)

Outlet

Uncontrolled Flow Velocity in Conventional Waste Stacks

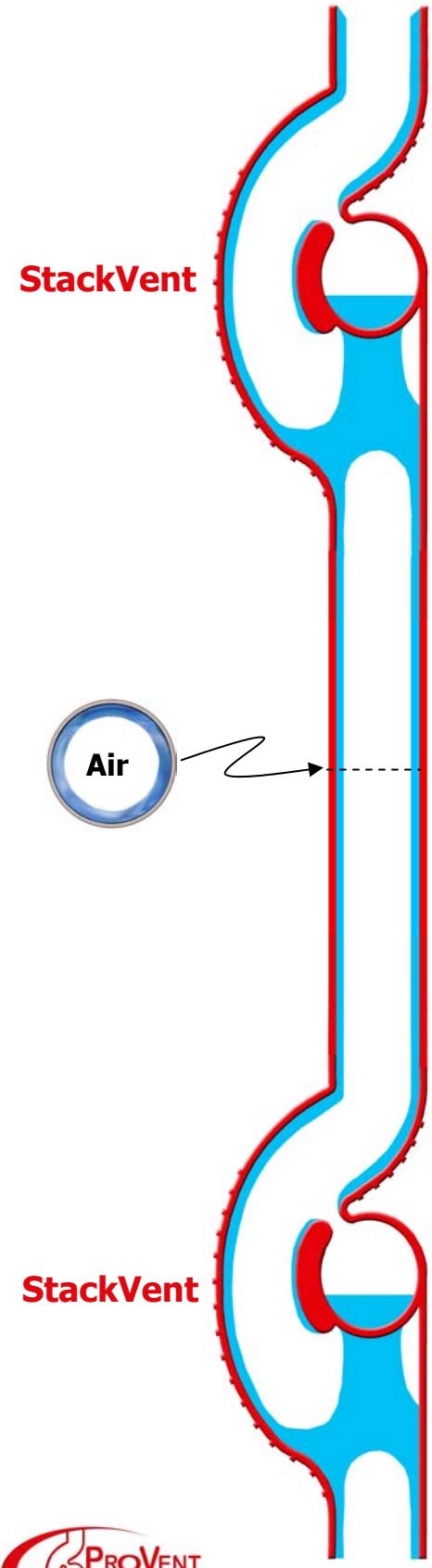


Velocity Close to Inlet
Open Airway in center of pipe permits normal air flow (up to 20' vertical drop).

Velocity Increases With Vertical Drop
The increase in water flow velocity causes the thickness of water flow to build up.

Reaches Terminal Velocity
The air opening in the center of the pipe is completely closed, forming a water plug. This causes siphonage and backpressure unless the branches are separately vented - requiring a separate vent and revent.

Controlled Flow Velocity: ProVent StackVent



The maximum flow of the branch drainage never exceeds quarter-full flow conditions at the inlet.

The StackVent maintains the proper air mix.

The stack length never exceeds 20 feet in length without either a StackVent or a velocity breaker offset (See Drawing 1.4 in ProVent Guide). This rule is subject to compliance with the maximum loading by stack as outlined in Chart 3 of the ProVent Guide (shown below)

CHART 3: MAXIMUM LOADING BY STACK	
Stack Size	**Fixture Units**
3”	64
3” (over 7 stories)	102
4”	504
5”	1,010
6”	2,200

A StackVent is required at every floor when connecting branch piping is 2 1/2” or larger in diameter (See Drawing 1.4 in ProVent Guide)

ProVent PVC StackVent Fitting

A StackVent fitting creates a combination drain and vent for fixtures. The chart below shows the Maximum Loading on the Stack. This is Chart 3 from the ProVent Guide.
This type of system has been successfully used for over fifty years starting with Copper Sovent then Cast Iron Sovent and, now, PVC Plastic ProVent.

The comparison of the two charts, below, shows the dramatic increase in fixture loading for the ProVent System due to the controlled flow velocity.

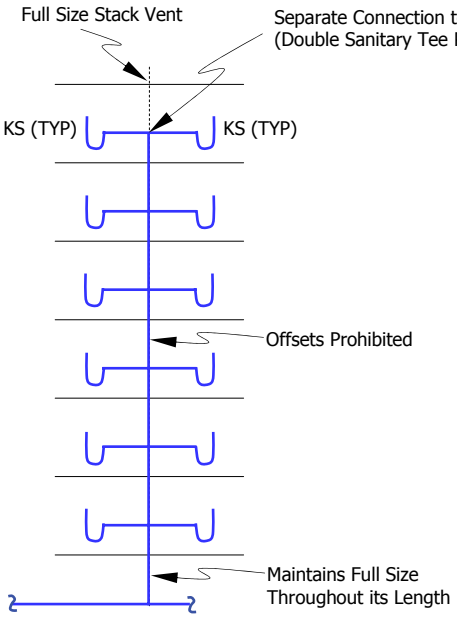
Controlling the flow velocities permits more fixture units to discharge into the combination waste and vent

ProVent Chart

CHART 3: MAXIMUM LOADING BY STACK	
Stack Size	**Fixture Units**
3”	64
3” (over 7 stories)	102
4”	504
5”	1,010
6”	2,200

The IPC “Waste StackVent”

The Waste StackVent is one of the terms used for classifying the stack as a combination drain and vent pipe system. This system has been identified by a variety of names including vertical vent, Philadelphia single stack and multiple floor stack venting and is included in the International Plumbing Code, Section 910.



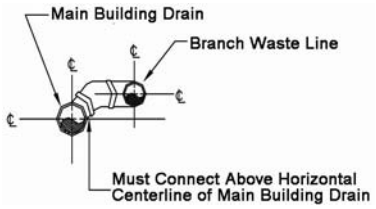
IPC Chart 912.3

SIZE OF COMBINATION DRAIN AND VENT PIPE		
PIPE DIAMETER	**MAXIMUM NUMBER OF DRAINAGE FIXTURE UNITS (dfu)**	
	Connecting to a horizontal branch or stack	**Connecting to a building drain or building subdrain**
2”	3	4
2 1/2”	6	26
3”	12	31
4”	20	50
5”	160	250
6”	360	575

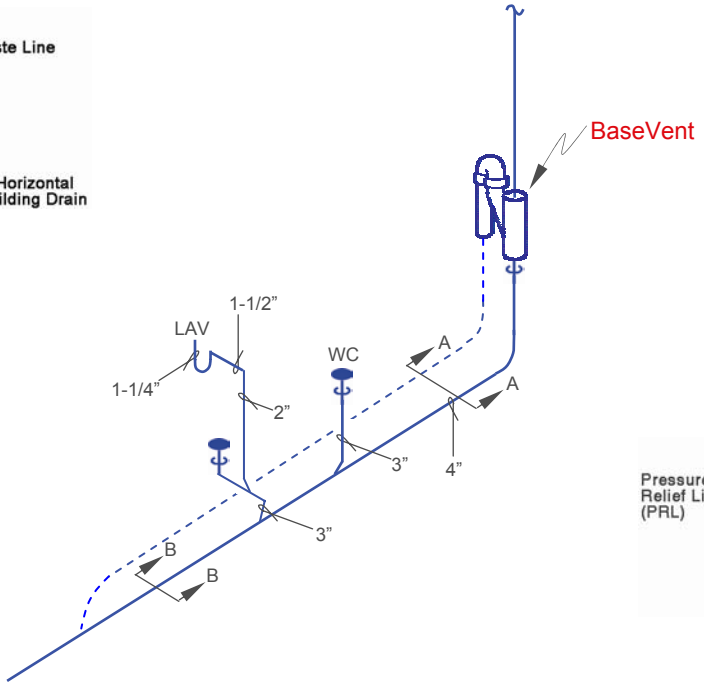
Note the large difference in capacity between the 4” and 6” stacks

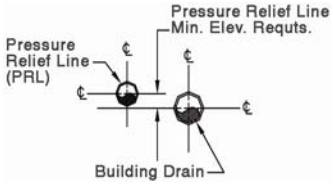
ProVent PVC BaseVent Fitting

Soil and waste branches can be connected into the building drain between the stack and the relief vent when the connections are made above the center line of the building drain. Pressure relief vent must be tied in a minimum of 10 pipe diameters behind the stack.



Detail: "B-B"

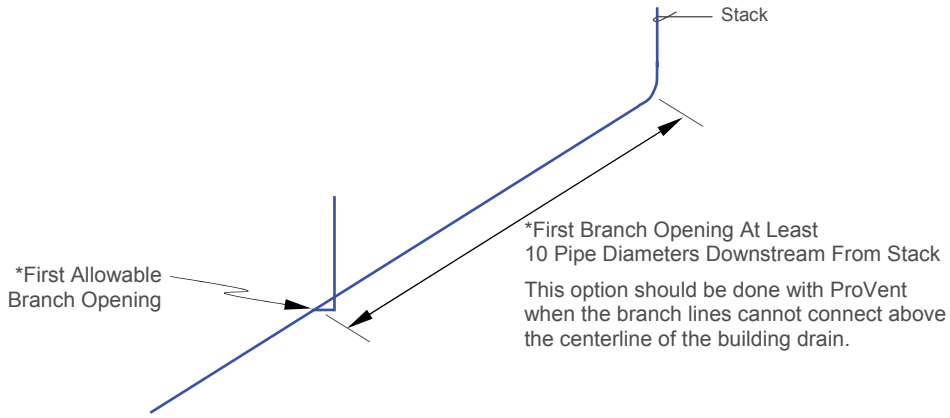




Detail: "A-A"

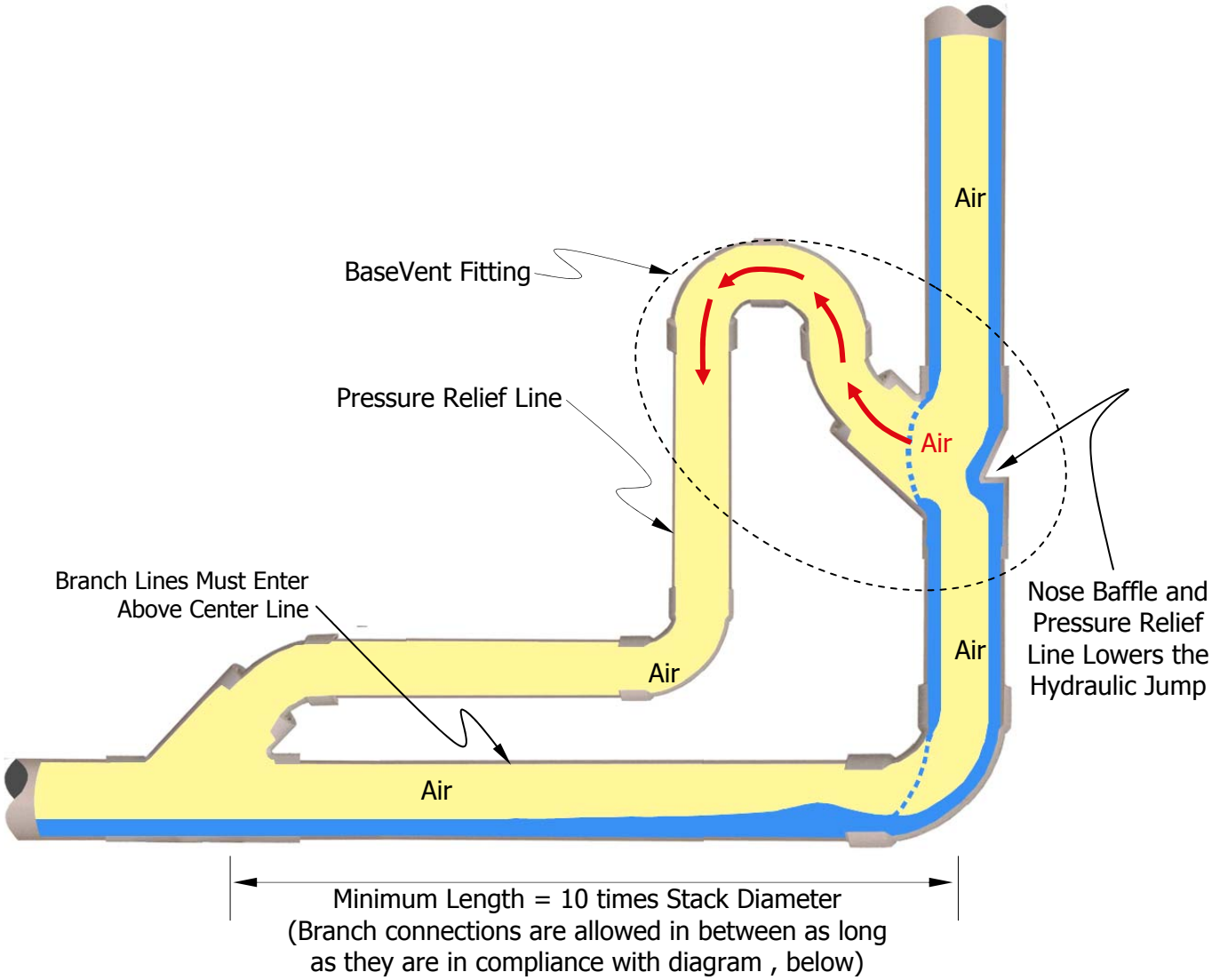
IPC Connections Between the Stack and Fixture Openings

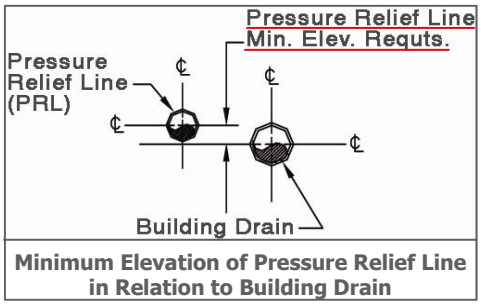
There cannot be any horizontal branch connections within 10 pipe diameters from the stack as is shown in the International Plumbing Code Section 704.3—because of the hydraulic jump. This rule would also apply to the ProVent system if the branches could not be connected above the center line of the building drain as shown in the Detail: "B-B", above.



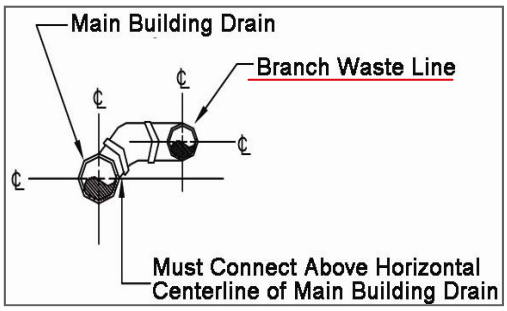
Controlling the Hydraulic Jump

The ProVent BaseVent provides a safe transition from vertical to horizontal flow - equalizing pressures and lowering the hydraulic jump.





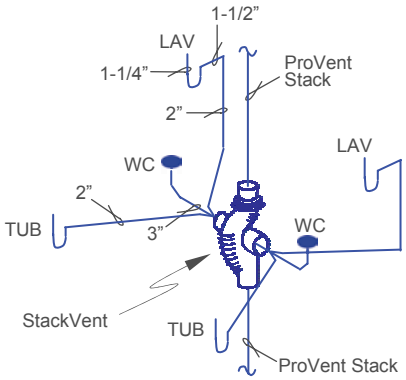
Minimum Elevation of Pressure Relief Line in Relation to Building Drain



ProVent Design Flows in Branch Piping

The design flows are in accordance with ProVent Chart 2 and will not fill the branch piping to more than 25% of capacity. See typical layout below. The ProVent Branch Rules are similar to those allowed in the IPC Plumbing Code (see below)

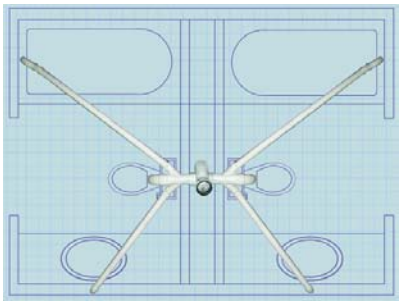
Branch Piping Schematic



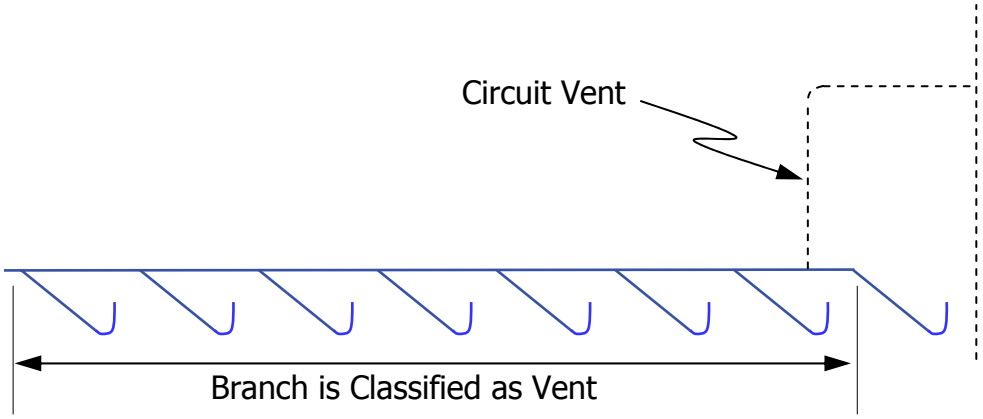
ProVent Double Wye Fitting

The side openings discharge into fitting above the centerline. It fits between the stack and the 12" rough water closet

Back-to-Back Bathrooms



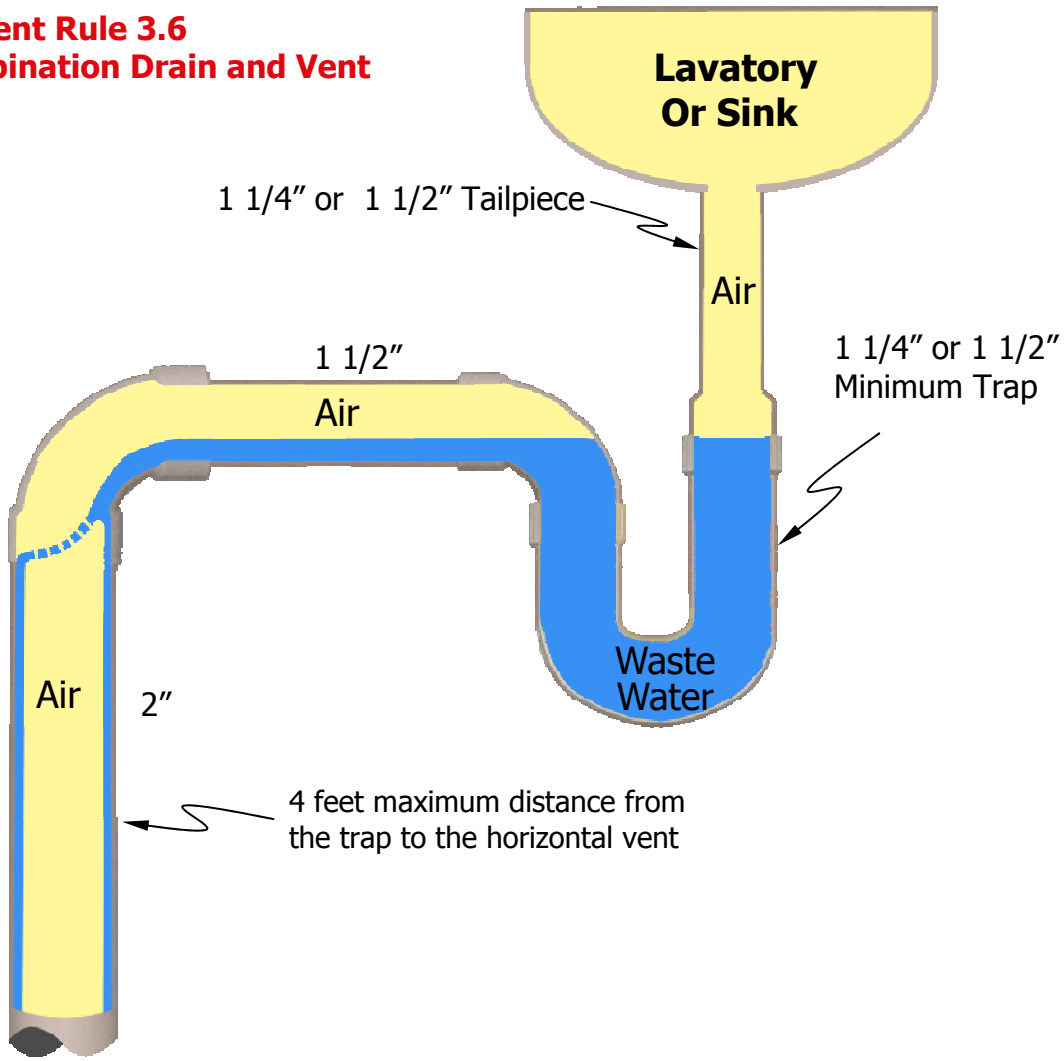
IPC Plumbing Code, Section 911: Circuit Venting



The principle behind circuit venting fixtures with a single vent is that the flow of drainage never exceeds half-full piping. Air for venting 7 (maximum) fixtures circulates in the top half of the pipe. The water flow in the branch is designed to prevent siphonage of any of the fixture branches (same as ProVent) in accordance with Section 911. The IPC actually allows more fixture branches than ProVent.

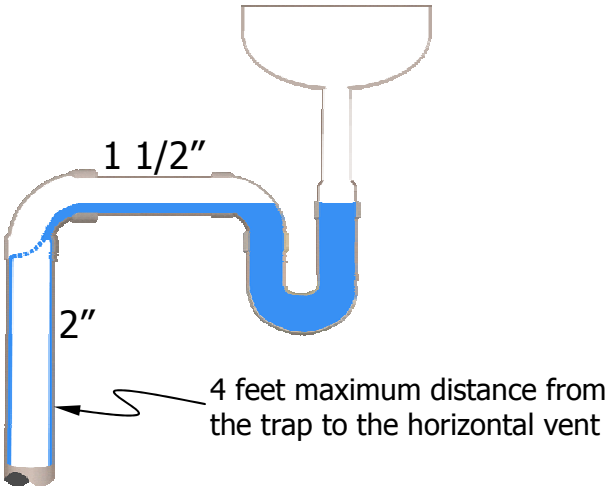
ProVent Lavatory or Sink Connections

ProVent Rule 3.6
Combination Drain and Vent

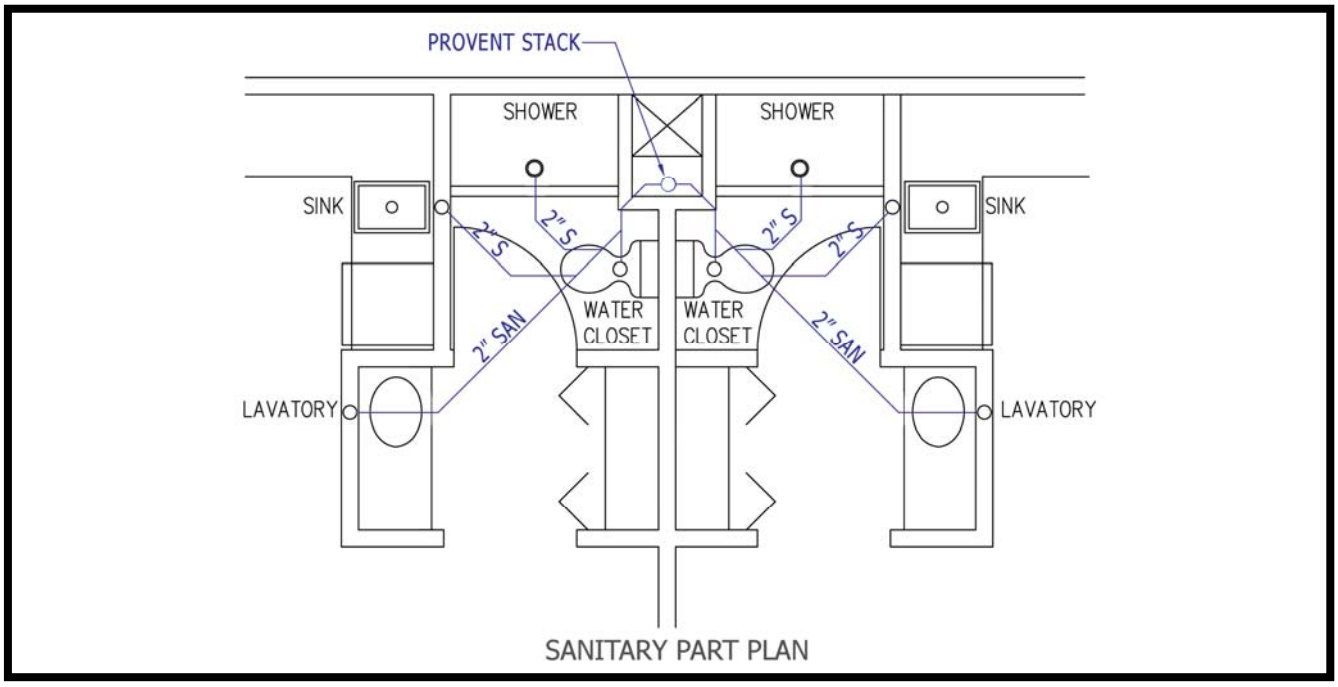


Section 912.2 IPC Code Combination Drain and Vent

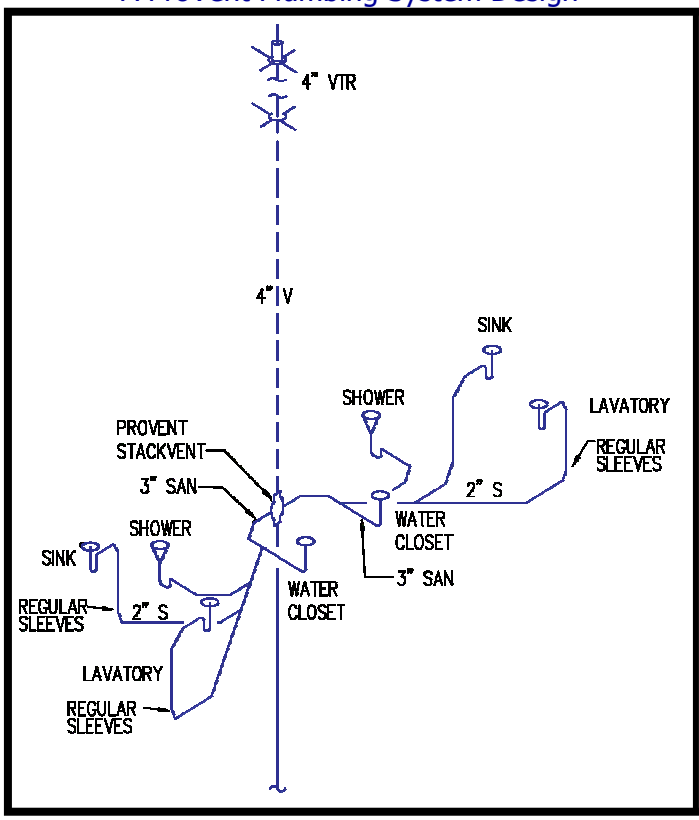
Island Sink drain with 1 1/2" trap and 2" oversized drain, vent and drop is allowed in Section 912.2



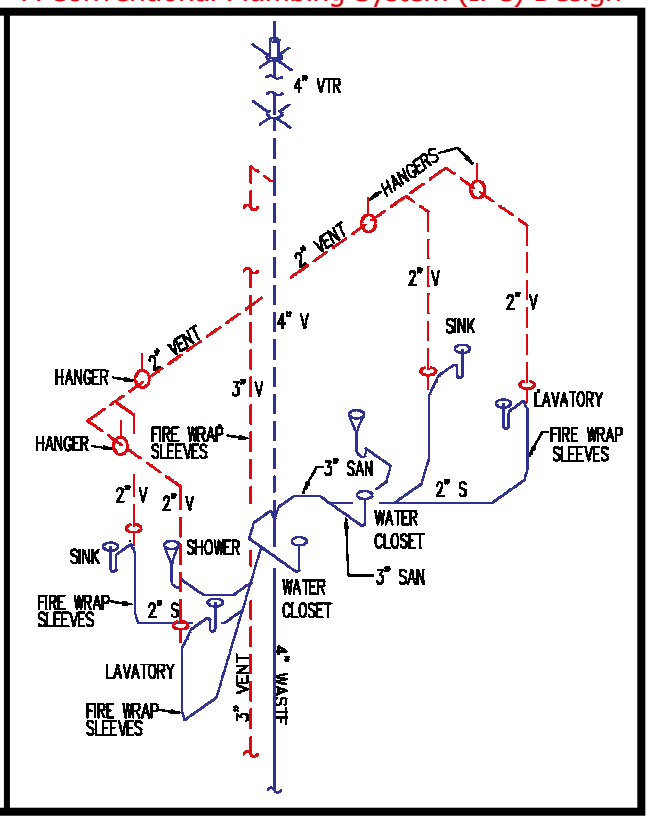
Impact of the Provent System on Design and Cost for Back-to-Back Bathrooms

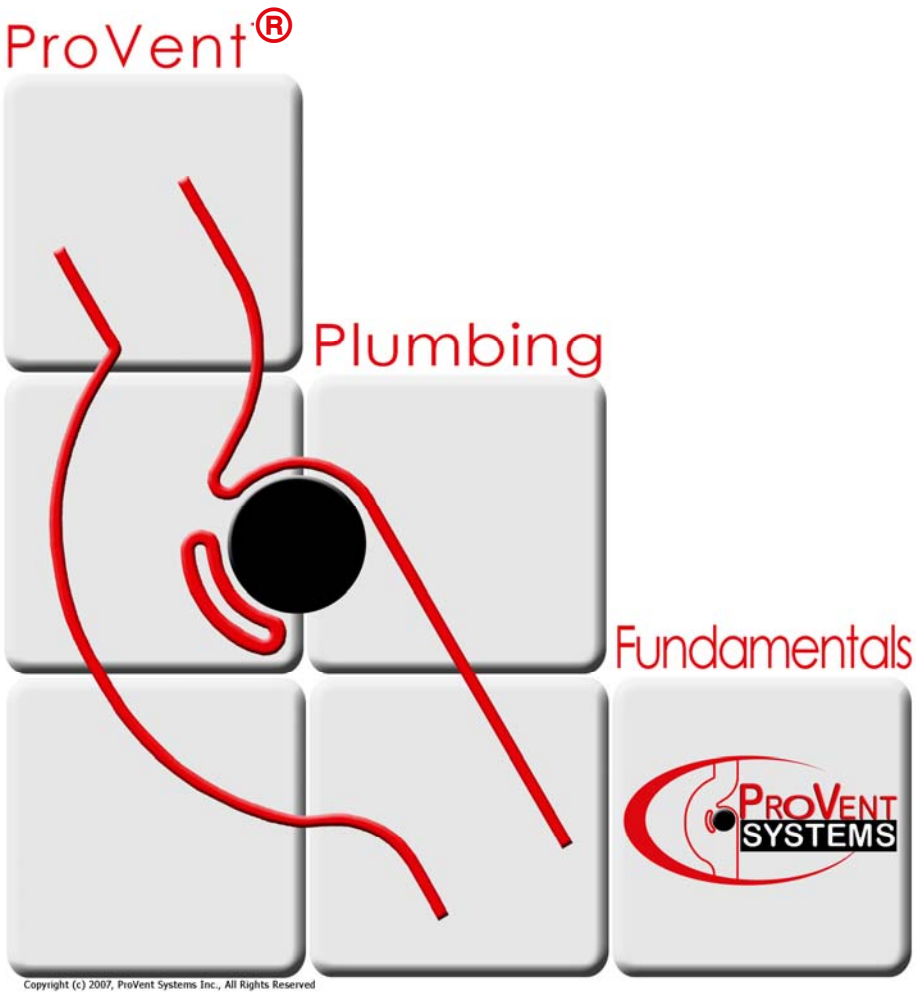


A ProVent Plumbing System Design



A Conventional Plumbing System (IPC) Design





Educational Literature

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