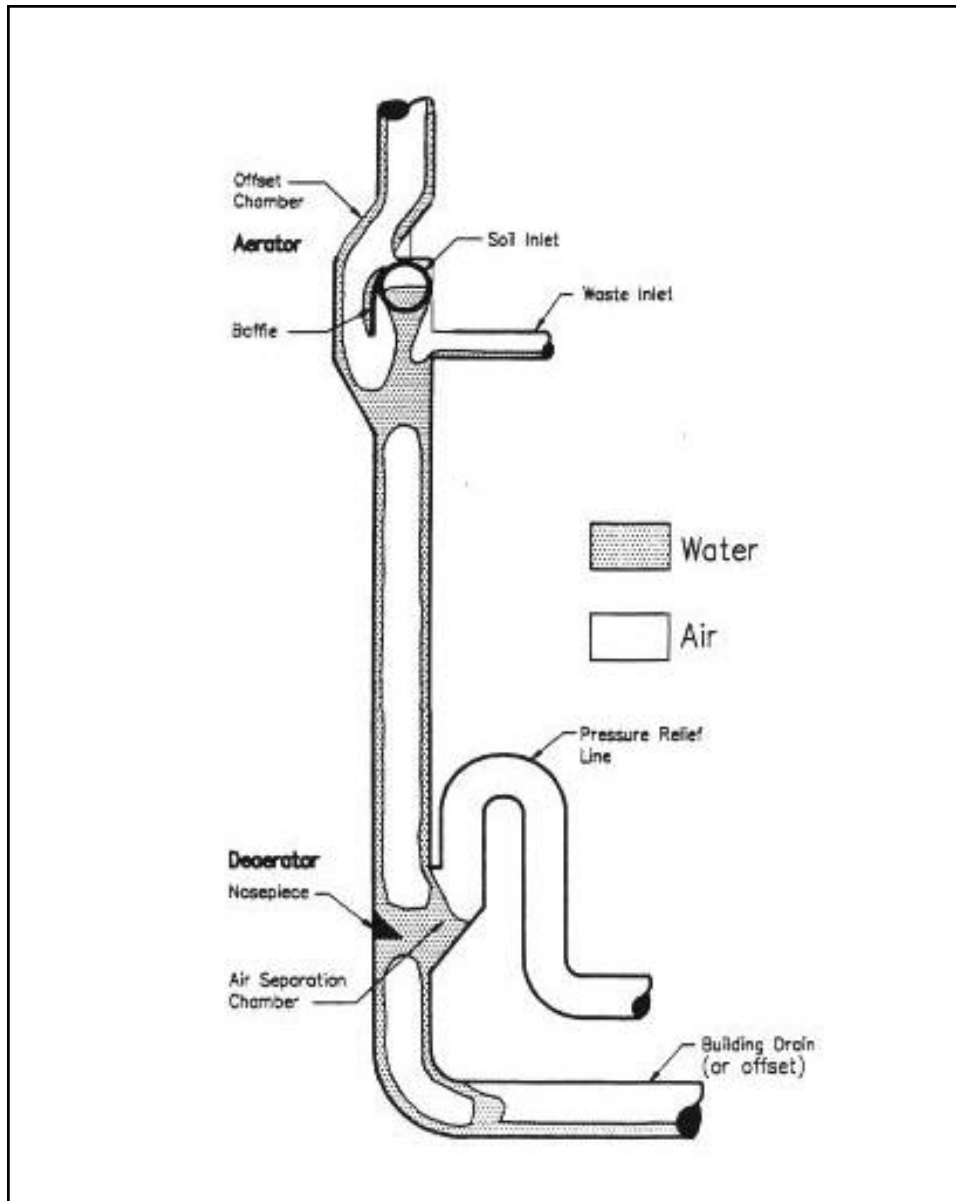


DESIGN MANUAL NO. 101/o

SOVENT

Single Stack DWV System



SESCO

TECHNICAL SUPPORT
Tel 954-785-0508 Fax 954-785-5123

www.sovent.com

TABLE OF CONTENTS

Introduction	—————	1-1
How System Works	—————	1-2
Sovent Design Requirements	—————	1-3
A) Sovent Stack & Aerator	—————	1-3
B) Deaerator & Building Drain	—————	1-4
C) Branches	—————	1-5
Aerator Dimensions	—————	1-6
Deaerator Dimensions	—————	1-7
Fixture Unit Values – Table “A”	—————	1-8
Maximum Stack Loading – Table “B”	—————	1-9
Building Drain Loading – Table “C”	—————	1-9
Branch Loading – Table “D”	—————	1-9
Rules Illustrated	—————	1-10

INTRODUCTION TO CAST IRON SOVENT SYSTEMS

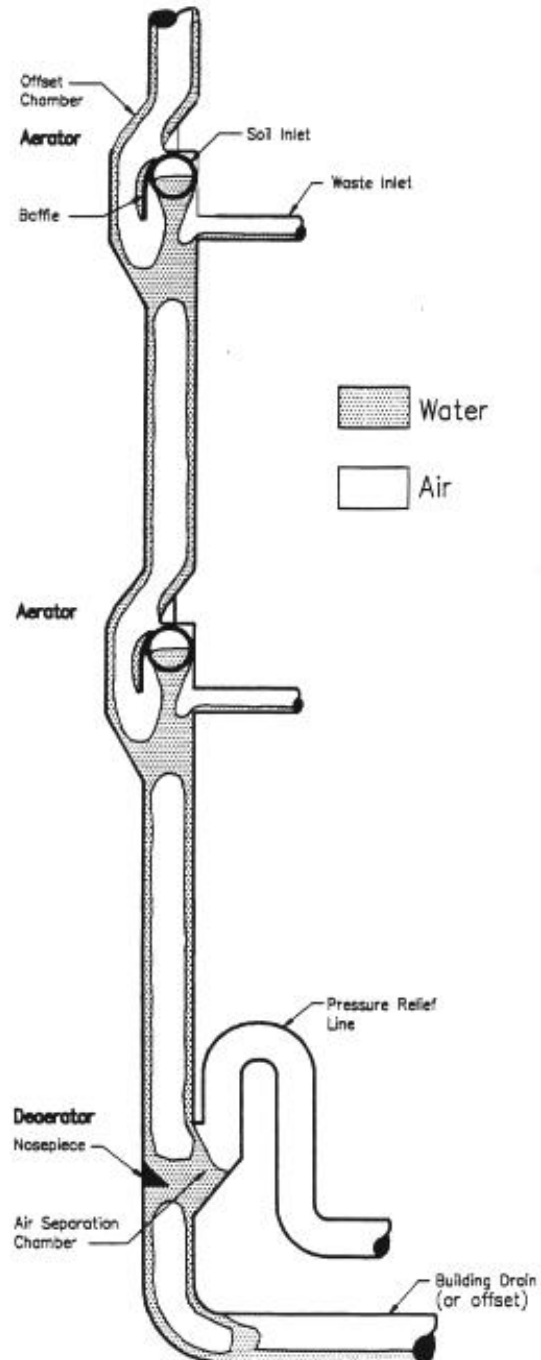
The Sovent System is an engineered single stack drainage system that offers the industry its first major change in many years. It offers a different concept of waste and venting by slowing the velocity of the liquids and solids through a series of aerator fittings and double offsets. Before entering the building drain a deaerator fitting is placed at the base of the stack to minimize solid build up and slow the drainage before entering the building drain. This fitting is designed to have a pressure relief line which is to extend back (10) ten pipe diameters and tied into the building drain. This eliminates any back pressure problems. As in all industries, especially the plumbing industry, something new can be very hard to accept. Sovent on the other hand offers an exciting new approach to the design and installation of sanitary plumbing systems with obvious savings in labor, material and construction.

THE CAST IRON SOVENT SYSTEM: HOW IT PERFORMS

The cast iron Sovent is a specially designed single stack soil and waste system using aerator fittings at each floor where soil and waste branches enter the stack and deaerator fittings at the base of the stack. By incorporating these fittings into a single multi-story stack the volume of the drainage is greatly increased over the standard two stack waste and vent system.

The aerator fitting is designed with an offset chamber that slows the Soil and waste matter at each floor, never allowing it to reach its terminal velocity thus eliminating back pressure.

The deaerator fitting at the base of the stack is designed to eliminate any build up of solids and slows the contents before the change of direction. At the base of the stack the pressure relief line eliminates any pressure build up which might occur. This fitting is designed to assure a smooth drainage flow from the vertical stack into the horizontal drain. The loop in the pressure relief line accommodates "hydraulic jump" that occurs at the base of the stack.



RULES FOR SOVENT STACK AND AERATOR

- A1.** The stack must be sized by fixture unit load using table B.
- A2.** The stack shall continue through the roof full size, or per rule A8. (*dwg. 101-4*)
- A3.** Aerator fittings are required at each floor when horizontal branches enter the stack as follows:
- a.** Soil branch
 - b.** Soil branch same size as stack
 - c.** Waste branch one (1) pipe size smaller than stack.
- A4.** A double in line offset may be used where an aerator is not required. The distance between the aerator and double offset is 20'-0" maximum with no more than two (2) consecutive in line offsets allowed. (*dwg. 101-1*)
- A5.** A waste branch two (2) sizes smaller than the stack may be connected directly to the stack without an aerator fitting by using sanitary fittings. (*dwg. 101-8b*)
- A6.** Stack offsets of more than sixty degrees require a deaerator fitting and pressure relief line. Soil or waste branches can be connected to the horizontal offset between the vertical stack and termination of the pressure relief line. The horizontal pipe more than sixty degrees shall be sized by table "C", and also may require resizing of stack. Refer to table B. (*dwg. 101-2*)
- A7.** The house drain system is sized by combining all vertical stack fixture loads as they connect to system and as per prevailing plumbing code.
- A8.** Stacks may offset above the highest fixture. When the horizontal offset exceeds 20'-0", the diameter of the horizontal offset and the VTR must be increased one pipe size. (*dwg. 101-4*)
- A9.** Stacks may be connected together above highest fixture before extending through the roof. The combined vertical stack must be one (1) pipe size larger than any of the combined stacks. If the distance between two (2) stacks to be connected is greater than twenty feet (20'-0") the horizontal branch must be one (1) pipe size larger than the downstream stack. (*dwg. 101-3*)

THE DEAERATOR AND BUILDING DRAIN

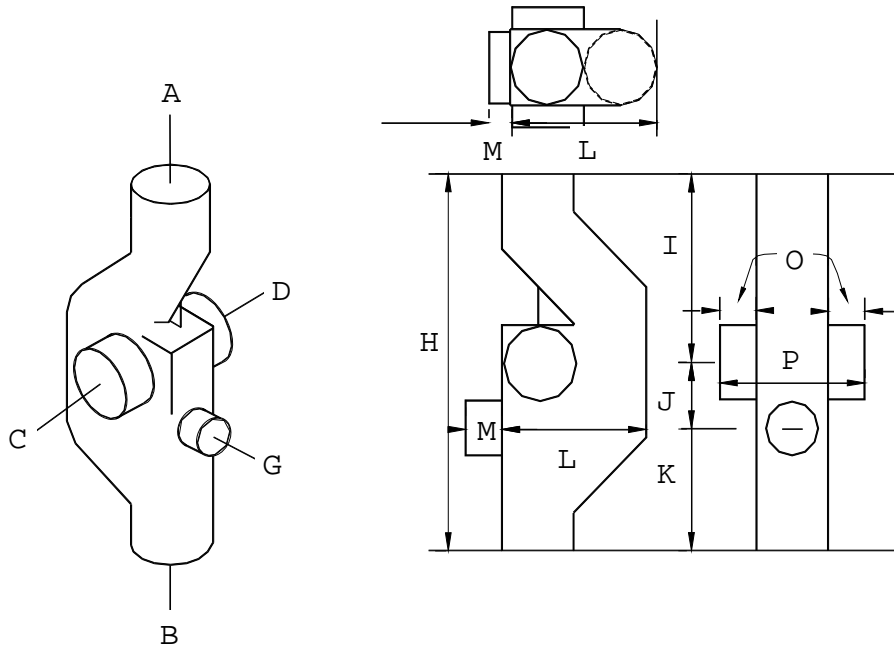
- B1.** The deaerator fitting must be installed at the base of the vertical stack before it enters the horizontal building drain. If the vertical distance to the closest aerator or double in line offset exceeds twenty feet (20'-0") an in line offset must be installed within five feet (5'-0") above the deaerator. (dwg. 101-5)
- B2.** A pressure relief line shall extend from the deaerator and connect to the horizontal building drain at a minimum 10 pipe stack diameters from the center line of the stack to connection point. The pressure relief line may run parallel to the horizontal drain and must be above the center line. The pressure relief line is connected to the building drain above the center line. (dwg. 101-5)
- B3.** Soil and waste connections between the center line of the sovent stack and termination point in the building drain is allowed. Connections must be made above the center line of the building drain, or the connections can be made 10 stack pipe diameters down stream. (dwg. 101-6b)
- B4.**
- Waste branches connected to the pressure relief line shall be one (1) pipe size smaller . No connections should be made in the vertical run of the pressure relief line. Battery type installations and clothes washers should not be connected to the pressure relief line. (dwg. 101-6b)
- B5.** Connections of soil and waste branches may be made down stream of the pressure relief line. Conventional plumbing rules apply. Vents from these lines may tie into the sovent stack. (dwg. 101-7)
- B6.** Soil or waste branches may be connected directly into the vertical stack below the deaerator. The connections shall be made using sanitary fittings. Connections of the stack to the building drain shall be made using combination wye & 1/8 bend or conventional plumbing practices. Check prevailing code.
- B7.** Remote fixtures from the sovent stack where space or other conditions become a problem may be connected by conventional plumbing practice with the waste and vent sized by prevailing code.

RULES FOR BRANCHES

- C1.** Maximum developed length of soil branches. A 3" soil branch shall not exceed twelve feet (12'-0"). A 4" soil branch shall not exceed twenty-seven feet (27'-0"). The vertical drops from trap arms or fixture are not included in the maximum developed lengths. (dwg. 101-8)
- C2.** The maximum developed length of a 2" waste branch from the stack shall not exceed fifteen feet (15'-0"). Waste branches must be two (2) pipe sizes smaller than the stack they are connected to. Vertical drops from trap arms or fixtures not included in developed lengths. (dwg. 101-8 & 101-9)
- C3.** When three (3) ninety degree changes of direction occur in a branch the size must be increased one (1) pipe size at the ninety degree closest to the stack. If on of the ninety degree can be made using two (2) one eighth (1/8) bends (or 45 degree bends) or short sweep then the size increase does not apply.
- C4.** Any connection from horizontal to horizontal shall be made using wyes or combinations.
- C5.** The length of the vertical drop into a horizontal branch is ten feet (10'-0") maximum. If a longer drop is required increase drop one (1) pipe size.
- C6.** Only one and one quarter (1 1/4") traps may be installed back to back on a single (2") vertical drop. The trap arm is always one (1) pipe size larger than the trap. An 1 1/4 x 1 1/2" trap connect may be made at the wall. Sink traps (1 1/2" and larger) must be installed using single vertical drops. Domestic clothes washers on a two inch (2") waste shall not exceed five feet (5'-0") from stack. (dwg. 101-10)
- C7.** An alternative to increasing branch sizes is using a pressure equalizing line. The pressure equalizing line shall be routed vertically and horizontally to the stack above the flood rim on a higher level.
- C8.** When a vertical drop of a branch exceeds forty inches (40"), the vertical and downstream piping shall be increased one pipe size. If the lower portion of the drop is made at 45 degrees and the vertical portion remains less than forty inches (40") in length no increase is required.

SE Cast Iron

AERATOR DIMENSIONS



Designation of openings are determined by placing fitting in an upright vertical position with FLAT FACE toward you.

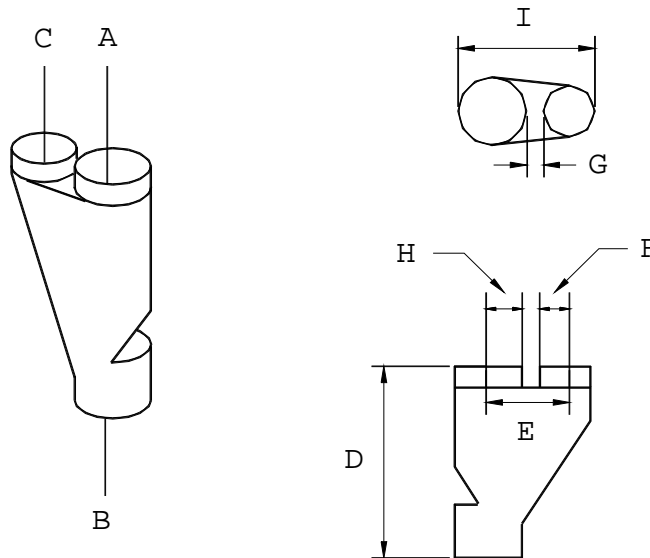
TO ORDER: Designate nominal fitting size and required inlets (by letter).

TITE-RUFF® AERATOR FITTING & SIZES

SIZE	A	B	C	D	G	H	I	J	K	L	M	O	P
3	3	3	3	3	2	19.50	8.25	5.00	6.25	6.75	2.25	2.00	7.25
4X3	4	4	3	3	3	24.75	8.75	8.00	8.00	9.75	3.00	1.80	8.10
4	4	4	4	4	3	24.75	9.25	7.50	8.00	9.75	3.00	2.50	9.50
5	5	5	4	4	3	30.75	13.75	7.00	10.00	12.50	2.25	3.50	12.50
6	6	6	4	4	N/A	33.75	14.00	N/A	N/A	12.50	N/A	N/A	10.75

A thru G are nominal sizes of openings. Actual size can be found by referring to Table E.

SE Cast Iron DEAERATOR DIMENSIONS



SE Deaerator Sizes

SIZE	A	B	C	D	E	F	G	H	I
3"	3"	3"	2"	11.26"	3.41"	1.75"	0.53"	1.63"	6.50"
4"	4"	4"	3"	12.75"	4.63"	1.63"	0.75"	2.25"	8.50"
5"	5"	5"	4"	16.00"	5.63"	2.25"	0.75"	2.63"	10.50"
6"	6"	6"	4"	21.375"	6.755"	2.19"	1.375"	3.19"	12.125"

A thru C are nominal sizes of openings. Actual Sizes can be found by referring to Tolerance Table.

TOLERANCE TABLE

SIZE	I.D.	O.D.	WALL THICKNESS	
			Nominal	Minimum
2"	2.00 +/- .06	2.35 +/- .09	.16	.13
3"	3.00 +/- .06	3.35 +/- .06	.16	.13
4"	4.00 +/- .06	4.38 + .09 - .05	.19	.15
5"	4.94 +/- .06	5.30 + .09 - .05	.19	.15
6"	5.94 +/- .09	6.30 + .09 - .05	.19	.15

National Standard for Cast Irons for Sovent ® Drainage Systems: ASME/ANSI B16.45 45-1998

C.I. Sovent ® Fittings are gray cast iron of chemical composition in accord with ASTM-126

Soil and waste openings on Aerators and Deaerators are in accord with CISPI 301-82 for hubless pipe and fittings.

TABLE "A"

<u>FIXTURE UNIT VALUES</u> FIXTURE TYPE	FIXTURE UNITS	MIN TRAP SIZE
BATHTUB (With or without overhead shower)	2	1 1/2
BIDET	2	1 1/4
CLOTHES WASHER STAND PIPE AND DRAIN	3	2
DRINKING FOUNTAIN	1	1 1/4
FLOOR DRAIN - 2" TRAP	2	2
KITCHEN SINK - DOMESTIC	2	1 1/2
KITCHEN SINK - DOMESTIC WITH DISPOSAL	2	1 1/2
LAVATORY	1	1 1/4
LAVATORY - BARBER , BEAUTY PARLOR	2	1 1/2
LAVATORY SURGEON'S	2	1 1/2
LAUNDRY TRAY - ONE OR TWO COMPARTMENT	2	1 1/2
SHOWER STALL - DOMESTIC	2	2
SHOWER - GROUP PER HEAD	2	2
SINKS		
SURGEONS	2	1 1/2
FLUSHING RIM WITH VALVE	6	3
SERVICE (P-TRAP)	2	2
SERVICE STANDARD TRAP	3	3
POT, SCULLERY, ETC.	2	1 1/2
URINAL - PEDESTAL	4	FOOTNOTE A
URINAL - WALL, SYPHONE JET, BLOWOUT, WATERLESS	2	FOOTNOTE A
URINAL - STALL, WASHOUT	2	FOOTNOTE A
WATER CLOSET FLUSH VALVE / PRESSURIZED TANK	6	FOOTNOTE B
WATER CLOSET TANK OPERATED / GRAVITY FED	3	FOOTNOTE B

A. Trap size shall be consistent with the fixture outlet size

B. Water closet branch piping shall be sized per manufacturers specifications (minimum 3")

1 - A shower head over a bathtub does not increase the fixture value

2 - Size of floor drain shall be determined by the area of surface to be drained

TABLE "B"

MAXIMUM STACK LOADING

STACK SIZE	MAX FIX UNITS
3"	64
3" (over 7 stories)	102
4"	504
5"	1010
6"	2200
8"	3900

IT IS RECOMMENDED TO ISOLATE CLOTHES WASHERS FROM OTHER FIXTURES, IF COMBINED, CALL FOR TECHNICAL SUPPORT.

TABLE "C"

BUILDING DRAIN LOADING

DRAIN SIZE	SLOPE	
	1/4"/Ft. (2%) F.U.	1/8"/Ft. (1%) F.U.
3"	42	36
4"	216	180
5"	350	280
6"	850	680
8"	2700	2160
10"	3900	3120
12"	5800	4640

THIS TABLE ALSO APPLIES TO SOLVENT STACK BASE DRAINS AND HORIZONTAL OFFSETS AT OTHER LEVELS IN THE PLUMBING SYSTEM.

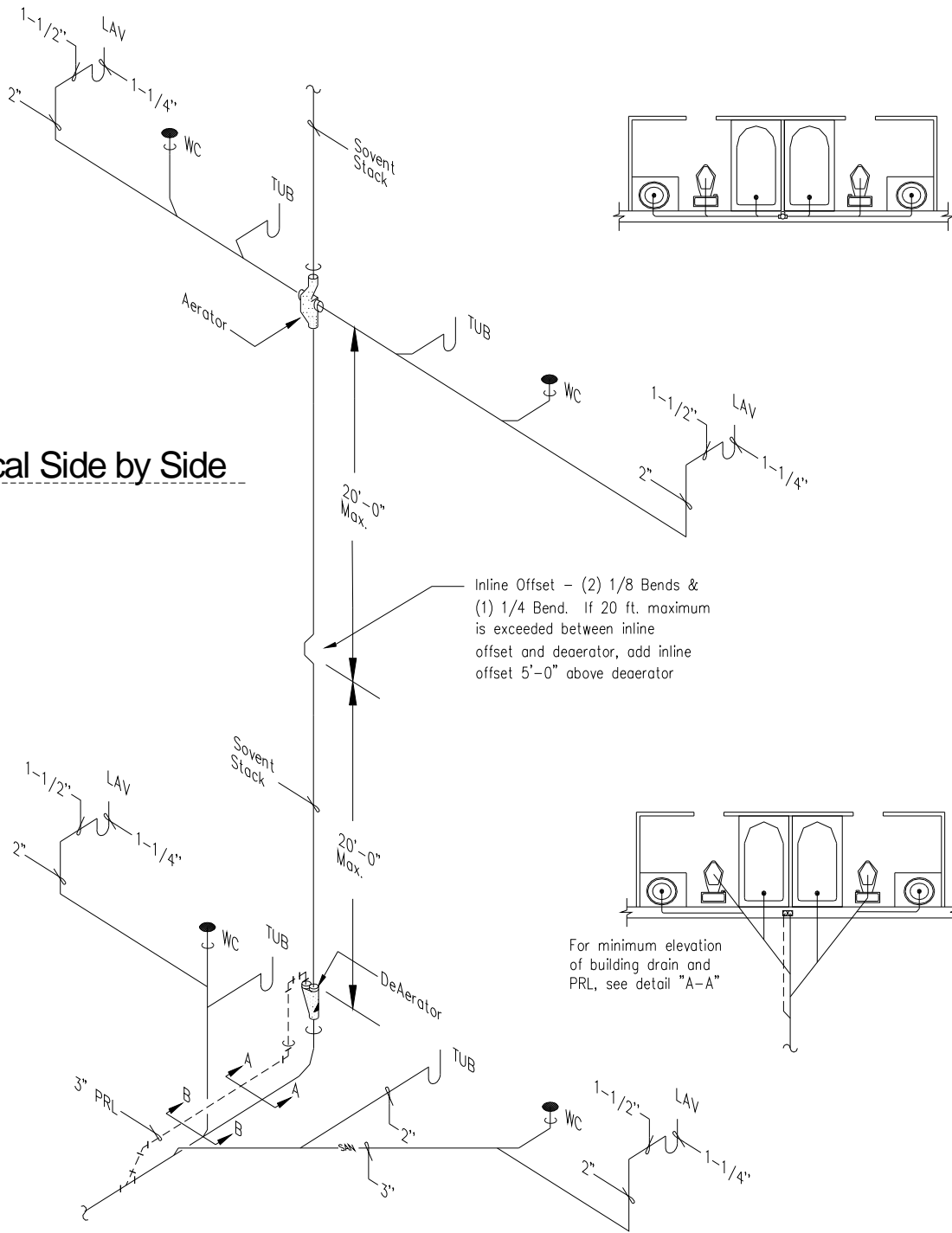
TABLE "D"

BRANCH LOADING

DRAIN SIZE	SLOPE	
	1/4"/Ft. (2%) F.U.	1/8"/Ft. (1%) F.U.
2"	6	5
3"	16	13
4"	90	72

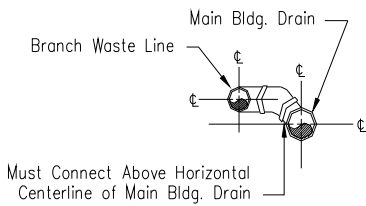
TWO (2) WATER CLOSETS MAY BE CONNECTED TO A COMMON 3 INCH SOIL BRANCH, WHEN ONE OR MORE ADDITIONAL FIXTURE BRANCHES ARE ADDED, INCREASE DOWNSTREAM PIPING ONE PIPE SIZE.

Typical Side by Side

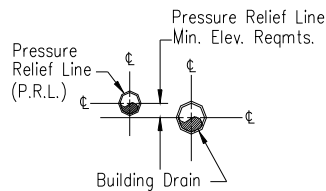


Inline Offset - (2) 1/8 Bends & (1) 1/4 Bend. If 20 ft. maximum is exceeded between inline offset and deaerator, add inline offset 5'-0" above deaerator

For minimum elevation of building drain and PRL, see detail "A-A"



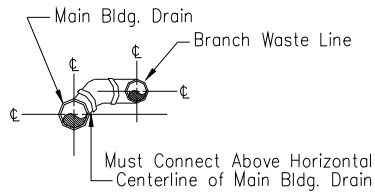
Detail "B-B"



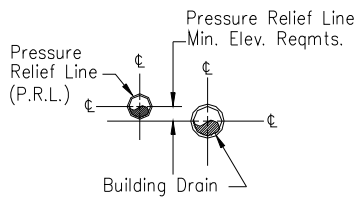
Detail "A-A"

Typical Side by Side Base of Stack

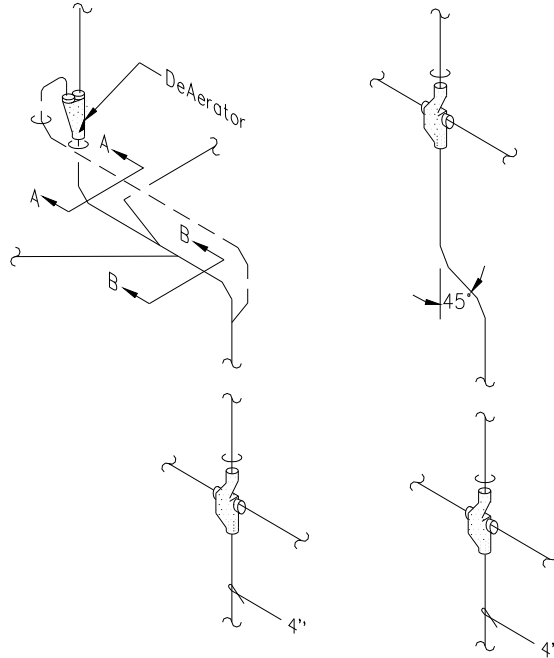
Drawing No. 101-1



Detail "B-B"

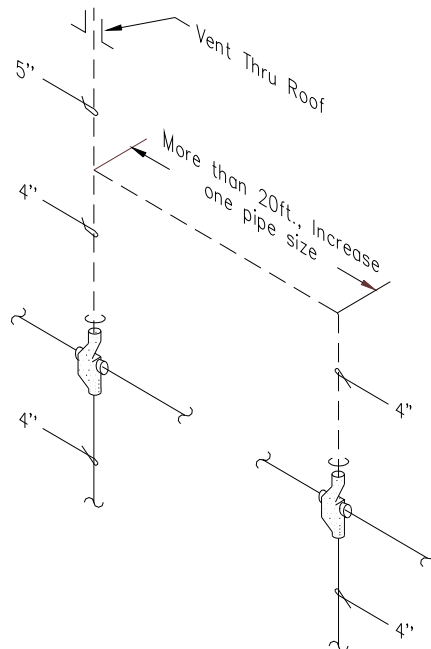


Detail "A-A"



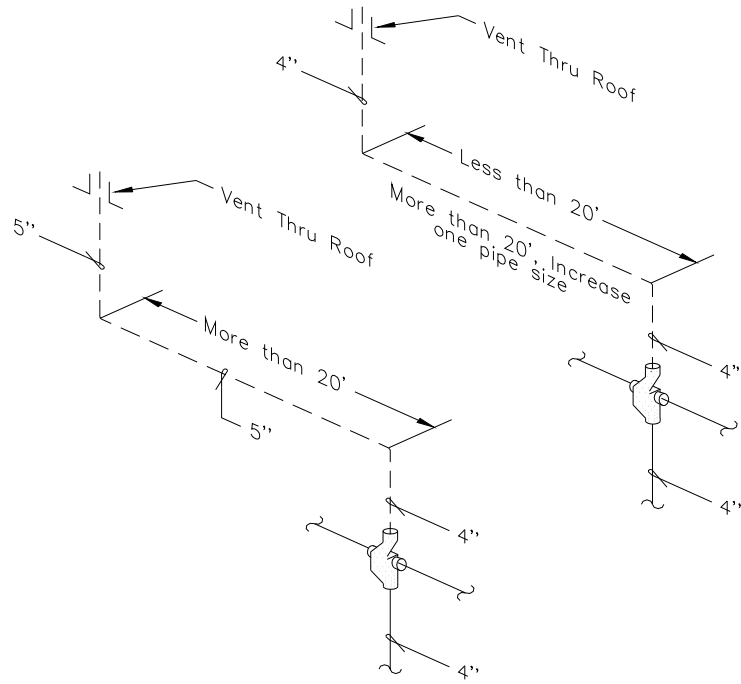
Sovent Stack Offsetting

Drawing No. 101-2



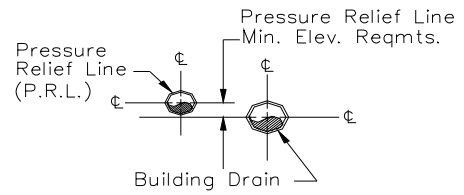
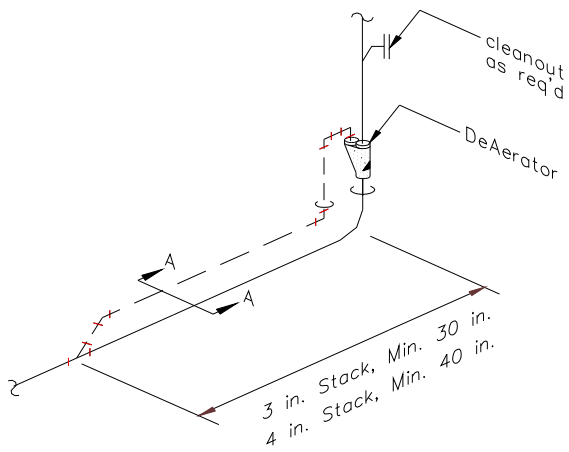
Combining Sovent Stacks

Drawing No. 101-3



Stack offsets Above Highest Fixture

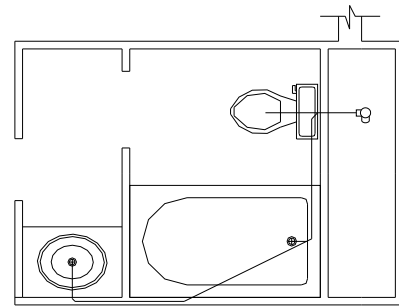
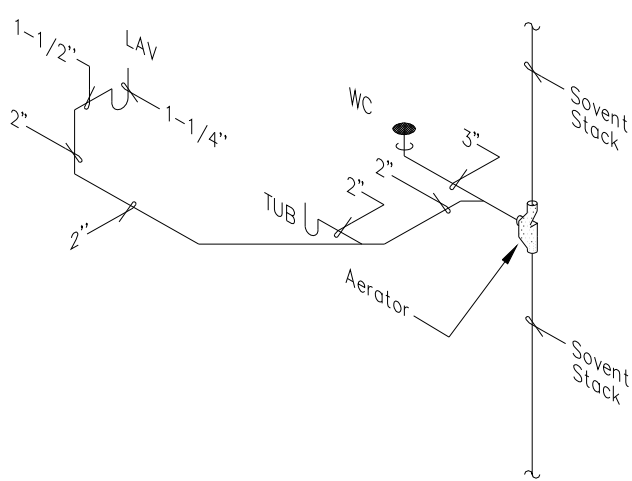
Drawing 101-4



Detail "A-A"

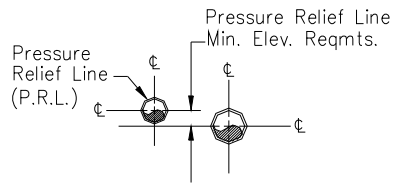
Horizontal length of Pressure Relief Line

Drawing 101-5

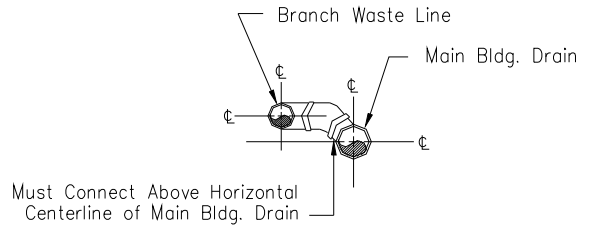


Typical Single Unit

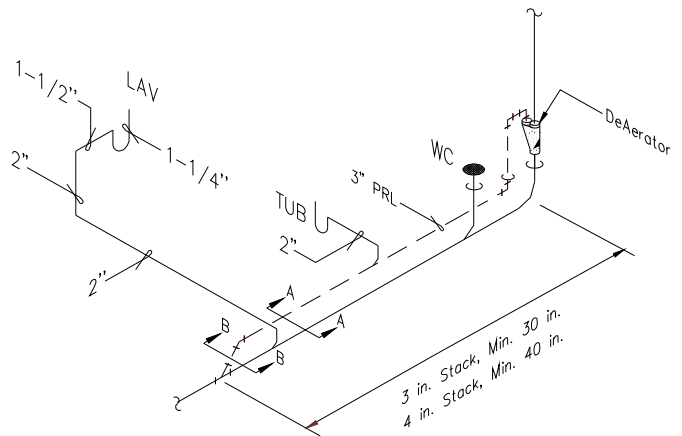
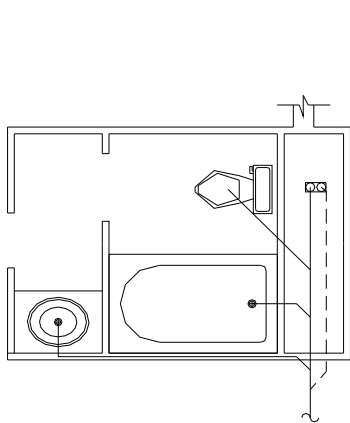
Drawing No. 101-6



Detail "A-A"

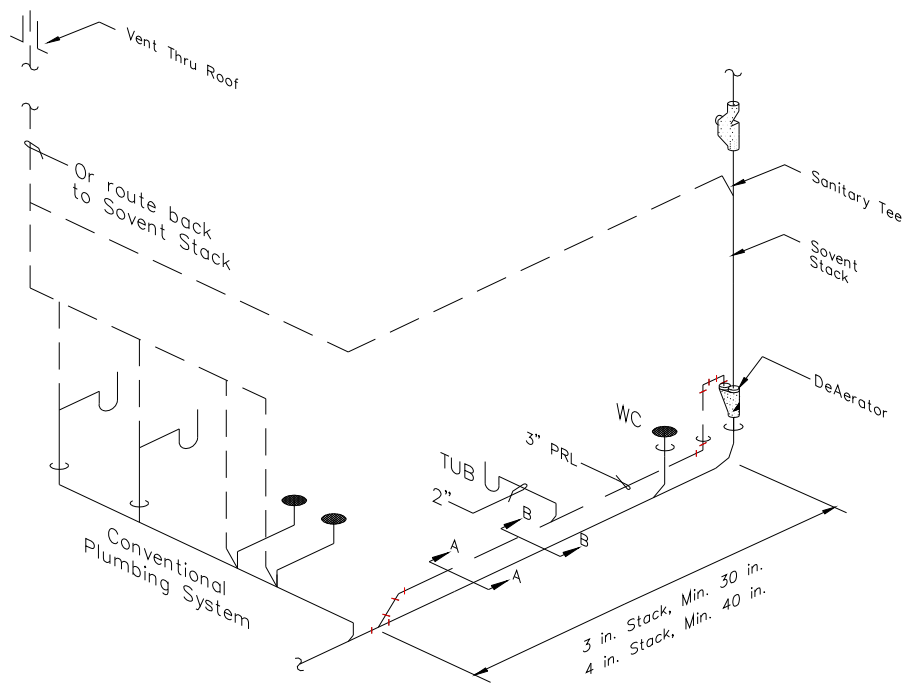


Detail "B-B"



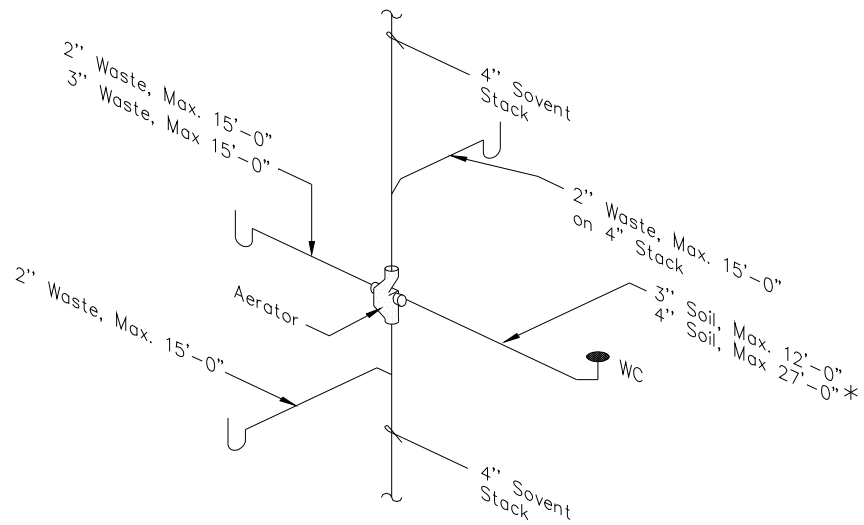
Typical Base of Stack-Single

Drawing No. 101-6



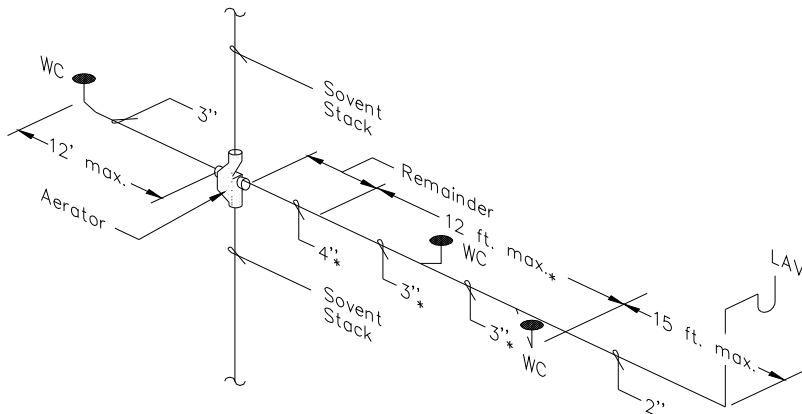
Conventional Vent / Sovent

Drawing No. 101-7



Sovent Waste Branches

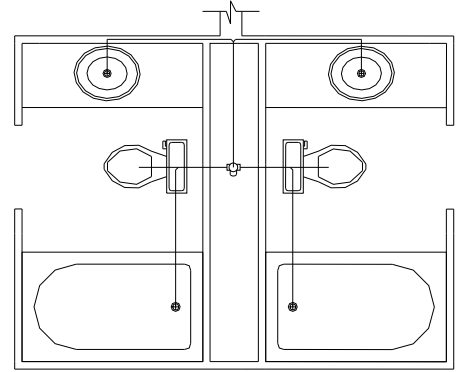
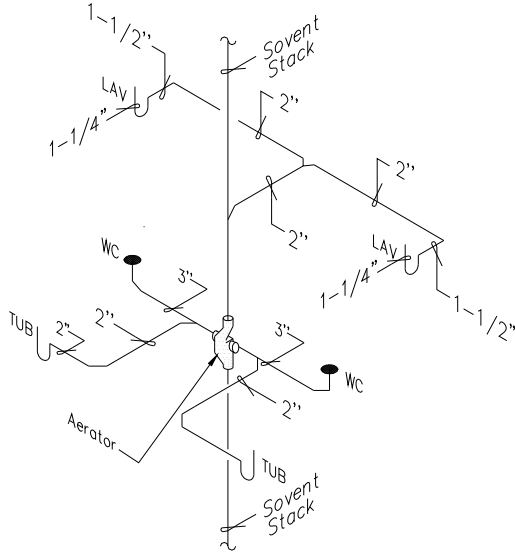
Drawing No. 101-8



Fixture Distances From Sovent Stack

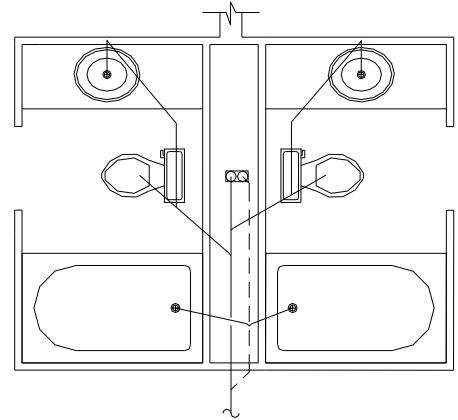
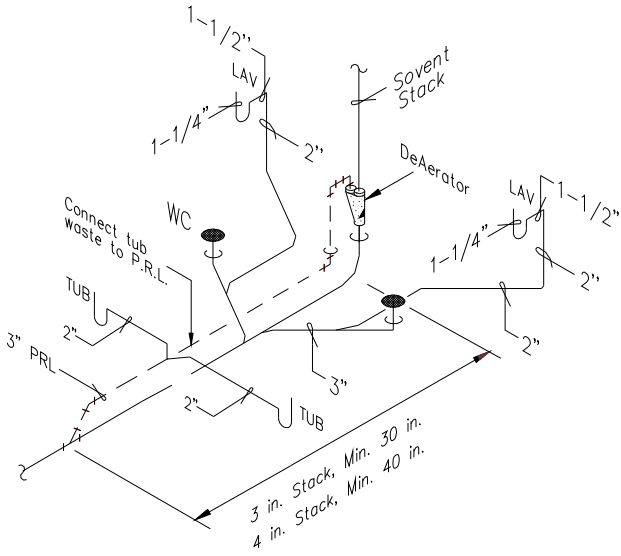
Drawing No. 101-8

* Note: Sovent criteria allows 27 ft. max. distance on 4 in. soil branch, it is recommended to maximize use of 3 in. pipe for 1.6 GPF toilet systems.



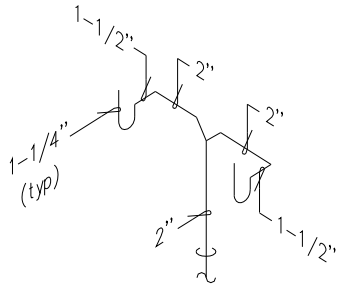
Typical Back To Back

Drawing No. 101- 9

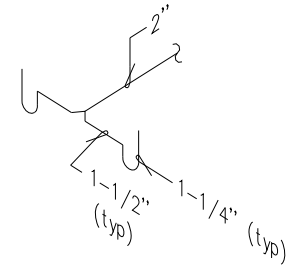
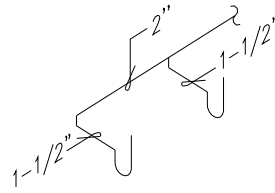


Typical Back To Back Base of Stack

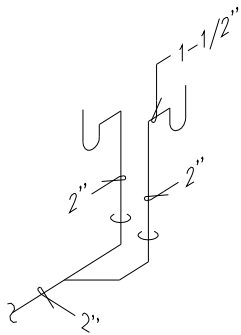
Drawing No. 101- 9



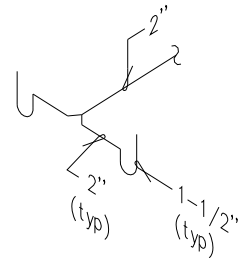
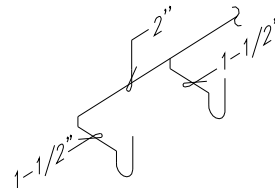
Lavatories – Vertical Branch



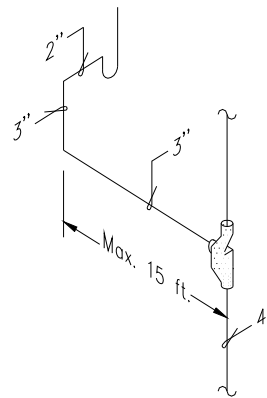
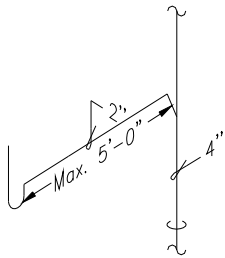
Lavatories – Horizontal Branch



Sinks – Vertical Branch



Sinks – Horizontal Branch



Washer Machine Branches

Sovent Fixtures Branches

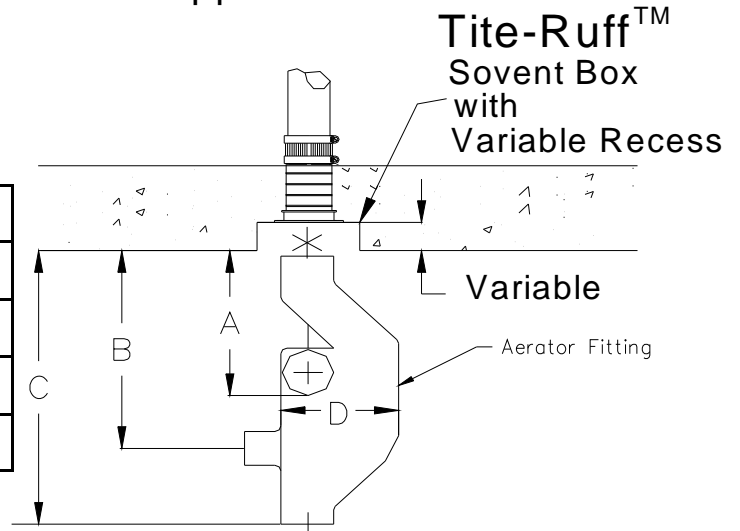
Drawing No. 101-10

SE C.I. Aerator Rough-in Dimensions

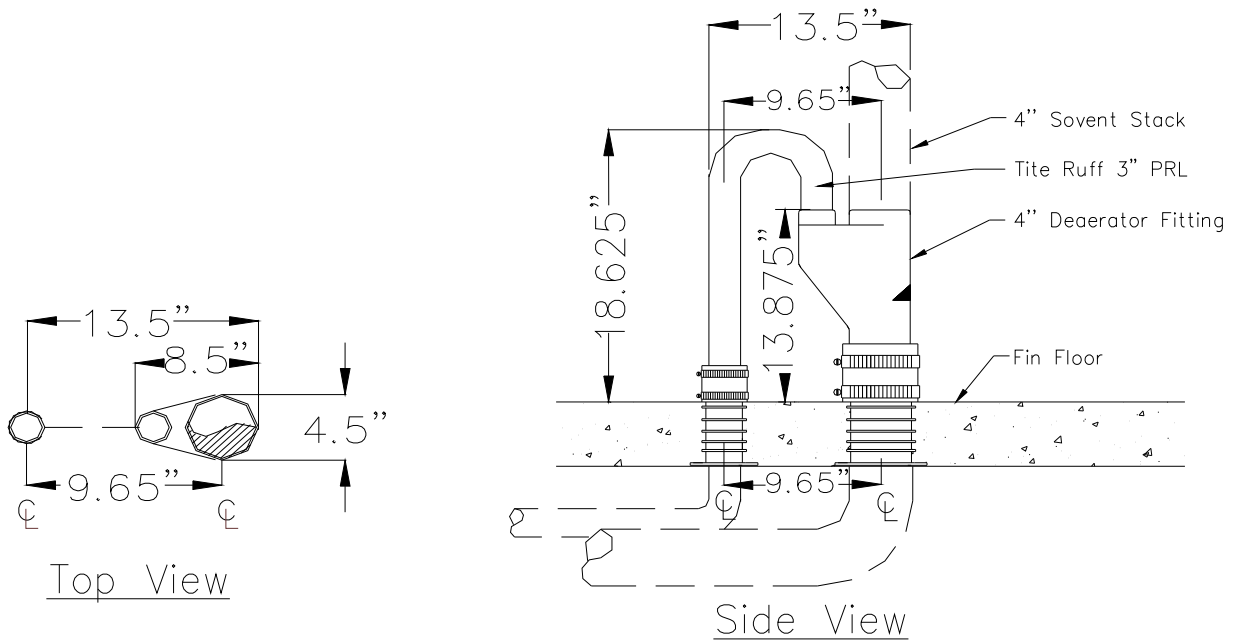
* Consult Factory For Penetration Applications

SE Aerator Sizes

	3"	4" x 3"	4"	5"	6"
A	10.00"	10.50"	11.50"	16.00"	16.25"
B	13.25"	16.75"	16.75"	20.75"	N/A
C	19.50"	24.75"	24.75"	30.75"	33.75"
D	6.75"	9.75"	9.75"	12.50"	12.50"



Tite-Ruff™ 3" PRL with 4" C.I. Deaerator Dimensions



***SE Sovent / Tite-Ruff
Sample Specifications***

General:

Provide SE Sovent Tite-Ruff Aerators, with the “curved baffle” maintenance feature, Deaerators and related components as distributed by Ken-Wall International, L.L.C. (954) 785-0508. Install system in compliance with the plumbing construction documents, installation details and recommendations in the SE Sovent (SESCO) Design manual 101/o (or latest edition). Follow all recommendations regarding the use of Low Flow Water closets and clothes washer applications.

Materials:

Aerator and Deaerator fittings shall be made in compliance with standard ASME/ANSI B16.45. Fittings shall be manufactured with the “Dismatic” method of casting production . Fittings shall be gray cast iron of chemical composition in accord with ASTM-126 and CISPI 301-82 for hubless pipe and fittings. Canadian applications shall comply with CSA B70.

Installation:

Install SE Sovent (SESCO) Tite-Ruff system in accordance to Design manual 101/o and follow piping recommendations for Low Flow water closets and clothes washing machine wastes. See other specification section for supports, hangers, fire rated pipe penetrations and related DWV requirements.

NOTES

NOTES

SE SOVENT®

TITE-RUFF® FITTING ORDER FORM

CONTACT _____ PHONE # _____
 COMPANY NAME: _____ FAX # _____
 PROJECT NAME: _____ E-MAIL: _____
 PROJECT LOCATION: _____

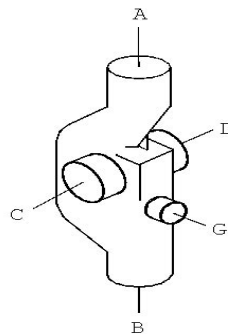
<u>QT</u>	<u>3" X 3" AER.</u>	<u>CONFIGURATION</u>	<u>QT</u>	<u>5" X 4" AER</u>	<u>CONFIGURATION</u>
_____	ABCDG	A=3", B=3", C=3", D=3", G=2"	_____	ABCDG	A=5", B=5", C=4", D=4", G=3"
_____	ABCG	A=3", B=3", C=3", G=2"	_____	ABCG	A=5", B=5", C=4", G=3"
_____	ABDG	A=3", B=3", D=3", G=2"	_____	ABDG	A=5", B=5", D=4", G=3"
_____	ABCD	A=3", B=3", C=3", D=3"	_____	ABCD	A=5", B=5", C=4", D=4"
_____	ABC	A=3", B=3", C=3"	_____	ABC	A=5", B=5", C=4"
_____	ABD	A=3", B=3", D=3"	_____	ABD	A=5", B=5", D=4"
_____	ABG	A=3", B=3", G=2"	_____	ABG	A=5", B=5", G=3"
_____	AB	A=3", B=3"	_____	AB	A=5", B=5"

<u>QT</u>	<u>4" X 3" AER</u>	<u>CONFIGURATION</u>
_____	ABCDG	A=4", B=4", C=3", D=3", G=3"
_____	ABCG	A=4", B=4", C=3", G=3"
_____	ABDG	A=4", B=4", D=3", G=3"
_____	ABCD	A=4", B=4", C=3", D=3"
_____	ABC	A=4", B=4", C=3"
_____	ABD	A=4", B=4", D=3"
_____	ABG	A=4", B=4", G=3"
_____	AB	A=4", B=4"

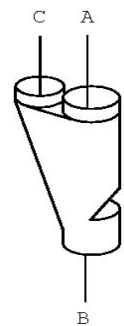
<u>QT</u>	<u>4" X 4" AER</u>	<u>CONFIGURATION</u>
_____	ABCDG	A=4", B=4", C=4", D=4", G=3"
_____	ABCG	A=4", B=4", C=4", G=3"
_____	ABDG	A=4", B=4", D=4", G=3"
_____	ABCD	A=4", B=4", C=4", D=4"
_____	ABC	A=4", B=4", C=4"
_____	ABD	A=4", B=4", D=4"
_____	ABG	A=4", B=4", G=3"
_____	AB	A=4", B=4"

<u>QT</u>	<u>6" X 4" AER</u>	<u>CONFIGURATION</u>
_____	ABCD	A=6", B=6", C=4", D=4"

AERATOR FITTING



DEAERATOR FITTING



<u>QT</u>	<u>DEAERATOR</u>	<u>CONFIGURATION</u>
_____	3"	A=3", B=3", C=2"
_____	4"	A=4", B=4", C=3"
_____	5"	A=5", B=5", C=4"
_____	6"	A=6", B=6", C=4"

PLEASE FILL OUT THE FOLLOWING ORDER FORM AND FAX IT TO OUR OFFICE AT:

FAX# (954) 785-5123

©2019 Copyright Protected—All Rights Reserved / Ken-Wall International , LLC.
This book or parts therein may not be reproduced in any form with out
The written permission of Ken-Wall International , LLC.

09-18-19