Pre-Installation Guide

A-dec DV Dry Vacuum

Contents

A-dec DV Dry Vacuum

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Regulatory Information and Warranty

For required regulatory information and the A-dec warranty, see the *Regulatory Information, Specifications, and Warranty* document (p/n 86.0221.00) available in the Resource Center at www.a-dec.com.

For quick access to this document online, scan, tap, or click this QR code, which points to: a-dec.com/regulatory-guide.

Product Service

Product service is available through your local authorized A-dec dealer. For service information, or to locate an authorized dealer, contact A-dec at 1.800.547.1883 in the USA and Canada or +1.503.538.7478 worldwide, or visit www.a-dec.com.

Product Models and Versions Covered in This Document*

Models	Versions	Description
DV5/DV7	n/a	Dry Vacuum
DV10/DV12		

**Some product models, versions, and options in this document may not be available in certain regions.*

Utility Requirements

CAUTION Local regulation may require licensed plumbers and electricians to install the utilities. All plumbing and utilities must conform to prevailing local codes.

Electrical Specifications		DV5	DV7	DV10	DV12
Electrical Supply	Voltage	200-240 VAC	200-240 VAC	200-240 VAC	200-240 VAC
	Phases/Frequency	1 phase / 60 Hz	1 phase / 60 Hz	1 phase / 60 Hz	1 phase / 60 Hz
Motor Nameplate Rating	hp	1.7	1.7	3.4	3.4
	kW	1.3	1.3	2.5	2.5
Amperage	Full Load Amps	9.8	15	17	17
	Minimum Circuit Breaker Rating (Amps)	20	20	30	30
Minimum Wire Gauge		12	12	10	10

Acceptable voltage range is 200-240 VAC. Voltage outside of that range will require a buck-boost transformer that provides an incoming voltage adjustment of +/- 10%.

Model	Size	Transformer p/n
DV5/DV7/DV10/DV12	.5 KVA	E0275

Piping Specifications		DV5	DV7	DV10	DV12
Connection Sizes	Suction Line	2" hose	2" hose	2" hose	2" hose
	Drain Port	1.5" hose	1.5" hose	1.5" hose	1.5" hose
	Wash Line (optional)	1/4" tubing	1/4" tubing	1/4" tubing	1/4" tubing
	Exhaust Vent[1, 2]	2"	2"	2"	2"
Maximum Exhaust Vent Air Flow (cfm)		45	65	85	105

(1) Increase the entire pipe by one size for every 10 feet of length over 30 feet.
(2) See the exhaust line requirements for tandem vacuum installations on page 13.

Operation Specifications		DV5	DV7	DV10	DV12
Maximum Number of User		5	7	10	12
Vacuum	Operational Setting ("Hg)[1]	10	10	10	10
	CFM at 8 "Hg	35	57	74	92
Ambient Temperature Operating Range		40 to 104°F / 4.4 to 40°C	40 to 104°F / 4.4 to 40°C	40 to 104°F / 4.4 to 40°C	40 to 104°F / 4.4 to 40°C

(1) Pre-set at the factory according to the site requirements.

Washdown Water Line Connections	
Tubing Size (Outside Diameter)	1/4"
Water Pressure (Max)	80 psi
Water Pressure Flow Rate	
20 PSI	2.1 GPM
40 PSI	3.0 GPM
60 PSI	3.7 GPM

Physical Characteristics

Characteristic	DV5	DV7	DV10	DV12
Dimensions - Installed (W/D/H - Inches)	18 x 19.5 x 49.5	18 x 19.5 x 49.5	18 x 19.5 x 49.5	18 x 19.5 x 49.5
Weight - Installed (lbs.)	152	152	191	191
Dimensions - Packaged (W/D/H - Inches)	24 x 31 x 56	24 x 31 x 56	24 x 31 x 56	24 x 31 x 56
Weight - Packaged (lbs.)	183	183	214	214
Sound - db(A) Max	62.8	70.0	63.2	70.5
Sound - db(A) - Average	57.4	57.4	58.3	58.3
BTU/Hr Max	5700	6800	8700	10436

Documentation References

Document Title	Part Number
Instructions for Use	
A-dec DV Dry Vacuum Instructions for Use	86.0888.00
Installation Guides	
A-dec DV Dry Vacuum Quick Reference	86.0893.00
A-dec DV Dry Vacuum Installation Guide	86.0891.00
Service Guide	
A-dec DV Dry Vacuum Service Guide	86.0897.00
Planning Resources *(These documents are available in Partner Resources > Planning Resources.)*	
A-dec Mechanical Room Sizing Worksheet	n/a
A-dec Mechanical Room Vacuum Piping Layout Questionnaire	n/a

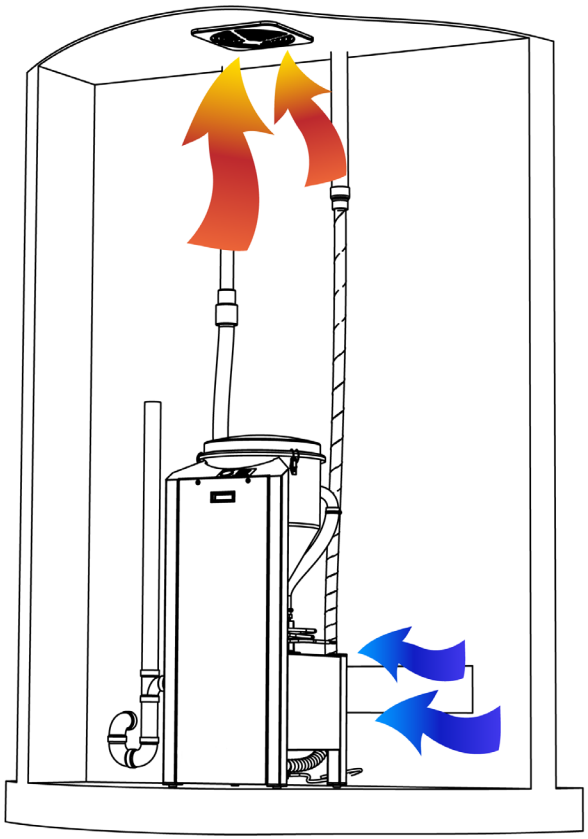
HVAC Requirements

Equipment life is directly affected by the operating temperature of the mechanical room. Adequate cooling air is required for proper equipment operation. A-dec recommends all dry vacuum models be installed and operated in a stable, ambient temperature environment. Forced air and HVAC input should be used in addition to an exhaust fan if normal ambient temperatures vary from specified operating temperature range.

The operating temperature range of the vacuum system is 40 to 104°F or 4.4 to 40°C.

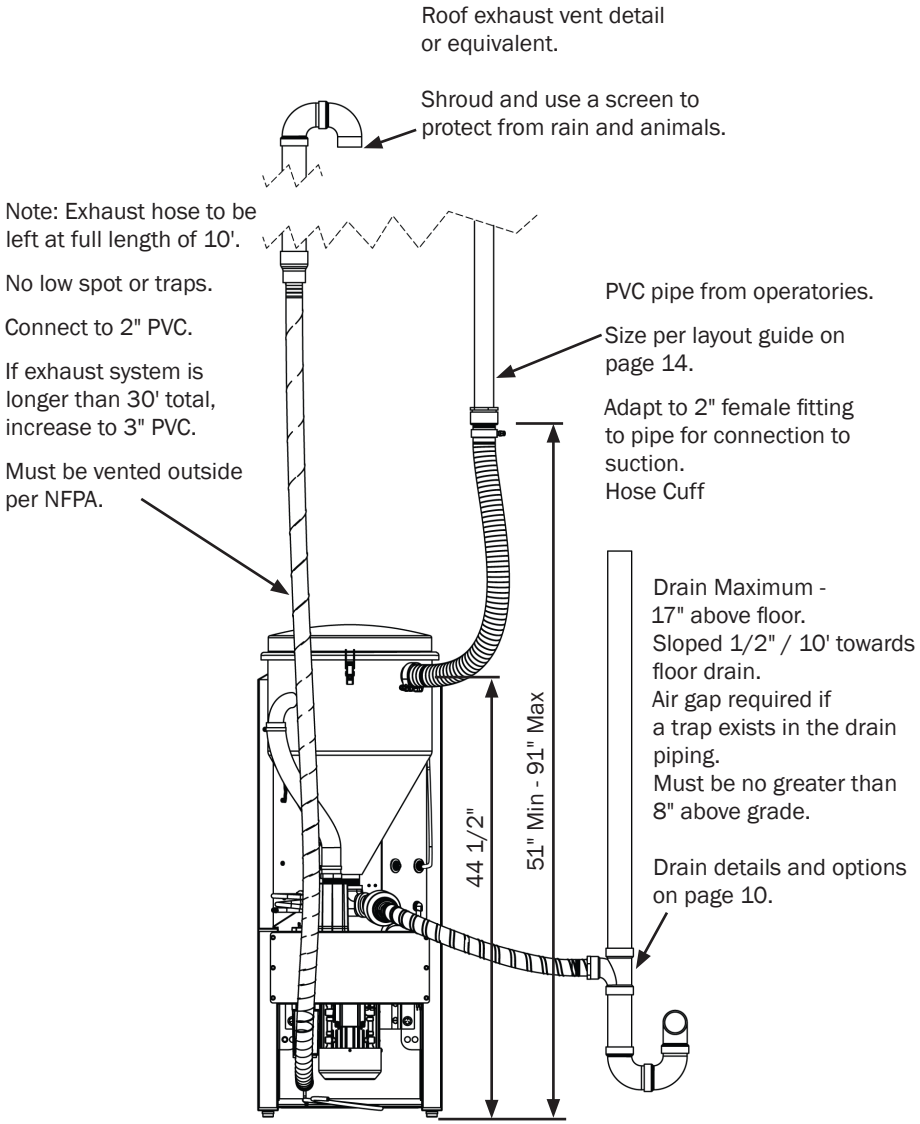
Model	Maximum (BTU/Hr)	Heat Rejection (BTU/Hr)	Cooling Fan* (CFM)
DV5	5,700	1,425	230
DV7	6,800	1,700	230
DV10	8,700	2,175	350
DV12	10,436	2,175	400

* *Based on 80°F/ 27°C cooling air available and 100°F / 38°C maximum mechanical room temperature. Does NOT include additional heat sources in the mechanical room.*

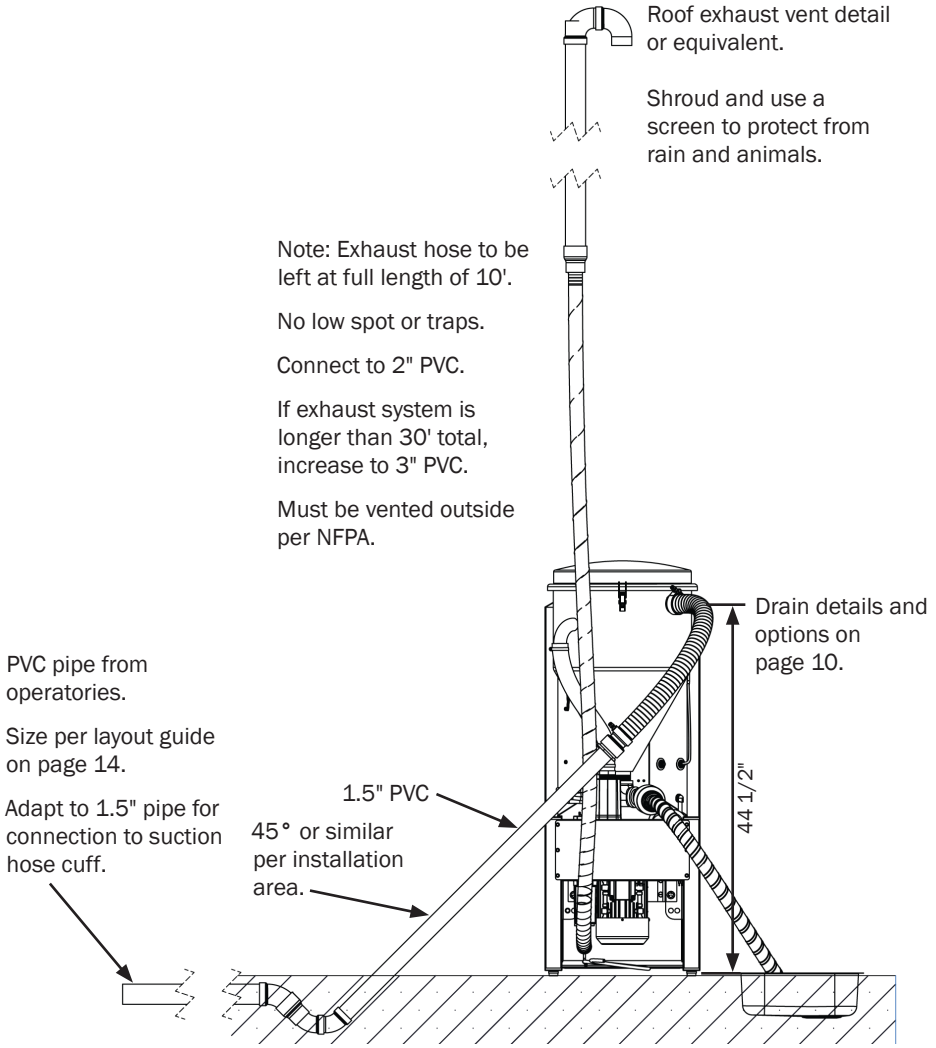


Connections

Overhead Connections



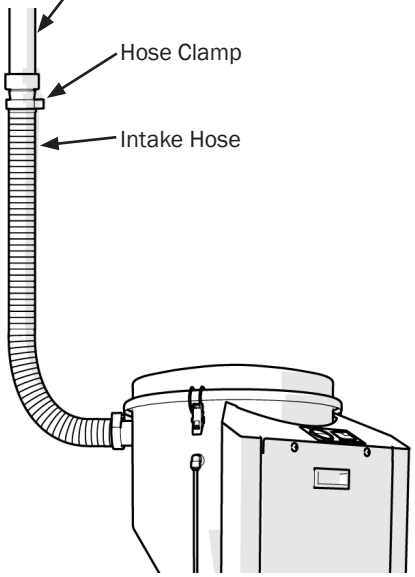
Below Grade Connections



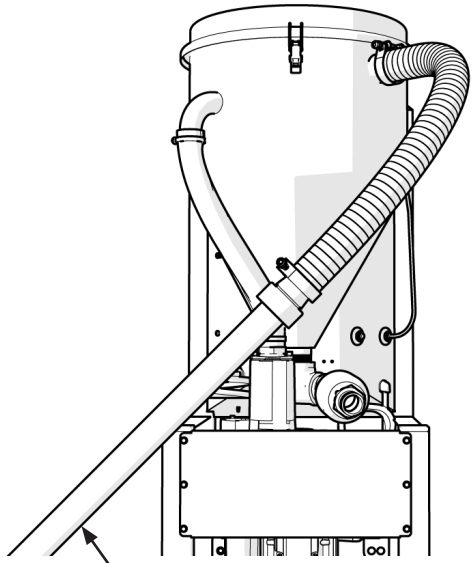
Intake Connections

Single Vacuum Installation

Overhead Intake

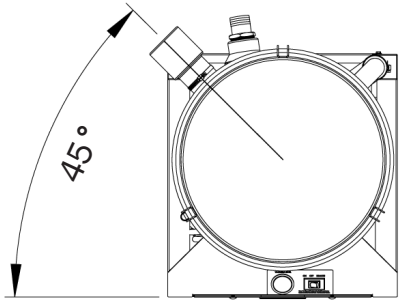


Below Grade Intake



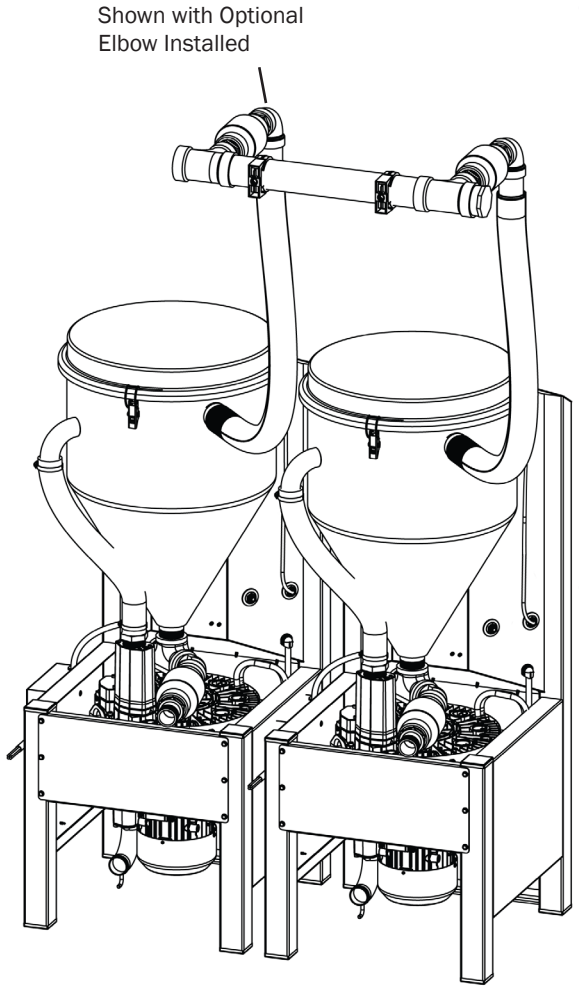
5' Hose Provided
6" Bend Radius
Trim if necessary.

NOTE Avoid low spots. Support if necessary. Keep elevation above tank inlet.



Tandem Vacuum Installation

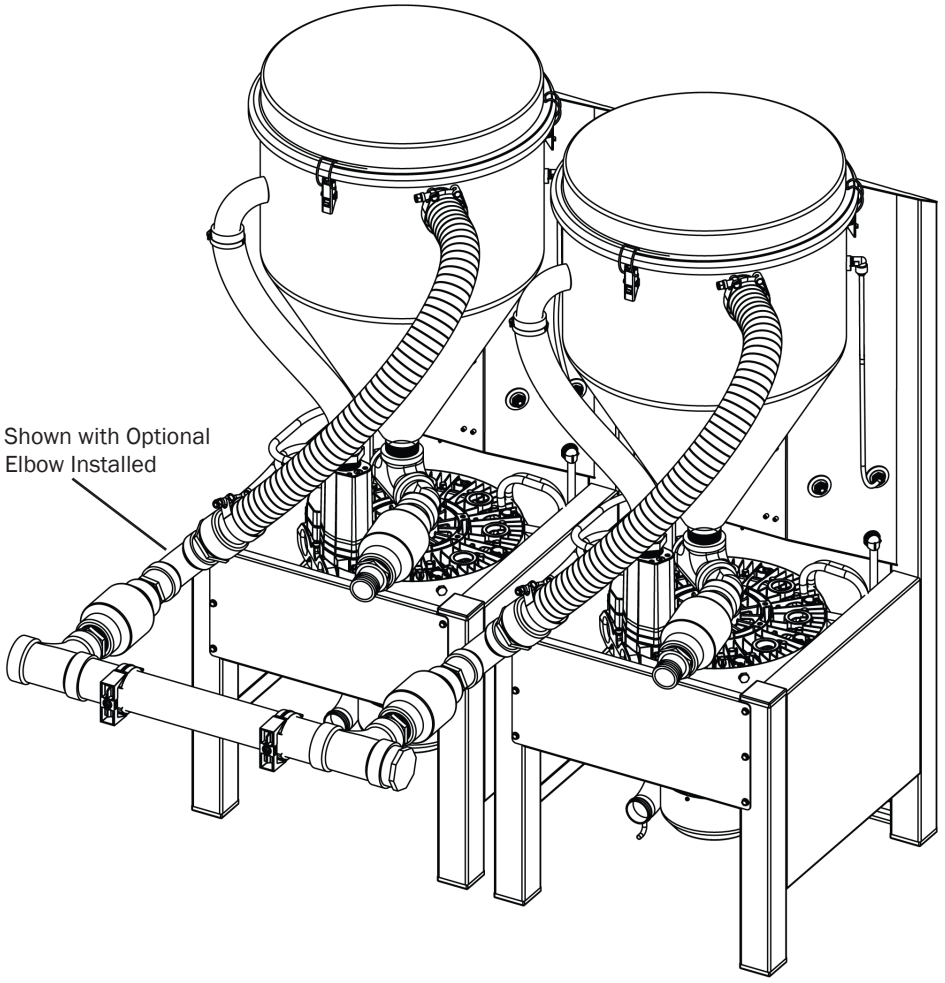
Overhead Intake



NOTE

- Tandem vacuums must be combinations of the same model vacuums.
- Tandems must be level to each other.
- For connecting three or more vacuums, contact A-dec Customer Service.

Below Grade Intake

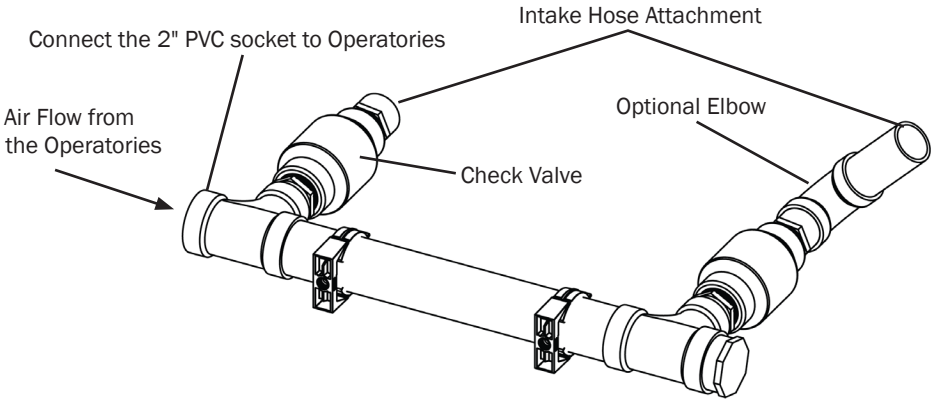


NOTE Trim intake hoses so that they have the shortest and smoothest run from the manifold to the tank inlet.

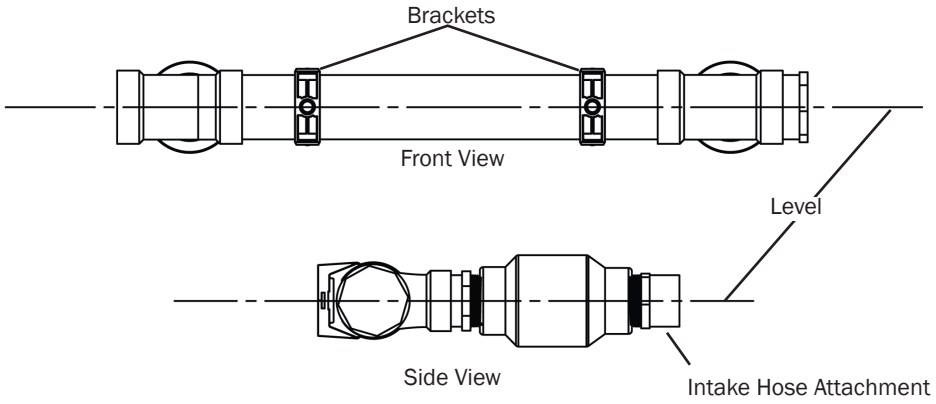
Tandem Vacuum Intake Manifold Assembly

When assembling the manifolds:

- The parts for the Tandem intake manifold are included with Tandem vacuum orders. Adjust their installation according to the location's needs.
- Manifolds can be configured to accept air intake from either side. When assembling the manifold, ensure the check valves are installed correctly according to the markings on the manifold that indicate which side should be up, and an arrow indicating the airflow goes from the manifold to the vacuum.
- Check valves must always be in a horizontal position.

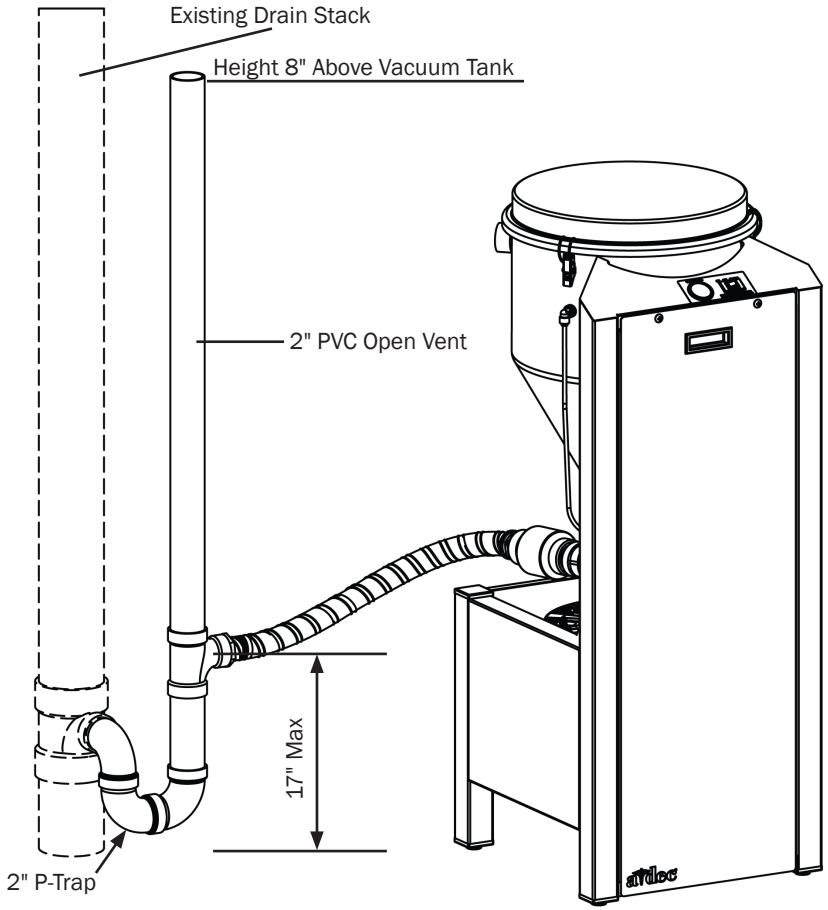


Intake Manifold Assembly



Drain

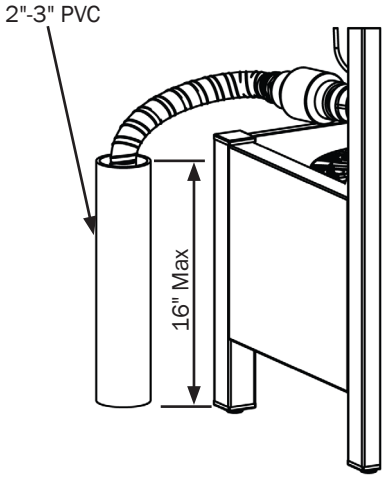
Direct Connection with Vent



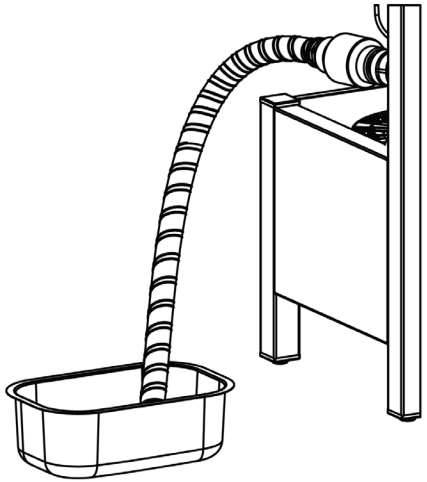
NOTE All installations must conform to local codes. Examples shown are for recommendation only.

- Trim included drain hose to fit application.
- Do not allow low spots or sags in drain hose.
- Support if necessary.

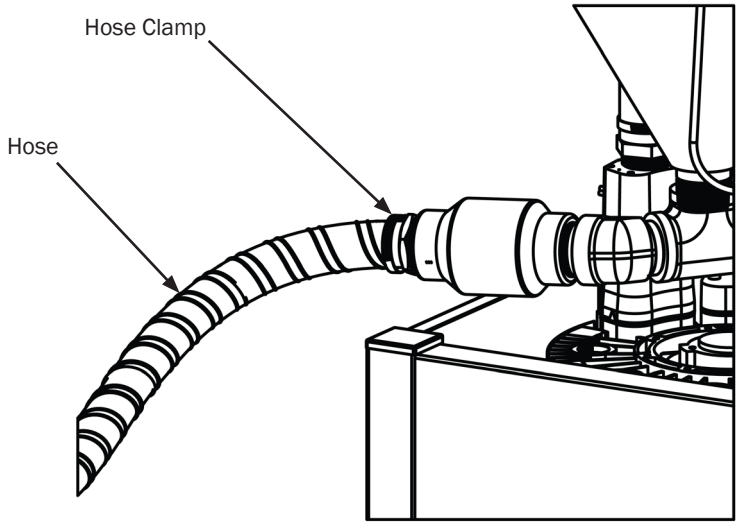
Pipe Stub with Air Gap (Gravity Drain Only)

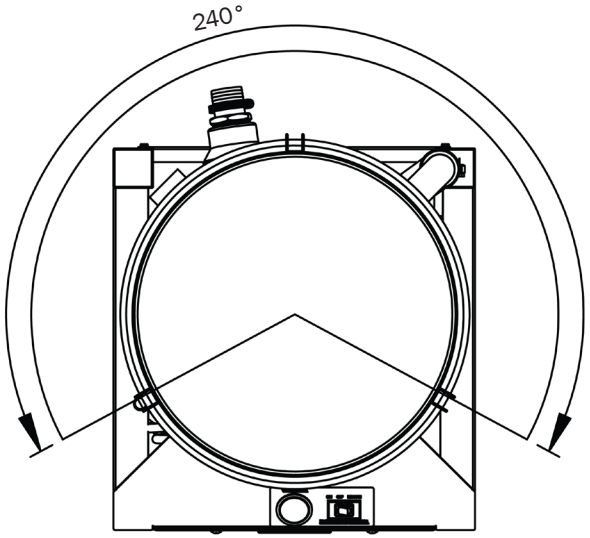


Floor Sink / Floor Drain



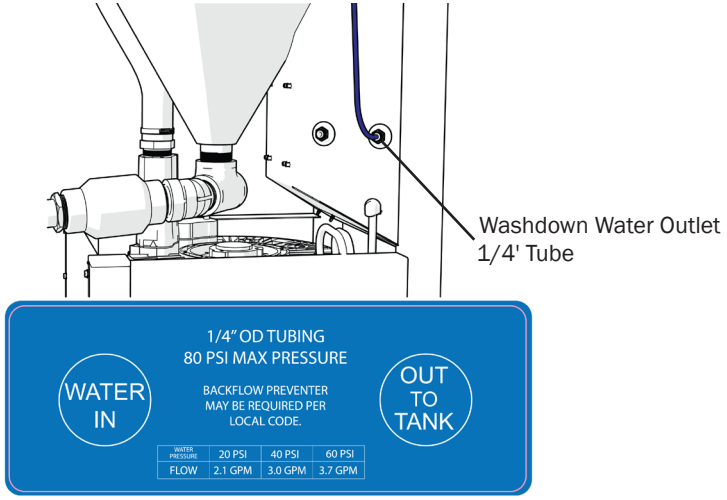
Drain Connection to Vacuum





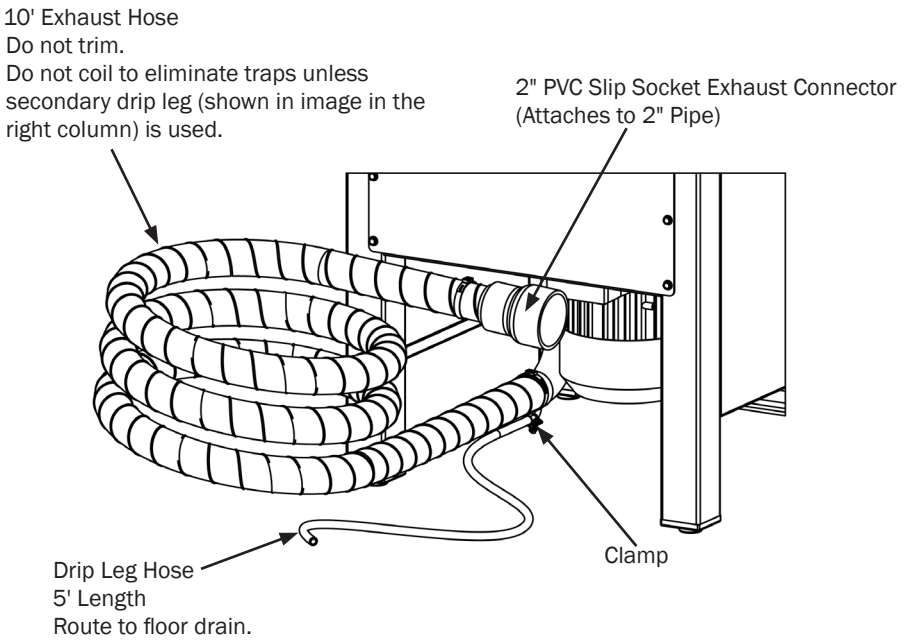
The drain connection can be rotated 240° to suit the installation.

Washdown

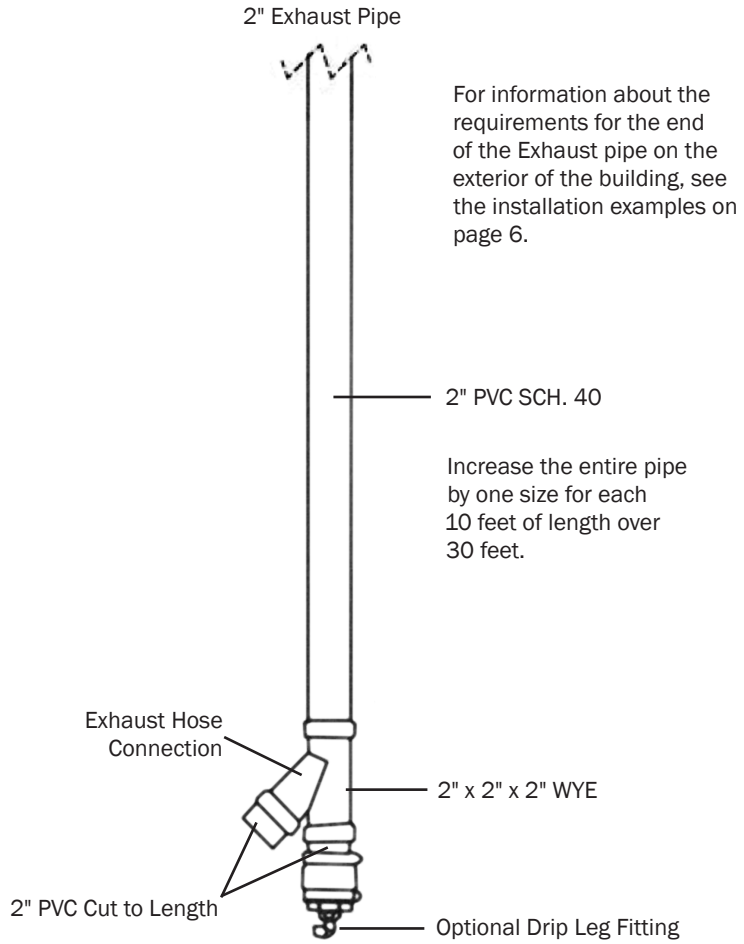


NOTE Washdown connection is required for endodontic offices.

Exhaust



Exhaust to the Outside for a Single Vacuum Installation

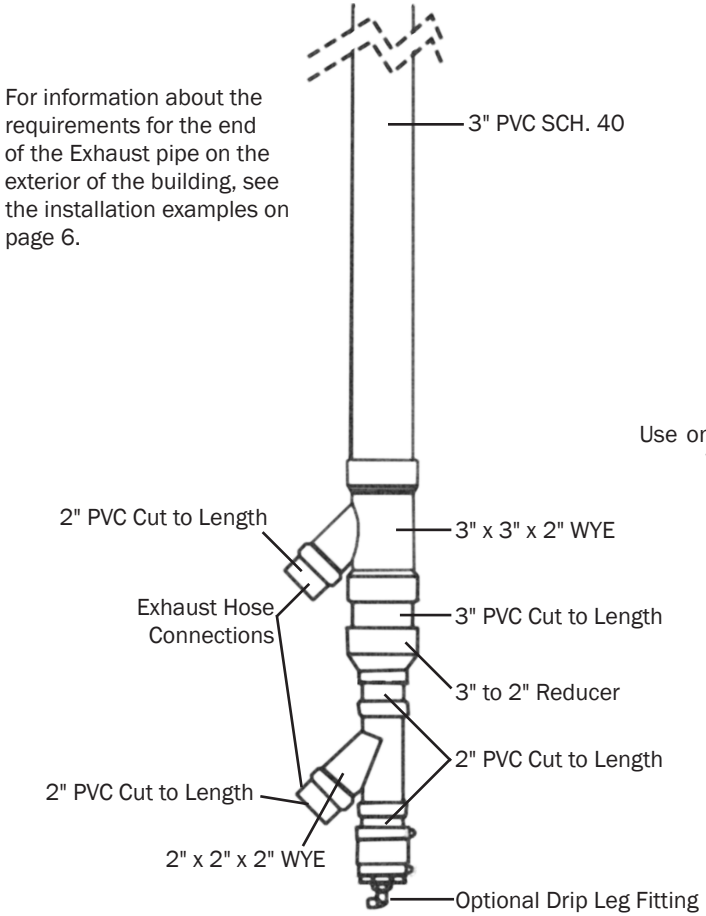


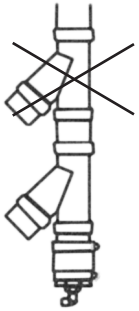
Exhaust to the Outside for Tandem Installations

- Do not trim the Exhaust hose.
- Route the drip leg hose to the drain so it is lower than the exhaust elbow. This prevents water from backing up into the vacuum.

Connect the Exhaust Hose to Two Vacuums

3" Exhaust Pipe Connections for Two Vacuums

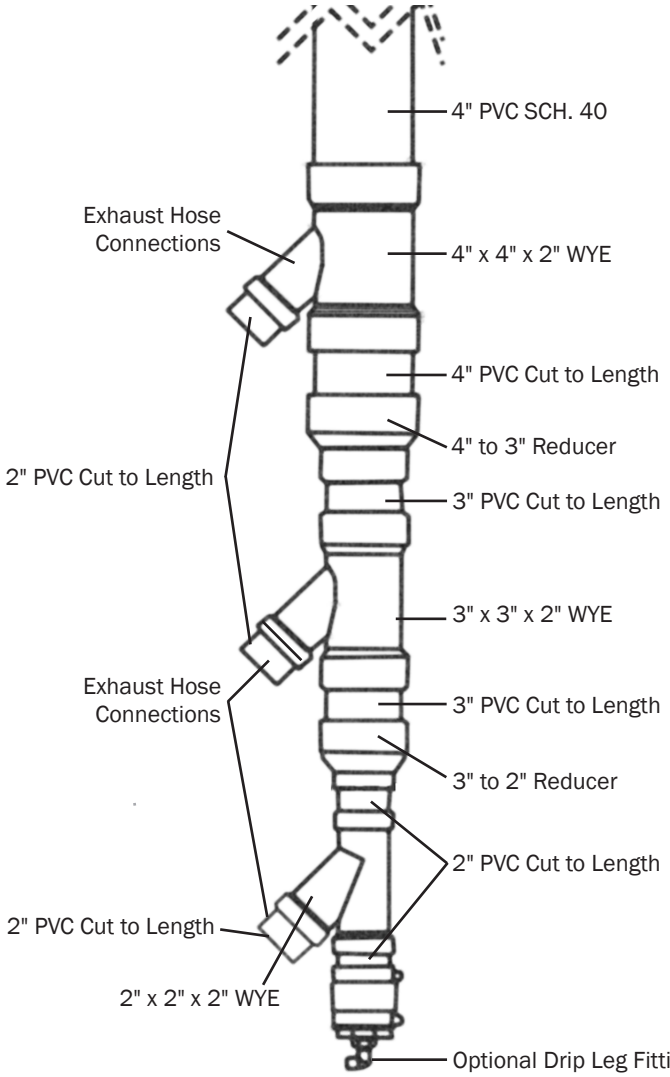


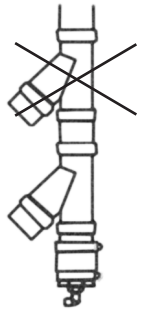


Use only one 2" x 2" x 2" WYE per line

Connect the Exhaust Hose to Three Vacuums

4" Exhaust Pipe Connections for Three Vacuums





Use only one 2" x 2" x 2" WYE per line

For information about the requirements for the end of the Exhaust pipe on the exterior of the building, see the installation examples on page 6.

For installations with more than 3 vacuums or exhaust lines greater than 70' in length, please consult with an A-dec Technical Service advisor.

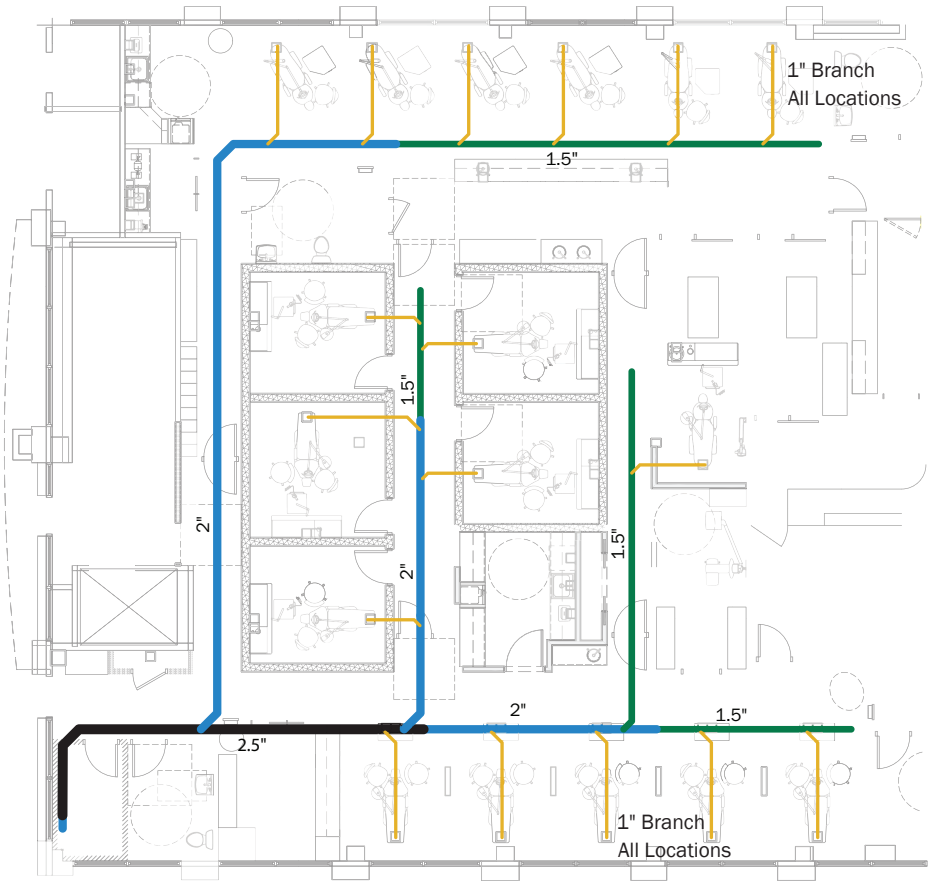
Vacuum Piping Layout Guide

Contents

Note

This section contains recommendations for facility vacuum piping layout and serves as a reference only. A-dec makes no claim to knowing local codes, local installation practices or specific facility construction. A-dec does not guarantee performance.

A-dec will provide example office piping layout drawings for dealers seeking assistance with new A-dec mechanical equipment installations. If making a request, please submit a complete office layout in either PDF or DWG format along with the completed Vacuum Layout Questionnaire document located in Partner Resources under Planning Resources. Send your completed request by email to customerservice@a-dec.com .



Glossary of Terms

Air Velocity - Velocity refers to how fast the air is moving in a pipe, in distance, per unit of time. Dry Vacuum systems use air velocity to move liquids and solids through the piping system.

Amalgam Separator - A device that captures solids, including amalgam material, from within the office's vacuum piping system. These are typically installed before the dental vacuum system.

Backflow - An unwanted flow of suction liquid in the reverse direction. Prevented by proper piping design.

Below Grade - Piping that is below ground level either buried in a slab or in a basement.

CFM - Cubic Feet per Minute (cu ft/min). Unit that represents the flow of air.

Cleanout - A plumbing cleanout provides a convenient place to access a building's vacuum piping system to clear clogs and debris.

Core Drilling - Access holes drilled through floors/ceilings to add piping for vacuum and compressed air systems in multi-floor buildings and/or crawlspaces. These are typically used when trenching or cutting concrete are not an option.

Double 45° - Using (2) 45° fittings to create a "sweep" 90°.

Drip Leg - A drainage line for excess water, commonly used with vacuum exhaust or compressor fresh air piping . In the dental installation these drain lines allows condensation and other potential liquids to drain away from the vacuum or compressor.

Dry Vacuum - A type of vacuum generating equipment that does not use water during operation.

DWV - Pipe fittings designed specifically for Drain, Waste, and Vent applications. These are the only type of fittings accepted for use in a vacuum system.

Exhaust - The escape of pressurized gases from the exhaust port of the dry vacuum's regenerative blower.

HVE - A High Volume Evacuator is a suction device that draws a large volume of air over a period of time. Flow requirement is approximately 1 user.

InHG / "HG / Inches of Mercury - Inch of mercury is a unit of measurement for vacuum. It is widely used in the dental industry. It is the vacuum level required to vertically lift a column of mercury 1 inch (25.4 mm) in height at the standard acceleration of gravity.

Inverted P-Trap - Branch lines connecting to overhead trunk tie into the top of the trunk to prevent backflow.

Junction Box - Connection box for all utilities to dental delivery unit. Generally floor or wall mounted. Details provided by equipment provider.

NFPA99 - The National Fire Protection Association (NFPA) establishes criteria for levels of health care services or systems based on risk to the patients, staff, or visitors in health care facilities to minimize the hazards of fire, explosion, and electricity. Dental Vacuum piping is covered under NFPA99 Level 3.

Nitrous (N_2O) Scavenging - A scavenging system, simply defined, is a means to collect and remove excess gases to prevent them from being vented back into the operating room. Flow requirement is approximately 1.5 CFM or 1/2 user.

Treatment Rooms - A highly specialized space configured to deliver dental treatment to patients while supporting all associated tasks performed by the dentist and auxiliaries.

Overhead - Vacuum piping system where the main trunk is suspended from the ceiling and runs above treatment rooms.

PVC Pipe - Abbreviation for polyvinyl chloride. White plastic pipe commonly used for plumbing and drainage.

Slope - Has the same meaning as pitch. It is generally accepted that 1/4" per 10' of pipe run is the minimum for proper slope on a Dental Vacuum Piping System.

SE (Saliva Ejector) - A narrow tubular device providing suction to draw saliva, blood, and debris from the mouth of a dental patient in order to maintain a clear operating field. Flow requirement is approximately for half a user.

Sweep - DWV elbows are usually long-radius ("sweep") types. To reduce flow resistance and solid deposits when the direction of flow is changed, they use a shallow curve with a large radius of curvature.

Glossary of Terms (*continued*)

Trunk - In a complete Dental Vacuum Piping System, the main supply lines, the "trunks," provide suction to the general area where it will be used. Smaller-diameter tubing, the "branch" lines, provide connections to the point of use.

Wet Vacuum - Wet dental vacuum systems use water to create vacuum pressure. They require a lot of water to operate.

General Guidelines

- Schedule 40 PVC is the minimum thickness of the vacuum piping.
- Vacuum piping to be PVC or Type M copper per local code.
- Main trunk lines and headers to have a minimum slope of 1/4" per 10'.
- For main trunk lines longer than 50', increase in pipe size.
- No split wye on main trunk lines, use only a branch wye.
- Branch lines should be of equal length, where possible.
- Use DWV piping and fittings.
- If DWV fittings are not available, use double 45° elbow.
- Do NOT use tee, 4-way cross, or short elbow connectors.
- Do NOT use standard PVC 90° elbows.

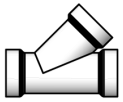
Cleaning Vacuum Lines

Use the A-dec Evacuation System Cleaner to keep your vacuum running at its optimal level while limiting costly downtime. A-dec does not endorse other manufacturers' evacuation line cleaning products. We have only tested the A-dec Evacuation System Cleaner for compatibilty with A-dec dental units, ICV®, and vacuum system. Other brands do not meet our quality standards and using them may adversely affect your equipment's performance and warranty.

A-dec Evacuation System Cleaner
p/n: 91.0060.00 - 33 fl oz (976 mL) 12 bottles
p/n: 91.0061.00 - 128 fl oz (3.78 L) 4 bottles

• **NOTE** Failure to comply with vacuum line cleaning guidance can decrease vacuum performance, including a complete loss of vacuum. Problems arising from the use of improper cleaning agents can affect the warranty.

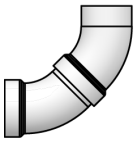
Schedule 40 PVC Fitting Examples



Drain Waste Vent Wye

Drain Waste Vent Offset Wye

Drain Waste Vent Sweep 90° Elbow

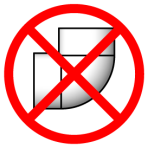


Standard PVC Double 45° Elbows to Make 90°

Do Not Use

Tee

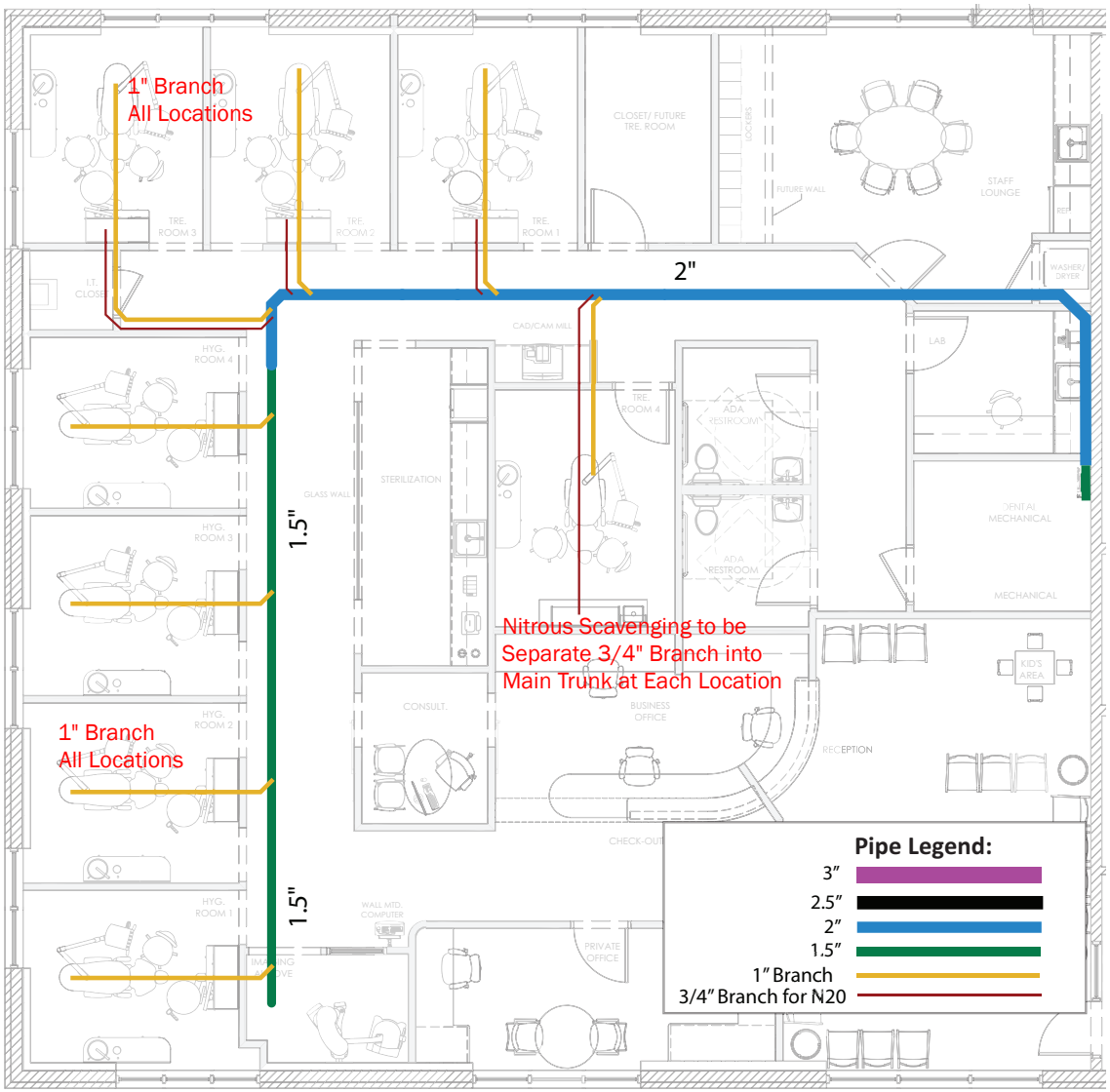
4-Way Cross



Short Elbow

Split Wye

Piping Layout Example 1

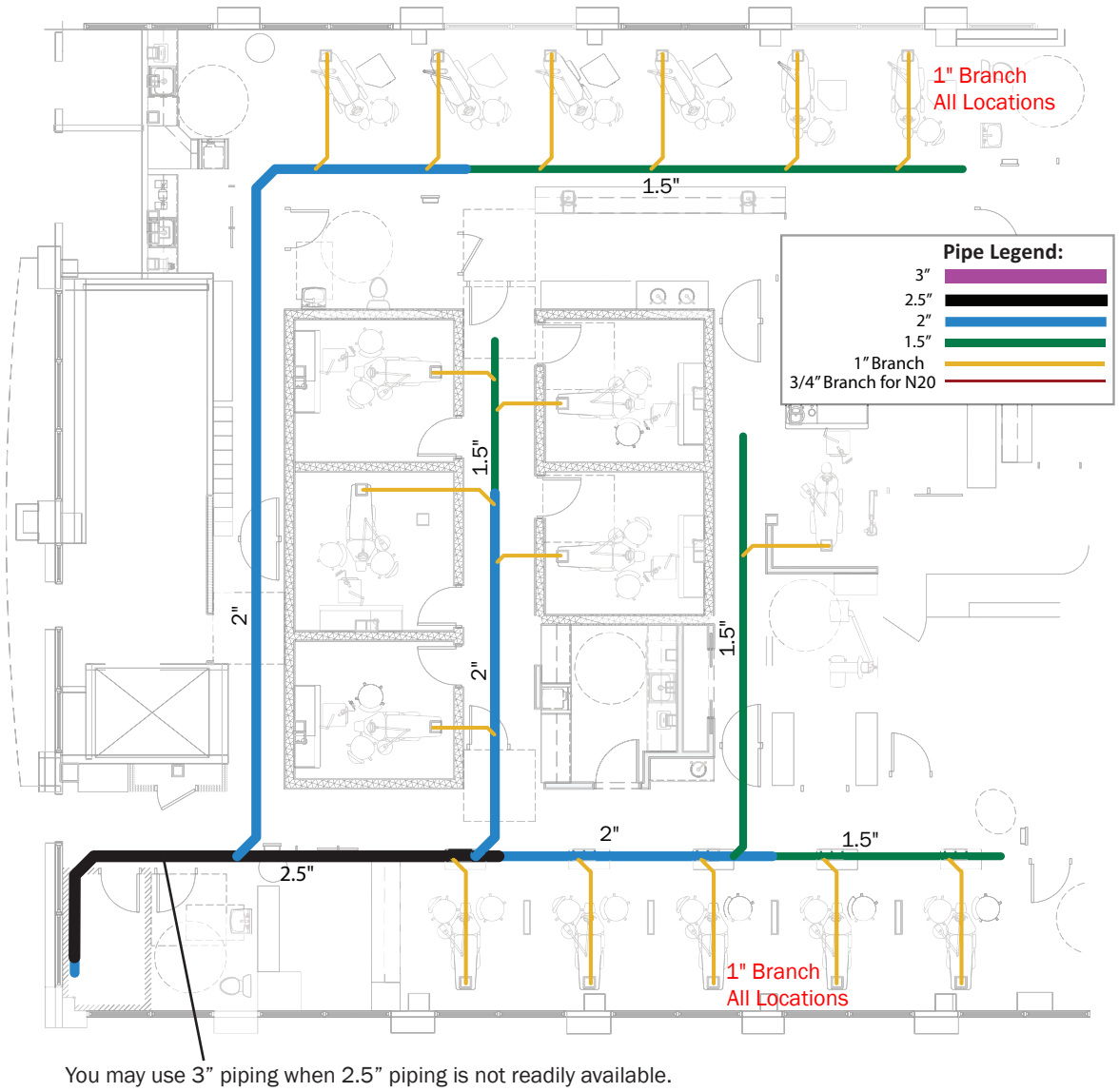


Main Trunk Sizing	
Number of Treatment Rooms	Minimum Size of Line
4	1.5"
8	2"
12	*2.5"
16	3"
For offices designed with more than 16 treatments rooms, with extra large length runs or multiple branch trunk lines, contact A-dec Customer Service for piping size and layout advisement. *You may use 3" piping when 2.5" piping is not readily available.	

Calculating Sizing

- Sizing applies to Overhead and Below Grade layouts.
- Using table above, count the number of treatment rooms starting with the furthest from the Mechanical Room.
- Every 4 Chairs, step up in size.
- Route Main Trunk for equal branch lengths (as much as possible, see #5 Branch in example. Extending slightly will not significantly impact performance).
- Reduce to 1.5" in Mechanical Room.
- Dual Vacuum: 2" connection in mechanical room.
- Optional: Piping will experience buildup over time. In addition to regular line cleaning, A-dec recommends adding cleanout access at end of header. Plumber to choose access method.

Piping Layout Example 2



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Number of Treatment Rooms	Minimum Size of Line
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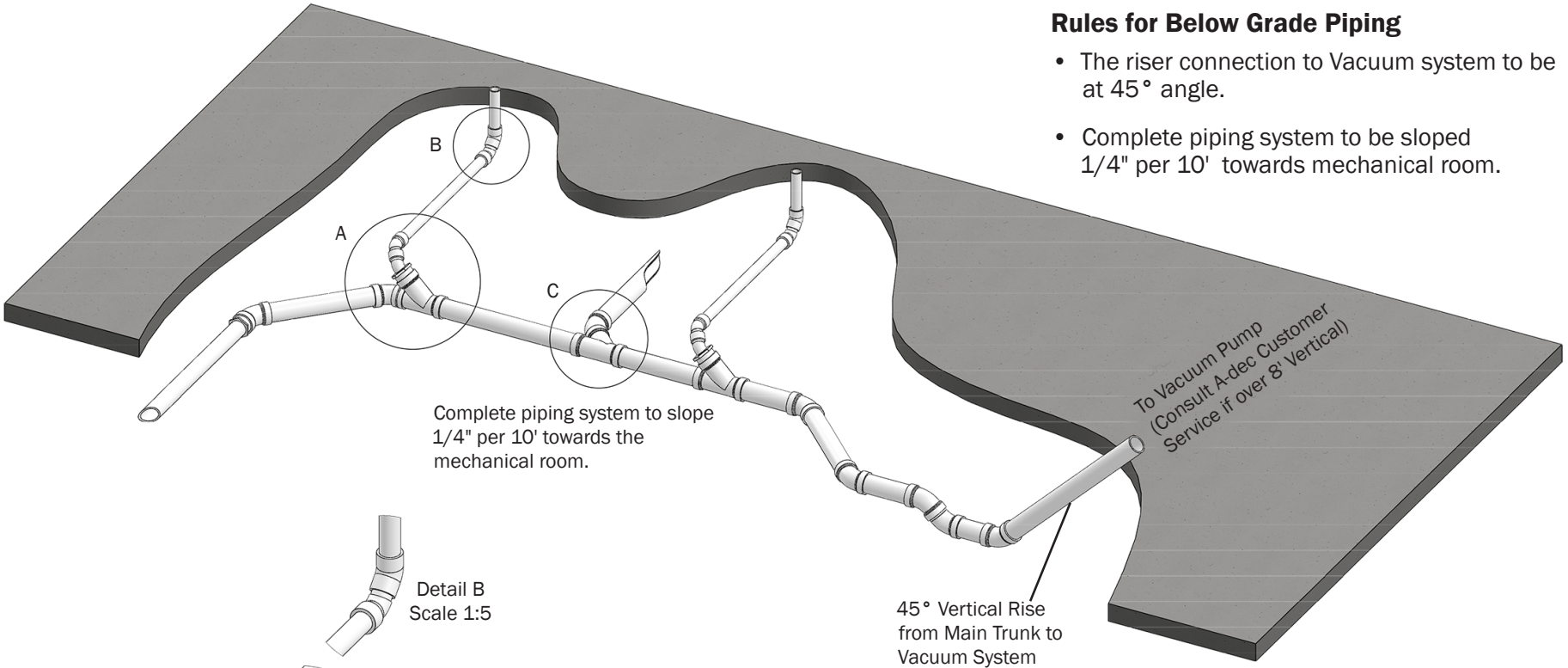
For offices designed with more than 16 treatments rooms, with extra large length runs or multiple branch trunk lines, contact A-dec Customer Service for piping size and layout advisement. *You may use 3" piping when 2.5" piping is not readily available.	

Multi-Branch

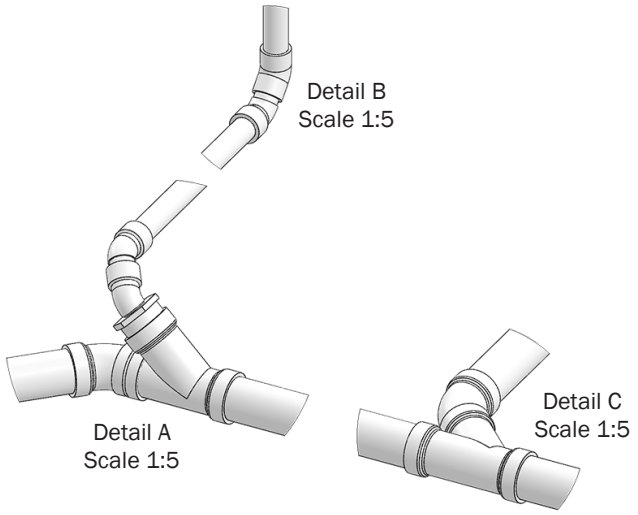
- Join Branch Trunk with Main Trunk using only DWV fittings.
- Using the table above, count the number of treatment rooms starting with the furthest from the mechanical room. Each Branch has its own count, adding to the total.
- Every 4 chairs, step up in size.
- Route Main Trunk and Branch Trunks for equal branch lengths (as much as possible; extending slightly will not significantly impact performance).
- Single Vacuum: Reduce to 1.5" in mechanical room.
- Dual Vacuum: 2" connection in mechanical room.
- Optional: Piping will experience buildup over time. In addition to regular line cleaning, A-dec recommends adding cleanout access at end of header. Plumber to choose access method.

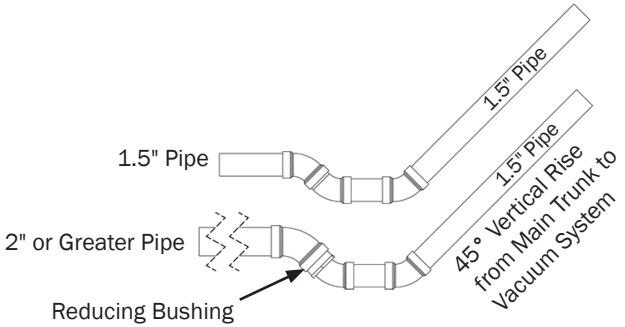
Below Grade Details for Branch Connection to Main Trunk



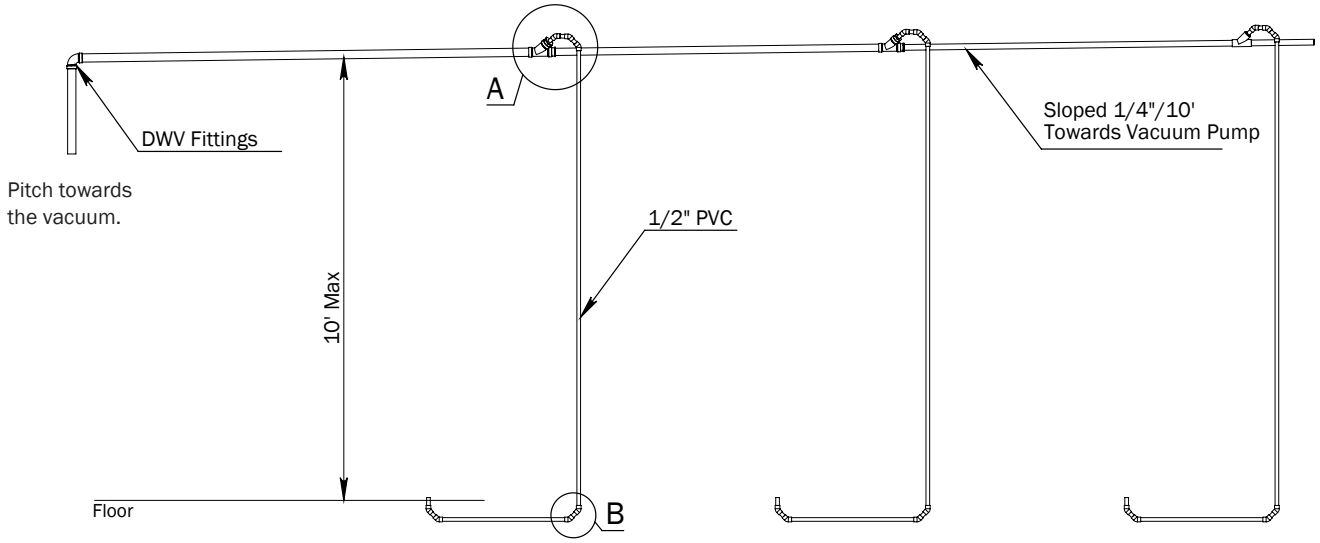
Rules for Below Grade Piping

- The riser connection to Vacuum system to be at 45° angle.
- Complete piping system to be sloped 1/4" per 10' towards mechanical room.

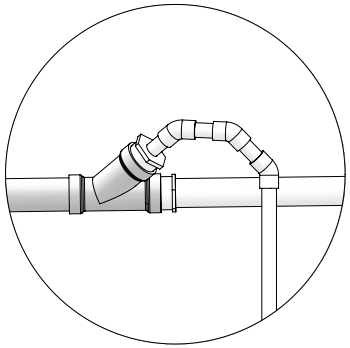




Overhead Details for Branch Connection to Main Trunk

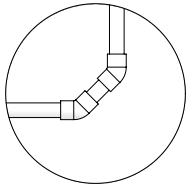


DETAIL A



Use overhead riser to
connect to header.
(Inverse P-trap
to prevent backflow.)

DETAIL B



All turns to be
two 45° elbows.

Rules for Overhead Piping

- Overhead Main Trunk height must be kept as low as possible.
- Vertical Branch must be 1/2" PVC.
- Branch must connect into Main Trunk per DETAIL A. Use DWV fittings and do not tee.
- Operators must be trained to allow air to move liquid before closing HVE/SE.

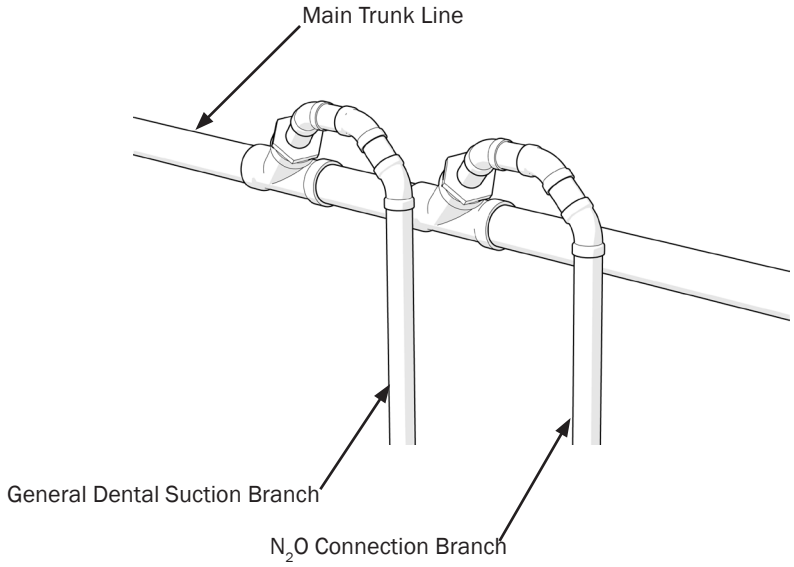
NOTE Do not use a combination of under floor and overhead piping systems.

Nitrous Oxide (N_2O) Scavenging

Rules for Nitrous Oxide Scavenging

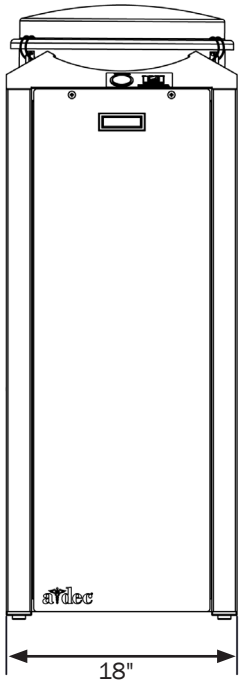
- Must have a separate branch dedicated to N_2O Scavenging.
- Applies to Below Grade or Overhead piping.

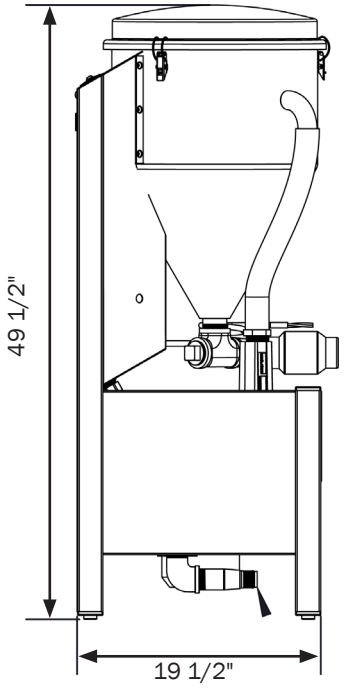
Overhead Piping

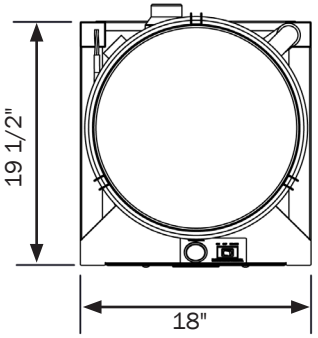


Vacuum Dimensions

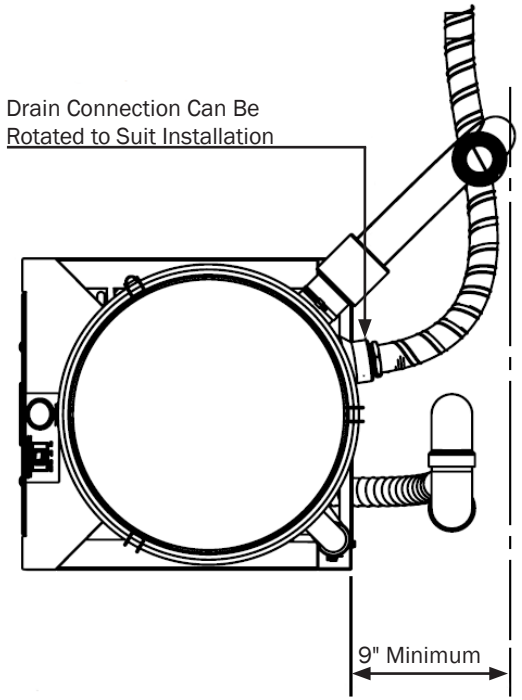
Vacuum External Dimensions

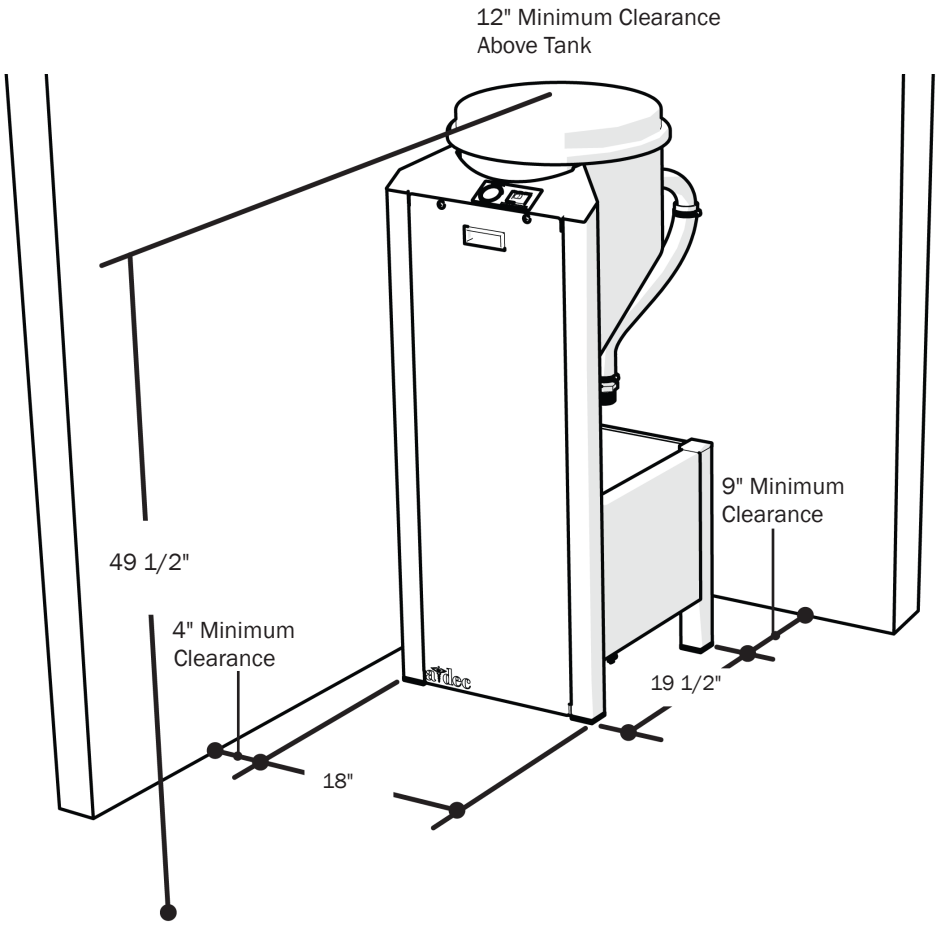






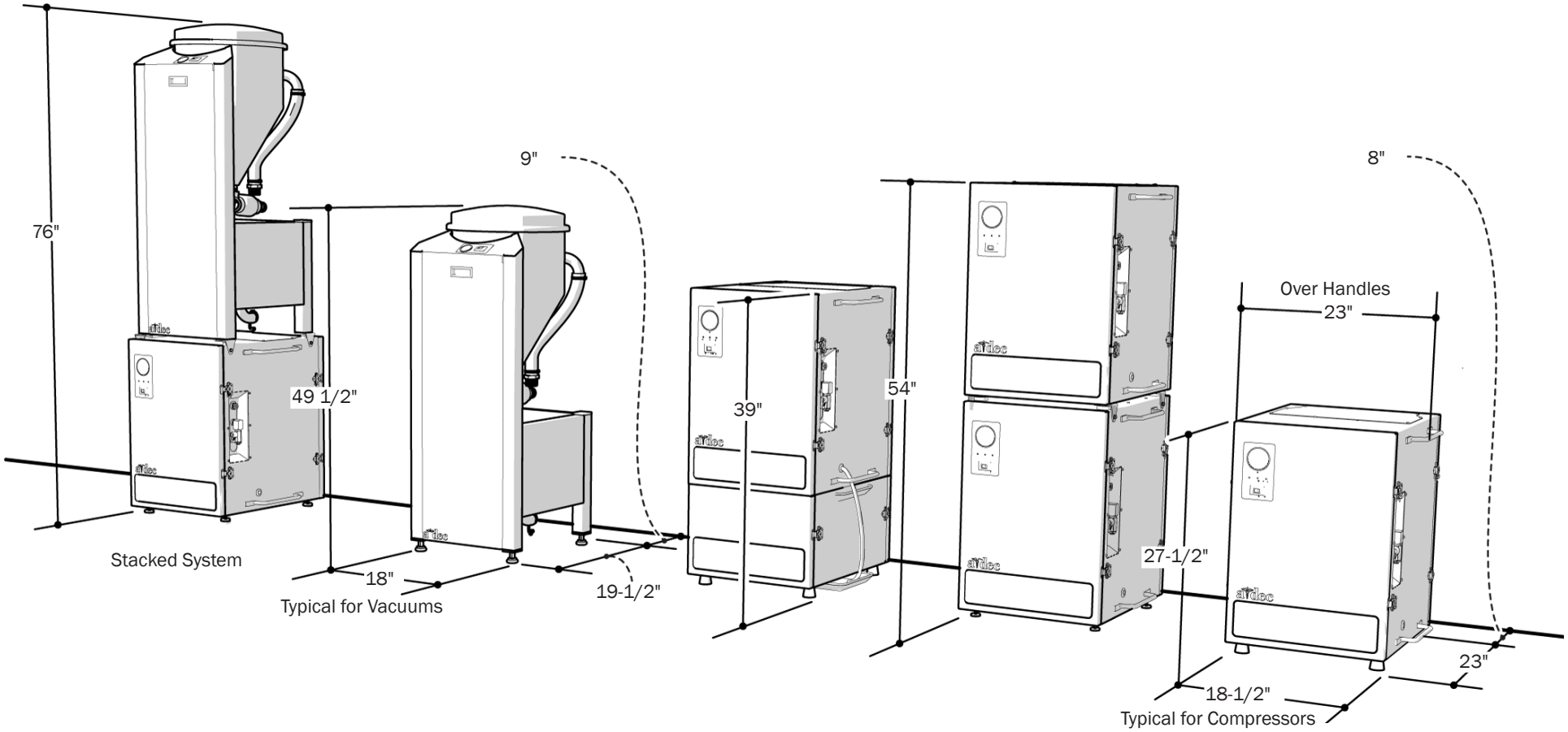
Vacuum Minimum Clearance





Sample Mechanical Room Layout

The following illustration shows the dimensions and spacing required when laying out a mechanical room using A-dec DV Dry Vacuums and A-dec SC Air Compressors for different equipment configurations.



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