**Intended Use**
To provide general dental vacuum plumbing layout recommendations per industry standards. Installation should be conducted by qualified dental/plumbing professionals.

**Limitations of Recommendations**
This Midmark document is designed to provide general vacuum plumbing recommendations commonly used in the dental industry. Midmark does not have expertise in building construction or detailed information about a specific building's construction. Therefore, Midmark is unable to provide recommendations for specific pipe and fitting locations.

**Equipment Alert**
Vacuum systems must be installed per local plumbing and electrical codes.
**Vacuum Plumbing Specifications**

### Power Vac “G” Intake (Suction) Line

<table>
<thead>
<tr>
<th>Type</th>
<th>Single Models G3, G5, G7</th>
<th>Twin Models G6, G10, G14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Size</td>
<td>PVC Sch 40 Pipe Recommended - for Main Trunk and Branch Lines</td>
<td>PVC Sch 40 Pipe Recommended - for Main Trunk and Branch Lines</td>
</tr>
<tr>
<td>Pump Termination</td>
<td>1 1/2”</td>
<td>2”</td>
</tr>
</tbody>
</table>

### Power Vac “std” Intake (Suction) Line

<table>
<thead>
<tr>
<th>Type</th>
<th>Single Models P3, P5, P7</th>
<th>Twin Models P6, P10, P14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Size</td>
<td>PVC Sch 40 Pipe Recommended - for Main Trunk and Branch Lines</td>
<td>PVC Sch 40 Pipe Recommended - for Main Trunk and Branch Lines</td>
</tr>
<tr>
<td>Pump Termination</td>
<td>1 1/2”</td>
<td>2”</td>
</tr>
</tbody>
</table>

### Wet-ring Intake (Suction) Line

<table>
<thead>
<tr>
<th>Type</th>
<th>Single Models CV3, CV5</th>
<th>Twin Models CV6, CV10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Size</td>
<td>PVC Sch 40 Pipe Recommended - for Main Trunk and Branch Lines</td>
<td>PVC Sch 40 Pipe Recommended - for Main Trunk and Branch Lines</td>
</tr>
<tr>
<td>Pump Termination</td>
<td>3/4” NPT connection</td>
<td>1 1/4” NPT connection</td>
</tr>
</tbody>
</table>

### Power Max Intake (Suction) Line

<table>
<thead>
<tr>
<th>Type</th>
<th>Model PM2</th>
<th>Model PM3</th>
<th>Model PM4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Size</td>
<td>Type K or L Copper Tubing - *Note: Do Not use compression fittings for vacuum lines.</td>
<td>1&quot;</td>
<td>1 1/4&quot;</td>
</tr>
<tr>
<td>Operatory Termination</td>
<td>1/2 OD copper</td>
<td>5/8 OD copper</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Device/Conditions</strong></th>
<th><strong>User Rating</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>High-volume Evacuation (HVE)</td>
<td>1</td>
</tr>
<tr>
<td>Saliva Ejector</td>
<td>1/2</td>
</tr>
<tr>
<td>Hand Wash Station</td>
<td>1</td>
</tr>
<tr>
<td>Nitrous Oxide Scavenger</td>
<td>1/2</td>
</tr>
<tr>
<td>Main Vacuum line 50 ft. (15m)</td>
<td>1</td>
</tr>
<tr>
<td>Branch Vacuum Line 50ft. (15m) beyond main line</td>
<td>1</td>
</tr>
</tbody>
</table>

*NOTE:* The number of devices and/or plumbing conditions will add to the total number of users.

### Vacuum Plumbing Specifications

<table>
<thead>
<tr>
<th>Number of Users</th>
<th>Vacuum line pipe size (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3/4</td>
</tr>
<tr>
<td>2</td>
<td>3/4</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>1 1/4</td>
</tr>
<tr>
<td>6</td>
<td>1 1/4</td>
</tr>
<tr>
<td>7</td>
<td>1 1/2</td>
</tr>
<tr>
<td>8</td>
<td>1 1/2</td>
</tr>
<tr>
<td>9</td>
<td>1 1/2</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>2</td>
</tr>
</tbody>
</table>

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Below floor or at floor level plumbing

General Recommendations

- Vacuum Piping to be Type M Copper or Schedule 40 PVC per product specs and local code.
- Main trunk lines must have a **minimum** slope of 1/4 inch per 10 feet towards the pump.
- Use "drain,waste and vent"(DWV), or 45 deg. elbows.
- Down size the main trunk line after every few junction boxes or branches in order to maintain sufficient suction in operatoires farthest from the vacuum.
- Every 50 feet of main trunk line should be considered a user.
- Attempts should be made to limit branch lines, orient main trunk lines below junction boxes or cabinets.
- Some applications may require the main trunk line to be split, attempts should be made to equalize flow in both directions.
- Always stagger branch lines from main trunk, do NOT use 4-way cross fittings.
- Large applications may require multiple vacuums and dividing the operatoires into zones in order to maintain sufficient suction.

Power Vac ("G" / "STD") specific recommendations

- 6 feet maximum height from main trunk line to the pump.
- When using in an oral surgery environment we recommend using the surgical operatory recovery room packages to collect everything and prevent build up/clogs in the lines and vacuum tank.

Wet-ring specific recommendations

- 4 feet maximum height from main trunk line to the pump.
Equipment Alert
When performing positive pressure leak tests to validate plumbing installation, verify vacuum systems are not connected to office piping.
Additional Recommendations

In certain situations it is necessary to split the main trunk line in different directions. When doing this take into consideration the potential volume on each line and size them accordingly. Use 45 deg. fittings flowing back towards the vacuum.
Additional Recommendations

Large applications may require multiple vacuums and dividing the operatoires into zones in order to maintain sufficient suction. Attempts should be made to equalize flow in both directions and size plumbing according to potential volume.
Additional Recommendations

In certain situations it is necessary to run the main trunk line at floor level along the wall. When doing this follow the recommendation for plumbing below floor level. Avoid running lines through doorways and other traffic areas.
Overhead Plumbing

General Recommendations

• Vacuum Piping to be Type M Copper or Schedule 40 PVC per product specs and local code.
• Main trunk lines must have a minimum slope of 1/4 inch per 10 feet towards the pump.
• Use “drain, waste and vent” (DWV), or 45 deg. elbows.
• Down size the main trunk line after every few junction boxes or branches in order to maintain sufficient suction.
• Every 50 feet of main trunk line should be considered a user.
• Attempts should be made to limit branch lines, orient main trunk lines in close proximity to the vertical vacuum lines.
• Some applications may require the main trunk line to be split, attempts should be make to equalize flow in both directions.
• Micro Mini Muffler / Vacuum Relief Valve (VRV) to be Installed at top of vent line in each operatory.
• Each Micro Mini Muffler / Vacuum Relief Valve VRV is considered 1/2 of a user.
• Maximum height of riser to the main trunk line trap is 10 feet. (A loss of 1” hg per 18” of rise limits height of trunk line.)
• It may be necessary to upgrade to the next size vacuum for systems with over head plumbing depending on the office size and usage.
• All risers need to be plumbed into the top of the main trunk line through a trap.
• We do not recommend combining overhead plumbing with below floor plumbing due to the different performance characteristics.
• When using in a oral surgery environment we recommend using the surgical operatory recovery room packages to collect everything and prevent build up/clogs in the lines and vacuum tank.
• Operation efficiencies must be considered I.E.: holding vacuum tips open longer in operatory’s to allow flow up walls to help prevent gurgling in plumbing.
Overhead plumbing - Sample Plumbing Layout

77005027 Micro Mini Muffler / VRV to be Installed at Top of Vent Line in Each Operatory to Keep Air Flow Pushing Liquids Up the Wet Line After HVE or SE is Closed

All Vertical Vent Lines are 1/2” Installed with VRV Above Inverted P-Trap. Allows Air Into System to Minimize Gurgling in Vacuum Lines

Optional Clean Out

All Vertical Wet lines are 1/2”

Vacuum Piping to be Type M or Schedule 40 PVC Maintain a 1/4” Slope per 10 feet of Piping (toward pump). Always Stagger Branch Lines From Main Trunk, Do Not Use 4-way Cross Fittings.

3/4” Inverted P-Trap

Use 45° Y’s and elbows only

Scavengers Should be Installed on the Vent Line to Prevent Backflow of Fluids Into Scavenger

Trunk Lines: Follow Sizing Guide Under Floor Installation and Add One User

Equipment Alert
Subfloor plumbing is preferred. Operatory utilization to be modified to allow flow up walls. Up size pump as per number of operatories. At least 1/2 user per VRV and 8 ft. riser. More than 8 ft. riser requires more pump capacity.

VRV is 1/8” MPT a 1/8” FPT fitting will need to be soldered to the top of the 1/2” vent line.
Overhead plumbing - Sample Plumbing Layout (Split Trunk Line)

Subfloor plumbing is preferred. Operatory utilization to be modified to allow flow up walls. Up size pump as per number of operatories. At least 1/2 user per VRV and 8 ft. riser. More than 8 ft. riser requires more pump capacity.

Scavengers Should be Installed on the Vent Line to Prevent Backflow of Fluids into Scavenger

Equipment Alert

77005027 Micro Mini Muffler / VRV to be Installed at Top of Vent Line in Each Operatory to Keep Air Flow Pushing Liquids Up the Wet Line After HVE or SE is Closed

All Vertical Vent Lines are 1/2" Installed with VRV Above Inverted P-Trap. Allows Air Into System to Minimize Gurgling in Vacuum Lines

3/4" Inverted P-Trap

Optional Clean Out

All Vertical Wet lines are 1/2"

Trunk Lines: Follow Sizing Guide Under Floor Installation and Add One User

Vacuum Piping to be Type M or Schedule 40 PVC Maintain a 1/4” Slope per 10 feet of Piping (toward pump). Always Stagger Branch Lines From Main Trunk, Do Not Use 4-way Cross Fittings.
Oral Surgery Plumbing Recommendations

General Recommendations (Power Max)

- Vacuum Piping to be Type M Copper or Schedule 40 PVC per product specs and local code.
- A Surgical Operatory Recovery Package is required for all Power Max applications.
- All liquids and solids should be collected in the Surgical Canister and disposed of per local codes prior to reaching the vacuum lines.
- Down size the main trunk line after every few junction boxes or branches in order to maintain sufficient suction.
- Every 50 feet of main trunk line should be considered a user.
- Attempts should be made to limit branch lines, orient main trunk lines close junction boxes or cabinets.
- Some applications may require the main trunk line to be split, attempts should be make to equalize flow in both directions.
- There is no loss of suction when overhead plumbing is used in conjunction with the Surgical Operatory Recovery Package due to no liquids or solids moving through the vacuum lines.

Power Vac ("G" / "std") specific recommendations

- When using in an oral surgery environment we highly recommend using the surgical operatory recovery room packages to collect everything and prevent build up/clogs in the lines and vacuum tank.
- When electing not to use the Surgical Operatory Recovery Package and collecting waste in the Power Vac collection canister, thorough line cleaning should be done after every procedure and the end of the day. The collection tank will also need rinsed periodically. When using the Power Vac style vacuum in this application the lines will have to be constructed with "drain,waste and vent"(DWV), or 45 deg. elbows (follow Overhead or Through the Floor specifications previously stated in this guide).
Oral Surgery - Sample Plumbing Layout (Split Trunk Line)

Equipment Alert
Subfloor plumbing is preferred. Operatory utilization to be modified to allow flow up walls. Upsize pump as per number of operatories. At least 1/2 user per VRV and 8 ft. riser. More than 8 ft. riser requires more pump capacity.

Vacuum Piping to be Type M or Schedule 40 PVC Maintain a 1/4” Slope per 10 feet of Piping (toward pump). Always Stagger Branch Lines From Main Trunk, Do Not Use 4-way Cross Fittings.