### Parts to Build an Auto-Cycling Vacuum Press

1. **Project EVS Kit™**
2. Additional Hardware Store Items
3. Vacuum Pump
4. Breather Mesh
5. Vacuum Bag
6. 3/4" Thick Melamine Board

#### Electric Vacuum Press Kits -

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Max Bag Size</th>
<th>Vacuum CFM</th>
<th>Maximum Vacuum</th>
<th>Maximum Force</th>
<th>Adjusted Vacuum</th>
<th>Noise</th>
<th>Evacuation Time</th>
<th>Background Noise</th>
<th>Pump Price</th>
<th>Kit Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Auto-Cycling Vacuum Press Kit</strong></td>
<td>Flat work: 4’ x 9’</td>
<td>3.5 CFM</td>
<td>25.5” Hg</td>
<td>1,785 lbs per square ft.</td>
<td>63 dB</td>
<td>114 seconds</td>
<td>63 dB</td>
<td>124 seconds</td>
<td>63 dB</td>
<td>$299.50</td>
<td>$183.90</td>
</tr>
<tr>
<td></td>
<td>Curved work: 4’ x 4’</td>
<td>4.5 CFM</td>
<td>25.5” Hg</td>
<td>1,785 lbs per square ft.</td>
<td>63 dB</td>
<td>54 seconds</td>
<td>53 dB</td>
<td>202 seconds</td>
<td>63 dB</td>
<td>$349.50</td>
<td>$259.50</td>
</tr>
</tbody>
</table>

#### Disadvantages

- The system is a bit heavy and takes more time to build than a comparable Excel kit.
- Limited to a vacuum bag no larger than 4’ x 4’ but for many users, it is perfect.
- Not quite as quiet as the Excel 5 system and a bit louder than Excel 1.

#### Comments

- This system is ideal for the woodworker who is looking for an affordable and reliable vacuum press system.
- Perfect for the woodworker who requires power-house vacuum press system that can handle large bags.
- The low cost of this system is just incredible. Get the vacuum clamping add-on. It is worth every penny.

#### Image

- Project: EVS Kit
- Project: EVS Kit
- Excel 1 Vacuum Press Kit
- Excel 3 Vacuum Press Kit
- Excel 5 Vacuum Press Kit

#### Links

- [Excel 1™ Kit](http://www.joewoodworker.com/veneering/excel-vacuum-presses/excel-1-kit)
- [Excel 3™ Kit](http://www.joewoodworker.com/veneering/excel-vacuum-presses/excel-3-kit)
- [Excel 5™ Kit](http://www.joewoodworker.com/veneering/excel-vacuum-presses/excel-5-kit)


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1. At sea level
2. Estimated
3. Estimated time to achieve 21” Hg for a flat panel in a 4’ x 4’ vacuum bag
4. If the reservoirs are pre-charged with vacuum before opening the vacuum valve
### Air Powered Vacuum Press Kits –

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>Auto-Cycling</td>
<td>Auto-Cycling</td>
<td>Auto-Cycling</td>
<td>Auto-Cycling</td>
<td>Auto-Cycling</td>
</tr>
<tr>
<td><strong>Max Bag Size</strong></td>
<td>2' x 4'</td>
<td>4' x 4'</td>
<td>4' x 9'</td>
<td>4' x 15' or 6' x 10'</td>
<td>6' x 15'</td>
</tr>
<tr>
<td></td>
<td>2' x 2'</td>
<td>2' x 4'</td>
<td>4' x 4'</td>
<td>4' x 6'</td>
<td>4' x 9'</td>
</tr>
<tr>
<td><strong>Vacuum CFM</strong></td>
<td>.5 CFM</td>
<td>1.2 CFM</td>
<td>3.2 CFM</td>
<td>5.5 CFM</td>
<td>9 CFM</td>
</tr>
<tr>
<td><strong>Maximum Vacuum</strong></td>
<td>25.5&quot; Hg</td>
<td>25.5&quot; Hg</td>
<td>25.5&quot; Hg</td>
<td>25.5&quot; Hg</td>
<td>25.5&quot; Hg</td>
</tr>
<tr>
<td><strong>Maximum Force</strong></td>
<td>1,750 lbs per square foot</td>
<td>1,750 lbs per square foot</td>
<td>1,750 lbs per square foot</td>
<td>1,750 lbs per square foot</td>
<td>1,750 lbs per square foot</td>
</tr>
<tr>
<td><strong>Adjustable Vacuum</strong></td>
<td>Yes (via vacuum controller)</td>
<td>Yes (via vacuum controller)</td>
<td>Yes (via vacuum controller)</td>
<td>Yes (via vacuum controller)</td>
<td>Yes (via vacuum controller)</td>
</tr>
<tr>
<td><strong>Air Compressor</strong></td>
<td>.8 CFM @ 80 PSI</td>
<td>1.8 CFM @ 80 PSI</td>
<td>4.8 CFM @ 80 PSI</td>
<td>7.8 CFM @ 80 PSI</td>
<td>12.5 CFM @ 80 PSI</td>
</tr>
<tr>
<td><strong>Output Requirement</strong></td>
<td>1.2 CFM @ 90 PSI</td>
<td>2.2 CFM @ 90 PSI</td>
<td>5.5 CFM @ 90 PSI</td>
<td>9 CFM @ 90 PSI</td>
<td>14 CFM @ 90 PSI</td>
</tr>
<tr>
<td><strong>Noise</strong></td>
<td>68 dB</td>
<td>68 dB</td>
<td>68 dB</td>
<td>68 dB</td>
<td>68 dB</td>
</tr>
<tr>
<td><strong>Evacuation Time</strong></td>
<td>262 seconds</td>
<td>118 seconds</td>
<td>66 seconds</td>
<td>38 seconds</td>
<td>25 seconds</td>
</tr>
<tr>
<td><strong>Build Time</strong></td>
<td>2 to 3 hours</td>
<td>2 to 3 hours</td>
<td>2 to 3 hours</td>
<td>2 to 3 hours</td>
<td>2 to 3 hours</td>
</tr>
<tr>
<td><strong>Items Not Included</strong></td>
<td>PVC Cement</td>
<td>PVC Cement</td>
<td>PVC Cement</td>
<td>PVC Cement</td>
<td>PVC Cement</td>
</tr>
<tr>
<td><strong>Kit Sale Price</strong></td>
<td>$279.50</td>
<td>$279.50</td>
<td>$289.50</td>
<td>$362.50</td>
<td>$390.50</td>
</tr>
<tr>
<td><strong>Vacuum Clamping</strong></td>
<td>Yes, w/ optional add-on kit</td>
<td>Yes, w/ optional add-on kit</td>
<td>Yes, w/ optional add-on kit</td>
<td>Yes, w/ optional add-on kit</td>
<td>Yes, w/ optional add-on kit</td>
</tr>
<tr>
<td><strong>Vacuum Forming</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Free Instructions</strong></td>
<td>Downloadable PDF</td>
<td>Downloadable PDF</td>
<td>Downloadable PDF</td>
<td>Downloadable PDF</td>
<td>Downloadable PDF</td>
</tr>
<tr>
<td><strong>Advantages</strong></td>
<td>Great for very small compressors. The kit is easy to</td>
<td>Great for small compressors. It's very easy to build</td>
<td>Very reliable and easy to build. Excellent vacuum</td>
<td>This version of the kit is very</td>
<td>A system like this can handle almost any veneering</td>
</tr>
<tr>
<td></td>
<td>build and ultra-reliable.</td>
<td>and of course it's ultra-reliable.</td>
<td>speed at a super low cost.</td>
<td>fast. It's even faster than a 5 CFM electric vacuum</td>
<td>project that you can imagine.</td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
<td>It's not as fast as some users prefer and has a lower</td>
<td>Faster than the Mini version but not as fast as the</td>
<td>Requires a small to medium size compressor but it's</td>
<td>Requires a decent size air compressor and uses 7.8 CFM</td>
<td>Requires a large air compressor and uses 12.5 CFM</td>
</tr>
<tr>
<td></td>
<td>performance-to-cost ratio.</td>
<td>other kits offered here.</td>
<td>very efficient with the air.</td>
<td>of air to create vacuum.</td>
<td>of air to create vacuum.</td>
</tr>
<tr>
<td><strong>Comments</strong></td>
<td>This system is best suited for smaller projects but if</td>
<td>If your compressor will allow it, spend an extra 10</td>
<td>This is the kit that gives you the most bang for your</td>
<td>The upgraded parts cause a jump in price but overall,</td>
<td>Similar high-speed systems can cost more</td>
</tr>
<tr>
<td></td>
<td>you own a small air compressor, it's not a bad deal.</td>
<td>bucks to get the “Plus” model. It's a very worthwhile</td>
<td>buck. This is one of my favorite vacuum presses.</td>
<td>this is a very cost-effective vacuum pressing system.</td>
<td>than twice as much.</td>
</tr>
</tbody>
</table>

**Image**

- [Project: V4 Vacuum Press Kit](http://www.joewoodworker.com/veneering/frequently-asked-questions.htm)

**Questions & Answers**

1. **Your Air Compressor**
   - Recommended: 
     - An Air Compressor.
     - DC or AC. 
     - 2-3 CFM is the minimum. 
     - The upgraded parts cause a jump in price but overall, this is a very cost-effective vacuum pressing system. 

2. **Project: V4 Kit™**
   - 4' x 4' Max Bag Size: 
     - Flat work: 
       - 1.750 lbs per square foot: 
         - The kit is very fast. It's even faster than a 5 CFM electric vacuum pump. 

3. **Breather Mesh**
   - 1.750 lbs per square foot: 
     - Requires a large air compressor and uses 12.5 CFM of air to create vacuum. 

4. **Vacuum Bag**
   - 1,750 lbs per square foot: 
     - Requires a decent size air compressor and uses 7.8 CFM of air to create vacuum. 

5. **3/4” Thick Melamine Board**
   - 1,750 lbs per square foot: 
     - Requires a large air compressor and uses 7.8 CFM of air to create vacuum. 

**Vacuum Clamping**

- Yes, w/ optional add-on kit
- Yes, w/ optional add-on kit
- Yes, w/ optional add-on kit
- Yes, w/ optional add-on kit
- Yes, w/ optional add-on kit

**Advantages**

- Great for very small compressors. The kit is easy to build and ultra-reliable.
- Great for small compressors. It's very easy to build and of course it's ultra-reliable.
- Very reliable and easy to build. Excellent vacuum speed at a super low cost.
- This version of the kit is very fast. It's even faster than a 5 CFM electric vacuum pump.
- A system like this can handle almost any veneering project that you can imagine.

**Disadvantages**

- It's not as fast as some users prefer and has a lower performance-to-cost ratio.
- Faster than the Mini version but not as fast as the other kits offered here.
- Requires a small to medium size compressor but it's very efficient with the air.
- Requires a decent size air compressor and uses 7.8 CFM of air to create vacuum.
- Requires a large air compressor and uses 12.5 CFM of air to create vacuum.

**Comments**

- This system is best suited for smaller projects but if you own a small air compressor, it's not a bad deal.
- If your compressor will allow it, spend an extra 10 bucks to get the “Plus” model. It's a very worthwhile upgrade.
- This is the kit that gives you the most bang for your buck. This is one of my favorite vacuum presses.
- The upgraded parts cause a jump in price but overall, this is a very cost-effective vacuum pressing system.
- The 9 CFM venturi is ridiculously quick. Similar high-speed systems can cost more than twice as much.

**Image**

- [Project: V4 Vacuum Press Kit](http://www.joewoodworker.com/veneering/frequently-asked-questions.htm)

**Estimated**

- 2 to 3 hours
- 2 to 3 hours
- 2 to 3 hours
- 2 to 3 hours
- 2 to 3 hours

**Estimated time to achieve 21" Hg for a flat panel in a 4' x 4' vacuum bag**

- It's not as fast as some users prefer and has a lower performance-to-cost ratio.
- Faster than the Mini version but not as fast as the other kits offered here.
- Requires a small to medium size compressor but it's very efficient with the air.
- Requires a decent size air compressor and uses 7.8 CFM of air to create vacuum.
- Requires a large air compressor and uses 12.5 CFM of air to create vacuum.

**If the reservoirs are pre-charged with vacuum before opening the vacuum valve**

- If the reservoirs are pre-charged with vacuum before opening the vacuum valve.
More Information About Our Vacuum Bags

- All VeneerSupplies.com vacuum bags are built in the USA.
- Each vacuum bag includes one bag closure.
- Each vacuum bag also includes our flush-mount stem.
- A lock-on connector, which is included with all of our vacuum press kits, is required to attach the vacuum tube to the bag.
Choosing a Vacuum Press

There are three types of vacuum presses for veneering. The information below refers to the systems offered at VeneerSupplies.com.

**Auto-Cycling Venturi System:** The Project: V4 kit creates vacuum using compressed air through a vacuum generator called a venturi. This system does not include an air compressor but you can buy one larger home improvement stores. The vacuum press is automatically controlled by a switching device that measures the vacuum level inside of the system and keeps it reasonably constant by opening the flow of compressed air to the venturi if the vacuum level decreases. The air compressor only runs if the air in the tank drops below level set by the manufacturer.

**Auto-Cycling Electric Pump System:** The Project: EVS kit also cycles on and off but achieves vacuum via an electric pump. Like the venturi system, it is automatically controlled by a switching device which measures vacuum inside of the system and keeps it reasonably constant by turning the pump on until the desired vacuum level is reached.

**Continuous-Run Electric Pump System:** A continuously running vacuum system such as the Excel 1, Excel 3, or Excel 5 uses an electric pump but does not cycle on and off. It run continuously, but don’t worry… most pumps are rated for continuous duty and some manufacturer suggest that these types of pumps can run for two years without stopping. These systems are less expensive and easy to assemble.

Other Considerations

**Performance**

**Maximum Vacuum:** Each of these systems can pull more than enough vacuum for veneering and clamping most bent lamination projects. The maximum vacuum is 25.5" of Hg at sea level for all of the systems we offer. This equals roughly 1,800 lbs of pressure per square foot. See this chart for details. Keep in mind that approximately 1" of Hg is lost for every 1,000 feet above sea level. If a pump is capable of pulling 25.5" of Hg at sea level, it will only pull 20.5" at 5000' above sea level.

**Cubic Feet per Minute:** The most common performance measure is the flow rating at zero vacuum. This coincides with the amount of time it takes to draw full vacuum on a vacuum bag. Bags that have a large amount of air inside (such as those being used with a curved veneer project) will benefit from a high-CFM vacuum source. More information about this is provided in the chart in the next page. VeneerSupplies.com offers vacuum sources from 1 CFM to 9 CFM.

*Keep in mind that a venturi will typically create full vacuum faster than a comparable electric pump. This is referred to as the “CFM Curve”. It simply means that 3 CFM electric pump will draw vacuum slower than a 3 CFM venturi.*
Project/Vacuum Bag Size
The CFM of the vacuum source typically determines the maximum bag size that can be used. Keep in mind, these are estimates.

<table>
<thead>
<tr>
<th>Project</th>
<th>Minimum Requirement for Flat Panels</th>
<th>Minimum Requirement for Curved Panels</th>
</tr>
</thead>
<tbody>
<tr>
<td>4' x 4' or smaller vacuum bags</td>
<td>1 CFM</td>
<td>3 CFM</td>
</tr>
<tr>
<td>4' x 6' to 4' x 8' vacuum bags</td>
<td>3 CFM</td>
<td>5 CFM</td>
</tr>
<tr>
<td>4' x 9' to 6' x 15' vacuum bags</td>
<td>5 CFM</td>
<td>9+ CFM</td>
</tr>
<tr>
<td>Vacuum clamping</td>
<td>1 CFM for non-porous materials</td>
<td>3+ CFM for porous materials</td>
</tr>
<tr>
<td>Vacuum chucking on a lathe*</td>
<td>1 CFM for very small projects</td>
<td>5 CFM for medium projects</td>
</tr>
</tbody>
</table>

* This largely depends on the porosity of the project.

Reliability
All of the systems described here are very reliable pieces of equipment with a focus on reduced complexity. Each component of every vacuum press kit uses vigorously tested components from trusted suppliers. Several of our vacuum press plans have been available and in use since 2002. A venturi-based model from 2003 is still the workhorse in my own shop! Consider posting a question on any of the online woodworking forums for more feedback on our vacuum press kits. We have very a helpful customer base.

Portability
Though the Project: EVS system is portable in the sense that electricity is easily obtainable, the system can weigh 30 lbs or more. Some users put casters on the bottom of the system to roll it around their shop. The 18 lb weight of the Project: V4 makes it very portable but compressed air is often not as easy to find outside of the workshop. The Excel 1 weighs approximately 14 lbs. The Excel 3 and Excel 5 weigh about 18 lbs and since they run on electricity alone, the Excel kits are the most portable systems we offer.

Adjustability
With the standard vacuum controller included with the Project: EVS and Project: V4 kits, the vacuum level can be adjusted from 10.5" to 25.5" of Hg. For most veneer projects, a setting between 18" and 21" is ideal. Excessive vacuum levels do not improve the bond of the veneer to the substrate. It only forces the vacuum source to work harder and risks glue-line starvation. The EVS and V4 kits can be upgraded with a special vacuum controller designed for lower vacuum levels on projects such foam core modeling. The Excel 1, 3, and 5 systems can be adjusted from 5" to 25.5" of Hg using the simple bleeder valve included with the kit.

Noise Factor

- **Project V4**: These systems operate at 68 dB during the “on” cycle which is less than the sound of a running shower.

- **Excel 1, 3, and 5**: The Excel 1 systems operates at 53 dB which is said to be the sound level of conversational speech at home. The Excel 3 and 5 operate at 63 dB which is slightly louder than conversational speech volume in the workplace.

- **Project EVS**: The 1, 3, and 5 CFM pumps offered at VeneerSupplies.com operate at 63dB. In an auto-cycling system the sound is only present when the unit is recharging the vacuum.
**Build Time**
- Project V4: less than 2 hours
- Project EVS: 3 to 7 hours
- Excel 1: 20 to 25 minutes
- Excel 3 and Excel 5: 30 to 35 minutes

**Benchtop Vacuum Clamping**
The companion clamping kit allows you to use the massive holding power of vacuum to instantly hold work pieces to your bench top for sanding, routing, carving and more. The picture shown to the right is the version used for the Project: EVS and Project: V4 systems. A clamping add-on for the Excel and CRS kits is also available. You’ll likely be surprised by the ease and versatility of a simple vacuum clamping set up.

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**Don’t Forget Breather Mesh**
Breather mesh is a unique plastic fabric that allows air to flow to the bag stem. When used in conjunction with bottom platen made from 3/4” thick melamine board (available at your local hardware store) breather mesh helps create an even level of vacuum on the project. It is used in place of a top platen. Without it, the vacuum bag material will seal itself against the veneer causing pockets of air to form. These pockets have little or no vacuum inside and therefore do not provide the even clamping strength required to keep the veneer pressed firm to the substrate during the vacuum pressing process. Use breather mesh to distribute vacuum evenly throughout the bag. This is the key to successful vacuum pressing!