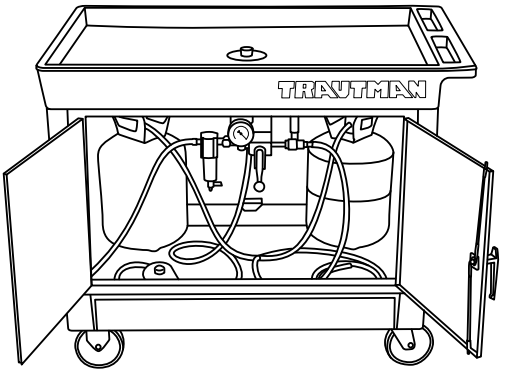
Trautman Mobile Vacuum Unit

from Fillauer LLC

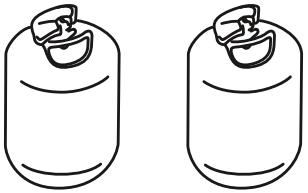
PRODUCT MANUAL

Fillauer COMPANIES

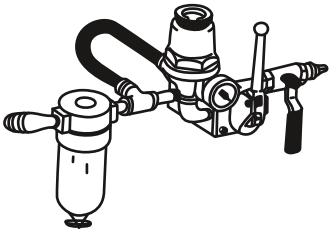
TRAUTMAN MOBILE VACUUM UNIT



The heart of the Mobile Vacuum Unit (MVU) is a vacuum control assembly which permits a rapid change in mode from low vacuum to high vacuum by means of a control valve. There is also a foot valve for momentary interruption of the vacuum. The MVU comprises a plastic storage cart on casters to which a Formica covered plywood table top has been affixed. In the center of the table top a section of 1 in. I.D. pipe is mounted so that it projects downward. The bottom end of the pipe is threaded to accept an end cap and a locking screw is provided in the middle portion of the pipe. This section of pipe will accept the platens or the angled or straight adapter as well as any plaster mold. Any of them is secured in proper orientation by the locking screw. For vacuum forming, directly on the table top an end cap connected to the vacuum control assembly is secured to the free end of the pipe.

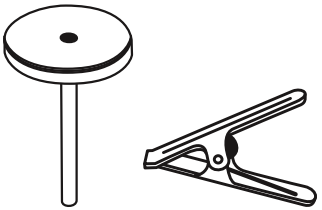


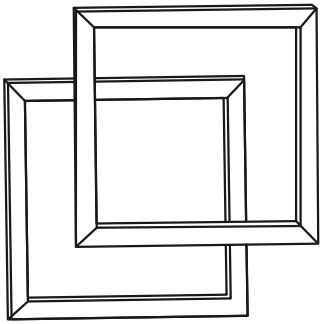
Two surge tanks (Cat. # 227503) are strapped to the inter posterior legs of the cart. Surge tanks act in a manner somewhat analogous to a flywheel. Should there be a delay in establishing a proper seal in the work, they maintain negative pressure while the hole or gap is closed and the vacuum pump labors to establish equilibrium. While a vacuum pump (Cat. # 227005) is available, any of the pumps commonly used in O&P facilities should prove effective.



The surge tanks are connected on one side to the vacuum pump and on the other to one end of the vacuum control assembly (Cat. # 227500). The other end of the control assembly is connected to the work in progress. Closest to the surge tank is the master cut off valve (Cat. # 227511) which is commonly kept closed to allow for the build up of negative pressure in the tanks. Next

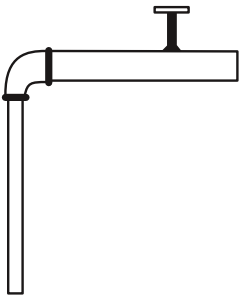
is the three-way control valve (3) (Cat. # 227529). When the lever is vertical the valve is closed. Tipping the lever one way or the other opens one of two vacuum lines. The high vacuum line connects the work directly to the surge tanks for full vacuum. The low vacuum line is connected to the work via the pressure regulator (4) (Cat. # 227537) and gauge (5) (Cat. # 227545) of the vacuum control assembly. It is used in the initial stages of blister or drape forming so that the plastic sheet can be drawn in very slowly and provide the operator time to eliminate any webs that may start to form. Once the walls are drawn in web-free, the three-way valve is used to establish full vacuum. Both lines are connected to a filter-water trap* (6) (Cat. # 227552). This is used to prevent contamination of the control assembly and pump by any excess water that is trapped in the plaster model. The rubber hose that leads from the water trap to the model or platen has mounted on it a foot operated on-off valve (7) (Cat. # 227560). This is used in connection with the low pressure line to interrupt the flow of vacuum (and thus the movement of the plastic sheet) to facilitate the prevention of webs.





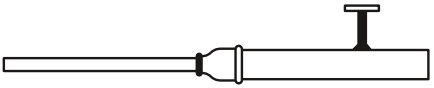
*** N.B. To achieve maximum protection of the gauge and regulator, the trap must be emptied after each use with web models.**

Two aluminum topped platens (9 in. dia.—Cat. # 227354, and 12 in. dia.—Cat. # 227347) are available, these are used with the steel frames (12 x 12 in., Cat. # 227420; 16 x 16 in., Cat. # 227438) and spring loaded clamps (Cat. # 227594, set of 4) for blister drape forming. This is used for the vacuum forming of objects such as sockets. It has the advantage that objects so formed will not have a seam (an optional technique for blister drape forming with a seam is described elsewhere) and normally only one operator is necessary. The disadvantages are that webs of excess plastic may form, the work will thin out from distal to proximal and its suitability is limited by the draw ratio. This is the ratio between the height of the model and the base dimension. The greater the ratio (great height vs. small base, i.e. Symes model) the greater the difficulty in obtaining proper results.



The angled drape forming adapter (Cat. # 227495), is available for instances such as this and is used for drape molding. This compromises an L-shaped assembly of pipe.

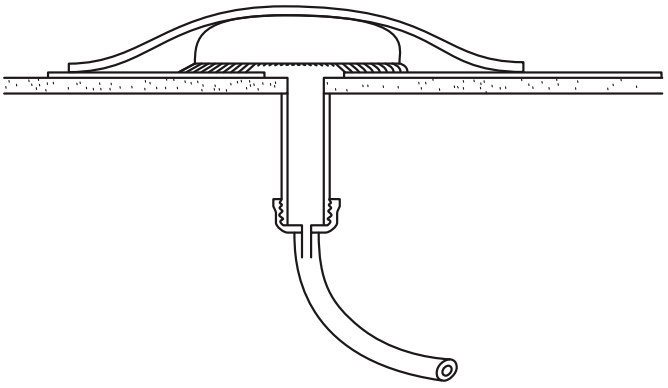
The small diameter end is mounted in the MVU so that the large diameter section is horizontal and projects past the edge of the table. A locking screw in this section is used to secure the model in place. Plastic is then draped and sealed around the model and shaft of the horizontal adapter. Objects formed in this manner are of relatively uniform wall thickness. The drawbacks are that a seam is inevitable and two operators are normally needed. This form of vacuum forming on the MVU is normally used for relatively small objects (AFO, short KAFO, or small body models) that will not tip the MVU over. For handling larger objects either the angled or straight adapter (Cat. # 227497) may be secured in the D-F pipe holding fixture which is mounted on a work bench Cat. # 220131).



VACUUM FORMING DIRECTLY ON THE TABLE TOP

This is a very simple and expeditious way of forming simple objects of very low draw ratios. It is particularly useful for repetitious forming of identical or very similar objects such as arch supports.

1. Remove any adapter or platen from the center pipe.
2. Screw the end cap onto the center pipe.
3. Secure the vacuum line to the brass nipple of the end cap.
4. Position a sheet of latex (1/8 in. thick) with a hole in the middle on the table top so that the hole in the sheet leaves the upper end of the pipe free. The sheet should be large enough to cover most of the table top. 1/8 in. latex



sheeting (Cat. # 211018) is available from Fillauer in 36 in. width by the foot.

5. Lay a piece of dacron felt slightly larger than the model on the table top over the center hole.
6. Position the model on the table—if necessary drill vacuum holes (1/16 in. dia.) through the model to expedite evacuation of trapped air from under cut areas.
7. Heat a sheet of the appropriate plastic on a sheet of Teflon-fiberglass sheet (Cat. # 211045 - 3 mil., 211086 - 10 mil.) in the oven. The plastic should be slightly larger than the model, allowing for the height of the model. In general less wastage is generated with this form of working than others.
8. When it is hot enough remove the plastic from the oven carrying it by the Teflon-fiberglass sheet.
9. Lay the two on the floor or a work table immediately adjacent to the MVU.
10. Peel the plastic from the Teflon sheet.
11. Drape the plastic on the model, stretching as necessary to remove wrinkles.
12. Open the high pressure line.
13. Using hands or a simple frame press the plastic down onto the latex to seal the two together. Once sealed the negative pressure will maintain the seal.
14. Cool the work if desired with an air gun.
15. When cool enough, shut off the vacuum and remove the model and plastic from the MVU table.

DRAPE FORMING WITH A SEAM

1. Position the angled adapter in the MVU table and connect the vacuum hose. If the work to be vacuum formed is too heavy for the MVU table, secure the adapter in a vise on an adjacent work bench.
2. Position the model in the adapter in the proper orientation and secure with the locking screw.
3. Pull a nylon hose or length of stockinette, if its use is indicated, over the model and secure to the pipe with clear stretch tape (Cat. # 199430).
4. Cut a sheet of plastic to size. It should extend beyond the model several inches at both ends and be at least 2 in. longer than the circumference. Clean it.
5. Position the sheet on a Teflon-fiberglass sheet (Cat. # 211045 0.3 m or 211088 0.10 m) and place the two in the oven.
6. When hot enough, remove the two from the oven with the aid of an assistant if necessary and position adjacent to the MVU table on a work table.
7. Pick the plastic up off the Teflon sheet being careful not to stretch it too much.
8. Position the plastic over the model taking care to ensure that there is enough

plastic extending beyond the model at both ends to allow it to be sealed.

9. Lower the plastic onto the model.
10. Working from both ends, stretch the plastic around the model taking care to stretch any wrinkles past the trim lines and seal the plastic to itself below the model.
11. Open the high pressure valve.
12. While one operator seals the plastic around the adapter, the other uses a pair of large scissors to cut away excess plastic. This removes the weight of the excess plastic and seals the two surfaces together.
13. When the plastic is cool enough, the vacuum valve is closed and the model removed from the adapter.

In cases of bivalve body jackets or similar devices where an overlapping seam is desired the following procedure is used.

1. Cut the first section at the lateral trim lines and reposition it on the model. Tacks or staples may be necessary to secure it in place.
2. Heat and stretch on a layer of ventilates Pe-Lite if desired, rubbing along the overlap to assure good definition. Trim the lateral edges of the Pe-Lite and skive if desired.
3. Position the model in the adapter with the surface to be vacuum formed up.
4. Apply a fresh nylon hose or piece of stockinette for vacuum.
5. Position the Pe-Lite, securing it with glue or staples.
6. Apply something like a length of cheap rope or 1 in. wide 1/2 in. thick Pe-Lite to the under surface of the model to prevent cutting the first section when the second is cut away.
7. Vacuum form as before.

LAMINATING WITH THE MVU

1. The straight adapter is positioned in the central pipe (Cat. # 237497).
2. Position the model to be laminated in the adapter and tighten the setscrew.
3. Apply the first PVA bag and use the low pressure line and regulator to adjust the vacuum.
4. Apply the lay-up and second PVA bag.
5. Punch a hole in the inner bag and tie the outer bag off below the lay-up.
6. Secure the free end of the bag inside a PVA bag collar by passing the end up through the collar, reflecting it around the collar, and applying a rubber band.
7. Proceed with laminating as usual. Adjust vacuum pressure with the regulator. Take care not to flood the trap with resin.

GUIDELINES FOR THE USE OF CARBON FIBER INSERTS

Carbon fiber inserts are used in prosthetic and orthotic devices to add rigidity and strength to selected high stress areas. The most frequent use of such inserts has been to stiffen the ankles of AFOs and KAFOs. Prefabricated inserts are available for this instance. Custom formed inserts for the ankle as for other applications can be cut from carbon composite sheets as necessary. Care should be taken to position patterns on the sheet at an angle of 45° relative to the long axis so as to prevent inserts from buckling and delaminating when they are molded to the model. The edges towards the model should be beveled at an angle of 45° so as to allow the hot plastic to mold in under the edge during vacuum forming. This locks the insert into the finished device like a dovetailed joint or the keystone of an arch and assures structural integrity.

Polypropylene should be used for the fabrication of devices incorporating inserts as materials such as copolymer will not flow in under the edge enough to insure proper interlocking. Inserts should be elevated above the surface of the model with mounting pads (Cat. # 076109) to similarly allow room for the plastic under the insert. Meticulous attention must be paid to the details of vacuum forming. Every precaution should be taken to be sure that the plastic is hot enough, to work fast enough, and to have full vacuum as soon as possible. In many instances it has proven desirable to provide a vacuum channel to the area underneath the inserts to ensure proper encapsulation.

For objects such as KAFOs or AFOs the following procedure is followed. The location of the insert is determined and marked. A hole (1/16 in. dia.) is drilled from inside the material perimeter of the insert to the anterior surface of the model. A large diameter hole is drilled in the anterior surface of the model. A large diameter hole is drilled in the anterior surface where the two vacuum holes from the inserts merge. One end of cheap 1/4 in. - 1/2 in. manila rope is inserted into the hole and the rope is led proximally to the proximal end of the model and secured to the anterior surface with staples or tape. This rope provides direct channel for the evacuation of air from around the inserts.

MOBILE VACUUM UNIT

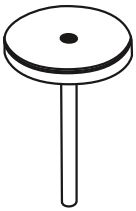
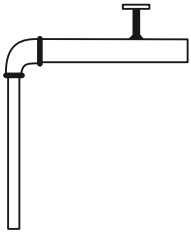
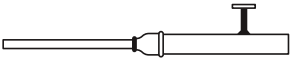
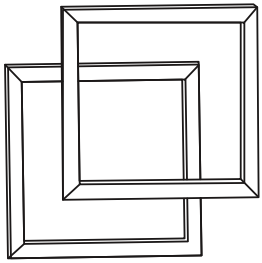
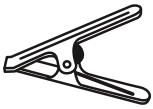
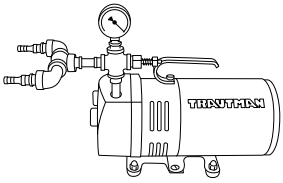
FEATURES:

- Sturdy, heavy-duty plastic molded cart with casters and Formica covered wood top.
- Multi-function table top for:
  - **a.** Pipe mounted
  - **b.** Vacuum forming directly on the table top
  - **c.** Pipe holding fixture for horizontal and vertical vacuum forming
  - **d.** Laminating capable
  - **e.** Drape forming
  - **f.** Blister forming
- Master cut-off valve and three-way valve
- Three-way valve provides:
  - **a.** Neutral (off) position
  - **b.** Hi vac line—full vacuum direct from vacuum source
  - **c.** Low vac line—controlled by regulator
- On-off foot operated valve
- Filter and water trap (wet plaster models release 4-6 oz. of water which could contaminate regulator, gauges and pump).
- Three gallon Surge tanks
- Peg board sites for storing accessories

227305 Mobile Vacuum Unit

227503	Surge Tanks
227511	Master Cur-off Valve
227529	Three-way Valve
227537	Regulator
227545	Gauge
227552	Filter-water Trap
227560	On-off Foot Control

ACCESSORIES

	**227354** **227347**	Platen—9 in. Platen—12 in.	Each
	**227495**	Angled Drape Forming Adapter	Each
	**227497**	Straight Drape Forming Adapter	Each
	**227420** **227438** **227443** **227449** **227450** **227451**	Holding Frames 12 x 12 in. Holding Frames 16 x 16 in. Holding Frames 18 x 18 in. Holding Frames 20 x 20 in. Holding Frames 22 x 22 in. Holding Frames 24 x 24 in.	Set
	**227594**	Spring Clamps	Set of Four
	**227005** **227020**	Vacuum Pump Dual Vacuum Pump	Each

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