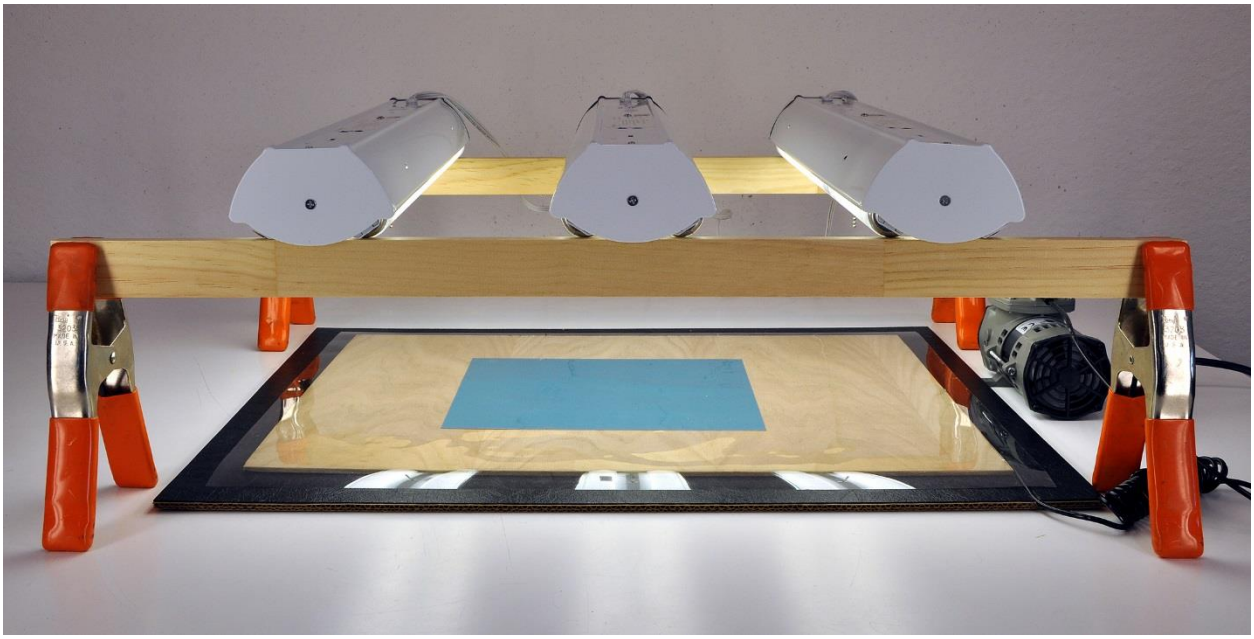


How to Build a Portable and Inexpensive Vacuum Exposure Unit

Bud Shark

Since 1976 I have used a *homemade* exposure unit for thousands of photo plates created in my studio. When I started Shark's I wasn't able to afford a manufactured commercial exposure unit and improvised a simple and crude unit. Since then I have continued to use a *homemade* unit based on that first one for exposing all photo plates. This information will describe how to build a portable and inexpensive vacuum exposure unit using commonly sourced materials. The exposure unit may be used for photo positive and negative lithography plates, solar plates and other photo-based processes up to 18 x 26 inches. The unit can be easily customized for plates of any size.

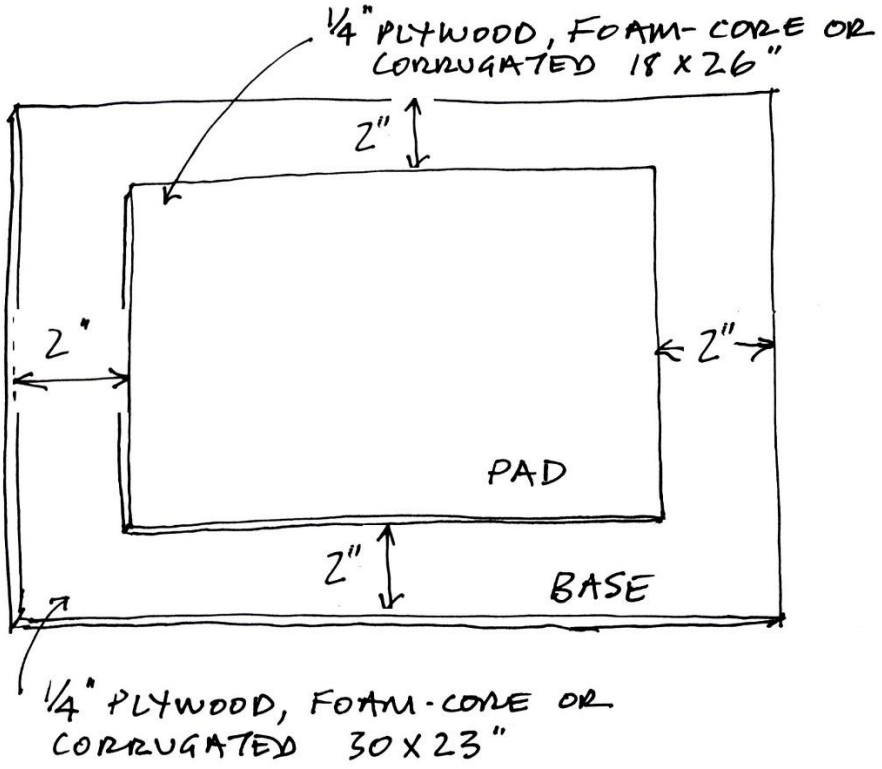
BUILDING THE UNIT:

Step 1: *Base:* Cut a ¼"plywood, foam core or corrugated cardboard base to 23 x 30"

Step 2: *Pad:* Cut a ¼"plywood, foam core or corrugated cardboard pad to 18 x 26". I use a router to cut channels on the back of the pad to create airways that help evacuate the air when exposing a plate. This can also be done by using a utility knife or other tool.

Step 3: Place the pad on top of the base. Center and secure using double sided tape, tacks or small dots of glue. See *Diagram 1 (Page 2)*.

Diagram 1



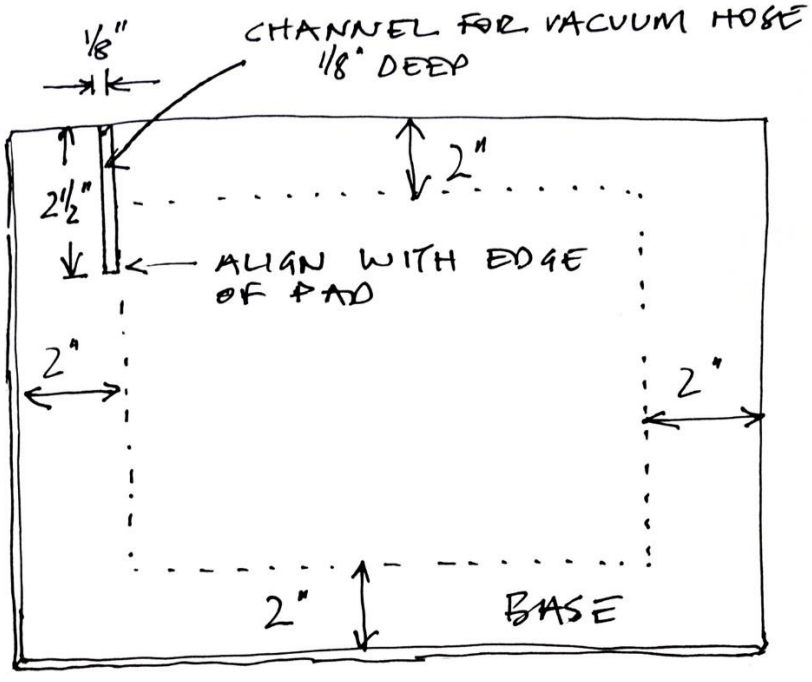


Diagram 2

Step 4: Cut a ⅛ x 2 ½" channel, about ⅛" deep, in the base for vacuum pump hose. Align channel with the edge of the pad. See *Diagram 2 (Page 2).*

Step 5: Glue vacuum hose into channel using hot glue or silicon sealant.

Step 6: Cut a piece of *Dura-Lar* to 21 x 28".

Step 7: Tape the perimeter of the surface base with 2" Gaffer's tape (or other cloth tape). This layer of tape will protect the base from other tape that will be used when exposing a plate.

Step 8: Center the cut *Dura-Lar* sheet overlapping pad about 1 -1¼".

Step 9: Tape top and left sides of *Dura-Lar* in place with 2" Gaffer's tape (or other cloth tape). Be sure to seal the top and left edge of *Dura-Lar* completely with the tape for vacuum seal.

Step 10: Connect hose to vacuum pump inlet connection.

Step 11: Connect vacuum pump to power strip and extension cord (if needed).

Step 12: Attach spring clamps to both ends of two 34"x 1 x 2" wood molding. See photograph on first page.

Step 13: Place 3 - 24" two-tube fluorescent light fixtures (with tubes) on top of assembled 1 x 2/clamp supports at 9" centers. This will place the lights at approx. 9" above the plate…which is the recommended height for exposure.

Step 14: Attach light fixtures to power strip and extension cord (if needed).

EXPOSING A PLATE:

Step 1: Cut a photo plate to size.

Step 2: Position artwork, transparency or film on plate with emulsion/drawing side face-down on the emulsion/coated side of plate.

Step 3: Insert plate with transparency under *Dura- Lar* centered on pad.

Step 4: Tape right and bottom edges of *Dura-Lar* tightly with masking tape or other easily removable tape. *Important:* Make a tight seal along all edges of the *Dura-Lar* for vacuum.

Step 5: Turn on vacuum pump. Make sure of good connection without air leaks at the fitting of base/pad and at pump. You should see suction occurring and very good contact with film and plate. If not, check connections and tape seal.

Step 6: Turn on lights. Expose for 7 to 7½ minutes (for Emerald Positive litho plates). Test exposures ranging from 7 to 8 minutes to determine optimal exposure time.

Step 7: Turn off lights

Step 8: Disconnect hose from vacuum pump and let it run *open* for a few minutes to cool.

Step 9: Turn off pump.

Step 10: Remove masking tape from *Dura-Lar* on right and bottom sides. Leave Gaffer's tape on top and left sides permanently.

Step 11: Remove plate and develop, store or print according to manufacturer's directions.

MATERIALS/SUPPLIES:

Vacuum Pump:
Source: Zoro.com
Link: http://www.zoro.com/i/G0847262/
Item # G0847262
Description:
Compressor/Vacuum Pump, Compressor Type Diaphragm, 1/20 HP, Voltage 115, 60 Hz, 1.7 Full Load Amps, Inlet Size 1/8 In. NPT, Outlet Size 1/8 In. NPT, Max. Vacuum 22.1, Max. PSI Cont./Int. 20/30, Free Air CFM @ 0 PSI 0.69, Free Air CFM @ 30 PSI 0.14, Free Air CFM @ 0 Vacuum 0.69, Free Air CFM @ 20 Vacuum 0.05, Power Cord No, Overall Length 7 In., Overall Width 4-1/4 In., Overall Height 4-3/4 In.
Quantity: 1
Cost: $245.00

Hose:
Source: Coast Airbrush
Link: http://www.coastairbrush.com/proddetail.asp?prod=CTI-10&cat=26
Item # Product ID: CTI-10
Description: Iwata / Tamiya 10' Coiled Airbrush Hose
Quantity: 1
Cost: $22.95 (plus shipping)

Dura-Lar:
Source: Dick Blick (or other art supply)
Link: http://www.dickblick.com/items/55506-1006/
Item # 55506-1006
Description: Clear Overlay Roll .003" 40" × 25 ft
Quantity: 1
Cost: $19.12 (plus shipping)
Note: *Dura-Lar* is superior to glass because it will not break or tear and conforms to the plate and drawing material/film for much better contact with the plate.

Fluorescent fixtures:
Source: The Hydro Shop or local hardware/lighting store
Link: http://www.longbeachhydro.com/
Item # 89
Description: 24" 2-Tube - Shop Light Fixture
Quantity: 3
Cost: $86.72 (3 x 24.99 = $74.97 plus shipping $11.75)

Fluorescent bulbs:
Source: Home Depot, Lowes or local hardware/electrical supply
Link: http://www.lowes.com/pd_148044-371-64244_0+1z0v1dp__?productId=3379956&Ntt=fluorescent+light+tubes&pl=1&currentURL=%3FNtt%3Dfluorescent%2Blight%2Btubes%26page%3D1&facetInfo=24
Description: GE 20-Watt Cool White 24" Fluorescent Tube Light Bulb (or similar)
Quantity: 6
Cost: +/-$45.18 ($7.53 x 6)

Clamps:
Source: Home Depot or local hardware store
Item: Pony #3203 spring clamps
Link: http://www.homedepot.com/p/Pony-8-in-Jaw-3-in-Jaw-Opening-Spring-Clamp-3203-HT-K/100348650
Description: 8" spring clamps
Quantity: 4
Cost: $10.88 ($2.72 x 4)

Wood:
Source: Lumber yard, Home Depot
Item: 1 x 2" x 34"
Description: 1 x 2" finger-joint or other similar material
Quantity: 2 - 34"
Cost: +/- $3.00

Other:
Power strips: (1 or 2)
Extension cords: as needed
Gaffer's tape: 2" wide - 1 roll
Masking tape: 2" wide - 1 roll
Silicon sealant: 1 tube
Cost: +/- $28.00

Total estimated cost of materials: $460.00

SOME NOTES:

-Many other compressor/vacuum pumps are available in a wide price range. All compressors are vacuum pumps and all vacuum pumps are compressors. They intake air creating a vacuum and they expel air creating pressurized air. The connection to a vacuum port or an air pressure port is not always easily accessible depending on the intended use of the pump. When purchasing a pump check carefully to be sure that you can connect to the vacuum port.

-The Emerald photo-litho plates are not highly sensitive to light and can be handled in normal lighting conditions.

-This unit was designed to be portable, inexpensive and a convenient size. One can easily be expanded and built as a more permanent unit. The current unit I am using in my studio handles plates 36 x 52" and is built into shelves in a storage area. I use a larger and more powerful vacuum pump***** and 48" light fixtures otherwise it's the same materials…Dura-Lar/tape etc.

*****The larger and very reliable vacuum pump we use is the GAST DOA-P704_AA (about $485.00).