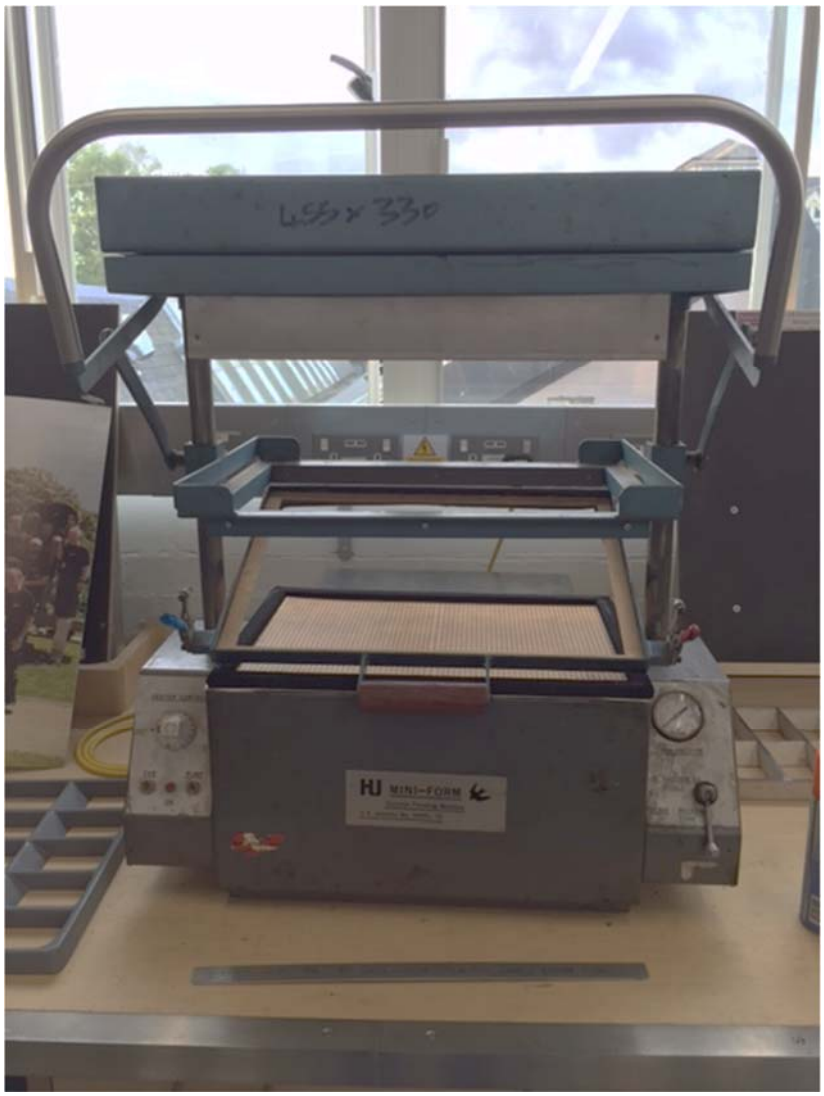
UNIVERSITY OF CAMBRIDGE
Department of Engineering

Dyson Centre
For Engineering Design

User manual for

the Vacuum Former



Created/edited by	Version	Date
Diana Thomas-McEwen	V2	03/10/2016

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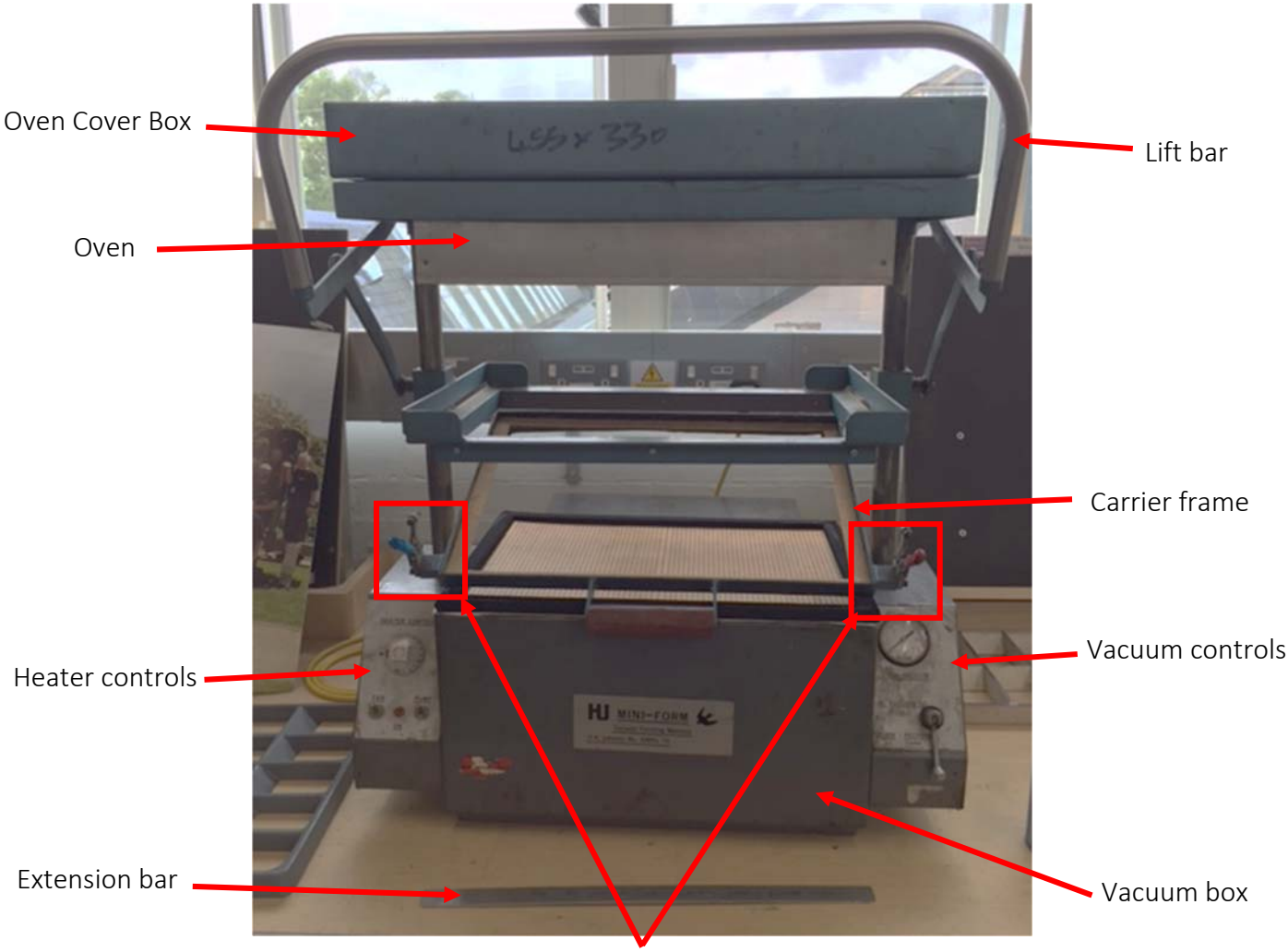
Vacuum Former User Manual

1.0 Machine Familiarisation

1.1 Machine Front



Heater controls

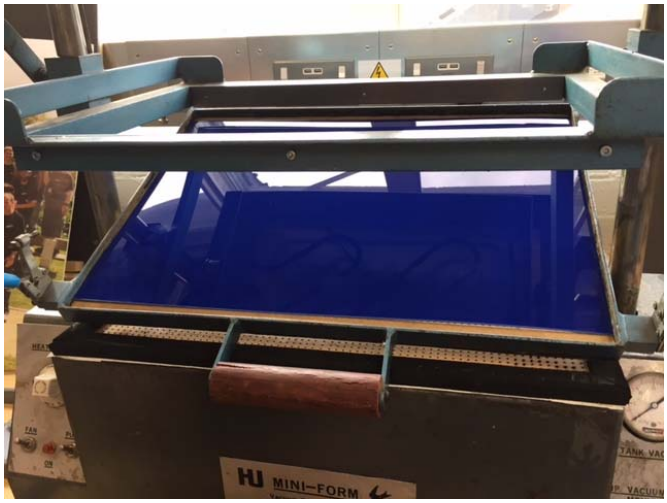
Vacuum controls

2.0 Setting up the Vacuum former correctly

The Vacuum former need to be setup so there can be enough 'suction' on the material to form around the mould. The position of the material, the heating time and the position of the bar can all affect the resulting material form.

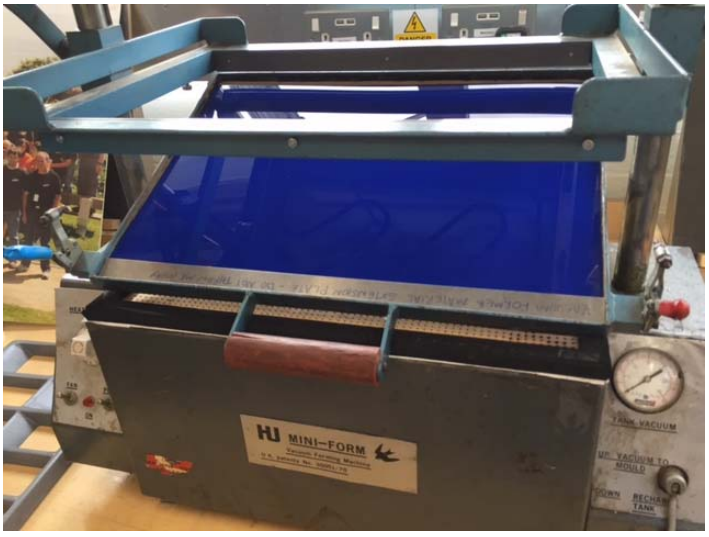
2.1 Material and positioning

High impact polystyrene comes in a variety of different sizes, but the most standard size is 457mm x 305mm (This can be ordered from Technology supplies Ltd). There are several thicknesses from (1mm, 1.5mm ad 2mm). The more complex the mould, the hard it is for the material to have the plasticity to show the details in the mould. Therefore, thinner material may be better to use, however thinner material may also make the form more fragile in area where the material has been stretched over the mould. So the shape of the mould has to be considered when choosing material thickness.



a. Position the high impact polystyrene so it covers to the edge of the vacuum former carrier frame allowing a 1-2mm overlap at the front (so there are no gaps). The size of the bed is 457 x 330mm and the material is only 457mm x 305mm, so there the bed is 25mm too wide for the material.

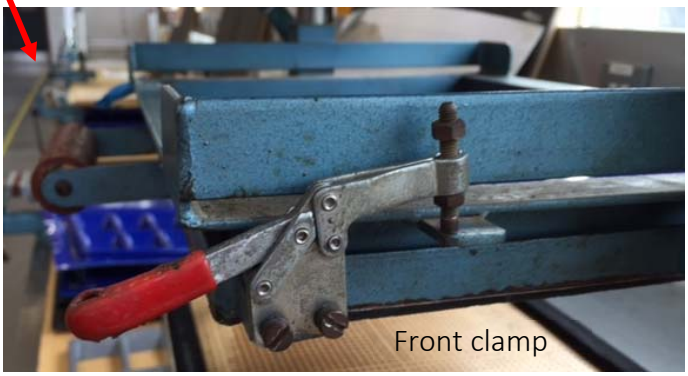
b. Place the extender bar over the top of the material and flush to the carrier frame rim.



2.2 Machine set up

a. Lift the material in the carrier frame to clamp in the lift frame. The positioning of the materials is important to ensure there are no gaps, this can be checked by getting to eye level with the bed and looking for light between the material and the bed.

b. Raise the lift bar half way to use the check for gaps using the ambient light to check the front and back of the machine as adjusting the clamps as necessary.



c. Use the clamps positioned at the front and back of the former (on both sides) to correct the seals to ensure there are no gaps between the materials and the lifting plate. Screw the bolts up to loosen the clamps tightness and down to tighten the bolts and clamp down tighter.

NOTE: Make sure clamps are tight, to pinch the material all the way around, as a good seal is vital.

2.3 Heating the material

a. Raise the lift bar to full and latched. controls set the vacuum 'Recharge point down). On the heater control on full and fan on.

b. Place the mould on the bed ensure that the mould is in the centre of the bed to allow enough room front and back of the mould so the high impact polystyrene will cover the mould all the way to meet the bed.

NOTE: By adding silicone spray/gel to top of the mould will make the mould easier to remove from the material when cooled

c. Wait for the plastic to sag with the heat (approx. 10 to 15 minutes), the thinner the material the less time is need to sag with the heat.

d. Ideally the material should sag to roughly 5 to 6 cm inches below the lift plate.

e. Bring the carrier frame holding the high impact polystyrene down to base level away from the heater between operations to prevent the material overheating and over stretching.

2.4 Vacuum forming the material to the mould

a. The vacuum control dial should read 85% before pulling the lift bar down to lower the heated sagging material to the mould.

b. Set the vacuum control to 'Vacuum to mould' and wait until the tank depletes to '0%'.

c. On the heater controls turn off the heater, Fan and pump.

d. Allow the material on the mould to cool.

e. Undo the catches and removed the material and mould.

f. Once fully cooled remove the mould from a material.

3.0 Post Forming

a. Once finished, turn off the fan, heater and vacuum pump, then turn the machine off at the mains switch.
b. Ensure the area is tidy (wipe down/clean up any silicone grease)
c. Leave the vacuum former positioned with the carrier frame touching the bed and the catches undone.
d. Make sure the extension strip is left with the machine
e. All waste material is tides away.

Appendix A -Trouble shooting and HSE

Problem: The material is taking too long to heat up.

Solution: Ensure the lift bar is raised to the maximum to raise the carrier plate holding the material to the heat.

Problem: The material is not forming to the mould.

Solution:

a. Ensure the seal on the carrier plate is tight to the material, make sure the bolts on the clamps are tight.
b. Ensure the material is heating to the maximum by lift bar is raised to the maximum to raise the carrier plate holding the material to the heat.
c. Ensure the material has stretched to 5-6cm below the carrier plate.
d. Ensure the vacuum pump has reached the is mx percentage before lowering the carrier plate holding the material to the mould.

NOTES