

A. Thermoforming

Technical Bulletin A - 2

Heat Bending (Thermoforming) VERSATEX Using a Heat Blanket

Using a Heat Blanket

Equipment used to heat bend or thermoform VERSATEX Cellular PVC can be purchased directly from Heatcon Inc., 600 Andover Park East, Seattle, Washington 98188-7610, Phone (206) 575-1333, Fax (206) 575-0856. The heat blanket system comes to you in an easy to transport plastic carrying case and contains the following items necessary to form VERSATEX Cellular PVC trimboards and mouldings:

- Two heat blankets 5" wide by 6'-0" long with built in thermocouples.
- One electrical control cabinet with digital program display that provides fast and precise temperature control to eliminate overheating.
- One pair of gloves
- One manual

Materials

The heat blankets can be manufactured longer and wider. The blanket size is dependent on the amount of electrical power you are willing or able to commit to the heating process. The standard heat blanket system operates off of a standard 110V outlet. Not supplied, but required materials needed for heat bending are as follows; a pair of safety glasses, a pair of heat resistant gloves, a digital infrared temperature gun, two (2) pieces of fiber cement siding 5" x 6', several pieces of 2 x 4 x 4" to 5" boards, two clamps or a nail gun, and a curving jig.

Safety Warnings and Guidelines

- Do not expose heat blankets to rain or wet conditions or submerge in liquid of any kind.
- Check the rating on your system to prevent circuit overloading.
- Ensure extension cord is rated to carry the current your kit will draw.
- Do not allow the heat blankets to come in contact with one another.
- Each heat blanket should be rolled for storage. Avoid any sharp turns or bends in the blankets.
- Do not overlap heat blanket onto itself while plugged in.
- Ensure the side of the blanket marked "X" is against the product.
- Never plug the blankets directly into an outlet. Always energize the blankets using the controller.
- Never leave the heat blanket system unattended when it is being energized.
- Extend the life of the heat blankets by keeping the operating temperature below 350°F.
- Extend the life of the heat blankets by avoiding gaps or space between the blanket and the VERSATEX board being heated.

Failure to follow these instructions may result in electrical shock, fire or serious bodily injury.

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Process

The thermoforming process is more art than science. The first step in the process is to preheat the cement fiber boards. This is accomplished by placing several of the small 2 x 4 wooden blocks on a solid surface (table) to properly support the bottom cement fiber board. Place one of the heating blankets on the cement board. Then lay the top piece of fiber cement board on top of the bottom blanket followed by the second or top heat blanket. Plug the two blankets into the controller before energizing your system. Finally, insert the plug into a standard 15 AMP outlet. Set the temperature on the controller to 300°F and preheat the fiber cement boards for 15 to 20 minutes, or until the controller reaches 300°F. Once the preheating phase has been completed, place your VERSATEX trimboard to be thermoformed between the two heating blankets, making sure not to allow the heated portion of the blankets to come in contact with each other. Place the second piece of preheated cement fiber siding on the top blanket. Push the run button for 2 seconds. The top screen will display the actual temperature while the lower screen will show the desired temperature. Adjust the temperature to 300°F. Set the timer to somewhere between 10 and 15 minutes. To adjust the timer, push the timer key twice. The lower display will show a "T" and the upper display will show a timer value. Use the up and down arrow key to adjust. Push the timer key once more to exit after the timer is set. When the blankets are within 5 degrees of the desired temperature, the timer will start (timer light will be blinking). At the end of the allotted time, the alarm will sound. Push the run key once to disable the alarm (blankets will still be powered). Monitor the core of the board with the infrared temperature gun to ensure the entire trimboard reaches the set temperature of 300°F. Check the material for consistency. Consistency should be like cooked spaghetti. Be aware overheating may result in a deformed surface and burn marks. When proper consistency is reached, place the material vertically along the left edge of the form or jig. Secure the board to the edge of the form or jig with a clamp or simply nail it to the jig. Gently pull the board stretching it as you proceed from left to right around the form or jig. Be sure there are no cold spots in the product; otherwise the board will not bend properly to the required radius. Instead, the boards will crimp and gather in cold spots. If the product wrinkles or feels rigid especially along the edges, immediately straighten out the piece before it has a chance to lose much heat and place it back between the blankets. Should the top edge curl up use a 2 x 4 block to hold the material against the jig while the shaped board cools. After formed, clamp or nail the other side of the curved VERSATEX board and allow it to cool. Do not put too much pressure on the hot VERSATEX board, since it may leave compression marks. Remove VERSATEX once it is cool enough to maintain its shape.

The process does not affect the cell structure or any other physical property of the cellular PVC product itself. However, the textured appearance will fade away when thermoforming.

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Heat Bending Tips

To keep product from distorting, rippling, etc, heat at 270°F for 10 to 15 minutes. Then take the product up to 300°F for no more than 5 minutes.

If product is rippling the ripples can be pulled out by tugging on the ends like you would taffy. The only issue here is that you may lose a little product thickness in the drawdown process.

Other Methods

Cellular PVC boards can also be heat bent using a duct pipe and torpedo heater or a PVC pipe and a wallpaper steamer. The goal is to get the temperature of the trimboard somewhere between 290°F and 300°F.

Questions?

Give us a call at (724) 857-1111 or e-mail us at sales@versatex.com.



MANUAL

HEAT FORMING KITS

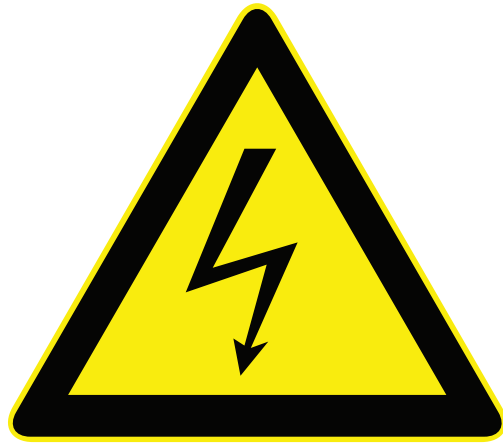
FOR CELLULAR PVC & COMPOSITE DECKING

Safety Warning and Guidelines...

WARNING!

Read and understand all instructions before operating this Heat Forming Kit. Failure To follow all instructions listed below may result in electric shock, fire and/or serious personal injury.

- Do not expose kit to rain or wet conditions.
- Ensure extension cord is rated to carry the current your kit will draw.
- Do not allow contact between the two blankets.
- Blankets should be rolled for storage. Avoid any sharp turns or bends.
- Do not overlap blanket heater onto itself while plugged in.
- Ensure Thermocouples are plugged in before powering on.
- Ensure the marked “X” on the heater is against the product.
- The Heaters will be operating at temperature exceeding 275 degrees Fahrenheit at no time should the heaters be handled without high temperature gloves.



Controls and Descriptions...

1. Heat LED

Illuminates when voltage is being sent to the blankets.

2. Timer LED

Illuminates while in the run mode while material is being heated. The LED pulses when temperature is within 5 degrees of goal and the timer has started.

3. Up/Down Arrow

Used to adjust the temperature and timer settings up or down. If pressed and held for 2 seconds the temperature will scroll faster.

4. Left/Right Arrow

Used to move the cursor between the temperature or time settings while the controller is in the Idle or Run mode. While the cursor is on the temperature or time setting the up/down arrow key will change the setting.

5. On/Off Key

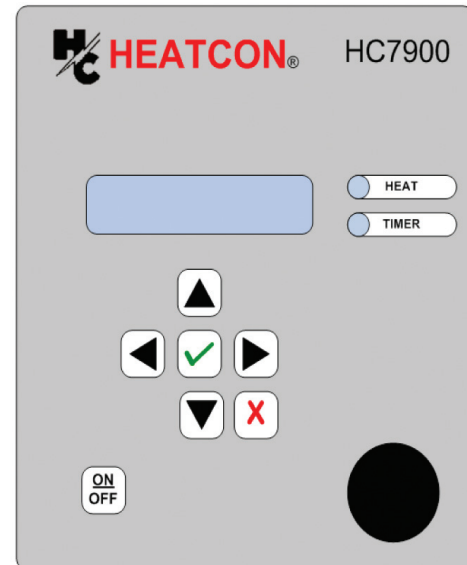
Used to turn the controller on and off.

6. ✓ Key

Used as an “enter” key. Pushing this key will enter the current value and advance to the next setting. This key will also enter the Run mode if pressed while in the Set mode.

7. X Key

Used to cancel an action. If depressed while in a menu it will move you back one step. If depressed in run mode it will return the controller to the Set mode.



Preparing to Heat Form...

1. Lay out wooden blocks (Fig. 2) to support lower cement board and to protect work surface from heat.

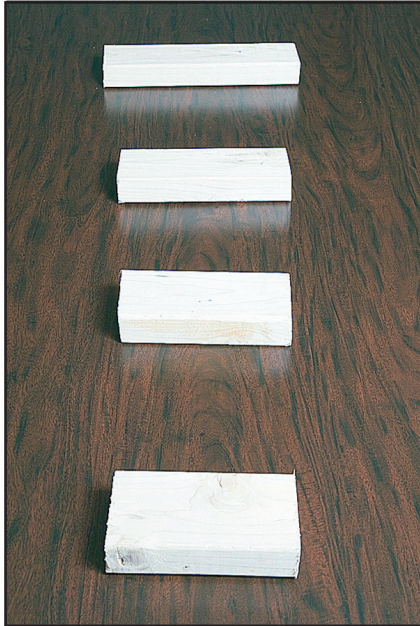


Figure 2

2. Place one piece of concrete board on the wooded blocks, (Fig. 3) the other on the work surface next to it.

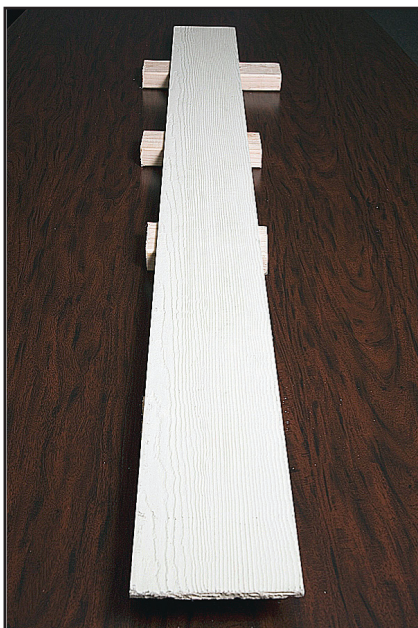


Figure 3

3. Lay the blankets out on their respective piece of concrete board. (Fig. 4)



Figure 4

4. Place the Material to be Heat formed on the Heating Blanket. Ensure the "X" is facing toward the material to be shaped. (Fig. 5)



Figure 5

5. Lay the second blanket on top of the material.
(Fig. 6)



Figure 6

6. Add the second piece of concrete board as shown in, ensuring the blankets do not shift on the material. (Fig. 7)

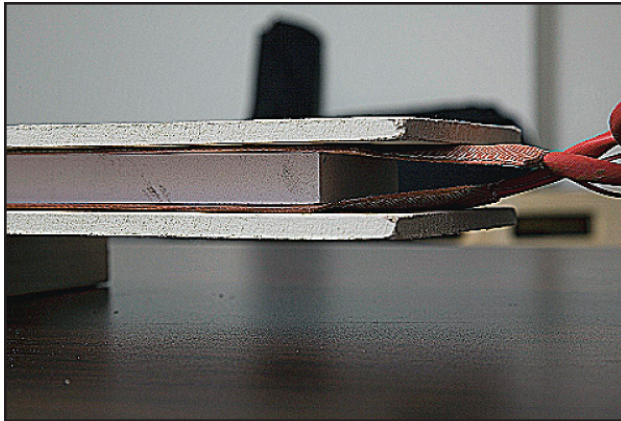


Figure 7

7. Make sure the controller is turned off and unplugged from the wall. Connect the heater power cords and thermocouple plugs on to the top of the HC7900 Controller. (Fig. 8)

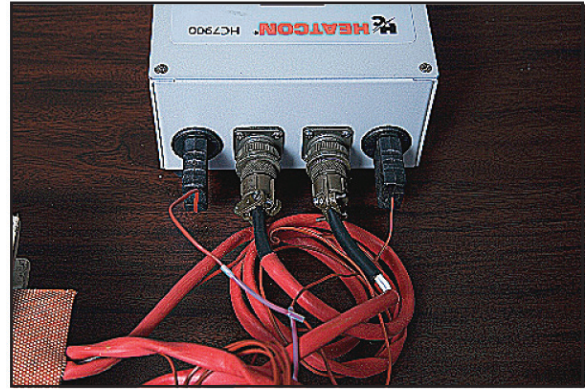


Figure 8

8. Plug the controller into the wall, and push the On/Off button. The display will flash the controller information then ask if you wish to bend PVC or Decking, use the left arrow to move the cursor to PVC then push the \checkmark key. (Fig. 9)

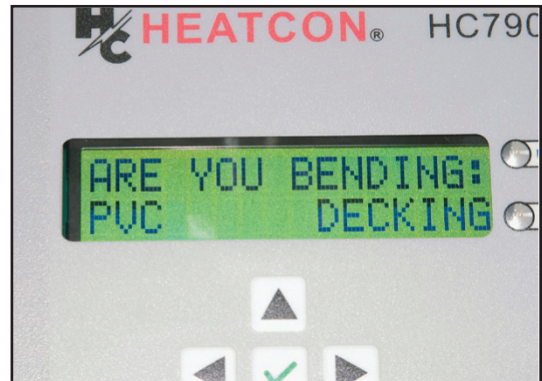


Figure 9

9. The Controller will ask you for the goal temperature, use the Up and Down arrow keys to set the proper temperature. Push the \checkmark key to enter the temperature (Fig. 10)

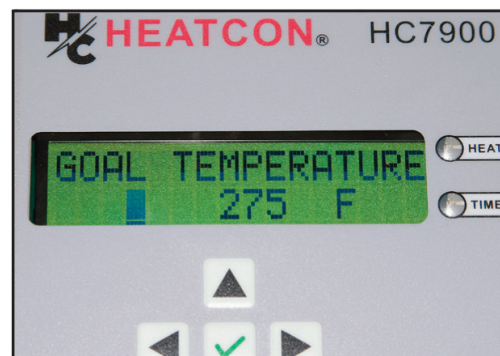


Figure 10

10. The controller will now ask for the time at temperature, use the Up and Down arrow keys to set the proper time. Push the ✓ key to enter the time. (Fig. 11)



Figure 11

11. The controller is now in the “set mode”. The display will show the temperature and the time. You can change the settings by using the Left/Right arrow key to select temperature or time, and using the Up/Down arrow key to change the setting. (Fig. 12)



Figure 12

12. The Heat Forming Kit is now ready to heat the material.

Preparing to Heat Form Continued...

1. Ensure the Temperature and Time settings are correct. Push the ✓ to begin the heating process.
2. The controller will enter the “Run Mode” as shown in (Fig. 13). The HEAT LED will begin to flash. The “TEMP” reading is the current temperature of the blankets. The “GOAL” shows the desired temperature.



Figure 13

3. When the Heaters reach the goal temperature the Timer function will begin. The “Run Mode” display will change to show the Timer Countdown. The Timer LED will begin to blink.
4. At the end of the Timer an Audible alarm will sound. Push the ✓ key to silence the alarm.

WARNING! The heaters will remain on.

5. Check the material for consistency.

WARNING! The material is hot and should only be handled while wearing high temperature gloves. The material should have a consistency of cooked spaghetti. (Fig. 14)

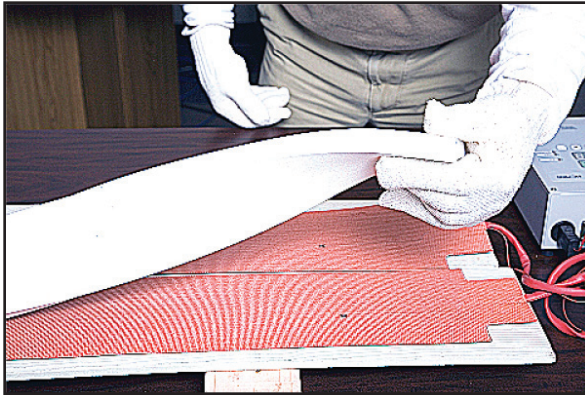


Figure 14

6. If the material does not have the correct consistency return the material to the heat blankets, and check it every 2 minutes until the proper consistency is achieved. If the material feels correct proceed to the Heat Forming.

Bending Cellular PVC...

1. Remove the material from the blankets, place one end of the Heated Material on the edge of the form and clamp it to keep it from moving (Fig. 15)

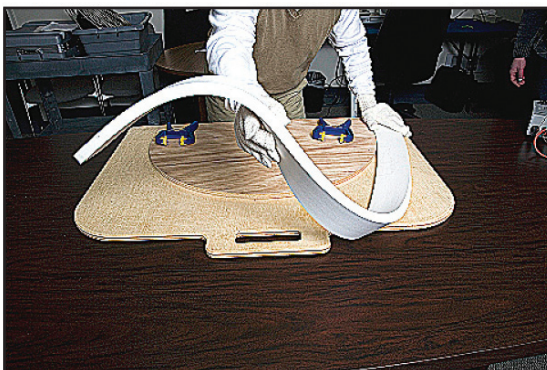


Figure 15

2. Begin pulling the material gently along the form as shown in (Fig. 16). If the product wrinkles or feels too rigid to form, straighten piece out before it cools and place it back between the blankets.



Figure 16

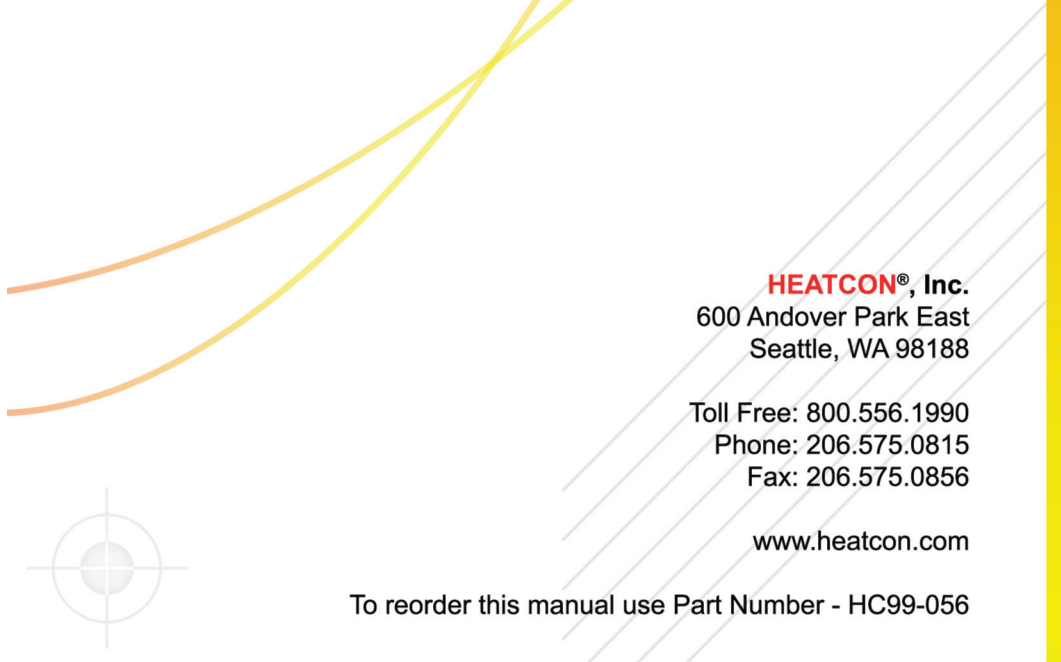
3. After completely forming the material clamp the opposite end. Run hands along the material, as shown in (Fig. 16), gently applying pressure to smooth the product as it cools.

WARNING! Do not apply too much pressure on the material.

4. After the material cools you can unclamp the product and remove it from the form. (Fig. 17)



Figure 17



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