

## Purpose:

The purpose of this document is to describe the procedure for removing a model from InduraBase and for removing the InduraFill support material from a finished model made of InduraCast. This process is also known as "de-waxing". Adherence to this procedure is critical if the best possible dimensional accuracy is to be maintained in the finished model.

## Required Mtls:

VSO Solvent - approximately 500 ml, depending on model size.  
Paper towels  
Latex, rubber or nitrile gloves  
Temperature resistant gloves or mitts

## Required Tools: (see included suggested De-waxing Materials List)

Heater Stirrer Device (capable of maintaining temperature between 50°C – 55°C)  
**Never exceed 110°C temperature setting on the heater-stirrer**  
Temperature Measuring Device - capable of +/- 2°C  
Pyrex (temp resistant) Glass bowl(s) – assorted sizes to match strainers (2.5 QT ideal)  
Basket strainer(s) – assorted sizes to match bowls (8" strainer ideal)

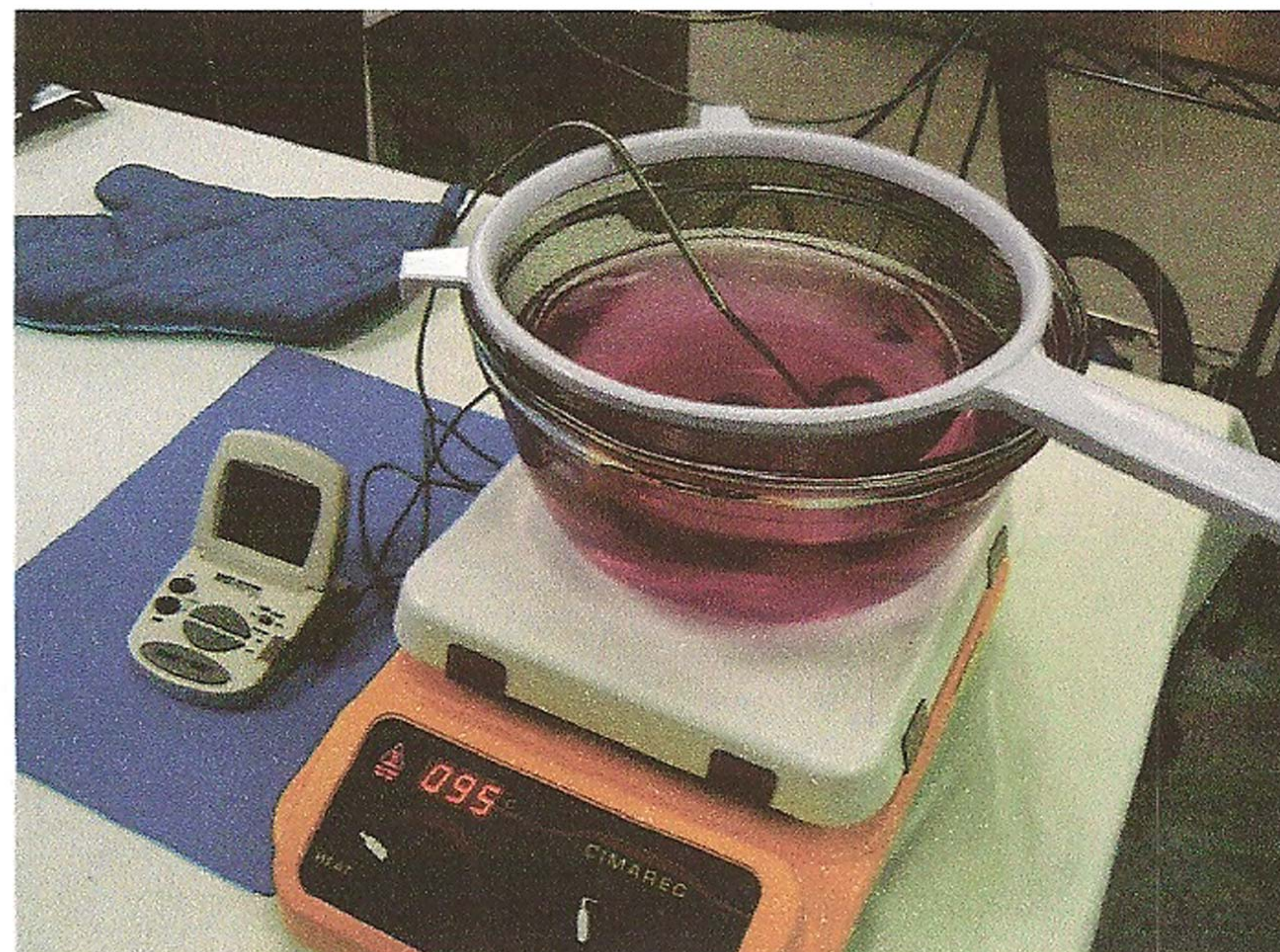
## Reference:

VSO MSDS  
InduraFill MSDS  
InduraCast MSDS  
Operational instructions Heater Stirrer

## Procedure:

As a general rule of thumb, the less the model is exposed to heat, the more accurate it will remain. This procedure is set to operate at the maximum temperature possible to continually maintain accuracy with Indura materials. Temperatures above 55°C will cause permanent dimensional expansion depending on exposure temperature and duration.

**The ideal de-waxing bath temperature range is between 50°C - 55°C**





## 1. General Setup

- 1.1 Turn on the Heater Stirrer and set its temperature control to the prescribed setting for the type of heater stirrer you are using (95°C - 100°C for Cimarec)

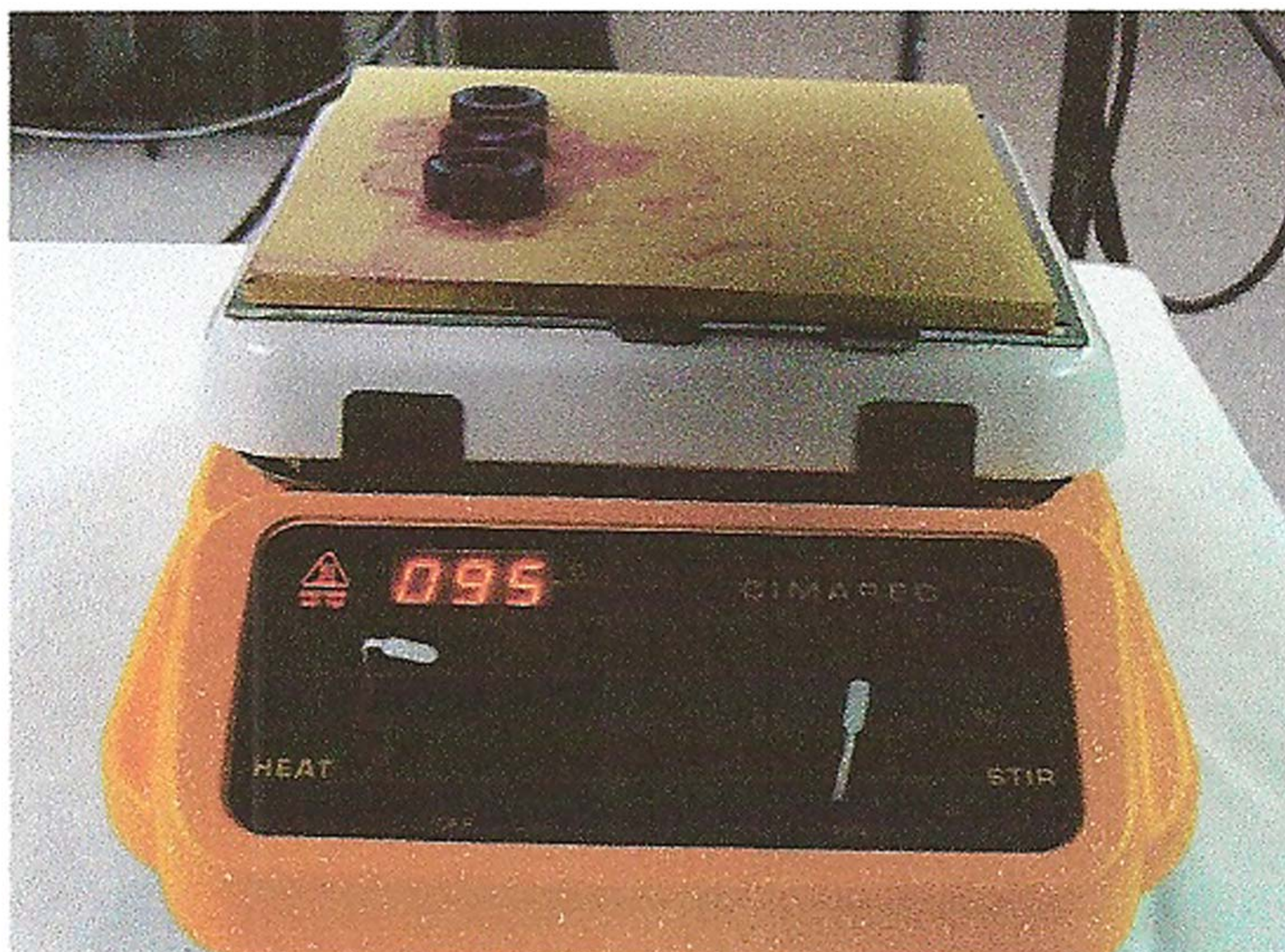
**Never exceed 110°C temperature setting on the heater-stirrer**

- 1.2 Clean the glass bowl used for the solvent bath of any loose debris and fill approximately 2/3rds full with fresh VSO (or enough that bottom of the basket strainer is below the bath surface sufficiently enough to fully cover the models). This bath may be used to dewax several models before the VSO needs to be changed. VSO will saturate with InduraFill at some point (depending on model geometry or quantity of models) and will have to be changed. Dispose of used VSO in accordance with your local regulations.

## 2. Model Removal from InduraBase

- 2.1 Remove any loose dust or debris from the model that is about to be de-waxed. This may be done manually by brushing it off, or by using compressed air and blowing it off. Use caution to not damage any delicate features of the model.
- 2.2 Place the entire build plate consisting of plate with InduraBase and model attached, onto the Heater Stirrer. Allow enough time for the platform layers to start to melt.
- 2.3 Check the model every 15 minutes to see if it has released from the InduraBase. Do this by GENTLY twisting the model. The sides of the model where there is a high concentration of InduraFill will be soft and may deform as you grasp it. If the model does not twist, leave the model on the plate and check it again in another 10 minutes. If the model does twist or move, slide it off the InduraBase and remove the plate from the heater.

**Never force the model to move or cracking may occur**  
**Typically this process can take between 20 – 30 minutes**



- 2.4 Once the InduraBase plate cools, it is ready for re-use on the unit. Selecting the **Last Used Plate** from the **Indurabase Setup** screen and then executing one foam cut will trim off any residual InduraFill left on the plate as a result of model removal.



#### Model Removal from InduraFill (De-waxing)

- 2.5 Once the model is removed from the InduraBase, place the model into the basket strainer and then place the strainer into VSO bath prepared in step 1.2. Use caution to position the model in the strainer such that it is not resting on a delicate feature.
- 2.6 Turn the digital alarm thermometer on; insert the temp probe into the basket with the models being careful to not hurt the models. Set the temperature alarm on the thermometer to 55°C.
- 2.7 Set the stirrer control on the heater stirrer to a setting that will gently circulate the bath without creating a lot of turbulence; the models should not be moving around in the strainer.
- 2.8 Check the model every 15 minutes to evaluate its progress. It may be necessary to adjust the heater control up or down slightly to maintain the bath within the ideal de-waxing range of 50°C - 55°C without exceeding the 55°C maximum bath temperature. **Never exceed 110°C temperature setting for the heater-stirrer.** It may also be necessary to flip or rotate certain designs to facilitate faster, more efficient de-waxing. (tweezers are a good tool for this).
- 2.9 De-waxing is complete when the last residue of InduraFill has dissolved off the model. The slowest sections to dissolve are those that are in the least amount of contact with fresh VSO (i.e. deep holes, channels, corners, etc.).
- 2.10 It may be necessary to rotate or turn over certain models in order to allow them to de-wax completely. Do this gently using tweezers or tongs or by hand (wearing gloves is recommended).
- 2.11 Periodically during the de-waxing process lift the strainer out of the bath to inspect the models. It is recommended also to raise and lower the strainer in and out of the bath a few times in order to rinse the models of any debris that may be accumulating in the basket or on the models.
- 2.12 Once the model is free of InduraFill, gently remove the model(s) from the VSO bath and place it on a paper towel to dry. (small tweezers are a good tool for this)
- 2.13 Turnoff the Heater Stirrer device (unless you have additional plates to de-wax)
- 2.14 At this time the models can be cleaned using soft bristled brushes and/or compressed air depending on the robustness of the model geometry.