INSTRUCTIONS FOR OPTIONAL ATTACHMENTS:

1) How to perform VACUUM DIE CASTING?

Process of creating & storing vacuum in the chamber and releasing it to the melt while casting it.

- ✓ Place the mold into the Vacuum Casting Chamber.
- ✓ Place the mold heater & its sensor into the mold and heat the mold to the required temperature. Once it is heated, switch OFF the mold heater and remove it.
- ✓ Slide the vacuum casting chamber inline with the bottom pouring tube so that the melt will fall directly into the mold.
- ✓ Switch ON the vacuum pump, this will generate vacuum on the vacuum chamber. Wait till the ultimate vacuum (650 to 700 mmHg) is achieved. Vacuum created will be shown on the gauge.
- ✓ Now pour the melt into the mold, vacuum in the high vacuum chamber will be released into the mold holding chamber when the pour valve is opened automatically.
- ✓ Switch OFF the vacuum pump once the pouring process is complete
- ✓ Slide the vacuum chamber away from the pouring tube
- ✓ Wait for the cast to cool and remove the cast from the mold.

2) How to perform Squeeze Die Casting?

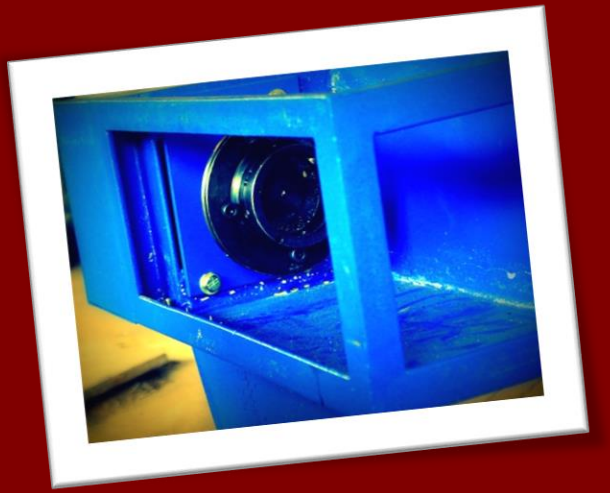
Process of pouring the melt into the mold and immediately pressing it with hydraulic piston (Max. load 40 tonns). There will be temperature loss in the melt while transferring it to the mold, to avoid this the melt is transferred through a closed runway tube which is heated using runway furnace (> 750 ^{0}C).

- ✓ Apply thin layer high temperature non-stick coating in the runway tube (inner side) and on the bottom face of the piston.
- ✓ Fix the runway tube in the runway furnace and start heating it with set point of > 750 ^{0}C.
- ✓ Place the mold heater & its sensor into the squeeze mold and start heating it.
- ✓ Once the set temperature of the runway furnace is reached, wait for 15 mins so that the temperature is uniform in the heating zone.
- ✓ Once the die heater has attained the set temperature, switch OFF the die heater and remove it.
- ✓ Position and align the squeeze die on the setup and ensure that the piston goes directly into the die without hitting on the edges and sides.
- ✓ Ensure that the runway tube is properly aligned with the squeeze casting mold such that the melt will flow directly into the mold.
- ✓ Switch ON the hydraulic power pack

- ✓ Keep the piston in the bottom position and set the pressure in the digital controller (Max. Pressure: 40 Tons)
- ✓ Bring back the piston to the top position so that you get a clear way for the melt to pour from the runway to the mold freely.
- ✓ After the stirring process is complete, press the POUR OPEN switch. This will allow the melt to flow into the squeeze casting mold.
- ✓ Once the melt has been transferred into the squeeze casting mold, close the bottom pouring
- ✓ Use the Press button in the squeeze casting frame to bring down the piston and to apply the load on the molten metal.
- ✓ Release the piston and remove the split mold to obtain the cast.
  Note: During hot condition, the piston gets stuck with the cast and lifts the mold when releasing. If so, use the stopper provided to stop the mold from lifting UP.
- ✓ Switch OFF the runway furnace.
- ✓ Remove the runway tube in hot condition and tap it in the ground to remove the sticky melt from the tube.

3) How to perform Rotary Die Casting?

The process of pouring the melt into a rotating mold is called rotary die casting.



- ✓ Place the mold into the Rotary Centrifugal Casting setup
- ✓ Place the mold heater & its sensor into the die and heat the die to the required temperature. Once heated remove the die heater
- ✓ Fit the funnel in the rotary setup
- ✓ Move the rotary centrifugal casting attachment below the stir casting machine in such a way that the melt will fall into the die directly into the cone.
- ✓ Switch ON the Rotary centrifugal motor in the HMI Software and set the speed > 1000 RPM (Recommended)
- ✓ Wait for the HMI to attain the set speed and then pour the melt into the rotary die.
- ✓ The rotary centrifugal motor must be switched ON till the melt solidifies in the mold.
- ✓ Wait for 10 mins and you can take cast out.

4) How to use Ultrasonic Vibrator?

Ultrasonic vibrator is used to mix the reinforcements in the melt using high frequency ultra sound vibrations.

Note: you can use either stirrer or ultrasonic vibrator at once.

You can find the below parameters in the UV control panel.

- PLC: Ultrasonci is effective when it is used in impulsively. Hence this PLC is used to switch ON/OFF the ultrasonic vibrator at the set interval. Also, it used for testing and overload tripping in the ultrasonic vibrator. Below are the actions for the buttons present in this PLC.
  - **F1**: Start the processor cycle
  - **F2**: Stop the processor cycle
  - **F3**: used for testing
  - **SET + F2:** Overload Reset
  - To navigate to Setup Mode: Press the switch set and F3. You will go in Setup mode. To go to next menu you have to press F1. You can modify the interval time / ON time / OFF time which will come consecutively.
  - In the setup mode, for increment use button F2 and use button F3 for decrement of values. After completion the configuration press ENTER button to save it.

- **Amplitude select switch (RED):**

Sr.No	Amplitude Position	% power drawn maximum
1	0	0 % (Rest position)
2	1	60%
3	2	70%
4	3	80%
5	4	100 %

- Tuning Knob: is used to set tuning of generator. If you find the power drawn by the crystal > 0.25 then you have to use this knob to bring it to this value. This will ensure greater efficiency.
- Power meter: shows the relative power the crystal draws.

5) To use this attachment, follow the below steps

- Apply high temperature non-stick coating in the tip of horn in cold condition
- Lift the stirrer up completely
- Place the lid given along with ultrasonic vibrator.
- Once the metal is melted, bring the ultrasonic vibrator near the machine and connect the electrical connector of the UV in the machine.
- Switch ON the water supply to cool the UV horn.
- Bring down the UV below such that the tip of the horn is immersed in the liquid exactly at the center.

- Switch ON the mains switch in the UV control panel, set the amplitude position in 1 or as required and press F1 in the PLC to start the processor.
- Once the program completes, lift the UV horn UP and clean the horn in hot condition to remove the pasted material.
- Remove the electrical connector and switch OFF the water supply once the horn is cooled.