

Minutes of the Pre-bid Meeting

The pre bid meeting for the “Design and Fabrication of Semi-automated Hot Press for Making Joint Free Gamma and Neutron Shielding Blocks (190 x 90 x 90mm³)” was held on 01/11/2022 in presence of Technical Sub Committee and three firms (participated in pre-bid meeting). The technical details of the intended equipment has been discussed and decided to include **following points in the tender documents:**

1. The Non Disclosure Agreement (NDA) shall be signed between the supplier and CSIR-AMPRI after the issue of work order to protect CSIR IPR.
2. The Scientists of CSIR-AMPRI will be visiting the factory during the manufacturing process to check whether it complies with CSIR-AMPRI’s specifications.
3. The vendor must provide pre-installation requirements within a month of issue of purchase order for necessary site preparation at CSIR-AMPRI.

The following points to be included in the specification:

1. The travel speed of each zone should be independent to each other and to be tunable from 1cm/min to 30 cm/min.
2. A provision to be provided at Zone 1 to fix a thermal imaging camera in future to see the pressing and die releasing.
3. The skin temperature of the furnace must be less than 50°C. The temperature of the exit and entry point must be less than 80°C. The outside of the furnace should be covered with metallic sheet.
4. Data logger has to be provided to record the experimental conditions.

(Note: specification revised after pre-bid meeting is on the next page)

Annexure I

Design and Fabrication of Semi-automated Hot Press for Making Joint Free Gamma and Neutron Shielding Blocks (190 x 90 x 90mm³).

1.) System shall have 3 heating and one cooling zones. All the zones to be operated under normal/inert ambient.

a. Zone1:

Heating zone,

Operating temperature: Room Temperature (RT) till 1400°C

Furnace Internal Dimension

Length: 100 cm

Height: 45 cm

Width: 45 cm

b. Zone 2:

Brick pressing zone,

Operating temperature: RT till 1350°C

Furnace Internal Dimension

Length: 100 cm

Height: 45 cm

Width: 45 cm

Specification of Hydraulic Press to be integrated with Zone 2 for hot compaction

- a. Pressure applicable: 0 – 200 Tone
- b. Minimum readable pressure: 100 kg
- c. Cylinder: Dual action
- d. Pressure to be hold for minimum 30 minutes
- e. The maximum temperature at which pressure to be applied is: 1250°C
- f. Ramp speed: 1 -10 cm/min
- g. Ramp Diameter: 200mm
- h. Alumina/Zirconia ramp to be provided to compact at normal ambient
- i. Height of the frame: Nearly 1 meter to accommodate the furnace
- j. Robotic arm to hold die against opening during hot compaction.
- k. Robotic arm to be made using alumina/zirconia/alloy

1. Automatic system for releasing the robotic arm.

c. Zone 3:

Mold Opening Zone

Operating temperature: RT to 1300°C

Furnace Internal Dimension

Length: 100 cm

Height: 45 cm

Width: 45 cm

Automated system for opening mold at Zone 3

Operating temperature: $\approx 1200^{\circ}\text{C}$

The hydraulic/pneumatic based robotic arm.

Robotic arm to be made using Alumina/Zirconia/Alloy.

Minimum 4 robotic arms to remove the die.

Automation for attaching robotic arm with die.

Zone 4:

Cooling zone

Cooling the bricks from 800 - 100°C using air/water

Internal Dimension

Length: 100 cm

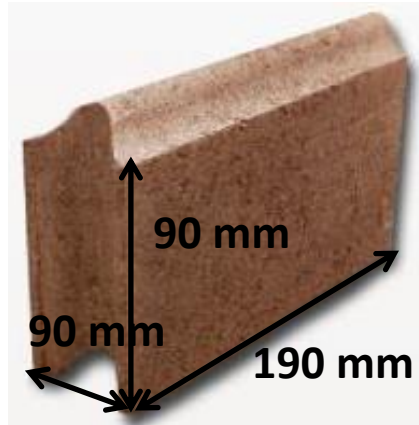
Height: 45 cm

Width: 45 cm

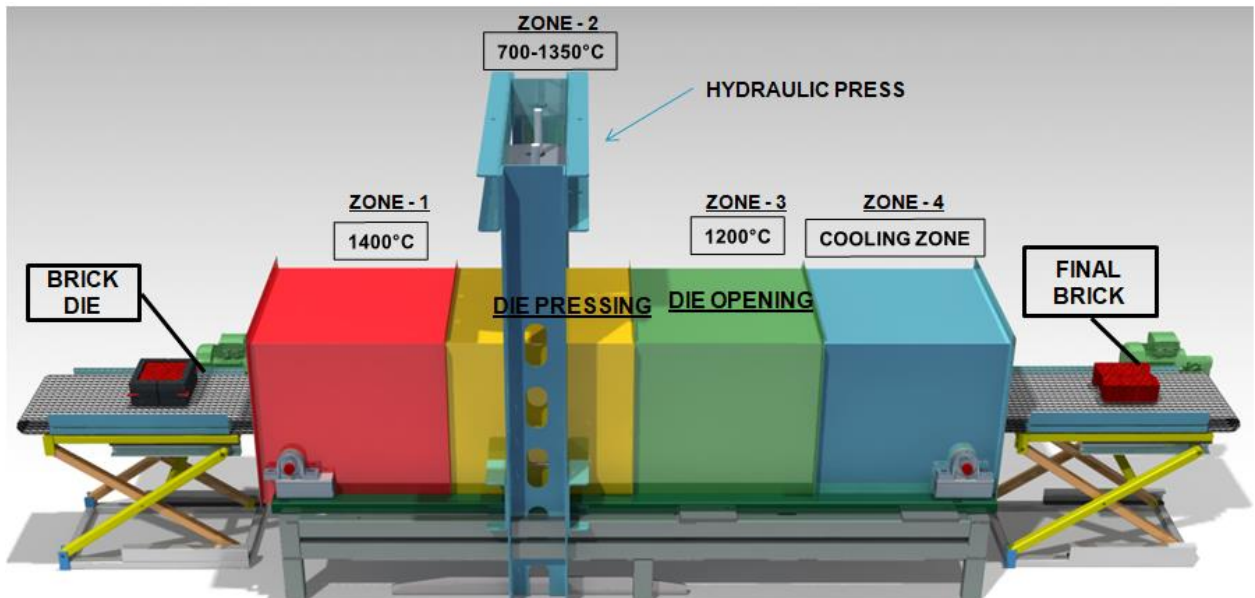
2.) Conveyer Belt System:

- a. Alumina/Zirconia/Alloy based conveyer belt for moving samples from one zone to other.
 - b. To be operated at $\approx 1400^{\circ}\text{C}$
 - c. To be operated under inert and normal ambient.
 - d. Sensor systems to be provided for positioning the die.
 - e. The travel speed of each zone should be independent to each other and to be tunable from 1cm/min to 30 cm/min.
- 3.) The whole system to be operated from a single panel.
 - 4.) The temperature accuracy of the furnace must be 0.5°C .
 - 5.) All the three zones to be programmable.
 - 6.) Heating rate of the furnace is variable from 1 to $10^{\circ}\text{C}/\text{min}$.
 - 7.) Designing of joint free die.
 - 8.) A provision to be provided at Zone 1 to fix a thermal imaging camera in the future to see the pressing and die releasing.
 - 9.) The skin temperature of the furnace must be less than 50°C . The temperature of the exit and entry point must be less than 80°C . The outside of the furnace should be covered with metallic sheet.

- 10.) Data logger has to be provided to record the experimental conditions.
- 11.) As it is a special requirement, the supplier has to mandatorily visit CSIR-AMPRI before submitting the tender.
- 12.) The image of the intended joint free brick and the setup is shown below.



The designing of intended joint free gamma and neutron shielding blocks.



The schematic of semi-automated hot press, which is indent to build to make the joint free gamma and neutron shielding blocks.