



# BATCH AND CULLET PREHEATING

Intervening Technique	Optimisation of Gas Consumption through Batch & Cullet Preheating
Description	<p>Batch and cullet is normally introduced cold into the furnace, but by using the residual heat of the waste gases to preheat the batch and cullet, significant energy savings can be possible.</p> <p>Preheating temperatures should preferably not be lower than 270 °C but should not exceed 500 – 550 °C. In practice, most batch and cullet preheaters operate at batch preheat temperatures between 275 and 325 °C.</p> <p>The available systems are described below:</p> <ul style="list-style-type: none"> <li>• Direct preheating – this type of preheating involves direct contact between the flue-gas and the raw material (cullet and batch) in a cross-counter flow. The waste gases are supplied to the preheater from the waste gas duct behind the regenerator. They pass through the cavities in the preheater, thereby coming into direct contact with the raw material. The outlet temperature of the cullet and batch is about 300 °C and could go up to 400 °C. The system incorporates a bypass that allows furnace operations to continue when preheater use is either inappropriate or impossible.</li> <li>• Indirect preheating – the indirect preheater is, in principle, a cross-counter flow, plate heat exchanger, in which the</li> </ul>

material is heated indirectly. It is designed in a modular form and consists of individual heat exchanger blocks situated above each other. These blocks are again divided into horizontal waste gas and vertical material funnels. In the material funnels, the material flows from the top to the bottom by gravity. Depending on the throughput, the material reaches a speed of 1 – 3 m/h and will normally be heated from ambient temperature up to approximately 300 °C. The flue-gases will be let into the bottom of the preheater and flow into the upper part by means of special detour funnels. The waste gases flow horizontally through the individual modules. Typically the flue gases will be cooled down by approximately 270 – 300 °C.

These techniques have a number of environmental effects, which can vary from case to case. In general, the benefits given below have been experienced.

- Specific energy savings of between 10 and 20 % with a consequent reduction of CO<sub>2</sub> emissions.
- Reduction in NO<sub>x</sub> emissions (due to lower fuel requirements and lower furnace temperatures). However, in most cases the energy savings are used to increase the pull of the furnace.
- An increase of pull rate of up to 10 – 15 %, is possible for applications to existing glass furnaces, with preheating of the batch to 300 °C.

By implementing the batch & cullet preheating plant can save Natural Gas and Furnace Oil.

**Savings after Batch & Cullet Pre-heating:-**

Industry	Investment	Annual Saving per Annum	Saving of Natural Gas	Payback in Month	Reduction in GHG
Container Glass	1,50,00,000 (for 2 Furnace)	53,87,000	1496616 SCM	34	2803 MT of CO2
Figure Glass	80,00,000	28,72,000	957522 SCM	30	1793 MT of CO2
Figure Glass	50,00,000	21,97,000	143397 SCM & 2126 Litre	28	271 MT of CO2