



tapping position. As ecological pressures grow, such arrangements may be more frequent. Savings of up to 5 million liters of water are possible with this method.



Cullet Wetting System

Hotwork's portable cullet wetting system allows the Hotwork technician to precisely control the amount of moisture being mixed into the cullet. The fines stick to the larger particles of cullet and sink into the melt. This eliminates dusting of the furnace super-structure.

The cullet wetting mixer also has push-button control of

the flow of cullet. This allows a trickle of cullet at the beginning of the fill with minimum air required for conveying the cullet to the melter.

The Hotwork cullet wetting system will provide the glass manufacturer with a broad, thin blanket of cullet spread in the melter, allowing a quick furnace turn-around and immediate glass packing. The system allows Hotwork to trim about 25% off of the normal fill time as compared to the conventional dry system.

Measured Crown Rise

The Hotwork electronic method of measuring crown rise (or fall) during a furnace pre-heating or cooling cycle, involves the strategic placing of transducers on the furnace crown, which measure crown movement, either up or down.

Transducer signals are registered on a chart recorder, providing accurate comparative data allowing appropriate adjustments to be made to the rate of temperature rise or fall. This system enables even the slightest expansion to be detected, thus allowing correct tie-rod adjustments to be made at the proper time. This consequently minimizes

the risk of furnace damage due to tie-rods either being over tightened, or left too slack.

It is possible to safely attain a more rapid rate of furnace heatup (or cooldown) as furnace movement can be clearly monitored.



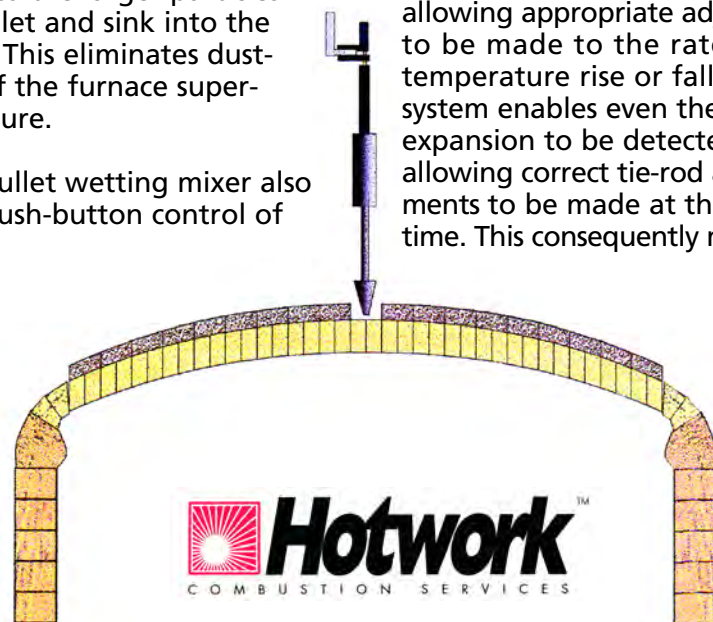
Thermal Cleaning of Regenerator Checker Work and Hot Repair/Checker Change

Once the furnace engineer has established the cause of regenerator checker work blockage, the best course of action can be determined.

If sulphate deposits cause the blockage, it is possible to use Hotwork high velocity burners to meltout these deposits. These burners are carefully controlled so as to meltout the sulphate deposits without causing fluxing of the rider arches.

Hundreds of such operations have been successfully carried out by Hotwork, usually resulting in a marked improvement in furnace efficiency.

If a regenerator problem cannot be solved by a meltout, Hotwork burners can be used to hold the furnace temperature while checkers are replaced.



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Services to the World of Glass Making



World leaders in the field of glass furnace pre-heating, draining and other services

Since 1963 Hotwork has provided a glass furnace pre-heating service to major glass manufacturers and its technicians have accumulated experience and knowledge on the technique of this operation, which is surely unrivaled anywhere in the world.

Hotwork's field technicians are backed up by a management team, which is widely experienced in the service requirements of the glass industry. This enables a totally professional service to be provided to all customers.

Hotwork has always responded positively and promptly to the needs of its customers, anywhere in the world and at any time.

The range of services, which Hotwork provides to the glass industry, is briefly described in these pages.

The engineering staff are always prepared to discuss particular applications in detail and to submit proposals and quotations for your consideration.

Furnace Heatup

The heatup of a glass furnace and sodium silicate furnaces, of whatever type or size, is a crucial activity, on which the eventual campaign life of the furnace greatly depends.

Traditional methods of heating a glass furnace nearly always produce a relatively cold furnace bottom, with higher temperatures in the super-structure and the crown as a result of non-uniform heating. This gives rise to differential expansion in the furnace walls and crown, causing fracture of the new refractories and general weakening of the furnace structure, with the consequent adverse effect on the campaign life expectancy of the furnace.

The Hotwork system, essentially, employs a high velocity burner with an exceptional turndown ratio, enabling temperature gradients to be accurately controlled from ambient to 1100/1200°C (2000/2200°F). The burner produces high volumes of turbulent hot gases (rather than a radiant, very hot flame, which would produce, localized 'hot-spots'), which, with the furnace placed under a slightly positive pressure, ensure even distribution of heat throughout the structure.



Hotwork burners can be supplied to fire on either LPG, natural gas, light oil, or on a mix of gas and oil.

Furnace Expansion Control Supervision

An important aspect of every glass furnace heatup is the correct adjustment of furnace steelwork to conform to the expansion of the refractory brickwork.

Inadequate control over this function will, of course, result in subsequent weaknesses in the furnace and a resultant shortening of the furnace campaign life.

Hotwork can, in conjunction with the use of electronic crown rise measuring equipment, undertake responsibility for the supervision of furnace steelwork adjustments throughout the pre-heating cycle.



Undertaking about 100 glass furnace pre-heats each year, affords Hotwork unparalleled experience in the problems and technique of furnace pre-heating.

Throughout the pre-heat process, Hotwork technicians will give specific instructions to factory personnel to make the physical adjustments to the

furnace steelwork at the critical stages of the heatup to control the refractory movement, on an around the clock basis.

Alternately, Hotwork can supply the labor to undertake these physical adjustments, thus leaving factory personnel free for other duties.

On conclusion of the service, Hotwork staff will leave written instructions as to any further adjustments, which may be required when the furnace is brought up to working temperatures.



Controlled Cooldown

Where a furnace is being only partially repaired, and it is therefore necessary to preserve the bulk of refractories in optimum condition, then the furnace must obviously be cooled to ambient under controlled conditions.

The Hotwork high velocity burner system is ideally suited for this operation, taking over from furnace burners when the temperature has been lowered to approximately 1100°C (2000°F) and thereafter reducing the furnace temperature to a precise and predetermined schedule. At a temperature between 200°C

(400°F) and 150°C (300°F) the burner system is switched off, but the combustion air fan is left running to complete the cooling to ambient temperature. This operation generally takes in the region of 72 hours, depending on the type, size and condition of the furnace.

Hotwork can also provide a service to control furnace contraction during the cooldown.

Rapid Steam Cooldown

Hotwork will provide special burner equipment to enable vaporized water to be injected (at high pressure) into the furnace. The furnace heat will immediately turn this water into steam which is a far more effective conductor of heat than air. Therefore, it removes the heat from the furnace refractory structure more rapidly.

Hotwork combustion air fans, operating through unlit burner chambers will also be used to inject a low-pressure, high-volume flow of air and assist in steam and heat dissipation.

The combined effect enables a rapid furnace cooldown on the order of 48 hours.

Glass Draining

Since 1977 Hotwork has provided a service for the fast and safe evacuation of molten glass from melting furnaces of all types and sizes.

Using a carefully designed, tried and proven hydraulic system, glass can be transported from the furnace to a remote, agreed disposal / catchment location, at rates in excess of 30 tons per hour.



With Hotwork service, the sintered glass can be deposited at a position where the factory can most conveniently handle it for further use as cullet. The photograph on the brochure cover shows glass being deposited in a yard outside of the furnace building, from where the factory could transport it to their cullet storage facilities, using mechanical shovels and trucks. Other possibilities exist, of course, and frequently the cullet is deposited in a designated cullet bay.



Hot Water Recycling During Drain

Where environmental concerns prevent the drainage of water back to the water table, an arrangement, such as that shown here, can be provided. The cullet and water is collected in a tank or on the ground and using a special pump, the used water can be recirculated to the