FLOAT GLASS ANNEALING LEHR TEMPERATURE

Typical float glass annealing lehr.

After the flat glass exits the float zone oven the glass has to be cooled in the annealing lehr. The temperature profile across the glass is quite critical. If the glass is cooled properly during its time in the lehr it will have a good property called cutability. If the glass has been properly annealed it will be easier to cut into the final shape and there will be less breakage of the glass. The obvious goal is to get the most finished glass that is possible from the process.

The most common method to determine the glass temperature profile is to space as many as seven infrared thermometers across the lehr and observe the temperature in each of the locations. There is one basic problem with this choice of temperature measurement. Each instrument has a life of its own. These instruments can be calibrated to indicate the same temperature at a specific value but as the ambient temperature of the sensor changes they will not be as repeatable as desired by the operator, especially when resolutions of 1 or 2°C are required. This problem leaves the operator with the question of, if I see a temperature difference of 5°C from one side of the glass to the other, is it really a 5°C difference or is some of the difference in the instruments?

The best instrument for this temperature profile is a Line Scanner. The Line Scanner actually can provide a continuous line profile across the glass and can also provide a thermal picture that is easy to interpret as to how the lehr is really cooling the glass. The advantage of the Scanner instead of the seven thermometers is the fact that the scanner only uses one detector. Thus when the operator sees a 1 or 2°C change in temperature he knows that this is a real temperature change not a difference in instruments.

Line Scanners have been installed at the entrance and exit to the lehr by many Ircon customers. However, most operators want to know the glass temperature inside of the lehr because the shape of the profile is deliberately changed as the glass progresses through the lehr. As many as three additional scanners are supplied along the length of the lehr to adjust the temperature profile as the glass proceeds through the lehr.

Installing a scanner in a lehr is a little more difficult than installing standard spot type instruments. First, the scanner requires an opening about 4"(100mm) wide across the full width of the lehr. Of course this is a large opening which can upset the air flow in the lehr. Ircon has designed a special shroud and air purge which will fit over the opening and provide the proper air flow to keep the SO_2 away from the lens of the scanner but does not introduce too much air into the lehr to upset the cooling rate. By the way, Ircon recognizes that it is difficult to cut this 4" slot in the lehr after it is built. We suggest that whenever you plan a rebuild or purchase a new lehr specify that the openings be supplied and then the scanner can be installed after the lehr is installed and running. The Ircon Line Scanner (ScanIR) has a feature of up to ten linear outputs. Each output can be matched to the cooling zones present in the lehr. As a result a closed loop control system could be developed to automatically control the cooling of the glass at each critical point in the lehr.

For further information please contact Ircon at:

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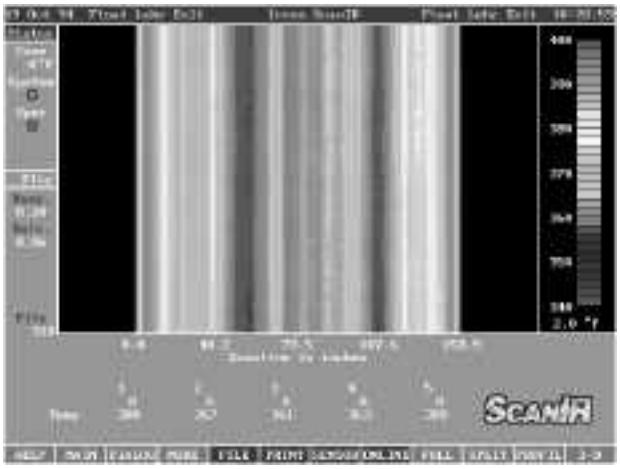
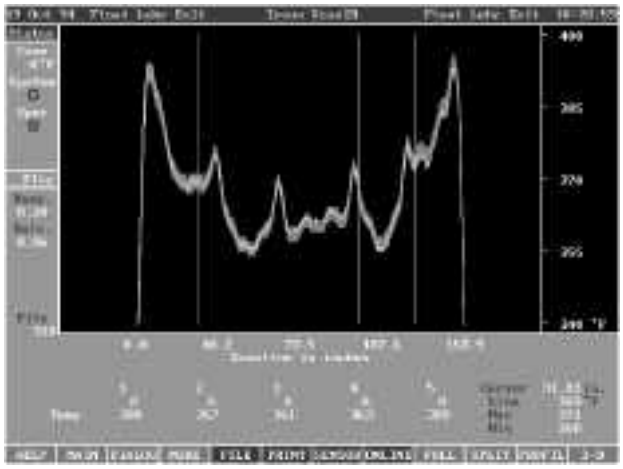


Thermal image produced by Ircon Line Scanner (ScanIR) of float glass at exit of lehr.



Temperature profile image of float glass at lehr exit showing cursor line temperature (Min. and Max.)

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