

TIN BATH COOLERS



HORN
GLASS INDUSTRIES

innovation
ENGINEERED IN GERMANY

TIN BATH COOLERS

Tin bath coolers mainly serve to extract heat from the glass in the tin bath. This can be effected on the basis of two different physical principles: by means of radiation cooling effected using cooling elements above the glass ribbon, and by means of convection and/or indirect cooling achieved by coolers submerged in the liquid tin. Usually these cooling elements are used in pairs on either side of the tin bath.

The temperature of the glass ribbon in the tin bath or the temperature of the tin can be controlled by means of a wide variety of coolers. The HORN® coolers assist in achieving the optimal production process in the tin bath. HORN® offers a wide range of tin bath cooler types and models.

ENTRANCE COOLER



The HORN® entrance cooler of Type HECO, which is installed in the entrance section of the tin bath, provides optimum production conditions in the tin bath right from the start. The cooling element is positioned above the glass ribbon and absorbs heat radiation from it in order to ensure the perfect glass temperature for the forming process (between 950 °C and 840 °C).

The entrance coolers are positioned on either side of the tin bath and can overlap in the centre in order to extract more heat from the middle of the glass ribbon.

In addition, the entrance cooler can be used at the end of the wide part of the tin bath, where it serves to catch condensate (dross trap), since it is easier to remove impurities from the cooling element than from other components of the tin bath. Depending on the type, the penetration movement of the entrance cooler can be carried out by means of a motor or manually.

EXIT END COOLER



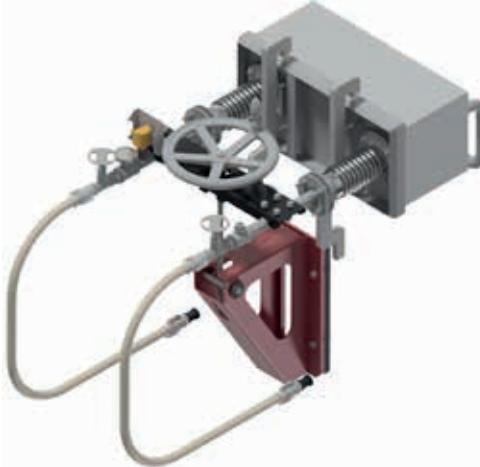
The exit end cooler of Type HEECO, which is installed in the narrow part of the tin bath, serves to cool down the glass ribbon to the optimal lift-out temperature (approx. 610 °C), which is crucial for ensuring smooth production.

The exit end cooler is moved by means of a motor-driven carriage on two rails, so the cooling element can easily be moved into and out of the tin bath. The travel distance on the rails is supervised by several limit switches and is limited on either end by mechanical stops.

The cooling element of the cooler is pushed laterally into the tin bath through a functional sealing box. The cooling element is positioned above the glass ribbon. Due to the precisely adjustable insertion and retraction of the cooling element, the glass ribbon temperature required for the dross box and the annealing lehr can be attained in the most efficient way.

The cooler can be operated via a panel directly at the cooler or remotely from the control room. This facilitates fast and uncomplicated control of the glass ribbon temperature.

TIN COOLER



The tin cooler of Type HTICO 600 operates on the physical principle of convection cooling. It is installed directly on the side walls of the tin bath. The cooling pipe is submerged directly into the liquid tin. The tin cooler extracts heat from the tin so that the tin, in turn, could extract heat from the glass ribbon.

The tin cooler consists of a functional sealing box, a cooling pipe with a flow monitor and a jackscrew for adjusting the immersion depth of the cooling pipe. Depending on the type, the immersion depth can be adjusted by means of a motor or a crank.