



Innovation in drying: Cell Rotaring Conditioning

Toggle and vacuum drying are today the two most important methods of drying used by the tanner, with the former resulting in higher area yield and greater stiffness while the latter produces increased toughness with softness in the leather.

Two Italian tannery machine manufacturers, Fratelli Carlessi, based in Arzignano, and Erretre SPA⁽¹⁾, have recently conducted extensive research into the function of wet leather drying, considered one of the key mechanical operations in leather production. Their research has resulted in a new drying and conditioning plant that comprises independent cells that can take into account the physical properties of leather, such as area retention and softness.

The Cell Rotaring Conditioning system (CRC) splits the drying chamber into independent sections, each of which can be programmed according to the required leather characteristics, and include temperature, humidity, airflow and strain. Every cell in the system contains twenty toggle frames programmed in accordance with the working cycle. A block of frames moves from one cell to the next, and the final module accepts a conditioning stage close to ambient temperature. Using water atomisers, humidification may be increased at this point. The frames carrying the leathers then transfer to the unloading station at near room temperature, considered important because leather and frames cool down before the leathers are actually unloaded; it has the added advantage of maintaining ambient conditions for an extended period.

Airflow temperature can be regulated by means of the independent heating system in every cell. The airflow can be either recirculated within the section or alternatively exchanged with airflow from the previous or the following cell. The airflow is drawn from the cell ceiling and blown downwards along the cell sides, creating a bottom to top movement and thus crossing the leathers belly to belly. The chamber's centrifugal fans run at different speeds for optimum mixing of the air, as well as preventing the stratification of moisture. Space between frames is greater than normally allowed on more conventional toggle dryers; this results in better ventilation, consequently increasing the evaporation rate of moisture in the leathers.

Stretch control

The rate of stretch of the leather has also been taken into account. There is a strain control system employing a series of devices effecting the initial stretch of wet leather after which the control system, section-by-section, prevents excessive stretch that may cause damage to the leather. The strain control can act



Inside view of cell rotaring conditioning toggle dryer.

individually on both butt and neck side. In this way differential elongation, if required, can be achieved.

Programming the dryer is based upon the relevant working recipes set in accordance with the type of leather being processed. The drying pattern is applied individually in every cell, with the twenty-frame block sequentially transferred from one cell to the next. In the event of unplanned changes in the process, such as a change of shift or other interruption, any single cell will modify its function so as to carry out the programmed cycle without the need to move the frames. Temperature and humidity levels are continuously monitored to ensure that the set values are always adhered to.

The primary objective of this innovation in drying is improved quality of leather and consistency in the finished product. It also offers significant reduction in energy consumption. The centrifugal fans of the CRC system are estimated to consume 15% less energy than the generally used axial fans. A further 10-15% saving could be achieved by employing air/air heat exchangers as a heat recovery means which recycles exhaust air. ☉

¹⁾ A comprehensive report on the research carried out by Fratelli Carlessi and Erretre SPA regarding the behaviour and characteristics of leather processed by this new drying and conditioning system is available from both companies. Fratelli Carlessi maintains commercial, production and development independence and is a division of Erretre as a financial entity.