

Automated manufacturing

A newly developed, fully integrated system has been designed for the production of hexagonal apexed beads used in truck and bus tire construction

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The fully automated Bead Apex Chipper & Flipper Assembly (BACFA) manufacturing cell is the latest product

from automated tire machinery manufacturer Intereuropean. The BACFA is designed for truck tire manufacturing plants.

The fully integrated system was developed using Intereuropean's many years of production experience, and includes the best features from previous generations of such machines. The result is a best-in-class, fully integrated system for the production of truck/bus hexagonal apexed beads, with productivity of up to five apexed beads per minute in fully automatic mode, and includes chipper and flipper application.

The BACFA cell uses industrial robots (ABB/KUKA/FANUC and so on) for bead handling between different stations of the system. Cameras, profilometers, laser scanners and other sensors check the machine operation at every stage of the process, recording the data, while the user-friendly touchscreen HMI interface provides full integration with the higher level plant management system software.

Closed loop control systems manage the extrusion process and provide automated adjustment of the extrusion parameters based on the feedback data received from different sensors installed in the extrusion head, as well as in different stations of the line.

Single/duplex head extruders can be provided with the system for the apex extrusion.

The rubber strip (chipper) application system provides automated chipper application on the side of the apex before or after cooling, depending on the customer's preferences.

The automated scrap-removal system enables sensor-based detection, tracing and cut-off

Figure 1 Intereuropean has developed the bead Apex Chipper & Flipper Assembly System for truck/bus tire plants

Figure 2: Bead Apex assembling station



of the scrap extruded material on a dedicated cutting conveyor belt.

The air-cooling system provides for automated cooling intensity adjustment based on the line speed, in order to keep constant apex profile temperature at the exit, based on preset recipe settings.

Apex application system on the bead with symmetric pressing of the apex base to the bead from both sides guarantees strong and uniform grip between the two components over the entire circumference of the bead, and the adjustable cutting angle and automated splicing system provides high consistency and optimum quality of apex application. The splice quality is controlled by a special scanning system, which automatically detects any irregularities and unloads the out-of-spec beads into a scrap container for further checks/repairs by the operator.

Flipper material (rubberized fabric cord) is applied to the bead apex assembly from underneath using the Intereuropean custom-built drums and tooling, also in fully automatic mode.

The hexagonal bead winding system is fully integrated into the BACFA cell and provided with it. Its productivity and speed are automatically adjusted based on the requirements of the apexing system. The wire pre-cast/pre-bending system eliminates the need for manual wire-end splicing to the bead. Nevertheless, an optional fully automated wire-end wrapping system can be provided upon customer request if process specifications require it.

The buffer beads accumulation system makes it possible to reduce production losses due to frequent size changes. **tire**