THE LINDE GROUP

Linde

Tire curing with nitrogen.



Nitrogen-operated, hydraulic tire press (courtesy of Harburg-Freudenberger Maschinenbau GmbH)

General	Curing is the chemical cross-linking of rubber and vulcanizing agents, resulting in an elastomer. The outcome of this reaction depends primarily on the amount and purity of the raw materials. Temperatures of up to 200 °C, pressures exceeding 30 bar and long cycles ranging from a few minutes to several hours help to create the unique properties of the final product rubber.
The state of the art so far	The heat and pressure needed for curing is often added to the process in the form of steam. This procedure, however, has a number of disadvantages: steam energy has a high price and the steam itself is difficult to handle. The maintenance effort for the steam production may also lead to long downtimes. And not all process parameters for steam application can be adjusted independently from one another. Additional antioxidants are needed to protect the bladder from premature deterioration. Moreover, condensing steam can lead to local overheating at the tire and have a negative effect on quality.
Nitrogen as the pressure agent	In order to minimize the disadvantages of the conventional process, nitrogen can be used as a flexible and inert pressure agent. After the steam-induced preheating, nitrogen takes over the part of keeping the system's pressure at the desired level. The ideal system pressure und curing temperature can be selected independently from each other. The rubber cannot overheat any more because of excessive steam supply and less steam can condense in subsequent stages of the curing process.

Curing principle

