PreNitLPC® technology
High-Speed Vacuum Carburizing

Up to 49% increase in process efficiency, optimum carbon penetration

SECO/WARWICK SA, in collaboration with the Institute of Materials Science and Engineering University of Lodz, has patented an improved technology for low-pressure vacuum carburizing with pre-nitriding, PreNitLPC®, which significantly reduces carburizing cycle time, improving productivity while producing work with superior metallurgical results.

Through dosing of the nitrogen carrier during controlled heat up ramp ❶, the furnace can run at higher temperatures (1000°C and above), while maintaining a fine grain structure within the case ❷.

The high temperature of the process increases the value of the diffusion coefficient, leading to a significant reduction of the carburizing cycle time. The layers, having been produced at higher temperatures during the pre-nitriding phase, demonstrate the strength properties similar to work that has been conventionally carburized at lower temperatures.

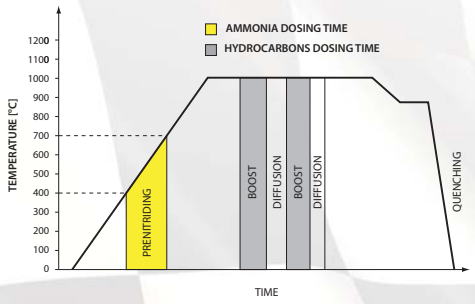
This technology saves process costs by reducing the carburizing cycle time and reducing the consumption of process gases (C_2H_2, C_2H_4, H_2, NH_3) as measured in liters and not, as in the case of conventional technologies, in cubic meters per hour.

PreNitLPC®, the latest advance in the FineCarb® family of technology, is a unique process offering total value in both cost of operation and process efficiency:

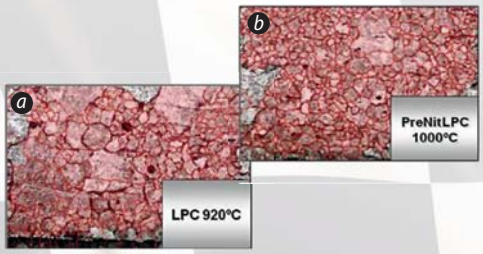
- ➲ REDUCE CARBURIZING CYCLE TIME
- ➲ LOWER PROCESS COST
- ➲ NO INTERNAL OXIDATION
- ➲ EXCELLENT UNIFORMITY
- ➲ OPTIMUM CARBON PENETRATION
- ➲ NO CO_2 EMISSIONS
- ➲ ENVIRONMENTALLY-FRIENDLY

For every 100 processes (i.e. for 0,6mm ECD) according to traditional carburizing methods ❹, PreNitLPC® technology can offer you up to 40% in increased process efficiency. Optimum carbon penetration allows efficient heat treatment of complex shapes and the densely packed loads with superior case uniformity.

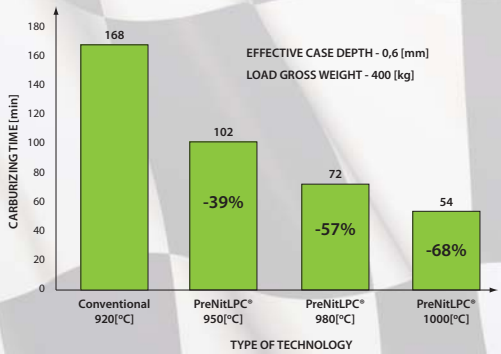
This technology is adaptable to both new and existing furnaces equipped with FineCarb® technology and may be equipped with either an oil or gas quench.



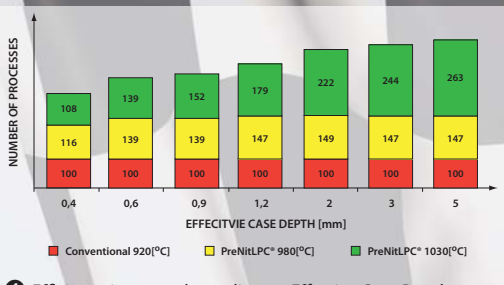
❶ *Process flow chart acc. to PreNitLPC® technology.*



❷ *Case structure of steel 16MnCr5 depending on the applied technology:*
a) LPC, low pressure carburizing at 920°C,
b) low pressure carburizing at 1000°C, with the option of pre-nitriding PreNitLPC®.



❸ *Time of carburizing depending on technology type*



❹ *Efficiency increase depending on Effective Case Depth.*