



1 Anti-adhesive coating
on a CFRP roller

Laser-based production of high-performance non-stick coatings

Lightweight rollers made of CFRP are increasingly being used as replacements for conventional rollers made of steel or aluminum in industrial applications. Since they weigh less, energy consumption in the application can be minimized and the service life of rollers, motors and bearings effectively increased. Functional coatings are often required for these lightweight rollers in order to improve the performance of the surfaces. Common high-performance anti-adhesive coatings are based either on sol-gel systems or high-performance polymers such as PEEK (polyether ether ketone), but these materials must be thermally post-treated after being applied to the CFRP rollers. This process step requires temperatures between 200 and 400 °C, which are above the damage limit of the CFRP rollers (approx. 120 °C). Owing to this limitation, the desired anti-adhesive properties cannot be achieved with conventional oven-based processes, as the component would have to be brought to too high a functionalization temperature.

Combination of high-performance anti-adhesive coatings and CFRP rollers

Fraunhofer ILT has developed a laser process that enables sol-gel and PEEK-based high-performance coatings to be deposited on temperature-sensitive CFRP rollers. The application-specific materials developed by Rhenotherm Kunststoffbeschichtungs GmbH are sprayed onto the rollers and dried in a first step. Thermal functionalization is carried out by means of a diode, whereby a defined surface temperature is achieved via pyrometric temperature measurement with closed-loop control

of the laser power. Since the local and temporal resolution of the energy input is so high, the necessary functionalization temperatures in the anti-adhesive coating can be achieved for a short time without causing thermal damage to the substrate.

Energy savings thanks to lightweight CFRP rollers

Such coated lightweight rollers can be used in production systems in the manufacture of hygiene articles, the packaging industry and the automotive industry and, thanks to their low weight, contribute to energy savings in industrial processes.

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