TRESCELEAN demonstrates improvements in the surface cleanliness and hygiene of steel pipes following laser texturing.

Tresclean Partner Ecor International and Sentiero International Campus, the Research Group Company (ASTER accredited research centre specialised also in the material testing) recently completed tests to evaluate the cleanliness and hygiene of textured pipes with the Tresclean production techniques.

The surface cleanliness and hygiene of the textured pipes was evaluated using whole milk and the performance of the textured surfaces was compared with untextured surfaces. In milk soiling experiments it was found that the milk slipped away from the pipe surface more frequently on textured surfaces than on untextured surfaces. Whilst in surface cleanability tests it was found that the cleanability of textured surfaces was on average 20% higher than untextured surfaces. Although further tests and independent comparisons are required these promising results demonstrate the potential of direct laser structuring of tubular metal parts using the TresClean high throughput production techniques.

Final TresClean Video Published

The final project video showcasing the results of TresClean is now live on the TresClean website (www.tresclean.eu) and social media channels (@TresCleanEU).

The video shows the TresClean surface texturing approach using high power femtosecond lasers. Including the whole surface texturing of metal moulds and steel pipes. It also showcases the results of the evaluation of the cleanability and antibacterial properties of surface textured prototype plastic tanks and steel pipes.
TresClean Achievements

In April 2016 TresClean set out to demonstrate that high throughput laser-based manufacturing using high-power lasers could be applied to produce fluid-repellent and anti-microbial metal surfaces. In achieving this goal the consortium made technological advancements in the fields of laser physics and materials processing. Particular achievements include:

- Identification of ultrashort pulsed laser texturing as a suitable technique for producing antibacterial surfaces
- Application of laser texturing to generate different topographies, characterized by feature size ranging from a few hundreds of nm to tens of μm
- Identification of suitable surface topographies to reach super-hydrophobic and antibacterial effects.
- Development of a high power laser delivering 1kW of output power and >3mJ of pulse energy, including the demonstration of high-power visible (green) and UV radiations with more than 600W and 200W power respectively.
- Development of a scanning system with processing speeds of up to several hundred m/s, improved resolution and sufficient accuracy to support laser power up to 1kW.
- Upscaling of the TresClean laser texturing technique to produce structures with a laser repetition rate of 10 MHz, at a scanning speed of 200 m/s in a field size of 200x200 mm.
- Transfer of nanoscale topographies on polymers by injection molding.
- Generation of functionalised surfaces on free-form components such as metal pipes.

Beyond TresClean

Although the TresClean project formally comes to an end in September 2020 the consortium partners intend to further develop the laser texturing methodologies and exploit the high power laser scanning technology beyond the end of the project. It is expected that the results generated by TresClean will be used by the partners to secure funding for further research and development in the areas of laser processing, surface topography, surface characterisation, and in the medium-term may even be integrated into the process for the development of new self-cleaning products.