



Characterization of dry electrolyte polishing process

GPAINNOVA is reinventing the way manufacturing teams are able to produce high quality metal surfacing. The DLYte series machines are based on patented Drylyte technology: the first dry electropolishing process that provides a solution for surface finishing of metal alloys for the industry. The applications range from grinding, rounding and deburring to surface smoothing and high gloss polishing of aesthetic parts. Sensofar's S neox Five Axis allows us to obtain highest-quality results in our current surface finishing solutions.

At GPAINNOVA, the Sensofar S neox Five Axis is used specially to quantify the quality of the polishing process and to report the roughness reduction in the samples after polishing with DLYte. Samples may vary from very rough additive manufacturing parts to mirror-like surfaces, all of them measurable with the Sensofar system thanks to its versatility of technologies, including Focus Variation, Confocal and Interferometry techniques.

Below is a small example of what DLYte is capable of. A femoral component made of CoCr before and after DLYte polishing can be seen.

Before having the Sensofar system, a contact stylus profilometer was used, obtaining only profile parameters (Ra, Rz, Rq, etc). Despite the fact that Ra is the most used parameter, it does not provide any information on the spatial



GPAINNOVA is a technology company established in 2013 in Barcelona, with subsidiaries in Miami (USA), Hong Kong and Shenzhen (Mainland China) and specializing in surface metal finishing machinery, medical devices, Unmanned Surface Vehicles and high performance power electronics. The company has been selected by Financial Times among the 1,000 Europe's Fastest Growing Companies in 2020 and 2021.

The study was carried out by Yaiza Gomez, David Gutierrez, Laura Abellan and Paul Berenguer (from left to right).

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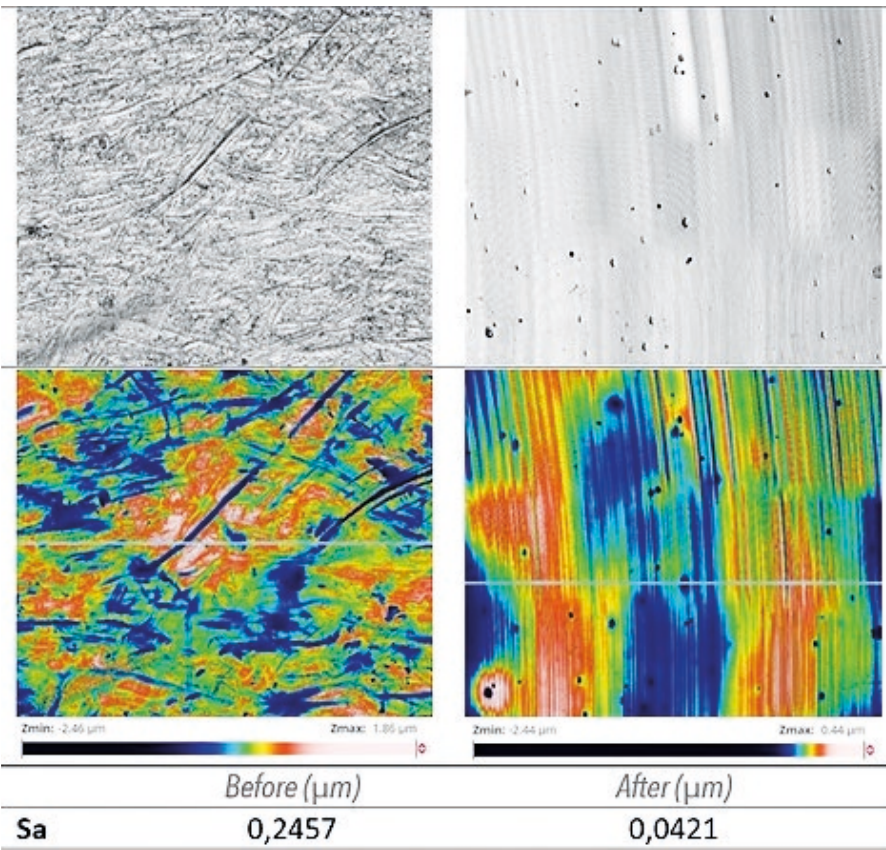
BEFORE

AFTER



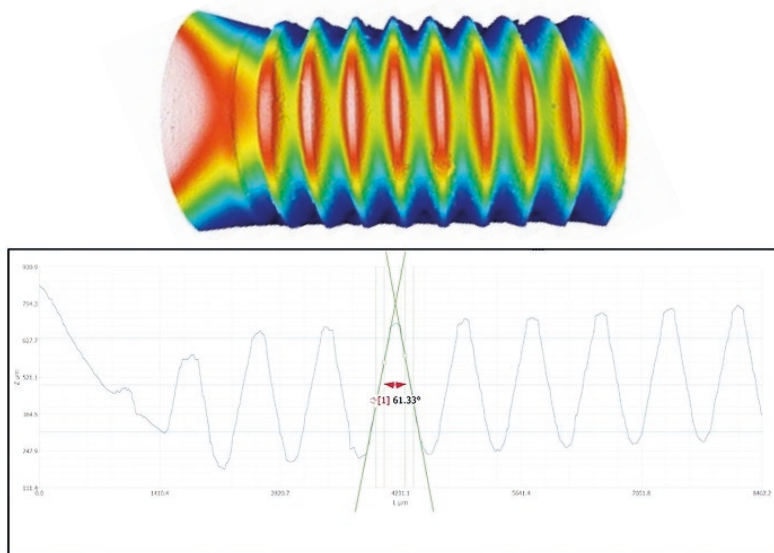
structure of the surface. Nonetheless, from now on, and thanks to Sensofar metrology, the surface parameters such as S_a — which is the extension of R_a to a surface — can be measured. S_a takes into account the surface of the sample to measure its roughness, allowing for a better characterization of the surfaces than R_a . The main advantage of measuring an area is the possibility to scan a larger area and to generate a surface of several millimeters in size as a better overview of the sample and thus get more reliable values. The 3D areal surface parameters are calculated following the ISO 25178 standard — considered as first and foremost the redefinition of the foundations of surface texture — and comprise the following parameters: S_a , S_q , S_{sk} , S_{ku} , S_p , S_v and S_z .

■ Measurements



The above measurements were obtained with a 50x DI objective lens using the Interferometry technique, that allows us to measure mirror-like surfaces like the previously-shown femoral component sample.

S neox Five Axis will allow us not only to characterize the reduction in surface roughness after the polishing process, but also to demonstrate the preservation of the tolerances in polished parts, thanks to Drylyte technology. Below there is an example of a shape and form measurement in a processed part, using in this case Focus Variation technology.



■ Conclusions

As can be seen, due to the B/W images and the colormap images taken with Interferometry, a decrease of the surface roughness of the sample is shown after the Dlyte process, quantified by an Sa parameter below 0.05 μm . Moreover, the preservation of the form is demonstrated by complementary form measurements using Ai Focus Variation technique. S neox Five Axis is a versatile metrology tool that perfectly suits our measurement needs and will be from now on a helpful tool in Dlyte's lab.

■ References

www.gpainnova.com

www.dlyte.es

www.muruagold.com

www.respiradevice.com



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HEADQUARTERS

SENSOFAR METROLOGY | BARCELONA (Spain) | T. +34 93 700 14 92 | info@sensofar.com

SALES OFFICES

SENSOFAR ASIA | SHANGHAI - China | T. +86 21 61400058 | info.asia@sensofar.com

SENSOFAR GERMANY | LANGEN - Germany | T. +49 151 14304168 | info.germany@sensofar.com

SENSOFAR USA | NEWINGTON (CT) - USA | T. +1 617 678 4185 | info.usa@sensofar.com

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