

# *When the material durability needs to be tested*

The company operates in the area of manufacturing machinery for food, beverage and tobacco processing by developing, designing and fabricating the complete tobacco machines, as well as sub-assembling the parts of the machinery. In the service offer the company additionally includes injection moulds and tools, overhaul of machines and uniting repairs, and finally the production maintenance support, [www.bamet.pl](http://www.bamet.pl)



## **Industrial need**

The company wanted to investigate durability and viability of the material provided by different vendors as raw material for the paper rolling machines used in tobacco industry. The needed tests were essential in designing a new machinery part in the Bamet portfolio.

## **Experiment**

The focus of the study was to compare two samples of metals with different coatings to find out which one of them can act as best substrate to build veins in paper rolling machine.

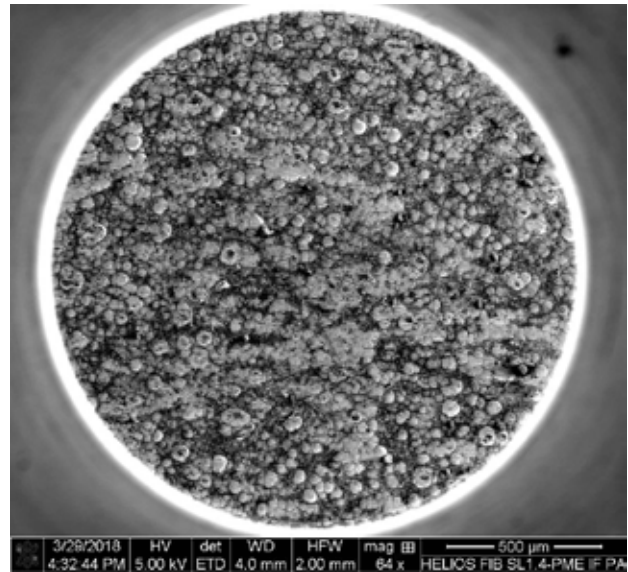
The aim of the research was to perform imaging of phosphate layers surfaces of both samples as well as analysis of their chemical composition. Scanning Electron Microscopy (SEM) was used for this purpose with analysis with elemental composition mapping (EDS). The measurements showed that the surface of the coatings of both samples are almost the same. The received findings were further complemented by the continued experiment, specifically the hardness test, which concluded that the core of samples differs and one of them is more durable than the second one.

## Techniques and materials

In the experiment two aluminium 10mm cubes were examined with Scanning electron microscopy (SEM), Energy dispersive spectroscopy (EDS) and Hardness Test with use of Brindell Method.

## Findings?

The measurements allowed to collect images of surfaces and compare samples morphologies, identify elements and estimate their content. Additionally, the hardness of core materials was measured. The experiment was valuable by performing on conductive samples and selecting the SEM as the most appropriate analytical technique. The company benefited from receiving the important description and specification of the samples microstructures, allowing to explore the durability of the tested metal.



**Figure 1. The image of the sample surface under microscope**