

Researchers develop process that allows industry to quantify metal particles

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Specialists from the Center of Research and Technological Development in Electrochemistry (CIDETEQ) in Mexico have developed a software called Proimpart, its function is to quantify metallic and nonmetallic

particles from pieces going through cleaning processes and that have been machined or processed and are required in industries such as automotive or metalworking.

One of the requirements for these industries (automotive and metalworking) is cleaning up the pieces, since the presence of particles would create problems for their components. Until a few years ago, there wasn't a laboratory in the country to evaluate the particles, so companies had to send samples abroad. In response, the CIDETEQ initiated the development of this methodology and it has been in use by these areas for the last five years.

Federico Guerrero Manriquez, Sc.M, said in an interview that during machining operations to apply the final touches to the pieces and fulfill the required dimensions, cutting tools and lubricants that improve the machining process are employed. However, some metallic and nonmetallic particles adhere to the surface of the pieces.

"As the cleaning is done, the solutions employed are saturated with particles, so it is necessary to use a mechanism that assesses the degree of washing of multiple parts and knows the type, quantity and particle size."

The specialist at CIDETEQ indicates that the technology was developed in Mexico with the idea of offering, in addition to the software, quantification services unavailable in Mexico.

In the research center, located in Queretaro (center state of Mexico), [software systems](#) were developed for "Mathematical Morphology" that through [image processing](#), which includes filters and algorithms, researchers analyze the characteristics of the particles in the developed parts.

It should be noted that the cleaning of the parts is a standard that companies must meet. And the degree of cleanliness is evaluated using this methodology, specifically for companies in the automotive, aerospace and electronics sectors.

Manriquez Guerrero indicates that with this technology, image processing can help uncover several characteristics of particles that are imperceptible to the human eye using quantitative tools, and identify their possible effect on the finished pieces.

"The way to assess the degree of cleanliness and type particle present in the solution is to run it through a filter that will retain the metallic and non-metallic particles. Once the filter has retained the particles, it has to be evaluated to determine the type, amount and size of them. "

Thus, the filter is evaluated using an optical microscope with which everything is checked and the images are acquired at specific magnifications. The software performs the image processing and gives shape, size and distribution criteria, and performs the quantification of the types of particles present in the washing solutions. This information is used to provide feedback to the processes of cleaning the parts and check if they meet the standards required by their customers.

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