



## Polymer Surface Finishing

An evaluation of finishing technologies, capabilities, and suppliers

### BACKGROUND

Since the extensive usage of additively manufactured polymer end-products, surface finishing applications have simultaneously emerged as a prominent preparation step for various kinds of polymer AM materials. As AMEXCI, we aim at providing an extensive overview as well as the evaluation needed on polymer surface finishing for our shareholder companies.

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### SCOPE

In 2019, AMEXCI conducted a pre-study about polymer surface treatments aiming at providing an overview of technology trends, maturity of manufacturers and technologies, material capabilities as well as main challenges. Following the know-how put together in the pre-study, in 2020, an extensive study on different surface finishing technologies, i.e., blasting, tumbling, chemical dipping, and vapor smoothing, was performed to evaluate different suppliers/technologies as well as the effect on various commodity polymer benchmark samples, e.g., PA12 (MJF and SLS printed), Onyx, ABS.

### INSIGHTS

Throughout the extended study “Polymer Surface Finishing”, AMEXCI’s goal was to broaden the knowledge on the capabilities of different available technologies as well as the suppliers. For this purpose, a benchmark sample with various functional features was designed and printed utilizing the most common Polymer AM methods and materials: FDM (ABS, Onyx), MJF(PA12) and SLS (PA12). The benchmark samples were sent out to different surface finishing service/technology providers to further test on them and evaluate the results by optical microscopy, 3D scanning, surface roughness measurements and visual check-ups. The obtained results from this project have been summarized in graphs and charts, comparing different technologies and materials as represented in the table above.

Operations		ABS	Onyx	PA12 SLS	PA12 MJF
Suppliers	As printed (ABS&Onyx)				
	De-powdered				
	Supplier-1				
	Operation-1				
	Supplier-2				
	Operation-2				
	Supplier-3				
	Operation-3				
	Supplier-3				
	Operation-4				

The attained outcomes of this study along with different analyses methods of each benchmark sample have not only broaden AMEXCI’s knowledge on surface finishing technologies, but also opened a discussion space for further applications regarding polymer AM surface modifications.

The full version is available for participants of this project within AMEXCI’s shareholder companies.