



Additive Manufacturing Interfaces

prostep ivip PSI 27 Recommendation V1.0

AMI Recommendation
Additive Manufacturing Interfaces

Abstract

Additive manufacturing, often simply referred to as 3D printing, is creating new business opportunities for manufacturing industry.

Additive manufacturing processes have been available for at least three decades and therefore have a long tradition in the field of prototyping, e.g. in automotive engineering. The motivation behind the use of this type of manufacturing technology was essentially the speed at which physical models of the designed components could be made available. Hence, the term "rapid prototyping" was born.

The resulting physical models were predominantly used for visualization, packaging, etc., while series production of the components was implemented – without exception – using conventional manufacturing processes, which often required dies and fixtures (e.g. casting).

This situation still exists to a large extent today, which means that existing prototyping processes are not currently exploiting key potential that additive manufacturing offers. This includes:

- Extensive freedom in product design in terms of geometry, material distribution and functional integration
- Economic and fast production of small and very small lot sizes compared to resource- and processing-time-intensive production methods (often mentioned in the context of objectives like "individualization", "lot size of 1" or "rapid manufacturing")
- Greater opportunities for cross-company collaboration, e.g. with external print service providers, than is possible with conventional manufacturing technologies.

Companies are gearing up for the transformation of existing processes needed to implement additive manufacturing for series production. However, while 3D printer technology and print material capabilities are advancing at a remarkable speed, existing digital tool chains and data formats face the challenge of trying to keep pace.

Design freedom, new manufacturing strategies and the need for a high degree of automation to speed up print job generation require the loss-free exchange of data between best-in-class process tools. Protecting valuable know-how and intellectual property (IP) when product data is exchanged between departments or companies is a key requirement. This recommendation presents a summary of the above-mentioned potential and challenges and defines the requirements for current and future data exchange formats. This provides us with a basis for making recommendations regarding digital interfaces, methods and architectural concepts for collaboration including IP protection.

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Abbreviations, Definitions

AM	Additive Manufacturing
AMI	Additive Manufacturing Interfaces
B2B	Business-to-Business
B2C	Business-to-Consumer
PMI	Product Manufacturing Information, e.g. GD&T, surface and roughness definition
PP	Process Planning