BUSINESS PLAN

CEN/TC 438
ADDITIVE MANUFACTURING

EXECUTIVE SUMMARY

Business environment

Additive Manufacturing (AM) consists of a set of processes of joining materials to make parts or objects from 3D model data, usually layer upon layer, as opposed to subtractive manufacturing and formative manufacturing methodologies. These objects can be manufacture prototypes, tools and production parts of almost any shape or geometry, and are produced from a 3D model or other electronic data source.

According to statistics on 2013, the size of the market was estimated at a value of 2,204 billion US $ (revenues generated in the primary additive manufacturing market).

Benefits realized and/or to be expected

- Systematic development, modification and use of mold-free production processes (AM) resulting in innovative products;
- Assistance to users within the assessment of different additive processes resulting in using the appropriate technology for the specified product demands;
- Specification of quality parameters of different processes needed for standardized test procedures;
- Specification of appropriate test procedures, thereby ensuring uniform interpretation and evaluation of quality parameters;
- Standardization of process chains of AM techlogies securing functionality and compatibility;
- Standardization of data formats, data structures and metrics for AM models
- Standardization of vocabulary required to define the product and to find a common speech

Main objectives and priorities

In order to ensure consistency and harmonization with international standards, the priority is to apply the Vienna agreement with ISO/TC 261: publish the ISO standards as EN ISO.

The main objectives and priorities is to standardize the processes of Additive Manufacturing, their process chains (hard- and software), test procedures, environnemental issues, quality parameters, supply agreements, fundamentals and vocabularies.

1 BUSINESS ENVIRONMENT

1.1 Description of the Business Environment

The European market of Additive Manufacturing is growing very quickly and offering, in various industrial sectors, highly innovative solutions for design / manufacturing issues that could not be solved by conventional substractive manufacturing thechnics. Standardization is necessary to build up confidence in this technology for different categories of stakeholders (feedstock providers, manufacturers - machines and parts -, end users, technical centres, universities, etc…) and on items such as specification of quality parameters, test procedures, data format, environnemental issues, support to regulation, ... The market of additive manufacturing is very wide as these technologies may be used in all sectors. As workpieces can be costumized with specific characteristics and specific geometries adapted to each case, there are big advantages especially for suppliers of medical services and implants, and aerospace and aircraft, and in general for High-Tech equipements.

The research program "SASAM" (Standardization in additive manufacturing) in February 2014 has recognized the need for European standards to support the industrial implementation of Additive Manufacturing as a big opportunity for innovation and economic growth of the European industry.

The strategic research agenda for additive manufacturing produced by the European AM Plateform also recognizes the need for standards: the lack of standards in AM has been limiting the uptake of AM in key industrial sectors e.g. aerospace and medical/dental. The availability of standards will help to increase adoption of the technologies and open up extensive research and development opportunities. Professional markets are often demanding and require certification which makes adoption of new technologies very difficult.

1.2 Quantitative Indicators of the Business Environment

According to Wohlers report 2013, the size of the market was estimated at a value of 2,204 billion US $ (revenues generated in the primary additive manufacturing market).
Market of personal 3D printers wil grow about 17% per year durong next 6 years to reach about 6,5 billion $ in 2019.
The use of additive manufacturing for the production of parts for final products continues to grow: in ten years, it has gone from almost nothing to 28,3 % of the total product and service revenues from additive manufacturing worldwide.

2 BENEFITS EXPECTED

The benefits already realized and/or expected through the availability of the standards are the following:

- Systematic development, modification and use of mold-free production processes (AM) resulting in innovative products;
- Assistance to users within the assessment of different additive processes resulting in using the appropriate technology for the specified product demands;
- Specification of quality parameters of different processes needed for standardized test procedures;
- Specification of appropriate test procedures, thereby ensuring uniform interpretation and evaluation of quality parameters;
- Standardization of process chains of AM techlogies securing functionality and compatibility;

- Standardization of data formats, data structures and metrics for AM models
- Standardization of vocabulary required to define the product and to find a common speech

3. PRIORITIES

The main objectives and priorities is to standardize the processes of Additive Manufacturing their process chains (hard- and software), test procedures, environnemental issues, quality parameters, supply agreements, fundamentals and vocabularies. The priority is to apply the Vienna agreement with ISO/TC 261.

4 OBJECTIVES OF THE CEN/TC AND STRATEGIES FOR THEIR ACHIEVEMENT

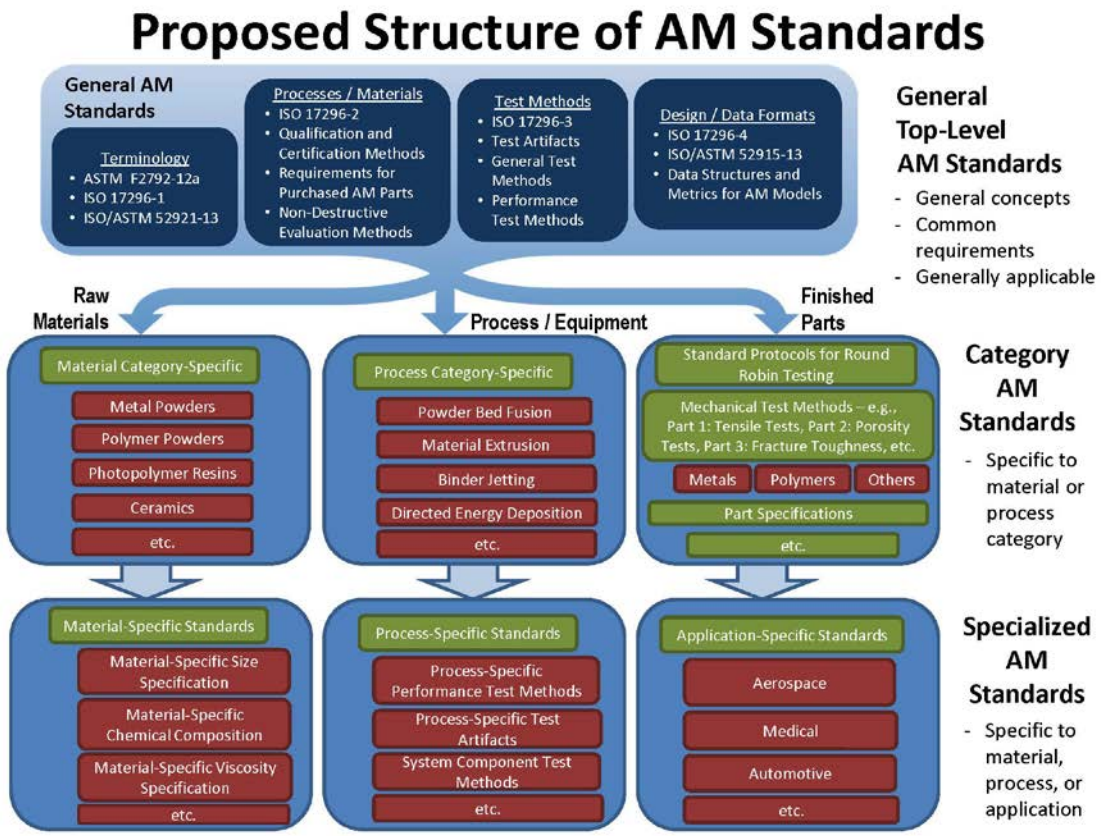
4.1 Defined objectives of the CEN/TC

The main objective of CEN/TC 438 is:

- To provide a complete set of European standards on processes, test procedures, quality parameters, supply agreements, fundamentals and vocabulary based, as far as possible on international standardization work. The aim is to apply the Vienna Agreement with ISO/TC 261 "Additive Manufacturing" (DIN) to ensure consistency and harmonization
- To strengthen the link between European Research programs ans standardization in additive manufacturing
- To ensure visibility to the European standardization in additive manufacturing by centralizing standardization initiatives in Europe on additive manufacturing

4.2 Identified strategies to achieve the CEN/TC.s defined objectives.

The set of European standards shall comply with the common ISO/ASTM roadmap below.



A main part of the strategy is to ensure a close cooperation between CEN/TC 438, ISO/TC 261 and ASTM F 42 resulting in of set of standards in order to develop the common roadmap and organization structure for AM standards into the following three levels according to the figure above:

- General standards: standards that specify general concepts, common requirements, or are generally applicable to most types of AM materials, processes, and applications,
- Category standards: standards that specify requirements that are specific to a material category or process category,
- Specialized standards: standards that specify requirements that are specific to a material, process, or application.

Therefore, any new idea for a European standard shall first be proposed at ISO/ASTM level to follow the common ISO/ASTM structure of AM standards above.

4.3 Environmental aspects

Resources and energy efficiency combined with economical production are the central challenges in the future. Additive Manufacturing technologies are one of the key factors to tackle those challenges. Additive Manufacturing technologies will become in addition a key player in placing advanced industrial production on a cost- and resource-efficient footing.

The generation of parts layer-by-layer allows for a geometric design that is not possible using other methods. Moreover, it enables a design driven manufacturing. Branches like e.g. automotive and aerospace are forced to reduce fuel consumption in the coming years as resources are decreasing as well in many areas. Additive Manufacturing can support these industries to achieve their goals, e.g. by enabling lightweight structures that help to reduce fuel consumption yet making sure that the part properties remain the same or are even better.

In AM usually only those raw materials are consumed that represent the part. There is a minimal amount of waste compared to conventional technology such as milling or turning.

5 FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE CEN/TC WORK PROGRAMME

Not identified at this time.