



International standardisation activities

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Motivation for standards

New challenges when entering additive manufacturing

- The early days of RP were furious, challenging and exciting - and nobody was seriously considering any standards
- Making “real” parts for end use means facing requirements that were unknown so far - and to some extent they still are, for vendors as well as for users
- Standards in conventional manufacturing technologies represent the experience of decades and make them reliable – successful parts from AM are mostly a result of individual validation
- Standards in AM are required, where existing standards do not match – either as a supplement or as a new one

Motivation for standards

The need is agreed all over the world

- The goals are similar, the wording is slightly different
 - ASTM F42 committee scopes
 - Promotion of knowledge
 - Stimulation of research
 - Implementation of technology
 - VDI group/DIN
 - Establish a common understanding between user & supplier - improve communication
 - Support a proper order processing
 - European RM platform vision 2020 on business implementation
 - "... Quality standards to be modified towards AM characteristics ..."

Motivation for standards

Thread: asking too much vs. softening

- OEMs tend to play down the importance of quality standards – while R&D institutions like to increase targets in order to stimulate development
- Finding the right balance prevents AM from being killed at the early stage
- Remember: conventional technologies have some years lead over AM



Report on activities

ASTM Committee F42 on Additive Manufacturing

- See also presentation from the 8th RM Platform meeting 2010
- Meanwhile 2 standards are ready
 - ASTM STANDARD F 2792-09 on Terminology is published
 - ASTM STANDARD F 2915-11 on AMF (publication pending)
 - See also http://en.wikipedia.org/wiki/Additive_Manufacturing_File_Format

SC	F42.01	F42.05	F42.04	F42.91	F42.90
	Test Methods	Materials and Processes	Design	Terminology	Executive
Chair	Jason Davidson	Shane Collins	Evan Malone	Terry Wohlers	Brent Stucker
Vice Chair	Roger Spielman	Denis Cormier	Karel Brans		Carl Decker
Secretary	Neil Hopkinson	Matt Donovan			R. Hague / C. Phillips
Members-at-Large					Joerg Lenz
Work items	WK26172	WK28740 - WK28741	WK26367	WK24055	
	New Test Method for Tension Testing of AM materials	New Specification for Electron Beam Melting (EBM) Titanium 6Al-4 V ELI, HIP - no HIP	New Terminology for Lattice Structures	New Terminology for Additive Manufacturing	
	<i>Ryan Kircher</i>	<i>Shane Collins</i>	<i>Scott Johnston</i>	<i>Terry Wohlers</i>	
	WK30107	WK28739 - WK25296	WK27506	WK26433	
	New Practice for Using Existing Test Methods with Specimens Prepared by Additive Manufacturing	New Specification for Electron Beam Melting (EBM) Titanium 6Al-4V, HIP - no HIP	New Specification for Data Exchange Format for Additive Manufacturing	New Terminology for Metal Deposition Additive Manufacturing Technologies	
	<i>Ken Sargent</i>	<i>Shane Collins</i>	<i>Hod Lipson</i>	<i>April Cooke</i>	
	WK30747	WK26174			
	New Terminology for Additive Manufacturing--Coordinate Systems and Nomenclature	New Specification for Additively Manufactured Titanium-6Aluminum-4Vanadium Alloy			
	<i>Jason Jones</i>	<i>Ryan Kircher</i>			
		WK26106			
		New Specification for Material Qualification for Additive Processes			
		<i>David Abbott</i>			
		WK26105			
		New Specification for Material Traceability for Additive Processes			
		<i>David Abbott</i>			
		WK26102			
		New Specification for Metrics for Initial Conditioning of Machines &/or Performance Metrics for Metal Deposition			
		<i>David Abbott</i>			
		WK25479			
		New Guide for Conditioning of machines and performance metrics of metal laser sintering systems			
		<i>James Taylor</i>			
		WK27752			
		New Specification for Laser Sintered Polyamides			
		<i>Dave Bourell</i>			
		WK30522			
		New Specification for Additive Manufacturing Titanium-6 Aluminum-4 Vanadium with Powder Bed Process			
		<i>Shane Collins</i>			
		WK30557			
		New Specification for Standard Specification for Laser Sintering Moderately Conductive High Melt Temperature Polymers for Non-Structural Aerospace Components			
		<i>Shane Collins</i>			
Standards			ASTM F2915 - 11 *)	ASTM F2792 - 09	
			New Specification for Data Exchange Format for Additive Manufacturing	Standard Terminology for Additive Manufacturing Technology	
			*) Publication pending		

ASTM F42 committee structure



e-Manufacturing Solutions

Report on activities

Next ASTM F42 meeting

- July 13./14. 2010 - following the AM conference
- Place: Loughborough university (UK)
- Open also to non-members!!

Report on activities

VDI Workgroup on RP – 3405a and 3405b

- See also presentation from the 8th RM Platform meeting 2010
- In 2009 the VDI 3404 was released and meanwhile transferred to ISO as New Work Item Proposal (NWIP)
- VDI3405a - Standard for plastic laser sintering, based on VDI3404, chaired by Prof. Thomas Seul, Schmalkalden
 - “green” version to be published
- VDI3405b - Standard for metal laser beam technologies (DMLS, LaserCusing, Laser-melting), based on VDI3404, chaired by Dr. Sabine Sändig, Jena
 - “green” version to be published

Report on activities

German committee on Additive Manufacturing at DIN

- DIN NA 145-04 FB “Additive Fertigungsverfahren” established
 - Chair: Martin Schäfer (Siemens)
- Tasks
 - Develop national proposals for standards
 - Decide on transfer to ISO and/or CEN
 - Prepare conversion of documents
 - Represent Germany in ISO/TC 216 and CEN meetings

Report on activities

ISO and CEN

- Germany has decided to choose the Vienna Agreement
 - establish a common ISO-CEN-Standard
- As there was no structure at ISO or at CEN
 - Establishment of an International Technical Committee at ISO called "Additive Manufacturing" ISO/TC 216 -> **done**
 - Establishment of the European Structure at CEN as a Sub-Sector at CEN called "Additive Manufacturing". A proposal will be circulated to all Member Bodies of CEN after the ISO/TC on "AM" has been established -> **July 26/27, 2011 in Berlin**
 - work will be carried out by the ISO/TC "AM" (ISO-Lead) and will then be parallel approved on European Level
 - intention to integrate the European Stakeholders into the Standardization process
- A parallel development of International and European Standards will reduce the project timeframe considerably
 - to standardise AM-technologies as fast as possible

What's next

Strengthen the role of Europe in standardization of AM

- The ISO/CEN approach allows Europe a “double” influence
 - Standardization interest exists in many European countries, as the feedback to the NWIP has shown
 - Please stay involved in ISO and CEN activities, contact your national ISO/CEN member bodies!
- Support us in achieving a European consensus also in ISO
 - By balancing different standardisation interests between countries, organisations and industries
 - By utilising the chance of a European secretary at ISO/TC 216 AM
 - By also taken into account the work at ASTM

Thank you for your attention !



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