

**SKILLS FRAMEWORK FOR PRECISION ENGINEERING
TECHNICAL SKILLS AND COMPETENCIES (TSC) REFERENCE DOCUMENT**

TSC Category	Precision Manufacturing Process					
TSC	Metal-based Additive Manufacturing					
TSC Description	Evaluate potential applications of additive manufacturing with a specialised emphasis on metallic component manufacturing					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
				PRE-MPR-4038-1.1	PRE-MPR-5038-1.1	
				Review additive manufacturing (AM) processes to determine their suitability for manufacturing metallic components	Review high-speed additive manufacturing (AM) processes to determine their suitability for manufacturing metallic components	
Knowledge				<ul style="list-style-type: none"> Principles of precision engineering Fundamentals of AM processes and general applications for metallic components Material considerations and metallurgy Thermodynamic characteristics of metals and alloys Material characterisation Applications and operational parameters of direct metal laser sintering (DMLS) machines Applications and operational parameters of selective laser sintering (SLS) machines Applications and operational parameters of selective laser melting (SLM) machines Post-processing of AM metallic components 	<ul style="list-style-type: none"> Principles of precision engineering Fundamentals of high-speed metallic additive manufacturing techniques, processes and applications Metallic powder characterisation Metallic powder production techniques Applications and operational parameters of electron beam melting (EBM) machines Applications and operational parameters of laser-aided additive manufacturing (LAAM) machines Post-processing of high speed additive manufacturing products and their equipment 	
Abilities				<ul style="list-style-type: none"> Review methodologies for AM of metallic components for appropriateness and 	<ul style="list-style-type: none"> Review methodologies for high-speed AM of metallic components for 	

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				<p>effectiveness in meeting requirements</p> <ul style="list-style-type: none"> • Determine material considerations and metallurgy of metallic components to be manufactured via AM • Evaluate viability of using various equipment and processes for AM of metallic components • Plan the processes and procedures for manufacturing metallic components using AM • Plan post-processing procedures for manufacturing metallic components using AM • Assess the value-add of AM for metallic component manufacturing, compared to traditional precision manufacturing processes • Identify and act on possible concerns of using AM as a new manufacturing technique • Obtain buy-ins and seek endorsement on the plans to use AM for manufacturing components 	<p>effectiveness in meeting requirements</p> <ul style="list-style-type: none"> • Determine material considerations and metallurgy of metallic components to be manufactured via high-speed AM • Determine requirements of metal powders for additive processes • Evaluate viability of using various equipment and processes for high-speed AM of metallic components • Plan and determine processes and procedures for manufacturing metallic components using high-speed AM • Plan post-processing procedures for manufacturing metallic components, using high-speed AM • Assess the value-add of high-speed AM for metallic component manufacturing, compared to other additive manufacturing processes • Identify and act on possible concerns of using high-speed additive manufacturing as a new manufacturing technique • Obtain buy-ins and seek endorsement on plans to use high-speed AM for manufacturing components 	
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