<table>
<thead>
<tr>
<th>TSC Category</th>
<th>Precision Manufacturing Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSC</td>
<td>Metal-based Additive Manufacturing</td>
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<tr>
<td>TSC Description</td>
<td>Evaluate potential applications of additive manufacturing with a specialised emphasis on metallic component manufacturing</td>
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<thead>
<tr>
<th>TSC Proficiency Description</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
<th>Level 6</th>
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<tbody>
<tr>
<td></td>
<td>PRE-MPR-4038-1.1</td>
<td>PRE-MPR-5038-1.1</td>
<td>Review additive manufacturing (AM) processes to determine their suitability for manufacturing metallic components</td>
<td>Review high-speed additive manufacturing (AM) processes to determine their suitability for manufacturing metallic components</td>
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**Knowledge**

- 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
- 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**

- Review methodologies for AM of metallic components for appropriateness and...
<table>
<thead>
<tr>
<th>Effectiveness in meeting requirements</th>
<th>Determine material considerations and metallurgy of metallic components to be manufactured via AM</th>
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<td>Effectiveness in meeting requirements</td>
<td>Determine requirements of metal powders for additive processes</td>
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<tr>
<td>Effectiveness in meeting requirements</td>
<td>Identify and act on possible concerns of using high-speed AM for manufacturing processes</td>
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<tr>
<td>Effectiveness in meeting requirements</td>
<td>Obtain buy-ins and seek endorsement on plans to use high-speed AM for manufacturing components</td>
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- 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

- 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
- 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