

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

<b>TSC Category</b>	Precision Manufacturing Process					
<b>TSC</b>	Surface Preparation and Protection					
<b>TSC Description</b>	Apply appropriate surface preparation and protection techniques, based on surface material, operating conditions and maintenance requirements					
<b>TSC Proficiency Description</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>	<b>Level 6</b>
	<b>PRE-OPR-1022-1.1</b>	<b>PRE-OPR-2022-1.1</b>	<b>PRE-OPR-3022-1.1</b>	<b>PRE-OPR-4022-1.1-1</b>		
	Carry out surface preparation and protection processes according to instructions and work plans	Oversee team's execution of tasks according to surface preparation and/or protection plans and manufacturers' instructions and ensure use of appropriate materials and application techniques	Draft surface preparation plans specifying appropriate surface preparation techniques by analysing material properties and surface requirements	Evaluate methods for corrosion prevention to facilitate product preservation and quality control		
<b>Knowledge</b>	<ul style="list-style-type: none"> <li>Types of surfaces (metallic and non-metallic) and preparation techniques</li> <li>Types of exposure and surface wear</li> <li>Painting, hot-dip galvanising and other types of surface protection techniques adopted in the marine industry</li> <li>Epoxy, alkyd and other types of paints, and their cathodic protection and classifications</li> <li>Procedures for surface preparation, protection and dimension checks</li> <li>Types of machine pre-operational checks and requirements</li> <li>Methods of waste material disposal</li> <li>Types of marine equipment and components</li> <li>Relevant Workplace Safety and Health (WSH) practices, guidelines and regulations</li> </ul>	<ul style="list-style-type: none"> <li>Applications of finishing processes and other surface preparation techniques</li> <li>Methods of evaluating surface conditions</li> <li>Relevant quality assurance and quality control (QA/QC) policies and procedures</li> <li>Types of finishing requirements</li> <li>Types of processing media</li> </ul>	<ul style="list-style-type: none"> <li>Properties of metallic and non-metallic surfaces</li> <li>Types of mechanical and chemical surface preparation techniques</li> <li>Types and factors of surface corrosion</li> <li>Surface profile measurement techniques</li> <li>Industry best practices in surface preparation and protection</li> <li>Impact of improper surface preparation techniques on production workflows and processes</li> <li>Properties of paints and other surface protection media</li> </ul>	<ul style="list-style-type: none"> <li>Industry performance requirements for surface treatment and coatings</li> <li>Surface inspection methods to evaluate surface cleanliness</li> <li>Surface mass finishing techniques</li> <li>Types of surface treatment processes</li> <li>Surface morphology techniques</li> </ul>		

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<p><b>Abilities</b></p>	<ul style="list-style-type: none"> <li>• Select and use suitable personal protective equipment appropriate to job requirements</li> <li>• Verify working conditions of tools and equipment through pre-operational checks and inspections</li> <li>• Set-up machines for surface preparation and finishing operations according to safe working practices</li> <li>• Prepare protection media to the specified consistency prior to application</li> <li>• Set up machines for application of paint or other protection media</li> <li>• Follow operating instructions for equipment and machineries to perform surface preparation or protection operations safely</li> <li>• Conduct visual surface inspections</li> <li>• Perform simple maintenance of blasting equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Correlate steps in preparation and/or protection processes to their impact on final, desired quality</li> <li>• Interpret task requirements from surface preparation and/or protection work plans to verify adherence by the team</li> <li>• Infer compliance requirements and potential defects in finished components from work plans and instructions</li> <li>• Confirm quantities of surface preparation and/or protection media supplied for work</li> <li>• Identify post-operation waste products and appropriate disposal techniques</li> </ul>	<ul style="list-style-type: none"> <li>• Analyse base materials, subjected environments, life of components and other factors for surface protection requirements</li> <li>• Conduct feasibility studies on surface preparation techniques with reference to product requirements</li> <li>• Conduct feasibility studies on manual and machine-based application processes for surface protection</li> <li>• Identify appropriate surface preparation and/or protection materials and techniques for application</li> <li>• Analyse long term effects of applying different protection techniques</li> <li>• Calculate quantities of surface preparation and/or protection media required</li> </ul>	<ul style="list-style-type: none"> <li>• Review functional requirements to shortlist coating and surface treatment technologies</li> <li>• Identify factors affecting coating and surface treatment adhesion, surface contamination and abrasive wear</li> <li>• Perform analyses on the effects of using various surface treatment processes to meet functional requirements</li> <li>• Use physical vapour deposition (PVD) magnetron sputtering systems with appropriate selections of electrical power for different kinds of targets</li> <li>• Measure wear rate of coating and surface treatments</li> <li>• Report on selected coating and surface treatment processes used to meet functional requirements</li> </ul>		
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