

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

TSC Category	Value Engineering					
TSC	Sustainable Manufacturing					
TSC Description	Manage efficient use of energy and other utility resources to promote sustainable manufacturing operations					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
			PRE-OPR-3065-1.1	PRE-OPR-4065-1.1	PRE-OPR-5065-1.1	PRE-OPR-6065-1.1
			Implement integrated environmental and resource efficiency management procedures	Develop sustainable manufacturing frameworks by identifying strategies for a more sustainable use of resources	Analyse organisational energy usage patterns to improve energy efficiency and productivity	Champion the organisation's approach towards sustainability
Knowledge			<ul style="list-style-type: none"> • ISO:50001 • Compliance requirements for relevant environmental and sustainability concerns • Legislation, regulations and codes of practice associated with work areas, job specifications and procedures • Environmental and energy efficiency issues, systems and procedures related to industry practices • External benchmarks for resource usage, and related support, relevant to the organisation • Workplace safety and health (WSH) requirements • Supply chain procedures 	<ul style="list-style-type: none"> • ISO:50001 • Concept of waste in manufacturing • Methods of material balancing • Methods of energy balancing • Methods of comparing theoretical with actual resource consumption • Methods for mapping manufacturing processes and resources consumed • Methods of measuring actual resource usage 	<ul style="list-style-type: none"> • ISO:50001 • Concept of energy efficiency (EE) • Approaches to energy consumption monitoring and analyses in manufacturing processes • Application of power signals monitoring for quality control in welding processes • Energy usage pattern discovery and production mode identification • Energy efficiency monitoring and analysis system (E2MAS) • Data mining methods 	<ul style="list-style-type: none"> • ISO:50001 • Principles of sustainability management • Practices, tools and techniques of sustainability management • Environmental and sustainability legislation, regulations and codes of practice applicable to the organisation • Workplace safety and health (WSH) regulations
Abilities			<ul style="list-style-type: none"> • Assess organisational processes compliance with environmental and sustainability regulations • Collect information on environmental and resource efficiency systems and procedures 	<ul style="list-style-type: none"> • Identify significant resources used in production processes • Calculate consumption measurements for resources used • Analyse processes to determine root causes of 	<ul style="list-style-type: none"> • Determine appropriate methodologies to adopt for manufacturing energy efficiency management • Employ data mining methods to collect energy consumption information 	<ul style="list-style-type: none"> • Establish an integrated approach to organisational sustainability, encompassing environmental, economic and social aspects

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			<ul style="list-style-type: none"> Analyse and document current resource purchasing strategies Implement and integrate environmental and resource efficiency improvement plans Evaluate the effectiveness of implemented improvement plans 	<p>emissions generated by production processes</p> <ul style="list-style-type: none"> Compare consumption levels and rates of difference resources to determine losses Develop recommendations for reducing waste Compile data, implications and recommendations to prepare resource use audit reports 	<ul style="list-style-type: none"> Calculate energy consumption in machining processes Establish energy usage patterns Perform energy efficiency benchmarking by machines, processes, job orders and/or per-unit costs Analyse energy efficiency and energy losses from manufacturing operations and processes Review production operation modes by using statistical analysis methods Determine shortfalls in the organisation's energy usage, and appropriate corrective actions 	<ul style="list-style-type: none"> Research relevant aspects of sustainability applicable to the organisation Analyse the organisation's business and market contexts with regard to sustainability practices Draft recommendations for the organisation's sustainability policy options, based on likely effectiveness, timeframes and cost Develop the organisation's sustainability strategies as an integral part of business planning Direct the development of promotion policies to encourage the adoption of workplace sustainability in the organisation
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