

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

TSC Category	Manufacturing and Operations					
TSC	Manufacturing Process Management					
TSC Description	Perform process engineering and ensure the stability of the manufacturing process as well as troubleshoot process deviations and propose strategies for process performance improvement					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
		PRE-OPR-2005-1.1	PRE-OPR-3005-1.1	PRE-OPR-4005-1.1	PRE-OPR-5005-1.1	PRE-OPR-6005-1.1-1
		Perform manufacturing processes and take corrective actions in accordance to out-of-control action procedures	Analyse manufacturing process stability and verify process performance	Review process performance and troubleshoot process deviations	Formulate strategies for manufacturing process performance improvement and recommend follow-up action	Establish shop floor tracking and control, utilising network and communications technologies
Knowledge		<ul style="list-style-type: none"> Types of manufacturing processes Steps in start lot, in-process quality control (IPQC) checks and end lot operations Basic configuration set-up for manufacturing processes Various hardware equipment used in manufacturing processes Escalation process and out-of-control action plan (OCAP) procedures 	<ul style="list-style-type: none"> Process functions Process parameters Process monitoring Process flows Process materials 	<ul style="list-style-type: none"> Process parameters Process monitoring Recipe optimisation Process release procedures 	<ul style="list-style-type: none"> Types of process performance metrics Problem solving techniques 	<ul style="list-style-type: none"> Layers and modules of shop floor control, and related implementation considerations Network and communications technologies Types of data collection devices and auto-identification technologies, and related implementation considerations Types of sensors and their installation, data acquisition systems, signal processing and feature extraction methods Entity-relationship models, conceptual designs, logical data models and physical database designs Approaches for statistical and neural networks Hardware and device interfaces, human-machine interfaces, design conditions and methodologies

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<p>Abilities</p>		<ul style="list-style-type: none"> • Prepare to carry out manufacturing processes in accordance to standard organisational procedures • Operate machines, in accordance to start lot procedures • Operate machines, in accordance to sort end lot procedures • Carry out IPQC checks • Take corrective actions, in accordance to out-of-control action procedures 	<ul style="list-style-type: none"> • Identify process functions within manufacturing processes • Determine critical process parameters • Determine process monitoring to maintain process stability • Analyse process stability • Verify process performance • Determine follow-up actions required 	<ul style="list-style-type: none"> • Set up process monitoring to determine process stability • Identify process deviations • Troubleshoot process deviations • Maintain process stability • Verify process performance 	<ul style="list-style-type: none"> • Define projects to meet process performance • Establish project scopes of work and the number of hours, based on business requirements • Execute projects in accordance with project plans • Evaluate project effectiveness, in accordance with project objectives • Recommend follow up actions 	<ul style="list-style-type: none"> • Prepare shop floor tracking and monitoring plans for production status and machine process and tool conditions • Prepare communications network designs • Perform signal processing and feature extractions • Conduct bottom-up data analyses and design physical databases for storing shop floor data • Apply statistical and neural networks for data mining • Apply dynamic resource allocation and dispatch optimisation methods • Design human-machine-interfaces • Select suitable, cost-effective data collection devices, auto-identification and sensing devices
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