

TSC Category	Discipline Engineering Specialisation					
TSC	Instrumentation and Control Design Engineering Management					
TSC Description	Manage the technical design, selection, specification, modification and troubleshooting of instrumentation and control systems in process plants to provide instrumentation and control engineering design and support to production, maintenance and project teams					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
			ECM-DEG-3004-1.1	ECM-DEG-4004-1.1	ECM-DEG-5004-1.1	
			Interpret designs, technical specifications, modification designs, constructability methods, maintenance procedures, and asset integrity techniques to provide instrumentation and control systems engineering design and support to production, maintenance and project teams	Develop designs, technical specifications, modification designs, constructability methods, maintenance procedures, and asset integrity techniques to manage instrumentation and control engineering design and support to production, maintenance and project teams	Evaluate designs, technical specifications, modification designs, constructability methods, maintenance procedures, and asset integrity techniques to drive high standards of instrumentation and control engineering design and support to production, maintenance and project teams	
Knowledge			<ul style="list-style-type: none"> • Instrumentation and control engineering codes and standards • Manufacturing, quality assurance and quality control (QA&QC), testing and troubleshooting techniques • Field measurement devices; temperature, pressure, level and flow measurement • Field control devices; control valves, shutdown valves, actuators and safety relief valves • Process control theory and principles • Control system applications; process logic controllers (PLC), Distributed Control System (DCS) 	<ul style="list-style-type: none"> • Installation, commissioning, start-up, planning and execution techniques • Chromatographs, analysers and densitometer field measurement devices • Automated sampling systems and techniques • Safety relief systems • Advanced process control theory and loop control • Third-party control systems, safety instrumented systems • Process control network design and security • Human-machine interface (HMI) console and control panels and smart device interfaces 	<ul style="list-style-type: none"> • Local and international standards and best practices for instrument and control systems • Instrument and control systems design and modification practices • Instrumentation and control design strategies • Engineering, procurement and construction (EPC) project management • Technological advancements in instrumentation and control 	

			<ul style="list-style-type: none"> Control room systems; fire and gas detection (FGD) systems, alarm management systems, communication systems Installation practices; wiring and grounding requirements, instrument and tubing installations Principles of fiscal metering 	<ul style="list-style-type: none"> Professional certifications for instrument and control engineers Failsafe/fault tolerance programmable logic controllers (PLCs) Emergency shutdown (ESD) and fire and gas (F&G) design methods Types of wireless technology Methods of machinery production systems 		
Abilities			<ul style="list-style-type: none"> Verify industry standards and practices referenced in vendor documents are active and applicable to projects Participate in factory acceptance testing (FAT), developing inspection and testing plans and QA&QC documentation of manufactured products Specify and size devices and equipment used for field measurements of pressure, level, flow and temperature Specify and size common field control devices Apply process control theory methods to designs Specify and apply process control systems to design Specify key elements of control room systems in project designs; FGD, communications, process control networks, alarm 	<ul style="list-style-type: none"> Manage the design and engineering of instruments and control equipment used in hazardous areas explosion-proof (Ex) competence levels and evidence requirements for designers, installers, maintainers and repairers Prepare recommendations for modification and/or design of main measurement and control systems Develop instrument and control system studies required during various project phases to verify system design and equipment selection Manage the construction, installation and commissioning of instruments and control equipment and systems Manage project execution and construction strategy through each project 	<ul style="list-style-type: none"> Set the organisation's instrumentation and control standards Define the strategy for instruments and control equipment used in hazardous areas (Ex) competence levels and evidence requirements for designers, installers, maintainers and repairers Review and endorse instrument and control system studies required during various project phases to verify system design and equipment selection Endorse the construction, installation and commissioning of instruments and control equipment and systems Define and mature project execution and construction strategy through each project, including project implementation with EPC contractors 	

			<p>management, human machine interface (HMI), and smart device interface</p>	<p>including project implementation with Engineering, Procurement and Construction Management (EPCM) contractors</p> <ul style="list-style-type: none"> • Manage instrumentation and control systems construction support through plans and drawings, specifications and design criteria • Specify communication topology and protocols and able to interrogate vendor's system into the overall plant/facility systems • Manage the design development of control room systems; F&G, communications, process control networks, alarm management, HMI and smart device interface 	<ul style="list-style-type: none"> • Benchmark instrumentation and control equipment integrity management systems against organisational, statutory or regulatory requirements • Maintain and manage current and developing technology applications to engineering design and problem solving 	
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