

TSC Category	Process Safety Management					
TSC	Safety Integrity Levels Management					
TSC Description	Analyse and determine appropriate Safety Integrity Levels (SIL) for the selection of safety protection devices and systems to ensure hardware and software meet SIL-rated requirements					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
			ECM-PSM-3003-1.1	ECM-PSM-4003-1.1	ECM-PSM-5003-1.1	
			Select and apply appropriate Safety Integrity Levels (SIL) for safety protection systems and equipment to meet SIL requirements	Analyse Safety Integrity Levels (SIL) for safety protection systems and equipment for appropriateness to meet SIL requirements	Evaluate Safety Integrity Levels (SIL) for safety protection systems and equipment for robustness and reliability for process plant operations	
Knowledge			<ul style="list-style-type: none"> • SIL definitions and principles • Principles of field instrumentation devices, and tolerance and accuracy levels • Principles of 2o3, 2o2 voting • Principles of safety protection system risk analysis • Principles of fault tolerance and fail-safe, triplex programmable logic controllers (PLCs) • Explosion-proof (Ex d) certifying authorities • Methods of proof-testing • Failure modes, effects and diagnostic analysis (FMEDA) 	<ul style="list-style-type: none"> • Principles of safety protection system design • Layer of protection analysis (LOPA) • Probability of failure on demand (PFD) • Principles of mean-time-between-failure (MTBF) • SIL in process design • Risk reduction factors (RRF) • SIL studies 	<ul style="list-style-type: none"> • International safety instrumented systems standards • Methods of developing and implementing safety integrity standards • Reliability modelling software • Human and cultural factors in process safety 	

**SKILLS FRAMEWORK FOR ENERGY AND CHEMICALS
TECHNICAL SKILLS AND COMPETENCIES (TSC) REFERENCE DOCUMENT**

<p>Abilities</p>			<ul style="list-style-type: none"> • Conduct SIL studies • Select and apply devices, architecture and system voting logic for SIL for safety protection systems and equipment to meet SIL requirements • Conduct system proof-testing • Perform process hazard analysis and FMEDA analysis • Conduct SIL verification and validation audits 	<ul style="list-style-type: none"> • Conduct SIL studies • Identify and calculate system and equipment PFD with, and without, redundancy • Define SIL levels and ranges for systems • Conduct basic PFD calculations • Design new systems or modify existing systems to meet SIL requirements and standards • Conduct hazard and operability (HAZOP) and layers of protection analysis (LOPA) studies and reviews • Conduct Failure Modes, Effects and Diagnostic Analysis (FMEDA) • Perform SIL verification and validation audits • Review and analyse system test results 	<ul style="list-style-type: none"> • Lead SIL studies and projects • Develop and implement SIL performance standards at the organisational level • Carry out system reliability software modelling 	
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