

**SKILLS FRAMEWORK FOR SEA TRANSPORT
TECHNICAL SKILLS AND COMPETENCIES (TSC) REFERENCE DOCUMENT**

TSC Category	Marine Engineering					
TSC	Electrical, Electronic and Control Engineering					
TSC Description	Manage and monitor electrical, electronic and control engineering systems					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
		STP-MEG-2001-1.1	STP-MEG-3001-1.1	STP-MEG-4001-1.1		
		Monitor the operation of electrical, electronic and control systems	Operate, maintain and repair electrical, electronic and control systems	Manage operation of, troubleshoot and restore electrical and electronic control equipment		
Knowledge		<ul style="list-style-type: none"> • Operation of mechanical engineering systems • Heat transmission, mechanics and hydromechanics • Electro-technology and electrical machines theory • Fundamentals of electronics and power elements • Electrical power distribution boards and electrical equipment • Fundamentals of automation, automatic control systems and technology • Instrumentation alar and monitoring systems • Electrical drives • Technology of electrical materials • Electro-hydraulic and electro-pneumatic control systems • Safety precautions relating to electrical equipment • Isolation procedures • Emergency procedures 	<ul style="list-style-type: none"> • Basic configuration and operation principles of electrical, electronic and control equipment • Safety requirements for working on shipboard electrical systems • Safe isolation of electrical equipment before working on equipment • Maintenance and repair of electrical system equipment, switchboards, electric motors, generator and DC electrical systems and equipment • Detection of electric malfunction, location of faults and measures to prevent damage • Construction and operation of electrical testing and measuring equipment • Function, performance tests and configuration of monitoring systems, automatic control 	<ul style="list-style-type: none"> • Marine electro-technology, electronics, power electronics, automatic control engineering and safety devices • Design features and system configurations of automatic control equipment and safety devices for the main engine, generator and distributor systems and steam boiler • Design features and system configurations of operational control equipment for electrical motors • Design features of high-voltage installations • Features of hydraulic and pneumatic control equipment • Methods to troubleshoot electrical and electronic control equipment • Function test of electrical, electronic control equipment and safety devices 		

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		<ul style="list-style-type: none"> • Different voltages on-board ships • Causes of electric shock and precautions to be observed to prevent shock • Coupling, load sharing and changing over generators 	<p>devices and protective devices</p>	<ul style="list-style-type: none"> • Troubleshooting of monitoring systems • Software version control 		
Abilities		<ul style="list-style-type: none"> • Recognise and report electrical hazards and unsafe equipment • Observe safety precautions prior to commencing work • Monitor performance levels to ensure adherence to technical specifications • Conduct surveillance of main propulsion plants and auxiliary systems to ensure it is sufficient to maintain safe operation condition • Operate generators and distribution systems 	<ul style="list-style-type: none"> • Plan and carry out operations in accordance with operating manuals, established rules and procedures to ensure safety of operations • Comply with safety measures when working on shipboard electrical systems • Use appropriate hand tools, measuring instruments and testing equipment • Dismantle, inspect, repair and re-assemble equipment in accordance with manuals and good practices • Re-assemble and test performance in accordance with manuals and good practices 	<ul style="list-style-type: none"> • Ensure operation of equipment and systems is in accordance with operating manuals • Ensure performance levels are in accordance with technical specifications • Plan maintenance activities in accordance with technical, legislative, safety and procedural specifications • Inspect, test and troubleshoot equipment 		