

**SKILLS FRAMEWORK FOR MARINE AND OFFSHORE
TECHNICAL SKILLS & COMPETENCIES (TSC) REFERENCE DOCUMENT**

TSC Category	Marine and Offshore System Design					
TSC	Power Generation System Design					
TSC Description	Design power plans for all equipment and systems on-board ships, rigs and/or conversions and integrated power generation systems and auxiliaries to cater to power requirements					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
			MAR-MSD-3012-1.1	MAR-MSD-4012-1.1	MAR-MSD-5012-1.1	
			Calculate power requirements of ships, rigs and/or conversions	Develop power system designs for various weather, loads and operating conditions for ships, rigs and/or conversions,	Verify material properties, component and position lists and calculations for power generation system designs, and ensure compatibility of power generation equipment with auxiliaries	
Knowledge			<ul style="list-style-type: none"> • Components of power generation equipment • Types of electrical equipment and on-board systems • Numerical computation of power requirements • Principles of equipment, structural, piping drawings and power plans • Principles of electrical load analysis • Concepts of alternating current (AC) and direct current (DC) • Types of electrical system configurations • Types and capacities of auxiliary equipment and cables required to support power generation equipment • Principles of electrical drawings • Safety devices for power generation equipment 	<ul style="list-style-type: none"> • Methods and devices for measuring power requirements of electrical equipment and systems in carrying load conditions • The International Convention for the Safety of Life at Sea (SOLAS) Chapter II-1, International Electrotechnical Commission (IEC) codes and standards and other international regulations • Principles of system drawings and conventions used in power plan creation • Types of materials used in power generation equipment manufacturing • Methods of electrical power transmission • Devices for indicating electrical parameters and sensors for power measurements 	<ul style="list-style-type: none"> • Methods of evaluating feasibility of power generation systems with respect to the ships, rigs and/or conversions • Advanced concepts of electrical and mechanical engineering • Advanced principles of electrical drawings • Methods of evaluating feasibility of materials • Evaluation criteria on feasibility of materials 	

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				<ul style="list-style-type: none"> • Factors affecting power generation and power consumption of auxiliaries • Emergency power supply systems and/or switchboards • Safety devices to limit overloading of equipment and systems 		
Abilities			<ul style="list-style-type: none"> • Interpret power plans to ascertain capacity requirements • Suggest appropriate electrical equipment and systems for projects • Interpret structural and arrangement drawings to ascertain equipment position lists • Infer power requirements of each equipment and system from specification sheets • Interpret electrical auxiliary specifications required to feed the entire ship, rig or conversion • Execute marine engineering calculations to design appropriate power generation systems • Draft power generation system design drawings to be used by the manufacturing department • Incorporate switches, breakers, safety devices and other types of electrical auxiliaries required to support 	<ul style="list-style-type: none"> • Tabulate calculations to facilitate power generation equipment selection • Identify suitable power generation equipment to support ships, rigs, and/or conversions • Identify suitable types of fuels and lube oils, based on customer requirements, trading areas, storage and treatment restrictions • Identify fuel and lube oil capacities • Identify materials and specifications for cabling • Synchronise equipment-specific systems with ships', rigs' and/or conversions' systems • Evaluate capacities of auxiliaries and probability of system failure during operations • Incorporate relevant protection and safety features in the systems • Propose design modifications in construction materials, components and auxiliaries to meet power requirements 	<ul style="list-style-type: none"> • Design process workflows to execute power generation system designs and/or power plans • Review component, material and auxiliaries lists to ensure they meet project requirements, budgets and international regulations • Lead customer discussions relating to electrical equipment and systems, power generation equipment and auxiliaries • Initiate improvements to power equipment design and power plan development and/or implementation processes • Evaluate performance specification analysis on selection of safety devices • Evaluate performance specification analysis on selection of measuring devices • Evaluate performance specification analysis on selection of cabling and insulation materials 	

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			<p>power generation and distribution</p> <ul style="list-style-type: none"> Evaluate reliability of power systems based on design specifications 		<ul style="list-style-type: none"> Evaluate final reports on selected components used to meet the system requirements 	
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