TSC Category	Marine and Offshore System Design					
TSC	Propulsion System Design					
TSC Description	Design propulsion systems and auxiliaries based on size, cargo carrying capacity and type of ship					
TSC Proficiency Description	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
			MAR-MSD-3013-1.1	**MAR-MSD-4013-1.1**	**MAR-MSD-5013-1.1**	
			Analyse the propulsion requirements of ships, rigs and/or conversions by retrieving data from equipment, structural, piping drawings and executing basic marine engineering calculations	Develop propulsion system designs by integrating information from marine engineering calculations with principles of internal combustion, engines, fuels and lube oils to be used, installation constraints and trading areas, and propose specific design modifications to construction materials, equipment and auxiliaries	Guide the formulation of propulsion system designs and approve material, equipment and position lists and calculations that are in line with international regulations and the equipment manufacturers' recommendations, requirements and ensure their compatibility with auxiliaries	
Knowledge			• Principles of system and equipment drawings and structural and arrangement drawings to ascertain system layouts, weight and space restrictions • Methods of interpreting ship specifications to ascertain total propulsion power required • Types and capacities of power transmissions, steering and stabilising equipment required • Principles of internal combustion engines, and fuel and lube oil properties • Material behaviour under varying temperatures and different fuels and lube oils	• Procedures for designing propulsion equipment • Material behaviour under varying temperatures and different fuels and lube oils • Factors affecting propulsion power requirements • Methods of evaluating feasibility of propulsion systems • Advanced concepts of electrical, electronic and mechanical engineering	• Methods of evaluating feasibility of materials • Methods of evaluating feasibility of safety devices • Methods to evaluate efficiency of power transmissions • Evaluation criteria on feasibility of materials, safety devices and transmission equipment	

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			• Types of materials used in propulsion equipment manufacturing • Devices for indicating machinery parameters • Equipment for transmitting power to propellers, causes and types of losses in power transmissions • Sensors for power measurements and safety devices to limit overloading of propulsion equipment • Types of auxiliary systems required to support propulsion equipment			
Abilities			• Analyse ship specifications to ascertain propulsion capacity requirements • Suggest appropriate propulsion equipment based on ships, rigs and/or conversions • Identify sources for retrieving relevant data • Interpret structural and arrangement drawings to ascertain equipment position lists • Execute marine engineering calculations to aid in designing appropriate propulsion equipment • Identify suitable components for propulsion equipment • Identify suitable components for transmission and other auxiliary equipment	• Identify 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 components and auxiliaries • Align equipment specific systems to ships' systems • Ensure safety features meet classification rules and requirements	• Guide development of propulsion equipment • Review component, material and auxiliaries lists to ensure they meet project requirements, budgets and international regulations • Lead customer discussions relating to propulsion equipment and auxiliaries • Initiate improvements to propulsion system designs • Evaluate performance specification analysis on selection of safety devices • Evaluate performance specification analysis on selection of measuring devices • Evaluate performance specification analysis on	

			• Evaluate capacities of auxiliaries • Gauge probability of system failure during operations		selection of transmission and stabilising devices • Evaluate final reports on selected components used to meet the system requirements	