

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

TSC Category	Technical Drawing					
TSC	Equipment Drawing					
TSC Description	Create equipment drawings based on design specifications representing working pieces of machinery for ships, rigs, conversions and/or equipment sub-components					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
		MAR-TDR-2002-1.1	MAR-TDR-3002-1.1	MAR-TDR-4002-1.1		
		Modify sections of equipment drawings to reflect changes to existing designs in line with international codes, conventions and regulations	Create full scale working equipment drawings used to design manufacturing workflows and further aid in maintenance and troubleshooting of equipment during their lifecycles	Develop new, large-scale and other high complexity equipment drawings and advise on optimal drawing methods to create such drawings based on complexity, cost and time involvement		
Knowledge		<ul style="list-style-type: none"> Relevant classification rules and other guidelines for structural and arrangement drawings Principles of 2D and 3D engineering drawings used in designing ships, rigs and/or conversions Types of equipment drawing symbols and conventions Methods of interpreting equipment drawings Applications of equipment drawings Basic principles of mechanical engineering Types and specifications of marine equipment Types of computer-aided design (CAD) software relevant to creating equipment and outfitting drawings Basic concepts of prototype design 	<ul style="list-style-type: none"> Methods of translating project requirements into 2D and 3D equipment drawings Methods of analysing equipment drawings Concepts in mathematics pertinent to marine engineering calculations Design for manufacture and assembly (DFMA) guidelines Principles of drawings related to marine equipment Methods of determining equipment interaction with other systems 	<ul style="list-style-type: none"> Methods of translating high complexity marine equipment project requirements into 2D and 3D electrical drawings Advanced principles of mechanical engineering International regulations related to mechanical engineering Methods of evaluating equipment drawing techniques Evaluation processes and criteria for design for manufacture and assembly (DFMA) 		

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		<ul style="list-style-type: none"> Principles of production and manufacturing workflow development 				
Abilities		<ul style="list-style-type: none"> Interpret equipment drawings Translate and incorporate hand sketches and tracing drawings into equipment drawings and plans based on examples and references Operate CAD software to modify existing equipment drawings Apply geometric dimensions and tolerances in engineering drawings Carry out basic engineering calculations pertaining to mechanical concepts Differentiate between specifications of various marine components Suggest improvements to equipment drawings Understand how equipment drawings are interpreted and used in production processes 	<ul style="list-style-type: none"> Apply mechanical principles to concept designs Create full scale equipment drawings using appropriate 2D or 3D methods Incorporate details of appropriate materials for a project in drawings Follow DFMA guidelines Incorporate provisions for syncing with other equipment Represent interdependence with other systems 	<ul style="list-style-type: none"> Create new, large scale and other high complexity equipment drawings using appropriate 2D or 3D methods Translate complex project requirements into marine equipment design drawings Review equipment drawings against regulations and conventions and project requirements Evaluate adherence of drawings to DFMA Ensure equipment drawings do not conflict with structural, electrical and/or arrangement plans Develop more efficient methods of creating equipment drawings based on complexity, cost and time involvement 		