

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

TSC Category	Marine Manufacturing					
TSC	Forming					
TSC Description	Fabricate components through processes using suitable compression, tension, shear, combined and/or other types of stresses to cause material deformation					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
	MAR-MMF-1003-1.1	MAR-MMF-2003-1.1	MAR-MMF-3003-1.1			
	Execute the prescribed forming processes in order to manufacture marine components under direct supervision adhering to safety requirements set by the organisation	Oversee the forming processes to ensure compliance with instructions, suggested manufacturing workflows and product specifications provided	Interpret structural, arrangement and equipment drawings and provide details of materials, measurement scales and tolerances to be followed during the manufacturing processes			
Knowledge	<ul style="list-style-type: none"> Types of offshore structures and environmental load exertions Technical drawings and specifications of components Forming techniques and processes of manufacturing in the marine industry, their applications and limitations Types of defects arising from forming processes Fabrication processes of block assemblies and panels Types of dimension control and their tools, procedures, criteria and limitations Causes of different types of structural stresses and criteria for checking interferences affecting structures Workplace safety and health (WSH) 	<ul style="list-style-type: none"> Forming processes and criteria Factors causing product variations Types of deformation characteristics Methods to minimise defects and deformations Methods of dimension control, corrective actions and rectifying distortion control Application of flow analysis and associated software Forming process automation and integration Relevant workplace safety and health (WSH) practices, guidelines and regulations Relevant quality assurance and quality control (QA/QC) policies and procedures Principles and procedures for surface preparation 	<ul style="list-style-type: none"> Functional requirements and types of ships and offshore structures Functional requirements of components to be manufactured Process parameters for various forming processes Material properties and their applications to relevant forming processes Association between assembly drawings, detailed drawings and bill of material (BOM) Applications of geometric dimensioning and tolerancing (GD&T) Computer-aided manufacturing (CAM) Organisational and legislative requirements Principles of rapid prototyping and tooling of small components Types of ships and rigs, terminologies and features 			

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	<p>requirements related to forming works</p> <ul style="list-style-type: none"> Quality assurance and quality control (QA/QC) requirements related to forming works 					
Abilities	<ul style="list-style-type: none"> Configure and set up equipment based on manufacturing requirements Conduct pre-operational checks and inspections to verify working conditions of tools and equipment Operate relevant equipment to manufacture components and hull structures Adjust equipment configurations to achieve required quality Check finished components for defects and compliance with required specifications Perform rework as necessary to achieve the desired product outcomes Perform dimension control and level checks on structures Prepare parts sketches of marine components for assembly 	<ul style="list-style-type: none"> Interpret component drawings and specifications to extract relevant information and determine manufacturing requirements Sequence forming activities for specific jobs according to process plans Prepare materials for processing Set up processes for forming, casting and compounding Interpret dimension limits, surface sign and finish, and basis and class of fit applied to components Produce models in accordance with the component specifications Supervise forming processes to ensure required products are produced Coach subordinates on proper forming techniques and correct errors Confirm material quality for forming works 	<ul style="list-style-type: none"> Determine forming processes to be applied based on component design and functional requirements Develop process plans for forming based on applications to be used Identify geometric features of engineering drawings to determine dimensioning of components Consider material properties and factors that affect temperature and strain rate on tensile, impact strength and types of alloys used Review accuracy of calculations relevant to forming and shaping designs Determine post-production requirements for particular applications Develop quality control procedures to address aspects of quality and compliance 			