

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

<b>TSC Category</b>	Marine and Offshore System Design					
<b>TSC</b>	Safety System Design					
<b>TSC Description</b>	Design of safety systems for ships, rigs and/or conversions to ensure readiness against emergency incidents on board					
<b>TSC Proficiency Description</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>	<b>Level 6</b>
			<b>MAR-MSD-3005-1.1</b>	<b>MAR-MSD-4015-1.1</b>	<b>MAR-MSD-5015-1.1</b>	
			Design lifesaving and firefighting plans for ships and/or rigs based on specification sheets and interpretation of design drawings	Develop safety system specification sheets and sketches by integrating information from marine engineering calculations with the types and properties of fluids to be handled and identifying the types and locations of pumping and firefighting equipment to be employed, and lifesaving appliances to be installed	Guide the formulation of safety system specification sheets and sketches and approve equipment lists, position lists and calculations that are in compliance with international regulations and equipment manufacturers' recommendations	
<b>Knowledge</b>			<ul style="list-style-type: none"> <li>Principles of fluid dynamics</li> <li>Types of marine engineering drawings</li> <li>Principles of numerical computation of flow rates, tank capacities and flow pressures</li> <li>Principles of structural and arrangement drawings to ascertain locations for firefighting and other safety equipment, and considerations for structural fire safety standards and structural strengthening needs</li> <li>Pressure regulation techniques for fire lines, foam lines and other firefighting media</li> </ul>	<ul style="list-style-type: none"> <li>Pump designs and specifications relevant to firefighting systems</li> <li>Piping specifications based on media being handled</li> <li>Types of fire line configurations</li> <li>Sensors for pressure and flow measurements</li> <li>Actuators for pressure and flow regulation</li> <li>Principles of system drawing processes</li> <li>Methods for evaluating the efficiency of firefighting and lifesaving systems</li> </ul>	<ul style="list-style-type: none"> <li>Procedures for formulating firefighting and lifesaving systems</li> <li>The International Convention for the Safety of Life at Sea (SOLAS) Chapter II-2 and Chapter III and other legislative requirements governing the design of firefighting and lifesaving systems</li> <li>Evaluation criteria for firefighting systems</li> <li>Evaluation criteria for lifesaving appliances</li> <li>Manufacturers' recommendations and limitations</li> </ul>	

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			<ul style="list-style-type: none"> <li>• Methods of segregating different firefighting media</li> <li>• Portable extinguishers, fixed extinguishers, sprinkler systems and other types of firefighting equipment</li> <li>• Lifeboats, life rafts, immersion suits and other lifesaving appliances</li> <li>• Conventions used in firefighting and lifesaving plan drawings</li> <li>• Limitations of firefighting and lifesaving systems</li> </ul>			
<b>Abilities</b>			<ul style="list-style-type: none"> <li>• Determine appropriate data for executing relevant firefighting system design calculations</li> <li>• Obtain prescribed data on the types and number of lifesaving appliances required from the International Convention for the Safety of Life at Sea (SOLAS) requirements</li> <li>• Identify sources for retrieving relevant data</li> <li>• Execute accurate flow rates, tank capacities and pressure calculations for foam and CO<sub>2</sub> firefighting systems</li> <li>• Interpret structural and arrangement drawings</li> <li>• Identify suitable firefighting media based on applications and locations</li> </ul>	<ul style="list-style-type: none"> <li>• Establish safety system parameters from design documents</li> <li>• Evaluate types of pump and piping systems required for specific firefighting media</li> <li>• Ensure system reliability during operations</li> <li>• Incorporate relevant safety features in the systems</li> <li>• Produce safety system designs and specifications for use by the manufacturing department</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure adherence to legislative requirements</li> <li>• Evaluate performance specification analysis on selection of sensors and actuators</li> <li>• Evaluate performance specification analysis on selection of pumping systems</li> <li>• Evaluate performance specification analysis on selection of piping specifications and configurations</li> <li>• Evaluate application of industry standards and international conventions in drawings</li> <li>• Evaluate final reports on selected components used to meet the system requirements</li> </ul>	

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			<ul style="list-style-type: none"><li>• Incorporate system isolation based on media of fire fighting</li><li>• Ensure system isolation in the firefighting and lifesaving systems</li></ul>			
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