



# Subsea Engineering Competency Profile

## SUBSEA EQUIPMENT MECHANICAL DESIGN FUNDAMENTALS

**ME-001**

This competency demonstrates a subsea engineer has a broad understanding of the design, manufacture and operation of subsea equipment, including subsea trees, manifolds and connection systems.

ELEMENT OF COMPETENCE	WHAT THIS COMPETENCE MEANS IN PRACTICE	TYPICAL EXAMPLES OF EVIDENCE
<p>Working knowledge of:</p> <ul style="list-style-type: none"> <li>● Relevant international standards associated with the mechanical design and operation of subsea equipment, including lifting, welding, coating and painting, cathodic protection and quality assurance</li> <li>● The design, manufacture, assembly, testing and installation of subsea equipment</li> <li>● Design qualification, verification and validation requirements and methods</li> <li>● Hydraulic and structural design principles and methods, including the benefits and limitations of finite element analysis</li> <li>● The impact of design upon the performance of the product during manufacture, testing, installation, commissioning and operation.</li> <li>● Destructive and non-destructive testing of components and assemblies</li> <li>● Resolution of manufacturing defects and errors</li> <li>● The key materials available and their limitations, including steels, alloys, polymers and elastomers</li> <li>● ROV interfaces, diver access and operations</li> </ul>	<p>Capable of:</p> <ul style="list-style-type: none"> <li>● Identifying and using applicable international standards</li> <li>● Describing various subsea equipment types and structures and their associated key design challenges</li> <li>● Originating engineering FEED and detail design deliverables related to the mechanical design of subsea equipment</li> <li>● Working in a multi-discipline project team to design subsea equipment</li> <li>● Identifying and mitigating risks in the design to personnel safety, environment and the asset.</li> </ul>	<p>Refer to only as many Indicators of Attainment as you need to demonstrate the Element of Competence</p> <ul style="list-style-type: none"> <li>● Can describe the design processes and key challenges in the design of subsea equipment</li> <li>● Can cite examples of interaction with other engineering disciplines that have achieved successful equipment designs</li> <li>● Has demonstrable mechanical design or package engineering experience working in FEED or detail design on at least two projects</li> </ul>



ENGINEERS  
AUSTRALIA

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<ul style="list-style-type: none"><li>• Methods of handling, packing and transport by air, land and sea, and the associated advantages and disadvantages</li><li>• Process safety - how isolations apply to the design to protect personnel and environment.</li><li>• Safety in design – understanding human factors of the system through manufacture and pre-deployment</li></ul> <p>Awareness of:</p> <ul style="list-style-type: none"><li>• Marine growth, bio-fouling, external scale (calcium carbonate) deposition and issues with functionality of subsea connectors, connections and moving parts</li><li>• The benefits and limitations of computational fluid dynamic analysis</li><li>• Quality control management systems and requirements</li></ul>		