



Subsea Engineering Competency Profile



UMBILICAL AND CABLE MANUFACTURE ELECTIVE

URF-005

This competency demonstrates a subsea engineer has expert knowledge of the processes and activities which must be undertaken to manufacture Electro/Hydraulic Umbilicals, Cables, Termination Assemblies / Distribution Units and/or other Structural Appurtenances.

ELEMENT OF COMPETENCE	WHAT THIS COMPETENCE MEANS IN PRACTICE	TYPICAL EXAMPLES OF EVIDENCE
<p>Expert knowledge of:</p> <ul style="list-style-type: none"> the manufacture, testing and load-out of either umbilicals, steel tubes, hydraulic hoses, electrical cables, power cables or fibre optic cables Quality control management systems applicable to manufacture, test and load out. Requirements for design verification and design validation during manufacture and test Manufacturing process reviews and improvement Relevant international standards associated with the manufacture and testing of umbilicals, steel tubes, hoses, cables and fibre optics The functional and structural role of each component in the cross-section Resolution of manufacturing defects and errors The impact manufacturing and testing has upon the performance of the product during design, installation, commissioning and operation phases. The methods of handling, packing and transport available and the associated advantages and challenges 	<p>Can provide technical support to the design, manufacture, testing and transportation of umbilical or cable systems.</p> <p>Capable of:</p> <ul style="list-style-type: none"> Specifying umbilical or cable systems for use subsea Specifying / implementing quality assurance and quality control requirements Managing umbilical components / materials procurement Specifying / implementing test methods for umbilicals and cables including component hoses, tubes, cables and fibre optics Interpretation of test results including electrical testing, pressure & leak testing and optical testing and performing troubleshooting Interfacing the product with the subsea equipment, including end terminations Interfacing with installation team and support operations executing subsea tieback, intervention or decommissioning 	<p>Refer to only as many Indicators of Attainment as you need to demonstrate the Element of Competence</p> <p>Has at least 5-years' experience in the manufacturing, testing and load-out in multiple projects representing the manufacturer or multiple projects as client's representative, including:</p> <ul style="list-style-type: none"> Qualification, validation and verification activities Risk based assessments of manufacturing activities Materials planning and plant scheduling Key manufacturing activities Manufacturing quality control including materials traceability and identification and resolution of non-conformances Termination and testing (FAT) activities Load-out and transportation of umbilical or subsea cable products <p>Can describe in detail how the products are manufactured from raw material to finished product, including the following manufacturing processes:</p> <ul style="list-style-type: none"> Copper drawing Extrusion



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ELEMENT OF COMPETENCE	WHAT THIS COMPETENCE MEANS IN PRACTICE	TYPICAL EXAMPLES OF EVIDENCE
<p>Working knowledge of:</p> <ul style="list-style-type: none">• Technical specification and design of umbilicals, steel tubes, hydraulic hoses, electrical cables, power cables and fibre optic cables• Umbilical and component terminations, connectors and structures• Optical fibre design, electrical engineering and fluid mechanics• The installation, tie in and commissioning of umbilical systems• The key materials available and their limitations• Destructive and non-destructive testing of components and assemblies• Hydraulic fluids and their cleanliness requirements• In-service faults and failures related to manufacturing processes.• Vendors and their product capabilities / limitations.	<ul style="list-style-type: none">• Identifying and resolving production non-conformances, manufacturing defects and errors	<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">• Tube manufacture• Fibre braiding• Lay-up and twisting• Armouring• Jointing and terminations• Welding• Spooling