



Subsea Engineering Competency Profile

UMBILICAL AND CABLE DESIGN ELECTIVE

URF-003

This competency demonstrates a subsea engineer has expert knowledge of the processes and activities which must be undertaken to design Electro/Hydraulic Subsea Umbilicals or Power Cables, including Termination Assemblies and Flying Leads

ELEMENT OF COMPETENCE	WHAT THIS COMPETENCE MEANS IN PRACTICE	TYPICAL EXAMPLES OF EVIDENCE
<p>Expert 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 • Relevant international standards associated with the design of umbilicals, steel tubes, hoses, cables and fibre optics • Design of umbilical cross sections • The impact of design upon performance in manufacture, testing, installation, commissioning and operation • Subsea umbilical stress, and dynamic and fatigue analyses • Umbilical failure modes and design solutions • Factory acceptance test requirements • Design of umbilical terminations and distribution units <p>Working knowledge of:</p> <ul style="list-style-type: none"> • Dynamic umbilical configurations 	<ul style="list-style-type: none"> • Delivers comprehensive design of subsea umbilical or power cable systems at FEED and Detailed Design. <p>Capable of:</p> <ul style="list-style-type: none"> • Specifying umbilical or cable systems • Preparing, reviewing and approving technical specifications for umbilicals and cables • Specifying purchase and / or manufacture requirements of umbilical or cable components • Specifying quality assurance requirements • Specifying test methods for umbilicals or power cables including component hoses, tubes, electrical cables and fibre optics, interpreting test results and performing troubleshooting • Providing technical support to subsea system design activities, in particular interface engineering • Identifying risks and opportunities and developing technical solutions to improve the performance of subsea umbilicals or power cables • Providing technical support during manufacture, installation and operation 	<p>Refer to only as many Indicators of Attainment as you need to demonstrate the Element of Competence</p> <p>Has led the umbilical or cable design process in more than two projects representing either the manufacturer's or client's perspective including:</p> <ul style="list-style-type: none"> • Qualification, validation and verification activities • Risk based assessments of umbilical system design encompassing functional components, manufacture, installation, commissioning and operation • Materials and components specification and qualification • Key manufacturing and testing activities • Quality assurance and control including design verification, manufacture traceability and final acceptance tests • Product integration and interfaces • Installation of subsea umbilical or power cable products • Assessment of failure modes and their mitigations



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<ul style="list-style-type: none"> ● Component manufacture including tubes, hoses, cables and fibre optics ● Subsea umbilical and flying lead manufacture, acceptance testing, installation, commissioning and operation ● Relevant international standards associated with the manufacture of umbilicals, steel tubes, hoses, cables and fibre optics ● Umbilical seabed stability analysis ● Hydraulic fluids and their cleanliness requirements ● Subsea production control system hydraulic and electrical design requirements, analysis and specification ● Destructive and non-destructive testing of subsea components, including electrical and fibre optic testing and hydraulic testing ● Quality control management systems and requirements for design verification and design validation ● Material selection and corrosion protection ● Storage, transportation and shipping ● Vendors, their capabilities and their limitations. 		