

# Umbilical Axial Compression Test

Determining umbilical design axial compression limits



Completing a physical test on a length of umbilical can confirm the limit of axial compression or confirm if the design will take the predicted compression generated by the installation and operational analysis. The test can also determine the most likely failure mode and the extent of damage likely to occur.

# Umbilical Axial Compression Test

## Determining umbilical design axial compression limits

An umbilical can experience axial compression during installation and operation. Depending on its design, each umbilical can take a determined amount of compression before its structural stability is compromised. Too much compression may result in irretrievable damage that can result in loss of functionality and structural integrity. Finite element analysis (FEA) can predict the axial compression capacity of an umbilical design, but a physical test may be used to confirm the actual limit. These defined limits help identify the functional limits for umbilical installation and operation.

It is not uncommon for clients to establish a requirement that no axial compression be applied to the umbilical either during installation or operation. Completing an umbilical axial compression test can help determine an acceptable level of axial compression, thereby establishing longer weather windows for installation or reducing the need to modify the umbilical's design for operation.

During the test, the horizontal samples are compressed between two vertical flat plates via power supplied by a hydraulic cylinder. Strain gauges placed on the umbilical sample measure axial and radial displacement.

### Technical Specifications

	Rosyth, Scotland	Niterói, Brazil
Maximum compression load	1,000 kN	1,500 kN
Test sample length ( x 2)	2.13 ft / .65 m (can be shorter for low stiffness umbilicals)	2.46 ft / .75 m (can be shorter for low stiffness umbilicals)
Test duration	1-2 days, depending on umbilical characteristics	1-2 days, depending on umbilical characteristics
Report	Full test report generated for client approval	Full test report generated for client approval



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