TRELLEBORG

Drilling Solutions



Drill Riser Buoyancy Modules

The drill riser provides a conduit for the drill string and drilling fluids from the ocean floor to the rig. This has significant weight which is reduced by the use of Drill Riser Buoyancy Modules.

The drill riser provides a conduit for the drill string and drilling fluids from the ocean floor to the rig. This has significant weight which must be supported by its own structure and ultimately by the drilling vessel. In order to reduce this weight in water to a more manageable amount, discrete buoyancy units in the form of Drill Riser Buoyancy Modules (DRBMs) are fitted along the length of the riser.

Each buoyancy module consists of elongate cylinders which are supplied in two or three discrete elements which surround the drill riser and ancillary lines. These elements are attached together using either an internal fastener or by external circumferential straps.

The internal fastener system consists of four threaded stainless steel (or titanium) studs or bolts that pass through the elements, held together by a washer/locknut arrangement. Recesses are provided to accommodate the stud/bolt system. Strengthening plates are provided to support and distribute the loads.

The external fastening system consists of Kevlar straps and tensioning assemblies which are placed around the outside of the elements. Recesses are provided to guide the straps around the outside surface of the elements as well as to minimise their exposure and possible damage during handling operations.

Circumferential raised support pads (or flexure lugs) are provided to ensure adequate clearance between the external surface of the riser and the internal surface of the modules when the riser pipe flexes during handling or installation. Additional axial recesses allow the ancillary lines to be accommodated.

Transverse recesses are provided to accommodate clamping and guidance equipment. For ease of stacking a flat surface typically 12" wide is provided on the outside surface of the buoyancy elements.

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Specification

The overall length and maximum allowable OD of buoyancy modules are defined by the riser joint length and the limiting dimensions of the drilling equipment (diverter housing and rotary table). Given riser and ancillary line diameters and orientations, stop collar, clamp band position and sizes together with the buoyancy requirement, we determine the elements volume and the composition of the composite syntactic foam necessary to yield the target buoyancy.

To achieve the riser performance characteristics, several depth ratings or types of buoyancy elements may be required. By working with the customer at all stages of the development process extremely accurate buoyancy ratings can be achieved. Typically, the client will require at least 96 to 98% efficiency from the buoyancy modules. The efficiency being the proportion of the riser string weight required to be supported by the upthrust provided by the modules.

As an aid to drilling operations and to ensure buoyancy modules are installed at the correct depths, we introduced the concept of color coding DRBMs. All of our buoyancy modules are clearly colour coded according to the chart below. Both ends of the modules are painted and matching colour identification label is attached to the side of each module.

Depth range (feet)	Depth range (metres)	Colour Code
0-1000	0-303	Grey
1001-2000	304-607	Green
2001-3000	608-914	Dark Blue
3001-4000	915-1219	Yellow
4001-5000	1220-1524	Orange
5001-6000	1525-1829	Black
6001-7000	1830-2134	Red
7001-8000	2135-2438	Purple
8001-9000	2439-2743	Brown
9001-10000	2744-3048	Light Blue

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Safety & Integrity

Drill Riser Buoyancy is used offshore and operates in a hostile environment. From receipt by the client to installation offshore, many operations are performed that can have a detrimental effect on Drill Riser Buoyancy. These operations could result in cracked or broken buoyancy elements which could cause damage to surrounding equipment and more importantly harm to personnel.

Health & Safety underpins all that we do and to this end, we have developed the 'Ultra MIS' range of Drill Riser Buoyancy. Ultra MIS (Module Integrity System) is the inclusion of a special discrete layer beneath the surface of the external skin of the buoyancy elements. This provides the ultimate in structural integrity.

Ultra MIS elements have been tested in parallel against elements without the Module Integrity System and have consistently demonstrated a dramatic advance in structural properties. The Ultra MIS system provides nearly a two-fold increase in mechanical strength and buoyancy elements have the ability to accommodate nearly twice the deflection before sustaining damage when compared with a standard buoyancy element.

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After Sales

We provide a comprehensive after sales installation, repair and modification service for our rigid drill riser buoyancy modules

We provide a comprehensive after sales installation, repair and modification service for our rigid drill riser buoyancy modules (DRBMs)

Engineers are available to visit clients and advise on all aspects relating to DRBMs installation, whether during the assembly of riser joints onshore or during installation offshore.

We provide a fast response DRBM repair and modification service. Engineers can visit the clients site or the modules can be delivered to either of our production facilities where the extent of the damage is assessed and a plan of action for repair is drawn up. In many cases, the damage is only considered minor and requires the simplest of repairs which can be carried out on site.

More severe damage may have resulted in the module being broken into two or three pieces. Comprehensive repair procedures are available which enable such modules to be repaired thus significantly extending their useable life.

Modification of modules to incorporate additional service lines and/or internal line clamps can also be conducted.

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