

Offshore Rig Design and Engineering



*Scarabeo 9. The first Frigstad D90™*

*The world largest deep water exploration and development drilling rig “Scarabeo 9”*

## Experience meets innovation

▲ A wealth of expertise earned at the sharp end of oil exploration is being harnessed to shorten the journey from drilling to production.

Established players, new entrants and investors are all turning to Frigstad Engineering to optimize deepwater operations in an industry which is placing an ever greater emphasis on efficiency. Historically, the evolution of semi-submersible rigs has been relatively slow. Old traditions die hard when there’s no real drive for change – but now a different set of dynamics are in play.



*Frigstad D90™ Next generation*

New requirements are forcing the offshore drilling industry to challenge designs, processes and capacities that have endured the test of time. Frigstad Engineering has responded with a fresh and practical approach. We design, construct and modify rigs according to the latest operational needs of the professionals. That includes both the crew operating the rig and the expectations of oil companies and investors.

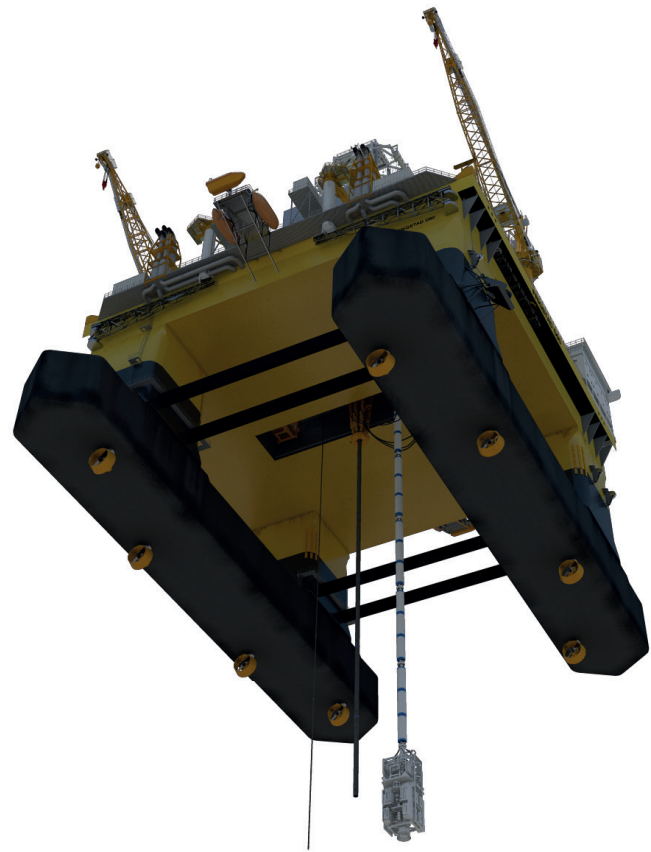
Our new way of thinking is best exemplified through Frigstad Engineering’s flagship: The Frigstad D90™ ultra deep water semi-submersible. It is large, powerful, super-efficient, low cost, easy to build and operator friendly. The D90™ is the “oil-man’s rig”.

## Rigged for the Future

Hands-on experience and extensive consultation with oil companies, other drilling contractors and fabrication yards have resulted in the optimum approach to the design and construction of deep water drilling rigs.

Frigstad Engineering's blueprint for success has been developed with efficiency, ergonomics, safety and environmental awareness as key design priorities.

Certified to the ISO 9001 international quality management standard in 1999, Frigstad Engineering operates with a deeply embedded philosophy of continuous improvement via innovation and employee engagement to safeguard and maintain our reputation for efficiency, practicality, credibility and trustworthiness.



*7<sup>th</sup> generation ultra deep water drilling rig*

With our main engineering force in Singapore, we are located right at the heart of the rig construction industry, with a cluster of companies supporting these activities.

Additionally, our office in Kristiansand, Norway, is strategically located close to the major suppliers of drilling equipment and machinery.

We employ an international staff of highly motivated and competent professionals, with a track record and hands-on experience in offshore rig construction and design.

### COMPANY BACKGROUND

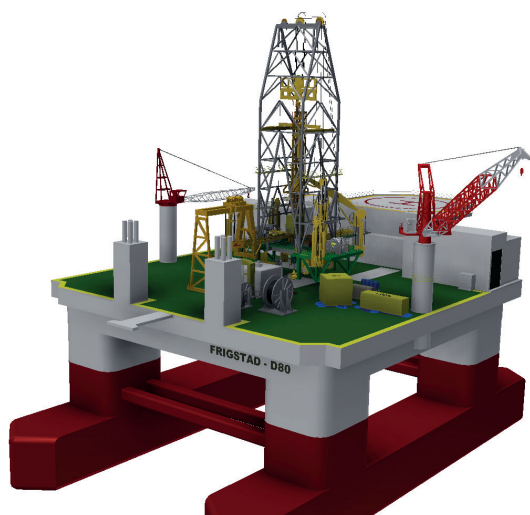
Frigstad Engineering was established in 1981 to provide multi-discipline engineering services for the offshore petroleum industry. Since its inception, Frigstad Engineering has delivered a broad range of services such as:

- In-house development of semi-submersible rig designs
- Project engineering and management
- Consultancy engineering and feasibility studies

Frigstad Engineering's engineering offices are located in Singapore, at the heart of the rig construction industry, Kristiansand, Norway, strategically located close to major suppliers of drilling equipment and machinery. Frigstad Group, including engineering ramping up in Brazil – located in the strong growth area.

Frigstad Engineering is a reputable provider of semi-submersible offshore drilling and production concepts – which has led to several projects, the first D90™, Scarabeo 9, working for Saipem, T70™ for SapuraKencana Drilling and 2 units of the latest generation D90™ for Frigstad Deepwater.

Frigstad Engineering employs an international staff of highly motivated and competent professionals with a track-record and hands-on experience in offshore rig construction and design



*Frigstad W80™ Well intervention rig*

## The new angle on semi-submersible rig designs

▲ The Frigstad Engineering adventure dates back to the Norwegian Harald Frigstad and his ambition to build the ultimate drilling rig. To him, the practical experience earned during his career offshore has been the key to success.

As the quest for energy continuously drives exploration activities further offshore and into deeper waters, the challenges faced by offshore drilling contractors gets more demanding. To meet the high costs associated with large scale exploration and development projects, the efficiency of the drilling rig itself becomes a vital and valuable asset.



*Frigstad D80™  
Ultra Deep Water and  
Midwater Drilling Rig*

Knowing that deepwater drilling and production represents the future of the oil industry, Frigstad Engineering sets out to develop the most efficient semi-submersible solutions on the market.

The meticulous design process, involving extensive research and testing has resulted in a state-of-the-art rig solution equipped to meet the high requirements of future deepwater drilling.



## Frigstad D80™ and D90™ – deepwater champions

▲ As rig locations get more remote, there is a continuously demand for more efficient rig solutions. The rig has to accommodate advanced technology and handle an increased complexity and diversity of onboard operations. To achieve this, logistics and material handling capacity becomes one of the most important aspects of a modern drilling rig.

Simple, yet innovative solutions have been incorporated into the Frigstad D90™ rig to meet these requirements. The D90™ is designed in order to provide a large, open and unobstructed deck, high deck load and spacious bulk capacity. Further, the D90™ offers efficient material handling on the upper and lower decks.

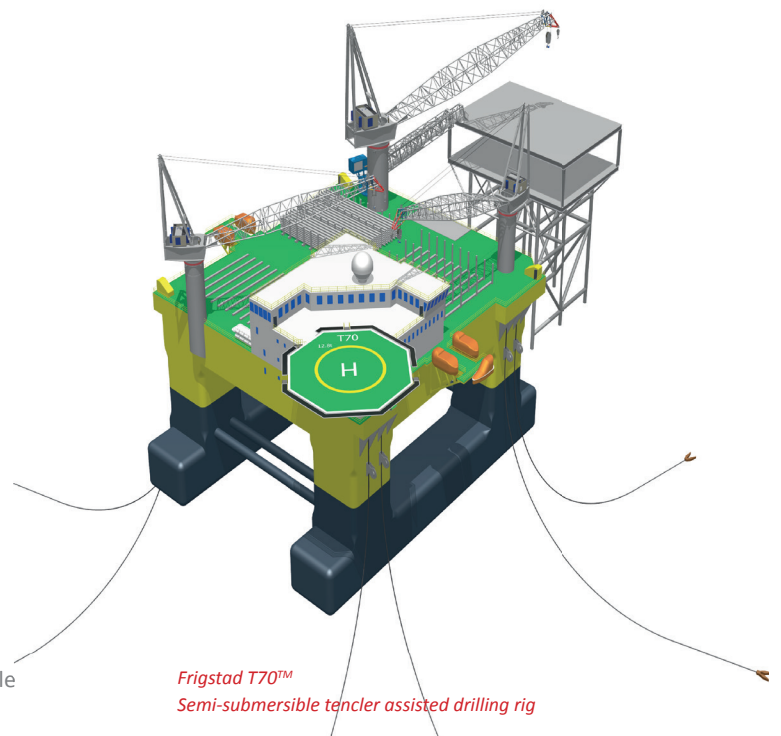


*Frigstad D90™  
Ultra deep water drilling rig*

To the Frigstad engineers, the vision will always be to design the ultimate deepwater drilling rig. Streamlining the drilling operation may be the most important part, but not the only one. The rig should be easily built and maintained. Our latest design provides an optimized arrangement of, and easily accessed, equipment and machinery, routing of cables and piping. It all adds up to the economic benefits provided by the Frigstad T70™, D80™ and D90™

In Frigstad Engineering we believe in making every detail as efficient as possible, starting with the drilling operation and then design the best possible foundation from there.

\*) Further details on the Frigstad T70™, D80™ and D90™ are available from Frigstad Engineering in separate brochures.

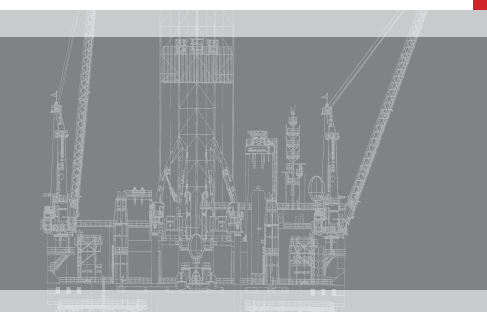


*Frigstad T70™  
Semi-submersible tencler assisted drilling rig*

## 360° engineering services

Through our offices in Cyprus, Singapore, Brazil and Norway, Frigstad Engineering provides multi-faceted engineering services at a world-class standard. Whether we are invited to design and develop a new rig or to modify and upgrade an existing unit, our team of experienced consultants and designers will ensure your satisfaction.

▲ Frigstad Engineering affiliates and cooperates closely with Frigstad Offshore. This enables us to offer a combination of competencies and turnkey project services that are unique to the industry. This includes total project management for rig construction all the way from the design phase via shipyard tender exercises and contract negotiations via site supervision, quality control, testing and commissioning to operational rig management.

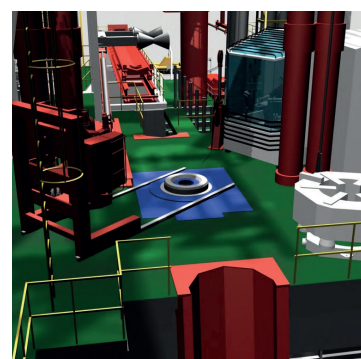


Through advanced simulation and other computer software we conduct motion, mooring and stability analyses and scantling calculations. We further provide technical feasibility studies in relation to offshore projects as well as conceptual engineering for both floating and fixed installations. Our guiding star is the perfect rig solution for any condition.

The strategic location of Frigstad Engineering offers a unique possibility to perform services such as FAT, interface and project management towards deliveries of drilling equipment on behalf of clients such as rig owners and construction yards in a cost efficient manner.

Our close attention to detail means every hook and hinge comes under scrutiny in the process of fabrication management. For us offering specification and procurement of equipment and materials is not enough. To guarantee a high quality result, we go the extra mile to ensure top-notch fabrication management through stringent project supervision.

Our consultancy engineering service includes technical inspection and evaluation of drilling rigs and offshore installations, with emphasis on safety and environmental responsibility. This involves the development of operation manuals, along with execution of testing, training, safety and other related activities.





## Customer satisfaction is our measure of success



Thanks to our clients continuous demand for improved solutions and our shared hands-on experience, Frigstad Engineering has launched several innovations that benefit our clients, partners and their shareholders. And not to forget, Frigstad Engineering has become an employer of choice.

This approach is underpinned by a quality policy and commitment to excellence. Our clients requirements, schedules and expectations are consistently met to the very highest standards, and always with a sharp focus on efficiency and reliability.

An energetic research and development function keeps Frigstad Engineering up to speed with the latest advances in technology and best practice, while staff and management alike measure everything they achieve according to levels of customer satisfaction.

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