

Frigstad Engineering

The Frigstad Engineering group has provided rig designs and engineering services to the offshore drilling and production industry since 1981. With offices in Singapore, Norway and Brazil, we have established strong ties with major offshore shipyards and suppliers of drilling equipment – and we are able to serve our clients world-wide. Frigstad Engineering operates with a deeply embedded philosophy of designing and modifying rigs according to the operational needs of the professionals who work on them and with the expectations of oil companies and investors in mind. Particular emphasis is placed upon equipment selection and arrangement which offers superior safety and operational performance while maintaining the highest levels of environmental protection and cost-efficiency.

Frigstad D90 – Operational Excellence

The Frigstad D90 is a proprietary semi-submersible drilling unit design which has been purposely developed for ultra deepwater exploration & development. The general arrangement of the unit has been carefully developed utilizing the extensive practical experience of the personnel at Frigstad Engineering and Frigstad Offshore. All aspects of equipment functionality and placement have been carefully considered to ensure that each process is safe and efficient.

Frigstad D90 DP3 + PSM – Key Features

- 12,000 ft water depth capacity
- 50,000 ft drilling depth capacity
- Vertical racking capacity for 10,100 ft drilling riser in 100 ft stands and 50,000 ft drill pipe in stands
- Dual activity Rig with 2 x 1,250 ST hoisting capacity
- Variable deck load capacity of more than 8,000 MT
- 2 x 150 MT platform cranes and large deck space for handling and storage of a number of fully assembled X-mas trees
- Large moonpool opening of 42m x 8m
- Powerful DP3 system with 8 thrusters that enables the rig to evacuate location and transit by up to 8–9 knots
- Anchor winches for hook-up to pre-set mooring system
- Storage and handling system (584 m³ / 20,624 ft³) designed to offer significant operational flexibility and cost efficiency.
- Fully integrated cuttings storage and handling system (584 m³ / 20,624 ft³) designed to offer significant operational flexibility and cost efficiency.



Large deck space



Vertical riser storage



D90-Port & Starboard well centers



Dual activity

D90 OUTLINE SPECIFICATION

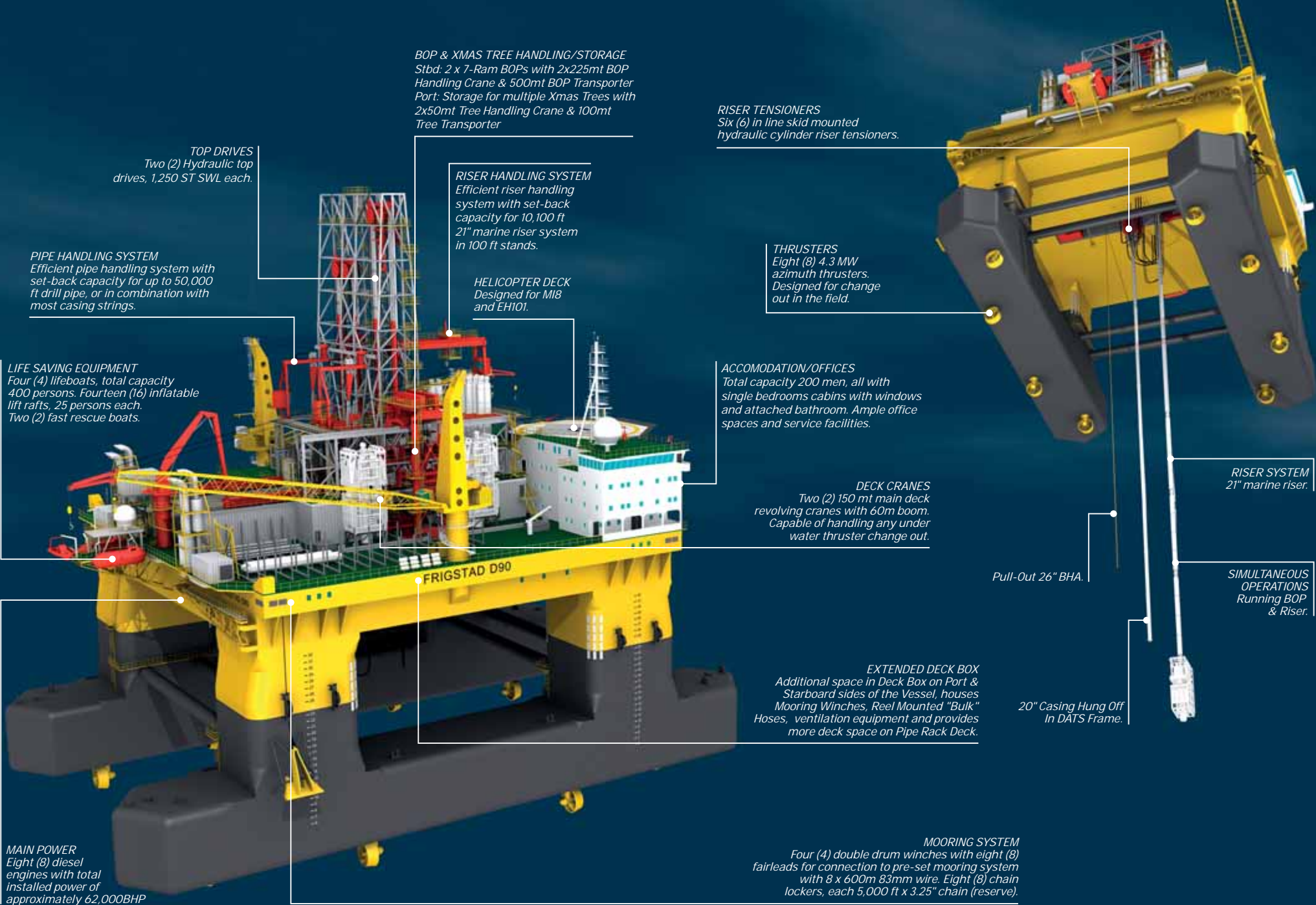
REGULATORY BODY APPROVALS			
SOLAS 2004, MARPOL 1973/78, IMO MODU CODE, all with latest amendments			
CLASSIFICATION			
DNV -I+I COLUMN STABILIZED DRILLING UNIT, DYNPOS AUTO/ (DP3), POSMOOR-ATA, CRANE, HELIDECK-SH, ECO, F-AM, DRILL & BWM-T			
ENVIRONMENTAL OPERATING LIMITS			
Maximum Wind Velocity	70 knots / 100 knots	Air Gap (Operating / Survival)	10.5 / 16.5 m (34.4 / 54.1 ft)
Wave Height Hs / Hmax	15.8 / 29.2 m (51.8 / 95.8 ft)		
PRINCIPAL PARTICULARS			
Length of Pontoons	114 m (374 ft)	Displacement (operational)	56,860 MT (55,962 LT)
Width & Length, Pipe Rack Deck	80 x 78 m (262.5 x 255.9 ft)	Displacement (survival)	50,124 MT (49,332 LT)
Height to Pipe Rack Deck (ABL)	42.9 m (140.7 ft)	Displacement (transit)	41,276 MT (41,116 LT)
Draft (operational)	23.6 m (77.4 ft)	Water depth (max)	12,000 ft (3,657 m)
Draft (survival)	17.6 m (57.7 ft)	Drilling depth (max)	50,000 ft (15,240 m)
STORAGE CAPACITIES			
Bulk mud	440 m ³ (5,538 ft ³)	Drill water, pontoon	3,776 m ³ (23,750 bbls)
Bulk cement	440 m ³ (5,538 ft ³)	Potable water	1,036 m ³ (6,516 bbls)
Sack material, upper hull	9,168 sacks	Open pipe rack deck area	3,037 m ² (32,690 ft ²)
Base oil for mud, pontoon	442 m ³ (3,175 bbls)	Variable deck load (max operational)	8,100 MT (8,929 ST)
Liquid mud / brine, upper hull	1,457 m ³ (9,161 bbls)	Variable deck load (max transit)	6,100 MT (6,724 ST)
Liquid mud / brine, pontoon	1,913 m ³ (12,033 bbls)	Payload (max operational)	14,700 MT (16,204 ST)
Diesel FO (MDO)	4,459 m ³ (28,046 bbls)	Cuttings Storage, upper hull	584 m ³ (20,624 ft ³)
ACCOMMODATION / OFFICE			
Total POB of 200 men with all single person bedrooms with windows. Ample office spaces and service facilities.			
MATERIALS HANDLING			
Deck Cranes	Two (2) 150 MT revolving deck cranes with 60 M boom. Capable of handling under water the riser changeout. One (1) 12 MT knuckle boom tubular handling crane		
Access to Machinery Spaces	One (1) 6mt Cargo Elevator & several forklifts to service all major machinery spaces in the deck box and pipe rack deck including Engine Rooms, Mud Pump Room, Cement Unit Room, Workshops, Sack Storage, Warehouse, Galley Stores, etc.		
MARINE SYSTEMS			
Main Power / Emergency Power	Eight (8) diesel engines, each with 5,760 kW capacity. Total installed horsepower is approximately 46,000 BHP (62,000 BHP)		
Power Distribution	AC Power Propulsion with PM system and DP with MP+AW drives and VM system. 11 kV AC alternators		
Dynamic Positioning	DP class 3. Eight (8) 4.3 MW azimuth thrusters		
Mooring System	Four (4) double drum winches with eight (8) fairleads for connection to pre-set system with 8 x 600 m of 83 mm wire.		
DRILLING SYSTEMS			
Drilling Rig	Dual Both have 1,250 ST capacity and dual handling capabilities. Set back for 50,000 ft drill string / casing in stands. Two (2) Diverters / Flowlines.		
Rotary Table	Two (2) 75.5" rotary tables with independent drive		
Top Drives	Two (2) top drives with 1,250 ST capacity		
Riser Tensioners	Six (6) in line hydraulic cylinder riser tensioner mounted on skid system (DATS) 3,200,000 lbs with only 4 out of 6 DATS cylinders working		
BOP and Riser	Two (2) 18.75" x 10,000 psi Annular preventors Seven (7) 18.75" x 15,000 psi Ram preventors 10,100 ft of 21" riser, 50 ft joints with c&k, booster and hydraulic lines. Vertical marine riser rack for 10,100 ft (100 ft stands made up of 2 x 50 ft lengths). Storage onboard for 12,000 ft of riser		
Drill String	5-7/8" drill string with subs, drill collars, heavy weight drill pipes		
DRILLING FLUID SYSTEMS			
Mud Pumps and Treatment System	Four (4) Main Mud pumps, Triplex, 2,200 HP 7,500 psi wp Four (4) to Six (6) Linear Motion Shale Shakers where two (2) equipped as mud cleaners (disfilter and disander), one (1) gumbo buster, two (2) Degasser Units, two (2) 60 bbls trip tanks		
OTHERS			
Helicopter Deck Capacity	Designed for M8 and EH 101 helicopters		
Life Saving Equipment	Four (4) lifeboats with total capacity of 400 persons (98kg, 21" seats), Sixteen (16) inflatable liferafts with capacity of 25 persons each. Two (2) fast rescue boats.		

Note: The details included in this specification may change prior to completion of the rig. 4668-BRO-FES

Frigstad D90

Operational Excellence in
Ultra Deepwater Drilling





BOP & XMAS TREE HANDLING/STORAGE
 Stbd: 2 x 7-Ram BOPs with 2x225mt BOP Handling Crane & 500mt BOP Transporter
 Port: Storage for multiple Xmas Trees with 2x50mt Tree Handling Crane & 100mt Tree Transporter

TOP DRIVES
 Two (2) Hydraulic top drives, 1,250 ST SWL each.

PIPE HANDLING SYSTEM
 Efficient pipe handling system with set-back capacity for up to 50,000 ft drill pipe, or in combination with most casing strings.

LIFE SAVING EQUIPMENT
 Four (4) lifeboats, total capacity 400 persons. Fourteen (16) inflatable lift rafts, 25 persons each. Two (2) fast rescue boats.

RISER HANDLING SYSTEM
 Efficient riser handling system with set-back capacity for 10,100 ft 21" marine riser system in 100 ft stands.

HELICOPTER DECK
 Designed for M18 and EH101.

RISER TENSIONERS
 Six (6) in line skid mounted hydraulic cylinder riser tensioners.

THRUSTERS
 Eight (8) 4.3 MW azimuth thrusters. Designed for change out in the field.

ACCOMODATION/OFFICES
 Total capacity 200 men, all with single bedrooms cabins with windows and attached bathroom. Ample office spaces and service facilities.

DECK CRANES
 Two (2) 150 mt main deck revolving cranes with 60m boom. Capable of handling any under water thruster change out.

EXTENDED DECK BOX
 Additional space in Deck Box on Port & Starboard sides of the Vessel, houses Mooring Winches, Reel Mounted "Bulk" Hoses, ventilation equipment and provides more deck space on Pipe Rack Deck.

MOORING SYSTEM
 Four (4) double drum winches with eight (8) fairleads for connection to pre-set mooring system with 8 x 600m 83mm wire. Eight (8) chain lockers, each 5,000 ft x 3.25" chain (reserve).

MAIN POWER
 Eight (8) diesel engines with total installed power of approximately 62,000BHP



Pull-Out 26" BHA.

20" Casing Hung Off In DATS Frame.

RISER SYSTEM
 21" marine riser.

SIMULTANEOUS OPERATIONS
 Running BOP & Riser.

DUAL ACTIVITY

TEMPLATE INSTALLATION



D90-Port & Starboard well centers



Barge with template positioned under rig with AHV's



Drilling in Ram Rig-Port & preparing BOP in Ram Rig-Starboard



Template lowered into water with both rigs



Dual activity



Landing template on seabed