OUTLINE OF SPECIFICATION
FOR 400FT JACK UP RIG (CP400)

1 General Provisions

1.1 Purpose and Applicability of Platform

This platform is a non-self-propelled self-elevating drilling rig used for offshore oil and natural gas exploitation and development operation, with the max. operating water depth 122m (400 ft), the drill capacity of 9000m (30000 ft), provided with such functions as drilling of deep well/ cluster well/ horizontal well, cementation, and auxiliary production test, etc.

1.2 General Description

The hull of the platform is triangle box-type structure. The main dimension of the hull is 70.27m length, 72.0m width, and 9.5m depth.

The platform is arranged with three triangle truss work legs, each fitted with a spud can at its lower end.

Hull structure is divided into three parts with four decks: main deck, intermediate deck, machinery deck, and bottom plate. Longitudinal and transversal bulkheads divide the hull into several spaces. The ballast tanks, drill water tanks，brine tank, base oil tank are arranged at the space of the surrounding of triangle hull; main engine room, main switchboard room, mud pump room, mud pit and other auxiliary machineries, etc. are arranged on the machinery deck and tween deck; fuel oil tank, potable water tank, bilge water tank, etc. are arranged in the double bottom.

The main deck is divided into three parts: living quarters at foreship, working area at aft-ship, and stack area at mid-ship. Cantilever is located on the main deck; drilling pipe rack and the guide rail for drill floor foundation transverse moving are arranged. Drill floor substructure is installed on the transverse guide rail. Cantilever and drill floor can be moved longitudinally and transversely. The platform can drill a number of wells at one site.

The 4 floors living quarters with a "V" shape is arranged on the main deck at the fore ship. Jacking control room, emergency generator room, mast, etc. are arranged on the top of the living quarter, and the helideck is arranged at the front of the quarters.

1.3 Platform Manning, Design Service Life

Platform manning: 120 persons
Design service life: 20 years
Self-sustaining capability: 20 days

1.4 Design Principles

The platform is designed in accordance with the rules of CCS and related international rules and regulations.

The basic design is approved by ABS ＆ CCS.
CCS Class Symbol: Self –elevating Drilling Unit

2 Design Conditions and Design Criteria

2.1 Design Environment Conditions

1. Design max operating water depth: 122m (400ft, including astronomical tide and storm tide)
2. Design temperature
Ambient temperature: 0℃ ~ +50℃
Sea water temperature: 0℃ ~ +32℃
Air Humidity：   90％ （Ambient temperature ＋ 20℃）
Steel design operating temperature: -10℃
3. Design wind speed:
Normal operating: 36m/s (70kn);
Storm survival: 51.4m/s (100kn)

Limited towing conditions:
Intact stability, field towing,   36m/s (70kn)
Intact stability, ocean towing,   51.4m/s (100kn)
Damaged stability: 25.8m/s (50kn)

2.2 Design Operating Condition

(1) Design Storm Survival Condition

	Unit	Survival Condition I	Survival Condition II	Survival Condition III
Operating water depth	m	122	106	91
Maximum wave height	m	14.3	17.0	18
Relative wave period	s	14.5	15.0	15.5
Maximum wind speed	m/s	51.5	51.5	51.5
Current speed	m/s	0.77	0.77	0.77
Air gap	m	12.5	15.3	20
Pile pitching depth	m	5.6	5.6	5.6
Variable load	t	2900	2900	2900

Ps: The locking system is engaged.

(2) Design Normal Operating Condition

	Unit	Operating Condition I	Operating Condition II	Operating Condition III
Operating water depth	m	122	106	91
Maximum wave height	m	17.0	18.5	20.5
Relative wave period	s	14.7	14.7	16.0
Maximum wind speed	m/s	36.0	36.0	36.0
Current speed	m/s	0.77	0.77	0.77
Air gap	m	12.5	15.3	20.0
Pile pitching depth	m	5.6	5.6	5.6
Variable load	t	3900	3900	3900
Distance from the rig centre to the AFT	m	22.5	22.5	22.5
Distance from the rig centre to the centerline	m	4.57	4.57	4.57

Ps: The locking system is engaged..
Above data is based on:
Class approved calculation method.
50 years return period environmental condition.
The length of leg: 167m
Without marine growth.
According to the P-delta effect ion and dynamic amplify coefficient.

3 Main Dimensions and Main Design Parameters

Length overall	Approx. 98.67m
Width overall	Approx. 72.0m
Length moulded	70.27m
Breadth moulded	72.0m
Depth moulded	9.50m
Lightship weight	Approx. 15773t
The whole length of the leg	167m
Center distance between legs: longitudinal	46.01m
transverse	47.5m
The diameter of spud can	17.8 m
The effective areas of spud can	248.72m2 ×3
Design Leg Penetration depth	5.60m
Dimension of Drill Floor (Length x Width)	22.54m x 18.192m
Height of drill floor (above main deck)	16.2m
Derrick height (clearance height)	52.00m
Distance from the cantilever pipe rack to main deck	9.25m
Living quarter(5floors) height of second and fifth floor: height of others:	second/jacking control room 3.35m, others 3.20m
The diameter of the helicopter platform	22.2m

4 Main Performance

Maximum operating water depth:	122m
Maximum drilling depth of rig (4 1/2" drill pipe):	9000m
Variable load at drilling condition (including hook load):	3900t
Maximum longitudinal outreach of rotary table center:	22.5m
Maximum transverse movement of derrick floor:	±4.57m
Design towing draught	Appox. 5.7m
Design ambient temperature:	0℃~+50℃
Normal lifting capacity of jacking system:	16470t
Preload capacity:	12530m3
Deck crane capacity	3 sets x 50t
Quantity and weight of anchor	4 sets x 7.5t
Raw water pump	4 sets x 300m3/h
Living Quarters	120 persons
Life boat	2 x 120 persons

5 Main Equipment

5.1 Power Equipment

Main Generator set: 5*1600kW
Electric system: 50Hz, 600V/400V AC/VDF
Emergency generator set: 1 x 750kW 50Hz、400V

5.2 Drilling Equipment

The main drilling equipments of the platform is suitable for 9000m (30000ft) AC variable frequency drill rig, mainly equipped three high pressure mud pumps, one set of draw works, one set of TDS-8SA top drive system with a big torque. The volume of mud pit is approx. 700m3. The equipments of solid control system are six (6) stages purification.

Dimensions of drill floor substructure	40ft x 40ft
Setback volume (5" drill pipe)	270pcs
Hook load	6750kN
Draw works	2880kW
High pressure mud pumps	3 x 2200HP
Rotary table opening	49 1/2", 1000HP
Top drive	1150HP (845kW)
Max working pressure of choke manifold	105MPa
max working pressure of kill manifold	70MPa
Well control equipment Diverter	40" * 500 psi
BOP	13 5/8" * 105MPa

or 18 3/4" * 105 MPa
Cement Unit   Double pump cement skid, 70MPa

6 Design Variable Load

Design variable load of platform is shown as below:

Table of Design Variable Load of Platform in Various Conditions

Condition	Design Variable Load
Storm Survival	2900t
Drilling Operating	3900t
Field Towing	2900t
Ocean Towing	2000t

Note: The variable loads listed in the above table are part or the combination of the following categories:

(1) Personnel and their effects, supplies, stores, and spare parts.
(2) Fuel oil, lubricating oil, drinking water, drilling water, ballast water, and bilge water.
(3) Liquid mud, bulk mud and cement, sack materials, etc.
(4) Drill pipe, drill collar, casing, drilling tool, BOP, etc.
(5) Other equipment, such as well survey, logging, directional well, oil test and other equipment.
(6) Derrick hook load, rotary table load, setback load, casing tension load, etc.

7 Design Load of Deck

Deck Load Design Table

Main deck (within pipe rack)	2.64 t/m2
Main deck (outside pipe rack)	2.08 t/m2
Cantilever deck (outside pipe rack)	1.30 t/m2

Cantilever deck (within pipe rack)		2.64 t/m2
Derrick floor	Working area	1.95 t/m2
	Setback	22.00 t/m2
Living quarter deck		0.46 t/m2
Living quarter roof		0.73t/m2
Mud pit		7.00 t/m2
Engine room		1.32 t/m2
Sack storage room		2.64t/m2
BOP storage area		2.64t/m2
Helicopter deck load		According to Sikorsky S-92 helicopter

8 Design Combined Load of Cantilever and Derrick Floor

8.1 Cantilever Dimension

Center distance of cantilever beam   18.08m
Total length and height of cantilever   53.53m x 8.4m
Dimension of pipe rack on cantilever   32.6m x 18.95m
Weight of cantilever   approx. 1024t

8.2 Max. Design Combined Load of Cantilever and Drill Floor

The max. design combined load of cantilever/drill floor is 1150t. The max. individual loads of sub items are as follows:

Hook load: 675t
Rotary table load: 900t
Setback load: 350t
Casing/BOP tension system load: 227t

8.3 Design load of cantilever pipe rack: 480t

8.4 The maximum load when cantilever moving:

350t setback +120t pipe rack load+10t sludge tank+60t mud purify tank liquid

8.5 Allowable Variable Load of Drill Floor on Cantilever

The relationship between variable load of derrick floor, outreach of cantilever and travel of derrick floor base is shown as below:

Position of Rotary Table	On Center Line	Depart from Center Line ± 4.57m
Outreach 13m	1150t	1150t
Outreach 22.5m	1150t	450t

Above of cantilever design allowable load based on the estimated weight data in the below table.

Project	Weight (t)	Longitudinal C.G (positive: fwd of rotary table center) (m)	Transverse C.G (positive: port of rotary table center) (m)
Drill floor	820	0.12	-0.495
Cantilever	1590	18.08	-0.225

9 Operating Capacity

Container/Cabin	Number	Total Capacity (m3)
Fuel oil tank	2	785
Potable water tank	4	572
Drilling water tank	2	955
Drilling water tank/ Ballast tank (compatible)	3	1136
Ballast tank	29	10856
Fire fighting buffer tank/ mid cooling water tank/ ballast tank (compatible)	1	540
Lubricating oil tank (Main Engine)	1	7.5
Lubricating oil tank (Mud Pump)	1	6.2
Lubricating oil tank (Emergency generator room)	1	1
Daily service tank	1	26.9
Settling tank	1	27.2
Day tank (Emergency generator)	1	4.5
Bulk cement	4	220
Bulk mud	4	220
Sack storage room	2	5000 sacks
Reserve and active mud pit	8+2	700
Mud sanding pit	5	70
Brine tank	1	177
Base oil tank	1	168
Waste oil tank	1	5.6
Oil sludge tank	1	5.6
Cantilever collecting dirty tank	1	10
Cantilever trip tank	2	10
Sewage tank	1	204
Industrial dirty liquid tank	1	84
Bilge water tank	1	204

10 Leg Structure

The whole length of the leg	167m
Section shape	Triangle
Structure type	Opposite "K" type
Chord spacing	13.1m（43ft）
Rack thickness	177.8mm (7 in)
Motor & Pinion	27 motor x 2 pinion/motor

11 Design Towing Conditions

The following defined data of towing conditions is used for the stability calculation and structure strength analysis during the platform towing works.

11.1 Wet Towing: Ocean Towing

Limit of Leg length(m)   99 (distance from the top of leg to the base line of hull)
Variable load(t)   2000
Hull draught(m)   approx. 5.35m
Wind speed   51.5m/s(100kn)
Max inclining angle(deg)   15
Wave crest period(sec)   10

Spud can to be replaced even with bottom shell and to be completely filled with water, moreover, the vessel to be on even keel and the locking system should be engaged.

11.2 Wet Towing: Oilfield Migration

Leg length(m)   167.0
Variable load(t)   2900
Hull draught(m)   approx. 5.7
Max inclining angle(deg)   6
Wave crest period(sec)   natural period

Spud can to be replaced even with bottom shell and to be completely filled with water, moreover, the vessel to be on even keel and the locking system should be engaged.

11.3 Dry Towing

Leg length(m)   167
Variable load(t)   Depend on semi-submersible barge capacity
Max inclining angle(deg)   Depend on semi-submersible barge capacity

Spud can to be replaced even with bottom shell and to be empty, moreover, locking system should be engaged.