

CONTESTS

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1. General specification

1.1 Service and navigation area

The vessel to be designed as a self-propelled drag suction dredger, mainly suitable for channel dredging. The maneuvering navigation area is offshore and the working navigation area is coastal. There are two kinds of working methods, one is discharged directly through the bottom door and the other is by fore blowing equipment.

1.2 Ship type

The vessel to be of steel type with double-engine, double-propeller and double-rudder. It to have a forecastle and a poop and to be propelled by diesel engine with gearing box, the engine to be located aft.

1.3 Quality control

1) The vessel, materials, workmanship, equipment (machinery, devices, piping etc.) to be approved by the owner and surveyors, to be built according to the charts approved by the owner and surveyors.

2) The quality of building to comply with the requirements of China Ship Building Quality Standard, 2005.

1.4 Regulations and rules

The vessel to comply with the following rules and regulations:

1) Regulations for the Statutory Surveys of the Ships and Offshore Installations (domestic navigation) ,2004 and its amendments.

2) Rules for Domestic Navigation Ships Building of CCS, 2006.

2. Main technique parameters

2.1 Main Dimensions

Length over all	111.26 m
Design waterline	106.66m
Length between perpendiculars	104.20 m
Breadth moulded	19.80 m
Depth moulded	9.60m
Design draught	7.00m
Displacement	13042.4t
Block coefficient	0.8775
Prismatic coefficient	0.8850
Midship section coefficient	0.9916
Waterplane coefficient	0.9570
Main deck sheer at forward perpendicular	0.135m
Main deck sheer at after perpendicular	0.016m
Camber	0.150m
Length between frames	600mm

2.2 Technique parameters

1) Capacity

spoil hopper(#38~#136) about 7143.24m³

Fore peak tank & water ballast tank	about 369.59 m ³
No.1 water ballast tank P&S(#111~#125)	about 310.32m ³
No.2 water ballast tank P&S(#49~#63)	about 310.40 m ³
Aft water ballast tank P&S(stern~#4)	about 255.64 m ³
No.1 fuel oil service tank S(#153~#156)	about 9.67 m ³
No.2 fuel oil service tank S(#150~#153)	about 11.78 m ³
No.3 fuel oil service tank S(#35~#38)	about 17.78 m ³
No.4fuel oil service tank S(#32~#35)	about 7.02 m ³
No.5 fuel oil service tank S(#16~#20)	about 23.41 m ³
No.6 fuel oil service tank S(#13~#16)	about 17.18 m ³
Fuel oil settling tank(#20~#23)	about 17.64 m ³
No.1 fuel oil tank P&S (#125~#136)	about 235.22 m ³
No.2 fuel oil tank P&S (#38~#49)(spare)	about 238.62 m ³
No.3 fuel oil tank P&S (#4~#13)	about 220.92 m ³
No.1 fresh water tank P&S (#87~#97)	about 221.74 m ³
No.2 fresh water tank P&S (#77~#87)	about 221.74 m ³
No.1 lubricating oil service tank P(#153~#156)	about 9.67 m ³
No.2 lubricating oil service tank P(#150~#153)	about 11.78 m ³
lubricating oil store S (#29~#31)	about 11.85 m ³
lubricating oil store P (#18~#23)	about 6.53 m ³
lubricating oil drainage tank S (#18~#23)	about 6.53 m ³
bilge water tank P (#156~#159)	about 3.39 m ³
bilge water tank P (#34~#38)	about 6.50 m ³

residual oil tank S (#159~#162)	about 3.39 m ³
residual oil tank S (#34~#38)	about 6.50 m ³
sea water settling tank C (#136~#141)	about 22.72 m ³

2) Main engine and propeller

① Main engine

Main engine model: X8320ZC6B/7B

Power rating: 3088KW × 650r/min × 2

Gearbox model: GWC60.66,

Reduction ratio: 3.0722:1

② Propeller

There to be two integral, Class III nickel aluminum bronze propellers, which to have four Ka4-70 blades and the diameter to be 2.80m, pitch ratio to be 1.1909 and disc area ratio to be 0.70.

3) Speed

The design speed should be 12.0kn at design draft, when the vessel to be in deep water, the main engine to put out constant power, sea calm and wind power no more than 2 level.

4) Endurance

The endurance of the vessel to be over 5000 n mile.

5) Complement

The complement of the vessel to be 40P.

6) Cargo capacity

Cargo capacity to be about 7500t at design draft of 7.00m and sea water proportion 1.025.

2.3 Tonnage

Gross tonnage: 6520

Net tonnage: 1956

2.4 Freeboard

The vessel's assignment freeboard should comply with the requirements of Ship B in Part 3 *Regulations for the Statutory Surveys of the Ships and Offshore Installations (domestic navigation)*, 2004. Geometrical freeboard to be 2195mm and assignment freeboard to be 2616mm.

2.5 Intact stability

The intact stability should comply with the requirements of drag suction dredger, in Chapter 7, Part 4 *Regulations for the Statutory Surveys of the Ships and Offshore Installations (domestic navigation)*, 2004 and its Amendments.

3. General arrangement

3.1 General (LJX9135-100-04)

There to be 5 watertight bulkheads, which divide the vessel from forward to aft in order into fore peak tank (& water ballast tank), pump room, spoil hopper, engine room, No.3 fuel oil tank (P&S) and aft water ballast tank (P&S).

1) double bottom arrangement in engine room

#18~#23 lubricating oil store (P), lubricating oil drainage tank (S)

2) arrangement below platform of spoil hopper

#38～#49	No.2 fuel oil tank (P&S) (spare)
#49～#63	No.2 water ballast tank (P&S)
#63～#77	void (P&S)
#77～#87	No.2 fresh water tank (P&S) (spare)
#87～#97	No.1 fresh water tank (P&S)
#97～#111	void (P&S)
#111～#125	No.1 ballast water tank (P&S)
#125～#136	No.1 fuel oil tank (P&S)

3) arrangement on platform of spoil hopper

#38～#136	spoil hopper in middle, void at sides
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4) arrangement on main deck

stern～#32	A larder, a galley and 5 crew cabins at port side; a drying clothes room, a laundry, a change room, a toilet, a CO2 room, a utility room, two double crew cabins at starboard side; a store room, a mess room, four double crew cabins and an engine room casing in the middle.
#38～#136	Spoil hopper space, suction tube and drag head located at two sides respectively
#136～#165	Pump room deck space, a windlass control room, an Oxygen cylinder room, a welding room at port side; an Acetylene room, a paint locker and a utility room at starboard side.
#165～bow	sail locker , chain locker (P&S)

5) arrangement on poop deck

poop~#5	necessary mooring equipment;
#5~#32	emergency generator room, a store room and 4 single crew cabins on port side; five single crew cabins, a store room, engine room casing and gangway in the middle

6) arrangement on forecastle deck

#157~forecastle	necessary mooring equipment and anchor equipment
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7) arrangement on boat deck

#8~#23	a life raft, a soft ladder and a lifeboat located at two sides respectively
#11~#32	three single crew cabins, a Second Engineer room at port side; a bathroom, an owner room, a single crew cabin and a Chief officer room at starboard side; an engine room casing, aisle, gangway, a boat fittings room, a utility room and two single crew cabin in the middle.

8) arrangement on berth deck

#20~#32	a battery compartment, a battery charging and discharging room, Chief Engineer room at port side; a store room and captain room at starboard side; aisle and gangway in the middle.
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9) arrangement on bridge deck bridge house

10) arrangement on compass deck standard compass, search light,

signal mast etc.

3.2 Compartment arrangement

1) crew accommodation

Captain room	1
Chief Engineer room	1
Chief Officer room	1
Second Engineer room	1
Owner room	1
Single crew cabin	17
Double crew cabin	11
Infirmary	1

2) living quarters

Galley	1
Messroom	1
Toilet	1
Bathroom	1
Lavatory	2
Laundry	1
Change room	1
Drying clothes room	1
larder	1

3) working compartments

bridge house	1
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battery charging and discharging room	1
battery compartment	1
CO2 room	1
utility room	3
Welding room	1
Emergency generator room	1
Oxygen cylinder room	1
Acetylene room	1
windlass control room	1
paint locker	1
steering gear room	1
boat fittings room	1
store	3
sail locker	1

3.3 Height

1) Deck height:

Compass deck to bridge deck	2.60m
Main deck to poop deck	2.50m
Main deck to forecastle deck	2.30m
The rest decks	2.40m

2) Double bottom height:

all over	1.20m
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4 Hull construction.

4.1 General

1) The vessel to be of steel type with double-propeller and double-rudder, engine aft, self-propelled drag suction dredger. There to be five watertight bulkheads including the bulkhead of aft peak tank and collision bulkhead. The vessel to be designed according to the requirements of *Rules for Domestic Navigation Ships Building of CCS, 2006*.

2) Types of construction

The main deck, bulkheads and sides of hopper and bilge to be longitudinal framing type. The rest construction to be transverse framing type. Machinery space to be double bottom and the rest single bottom structure.

3) Materials and welding

The vessel to be welded design, Class A marine general steel to be used. Class D steel to be used for hatch coaming. Stem to be of steel plate and stern to be of cast steel.

4.2 Scantling dimensions.

4.2.1 Plating

Unit: mm

items	Position and standard	Remark
Bottom plate	0.4L of midship t=22	
	0.075L to bow t=14/16/22	
Flat plate keel	-22×1800/-18×1800	
Bilge Strake	0.4L of midship t=18	
Side plating	0.4L of midship t=14	

	0.075L to bow t=12/14	
sheer-strake	0.4L of midship t=16×1800	
Strengthened locally	Coffin plate and plating connected with stern t=18	
	Sheathing and plating of chain cable t=16	
	Sheathing and plating of suction box t=16	
Bilge keel	$\perp \frac{10 \times 350 \cdot 30}{10 \times 120}$	

4.2.2 Deck plate

Unit: mm

Items	Position and standard	Note
Strength deck	Deck of hopper space t=14 deck stringer t=16×1600	
	0.075L to bow t=14	
Forecastle platform deck	10	
Engine room and pump room platform	10	
Steering gear room platform	10	

4.2.3 Bottom frame

4.2.3.1 Double bottom

Unit: mm

Items	Position and standard	Note
Centre girder	-16×1200	
Side girder	14	Stiffener:-14×160
Watertight side girder	16	stiffener:-14×160
Solid floor of engine room and pump room	-12×1200	stiffener:-14×160
Oiltight and watertight floor	-14×1200	stiffener:-14×160
Inner bottom plating of engine room and pump room	12	
Inner bottom plating	12	
Bilge bracket	$L \frac{12}{120}$	

4.2.3.2 Transverse framing single bottom**Unit: mm**

Items	Position and standard	Note
Side keelson	$\perp \frac{12}{16 \times 200}$	
Floor (fore peak tank)	$\perp \frac{12 \times 1200}{14 \times 200}$	
Floor (aft peak tank)	$\perp \frac{12}{14 \times 150}$	

4.2.3.3 Hopper space single bottom**Unit: mm**

Items	Position and standard	Note
Side tank solid floor	$\perp \frac{12 \times 1000}{14 \times 200}$	
Box shaped keel	Side plate 16 × 2000	
	Sloping plate 14	
	Inner keel of box shaped keel	$\perp \frac{14 \times 1200}{18 \times 400}$
	Floor of box shaped keel	$\perp \frac{14 \times 1200}{16 \times 300}$
	Sloping plate girder of box shaped keel	$\perp \frac{14 \times 600}{16 \times 200}$
	Stiffener of sloping plate L 180 × 110 × 12 (2 above)	
	Stiffener of sloping plate L 200 × 125 × 12 (3 below)	
	Stiffener of side plate L200 × 125 × 12	
Bottom longitudinal	L200 × 125 × 12	
Box shaped floor	Side plate 16 × 2000	
	Sloping plate 14	
	Floor	$\perp \frac{14 \times 1200}{16 \times 300}$
	Side keelson	$\perp \frac{14 \times 1200}{16 \times 300}$
	Inner girder of box shaped floor	$\perp \frac{14 \times 600}{16 \times 200}$
	Vertical stiffener L200 × 125 × 14	

4.2.3.4 Sides framing

Unit: mm

Items	Position and standard	Note
Side longitudinal (hopper space)	Below Side longitudinal girder L180×110×10	
	Below platform deck L160×100×12	
	On platform deck L160×110×10	
Web frame (hopper space)	Below platform deck $\perp \frac{12 \times 550}{14 \times 200}$	
	On platform deck $\perp \frac{10 \times 450}{12 \times 150}$	
Side longitudinal girder (hopper space)	$\perp \frac{12 \times 550}{12 \times 200}$	
Engine space frame	Below platform deck L180×100×12	
	Between decks L180×100×12	
Web frame	$\perp \frac{10 \times 500}{12 \times 150}$	
	Between decks $\perp \frac{10 \times 500}{12 \times 150}$	
Side longitudinal girder	$\perp \frac{8 \times 500}{10 \times 150}$	
Pump room frame	Below platform deck L180×100×12	
	Between decks L180×100×12	
Web frame	$\perp \frac{10 \times 500}{12 \times 150}$	
	Between decks $\perp \frac{10 \times 500}{12 \times 150}$	
Stern frame (#4 to # 13)	L180×110×12	
Web frame (#4 to # 13)	$\perp \frac{10 \times 400}{12 \times 150}$	
Stern frame (stern to #4)	L180×110×10	
Web frame(stern to #4)	$\perp \frac{10 \times 400}{12 \times 150}$	
Bow frame (#165 to bow)	L180×110×10	
Web frame(#160 to bow)	$\perp \frac{10 \times 450}{12 \times 150}$	
Side longitudinal girder (#165 to bow)	$\perp \frac{10 \times 720}{12 \times 150}$	
Panting beam	$\perp \frac{10 \times 250}{10 \times 120(2)}$	#166、#168 #170、#172

4.2.4 Deck framing

4.2.4.1 stern to # 4 main deck framing

Unit: mm

Items	Position and standard	Note
Beam	L140×90×10	
Web beam	$\perp \frac{10 \times 350}{12 \times 150}$	
Deck girder	$\perp \frac{10 \times 350}{12 \times 150}$	
Deck plating	10	

4.2.4.2 # 4 to #13 main deck framing

Unit: mm

Items	Position and standard	Note
Beam	L140×90×10	
Web beam	$\perp \frac{10 \times 350}{12 \times 150}$	
Deck girder	$\perp \frac{10 \times 350}{12 \times 150}$	
Deck plating		

4.2.4.3 Engine room (# 13~ # 38)

Unit: mm

Items	Position and standard	Note
Beam	L140×90×10	
Web beam	$\perp \frac{12 \times 500}{14 \times 180}$	
Deck girder	$\perp \frac{14 \times 500}{16 \times 200}$	
Hatch end deck girder	$\perp \frac{14 \times 500}{16 \times 200}$	
Deck plating	10	

4.2.4.4 # 38~ # 136 main deck framing

Unit: mm

Items	Position and standard	Note
Deck longitudinal	L160×110×10	
Deck girder	$\perp \frac{10 \times 450}{12 \times 150}$	
Web frame	$\perp \frac{10 \times 450}{12 \times 150}$	

4.2.4.5 # 138~165 main deck framing

Unit: mm

Items	Position and standard	Note
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Beam	L160×100×10	
Web beam	$\perp \frac{10 \times 500}{12 \times 150}$	
Deck girder	$\perp \frac{10 \times 500}{14 \times 200}$	
Deck plating	10/12/14/16/18	

4.2.4.6 # 165~forecastle deck framing

Unit: mm

Items	Position and standard	Note
Beam	L140×90×10	
Web beam	$\perp \frac{8 \times 350}{10 \times 150}$	
Deck girder	$\perp \frac{8 \times 350}{10 \times 150}$	
Deck plating	10	

4.2.4.7 Steering gear room platform deck framing

Unit: mm

Items	Position and standard	Note
Beam	L125×80×10	
Web beam	$\perp \frac{10 \times 350}{12 \times 150}$	
Deck girder	$\perp \frac{10 \times 350}{12 \times 150}$	

4.2.4.8 # 4~ # 13 platform deck framing

Unit: mm

Items	Position and standard	Note
Beam	L125×80×10	
Web beam	$\perp \frac{10 \times 350}{12 \times 150}$	
Deck girder	$\perp \frac{10 \times 350}{12 \times 150}$	
Platform deck plating	10	

4.2.4.9 # 13~ # 38 engine room platform deck framing

Unit: mm

Items	Position and standard	Note
Beam	L140×90×10	
Web beam	$\perp \frac{10 \times 450}{12 \times 150}$	
Deck girder	$\perp \frac{10 \times 450}{12 \times 180}$	
Platform deck plating	10	

4.2.4.10 # 38~ # 136 hopper platform

Unit: mm

Items	Position and standard	Note
Platform longitudinal	L140×90×10	
Web beam	$\perp \frac{10 \times 450}{12 \times 200}$	
Platform deck girder	$\perp \frac{10 \times 450}{12 \times 200}$	
Platform deck plating	10	

4.2.4.11 # 136~ # 165 platform**Unit: mm**

Items	Position and standard	Note
Beam	L140×90×10	
Web beam	$\perp \frac{10 \times 500}{12 \times 150}$	
Deck girder	$\perp \frac{10 \times 500}{12 \times 200}$	
Platform deck plating	10	

4.2.5 Pillar**Unit: mm**

Items	Position and standard	Note
Pillar	On steering gear room platform $\phi 168 \times 8$	
	On engine room platform $\phi 194 \times 10$	
	Below engine room platform $\phi 219 \times 14$	
	Hopper pillar $\phi 325 \times 16$	
	Pillar on pump room platform $\phi 194 \times 10$	
	Pillar on pump room platform $\phi 273 \times 14$	
	Forecastle pillar $\phi 159 \times 9$	

4.2.6 Bulkhead**4.2.6.1 Watertight plane bulkhead****Unit: mm**

Items	Position and standard	Note
#4 bulkhead	Plate thickness 12/10	
	Vertical stiffener L140×90×10	
	Vertical girder $\perp \frac{10 \times 400}{12 \times 150}$	
	Horizontal girder $\perp \frac{8 \times 400}{10 \times 150}$	
#13 bulkhead	Plate thickness 10/12/16/20	
	Vertical stiffener L160×100×10	On platform deck
	Vertical stiffener L180×110×10	Below platform deck

	Vertical girder $\perp \frac{10 \times 400}{12 \times 180}$	On platform deck
	Vertical girder $\perp \frac{10 \times 450}{12 \times 180}$	Below platform deck
	Horizontal girder $\perp \frac{10 \times 400}{12 \times 180}$	On platform deck
	Horizontal girder $\perp \frac{10 \times 450}{12 \times 180}$	Below platform deck
#38 bulkhead	Plate thickness 16/14	
	Vertical stiffener L200×125×12	
	Vertical girder $\perp \frac{14 \times 600}{16 \times 200}$	
	Horizontal girder $\perp \frac{14 \times 600}{16 \times 200}$	
#136 bulkhead	Plate thickness 16/14	
	Vertical stiffener L200×125×12	
	Vertical girder $\perp \frac{14 \times 600}{16 \times 200}$	
	Horizontal girder $\perp \frac{14 \times 600}{16 \times 200}$	
#165 bulkhead	Plate thickness 10/12	
	Vertical stiffener L160×100×12	Below platform deck
	Vertical stiffener L140×90×10	On platform deck
	Vertical girder $\perp \frac{12 \times 450}{14 \times 200}$	Below platform deck
	Vertical girder $\perp \frac{10 \times 350}{12 \times 150}$	
	Horizontal girder $\perp \frac{12 \times 450}{14 \times 150}$	

4.2.7 Ship ends strengthening

4.2.7.1 fore peak tank strengthening Unit: mm

Items	Position and standard	Note
Floor	$\perp \frac{12 \times 1200}{14 \times 200}$	
Panting beam	$I \frac{10 \times 250}{2 \times (10 \times 120)}$	
Side stringer	$\perp \frac{10 \times 720}{12 \times 150}$	
Swash bulkhead	Thickness 8/10/12	

	Stiffener below platform L160×100×10	
	Stiffener on platform L140×90×8	

4.2.7.2 Bottom strengthening for bow Unit: mm

Items	Position and standard	Note
Strengthening scope	Transverse h>0.277m ,longitudinal L>2.193m	
Bottom plating	22	

4.2.8 Stem and stern post Unit: mm

Items	Position and standard	Note
Stem post	8/10/14/18/22	
shaft bossing thickness of propeller at the outlet of stern tube	100	

4.2.9 Bedplate of main engine Unit: mm

Items	Position and standard	Note
Bedplate girder	Face plate 30, web 28	
Transverse partition plate	$\perp \frac{18}{18 \times 120}$	
Bracket	$\perp \frac{18}{18 \times 120}$	

4.2.10 Superstructure

4.2.10.1 Forecastle Unit: mm

Items	Position and standard	Note
Side plate	10/12	
Deck plate	10	
Frame	L140×90×8	
Web frame	$\perp \frac{8 \times 350}{10 \times 150}$	
Aft end bulkhead	8	
Stiffener of aft end bulkhead	L100×63×8	
Beam	L160×100×10	
Web beam	$\perp \frac{10 \times 350}{12 \times 150}$	
Deck girder	$\perp \frac{10 \times 350}{12 \times 150}$	

4.2.10.2 Poop Unit: mm

Items	Position and standard	Note
Side plate	8/10/12/14	
Deck plate	8/10	

Frame	L140×90×8	
Fore end bulkhead	10	
	Stiffener L140×90×10	
Aft end bulkhead	8	
	Stiffener L140×90×8	
Beam	L125×80×8	
Deck girder	$\perp \frac{10 \times 300}{12 \times 150}$	
Web beam	$\perp \frac{10 \times 300}{12 \times 150}$	

4.2.11 Deckhouse

4.2.11.1 Boat deck

Unit: mm

Items	Position and standard	Note
Deck plate	8	
Beam	L100×63×8	
Deck girder	$\perp \frac{8 \times 220}{8 \times 80}$	
Web beam	$\perp \frac{8 \times 220}{8 \times 80}$	
Fore bulkhead	8 Stiffener L125×80×8	
Side bulkhead	8 Stiffener L125×80×8	
Aft bulkhead	8 Stiffener L125×80×8	
Inner bulkhead	8 Stiffener L90×56×6	

4.2.11.2 Accommodation deck

Unit: mm

Items	Position and standard	Note
Deck plate	8	
Beam	L100×63×6	
Deck girder	$\perp \frac{8 \times 220}{8 \times 80}$	
Web beam	$\perp \frac{8 \times 220}{8 \times 80}$	
Fore bulkhead	8 Stiffener L100×63×8	
Side bulkhead	8 Stiffener L100×63×8	
Aft bulkhead	8 Stiffener L100×63×8	
Inner bulkhead	8 Stiffener L90×56×6	

4.2.11.3 Bridge deck

Unit: mm

Items	Position and standard	Note
Deck plate	8	
Beam	L90×56×6	

Deck girder	$\perp \frac{8 \times 220}{8 \times 80}$	
Fore bulkhead	8 Stiffener L100×63×6	
Side bulkhead	8 Stiffener L100×63×6	
Aft bulkhead	8 Stiffener L100×63×6	
Inner bulkhead	6 Stiffener L75×50×6	

4.2.11.4 Compass deck

Unit: mm

Items	Position and standard	Note
Deck plate	8/10	
Beam	L100×63×8	
Deck girder	$\perp \frac{8 \times 300}{8 \times 100}$	
Web beam	$\perp \frac{8 \times 300}{8 \times 100}$	
Fore bulkhead	8 Stiffener L100×63×6	
Side bulkhead	8 Stiffener L100×63×6	
Aft bulkhead	8 Stiffener L100×63×6	
Inner bulkhead	6 Stiffener L75×50×6	

4.2.12 Engine room casing wall**4.2.12.1 Open engine room casing**

Unit: mm

Items	Position and standard	Note
Coaming	6/8	
Stiffener	L90×56×6	

4.2.12.2 Closed engine room casing

Unit: mm

Items	Position and standard	Note
Coaming	8	
Stiffener	L90×56×6	

4.2.12.3 Bulwark

Unit: mm

Items	Position and standard	Note
Bulwark plate	6	
Upper edge construction material	L125×80×8	
Supporting bracket	$L \frac{6 \times 250}{60}$	

5. Outfitting part

5.1 Anchor equipment

Provided anchor equipment to comply with the requirements of Rules for Domestic Navigation Ships Building of CCS, 2006 and its amendments.

Number of outfitting: N=1208

Anchor: 2 3450kg SPEKE anchors provided.

Chain cable: CCSAM2 Class welding stud chain cables, diameter to be $\Phi 52\text{mm}$, overall length to be 522.5m, the port cable to be 247.5m and starboard cable to be 275m. Anchor chain consists of end link, intermediate link and anchor end link. The fore end of each cable to be connected with fore anchor with joint shackle. The aft end to be connected with the cable releaser in chain locker. Each cable joint to be connected with Kent type joint link.

Anchor equipment: there to be semi-disc steel anchor lips under hawse pipe and above the hawse pipe there to be cable roller fairlead. The cable stopper and anchor stopper to be arranged between the roller and the cable lifter.

5.2 Mooring equipment

Stern: provided with an 80kN hydraulic horizontal warping winch.

Mooring rope: 4 eight-part polypropylene fiber cable, the diameter to be $\Phi 64\text{mm}$, each to be 180m long and the breaking load to be 402.21kN, which is greater than the requirement of 230kN.

In addition, there to be one A500 mooring post, ten A400 bollards, four 300ZG triple roller fairleads, six 300ZG double roller fairleads, four

C300×220 mooring pipes, two $\phi 72$ fiber cable reels, one set of rope throwing equipment.

There to be 40 $\phi 900$ airplane rubber tires as pads.

5.3 Steering gear equipment

1) To use the streamlined under hung balanced rudder (double rudder), area of rudder to be 9.69m² (single rudder), the rudder to be of steel welding type and the blades connected with rudder stock by flanges.

2) Rudder stock

Stock diameter at tiller of transmission rudder torque to be $\phi 200$ mm, at lower rudder bearing and below to be $\phi 260$ mm, the top of rudder stock connected with steering gear by keys.

3) Steering gear to be 250kN-m electrical hydraulic type, of putting the rudder from 35 degree a side to 30 degrees the other side in no more than 28 seconds. Upper rudder bearing to be fitted with sliding bearing and lower rudder bearing with watertight sliding bearing.

4) To provide with one set of emergency manual steering system .

5.4 Rescue apparatus

The rescue apparatus to be provided according to *Regulations for the Statutory Surveys of the Ships and Offshore Installations (domestic navigation)* ,2004 and its amendments of Marine Safety Administration People's Republic of China.

Two inflatable life rafts (QJF-B 25) , fitted with hydrostatic releaser

Two 18 P open lifeboats (GB 795-85)

Two 25KN gravity inverse arm type davit (A25)(CB* 3072-83)

Two L=10.85m embarkation rope B35 (CB/T 428-93) .

Ten lifebuoys (among which, 3 with self-lighting light, 3 with rescue buoyant rope, 2 with self-lighting light and smog signal light).

48 life jackets.

12 rocket parachute flares.

5.5 Navigation and Communication Equipment

One steering magnetic compass (with compass magnifier) and one azimuth circle installed in bridge house. On compass deck, there to be installed one standard compass, one marine sextant, one 7×50 telescope, five 140 time bells and three clinometers, etc. The foremast and aft mast signal equipment shall be equipped in accordance with the requirements of *Regulations for the Statutory Surveys of the Ships and Offshore Installations (domestic navigation)*, 2004.

- 1) Signal Lights: details referred to signal equipment arrangement (LJX9135-240-01)
- 2) Signal type: four big Φ 610 black sphere type and three rhombus type.
- 3) Signal flag: four No.4 national flags, a set of No.3 international signal flag, a signal flag and a No.1 sign flag.
- 4) Acoustic signal: one big signal flute, one big signal bell and one signal gong.

5.6 Fire Fighting Apparatus and Fire Prevention

The details referred to the Fire Prevention Control Chart

(LJX9132-103-03)

Above bridge deck to be provided :one 5kg CO2 fire extinguisher , one 6kg portable dry power fire extinguisher, one emergency escaping breathing device (EEBD), one dual purpose fire fighting gun (water spray /water column), one fire belt, one fire belt box and one fire plug.

Above accommodation deck to be provided: one 6kg portable dry power fire extinguisher, one 9L portable foam fire extinguisher, two dual purpose fire fighting guns (water spray /water column), two fire belts, two fire belt boxes and two fire plugs.

On boat deck to be provided: two 6kg portable dry power fire extinguishers, two 9L portable foam fire extinguishers, a set of fire fighting device, two dual purpose fire fighting guns (water spray /water column), two fire belts, two fire belt boxes and two fire plugs.

Above poop deck to be provided: three 6kg portable dry power fire extinguishers, four 9L portable foam fire extinguishers, one 5kg CO2 fire extinguisher, two dual purpose fire fighting guns (water spray /water column), two fire belts, two fire belt boxes, two fire plugs, two emergency escaping breathing devices (EEBD) and one emergency axe .

On forecastle deck to be provided: one emergency axe

Outside main deck to be provided: four 6kg portable dry power fire extinguishers, six 9L portable foam fire extinguishers, three 5kg CO2 fire extinguishers, ten dual purpose fire fighting guns (water spray /water

column), ten fire belts, ten fire belt boxes, ten fire plugs, one F135 handcart type foam fire extinguisher and three emergency escaping breathing devices (EEBD).

On platform deck to be provided: seven 9L portable foam fire extinguishers, three 5kg CO2 fire extinguishers, two 6.0kg dry power fire extinguishers, two F45 handcart type foam fire extinguishers, two 20L piggy-back foam spray guns, three dual purpose fire fighting guns (water spray/water column), three fire belts, three fire belt boxes, three fire plugs and three emergency escaping breathing devices (EEBD).

Inside compartments to be provided: four 9L portable foam fire extinguishers, four 5kg CO2 fire extinguishers, two dual purpose fire fighting guns (water spray/water column), two fire belts, two fire belt boxes and four emergency escaping breathing devices (EEBD).

Engine room and pump room belong to CO2 protection area.

5.7 Ladders and covers equipment

1) Ladders

Ten 700mm wide engine-room slanting ladders to be arranged at the place from main deck to engine room, pump room and engine room.

Two 700mm wide slanting steel ladders to be arranged at the place from main deck to forecastle (outside).

Two 700mm wide slanting steel ladders to be arranged at the place

from main deck to poop deck (outside)

Three 700mm wide slanting steel ladders to be arranged at the place from main deck to poop deck (inside)

One 700mm wide slanting steel ladder to be arranged at the place from poop deck to boat deck (inside)

One 700mm wide slanting steel ladder to be arranged at the place from poop deck to boat deck (outside)

One 700mm wide slanting steel ladder to be arranged at the place from boat deck to accommodation deck (inside)

Two 700mm wide slanting steel ladders to be arranged at the place from boat deck to accommodation deck (outside)

One 700mm wide slanting steel ladder to be arranged at the place from accommodation deck to bridge deck (inside)

Two 700mm wide slanting steel ladders to be arranged at the place from accommodation deck to bridge deck (inside)

Steel ladders to be arranged at the exits of engine room, pump room and hopper, compass deck and double bottom etc.

2) Covers

Fuel oil tank, fresh water tank, water ballast tank and empty tank to be provided fluid tight manhole covers.

Details referred to “LJX9135—260-01 (railings, handrails and awnings arrangement)”

5.8 Doors and windows equipment.

1) Doors

In hull:

Monitoring room to provide with sound-insulated and gas tight steel door .

A-60 level fire doors to be arranged at the exits of engine room and pump room respectively.

From main deck to forecastle deck:

Paint locker, oxygen bottle room, welding room, Acetylene room, sail locker, windlass control room and aisles to provide with marine weather tight steel doors.

From main deck to poop deck:

Aisles and CO2 room to have marine weather tight steel doors.

A-60 level fire doors to be arranged at engine room casing. A-0 level fire door to be arranged at air-conditioner room, galley, stairway and steering gear room.

B-0 level fire doors to be arranged at galley, crew cabins, bathrooms and W.C. Nonmetal doors be arranged at indoor W.C.

From poop deck to boat deck:

Port, starboard and back aisles to provide with marine weather tight steel doors.

A-60 level fire doors to be arranged at engine room casing and exits.

A-0 level fire door to be arranged at stairways and larder.

B-0 level fire doors to be arranged at crew cabins, bathrooms and W.C.

From boat deck to accommodation deck:

A-0 level fire door to be arranged at aisles, battery compartment , engine room casing. The rest to have B-0 level fire doors.

2) Windows:

Engine room and monitoring room of pump room to provide with double-layer sound-insulation aluminum alloy glass window.

Marine portholes to be arranged on main deck. General rectangle marine windows to be arranged on poop deck, boat deck, accommodation deck and bridge deck. Bridge fastened rectangle windows also used on bridge deck.

Details referred to “LJX9135-260-02MX(doors and windows arrangement plan and list.)

5.9 Hull corrosion-resistance

Hull corrosion-resistance to use the aluminum zinc indium alloy anode sacrificial protection, its design life to be 2 years. There to be 88 corrosion-resistant zinc blocks (sacrifice positive plate A11H-4) at the two sides of stern plating, steer keel and bilge keel etc. Seven corrosion-resistant zinc blocks (sacrifice positive plate A11H-6) at sea water door.

5.10 The rest

1) Cement to be laid on the floor of galley, W.C. and bathroom. Concrete to be filled in the bottom of fore and aft peak tanks. Fresh water tank to be coated with cement sand oar.

2) Ventilation equipment:

Engine room and pump room to use mechanical ventilation; living place to use natural ventilation