

这个封面不要

					5000DWT 散货船	技术设计		
						TZHS4009-401-01SM		
					轮机说明书	标 记	质量(Kg)	比 例
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1 概述GENERAL

1.1 本船为尾机型柴油机动力装置、航行于国内近海航区，主要运输煤、矿砂等散货船。

It is designed as one aft engine bulk carrier, with diesel engine power device, which service in domestic offshore area, mainly loading coal, ore etc.

1.2 轮机部分的设计依据是《国内航行海船建造规范》2006版、《船舶与海上设施法定检验规则》2004(含06修改通报)等要求。

The machinery shall be designed in accordance with the requirements of “Rules for Construction of Sea-going Ships Engaged on Domestic Voyages” (2006) and “Regulation of Statutory Survey for ship and establishment on sea in 2004 and amended by 2006

2 机舱布置E/R ARRANGEMENT

本船机舱底层位于#7~#28肋位间，全长为12.6m。机舱设有一平台甲板，以利于加强船体结构强度及机舱机电设备布置。推进机组安装在#10~#23肋位间。轴线与基线平行，且距基线2100mm。

The bottom of engine room to be laid between fr. #7~#28, with total length of 12.6m. Platform deck to be fitted in E/R, for reinforcement of hull structure strength and arrangement of electromechanical devices. Propulsion machinery to be installed between fr. #10~#23. The shaft line is parallel to base line, and the distance to be 2100mm off base line.

机舱上层设有机舱棚，作布置设备及进出机舱之用。主甲板层机舱棚位于#10~#19肋位间，机舱棚长5.4m，宽3.0m；救生甲板的机舱棚位于#11~#16肋位间，长3.0m，宽3.0m；起居甲板的机舱棚位于#11~#15肋位间，长2.4m，宽3.0m。在机舱底层#13~#17肋位的左右舷，纵向各布置一具斜梯，供机舱底层通往机舱下平台之需；在机舱平台#13~#17肋位的左舷和#18~#20肋位的右舷，纵向各设置一具斜梯，作为机舱平台至主甲板的通道；在机舱左舷#8~#9⁺⁴⁰⁰肋位间，设有从机舱底层一直通至上甲板的机舱应急脱险通道，并在机舱底层及机舱平台上分别设有自闭式防火门。

Engine casing to be fitted on the upper of engine room for arrangements of equipments and exit to E/R; Engine casing on main deck, with length 5.4m × width 3.0m, to be fitted between fr #10~#19; Engine casing on lifesaving deck, with length 3.0m × width 3.0m, to be fitted between fr #11~#16; Engine casing on accommodation deck, with length 2.4m × width 3.0m, to be fitted between fr #11~#15; Each one (1) set of inclined ladder to be arranged longitudinally between E/R bottom fr #13~#17 at two sides, as the

alleyway from E/R bottom to engine platform below. Each one(1) set of inclined ladder to be arranged longitudinally between engine platform fr #13~#17 at port,fr#18~#20 at starboard,as the alleyway from engine platform to main deck.One(1) emer.escape route from bottom of E/R to upper deck ,to be laid between fr#8~#9⁺⁴⁰⁰ at starboard in E/R;

Self-closed fire-proof door to be installed on bottom of E/R and engine platform.

机舱底部设有花钢板，花钢板距基线的高度为2200mm，其中#7~#11花钢板距基线为2500mm。为便于设备维护保养，主机左右两侧适当宽度的花钢板支架应为可拆式。为安全起见，主机飞轮处配设防护罩。主甲板机舱棚内设有格栅。

Floor to be provided at bottom of E/R ,the distance is 2200mm off base line.The floor laid between fr #7~#11 is 2500mm off base line.For convenience of maintenance,the support for floor of suitable width must be demountable at two sides of Main engine. Protection cover for M/E fly wheel and grating in engine casing of main deck shall be adopted for safety purpose.

机舱底层主要布置设备有：主机、轴系及为主机服务的泵、冷却器、空气瓶、空压机等，主发电机柴油机组，主付机海淡水备用泵，主机及齿轮箱滑油备用泵，舱底泵，消防泵及压载泵，日用海淡水泵，燃油、柴油泵及备用泵，滑油分油机及其加热器、油污水分离器等。高位海底门设在左舷#18~#19，低位海底门设在右舷#18~#19双层底下，海水总管规格为 $\phi 325 \times 9.0$ 。

Main equipments on E/R bottom such as :M/E.Shafting and pump served for M/E,cooler,air receiver,air compressor and etc,main generator diesel engine set , M/E A/E sea/fresh water standby pump, L.O.standby pump for M/E and gearbox , bilge pump, fire pump ,ballast pump, sea/fresh water service pump, F.O./D.O. pump and stanby pump, L.O.purifier with heater, oily water seperator and etc,

High sea chest to be fitted between fr. #18~#19 at port,and low sea chest to be fitted between fr. 18~#19 at starboard under double bottom.The specification of S.W.main is $\phi 325 \times 9.0$.

机舱平台主要布置设备有：停泊发电柴油机组，海淡水压力水柜，电加热热水柜，生活污水处理装置，工具箱、砂轮机及台钻，燃油供油单元，燃油分油机，燃油日用油舱及燃油沉淀舱；在#23~#28肋位设有机舱控制室，内设机舱控制台、主配电板等。

Main equipments on Engine platform such as : harbor D/G set, sea/fresh water pressure tank,electrical hot water tank, sewage treatment unit, tool box, grinder, bench drill, fuel oil supply unit, F.O. purifier, F.O.service tank ,F.O.settle tank etc.

E/R control room to be arranged between fr #23~#28 ,with E/R control,MSB etc.

主甲板层机舱棚内，设有主机淡水膨胀水箱，导热油循环泵两台。

Such equipments fitted in Engine casing of main deck: M/E F.W. expansion tank,two(2)hot circulating pumps.

救生甲板机舱棚内设有废气导热油炉一台，控制箱一只。

One (1) exhaust gas thermal oil boiler and one(1) control box to be fitted in engine casing of lifesaving deck.

起居甲板机舱棚内有一只导热油膨胀柜，及主机消音器。

One(1)thermal oil expansion tank and M/E silencer to be fitted in engine casing of accommodation deck.

在机舱底层设有45L推车式泡沫灭火器1具；机舱平台设有手提式泡沫灭火枪1具；在机舱各层还设有适当数量的手提式灭火器。

One (1) 45L Trolley foam extinguisher to be fitted in bottom of E/R;One(1)portable foam extinguishing gun used for engine platform; Suitable number of portable extinguisher to be fitted on each layer of engine room.

在起居甲板#9~#11间设有两台机舱通风机（其中1台可逆转），作机舱通风用，通风机上部装有带可闭装置的菌形通风筒。

Two(2) E/R fan,one for reversible,to be fitted between fr #9~#11 outside engine casing of accommodation deck for E/R ventilation.Mushroom ventilator with closing device to be provided on top of fan.

机舱内布置详细情况详见TZHS4009-400-02 《机舱布置图》。

For details of E/R,refer to “E/R ARRANGEMENT” (TZHS4009-400-02).

3 主柴油机及推进系统MAIN D/E AND PROPULSION SYSTEM

3.1 主柴油机Main diesel engine

型 号(type): G8300ZC16B (无锡 Wuxi diesel engine)

数 量(Q' ty): 1 台/set

型 式(model): 四冲程、直立八缸、双循环水冷、废气涡轮增压中速
柴油机

Four-strokes, in line 8 cylinders,dual cycle water cooler,Exhaust turbocharging,marine medium speed

diesel engine.

额定功率(Rated power): 1765 KW

额定转速(Rated speed): 525 r/min

转 向(Direction): 顺时针 (面向飞轮端)

clockwise (Face to flywheel end)

缸 数(Cylinder number): 8

缸径×冲程(Cylinder bore×stroke): 300×380mm

起动形式(Starting method): 压缩空气起动/compressed air

3.2 高弹性联轴器High flexible coupling

型 号(type): HGT5020 III D (杭齿Hangzhou gearbox)

额定扭矩(Rated torque): 50 KN.m

瞬时最大扭矩(Instantaneous max.torque): 125 KN.m

许用转速(Allowance speed): 1410 r/min

3.3 齿轮箱Gearbox

型 号(type): GWC49.54 (杭齿Hangzhou gearbox)

型 式(model): 船用倒顺离合减速齿轮箱

Marine ahead and astern clutch reduction gear

实际减速比(actual reduction ratio): 2.9172:1

传递能力(transmission capacity): 3.588 KW/r/min

最大螺旋桨推力(Max.propeller thrust): 270 KN

转 向(direction): 顺车时与输入轴方向相同

Same as input shaft when ahead

3.4 推进轴系Propulsion shafting

本船推进轴系为单机单桨直接传动形式,螺旋桨为固定螺距螺旋桨、中间轴、尾轴等组成轴系。尾轴与螺旋桨及可拆联轴节用导向平键装配,主机输出法兰与齿轮箱采用高弹性联轴器联接。中间轴、尾轴均由35#锻钢制成。中间轴的基本直径为230mm,长度约为600mm(按船台测量尺寸);尾轴的基本轴径为270mm,长度约为4545mm,后轴承档的直径为300mm,前轴承档的直径为295mm。尾轴承的材料为铜衬套白合金,用油润滑冷却。尾轴管前后设有油润滑密封装置。

The propulsion shafting is directly driven by single propeller and single engine, which consists

of fixed pitch propeller,intermediate shaft and stern shaft etc.

Stern shaft and propeller with demountable coupling to be fitted with feather key;M/E output flange and gearbox to be connected by high flexible coupling.Intermediate shaft and stern shaft to be made of 35[#] forged steel,with the following parameter:

Basic diamter of intermediate shaft: 230mm

Length of intermediate shaft : 600mm (measured on ship berth)

Basic diamter of stern shaft: 270mm

Length of stern shaft: 4545mm

Diameter of tail bearing : 300mm

Diameter of fore bearing: 295mm.

The material of bearing is copper bushing white metal,which to be lubricated and cooled by oil .Oil lubricating seal devices to be fitted at the fore end of stern tube.

4 其它主要机械设备OTHER PRIMARY MECHANICAL EQUIPMENT

4.1 主柴油发电机组Main D/G set

机 组 型 号(Type):	CCFJ120J-Y
数 量(Q' ty):	2 套/sets
柴油机型号(D/E type):	6135AZCaf
柴油机缸数(Cylinder number):	6
缸径×行程(Cylinder bore × stroke):	135×150 mm
额 定 功 率(Rated power):	138 KW
额 定 转 速(Rated speed):	1500 r/min
冷 却 方 式(Cooling method):	闭式水冷 Closed water cooling
启 动 方 式(Starting method):	24V电起动 24V electrical starting
发电机型号(D/G type):	TFXW-280L4-H
发电机功率(D/G power):	120 KW
发电机转速(D/G speed):	1500 r/min
电 制(Voltage):	三相三线制/three phase three wire, 400V, 50Hz

4.2 停泊柴油发电机组Harbor D/G set

机组型号(Type):	CCFJ50J-Y
数 量(Q' ty):	1 套/set
柴油机型号(D/E type):	4135ACaf
柴油机缸数(Cylinder number):	4
缸径×行程(Cylinder bore × stroke):	135×150 mm
额 定 功 率(Rated power):	63 KW
额 定 转 速(Rated speed):	1500 r/min
冷 却 方 式(Cooling method):	闭式水冷 Closed water cooling
启 动 方 式(Starting method):	24V 电启动 24V electrical starting

发电机型号(D/G type):	TFXW-225L4-H
发电机功率(D/G power):	50 KW
发电机转速(D/G speed):	1500 r/min
电 制(Voltage):	三相三线制/three phase three wire, 400V, 50Hz

4.3 废气导热油炉 Exhaust gas thermal oil boiler

型 号(Type):	LRF36-0.32
型 式(Model):	立式/vertical
数 量(Q' ty):	1 台/set
工作压力(Working pressure):	0.32 MPa
受热面积(Heated area):	~36 m ²

配套热油循环泵 Hot oil circulating pump

型 号(T y p e):	WRY65-40-160
流 量(Capacity):	12.5 m ³ /h
压 头(Pressure head):	0.25 MPa
转 速(Speed):	2900r/min
电机功率(Elec. motor power):	3 KW
电机型号(Elec. motor type):	Y100L-2-H

4.4 导热油注油泵 Thermal oil filling pump

型 号(T y p e):	2CY3.3/3.3-2
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形 式(Model):	外啮合式齿轮泵 External gear pump
流 量(Capacity):	3.3 m ³ /h
排出压力(Output pressure):	0.33 MPa
转 速(Speed):	1400 r/min
电机型号(Elec. motor type):	YH90L-4
电机功率(Elec. motor power):	1.5 KW
电 源(Power):	AC380V/50HZ
4.5 空气压缩机Air compressor	
型 号(T y p e):	CZ-20/30F
数 量(Q' ty):	2 台/sets
排 量(Capacity):	20 m ³ /h
压 力(Pressure):	3.0 MPa
电机功率(Elec. motor power):	5.5 KW
4.6 机舱通风机 E/R fan	
型 号(T y p e):	CZ-75
型 式(Model):	船用轴流通风机 Marine axial flow fan
数 量(Q' ty):	2 台/sets
风 量(Capacity):	18000 m ³ /h
风 压(Pressure):	420 Pa
电机型号(Elec. motor type):	Y112M-4-H
电机功率(Elec. motor power):	4 KW
4.7 舱底泵Bilge pump	
型 号(T y p e):	80CBZ-42
型 式(Model):	卧式自吸离心泵 Horizontal self-priming centrifugal pump
数 量(Q' ty):	1 台/set
排 量(Capacity):	60 m ³ /h

扬程(Range):	42 m
电机型号(Elec. motor type):	Y160M2-2-H
电机功率(Elec. motor power):	15 KW

4.8 污油驳运泵Dirty oil transfer pump

型号(Type):	2GM58-24
型式(Model):	卧式双螺杆泵 Horizontal twin screw pump
数量(Q' ty):	1 台
排量(Capacity):	2.1 m ³ /h
压力(Pressure):	0.6 MPa
电机型号(Elec. motor type):	Y100L-6-H
电机功率(Elec. motor power):	1.5 KW

4.9 消防泵Fire pump

型号(Type):	80CBZ-42
型式(Model):	卧式自吸离心泵 Horizontal self-priming centrifugal pump
数量(Q' ty):	1 台/set
排量(Capacity):	60 m ³ /h
扬程(Range):	42 m
电机型号(Elec. motor type):	Y160M2-2-H
电机功率(Elec. motor power):	15 KW

4.10 压载泵Ballast pump

型号(Type):	150CLH-26
型式(Model):	立式离心泵 Vertical centrifugal pump
数量(Q' ty):	2 台/sets
排量(Capacity):	200 m ³ /h
扬程(Range):	20 m
电机型号(Elec. motor type):	Y160L-2-H
电机功率(Elec. motor power):	18.5 KW

4.11 应急消防泵 Emergency fire pump

型 号(Type):	65CBZ-42
型 式(Model):	卧式自吸离心泵 Horizontal self-priming centrifugal pump
数 量(Q' ty):	1 台/set
排 量(Capacity):	36 m ³ /h
扬 程(Range):	42 m
柴油机型号(D/E type):	ZS1105
柴油机功率(D/E power):	11 KW

4.12 主机燃油供油单元M/E Fuel oil supply unit

型 号(Type):	HY-01 SS
数 量(Q' ty):	1 台/set
供 油 量(Oil supply capacity):	1.3 m ³ /h (180cst/50°C)
压 力(Pressure):	0.3~0.5 MPa
加热介质(Heating medium):	导热油/thermal oil (0.32 MPa)

4.13 燃油输送泵F.O.delivery pump

型 号(Type):	KCB5/3.3
型 式(Model):	齿轮泵Gear pump
数 量(Q' ty):	1 台/set
排 量(Capacity):	5 m ³ /h
压 力(Pressure):	0.33 MPa
电机型号(Elec. motor type):	YH100L1-4-H
电机功率(Elec. motor power):	2.2 KW

4.14 柴油输送泵D.O.delivery pump

型 号(Type):	KCB5/3.3
型 式(Model):	齿轮泵Gear pump
数 量(Q' ty):	1 台/set
排 量(Capacity):	5 m ³ /h
压 力(Pressure):	0.33 MPa
电机型号(Elec. motor type):	YH100L1-4-H

电机功率(Elec. motor power): 2.2 KW

4.15 燃油备用输送泵F.O.standby delivery pump

型号(Type): KCB5/3.3
型式(Model): 齿轮泵Gear pump
数量(Q' ty): 1 台/set
排量(Capacity): 5 m³/h
压力(Pressure): 0.33 MPa

电机型号(Elec. motor type): YH100L1-4-H

电机功率(Elec. motor power): 2.2 KW

4.16 主机滑油备用泵M/E L.O.standby pump

型号(Type): YCB40-0.6
型式(Model): 外啮合式齿轮泵
External gear pump

数量(Q' ty): 1 台/set
排量(Capacity): 40 m³/h
压力(Pressure): 0.60 MPa

电机型号(Elec. motor type): YH180L-6-H

电机功率(Elec. motor power): 15 KW

4.17 齿轮箱滑油备用泵Gearbox L.O.standby pump

型号(Type): 2CY-7.5/2.5D
型式(Model): 外啮合式齿轮泵
External gear pump

数量(Q' ty): 1 台/set
排量(Capacity): 7.5 m³/h
压力(Pressure): 2.50 MPa

电机型号(Elec. motor type): Y132M-4-H

电机功率(Elec. motor power): 7.5 KW

4.18 主机海(淡)水备用泵M/E S.W. / F.W. standby pump

型号(Type): 80CWL-11
型式(Model): 卧式离心泵

Horizontal centrifugal pump

数量(Q' ty):	各 1 台/each 1 set
排量(Capacity):	60 m ³ /h
扬程(Range):	30 m
电机(Motor):	Y132S2-2-H
电机功率(Elec. motor power):	7.5 KW

4.19 付机海水备用泵A/E S.W.standby pump

型号(Type):	CIS65-50-160A
型式(Model):	卧式离心泵

Horizontal centrifugal pump

数量(Q' ty):	1 台/set
排量(Capacity):	23.4 m ³ /h
扬程(Range):	28 m
电机(Motor):	Y100L-2-H
电机功率(Elec. motor power):	4 KW

4.20 日用海、淡水泵S.W/F.W. service pump

型号(Type):	1.5CWX-3
型式(Model):	自吸式旋涡泵

self-priming vortex pump

数量(Q' ty):	2 台/sets
排量(Capacity):	6.5 m ³ /h
扬程(Range):	35 m
电机功率(Elec. motor power):	3 KW

4.21 燃油分离机F.O.purifier

型号(Type):	KYDH204SD-23
型式(Model):	离心式自动排渣

Centrifugal,auto slag-off type

数量(Q' ty):	2 台/sets
处理能力(capacity):	~1800 l/h
电机功率(Elec. motor power):	4.0 KW

4.22 滑油分离机L.O.purifier

型 号(Type):	KYDR203CD-23
形 式(Model):	离心式/Centrifugal
数 量(Q' ty):	1 台/set
处理能力(capacity):	~600-800 l/h
电机型号(Elec. motor type):	Y100L ₁ -4-H
电机功率(Elec. motor power):	2.2 KW

4.23 生活污水处理装置Sewage treatment device

型 号(Type):	SSIP-20
型 式(Model):	生化法/Biochemical process
使用人数(Service personal):	20人/persons
总功率(Total power):	2.2 KW

4.24 油污水分离装置Oily water separation device IMO MEPC.107 (49)

型 号(Type):	ZYFM-1
数 量(Q' ty):	1 台/set
处理能力(Capacity):	1 m ³ /h
排放标准(Discharge standard):	< 15 ppm

4.25 CO₂室通风机Fan for CO₂ room

型 号(Type):	CZF-35A
型 式(Model):	船用轴流通风机 Marine axial flow fan
数 量(Q' ty):	1 台/set
风 量(Capacity):	1200 m ³ /h
风 压(pressure):	110 Pa
电机型号(Elec. motor type):	Y711-4-H
电机功率(Elec. motor power):	0.25 KW

4.26 电加热热水柜Electrical hot water tank

型 号(Type):	0.3 CB/T3686-1995
数 量(Q' ty):	1 台/set
容 积(Capacity):	0.3 m ³

加热水量(Heating capacity): 200 Kg/h

电 功 率(Power): 12 KW

4.27 海(淡)水压力水柜Sea (fresh) water press.tank

型 号(T y p e): A-0.3 CB455-91

数 量(Q' ty): 各 1 台/each 1 set

容 积(Capacity): 0.3 m³

工作压力(Working pressure): 0.6 MPa

5 管路系统PIPELINE SYSTEM

5.1 总则General

本船的管路系统中,当泵的工作压力超过系统的设计压力时,在系统中设安全阀。燃、滑油加热器的燃、滑油侧设安全阀,安全阀的调定值为高于供油泵安全阀开启压力。需加热的燃油舱,燃油、滑油加热器等设备设有指示油温的设施。

Safety valve to be installed for pipeline system if the working pressure of pump exceed design pressure. The setting value of safety valve shall be greater than starting pressure of feed oil pump's ,which fitted at fuel (lubricating) oil side of fuel (lubricating)oil heater .Fuel oil tank ,which need to be heated,F.O.heater and L.O.heater etc. shall be provided with oil temperature indication .

5.2 燃油管系F.O.piping system

本船的主机采用1500s(180cst/50°C)燃油作燃料,付机采用轻柴油作燃料。系统中设有燃油日用舱、燃油沉淀舱各一,柴油日用舱2只。燃油输送泵将加热过的燃油从燃油舱驳至燃油沉淀舱,燃油分离机将沉淀舱内沉淀过的燃油进行分离处理,分离后的净油送至燃油日用舱,供主机使用。主机燃油系统中设有燃油供油单元,供油单元由两台燃油供给泵(一用一备)、两台循环泵(一用一备)、网片式油滤器、全自动反冲洗滤器、燃油加热器、燃油粘度控制系统、电气控制箱等组成。航行中主机耗用燃油,在起动和进出港时或其他必要的时候,可燃用两只柴油日用舱内的轻柴油。柴油日用舱内的柴油由柴油输送泵注入。柴油日用舱设有阀门及管路通向主机,使主机的燃油系统能立即从燃油换至轻柴油。

1500s(180cst/50°C)Fuel oil to be used for M/E .Light diesel oil to be used for A/E.Such arrangements in fuel oil system including:One (1) F.O.service tank,F.O.settle tank , two(2) D.O. service tanks .

Fuel oil heated from fuel oil tank through delivery pumps to F.O. settle tank, and then shall be detached. Clean oil to be delivered into Fuel oil service tank and used for M/E.

Fuel oil supply unit to be fitted in M/E fuel oil system, which consists of two(2) fuel oil feed pumps(use/standby), two(2) sump pumps(use/standby), screen filter, full automatic backflush filter, fuel oil heater, fuel oil viscosity control system and electrical control box and etc.

Fuel oil should be used during M/E service. Fuel oil can be shifted into L.D.O. from D.O. service tank when M/E starting and arrival /departure of ships or in other necessary condition. Diesel oil in D.O. service tank to be filled by use of D.O. delivery pump. The valves and pipeline lead to M/E to be installed on L.D.O. service tank for changing fuel oil into light diesel oil serviced for M/E.

本船的燃油舱、燃油沉淀舱、燃油日用舱内设有加热盘管。加热介质为导热油，由废气导热油炉提供。各油舱设有温度计，人工控制导热油量，以使燃油加热的温度低于闪点 10°C 。

Heating coil to be fitted in Fuel oil tank, fuel oil settle tank, fuel oil service tank. Thermal oil to be used as heating medium, to be supplied by exhaust gas thermal oil boiler. Thermometer shall be provided in each tank and the temperature must be below 10°C of flash point by manual controlling thermal oil.

本船设燃油输送泵1台及柴油输送泵1台，1台备用输送泵，设燃油分离机2台。重燃油管路均敷设导热油伴行管，并外包绝热层。

One(1) fuel oil delivery pump and One(1) D.O. delivery pump, one(1) standby delivery pump and two(2) F.O. purifier to be installed on board. thermal oil tracing pipe to be fitted and arranged for heavy fuel oil pipeline, which covered with heat-insulating layer.

为确保安全，各燃油舱（除双层底舱外）的出油口均设有手动快关阀，并由设在主甲板机舱棚右后角壁龛内的手动快关阀控制箱控制。应急消防泵柴油机所需的柴油日用柜的出油口快关阀为手拉钢丝绳遥控操作。

Pneumatic quick-close valve to be fitted in way of output of each fuel oil tank (except double bottom tank) and controlled by control box laid in niche at right and after corner of engine casing on main deck so as to ensure the safety of fuel oil system. Quick-close valve for emer. D/E to be fitted in way of output of diesel oil service tank and remote operated by hand pulled steel wire.

5.3 滑油系统 Lubricating oil system

本船的柴油发电机组为湿式油底壳，自成体系。主机为干式油底壳，机外设滑油循环舱（双层底舱），主机自带滑油泵，主机滑油泵将滑油循环舱内的滑油泵至滑油过滤器、滑油冷却器进入主机油道分配至各润滑点，润滑及冷却各部件后回到油底壳；油底壳内的滑

油靠滑油抽出泵泵至滑油循环舱。在机舱内设主机备用滑油泵1台，由电动机驱动，当主机自带的滑油泵出现故障时，可作代替主机滑油泵工作。

An independent L.O. system shall be arranged for D/G set, with wet sump. The M/E is dry sump type, outside equipped with L.O. Sump tank (double bottom tank), M/E L.O. pump. The oil in L.O. sump tank will be transferred by M/E L.O. pump to L.O. filter, L.O. cooler and then merged into M/E oil pipeline, which to be distributed into each oil site for lubrication and cooling of every part, finally return to oil sump. L.O. in sump to be flowed into L.O. sump tank by gravity.

One(1) M/E L.O. standby pump, driven by electrical motor, to be fitted in E/R. when L.O. pump in failure, standby pump to be ran and renews the system.

齿轮箱的滑油和工作自成体系，外部设一台滑油备用泵。

L.O. system for gearbox shall be also an independent loop, supplied with one(1) L.O. standby pump.

本船的应急消防泵柴油机为湿式油底壳，自成体系。

An independent L.O. system shall be arranged for Emer. Fire pump D/E, with wet sump.

5.4 冷却水管系 Cooling water piping

本船的主机采用闭式冷却，自带海、淡水泵。主机的冷却系统为海水冷却淡水及滑油，淡水冷却机器。主机海水冷却柴油机后出口分一路至齿轮箱滑油冷却器，供齿轮箱冷却之用。另设主机备用海水泵、主机备用淡水泵各1台，当主机的冷却水泵出现故障时，可代替其工作。

Closed cooling system to be applied for M/E. Sea water pump and fresh water pump to be supplied with M/E. The working principle of M/E cooling system shall be as follow: fresh water and lubricating oil to be cooled by sea water and the equipments cooled by fresh water.

After cooling D/E, Sea water shall be branched into gearbox L.O. cooler for cooling of gearbox. Additional M/E S.W. stand-by pump and M/E F.W. stand-by pump to be installed to ensure that the system is running normally, when fresh/sea water pump in failure.

付机亦为闭式冷却系统，设2台付机海水泵，一用一备，三台付机共用一台电动海水备用泵，付机的淡水泵为机器自带。付机的冷却系统为海水冷却淡水，淡水冷却滑油及机器。

Closed cooling system also to be applied for A/E. Two(2) A/E sea water pumps

(use/standby).One(1) electrical S.W. standby pump serves for the three (3) A/E. Fresh water pump to be provided with A/E.

The working principle of A/E cooling system: fresh water to be cooled by sea water and the equipments & lubricating oil to be cooled by fresh water

主机的喷油器用润滑油进行冷却,主机自带喷油器冷却泵,在机外设有喷油器冷却油箱及喷油器冷却器。喷油器冷却油箱内的润滑油由人工注入。喷油器冷却器串接在主机的海水冷却管路上,由于喷油器冷却器的通径小,为防止出现液阻现象,喷油器冷却器设有旁通管路及阀门。

M/E oil injector to be cooled by use of lubricating oil, injector cooling pump to be together supplied by M/E, injector cooling oil tank and injector cooler to be installed outside the engine. The lubricating oil to be filled into injector cooling oil tank by manual.

Injector cooler connected M/E fresh water cooling pipe in parallel. By-pass line and valve to be installed for injector cooler in order to avoid liquid block induced due to the diameter of cooler too small.

付机的淡水冷却系统在机器出厂时已全部装于机器上,仅需在机带的膨胀水箱中加入足够的淡水即可工作。主机自带淡水泵,在机外设膨胀水箱1只,工作前,整个系统应充满淡水。

F.W.cooling system for A/E shall be installed on the equipments when it is delivered from maker, plunging into work if enough fresh water filled into expansion water tank.

Fresh water pump to be provided with M/E,where one(1)expansion water tank fitted outside .Prior to running,the whole system to be full of fresh water.

5.5 排气管系Exhaust Gas system

本船的主、付机均设独立的排气管系。主机排气经消音器或废气导热油炉、付机排气经各自消音器,从假烟囱顶部排入大气。柴油机的排气出口处设置波纹膨胀接头。

An independent exhaust gas system shall be fitted for M/E and A/E. Exhaust gas from M/E shall be led to funnel top and then discharged into atmosphere through silencer or exhaust gas thermal oil boiler, while A/E exhaust gas by use of every silencer.Stainless steel corrugated expansion joint to be installed in the exhaust output of D/E.

各排气管在适当处设有弹性吊架,排气管外均需包扎绝热层,应保证排气管外表面温度不大于60℃。

Flexible brackets shall be provided for every exhaust pipe at proper location, which tied up with heat-insulating layer so as to ensure the outside temperature of exhaust pipe not greater than 60°C.

5.6 压缩空气管系 Compressed air piping

本船设电动空气压缩机2台，可由空气瓶压力控制器控制自动向空气瓶充气。当气瓶压力低于1.5MPa时一台空压机自动启动，当气瓶压力低于1.18MPa时另一台空压机同时自动启动，当气瓶压力达到3.0MPa时两台空压机停止运行。系统设主机起动气瓶2只、控制空气瓶一只、杂用空气瓶一只。

主机起动空气瓶除供给主机起动外，出口管路经减压至1MPa后设二支路：一路给控制空气瓶充气，一路给杂用空气瓶充气，杂用空气瓶一路供汽笛，另一路经减压至0.4MPa后供全船杂用。

Two(2) Electrical air compressor to be fitted for filling air into air receiver automatically by air receiver press.controller .when the pressure of air receiver below 1.5Mpa,one(1) air compressor would be ran automatically and below 1.18MPa ,another air compressor ran simultaneity and reach to 3.0MPa,two air compressor would be stop.

Two(2) M/E starting air receiver,one(1)control air receiver and one(1) general air receiver to be provided for the system.

Besides served for starting of M/E, outlet pipeline of M/E starting air receiver to be reduced to 1Mpa and then branch into another two ways:one way for supplying compressed air to control air receiver and another way for general air receiver , one branch shall be used for air horn, the other branch shall be reduced to 0.4Mpa, and used for general service of ships.

5.7 机舱通风系统 Ventilation system of E/R

机舱设通风机2台，安装成鼓风状态。机舱内设有通风管道，在机舱控制室及各柴油机附近及经常有人作业处，设有通风口。机舱的通风机设在救生甲板上，通风机上部装有带可闭装置的菌形通风筒。必要时，机舱通风机一台可逆转，使其具有抽风功能。

Two (2) fans to be provided in E/R and kept in blasting condition. Vent duct to be fitted in E/R and fresh air inlet fitted in E/R control room and nearby of every diesel engine and work space.E/R fan to be installed on lifesaving deck with mushroom ventilator(together with closing equipment) on upper of it.if necessary,One fan ,capable of reversible,could be processed with air draft.

5.8 导热油加热系统 Thermal oil heating system

本船设有废气导热油炉1台。所产生的导热油供给燃油舱、燃油日用舱、燃油沉淀舱、溢油舱、污油舱、油渣舱、燃（滑）油分油机加热器用。

One(1) exhaust gas thermal oil boiler to be fitted on board,where thermal oil induced would be used for fuel oil tank,fuel oil service tank,fuel oil settle tank,oil overflow tank, dirty oil tank,sludge tank and heater for fuel (lubricating)oil purfier.

一般燃油舱的加热温度约30~40℃，燃油沉淀舱的加热温度为50℃左右，燃油日用舱的加热温度约80℃，燃油分油机加热器加热温度约90℃，滑油分油加热器加热温度约80℃。对不同的油品，加热温度应控制在该油品闪点10℃以下。

Generally, the heating temperature for diffenert type of oil, shall be listed as follows and kept below the flash point 10℃:

Fuel oil tank	abt.	30~40℃
fuel oil settle tank	abt.	50℃
fuel oil service tank	abt.	80℃
heater for fuel oil purfier	abt.	90℃
heater for lubricating oil purfier	abt.	80℃

5.9 舱底、压载、消防管系Bilge,Ballast and Fire fighting system

本船设舱底泵和消防泵各1台，两泵型号相同，为卧式自吸式离心泵，并互为备用；压载总用泵2台，为立式离心泵；油污水分离器一台。

Each one(1) bilge pump and fire pump to be of horizontal self-priming centrifugal pump,same type, acted as stand-by with each other.Two(2) ballast general pump to be of vertical centrifugal pump,one(1) oily water separator.

舱底泵和消防泵同时可抽取机舱和货舱的舱底水。机舱前左、右舷污水阱内均设有舱底水支吸口和泵直通吸口，机舱内还设有与主机海水冷却备用泵相接的应急吸口。油污水分离器可将机舱含油污舱底水驳至油污水舱，也可将机舱或舱底水舱内的含油污舱底水经分离后泵至渣油舱，经设在尾楼甲板上的油类标准排放接头排至岸上接收设备。

The bilge water could be drawed simultaneity from engine room and cargo hold by use of bilge pump and fire pump. Bilge branch suction and pump direct suction to be fitted for bilge well at fore (P) and fore(S) of E/R. The emergency suction shall be connected to M/E S.W.cooling standby pump in E/R. Oily water separator to be installed for tranfering oily bilge water in E/R to dirty oily water tank, also pump oily bilge water in E/R or bilge water tank to sludge tank after separated,and then discharged into shore

through oil discharge standard connection on poop deck.

本船各货舱污水阱舱底水管通过截止止回阀箱接至机舱舱底水总管。

The bilge water pipe for each cargo hold to be connected to E/R bilge water main by use of check stop valve box.

首泵舱设有舱底水喷射泵一台（工作水为消防水），将锚链舱污水阱及应急消防泵污水阱的舱底水排至舷外。

Bilge water of bilge well for chain locker and emergency fire pump tank shall be drawn by one(1) ejector located in fire pump tank, then discharged overboard. The working water shall be fire water.

舵机舱的舱底水经管路和自闭式放泄阀放入机舱后部污水阱。

Bilge water of steering gear room to be discharged into the bilge well of E/R aft.by use of pipeline and self-closing drain valve.

各舱压载水管机舱部分采用 $\phi 114 \times 4.5$ 无缝钢管，货舱部分采用 $\phi 110 \times 6.6$ PE100船用强化聚乙烯管，顶压载舱的压载管为 $\phi 89 \times 4.5$ 无缝钢管，压载总管为 $\phi 168 \times 5.0$ 无缝钢管。顶压载舱的压载水通过主甲板上消防总管压入，排出由甲板操纵的平面阀直接排至舷外。压载水管在适当处设有不锈钢波形膨胀节。尾轴管冷却水舱的水由舱底泵抽出。

The material of each ballast pump shall be as follows:E/R:

$\phi 114 \times 4.5$ seamless steel pipe,cargo hold: $\phi 110 \times 6.6$ PE100 marine ruggedized polyethylene pipe,top water ballast tank: $\phi 89 \times 4.5$ seamless steel pipe, ballast main: $\phi 168 \times 5.0$ seamless steel pipe.

The ballast water in top water ballast tank shall be pressed in through fire general pump on main deck,and directly discharged overboard by plane valve which is controlled on deck.Stainless steel corrugated expansion joint shall be arranged in the suitable place of ballast water pipe..Water in tailtube cooling water tank shall be pumped out by bilge pump.

消防水总管在机舱外装有截止阀。机舱底层和平台甲板层设有DN65消防栓2只，主甲板、救生甲板、起居甲板、和驾驶甲板均装有适当数量的DN50消防栓。货舱甲板两舷各货舱围壁旁均设有DN65的消防栓，供作消防和甲板冲洗用。在船上存有国际通岸接头两只，必要时可与消防栓相接使用。

Stop valve to be equipped for fire water main outside engine room. DN65 fire hydrants to be provided for the following space:

bottom of E/R and platform deck Two(2)

main deck,lifesaving deck, accomm.deck, Suitable quantity
and navigation deck

Cargo casing at two sides of cargo deck For fire fighting and deck washing

Two (2) International shore connections to be arranged and stowed on board also could be connected with fire hydrant if necessary.

在首部应急消防泵舱内，设有柴油机驱动应急消防泵1台、应急消防泵海底门1只。应急消防泵为自吸式离心泵，其出水管经阀与消防总管连接。

One(1) emer.fire pump,to be self-priming centrifugal pump which driven by diesel engine,with one(1) sea chest for emer.fire pump shall be fitted in fore emer.fire pump tank.
The drainage pipe would be connected with fire main by valves.

5.10 二氧化碳灭火管系 CO₂ fire fighting system

本船的机舱及货舱为二氧化碳被保护处所。二氧化碳气瓶组分双列 20 瓶组 2 套，共 40 瓶 68 升二氧化碳瓶，设在主甲板#28~#35 肋位右舷的二氧化碳室内。系统通过遥控施放站进行遥控操纵，在二氧化碳施放前及施放过程中均伴有声光警报。在实际使用中，必须首先确认失火舱室的工作人员已全部撤离，才执行操纵施放二氧化碳。

CO₂ fire extinguishing system shall be used for protection of E/R and cargo hold. CO₂ bottles group divided into two(2) units of biserial 20 bottles, in total 40 bottles of 68L CO₂ bottles,to be provided for CO₂ room,which located between fr #28~#35 at starboard on main deck.The system is operated by remote control station, and should have visual and audio alarm before and during CO₂ releasing. In the actual operation,firstly confirm no staff in E/R and then CO₂ releasing would be performed.

5.11 日用海、淡水管系 Sea water & fresh water service piping

本船在机舱内设有日用海、淡水泵各一台，海、淡水压力水柜各1只。日用海水泵将海水从海水总管泵至海水压力柜，供冲厕所等日常使用。日用淡水泵将淡水从淡水舱泵至淡水压力柜，供主、付机淡水膨胀水箱和厨房、卫生间等日常使用。海、淡水及饮用水压力柜设有压力继电器，可控制泵的自动运行。

Each one(1) Sea water /fresh water service pump , Each one(1) Sea water /fresh water pressure tank to be fitted in E/R.

Sea water shall be pumped by sea water service pump from sea water main into S.W.pressure

The suction port to be branch into three(3) ways:one connected to E/R suction pipe for drawing oily water in E/R;one connected to bilge suction pipe for drawing bilge water in dirty oily water tank;the last one from sea water main for cleaning of oily water separation device.

机舱日常含油污油水可由油污水处理装置从各污水阱经泥箱抽取并分离后排出舷外。当机舱有大量含油污油水时,可由油污水处理器的抽吸泵抽至油污水舱,再由油污水处理装置分离后排出舷外。

Generally,E/R oily water would be drawn from bilge well through mud box by oily water separation device,then seperated and drained overboard.

If many oil waters exit in E/R,it could be pumped to dirty oily water tank by suction pump and separated and drained overboard.

含油污水经油污水分离装置处理后,排水由油份浓度计控制,排出水含油率大于15 ppm时回至舱底水舱,含油率小于15ppm的水排至舷外,油污排入油污舱。油污舱内的油污,由专设的油污(油渣)泵,经设在尾楼甲板上的油类标准排放接头排至岸上接收处。

After treated by oily water separation device, discharge water to be controlled by oil densimeter :if oil content greater than 15 ppm,it returns to bilge tank and if less than 15ppm,Water to be drained overboard directly and sludge into oil dirty oil tank.Dirty oil in dirty oil tank to be discharged ashore by dirty oil/sludge pump through oil standard discharge joint on poop deck.

5.13 疏排水管系及生活污水处理系统 Drainage piping and sewage treatment system

各层露天甲板均设有适当数量和规格的甲板漏水口,将各层的排水从上到下逐层向下至上甲板下通过加厚管直接排出舷外。室内面盆、水池的疏水管及厕浴室、厨房等处的甲板排水管从上至下逐层向下至上甲板下通过两只止回阀排出舷外。全船各厕所的小便、粪便管从上至下逐层向下排至机舱内的生活污水处理装置。生活污水经处理后在水线下排出舷外并设有旁通管路,也可在允许的海域低速排放到海中。

Suitable quantity of Deck Scupper shall be arranged for every exposed deck. The water draining on each deck shall be led to the position below the upper deck and then discharged overside by extra strong pipe. Drain pipe to washing basin and pool, with deck Scupper arranged for galley room, bathroom/washroom, shall be led to the position below the upper deck and then discharged overside by two (2) stop valves. Hawse and soil pipe shall be led to E/R sewage treatment from above to below. All sewage will be flow into overside below water line after treated,and also fitted with by-pass pipeline for

draining into allowed sea in low velocity.

6.主机及齿轮箱的集控室报警项目ALARM ITEM IN CONTROL ROOM FOR M/E AND GEARBOX

主机转速表M/E speed indicator

倒顺车指示ahead/astern indication

手控遥控转换hand/remote control conversion

主机综合报警（超速停车、淡水高温、滑油低压等）

M/E integrated alarm(overspeed stop,F.W.temp.high,L.O.pressure low etc.)

齿轮箱综合报警（工作油压低、滑油高温、滑油低压等）

Gearbox integrated alarm(working oil pressure low,L.O.temp.high,L.O.pressure low etc.)

齿轮箱离合器错向报警Gearbox clutch misorientation alarm

主机控制系统失压报警M/E control system loss pressure

主机控制系统电源失效报警M/E control system power failure

7.操舵系统STEERING SYSTEM

本船选用100KN.m柱塞式油缸液压舵机一台，舵机配有两台液压泵组，电机均由主发电机组供电。在驾驶室设有一只舵机操纵台，由安装在操舵台上的操舵手轮来操纵舵的左右转。其中本船设有在舵机舱操作辅助操舵装置，该辅助操舵装置由人力操作。当发生紧急情况时可以关闭手动隔离阀，转为人力辅助操舵。应急手压泵的手柄力：150N(额定压力时)。

One(1) 100KN.m plunger cylinder hydraulic steering gear to be adopted.Two(2) hydraulic pump sets to be fitted with steering gear,the motor shall be feed by main D/G set.One(1)steering console to be adopted in wheelhouse,Turn-over of rudder shall be operated by steering handwheel on steering console.Assistant steering device which is controlled by manual and operated in steering gear tank to be adopted on board. Hand-isolation valve could be closed when in emergency,and change into manual assist steering.Handle force of emergency hand pump: 150N(rated pressure)