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## 总 则

### GENERAL

- 1、试验前应备齐所有试验设备装置的产品检验合格证书和相关证书, 以及技术文件。  
The required certifications, production certifications and technical documents of all examined equipment should to be prepared well before tests.
- 2、试验所用的各种测量仪器、仪表应校验合格, 仪表的级别应确保被测参数的精度。  
All kinds of instruments for measuring and gauges used in the tests to be calibrated, which to be with certification, if necessary. Their grade should insure the precision of the measured parameters.
- 3、各种设备、装置试验前与其相关的辅助设备、系统必须安装完工, 方可试验。  
Before all kinds of equipment were tested, concerned auxiliary equipment, systems to be installed completely.
- 4、试验前, 应全面检查各类设备、系统、仪表、铭牌等正确性、完整性, 以及各系统管路作好密性、试验畅通性试验, 确认投油、吹气清洗等工作完成, 确保试验顺利进行。  
The tightness test and well-fluency test and of piping should to be carried out so that the tests can be got along well. The safety items of equipment and systems should be surveyed at first.
- 5、各种设备和系统安全保护项目应在试验中先行报验, 合格后方可做其它项目试验, 以确保设备、系统安全。  
For equipment and systems' safety, the safety device and safety item shall be tested first, only the safety items are accepted, other tests can be carried out.
- 6、各种泵做运转试验, 并调定安全阀。  
The running test of pumps should to be carried out, and their safety valves to be adjusted.
- 7、所有电气设备在通电之前进行箱内清洁检查。各类用电设备都要检查它们的绝缘电阻, 除非另有说明, 绝缘电阻值均应 $\geq 1M\Omega$ , 还应检查电缆, 电器设备的保护接地。  
All electrical equipment to be inspected for cleanness before switch on. All kinds of the electrical equipment shall be measured concerning their insulation resistant, and each value of the insulation resistant shall be over  $1M\Omega$ , unless otherwise mentioned. Also protective earthing of the cable and equipment shall be checked.
- 8、如果在系泊试验中无法完成的项目可在航行试验中进行。  
If some items cannot be carried out during mooring test, they can be done in following sea trial test.
- 9、目的 Purpose
- 9.1、验证各机械设备和系统安装的正确性及其工作性能。  
The mooring test is to verify the correctness of installation and to examine the working performances for machinery and system.
- 9.2、试验数据的记录 Record Of Test Data  
凭籍各设备上仪表所显示的参数记录在检查部门准备的表格上。  
The parameters indicated by the gauges of equipment are to be recorded in the forms prepared by the inspection department concerned.
- 9.3、设定值的允许误差 Tolerance of setting

9.3.1、压力设定值的允许误差为 $\pm 0.01\text{Mpa}$ 。

Tolerance of pressure set value is  $\pm 0.01\text{Mpa}$ ;

9.3.2、温度设定值的允许误差为 $\leq 100^\circ\text{C}$ 时为 $\pm 3^\circ\text{C}$ ， $> 100^\circ\text{C}$ 时为 $\pm 5^\circ\text{C}$

Tolerance of temperature set value is  $\pm 3^\circ\text{C}$  for  $< 100^\circ\text{C}$  and  $\pm 5^\circ\text{C}$  for  $\geq 100^\circ\text{C}$

9.3.3、液位设定值的允许误差为 $\pm 5\%$ （满量程）

Tolerance of level set value is  $\pm 5\%$  of full range.

9.3.4、若有特殊规定的允许误差，应按特殊规定

Adopt to the specially tolerance if it need be

9.4、本试验大纲所出的压力值均为表压。

The pressure value indicated in the program is gauge pressure.

9.5、某些设定值可以由设备服务商现场调整。

Some set value can be adjusted by service engineer on board.

9.6、船厂在系泊试验时应作各种测试记录，整理后提交验船部门和船东

The tests shall be witnessed by owner supervisor and class and the test result/data shall be recorded by the yard and submitted to owner and class.

## 一、燃油系统试验

### F.0 system

根据系统图，系统的完整性，正确性和密性交验完

Completion, correctness, air-tightness of this system should be ok according to system drawing.

试验前检查项目 Pre-Test Check Item

Check Item 检查项目	Check result (yes/no) 检查结果	Owner 船东	RINA 船检
Tank integrity and tightness test 舱室完整性			
Piping installation and pressure test 管路安装和压力试验			
Mechanical installation 设备安装			
Cable termination and power supply 接线和电力供应			

- 1、Measure the cold/hot insulation resistance of the electrical motor, measure the starting current and working current of the electrical motors.  
测量燃油泵电动机冷态及热态绝缘电阻，测量电动机起动电流和工作电流。
- 2、An operating test of transfer pump of the fuel oil system is carried out for minimum 30 minutes. Pump relief valve to be checked.  
各燃油输送泵作效用试验不少于 30 分钟。检查泵的安全阀。
- 3、Effective test for remote control and change switch of fuel oil pump.  
燃油泵遥控按钮和转换开关作效用试验。
- 4、Simulate check up working reliability of all alarm devices for high and low level of every tank.  
模拟检查各舱柜高低液位报警装置工作的可靠性。
- 5、Simulate check up working reliability of M.D.O. transfer pump auto start/stop.  
模拟检查燃油输送泵的自起停泵的可靠性。
- 6、Sort data and fill report.  
记录试验数据，填写表格。

## 燃油系统试验记录

## Fuel sys. Record list

Check Item 检查项目		Check result (yes/no) 检查结果	
		左舷 Port side	右舷 Starboard side
Fuel pump motor insulation 燃油泵电机绝缘电阻	冷态 Cold		
	热态 Hot		
Fuel pump start/stop 燃油泵启/停			
Motor start current 电动机起动电流			
Motor working current 电动机工作电流			
M. D. O. T level high alarm (Simulate) 燃油舱高位报警			
M. D. O. T level low alarm (Simulate) 燃油舱低位报警			
M. D. O. S. T level high alarm (Simulate) 燃油日用柜高位报警			
M. D. O. S. T level low alarm (Simulate) 燃油日用柜低位报警			
M. D. O. S. T level high stop pump (Simulate) 燃油日用柜高位停泵			
M. D. O. S. T level low start pump (Simulate) 燃油日用柜低位启泵			
Fuel pump discharge pressure (bar) 燃油泵出口压力			
Fuel pump suction pressure (bar) 燃油泵吸口压力			

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 二、Lubrication oil system

## 滑油系统试验

根据系统图，系统的完整性、正确性和密性交验完毕。

Completion, correctness, air-tightness of this system should be ok according to system drawing.

试验前检查项目 Pre-Test Check Item

Check Item 检查项目	Check result (yes/no) 检查结果	Owner 船东	RINA 船检
Tank integrity and tightness test 舱室完整性			
Piping installation, flushing and pressure test 管路安装, 串洗和压力试验			
Mechanical installation 设备安装			
Cable termination and power supply 接线和电力供应			

- 1、Measure the cold/hot insulation resistance of the electrical motor, measure the starting current and working current of the electrical motors.  
测量污油泵电动机冷态及热态绝缘电阻，测量电动机起动电流和工作电流。
- 2、An operating test of dirty oil transfer pump is carried out for minimum 30 minutes. Pump relief valve to be checked.  
污油泵作效用试验不少于 30 分钟。检查泵的安全阀。
- 3、Effective test for remote control of dirty oil pump.  
污油泵遥控按钮作效用试验。
- 4、Simulate check up working reliability of all alarm devices for high and low level of every tank.  
模拟检查各舱柜高低液位报警装置工作的可靠性。
- 5、To test the effect of the lub oil filters, its actions should be normal and reliable.  
滑油滤器的功能应正确可靠。
- 6、To record lub pressure and fill report  
记录有关滑油压力, 填写试验报告。

滑油系统试验记录

Lub. oil sys. Record list

Check Item 检查项目		Check result (yes/no) 检查结果	
		左舷 Port side	右舷 Starboard side
Dirty oil pump motor insulation 污油泵电机绝缘电阻	冷态 Cold		
	热态 Hot		
Dirty oil pump start/stop 污油泵启/停			
Motor start current 电动机起动电流			
Motor working current 电动机工作电流			
L.O.T. level high alarm (Simulate) 滑油柜高位报警			
Dirty oil pump discharge pressure (bar) 污油泵出口压力			
Dirty oil pump suction pressure (bar) 污油泵吸口压力			

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_



### 三、cooling water system

#### 冷却水系统试验

Completion, correctness, air-tightness of this system should be ok according to system drawing.

根据系统图，系统的完整性, 正确性和密性交验完毕

试验前检查项目 Pre-Test Check Item

Check Item 检查项目	Check result (yes/no) 检查结果	Owner 船东	RINA 船检
Piping installation and pressure test 管路安装和压力试验			
Mechanical installation 设备安装			
Cable termination and power supply 接线和电力供应			

1. Measure the cold/hot insulation resistance of the electrical motor, measure the starting current and working current of the electrical motors.  
测量冷却泵电动机冷态及热态绝缘电阻，测量电动机起动电流和工作电流。
2. An operating test of sea water cooling water pump are carried out for minimum 30 minutes.  
海水冷却泵及冷却系统作效用试验不少于 30 分钟。
3. Effective test for remote control of cooling water pump.  
海水冷却泵遥控按钮作效用试验。
4. Sort data and fill report.  
记录试验数据, 填写表格。

冷却水系统试验记录

Cooling water sys. Record list

Check Item 检查项目		Check result (yes/no) 检查结果	
		左舷 Port side	右舷 Starboard side
Cooling water pump motor insulation 冷却水泵电机绝缘电阻	冷态 Cold		
	热态 Hot		
Cooling water pump start/stop 冷却水泵启/停			
Motor start current 电动机起动电流			
Motor working current 电动机工作电流			
Cooling water pump discharge pressure (bar) 冷却水泵出口压力			
Cooling water pump suction pressure (bar) 冷却水泵吸口压力			

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 四、发电机试验程序

### DIESEL GENERATOR TEST PROCEDURE

#### Specification 技术参数

Maker 供应商	Cummins
TYPE 型号	CCFJ200-1500DKCMar
Generator 发电机	revolution 转速: 1500r/min Rated output 额定输出功率: 200 KW Rated voltage 额定电压: 400V Current 电流: 667.5A Frequency 额定频率: 50 HZ Power factor 功率因数: 0.8(滞后 lagging) No. of phase 相数: 3
Number of sets 数量	2

#### 1. 动车前的试验、测量 Check Items Before A/E Starting

##### 1.1 为发电机组服务的各系统及设备在发电机组试验前应预先运转，检查其可靠性。

All systems and auxiliary equipment serving for A/E to be operated in advance in order to check their reliability.

#### 2. 测量发电机冷态绝缘电阻。

The cold Insulation Resistance of generator to be recorded completely.

#### 3. 起动试验 Starting Test

电起动试验，先将起动蓄电池充足，在中途不补充充电的情况下，柴油机从冷态开始连续进行 3 起动试验。

Battery start test, first full in charge of the battery and then start the engine from cold condition 3 times.

机组报警系统和安全装置模拟试验（模拟试验）。

Safety and alarm points testing (simulation)

用手动液压泵校对并整定报警及停车压力开关或传感器的设定值。

Adjust and test the pressure transmitter by portable hand pump.

用加热方法校对并整定报警及停车温度开关或传感器的设定值。

Adjust and test the thermometer by heating method.

人为造成柴油发电机超速，检查超速停车保护功能。

Check the over speed function by manually adjusts the governor.

#### 4. 报警系统 Alarm items

See the attached list.

##### 4.1 柴油发电机组安全报警试验

Safety function alarm test of main D/G set

参照监测报警清单，作模拟及效用试验。

According to monitoring & alarm list, a simulation test as well as an effect test shall be carried out.

序号 No.	名 称 Description	设定值 setting	1#发电机组 No.1 D/G set	2 发电机组 No.2 D/G set
1	柴油发电机转速高报警 G/E SPEED HIGH	1650r/min		
2	滑油进口压力报警 Low Press. of L.O. inlet alarm	0.1MPa ±%2		
3	柴油发电机冷却水温度报警 High Temp. of cooling water alarm	94℃±2		
4	柴油发电机启动蓄电池低压报警 Low voltage of start battery alarm	_____		
5	柴油发电机公共报警 Commonality alarm	_____		

## 4.2 安全装置模拟试验 D/E Safety Device Test

当发电机达到如下情况（模拟）时应自动停车：

D/E should shut down if it falls across the conditions as follows (SIMULATION):

序号 No.	名 称 Description	设定值 setting	1#发电机组 No.1 D/G set	2 发电机组 No.2 D/G set
1	超速停车保护 D/E high speed stop	1695r/min		
2	滑油低压停车 Low Press. of L.O. inlet alarm stop	0.08 MPa ±%2		
3	冷却水出口高温停车 High Temp. of cooling water stop	100℃±2		

## 5. 柴油发电机组的负荷实验 Load Test

采用水电阻作为负荷对发电机组进行全负荷试验，单机全负荷试验后，进行并车试验。

During the load test using the water resister as load, first tests the each generator then two Diesel Generators Parallel Running load test will be carries out.

## 5.1 单机负荷试验时，测量相关性能参数是否在规定范围内。

During the each generator load test, check and record the concerned parameters.

## 5.2 柴油机在 100%负荷试验时应平稳，无异常发热，发电机频率应保证在额定值公差范围内。

During the 100% load test the diesel engine should be keep in normal condition and the frequency of the generator in rated value tolerance range.

## 5.3 柴油发电机组负荷试验的工况及试验时间按下表规定：

The load test should be carried out in accordance with following table:

No. 序号	转速 revolution (r/m)	发电机负荷 load (%)	试验时间 test time (min.)
1	1500	25	15
2	1500	50	15
3	1500	75	30
4	1500	100	60
5	1500	110	15

注：检查并记录各种参数(见下表)。

Notice: Check and record the concerned parameters. (See below list)

Test results shall be recorded in table:

试验结果记录在表格中:

Load 负载	Time 时间	Output(kw) 输出功率	Voltage(V) 电压	Frequency (Hz) 频率	Current(A)电流 R S T			Remark 备注
25%								
50%								
75%								
100%								
110%								

After the load test, record the temperature of each winding and bearing.

负载试验后, 记录绕组及轴承温度。

Measuring point 测量点 (°C)	1G	2G
Bearing temp. 轴承温度		
Ambient temp. 环境温度		

#### 6. 发电机特性试验 generator characteristic test

##### 6.1 稳态调压特性试验

##### Voltage-Load Characteristic & Governor Characteristic Testing

在负荷试验后, 将柴油发电机的负荷和功率因数调整到额定值, 柴油机转速调整到额定转速 1500 rpm, 就可以进行稳态特性试验。试验负荷按下列程序变化: 负荷 100% → 75% → 50% → 25% → 0% → 25% → 50% → 75% → 100% 记录各种负荷状态下, 电压、电流、频率。

After load test, adjust the voltage and frequency of each main generator to the rating, adjust the load from rating varies as 100%~75%~50%~25% then to zero, then from zero varies as 25%~50%~75% then to the rating, measure the voltage and frequency at each state after stable

Load % 负载	1G			2G		
	Output(kw) 功率	Volt. (v) 电压	Fre. (Hz) 频率	Output(kw) 功率	Volt. (v) 电压	Fre. (Hz) 频率
100						
75						
50						
25						
0						
25						
50						
75						
100						

During the above measurement, it shall be verified that the voltage variation rate shall

not exceed  $\pm 2.5\%$ , the frequency variation rate shall not exceed  $\pm 5\%$ .

在进行以上试验时, 电压偏差不应超过额定值的 $\pm 2.5\%$ , 频率偏差不应超过额定值的 $\pm 5\%$ 。

计算稳态调整率 voltage variation rate  $\Delta V\% = (V - V_n) / V_n$

V 是不同功率下电压 Voltage under variation power

V<sub>n</sub> 是额定电压 400V rated voltage 400V

$\Delta V\% \leq \pm 2.5\%$

## 6.2 调速特性试验 Governor Test

a. 突卸: 负荷 100 %  $\rightarrow$  0 , 记录瞬时和稳定状态时电压、频率值、转速和稳定所需时间。

When the G/E is unloaded suddenly from 100% to 0% (100% $\rightarrow$ 0%), measure D/E' s momentary speed and steady speed, restoring time.

b. 突加: 负荷 0 $\rightarrow$  50 %  $\rightarrow$  100 % , 记录突加载荷时瞬时电压、频率、转速值, 稳定后电压、频率、转速值和稳定所需时间填写下表。

0% of the rated load is suddenly thrown on following applied to the 50% and 100% of the rated load respectively after interval sufficient to restore the speed to steady state. ( 0 $\rightarrow$  50 %  $\rightarrow$  100 %).

Instantaneous frequency variation shouldn' t more than 10%.

瞬态频率变化不超过 10%。

Stable frequency variation shouldn' t more than 5%.

稳态频率变化不超过 5%。

Stable time shouldn' t more than 5 seconds.

稳定时间不超过 5 秒。

Changing 改变	Condition 条件	1G				2G			
		Volt 电压 v	Fre. 频率 Hz	Speed 转速 rpm	Settled time 稳定时间 S	Volt 电压 v	Fre. 频率 Hz	Speed 转速 rpm	Settled time 稳定时间 S
100% $\downarrow$ 0%	Momentary 瞬态								
	Permanently 稳态								
0% $\downarrow$ 50	Momentary 瞬态								
	Permanently 稳态								
50% $\downarrow$ 100%	Momentary 瞬态								
	Permanently 稳态								

## 7. 操纵试验 Maneuver Test

### 7.1 机旁起动停车试验。

D/G local manually starting should be carried out on local start panel.

### 7.2 集控室遥控起动、停车试验。

Test of remotely starting and stopping D/E in MSB.

## 8. 检查发电机主开关过载保护延时跳闸的可靠性

ACB of main generator protection test

(1) 优先卸载约 10 秒 Preference trip delay about 10 seconds

(2) 长延时脱扣 20 秒 long time trip delay 20 seconds

(3) 短延时脱扣试验 400 ms short time trip delay 400 ms

9. 逆功率保护 Reverse Power Protection

设定值: ~10%额定功率, 动作时间约 2-5 秒。

Reverse power setting value: ~10% of rated output 20 kW. Operating time is about 2-5sec.

10. 欠压保护: 电压降至 70% — 35%额定电压时自动跳闸

Under voltage protection: Drop the voltage to 70% to 35% of rated value, i.e., 308V to 154V, ACB shall trip automatically.

11. 主发电机开关联锁试验 Interlock Test Of Main Generator Switches

a. 发电机 ACB 与各自的空间加热器。

Main generator ACB and its space heater interlock.

当发电机开关合闸时, 空间加热器指示灯熄灭。

The Space Heater power will be cut off when generator's ACB is closing

b. 发电机 ACB 与岸电。

Main generator ACB and shore power MCB

当发电机供电时, 岸电开关应合不上闸, 反之亦然。

SHORE power breaker of MSB can not be closing when D/G running and its ACB was closed. Vice versa.

12. 检查配电板上各设备的标识, 验证配电板上有关指示灯应工作正常。

Signs on the equipment in the switchboard etc to be checked. Verify that concerning indicators of main switchboard work normally.

13. 并联运行试验 Parallel Running Test Of Generator

并联运行负载试验的操作方法: 运行中发电机在 75%额定负载时, 并入待并发电机组, 然后将各发电机的负载调整到额定功率的 75%作为起并负载点, 按顺序 75 % → 100 % → 75 % → 50% → 25 % → 50 % → 75 % → 100%改变负荷进行试验, 在各个负荷状态下记录电压、电流、功率。每一负载点并联运行时间为 5 分钟。有功功率分配差值应不超过发电机额定功率的 ±15%。Parallel running test of generator, per-running generator is loading 75% of rated as a start point of parallel running, then the total load shall be changed as below mentions. (Cos φ=1.0) 75%→100%→75%→50%→25%→50%→75%→100%. During test, voltage & active power at each step of generator shall be measured and calculate the divergence of the parallel running generators' load relative to rated power of each generator, and the divergence shall not exceed ±15% rated power of one generator. (The running time of every measured point is 5 minutes.)

Load % 负载	1G			2G		
	Output (kw) 功率	Volt. (v) 电压	Fre. (Hz) 频率	Output (kw) 功率	Volt. (v) 电压	Fre. (Hz) 频率
75						
100						
75						
50						
25						
50						
75						
100						

## 五、Service air compressors and compressor air system

## 杂用空压机和压缩空气系统试验

Completion, correctness, air-tightness of this system should be ok according to system drawing.

根据系统图，系统的完整性、正确性和密性交验完毕。

试验前检查项目 Pre-Test Check Item

Check Item 检查项目	Check result (yes/no) 检 查结果	Owner 船东	RINA 船检
Piping installation and pressure test 管路的安装和压力试验			
Mechanical installation 设备的安装			
Cable termination and power supply 接线和电力供应			

## 1. Safety valve adjustment

## 安全阀校验

Check the opening pressures of safety valves and adjust them according to the settings below:

校验空压机、空气瓶的安全阀开启设定压力

Air compressors 空压机 2set 8.8 bar

Air receivers 空气瓶 2set 11bar

## 2. Relieve valve adjustment

## 减压阀组的调整试验

Reduction valve set 7~4 bar reduction valve (one set), regulation pressure from 7 bar to 4bar. relief valve set point: 4.4bar;

7~4 bar 减压阀(1组)调整压力从 7bar 减到 4 bar, 其安全阀的开启压力为 4.4 bar。

## 3. Measure the cold/hot insulation resistance of the electrical motor, measure the starting current and working current of the electrical motors.

测量电动机冷态及热态绝缘电阻，测量电动机起动电流和工作电流。

## 4. 空气瓶充气试验 Reservoir Charge Test

Reservoirs to be charged by compressor, the air pressure in the reservoirs from atmosphere pressure to 8bar, charging time to be recorded.

起动空压机向空气瓶充气，记录空气压力从大气压力升至 8bar 所需时间。

## 5. 空气瓶及系统保压试验 Keep pressure test for reservoir and sys. piping

Check the pressure drop in the reservoir and sys. piping should within 10% of rated value in 2 hours.

空气瓶及压缩空气系统做保压试验 2 小时，压力下降应≤10%额定压力。

## 6. Compressor auto starting and stop device

空压机自动起动/停车装置

Working air compressor: auto starting 2bar

工作空压机 auto stop 8bar

## 7. Sort data and fill report

记录试验数据，填写表格。



压缩空气系统试验记录

Compress air sys. Record list

Check Item 检查项目		Check result (yes/no) 检查结果	
		1# Compressor(Reservoir) 1#压缩机(空气瓶)	2# Compressor(Reservoir) 2#压缩机(空气瓶)
Compressor motor insulation 压缩机电机绝缘电阻	冷态 Cold		
	热态 Hot		
Reservoir charge time 空气瓶充气时间		8bar	8bar
Motor start current 电动机起动电流			
Motor working current 电动机工作电流			
Compressor auto start 空压机自动起动			
Compressor auto stop 空压机自动停止			
Opening pressure of safety valve on compressor 空压机安全阀开启压力			
Opening pressure of safety valve on reservoir 空气瓶安全阀开启压力			
Opening pressure of safety valve on relieve valve 减压阀组安全阀开启压力			

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 六、Water supply system.

## 供水系统试验

Completion, correctness, air-tightness of this system should be ok according to system drawing.

根据系统图,系统的完整性,正确性和密性交验完毕。

试验前检查项目 Pre-Test Check Item

Check Item 检查项目	Check result (yes/no) 检查结果	Owner 船东	RINA 船检
Tank integrity and tightness test 舱室完整性			
Piping installation and pressure test 管路安装和压力试验			
Mechanical installation 设备安装			
Cable termination and power supply 接线和电力供应			

1. Measure the cold/hot resistance of the electrical motor, measure the starting current and working current of the electrical motors.  
测量各水泵电动机冷态及热态绝缘电阻, 测量电动机起动电流和工作电流。
2. A release pressure of safety valve for FW pressure tank shall be adjusted to 4.4bar.  
淡水压力柜的安全阀起跳压力调至 4.4bar。
3. To adjust the starting and stopping pressure of relay for fresh water pump and technical fresh water pump.  
检查、调整淡水泵的起动、停止继电器启动动作的压力。 淡水压力柜 2bar 淡水泵自动启动, 淡水压力柜 4bar 淡水泵自动停止。
4. An operating test of each pump is carried out; in the meantime open the pressure air valve, and water supplied to all ship taps by the water supply system to be examined.  
各泵进行效用试验不少于 30min, 同时打开压缩空气供应阀检查供水系统向全船供水情况。
5. Fill report.  
填写试验报告书。

供水系统试验记录

Water supply sys. Record list

Check Item 检查项目		Check result (yes/no) 检查结果	
		FW pressure tank(Fore) 淡水压力柜(艏部)	FW pressure tank(Aft.) 淡水压力柜(艉部)
FW pump motor insulation 淡水泵电机绝缘电阻	冷态 Cold		
	热态 Hot		
Opening pressure of safety valve on FW pressure tank 淡水压力柜安全阀开启压力			
Motor start current 电动机起动电流			
Motor working current 电动机工作电流			
FW pump auto start 淡水泵自动起动			
FW pump auto stop 淡水泵自动停止			

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 七、Bilge system

## 舱底水系统试验

Completion, correctness, air-tightness of this system should be ok according to system drawing.

根据系统图, 系统的完整性, 正确性和密性交验完毕

试验前检查项目 Pre-test check item

Check Item 检查项目	Check result (yes/no) 检查结果	Owner 船东	RINA 船检
Tank integrity and tightness test 舱室完整性			
Piping installation and pressure test 管路安装和压力试验			
Mechanical installation 设备安装			
Cable termination and power supply 接线和电力供应			

1. Measure the cold/hot insulation resistance of the electrical motor, measure the starting current and working current of the electrical motors.  
测量舱底总用泵电动机冷态及热态绝缘电阻, 测量电动机起动电流和工作电流。
2. An operating test of water discharge by each bilge pump is carried out for an hour; all motors, pumps and piping should be in good condition.  
舱底总用泵进行排水效用试验不小于 30 分钟, 电动机、泵、管路运行正常。
3. To fill the bilge wells with water then discharge the water by each bilge pump.  
各污水井注水用舱底泵将其排出, 各泵都能正常排水。
4. A high-level alarm test of bilge wells is carried out.  
各污水井高液位报警效用试验。
5. Effective test for E/R bilge water emergency suction.  
机舱舱底水应急吸口效用试验。
6. Effective test for remote control of bilge pump.  
舱底总用泵遥控按钮作效用试验。
7. Fill report.  
填写试验报告书。

舱底水系统试验记录

Bilge sys. Record list

Check Item 检查项目		Check result (yes/no) 检查结果	
		Bilge pump(Effective) 舱底泵（效用）	High level alarm 高位报警
Bilge pump motor insulation 舱底泵电机绝缘电阻	冷态 Cold		
	热态 Hot		
Motor start current 电动机起动电流			
Motor working current 电动机工作电流			
Bilge pump start/stop 舱底泵启/停			
Compressor auto stop 空压机自动停止			
RM(P) fwd. (P) B.W. high 左机舱前左污水井高			
RM(P) fwd. (S) B.W. high 左机舱前右污水井高			
RM(S) fwd. (P) B.W. high 右机舱前左污水井高			
RM(S) fwd. (S) B.W. high 右机舱前右污水井高			
Aft. pipe tunnel (P) B.W. high 管弄后左污水井高			
Aft. pipe tunnel (S) B.W. high 管弄后右污水井高			
Aft. pipe tunnel B.W. high 管弄后污水井高			
Pipe tunnel FWD B.W. high 管弄前污水井高			
FWD Pipe tunnel B.W. high 前管弄污水井高			
Bow thruster room(P) B.W. high 艏侧推室左污水井高			
Bow thruster room(S) B.W. high 艏侧推室右污水井高			

HPU room B.W. high 液压单元室污水井高		
Bosun story room(P) B.W. high 水手长储藏室（左）污水井液位 高		
Bosun story room(S) B.W. high 水手长储藏室（右）污水井液位 高		
Chain locker(P) B.W. high 左锚链舱污水井高		
Chain locker(S) B.W. high 右锚链舱污水井高		

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 八、BELGE OILY WATER SYSTEM

## 舱底水油水分离器管系图

Completion, correctness, air-tightness of this system should be ok according to system drawing.

根据系统图，系统的完整性、正确性和密性交验完毕。

试验前检查项目 Pre-test check item

Check Item 检查项目	Check result (yes/no) 检查结果	Owner 船东	RINA 船检
Piping installation and pressure test 管路安装和压力试验			
Mechanical installation 设备安装			
Cable termination and power supply 接线和电力供应			

1. 测量和记录泵电机冷、热态绝缘电阻。

Measure and record the motor insulation resistant under cold/hot condition

2. 测量和记录油水分离器泵电机启动/运转电流。

Measure and record the motor starting/working current

3. 油水分离器及泵运行试验

Automatically control of oily water separator

- 3.1 启动油水分离器泵，检查油水分离器泵干运转保护功能试验（当油水分离器中无油或水时，应报警，同时油水分离器泵自动停止运行，并通过油排出阀开始除气）。

Start oily water separator pump, check dry running protection for oily water pump (If there is no oil or/and no water the alarm device will be activated which stops the pump automatically and starts the deaeration through the oil discharge valve.

- 3.2 油水分离器泵马达异常报警试验。

Oily water separator and pump motor failure alarm.

- 3.3 用清水检查油份浓度计零位。

Using fresh water to inspect zero point of the oil content meter

将油份浓度计放入清水中，调节控制单元设置油份浓度计的零位并复查。

The clean oil-free water to be led through the respective connection into the measuring cell. Set zero by adjusting in oil alarm unit and confirm zero setting.

- 3.4 油份浓度计功能试验

To inspect the oil content meter's function

将油份浓度计从油水分离器上拆出，放入预先配置好的样水中；油水分离器将在油份在 15ppm 的情况下运行，并通过检查气动三通电磁阀的位置来确认油水在舱底水存放舱和油水分离器间的循环情况。

Sampling bottler to be connected to each connection. Oily water separator to be in service within 15ppm and then sampling water is to be led through the 15ppm alarm unit. Confirm that the oily water recirculates into bilge holding tank by checking the solenoid valve for 3-way air piston valve

- 3.5 油位传感器功能试验

To inspect the oil level sensor function

在油水分离器停止运行的情况下，拆出油位传感器；将传感器放入预先配制好的样水中；确认当油水分离中的传感器检测到上层积油的厚度达到预先设定的液位时，通过液位自动控制器，打开油排出阀和回冲水进口阀。通过回冲水的进口压力，可以将油冲至舱底水分离油舱，同时回冲开始，回冲水的进口和出口均打开，对油水分离器中的高效凝聚过滤器进行冲洗。确认在对油水进行冲洗时，泵自动停止功能。

Detach the oil level sensor from the oily water separator (oily water separator is not to be in service at this time). Put sensor into the sampling bottle made specially; Confirm the RWO automatic level control opens the oil discharge valve and the backwash water inlet valve so that the backwash water pressure can flush the oil to the bilge tank; The backwash process is then initiated. The backwash water inlet valve and the backwash water outlet valve are then opened and the high-performance coalesce is backwashed with clean water. Confirm the pump automatic stop during the oil flushing and back washing procedure.

4. 试验后 After test

4.1 用淡水冲洗系统，并往腔内加注淡水。

Flush system by fresh water, filled oily water separator with fresh water.

4.2 关闭系统。Closing the system

4.3 用淡水清洗油份浓度传感器，清洗后用淡水浸泡传感器。

Cleaning indication of oil content sensor by fresh water, and then immerge into fresh water.

5. Fill report.

填写试验报告



舱底水油水分离器系统试验记录

Bilge oily water sys. Record list

Check Item 检查项目		Check result (yes/no) 检查结果
Oily water separator pump motor insulation 油水分离器泵电机绝缘电阻	冷态 Cold	
	热态 Hot	
Motor failure alarm. 马达异常报警试验		
Motor start current 电动机起动电流		
Motor working current 电动机工作电流		
Bilge Alarm 油份浓度计报警		
Zero Point with clean water 用清水检查零位		
Three-way valve function test 三通阀功能试验	高于 over 15ppm	
	低于 with in 15ppm	

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 九、Test of Fire system

## 水消防系统试验

Completion, correctness, air-tightness of this system should be ok according to system drawing

根据系统图，检查系统的完整性、正确性和密性交验完毕。

试验前检查项目 Pre-test check item

Check Item 检查项目	Check result (yes/no) 检查结果	Owner 船东	RINA 船检
Piping installation and pressure test 管路安装和压力试验			
Mechanical installation 设备安装			
Cable termination and power supply 接线和电力供应			

1. Measure the cold/hot insulation resistance of the electrical motor, measure the starting current and working current of the electrical motors.  
测量消防总用泵电动机冷态及热态绝缘电阻，测量电动机起动电流和工作电流。
2. Effective test for remote control of fire pump.  
消防总用泵遥控按钮作效用试验。
3. Back to normal condition and then turn the pump for minimum 30 min. to measure as following: Suction & discharge pressure.  
消防总用泵进行打水试验不少于 30 分钟，同时检查泵以及系统的运转情况，测量泵的进出口压力。
4. When fire pump supply water to fire main, open one fire hydrant ( $\phi 16\text{mm}$ ) on forecastle deck and navigation deck respectively, the Eject Height of fire water not to be less than 12 meters.  
在进行消防泵运转试验时，在艏楼甲板和舵楼甲板各用一只  $\phi 16\text{mm}$  水枪出水进行喷射试验，其射程不得小于 12m。
5. When fire G.S. pump and bilge G.S. pump supply water to fire main at the same time, open one fire hydrant ( $\phi 16\text{mm}$ ) on forecastle deck and navigation deck respectively, the pressure of fire water not to be less than 0.27MPa, check every fire hydrant's working condition. And free choice 2-3 fire hydrant test outlet pressure.  
消防总用泵和舱底总用泵同时向消防总管供水，在首楼甲板和驾驶甲板各用一只  $\phi 16\text{mm}$  水枪出水的情况下，管内水压应不低于 0.27 MPa，同时逐一检查各消防阀畅通情况。试验时抽检其它 1~2 只消防栓上的压力。
6. A flushing test of deck and anchor chain shall be carried out with water supplied by fire pump.  
消防水作甲板冲洗，锚链冲洗效用试验。
7. Fill report.  
填写试验报告

水消防系统试验记录

Fire water sys. Record list

Check Item 检查项目		Check result (yes/no) 检查结果
Fire pump motor insulation 消防总用泵电机绝缘电阻	冷态 Cold	
	热态 Hot	
Motor start current 电动机起动电流		
Motor working current 电动机工作电流		
Suction pressure of fire pump 消防总用泵进口压力		
Discharge pressure of fire pump 消防总用泵出口压力		
Eject Height with 2 Piece of $\phi 16\text{mm}$ squirt gun 2 只 $\phi 16\text{mm}$ 水枪同时出水时射高		
Supply Water With Bilge & G.S. Pump and Fire & G.S. Pump 消防总用泵和舱底总用泵同时向消防 总管供水压力		

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 十、Sewage treatment system

## 污水处理系统试验

Completion, correctness, air-tightness of this system should be ok according to system drawing.

根据系统图，系统的完整性、正确性和密性交验完毕

试验前检查项目 Pre-test check item

Check Item 检查项目	Check result (yes/no) 检查结果	Owner 船东	RINA 船检
Tank integrity and tightness test 舱室完整性			
Piping installation and pressure test 管路安装和压力试验			
Mechanical installation 设备安装			
Cable termination and power supply 接线和电力供应			

1. Measure the cold/hot insulation resistance of the electrical motor, measure the starting current and working current of the electrical motors.  
测量污水泵电动机冷态及热态绝缘电阻，测量电动机起动电流和工作电流。
2. An operating test of sea water cooling water pump are carried out for minimum 30 minutes.  
污水泵及效用试验不少于 30 分钟。
3. Effective test for remote control of sewage pump.  
污水泵遥控按钮作效用试验。
4. Simulate sewage storage tank high level alarm test.  
污水储存舱高位报警试验。
5. Sort data and fill report.  
记录试验数据，填写表格。

污水处理系统试验记录

Sewage treatment sys. Record list

Check Item 检查项目		Check result (yes/no) 检查结果	Remark 备注
Sewage pump motor insulation 污水泵电机绝缘电阻	冷态 Cold		
	热态 Hot		
Sewage pump start/stop 污水泵启/停			
Motor start current 电动机起动电流			
Motor working current 电动机工作电流			
Sewage pump di scharge pressure (bar) 污水泵出口压力			
Sewage pump suction pressure (bar) 污水泵吸口压力			
High level alarm for sewage storage tank(Simulate) 污水储存舱高位报警			

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 十一、Cranes in E/R

### 机舱行车试验

1. The crane to move forward and backward on the rail, and the hock to go up and down without loading, check the reliability of the operation device and the position limit device.  
作空载全程来回行走, 钩升降, 检查操纵机构和限位装置的可靠性。
2. To lift  $1.25 \times 1000 = 1250\text{Kg}$  weight and keep for 10 minutes, the heavy can not slide down. Meanwhile test the reliability of skid unit ( $1.1 \times 1000\text{Kg}$ ).  
吊起  $1.25 \times 1000 = 1250\text{KG}$  重物, 保持 10 分钟, 重物不得有下滑现象。同时做制动器刹车试验 ( $1.1 \times 1000\text{Kg}$ ), 检查行车装置的工作情况及制动的可靠性。
3. To lift  $1000\text{Kg}$  weight for walking forward and backward once, meanwhile test the effect of the brake and end limited switches.  
吊起  $1000\text{Kg}$  重物进行试验往返一次, 同时做制动和终点开关的效能试验。
4. Fill report.  
填写试验报告。

机舱电动单梁行车试验记录

Single girder crane Record list

Check Item 检查项目		1# (P)	1# (S)
Hoist motor insulation 起重电机绝缘电阻	冷态 Cold		
	热态 Hot		
Hoist motor hoisting current 起重电动机上升电 流	启动 Start		
	工作 Work		
Hoist motor low current 起重电动机下降电 流	启动 Start		
	工作 Work		
Travel motor insulation 行走电动机绝缘电 阻	冷态 Cold		
	热态 Hot		
Travel motor hoisting current 行走电动机电流	启动 Start		
	工作 Work		
无负荷试验 operation under no load	上升限位 Hoist limit		
	下降限位 Low limit		
	前后限位 Travel limit		
工作负荷试验 operation under work load	上升限位 Hoist limit		
	下降限位 Low limit		
	前后限位 Travel limit		

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 十二、Test of ventilating system and ventilators

### 通风系统及通风机试验

#### 1. Test conditions:

All ventilators and ventilating ducting shall be installed properly; Workings in every space requiring ventilation shall be completed.

试验条件:

各种风机及通风管路安装合格,各机械通风舱室施工完毕。

#### 2. Contents and the procedure of test:

试验内容及程序:

2.1 An operating test of each ventilator should be carried out for half an hour, meanwhile the running condition of ventilators, motors and ventilating ducts to be checked. An abnormal vibration of the ducts should not be allowed, the connecting seal of the ducts should be in good tight condition and the closing of the ventilating gates should be firm and tight. During the operating test to check the ventilating condition on outlet and the ventilating should be well distributed.

各通风机进行效用试验半小时, 检查风机、电动机、风管运行时的情况, 风管不应有异常的振动, 风管接头应气密, 风闸关闭应紧密, 效用试验时检查各出风口的布风情况, 布风应均匀。

2.2 An operation test of controlling and closing devices of ventilators and ventilation system is carried out for 2-3 times. The controlling and closing should be convenient and quick.

通风机及通风系统的控制装置、关闭装置均应进行效用试验 2~3 次, 控制及关闭应方便、迅速。

2.3 During the operation test, hot insulation resistance of the motor shall be measured. 风机进行效用试验时应记录电动机的热态绝缘电阻。



## 通风系统及通风机试验记录

## Ventilation and ventilator Record list

Fan model 风机型号	Check Item 检查项目	Test result 试验结果		Remark 备注
机舱供风 (P&S) E/R supply CZ-75 21000m3/h	冷态绝缘 Cold resistance	P	S	
	热态绝缘 Hot resistance	P	S	
	启动电流 Start current	P	S	
	工作电流 Work current	P	S	
艏侧推室供风 Bow thruster room supply CZ-70A 12000m3/h	冷态绝缘 Cold resistance			
	热态绝缘 Hot resistance			
	启动电流 Start current			
	工作电流 Work current			
1#货舱排/供风 No.1 cargo hold exhaust/supply CBZT-40 6000m3/h	冷态绝缘 Cold resistance	排风 Exh.	供风 Sup.	
	热态绝缘 Hot resistance	排风 Exh.	供风 Sup.	
	启动电流 Start current	排风 Exh.	供风 Sup.	
	工作电流 Work current	排风 Exh.	供风 Sup.	
2#货舱排/供风 No.2 cargo hold exhaust/supply CBZT-40 6000m3/h	冷态绝缘 Cold resistance	排风 Exh.	供风 Sup.	
	热态绝缘 Hot resistance	排风 Exh.	供风 Sup.	
	启动电流 Start current	排风 Exh.	供风 Sup.	
	工作电流 Work current	排风 Exh.	供风 Sup.	
3#货舱排/供风 No.3 cargo hold exhaust/supply CBZT-40 6000m3/h	冷态绝缘 Cold resistance	排风 Exh.	供风 Sup.	
	热态绝缘 Hot resistance	排风 Exh.	供风 Sup.	
	启动电流 Start current	排风 Exh.	供风 Sup.	
	工作电流 Work current	排风 Exh.	供风 Sup.	
4#货舱排/供风 No.4 cargo hold exhaust/supply CBZT-40 6000m3/h	冷态绝缘 Cold resistance	排风 Exh.	供风 Sup.	
	热态绝缘 Hot resistance	排风 Exh.	供风 Sup.	
	启动电流 Start current	排风 Exh.	供风 Sup.	

	工作电流 Work current	排风 Exh.	供风 Sup.	
配餐室排风 Pantry room exhaust CWZ-200D I 450m3/h	冷态绝缘 Cold resistance			
	热态绝缘 Hot resistance			
	启动电流 Start current			
	工作电流 Work current			
液压单元室排风 HPU room exhaust CWZ-250D I 910m3/h	冷态绝缘 Cold resistance			
	热态绝缘 Hot resistance			
	启动电流 Start current			
	工作电流 Work current			
厕所排风 W.C exhaust CWZ-200D I 450m3/h	冷态绝缘 Cold resistance			
	热态绝缘 Hot resistance			
	启动电流 Start current			
	工作电流 Work current			
集控室排风 Control room exhaust CZ-40B 4500m3/h	冷态绝缘 Cold resistance			
	热态绝缘 Hot resistance			
	启动电流 Start current			
	工作电流 Work current			

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 十三、Test of ballast system

## 压载水系统试验

Completion, correctness, air-tightness of this system should be ok according to system drawing.

根据系统图，系统的完整性、正确性和密性交验完毕

试验前检查项目 Pre-test check item

Check Item 检查项目	Check result (yes/no) 检查结果	Owner 船东	RINA 船检
Piping installation and pressure test 管路安装和压力试验			
Mechanical installation 设备安装			
Cable termination and power supply 接线和电力供应			

1. Measure the cold/hot insulation resistance of the electrical motor, measure the starting current and working current of the electrical motors.  
测量压载泵电动机冷态及热态绝缘电阻，测量电动机起动电流和工作电流。
2. An operating test of water discharge by each ballast pump is carried out for half an hour; all motors, pumps and piping should be in good condition.  
压载泵进行排水效用试验不小于 30 分钟，电动机、泵、管路运行正常。
3. Effective test for remote control of ballast pump.  
压载泵遥控按钮作效用试验。
4. To pump water into/out each of ballast tanks.  
结合泵的运转，对各压载舱进行注水和排水效用试验。
5. Choose one ballast tank and record the time needed for filling /emptying fully when ballast pump running.  
任选一压载舱作注满和排空试验，记录所需时间。
6. To test ballast tanks emptying with ballast ejectors and measure the depth of remained water when emptying.  
压载水喷射泵作压载舱排空试验，各压载舱排空后，测量舱内残水深度。
7. To fulfill the test report.  
填写试验报告。

压载水系统试验记录

Ballast water sys. Record list

Check Item 检查项目		Check result (yes/no) 检查结果	
		左舷 Port side	右舷 Starboard side
Ballast water pump motor insulation 压载水泵电机绝缘电阻	冷态 Cold		
	热态 Hot		
Ballast water pump start/stop 压载水泵启/停			
Motor start current 电动机起动电流			
Motor working current 电动机工作电流			
Ballast water pump discharge pressure (bar) 压载水泵出口压力			
Ballast water pump suction pressure (bar) 压载水泵吸口压力			
Filling & emptying full 注满和排空试验	Filling 注满		
	Emptying 排空		

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 十四、Test of remote control system for valves

## 液压阀门遥控系统试验

Completion, correctness, air-tightness of this system should be ok according to system drawing.

根据系统图，检查系统的完整性，正确性和密性交验完毕。

Check Item 检查项目	Check result (yes/no) 检查结果	Owner 船东	RINA 船检
Piping installation and pressure test 管路安装和压力试验			
Mechanical installation 设备安装			
Cable termination and power supply 接线和电力供应			

## 1. 液压动力单元 Hydraulic power pack unit

## 1.1 液压泵(2 台) Hyd. pump unit (2 sets)

马达(每个): 1.5kw, AC 380V/50HZ, 3 相, 转速: 1780 RPM

Motor (each): 1.5kw, AC 380V/50HZ, 3 Ph, RPM: 1780 RPM

油泵流量(每个): 大约 4.5L/min

Oil pump flow rate (each): abt. 4.5L/min

蓄能器: 32L\*1 套 Accumulator: 32L\*1 set

## 1.2 控制箱等 Control panel. Etc.

## 1.3 液压执行机构: 共 67 套 Hyd. Actuator: total 67sets

## 1.4 设定点 / 设定值 setting point/value

NO.1 号马达启动 -MOTOR NO.1 START : 120bar

NO.1 号马达停转 -MOTOR NO.1 STOP : 150bar

NO.2 号马达启动 -MOTOR NO.2 STARTS : 110bar

NO.2 号马达停转 -MOTOR NO.2 STOP : 140bar

低油压报警 (管路压力) : 85bar 指示灯亮

LOW OIL PRESSURE ALARM (PIPE PRESSURE) : 85bar LIGHT ALARM

高油压报警 (管路压力) : 140bar 指示灯亮

HIGH OIL PRESSURE ALARM (PIPE PRESSURE) : 140bar LIGHT ALARM

低油位报警 (模拟) : 50%油位

LOW OIL LEVEL ALARM (SIMULATION) : 50% FILLING

低油位停泵 : 大约 30%油位

LOW OIL LEVEL POMP STOP : APPROX30% FILLING

安全阀设定压力 : 160bar

PRESS RELIEF VALVE SET PRESS : 160bar

## 1.5 便携式液压手动泵:1 套 Hand Pump (Portable):1 sets

## 1.6 固定式液压手动泵:2 套 Emergency Hydraulic Hand Pump (Stationary):2sets

## 1.7 阀门操作时间 (启闭) Valve operation (open/shut) time

每台泵应能在 1 分钟内同时操作 2 只最大的蝶阀从全开位置到全闭位置，相反操作也可以。

Each hydraulic pump of the power unit to be capable of operating two sets of the largest butterfly valves simultaneously from full open to full shut or vice versa within one

minute.

2. 试验条件 TEST CONDITION

2.1 系统电缆和管路应按照设计图纸和规格书正确安装完毕。

Electric cables & piping shall be correctly installed according to the drawing and specifications for them

2.2 液压控制管应用氮气进行全面冲洗。

The hydraulic control pipe lines shall be completely flushed with Nitrogen Gas.

2.3 系统管路需注入推荐的液压油且管路的空气需要彻底被清除。

The system shall be filled with the recommended hydraulic Oil and the air in the system shall be thoroughly purged.

3. 试验程序 TEST PROCEDURE

3.1 液压动力单元测试 Hydraulic power pack operation test.

确定下列设定值测试结果并在测试结果表中记录下来

Confirm following functions and record each setting value on an attached sheet for Inspection result.

-NO.1、NO. 2 液压泵马达绝缘，启动电流

-NO.1、NO. 2 MOTOR INSULATION, STARTING CURRENT

-NO.1,2 马达启动 -MOTOR NO.1&2 Starts

-NO.1,2 号达停转 -Motor No.1&2 Stop

-低油压报警 -low oil pressure alarm

-高油压报警 -HIGH oil pressure alarm

-低油位报警 -low oil level alarm

-低油位停泵 -low oil level pump stop

-安全阀设定压力 -press relief valve set press

4. 蝶阀遥控试验 Butterfly valve remote control test

4.1 在阀门遥控屏上进行各个阀门的启闭操作。

Operate each valve open/close panel on V.R.C. console on B.C.R.

4.2 核对阀门遥控屏上的操作性能和每个阀门的启闭时间间隔。

Check operation function on console and each valve open/close time interval.

4.3 检查 2 个最大通径的蝶阀可以在一分钟内同时工作。

Confirm that 2 biggest butterfly valve can be operated simultaneously within one minutes.

4.4 这项测试中的每一个阀都必须有一定代表性。且如果测试结果被船东认可，其他阀的操作运转数据可以同样被接受而不需要再进行操作性能试验。

Any several valves are to be typically selected for this test. And if their test result is accepted by owner, operation/function data of the other valve may also be accepted without the operation/function test.

4.5 阀应急启闭试验 Valve emergency open/close testing.

4.6 任选 2 个具有代表性的阀进行应急启闭试验。

Select any two valves for typical emergency valve open/close test.

4.7 连接应急手动泵至船东选定的阀。

Connect emergency hand pump to the selected valves by owner.

4.8 确定应急手动泵的性能和阀的开/关。

Confirm function of emergency hand pump and valve open/close.

5. To fulfill the test report.填写试验报告

阀门遥控系统试验记录

Valve remote control Record list

Check Item 检查项目		Test result 试验结果				Remark 备注
		Setting 设定值		Actual 实际值		
1#液压马达 No.1 Hyd. motor	绝缘 Insulation					
	启动电流 Start current					
	自动启动 Auto start					
	自动停止 Auto stop					
2#液压马达 No.2 Hyd. motor	绝缘 Insulation					
	启动电流 Start current					
	自动启动 Auto start					
	自动停止 Auto stop					
模拟低油压报警 Low oil pressure alarm						
模拟低油位报警 Low oil level alarm						
低油位停泵 Low oil level pump stop						
安全阀设定压力 Press relief valve set press						
阀门代号规格 Valve No. & size	阀门描述 Description	OPEN 开		CLOSE 关		
		Show in Mimic 显示	Actual 实际	Show in Mimic 显示	Actual 实际	
BAV1 DN250	NO.1 BALLAST PUMP SUCTION					IN E/R
BAV2 DN250	NO.2 BALLAST PUMP SUCTION					IN E/R
BAV3 DN250	NO.1 BALLAST PUMP SUCTION					IN E/R
BAV4 DN250	NO.2 BALLAST PUMP SUCTION					IN E/R
BAV5 DN250	BETWEEN INLETS OFBALLAST PUMP					IN E/R
BAV6 DN250	NO.1 BALLAST PUMP INLET					IN E/R
BAV7 DN250	NO.2 BALLAST PUMP INLET					IN E/R
BAV8 DN250	NO.1 BALLAST PUMP OUTLET					IN E/R

BAV9 DN250	NO. 2 BALLAST PUMP OUTLET					IN E/R
BAV10 DN250	NO. 1 BALLAST PUMP DIS.					IN E/R
BAV11 DN250	NO. 2 BALLAST PUMP DIS.					IN E/R
BAV12 DN250	BETWEEN OULETS OFBALLAST PUMP					IN E/R
BAV13 DN350	BALLAST PUMP OVERB. V. (P)					IN E/R
BAV18 DN400	SEA MAIN SUCTION FR L. SEW CHEST					IN E/R
BAV19 DN400	SEA MAIN SUCTION FR H. SEW CHEST					IN E/R
BAV22 DN350	BALLAST PUMP OVERB. V. (S)					IN E/R
BAV25 DN200	FROM NO. 7 B. W. TK. (P)					IN E/R
BAV26 DN200	FROM NO. 7 B. W. TK. (S)					IN E/R
BAV27 DN200	TO NO. 7 B. W. TK. (P)					IN E/R
BAV28 DN200	TO NO. 7 B. W. TK. (S)					IN E/R
BGV3 DN65	BILGE FR. FWD. OF E/R (P1)					IN E/R
BGV4 DN65	BILGE FR. FWD. OF E/R (P2)					IN E/R
BGV5 DN65	BILGE FR. FWD. OF E/R (S1)					IN E/R
BGV6 DN65	BILGE FR. FWD. OF E/R (S2)					IN E/R
BGV7 DN125	DIRECT BILGE SCUTION TO BILG PUMP(P)					IN E/R
BGV8 DN125	DIRECT BILGE SCUTION TO BILG PUMP(S)					IN E/R
BGV9 DN150	BETWEEN INLETS OF BILG PUMP & FIRE PUMP					IN E/R
BWV1 DN200	NO. 6 B. S. W. B. TK. (P2) BALLAST					
BWV2 DN200	NO. 6 B. S. W. B. TK. (S2) BALLAST					
BWV3 DN200	NO. 5 B. S. W. B. TK. (P2) BALLAST					
BWV4 DN200	NO. 5 B. S. W. B. TK. (S2) BALLAST					
BWV5 DN200	NO. 4 B. S. W. B. TK. (P2) BALLAST					
BWV6 DN200	NO. 4 B. S. W. B. TK. (S2) BALLAST					
BWV7 DN200	NO. 3 B. S. W. B. TK. (P2) BALLAST					
BWV8 DN200	NO. 3 B. S. W. B. TK. (S2) BALLAST					



BWV9 DN200	NO. 2 B. S. W. B. TK. (P) BALLAST					
BWV10 DN200	NO. 2 B. S. W. B. TK. (S) BALLAST					
BWV11 DN200	NO. 1 B. S. W. B. TK. BALLAST					
BWV12 DN200	NO. 6 B. S. W. B. TK. (P1) BALLAST					
BWV13 DN200	NO. 6 B. S. W. B. TK. (S1) BALLAST					
BWV14 DN200	NO. 5 B. S. W. B. TK. (P1) BALLAST					
BWV15 DN200	NO. 5 B. S. W. B. TK. (S1) BALLAST					
BWV16 DN200	NO. 4 B. S. W. B. TK. (P1) BALLAST					
BWV17 DN200	NO. 4 B. S. W. B. TK. (S1) BALLAST					
BWV18 DN200	NO. 3 B. S. W. B. TK. (P1) BALLAST					
BWV19 DN200	NO. 3 B. S. W. B. TK. (S1) BALLAST					
BWV20 DN200	NO. 7 B. S. W. B. TK. (P) BALLAST					
BWV21 DN200	NO. 7 B. S. W. B. TK. (S) BALLAST					
BLV1 DN100	AF. OF PIPE TUNNEL (P) BILGE					
BLV2 DN100	AF. OF PIPE TUNNEL (S) BILGE					
BLV3 DN100	NO. 4 C/H B. W. (P) BILGE					
BLV4 DN100	NO. 4 C/H B. W. (S) BILGE					
BLV5 DN100	NO. 3 C/H B. W. (P) BILGE					
BLV6 DN100	NO. 3 C/H B. W. (S) BILGE					
BLV7 DN100	NO. 2 C/H B. W. (P) BILGE					
BLV8 DN100	NO. 2 C/H B. W. (S) BILGE					
BLV9 DN100	NO. 1 C/H B. W. (P) BILGE					
BLV10 DN100	NO. 1 C/H B. W. (S) BILGE					
BLV11 DN100	BOW THRUSTER (P) BILGE					
BLV12 DN100	BOW THRUSTER (S) BILGE					
BLV13 DN100	FORWARD. OF PIPE TUNNEL (P) BILGE					

BLV16 DN65	HATCH COVER HYDR. POWER RACK BILGE					
BLV17 DN65	BOSUN STORE (S) BILGE					
BLV18 DN65	BOSUN STORE (P) BILGE					
BLV20 DN100	AF. OF PIPE TUNNEL BILGE					
BLV21 DN100	F. OF PIPE TUNNEL BILGE					
EAV13 DN50	WORK. W. FOR BOATSWAIN'S STORE EDUCTOR					

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 十五、Test of ship tank level remote sounding draft gauging devices

### 液位遥测吃水测量装置试验

#### 试验前检查项目 Pre-test check item

Check Item 检查项目	Check result (yes/no) 检查结果	Owner 船东	RINA 船检
Piping installation and pressure test 管路安装和压力试验			
Mechanical installation 设备安装			
Cable termination and power supply 接线和电力供应			

1. 在一定的压载条件下，压载舱水位需通过压载控制室中的压载控制台测量出来，并与手测结果进行比较。（至少记录 5 个点位。）

At a certain ballast condition, the levels of water ballast tanks shall be remotely measured on the ballast control console in B.C.R. and then it shall be compared with the levels measured by manual sounding. (Minimum record 5 state.)

2. 如果试验时船舶不是处于水平状态，则需记录下船舶的倾斜状态修正测量值。一般情况下此试验应在船舶水平状态下进行。

Both measurement to be recorded and trim correction shall be considered on both measurement if ship's condition is not in even keel. In general, the test shall be done at even keel.

3. 在一定的压载条件下，船的吃水深度需要通过压载控制室中的压载控制台测量出来，并与船侧的目测实际结果进行比较

At a certain ballast condition, the draft shall be remotely measured on the ballast control console in B.C.R. and then it shall be compared with the draft measured actually by a visual-manual checking at ship side.

液位遥测及吃水系统试验记录

Remote sounding & draught Record list

Tank name 舱室名称	Test result 试验结果										Remark 备注
	Remote 遥控					Manual 手动					
NO. 1 B. W. T											
NO. 2 B. W. T(P)											
NO. 2 B. W. T(S)											
NO. 3 B. W. T(P1)											
NO. 3 B. W. T(S1)											
NO. 3 B. W. T(P2)											
NO. 3 B. W. T(S2)											
NO. 4 B. W. T(P1)											
NO. 4 B. W. T(S1)											
NO. 4 B. W. T(P2)											
NO. 4 B. W. T(S2)											
NO. 5 B. W. T(P1)											
NO. 5 B. W. T(S1)											
NO. 5 B. W. T(P2)											
NO. 5 B. W. T(S2)											
NO. 6 B. W. T(P1)											
NO. 6 B. W. T(S1)											
NO. 6 B. W. T(P2)											
NO. 6 B. W. T(S2)											
NO. 7 B. W. T(P)											
NO. 7 B. W. T(S)											
M. D. O. T(P)											
M. D. O. T(S)											

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 十六、Quick-closing valve system

## 快关阀系统试验

Completion, correctness, air-tightness of this system should be ok according to system drawing.

根据系统图，系统的完整性、正确性和密性交验完毕。

试验前检查项目 Pre-test check item

Check Item 检查项目	Check result (yes/no) 检查结果	Owner 船东	RINA 船检
Piping installation and pressure test 管路安装和压力试验			
Mechanical installation 设备安装			
Cable termination and power supply 接线和电力供应			

1. 控制箱内气瓶安全阀起跳试验，起跳压力设定值为 0.77MPa。

Air bottle safety valve popping test in control box, setting pressure value is 0.77MPa.

2. 快关阀气动关闭试验 Quick-closing valve closed by air test

2.1 由机舱压缩空气系统向快关阀控制箱内的气瓶充气时，先打开瓶上的泄放阀放掉瓶中的气及残水，然后关闭充气，直至达到 0.7MPa（工作压力）。

Charge air from engine room compress air system to the air bottle in the quick-closing valve control box, open the drain valve on the air bottle to let water out, then stop charging air, confirm the pressure in piping is 0.7MPa

2.2 分别打开控制箱内 2 只操作球阀，观察各路快关阀的关闭状况是否良好，并在快关阀控制气瓶不充气的情况下进行快关阀关闭试验。

Open 2 operation ball valves separately, observe the quick-closing valve closing condition, and have close/open test in the condition that without charge air into the control air bottle.

3. 气动关闭试验结束后，抽检 2 只快关阀做手动关闭，检验手动开启的灵活性。

Take randomly 2 quick-closing valves to make flexibility test of manually closing and opening after pneumatic closing test

4. 气动关闭试验结束后，使 6 只快关阀处于正常工作位置，控制箱内 3 只球阀（其中一只为用于备用管路）处于关闭位置。

After test, reset all 6 quick-closing valves to normal working condition, 3 ball valves (one is for spare) in close condition.

快关阀系统试验记录

Quick close valve sys. Record list

Valve name 阀件名称	Test result 试验结果		Remark 备注
	Remote 遥控	Manual 手动	
FV1			M.D.O. tank(P)
FV2			M.D.O. tank(S)
FV3			M.D.O. service tank(P)
FV4			M.D.O. service tank(S)
LV5			L. 0. story tank(P)
LV6			L. 0. story tank(S)
Operate air press. low alarm 操作空气压力低报警			
Safety valve Blow out press. 安全阀起跳压力			

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 十七、Anti-fouling and corrosion prevention system

### 防海生物系统试验

Completion, correctness, air-tightness of this system should be ok according to system drawing.

根据系统图，系统的完整性、正确性和密性交验完毕

试验前检查项目 Pre-test check item

Check Item 检查项目	Check result (yes/no) 检查结果	Owner 船东	RINA 船检
Mechanical installation 设备安装			
Cable termination and power supply 接线和电力供应			

- 1、Measure the insulation.  
测量绝缘值。
- 2、Adjust current output in the range of 0.1A-2.0A.  
电源电流输出 0.1A-2.0A 范围内连续可调。
- 3、Anti-fouling unit failure alarm simulate test.  
防海生物装置故障报警模拟试验。
- 4、Sort data and fill report.  
记录试验数据，填写表格。

防海生物系统试验记录

Anti-fouling sys. Record list

Check Item 检查项目		Check result (yes/no) 检查结果
Insulation 绝缘		
Current output 电流输出	First line 第一路	
	Second line 第二路	
	Third line 第三路	
	Fourth line 第四路	
Failure alarm(Simulate) 故障报警		

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_



## 十八、主配电板

### Main switchboard

Signs on the equipment in the switchboard etc to be checked.

首先检查配电板上各设备的标识。

#### 1. INSULATION CHECK 绝缘检查

1.1 Switch off all external loads and measure insulation resistant of the main switchboard between bus-bar to earth and bus-bar each phase by a DC 500V megohmmeter .

断开所有外部负荷，通过直流 500V 兆欧表测量主配电板汇流排对地及汇流排各项之间的绝缘电阻。

1.2 Check up monitoring-alarm circuit of insulation.

检查监视报警电路的绝缘。

#### 2. PROTECTIVE DEVICE TEST 保护装置试验

2.1 Function of low voltage protection: when a voltage drops down to 70%-35% of a rated value ,a main switch of the generator shall be off automatically, same as low frequency.

测量欠电压保护功能，当电压下降到额定电压的 70%~35%时，发电机主开关应自动断开。低频率保护相同。

2.2 Measure setting value of a overload protection device. When an overload current reaches 30% of a rated value, in two minutes a main switch of the generator will be cut off automatically.

测量过载保护装置的设定值，其过载电流达到 30%额定值时，在 2 分钟内能自动断开发电机主开关。

2.3 Measure setting value of a reverse-power protection device. When a reverse-power reaches 10% of a rated output of the generator, in 2-5 seconds a main switch of the generator will be off automatically.

测量逆功率保护装置的设定值，当逆功率达到发电机额定输出的 10%时，在 2~5 秒时间内应能自动断开发电机主开关。

#### 3. FUNCTION TEST 功能试验

3.1 Check the load transfer between main generators.

检查主发电机相互之间负荷转移功能。

3.2 Check the interlock of the switch between main switchboard and shore supply.

检查主配电板和岸电开关相互之间的联锁。

3.3 Check the instruments, control breakers and indicating lamps etc. on main switchboard concerning the correctness of their activation.

检查主配电板上各种仪器、仪表，控制开关，指示灯等的动作正确性。

3.4 Check the emergency stop function.

检查应急停止功能。

ES-1 EMERGENCY TURN OFF E/R OIL PUMP AND FAN

应急切断机舱油泵和风机

ES-2 EMERGENCY TURN OFF ACCOMMODATION FAN AND AIR COND.

应急切断住宿舱风机和空调

ES-3 EMERGENCY TURN OFF CARGO HOLDS FAN

应急切断货舱风机

4. LOAD BALANCE CHECK 负荷平衡检查

Under the normal working condition, the load deviation between each phase shall not be greater than 15%.

正常工作工况下，各相线上的负载彼此相差不大于 15%。

十九、各类辅助机械、甲板机械、厨房等用设备

Electric equipment of all aux. machinery, deck machinery and galley

1. According to the monitoring&alarm list, alarm function of all system is to be checked  
参照监测报警清单，检查各系统的报警功能。

二十、24V 配电系统

24V power distribution system

1. Insulation resistance of power supply system to be measured 测量供电系统的绝缘电阻值
2. Charging function is to be checked 检查充电功能。
3. Verify the battery and charging functions , measure voltage and current , measure voltage regulation rang and simulate alarm test.  
验证充电功能，测量电压，电流，电压调节范围，模拟报警试验。

二十一、船内通讯和报警系统

Interior communication and alarm system

1. 通用报警 General alarm
  - 1.1 Manual and automatic signaling of the general shall be functionary checked.  
检查手动及自动发送通用报警信号的功能。
  - 1.2 Check up acoustic and optic signal of alarm equipment in every position.  
检查各部分报警设备的声光信号。
  - 1.3 General alarm activated automatically for fire detective equipment shall be checked.  
检查探火设备自动激励通用报警的功能
2. 火警 Fire detective alarm
  - 2.1 A simulating test of activating of fire detectors shall be carried out and the correctness of activating and alarm is to be checked.  
模拟检查每一探头动作及报警的正确性。
  - 2.2 Check the function of manual signaling.  
检查手动发送信号的功能。

## 二十二、航行设备

### Equipment of navigation

1. Navigation lights and signal lamps running test 航行灯、信号灯效用试验  
Check the lighting failure alarm, power source changeover, navigation lights and the indicators corresponding correctly.  
检查灯故障报警，电源转换，及指示灯和航行灯指示的一致性。

## 二十三、照明系统

### Illumination system

#### ALL ILLUMINATION EQUIPMENT TO BE TESTED

试验所有的照明设备

1. Check shunt insulation resistance, its value shall be not less than  $1.5M\Omega$ .  
检查每一分路的绝缘电阻，其值不小于  $1.5M\Omega$ 。
2. Check the installation correctness of lamps in every spaces. lamps and lanterns of emergency lighting shall be marked with red color.  
各舱室照明灯具安装正确。应急照明灯具应有红色标志。
3. Verify the automatic lighting functions of the AC220V emergency lighting via MSB failure. (simulate or practice)  
通过主配电板失电（模拟或实际），验证 AC220V 应急照明系统的自动照明功能。
4. Running test of electric heaters.  
电加热器效用试验。

## 二十四、变压器试验

### Transformer test

1. Particular of transformer 变压器参数

	Main transformer 主变压器	
Voltage 电压 (V)	AC400V/AC230V 3ph	
Capacity 容量 (KVA)	75	

2. Test insulation resistance of transformer' s primary coil to secondary coil and primary coil to earth, secondary coil to earth.  
测量变压器原边对副边，原边对地及副边对地的绝缘电阻。

	primary coil to secondary coil 原边对副边	primary coil to earth 原边对地	secondary coil to earth 副边对地
1T			
2T			

3. Voltage and current of primary & secondary side shall be measured under efficiency test.  
在效用试验时，测量原边和副边的电压和电流。

	Voltage (V) 电压		Current (A) 电流	
	Primary 原边	Secondary 副边	Primary 原边	Secondary 副边
1T				
2T				

## 二十五、Hyd. Sys. For windlass & automatic tensioning mooring winch

### 锚机和自动绞缆机液压系统

Completion, correctness, air-tightness of this system should be ok according to system drawing.

根据系统图，系统的完整性、正确性和密性交验完毕

试验前检查项目 Pre-test check item

Check Item 检查项目	Check result (yes/no) 检查结果	Owner 船东	RINA 船检
Piping installation and pressure test 管路安装和压力试验			
Mechanical installation 设备安装			
Cable termination and power supply 接线和电力供应			

- 空载试验：在电机接线正确的情况下，开机空运转 10 分钟。  
No-load test: if the wire is connected correctly, run the machine for 10 minutes and then check:  
检测内容：  
(1) 电机绝缘检查  
Check the electromotor is insulating  
(2) 电机空载电流  
Electromotor's current when no-load  
(3) 泵输出流量检查方法：称重。  
Output flux of pump, method: weighing  
将检查内容填于表一。  
Record the results write in the table 1
- 运行试验 operation test:
  - 将压力调至为 5Mpa 或 10Mpa 或 15Mpa，直至系统额定压力下运行，每个压力级下运行 5 分钟；系统运行应正常，各密封部位和管路不应有漏油现象。  
Run the machine when the pressure is 5Mpa、10Mpa or 15MPa and rated pressure, every time, running 5 minutes for above pressure: The system must be normal and all parts haven't oil to leak.
  - 油泵调整与校验试验 adjust and control test for the oil pump
    - 将主泵压力升至系统额定压力，调节泵的输出量至系统额定流量，将控制泵压力升至系统额定压力，测定在系统压力下、额定流量下电机输出电流，并与电机额定电流相比较，在

此工况下判断电动机是否超功率，将测试内容记于表二中。

Measure and check pump' s flux when the pressure is rated and pump begin to change flux ; measure the electromotor' s current when the pressure and flux are rated ; the results write in the table 2

b. 油泵切断压力试验 sever pressure test of oil pump

将主泵压力升至系统安全阀设定压力（23Mpa），看油泵是否自动变量，并将此时电机电流记于表二中。

The hydraulic system' s pressure is relief valve' s rated pressure adding 23Mpa, the oil pump if automation variable, the results write in the table 2.

3. 报警功能复核试验，将结果记录于表四中。

Inspection test of alarm function, the results write in the table 4.

a. 低液体位置模拟报警试验:

Simulation' s alarm test for the liquid' s at the low place.

b. 高油温模拟报警试验

Simulation' s alarm test for high oil temperature

c. 滤器阻塞模拟报警试验

Simulation' s alarm test for lifter' s choking.

4. 效用试验 Utility test

开启系统中泵组，运行周期为 T=2 小时，其中主泵组作额定工况下运行时间 0.5 小时、待机 1.5 小时，检测油液温升，将结果记于表五中。

Open feed system, cycle of operation is T=2hour, run time 0.5hour and stand by 1.5hour when rate working of the main pump unit, checked temperature rise, the results write in the table 5.

5. 检查锚机及绞车的各轴承间隙。

Check the bearing clearance of windlass and winch.

6. 锚和锚机效用试验 Anchor and windlass utility test

a. 将锚放低，然后分别将锚拉到左舷和右舷锚链管，检查锚爪与船体贴合情况。

Lower the anchor and lift it up to the hawse pipe separately for P and S side, check the contact condition of anchor fluke and hull.

b. 检查掣链器的工作情况，锚链管冲水状态。

Check the operation of chain stoppers and the working condition of hawse pipe washing.

c. 锚试验时进行刹车 2~3 次，以检查刹车装置。

Anchoring test include anchor brake to be carried out 2-3 times in order to check the brake system operation.

d. 左右两只带有 82.5m 锚链的锚需要做起锚试验，确认所用时间不超过 9 分钟（不包括进入锚链管以后的时间）。

The weighing test is to be carried out for both, weighing an anchor suspended to 82.5m of chain cable and verifying the time that required for the weighing (excluding the housing in the hawse pipe) does not exceed 9 min.

7. 系泊绞车试验

a. 液压绞车在额定转速正倒车空载运转 20 分钟，每隔 5~10 分钟换向一次。

Running test of hydraulic pressure winches on rated rotating speed to be carried out without load for 20 minutes in forward and reverse rotating direction. Every 5-10 minutes, to reverse the rotating direction of the winch.

b. 检查工作状况应为正常。Check working condition to be normal.

空载试验记录表一

Table 1 for no-load test

内 容 content 序号 No.	运行时间 Run time (Min)	泵出油口压力(Mpa) Oil port pressure of pump	电机电流(A) Current of electromotor	泵 流 量 flow of pump (L/min)	油 温℃ Oil temperatu re
1					
2					
3					
4					
结 论 result					

运行试验表二

Table 2 for running test

内容 content 序号 No.	泵出油口压力(Mpa) oil port pressure of pump	电机电流 (A) current of electromotor	
1			
2			
3			
4			
5			
6			
结 论 result			

报警功能复核试验表四

Table 4 for inspection test of alarm function

试验内容 Test content	低液位模拟报警试验 simulation' s alarm test for low place by the liquid	高油温模拟报警试验 simulation' s alarm test for high oil temperature	滤器阻塞模拟报警试验 simulation' s alarm test for lifter' s choking
1			
2			
结 论 result			

油温效用试验表五

Table 5 for utility test of oil temperature

环境温度 ambient temperature:        °C

试验时间 time of tests

时间 min time		液压油油温 °C Oil temperature of hydraulic oil
1		
2		
3		
结 论 result		

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 二十六、Electric-Hyd. Provision crane

## 电动液压回转起重机

Completion, correctness, air-tightness of this system should be ok according to system drawing.

根据系统图，系统的完整性、正确性和密性交验完毕

试验前检查项目 Pre-test check item

Check Item 检查项目	Check result (yes/no) 检查结果	Owner 船东	RINA 船检
Piping installation 管路安装			
Mechanical installation 设备安装			
Cable termination and power supply 接线和电力供应			

## 1. 技术参数 Technical Data

安全工作负载 Rated safety working load	SWL 1t
工作半径 Working radius	Rmax=12m, Rmin=2.8m
起升速度（在 SWL 下）Hoisting speed(at SWL)	~19m/min
空载回转速度 Slewing speed(no load)	~1.1r/min
空载变幅时间 Luffing time(no load)	~25sec
起升高度 Hoisting height	20m
回转范围 Slewing range	360° (Slewing limit)
额定工况下允许倾角（横倾/纵倾）	Max. allowable list/trim 5° /2°
电机型号 Motor model	Y160M-4-H
电机功率 Motor capacity	15KW
电制 Power supply	380V/50Hz/3ph
电机转速 Motor speed	14450r/min
额定电流 Rated current	30.5A
防护等级 Protection class	F

## 2. 确认安装正确，润滑良好的情况下，进行对液压系统元件调试，然后再进行较充分的各项动作功能及轻载跑合试验。

Under the condition of confirming the correct installation and good lubrication, carry out the adjusting test for the hydraulic sys., then carry out the relatively adequate function test for each motion and the trial test under light load.

## 3. 安全限位装置的调整试验 Safety limit unit test

## 3.1 起升上，下限位 Hoisting and low limit

调试绞车上下限位的准确性，上下限位应准确可靠。

Check the correctness of hoisting and low limit.

## 3.2 变幅限位 Luffing limit

起重机在工作最大距离和最小距离时，油缸限位准确可靠。

Check the correctness of cylinder limit when crane at the maximum and minimum working radius.

## 4. 负载试验 Load test

## 4.1 在空负载状态下，升降，变幅，回转机构分别以低速和高速最大范围内动作，观察有无异



常现象，检测各动作的速度，油压，电流，电压等。

At no load state, check the abnormal during hoisting luffing and slewing at low and high speed, record the speed, oil pressure, current and voltage at each move.

#### 4.2 安全工作负载试验 (SWL) SWL test

4.2.1 在吊臂与水平面成 60° 位置处，检测绞车起升，下降动作的速度，油压，电流，电压等。

During the crane arm with 60° angle check the winch speed, oil pressure, current and voltage

4.2.2 在最大工作幅度处，检查左右回转动作的油压，电流，电压等。

At the maximum luffing position check oil pressure, current and voltage when slewing.

4.2.3 吊臂从最大工作幅度到最小工作幅度或吊臂从最小工作幅度到最大幅度运动时，测量变幅动作的油压，电流，电压等。

Check and record the oil pressure, current, voltage when the crane arm from the maximum luffing position to the minimum position or reverse move.

#### 5 刹车试验 Skid test

以安全工作负载最大速度动作时，操纵手柄迅速回到中位，试验刹车机构是否安全准确地停止动作，与 4.3 试验同时进行。

At SWL and the maximum speed, control the hand grip to middle position. Check the correctness of skid unit, carry out with the item 4.3.

#### 6 应急试验 Emergency test

以安全工作负载按 4.3 进行试验的过程中，同时操纵应急阀，检查各动作停止是否安全可靠。During the process of item 4.3, operate the emergency valve check reliability of each action.

#### 7 绞车制动器的手动释放试验（带载）

Winch skid unit manual relies test(with load)

升降动作时将应急阀手柄置与应急状态，用手动泵供油打开升降制动器，检查重物是否能安全平稳落下。

During the hoisting and low process operate the emergency hand grip at emergency state, open the skid unit with hand pump and check whether the heavy can falling smoothly.

#### 8 绝缘电阻测试 Insulation resistance test

起重机运转前，在温度 5-40°，相对湿度 45%-75%，气压 86-106Kpa 的环境条件下，用 500V 的兆欧表进行绝缘电阻测试，主电路与船体之间的绝缘电阻值应不低于 20MΩ，控制电路与船体之间的绝缘电阻应不低于 5 MΩ。

Before start the winch, at the following condition Tem. 5-40° ,Hum. 45%-75%, air pre. 86-106Kpa. Carry out insulation resistance test use 500V megaohm gauge. The resistance between main circuit with hull should above 20MΩ, between control circuit with hull should above 5 MΩ.

电动液压回转起重机试验记录

Electric-Hyd. Provision crane Record list

Test items 试验项目		高度 Hi g. m	压力 Pre. Mpa	时间 Tim. sec	速度 Spe. m/mi n	刹车 Skid 次数 Fre. 可靠性 credibi lity		电机参数 Motor 电压 Vol. 电流 Cur.		试验 结果
空载绞车 Hoisting no load	起升 Hosi t									
	下降 Low									
空载变幅 Luffing no load	起升 Hosi t									
	下降 Low									
空载回转 Slewing no load	左 Left									
	右 Right									
100%负载绞车 1*SWL	起升 Hosi t									
	下降 Low									
100%负载变幅 1*SWL	起升 Hosi t									
	下降 Low									
100%负载回转 1*SWL	左 Left									
	右 Right									

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 二十七、Hatch cover sys. Test

## 舱盖系统试验

Completion, correctness, air-tightness of this system should be ok according to system drawing.

根据系统图，系统的完整性、正确性和密性交验完毕

试验前检查项目 Pre-Test Check Item

Check Item 检查项目	Check result (yes/no) 检查结果	Owner 船东	RINA 船检
Piping installation and pressure test 管路安装和压力试验			
Mechanical installation 设备安装			
Cable termination and power supply 接线和电力供应			

## 1. 液动力单元 Hydraulic power pack unit

## 1.1 液压泵(2 台) Hyd. pump unit (2 sets)

转速Rotate speed: 1450RPM

马达(每个): 15kw, AC 380V/50HZ, 3相

Motor (each): 15kw, AC 380V/50HZ

油泵流量(每个): 大约 22L/min

Oil pump flow rate (each): abt. 22L/min

冷却器: 3-4m<sup>3</sup>/h Cooler: 3-4m<sup>3</sup>/h

## 1.2 设定值 / 设定值 setting point/value

低液位报警 Low oil level alarm

最低液位停机 Most low oil level stop

高温停机 High temp. stop: 65°

滤器阻塞报警 Filter blocked alarm

冷却器自动启动 Cooler auto start: 45°

低温启动加热器 Low temp. start heater: 15°

## 1.3 移动泵站 Moveable pump station

液压泵 Hyd. pump unit (1 sets)

转速Rotate speed: 1450RPM

马达: 7.5kw, AC 380V/50HZ, 3相

Motor (each): 15kw, AC 380V/50HZ

油泵流量Capacity: 13L/min

## 2. 试验条件 TEST CONDITION

## 2.1 系统电缆和管路应按照设计图纸和规格书正确安装完毕。

Electric cables & piping shall be correctly installed according to the drawing and specifications for them

## 2.2 液压管应经过串油清洗及压力试验合格。

The hydraulic pipe should be flushed by oil and then carry out pressure test.

## 2.3 系统管路需注入推荐的液压油且管路的空气需要彻底被清除。

The system shall be filled with the recommended hydraulic oil and the air in the system

shall be thoroughly purged.

2.4 各连接运动部件，连接可靠并涂有润滑脂。

Check the reliability of each connection part and ensure efficient lubricate.

### 3. 试验程序 TEST PROCEDURE

3.1 液压动力单元测试 Hydraulic power pack operation test.

确定下列设定值测试结果并在测试结果表中记录下来

Confirm following functions and record each setting value on an attached sheet for Inspection result.

NO.1、NO.2 液压泵马达绝缘，启动电流

NO.1、NO.2 Motor insulation, starting current

低液位报警 Low oil level alarm

最低液位停机 Most low oil level stop

高温停机 High temp. stop

冷却器自动启动温度 Cooler auto start temp.

低温启动加热器 Low temp. start heater

安全阀设定压力 -press relief valve set press

### 4. 舱盖开启关闭试验 Hatch cover open&close test

4.1 将操作阀组中左侧手动换向阀的手柄置于“LIFT”位置，液压油便从油箱吸出，经过油泵、手动换向阀、液压锁和单向节流阀将压力油压入油缸无杆腔，油缸为活塞式油缸，压力油使活塞杆伸出，将舱盖上的滚轮顶升到到位，液压锁可将滚轮始终保持在轨道上。记录油缸启动到顶升到到位的时间。

Operate the left hand grip of valve block at “LIFT” position, the hyd. Oil suctioned from tank through the oil pump, valve, hyd. Lock and throttle valve to cylinder, the piston was pressed out and lift wheel on the rack. Record the lifting time.

8.2 将阀组中右侧手动换向阀的手柄置于“OPEN”位置，此时，油压经过阀组到油马达的A腔，油马达旋转时带动链轮，通过链条拖动舱盖在舱口围面板上运动，最后将舱盖拖曳到舱盖收藏端。记录此过程所需时间。

Operate the right hand grip of valve block at “OPEN” position, and then the hydraulic oil get to the cavity of motor, drive the motor to move the cover at complete open position by chain. Record the time used by this process.

8.3 将阀组中右侧手动换向阀的手柄置于“CLOSE”位置，此时，油压经过阀组到油马达的B腔，油马达旋转时带动链轮，通过链条拖动舱盖在舱口围面板上运动，最后将舱盖拖曳到舱盖关闭位置。记录此过程所需时间。

Operate the right hand grip of valve block at “CLOSE” position, and then the hydraulic oil get to the opposite cavity of motor, drive the motor to move the cover at close position by chain. Record the time used by this process.

8.4 在舱盖开启和关闭过程当中停留在任意位置，检查油驱动马达中平衡阀对舱盖的锁定性能。Stop the cover at optional position during open or close process, check the lock capacity of balance valve in drive motor.

8.5 舱盖被拖曳到舱盖关闭位置后，将阀组中左侧手动换向阀的手柄置于“LOWER”位置，压力油压入油缸有杆腔，压力油使活塞杆缩回，使舱盖上的滚下降，降到收藏位置。记录此过程所需时间。

When the cover at close position, set the left hand grip at “LOWER” position, then the hydraulic oil press the piston back and let wheel down at the collection

position. Record the time used by this process.

- 8.6 任选一个舱盖做移动泵站操作试验。关闭换向阀组P、T 口的球阀，将移动泵站移至需工作的舱口盖换向阀组旁，接上电源，接好快速接头，启动移动泵站电机，通过操纵换向阀组就可实现开舱和闭舱动作。记录移动泵站开启和关闭舱盖所需的时间。

Chose one cover check the moveable hydraulic pump station. Close the globe valve before the valve block, connect the power and the quick connector for pump station then start motor. Operate the changeover valve open and close hatch cover. Record the open and close time drive by moveable pump station.

- 9 对每一舱盖进行应急停机试验。

Emergency stop test for each hatch cover.

- 10 To fulfill the test report.

填写试验报告。

## 舱盖系统试验记录

## Hatch cover sys. Record list

Check Item 检查项目		Test result 试验结果		Remark 备注
		Setting 设定值	Actual 实际值	
1#液压马达 No.1 Hyd. motor	绝缘 Insulation			
	启动电流 Start current			
2#液压马达 No.2 Hyd. motor	绝缘 Insulation			
	启动电流 Start current			
低液位报警 Low oil level alarm				
最低液位停机 Most low oil level stop				
高温停机 High temp. stop				
冷却器自动启动 Cooler auto start temp.				
加热器自动启动 Heater auto start temp.				
安全阀设定压力 Press relief valve set press				
舱盖开启耗时 Open cover time	1#			
	2#			
	3#			
	4#			
舱盖关闭耗时 Close cover time	1#			
	2#			
	3#			
	4#			
移动泵站开启舱盖时间 Open cover time by move pump station				
移动泵站关闭舱盖时间 Close cover time by move pump station				
应急停车 Emergency	1#			
	2#			
	3#			
	4#			

结论:

检验员\_\_\_\_\_

船 东\_\_\_\_\_

船 检\_\_\_\_\_

## 二十八、Hose test of doors, windows and covers

### 门、窗、盖的冲水试验

1. Check installation completeness of doors, windows and covers. Chalk test to be carried out check tightness (painting and covering laying (such as insulation material etc.) in the position being checked on doors, windows and covers to be carried out after watertight test is up to standard).

检查门、窗、盖安装的完整性，用粉笔自检密封性能（门窗盖受检部位涂漆或敷设绝缘等复盖物应在密性试验合格后进行）。

2. Manholes: hydraulic (pneumatic) test to be carried out simultaneously with hull tanks.  
人孔盖：与船体舱柜同时进行水（气）压试验。

3. Watertight or Weather tight doors under forecastle deck: hose test to be carried out after installed on board. And water-spraying test to be done for doors above forecastle deck.

艏楼甲板以下的风雨或水密门：装船后作冲水试验，艏楼甲板以上的门做淋水试验。

4. Porthole and rectangle windows: water-flushing test to be carried out after installed on board.

舷窗、矩形窗：装船后作冲水试验。

5. Hatch cover, small hatch covers and the opening for lifting: water-flushing test to be carried out after installed on board.

货舱盖、小舱盖、吊物口：装船后作冲水试验。

6. Requirements for water-flushing test:

Diameter of nozzle: not less than 16mm

Pressure of water: not less than 0.1Mpa

Distance between nozzle and position being checked: not more than 3m

冲水要求：用喷嘴直径不小于 16mm、水压力不小于 0.1Mpa，喷嘴距被测处的距离不大于 3m 直接冲水。

## 二十九、舷梯强度试验

### Strength Test of Accommodation Ladder

1. Test of hoisting and lowering operation to be carried out without load for three times, Check reliability of limit position switch and record the parameter of motor measure insulation resistance of motors( not less than  $1M\Omega$  ).

舷梯空载吊起和放下各 3 次，检查限位开关的可靠性，记录电机有关参数测量电机绝缘电阻(不小于  $1M\Omega$ )。

2. Turn the accommodation ladder outboard at the angle of  $30^\circ$  to horizon.

Carry out the test of weight distribution, put a load of 300Kg (weight) on the upper platform, 150Kg on lower platform, 75 Kg on each step (or 150Kg on every other step), keep in a static condition for 15 minutes. Then remove the loading and check that turning parts of accommodation ladders should be flexible.

There is to be no blocking occurred, and no crack on the upper platform.

将舷梯翻转到舷外与水平线成  $30^\circ$ ，做重量分布试验：上平台放置 300Kg(压铁)，下平台放置 150Kg。每一踏步放置 75Kg 或隔一踏步放置 150Kg(压铁)，在静止状态下保持 15 分钟，然后卸去负荷，舷梯各旋转部分应保持灵活，不得有卡住现象，平台不允许有裂纹。