PLAN RECORD				
REV. NO.	DESCRIPTION	DRAWN BY	DATE	CHECKED
ORIG.	ORIGINALLY PREPARED FOR 8250/8251	J.S.YOON	2023.11.30	S.H.HAN
0	ISSUED FOR PURCHASE ORDER.	J.W.PARK	2023.12.18	Y.U.KIM

Prepared by Hyundai Heavy Industries Co., Ltd.
on behalf of Hyundai Samho Heavy Industries Co., Ltd.

전장 협의

(7 SHEETS WITH A COVER)

SEC. NO. C2Y4	PROJECT PLANNING DEP'T (Commercial Ship)	157,000 DWT CLASS CRUDE OIL CARRIER
DATE	2023. 11. 30.	PURCHASE ORDER SPECIFICATION FOR
TEL. NO. *1-6325	SHIP NO. **8250/8251**	**F.W. GENERATOR**
	APPROVED Hyunseung Kim	
	CHECKED Seungho Han	
	DRAWN Junsuk Yoon	
HYUNDAI HEAVY INDUSTRIES CO., LTD. SAMHO SHIPYARD. KOREA		REFERENCE DRAWING NO. 8250536-0 / DRAWING SCALE
		SEQUENCE NO.

PACKAGE LIST

HULL NO. : 8250/8251 PAGE : 0

POR NO.		DESCRIPTION	Q'TY	REMARK
SER. NO.	SEQ. NO.			
M536	AA	F.W. GENERATOR EVAPORATING TYPE	1	Separately packed
M536	BB	SPARE PARTS & TOOLS FOR F.W. GENERATOR	1	

1. EACH UNIT WITHIN A PACKAGE OR SHIPPING CONTAINER SHALL BE CLEARLY MARKED IN A MANNER AS MAY BE DESIGNATED BY THE BUYER BY STAMPING, TAGGING OR OTHER SUITABLE MEANS WITH IDENTIFICATION OF SUPPLY.
   THE OUTSIDE OF EACH PACKAGE AND OR PROTECTIVE DEVICES SHALL BE CLEARLY MARKED, REFERING SHIPPING MARK.
2. ABOVE POR NO. (SER. NO. - SEQ. NO.) AND DESCRIPTION MUST BE MARKED ON EACH PACKAGE AND PACKING LIST.

1. Type

Low pressure evaporating type. (M/E jacket water heating)
Shell & Tube type

2. Particular

1) Q'ty/ship : One(1) Set
2) Capacity : 25 ton/day ***with 15% fouling margin***
3) Shell vacuum : Maker's standard
4) Salinity of distillate water : Max. 10 PPM
5) Design condition

	HEATING MEDIUM	COOLING MEDIUM
Source	M/E jacket cooling F.W. (M/E model : ***HYUNDAI-MAN B&W 6G70ME-C10.5-HPSCR***)	S.W.
Flow rate (m3/h)	Maker's standard	Maker's standard
Inlet temp.(℃)	***83***	32
Press.(bar)	***4.5***	Maker's standard
	Distillate pump	Ejector pump
Capacity	Maker's standard	To be supplied by shipyard
Total head	Maker's standard	
Shaft seal	Maker's standard	

3. Construction and Material

1) Construction
- Fresh water generator to consist of evaporating chamber, condensing chamber, distillate pump, salinity indicator, brine/air ejector, and other accessories.
- Jacket cooling water of main engine to be used as heating medium during normal sea going.
- Sufficient vacuum to be maintained inside the distiller by means of brine/air ejector.
- Sea water supplied by ejector pump to be delivered to ejector for taking out the brine and air. The for cooling water system of condensing chamber and feeding of evaporating chamber to be arranged in accordance with maker's standard.
- Salinity of distillate not to exceed 10 PPM and to be monitored by a salinity control unit with high salinity alarm.
- On sensing an excessive salt content, the fresh water outflow to be automatically diverted to return to evaporating chamber by a dump valve.
- The other except the above mentioned to be in accordance with maker's standard and the requirements of Class Society(***DNV***)/Regulatory Bodies.

2) Material : Maker's standard.

4. Accessory and fittings

To be in accordance with the requirements of Classification Society/Regulatory Bodies and maker's standard including following.

1 set - S.W. ejector for brine/air extraction
1 set - Thermometer and bulb with name plate(S.W. in/outlet, J.W. in/outlet, Condenser)
1 set - Pressure/Compound gauge with root valve and name plate.
1 - Motor driven distillate pump.
1 - Vacuum gauge with root valve and name plate.
1 - Vacuum breaker.
1 - Safety valve.
1 - Sight glass.
1 - Distillate flowmeter with by-pass line
1 - Solenoid dump valve
1 - Water treatment unit for evaporating chamber, if necessary
1 - Salinometer with automatic control to re-circulate distillate on high salinity
1 - F.W. generator chemical dosing unit

All of necessary items and fittings to perform function/operation of the unit.

5. Spare parts and tools

To be supplied as shown on General Information & Requirement which is separately distributed by Material Purchasing Department.

6. Remark

1) Capacity of M/E jacket cooling fresh water is max. (***105***) m3/h.
2) Available heat dissipation of M/E jacket cooling water is max. (***782,170***) kcal/h.
3) The sensor for salinity indicator to be temperature compensated.
~~4) (5.5) kg/cm2G saturated steam to be supplied for steam injector.~~
5) Voltage free, normal close contact for salinity high alarm to be provided for engine control room console.
6) Ejector pump to be supplied by shipyard.
The capacity/head of above ejector pump to be informed on quotation sheet for yard's reference.
7) The starter to be supplied by ship yard, but the recommended elec. wiring diagram to be included in approval drawing for yard's reference.
8) Acid cleaning connection to be provided on S.W. in/outlet for condenser, if necessary.
9) Maker shop test result to be submitted.
10) The final painting color of mach. external surface to be of Munsell no. 7.5 BG 7/2.
11) The S.W. strainer(mesh size : ***4*** mm) will be provided by yard. But, if the finer strainer than mesh size of ***4*** mm is recommended, the required S.W. strainer to be supplied by maker.

12) If the power plug is supplied with the following equipment, the power plug to be of AC ____V, DIN type (W/T type, Non W/T type)
- F.W. generator chemical dosing unit

13) The rated evaporation capacity shall be designed based on sea water temp. 32°C at M/E NCR load.

14) Packing method
- All components/fittings to be supplied as one unit with the assembled condition without loose supply items.
- The packing/content list to be prepared for each packing.
- The packing case for spare part/tool to be made separately.
- **The protection cover to be of flame resistance type.**
- Each group of packages shall be delivered on time separately required by Material Purchasing Department .
- The item(s) marked as “Separately packed” in Package List to be packed separately as it is to be directly supplied to the third party, i.e. manufacturer for ship’s hull block and/or equipment (machinery) package unit including pipe fitting and steel outfitting.

15) The other general requirements which are not shown on this technical spec of P.O.R and the details of electric spec to be complied with General Information & Requirement which is separately distributed by Material Purchasing Department.

16) FAT Procedure has to be submitted to our QM before FAT - 30 days.
The mentioned documents for FAT have to be submitted at the initial stage.
- Piping & Instrument Diagram
- Operation manual
- Alarm & Safety Device List
- Function manual(FDS)
- I/O List (If possible)
Owner's approval comments have to be closed before FAT.

General Remark

1) The material of insulation, gasket and/or gland packing shall be of asbestos-free type.
2) All instruments to be of suitable construction for max. operating value and to be of graduation in metric units and normal reading should be between 50% and 75% of the value as far as practicable.
3) Temp. sensor for remote reading & supervision to be of the electric analogue type.
4) Sensor cables to have a loop of excess cable at the sensor end to facilitate replacement of sensor.
5) Thermometers and temp. sensors for monitoring of fluid temp. only to be equipped with pockets of suitable material or to be element exchangeable type Pocket to be filled with heat conductive compound.
6) All pneumatic control loops to have air filter regulators.
7) All control valves, if adopted, shall be provided with manual handle.
8) Local pressure gauge to be of bourdon tube type with body of brass or SUS.

   Local pressure gauge to be liquid filled type, as far as practicable.

   Local pressure gauges on cargo part & exposed deck area to have body of stainless steel, as far as practicable. (Brass, copper & Al –brass is not acceptable due to non-compatible with NH3 and Urea)
9) All root valves for pressure gauges shall be of bite type joint, not brazing type.
10) Name plate for instrument (press., level, temp. sensors) to be fitted an suitable place of main equipment or to be attached to instrument by using stainless steel (SUS) wire / lug similarly to tag.
11) Spare parts and tools to be supplied with suitable rust preventive coating where necessary.
12) Grease nipple to be of ball type (JIS B 1575 A-PT 1/8 or equivalent type). (Material : Brass ***for indoor, SUS316L for outdoor and when exposed and/or submerged in Sea Water***) or maker's standard which is provided by the equipment supplier as a package.
13) Removal space (if required) for maintenance to be mentioned on approval drawing.
14) All opening(i.e. in/out connection etc.) to be packed by blank flanges made of hard material after suitable treatment to corrosion attack.
15) Stainless steel described without grade notation means SUS 304.
16) Name plate showing valve's purpose to be fitted on hand wheel of the valve. (Tag or identification plate fitted with wire on the valve can also be acceptable for small valve)
17) Spare parts & tools for ancillary equipment to be also shown on "List of spare parts & tools" together with those of main unit. And working q'ty, spare q'ty, part number to be shown definitely with sketch of shape.
18) Control air pipe connection (if required) to be suitable for yard's 8Φ copper pipe.
19) Drawing of general layout showing plan / elevation / section view shall be included in the approval drawing.
20) Eye-plate to be suitably fitted for rotor of generator, steam turbines, electric motors, heat exchanger's cover/tube/bundles and heavy strainer's cover/filter/element of about 40 kg & above (And lifting eyes to have a min. diameter of 23 mm).
21) Test provision such as three way test cock to be provided for pressure switches and pressure transmitters.

22) The surfaces having normal operating temperatures above 60 ℃ to be insulated by “Supplier", except valves and flanges, where required, for maintaining internal fluid temperature and for personal protection and at least the a preparation work(insulation stopper and/or pin) should be done by supplier before equipment delivery.

23) The information of loose supply items (Yard Supply Scope) & connections to be separately listed and reflected on the approval drawing.

24) The deviation from yard’s P.O.S. to be notified by the deviation list and clarified at the quotation stage. (IMPORTANT)

Items not notified in the deviation list should be considered as fully satisfied with this technical specification.

Even in case there is no deviation, such a term as ‘no deviation’ should be stated in the deviation list. (IMPORTANT)

25) Any necessitate modification and/or changes from the submitted specifications and/or official performance data released at the time being, MUST be informed separately and agreed by YARD prior to application. (IMPORTANT)

26) For the explosion proof equipment installed in hazardous area, item list of explosion proof electric component (such as sensor, motor) and specific general arrangement drawing including location of the component and copy or picture of Certificate No./Classification to be submitted prior to FAT.

27) Cable way to be provided on equipment body or additional cable tray to be provided for each yard cable connection. And standardized cable way/tray should be indicated and represented clearly on approval drawing.

28) All cable glands to be marine use type and maker’s standard. Maker shall be responsible for provision/installation of suitable size of cable gland with gapless inner packing so that it can hold cable tightly and ensure intended quality and performance. In case of non-metallic gland application, it should be made of approved corrosion/oil resistant materials and non-hazardous material including flame retardant characteristic. Strength and hardness shall be similar to metallic gland and it shall be capable of withstanding ship’s vibration and UV light(ultra violet) by such as anti-UV coating or equivalent. Unused cable glands to be blocked by blind plug to satisfy IP grade & explosion proof.

29) Enclosure and protection type for electric equipment to be applied as follows unless specified elsewhere in the POS.

- Drip-proof type (IP 20): Inside control room and accommodation

- Drip-proof type (IP 22): Inside engine room (above floor) and other enclosed machinery space

- Splash-proof type (IP 44): Inside engine room (below floor), steering gear, fire control station, purifier space, galley and laundry, bosun store.

- Water-proof type (IP 56): Weather exposed space