

ATTECHMENT-A-1

SPECIFICATION FOR CARGO OIL

SYSTEM CARGO LOADING AND UNLOADING SYSTEM

The vessel shall be able to load and discharge four (4) different kinds of cargo oil simultaneously without contamination and with double valve segregation.

Loading of cargoes shall be from manifold with a bypass arrangement on the cargo pumps.

The cargo pumping systems shall allow cargo maximum discharge rate of 1500 m³/hr with four (4) cargo pumps running simultaneously.

The vessel shall achieve a cargo loading rate of approximately 1,500 m³/hr through the cargo manifolds, and cargo pumps (detailed as below).

Pump	Cargo pumps (inside cargo tanks)	Cargo pumps (inside slop tanks)	Portable cargo pump
Number	12	2	1
Type	Single stage submerged	Single stage	Single stage submerged
Driven by	Hydraulic powerpack in engine room	Hydraulic powerpack in engine room	Hydraulic power pack in engine room
Capacity	375 m ³ /h x 110 mlc, sp.g 0.8, visc 1.0 cSt	100 m ³ /h x 110 mlc, sp.g 0.8 visc 1.0 cSt	70m ³ /hr – 70mc, s.g.-0.8
Material	Stainless steel AISI 316	Stainless steel AISI	

The pipestack between the top-plate and the pumphead consists of the main cargo pipe, stripping and purging pipes and a concentric hydraulic pipe.

The hydraulic high pressure pipe is located inside the return pipe and the complete hydraulic section is isolated from the cargo by a cofferdam ventilated to the atmosphere.

CARGO OIL MAIN LINE

The cargo oil main line shall be arranged for cargo tanks, slop tanks and on the main deck as shown on "Piping Diagram of Cargo Oil System". Drg. No. SS/MC-52/11, Rev C, SS/MC-52/12, Rev C and SS/MC- 52, Rev C attached here with.

Cargo oil lines in tanks and on deck shall consist of independent systems serving the following groups and shall be capable of performing loading or unloading of different kinds of products simultaneously and shall be capable of changing the combination of tanks and pumps using the inter connection line and header manifold. Suitable height coaming to contain spillage shall be fitted throughout the main deck.

The cargo oil tanks shall be fully segregated into seven (7) groups of cargo with double segregation as per attached General Arrangement drawing Drg. No. ST1436 – GI, Rev – E.

No 1	P & S cargo tank.
No 2	P & S cargo tank
No 3	P & S cargo
No 4	P & S cargo
No 5	P & S cargo
No 6	P & S cargo
	P & S slop tanks.

Carriage of up to seven (7) segregated cargoes.

Simultaneous loading of seven (7) grades over seven (7) manifolds and direct drop lines to cargo tanks, with venting to atmosphere.

A common cargo crossover with connections to individual crossovers by bends / spool pieces etc., for loading/discharging unit cargoes shall be included.

Simultaneously loading of seven (7) grades over seven (7) manifolds and direct drop lines to cargo tanks, with vapour return line back to cargo tanks.

Direct drop line shall be arranged for each cargo tank.

Pockets of likely contamination or sources for accumulation of stagnant fluid must be eliminated as far as possible.

Cargo piping shall be of AISI 316L stainless steel welded pipe. These pipes shall be supported on resilient Teflon packing on pipe stools to reduce the transmission of noise and vibration.

Expansion bends shall be used on the main deck.

Sampling cock shall be provided on each cargo manifold and a boss with gauge cock for portable pressure gauge and a boss with pocket for portable temperature gauge also shall be provided on each cargo manifold.

Cargo reducers with ANSI 150 PSI flanges shall be supplied.

Shore connections shall be provided amidship on both side of main deck in accordance with MARPOL requirement.

The shore connection flanges shall be ANSI flat face. Two (2) sets of reducers of 4", 6", 8", 10" from 12" Sch. 80 pipes. These reducers shall be of stainless steel, internally and externally coated with epoxy.

A drain spill tank for the manifold shall be fitted to each side of the manifold. Each spill tank shall be provided with open grating at top as a working platform.

Manifold height above main deck shall be about 1.8 meter and distance of manifold from ship's side shall be about 4.0 meter.

Drain from spill tanks (P&S) and shore connections shall be led to port side slop tank through a permanent piping.

Discharge points located port, starboard and a midship shall be designed suitable for four (4) pumps operating simultaneously.

The spill tank shall be extended at least 1,200mm beyond the outermost flange of vapor collecting manifolds.

Cargo valves shall be butterfly valve Material of

butterfly valves shall be as follows

Body	Stainless Steel	Stainless Steel
Disc	Steel (SUS 316)	Stainless Steel
Stem	Steel	PTFE (To suit chemicals)
Seat	Stainless Steel	
Ball	Steel	

CARGO OIL VALVE OPERATION

All cargo valves shall be of AISI 316 stainless steel butterfly-type valves.

All cargo valves except manifold valves shall be hydraulically remote operated from cargo control room. Local control also shall be arranged on deck.

Adequate capacity hydraulic power pack to be included in scope of supply.

Discharging valves for each cargo pump outlet shall be remote controlled and have the possibility to regulate from 0 - 100% gradually, not only for open or closed.

Cargo valve reducers and spool pieces shall be installed in accordance with the OCIMF requirement. Securing arrangement for reducers, spool-pieces, bends, etc. shall be arranged on top of deck trunk at cargo manifolds.

One (1) additional spare cargo manifold valve of manual type shall be supplied.

SAMPLING POINTS

A sampling cock (approx. 25 mm dia.) shall be provided at each cargo manifold. Sample points shall have a drip tray under. A boss with gauge lock for portable pressure gauge and a boss with pocket for portable temperature gauge shall also be provided on each cargo manifold.

All cocks shall be of stainless steel type.

Sufficient space shall be provided for the safe keeping of samples.

CARGO OIL STRIPPING

Stripping of cargo tanks shall be done by the submerged cargo pumps which have a built in stripping system.

ATTACHMENT- A- 2

CARGO OIL TANK CLEANING SYSTEM

Fixed tank cleaning machines in each tank c/w flexible rubber hoses, couplings and hose saddles suitable for tank washing shall be provided operated by a special pump of 10 bar. For this a minimum 60 m³ of additional FW is required which can be stored in the aft peak instead of WB.

The system shall be designed with the four (4) tank cleaning machines operating simultaneously.

In addition four (4) nos. portable machines of the following specification shall be provided.

Type : Portable, twin nozzles.
Rating : 15 m³/hr at 7 bar.

The machines shall be connected to a tank cleaning main line operated by a special pump of 10 bar.

One (1) stop valve shall be provided for each fixed machine.

Suitable number of branch lines with 50mm dia. diaphragm valves and hose coupling shall be provided for the fixed and portable machines.

One (1) pressure gauge shall be provided in tank cleaning main line and the pressure shall be indicated at the local position.

Interconnection between tank cleaning main line and fire and wash deck main line shall be arranged by a special piece on deck.

A) Tank Cleaning Hatches (14 Nos.)

One (1) of diameter 320 mm per tank shall be provided with coaming height of 150 mm for openings. Hinge pin and butterfly nuts shall be stainless steel.

The above specified numbers of hatches per tank is subjected to final arrangement and may be increased accordingly (but limited to maximum of 3 numbers per tank) due to difficult hidden corners.

B) Tank Cleaning Machine

The technical data of the T.C. machines shall be submitted to the Owner for installation of T.C. holes and decision of branch pipe bore before design stage.

- Two (2) bulkhead penetration.
- One (1) sample probe.
- One (1) flow meter system.
- One (1) solenoid valve for operating of pneumatic controlled overboard valve.

Overboard discharge valve,
Recirculating valves.
Remote valve position indicator connected to speedlog.
Operation manual to Class approval.

All installation of equipment in engine room and cargo control room shall be tested and commissioned to Classification and Owner's Representative satisfaction.

The monitor shall be connected to the cargo system overboard discharge.

A separate overboard discharge system for chemicals, as per Marpol Annex II shall be installed.

The sampling arrangement to fulfill the latest IMO requirements.

The overboard discharge of water from slop tank shall be automatically isolated and dumped back to slop tank if monitored value of oil content is above pre-set value.

- a) The vessel shall carry one (1) set of portable steel gauging tape approved by ASTM with a 150 mm (6") weight attached to one end.
- b) The vessel shall carry one (1) set of API/ASTM/IP approved electronic type thermometer on board for manual temperature measurement of the cargo.
- c) The latest ASTM temperature/specific gravity/density correction tables shall be available on board for calculation of bunker volume.

One (1) set of vapor control valve on each cargo tank deck and each slop tank deck shall be provided for ullage, interface, hand dipping and which shall be used for cargo sampling as well. The vapor control valves shall be ball valve or spring loaded type as per Maker's standard and shall be sealed when not in use.

100mm dia ullage hatches shall be provided on the top of the access hatches and the reference height shall be stated in the calibration tables.

ATTECHMENT- A- 4

CARGO OIL TANK VENTING SYSTEM

CARGO OIL TANK VENTING

The air pipes shall be sized according to the loading rate and shall comply with the Classification requirements.

Cargo tank venting with two (2) central venting stations shall be through approved systems that expel vapours clear of the tank deck area in accordance with ISGOTT.

Two (2) independent high velocity pressure/vacuum valves shall be provided for each cargo/slop tank and grouped to form centralised venting system.

Each riser shall be provided independently and shall be about 2 metres high above deck and provided with a flame arrestor and a weather bond.

Each individual pressure-vacuum valve shall be of "SS PV" type and be fitted and each tank.

The pressure/vacuum valves shall be set at 0.14 kg/cm² for pressure and 0.035 kg/cm² for vacuum.

A system for vapour return of 2 cargos simultaneously with pressure sensor shall be installed.

Service air shall be utilized for operation of portable gas freeing fans.

ANNEXURE-B-1

SPECIFICATION FOR WATER BALLAST SYSTEM IN WAY OF CARGO AREA

Ref. Drg. No. SS/MC – 52/ 06, Rev . C

The ballast system shall be arranged to facilitate complete ballasting or deballasting of the vessel.

The submerged centrifugal hydraulically driven ballast pumps for cargo area shall be located in side the ballast tanks P and S and shall have piping arrangement for filling and discharge of water ballast in cargo area. The capacity of the ballast pump shall be 400 m³ /hr – 15 mwc, s.g. 1.025

The ballast piping shall be of GRP material.

All Deck / BHD penetration shall be of Carbon Steel Sch – 80 thk. Galvanized.

All ballast valves in tanks shall be of butterfly type and hydraulically remote operated from cargo control room. The pump discharge valve shall be a throttle valve with remote indication in CCR. Ballast valves to have open/closed indication in CCR.

Single suction bell mouths shall be provided at each ballast tank suction.

Ballasting shall also be done by direct flooding from the sea chest.

No separate stripping line with bell mouth shall be provided, but there shall be one ballast eductor for stripping of ballast tanks. Drive water shall be supplied by ballast pumps.

The ballast system shall be arranged for connection to cargo manifold by spool piece for emergency ballasting. Blind flanges shall be fitted on both sides at manifolds.

Remote reading level gauging system for water ballast tanks shall be fitted.

ATTECHMENT- C

OIL DISCHARGE MONITOR

One (1) unit MARPOL "Category I" Oil Discharge Monitoring System consisting of the following shall be provided :-

- One (1) main computer unit.
- One (1) control terminal with printer.
- One (1) measuring unit.
- One (1) sample feed pump and electric motor assembly plus starter.
- One (1) ejector unit.

