

G- GENERAL

G.1

GENERAL PROVISION

It is the intent of these Specifications hereinafter called the "Specifications", accompanying plan(s) to describe and set forth the details of technical matters such as design, performance, capacities, construction, equipment, material, etc., required for building a vessel suitable for carrying the following cargo which is allowable to within the scope of these Specifications and/or General Arrangement Plan(s) attached hereto.

- Oil Petroleum products
- IMO II & III, D cargoes according to IBC code and compatible with the Specifications.

Intended Cargo List to be subject to Buyer's review. Should the Buyer request carriage of additional cargoes such requirement will be accommodated by the Builder at reasonable cost.

The vessel to be designed, constructed, equipped, tested and delivered to the Owner by the Builder in accordance with the Contract, these Specifications and Plan(s) for worldwide service as approved by the Classification Society and statutory requirements which the Society is authorized to implement.

Wherever "Owner" is mentioned in these Specifications, it means exactly the same as "Buyer".

Wherever "Owner's supervisor" or "Owner's local supervisor" or "Owner's Representative" is mentioned in these Specifications, it means exactly the same as "Buyer's Representative".

Wherever "Shipbuilding Contract" is mentioned in these Specifications, it means exactly the same as the "Contract".

Wherever "Builder's Standard" is mentioned in these Specifications, it means exactly the same as "Builder's Practice" as defined in the Contract.

The Builder to furnish the vessel all items required by the Rules and Regulations as specified in section G.6 "CLASSIFICATION, RULES AND REGULATIONS", also all items which are specified herein except those items specifically stated herein as to be supplied by the Owner.

Anything not mentioned in these Specifications but which is required by the classification society and other regulatory bodies listed herein shall be supplied and/or equipped and/or furnished by the Builder.

If any item(s) is mentioned twice or more in these Specifications, it is to be understood that this item(s) will be supplied and/or equipped only once unless otherwise agreed.

The terms of the Shipbuilding contract shall prevail and govern in the event of disagreement, contraction or any inconsistency between the Shipbuilding contract and the Specification, accompanying plan(s) and General Arrangement Plan. If discordances are found between the Specification and plan(s), the Specification shall govern unless otherwise mutually agreed. If any inconsistency is to be found between the approved plans and the Builders or subcontractors practice, the plans are to prevail and govern unless otherwise specifically agreed.

It is regarded that chapter "G-GENERAL" prevails over others. In the event of conflict or inconsistency between the terms of the parts of the specifications, the Hull part to prevail in respect of hull items, the machinery part in respect of machinery items, and the Electrical part in respect of electrical items.

Details in design, construction, installation, inspection, test and workmanship not covered by the Specifications shall be performed under the working plans and the Builders practice, copies of which shall be submitted to the Buyer for his reference.

The Builder will authorize the Class to provide to the Buyer with all and any correspondence & documents related to the plan approval upon Buyers request. Copy of such authorization from the Builder to the Class shall be provided to the Buyer.

Any amendment or change in the Rules and Regulations as specified in section G.6 "CLASSIFICATION, RULES AND REGULATIONS", is to be carried out subject to a documented in writing adjustment of the contract price which is to be fair and reasonable, deadweight, delivery date or any other item, if any, as the case may be.

Any amendment or change in these Specifications and/or Plan(s) under which the Vessel is to be constructed may be made at any time thereafter by written agreement between the Builder and the Buyer.

If the Owner desires to apply the said amendment and/or change to the vessel, the Builder will submit a written document, their effect on the contract price, deadweight, delivery date or any other items, if any, as the case may be.

Amendment and change shall come into effect after agreement has been reached between the Owner and the Builder, and a written consent has

been signed by both parties.

Amendment and change shall be recorded in a memorandum or a written document signed by the Owner and the Builder, which will be supplement to these Specifications.

Any oversight or omission in the Specifications concerning materials, equipment and machinery shall be included under the obligation of Builder and taken care of and/or installed if so usually done by Building yards for this kind of vessel.

Metric system to be adopted for designing and construction of hull, machinery and equipment unless otherwise specifically stated in these Specifications.

The draught of the vessel specified in these Specifications to be of moulded figure unless otherwise specifically stated.

The deadweight of the vessel specified in these Specifications to be of "all told" figure at the scantling draft unless otherwise specifically stated.

All plans, booklets, nameplates, caution/identification plates and whatever documents required for implementation of the Specifications to be in English.

Buyer's approval of drawings does not relieve the shipbuilder from his responsibility for design construction, workmanship and commissioning.

The maker list is to be prepared by the Builder, and mutually agreed by the Buyer and the Builder and to be part of these specifications.

The Plan(s) listed below to form an integral part of these Specifications and are subject to final approval by the Buyer and the Class where applicable.

The Plan(s) attached :

General Arrangement (preliminary)

Midship section (Preliminary)

Manufacturer List

Intended Cargo List

The following drawings to be provided as reference only.

Capacity Plan & Deadweight Scale

Cargo Piping Diagram & Ballast Piping Diagram

Midship Section plan will be the design basis from which no scantlings reductions being allowed without the consent of the Buyer.

The Vessel shall be constructed according to Builders Standards / Practice.

G.2

GENERAL DESCRIPTION OF VESSEL

The vessel to be built as ocean going oil product & chemical (IMO II & III) tanker with transom stern, bulbous bow, with expansion trunk, with forecastle, balanced rudder with shoe-piece and single screw propeller driven by a medium speed diesel engine.

The propulsion machinery and all living quarters including navigation bridge to be located aft.

The vessel to have continuous deck from stem to stern, transverse bulkheads, three (3) longitudinal bulkheads in way of the cargo tanks and the slop tanks as shown on the General Arrangement plan.

The vessel to have the following subdivisions as shown on the General Arrangement plan ;

- Fore peak tank for ballast water, chain locker, bosun store and bow thruster.
- The cargo space to be divided into five (5) pairs of cargo oil tanks, one(1) pair of slop tanks, six (6) pairs of water ballast tanks and one(1) pair of clean water tanks.
- Fuel oil tanks to be arranged between cargo space and engine room, and in engine room if necessary.
- Fresh water to be arranged under the steering gear room.
- Steering gear compartment, fresh water tanks and stern tube cooling water tank.
- Other miscellaneous tanks and compartments to be arranged as the Builder's design development according to these Specifications.

All cargo tanks shall be suitable for unrestricted full and partial filling with cargo of relative specific gravity not greater than 1.45 tons /cbm.

G.3**MAIN DIMENSION**

| | | |
|----------------------------------|------|---------------------------|
| Length, overall | abt. | 105.50 m |
| Length, between perpendiculars | | 98.00 m |
| Breadth, moulded | | 16.60 m |
| Depth, moulded | | 8.60 m |
| Scantling draught, moulded | | 6.60 m |
| Deck height at center line | | |
| Upper deck to F'cle deck | | 2.50 m |
| Upper deck to Poop deck | | 3.00 m |
| Upper deck to "A" deck | | 2.65 m |
| "A" deck to "B" deck | | 2.65 m |
| "B" deck to Nav. Bri. Deck | | 2.65 m |
| Nav. bridge deck to compass deck | | 2.60 m |
| Camber | | |
| Upper/Poop deck | | 150 mm high, knuckle type |
| F'cle deck | | 150 mm high, knuckle type |
| Nav. Bridge & "A" deck | | 50 mm high, side only |
| Other decks in deckhouse | | Nil |
| Sheer | | |
| Upper deck | | Due to camber only |
| Deckhouse | | Nil |
| Rise floor (dead rise) | | 150mm high, Knuckle type |
| Freeboard | | |
| Type | | "A" type |
| Freeboard deck | | Upper deck |

G.4

DEADWEIGHT AND CAPACITY

G.4.1

DEADWEIGHT

The deadweight in sea water (specific gravity of 1.025) is to be about 5,600 metric tons at the moulded scantling draft.

When the vessel is nearly completed prior to delivery, the lightweight measurement is to be carried out at the Builder's quay in the presence of the Owner's supervisor and surveyor of the Classification society or the Authority concerned.

The lightweight to be calculated in accordance to the definition and the requirements of SOLAS.

The lightweight measurement to be carried out by reading the draught of the vessel at aft, midship and forward on both port and starboard sides and measuring the specific gravity of sea water.

Displacement of the vessel at this lightweight measurement is to be determined from the hydrostatic tables including shell and all appendages.

The corrections of displacement for trim, heel, deflection of the vessel and the specific gravity of sea water at the lightweight measurement to be also made. If any superfluous weights are on board the vessel or any items belonging to the lightweight are not on board the vessel at the time of the lightweight measurement, such weight to be corrected as if not being on board or being on board respectively.

The lightweight and deadweight to be calculated by the Builder shall also be submitted to the Authority concerned for approval.

The lightweight is the weight of:

- Hull, machinery and electrical weight including all equipment and fittings required by the rules and these specification.
- Spare parts and inventories according to the requirements of the Classification Society and other contractual Regulatory Bodies.
- Oil and water inside the machinery, tanks, vessels, heat exchangers,

pipes and valves in the engine room directly related to main engine starting.

The deadweight thus to include :

- Cargo and/or ballast water
- All oil and water including stern tube cooling water except those in minimum required quantity in engine room machinery and their piping which are directly related to the main engine starting.
- Spare parts and inventories in excess of the requirements of the Class and other contractual Regulatory Bodies.
- Tools and test equipments
- Crew, their luggage and effects
- Provisions
- Stores of all kinds
- Spare anchor, propeller, and tail shaft if fitted.
- All other outfitting items supplied by the Owner, if any

G.4.2

CAPACITY

| | | |
|---------------------------|------|----------------------|
| Cargo tanks (100% full) : | abt. | 6,200 m ³ |
| Slop tanks (100% full) | abt. | 200 m ³ |

Tank capacity (100% full) :

| | | |
|--|------|----------------------|
| - Fuel oil tanks including settling and service tanks. | abt. | 260 m ³ |
| - Diesel oil tanks including settling, service tank | abt. | 65 m ³ |
| - Lub. oil tanks including settling ,service tank and Storage tank | abt. | 30 m ³ |
| - Fresh water tanks | abt. | 120 m ³ |
| - Cleaning water tanks | abt. | 150 m ³ |
| - Water ballast tanks | abt. | 2,400 m ³ |
| - Drinking water tanks | abt. | 40 m ³ |

G.5

G.5.1

Type : One, Wartsila 6L32
MCR : 3,910 BHP x 750 RPM
NCR(85% MCR) : 3,323.5 BHP x 710.5 RPM

G.5.2

Service speed at the scantling draft and at the normal continuous output (85% of MCR, 15% sea margin) at the condition of clean bottom in calm and deep sea is to be not less than 13.15 Knots.

G.5.3

Fuel oil consumption at the maximum continuous rating of main engine to be about 135 g/BHP.H +5% based on marine diesel oil of 10,200 Kcal/kg in lower calorific value at shop test under ISO reference condition.

Daily F.O.C., at 85% MCR based
on D.O. of 10,200 kcal/ kg LCV abt. 10.8 MT/day.

G.5.4

Duration of cruise at the normal continuous rating of main engine and on the condition of fuel oil consumption only for main engine using full bunker(based on heavy fuel oil : specific gravity of 0.98, 9,700 Kcal/kg in lower calorific value, filling ratio of 98%) with 3 days reserve to be minimum 19 days.

G.5.5

Cruising range on the condition of above mentioned duration of cruise and service speed to be about 6,600 sea miles with additional 300 sea miles as margin.

G.6**CLASSIFICATION, RULES AND REGULATIONS****G.6.1****CLASSIFICATION**

The vessel including its hull, machinery and equipment and all appliances shall be constructed and registered in accordance with the Rules and Regulations of the Classification Society and other Regulatory Bodies current as of the date of the Contract or published or ratified as of the date of the Contract to come into effect with compulsory application to the Vessel on or before the date of delivery of the Vessel and under survey of the Classification Society (hereinafter referred to as "Class and/or the Classification Society" and shall be distinguished in register by symbol of);

ABS (American Bureau of Shipping)

+A1 (E) Oil / Chemical carrier, IMO ship type II, ESP

+AMS

Flag : Marshall Island / Bahamas

G.6.2**RULES AND REGULATIONS**

Further to G.6.1 above the vessel to be built in compliance with the latest edition issued prior the date of signing contract of all applicable Rules and Regulations, which are in force at the time of signing the contract and in general are:

- National Maritime Regulations.
- International Convention on Load Lines, 1966 with Protocol of 1988 and latest amendments.
- International Convention for the Safety of Life at Sea 1974 including Protocol of 1978 and latest Amendments
- International Telecommunication Convention and Radio Regulations, 1974, 1982 and latest Amendments.
- International Convention on Tonnage Measurement of Ships, 1969 and latest Amendments.
- International Code for the Construction and Equipment of Ship's Carrying Dangerous Chemical in Bulk including latest Amendments.
- International Convention for Preventing Collision at Sea, 1972 and latest Amendments
- International Convention for the Prevention of Pollution from Ships, 1973 Annex I, II, IV, V & VI (Reg. 12/13/16/25) and the Protocol of 1978 and latest Amendments
- U.S. Coast Guard's Regulations for Foreign Flag Vessels Operating in the Navigable Waters of the United States (CFR Tittle 33-part 155,

- 156,157,159 and 164, CFR Title 46 – part 32,33,34.05,34.15, 35.01-1, 35.30, 35.35, 39) with Letter of compliance CFR Title 29 part 1981
- The International Electro-Technical Commission (IEC) Publication No. 92 (Recommendations for Electrical Installation in Ships)
 - Panama and Suez Canal Navigation Regulations including Tonnage Measurement.
 - ILO Convention No.92 and 133 Concerning Crew Accommodation on Board Ship
 - O.C.I.M.F Recommendations for Oil Tanker Manifolds and Associated Equipment, 1991, as practicable.
 - OCIMF Mooring Equipment Guidelines 1997 as practicable.
 - IMO Resolution A.468 (XII) "Code of Noise Level on Board Ships" as guideline
 - Exxon Mobil "Marine Safety Criteria for Industry Vessels" 2002 Edition (Inert Gas System shall be not provided) and time chartered tonnage additional criteria as practicable
 - ISO 6954 "Guidelines for the Evaluation of Vertical and Horizontal Vibration in Merchant Ships"
 - OCIMF/ITOPF Guidelines for the preparation of ship board oil spill contingency plans. (Shipyard provide drawing only).
 - OCIMF information paper on Marine Vapour Recovery system.
 - IMO A.751(18) Interim standards for ship maneuverability
 - ILO Convention concerning Crew Accommodation on Board Ship, No.140, 141, 147, as applicable.
 - ISGOTT International safety guide for oil tankers and terminals.
 - IMO Resolution A586(XIV) Revised guidelines for specification for oil discharge monitoring and control system for tankers
 - ISO 8861: Shipbuilding. : E/R ventilation in diesel ships. Design requirements and basic calculations. Note: Design basis to be a temperature increase of 10⁰ C so that max E/R temperature will not exceed 45⁰ C.
 - IMO Resolution A686(17). Code on alarms and indicators.
 - IMO Resolution A708(17). Navigation Bridge Visibility
 - IMO Resolution A719(17). Prevention of Air pollution by ships.
 - IMO Resolutions A224(VII) A422(VII) A424(XI) A477(XII) and A478(XII) for navigation equipment

Compliance with the above Rules and regulations is to be certified after proper survey, by the issuance of appropriate certificate issued by the relevant authority or on its behalf, or by detailed itemized attestation of the Builder.

G.7**CERTIFICATE**

The Builder shall obtain the following Certificates and deliver to the Buyer at the time of Vessel's delivery one (1) original and two (2) certified copies

| <u>Certificate</u> | <u>Issued by</u> |
|--|--|
| - Classification Certificate for Hull and Machinery | Class |
| - International Load Line Certificate | Class |
| - Safety Radio Certificate | Class |
| - Safety Construction Certificate | Class |
| - Safety Equipment Certificate | Class |
| - International Certificate of Fitness for Carriage of Dangerous Chemicals in Bulk | Class |
| - International Tonnage Certificate | National Authority |
| - Panama and Suez Tonnage Certificate | Class |
| - IOPP Certificate | Class |
| - Builder's Certificate | Builder |
| - Deadweight Certificate | Builder |
| - Derating Exemption Certificate | National Authority |
| - Certificates of Compass Adjustment | Manufacturer |
| - Major Machinery, Equipment and Lifting Devices Certificates | Manufacturer (under authority by class) |
| - Navigation lights and Special Signal lights | Manufacturer |
| - Life boat and Life saving equipment certificates | Manufacturer |
| - International sewage pollution prevention certificate | |
| - Anchor and chain certificate | |
| - Mooring rope and lifeboat rope certificate | |
| - Fire-fighting equipment certificate | |
| - Smoke signal equipment certificate | |
| - Fog whistle certificate | |
| - Cargo oil tank measurement certificate | |
| - Certificate for Hose Handling Crane, Provision Crane and Engine Room Crane, and all other permanent lifting appliances | |
| - Trim & Stability Booklet | |
| - Certificate for lanterns | |
| - Certificate for nautical equipment | |
| - Certificate for Loading Instrument | |

- Statement of Compliance of EIAPP for Main Engine & Aux. Engines
- Statement of Compliance of MARPOL Annex VI for Incinerator
- Casting and Forging Test Report

The Builder shall pay the charges for official measurements, certification above stated and Classification but the registration of the Vessel shall be of the Buyer's responsibility.

If formal Certificate(s) shall not be obtained upon the Vessel's delivery, the Builder shall furnish provisional one(s) which substitutes the formal Certificates.

Any cost involved for the issuance of the final certificates to be to the Builders account, who will also be responsible for the cost involved if there is any delay to the vessel as a consequence of expired certificates.

In such case, the Builder shall deliver the formal Certificates to the Buyer as soon as available after the Vessel's delivery, but in any case within 3(three) months from Vessel's delivery.

Detailed item-by-item letter of compliance or attestation to be issued by Builder, for other competent authority, verifying vessels compliance with all USCG/ OCIMF/ ISO/ ICS/ etc. Rules/ regulations/ specified in the above item G.6.2.

Date of issue of certificates for safety equipment items (life rafts, etc.) requiring annual renewals to be no more than **3 months** prior to the vessel delivery.

The following manuals approved by the Classification Society to be provided:

- Cargo Vapour Emission Control System Manual (VEC)
- ODME manual
- SMPEP (Prepared by the owner)

G.8

TRIM AND STABILITY

The preliminary trim and stability calculation to be submitted to the Owner as soon as possible for the Owner's consideration for the following loading conditions.

- 1) Light ship

- 2) Docking condition with arrival bunker
- 3) Ballast condition, departure and arrival
- 4) Homogeneously loaded condition at the scantling, draft departure and arrival
- 5) Liquid transfer operation condition for MARPOL Annex I, Reg. 25A.
- 6) Group loading conditions with a range of cargoes between 0.7–1.025 s.g. departure and arrival for every single group loading condition and every two group loading condition
- 7) Partially loaded condition, departure & arrival within allowable limits of BM & SF without sloshing investigation

For each calculation, bunker and other consumable supplies are presumed as follows :

- At departure : Full supplies
- At arrival : Approx. 10% supplies of each type for departure condition

For all sea going conditions an intermediate condition with 50% consumables to be also included.
No partially filled ballast tanks to be indicated in the departure and arrival conditions examined.

Trim & Stability booklet including longitudinal strength calculation to be submitted to Class.

At the early stage of construction, the Builder will submit preliminary trim and stability calculation to the owner for approval.

The vessel is to comply with class requirements regarding intact stability for oil/chemical tankers with unrestricted worldwide service.

The longitudinal bending moment and shear forces of the loading conditions are not exceed 90% of the maximum permissible values assigned by the Class Society.

The stability of the vessel to comply with all Class and statutory requirements concerning rules and regulations.

The stability of the vessel in both intact and damaged conditions to comply with all Class and statutory rules and regulations.

For the adjustment of trim, stability, bending moment and shear force at the above loading conditions, ballast water may be fully loaded, if

necessary.

Should other loading conditions be envisaged, they might be considered within the allowable range of trim and stability, propeller immersions, structural soundness, etc.

The provisional trim and stability calculation booklet including damage stability calculation shall be on board prior to departure of the vessel.

Final trim and stability calculation on above mentioned loading conditions to be carried out based on the position of center of gravity of the vessel obtained from inclining experiment and submitted to the Owner.

Specific gravity and filling ratio of liquid for calculation

| | | | |
|---------|---|------------|--------|
| - H.F.O | : | 0.980 T/M3 | (98%) |
| - M.D.O | : | 0.860 T/M3 | (98%) |
| - L.O | : | 0.900 T/M3 | (98%) |
| - F.W | : | 1.000 T/M3 | (100%) |
| - B.W | : | 1.025 T/M3 | (100%) |

G.9 VIBRATION AND NOISE LEVELS

G.9.1 VIBRATION

The vibration levels in accommodation area to be limited within the range of “Stippled zone” as defined by ISO 6954-1984(E) “Guidelines for the evaluation of vertical and horizontal vibration in merchant ships (peak values)” with the vessel in the sea trial condition with normal continuous rating of main engine.

If vibration level exceeds the defined criteria, the Builder to make necessary improvement to a practical extent agreed between the Buyer and Builder.

Instrument used for vibration measurement shall have valid calibration certificates.

G.9.2 NOISE LEVELS

For noise levels shall apply IMO Resolution A.468 “Code of Noise Level on Board Ships” as guideline, and to be checked during scantling draft sea trial at normal sea going condition with normal continuous rating of main engine.

1) Work spaces dB(A)

| | |
|--|-------|
| - Engine room(continuously manned) | 90 |
| - Engine room(intermittently manned) | 110 |
| - Engine control room | 75 |
| - Workshop | 85 |
| - Non-specified work spaces | 90 |
| 2) Navigation spaces | dB(A) |
| - Navigation bridge and chart room | 65 |
| - Radio space (with radio equipment operating but not producing audio signals) | 60 |
| 3) Accommodation and recreation spaces | dB(A) |
| - Cabins and hospital | 60 |
| - Mess room | 65 |
| - Recreation room | 65 |
| - Outdoor recreation areas | 75 |
| 4) Service and office spaces | dB(A) |
| - Galley, without food processing equipment operating | 75 |
| - Service and pantries | 75 |
| - Offices | 65 |
| 5) Normally unoccupied spaces | dB(A) |
| - Spaces not specified | 90 |

Special attention shall be given by the Builder in further reducing the noise levels particularly in the areas of service and office spaces.

The noise level measurement is to be carried out in scantling draft when the vessel is running ahead steadily at normal continuous rating of main engine during sea trial under the following conditions.

- . Machinery unnecessary for normal navigation is to be stopped.
- . Mechanical ventilation and air-conditioning equipment to be in normal operation.
- . All doors and windows of the room are to be closed.

- No intermittent sound and noise to be included. (i.e. from air horn, sanitary flushing, laundry machine, emergency generator, telephone, speaker, foot-step noise in stair and corridor space.)
- The measurement is to be taken at a height of 1.2m to 1.6m above deck in the center of each room.
- Mean value of graduations on the meter to be taken as the noise level.

Any corrective action for noise or vibration to be made after completion of sea trial and in case serious defect has been noticed then further sea trial to be carried out to verify repaired condition.

If the noise level exceeds 5 dB(A) above the specified value, the Builder to make necessary improvements to a practical extent mutually agreed between the Buyer and the Builder.

G.10

MATERIAL EQUIPMENT AND WORKMANSHIP

G.10.1

MATERIAL AND EQUIPMENT

Materials, Equipment, Machineries, etc. to be used or installed on the vessel to be made by makers agreed as per maker's list and in accordance with the specification.

Materials, machinery, equipment, appurtenance and outfit to be new and of normal shipbuilding and marine engineering quality, tested, inspected and certified when required by the Classification Society and Regulatory Bodies concerned.

Physical dimension and chemical composition of material, equipment, machinery, etc. to be generally in accordance with KS/JIS, **GB**, ISO and IACS standards as well as, the Builder's standard and/or the maker's standard as long as the standards are not inconsistent with the requirements of the Classification Society and Regulatory Bodies concerned.

Structural steel material of main hull structure to be new and of the quality as required, inspected and certificated by the Classification Society and free from crack, lamination and similar defects.

Maker's standard type, size & material of machinery, equipment, and fittings are to be adopted in a way satisfying the requirements of these Specifications.

All the equipment and machinery installed on the vessel to be new and to

be accompanied by makers certificate indicating manufacturing date to be within two(2) years before Vessel's delivery date unless otherwise specified herein.

- stainless steel described without notation means SUS 304
- Grease nipples to be ball type (JIS B157SA-PT 1/8 inch or equivalent type)

Machinery equipment etc. made under license to have parts/ components fully interchangeable with the ones produced by the original maker.

No TMPC steel is to be used in the construction of this vessel.

G.10.2

WORKMANSHIP

The vessel is to be built in accordance with the current shipbuilding practice, and the Builder practice subject to the requirements of the Classification Society.

Ship workmanship and standards shall be approved by the Classification society. Certificate of competence for workers shall be in accordance with Classification requirements.

The Builder will provide copies of all relevant yard quality standards for Buyers review, information, and future reference. Acceptable tolerances to be agreed.

The Builder will make sure that the manufacturer of vessel's equipment, and machinery, (Bridge navigations systems, main engine, auxiliary engines, purifiers etc.) will provide to the Buyers representative detailed booklets containing full information for their correct installation and operation.

G.11

INSPECTION, TEST AND TRIAL

The inspection, test and trial during construction of the vessel to be carried out by the Builder and/or the maker at the maker's shop or onboard in accordance with the requirements of the Classification Society and/or the Regulatory Bodies concerned to demonstrate satisfactory workmanship, suitability for the purpose intended and compliance with these specifications in the presence of the Owner's supervisor's and the surveyor of the Classification Society and other Regulatory Bodies as far as the latter two are concerned.

Any defects, which may develop or become apparent from these test shall

be remedied by the Builder in accordance to procedures previously submitted and accepted by the Buyer except the equipment supplied by the Owners.

The testing schedules and items are to be set up by the Builder to suit its building schedule and to be submitted to the Buyer in advance for approval.

The construction schedule of vessel shall be so arranged as to allow reasonable time for the inspections.

Buyer's representative(s), will have the right of access to the Builders yard and subcontractors premises at any time where and while work for the subject vessel is in progress.

The Buyer's representative to attend the inspections and tests according to the Builder's application schedule and to be kept well informed of when and where tests to be carried out to ensure the Buyer's Representative is able to attend to such matter.

The Builder will make every possible effort to avoid concurrent inspections.

Should the Buyer's Representative fail to be present at any inspections and tests, after the Builder's due notice to the Buyer as provided above, the Builder shall be entitled to conduct such inspections and tests with the presence of the representative(s) of the Classification Society, only, without the Buyer's Representative being present. In such case the Buyer's Representative shall be obliged to accept the results of such tests and inspections on the basis of written reports signed by the surveyor of the Classification Society and regulatory bodies concerned, stating that the Vessel after such inspections and tests, subject to alterations and corrections if necessary, has been found to conform with the Specifications and the Contract and is satisfactory in all respects, provided the Builder first makes such corrections and alterations promptly.

After the completion of all trials, the results of these inspections, tests and trials to be submitted the Owner.

As to the details of inspection and test of machinery and electric equipment and installations, refer to relevant part.

Model test report to be submitted to the Buyer for **resistance to be** his reference.

G.11.1 INCLINING EXPERIMENT

The inclining experiment to be carried out to ascertain the position of center of gravity and the weight of the vessel in lightship condition at Builder's quay in the presence of the Owner's representative and surveyor of the Classification Society and the Regulatory bodies concerned in accordance with the procedure approved by the Classification Society.

Lightweight calculations to include corrections for trim and deflection of the vessel.

For subsequent vessel of this series, the inclining experiment not to be carried out, and the results of the first vessel shall be referred to, provided that the deadweight determination results of the remaining vessels show no more than 2 % difference in the light weight nor more than 1% of the LBP difference in the location of the LCG of the vessels. Otherwise the inclining experiment is to be carried out.

The results are to be submitted for approval to the Buyer and the Classification Society.

G.11.2 SHOP TESTS

Main engine, major machineries and equipment are to be tested or inspected at the manufacturer's factories in accordance with manufacturer's practices, the requirements of these Specifications, the Classification Society and the Regulatory bodies concerned in the presence of Owner's representatives.

Mooring test to be conducted after vessel is substantially completed and prior to the sea trials. Procedure for mooring tests to be submitted for Buyer's review and approval.

G.11.3 OFFICIAL SEA TRIAL

When the vessel is substantially completed to the extent that she can immediately resume service if all items are found in order after the trials, the sea trial shall be carried out by the builder in accordance with the Builder's practice and the procedure of sea trial submitted to the Owner for

approval.

The progressive speed trial shall be measured on measured mile course or with DGPS.

The results of sea trials shall be furnished for the Owner.

The official sea trial to consist of the following test and trials at the scantling draft, as well as other items required by the Classification and / or the Regulatory Bodies concerned.

Up to ten (10) persons from Buyer's side may attend the sea trials.

The sea trial to be carried out at the scantling draught, with one run at the Ballast condition if Builder and Buyer consider it necessary for measurement of vibration and noise.

The speed at the sea trial to be measured by a conventional measured mile course or D.G.P.S. Power of main engine to be measured also by indicator card during the progressive speed trail for the official purpose.

The speed trial to be carried out at a sufficient depth and the results to be corrected to the calm (no wind, no wave) in accordance with the Builder's standard speed trial analysis method which will be submitted to the Buyer for review during the plan approval.

The speed and power curves and a complete report of the trials to be furnished to the Buyer.

During the sea trial following test and trials, as well as other items required by the Classification and/or the Regulatory Bodies concerned to be conducted, including actual maneuvering tests to cover requirements of IMO A. 751(18).

| Trial | Engine load | Remarks |
|--------------------------------|--|---|
| Progressive speed trial | 50% of MCR 75% of MCR NCR MCR | Each speed to be the mean of two successive runs alternating in direction |
| Crash stop Astern and ahead | From the Speed Corresponding to | Until ahead / astern speed becomes zero |

| | | |
|------------------------------------|---------------------------------|--|
| trial | MCR to full astern | |
| ## Turning trial | speed corresponding to 85% MCR | One right and one left for rudder hardover |
| ## Zig-zag test | speed corresponding to 85% MCR | Port and starboard to each of 10° / 10° and 20° / 20° test |
| ## Inertia test | Speed corresponding To 100% MCR | Until ahead speed to 3 knots |
| Lowest revolution test of Main ENG | | Engine to be run as slowly as possible |
| Endurance test | N.C.R. MCR | 4 hours 2 hours |
| Measurement of F.O consumption | | To Class requirement |
| Anchoring test | | To Class requirement and at a depth of allowing the dropping of at least three (3) shots of chain and anchor, and not to be less than 80 meters. |
| Steering gear test | | To Class requirement |
| M/E starting test | | To Class requirement |
| Black out test | | To Class requirement |
| ##Torsional vibration measurement | | To Class requirement |
| ## Noise level measurement | N.C.R. | During endurance test and/or-on ballast condition |
| ## Local vibration measurement | N.C.R. | During endurance test and/or on ballast condition |
| Cargo pumping & stripping test | | To Class requirement |
| Black-out test | | To Class requirement |

- Trials for turning circle, 'z' manouvering test to be carried out for 1st vessel only.
- Following sea trials, one M/E cylinder unit to be overhauled as well as any other machinery if necessary due to its performance during trials.
- Black out test to be followed by confirmation of sequential starting of

essential auxiliaries.

- Power rating for black out test to be confirmed later.
- Navigation equipment to be tested prior to sea trial unless it is practical to carry out such test(s) only during sea trial.
- Stripping of one WBT
- Exhaust gas economizer evaporation test
- Fresh water generator capacity test
- Fire detection and alarm test
- Tests of refrigerated machineries and refrigerated chamber
- Test of air conditioning system
- Working test of emergency fire pump
- Boiler evaporation test
- Adjustment of magnetic compass

Note : ## marked trial and test to be conducted for the first vessel only, but trial and test data achieved from the first vessel to be provided for the other remaining vessel. However if corrective action becomes necessary during such trials and tests on the first Vessel, then these tests shall be carried out for subsequent vessels to verify satisfactory performance.

During these trials fuel oil consumption values and rpm/HP values (by torsion-meter), to be taken/recorded and results plotted for Owners reference only.

G.11.4 ON-BOARD TEST

The installations and tests of equipment on-board the vessel to be performed in accordance with the Builder's and the manufacturer's practices, the requirements of the Classification Society and Regulatory bodies concerned.

Individual trials of auxiliary engines, deck machinery, steering gear, life boat with davits, accommodation ladder, safety system, controls, communication and signal equipment, light installation, domestic machinery arrangement for water and oil and other equipment important for the operation of the vessel, excepts M/E Dock trial, to be carried out to demonstrate satisfactory workmanship and proper working order.

The testing schedule, including the items to be tested and the testing procedures, to be submitted to Buyer's for review.

G.12

PLANS FOR APPROVAL

The Builder will submit to the Buyer for its agreement as soon as possible after signing the Contract a list of drawings and plans for approval by the Buyer and schedule for their production and approval.

Four (4) copies of the plan(s) and documents for approval shall be submitted to the Buyer in normal intervals and manageable lots.

Prior to the commencing of plan submission for their approval, Builder is to provide the Buyer with a full set of Builder's practice (hull, piping, machinery, electrical, etc.) for Buyer's guidance during plan approval

Drawings which are submitted to the Class or all other authorities for approval shall be submitted to the Buyer simultaneously and the Class's recommendation, if any, shall be informed to the Buyer immediately.

Upon receipt of the plan(s) for approval by the Buyer, the Buyer shall return one copy of plan to the Builder, together with approval or comments in writing not later than three (3) weeks excluding mailing time.

If the Buyer's approved drawing(s) is not returned within three (3) weeks after receipt, the submitted plan(s) and drawing shall be deemed to have been automatically approved without any comment.

The Buyer may respond with e-mail or fax within the above period and then express mail stamped approved drawings.

The Builder shall reply to Buyer's comments within twenty one (21) days from the date of receiving. If the Builder fails to answer, the Buyer will deem that his comments have been automatically accepted.

The Builder shall submit three (3) copies of maker's drawing for approval.

The plan approval of hull structural drawings shall be generally completed prior to the commencement of steel cutting.

G.13

FINAL PLAN AND INSTRUCTION BOOK

All finished plans, calculations and instruction manuals, etc shall be written in English.

G.13.1**FINAL PLAN**

At the time of delivery of the vessel, four (4) copies of the final plan shall be furnished to the Owner.

(List of finished drawing shall be submitted separately for approval.)

Two (2) sets of drawings and instruction books will be placed onboard in suitably prepared filling cabinets or bookshelves, (racks), whereas the other two (2) set will be forwarded to the Owners Office.

Information booklets indicating main particulars and data characteristic of the ship to be prepared per sample given furnished by the Owner.

In addition the following Plans are to be furnished as indicated below:

| <u>Plan</u> | | <u>Vessel</u> | <u>Owner</u> |
|---------------------------------------|----|---------------|--------------|
| 1. General Arrangement Plan | | 4P | 4P |
| 2. Capacity Plan and Deadweight Scale | 4P | 4P | |
| 3. Midship Section | | 2P | 2P |
| 4. Docking Plan | | 4P | 4P |
| 5. Shell Expansion | | 4P | 4P |
| 6. Cargo/Ballast Piping Plan | 4P | 4P | |
| 7. Ullage tables for cargo tanks | | 1P | 1P |
| 8. Trim and stability Booklet | 1P | 1P | |
| 9. Profile and deck construction | | 2P | 2P |
| 10. Safety Plan | | 2P | 2P |
| 11. Rudder Assembly | | 2P | 1P |
| 12. Rudder | | 2P | 1P |
| 13. Rudder Carrier | | 2P | 1P |
| 14. Maneuvering Chart | | 2P | 1P |

In addition, two (2) each of the following plans and/or documents shall be vinyl filmed with aluminum alloy frame and placed on board according to Rule requirement and Buyer's instruction in selected locations for their immediate reference of the crew.

1. General Arrangement Plan
2. Capacity Plan and Deadweight Scale
3. Safety Plan (Fire Control Plan + Life Saving Plan) on every deck
4. Cargo piping diagram.

5. Ballast piping diagram
6. Instruction of Life jacket / Life boat operation
7. Necessary information boards agreed mutually
(including maneuvering characteristic)

Besides above prints, one (1) set of transparent copy of some major drawings shall be furnished to the Buyer.

All name plates, booklets and plans shall be written in English.

One (1) set of the major **basic** drawings to be furnished to the Buyer in electronic format (CD-ROM **with PDF**) .

G.13.2

INSTRUCTION BOOK

Three (3) copies of instruction books of the vessel's major machinery, equipment and system to be furnished to the Owner in accordance with approved list of books and manuals.

The Builder also to prepare three (3) sets of data booklets for the hull, machinery and electric equipment giving the name/address of makers and references to such information as maintenance instruction books and/or spare parts list.

G.14

SPARE PARTS, TOOLS AND ACCESSORIES

The spare parts, tools and accessories to be furnished in accordance with the recommendation of the Classification Society and the requirements of the Regulatory Bodies concerned and in accordance with the maker's normal standard or as listed throughout these Specifications, whichever is greater.

The spare parts, tools and accessories to be properly protected against mechanical damage, greased and wrapped as necessary for protection from corrosion and to be stored in a way which provides easy access and control depending on its type and size.

The steel cabinets, shelves and drawers to be used for storing spare parts in accordance with the Builder's practice and the recommendations of the makers.

During the tests and trials, the Builder may use some of the supplied spare parts, tools and accessories to the vessel if necessary but to be replenished promptly before delivery.

G.15**BUYER'S SUPPLY**

Following equipment shall be furnished and supplied by the Buyer at their own expense, and installed on the Vessel by the Builder.

- Bedding (Except mattresses), blankets and napery, pillows.
- Silverware, cutlery, crockery and glassware.
- Utensils (use of galley) other than those mentioned in the Specifications.
- Medical equipment and medicines.
- Charts Books (Nautical almanacs, tide table, international signal book and etc) and flags.
- Paintings and pictures.
- All consumable stores.
- Spare parts and tools in excess of maker standards and in excess of the recommendations of the Rule and regulation as specified herein, and other than those specified in this Specification.
- Fuel oil, lubricants shall be of the Buyer's account excepting those which have been consumed during trials and tests, which are to be borne by the Builder.
- Deck and cabin stores in excess of those specified in this specification
- Cargo hose in excess of those specified in this specification or required by the Class/Regulatory Bodies

G.16**NAME PLATES AND IDENTIFICATION**

A hard wood ship's name board shall be fitted on each side of the wheelhouse in letters of suitable size engraved, painted and effectively varnished.

The name of the Vessel shall be fitted with welding bead and paint on both sides of the bow and on the stern, in letters of suitable size.

The port of registry shall be fitted with welding bead and paint of transom stern shell below the Vessel's name letters.

Draft mark shall be fitted on both sides of the vessel at bow, midship and stern, and to indicate vertical height at the bottom of numerals in decimeter above bottom keel.

Freeboard marks as required by International Load Line Regulation to be

of steel plate on both sides of the Vessel's midship.

Ship's call sign number shall be provided and secured in suitable locations in the wheelhouse and in the radio space.

Funnel marks shall be marked with welding bead and paint.

Another marks such as bow thrust mark, bulbous mark, tug mark, no smoking mark and tank division & name mark shall be marked up with welding beads.

Two (2) of harbour speed tables of acryl plate(s) shall be fitted at necessary compartments.

The other information/ notice boards and essential caution boards shall be provided according to the Buyer's requirements.

Name plates and caution plates shall be written in English.

G.17

DELIVERY

When completed, and after completion of successful sea trial and acceptance by the Buyer, the Vessel shall be delivered to the Buyer in a seaworthy condition, safely afloat at the Builder's wharf under the requisite legal formalities and all machinery, equipments spare parts and certificates placed on board.

Tanks, bilges, accommodation, decks and other spaces shall be free from drainage and dirt.

Painted surface shall be touched up and cleaned, machinery shall be in running order, outfit and stores to be properly stowed, and compass adjusted.

The Builder shall assist the buyer to move the Vessel to open sea or port anchorage when the Vessel departs form Builder's wharf.

G.18**THE VESSEL'S MODEL**

One (1) set of the model (1/100) for 4 vessels to be placed on board by time of delivery unless otherwise instructed by Buyer.

On completion of the contract one(1) more ship model as above to be delivered to the shipowner as a present from the Builder.

G.19**INTENDED CARRYING CARGOES**

The ship shall be intended to carry petroleum products and chemicals in bulk which are applicable to these specifications as per cargo list referred to in G.1 (page G-3).