This specification describes the design criteria for a modern Panamax Bulk Carrier intended for world wide trading of grain, coal and iron ore.

This specification does not include detailed requirements on the many different technical aspects of a vessel of this kind. Performance, equipment, capacities etc. not specified, but generally recognised as being standard on a vessel of this kind and in this operation are to be included.

1. GENERAL DESCRIPTION
The vessel shall be a single screw diesel engine driven 80,000 tdw bulk carrier with forecastle, bulbous bow and open water type stern. Engine room and living quarters including navigation bridge located aft.

The cargo holds are silo type, consisting of seven (7) holds, surrounded with double bottom and double side ballast tank consisting of seven (7) pairs of tanks in way of cargo area and peak tanks.

Superstructure including casings to be stiffened and integrated into hull structure with attention to prevent vibrations.

1.2 Main parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length o.a.</td>
<td>225.0 m</td>
</tr>
<tr>
<td>Length p.p.</td>
<td>217.5 m</td>
</tr>
<tr>
<td>Breadth, mld.</td>
<td>32.2 m</td>
</tr>
<tr>
<td>Depth to main deck.</td>
<td>19.8 m</td>
</tr>
<tr>
<td>Design draught, mld</td>
<td>12.2 m</td>
</tr>
<tr>
<td>Scantling draught, mld</td>
<td>14.8 m</td>
</tr>
<tr>
<td>Deadweight at design draught</td>
<td>64,000 mt</td>
</tr>
<tr>
<td>Deadweight at scantling draught</td>
<td>80,000 mt</td>
</tr>
<tr>
<td>Speed at moulded scantling draught</td>
<td>Approx. 14.5 knots</td>
</tr>
<tr>
<td>Endurance</td>
<td>Approx. 21,000 sea miles</td>
</tr>
<tr>
<td>Accommodation for</td>
<td>26 man + 6 Suez crew</td>
</tr>
</tbody>
</table>

Class : Det Norske Veritas + 1A1, Bulk Carrier, ESP, HC-E (2 and 5 empty), NAUTICUS (Newbuilding), E0,
Flag : NIS or Bahamas (for design/outfitting purpose)

1.3 Basis operational criteria
The vessel is intended for the carriage of dry bulk cargoes and shall be designed as silo type with high grade of self trimming in carriage of grain, coal and iron ore cargoes.

The hatch cover arrangement shall be of "open hatch type" giving 100 % grab access to the cargo hold flat bottom area.

Cargo holds to be designed for a free fall loading rate 16,000 t / h, and strengthened for 50 tons grab discharge

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1.4 Pollution prevention and Environmental protection
The vessel is designed in accordance with DNV class notation Clean in order to make the vessel suitable for all trades requiring a highly safe and “environmentally friendly” vessel.

Change of ballast water during voyage to be possible under moderate sea conditions.

For collection of deck water during tropical rainfall, two (2) rainwater collection tanks to be provided on each side of aft cargo, tank capacity 1.0 mm rain on cargo deck during a 10 min period.

HFO and Diesel oil tanks to be protected by cofferdam/ballast tank against sea

A sewage treatment plant of gravity type sewage system, sized for 28 persons.

Garbage disposal arrangement, consisting of a garbage collection room, with facilities for garbage separation and removal in containers to shore.

1.5 Cargo and ballast tank capacities
Cargo hold capacity (including the coaming dome) shall be min. 91,800 m3.
The ballast tank capacity shall be min 34,000 m3 and to comply with MARPOL and Panama Canal Regulations.

Other tank capacities:
Fuel oil tanks including settling & service tanks          abt. 2,100 m3
Diesel oil tanks including service tank                abt. 150 m3
Fresh water tanks (potable)                            abt. 400 m3

2. CARGO HOLD AND DECK ARRANGEMENT

2.1 Cargo holds
The cargo holds shall consist of seven (7) silo type holds. The transverse bulkhead of vertically corrugated plating, having stools at top and bottom. Side bulkheads are plane, with structural members inside ballast tanks.

The cargo holds to be strengthened for grab discharge with grabs up to 50 tons.

The entrance to cargo holds to be from open deck, through an access trunk at transverse stools, and thereafter by spiral ladders inside double corrugation in the bulkhead.

2.2 Hatch covers
The hatch covers on cargo holds to be of side rolling type designed for a 21,0 x 15.8 m free opening.
The forward hatch cover to be for a hatch opening 20,0 x 15.50/10.5 m.

The hatch covers to be hydraulically operated and provided with hydraulic cleats.

2.3 Windlass and Mooring winches
Hydraulic powered windlass and mooring winches without automatic tension
- two sets of combined windlass / mooring winches, each with cable lifter, two 20 tons mooring drums and one warping end
- six sets of mooring winches, each with two 20 tons drums and warping end

2.4 Cargo hold bilge arrangement
For bilge arrangement and stripping operations during hold cleaning, each cargo hold to be provided with 2 (two) stripping ejectors, operated with water from the general service pump.

The ejector and piping arrangement to be located in one closed bulkhead corrugation. Bilge well opening to cargo hold to be provided with bolted hatch.

2.5 Cargo tank cleaning arrangement
At least two (2) tank cleaning machines to be provided for each cargo tank, located in the upper transverse stool, retraction type, stored inside the stool

The cleaning machines shall be supplied with seawater from operation by the general service pump, provided with a suction from ME cooling water outlet, enabling cleaning with up to 45 degC hot water

4. MACHINERY ARRANGEMENT
The engine room installations, monitoring, alarm and remote controls shall be equipped and installed in accordance with classification society requirements for unattended engine room arrangement, DNV’s class notation E0.

4.1 Main engine and propulsion arrangement
One MAN B&W or SULZER, two stroke, single acting, direct reversible cross head marine diesel engine with exhaust gas turbocharger and auxiliary blower.

The propulsion arrangement to be sufficient to give the vessel a speed of 14.5 knots at 90 % MCR with 15% sea margin

4.2 Auxiliary diesel engines
Three (3) Auxiliary engines, four stroke, single acting, direct injection marine diesel engine equipped with exhaust gas turbocharger:

<table>
<thead>
<tr>
<th>Type</th>
<th>WARTSILA 5L20, or equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCR</td>
<td>775 KW</td>
</tr>
<tr>
<td>RPM</td>
<td>900</td>
</tr>
</tbody>
</table>

One emergency diesel engine set with a capacity of abt. 180 KW at 440 V, AC, 60 Hz to be arranged in a separate room outside the engine room.

4.3 Steam production plant
For steam production for HFO heating and internal hot FW use, one (1) combined exhaust boiler capacity 4.0 tons / h, working pressure 8 bar to be provided

5. SAFETY EQUIPMENT AND FIRE PROTECTION
The vessel to be equipped with all appliances necessary to comply with applicable regulations of flag state administration, classification requirements and USCG regulations for foreign flag vessels.

5.1 Safety equipment

One (1) free fall lifeboat for 28 persons to be provided.
One (1) rigid fibre glass MOB / rescue boat with single-point launching, capacity 6 persons with an outboard engine of abt. 40 HP.
Four (4) inflatable rafts aft, each for 14 pers.
One (1) inflatable raft for 6 men forward.
Life-buoys, life-jackets and other lifesaving equipment for 28 persons

5.2 Fire Protection

The fire protection and execution shall be in compliance with SOLAS 2001 including latest amendments and to consist of:

- Fire detection and alarm systems for ER and accommodation
- Fire and deck-wash line with hydrants on main deck
- Portable dry powder fire extinguishers on cargo deck
- Fire hydrants in engine room and accommodation
- CO₂ smothering for ER
- Fixed local water mist system incl. pumps in ER
- Portable fire extinguishers in accommodation.
- One (1) Fire / deck wash and general service pump, cap. acc. to rules.
- One (1) Fire pump, cap. acc. to rules.
- One (1) Emergency fire pump, cap. acc. to rules

6. Navigation and Communication Equipment

Navigation and communication equipment, bridge arrangement and layout shall be designed with the object of maximum visibility and functional efficiency.
The bridge shall be of integrated design containing the following equipment:

6.1 Navigation equipment and systems:

- Two (2) radars, one 3 cm and one 10 cm rasterscan radar, with color monitor.
  One radar with ARPA. Interswitch.
- DGPS system
- Conning display
- Watch monitoring and alarm transfer system
- Two (2) Gyro-compass with repeaters
- Auto-pilot
- Automatic Identification System
- Magnetic compass
- Echo-sounder
- Doppler type speed log
- Anemometer
6.2  Radio and Communication systems
- One (1) radio station to be arranged and equipped in accordance with GMDSS for world wide trading (A3 areas).
- One (1) Satellite communication plant FLEET 77, class 4, with telephone, high-speed data possibility and facsimile services
- Two (2) Satellite communication plant INMARSAT Fleet
- Mobile telephone GSM system, with fax and e-mail
- One (1) MF/HF Single-Side-Band Duplex Radio station, 250 W PEP, with DSC facility and mast antennae
- Navtex with printer
- Weatherfax
- Emergency radio equipment (for lifeboats etc.) according to authorities' requirements
- EPIRB, free float type
- Two (2) VHF with Digital Sell-Call units (DSC), 55 channels
- Five (5) intrinsically safe UHF portable on-board communication sets, 8 channels

7.  ACCOMMODATION
Accommodation to be arranged for 26 persons including pilot plus 1 hospital and 6 Suez crew in a 6-berth cabin. Single berth cabins with private bathroom for all officers and crew as follows:

<table>
<thead>
<tr>
<th>Ranking</th>
<th>No of cabins</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Captain class</td>
<td>2</td>
<td>Dayroom, bedroom &amp; private bath / toilet</td>
</tr>
<tr>
<td>Senior officers</td>
<td>2</td>
<td>Single cabin &amp; private shower / toilet</td>
</tr>
<tr>
<td>Junior officers</td>
<td>7</td>
<td>Single cabin &amp; private shower / toilet</td>
</tr>
<tr>
<td>Crew class</td>
<td>15</td>
<td>Single cabin &amp; private shower / toilet</td>
</tr>
<tr>
<td>Suez crew</td>
<td>6</td>
<td>One cabin with shower / toilet</td>
</tr>
</tbody>
</table>