

## **CV3200<sup>PLUS</sup> DIANA - BETTER BY DESIGN**

Shipyards want a ship easy to build and light. Owners want a ship that has record-breaking total capacity, is easy to maintain and operate, inexpensive, safe, etc. Shippers/cargo owners want the cargo to reach its destination without any harm. Masters and crew wish a ship that is easy to operate, comfortable and also safe in the broadest sense of the word and certainly with respect to working environment. All expect a ship that is able to transport safely huge number of containers especially reefer units, easy to maintain, easy to operate, comfortable and environmentally friendly.

The container vessel of 3200<sup>PLUS</sup> type DIANA is designed with the target to meet these expectations in the best way.

### **TYPE OF VESSEL**

DIANA is the innovative, green and economically advantageous Panama-beam gearless container carrier. She has six cargo holds and is designed especially for transport of the large number of the high cube reefer containers. Total capacity is 3266 TEU. Stability of the ship at scantling draft is sufficient to carry 2350 TEU (14 t, VCG=0.45H). A feature of the design is 735 reefer FEUs onboard. Maximum 75% of reefer boxes may be loaded with fruit/chilled cargoes. In order to provide electrical power for such large number of reefer boxes, the ship is equipped with four diesel driven alternators.

*For comparison the 300m long Panamax 5060TEU vessel from Hanjin Heavy Industries can transport only 454 reefer FEUs.*

With the emphasis on fast port turnarounds, the vessel is provided with two tunnel thrusters: the one aft and other one at the bow. This enables the vessel to track sideways and turn in its own length.

Another outstanding feature of the vessel, is a total segregation of oil tanks from the sea: all HFO, DO and Lube Oil tanks are placed outside of double skin reducing the risk of oil spill.

In order to decrease building costs several measures have been adopted:

- simple and logical arrangement,
- excellent continuity of main structure which gives very good support of the accommodation deckhouse, decreases danger of vibration and eliminates costly reinforcements,
- only one frame spacing on the whole ship length,
- the identical arrangement of four accommodation decks.

Other important features of the design include:

- Possibility to accommodate eleven bays of 45ft containers on hatch covers.
- Direct access from the Engine Room into holds for reefer containers.
- Fixed, ship-based system for supplying power to the ship in port (cold ironing).
- Excellent continuity of main structure.
- Anchoring/mooring equipment protected by wave breaker.
- Enhanced damage stability.
- High standard of accommodation.
- User-friendly operational design.

**CV3200<sup>PLUS</sup> DIANA - BETTER BY DESIGN**

The main engine developing 28 880 kW MCR at 104 rev/min, is directly coupled to a fixed pitch highly skewed propeller. At 90% continuous power the ship can achieve service speed of 23 knots at the design draught of 10.50 m. Four 2200kW diesel driven generators provide electrical power, and a 180 kW emergency generator supplements the electric energy output. When moored in a port, the power is supplied from shore through the fixed system mounted on the ship reducing pollution in terminal.

**PRINCIPAL PARTICULARS**

Length overall	L <sub>OA</sub>	218.20m
Length between perpendiculars	L <sub>BP</sub>	206.00m
Breadth moulded	B <sub>mid</sub>	32.24m
Depth to main deck	D	19.00m
Design draught	d <sub>1</sub>	10.50m
Scantling draught	d <sub>2</sub>	12.00m

**CLASS AND FLAG**

The vessel can be designed and constructed according to the requirements of the Germanischer Lloyd, for the following class:

**+ 100 A5 E "CONTAINERSHIP" NAV-O, IW, BWM-F, ERS, RCP 735/75, Environmental passport, SOLAS II-2, Reg.19 +MC E AUT**  
or to the equivalent class of any other Class Society.

The vessel will meet all rules and requirements necessary to fly the Cyprus flag.

**CARGO CAPACITY**

**Container Capacity**

Equivalent container capacity:

On deck	1977 TEU (IMO visibility considered)
In holds	1289 TEU
Total	3266 TEU

**Container stowage**

Containers are stowed in six holds optimized for max. 7 tiers (6x8ft6inch + 1x9ft6inch) containers and provided with cell guides designed for 11 rows of 2438/2500 wide containers. Vertical gaps between angle bars of cell guides allow proper airflow through hold.

FEU/TEU containers are transported on hatch covers in max. 13 rows amidship. Min. distance between TEU blocks is 830mm meeting latest requirements.

Eleven bays of 45 feet containers can be stowed on hatch covers.

## CV3200<sup>PLUS</sup> DIANA - BETTER BY DESIGN

### Transport of reefer containers on open deck

1. 429 40ft reefer containers can be transported in three tiers on open deck as shown on the GAP, provided no dangerous cargoes are transported at the same time.
2. Reefer containers on open deck can be located in such a way that there is no possibility to suck heated air to cargo holds.

### Transport of reefer containers in holds

1. 306 40ft reefer containers can be accommodated in specially constructed and ventilated holds N°2A, 2B, 3A, 3B, 4A, 4B, 5A and 5B. These holds are equipped with mechanical supply/natural exhaust ventilation system providing 4500 m<sup>3</sup>/h for each of the 40ft reefer container.
2. A separate air duct serves each container stack.
3. Air ducts have adjustable openings or elastic hoses to direct air to the lower part (1/3 height) of the container independent of the stowage pattern.
4. Supply air fans and air ducts are located in the middle of the hold. Each duct is served by its own fan.
5. In any loading condition it is possible to replace the motor of any fan.
6. The ship is provided with the efficient ventilation system able to prevent any cargo harm even if a part of venting opening are closed due to bad weather.

### Transport of Dangerous Cargoes

1. Containers loaded with dangerous cargoes can be transported on open deck and in holds N° 1A, 1B equipped with explosion-proof reversible fans.
2. Transformers and switchboards for electric equipment located in the holds N° 1A, 1B, are placed outside of these holds.

### CAPACITIES OF TANKS

Oil tanks are arranged according to the principle of the complete segregation from the sea; HFO will be carried in easy to heat and clean rectangular tanks between holds, other oil tanks will be placed outside of the double skin. Capacity of ship's tanks will be sufficient to accommodate the following quantities of liquid stores:

No		Volume (m <sup>3</sup> )	Spec. gravity (t/m <sup>3</sup> )	Capacity (t)
1	HFO		0.98	3 600
2	MDO		0.89	250
3	Lub. oil		0.90	200
4	Fresh water		1.00	100
5	Drinking water		1.00	50
6	Ballast water		1.025	12 000

### LIFTING APPLIANCES

The monorail crane aft of the superstructure enables stores/provisions handling. Two simple davits are installed on the Upper Deck in way of bunkering stations.

## **CV3200<sup>PLUS</sup> DIANA - BETTER BY DESIGN**

Two davits with lifting capacity of 40kN designed for Suez Canal boats are installed amidships.

### **ACCOMMODATION**

Improper accommodations design can adversely impact the crewmember ability to reliably perform their duties, fully relax, sleep and recover from mentally and physically demanding work activities. This in turn may impact their ability to carry out duties on succeeding watches with the required diligence and accuracy. Accommodation onboard DIANA is designed with particular care in order to provide an on-board environment that increase crewmember alertness and well-being. Seven-tier superstructure with the wheelhouse on the top houses 26 persons. In addition the six-berth Suez crew cabin is provided.

Heavy and noisy equipment such as air condition unit and emergency genset are placed on the Main Deck, where also the Engine Control Room and Changing Room are located.

### **Access to the ship and stairs**

1. Short accommodation ladders, for the use only when ship is moored, are located on the Poop Deck. In this way the access to the ship in the port does not interfere with cargo handling operations.
2. When the ship is in the port, the access to accommodation deckhouse and spaces below is possible only through one controlled entrance leading directly to the separate reception area on the Deck.
3. There are no external doors leading from the Main Deck to spaces below.

### **Cabins**

1. There are three types of cabins: apartments for Senior Officers, cabins for Officers and ordinary single cabins. Each type of cabin has an identical arrangement in order to facilitate production.
2. Captain's and Chief Engineer's cabins are usually located on the highest deck. There is no problem onboard vessel provided with a crew lift, however to economise money lifts are not so often installed nowadays. In case of any alarm the Chief Engineer should go down to the Engine Room, similarly all representatives of Authorities or class surveyors shall go high up to visit the Captain. On board the DIANA apartments for Chief Engineer and 1<sup>st</sup> Engineer are located at 1<sup>st</sup> Accommodation Deck. The Captain Office, offices of Chief Officer and Chief Engineer are placed on the same deck.
3. All cabins are designed as standard modules, equipped with private sanitary units.
4. Sanitary units (WC/shower) are arranged in vertical lines, with easy access to pipe connections (small doors can be arranged).

### **Galley and Provision Stores**

Galley, two pantries and two messrooms are located at the 1<sup>st</sup> Accommodation deck. The galley is connected by direct stairs with provision stores below.

### **Recreation**

The following items are arranged on the 2<sup>nd</sup> Accommodation Deck:

**CV3200<sup>PLUS</sup> DIANA - BETTER BY DESIGN**

1. Sport room.
2. Recreation Room.
3. Internet cafe.
4. Open deck recreation area with a swimming pool.

**Access to life-saving equipment**

1. A large embarkation deck is arranged to enable fast and easy embarkation to free-fall lifeboat.
2. Easy embarkation of injured person on the stretcher is possible.
3. Easy access to the rescue boat and davit launched liferaft is arranged.
4. A store for safety equipment is arranged near life-saving crafts.

**WORK ON DECK**

**Safety for stevedores**

Very often the lack of suitable and safe access to lashing workstations creates costly delays in stevedoring operation. More important, it is also the most common cause of accidents of stevedores onboard container ships. The financial implications of any such accident are obviously profound.

To minimise the risk for those who have to work on these vessels hatch covers and lashing platforms will create one continuous plan. In addition fixed railings protected by high guides against damages by containers will be arranged.

**Loading of stores and provisions**

1. The ship will be equipped with the monorail crane behind the superstructure.
2. The arrangement of storerooms, provision stores, workshop, and Emergency Genset Room enables direct and easy transport using a/m crane.

**ENGINE ROOM**

Four diesel generators placed in two separate Genset Rooms will provide electric power. It will be possible to take out any generator through the maintenance hatch in the Main Deck.

The Engine Control Room (ECR) will be arranged on the Main Deck outside of machinery spaces of category "A". Changing Room and stairs to the Engine Room, will be placed near ECR.

Three emergency escapes are arranged:

- vertical trunk on the fore bulkhead,
- vertical trunk on PS,
- A60 insulated staircase from the workshop to the Main Deck.

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Note: All data preliminary and subject to further design development.