



**MARINE SIMULATOR**

**MODULAR**  
**ELSTEEL**  
**ENCLOSURES**

# MARINE PANELS

**Travelling the oceans of the world requires you to rely on your ships functionality at all times. Elsteel panel boards have been designed and developed to protect your electrical installations in the best possible way.**

Panel boards in ships and on oil rigs have to endure a lot of stress from a variety of weather conditions. The ocean is a highly corrosive environment and combined with constant vibrations from engines and rolling waves it puts enormous challenges on the equipment on board.

Elsteel offers you the best solutions for panel boards in the maritime field. Our unique combination of design and material ensures the panels are operational and serviceable during storms and high temperatures.



Techno Module has been thoroughly tested in our Marine Simulator as well as accredited test labs. The Marine Simulator is designed by Elsteel and is able to generate not only the vibrations from main engines, generators, compressors, thrusters etc. but is also able to replicate a ships movement during storm.

The panel boards have also been type tested by IPH at 50°C ambient, ensuring full capacity in a hot engine room.



You're holding a top of the line quality product in your hands. Made with love and excellence! I hope you will enjoy assembling and using Elsteel products as much as I enjoy manufacturing it for you.

A stylized, handwritten signature in black ink, appearing to be 'F. Logstrup'.

**Fang Logstrup**  
Managing Director

# STANDARDS & RESULTS OBTAINED



Vibration in all directions is to be less than 10mm/sec.

(rms velocity value)

Frequency should lie between 0-1000Hz.

Usual practice with high-speed ships is, that flare angles of the bow side shell and bulwarks are not to exceed angles of 40 to 45 degrees relative to the vertical.

(Normal value at rough weather,  $2\beta \approx$  degrees.)

STANDARDS

RESULTS

Panels are stable for 0-30mm/sec. velocities.

Panels can withstand frequencies in XYZ directions from 0-5000Hz.

Panels are stable for 0-30m/s<sup>2</sup> accelerations.

Tilting Angles

At slow speeds  $2\beta = 25$  degrees

At high speeds  $2\beta \approx 40$  degrees



Elsteel products are certified for marine applications by





## SIMULATOR FUNCTIONS

**Wave Motion** // Tilting of a Ship

**Main Engine** // Main Driving Engine of a ship

**Vibrators** // Other Machineries such as Compressors and Generators



## FREE VIBRATION

Free vibration takes place when a system oscillates under the action of forces inherent in the system itself, and when external impressed forces are absent.

## NATURAL FREQUENCY

Natural frequency is the frequency of free vibrations in Hz and is a property of the dynamic system established by its mass and stiffness distribution.

## FORCED VIBRATIONS

Vibration that takes place under the excitation of external forces is called forced vibration.

## RESONANCE

If the frequency of excitation coincides with the natural frequency of the system, a condition of RESONANCE is encountered, and dangerously large oscillations may result. The failures of major structures occur due to this theory.

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Technology

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