



Sail into a sustainable future

General

Length overall	120,46 m	Air draught (top of Flettner rotor)	35,0 m
Length between perpendiculars	117,38 m	Design speed	13,0 kts
Breadth hull	18,00 m	Deadweight	5000 t
Depth maindeck	9,53 m		
Design draught	6,00 m		

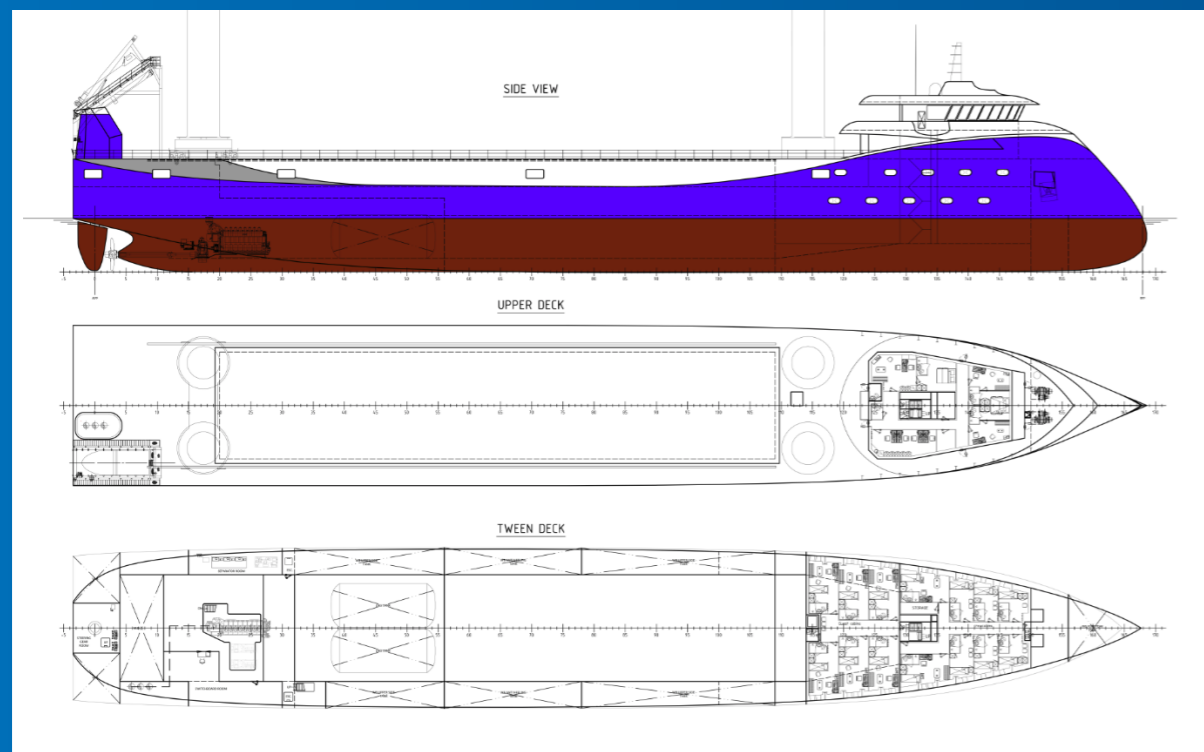
Loading Capacities

Total hold volume	6320 m ³	Area floor hold	445 m ²
Dimensions hold opening	62,3 x 12 m	Area maindeck hold	747,6 m ²
Height closed hold	16,90 m	Displacement	7956 t

Propulsion & Manoeuvring particulars

Main engine (approx.)	4000 kW	Flettner rotor diameter	3,70 m
Number of Flettner rotors	4	Flettner rotor end disc diameter	7,40 m

Flettner rotor height	20,0 m	Rotational speed	300 rpm
		Required power Flettner rotor (approx.)	4 x 70 kW



Factsheet **Flettner Freighter**



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Flettner Freighter

by C-Job Naval Architects

Working principle of rotors

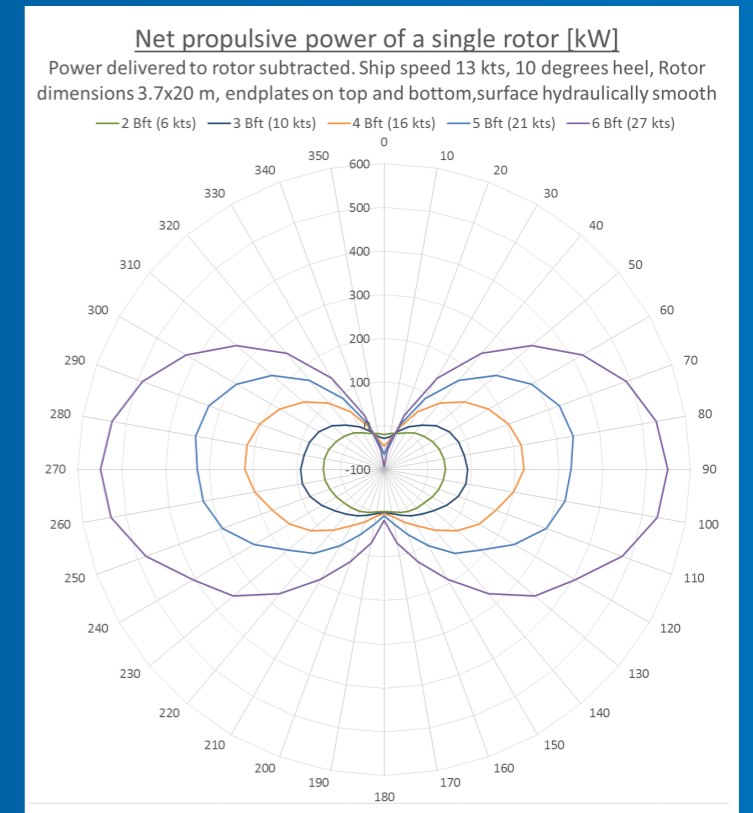
The cylinders are rotated with aid of an electric motor. The air attaches to the cylinder surface and is lead in a curve. By bending the air stream lift arises. This is the so-called Magnus effect. With a rotating cylinder 8 – 10 times more power can be absorbed from the wind compared to sails or wing-shaped structures of similar size. This makes Flettner rotors especially suitable for wind assisted propulsion of ships.

Fuel Saving

- While sailing at 13 knots of speed, fuel can be saved on headings between 30 – 170 degrees relative to the true wind. The greatest contribution can be obtained at headings between 80 – 100 degrees;
- The rotor applied on a vessel is effective from windspeeds starting from 2 Bft and its effectiveness increases significantly with the wind speed;
- In fully loaded condition while sailing in 4 Bft wind, the average power contribution over all headings of four Flettner rotors can be approximately 18% of the normal upright resistance, with a maximum of 38% when sailing at half wind headings (power delivered to rotors subtracted in calculations). In 6 Bft wind, the average contribution can be approximately 50% with a maximum of 95%;
- The aft set of rotors can be moved longitudinally over the hold. This feature ensures the sail balance can be obtained in all headings and wind speeds resulting in the optimum forward thrust and minimum resistance;
- Another side effect which can also contribute to fuel savings is the gyroscopic force that is generated by the rotors while rotating, which may contribute to the damping of undesirable rolling motions.

Practical advantages

- The size of the rigging can be greatly reduced compared to sails or wing-shaped structures, by the use of rotating cylinders. This is due to the high



- effectiveness of the rotor, since they produce 8 – 10 times more lift force per unit area of the projection;
- Another great advantage of the rotors is that they need no adjustment for changes in the direction of the wind. This makes them very easy to handle;
- Flettner ships are highly manoeuvrable. When rotating the two sets of rotors in opposite directions, the ship can turn in place;
- Also from a safety point of view, Flettner ships perform better in strong winds. The force on a rotor increases more slowly than on sails, due to constant circulation of the air dictated by the rotation speed of the rotor. Further lift decrease is possible by reducing the rotational speed;
- In a heavy storm, the power can be entirely switched off. The adverse effect of the wind on the rotors is then very small.

