



G	2022-09-08	Revised for methanol fuel and according to design development
F	2022-03-21	Revised according to design development
E	2021-10-20	Minor change in wording
D	2021-10-08	Revised according to changed main dimensions
C	2021-09-23	Revised according to Procurer's comments
B	2021-09-09	Revised according to Procurer's comments
A	2021-08-27	Initial revision for Tender Design
Revision	Date	Alteration Remark

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Reference Drawing 30193-002-1-111_J	Title PUBLIC DATA SHEET		
Designer Romu, T.	Changed by		
Reviewed by Hovilainen, M.	Approved by Vocke, M.		
Aker Arctic Design Aker ARC 130 S	Pages 3	Drawing Number	Revision
Paper Size A4	Drawing Scale NA	Document Date 2022-09-08	30193-002-1-102
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GENERAL

Aker Arctic Technology Inc has developed a concept design for the next-generation icebreaker for the Swedish Maritime Administration (SMA).

The design is proprietary to Aker Arctic and identified as **Aker ARC 130 S**.

GENERAL DESCRIPTION

The primary tasks of the new icebreaker are assistance icebreaking, convoy operations, towing (both long and short), and ice management. In addition, the vessel can be used for local icebreaking, supporting search-and-rescue operations including helicopters, fairway management including buoy handling, and additional duties.

While the icebreaker's primary operational area is the Baltic Sea, it is designed for unlimited worldwide operation. The vessel is designed for operations in $-35\text{ }^{\circ}\text{C}$ to $+35\text{ }^{\circ}\text{C}$ ambient air temperatures and -2 to $+25\text{ }^{\circ}\text{C}$ sea water temperatures.

MAIN PARTICULARS

Length over all (including towing notch).....	about 126.00 m
Length over all (hull)	about 119.90 m
Length at design waterline	about 111.67 m
Beam, main deck	about 28.00 m
Beam, design waterline.....	about 27.42 m
Draught, maximum (summer load line)	8.95 m
Draught, design waterline	8.00 m
Depth to main deck.....	12.00 m
Displacement, design waterline (Baltic Sea).....	about 15400 t

HULL STRUCTURES

The icebreaker has an all-welded steel hull and superstructure built generally of mild steel and, where advantageous to the design, high-strength steel with a yield point up to 500 MPa.

The icebreaker's hull is framed transversally with 800 mm main frame spacing with intermediate frames between each main frame. The hull is strengthened to Polar Class (PC) 4 with additional strengthening according to the vessel's operational profile and scenarios.

The upper part of the underwater hull is clad with unpainted stainless steel with a vertical extent of approximately 3.5 m; other parts are coated with approved abrasion-resistant low-friction paint.

The icebreaker's total steel weight including outfitting and painting is approximately 6500 t.

POWER PLANT AND PROPULSION SYSTEM

The icebreaker has an integrated diesel-electric hybrid power plant and propulsion system. The power plant includes an energy storage system (ESS). Special emphasis has been given to high overall energy efficiency, waste heat recovery, and low emissions.

The power plant consists of four medium-speed main diesel generators operating on hydrotreated vegetable oil (HVO) and, with modifications, on bio-methanol. In addition, the icebreaker has four high-speed auxiliary diesel generators operating on MD97 fuel (97 % bio-methanol and 3 % additives). The total output of the power plant is approximately 30 megawatts.

The power plant and electrical equipment spaces are divided into two redundant engine rooms separated by an A60 bulkhead.

The propulsion system consists of three electrically driven azimuthing propulsion units: two in the stern and one in the bow. The total propulsion power is approximately 21 to 22 megawatts.

OTHER FEATURES AND INFORMATION

The icebreaker is designed to meet the requirements of ships registered under the Swedish flag.

The icebreaker has accommodation, public and service spaces, and lifesaving appliances for up to 54 persons.

The overall operational endurance of the icebreaker is 28 days.

The towing equipment consists of an electric or hydraulic double-drum waterfall type towing winch, fixed towing notch, towing block and fairlead, pop-up pins, towing pins and shark jaws. Other deck equipment includes main deck crane (10 t at 11 m and 2 t at 28 m) serving the aft cargo deck and two smaller service cranes (provision handling crane and pilot transfer crane) in the forward part of the vessel.

The icebreaker has a helideck with a D-value of 19.8 m and refueling system with two jettisonable JET A-1 storage tanks.

The icebreaker is provided with a passive roll reduction tank and an active heeling system consisting of two wing tanks, cross duct, and a propeller pump.

The icebreaker is equipped with two fire monitors for fighting external fires.