



Icebreaker, drilling platform and
multi-purpose research vessel

AURORA BOREALIS

Data Sheet for Overview



GENERAL

Heavy ice breaker (comparable to the world's strongest ice-breakers), a multifunctional research vessel covering any marine related area of research, and a scientific drilling platform to extract drilling cores from the sediments of the deep oceans. AURORA BOREALIS shall be a successful combination of all of these ship types.

The ship has been initially planned and shall be designed for full year research operations in the entire Arctic and in Antarctica. This includes also the possibility of a partial wintering period during research missions. Wintering means the vessel drifts in the ice without own propulsion ahead. Operation also includes all ice-free oceans between the poles, including the warm tropical zones, i.e. world-wide service.

The ship shall be designed for an operation period of 40 years.

AURORA BOREALIS shall be designed to be autonomous and to advance as far as possible to the ice covered deep sea basins without any assistance by other ice breakers. At these most remote places of the Arctic Ocean AURORA BOREALIS shall perform deep sea drilling and research tasks. All the ship's facilities must be planned to meet the highest standards of safety, reliability and redundancy. AURORA BOREALIS shall have a triple skin over large areas of the hull. For safety reasons she shall be divided by watertight longitudinal and transversal bulkheads and shall have the necessary segregated fire zones with own stair cases and safe escape routes. She shall have redundant power plants positioned in entirely separated engine rooms and switchboard rooms. The pipe systems and cable trays shall be arranged for highest safety in such way that ship operation can continue in cases of flooding or fire in limited areas. A breakdown of single components or systems shall neither endanger the lives of persons on board at any time nor shall this inevitably result in an abortion of the mission.

AURORA BOREALIS shall be designed to accommodate a maximum of 120 persons in 72 single and 24 double cabins, all with own sanitary modules. All cabins shall be located towards the outside of the superstructure with daylight.

Icebreaking capacity more than 2.5m multi-year ice with 2-3 kts

Dynamic positioning in drifting ice up to 2.5m thickness and in open water

Environmentally friendly ship with optional MDO / HFO fuel utilisation according to areas of operation. Most intensive Waste Heat Recovery systems and Heating systems for most economic energy utilisation and operating costs. Full future exhaust gas IMO Tier III compliance.

MAIN CHARACTERISTICS

Length over All	appr.	199.95 m
Length between PP	appr.	174.27 m
Breadth (mld.) max.		49.00 m
Breadth (mld.) at T=13 m	appr.	45.00 m
Depth to main deck (mld.)		17.75 m
Design draught (mld.)		13.00 m
Scantling draught (mld.)		13.25 m
Light operating draught (mld.)	appr.	11.50 m

Light Weight	appr.	49,000 t
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Deadweight at 13.00 m (mld.) draught	appr.	15,500 t
Deadweight at 13.25 m (mld.) draught	appr.	17,300 t

Displacement at 13.00 m (mld.) draught	appr.	64,500 t
Displacement at 13.25 m (mld.) draught	appr.	66,300 t
Displacement at 13.25 m*) (mld.) draught	appr.	63,200 t

*) with lost buoyancy caused by opened moon pools.

HFO / MDO total capacity	appr.	12,300 m ³
MDO extra capacity	appr.	500 m ³
Lubricating Oil capacities	appr.	500 m ³
Fresh water capacity (with daily tank)	appr.	1,300 m ³
Ballast Water capacity	appr.	19,500 m ³
Active Heeling Tanks capacity	appr.	3,600 m ³
Active Pitching Tanks capacity	appr.	3,600 m ³

Power plant (Diesel-electric)	appr.	94 MW(m)
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Open water cruising speed		15.5 kts
Maximum open water speed	appr.	20.0 kts

Endurance depending on mission profile 10,000 nm or 90 days

CLASS

- GL ✘ 100 A 5 Research Vessel, Icebreaker, Ice Class PC1, IW, EP(A,B,G,N,O,P,R)
- ✘ MC, AUT, RP3 100%, CM-PS, ERS
- LR ✘ 100 A 1 Multi-Purpose Research Ship, Icebreaker, Ice Class PC1, Winterization H(-50)A(-50) *IWS, EP (A,B,G,N,O,P,R)
- ✘ LMC, UMS, PSMR*, ShipRight (SCM), ShipRight (SERS), Green Passport
- DNV ✘ 1A1, Icebreaker, PC1, BIS, CLEAN, E0, RPS, TMON, WINTERIZED(-50degC), DE-ICE



EUROPEAN RESEARCH ICEBREAKER

Icebreaker, drilling platform and multi-purpose research vessel

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Data Sheet for Overview



SCHIFFKO
PRV 200

Polar Research Vessel

- BVI ✘ HULL ✘ MACH special service - multi purpose research vessel / icebreaker, unrestricted navigation, ✘ AVM-IPS ✘ AUT-UMS, MON-SHAFT, CLEANSHIP SUPER 7+ AWT, POLAR CLASS 1, COLD(H -50 °C, E -50 °C), INWATERSURVEY, GREEN PASSPORT

Environmental Conditions

- Minimum air temperature where scientific work is ensured within any safety aspects: minus 30°C
- Maximum air temperature ensuring unlimited operational mode for all equipment: plus 45°C
- Minimum air temperature for drilling operation: minus 25°C
- Minimum air temperature for limited ship's operation: - 50°C
- Maximum air temperature for ship's operation: plus 45°C
- Minimum water temperature for ship's operation: minus 2°C
- Maximum water temperature for ship's operation: plus 32°C
- Maximum of assumed wind velocity: 85 kn (equals 14 Bft)
- Maximum wind velocity where scientific work is ensured: 7 to 8 Bft (equals sea state 6), according to the equipment used and the actual wind and sea conditions
- Relative humidity: up to 90%

ACCOMMODATIONS

Accommodations shall be provided for 120 Persons: Persons to be accommodated in 72 single and 24 double cabins each with sanitary module.

The complement can be composed according to mission, comprising of:

• Nautical crew	35 Persons
• Scientists	50 Persons + 3 Reserve
• Drilling Crew	25 Persons
• Helicopter Crew	5 Persons
• Meteorology + Ice Observation	2 Persons

Mess Rooms, Recreation Rooms and Pantries

- Crew's mess room with self-service food counters for 30-40 persons at the same time.
- Crew's and scientists' mess with self-service food counters for 50-60 persons at the same time.
- Officers' and scientists' mess to serve about 50 persons
- Crew and scientists' recreation room (noisy) for 40-50 pers.
- Crew and scientists' recreation room for 40 persons
- Officers' and scientists' Recreation and Library (Europe Lounge) for 150 persons

Sport, Fitness & Hobby Rooms

- Ship's Office
- Ship's Archive
- General archive
- Kiosk

- Multifunction room / Cinema
- Scientific Library
- 4 Changing rooms
- Citadel Area
- Swimming Pool and Sauna
- Fitness Room

Medical Rooms

- 1 Hospital room
- 1 Treatment room
- 1 Operating theatre
- 2 Patients' rooms
- 2 Medical stores
- 1 Doctor's cabin
- 1 Nurse cabin

Service Rooms

- Provision Cool and Storage Rooms
- Ship Command Rooms
- Galley
- Pantry
- Laundry and Ironing room
- Steering Gear Compartments
- Thruster Drive Compartments
- Winch etc. Rooms, Service Rooms for Deck Aux.
- Rooms Fire-Fighting Systems, Emergency Pump
- Pump Rooms
- Fan Rooms
- Air conditioning Rooms
- 12 Workshops
- Miscellaneous ship service rooms

Ship Operation Rooms

- Switchboard & Electrical Control Rooms
- Converter Rooms
- Gyro Rooms
- Sounding Equipment Rooms
- Radar Equipment Rooms
- Air Treatment Unit Rooms
- Battery Rooms

MAIN PROPULSION SYSTEM

Diesel Engines

• 4 Generator Engines (MCR)	appr.	8,700 kW
• 2 Generator Engines (MCR)	appr.	17,500 kW
• 2 Generator Engines (MCR)	appr.	11,600 kW
• Harbour Generator (MCR)	appr.	1,670 kW
• Emergency Generator (MCR)	appr.	1,260 kW

Catalysers with Urea Injection, Silencers and Exhaust Gas Economizers

Propellers

- 3 Propellers fixed pitch, 5 blades, ice strengthened dia. 6.50 m for max. 3 x 27.000 kW shaft power
- 2 x 3 retractable transverse thrusters in nozzles with bottom cover plates, each max. 4.500 kW

Stabilizers and Tank Systems

- 2 Fin Stabilizers
- Active Ice Rolling Tank System / Tank Stabilizer System
- Active Ice Pitching Tank System

Fresh Water Makers

- Vacuum Evaporator System 35m³/day
- Reverse Osmosis System 37m³/day
- Active Ice Pitching Tank System

Waste Disposal System

Compressors

- 4 Air Compressors 30 bar 83m³/h
- 2 Air Compressors 10 bar 144m³/h

CONTAINER CAPACITY

- 20' Containers in moon pool area 39
- 20' Container in Cargo Hold area 48
- 20' Container on Wheelhouse top 6
- 20' Container on Deck 1st Tier 32
- 20' Container on Deck 2nd Tier 64
- 20' Container on Deck 3rd Tier 88

Alternatively up to 64 Nos. 40' Containers plus 8 Nos. 20' Containers can be stowed on Deck.

DECK'S EQUIPMENT

Life saving

- 4 Life boats fully enclosed each for 60 persons
- 1 Fast rescue boat
- 2 Emergency rescue boats each for 6 persons
- 1 Rigid boat for working 12 persons
- Inflatable life rafts

Anchor and mooring

- 2 combined anchor/mooring winches fore 250 kN
- 2(3) Anchors SPEK type
- 2 mooring winches aft 250 kN
- 4 Anchor positioning winches

Towing Points (Salvage)

- Aft 2 x 900t SWL
- Fore 1 x 900t SWL

Cranes

- 1 Research & cargo crane 35 m/100 kN, 6 m/300 kN
- 1 Research & cargo crane 45 m/170 kN, 6 m/850 kN
- 1 Cargo crane 35 m/200 kN
- 1 Research & cargo crane 33 m/30 kN, 20 m/100 kN
- 1 Research - sickle crane 7 m x 37 m, 100 kN
- 1 research - sickle crane 7 m x 23 m, 100 kN
- 2 removable research & working cranes 4.5 m/50 kN
- 1 A-Frame 1,000 kN
- 2 Telescoping beams each 200 kN
- 1 Telescoping beam 100 kN
- 1 Mobile pick-up frame for thrusters 1,750 / 2,400 kN

Transport System

The System shall consist of fully symmetric (regarding kinematics and operation), laser-navigation, unmanned, self-propelled battery-powered vehicles designed to transport trolleys and special racks along a predetermined paths within the ship, a Central Control Personal Computer (PC) and software, Communication Devices, and all other necessary components to meet the requirements as specified. This System shall handle complete daily supplies and disposals between the service areas. The transport tasks shall be executed daily according to a specified schedule or ad hoc.

Helicopter

- 1 Bell Agusta BA609 Tiltrotor VTOL Aircraft
- 2 Bo 105 Helicopters
- Helicopter Emergency Landing Pad in Bow
- Helicopter Landing Pad with automatic landing facilities
- Helicopter Re-fuelling facilities
- Helicopter Hangar for 3 helicopters
- Helicopter Workshop

NAUTICAL EQUIPMENT

External communication

- 2 GMDSS systems for area A4
- AIS system
- INMARSAT
- IRIDIUM system
- Navtex terminal
- Satellite emergency position EPIRB 406 MHz
- SART 9 GHz

DP system

The DP system shall comply with the rules and regulations: IACS, DP3 (safety standard and redundancies but without Class notation)

Radar navigation systems

- X-Band radar

- S-Band radar
- Ice radar
- Magnetic compass
- Gyro compass
- Inertia platform
- Conning display
- Speed log
- Wind speed direction

Detection systems

- Ice Radar Detection system
- Night vision camera
- Ice Search Lights

Devices for Tele-medicine

- Communication facilities in Operating Theatre for medical assistance by onshore hospitals

SCIENTIFIC EQUIPMENT

Disciplines

- Geology
- Geophysics
- Biology
- Physical and chemical Oceanography
- Glaciology
- Meteorology
- Atmospheric physics and chemistry
- Bathymetry

Moon pools

- 1 for scientific drilling 7.0 x 7.0 m
- 1 for other science equipment deployment 7.0 x 7.0 m

Stern Chute

- Hydraulically operated stern doors
- Filling piece dismountable at sea

Drilling tower & Drill Pipes

- Maximum drilling up to 5000 m water depth and 1000 m penetration
- Height above keel 80,75 m
- Height above working deck 63,00 m
- Drill pipes (two full strings) 12.000 m

Sounding & Hydro-acoustic navigation systems

- Navigation echo sounder
- Survey sounders
- 4 HIPAP 500 systems
- Multi beam echo sounder deep sea depth > 10.000 m
- Multi beam echo sounder shallow sea depth 20 -2.000 m
- Sub-bottom profiler depth range > 10.000 m

- Precision hydrographical sounder depth 20-10.000 m
- Acoustic Doppler current profiler

Winches

- 2 Friction winch drum 10,000 m Ø 18 mm 200 kN
- 1 Friction winch 10,000 m Ø 22 mm 200 kN
- 3 Conduction cable winch 8,500 m Ø 11 mm 5 kN
- 1 Storage winch (coaxial) 10,000 m Ø 18 mm
- 1 Storage winch (6 Cu) 10,000 m Ø 22 mm
- 2 Storage winch (Wire) 12,000 m Ø 22 mm
- 1 Rewinder winch Ø 11-22 mm
- 1 Streamer winch 4,000 m 2"
- 1 Streamer winch 1,000 m 2"
- 1 Magnometer winch 500 m 1¼"
- 3 Airgun winches 8,500 m Ø 18 mm
- 1 Mobile storage winch Ø 11-22 mm
- 1 Horizontal capstan 20 / 10 kN

Cranes and lifting devices

- 1 Travelling crane 150 kN
- 1 Travelling crane appr. 8 m x 27 m 100 kN
- 1 Travelling sickle crane appr. 5 m x 22 m 100 kN
- 1 Travelling crane appr. 9 m x 25 m 300 kN
- 1 Travelling crane appr. 8m x 8.5 m 100 kN
- 1 Research sickle crane appr. 7 m x 23 m 100 kN
- 3 Travelling cranes appr. 7 m x 23 m 100 kN

LABORATORIES

Wet laboratories

- Hangar and large wet laboratory
- Biological wet laboratories
- Decanter area
- Salinometer laboratory
- Biological aquarium

Dry laboratories

- 5 Dry laboratories
- 2 Geochemical ice laboratories
- 2 Clean laboratories
- 1 Clean laboratory for general use
- Crow's nest with whale observation stand

Container laboratories

- Large laboratory spaces for placing up to 32 Laboratory Containers inside around forward moon pool.

Innovative Atrium Concept above science equipment deployment moon pool with crane access.

Work area on deck 1900 m²
Laboratory area 2300 m²