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Commercial offer for the manufacture of  
**BE-200 AMPHIBIOUS AIRCRAFT**

2019

## Be-200 amphibious aircraft



Maiden flight: 1998

The baseline design of Be-200 amphibious aircraft is intended for aerial wildfire-fighting using water or fire-extinguishing liquids. This includes the following objectives:

- Stopping the spread, and containment, of moderate and large forest fires by creating a barrier with multiple drops of an extinguishing fluid at the edge of the fire;
- The elimination of small and newly-started forest fires;
- the delivery of firefighting teams and equipment to disaster areas with landing on a preselected water surface or airfield, and subsequent extraction.

Additionally, the airplane can perform:

- passenger transportation;
- search-and-rescue work;
- environmental monitoring;
- patrolling of exclusive economic zones and sea boundaries.

The Be-200 can be reequipped into the following versions quickly and with minimum cost:

- transport airplane;
- passenger airplane (Be-210);
- search-and-rescue airplane;
- medical evacuation airplane.

All firefighting capabilities are retained. Work on a business-version design are underway.

The Be-200 can operate from Class B airfields with a runway length of 1,800 m and from a water surface at least 2,300 m long with a water body depth of at least 2.5 m. The airplane can take off and land on water with a wave height of up to 1.3 m, and special anti-corrosion treatments enable operation of this airplane in maritime conditions.

In areas with underdeveloped ground infrastructure, the Be-200 may be deployed on a 130 x 70 m paved area equipped with a slipway. The Be-200's detailed design was completed with consideration of FAR-25 airworthiness standards (USA), which will facilitate certification of the airplane in accordance with FAA and JAA standards.

The Be-200ES-E is fitted to the requirements of the Russian Ministry of Emergency Situations, and is intended for the following main applications:

- Fire suppression;
- Delivery of search-and-rescue teams, required equipment and essential goods to disaster areas, with landing at the nearest airfield or water body;
- Evacuation of survivors from disaster zones, search and location of ships and vessels suffering distress;
- Finding the precise coordinates of disaster spots;
- Classification of the detected objects, both visually and with the use of on-board equipment;
- Carriage of fire teams and goods.

There is currently no maintenance interval set for the airplane and it is maintained as condition requires. Its assigned service life is 30 years.

The Be-200 can hold up to 12 tons of water. The airplane can be filled with water at an airfield using a hydrant system, or it can scoop water while skimming the water surface and fill its tanks in 14 seconds. The airplane is fitted with tanks for chemical liquids with a total capacity of 1.2 m<sup>3</sup>. Water can be dropped in a single salvo, or in consecutive drops by opening the water tank doors in sequence.

Thanks to its high speed, the Be-200 offers high fire-suppression capacity in terms of the number of water drops per hour. With an airfield-fire distance of 100 km and airfield-water body distance of 10 km, the airplane can drop up to 270 tons of water on the fire. The high rate of climb is a significant advantage when it comes to fire suppression in a narrow space, for example, in mountainous areas, or when scooping/dropping water in areas with obstacles present.

## Design features

The multi-purpose amphibious aircraft Beriev Be-200 represents a new generation of amphibians. The most recent achievements in the field of hydrodynamics have made it possible to design the Beriev Be-200 with aerodynamics no worse than those of land-based transport aircraft of a similar class.

The airplane is made according to normal aerodynamic design, with a high-set wing, T-shaped tail unit, two under-wing stabilizer floats, and hull with a high length-to-beam ratio and variable rise.

The wings of the Be-200 have been provided with well-developed take-off and landing devices. An automatic flap re-extension system has been applied that sets flaps to the take-off position during take-off at high speeds only, when the height of splash water is considerably lower.

The airframe is constructed mainly from aluminum alloys with enhanced corrosion resistance, while the structure of such airframe parts as wing leading edge and trailing edge sections, elevators and rudders, ailerons, flaps, spoilers, fin and horizontal stabilizer trailing edge sections, water flaps and stabilizer floats, widely uses composite materials.

Ukraine-based Progress Engine Design Bureau and JSC Motor Sich have designed and manufactured a special "maritime" corrosion-resistant version of the D-436 three-shaft turbofan engine for the Be-200 amphibian. Two such engines are mounted above the wingroot pods on the landing gear fairings to prevent water spraying into the engines during take-off and landing.

What distinguishes the Be-200 from other amphibious aircraft is its completely sealed hull, which allows for its use in a wide range of circumstances. For the first time in the history of domestic amphibian-aircraft production, the cargo cabin is pressurized along the whole hull length, while all of the components of the special fire-suppression system, including large water tanks, are accommodated under the cargo floor.

The up-to-date ARIA-200M integrated avionics system provides navigation and flight control in adverse weather conditions, anywhere in the world, as well as at any time of the day and in any season – in compliance with ICAO Cat. III requirements. The system's open architecture allows changes to be made to its configuration to suit the customer's requirements. All information for the two-pilot crew is displayed on six multi-functional color LED electronic displays arranged on the instrument panel. Conventional instruments are used for back-up only in case of possible electronics failure.

The Be-200 boasts high maneuverability and handling characteristics, which are vital for any fire-fighting aircraft. The Beriev Be-200 is the first airplane produced by BERIEV Aircraft Company to be fitted with an EDSU-200 three-channel fly-by-wire system. The crew compartment is equipped with "fighter" control sticks instead of conventional control wheels.

A special fire-fighting system able to scoop water to tanks at skimming speeds of 0.9 - 0.95 of the take-off speed has been designed specifically for the Be-200. The Be-200ES version differs from the baseline version due to the availability of additional equipment. A new EDSU fly-by-wire system and SPU-200ES intercom system, AOS airborne observation system, SGU-600 external audible warning system and SX-5 floodlight have been installed. Seats for two observers are provided in the cargo cabin, which are fitted with teardrop windows for the visual search of targets, as well as an Orion-25S inflatable boat and cargo equipment. The walls and ceiling of the crew compartment are covered with decorative panels made by AIM Aviation (UK).

## Scheme



## Aircraft specification

	Be-200	Be-200ChS
<b>Dimensions</b>		
Wing span (m)	32,78	
Aircraft length (m)	32,05	
Aircraft height (m)	8,9	
Wing area (m <sup>2</sup> )	117,44	
Wing sweep angle at 1/4 chord line (degrees)	23	
Fuselage diameter (m)	2,86	
Wheel track (m)	4,3	
<b>Engine's main performance data</b>		
Engine type and model	D436-TP	
Number of engines	2	
Maximum takeoff thrust (ISA, H=0) (kgf)	2x7500	
Maximum unboosted thrust (ISA, H=0) (kgf)	2x1500	
Fuel consumption (kg/kgf·h (kg/N·h))	0,608 (0,062)	
<b>Weight characteristics</b>		
Maximum take-off weight (kg)	runway - 37900	runway - 42000
	water - 37200	water - 40000
Max payload (weight of water loaded to tanks) (kg)	12000	
Empty weight(kg)	25340	28000
Total capacity of fuselage fuel tanks (l)	12500	
<b>Performance data</b>		
Flight speed (km/h)	710	700
Maximum flight range (km)	3600	3100
Maximum range with maximum payload (km)	1400	1800
Take-off distance (land/water) (m)	700/1000	1350/1000
Landing distance (land/water) (m)	950/1300	1020/1300
flight altitude (m)	8000	
<b>Seaworthiness</b>		
Seaworthiness, sea state	3	
Wave height (m)	up to 1,2	
Min depth required for operation (m)	2,6	
<b>Cargo cabin dimensions</b>		
Length (m)	18,7	
Height (m)	1,9	

Maximum width (m)	2,5
Floor area (m <sup>2</sup> )	41
Volume (m <sup>3</sup> )	80,8
<b>Service life</b>	
Calendar	30
<b>Fire suppression</b>	
Maximum capacity of water tanks (m3)	12
Maximum capacity of chemical fluid (m3)	1,2
Rate of climb after water scooping by skimming (43 t, sea level) (m/s)	9,5
Speed during water scooping by skimming (km/h)	150-190
Time of water scooping by skimming (s)	14
Minimum water drop speed (km/h)	200-250
Minimum drop height (m)	40
<b>Search-and-rescue on water, medical transport</b>	
Patrol heights (m)	100-8000
Patrol speed (km/h)	300-560
Number of survivors:	
- accommodated in side jump seats	50
- accommodated in stretchers	30
Patrol time (h)	6,5
<b>FREIGHT</b>	
Payload (kg)	7500
Range (8000 m, 1 hour fuel reserve), km	1000
Cargo pallets dimensions (m)	2,050x1,760
Cargo pallets, type PA 1.5, pcs	up to 9
Cargo containers, type LD3	up to 7