

SEASTAR CD 2

Amphibious Flying Boat

Description & Specification

Exhibit A

October 2008
- Preliminary -



DOCUMENT APPLICATION

This document defines the standard DORNIER SEASTAR twin-engine amphibious aircraft. DORNIER SEAPLANE COMPANY (DSC) reserves the right to incorporate design changes and to substitute equipment in lieu of that herein, whenever such substitution is necessary to improve the product or to meet the requirements of government regulatory agencies.

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This document has been published to provide technical information on the design, systems and performance of the aircraft. Should more detailed data be required, please contact

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1. GENERAL

The aircraft described within this document is the standard DORNIER SEAPLANE COMPANY SEASTAR CD 2 twin-engine amphibian. The aircraft airframe is predominantly manufactured using low-pressure composite (LPC) construction with fiberglass and carbon fiber. The fuselage is unpressurized and incorporates an integral fuel tank in each sponson and retractable tricycle type landing gear. The tail section is equipped with a variable incidence horizontal stabilizer. The cabane mounted cantilever wing incorporates single slotted trailing edge flaps. The twin turboprop engines are mounted above the wing on the center-line of the aircraft in a push-pull configuration.

Crew

The basic Aircraft has accommodation for one pilot and one co-pilot. For VFR operations the co-pilot seat may be used for a passenger.

Number of Passengers

The Aircraft is designed to accommodate a maximum of nine passengers and two crewmembers in the standard interior configuration, with the maximum number of passengers varying for each of the different configurations. For special operations up to 13 passengers and 1 crew may be carried.

Other configurations will be available.

1.1 CERTIFICATION

The Aircraft is EASA and FAA certified. The

certifications currently include Day, Night, single pilot VFR, and two pilot IFR operations. Flight into known icing conditions will be certified in the future.

1.2 APPROXIMATE DIMENSIONS

General

Overall Height (Fr. Prop. Tip)15.86 ft
Width (including sponsons) 13.84 ft

Wing

Span..... 58.20 ft
Area.....329.40ft²
Sweepback (at 5% chord) ... 0°

Horizontal Tail

Span..... 18.24 ft
Area.....68.03 ft²
Sweepback (at 61.5% chord) 0°

Vertical Tail

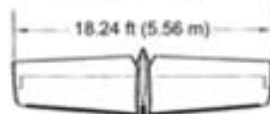
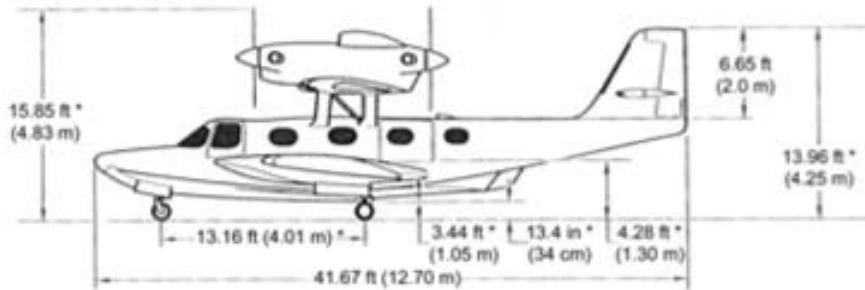
Height (overall)13.96 ft
A r e a33.91 ft²
Sweepback (at 25% chord) 22.5°

Cabin

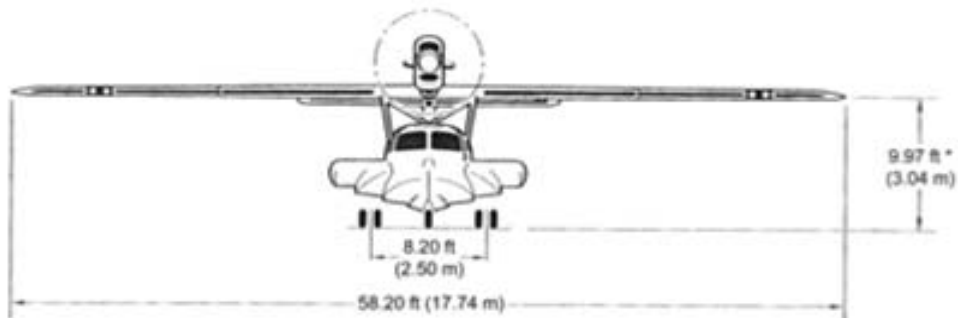
Height (max. overall).....4.49 ft
Width (max).....5.41 ft
Length
(excl. cockpit and baggage area)..... 13.21 ft
Baggage Compartment57.56 ft³

Landing Gear

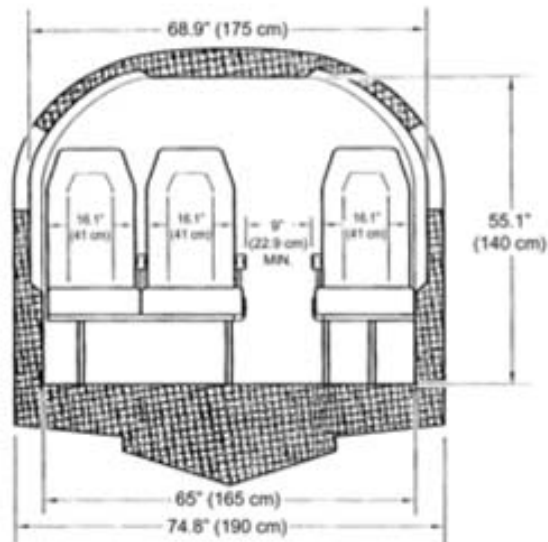
Track..... 8.20 ft
Wheelbase.....13.16 ft



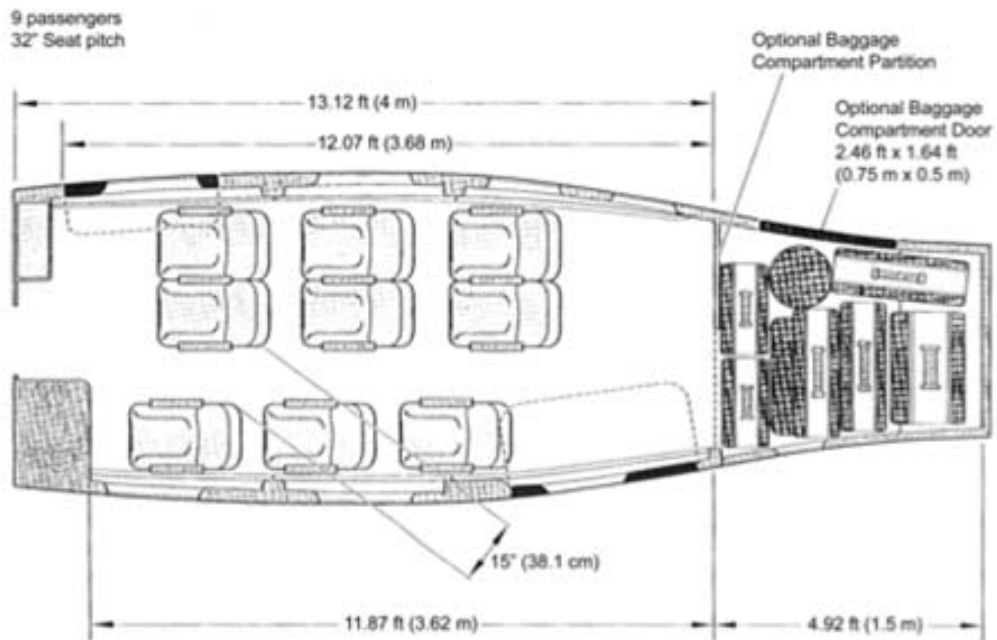
* These dimensions are based on aircraft on jacks with wheels touching the ground.



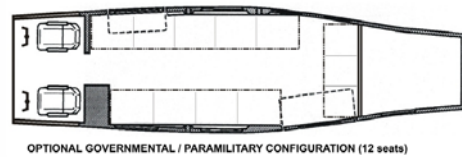
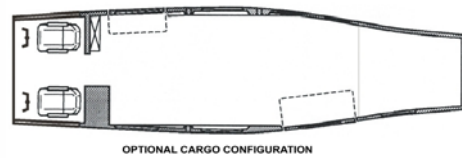
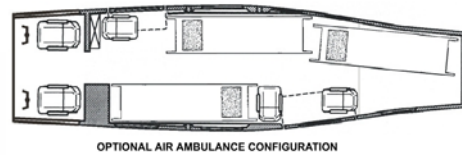
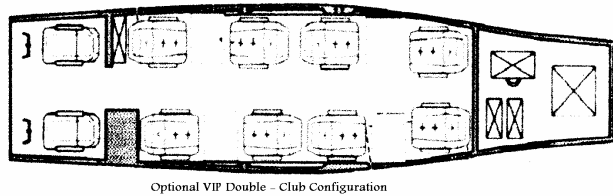
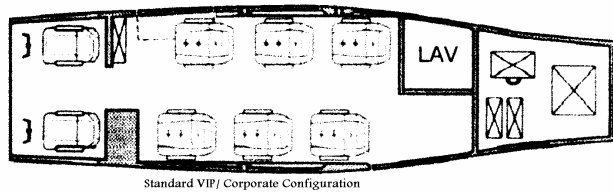
3-View



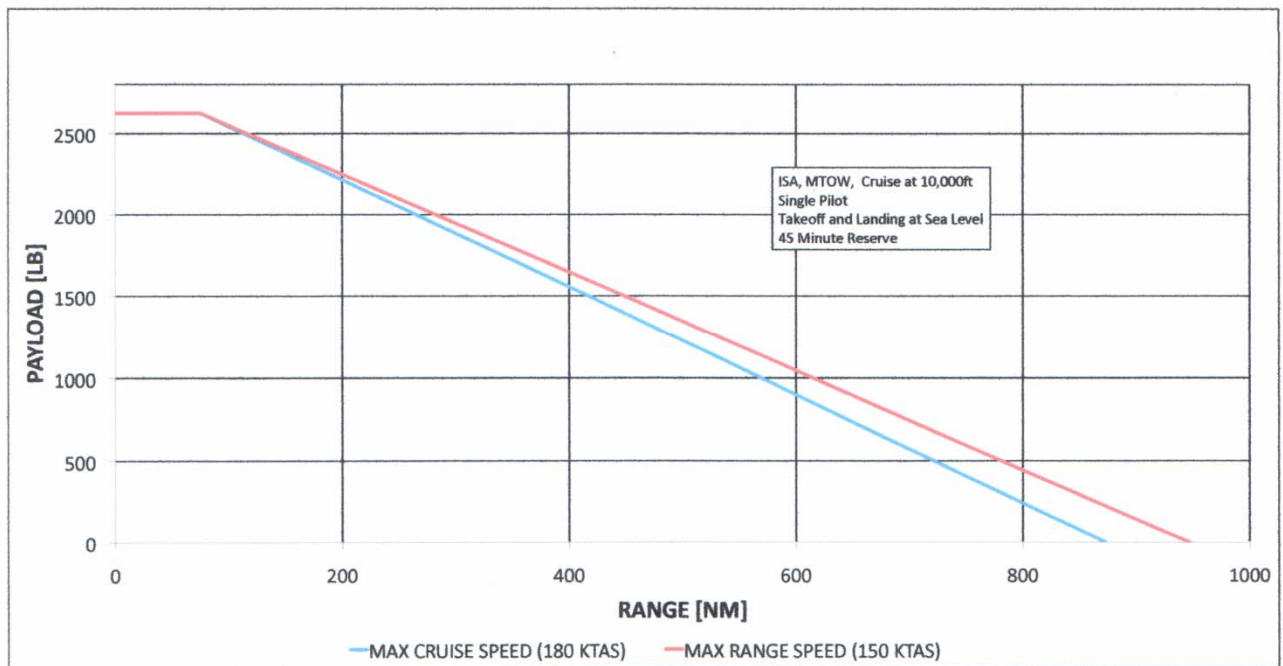
CABIN CROSS SECTION



STANDARD PASSENGER / CARGO TRANSPORT



OPTIONAL CONFIGURATIONS



PAYLOAD RANGE DIAGRAM



1.3 DESIGN WEIGHT AND CAPACITIES

MTOW10,141 lbs
 Approximate Useful Load2,910 lbs
 Baggage Compartment.....397 lbs

2. PERFORMANCE

All performance data is based on a standard aircraft configuration, International Standard Atmosphere (ISA) conditions at sea level and zero wind. Additionally, take-off and landing performance data are based on level, hard surface and dry runways. Production aircraft performance will depend on actual flight conditions and may vary from that described below.

Land Operation

Takeoff Distance (MTOW, 2 Eng., Flaps 20°)
 Over 35 ft.....1850 ft
 Landing Distance (9920 lbs, Flaps 40°)
 Over 50 ft.....2250 ft

Water Operation

Takeoff Distance (MTOW, 2 Eng., Flaps 30°, Wave Height 6 – 12 inches)
 Over 35ft..... 2500 ft
 Landing Distance (MTOW, Flaps 40°)
 Over 50 ft..... 2480 ft
 Rate of Climb
 (MTOW, 2 Engines) 1300ft/min
 Rate of Climb (MTOW, 1 Engine).....490 ft/min
 Maximum Operating Altitude15,000 ft
 Max. Cruise Speed
 (FL 100, 8810 lbs)..... 180 KTAS

Noise Emission:

According to LSL Chapter 672.8 dB(A)
 According to LSL Chapter 10 82.3 dB(A)

3. DESIGN CRITERIA Limit Speed

VMO.....180 KTAS
 Flap Extension Speeds
 VF20.....137 KIAS
 VF30.....127 KIAS
 VF40 / VFE.....117 KIAS
 Landing Gear Extended and Operating Speed
 VLE / VLO.....148 KIAS

4. FUSELAGE

Normal passenger cabin access is provided through the LH cabin door and emergency exit is facilitated through both the LH and the RH door. All doors are positioned above their respective sponsons.

A baggage compartment is located to the aft of the passenger cabin and is accessible in flight. It can be closed off from the passenger cabin by an optional partition.

5. WING

The wing, a one-piece cantilever assembly, is supported above the fuselage on high tensile steel struts.

The wing is equipped with four single-slotted trailing edge flaps extending from the engine nacelle to the inboard end of the aileron.



6. EMPENNAGE

The tail plane consists of a variable incidence horizontal stabilizer with separate left and right hand elevators and a vertical stabilizer with rudder.

7. LANDING GEAR

The aircraft is equipped with a fully retractable tricycle landing gear incorporating nitrogen and oil filled shock struts, a single nose gear wheel and twin wheels on each main gear. The twin main gear wheels have a single disk brake assembly. The steering for the free casting nose wheel is provided by the application of differential braking.

To provide steering for water operation, the aircraft is equipped with a water rudder operated by the flight control rudder pedals. When the water rudder is not in use, it is locked in the neutral position with a lever located on the center pedestal in the cockpit.

8. POWERPLANTS

The two 650 shp flat rated Pratt & Whitney PT6A-135A engines are mounted over the wing and will be controlled by three levers for each engine. One lever controls propeller speed through a constant speed unit, while a second lever controls engine power through a fuel control unit. The third lever (condition) is connected to a fuel shut-off valve. It is used during starting and shutdown sequences and also to select high and low idle settings.

The counter-rotating front and rear four blade McCauley propellers are full feathering, constant speed, and reversible. The pitch and speed of the propellers are maintained by an

engine-driven hydraulic governor, which is controlled by engine oil pressure.

9. SYSTEMS

9.1 FLIGHT CONTROLS

The aircraft is equipped with a conventional dual flight control system consisting of primary and secondary controls.

The primary flight controls are manually operated via control rods and consist of differential Fricke type ailerons, a conventional elevator and a rudder. Pitch trim is achieved by varying the position of the horizontal stabilizer, roll trim by an aileron trim tab and yaw trim by a rudder trim tab. All trim systems are electrically operated.

The secondary flight controls consist of four single-slotted trailing edge flaps, which extend and retract by a single electrical actuator.

9.2 FUEL SYSTEM

The aircraft is equipped with one integral fuel tank in each sponson to provide the aircraft with a maximum usable fuel capacity of 458 US gallons. The left hand tank supplies fuel to the forward engine and the right tank supplies the rear engine. Each fuel tank consists of three interconnected compartments.

One tank filler is located on the upper surface of each sponson for refueling.

The fuel totalizer system consists of a digital indicator for each engine, which displays the total fuel consumed in pounds.



9.3 HYDRAULIC SYSTEM

The hydraulic power pack is located in the forward right hand equipment bay and provides hydraulic pressure for the landing gear and braking system.

9.4 ELECTRICAL SYSTEM

The electrical power is provided by two engine driven starter-generators and a nickel-cadmium battery located in the left hand forward equipment bay. AC electrical power is provided by two inverters that each convert a 28 VDC input voltage into 115/26 VAC 400 Hz outputs.

A standard ground power receptacle is fitted in the left hand forward equipment bay to enable connection of external DC power from a ground power unit.

9.5 ENVIRONMENTAL SYSTEM

The standard environmental system consists of flight and passenger compartment heating and ventilation. The system uses bleed air from both engines and ambient ram air. System control and regulation is performed from the flight compartment and a provision is made for system shut-down or reduction of bleed air during takeoff and landing.

Air conditioning will become available as an option at serial number 10 and on.

9.6 ICE AND RAIN PROTECTION

The aircraft will be subsequently certified with an optional ice and rain protection system that will allow safe flight through known icing conditions. The left and right flight compartment windshields are electrically heated with heating elements.

The pitot tubes and stall warning vane are electrically heated to prevent ice formation.

The front propeller de-icing system consists of electrically heated rubber boots bonded to the inner section of each blade.

Rubber boots will be bonded to the leading edge of the wing, the horizontal and vertical stabilizers.

To prevent ice formation, electrically heated rubber boots will be fitted to the air intake of both the front and rear engines, the front oil cooler intake and the LH/RH wing roots.

To prevent ice formation on the forward crossbraces of the cabane struts, an anti-icing provision will be fitted.

10. AVIONICS

10.1 GENERAL

The avionics installed in the standard aircraft (serial numbers 3 through 9) are Collins Pro-Line equipment in combination with two Becker audio selector units. Serial numbers 10 and on will have a three tube glass cockpit as standard equipment.

A three axis autopilot will be available after serial number 10 and on.

10.2 INSTRUMENT AND CONTROL PANELS

The instrument panel houses various instruments and equipment for monitoring flight, navigation, engine parameters, and aircraft systems. It also houses the central annunciator panel. The aircraft is equipped with a dual set of flight instruments (conventional layout)



The following flight instruments are provided on the pilot's side of the panel:

- Airspeed Indicator
- Encoding Altimeter
- Vertical Speed Indicator
- Attitude Direction Indicator (ADI)
- Horizontal Situation Indicator (HSI)
- Turn and Bank Indicator
- Radio Magnetic Indicator (RMI)
- Flap Position Indicator

and the co-pilot's side of the panel comprises:

- Airspeed Indicator
- Altimeter
- Vertical Speed Indicator
- Attitude Gyro
- Horizontal Situation Indicator (HSI)
- Turn and Bank Indicator
- Radio Magnetic Indicator (RMI)

The following engine and fuel instruments are provided:

- Torque Indicators
- Propeller RPM Indicators
- ITT Indicators
- Fuel Flow Indicators
- % Ng Indicators
- Oil Pressure and Temperature Indicators
- Fuel Totalizer
- Fuel Quantity Indicator

The presence of water in selected buoyancy compartments of the fuselage shall be indicated by a "WATER" annunciator that will illuminate in order to alert the pilot.

10.3 AVIONICS

The installed avionics equipment shall be as specified for each customer. In general, the equipment is installed on the instrument panel and in the avionics rack situated on the left hand side behind the flight compartment partition. Avionics equipment is powered by

four avionics busses that are controlled by an avionics master switch.

11. INTERIOR

All aircraft furnishings throughout the flight compartment and passenger cabin are designed to provide comfort, durability and an appearance appropriate to the role of the SEASTAR aircraft as a passenger / cargo aircraft.

Detailed finish requirements for the passenger cabin's interior color scheme, upholstery and floor covering are in accordance with DSC specifications.

12. TRAINING

The Seller shall make available, at its designated training facility, a ground and flight training program for two qualified pilots and a ground maintenance program for one mechanic. The purchaser shall be responsible for all travel and living expenses of his or her personnel.

13. TECHNICAL PUBLICATIONS

A revision service will be available for DSC publications for a period of 15 years after the date of the sales contract.

One set of vendor manuals and publications shall be supplied to the purchaser with the revision service being provided by the vendor.

DSC Manuals and Publications

These documents will consist of:

- Pilot's Operating Handbook / Aircraft Flight Manual
- Aircraft Maintenance Manual
- Aircraft Wiring Diagrams Manual
- Illustrated Parts Catalogue



and shall be organized in accordance with GAMA 1 and 2 specifications.

Vendor Manuals and Publications

- Pratt & Whitney Canada Ltd. PT6A-135A
Engine Publications:
 - Engine Maintenance Manual
 - Engine Parts Catalogue
- McCauley Propeller Publication:
 - Propeller Maintenance Manual with Illustrated Parts List

14. WARRANTY

Seller expressly warrants the Aircraft (and new equipment and accessories except as noted below) to be free from defects in material and workmanship under normal use and service for a period of three years or 1,500 flight hours (whichever first occurs) after delivery to the original retail purchaser or first user. The warranty period for the Aircraft interior and exterior paint shall be one year. The foregoing warranty shall extend to any other person or entity to which title to the Aircraft is transferred during the applicable warranty term. Engines, engine accessories and avionics are specifically excluded from this warranty and are covered by their respective manufacturer's warranty, the applicable terms and conditions of which are provided at time of delivery.

Seller's obligation under this warranty is limited to the repair or replacement, at its option, of any part or parts which within the applicable period as set for the above shall be returned to Seller or authorized service facility designated

by Seller and, which upon examination, shall be determined by Seller to be defective. Any replacement parts are warranted for the remainder of the applicable original warranty period.

The repair or replacement of defective parts under this warranty shall be made without charge for parts or labor for removal, installation and/or actual repair of such defective parts, except shipping and, if applicable, import duties and sales/use taxes on replacement parts, which are the responsibility of the owner/operator. Purchase shall be responsible for any costs related to items submitted under this warranty, which are later determined to have no defect.

The provisions of this warranty do not apply to:

- a) The Aircraft and its equipment, accessories or service parts manufactured or sold by Seller which have been subject to misuse, negligence or accident or which shall have been repaired or altered by anyone other than Seller or Seller's authorized service facility in any way so as to adversely affect their performance, stability or reliability;
- b) Normal maintenance services (such as cleaning, control rigging, brake and other mechanical adjustments) and mechanical inspections or the replacement of service items (such as light bulbs, brake linings, filters, hoses and tires) made in connection with such services or required as maintenance;
- c) Normal deterioration of soft trim and appearance items (such as paint, upholstery and rubber-like items) due to wear and exposure; and
- d) Aircraft equipment, accessories or service parts sold separately which have been improperly installed.