

UNITED STATES OF AMERICA  
DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
KANSAS CITY, MISSOURI 64106

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In the matter of the petition of

BURKHART GROB Luft-und Raumfahrt GmbH &  
Co. KG  
for exemption from §§ 23.841(a) and  
23.841(b)(6) of the Federal Aviation  
Regulations

Regulatory Docket No.  
085CE

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GRANT OF EXEMPTION

By letter dated April 17, 1990, Mr. R. Rischer of BURKHART GROB Luft-und Raumfahrt GmbH & Co. KG, Postfach 1257, Mindelheim, Federal Republic of Germany, petitioned for exemption from § 23.841(a) and 23.841(b)(6) of the Federal Aviation Regulations (FAR) to permit type certification of the EGRETT airplane for operation over 31,000 with cabin pressure altitude above 15,000 feet. They also requested permission to operate over 29,000 feet with a warning indication of a cabin pressure altitude of 20,000 feet instead of 10,000 feet. When the airplane is operating above 29,000 feet, the pilot must wear a full pressure suit. The petition was supplemented by data contained in Telefax Number 001-8164-26305 dated August 20, 1990.

Sections of the FAR affected:

Section 23.841(a) requires that the airplane be able to maintain a cabin pressure altitude of not more than 15,000 feet in the event of any probable failure or malfunction in the pressurization system for operation over 31,000 feet. Section 23.841(b)(6) requires a warning indication at the pilot station to indicate when the safe or preset pressure differential is exceeded and when a cabin pressure altitude of 10,000 feet is exceeded.

The Petitioner's supportive information is as follows:

The GROB EGRETT is an all composite, single seat, high aspect ratio, midwing monoplane with retractable tricycle landing gear, powered by a single turbopropeller-engine.

The aircraft is capable of performing numerous high-altitude activities as follows:

- Emergency re-broadcast to achieve extended line-of-sight
- Aid in cases of natural disaster
- Search and rescue missions
- Environmental protection
- Geophysical - earth resources surveys
- Scientific experiments
- Mapping
- Research of the ozone layer
- Photographic reconnaissance
- Airborne communication station or relay
- Public service or entertainment broadcasts
- Drug interdiction
- Border surveillance
- Law enforcement

The petitioner contends that granting this exemption is in the public interest because the GROB EGRETT airplane offers a mission profile not currently available in any existing airplane. They also contend that utilization of these mission profiles will assist in such public interest issues as the study of ozone layer depletions, providing assistance in the event of natural disasters, and providing assistance to drug law enforcement operations, among others.

Airplane design features are such that, cabin altitude will exceed 15,000 feet during certain operations above 29,000 feet. In addition, when these high mission profiles are flown, the warning light required by § 23.841(b)(6) would illuminate and remain illuminated for extensive periods of time, which would result in a tendency for pilots to become desensitized to the purpose of the warning.

As compensating features, the petitioner offers the following:

In order to compensate for any probable failure in the cabin pressurization system, the pilot must wear a full pressure suit on all missions above 29,000 feet. In case of a cabin pressurization failure, the suit will pressurize instantaneously when cabin altitude is 35,000 feet or above and will maintain this altitude. The suit pressure will be stabilized within 4 to 7 seconds while the cabin will go to ambient pressure. The oxygen system will maintain a 100% oxygen breathing atmosphere to the pilot, a sea level equivalent of breathing air, and will thus prevent any adverse effect on pilot performance. The pressure suit is considered a secondary cabin pressure system. Its performance is monitored by a redundant aneroid system. A failure of either of the aneroids pressurizes the suit and activates the "fail-safe" mode. The redundant aneroid would perform likewise, and would prevent any effect on pilot performance. The breathing system is monitored by redundant aneroid systems that monitor lung pressure automatically. The failure of either aneroid system would result in enhanced delivery of oxygen for safety. Failure of the secondary or redundant oxygen system aneroid would result in an additional fail safe mode. The systems will maintain, from sea level to infinite altitude, lung partial pressure of O<sub>2</sub> equivalent to sea level breathing air and a pressure suit internal altitude of no more than 35,000 feet. Little effect will be noticed in effective pilot performance time, and safe descent can be made to a safe altitude. Supplemental oxygen can be utilized throughout these failure modes should the aircraft oxygen system fail.

The physiological hazards, which include hypoxia, gas expansion, decompression sickness, and cold injury, are compensated completely by using a pressure suit. The pressure suit is pre- & post flight-tested and maintained in accordance with technical manual DCC-3094 dated 1st May 1985.

A 20,000 feet warning indicator will be installed for missions above 29,000 feet. This system is activated occurs when the intercom lead from the pressure suit is plugged into the terminal on the left hand side console (on the pilot's suit interface panel). Under these conditions, the 10,000 feet warning indication is automatically reset to 20,000 feet.

When the cabin pressure switch activates, an indicator lamp and legend on the annunciator warning panel illuminates, an aural warning buzzer sounds in the pilot's helmet to alert the pilot. The aural warning and the legend can be manually deactivated but the warning

indicator lamp remains on until the aircraft descends to an altitude below 20,000 feet for pressure suit operations, or 10,000 feet for non-pressure suit operations.

The Pilot Operating Handbook of the EGRETT will state that in the case of a pressurization warning there must be an immediate reaction from the pilot, i.e., decrease airplane altitude until the warning light goes out.

Furthermore, the following additional safety features are provided:

- cockpit pressure control safety valve
- emergency exit

Adding the pressure suit as a backup system will exceed any presently certified system and will meet the intent of the part 23 regulations.

Comments on published petition summary:

A summary of this petition was published in the FEDERAL REGISTER for public comment on June 12, 1990 (55 FR 23828). The comment period closed July 2, 1990. No comments were received.

The Federal Aviation Administration's (FAA) analysis is as follows:

To obtain this exemption, the GROB must show, as required by § 11.25(b)(5), that: (1) granting the request is in the public interest, and (2) the exemption will not adversely affect safety, or that a level of safety will be provided that is equal to that provided by the rules from which the exemption is sought.

The FAA has reviewed and evaluated the information contained in the GROB request for exemption. Section 23.841(a) and 23.841(b)(6), requiring cabin altitude of 15,000 feet and warnings above 10,000 feet, did not envisage an aircraft design that utilizes a pressure suit as back up protection for the pilot. The FAA has accepted the compensating features offered by GROB as ensuring a level of safety equal to or exceeding that provided by § 23.841(a) and 23.841(b)(6) when compliance is shown with specific conditions set forth as limits herein.

In consideration of the foregoing, I find that a grant of exemption is in the public interest and will not adversely affect safety. Therefore, pursuant to the authority contained in Sections 313(a) and 601(c) of the Federal Aviation Act of 1958, as amended,

delegated to me by the Administrator (14 CFR §§ 11.53), BURKHART GROB Luft-und Raumfahrt GmbH & Co. KG, is granted an exemption from § 23.841(a) and 23.841(b)(6) of the Federal Aviation Regulations to the extent necessary to allow type certification of the EGRETT airplane for operation above 29,000 feet subject to the following conditions and limitations:

1. A pressure suit as described in the GROB petition shall be provided and utilized for any operation over 29,000 feet. The pressure suit shall maintain pressure on the pilot's body corresponding to an altitude of 35,000 feet or less, and shall, under all conditions, supply oxygen at a pressure corresponding to breathing sea level air (i.e., the partial pressure of oxygen shall be no less than 160mmHg).
2. Provision shall be made to warn the pilot if the pressure suit fails during the flight.
3. The pressure suit and its connection to the airplane shall be described on the appropriate Type Certificate Data Sheet to ensure that required maintenance of their suit be included in the Instruction for Continued Airworthiness (ICA).
4. The EGRETT Pilot Operating Handbook/Airplane Flight Manual (POH/AFM) Limitation Section shall specify that the pilot:
  - (a) Will have received approved appropriate training; and,
  - (b) Is familiar with the operation, use and failure modes of the pressure suit and its associated equipment; and,
  - (c) Must use the pressure suit above 29,000 feet; and,
  - (d) Must immediately decrease altitude to below 20,000 feet in the event of a pressurization warning.
5. The EGRETT POH/AFM shall include a preflight checklist to determine that the pressure suit is airworthy.

Issued in Kansas City, Missouri on September 13, 1990.



Don C. Jacobsen  
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