Exemption No. 5952

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

In the matter of the petition of PILATUS BRITTEN-NORMAN for an exemption from § 23.1303(e)(1) of the Federal Aviation Regulations	Regulatory Docket No. 119CE

GRANT OF EXEMPTION

By letter dated March 21, 1994, the Civil Aviation Authority (CAA) of the United Kingdom, on behalf of Pilatus Britten-Norman, Bembridge Airport, Bembridge, Isle of Wight, England, petitioned for an exemption from § 23.1303(e)(1) of the Federal Aviation Regulations (FAR) to permit type certification of the Pilatus Britten-Norman BN2T Series airplanes (including the Models BN2T-4R, and BN2T-4S), without a speed warning device installed.

The petitioner requires relief from the following regulations:

Section 23.1303(e) which provides, in pertinent part, that a speed warning device is required for turbine engine powered airplanes and other airplanes with maximum operating limit speeds (V_{MO}) and design dive speeds established under §§ 23.335(b)(4) and 23.1505(c).

Related sections of the FAR:

Section 23.335(b)(4) which provides, in pertinent part, that the design diving speed (V_D) be greater than the speed attained when the airplane, flying at design cruising speed, is dived at a 7.5 degree angle for 20 seconds.

Section 23.1505(c) which provides, in pertinent part, that the established V_{MO} be sufficiently below V_D such that it is unlikely to be exceeded in operations and that the speed differential between V_{MO} and V_D be less than that established in § 23.335(b)(4).

The petitioner supports its request with the following information:

1. If the BN2T Series airplanes had been re-engined with comparable brake horsepower(BHP) turbocharged piston engines, instead of the turbine engines, there would not have been a requirement to provide an overspeed warning. Worldwide, there is a large fleet of unpressurized aircraft with twin piston engines delivering more than 320 BHP with performance capability at least as great as the Turbine Islander that have been operated safely and not found to be at risk of hazardous overspeed. None of these aircraft types is equipped with aural overspeed warning.

2. Introduction of the requirement for overspeed warning arose from the development of new high performance, high altitude, pressurized turbojet aircraft capable of cruising close to their maximum permissible Mach number at altitude and, due to their clean aerodynamic shapes, capable, in the event of brief inattention by the crew or mild atmospheric upset, of exceeding M_{MO} and being, in some cases, then exposed to undesirable handling characteristics, such as degraded lateral control and nose down longitudinal instability. None of these considerations apply to the BN2T Series airplanes.

3. The amendments to Part 23 of the FAR and Section K of the British Civil Air Regulations, which added standards appropriate to high performance jets, introduced the V_{MO} concept in place of the previous V_{NO}/V_{NE} philosophy. In the case of the BN2T Series airplane, this change is not necessitated by the altitude and speed performance of the aircraft but the resulting low V_{MO}, compared to the V_{NE} red line of the piston engine aircraft, obviously makes "overspeed" more readily achieved. This, in turn, results in the practical problem that the low dynamic pressure makes the permitted tolerance of -0/+6 knots for the pressure switch difficult to achieve.

4. The type certificated airspeed limits (KIAS) of the Islander airplanes:

Aircraft	BN2T	BN2T-4R	BN2T-4S
Maximum continuous power (HP)	320	380	380
Weight (LB)	7000	8500	8500
Maximum speed achievable in level flight at SL (KIAS)	159	160	164*
V_{MO} (KIAS)	152	151	151
V_{DF} (KIAS)	219	216	216

* Estimate

5. To demonstrate that the BN2T Series airplane cannot readily achieve hazardous speeds, Pilatus Britten-Norman conducted flight tests with the BN2T-4R to the requirement of § 23.335(b)(4)(i) of the FAR. The aircraft was set up in level flight at V_{MO} (151 KIAS), which required maximum takeoff power of 400 shp. The

aircraft was then pitched down on a -7.5 degree flight path and the speed recorded after a minimum of 20 seconds. This exercise was carried out four times with the highest speed recorded being 181 KIAS after 26 seconds. From these maneuvers, it can be seen that this Model Islander does not readily achieve hazardous speeds, 181 KIAS being 35 kts below the V_{DF} speed of 216 KIAS for this model.

6. The history of the piston engine Islander fleet of some 920 aircraft has, to the best of the manufacturer's knowledge, no example of any untoward incident attributed to flight at high KIAS in the speed range resulting from the upset maneuver of § 23.335(b)(4)(i) as flown by the BN-2T Series aircraft.

7. The CAA concluded in certificating the BN2T Series aircraft that an aural warning of speed in excess of V_{MO} was not necessary due to the combination of performance capability, relative slowness to accelerate, and proven safe speed margins. CAA endorses the request for exemption from § 23.1303(e)(1) and deletion of the aural speed warning device in the BN2T Series airplane.

Comments on published petition:

A summary of this petition was published in the FEDERAL REGISTER on July 22, 1994 (59 FR 37525). The comment period closed on August 11, 1994, and the FAA received no comments.

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

The FAA has carefully reviewed the information contained in the petitioner's request for exemption.

1. The purpose of the overspeed warning is to alert pilots of an impending condition that could degrade airplane handling characteristics.

2. This warning requirement was directed primarily toward aerodynamically clean, high performance, turbine powered airplanes. Lower performance, fixed gear airplanes were not taken into consideration.

3. The Pilatus Britten-Norman Model BN2T Series airplane exhibits drag characteristics representative of fixed gear airplanes and the manufacturer has demonstrated, in flight tests, that, when dived in accordance with § 23.335(b)(4), this airplane did not experience a speed increase inconsistent with § 23.1505(e).

The FAA agrees that the proposed exemption would be in the public interest because:

1. The Pilatus Britten-Norman Model BN2T Series airplanes have inherent drag characteristics that make it unlikely that a rapid speed increase will not be perceived by the pilot.

2. The airplane manufacturer has shown by flight tests that the airplane is not subject to rapid speed increases when subjected to a simulated minor upset.

3. Complying with the requirements of § 23.1303(e), in this case, places an undue burden on the public without compensating safety benefits.

4. The airplane, with this exemption to the applicable rules, will meet the level of safety intended by the rules.

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 § 313(a) and § 601(c) of the Federal Aviation Act of 1958, as amended, delegated to me by the Administrator (14 CFR 11.53), and § 603 of the Act, Pilatus Britten-Norman is granted an exemption from § 23.1303(e)(1) to the extent necessary to allow type certification of Pilatus Britten-Norman Model BN2T airplanes without an aural speed warning device. This exemption is subject to the following conditions and limitations:

It is valid only for Model BN2T Series airplanes in their present configuration, which includes landing gear, turbopropeller engines and the highest established maximum operating limit speed of 152 knots.

Issued in Kansas City, Missouri, on August 18, 1994.

Gerald Pierce, Acting Manager
Small Airplane Directorate
Aircraft Certification Service