equivalent to that established in the regulations.

Type Certification Basis

Under the provisions of § 21.17 of the FAR, IAI Ltd. must show that the Galaxy meets the applicable provisions of part 25, effective February 1, 1965, as amended by Amendments 25–1 through 25–77. The certification basis may also include later amendments to part 25 that are not relevant to these special conditions. In addition, the certification basis for the Galaxy includes part 34, effective September 10, 1990, plus any amendments in effect at the time of certification; and part 36, effective December 1, 1969, as amended by Amendments 36–1 through the amendment in effect at the time of certification. These special conditions form an additional part of the type certification basis. In addition, the certification basis may include other special conditions that are not relevant to these special conditions.

If the Administrator finds that the applicable airworthiness regulations (i.e., part 25, as amended) do not contain adequate or appropriate safety standards for the Galaxy because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16 to establish a level of safety equivalent to that established in the regulations.

Special conditions, as appropriate, are issued in accordance with § 11.49 of the FAR after public notice, as required by §§ 11.28 and 11.29, and become part of the type certification basis in accordance with § 21.17(a)(2).

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same novel or unusual design feature, the special conditions would also apply to the other model under the provisions of § 21.101(a)(1).

Novel or Unusual Design Feature

The IAI Galaxy will incorporate an unusual design feature in that it will be certified to operate up to an altitude of 45,000 feet.

The FAA considers certification of transport category airplanes for operation at altitudes greater than 41,000 feet to be a novel or unusual feature because current part 25 does not contain standards to ensure the same level of safety as that provided during operation at lower altitudes. Special conditions have therefore been adopted to provide adequate standards for transport category airplanes previously approved for operation at these high altitudes, including certain Learjet models, the Boeing Model 747, Dassault-Breguet Falcon 900, Canadair Model 600, Cessna Model 650, Israel Aircraft Industries Model 1125 Westwind Astra, and Cessna Model 560. The special conditions for the Learjet Model 45 are considered the most applicable to the Galaxy and its proposed operation and are therefore used as the basis for the special conditions described below.

Damage tolerance methods are proposed to be used to ensure pressure vessel integrity while operating at the higher altitudes, in lieu of the ½-bay crack criterion used in some previous special conditions. Crack growth data are used to prescribe an inspection program that should detect cracks before an opening in the pressure vessel would allow rapid depressurization. Initial crack sizes for detection are determined under § 25.571, as amended by Amendment 25–72. The maximum extent of failure and pressure vessel opening determined from the above analysis must be demonstrated to comply with the pressurization section of the proposed special conditions, which state that the cabin altitude after failure must not exceed the cabin altitude/time curve limits shown in Figures 3 and 4.

In order to ensure that there is adequate fresh air for crewmembers to perform their duties, to provide reasonable passenger comfort, and to enable occupants to better withstand the effects of decompression at high altitudes, the ventilation system must be designed to provide 10 cubic feet of fresh air per minute per person during normal operations. Therefore, these special conditions require that crewmembers and passengers be provided with 10 cubic feet of fresh air per minute per person. In addition, during the development of the supersonic transport special conditions, it was noted that certain pressurization failures resulted in hot ram or bleed air being used to maintain pressurization. Such a measure can lead to cabin temperatures that exceed human tolerance. Therefore, these special conditions require airplane interior temperature limits following probable and improbable failures.

Continuous flow passenger oxygen equipment is certificated for use up to 40,000 feet; however, for rapid decompressions above 34,000 feet, reverse diffusion leads to low oxygen partial pressures in the lungs, to the extent that a small percentage of passengers may lose useful consciousness at 35,000 feet. The percentage increases to an estimated 60 percent at 40,000 feet, even with the use of the continuous flow system. Therefore, to prevent permanent physiological damage, the cabin altitude must not exceed 25,000 feet for more than 2 minutes, or 40,000 feet for any time period. The maximum peak cabin altitude of 40,000 feet is consistent with the standards established for previous certification programs. In addition, at high altitudes the other aspects of decompression sickness have a significant, detrimental effect on pilot performance (for example, a pilot can be incapacitated by internal expanding gases).