



Designation: F3568 – 23

Standard Guide for Medical Qualifications for Suborbital Vehicle Passengers¹

This standard is issued under the fixed designation F3568; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This guide provides a consensus set of Space Flight Participant (SFP) acceptance guidelines that will serve as advice to commercial human spaceflight operators as they develop their own medical programs for suborbital flights.

1.2 *Units*—The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 FAA regulatory authority: In 2004 Congress granted the FAA the authority to oversee the safety of the emerging commercial human space flight industry, but limited its rule-making authority. To ensure the industry had an ample learning period to develop and innovate, Congress prohibited the FAA from issuing any regulations governing the design or operation of a launch vehicle intended to protect the health and safety of crew and space flight participants unless there was a death, serious injury, or close call. The original prohibition expired in 2012, but Congress extended it to 2015, then extended it again to 2016, and finally to October 1, 2023. SFP medical requirements are not under the Amendments Act of 2004 current moratorium that will expire in 2023.

The Secretary of the US Department of Transportation (USDOT) has authority to issue regulations regarding SFP medical requirements under *Title 51 USC § 50905 (b) (6)*:

(A) The Secretary may issue regulations requiring space flight participants to undergo an appropriate physical examination prior to a launch or reentry under this chapter. This subparagraph shall cease to be in effect three years after the date of enactment of the Commercial Space Launch Amendments Act of 2004.

(B) The Secretary may issue additional regulations setting reasonable requirements for space flight participants, including medical and training requirements. Such regulations shall not be effective before the expiration of 3 years after the date of enactment of the Commercial Space Launch Amendments Act of 2004.

However, USDOT has declined to exert this authority thus far.

¹ This guide is under the jurisdiction of ASTM Committee F47 on Commercial Spaceflight and is the direct responsibility of Subcommittee F47.01 on Occupant Safety.

Current edition approved Sept. 1, 2023. Published September 2023. DOI: 10.1520/F3568–23.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Terminology

2.1 Definitions:

2.1.1 *aerospace medicine specialist, n*—a physician who is residency trained and board certified in the specialty of Aerospace Medicine, or a physician who is otherwise qualified by virtue of knowledge, training, and experience.

2.1.2 *flight crew equipment, n*—any personal protective equipment necessary for the safe conduct of the flight. This can include pressure suits, helmets, parachute assemblies, medical systems, emergency breathing devices, or other equipment required for safe operations.

2.1.3 *medical, adj*—the term ‘medical’ as used in this document is to be interpreted broadly and includes the terms ‘physical,’ ‘physiological,’ and ‘psychological.’

2.1.4 *operational readiness, n*—the continuous process of assessing the SFP’s demonstrated capabilities to safely perform tasks related to the spaceflight such as vehicle ingress and egress, to utilize all safety equipment including but not limited to seat harnesses, and to be in an optimal state of health on the day of the spaceflight as determined by the Operator’s flight environment and mission specifics. This assessment starts with first contact between the SFP and the Operator and continues until the time of launch.

2.1.5 *payload specialist (PS), n*—an individual that flies for the purpose of conducting scientific investigations on themselves, other SFPs, or scientific payloads or performing technology or engineering evaluations. For medical standards purposes, this is a subset of the space flight participant category.

2.1.5.1 *Discussion*—While most SFPs would fly only one

time per day, it is possible that payload specialists could fly on multiple missions in a single day or on repetitive days. Payload specialists normally are screened as space flight participants (SFPs), but certain operations or operators may require additional medical screening.

2.1.6 space flight participant, (SFP), n—an SFP is a non-flightcrew member that participates in suborbital spaceflight but has no safety-related responsibilities for the vehicle or the conduct of the flight.

2.1.6.1 Discussion—Suborbital space flights are operationally different than the typical experience of passengers on a commercial airliner or other modes of transportation such as cars or trains. SFPs may not be physically separated from the flightcrew, are exposed to increases in gravitational forces beyond commercial aircraft flight and may be exposed to off-nominal cabin environmental parameters. They must integrate into, or be compatible with, required flightcrew equipment, restraint systems, and vehicle egress systems. SFPs may be flying for pleasure or could be scientists, engineers, or others conducting microgravity research, performing technology demonstrations, or providing medical care/monitoring for other SFPs.

3. Significance and Use

3.1 In keeping with **1.1**, commercial human spaceflight companies should follow the guidelines recommended by this document. These guidelines may be tailored to fit each company's specific spaceflight systems, operational procedures, safety standards, and risk profiles.

3.2 Companies currently are required under Title 51 USC § 50905(b) (5) to inform spaceflight participants about the mission-related risk, but the specific risk of certain medical conditions has yet to be determined. The SFP medical standards and guidelines in this guide shall be considered the minimum recommended, and governmental agencies and operators have the option for additional medical and operational constraints.

4. Spaceflight Participant Medical Acceptance Guidelines—Suborbital

4.1 Reference Mission—Guidelines for operators for suborbital SFPs assume that the spacecraft will normally provide a shirt-sleeve cabin environment with the appropriate temperature, pressure (not less than 75.3 kPa equivalent to a maximum pressure altitude of 2438 m), and breathable atmosphere.

4.1.1 G-Profile—Acceleration in suborbital spacecraft should not exceed +6Gx, +1Gy, and +4Gz. Brief exposures above these levels may occur, are acceptable for suborbital flight, and would not be automatically considered as indicative of an orbital flight.

4.1.2 Number of Flights per Day—Guidelines will assume SFPs will generally only participate in one suborbital flight per day. Payload specialists or flight crew may make multiple flights per day. Repeated flights to the acceleration limits listed above and with approximately 4 min of microgravity exposure

between launch and entry have not been accomplished before, and caution will be indicated until an experience base is acquired.

4.1.3 Time Limit in Spacecraft—Time within the spacecraft will be defined as the interval from the SFPs being secured within the space craft before flight to door(s) open upon return. The time requirement to complete a flight will be short enough to avoid negatively impacting a SFP medical condition, interrupting medical mitigation or treatment needs, and take human physiological needs into consideration (refer to **4.3**).

4.1.4 Radiation Limits—The ionizing radiation effective dose shall not exceed the yearly commercial airline passenger dose defined as no more than 1 mSv/year.

4.2 Guidelines for Screening Suborbital SFPs—A preflight evaluation of SFPs shall be performed and include a statement by the Operator that summarizes the expected environment and associated risks and hazards during the spaceflight, the medical conditions the Operator deems to be incompatible with spaceflight or that warrant consultation with medical specialists, and any tasks or activities that the SFP will be required to perform including operational readiness requirements. The contents of this evaluation shall be developed in consultation with an aerospace medicine specialist and provided to the SFP. The SFP shall complete a medical questionnaire and return it to the Operator for their review. A physical exam shall be performed by a licensed physician and will include additional testing including laboratory testing and imaging analysis as appropriate. During training and preflight operations, the Operator shall perform an evaluation of SFP operational readiness that is specific to the Operator's flight profile and environment.

The content and extent of the medical questionnaire, physical examination, and any additional tests shall be related to each Operator's flight profile. The suggested contents of the medical questionnaire and physical examination are shown in **Tables 1 and 2** and may be modified by each Operator to account for differences in their specific flight profiles. The preflight evaluation shall be reviewed by an aerospace medicine specialist, and ideally should be performed by an aerospace medicine specialist.

4.2.1 Timing of Medical Screening—The SFP's age and medical complexity shall be considered in determining the timing for medical screening. Generally, initial screening should be performed within six months before the SFP's suborbital flight. Follow-up medical screening, including updating the medical history and physical examination, may be advisable before initiation of training, analog activities, or spaceflight. Evaluation for operational readiness of the SFP by the Operator typically begins with training activities and continues through preflight activities including vehicle ingress and preparation for launch.

4.2.2 Self-Certification—SFPs shall indicate to the examining physician and the Operator if they know or have reason to know of a medical condition that would impair their ability to safely perform any of the space-flight tasks required of the SFP during all mission phases, including vehicle ingress and egress, high-g and microgravity operations, seat/restraint ingress and egress, and off-nominal or emergency procedures.