



AEROSPACE STANDARD

AS6316™

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Performance Standards for Oblique Facing Passenger Seats in Transport Aircraft

RATIONALE

The use of oblique facing passenger seats has become prevalent for business and first class seating arrangements on many airlines. Industry standard test requirements and occupant injury criteria that supplement the requirements of AS8049 are required for these types of seats. This standard supersedes ARP6316.

AS6316 has been reaffirmed to comply with the SAE Five-Year Review policy.

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1. SCOPE

1.1 Purpose

This SAE Aerospace Standard (AS) documents a common understanding of terms, compliance issues, and occupant injury criteria to facilitate the design and certification of oblique facing passenger seat installations specific to Part 25 aircraft.

The applicability of the criteria listed in this current release is limited to seats with an occupant facing direction greater than 18° and no greater than 45° relative to the aircraft longitudinal axis. Seats installed at angles greater than 30° relative to the aircraft longitudinal axis must have an energy absorbing rest or shoulder harness and must satisfy the criteria listed in Table 2. Later revisions are intended to provide criteria for other facing directions.

Performance criteria for forward and aft facing seats are provided in AS8049 and for side facing seats in AS8049/1.

This document contains the same content as superseded ARP6316 with additional information included to align this Aerospace Standard with AS8049/1 regarding the use of the femur angular rotation sensor.

Although the issues and criteria presented in this document are common with oblique facing seats installed in Part 23 aircraft and Parts 27 and 29 rotorcraft, these standards have not been validated for these types of aircraft.

1.2 Seat Types

This document presents standards for oblique facing passenger seats for use in aircraft type-certificated in the aircraft categories shown in Table 1.

Table 1 - Seat type categories

Seat Type	Aircraft Category	Applicable Federal Regulations
A-T	Transport Airplane	14 CFR 25

1.3 Units

In this document, U.S. customary units (in-lb) and International System of Units (SI) are provided. In all cases, the in-lb units take precedence and the SI (metric) units provided are approximate and conservative conversions. Those who routinely use SI units in practice may make the conversions more precisely.

1.4 Use of Should and Shall

Requirements for which no deviation can be accepted are denoted by the use of “shall” in this document. Requirements for which a noncompliance is permissible are denoted by the use of “should” in this document.

2. REFERENCES

2.1 Applicable Documents

This AS must be used in conjunction with AS8049C and cannot be used without it. It utilizes the performance standards for aircraft seats defined in AS8049C and the Sections 1 through 7 directly correspond to those of AS8049C. Sections 3 through 7 of this AS note only differences between the standards of this AS and the standards of AS8049C, otherwise the standards of the AS are to be used in their entirety. Sections 8 and 9 are reserved for future use and material specific to oblique facing seats begins with Section 10. Test pulse evaluation shall use the method defined in AS8049C Appendix A.

2.1.1 The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.2 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J211/1	Instrumentation for Impact Test - Part 1 - Electronic Instrumentation
SAE J211/2	Instrumentation for Impact Test - Part 2: Photographic Instrumentation
SAE J1733	Sign Convention for Vehicle Crash Testing
SAE J826	Devices for Use in Defining and Measuring Vehicle Seating Accommodation
ARP5482	Photometric Data Acquisition Procedures for Impact Test
ARP5526	Aircraft Seat Design Guidance and Clarifications
AS8049	Performance Standard for Seats in Civil Rotorcraft, Transport Aircraft, and General Aviation Aircraft
AS8049/1	Performance Standards for Side-Facing Seats in Civil Rotorcraft, Transport Aircraft, and General Aviation Aircraft

Gowdy, V., DeWeese, R., Beebe, M., Wade, B. et al., "A Lumbar Spine Modification to the Hybrid III ATD For Aircraft Seat Tests," SAE Technical Paper 1999-01-1609, 1999, doi:10.4271/1999-01-1609.

2.1.3 Code of Federal Regulations (CFR) Publications

Available from the United States Government Printing Office, 732 North Capitol Street, NW, Washington, DC 20401, Tel: 202-512-1800, www.gpo.gov.

Title 14, Code of Federal Regulations (14 CFR) part 21, Certification Procedures for Products and Parts

Title 14, Code of Federal Regulations (14 CFR) part 25, Airworthiness Standards: Transport Category Airplanes

Title 14, Code of Federal Regulations (14 CFR) part 121, Certification and Operations: Domestic, Flag, and Supplemental Air Carriers and Commercial Operators of Large Aircraft

Title 49, Code of Federal Regulations (49 CFR) part 571, Federal Motor Vehicle Safety Standards (FMVSS)

Title 49, Code of Federal Regulations (49 CFR) part 572, Anthropomorphic Test Dummies

FAA Advisory Circular 25.562-1B CHG 1: Dynamic Evaluation of Seat Restraint Systems and Occupant Protection on Transport Airplanes

FAA Advisory Circular 25.853-1: Flammability Requirements for Aircraft Seat Cushions

FAA Policy Statement PS-ANM-25-03-R1: Technical Criteria for Approving Side-Facing Seats

FAA Policy Statement AIR-100-3-3-2000: Use of the Hybrid III Anthropomorphic Test Dummy in Seat Dynamic Testing

FAA Policy Statement PS-ANM-25.853-01 R2: Flammability Testing of Interior Materials

FAA Policy Statement ANM-115-07-002: Policy Statement on certification for flammability of lightweight seat cushions

2.2 Definitions

2.2.1 SIGN CONVENTION

The sign convention defined in SAE J211/1, Section 7, is adopted in this document and shall be used for all reported data.

2.2.2 OCCUPANT/ATD CHARACTERISTICS

SAE J211/1 defines ATD coordinate system and provides descriptions of occupant forces and moments. These definitions are reproduced here for convenience together with additional definitions.

Abdominal - Of or pertaining to the region of the body that contains the internal organs (excluding the respiratory and cardiac organs). It is bounded by the diaphragm and the pelvis.

Cervical - Of or pertaining to the vertebrae in the neck that support the head and link the head to the spine.

Neck Fz – Force acting to move the head up or down. Positive in the up direction.

Neck Mx – Moment acting to move the head sideward. Positive in the direction of moving the left ear toward the left shoulder.

Neck My – Moment acting to move the head forwards or backwards. Positive in the direction of moving the head such that the chin approaches the sternum.

Neck Mz - Moment acting to rotate the head. Positive in the direction of moving the chin towards the left shoulder.

Nij – A measure of neck injury calculated in accordance with 49 CFR 571.208 S6.6 (a).

Occipital Condyle - The points where the skull attaches to the first cervical (neck) vertebra.

Pelvic - Of or pertaining to the pelvis, which is commonly called the hip bone.

Sternum - The Sternum is the long flat bone in the upper middle of the front of the chest linking the ribs and the collar bone. It is also called the breastbone.

Thoracic - Of or pertaining to the thorax, which is the region of the body that includes the ribs and the sternum between the neck and abdomen. The thorax contains the respiratory and cardiac organs.