



Designation: F3229/F3229M – 17

Standard Practice for Static Pressure System Tests in Small Aircraft¹

This standard is issued under the fixed designation F3229/F3229M; 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 reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers internationally accepted methods for the conducting static pressure system tests for “small” aircraft.

1.2 The applicant for a design approval must seek the individual guidance of their respective CAA body concerning the use of this practice as part of a certification plan. For information on which CAA regulatory bodies have accepted this practice (in whole or in part) as a means of compliance to their Small Aircraft Airworthiness regulations (hereinafter referred to as “the Rules”), refer to ASTM F44 webpage (www.ASTM.org/COMMITTEE/F44.htm) which includes CAA website links.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 Following is a list of external standards referenced throughout this practice; the earliest revision acceptable for use is indicated. In all cases later document revisions are acceptable if shown to be equivalent to the listed revision, or if otherwise formally accepted by the governing civil aviation authority; earlier revisions are not acceptable.

2.2 ASTM Standards:²

F3060 Terminology for Aircraft

¹ This practice is under the jurisdiction of ASTM Committee F44 on General Aviation Aircraft and is the direct responsibility of Subcommittee F44.50 on Systems and Equipment.

Current edition approved Feb. 15, 2017. Published March 2017. DOI: 10.1520/F3229_F3229M-17.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

F3061/F3061M Specification for Systems and Equipment in Small Aircraft

3. Terminology

3.1 Terminology specific to this practice is provided below. For general terminology, refer to Terminology F3060.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *aircraft type code, n*—an Aircraft Type Code (ATC) is defined by considering both the technical considerations regarding the design of the aircraft and the airworthiness level established based upon risk-based criteria; the method of defining an ATC applicable to this practice is defined in Specification F3061/F3061M.

4. Static Pressure System Tests

NOTE 1—Table 1 provides correlation between various Aircraft Type Codes and the individual requirements contained within this section; refer to 3.2.1. For each subsection, an indicator can be found under each ATC character field; three indicators are used:

An empty cell () in all applicable ATC character field columns indicates that an aircraft must meet the requirements of that subsection.

A white circle (○) in multiple columns indicates that the requirements of that subsection are not applicable to an aircraft only if all such ATC character fields are applicable.

A mark-out (×) in any of the applicable ATC character field columns indicates that the requirements of that subsection are not applicable to an aircraft if that ATC character field is applicable.

Example—An aircraft with an ATC of 1SRLLDLN is being considered. Since all applicable columns are empty for 4.2.1, that subsection is applicable to the aircraft. 4.1.1 would not be applicable, since it contains an × in the “D” meteorological condition column.

4.1 Proof Test for Unpressurized Aircraft:

4.1.1 To demonstrate the integrity of the static pressure system, a proof test must be conducted for unpressurized aircraft by evacuating the static pressure system to a pressure differential of approximately 3.4 kPa [0.5 psi] or to a reading on the altimeter of 305 m [1000 ft] above the aircraft elevation at the time of the test. Without additional pumping for a period of 60 s, the loss of indicated altitude must not exceed 30 m [100 ft] on the altimeter.

4.2 Proof Test for Pressurized Aircraft:

4.2.1 To demonstrate the integrity of the static pressure system, a proof test must be conducted for pressurized aircraft by evacuating the static pressure system until a pressure differential equivalent to the maximum cabin pressure differential for which the aircraft is type certificated is achieved.

TABLE 1 ATC Compliance Matrix, Section 4

Section	Airworthiness Level				Number of Engines		Type of Engine(s)		Stall Speed			Cruise Speed		Meteorological Conditions			Altitude		Maneuvers	
	1	2	3	4	S	M	R	T	L	M	H	L	H	D	N	I	L	H	N	A
4																				
4.1																				
4.1.1														x						
4.2																				
4.2.1																				
4.3																				
4.3.1														x						

Without additional pumping for a period of 60 s, the loss of indicated altitude must not exceed 2 % of the equivalent altitude of the maximum cabin differential pressure or 30 m [100 ft], whichever is greater.

4.3 Calibration Test:

4.3.1 Each static pressure system must be calibrated in flight to determine the system error. The system error, in indicated pressure altitude, at sea-level, with a standard atmosphere,

excluding instrument calibration error, may not exceed ± 9 m [± 30 ft] per 185 km/h [100 knots] speed for the appropriate configuration in the speed range between $1.3 V_{S0}$ with flaps extended, and $1.8 V_{S1}$ with flaps retracted. However, the error need not be less than ± 9 m [± 30 ft].

5. Keywords

5.1 calibration test; pitot; pressurization; proof test; static

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, Tel: (978) 646-2600; http://www.copyright.com/