

MIL-STD-1524
NOTICE 1
10 MARCH 1987

MILITARY STANDARD

TABLE OF DIFFERENTIAL PRESSURE IN RELATION TO CALIBRATED AIRSPEED

TO ALL HOLDERS OF MIL-STD-1524:

1. THE FOLLOWING PAGES OF MIL-STD-1524 HAVE BEEN REVISED AND SUPERSEDE THE PAGES LISTED:

NEW PAGE	DATE	SUPERSEDED PAGE	DATE
i	31 July 1972	i	REPRINTED WITHOUT CHANGE
ii	10 March 1987	ii	31 July 1972
1	10 March 1987	1	31 July 1972
2	31 July 1972	2	REPRINTED WITHOUT CHANGE

2. RETAIN THIS NOTICE AND INSERT BEFORE TABLE OF CONTENTS.

3. Holders of MIL-STD-1523 will verify that page changes and additions indicated above have been entered. This notice page will be retained as a check sheet. This issuance, together with appended pages, is a separate publication. Each notice is to be retained by stocking points until the military standard is completely revised or canceled.

Custodians:

Army - AV
Navy - AS
Air Force - 11

Preparing activity:
Air Force - 11

Project 6610-0140

User activity:

Army - ME

AMSC: N/A

FSC 6610

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

MIL-STD-1524

31 July 1972

MILITARY STANDARD

TABLE OF DIFFERENTIAL PRESSURE IN RELATION TO
CALIBRATED AIRSPEED



FSC 6610

MIL-STD-1524
NOTICE 1
10 March 1987

DEPARTMENT OF DEFENSE
WASHINGTON DC 20402

Table of Differential Pressure in Relation to Calibrated Airspeed

1. This military standard is approved for use by all Departments and Agencies of the Department of Defense.
2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: ASD/ENES, Wright-Patterson AFB OH 45433-6503 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1425) appearing at the end of this document or by letter.

Supersedes page ii dated 31 July 1972

MIL-STD-1524
NOTICE 1
10 MARCH 1987

1. SCOPE

1.1 This standard presents differential pressures in inches of mercury and inches of water for values of calibrated airspeed in knots.

2. REFERENCED DOCUMENTS

2.1 Other publications. The following documents form a part of this standard to the extent specified herein. Unless otherwise specified, the issues of the document which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. The issues of documents which have not been adopted shall be those in effect on the date of the cited DODISS.

National Aeronautics and Space Administration

NASA SP-3082 Revised Tables of Airspeed, Altitude and Mach Number Presented
 In the International System of Units

(Application for copies should be addressed to the National Aeronautics and Space Administration, Washington DC 20546.)

U.S. Standard Atmosphere 1962

(Request for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington DC 20402.)

Airplane Aerodynamics, 1967 (Dommash et al)

(Application for copies should be addressed to the Pitman Publishing Corporation, 20 East 46th Street, New York NY 10017.)

2.2 Order of precedence. In the event of a conflict between the text of this standard and the references cited herein, the text of this standard shall take precedence.

3. DEFINITIONS

CALIBRATED AIRSPEED (V) - Calibrated airspeed is the indicated airspeed corrected for installation (position) errors, instrument errors, errors in the pitot-static system, and errors induced by the attitude of the aircraft.

INDICATED AIRSPEED - The reading in knots of an airspeed indicator without any correction.

4. GENERAL REQUIREMENTS (Not applicable)

5. DETAIL REQUIREMENTS

5.1 Formulae and symbols. The equations listed in 5.1.1 are derived from the classical form of Bernoulli's equation for compressible flow in the subsonic case and the Raleigh-Pitot formula in the supersonic case. These equations may be found in NASA SP-3082 or Airplane Aerodynamics. For a detailed discussion of the calculation of calibrated airspeed, Airplane Aerodynamics or a similar text on aircraft dynamics should be consulted.

Supersedes page 1 dated 31 Jul 72.

MIL-STD-1524
31 July 1972

5.1.1 Formulae. The formulae relating to calibrated airspeed, V_c , and differential pressure, Q_c , shall be as follows:

a. For $V_c \leq A_0$

$$(1) Q_c = P_o \left[\left(1 + \frac{(\gamma-1)}{2\gamma} \frac{\rho_o}{P_o} V_c^2 \right)^{\frac{\gamma}{\gamma-1}} - 1 \right]$$

$$(2) Q_c = 29.9213 \left[(1.000 + .457090 \times 10^{-6} V_c^2)^{7/2} - 1.000 \right]$$

b. For $V_c > A_0$

$$(1) Q_c = \frac{(1+\gamma)}{2} \left(\frac{V_c}{A_0} \right)^2 P_o \left[\frac{(\gamma+1)^2}{4\gamma-2(\gamma-1)(A_0/V_c)^2} \right]^{\frac{1}{\gamma-1}} - P_o$$

$$(2) Q_c = .820610 \times 10^{-4} V_c^2 \left[\frac{5760 V_c^2}{5.600 V_c^2 - 35.003913 \times 10^4} \right]^{5/2} - 29.92126$$

5.1.2 Symbols. Symbols shall be as follows:

a. P_t : Total pressure or ram pressure (in. Hg)

b. P_s : Static pressure (in. Hg)

c. P_o : Static atmospheric pressure at sea level (in. Hg)

d. Q_c : Differential pressure, $P_t - P_s$ (in. Hg)

e. ρ_o : Mass density of dry ambient air at sea level ($P_o = 29.92126$) and standard temperature of 15°C

f. V_c : Calibrated air speed (knots)

g. A_0 : Speed of sound at sea level and 15°C (knots)

h. γ : Ratio of specific heats of air (dimensionless).

5.1.3 Alternate formulae and symbols. The following alternate formulae and symbols may be used to permit the use of units other than inches Hg:

a. Alternate formulae

(1) For $V_c \leq A_0$

$$(a) Q_c = P_o \left[\left(1 + 0.2 \left(\frac{V_c}{A_0} \right)^2 \right)^{7/2} - 1 \right]$$