Repl. by 43-2A

Federal Aviation Agency

ADVISORY CIRCULAR

AC NO:	AC 43-2 MAINTENANCE, PREVENTIVE MAINTENANCE, REBUILDING, AND ALTERATIONS
EFFECTIVE:	9/10/65

SUBJECT: MINIMUM BAROMETRY FOR CALIBRATION AND TEST OF ATMOSPHERIC PRESSURE INSTRUMENTS

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1. PURPOSE. This Advisory Circular sets forth guidance material which may be used to determine the adequacy of barometers used in the calibration of aircraft static instruments. It was also prepared to explain barometric accuracy requirements and to provide general information pertaining to altitude and atmospheric pressure measurement. It presents additional information concerning the general operation, calibration, and maintenance of such barometers.

2. BACKGROUND. The Federal Aviation Agency has long recognized the direct relation that exists between altimeter accuracy and the efficiency with which the available airspace can be utilized, and the contribution that accurate altimetry makes with respect to collision avoidance and terrain clearance. To improve safety in this area, the Agency recently adopted rules prescribing (among other things) periodic tests of aircraft altimeter systems. Realizing that such testing calls for adequate barometer equipment, the Agency conducted a field survey at representative aircraft repair and service facilities that use barometric devices. The survey showed that some of the facilities were deficient in barometry. This circular, published as a result of the survey, is not intended to replace manufacturers' maintenance and overhaul instructions but to collect some basic information into one place for presentation to the public. Additional information, more specific in nature, is contained in the books and pamphlets listed in the associated publication section.

3. GENERAL. Following is a general discussion of each of the major areas of barometry which concern persons using barometers in aviation.

   a. Basic Reference. The National Bureau of Standards of the Department of Commerce published Monograph 8 entitled "Mercury Barometers and Manometers." This excellent publication was prepared to fill the need of manufacturers and users of barometers for information which was scattered through the literature and, in some cases, was unpublished. The definitions

and terminology used in the monograph will be used in this Advisory Circular. Monograph 8, "Mercury Barometers and Manometers," describes the variety of design elements of these instruments which are critical in obtaining precision and accuracy. It may be purchased from the Superintendent of Documents, United States Government Printing Office, Washington, D. C. 20402, for 60 cents.

b. The Standard Atmosphere. The U. S. Standard Atmosphere of 1962 is recognized by the FAA and International Civil Aviation Organization members. Prior to 1964, the standard atmosphere against which all altimeters and barometers were calibrated was established in ICAO Document Number 7488 or National Aeronautics and Space Administration Technical Report Number 1235. Even now these tables are satisfactory for use up to 65,800 feet, which is above the certificated limit of current civilian aircraft. The 1959 Air Research and Command extension of the Standard Atmosphere and the 1962 Standard Atmosphere differ (pressure versus feet) above 65,000 feet. Facilities which maintain and service military instruments or barometric equipment, whose range extends above 65,000 feet of altitude, should make themselves aware of the difference between the 1959 Air Research and Development Command extension of the Standard Atmosphere, presently being used by the military, and the "U. S. Standard Atmosphere of 1962" which was recently adopted by the Department of Defense. This changeover to the 1962 Atmosphere will affect the high altitude calibration of a barometer if its scale is marked in feet of altitude. The book "U. S. Standard Atmosphere 1962" discusses the high altitude temperature differences that prompted the change and defines the standard conditions for pressure measurement.

c. Standard Barometers. The reference standard barometer is one which is capable of accuracies at least equal to and preferably superior to the calibrating barometers. In some cases, it may be used in the final calibration of altimeters.

(1) Accuracy. Most sensitive altimeters used in civil aircraft are either manufactured in accordance with FAA Technical Standard Orders (C10a and C10b) or to military specifications which allow indication tolerances of $\pm$ 20 feet over the range -1000 to +1000 feet. Higher tolerances are allowed as the altitude increases. The accuracy of the measuring device may approach that specified for the device being measured

and facilities conducting tests usually allow for this uncertainty to assure compliance with the Federal Aviation Agency regulations and tolerances specified by the manufacturer. Barometers which have an accuracy or uncertainty of .02 inches of mercury (Hg) will result in errors of 18.6 feet at sea level and, therefore, are generally unsuitable for calibrating sensitive altimeters.

(2) Calibration. The barometer should be calibrated against a primary standard or a transfer standard of known accuracy whose calibration is traceable to the National Bureau of Standards. The term, "calibration traceable to the National Bureau of Standards," means that the barometer was calibrated to read the United States' Standard Pressure and that it is so constructed and the scales so designed that an indicated number of inches of mercury on the repair facility's barometer is the United States standard inches of mercury pressure as established with reference to the National Bureau of Standards barometer. This calibration will normally be performed by the manufacturer when the instrument is built or overhauled, and should be on a chart handy to the instrument technician. High quality barometers have provisions for checking the zero adjustment and, if properly used and maintained, need only be calibrated at overhaul. Should the technician using the barometer not wish to check its zero adjustment, he can compare the local pressure reading against that of a similar barometer. This check, if properly applied, is sufficient to show up errors. The readings must be corrected for the difference in instrument height.

(3) Level. The level of the barometer should be maintained within one minute of arc. Most units easily accomplish this with built-in spirit levels.

(4) The Scale. The instrument scale should be marked so that it can be read to .001 inch of mercury and should indicate from zero to 800 mm or zero to 31.5 inches of mercury. Regular weather barometers with short scales are not satisfactory for altimeter calibration, since they are only readable over a small band around sea level pressure. Some type of readout assembly should be used to reduce parallax errors and to make the scale easier to read.

(5) Temperature. The instrument temperature should be determined from a thermometer either affixed to the instrument or in the temperature controlled barometer cabinet. This thermometer should be accurate to .5° centigrade or better (reference Monograph 8) or its accuracy should be matched

to the accuracy of the temperature compensating device. The temperature of the instrument should be kept as constant as practicable. The barometer should be installed where the temperature is controlled within ± 10°F. After any changes of temperature over 10° the barometer should be allowed to stabilize for 5 hours before attempting to use it for altimeter calibration. Smaller temperature changes require proportionally less time for the temperature of the various parts of the barometer to stabilize. Inadequate temperature control and correction is one of the largest sources of barometer error and the use of a temperature controlled enclosure should be considered.

(6) Correction for Local Gravity. The local gravity value should be determined by one of the methods suggested or referenced in the National Bureau of Standards, Monograph 8, or by contacting the regional Coast and Geodetic Survey Office and obtaining the latest gravimetric value for the area in which the barometer is located. The local gravity value should be corrected for elevation differences when necessary.

(7) Tables. Tables used to correct barometer readings for gravity and/or temperature should be close to the instrument and used by the technician to assure accurate pressure measurement. Any method of preparing this table is satisfactory if its use results in the required accuracy.

(8) Automatic Correcting Devices. If automatic correcting devices are attached to the barometer, the temperature corrector should have scales capable of being set to .5° centigrade and the corrector for local gravity should have scales capable of being set to .15 centimeter per second squared. These scales should be positioned so that the technician can see them easily and thus assure that proper corrections are applied. Automatic correcting devices make the barometer much easier to use and barometers so equipped give consistently better results since they reduce the computations required of the technician.

(9) Capillary Depression. Capillary depression errors and tube bore diameters are discussed in the NBS Monograph 8. It states that to obtain an accuracy

of .004 inch of mercury, a tube with a bore of not less than one-half inch in diameter should be used. The cleanliness of the tube bore and the mercury affect the shape of the meniscus and the accuracy of the instrument.

(10) The Vacuum. The use of a vacuum pump and McLeod gauge to measure the pressure above the mercury is the best method of establishing and checking the vacuum. Pressures of 15 microns or less are satisfactory. Instruments equipped with a mercury seal (one-way check valve) should have the vacuum checked frequently and should not be subjected to high slew rates. A high slew rate or the rapid movement of mercury from the cistern into the instrument tube increases the possibility of damage to the instrument and loss of mercury.

(11) Operating and Maintenance Instructions. A handbook or manual should be prepared for each barometer and should be immediately available to the technician. This manual is normally prepared by the manufacturer. It should contain at least:

(a) The accuracy and range of the instrument.

(b) Operating instructions covering each operation of the instrument and its accessories.

(c) A periodic inspection and maintenance guide which clearly establishes the daily, weekly, or monthly inspection or maintenance requirements necessary to maintain the instrument and accessories to their original standards. The facility should keep those records of the instrument maintenance, inspection and calibration necessary to support its existing accuracy.

d. The Working Standard Barometer. Shops which repair and calibrate altimeters should have a working standard barometer with a repeatable accuracy appropriate to the type of altimeters to be worked on. This barometer may be the shop standard as well as the working barometer. In most small repair facilities, it will be used to serve both purposes. Strict adherence to good maintenance practices is required in either case. The working barometer should be of high quality capable of a wide range of performance and be relatively insensitive to handling.

Pressure measuring devices used in the rough calibration of pitot/static instruments may be either mercury or aneroid barometers with wider tolerances. However, the instrument used for final calibration of, for instance, nonsensitive altimeters or sensitive altimeters certificated for use below 35 thousand feet, should have a repeatable accuracy of at least .01 inch. Sensitive altimeters,

altitude hold devices, altimeters used in Category II landing systems (Reference Advisory Circular 120-15, Criteria for Approval of Category II Landing Weather Minima) or servoed equipment associated with air data computers usually require test and calibration equipment with repeatable accuracies of .005 inch Hg or better. Care should be taken when selecting the working barometer to assure that its errors do not exceed the tolerance of the equipment being tested. It would be well to assure that the instrument used in final calibration has an error no more than one-fourth the tolerance allowed for the instrument being tested.

Mercurial barometric equipment is sensitive to temperature changes, airborne impurities, rough handling, and vacuum loss and, in addition, the fixed cistern barometer also has problems associated with mercury loss. These possible sources of error must be understood in relation to the specific equipment being used by the repair facility and positive action taken to eliminate them or reduce their effect.

e. Shop Practice. Good shop practice should be adhered to regardless of the type of test equipment being used. Consideration should be given to the following:

(1) Clean dry air or nitrogen should be used in the test equipment to prevent contamination by airborne polluting agents such as industrial smoke and dust. Isolation filters should be considered. Minor fouling of the mercury or mercury droplets adhering to the tube will make the barometer inaccurate.

(2) The barometer system should be used in a clean, vibration free area.

(3) Correction should be made for significant differences in height between the barometer reservoir and the vacuum chamber in which tests are conducted.

(4) A barometer located near a radiator or window will exhibit excessive temperature fluctuations.

(5) If two or more barometers are present in the shop, the use of comparison graphs will readily show any deterioration of one of the instruments.

(6) Virgin, clean, triple distilled mercury of instrument grade, or American Chemical Society (ACS) reagent grade should be used in all manometers. Mercury is toxic and care should be taken when handling it.

(7) FAA Technical Report No. RD-64-119, "Pressure Measurement for Pressure Altimetry," August 1964, suggests the following which may be used to the advantage of those facilities not having an established barometer maintenance program. The Technical Report contains detailed maintenance instructions. Only the schedule of this report is reproduced below.

Barometer Inspection Schedule

Procedure	Frequency		
	Daily	Weekly	Monthly
(a) Compare shop altimeter calibrating barometers with each other (and with shop standard barometer, if used).	X		
(b) Check reference vacuum of calibrating barometer.	X		
(c) Visually check packing glands and cistern seals for leaks.	X		
(d) Check electronic scanning devices.	X		
(e) Make comparison reading with the shop standard barometer. In lieu thereof, a comparison can be made between shop barometers and to the nearest U. S. Weather Bureau (USWB) mercurial barometer.		X	
(f) Test cistern for leaks.		X	
(g) Check temperature and gravity compensating devices (other than those on barometers using lead screws for readout) for accuracy.			*X
(h) Check zero of readout device on barometers using lead screw.			**X

*Must also be checked after overhaul.

**Must also be checked after glassware has been washed and mercury changed.

4. ASSOCIATED PUBLICATIONS. The following publications are suggested as references for those who desire more detailed and comprehensive coverage of the various aspects of barometry.

J. M. Los and J. A. Morrison. A Sensitive Differential Manometer. Rev. Sci. Instr. 22:805 (1951)

E. C. Hass. Correcting Mechanism for Mercury Column Type Measuring Instruments. U. S. Patent No. 2,542,671 (Feb. 20, 1951)

J. B. Lawrence. Mercury. Instruments 25:310 (1952)

H. J. Svec and D. S. Gibbs. Recording Mercurial Manometer for Pressure Range 0-760mm Hg. Rev. Sci. Instr. 24:202 (1953)

World Meteorological Organization, Commission for Instruments and Methods of Observation. Abridged final report of the first session, Toronto, 1953. WMO No. 19, RP 9:73; Secretariat of the WMO, Geneva, Switzerland (1953)

World Meteorological Organization, Fourth Session of the Executive Committee, Geneva, 1953. Abridged report with resolutions. WMO No. 20, RC 5:86: Secretariat of the WMO, Geneva, Switzerland (1953)

K. E. Bett, P. F. Hayes, and D. M. Newitt. The Construction, Operation, and Performance of a Primary Standard Mercury Column of the Measurement of High Pressure. Phil. Trans. 247:59 (1954)

J. R. Roebuck and H. W. Ibser. Precision Multiple-Mercury-Column-Manometer. Rev. Sci. Instr. 25:46 (1954)

National Physical Laboratories, Teddington. Measurement of Pressure With the Mercury Barometer. Notes on App. Sci. No. 9 (1955)

H. F. Stimson. Precision Resistance Thermometry and Fixed Points; Temperature, Its Measurement and Control. AM. Inst. Phys. 2:141 (1955)

F. M. Ernsberger and H. W. Pitman. New Absolute Manometer for Vapor Pressure in the Micron Range. Rev. Sci. Instr. 26:584 (1955)

M. Ross and E. E. Suckling. Permanent Record From a Mercury Manometer. Rev. Sci. Instr. 27:409 (1956)

World Meteorological Organization Technical Regulations. Secretariat of the WMO Geneva, Switzerland 1. WMO No. 49, BD 2 (1956)

K. W. T. Elliot and D. C. Wilson. An Optical Probe for Accurately Measuring Displacements of a Reflecting Surface. J. Sci. Instr. 34:349 (1957)

C. L. Gordon and E. Wichers. Purification of Mercury and ITS Physical Properties. Ann. N.Y. Acad. Sci. 65:369 (1957)

A. J. Eberlein. Laboratory Pressure Measurement Requirements for Evaluating Air Data Computer. Aeronaut. Eng. Rev. 17:53 (1958)

Test for Schedules of the National Bureau of Standards and Mechanics. Reprinted from Federal Register 23, No. 188 (1958)

WBAN Manual of Barometry. Published under sponsorship of U. S. Weather Bureau, Dept. of the Air Force, Air Weather Service and Dept. of the Navy, Naval Weather Service Division. Gov't. Printing Office.

W. G. Brombacker, D. P. Johnson, and J. L. Cross. Mercury Barometers and Manometers. NBS Monograph 8. Gov't Printing Office, Washington, D. C. (May 20, 1960)

National Aeronautics and Space Administration. U. S. Standard Atmosphere 1962. Gov't. Printing Office, Washington, D. C.

Federal Aviation Agency. Pressure Measurement for Pressure Altimetry, August 1964. TR Project No. 320-205-02N.

George S. Moore
Director
Flight Standards Service

AC NO: 43-2A

DATE: 8/22/74

ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

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1. PURPOSE. This advisory circular provides guidance material which may be used to determine the adequacy of barometers used in the calibration of aircraft static instruments. It explains barometric accuracy requirements and provides general information pertaining to altitude and atmospheric pressure measurement. Additional information concerning the general operation, calibration, and maintenance of barometers is presented.

2. CANCELLATION. AC 43-2 dated September 10, 1965, is cancelled.

3. BACKGROUND. The Federal Aviation Administration has long recognized the direct relation that exists between altimeter accuracy and the efficiency with which the available airspace can be utilized. Accurate altimetry contributes to collision avoidance and terrain clearance. To improve safety in this area, the agency adopted rules prescribing periodic tests of aircraft altimeter systems. Following is a general discussion of each of the major areas of barometry which concern persons using barometers in aviation.

4. BASIC REFERENCE. The National Bureau of Standards of the Department of Commerce published Monograph 8 entitled "Mercury Barometers and Manometers." This excellent publication was prepared to fill the need of manufacturers and users of barometers for information which was scattered through the literature and, in some cases, was unpublished. The definitions and terminology used in the monograph will be used in this advisory circular. Monograph 8 describes the variety of design elements which are critical in obtaining precision and accuracy from these instruments. It may be purchased from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402.

5. THE STANDARD ATMOSPHERE. Prior to 1964, the standard atmosphere against which all altimeters and barometers were calibrated was established in International Civil Aviation Organization Document Number 7488 or

National Aeronautics and Space Administration Technical Report No. 1235. These tables are satisfactory for use up to 65,800 feet which is above the certificated limit of current civilian aircraft. Facilities which maintain and service military instruments or barometric equipment whose range extends above 65,000 feet should consult the appropriate charts for the altitudes. The book, "U.S. Standard Atmosphere 1962" discusses the high altitude temperature difference and associated pressures and defines the standard conditions for pressure measurements.

6. STANDARD BAROMETERS. A standard barometer is one which is capable of accuracy at least equal to, and preferably superior to, a calibrating barometer. In some cases, it may be used in the final calibration of altimeters.

   a. Accuracy. Most sensitive altimeters used in civil aircraft are manufactured in accordance with FAA Technical Standard Orders C10a and C10b, or in accordance with military specifications which allow indication tolerances of +20 feet over the range -1000 to +1000 feet. Higher tolerances are allowed as the altitude increases. The accuracy of the measuring device should exceed that specified for the device being measured. Facilities conducting tests usually allow for this uncertainty to assure compliance with the Federal Aviation Regulations and tolerances specified by the manufacturer. Barometers which have an accuracy or uncertainty of .02 inches of mercury (Hg) will result in errors of 18.6 feet at sea level and, therefore, are generally unsuitable for calibrating sensitive altimeters.

   b. Calibration. The barometer should be calibrated against a primary standard or a transfer standard of known accuracy whose calibration is traceable to the National Bureau of Standards. This calibration will normally be performed by the manufacturer when the instrument is built or overhauled, and should be on a chart handy to the instrument technician. High quality barometers provide for checking the zero adjustment and, if properly used and maintained, need only be calibrated at overhaul. Should the technician using the barometer not wish to check its zero adjustment, he can compare the local pressure reading against that of a similar barometer. This check, if properly applied, is sufficient to show up errors. The readings must be corrected for the difference in instrument height.

   c. Level. The level of the barometer should be maintained within one minute or arc. Most units easily accomplish this with built-in spirit levels.

d. The Scale. The instrument scale should be marked so that it can be read to .001-inch of mercury and should indicate from zero to 800 mm or zero to 31.5-inches of mercury. Regular weather barometers with short scales are not satisfactory for altimeter calibration since they are only readable over a small band around sea level pressure. A readout assembly should be used to reduce parallax errors and to make the scale easier to read.

e. Temperature. The instrument temperature should be determined from a thermometer either affixed to the instrument or in the temperature-controlled barometer cabinet. The thermometer should be accurate to .5° centigrade (.9 Fahrenheit) or better (reference Monograph 8), or its accuracy should be matched to the accuracy of the temperature-compensating device. The temperature of the instrument should be kept as constant as practicable. The barometer should be installed where the temperature is controlled within ± 10°Fahrenheit. If any changes of temperature over ± 10°F occur, the barometer should be allowed to stabilize for five hours before attempting to use it for altimeter calibration. Inadequate temperature control and correction cause barometer error.

f. Correction for Local Gravity. The local gravity value should be determined by one of the methods referenced in the NBS Monograph 8, or by contacting the regional Coast and Geodetic Survey office and obtaining the latest gravimetric value for the area in which the barometer is located. The local gravity value should be corrected for elevation differences.

g. Tables. Tables used to correct barometer readings for gravity and/or temperature should be close to the instrument and used by the technician to assure accurate pressure measurement. Any method of preparing this table is satisfactory if its use results in required accuracy.

h. Automatic Correcting Devices. If automatic correcting devices are attached to the barometer, the temperature corrector should have scales capable of being set to .5°C (.9°F), and the local gravity corrector should have scales capable of being set to .15 centimeter per second squared. These scales should be positioned so that the technician can see them easily and thus assure that proper corrections are applied. Automatic correcting devices make barometers easier to use, and barometers so equipped give consistently better results since they reduce the computations required of the technician.

i. Capillary Depression. Capillary depression errors and tube bore diameters are discussed in the NBS Monograph 8. To obtain an accuracy of .004 inch of mercury, a tube with a bore of not less than one-half inch in diameter should be used. The cleanliness of the tube bore and the mercury affect the shape of the meniscus and the accuracy of the instrument.

j. The Vacuum. The use of a vacuum pump and McLeod gauge to measure the pressure above the mercury is the best method of establishing and checking the vacuum. Pressures of 15 microns or less are satisfactory. Instruments equipped with a mercury seal (one-way check valve) should have the vacuum checked frequently and should not be subjected to high slew rates. A high slew rate or the rapid movement of mercury from the cistern into the instrument tube increases the possibility of damage to the instrument and loss of mercury.

k. Operating and Maintenance Instructions. A handbook or manual should be prepared for each barometer and should be immediately available to the technician. This manual is normally prepared by the manufacturer. It should contain at least:

(1) The accuracy and range of the instrument;

(2) Operating instructions covering each operation of the instrument and its accessories; and

(3) A periodic inspection and maintenance guide which clearly establishes the daily, weekly, or monthly inspection or maintenance requirements necessary to maintain the instrument and accessories to their original standards. The facility should keep those records of the instrument maintenance, inspection, and calibration necessary to support its existing accuracy.

7. THE WORKING STANDARD BAROMETER. Shops which repair and calibrate altimeters should have a working standard barometer with a repeatable accuracy appropriate to the type of altimeters to be worked on. This barometer may be the shop standard as well as the working barometer. In most small repair facilities, it will be used to serve both purposes. Strict adherence to good maintenance practices is required in either case. The working barometer should be of high quality, capable of a wide range of performance, and relatively insensitive to handling.

a. Pressure measuring devices used in the rough calibration of pitot/static instruments may be either mercury or aneroid barometers with wider tolerances. However, the instrument used for final calibration of nonsensitive altimeters or sensitive altimeters certificated for

use below 35,000 feet, should have a repeatable accuracy of at least .01-inch. Sensitive altimeters, altitude hold devices, altimeters used in Category II landing systems, or servoed equipment associated with air data computers, usually require test and calibration equipment with repeatable accuracies of .005-inch Hg or better.

b. When selecting the working barometer, assure that its errors do not exceed the tolerance of the equipment being tested. It would be well to assure that the instrument used in final calibration has an error no more than one-fourth the tolerance allowed for the instrument being tested.

c. Mercurial barometric equipment is sensitive to temperature changes, airborne impurities, rough handling, and vacuum loss. The fixed cistern barometer also has problems associated with mercury loss. These possible sources of error must be understood in relation to the specific equipment being used by the repair facility; take positive action to eliminate them or reduce their effect.

8. BAROMETER INSPECTION SCHEDULE. FAA Technical Report No. RD-64-119, "Pressure Measurement for Pressure Altimetry," August 1964, suggests the following schedule which may be used to the advantage of those facilities not having an established barometer maintenance program. The Technical Report contains detailed maintenance instructions. Only the schedule of the report is reproduced in this advisory circular.

PROCEDURE	FREQUENCY		
	Daily	Weekly	Monthly
(a) Compare shop altimeter calibrating barometers with each other (and with shop standard barometer, if used).	X		
(b) Check reference vacuum of calibrating barometer.	X		
(c) Visually check packing glands and cistern seals for leaks.	X		
(d) Check electronic scanning devices.	X		
(e) Make comparison reading with the shop standard barometer. In lieu thereof, a comparison can be made between shop barometers and the nearest National Weather Service mercurial barometer.		X	
(f) Test cistern for leaks.		X	
(g) Check temperature and gravity compensating devices (other than those on barometers using lead screws for readout) for accuracy.			X *
(h) Check zero of readout device on barometers using lead screw.			X **

*Must also be checked after overhaul.
**Must also be checked after glassware has been washed and mercury changed.

9. SHOP PRACTICE. Good shop practice should be adhered to regardless of the type of test equipment being used. Consideration should be given to the following:

   a. Use clean, dry air or nitrogen in the test equipment to prevent contamination by airborne polluting agents such as industrial smoke and dust. Isolation filters should be considered. Minor fouling of the mercury or mercury droplets adhering to the tube will make the barometer inaccurate.

   b. Use the barometer system in a clean, vibration-free area.

   c. Make corrections for significant differences in height between the barometer reservoir and the vacuum chamber in which tests are conducted.

   d. A barometer located near a radiator or window will exhibit excessive temperature fluctuations.

   e. If two or more barometers are present in the shop, use comparison graphs to readily show any deterioration of one of the instruments.

   f. Use virgin, clean, triple-distilled mercury of instrument grade, or American Chemical Society (ACS) reagent grade in all manometers. Mercury is toxic - take care when handling it.

C. R. Melugin, Jr.

Acting Director, Flight Standards Service

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