



AEROSPACE RECOMMENDED PRACTICE

ARP1340™

REV. B

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Superseding ARP1340A

Periodic Surveillance Procedures for Horizontal Dynamic Balancing Machines

RATIONALE

The EG-1A Balancing Committee recommends the cancellation of ARP1340B - Periodic Surveillance Procedures for Horizontal Dynamic Balancing Machines due to several reasons:

- The committee reviewed this document and has determined that the contents of this document are out-of-date and incorrect.
- This document was superseded by ARP4048 - Balancing Machines - Description and Evaluation Horizontal, Two-Plane, Hard-Bearing Type for Gas Turbine Rotors.
- The sister document, ARP1342, that addresses vertical machines (as opposed to horizontal) was canceled in 2002.

CANCELLATION NOTICE

This Technical Report has been declared "CANCELLED" as of July 2018. By this action, this document will remain listed in the respective index, if applicable. Cancelled Technical Reports are available from SAE.

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1. PURPOSE

To define a standard method for the Periodic Surveillance of Horizontal Dynamic Balancing Machines.

2. SCOPE

This document specifies those requirements and procedures for periodic tests to insure maintenance of balance machine capabilities for balancing jet engine components.

It will specify:

- (a) Requirements for tests
- (b) Calibration tests
- (c) Residual unbalance and accurate angle and amount indication tests
- (d) Plane separation test
- (e) End-drive system unbalance disturbance test

- 2.1 Reference Standard: See ARP 587A, Balancing Machines for Jet Engine Components - Compressors and Turbines - Rotating Type - For Measuring Unbalance in More than One Transverse Plane.

3. REQUIREMENTS FOR CALIBRATION OF BALANCING MACHINES

- 3.1 Each balancing machine shall be checked periodically for conformance with tests described herein and/or when repairs require recheck.

3.2 Proving (test) Rotors and Test Weights Required:

Machine Capacity (lb)	Rotor Class *1	Rotor Weight (lb) *2	Test Weights Req. Ref. ARP 587A	Quantity Required
45 - 450	300 lb Machine	51.75	2.5 A	2
150 - 1500	1000 lb Machine	170	30 A	1
450 - 4500	3000 lb Machine	452.65	40 A	1

*1 Ref. ARP 587A Fig. 4

*2 ARP 587A Appendix 1

NOTE: Rotor must be centered between supports with a minimum of 1/16 in. clearance between rotor flanges and faces of support bearings. Recommended width of drive belt for 300 lb and 1000 lb class rotors is .250 in., for 3000 lb class rotor .500 inch.

- 3.3 Readout instruments such as amount of unbalance meters and angle meters not having full 360° scale should be checked for calibration periodically and marked with month, day and year for next calibration. Wattmeters on machines should be similarly checked. Electronic tachometers should be marked indicating ranges calibrated. Angle meters with 360° scale and having three or more series windings for continuous path operations vectometers, and selsyn repeaters or memory synchros do not require calibration checks as the accuracy of these instruments is substantiated by the proving rotor tests.
- 3.4 Documentation of balancing machine calibrations should be maintained and each machine should be tagged indicating the month, day and year when the machine is due to be checked again.
- 3.5 Tests and Rechecks:
- 3.5.1 A machine which fails to conform during a test run shall have one recheck in which it must conform. The recheck is required only on that portion of the test that was unacceptable unless repairs or adjustments have invalidated earlier test results.

4. PROCEDURE FOR CALIBRATION TEST

- 4.1 Position proving (test) rotor in supports of balancing machine and check for sufficient clearances.
- 4.2 Run proving rotor at test speed for at least 15 minutes to stabilize prior to test. No physical contact except to position weights should be made to the proving rotor during tests. Each traverse check must be completed with rotor in continuous rotation excluding minimal time used to shift position of weights. Rotor speed for variable speed machines shall be 900 rpm minimum. For fixed step speed machines, use nearest available speed and note on test log sheet. A portable tachometer may be used for this reading.
- 4.3 Set machine for calibration, using compensators as directed by machine manufacturer's instructions.
- 4.3.1 If machine is equipped with electronic filter dials, install 30A test weight on rotor, run machine, and peak filters to give highest reading on amount readout meter.
- 4.4 Adjust the Amount of Unbalance calibration dials of the machine to give a readout directly in units of A. (One A unit is equal to that weight in ounces calculated to cause a displacement of the rotor bearing mid-points a distance equal to specified machine sensitivity in microinches if the rotor were rotated in free space without any restraint. It is a calculated weight value derived from the design of the particular proving rotor. It is vital to the conduct of a test to use the correct set of A unit test weights calibrated for both the proving rotor and the machine tested.) Use a 30A test weight for initial plane separation and calibration in A units, applied alternately in each correction plane. Remove 30A weight after calibration and switch compensator to off position.
- 4.5 Run machine with no test weights on the proving rotor and measure the unbalance which should be less than 0.5A in both planes. If necessary, add balancing clay to obtain readings of less than 0.5A.
- 4.6 Residual Unbalance and Accurate Angle and Amount Indication Tests:
- 4.6.1 Place one 2.5A weight at any one of the following locations in plane 1 (left plane of machine): 15°, 165°, 195°, 345°. The actual location is selected from one of those listed. Call this location angle "E". The weight remains at this location on the proving rotor for the following series of tests except for readings marked (**) on the test Log Sheet. At (**) marks the weight is removed. It is permissible to run plane 1 and plane 2 simultaneously if 2 sets of 2.5A weights are available.
- 4.6.2 Place another 2.5A test weight at each of the locations in plane 1. The weight is located on the proving rotor at positions calculated in the test Log Sheet, column G. Record the amount and angle of the resultant unbalance as indicated by the balancing machine in plane 1 for each of the locations listed in column G. Repeat test series twice. It is permissible to run plane 1 and plane 2 simultaneously if two sets of 2.5A weights are available.