



AEROSPACE RECOMMENDED PRACTICE

Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N.Y. 10001

ARP 1342

Issued November 1973
Revised

PERIODIC SURVEILLANCE PROCEDURES FOR VERTICAL, STATIC, BALANCING MACHINES

1. PURPOSE

To define a standard method for periodic surveillance of vertical, static (i.e., one plane), balancing machines.

2. SCOPE

This document specifies those requirements and procedures for periodic tests to insure maintenance of balancing 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) Static-couple separation test.

- 2.1 Reference Standard: See ARP 588, Force Balancing Machines for Jet Engine Compressor and Turbine Components - Rotating Type.

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 lbs.	Proving (test) Rotor Class Ref. ARP 588 Fig.	Test Weights Req. (Ref. ARP 588 Fig.)	Quantity Req.
25	25 lb	2.5 A	2
100	100 lb	30 A	1
250	250 lb	40 A	2
500	250 lb		

NOTE: Individual manufacturers may utilize test rotors of different weight class or test weights of different microinch level to meet special requirements of their machines or engineering drawing unbalance limits. The basic design of this special equipment should be similar to the nearest SAE recommended rotor. For machines that do not have SAE standard spindle nose, an adapter shall be provided to accept the SAE rotor on one face and the machine spindle on the other.

- 3.3 Readout instruments such as amount of unbalance meters, angle meters, and electric tachometers capable of bench calibration should be periodically calibrated and provided with stickers giving month, day, and year of next calibration. The interval for calibration of these instruments need not coincide with that for the machine test, but the due date shall not have expired on or before machine test date. Readout instruments not capable of bench calibration shall have their accuracies substantiated by the proving rotor tests.

SAE Technical Board rules provide that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report, in formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

3.4 Documentation of balancing machine calibrations shall be maintained, and each machine shall be tagged to indicate 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 Install adaptor (if required) and correct size SAE rotor on spindle of balancing machine.

4.2 Run machine at test speed for at least 15 minutes to stabilize prior to test. Rotor speed for variable speed machines shall be 900 rpm minimum. For fixed speed machines, use nearest available speed and note on test log sheet. A portable tachometer may be used for this reading.

4.2.1 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.

4.2.2 With no weights on test rotor run machine and null amount reading with compensator. For machines with double compensators use first set or Eccentricity dial.

4.2.3 For machine with one compensator install 30A calibration weight at 0° position plane II and calibrate machine to read 30A units at or as close as possible to 0°.

4.2.4 For all machines, index test rotor 180° relative to spindle, being careful to return bolts to the same hole locations of rotor.

4.2.5 For machines with double compensators, set second compensator in Null position and again null amount reading. Install 30A test weight at 0°, plane II run machine and calibrate to read 30A units at or as close as possible to 0°.

4.2.6 For machine with single compensator, adjust compensator dial to remove one-half the indicated amount reading. For machine with double compensator, switch second compensator to Read position.

4.2.7 Run machine and measure unbalance in test rotor and correct by adding wax to bring amount reading to less than .5A units.

4.3 Residual Unbalance and Accurate Angle and Amount Indication Tests:

4.3.1 Place one 2.5A test weight at any one of the following locations in plane II (mid plane) of the test rotor: 15°, 165°, 195°, or 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 all weights are removed.

4.3.2 Place another 2.5A test weight at each of the positions calculated in the test log sheet column "G" in plane II of the test rotor. Record the angle and amount of the resultant unbalance as indicated by the balancing machine for each position of test weights. Repeat test series twice (3 runs total).

4.3.3 Plot the results of 4.3.2 on polar graph paper with symbols shown on test log sheet. Use scale shown in Figure 5 of ARP 588 to correspond with transparent overlay Figure 6 of ARP 588. Darken a line from origin pointing in direction of angle E.