MILITARY SPECIFICATION

BLOWERS, ELECTRONICALLY COMMUTATED
BRUSHLESS, DIRECT CURRENT, (ECDC) MOTOR
DRIVEN, FOR COOLING ELECTRONIC
EQUIPMENT, GENERAL SPECIFICATION FOR

This amendment forms a part of Military Specification MIL-B-28873, dated 7 December 1983, and is approved for use by all departments and agencies of the Department of Defense.

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2.2, add at end of paragraph:

Institute of Electrical and Electronics Engineers

1EEE 119-1974 (ANSI) General Principles of Temperature Measurement as Applied to Electrical Apparatus

(Application for copies should be addressed to the Institute of Electrical and Electronics Engineers, 345 East 47th Street, New York, NY 10017.)

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2.2, delete: American Society of Mechanical Engineers, ASME Power Test Codes, Part 5, Chapter 4, Bulletin PTC 19.5 4-1959 (Application for copies ..... NY 10017)

2.2, substitute under AMERICAN NATIONAL STANDARDS INSTITUTE:

ANSI S1.32 for ANSI S1.21-72

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3.5.15, add "using "A" weighting"; to read: Acoustic noise. When tested as specified in 4.7.15, the noise level in decibels (dB) (Sound Pressure Level) at 3 feet using "A" weighting shall not exceed the requirement of the specification sheet (see 3.1).

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Add as paragraph 4.1.1 (change existing para 4.1.1 to 4.1.2)

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

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4.7.13.1, delete and substitute:

4.7.13.1 - Mounting and Instrumentation: The temperature rise of the motor windings shall be determined using a thermocouple attached to the winding head or imbedded in a motor slot when testing units with integral electronics (measure per 4.7.13.2). Units with separate (external) electronic boxes may be tested using resistance measurement (measure per 4.7.13.3) or by the thermocouple method measure per 4.7.13.2). The method used must be the same each time a given model is tested. Care shall be taken to ensure that the thermocouple, if used, makes good thermal contact with the winding using wedges, thermal conducting epoxy or another suitable method. If the thermocouple is in a winding slot, it shall be imbedded as close to the center of the motor as possible. The thermocouple shall be connected to an appropriately calibrated thermocouple temperature bridge. The blower shall be mounted by its normal means to a surface of low themal conductivity.

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Add paragraph 4.7.13.3 through 4.7.13.2 as follows:

4.7.13.3 - Continuous Duty Blower: The temperature rise of the windings shall be determined by resistance measurements made in a draft-free area. The blower shall be mounted by its normal means on a surface of low thermal conductivity. One of the following methods shall be used.

4.7.13.1 - Recently De-energized Blower: A thermocouple shall be securely attached to the motor frame at a convenient location between bearings on the motor frame surface. Frame temperature, room ambient temperature, and motor winding resistance shall be measured and recorded. The blower shall then be energized for a three-hour minimum period with nominal voltage and frequency until the frame temperature has reached the point of stability. The blower shall be considered to be thermally stable when five successive frame temperature readings at one-minute intervals are equal. This temperature shall be recorded for informational purposes. To determine R, the resistance of the main winding shall be measured five times at intervals of approximately 30 seconds, commencing immediately after the motor is de-energized. After the fifth measurement is completed, the resistance shall then be extrapolated back to the resistance at the time of shutdown. The temperature rise of the winding shall be computed from the following formula:

$$T=\left[\frac{R-r}{r}\right] x \ (t'+234.5) - T-t')$$

where:

T= temperature rise in degrees celsius of the winding over the ambient temperature.

t' = initial ambient temperature in degrees celsius - room temperature.

R = resistance of the winding in ohms at the time of shutdown.

r = resistance of the winding in ohms at temperature t'.

T = ambient temperature at the time of shutdown.

4.7.13.2 - Energized Blower: The motor windings shall be connected in a circuit as shown in figure 1 which incorporates the "Seeley Method" as described in 1EEE119-1974. The measured resistance includes that of the connecting leads between the test equipment and the apparatus being tested. Therefore, the resistance of the connecting leads, if appreciable, must be subtracted from the total measured resistance. The blower shall then be energized for a sufficient period with nominal voltage and frequency until the winding temperature has reached the point of stability as determined by a minimum of five resistance measurements. The blower shall be considered to be thermally stable when five successive resistance measurements are equal. This value will then be R and shall be used to compute the temperature rise of the winding by the same formula described for a de-energized blower.

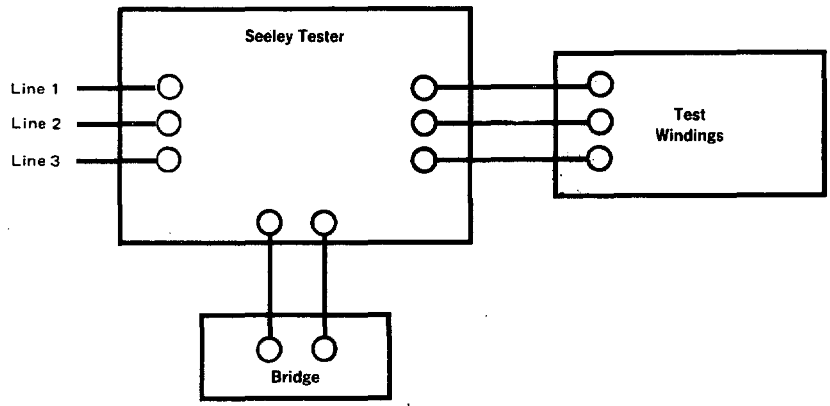

FIGURE 1. Test circuit for measuring resistance of energized single phase or polyphase windings. Seeley tester is installed between external module and the fan.

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Add paragraph 6.5 Subject term (key word) listing

Airmover, DC
Brushless DC Blower
Cooling Fan, DC
Direct Current, Blower
Electronic Commutated Blower
Electronic Equipment Blower
Fan, DC
Impeller, DC
Muffin Fan, DC
Propeller Blower, DC
Rotary Fan, DC
Tubeaxial Blower, DC
Vaneaxial Blower, DC
Ventilator, DC

CUSTODIANS:
ARMY - ME
NAVY - EC
AIR FORCE - 99

REVIEW ACTIVITIES:
ARMY - M1
NAVY - AS
AIR FORCE - 82
DLA - GS

USER ACTIVITIES:
AIR FORCE - 11
NAVY - OS, MC

AGENT:
DLA - GS

Preparing Activity
Navy - EC

(Project 4140-0138)