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## **Report:**

# **Fans, Electric**

File E213292  
Project 01NK4301

November 27, 2001

REPORT on FANS, ELECTRIC

**Active Ventilation Products, Inc.**  
Newburgh, NY

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### **DESCRIPTION**

PRODUCT COVERED: USL - Roof Mounted Attic Ventilator, Model AF-8.  
ELECTRICAL RATINGS: 120 V, 60 Hz, 1.0 A.

### **ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):**

The product covered by this Report is a roof mounted attic ventilator intended for installation in manufactured homes in accordance with the National Electric Code, and to be mounted on a roof having a maximum pitch of 6/12. It is shipped as described in this Report and in the field, the leads will be connected to a Listed Nonmetallic Sheathed Cable Splicing Connector subjected to the Overload and Resistance to Arcing Tests per UL498, the Standard for Attachment Plugs and Receptacles, and also Listed for use in manufactured buildings and mobile homes in accordance with Articles 545 and 550 of the National Electric Code.

These fans have not been evaluated for use with solid state speed controls, and are not suitable for use over cooking equipment.

USL indicates evaluation with the US Standard for Electric Fans, UL 507, Ninth Edition.

## CONSTRUCTION DETAILS

**Spacings** - A minimum spacing of 3/32 in, (2,38 mm) is maintained through air and over surface between uninsulated live parts and dead-metal parts and between uninsulated live parts of opposite polarity.

**Corrosion Protection** - All ferrous metal parts are suitably protected against corrosion by painting, plating or the equivalent.

**Grounding** - A bare, NQ. 14 AWG lead, is secured to a green grounding screw on the motor chassis.

**Internal Wiring** - All internal wiring shall be R/C(AVLV2) AWM, rated minimum 60 C, 300 V minimum unless otherwise specified in the following description. All wiring is secured with Listed cable ties and routed away from moving parts and sharp edges.

**Splices** - Unless specifically described by Cat. No., insulated wire connectors shall be Listed; suitable for the number, size and type of conductor, covering all stripped conductors. Crimped on connectors shall be assembled using the connector manufacturers recommended tools. Quickdisconnect connectors shall have positive indents. Soldered connections shall be mechanically secured before soldering.

**Marking** - Label composed of R/C(PGDQ2) suitable for use on each type of surface applied. Includes Listee's name or trademark, model number, electrical ratings, date of manufacture.

**Installation and Safety Instructions** - Important safety instructions shall be packaged with each fan.

### MODEL AF-8 - FIG. 1 (N01-23182) AND FIG. 2 (N01-23183)

- Outer Cover** - Aluminum, 290 mm OD, 133 mm high at edge, 0.5 mm thick, secured to inside enclosure with three screws. Consists of two sheets fastened together. Provided with louvered ventilation openings, each opening approx 5 mm wide by 112 mm long.
- Inside Cover** - Aluminum, 200 mm OD, 160 mm high, 0.5 mm thick. Provided with ventilation openings, each opening approx 5 mm wide by 115 mm high. Clamps to ridge around opening in the center of mounting plate.
- Mounting Plate** - Aluminum, measures approximately 345 by 345 mm, provided with opening in center, 200 mm diameter.

### MODEL AF-8 - FIG. 3 (N01-23184)

**Fan** - R/G(QMFZ21), rated HB minimum, 118 mm diameter, 1.5 mm thick. Provided with 10 blades, each 25 mm high. Press fit to motor shaft. Blades located 25.4 mm minimum from the motor windings.

**Time Delay Control Module** - R/C(NKCR2), Infitec Inc., model FRS51115M, rated 120 V ac, 1.0 A, secured to mounting bar with Listed cable tie. Module is orientated so the electrical connections are opposite the mounting bar.

**Motor** - RJC(XEWR2), Bomax, type B-FTP, rated 120 V, 60 Hz, 1,2 A Employs a R/C(OBJY2) Class B insulation system. Secured to mounting bar by two bolts through the motor chassis. Motor leads are secured with Listed cable ties and routed away from moving parts and sharp edges. (Employs a single operation thermal cut-off device, rated 152°C.

**Fan beads** - Listed nonmetallic sheathed cable, type NM-B, 14 AWG, 2 conductor with bare ground conductor, jacket rated 600 V. Leads extend 6 in. minimum from where it exits the fan housing. Primary leads terminate with Listed quick-disconnect connectors, other ends are not terminated. Grounding conductor is secured to green colored screw on the motor chassis. Strain relief is achieved by clamping the leads between the mounting bar and the motor chassis.

**Mounting Bar** - Aluminum, 200 mm long, 3.0 mm thick, secured to inside cover with four screws.

## TEST RECORD NO. I

### SAMPLES

The manufacturer submitted representative production samples of attic fan Model AF-8. The following tests were conducted in accordance with the Standard for Electric Fans, UL 507, Ninth Edition. Only the following tests were deemed necessary.

## CONTINUITY OF GROUNDING CIRCUIT TEST:

### METHOD

A suitable measuring instrument was used to measure the resistance between any point of the appliance required to be grounded and the equipment grounding terminal or the point of attachment of the wiring system.

### RESULTS

Location	Ground Resistance, Ohms
Enclosure (external vent)	0.07

## STARTING CURRENT TEST:

### METHOD

The appliance was connected to a 120 V, 60 Hz source of supply, protected with a nontime delay fuse rated 15 A. The appliance was started three times with the appliance at room temperature at the beginning of each start. The appliance was allowed to come to full speed after each start and to come to rest between each start.

### RESULTS

The fuse remained intact.

## INPUT TEST:

### METHOD

A sample of the appliance was installed as intended and connected to a 60 Hz source of supply adjusted to the voltage as noted in "Results". It was operated normally under the conditions specified until heated when the input current and power were measured.

### RESULTS

Condition	V	A	W	RPM
Running High	120	0.95	69	2239
Stalled High	120	1.12	75	–

## NORMAL TEMPERATURE TEST:

### METHOD

The appliance was installed and operated in the intended manner while connected to a 120 V, 60 Hz source of supply. Temperatures were measured by means of thermocouples at points specified below after thermal equilibrium was attained. Thermal equilibrium was considered to be obtained when three readings, taken ten minutes apart, indicated no change in temperature.

### RESULTS

Thermocouple Location	Maximum Temperature, °C
Motor windings	High
Motor windings	55
Motor windings	85
Motor windings	76
Motor leads	38
Time delay module body	27
Room ambient	23

## **DIELECTRIC VOLTAGE WITHSTAND TEST:**

### **METHOD**

While the appliance was in a heated condition, a 60 Hz potential was applied between current-carrying parts and dead-metal parts of the sample. Starting at zero, the potential was gradually increased to 1000 V and maintained for one minute.

### **RESULTS**

There was no dielectric breakdown.

## **STRAIN RELIEF TEST (UL 514B, CLAUSE 52):**

### **METHOD**

A direct pull of 60 lbs was applied to the supply cord and supported by the appliance ss that the strain relief means was stressed from any angle the construction permits for a period of one minute. Before the pull was applied, the internal connections to the supply cord were disconnected.

### **RESULTS**

There was no movement of the cord that would indicate stress on the connections.

## **HUMIDITY CONDITIONING TEST:**

### **METHOD**

A sample of the appliance was heated to a temperature just above 34°C for six hours to reduce the likelihood of condensation of moisture during conditioning. The heated sample was then placed in a humidity chamber and conditioned for 48 hours in air having a relative humidity of 88 ~ 2 percent and at a temperature of 32 + 20°C.

Following the conditioning, the insulation resistance was measured between live and dead-metal parts by means of a high resistance voltmeter using a 250 V dc circuit. The insulation resistance was also measured between the conductors of the supply leads and the insulating jacket. Following the resistance measurement, the Dielectric Voltage Withstand Test was conducted by applying a 19DD V ac potential between live-metal parts and dead-metal parts of the fan for one minute.

### **RESULTS**

There was no dielectric breakdown,

The maximum insulation resistance was 283M ohms.

The maximum insulation resistance of the supply leads was 384M ohms.

## **WATER SPRAY TEST (Permanently Connected):**

### **METHOD**

The fan was mounted as intended. During which, the fan was subjected to a simulated driving rain, with a resistivity of approximately 3500 ohms-cm, for a period of 4 hours. Immediately after cessation of the spray, the maximum insulation resistance was recorded. After which, within one minute after the insulation resistance measurement, the Dielectric Withstand Test was conducted at 1000 V for 15 seconds. The Dielectric Withstand Test was repeated after 30 minutes, but at 1000 V for one minute.

<b>As Received</b>	
Minimum Insulation Resistance	625M ohm
Water Resistivity	3500 ohm-cm
Ambient	22°C
<b>Immediately After Cessation</b>	
Minimum Insulation Resistance	497M ohms
Dielectric Breakdown (15 Sec.)	No
Water Resistivity	3500 ohm-cm
Ambient	22°C
Wetting of uninsulated live parts or film-coated wire other than motor windings	No
Accumulation of water in wiring compartment or channel	No
<b>30 Minutes After Cessation</b>	
Dielectric Breakdown	No

## CONCLUSION

Samples of the product covered by this Report have been found to comply with the requirements covering the category and the product is judged to be eligible for Listing and Follow-Up Service. The manufacturer is authorized to use the UL Mark on such products which comply with the Follow-Up Service Procedure and any other applicable requirements of Underwriters Laboratories Inc. Only those products which properly bear the UL Mark are considered as Listed by Underwriters Laboratories Inc.

Report by:

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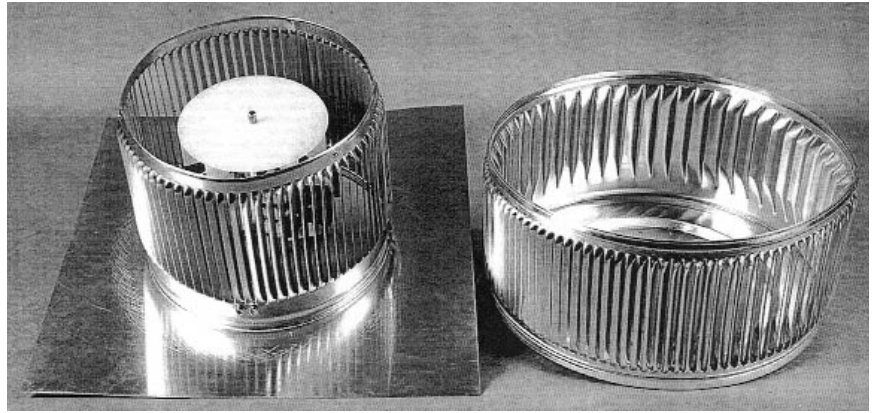
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**Figure 1**



**Figure 2**