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INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS

IAPMO GUIDE CRITERIA

FOR

AIR-BASE SOLAR THERMAL COLLECTOR

IAPMO IGC 190-2003

1. PURPOSE

- 1.1** The purpose of this standard is to establish a generally accepted standard for the design and construction of air-based solar thermal collectors. Its purpose is to serve as a guide for designers, manufacturers, installers, and inspectors in the understanding of the requirements for fabricating these devices and their identification in the field.
- 1.2** The provisions of this standard are not intended to prevent the use of any alternate material, or method of construction, provided any such alternate meets or exceeds the intent of this standard.

2. SCOPE

- 2.1** This standard serves to supplement the provisions set forth for air-based collectors in the Uniform Solar Energy Code. This standard sets forth minimum standards for materials used in the construction of air-based solar collectors, the design of the air passage, and structural load ratings of the completed product. Methods of marking and identification are also covered by the standard. This standard is not intended to be a specification guide nor is it intended to restrict design.

3. REFERENCE STANDARDS

- 3.1** All standards referenced herein shall be the current edition of that standard as published in Table 11-1 of the Uniform Solar Energy Code.

ASTM C 920	Elastomeric Joint Sealants
ASTM D 2000	System for Rubber Products in Automotive Applications
ASTM E 84	Surface Burning Characteristics of Building Materials
ASTM G 21	Determining Resistance of Synthetic Polymeric Materials to Fungi
ASTM G 22	Determining Resistance of Plastics to Bacteria
UL 181	Factory-Made Air Ducts and Air Connectors
UL 723	Test for Surface Burning Characteristics of Building Materials
USEC 701.5	Uniform Solar Energy Code

4. GENERAL REQUIREMENTS

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4.1 Materials

- 4.1.1 Materials in contact with the air flow passage shall have a flame spread rating of not more than 25 and a smoke developed rating not exceeding 50 when tested in accordance with ASTM E 84 or UL 723.
- 4.1.2 Materials in direct contact with the absorber or air flow passage shall have an operating temperature limit of not less than 250 °F when tested in accordance with UL 181.
- 4.1.3 Materials in contact with the air passage shall meet the mold, fungal, and bacteria resistance requirements set forth in UL 181, ASTM G 21, and ASTM G 22.
- 4.1.4 Insulation in contact with the air passage shall be rated for air velocities two times higher than the calculated for the maximum allowable flow rate marked on the collector. Maximum allowable air velocities for the insulation shall be rated in accordance with UL 181.
- 4.1.5 Collector glazing shall be tempered glass in compliance with USEC 701.5.
- 4.1.6 Collector glazing detail shall contain a primary gasket seal such as EPDM or other suitable material that meets ASTM D 2000.
- 4.1.7 Collector glazing detail shall contain a secondary elastomeric seal that is rated for a minimum 12.5% joint movement, non-sag (NS), and classified for use with Glass and Aluminum in accordance with ASTM C 920.

5. TESTING REQUIREMENTS

- 5.1 The entire collector assembly must withstand a minimum static load of 30 pounds per square foot. Load shall be considered as normal to the collector aperture and uniformly applied. Collector support points shall be in accordance with manufacturers stated mounting procedure, or at the outermost corners of the unit if a mounting method is not specified. Unit must be capable of surviving the applied load under both positive and negative pressures with respect to the aperture without structural failure of any component, or permanent deformation of the unit. Compliance with load ratings may be in the form of:
 - a) A full report documenting compliance by a licensed professional engineer with supporting calculations.
 - b) A laboratory performed test in which the load pressure is statically applied to the collector for a minimum 15 second duration. The load pressure shall be calculated as the pressure differential is applied across the front and back surfaces of the collector.
- 5.2 The collector shall be capable of resisting water penetration into the air cavity. A suitable test shall consist of:

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