



Standard Guide for On-Site Inspection and Verification of Operation of Solar Domestic Hot Water Systems¹

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1. Scope

1.1 This guide covers procedures and test methods for conducting an on-site inspection and acceptance test of an installed domestic hot water system (DHW) using flat plate, concentrating-type collectors or tank absorber systems.

1.2 It is intended as a simple and economical acceptance test to be performed by the system installer or an independent tester to verify that critical components of the system are functioning and to acquire baseline data reflecting overall short term system heat output.

1.3 This guide is not intended to generate accurate measurements of system performance (see ASHRAE standard 95-1981 for a laboratory test) or thermal efficiency.

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

E 772 Terminology Relating to Solar Energy Conversion²

E 823 Practice for Nonoperational Exposure and Inspection of a Solar Collector²

E 904 Practice for Generating All-Day Thermal Performance Data for Solar Collectors²

E 1056 Practice for Installation and Service of Solar Domestic Water Heating Systems for One- and Two-Family Dwellings²

2.2 ASHRAE Standards:

93-1986 (ANSI B198.1-1977) Method of Testing to Determine the Thermal Performance of Solar Collectors³

95-1981 Method of Testing to Determine the Thermal Performance of Domestic Water Heating System³

2.3 NIST Standard:

76-1137 Thermal Data Requirements and Performance Evaluation Procedures for the National Solar Heating and Cooling Demonstration Program⁴

3. Summary of Guide

3.1 This guide recommends inspection procedures and tests for: general system inspection, collector efficiency, freeze protection, and controller and pump/blower operation.

3.1.1 Verification of satisfactory operation of these components indicates that the system is functioning. Tests are designed to take a minimum of time in preparation, testing and restoration of the system. They may use relatively inexpensive, nonintrusive instrumentation which system installers can reasonably be expected to have on hand.

3.2 Recommended tests for each component or subsystem fall into categories according to the level of complexity and cost (Note 1).

3.2.1 *Category A*—The most rudimentary tests, such as visual inspection.

3.2.2 *Category B*—Tests that require minimal instrumentation and skill.

3.2.3 *Category C*—Tests that require most expensive or sophisticated instrumentation or more time to perform.

NOTE 1—Category B tests should include Category A tests as prerequisite, etc.

3.2.4 Selection of the appropriate test is at the discretion of the tester and purchaser, who should be aware of the tradeoffs between cost and accuracy at each level of testing. The tester should make these clearly known to the purchaser of the system who may wish to assume the costs of more sophisticated testing (Note 2). Preferably there should be a part of the installation contract between the tester and purchaser spelling out test specifics (for example, Category A, B or C for each subtest).

NOTE 2—Consult your local National Balancing Bureau or Associated Air Balance Council.

3.3 Instrumentation includes sensors to monitor some or all of the following conditions:

3.3.1 Total incident solar radiation (in the plane of the collector array),

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² Annual Book of ASTM Standards, Vol 12.02.

³ Available from ASHRAE, 1791 Tullie Circle, N.E., Atlanta, GA 30329.

⁴ Available from National Institute of Standards and Technology, Gaithersburg, MD 20899.