ANSI/ASHRAE Standard 20-1997 (RA 2006)
Reaffirmation of ANSI/ASHRAE Standard 20-1997

ASHRAE STANDARD

Method of Testing for Rating Remote Mechanical-Draft Air-Cooled Refrigerant Condensers

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CONTENTS

ANSI/ASHRAE Standard 20-1997 (RA 2006)
Method of Testing for Rating Remote Mechanical-Draft Air-Cooled Refrigerant Condensers

SECTION	PAGE
Foreword	2
1 Purpose	2
2 Scope	2
3 Definitions	2
4 Test Methods	2
5 Test Instruments	3
6 Test Apparatus	6
7 Test Procedure	8
8 Data to be Recorded	9
9 Source of Physical Properties	10
10 Symbols	10
11 Computations	11
12 References	12
Appendix A	13
Appendix B	15

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(This foreword is not a part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process.)

FORWARD

This is a reaffirmation of ANSI/ASHRAE Standard 20-1997. This standard was prepared under the auspices of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). It may be used, in whole or in part, by an association or government agency with due credit to ASHRAE. Adherence is strictly on a voluntary basis and merely in the interests of obtaining uniform standards throughout the industry.

The changes made for the 2006 reaffirmation were that the references were updated.

1. PURPOSE

This standard prescribes methods of laboratory testing to measure the heat rejection capabilities of remote mechanical draft, air-cooled refrigerant condensers for refrigerating and air conditioning. The objective is to ensure uniform performance information for establishing ratings.

2. SCOPE

2.1 This standard provides

a. uniform methods of testing for obtaining performance data,
b. definition of terms,
c. specification of data to be recorded and calculation formulas, and
d. test limits and tolerances.

2.2 This standard does not cover

a. methods of test for production or field use,
b. liquid-cooled condensers, nor
c. heat reclaim condensers using less than full refrigerant liquid condensing.

3. DEFINITIONS

3.1 General

calorimeter: a device for accurately determining refrigerant flow rate by the principle of known heat input or output, known physical characteristics of the transfer media, and observed thermal differences.

condenser subcooling: number of degrees that a pressurized liquid is cooled lower than its saturated temperature at that pressure.

condensing temperature: the saturation temperature, in degrees, corresponding to the measured refrigerant pressure at the condenser inlet.

remote mechanical-draft air-cooled refrigerant condenser: a self-contained, waterless refrigerating system component that fully condenses refrigerant vapor by rejecting heat to air, mechanically circulated by integral fans and fan drives over its finned-tube heat transfer surface, causing a temperature rise in the air. Refrigerant gas desuperheating and liquid subcooling are expected to occur.

shall ("it is required"): term used in standards and regulations (as "shall" or "shall not") to indicate a provision that is mandatory.

should ("it is recommended"): term used in standards and regulations to indicate a provision that is not mandatory but that is recommended as good practice.

temperature difference (TD): the difference in degrees between the condensing temperature and the entering air dry-bulb temperature.

3.2 Coil Dimensions

coil depth: the dimension of the finned surface as measured from the entering air face to the leaving air face in the direction of airflow.

coil face area: the product of the coil length and coil width.

coil length: the dimension of the face of the coil in the direction of the finned tubes exposed to the flow of air.

coil width: the dimension of the face of the coil perpendicular to the direction of the tubes and includes only the width over the tube and fins exposed to the airflow. ***Note*:** Height may be substituted for width if the condenser has a vertical coil orientation.

3.3 Testing Terms

equilibrium: the steady-state condition during which the fluctuations of variables being measured remain within stated limits.

test: the recorded group of readings of test variables taken while equilibrium is maintained and used in the computation of results.

test run: the complete group of readings of test variables, which includes

a. those observed or recorded during a sufficient period to indicate that equilibrium was obtained prior to the test and
b. those recorded during the period of the test.

4. TEST METHODS

4.1 General

4.1.1 To fulfill the requirements of this standard, two simultaneous methods of determining condenser capacity shall be used—one primary method and one confirming method. The primary method utilizes the refrigerant mass flow rate and enthalpy differences of the refrigerant entering and leaving the condenser. This is determined from the accurate measurement of the pressure-temperature state of both the refrigerant gas entering and liquid leaving the condenser. Condenser heat of rejection shall then be calculated as a product of refrigerant flow rate measured (see Section 4.1.2) and the enthalpy difference.