

AMCA Publication 222-08

Application Manual for Air Curtains



**AIR MOVEMENT AND CONTROL
ASSOCIATION INTERNATIONAL, INC.**

The International Authority on Air System Components

AMCA PUBLICATION 222-08

Application Manual for Air Curtains



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Authority

AMCA Publication 222 was approved by the AMCA Membership on October 16, 2008.

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Related AMCA Standards and Publications

AMCA 211 Certified Ratings Program - Product Rating Manual for Fan Air Performance

ANSI/AMCA 220 Laboratory Methods of Testing Air Curtain Units for Aerodynamic Performance Ratings

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Application Manual for Air Curtains

1. Purpose

The purpose of this application guide is to familiarize the reader with air curtain unit (ACU) technology.

2. Scope

This document covers ACU theory, components, construction, testing and certification of ratings, applications, benefits, selection, purchase, installation, service and maintenance.

3. Definitions - Units of Measure - Symbols

3.1 Definitions

3.1.1 Air curtain (airstream). A directionally-controlled air curtain, moving across the entire height and width of an opening, which reduces the infiltration or transfer of air from one side of the opening to the other and/or inhibits flying insects, dust or debris from passing through. For the purposes of this publication, "air curtain" and "airstream" are synonymous.

3.1.2 Air curtain depth. The air curtain dimension perpendicular to both the direction of airflow and the air curtain width; the short dimension of the air curtain.

3.1.3 Air curtain width. The air curtain dimension perpendicular to both the direction of airflow and the air curtain depth; the long dimension of the air curtain.

3.1.4 Air curtain unit (ACU). An air moving device that produces an air curtain.

3.1.5 Air discharge nozzle. A component or assembly, which may include adjustable vanes in the ACU, that directs and controls the air curtain.

3.1.6 Air discharge nozzle depth (N_d). The inside dimension perpendicular to both the direction of airflow and the air curtain width.

3.1.7 Air discharge nozzle width (N_w). The inside dimension perpendicular to both the direction of airflow and the nozzle depth.

3.1.8 Air discharge angle (θ). The angle between the plane of the protected opening and the direction in which the air curtain leaves the discharge.

3.1.9 Psychrometrics (From ANSI/AMCA 210)

3.1.9.1 Dry-bulb temperature (t_d). The air temperature measured by a dry temperature sensor.

3.1.9.2 Wet-bulb temperature (t_w). The temperature measured by a temperature sensor covered by a water-moistened wick and exposed to air in motion. When properly measured, it is a close approximation of the temperature of adiabatic saturation.

3.1.9.3 Wet-bulb depression. The difference between the dry-bulb and wet-bulb temperatures at the same location.

3.1.9.4 Stagnation (total) temperature. Stagnation (total) temperature is the temperature which exists by virtue of the internal and kinetic energy of the air. If the air is at rest, the total temperature will equal the static temperature.

3.1.9.5 Static temperature. Static temperature is the temperature which exists by virtue of the internal energy of the air only. If a portion of the internal energy is converted into kinetic energy, the static temperature will be decreased accordingly.

3.1.9.6 Air density (ρ). Air density is the mass per unit volume of the air.

3.1.9.7 Standard air. Air with a density of 1.2 kg/m³ (0.075 lbm/ft³), a ratio of specific heats of 1.4, a viscosity of 1.8185×10^{-5} Pa·s (1.222×10^{-5} lbm/ft·s). Air at 20 °C (68 °F) temperature, 50% relative humidity, and 101.3207 kPa (29.92 in. Hg) barometric pressure has these properties, approximately.

3.1.10 Pressure and head

3.1.10.1 Pressure. Force per unit area.

3.1.10.2 Absolute pressure. The value of a pressure when the datum pressure is absolute zero. It is always positive.

3.1.10.3 Barometric pressure (p_b). The absolute pressure exerted by the atmosphere.