AHRI Standard 881 (SI)

2017 Standard for

Performance Rating of Air Terminals

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IMPORTANT

SAFETY DISCLAIMER

AHRI does not set safety standards and does not certify or guarantee the safety of any products, components or systems designed, tested, rated, installed or operated in accordance with this standard/guideline. It is strongly recommended that products be designed, constructed, assembled, installed and operated in accordance with nationally recognized safety standards and code requirements appropriate for products covered by this standard/ guideline.

AHRI uses its best efforts to develop standards/guidelines employing state-of-the-art and accepted industry practices. AHRI does not certify or guarantee that any tests conducted under its standards/guidelines will be non-hazardous or free from risk.

Note:

For I-P ratings, see AHRI Standard 880 (I-P)-2017.

This Standard supersedes AHRI Standard 881 (SI)-2011 with Addendum 1.

USE OF THE SOUND RATINGS

Sound power level data generated by use of this standard with air terminals are directly applicable to AHRI Standard 885, a procedure for using published sound ratings in the estimating of sound levels in occupied spaces.

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PERFORMANCE RATING OF AIR TERMINALS

Section 1. Purpose

1.1 *Purpose.* The purpose of this standard is to establish for Air Terminals: definitions; classifications; test requirements; rating requirements; minimum data requirements for Published Ratings; marking and nameplate data; and voluntary conformance conditions.

1.1.1 *Intent.* This standard is intended for the guidance of the industry, including manufacturers, engineers, installers, contractors and users.

1.1.2 *Review and Amendment.* This standard is subject to review and amendment as technology advances.

Section 2. Scope

2.1 *Scope.* This standard applies to air control devices used in air distribution systems. These devices provide control of air volume with or without temperature control by one or more of the following means and may or may not include a fan:

2.1.1 Fixed or adjustable directional vanes (i.e. Bypass Air Terminal)
2.1.2 Pressure dependent volume Air Valves (including air induction nozzles)
2.1.3 Pressure independent (compensated) volume Air Valves (including air induction nozzles)
2.1.4 Integral heat exchange
2.1.5 On/off fan control
2.1.6 Variable speed fan control
2.1.7 Integral Diffuser Air Terminals

2.2 *Exclusions.* This standard does not apply to registers, diffusers and grilles that do not include an Air Valve or to products specifically covered by ANSI/AHRI Standard 410 or ANSI/AHRI Standard 440.

Section 3. Definitions

All terms in this document will follow the standard industry definitions in the ASHRAE Terminology website (https://www.ashrae.org/resources--publications/free-resources/ashrae-terminology) unless otherwise defined in this section.

3.1 *Acoustic Test Duct.* Duct used to convey the sound of the unit configuration under test to the reverberation room during a ducted discharge test. A Duct End Correction (E_1) shall be added to the sound data measured in the reverberation room to account for the presence of an open-ended duct termination.

3.2 *Acoustically Isolated.* The specimen under test shall have a sound pressure level at least 10 dB higher than any extraneous sound sources, such as sound generated from the air supply or duct walls, to insure that the test specimen is the sole contributor to the sound level being measured.

3.3 *Air.*

3.3.1 *Primary Air.* Air supplied to an air terminal inlet under positive static gage pressure, normally from an air handling unit.

3.3.2 *Secondary Air.* Air drawn into an Air Terminal by means of induction and discharged through the air terminal outlet.

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3.3.3 *Standard Air.* Air weighing 1.2 kg/m^3 which approximates dry air at 21°C and at a barometric pressure of 101.3 kPa.

3.4 *Airflow.* Unit volume displacement of Standard Air per unit time, scfm. The various types of Airflow are defined as follows:

3.4.1 *Induced Airflow.* The flow of Secondary Air into an Air Terminal resulting from a pressure differential within the terminal.

3.4.2 *Rated Airflow.* The flow of Air through an Air Terminal at which test or performance data is generated.

3.4.3 *Standard Airflow.* Airflow corrected for the density of Standard Air.

3.5 *Air Terminal.* A device that modulates the volume of Air delivered to or removed from a defined space in response to an external demand (Figure 1). The various types of Air Terminals are shown in Figures 1.a through 1.k and described below.

3.5.1 *Bypass Air Terminal.* Air Terminal, typically having more than one outlet, that uses a method of volume modulation whereby Airflow is varied by distributing that volume required to meet the space requirements with the balance of Primary Air being diverted away from the space. See Figure 1.c.

3.5.2 *Dual Duct Air Terminal.* Air Terminal that mixes varying portions of two independent sources of Primary Air. See Figure 1.d.

3.5.3 *Fan-powered Air Terminal.*

3.5.3.1 *Booster Fan-powered Air Terminal.* Air Terminal similar to a series terminal unit without a primary Air Valve. Unit may have supplemental heat or reheat. See Figure 1.k.

3.5.3.2 *Parallel Flow Fan-powered Air Terminal.* Air Terminal in which the primary Air Valve is parallel to the fan allowing the primary air to bypass the fan. The fan induces Airflow only through the induction port. Unit may have supplemental heat or cooling. See Figure 1.h.

3.5.3.3 *Series Flow Fan-powered Air Terminal.* Air Terminal in which the primary Air Valve is in series with the fan and typically all air flows through the fan. The fan induces Airflow from the induction port and the primary Air Valve. Unit may have supplemental heat or cooling. See Figure 1.g.

3.5.4 *Induction Air Terminal.* Air Terminal, typically having more than one inlet, which supplies varying proportions of Primary Air and induced air (excludes Fan-powered Terminals). See Figure 1.b.

3.5.5 *Integral Diffuser Air Terminal.* Diffuser with the features of an Air Terminal. Air is modulated via outlet or inlet Air Valves. See Figures 1.e and 1.f.

3.5.6 *Modulating Diffuser Air Terminal.* A diffuser with an integral Air Terminal. See Figure 1.i.

3.5.7 *Single-duct Air Terminal.* Air Terminal supplied with one source of Primary Air (excludes Fan-powered Terminals). Unit may have supplemental heat. See Figure 1.a.

3.5.7.1 *Exhaust Air Terminal.* Air Terminal for regulating exhaust or return. See Figure 1.j.

3.5.7.2 *Mechanically Pressure Independent (Compensated) Air Terminal.* Air Terminal that mechanically regulates supply/exhaust Airflow, independent of pressure drop through the device. See Figure 1.a.1.

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3.5.7.3 *Reheat Air Terminal.* Air Terminal that heats a single source of Primary Air from a cooling and/or dehumidification source.

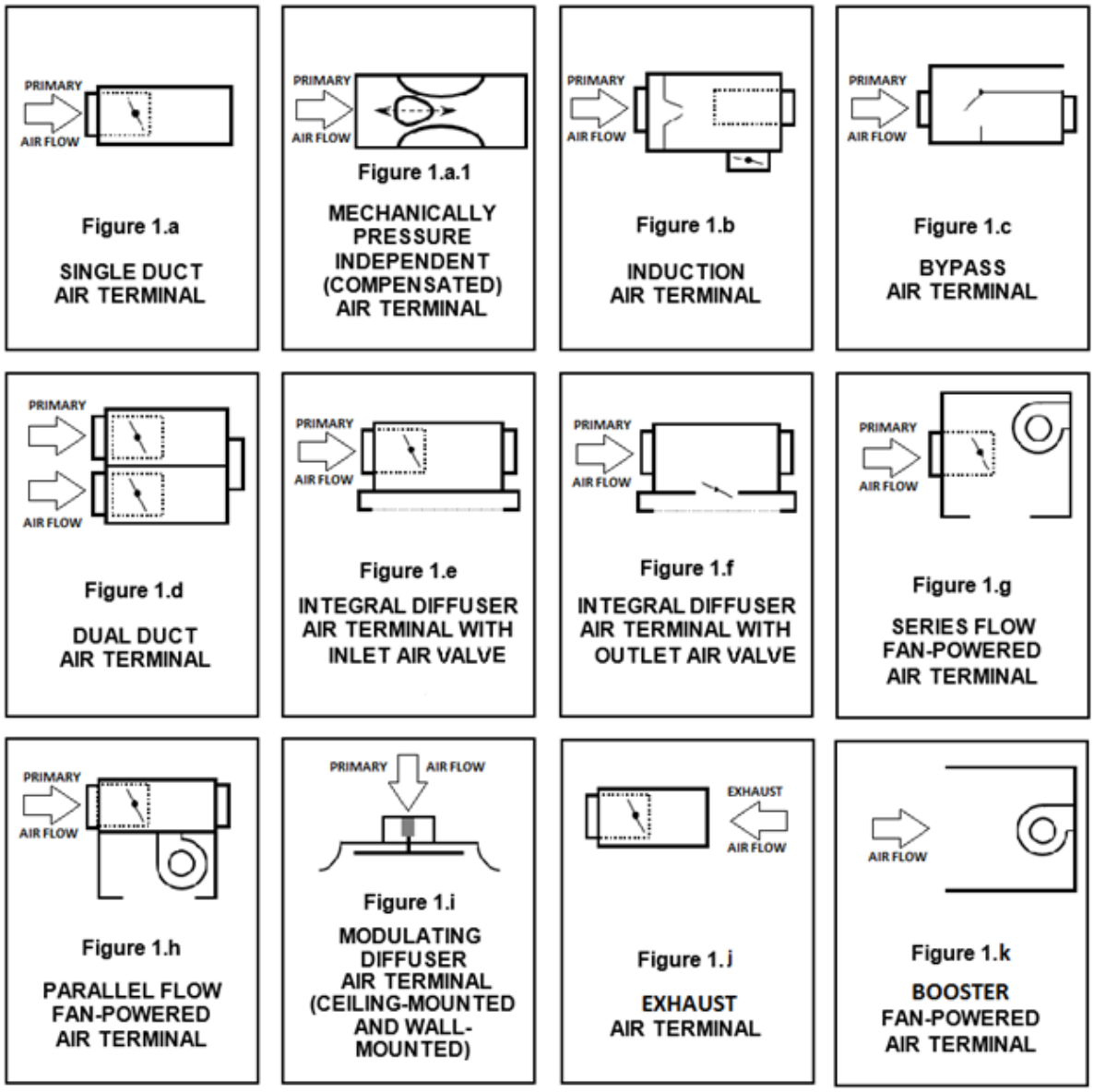


Figure 1. Air Terminal and Air Outlet Configurations

3.6 *Air Valve.* A device used to regulate or modulate the flow of air.

3.6.1 *Inlet Air Valve.* Controls all Air flowing into an Integral Diffuser Air Terminal. See Figure 1.e.

3.6.2 *Outlet Air Valve.* Controls only the air being discharged through the diffuser part of an Integral Diffuser Air Terminal. See Figure 1.f.

3.7 *Duct End Correction, E_1.* A correction in a frequency band that accounts for the acoustic energy in an Acoustic Test Duct that is prevented from entering the test space by the impedance mismatch created by the termination of the Acoustic Test Duct; a method for computing the Duct End Correction is described in Section 5.1.3.9.

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