CARNES®

Humidifier Products

Hospitals/Clinics

Laboratories

Printing Facilities

Museums

Computer Rooms

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05-2016
CARNES-HUM-FL

Steam Humidifiers

CARNES MICROPROCESSOR CONTROLLED STEAM HUMIDIFIERS use ordinary untreated tap water and convert it to mineral free steam for humidity control in commercial, industrial, institutional and residential applications.

ECONOMICAL

- Disposable Cylinders Eliminate Periodic Maintenance For Reduced Maintenance Costs
- Fast and Easy Installation
- Reliable Electronic Components For Long Life

EFFICIENT

- Circuit Board Utilizes Microprocessor To Maximize Energy Conservation
- Exclusive Circuit Board Design With Attached True Touchscreen Control Display

VERSATILE

- Digital Output On A True Touchscreen Control Display Providing Status and Help Buttons For Operational Details and Troubleshooting
- Capacities Up To 200 Pounds Of Steam Per Hour Per Single Unit
- Utilize Any On-Off Humidistat, Carnes Proportional Humidistat or External Signal From DDC Controls

HTGH Shown

Door lock prevents unauthorized adjustments.

Hinged and removable door provides easy access for service.

Disposable plastic cylinder eliminates periodic maintenance.

Easy access "on-off-drain" switch.

True Touchscreen control display.

Optional Building Communications - CarnesLink

20 gauge metal partition covers line voltage wiring for added safety.

Optional internal circuit breaker available. *Please note: certain units require circuit breakers per NEC 48 amp guidelines.*

The simplicity and unique advantages of humidity from directly boiling water in disposable cylinders has been well known since Carnes pioneered the concept in North America in 1969. Pan type humidifiers require messy, time consuming cleaning that may require the use of acids. Electric heating elements in pan type units may also require replacement. Easily changeable steam cylinders containing electrodes can be replaced in less than five minutes.

Cut-away used steam cylinder showing mineral deposits.

Applications

COMFORT

Temperature and relative humidity affect the comfort and well being of all living things. High temperatures require low humidity to maintain comfort conditions, while low temperatures can more easily be tolerated at high relative humidity. Humidification occurs when air is moisturized by a humidification unit or when hygroscopic materials(materials containing moisture) lose moisture to drier air. Proper humidification is widely accepted as healthy, minimizing employee illness and lost work time.

MATERIALS STORAGE

Paper, fabrics, wood, plastic, chemicals and most other materials are hygroscopic. Their water content depends on the humidity of the air around them. If air is too dry, these substances lose moisture until an equilibrium is reached between hygroscopic materials and the air.

PROCESS

Process operations, such as data processing areas, are affected by two major humidity factors: hygroscopic material and generation of static electricity.

Hygroscopic material used in the process influences material weights, dimensions and workability.

Static electricity can totally disrupt high speed process operations as found in a data processing center, paper or film handling business. Created by friction between two substances, static electricity can be prevented by proper humidification of the process environment.

RECOMMENDED TEMPERATURE AND HUMIDITY RANGE

APPLICATION	TEMP F°	RH %
Computer Rooms	72±2	50±5
Office Buildings	70-74	20-30
Libraries & Museums	68-72	40-55
Archival Libraries & Museums	55-65	35
Art Storage	60-72	50±2
Stuffed Animals	40-50	50
Bowling Centers	70-74	20-30
Health Facilities		
Full Term Nursery	75	30min.-60max.
Special Care Nursery	75-80	30min.-60max.
Patient Rooms	75	30
Intensive Care	75-80	30min.-60max.
Operating Rooms	68-76	50min.-60max.
Recovery Rooms	75	50min.-60max.
Electrical Instrument Mfg.	70	50-55
Fur Storage	40-50	55-65
Photo Film Darkroom	70-72	45-55
Photo Print Darkroom	70-72	45-55
Photo Drying Room	90-100	35-45
Photo Finishing Room	72-75	40-55
Cellophane Wrapping	75-80	45-65
Animal Laboratories		
Mouse, Rat	64-79	40-70
Cat	65-85	30-70
Dog	65-85	30-70
Primate	65-84	30-70
Clean Rooms	67-77	40-55
Printing Plants		
Lithography	76-80	43-47±2
Rotogravure		45-50±2
Collotype	80±2	85±2
Platemaking	75-80±2	45±2
Telephone Terminal Rooms	72-78	30-40
Radio and TV Studios	74-78	30-40

± = plus or minus

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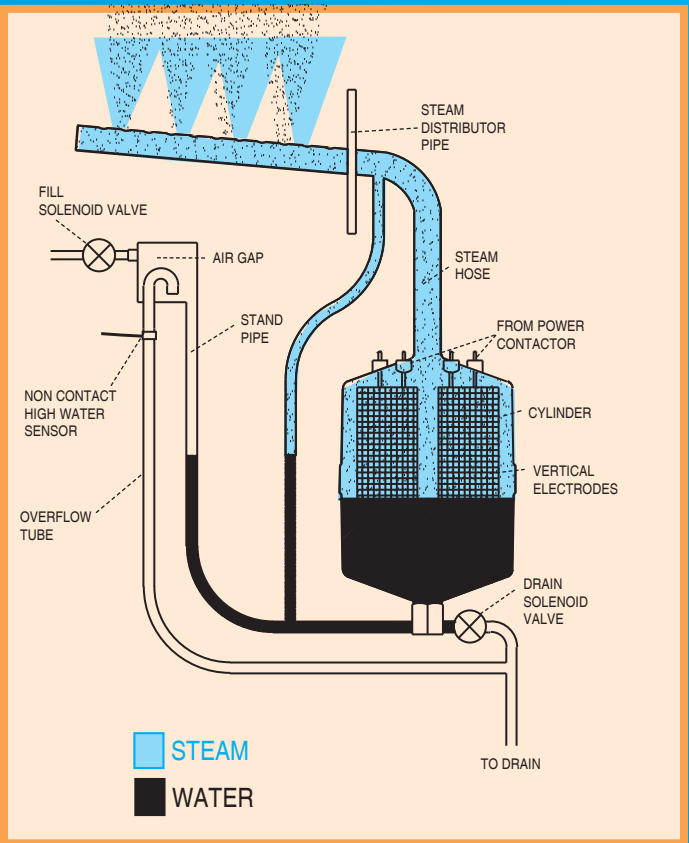
Operation

When the circuit board verifies all four basic controls have been satisfied (control humidistat, high humidistat, air flow, door interlock), a signal is sent to open a fill solenoid valve, allowing water to flow across an air gap into a standpipe. The standpipe provides a column of water to be fed into the cylinder using gravity. The air gap prevents the cylinder from pressurizing. The steam cylinder normally operates at a pressure of approximately 1/2 psi.

The circuit board also closes a power contactor allowing current to flow to vertical electrodes sealed inside the cylinder. Current flows between the electrodes using minerals in the water as a conductor. The water is heated to boiling and converted to steam which leaves the cylinder through the flexible steam hose which is connected to the steam distributor pipe.

The circuit board reacts to current flow between the electrodes and automatically opens the fill solenoid valve when more water is required to maintain the desired output rate and closes when the desired rate is reached. The operation of the drain solenoid valve is automatically controlled by the circuit board which responds to any changes in water conditions and drains the required quantity of water to provide stable operation and long cylinder life.

As mineral deposits build up within the cylinder the water level will slowly rise to uncovered electrode surfaces to maintain the desired steam output rate. When mineral deposits have covered all available electrode surfaces, current flow will be reduced to a level where the desired steam output cannot be reached and the service light will signal the need for maintenance. When the cylinder is filled with minerals it is easily changed in less than five minutes.



UNIT AVAILABILITY MODELS AVAILABLE AND ELECTRICAL DATA

	Model	Max Lb/Hr	Volt	Ph	kW	Line Amp	Disc. Size	Optional Cir. Breaker*	Steam Cylinder
HSAH HTAH	H_AHAU	5	120	1	1.725	14.4	25	1-20 Amp	AX220
	H_AHBU	5	208	1	1.725	8.3	15	1-15 Amp	AX380
	H_AHDU	5	230	1	1.725	7.5	15	1-20 Amp	AX380
	H_AHFU	5	277	1	1.725	6.2	15	1-15 Amp	AX380
	H_AHLU	5	380	1	1.725	4.5	15	1-15 Amp	AX600
	H_AHQU	5	415	1	1.725	4.2	15	1-15 Amp	AX600
	H_AHMU	5	460	1	1.725	3.7	15	1-15 Amp	AX700
	H_AHNU	5	575	1	1.725	3.0	15	1-15 Amp	AX700
	H_AHAU	10	120	1	3.45	28.7	45	1-40 Amp	AX220
	H_AHBU	10	208	1	3.45	16.6	25	1-25 Amp	AX380
	H_AHDU	10	230	1	3.45	15.0	25	1-25 Amp	AX380
	H_AHFU	10	277	1	3.45	12.4	20	1-20 Amp	AX380
	H_AHLU	10	380	1	3.45	9.1	15	1-15 Amp	AX600
	H_AHQU	10	415	1	3.45	8.3	15	1-15 Amp	AX600
	H_AHMU	10	460	1	3.45	7.5	15	1-15 Amp	AX700
	H_AHNU	10	575	1	3.45	6.0	15	1-15 Amp	AX700
HSDH HTDH	H_DHBU	20	208	1	6.9	33.1	50	1-45 Amp	B380
	H_DHDU	20	230	1	6.9	29.9	45	1-40 Amp	B380
	H_DHFU	20	277	1	6.9	24.9	40	1-35 Amp	B380
	H_DHLU	20	380	1	6.9	18.1	30	1-30 Amp	B600
	H_DHQU	20	415	1	6.9	16.6	25	1-25 Amp	B600
	H_DHMU	20	460	1	6.9	15.0	25	1-25 Amp	B700
	H_DHNU	20	575	1	6.9	12.0	20	1-15 Amp	B700
	H_DHCU	20	208	3	6.9	19.1	30	1-25 Amp	B500
	H_DHEU	20	230	3	6.9	17.3	30	1-25 Amp	B500
	H_DHTU	20	380	3	6.9	10.4	20	1-20 Amp	B600
	H_DHWU	20	415	3	6.9	9.6	20	1-20 Amp	B600
	H_DHGU	20	460	3	6.9	8.6	15	1-15 Amp	B700
	H_DHHU	20	575	3	6.9	6.9	15	1-15 Amp	B700
	H_DHCU	30	208	3	10.3	28.7	45	1-40 Amp	B500
	H_DHEU	30	230	3	10.3	25.9	40	1-35 Amp	B500
	H_DHTU	30	380	3	10.3	15.6	25	1-25 Amp	B600
	H_DHWU	30	415	3	10.3	14.4	25	1-25 Amp	B600
	H_DHGU	30	460	3	10.3	13.0	20	1-20 Amp	B700
	H_DHHU	30	575	3	10.3	10.4	20	1-15 Amp	B700
HSGH HTGH	H_GHBU*	30	208	1	10.3	49.7*	80	2-35 Amp*	C62
	H_GHDU	30	230	1	10.3	44.9	70	1-60 Amp	C62
	H_GHFU	30	277	1	10.3	37.3	60	1-50 Amp	C62
	H_GHLU	30	380	1	10.3	27.2	45	1-40 Amp	C62
	H_GHQU	30	415	1	10.3	24.9	40	1-40 Amp	C62
	H_GHMU	30	460	1	10.3	22.5	35	1-30 Amp	C62
	H_GHNU	30	575	1	10.3	17.9	30	1-25 Amp	C62
	H_GHCU	40	208	3	13.8	38.3	60	1-60 Amp	C62
	H_GHEU	40	230	3	13.8	34.6	60	1-50 Amp	C62
	H_GHTU	40	380	3	13.8	20.9	35	1-35 Amp	C65
	H_GHWU	40	415	3	13.8	19.2	30	1-30 Amp	C65
	H_GHGU	40	460	3	13.8	17.3	30	1-25 Amp	C65
	H_GHHU	40	575	3	13.8	13.8	25	1-20 Amp	C65

	Model	Max Lb/Hr	Volt	Ph	kW	Line Amp	Disc. Size	Optional Cir. Breaker*	Steam Cylinder
HSGH HTGH	H_GHCU	50	208	3	17.2	47.8	80	2-35 Amp	C62
	H_GHEU	50	230	3	17.2	43.2	70	1-60 Amp	C62
	H_GHTU	50	380	3	17.2	26.2	40	1-40 Amp	C65
	H_GHWU	50	415	3	17.2	24.0	40	1-40 Amp	C65
	H_GHGU	50	460	3	17.2	21.6	35	1-30 Amp	C65
	H_GHHU	50	575	3	17.2	17.3	30	1-25 Amp	C65
	H_GHCU*	60	208	3	20.7	57.4*	90	2-40 Amp*	C62
	H_GHEU*	60	230	3	20.7	51.9*	80	2-40 Amp*	C62
	H_GHTU	60	380	3	20.7	31.4	50	1-50 Amp	C65
	H_GHWU	60	415	3	20.7	28.8	45	1-45 Amp	C65
	H_GHGU	60	460	3	20.7	26.0	40	1-40 Amp	C65
	H_GHHU	60	575	3	20.7	20.8	35	1-30 Amp	C65
	H_GHCU*	80	208	3	27.5	76.5*	125	2-60 Amp*	C62
	H_GHEU*	80	230	3	27.5	69.2*	110	2-50 Amp*	C62
	H_GHTU	80	380	3	27.5	41.9	70	1-60 Amp	C12
	H_GHWU	80	415	3	27.5	38.4	60	1-60 Amp	C12
	H_GHGU	80	460	3	27.5	34.6	60	1-50 Amp	C12
	H_GHHU	80	575	3	27.5	27.7	45	1-40 Amp	C12
	H_GHCU*	100	208	3	34.4	95.6*	150	2-60 Amp*	C62
	H_GHEU*	100	230	3	34.4	86.4*	150	2-60 Amp*	C62
	H_GHTU*	100	380	3	34.4	52.3*	110	2-50 Amp*	C12
	H_GHWU	100	415	3	34.4	47.9	80	2-40 Amp	C12
	H_GHGU	100	460	3	34.4	43.3	70	1-60 Amp	C12
	H_GHHU	100	575	3	34.4	34.6	60	1-50 Amp	C12
HSHH HTHH	H_HHCU*	125	208	3	43	119.5*	200	4-40 Amp*	C62 (2)
	H_HHEU*	125	230	3	43	108*	175	4-40 Amp*	C62 (2)
	H_HHTU*	125	380	3	43	65.3*	100	2-50 Amp*	C12 (2)
	H_HHWU*	125	415	3	43	59.8*	90	2-45 Amp*	C12 (2)
	H_HHGU*	125	460	3	43	54.0*	90	2-40 Amp*	C12 (2)
	H_HHHU	125	575	3	43	43.2	70	2-30 Amp	C12 (2)
	H_HHCU*	150	208	3	51.7	143.5*	225	4-50 Amp*	C62 (2)
	H_HHEU*	150	230	3	51.7	129.7*	200	4-50 Amp*	C62 (2)
	H_HHTU*	150	380	3	51.7	78.6*	125	2-60 Amp*	C12 (2)
	H_HHWU*	150	415	3	51.7	71.9*	110	2-60 Amp*	C12 (2)
	H_HHGU*	150	460	3	51.7	64.8*	100	2-50 Amp*	C12 (2)
	H_HHHU*	150	575	3	51.7	51.9*	80	2-35 Amp*	C12 (2)
	H_HHCU*	175	208	3	60.3	167.3*	300	4-60 Amp*	C62 (2)
	H_HHEU*	175	230	3	60.3	151.3*	250	4-60 Amp*	C62 (2)
	H_HHTU*	175	380	3	60.3	91.6*	150	4-35 Amp*	C12 (2)
	H_HHWU*	175	415	3	60.3	83.9*	150	2-60 Amp*	C12 (2)
	H_HHGU*	175	460	3	60.3	75.6*	125	2-60 Amp*	C12 (2)
	H_HHHU*	175	575	3	60.3	60.5*	100	2-50 Amp*	C12 (2)
	H_HHCU*	200	208	3	68.9	191.2*	300	4-60 Amp*	C62 (2)
	H_HHEU*	200	230	3	68.9	172.9*	300	4-60 Amp*	C62 (2)
	H_HHTU*	200	380	3	68.9	104.7*	175	4-40 Amp*	C12 (2)
	H_HHWU*	200	415	3	68.9	95.9*	150	4-35 Amp*	C12 (2)
	H_HHGU*	200	460	3	68.9	86.4*	150	2-60 Amp*	C12 (2)
	H_HHHU*	200	575	3	68.9	69.2*	110	2-50 Amp*	C12 (2)

*** = Circuit Breaker is REQUIRED per NEC 48 amp guidelines.**

True Touchscreen Control Display

FRONT PANEL DISPLAYS & CONTROLS

The display on the front panel of the humidifier cabinet contains the “On-Off-Drain” switch, the LCD True Touchscreen display and the “Fill”, “Drain” and “High Water” LED’s.

“ON-OFF-DRAIN” SWITCH

In the “On” position the humidifier will operate if all controls are calling for humidity. The “Off” position is used for seasonal shut down if desired. The “Drain” position is used to drain water from the steam cylinder for maintenance. The fill solenoid valve will be on whenever the drain is activated to reduce the drain water temperature.

LCD TRUE TOUCHSCREEN DISPLAY

The LCD True Touchscreen display offers a user friendly interface to control and monitor many aspects of the humidifier. The screen uses pressure sensitive technology. Depressing on the labeled buttons on the designated area of the screen will allow you to navigate through the different menu pages.

HOME SCREEN

The “Home Screen” page is the main screen through which most other pages can be accessed. The “Home Screen” displays the current steam output in Lb./Hr. (or Kg/Hr., selected in “Settings”). The main “Home Screen” features four navigation buttons, Carnes logo (providing contact information to the factory and the company website), Steam Menu, Menu and Settings. The “Home Screen” will also display a “Service Required” indicator when a current service issue is indicated. The “Service Required” and Steam Output number will illuminate in red. Tap on “Service Required” to access the service required page which indicates what service issue is being detected.

“SERVICE REQUIRED” PAGE

The “Service Required” page outlines any service issues that are in need of being resolved. Many issues can be traced back to variability in water parameters, and often the solution can be dealt with through the changing of cylinders or modifying timer values within the “Settings” page. This page is used to alert the user and direct them on the right path towards resolution.

When CarnesLink is being used, the “Back End Override” indicator is displayed only when the connected building management system requests the unit to be set to “off” or “drain” while the unit is “on”. When selected more information is provided about the override.

“FILL” LED

The FILL LED is a blue light illuminated when the Fill Valve is activated. An activated Fill Valve allows water to flow into the cylinder of the humidifier. An analogous indicator, and a description of its operation, is offered in the "Menu" screen under “Component Activity”.

“DRAIN” LED

The DRAIN LED is a red light illuminated when the Drain Valve is activated. An activated Drain Valve allows water to drain from the humidifier. An analogous indicator, and a description of its operation, is offered in the "Menu" screen under “Component Activity”.

“HIGH WATER” LED

The HIGH WATER LED is an orange light illuminated when the High Water Sensor is activated. An activated High Water Sensor indicates that the water has risen to the maximum allowable level in the cylinder. An analogous indicator, and a description of its operation, is offered in the "Menu" screen under “Component Activity”. More information on troubleshooting High Water situations can also be found under the “Help” button, on the "Menu" screen.

"CARNES®" LOGO

The Carnes logo on the “Home Screen” will take you to a page that displays the Carnes Company contact information (address, phone number and company website). This feature is for the purpose of contacting the factory for any startup questions, troubleshooting, or service issues that may arise.

“STEAM” MENU

The “Steam Menu” page will display the status of the four basic controls (Control Humidistat, High Limit Humidistat, Air Flow Switch, and Door Interlock). The humidifier will only produce steam when the unit is switched into the “ON” position and if all four controls are satisfied.

MENU

The “Menu” page displays four features: setpoint, component activity, dim LCD and help. Tapping any of these buttons will show dialog explaining the subject or status of that button and display pictures.

1. "**SETPOINTS**" - The Setpoints page displays the Setpoints (the target steam output of the humidifier) associated with the unit. There are three different Setpoints (max setpoint, controlled setpoint, reduced setpoint) but only one Setpoint is active at the right, and an indicator that represents its status.
2. "**COMPONENT ACTIVITY**" - The Component Activity page lists all internal components that can switch on and off during operation. This includes the Fill Valve, Drain Valve, Contactor, High Water Sensor, and Board Communication.
3. "**DIM LCD**" - This feature will toggle the LCD screen to dim and turn off to save on the longevity of the screen. It also has an auto-dim feature that will turn off the screen after 15 minutes of none use in the "Setting" menu.
4. "**HELP MENU**" - The "Help" pages consists of buttons labeled with questions. When a button is pressed, information will be given answering and/or giving information about the subject in question. A basic help page consists of text and/or diagrams to help the user through basic problems.

“SETTINGS” MENU

The “Settings” menu has pages where all operational values can be set. It is password protected by default.

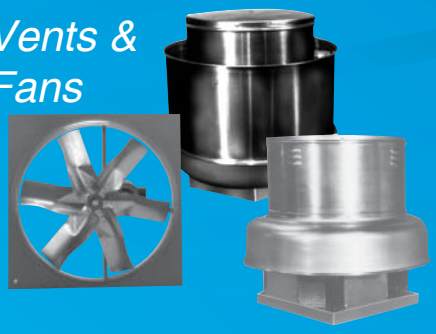
1. **Max Output Adjust** - The maximum steam output of the unit can be set on this page. The maximum output can be adjusted lower from the nominal output value of the unit (set at factory).
2. **Cylinder Life Counter** - This page consists of a counter where the user can monitor the life, in hours, of the cylinder.
3. **Fan Speed Adjust** - This page consists of a slider bar that can change the speed of the fans when the humidifier is connected to an optional blower box.
4. **Setpoint Timeout** - This page is where the Setpoint Timeout value is set. The maximum amount of time allowed for the unit to reach Setpoint during a fill sequence is designated by the Setpoint Timeout.
5. **High Water Timeout** - This page is where the High Water Timeout value is set. This is the maximum amount of time allowed for the unit to run in a “Reduced Setpoint” mode.
6. **Boil Down Timer** - This page is where the Boil Down Timer is set. Setting the Boil Down Timer higher or lower will adjust the water level in the cylinder.
7. **Settings Password** - This page is where the password for the settings menu can be changed or disabled. If the password for the Settings menu is forgotten, it can be reset at the circuit board.
8. **Calibration Password** - This page is where the humidifier unit code, a four digit number identifying the humidifier, is programmed into the unit.
9. **Corrective Drain Length** - This page is where the Corrective Drain Length is set. This value represents how much water should be drained from the cylinder when the humidifier senses a corrective drain is needed.
10. **On/Off Setting Buttons** - There are a few operational options that do not need separate pages, and therefore are only enabled/disabled via the ON/OFF Buttons. They are:
    A. **Drain Valve Pulse**
    B. **72-Hour Drain**
    C. **LCD Auto-Dim**
    D. **Steam Output Units**

CARNESLINK COMMUNICATION PROTOCOL SETUP

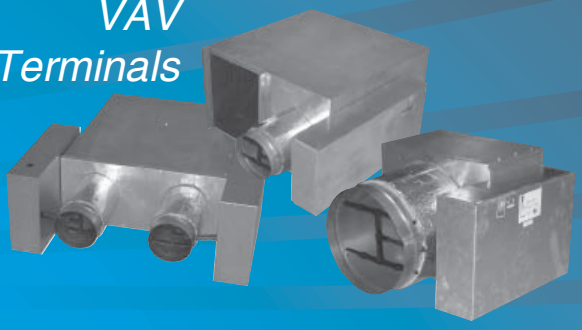
This page is where you can select and setup the communication protocol you will be using with your Building Management System (BMS) for full external monitoring capabilities.

Quality Built Products Since 1939

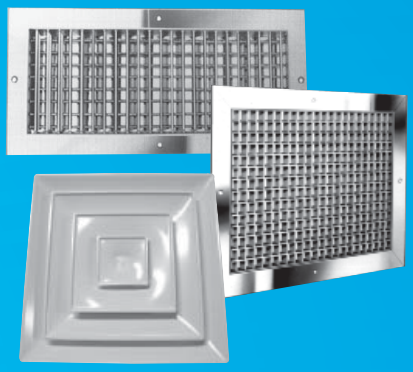
Vents & Fans



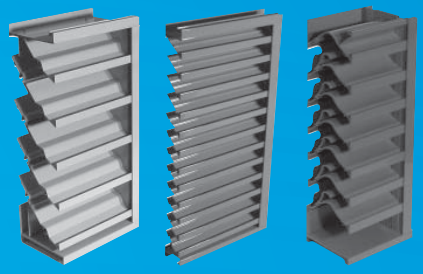
VAV Terminals



Registers, Grilles & Diffusers



Louvers & Penthouses



Energy Recovery

Fire & Smoke Dampers

Humidifiers

AMCA INTERNATIONAL MEMBER

AHRI CERTIFIED www.ahridirectory.org VAV Terminals AHRI Standard 880

INTERTEK ETL LISTED C US

UL

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