

NAC

Air curtain
catalog 1.2.1





NAC

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NAC

Description and benefits

The NAC air curtain acts as a thermal barrier, considerably reducing energy costs while increasing the comfort level.

The NAD Klima NAC air curtain is used primarily in industrial areas, warehouses as well as distribution and transshipment centers.

The air curtain is installed either horizontally or vertically depending on the garage door size or installation conditions.

Installation of the NAC air curtain ensures that hot or cool air is kept in the premises, regardless of the frequency or duration of time that the doors are opened.



Benefits

- Energy savings
- Low electricity consumption
- Promotes a more comfortable work environment
- Prevents the loss of hot or cold air
- Prevents the formation of ice close to the doors
- Controls the infiltration of dust and insects
- Easy to install and adaptable to all garage door structure
- Compact and lightweight

Areas of application

- Warehouses
- Loading docks (NAC - S)
- Industrial areas
- New or existing buildings
- Distribution centers
- Automobile dealers
- Shipping companies
- Exhibition Centers
- All buildings with garage doors



NAC - S



Certification
ANSI/UL Std. 507
CAN/CSA Std. C22.2 No. 113

Configuration

NAC - H / V

The NAC air curtain is made of aluminum frame and steel panels.

Fans are integrated into the steel panels. Nozzles and nozzle plates are made of aluminum.

The nozzles plate are slightly inclined towards the door, depending on the height of the door, in order to optimise the efficiency of the system.

Small nozzles are inserted between the large nozzles to eliminate the exfiltration of hot air to outdoors.

Powerful fans recirculate ambient air, propelling it through large and small nozzles. The air jets form a thermal barrier covering the entire surface of the door.

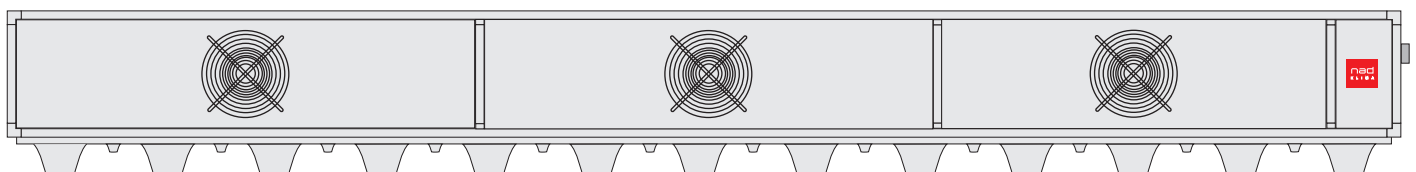
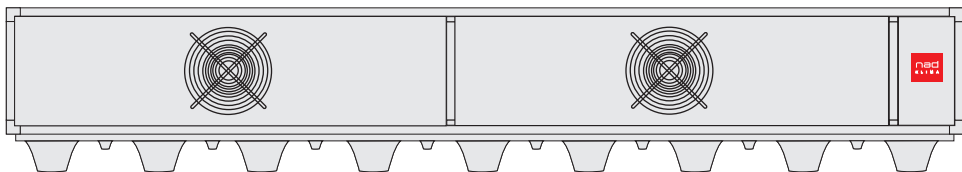
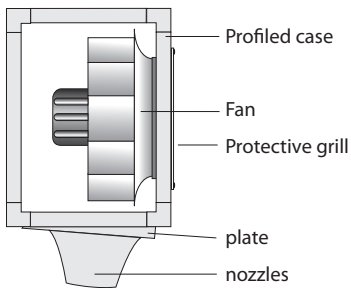
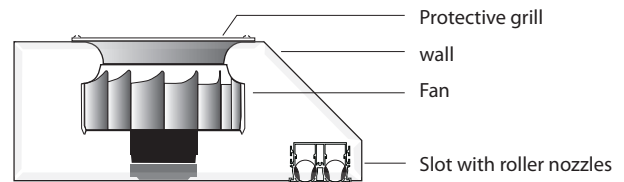
Built to the client's needs and to meet the occupied area's specifications, the NAC - H and NAC - V air curtain is available for doors from 8 to 24 feet (2.5 to 7.3 m) wide with openings up to 10 to 30 feet (3.5 to 9 m) in high.

NAC - S

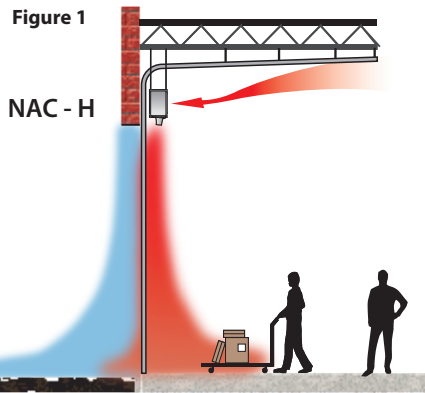
The NAC - S air curtain was especially developed and produced for loading doors of 2.5 m (8ft) wide by 2.5 and 2.75 m (8 and 9 ft) high.

The NAC - S air curtain is fabricated with steel panels with slots for nozzle rollers.

The low level noise fans recirculate the ambient air, propelling it through the nozzle rollers.



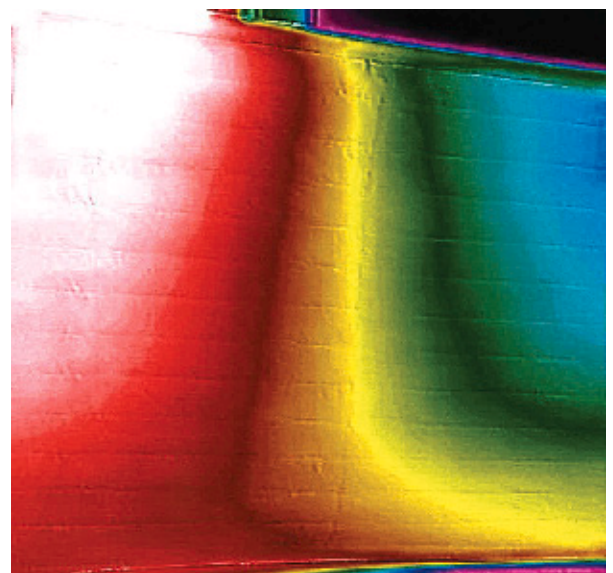
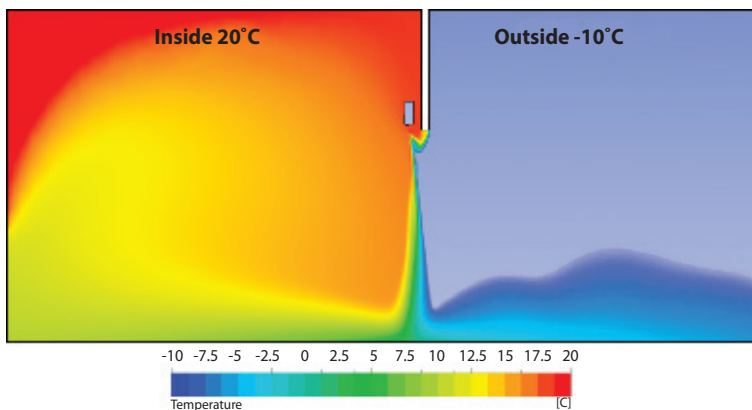
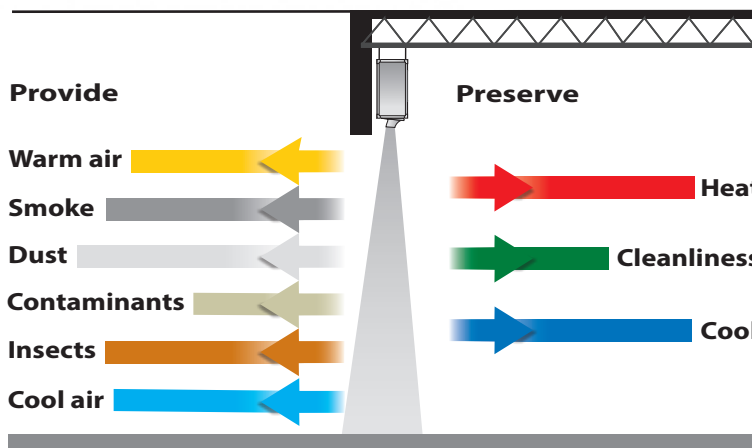
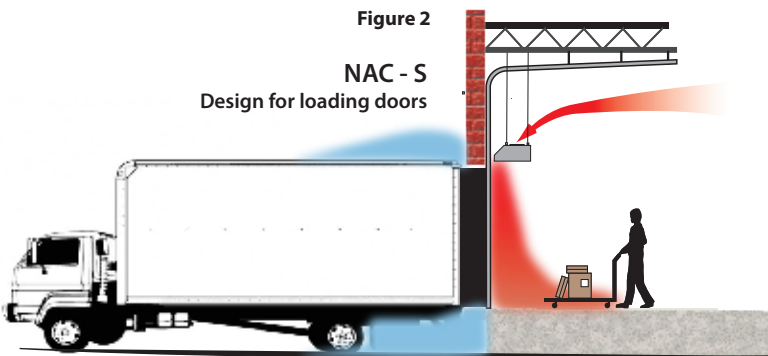
Mode of operation



The NAC air curtain projects air through conical nozzles in the case of the NAC - H and V (figure 1) and through nozzle roller slots for the NAC - S (figure 2). This creates a thermal barrier covering the entire surface of the door without obstructing the working area.

NAC air curtain operate without internal heating and consume very little electricity, in addition to maintaining interior comfort.

Their performance allows a reduction in heat exchange of up to 90%.



Thermal photography of the NAC - S air curtain's thermal barrier.

- Air curtain with 4 fans
- Door dimensions:
3.66 m x 4.25 m (12 ft x 14 ft)



NAC

Selection table

NAC - S horizontal air curtain with vertical flow for 8 feet (2.4 m) wide door

Door width - ft (m)		8 (2.4)	Height ft (m)
Air flow	(cfm)	2700	8 to 9 (2.4 to 2.8)
Number of fans	(-)	3	
Motor voltage	(V)	115	
Number of phases	(~)	1	
Power / motor	(kW)	0.51	
Current / motor	(A)	4.3	
Current total	(A)	12.9	
Weight	(kg/lb)	63 / 140	

NAC - H horizontal air curtain with vertical flow

Door width - ft (m)		10 (3.05)			12 (3.66)			Height ft (m)
Air flow	(cfm)	3200			4000			10 (3.05)
Number of fans	(-)	3			3			
Motor voltage	(V)	115	230	575	115	230	575	
Number of phases	(~)	1	1	3	1	1	3	
Power / motor	(kW)	1.1	1.1	1.1	1.1	1.1	1.1	
Current / motor	(A)	9.4	4.7	1.28	9.4	4.7	1.28	
Current total	(A)	28.2	14.1	3.84	28.2	14.1	3.84	
Weight	(kg/lb)	130 / 290			140 / 310			

NAC - V vertical air curtain with horizontal flow

For vertical installation of the air curtain with a horizontal flow, data will be available upon request.

* For the doors more than 5.5 m (18 ft) wide and 5 m (16 ft) height and under, the air curtain will be supplied in two modules of NAC - H and requires assembly by the installer. See the installation guide.

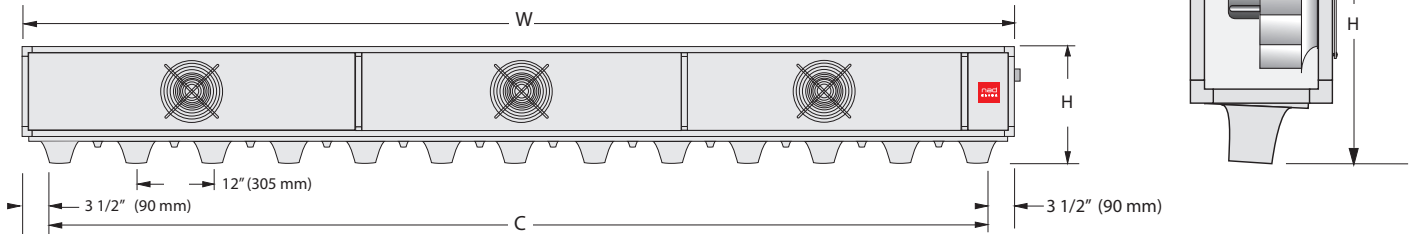
Door width - ft (m)		12 (3.66)		14 (4.3)		16 (4.9)		18 (5.5)		20 (6.1)*		22 (6.7)*		24 (7.3)*		Height ft (m)
Air flow	(cfm)	5200		5400		6400		-	-	-	-	-	-	-	-	12 (3.66)
Number of fans	(-)	4		4		5		-	-	-	-	-	-	-	-	
Motor voltage	(V)	230	575	230	575	230	575	-	-	-	-	-	-	-	-	
Number of phases	(~)	3	3	3	3	3	3	-	-	-	-	-	-	-	-	
Power / motor	(kW)	1.1	1.1	1.1	1.1	1.1	1.1	-	-	-	-	-	-	-	-	
Current / motor	(A)	2.8	1.28	2.8	1.28	2.8	1.28	-	-	-	-	-	-	-	-	
Current total	(A)	11.2	5.1	11.2	5.1	14	6.4	-	-	-	-	-	-	-	-	
Weight	(kg/lb)	150 / 330		165 / 370		195 / 430		-	-	-	-	-	-	-	-	
Airflow	(cfm)	5200		6300		6700		6900		7600		-	-	-	-	14 (4.3)
Number of fans	(-)	4		5		6		6		7		-	-	-	-	
Motor voltage	(V)	230	575	230	575	230	575	230	575	230	575	-	-	-	-	
Number of phases	(~)	3	3	3	3	3	3	3	3	3	3	-	-	-	-	
Power / motor	(kW)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	-	-	-	-	
Current / motor	(A)	2.8	1.28	2.8	1.28	2.8	1.28	2.8	1.28	2.8	1.28	-	-	-	-	
Current total	(A)	11.2	5.1	14	6.4	16.8	7.7	16.8	7.7	19.6	9	-	-	-	-	
Weight	(kg/lb)	150 / 330		185 / 410		210 / 460		220/485		245/540		-	-	-	-	
Air flow	(cfm)	5600		6300		6700		7600		8000		8800		9600		16 (4.9)
Number of fans	(-)	5		5		6		7		8		9		10		
Motor voltage	9V)	230	575	230	575	230	575	230	575	230	575	230	575	230	575	
Number of phases	(~)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
Power / motor	(kW)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
Current / motor	(A)	2.8	1.28	2.8	1.28	2.8	1.28	2.8	1.28	2.8	1.28	2.8	1.28	2.8	1.28	
Current total	(A)	14	6.4	14	6.4	16.8	7.7	19.6	9	22.4	10.2	25.2	11.5	28	12.8	
Weight	(kg/lb)	170 / 375		185 / 410		210 / 460		235 / 520		270 / 595		295 / 650		315 / 690		

Dimensions and installation

Dimensions of horizontal air curtain with vertical air jet

Door width (C)	ft (m)	10 (3)	12 (3.7)	14 (4.3)	16 (5)	18 (5.5)
Curtain width (W)	ft (m)	10'-7" (3.23)	12'-7" (3.84)	14'-7" (4.45)	16'-7" (5.05)	18'-7" (5.66)

H	21 3/4 in (553 mm)
E	11 7/8 in (301 mm)



NAC - H - Horizontal installation

The NAC air curtain is installed below the door rails, as shown in figures A and B. The installation does not interfere with the opening or closing of the door.

Ideally, the air curtain should be installed so the nozzles are leveled with the opening of the door (figures A, B and C). In the case where the clearance necessary is insufficient, the air curtain should be installed at a height lower than the opening.

The door will have to be adjusted so it does not open higher than the nozzles (figure C). An evaluation of feasibility will have to be done.

The NAC air curtain is suspended at the four corners by threaded rods (not supplied) to the outside of the door frame. Threaded inserts (3/8" - 9.5 mm) are provided for this purpose located in the frame of the air curtain.

NAC - V - Vertical installation

In the case of vertical installation of the air curtain, a floor mounting bracket is provided (figures E and F).

Threaded inserts are provided on the air curtain for attachment to the bracket.

Figure E

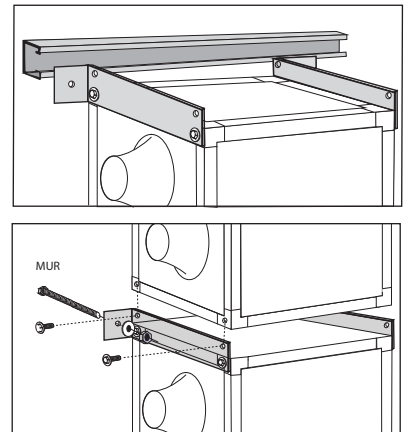


Figure F

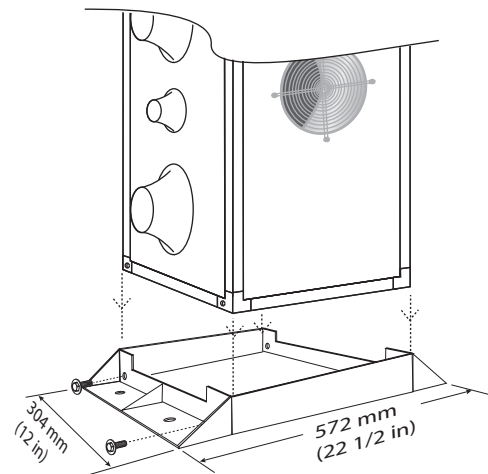


Figure A - Installation under the rails

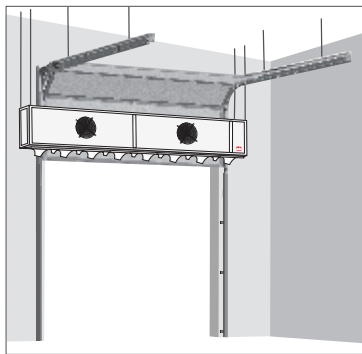


Figure B

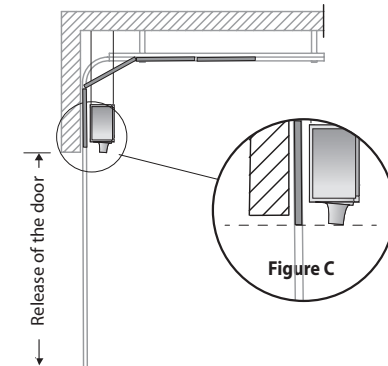
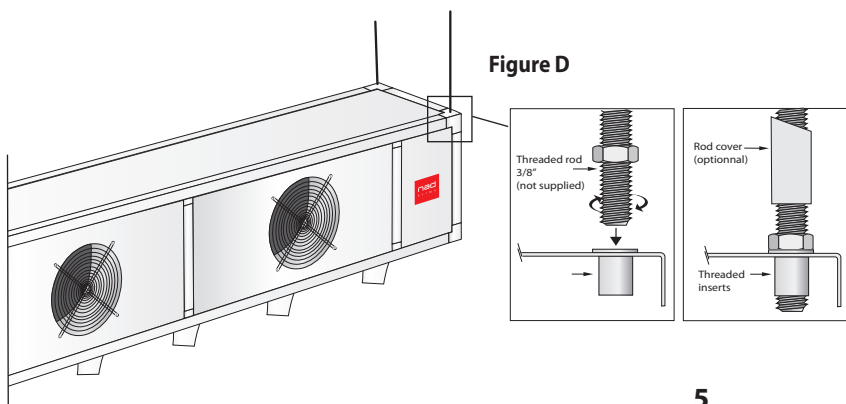


Figure D





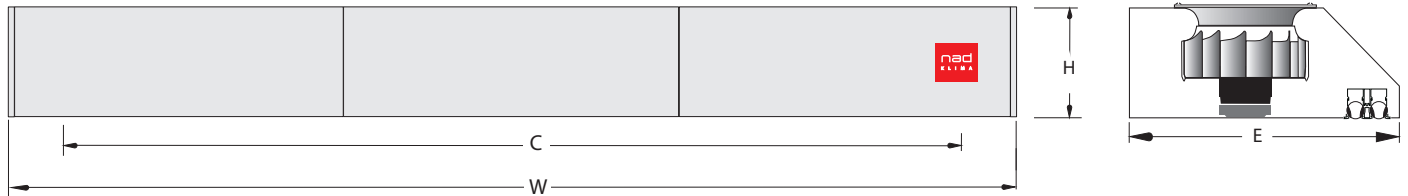
NAC

Dimensions and installation

NAC - S

Dimensions - NAC - S - horizontal with vertical flow

Door width (C) ft (m)	8 (2.4)	H	8 1/8 in (208 mm)
Curtain width (W) ft (m)	9 (2.75)	E	20 3/8 in (518 mm)



NAC - S - Assembly and disassembly

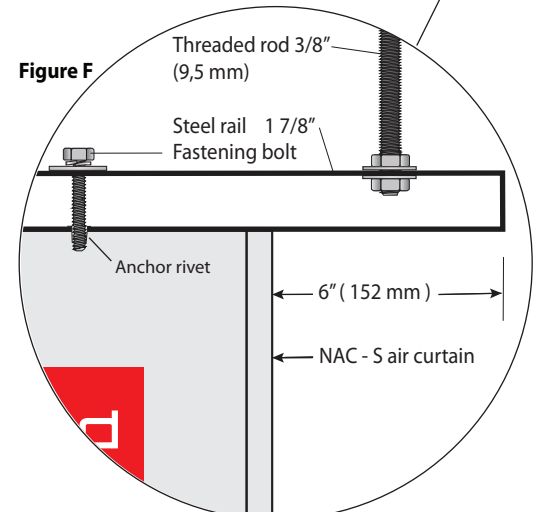
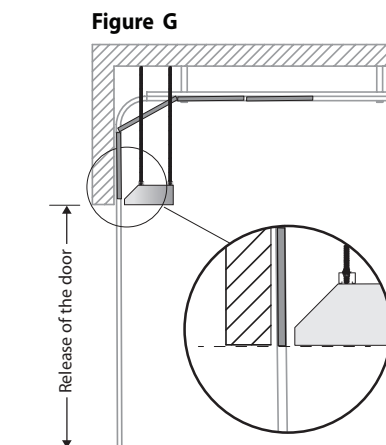
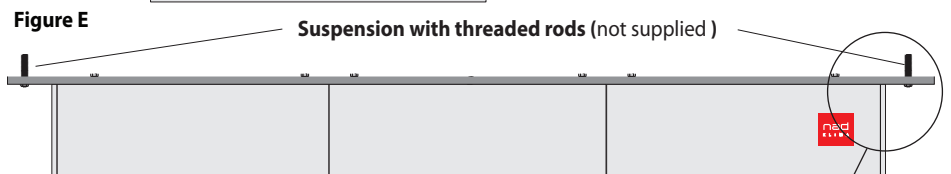
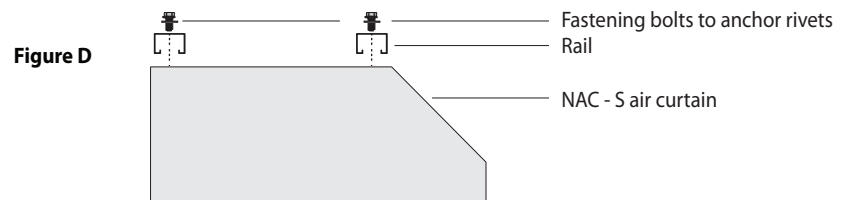
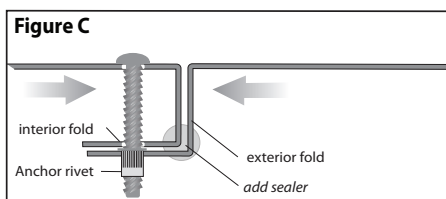
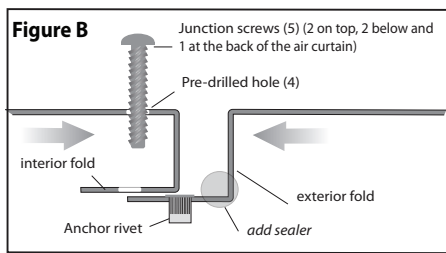
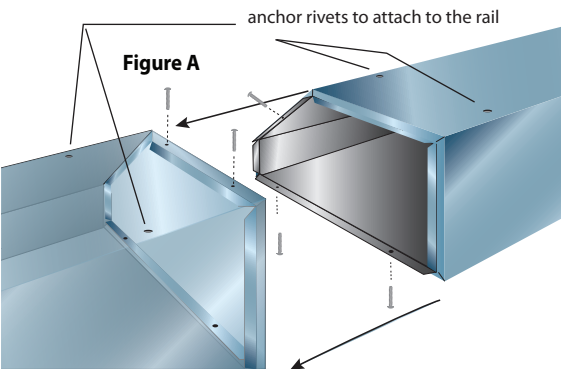
The three sections of the NAC - S air curtain are assembled by the manufacturer. The sections are secured with five (5) screws (figure A). It is very simple to remove one section for maintenance and repair. (figures B and C)

A bead of silicone placed inside the projection prior to the assembly will insure an airtight seal.

NAC - S - Installation horizontale

In order to ensure the installation is secure, the NAC - S air curtains are suspended on a system of rails which are attached to the air curtain with 3/8 in (9.5 mm) bolts at both ends and at the junction of each unit (figures D, E et F). The air curtain is installed underneath the door rails, the base must be at the same height as the clearance for the door as illustrated in figure G. Make sure the installation does not interfere with the opening and closing of the door.

The Air curtain is suspended using threaded rods (not included) attached to the protruding part of the rail fixed to the air curtain and outside the door rails. (Figure F)



Control system

Control panel

The NAC air curtain is operated by a control panel. The panel is supplied by NAD Klima and has a selector switch with the options "MAN- OFF - AUTO". When it is set to "Manual" mode, the air curtain will start and will only shut down when set to "OFF".

When set to "AUTO" mode, the air curtain starts automatically when the opening of the door is detected. An indicator light comes on when the curtain is on. When the door is closed, the switch stops the air curtain. The electrical connection of the air curtain to the control panel is made using a Multipole Connectors model plug. See page 10 of the installation guide.

Automatic control System

The switch is compatible with most types of doors, for a virtually universal installation. It is composed of two parts; the switch and the trigger magnet.

Select the most appropriate location

- Ensure there are no objects which could interfere with the operation of the system.
- Place the magnet in an area where it cannot be used as a handle for opening or closing the door.

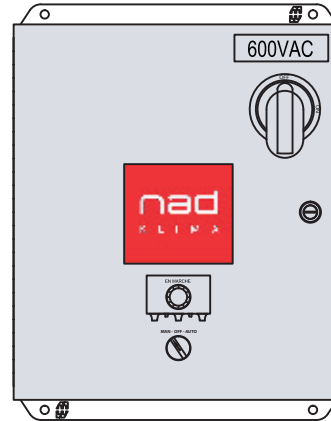
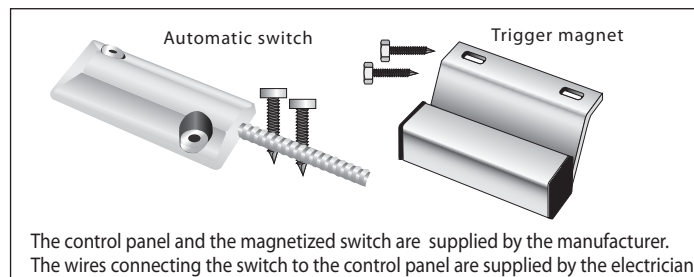
Install the switch

- A) Install the switch on the wall above the door.
It is important to choose a place where no objects will affect the proper operation of the switch.

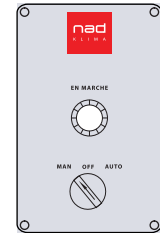
Install the trigger magnet

- B) Install the magnet at a maximum of 3 inches (75 mm) from the switch.
Fix solidly to the door with the two screws supplied. The magnet can be fixed in different ways to the door.

- C) Connect the wires to the switch from the control panel and verify that the switch functions correctly.



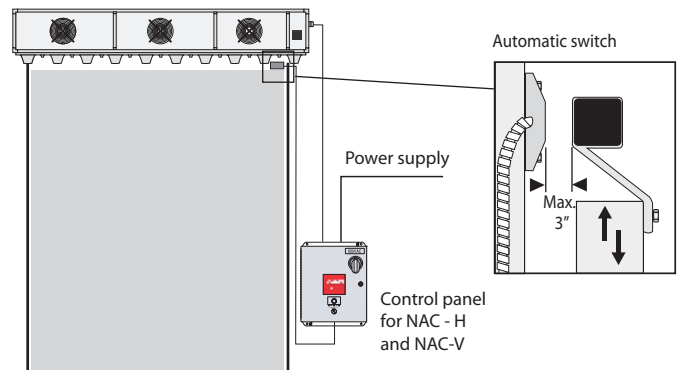
Control panel for NAC - H and NAC - V



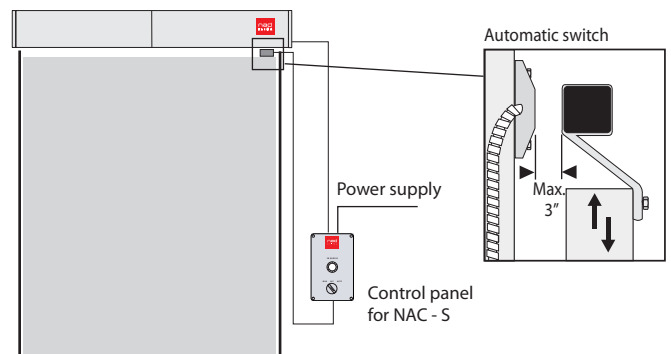
Control panel for NAC - S

Wiring diagram

NAC - H



NAC - S



Energy savings and return on investment

1. Data

Province	Québec
Région	Eastern Townships
Exterior temperature in winter	-15°C (5° F)
Interior temperature in winter	22°C (72° F)

2. Building Features

Door width	3.7 m (12 ft)
Door height	4.3 m (14 ft)
Annual natural gas consumption	20000 m ³
Cost of natural gas	0.44 \$/m ³

3. Air curtain features

Numbers of fans (motors)	4
Voltage	575 VAC
Total forced air flow	5200 cfm
Air curtain cost	10 000 \$
Operating hours per day	2 hours
Days per week	5 days
Weeks per year	28 weeks
Total operating hours/year	225 h/year

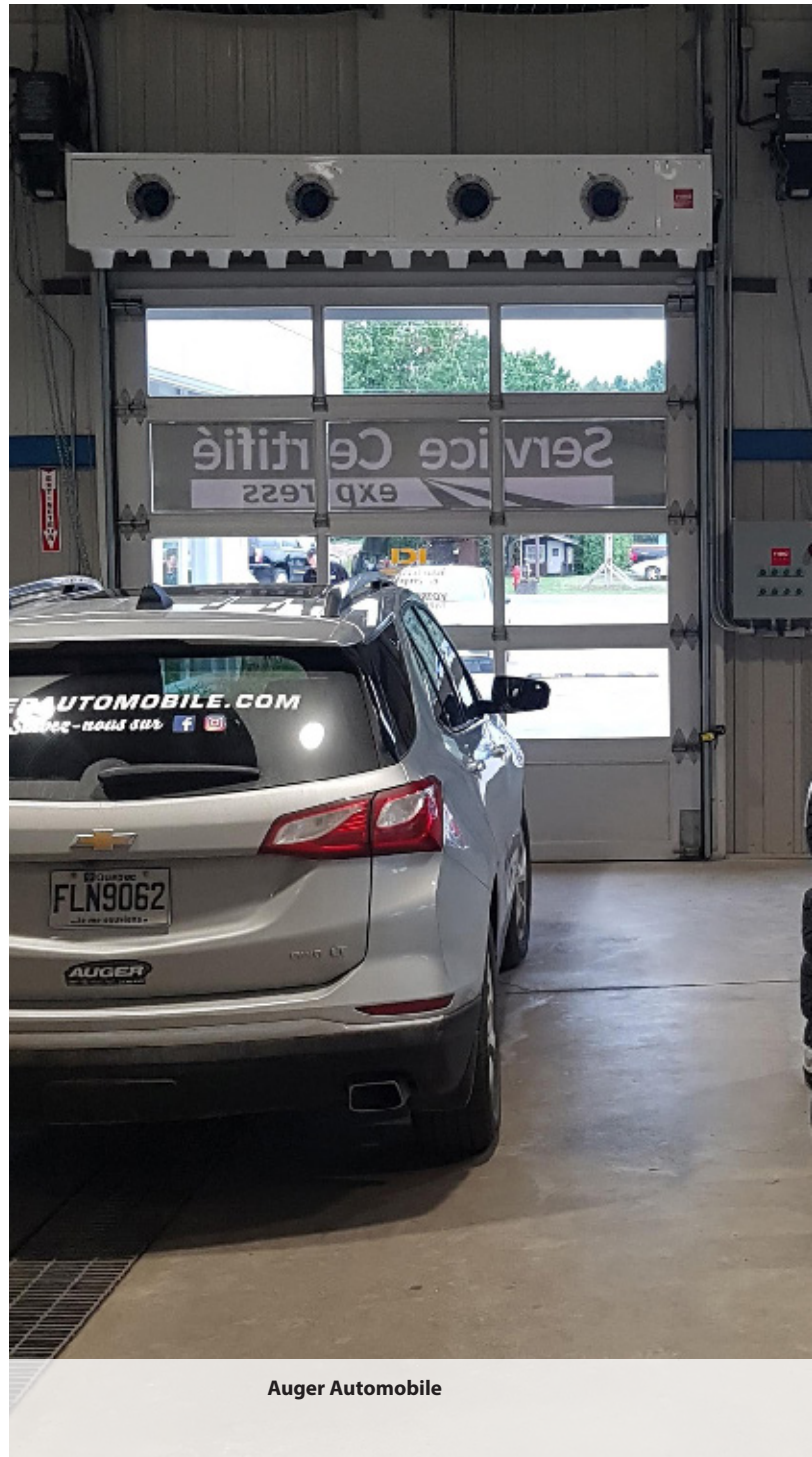
4. Results

Consumption without air curtain	20000 m ³
Consumption with air curtain *	9693 m ³
Annual quantity saved	10307 m ³

5. Annual savings

Annual savings	4535 \$
Payback period (PRI)	2.2 years
Énergir subsidy	3092 \$
Subvention / Air curtain cost	30%

* Results Based on the calculator developed by Énergir.



Auger Automobile



NAC

Specifications

1. Description and physical characteristics

NAC - H and NAC - V

- 1.1 The air curtain shall be made of aluminum and steel.
- 1.2 The nozzles shall be slightly slanted towards the door. The nozzles' incline and configuration shall be adapted to the door's dimensions.
- 1.3 The fans shall be offered in 115 or 230 volt single-phase current, and 230 or 575 volt three-phase current.
- 1.4 The air curtains must have an indicator light confirming the operation of each fan.
- 1.5 The air curtain shall be painted with a TGIC-free polyester powder coat. It shall have a smooth surface for easy cleaning. The colour shall be chosen by the architect or the customer.
- 1.6 The air curtain shall be available for vertical or horizontal installation.

NAC - S

- 1.1 The air curtain shall be made of steel.
- 1.2 The roller nozzles shall be placed near the door. The roller nozzles shall be adapted to the door's dimensions.
- 1.3 The fans shall be offered in 115 volt single-phase current.
- 1.4 The air curtains must have an indicator light confirming the operation of three fans.
- 1.5 The air curtain shall be painted with a TGIC-free polyester powder coat. It shall have a smooth surface for easy cleaning. The standard colour is white (RAL 9003). Other colours, according RAL chart, chosen by the architect or the customer are optional.

2. Performances

- 2.1 The air curtain shall provide a thermal wall allowing for energy savings of up to 90%.
- 2.2 The air jets shall reach the floor over the entire width of the air curtain with velocities superior to 500 ft/min for NAC - H and NAC - V and to 450 ft/min for NAC - S.
- 2.3 The fans shall have a factor of protection (norm IP) against foreign object intrusion (minimum 5) and (minimum 4) IP54 water resistance.
- 2.4 The air curtain shall have an indicator light to confirm the operation of each of the fans.
- 2.5 Each fan shall be equipped with an internal thermal protection and a protection against surcharges.

3. Control

- 3.1 The air curtain shall be equipped with a magnetized switch (automatic opening/closing of the door) supplied by the manufacturer.
- 3.2 The control panel shall be equipped with a selection switch for manual, automatic or stop modes.
- 3.3 Optionally, the air curtain shall be available with a variable speed drive.

4. Accreditation

The air curtain shall be approved according to the CSA C22.2 No113 Fans and Ventilators, or ANSI/UL according to UL 507 Standard for Safety Electric Fans.

5. **Quality required: NAD Klima air curtain NAC - H**
Quality required: NAD Klima air curtain NAC - V
Quality required: NAD Klima air curtain NAC - S

Codification

NAC	Product
<p>S = Horizontal air curtain for 8 ft (2.4 m) wide door (loading door) H = Horizontal air curtain with vertical air discharge for 10 ft (3 m) wide and more doors V = Vertical air curtain with horizontal air discharge for 10 ft (3 m) wide and more doors</p>	Installation
<p>08 (2.4), 09 (2.75), 10 (3), 12 (3.66), 14 (4.3), 16 (5), 18* (5.5), 20* (6), 22* (6.7), 24* (7.3) * supplied in two modules</p>	Door width: ft (m)
<p>08 (2.4), 09 (2.75), 10 (3), 12 (3.66), 14 (4.3), 16 (5), 18* (5.5), 20* (6), 22* (6.7), 24* (7.3), 26* (7.9), 28* (8.5), 30* (9.1) * supplied in two modules or more on vertical installation</p>	Door height: ft (m)
<p>1151 = 115/120 1~ 2301 = 208/230 1~ (on request only for NAC-S) 2303 = 208/230 3~ (not available for NAC - S) 6003 = 575/600 3~ (not available for NAC - S)</p>	Motor voltage
<p>D = With fan drive and rheostat X = Without fan drive</p>	Fan drive
<p>9003 = White Standard ____ = RAL color (indicate RAL color number)</p>	Color
<p>X = Without support S = With support (for a vertical installation)</p>	Vertical installation
NAC - S - 08 - 08 - 1151 - X - 9003 - X	Example



Vaillancourt doors and windows, St-Germain de Grantham.



NAC



Girardin bus, Drummondville, Canada



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