## חea

## RRA

Duct diffuser
catalog 1.1.4



Borealis, Magog, Canada

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RRA

## Presentation and benefits

The RRA is a high induction diffuser made to address the ventilation needs of spaces with low and medium heights.

The RRA diffuser is made of galvanneal steel covered with powder coated paint. The standard manufacture size is 1500 mm (59 in) long. Alternatively, it is available in different lengths to meet your needs.

It is ideal for applications where the technology must be not only efficient but also integrated into the architectural design. With integrated eccentric rollers and/or nozzle rollers, the circular RRA diffuser offers a multitude of air direction choices.

All air conditioning and heating solutions are found in one application, which combines technology, aesthetics and comfort.

## Benefits

- High induction diffuser which allows homogeny of the air in a room: the temperature, humidity and density
- Increased comfort in the occupied zone
- Comfortable movement of air
- Low temperature differences
- Low noise
- Eccentric rollers allow an adjustment of the airflow in a $180^{\circ}$ range
- Possibility to change the direction of air flow after installation
- Possibility of reducing the total airflow up to 30 \% in V.A.V.
- Possibility to eliminating the heating baseboard through heating by the diffuser
- Simplifies the ventilation network and reduces installation costs
- Easy adaption to systems with variable or constant airflow


## Easy to maintain

- Powder coated paint which minimizes dust collection and makes it easy to clean
- Low accumulation in the interior because dust is purged by the slots.


## Durability

- The powder coated paint prevents chipping
- Sealed with PVC joint to prevent leakage and seal degradation
- Aluminum suspension rail and duct in galvanneal metal covered with a powder coated paint


## Easy installation

- Installed using a suspension rail
- No sealing required
- Fewer suspension rods and installation screws
- Buildings with apparent structure
- Public spaces

RRA

## Configuration and accessories

## Composition

The RRA in－duct diffuser is a smooth circular pipe on which the slots are mounted lengthwise．The number of slots is determined by the quantity of air flow and by the diameter of the duct．

The slots contain 100 mm long ABS eccentric rollers or ABS nozzle rollers （black，cream or white）．The eccentric rollers are provided with alphanumeric guides，which allow adjustment of the airflow pattern across a $180^{\circ}$ range．The RRA diffuser is constructed in diame－ ters from 200 mm up to 1419 mm ． Metallic reinforcements are installed on the interior of ducts wider than 433 mm to maintain circular integrity．

At each end，a receiving groove fitting integrated PVC gasket ensures a proper seal．

Passive ducts without slots are available in the same dimensions as the active RRAs in order to ensure the uniformity of the duct network．

## Assembly

The RRA diffuser sections are linked by connection sleeves which are adapted to the diameter of the duct．


## Active and passive ducts have small ends（male）



Accessories
big ends（female）



Centric reducer


Elbows have big ends（female）

$15^{\circ}$

$30^{\circ}$

$45^{\circ}$

$60^{\circ}$



## Accessories

All of the standard accessories（elbows， sleeves，reducers，multi－branch connectors，etc．）are available in the precise dimensions of the ducts．

For air balancing reasons，a reducer or a balancing damper is required between multiple sections．

Standard Sleeve（ 120 mm ）（No space between RRA） X $=0$


Special sleeve（space between RRA） X＝from 1 mm to 1380 mm


Bivelled end－cap with big end（female）


RRA

Mode of operation and direction of air flow

## Mode of operation

The eccentric rollers and nozzle rollers form, with the aluminum air guiding slots, an optimal flow of air. A drop in pressure occurs when approching the surface of the rollers. As the air leaves the slot, it is stable and generates a low level of acoustic power. The flow maintains a powerful induction of ambient air.
The positioning of the eccentric rollers allows for an air jet direction adjustment, with or without reduction in the exit area. The rollers have small plates to guide the air, which support a dense airflow and maintain that air flow direction perpendicular to the roller's axis.

## Setting of the air jet direction

Thanks to the shape of the eccentric rollers and adjustment dial with alphanumeric characters, the air jet's direction at the outlet of the diffuser can vary up to $180^{\circ}$. For each direction, there are two (2) roller positions ("reduced" or "not reduced"), as illustrated in figure E.

The length of each roller is 100 mm and they are individually adjustable. As a result, the combinations of airflow are almost infinite. In manufacturing, the ducts are individually adjusted for each project. The standard setting for the rollers is set to diffusion mode, in the positions " 21 " and " 65 " alternately. This setting produces strong induction, which can be used to meet heating and cooling needs, thereby creating high mixing levels. The nozzle rollers can only be set in the open and closed position.


As a result, the divergent mode allows jets to blow in more accurate directions. This mode also allows a longer projection of the airflow. In specific zones which are habitually difficult to cover, a specialized setting can be created. Figures $C$ and $D$ show the relationship between the position of the eccentric roller and the direction of the exiting airflow. Note that to maximize air projection, multiple jets can be orientated in the same direction to optimize the coverage of a zone, even when heating.


Figure E


## Nozzle roller




RRA with eccentric rollers and/or nozzles

Range of application

## Maximum installation space

|  | Air flow by meter of slot of RRA Vo | Installation height of of the RRA H | Recommended space between RRA X maximum |
| :---: | :---: | :---: | :---: |
|  | m ${ }^{\text {／h／m }}$（ $\mathbf{c f m} / \mathrm{li} . \mathrm{ft}$ ） | m（ft） | m（ft） |
| （6）蒌 | 50－100（9－19） | $\leq 3$（10） | 5 （16） |
| （6）＊＊ | 100－150（19－27） | 3－4．3（10－14） | 7 （22） |
| （6）＊＊ | 150－170（27－31） | 4．3－7（14－23） | 8 （26） |
| 挡 | Cooling only：keep the maximum distance $X$ depending on the height，but keep the airflow by meter of the slot at$50-120 \mathrm{~m}^{3} / \mathrm{h} / \mathrm{m} .$ |  |  |

## Aerodynamic balancing and reducer placement

 To optimize a uniform airflow in the RRA diffuser，the total length must not exceed $7.5 \mathrm{~m}(25 \mathrm{ft})$ without using a reducer or a balancing damper．For a diffuser greater than 7.5 meters（ 25 ft ），a reducer must be installed at the center（see 1）．Once there are more than $4.5 \mathrm{~m}(15 \mathrm{ft})$ of active ducts，it is recommended to install a register to balance the air（see 2）．


Selection of the diameter
For a flow lower than 1400 cfm， use the following table：

| Flow range | $\varnothing$ recommended |
| :---: | :---: |
| below 280 cfm | $200 \mathrm{~mm}(8 \mathrm{in})$ |
| 281 cfm to 460 cfm | $251 \mathrm{~mm}(10 \mathrm{in})$ |
| 461 cfm to 650 cfm | $303 \mathrm{~mm}(12 \mathrm{in})$ |
| 651 cfm to 1100 cfm | $353 \mathrm{~mm}(14 \mathrm{in})$ |
| 1101 cfm to 1400 cfm | $403 \mathrm{~mm}(16 \mathrm{in})$ |

For an airflow greater than 1400 cfm，
select a duct diameter（see diameters in the codification on page 18）for a maximum air speed of $1000 \mathrm{ft} / \mathrm{m}$ ．


Note ：The standard length of reducers is rounded to the next whole foot．
ex．： $\mathrm{L}=1.3 \mathrm{ft}$ ．will be ： $\mathrm{L}=2 \mathrm{ft}$ ．


RRA

For an installation height up to $4.3 \mathrm{~m}(14 \mathrm{ft})$


Important：
To make the selection of RRA，the total airflow must be calculated for a 1 m length of active slots．

Specifications：
Height at the bottom of the duct： $\mathrm{H}=4 \mathrm{~m}$

| Airflow by diffuser： | $\dot{\mathrm{V}} \mathrm{o}=420 \mathrm{~m}^{3} / \mathrm{h}$ |
| :--- | :--- |
| Cooling： | $\Delta \mathrm{T}=-10^{\circ} \mathrm{C}$ |
| Heating： | $\Delta \mathrm{T}=+10^{\circ} \mathrm{C}$ |
| Length of the RRA： | $L_{R}=1500 \mathrm{~mm}$ |

Length of the RRA：
$\mathrm{L}_{\mathrm{R}}=1500 \mathrm{~mm}$
Required：
1－Airflow per meter of slot section
2－Number of slots n
Solution：
1 －The length of RRA slot is determined by the following：
$L_{S}=L_{R}-200 \mathrm{~mm}=1300 \mathrm{~mm}$
We find the airflow by meter of slot section：
$\dot{\mathrm{V}}_{\mathrm{O}}\left(\mathrm{m}^{3} / \mathrm{hRRA}\right) \mathrm{XF}=\dot{\mathrm{V}}_{\mathrm{o}}\left(\mathrm{m}^{3} / \mathrm{h} / \mathrm{m}\right)$
$420\left(\mathrm{~m}^{3} / \mathrm{h}\right) \times 0.77=323\left(\mathrm{~m}^{3} / \mathrm{h} / \mathrm{m}\right)$（1）
2－Using the diagram＂Selecting the number of slots＂，for a height of 4 m and with a heating application， we find the number of slots： $\mathrm{n}=3$（2）

| Duct <br> diameter <br> $\varnothing$ <br> mm |  |
| :---: | :---: |
| in | Number <br> of slots <br> from <br> 1 to ．．． |
| $200-8$ | 3 |
| $251-10$ | 6 |
| $303-12$ | 6 |
| $353-14$ | 6 |
| $404-16$ | 8 |
| $454-18$ | 8 |
| $505-20$ | 14 |
| $556-22$ | 14 |
| $607-24$ | 14 |
| $657-26$ | 14 |
| $708-28$ | 14 |
| $759-30$ | 14 |
| $810-32$ | 14 |

## Selecting the number of slots RRA with eccentric rollers


－In the case where heating mode can not be selected with initial air flow，reduce the length $L$ s of the slot，in accordance with the air flow per meter of recommended slot．
－In critical acoustic environment，increase the number of slots．


Airflow conversion by meter of slot length
$\dot{V}_{0}\left(\mathrm{~m}^{3} / \mathrm{hRRA}\right) X F=\dot{V}_{0}\left(\mathrm{~m}^{3} / \mathrm{h} / \mathrm{m}\right)$
$\dot{V}_{\mathrm{O}}(\mathrm{pcm} / \mathrm{RRA}) X \mathrm{~F}=\dot{\mathrm{V}}_{\mathrm{o}}(\mathrm{cfm} / \mathrm{li} . \mathrm{ft})$

|  | Lenght of RRA $L_{R}$ | Lenght of slot $L_{S}$ |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1000 | （800） | （2．62） | 1.25 | （0．382） |
|  | 1100 | （900） | （2．95） | 1.11 | （0．339） |
|  | 1200 | （1000） | （3．28） | 1.00 | （0．305） |
| （1） | 1300 | （1100） | （3．60） | 0.91 | （0．278） |
|  | 1400 | （1200） | （3．94） | 0.83 | （0．254） |
| Standard | 1500 | （1300） | （4．27） | 0.77 | （0．235） |
|  | 1600 | （1400） | （4．60） | 0.71 | （0．217） |
|  | 1700 | （1500） | （4．92） | 0.67 | （0．203） |
|  | 1800 | （1600） | （5．25） | 0.63 | （0．190） |

R R A

## Selecting the number of slots RRA with noozle rollers



- In the case where heating mode can not be selected with initial air flow, reduce the length $L s$ of the slot in accordance with the air flow per meter of recommended slot.
- In critical acoustic environment, increase the number of slots.

For an installation height from $4.3 \mathrm{~m}(14 \mathrm{ft})$ to $7 \mathrm{~m}(30 \mathrm{ft})$

## Important:

To facilitate the selection of RRA, the total airflow should be calculated for active vents lengths of 1 m .

Specifications:
Height at the bottom of the duct: $\mathrm{H}=5 \mathrm{~m}$

| Airflow by diffuser: | $\grave{V o}_{0}=1040 \mathrm{~m}^{3} / \mathrm{h}$ |
| :--- | :--- |
| Heating: | $\Delta \mathrm{T}=+10^{\circ} \mathrm{C}$ |
| Length of the RRA: | $\mathrm{L}_{\mathrm{R}}=1500 \mathrm{~mm}$ |

Required:
1- Airflow per meter of slot section
2- Number of slots $n$

## Solution:

1- The RRA slot length is determined by the following: $L_{S}=L_{R}-200 \mathrm{~mm}=1300 \mathrm{~mm}$ The airflow is calculated by the number of slot section meters:
$\dot{\mathrm{V}}_{\mathrm{O}}\left(\mathrm{m}^{3} / \mathrm{h} R R \mathrm{~A}\right) \times \mathrm{F}=\dot{\mathrm{V}}_{\mathrm{o}}\left(\mathrm{m}^{3} / \mathrm{h} / \mathrm{m}\right)$ $1040\left(\mathrm{~m}^{3} / \mathrm{h}\right) \times 0.77=800\left(\mathrm{~m}^{3} / \mathrm{h} / \mathrm{m}\right)(1)$

2- From the diagram "Selecting the number of slots" and for a height of 5 m in heating application, we find the number of slots: $n=3$.(2)

Airflow conversion by meter of slot length
$\dot{V}_{0}\left(\mathrm{~m}^{3} / \mathrm{h} / \mathrm{mRRA}\right) \times F=\dot{\mathrm{V}}_{\mathrm{o}}\left(\mathrm{m}^{3} / \mathrm{h} / \mathrm{m}\right)$
$\dot{V}_{\mathrm{o}}(\mathrm{cfm} / R R A) \times F=\dot{V}_{\mathrm{o}}(\mathrm{cfm} / \mathrm{li} . \mathrm{ft})$


Air flow velocity diagram RRA with eccentric rollers




RRA

## Air flow velocity diagram RRA with nozzle rollers

For an installation height from $4.3 \mathrm{~m}(14 \mathrm{ft})$ to $9 \mathrm{~m}(30 \mathrm{ft})$


## Acoustic power diagrams

RRA with eccentric rollers

| Number of slots <br> n | $L_{\text {WA }}=L_{\text {WA Diagram }}+\Delta L_{\text {WA }}$ |  |  |
| :---: | :---: | :---: | :---: |
|  | $\begin{gathered} L_{R}=1000 \\ L_{S}=800 \\ \Delta L_{W A} \end{gathered}$ | $\begin{gathered} L_{R}=1500 \\ L_{S}=1300 \\ \Delta L_{W A} \end{gathered}$ | $\begin{gathered} \mathrm{L}_{R}=1700 \\ \mathrm{~L}_{S}=1500 \\ \Delta \mathrm{~L}_{\mathrm{WA}} \end{gathered}$ |
| 1 | 0.0 | 2.1 | 2.7 |
| 2 | 3.0 | 5.1 | 5.7 |
| 3 | 4.7 | 6.8 （10） | 7.5 |
| 4 | 6.0 | 8.1 | 8.8 |
| 5 | 7.0 | 9.1 | 9.7 |
| 6 | 7.8 | 9.8 | 10.5 |
| 7 | 8.4 | 10.5 | 11.2 |
| 8 | 9.0 | 11.1 | 11.8 |
| 9 | 9.5 | 11.6 | 12.3 |
| 10 | 10.0 | 12.1 | 12.7 |
| 11 | 10.4 | 12.5 | － |
| 12 | 10.8 | 12.9 | － |
| 13 | 11.1 | 13.2 | － |
| 14 | 11.5 | 13.5 | － |
| Duct length | $=$ Slot length | Standard |  |

## RRA with nozzle rollers



RRA data with eccentric rollers：
－Total airflow： 2080 m³／h
－Number of RRA sections： 4
－Number of slots per RRA： 3
－Length of the RRA：$L_{R}=1500 \mathrm{~mm}$
－Length of the slot：$L s=1300 \mathrm{~mm}$
Required：
1．Air flow by meter of slot
2．Critical air flow distance $X$
3．Vertical penetration in heating $Y_{\text {max }}$
4．Acoustic power generated $\mathrm{L}_{\mathrm{wA}}$ and noise criteria（NC）

## Solution：

1．From total air flow，the number of section of RRA and slots，we find：$\left(2080 \mathrm{~m}^{3} / \mathrm{h} \div 4 \mathrm{RRA}\right) \div 3$ slots $=173 \mathrm{~m}^{3} / \mathrm{h}$ by slot
For a 1300 mm slot length，we calculate the air flow by meter of slot $173 \mathrm{~m}^{3} / \mathrm{h} \times 0.77=133 \mathrm{~m}^{3} / \mathrm{h} / \mathrm{m}$ slot（1）
2．From dimension＇s diagram，the air velocity in occupied area of $0.25 \mathrm{~m} / \mathrm{s} 4$ and a distance after meeting $y=4 m-1.8 m=2.2 m(5$ ，we find the distance of air flow：$X=3.5 \mathrm{~m}$（6）（see page 7 ）．

3．For a temperature difference of $+10^{\circ} \mathrm{C}(7)$ ，we find the vertical penetration： $\mathrm{Y}_{\max }=3.5 \mathrm{~m}$ ．（8）
4．From the acoustic power diagram，we read： $\mathrm{L}_{\text {wA diagram }}=37 \mathrm{~dB}(\mathrm{~A})$（9） and a number of slots $n=3: \Delta L_{w A}=6.8 \mathrm{~dB}(\mathrm{~A})(10)$
Finally，the acoustic power generated is：
$\mathrm{L}_{\mathrm{WA}}=\mathrm{L}_{\text {WA diagram }}+\Delta \mathrm{L}_{\mathrm{WA}}=43.8 \mathrm{~dB}(\mathrm{~A})-10 \mathrm{~dB}(\mathrm{~A})=33.8 \mathrm{~dB}(\mathrm{~A})$
Noise criteria $(\mathrm{NC})=25+2(3$ fentes $)=27$（11）

RRA

## Loss of pressure

| $\Delta P$ duct |  |
| :---: | :---: |
| Diameter | $\Delta P$ <br> of the duct |
| Pressure drop <br> by diameter of <br> regular duct <br> $5 \mathrm{~m} / \mathrm{s}(1000 \mathrm{fpm})$ |  |


| mm (in.) | $\mathrm{Pa} / \mathrm{m}$ <br> (" water / 100ft) |
| :---: | :---: |
| $200(8)$ | $1.63(0.20)$ |


| $251(10)$ | $1.31(0.16)$ |
| :---: | :---: |
| $302(12)$ | $1.06(0.13)$ |
| $353(14)$ | $0.82(0.10)$ |
| $403(16)$ | $0.73(0.09)$ |
| $454(18)$ | $0.65(0.08)$ |


| $505(20)$ | $0.57(0.07)$ |
| :--- | :--- |
| $556(22)$ | $0.49(0.06)$ |


| $607(24)$ | $0.41(0.05)$ |
| :--- | :--- |
| $657(26)(5)$ | $0.41(0.05)$ |


| $708(28)$ | $0.37(0.045)$ |
| :--- | :--- |
| $759(30)$ | $0.37(0.045)$ |


| $810(32)$ | $0.33(0.040)$ |
| :--- | :--- |
| $861(34)$ | $0.29(0.035)$ |


| $911(36)$ | $0.29(0.035)$ |
| :--- | :--- |
| $962(38)$ | $0.24(0.030)$ |


| $1013(40)$ | $0.24(0.030)$ |
| :--- | :--- |


| $1064(42)$ | $0.24(0.030)$ |
| :--- | :--- |
| $1115(44)$ | $0.20(0.025)$ |


| $1165(46)$ | $0.20(0.025)$ |
| :---: | :---: |
| $1216(48)$ | $0.20(0.025)$ |
| $1267(50)$ | $0.16(0.020)$ |
| $1318(52)$ | $0.16(0.020)$ |
| $1369(54)$ | $0.16(0.020)$ |
| $1419(56)$ | $0.16(0.020)$ |

${ }^{*} \Delta \mathrm{P}_{\mathrm{L}}$ Equivalence in length of pressure loss $\quad{ }^{* *}$ Based on $\Delta \mathrm{P}=0.82 \mathrm{~Pa} / \mathrm{m}(0.1 \mathrm{in}$ of water $/ 100 \mathrm{ft})$

Correction factor for different air velocity in duct:
$\Delta P=F \times \Delta P(v=1000 \mathrm{fpm})$

| Air velocity <br> in duct | $\Delta P$ <br> Pressure drop <br> by diameter <br> in straight duct | $\Delta P$ <br> Pressure drop <br> in elbows | $\Delta P$ <br> Pressure drop <br> in reducer |
| :---: | :---: | :---: | :---: |
| $\mathrm{m} / \mathrm{s}(\mathrm{fpm})$ | F | F | F |
| $3(600)$ | 0.4 | 0.8 | 0.4 |
| $4(800)$ | 0.7 | 0.9 | 0.6 |
| $5(1000)$ | 1.0 | 1.0 | 1.0 |
| $6(1200)$ | 1.4 | 1.1 | 1.4 |
| $7(1400)$ | 1.8 | 1.2 | 2.0 |


| Pa | in of water | Pa | in of water | Pa | in of water | Pa | in of water |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2.5 | 0.010 | 2.0 | 0.007 | 1.5 | 0.005 | 0.8 | 0.003 |
| 3.6 | 0.011 | 2.1 | 0.008 | 1.6 | 0.006 |  |  |



|  | $\begin{array}{c}\Delta \text { P rollers } \\ \text { Air flow for slot length } \\ \text { of 1 meter }\end{array}$ |  |
| :---: | :---: | :---: |
| $\begin{array}{c}\text { Eccentric } \\ \text { rollers }\end{array}$ | $\begin{array}{c}\text { Nozzle } \\ \text { rollers of pressure }\end{array}$ |  |
| over |  |  |
| all rollers |  |  |
| (1A/F6) |  |  |$)$

Correction factor for different adjustments of rollers:
$\Delta \mathrm{P}=\mathrm{F} \times \Delta \mathrm{P}$ (standard adjustment)

| Roll <br> adjustment | $F$ |
| :---: | :---: |
| $1 \mathrm{~A} / \mathrm{F6}$ | 1.0 |
| $\mathrm{AB} / \mathrm{EF}$ | 1.0 |
| CD | 1.1 |
| $21 / 65$ | 1.1 |
| $32 / 54$ | 1.4 |
| $\mathrm{CD} / 65-\mathrm{CD} / 21$ | 1.1 |

RRA

## Example of calculation



Notes: For a system height of 3 m , a single RRA circular
tube is sufficient to cover an area of 10 m .
The placement of vents are at $0^{\circ}$ ( $60^{\prime}$ clock) with the rollers set in position $A B / E F$ (diffuse).

Dimensions and weight


## Suspension systems

The suspension of the RRA diffuser is assured by threaded rods ( $3 / 8^{\prime \prime}$ ) provided by the installer.
Upon request, colored rod covers are supplied to cover the threaded rods.





## RRA

## Specifications

## 1. Description and physical characteristics

1.1 The high induction duct diffuser shall be made of 22 ga brushed steel for ducts inferior to 457 mm ( 18 in ) in diameter, and 20 ga for diameters superior or equal to 457 mm ( 18 in ).
1.2 The circular duct diffuser shall be available in diameters ranging from 203 mm ( 8 in ) to 1419 mm ( 56 in ). The duct diffuser shall be grooved at each end and fitted with a PVC gasket to insure a tight seal between sections. The sections shall be assembled using union sleeves.
1.3 Steel reininforcements shall be installed inside ducts of more than 433 mm (17 in) in diameter in order to maintain its shape.
1.4 The duct diffuser 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. The paint of the diffuser shall be guaranteed against peeling for a minimum period of 5 years when used under normal conditions.
1.5 The duct diffuser shall be supplied with slots containing (black, creme or white) eccentric rollers and / or nozzle rollers. The 100 mm ( 4 in ) long eccentric rollers shall be alphanumerically identified allowing for adjustment of duct's air flow pattern over 180 degrees.
1.6 The union sleeves shall not exceed the dimensions of more than 3 mm ( $1 / 8 \mathrm{in}$ ), and will be rounded to facilitate cleaning. The duct shall have a as smooth as possible surface to maintain an esthetic appeal.
1.7 A reducer fitting, or perforated balancing damper with a self-locking mechanism, allowing for an output between $25 \%$ and $100 \%$, shall be installed after a maximum of 5 consecutive active sections of the same diameter. A slot register shall be integrated to the last active section of the system.
1.8 The duct diffuser can be passive, without slots.
2. Installation and suspension
2.1 The suspension of the duct shall be done with threaded rods $9.5 \mathrm{~mm}(3 / 8 \mathrm{in})$ supplied by the installer.
2.2 The threaded rods shall be covered with rod covers supplied by the manufacturer of the diffuser. The colour of the rod covers shall be chosen by the architect or the customer, according to the RAL colour chart.
2.3 When required, the suspension of the duct diffuser shall be available in three options.

### 2.3.1 Rail suspension

The duct diffuser shall be slid into a suspended aluminum rail, offering a solution for varied types of ceilings. The rail shall be painted according to the RAL colour chart and chosen by the architect or customer.

### 2.3.2 Suspension by metallic cable

The duct diffuser shall be suspended by metallic cable (aviation style) $7 \times 7$ or $7 \times 9$, made of galvanized or stainless steel (304 or 316), of medium or high traction resistance.

### 2.3.3 Wall suspension

The duct diffuser shall be anchored laterally with an adjustable wall support in the same colour as the duct diffuser. This wall mount shall be supplied by the manufacturer of the diffuser.
2.4 When the duct diffuser goes through a wall, a collar adapted to the duct diffuser shall be supplied by the manufacturer.
2.5 The standard accessories shall have the same finish as the duct diffuser (elbows, sleeves, reducers, branches, etc.).
2.6 Each duct diffuser shall be identified with a label. This label shall contain the section number, direction of the air flow, number of slots and positioning of the eccentric rollers.

## 3. Performances

The manufacturer shall supply for approval the following:
3.1 A diagram of the air flow, illustrating the trajectory of the air jets, the pressure loss and the accoustic power produced by the diffuser.
3.2 A simulation of the air flow distance, installation considering conditions for comfort in the occupied zone, for cooling, isothermal and heating ventilation mode.
4. Adjustment
4.1 Adjustment of the eccentric rollers shall be done by the manufacturer according to the required output.
4.2 Adjustment of the eccentric rollers shall be possible even after the installation of the diffuser, in order to meet new output requirements.

## 5. Balancing

5.1 Balancing of the diffusers shall be done by a ventilation balancing technician, accredited as a qualified professionnal.
5.2 When required, the technician shall refer to the eccentric roller adjustment mode, available in the manufacturers' reference manual.

## 6. Required quality : NAD Klima, model RRA

R R A

## Codification



Blue：Standard

RRA

## Codification



## Codification for endcap and collar



Blue: Standard

RRA

## Codification

## Suspension with rail



## Accessories supplied for aluminum rail (ALU)


Accessories supplied for steel rail (S33)


## Touch-up spray paint

CAN 9003 Paint can (RAL 9003)
CAN $\qquad$ Paint can (other colour RAL)
(write the number of the colour)
CAN - $9003 \square$ Example

Adjustable wall mount

Suspension with cable

| Description of anchors for the ceiling |  |  |
| :---: | :---: | :---: |
| CPA | Anchor with hook <br> nickel plated <br> $\emptyset 13 \mathrm{~mm} \times 70 \mathrm{~mm} \times 14.3 \mathrm{~mm}$ <br> (Ø 1/2 in $\times 2$ 3/4 in $\times 9 / 16$ in) |  |
| CCP | Swiveling anchor nickel plated Not adjustable $\emptyset 25 \times 281 / 2 \mathrm{~mm}$ ( $\varnothing 1$ in $\times 1$ 1/8 in) (screw not supplied) |  |
|  | Description of anchor for the diffuser |  |
| CCA | Anchor for duct <br> Adjustment throttle <br> nickel plated <br> $\emptyset 19 \times 50 \mathrm{~mm}$ <br> (Ø $3 / 4$ in $\times 2$ in) |  |
|  | XXXX = Without cable 3048 mm - standard (10 ft) | Cable length |
|  | A $=$ Nickel plated steel (standard) <br> S = Stainless Steel (optional) |  |
| CPA | 3048 - A | Example |

$203,254,305,356,406,457,508,559,610,660,711,762,813,864,914,965$, 9003 = White, 9010 = Cream,
00SB = Solar Black (Standard black matte), 00SM = Standard Metallic Grey _ = Colour RAL (write the number of colour)





K L I M A

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