

KOOLAIR

series

40.2

Adjustable blades
swirl diffusers

ISO 9001

BUREAU VERITAS
Certification

Sistema de Gestión



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Adjustable-blade swirl diffusers

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Adjustable-blade swirl diffusers



DF-RQ diffuser

Models

Increasingly stringent requirements from the standpoint of technical features (higher supply flow rates and lower velocities in the occupant area) and aesthetics (smoother incorporation in the interior design) have generally made swirl diffusers a better choice for air diffusion.

KOOLAIR has enlarged its range of adjustable-blade swirl diffusers and now provides eight sizes of its well-known DF-RO diffuser, a unit with non-radial slot pattern for an "open" or "concentrated" swirl distribution.

The new DF-RA model retains the excellent features of the DFRO model, but modifies the aesthetics of the diffuser by using a radial pattern for the deflectors.

The DF-RQ model is an alternative model with a whole new look that differs models currently available on the market and allows a reduction in the distance between diffusers or between the diffuser and the wall, thus achieving residual velocities below those of "conventional" swirl diffusers.

The recommended mounting height is around 2.5 to 4.0 m for all models. All these units can be used in VAV systems, allowing the flow rate to be reduced up to 25% of the nominal air flow rate without producing uncomfortable air currents in the facility.

Description

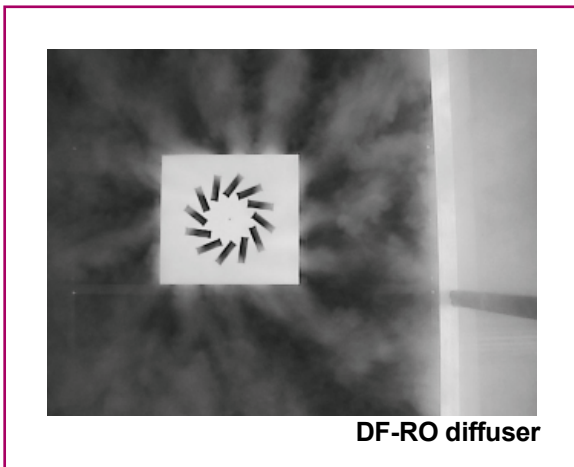
The adjustable-blade swirl diffusers manufactured by KOOLAIR are made entirely of steel sheet. The diffusers basically consist of the following:

- Swirl diffuser integrated in a panel that can be adapted to modular ceiling formats currently available on the market, with special models for square or round installation in plaster ceilings, etc. The standard diffuser finish is white (RAL9010) with adjustable blades in black (RAL 9005). Other finishes can be supplied by special order upon prior consultation with our Sales Department.

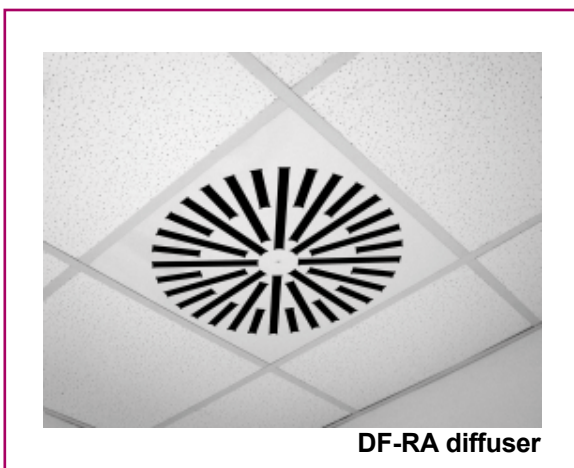
- Connection plenum in galvanized steel sheet with inter equalizer panel to ensure proper air distribution and air inlet of standard ISO diameter with manual damper. The standard model of this damper is accessible from the false ceiling, although a special installation type also allows the user to make adjustments from the room using a hidden screw.

An electrical servo drive for applications in VAV systems can also be added.

The diffuser is fastened by means of a single central screw, except in the case of plates larger than 675 mm, which will be fastened with additional screws around the perimeter: 4 for square plates and 3 for circular plates.



DF-RO diffuser



DF-RA diffuser

Adjustable-blade swirl diffusers

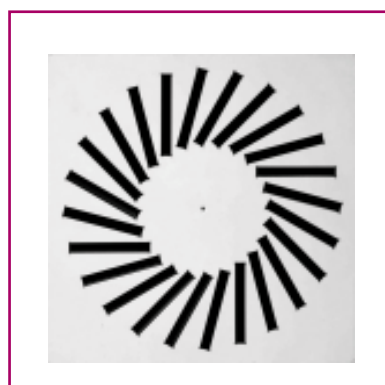
Preselection based on sound level and pressure drop

The tables shown below allow quick identification of the flow rate that can be supplied by each basic diffuser size for each of the available models:

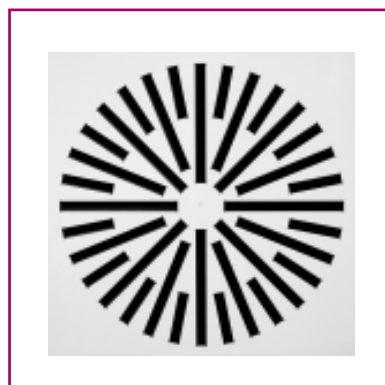
- DF-RO (8 basic sizes)
- DF-RA (8 basic sizes)
- DF-RQ (4 basic sizes)

Since all swirl diffusers manufactured by KOOLAIR can be integrated in different panel sizes, the table indicates the minimum dimensions of the panel in which each basic size can be fitted.

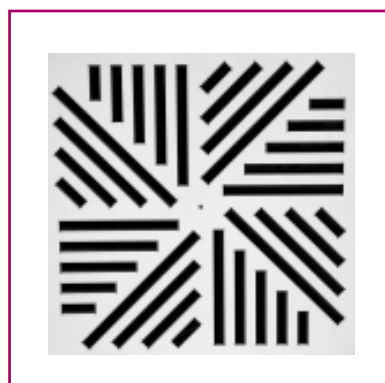
Each table contains four columns corresponding to four sound pressure levels: 30, 35, 40 and 45 dB (A), indicating in each cell the flow rate, expressed in m³/h, and the total pressure drop generated (in parentheses), expressed in Pa, in the basic size of the selected row.



| DF-RO: FLOW RATE - SOUND POWER- ΔP_t | | | | | |
|--|------------------|------------------------|-----------|-----------|-----------|
| Size | Plate dimensions | m ³ /h (Pa) | | | |
| | | 30 dB(A) | 35 dB(A) | 40 dB(A) | 45 dB(A) |
| 12 | 294 x 294 | 175 (22) | 210 (31) | 245 (43) | 290 (61) |
| 16 | 394 x 394 | 255 (13) | 305 (18) | 360 (26) | 425 (35) |
| 20 | 494 x 494 | 365 (16) | 430 (22) | 510 (30) | 600 (42) |
| 24 | 594 x 594 | 495 (14) | 580 (19) | 685 (27) | 810 (37) |
| 32 | 594 x 594 | 570 (15) | 675 (21) | 795 (29) | 940 (41) |
| 36 | 623 x 623 | 600 (16) | 705 (22) | 835 (31) | 985 (43) |
| 40 | 670 x 670 | 735 (16) | 870 (22) | 1025 (30) | 1210 (42) |
| 48 | 794 x 794 | 890 (15) | 1050 (21) | 1240 (29) | 1465 (41) |

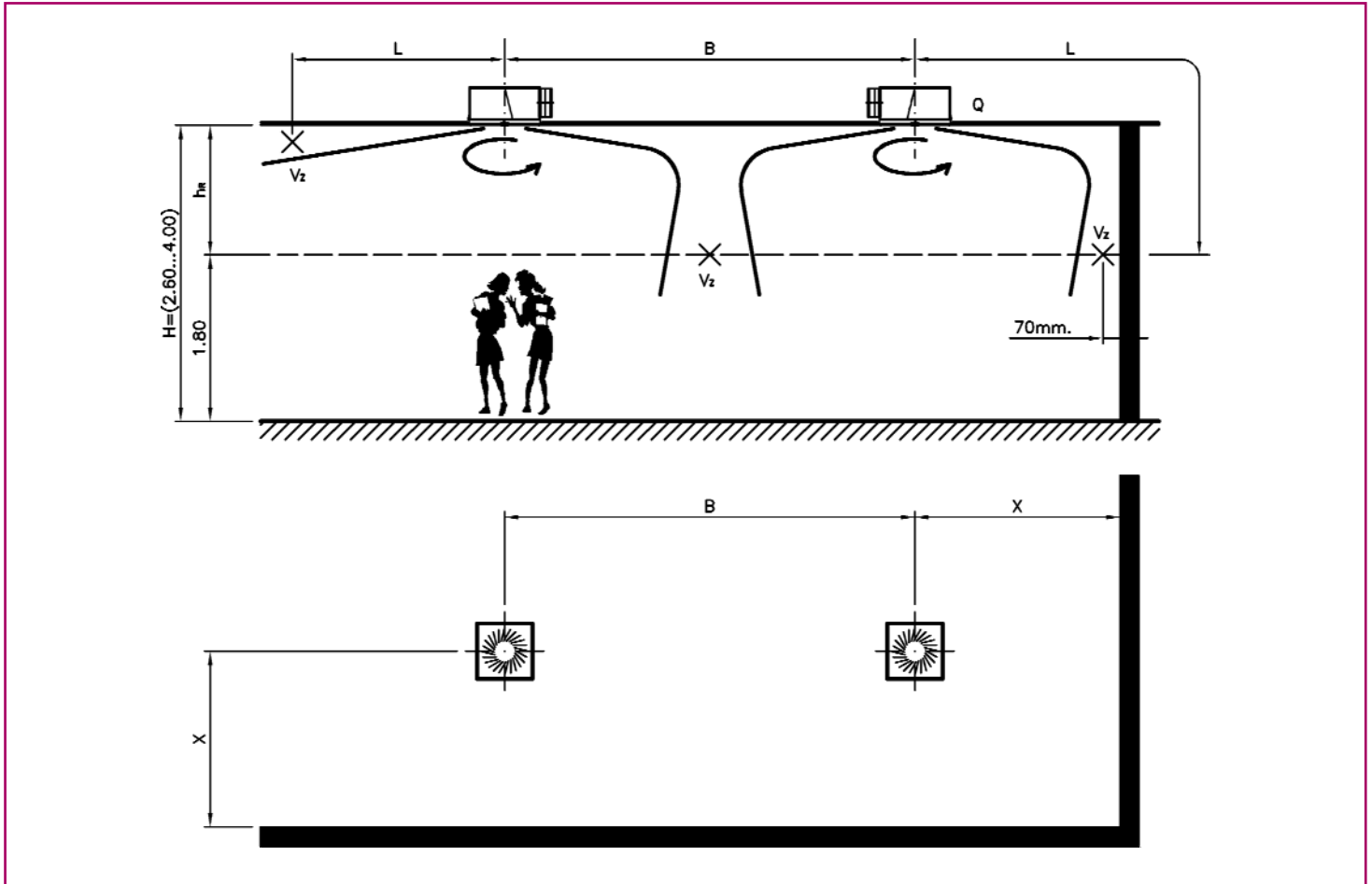


| DF-RA: FLOW RATE - SOUND POWER- ΔP_t | | | | | |
|--|------------------|------------------------|-----------|-----------|-----------|
| Size | Plate dimensions | m ³ /h (Pa) | | | |
| | | 30 dB(A) | 35 dB(A) | 40 dB(A) | 45 dB(A) |
| 12 | 294 x 294 | 175 (23) | 210 (32) | 250 (46) | 300 (66) |
| 16 | 394 x 394 | 265 (13) | 315 (19) | 375 (26) | 450 (38) |
| 20 | 494 x 494 | 370 (15) | 445 (22) | 530 (30) | 635 (41) |
| 24 | 594 x 594 | 510 (14) | 610 (20) | 730 (27) | 870 (40) |
| 32 | 594 x 594 | 570 (15) | 685 (21) | 815 (30) | 975 (43) |
| 36 | 623 x 623 | 615 (16) | 735 (22) | 880 (32) | 1050 (46) |
| 40 | 670 x 670 | 755 (15) | 905 (22) | 1080 (30) | 1290 (42) |
| 48 | 794 x 794 | 905 (15) | 1080 (21) | 1290 (30) | 1540 (42) |



| DF-RQ: FLOW RATE - SOUND POWER- ΔP_t | | | | | |
|--|------------------|------------------------|-----------|-----------|-----------|
| Size | Plate dimensions | m ³ /h (Pa) | | | |
| | | 30 dB(A) | 35 dB(A) | 40 dB(A) | 45 dB(A) |
| 28 | 494 x 494 | 420 (18) | 490 (25) | 580 (34) | 680 (48) |
| 36 | 594 x 594 | 655 (18) | 770 (24) | 900 (34) | 1060 (46) |
| 40 | 670 x 670 | 820 (15) | 965 (21) | 1130 (29) | 1325 (40) |
| 48 | 794 x 794 | 960 (16) | 1130 (22) | 1330 (30) | 1560 (42) |

Adjustable-blade swirl diffusers



Legend

- B = Distance between diffuser axes, in m.
- X = Distance between diffuser axis and wall, in m.
- h_R = Distance between ceiling and occupied area, in m.
- L = $X + h_R$, in m.
- H = Room height, in m.
- Q = Air flow per diffuser, in m^3/h and in l/s .
- V_z = Air flow velocity in occupied area, in m/s .
- ΔP_t = Pressure drop, in Pa.
- L_{WA} = Sound power, in $dB(A)$.

Adjustable-blade swirl diffusers

Selection from graphs. Example

The selection graphs contained in this catalogue are similar for the various models: DF-RO, DF-RA and DF-RQ, allowing the following parameters to be obtained from the supply flow rate and diffuser layout on the ceiling:

- Pressure drop and sound power level generated in plenum-diffuser assembly.
- Air flow velocity in occupied area at the two most adverse points a priori:

- At the midpoint between two diffusers
- At the wall closest to the diffuser

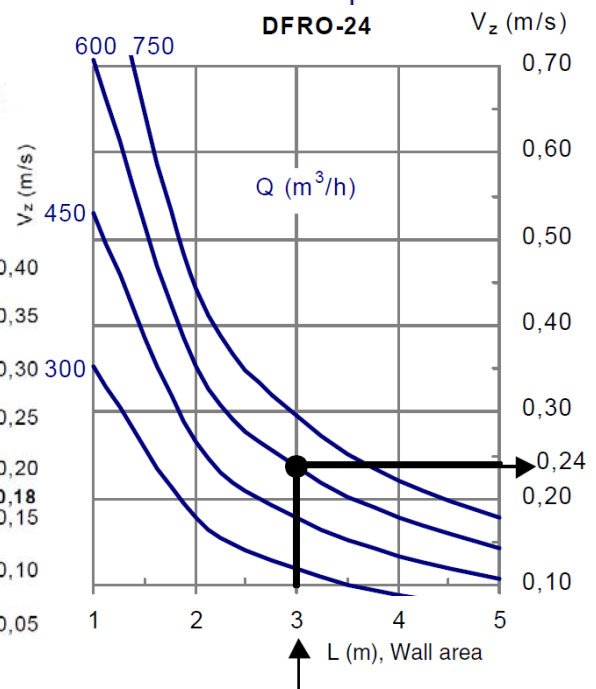
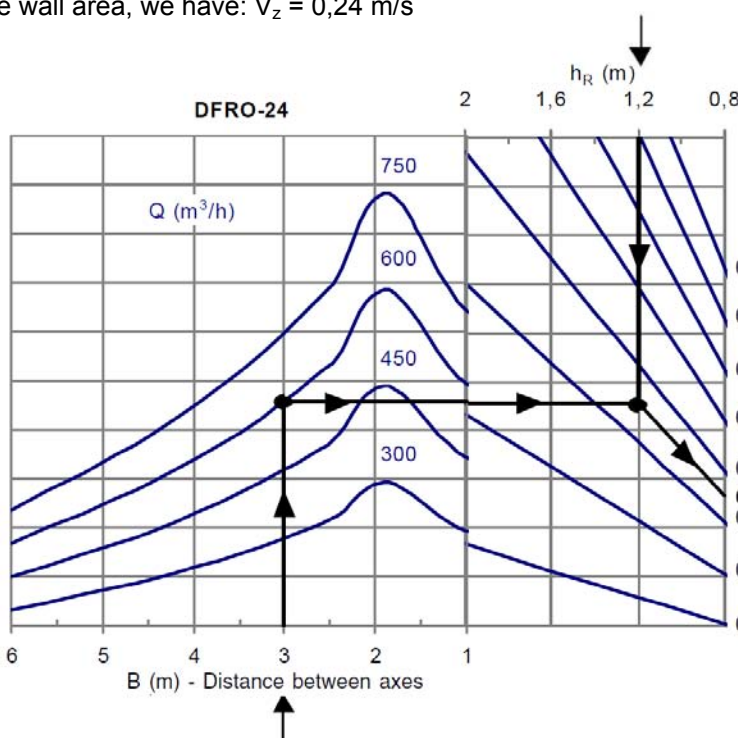
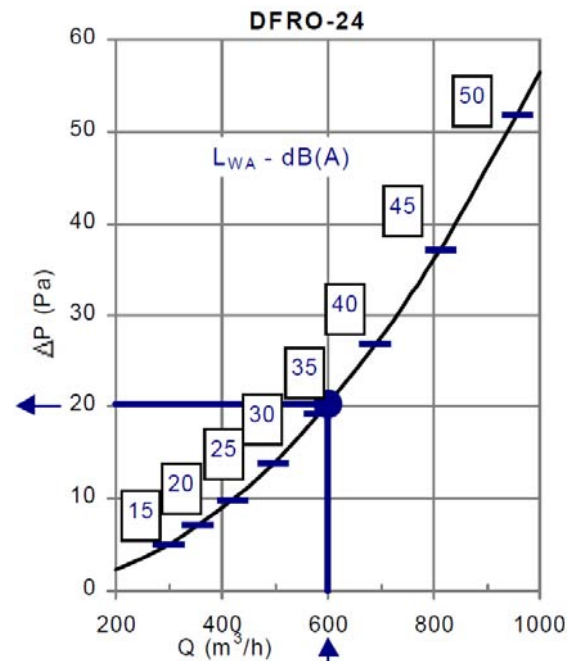
The methodology is explained below with an example.

Initial data

Diffuser model: DF-RO-24xx
 Unit flow rate of supply air: 600 m³/h
 Distance between diffuser axes: B = 3 m
 Distance between diffuser axis and nearest wall: X = 1,8 m
 Room height: H = 3 m

Results

Pressure loss: 20 Pa
 Sound power level: 36 dB(A)
 Based on the symbols from the previous page, we have:
 $h_R = H - 1,80 = 1,2$ m
 Between diffusers, we have: $V_z = 0,18$ m/s
 For the wall area graph, we calculate:
 $L = X + h_R = 1,8 + 1,2 = 3,0$ m
 In the wall area, we have: $V_z = 0,24$ m/s



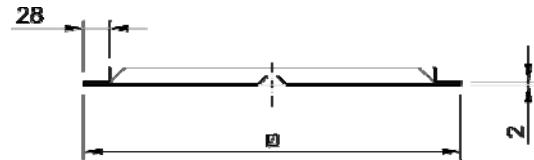
Note: The catalogue also includes selection tables for these specific cases.

DF-RO swirl diffusers

Basic sizes.

There are eight basic slot arrays for the DF-RO, varying from 12 to 48 slots and covering a wide range of air flow rates. Since the diffusers can be integrated into different sizes and types of panel (square, rectangular, round, etc.), each basic size is coded according to the number of slots it includes.

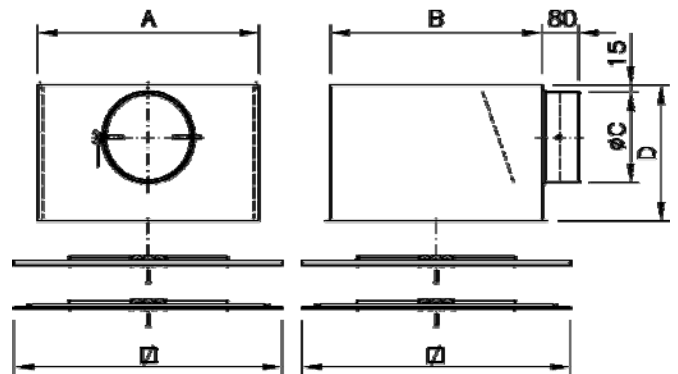
Square panels for plaster false ceiling, installation type: DF-RO-E. Dimensions and coding.



| Panel for plaster ceiling: DF-RO-E | | |
|------------------------------------|----------------------------|------------|
| Basic size | Minimum standardized panel | |
| | Dimensions | Panel code |
| 12 | 320 x 320 | 32 |
| 16 | 420 x 420 | 42 |
| 20 | 520 x 520 | 52 |
| 24 | 620 x 620 | 62 |
| 32 | 620 x 620 | 62 |
| 36 | 645 x 645 | 64 |
| 40 | 695 x 695 | 69 |
| 48 | 820 x 820 | 82 |

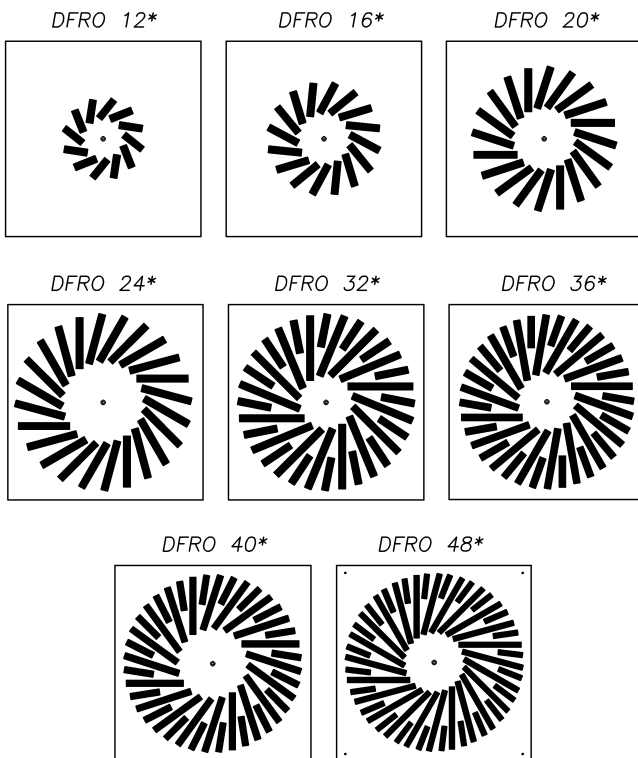
Note: This installation model has no sharp edges.

Plenum with lateral connection for diffusers integrated in square panels, PQ model.

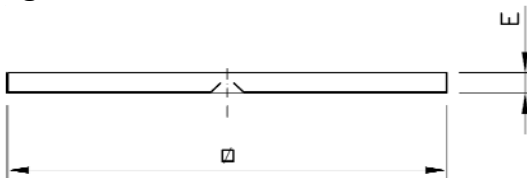


| Basic size | A | B | C | D |
|------------|-----|-----|------|-----|
| 12 | 288 | 270 | 159 | 250 |
| 16 | 388 | 370 | 199 | 300 |
| 20 | 488 | 470 | 199 | 300 |
| 24 | 588 | 570 | 249 | 350 |
| 32 | 588 | 570 | 249 | 350 |
| 36 | 616 | 598 | 249 | 350 |
| 40 | 663 | 645 | 314* | 350 |
| 48 | 788 | 770 | 314 | 410 |

(*) In oval model.



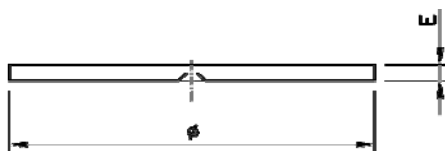
Square panels for modular false ceiling, installation type: DF-RO. Dimensions and coding.



| Panel for modular ceiling: DF-RO | | | |
|----------------------------------|----------------------------|------------|----|
| Basic size | Minimum standardized panel | | |
| | Dimensions | Panel code | E |
| 12 | 294 x 294 | 30 | 6 |
| 16 | 394 x 394 | 40 | 6 |
| 20 | 494 x 494 | 50 | 6 |
| 24 | 594 x 594 | 60 | 10 |
| 32 | 594 x 594 | 60 | 10 |
| 36 | 623 x 623 | 62 | 10 |
| 40 | 670 x 670 | 67 | 10 |
| 48 | 795 x 795 | 80 | 10 |

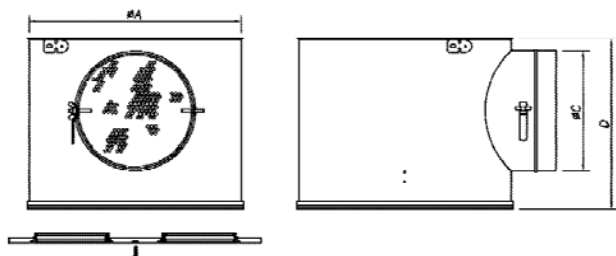
DF-RO swirl diffusers

Round panels for false ceiling, installation model: DF-RO-C. Dimensions and coding



| Panel for plaster ceiling: DF-RO-C | | | |
|------------------------------------|----------------------------|------------|----|
| Basic size | Minimum standardized panel | | |
| | Dimensions | Panel code | E |
| 12 | Ø 298 | 30 | 6 |
| 16 | Ø 403 | 40 | 6 |
| 20 | Ø 500 | 50 | 10 |
| 24 | Ø 594 | 60 | 10 |
| 32 | Ø 594 | 60 | 10 |
| 48 | Ø 800 | 80 | 10 |

Connection plenum, PC model for diffusers integrated in round panels.



| Size | Ø A | Ø C | D |
|---------|-----|-----|-----|
| 12 | 275 | 159 | 230 |
| 16 | 375 | 199 | 270 |
| 20 | 476 | 199 | 270 |
| 24 / 32 | 576 | 249 | 320 |
| 36 | 597 | 249 | 320 |
| 40 | 636 | 314 | 385 |
| 48 | 771 | 314 | 385 |

Coding for purchase orders. Example

Coding provides a unique description of the model ordered by the customer.

| | |
|----------------|------------------------------|
| DF-RO | Square panel/Modular ceiling |
| DF-RO-E | Square panel/Plaster ceiling |
| DF-RO-C | Round panel |

Standard panel finish in white (RAL 9010), other finishes available by special order.

12, 16,... 48 Basic size / N° slots

Standard deflectors in black (RAL 9005). White (RAL 9010) finishes available by special order.

| | |
|----------------------|---------------------------|
| 30, 40,... 80 | Panel code DF-RO |
| 32, 42,... 82 | Panel code DF-RO-E |
| 30, 40,... 80 | Panel code DF-RO-C |

Check compatibility with the basic sizes.

| | |
|--------------|--|
| PQ | Plenum with lateral connection for DF-RO and DF-RO-E |
| PQA | Same as above, internally insulated |
| PC | Plenum with lateral connection for DF-RO-C |
| PCA | Same as above, internally insulated |
| PE-45 | Polystyrene plenum box for diffusers with plate of 595 x 595 mm |

Special installation types by special order.

| | |
|-----------|---|
| RE | Manual damper accessible from false ceiling |
| RL | Manual damper accessible from room |
| RM | Damper equipped to allow motorization. |


Coding example:

DF-RO-C/2050/ PCA/RL

Description:

Adjustable-blade swirl diffuser, DF-RO-C model, size 20, round installation type with diameter 500 mm; insulated plenum with lateral connection and manual damper accessible from the room. Front panel in white (RAL 9010) with deflectors in black (RAL 9005).

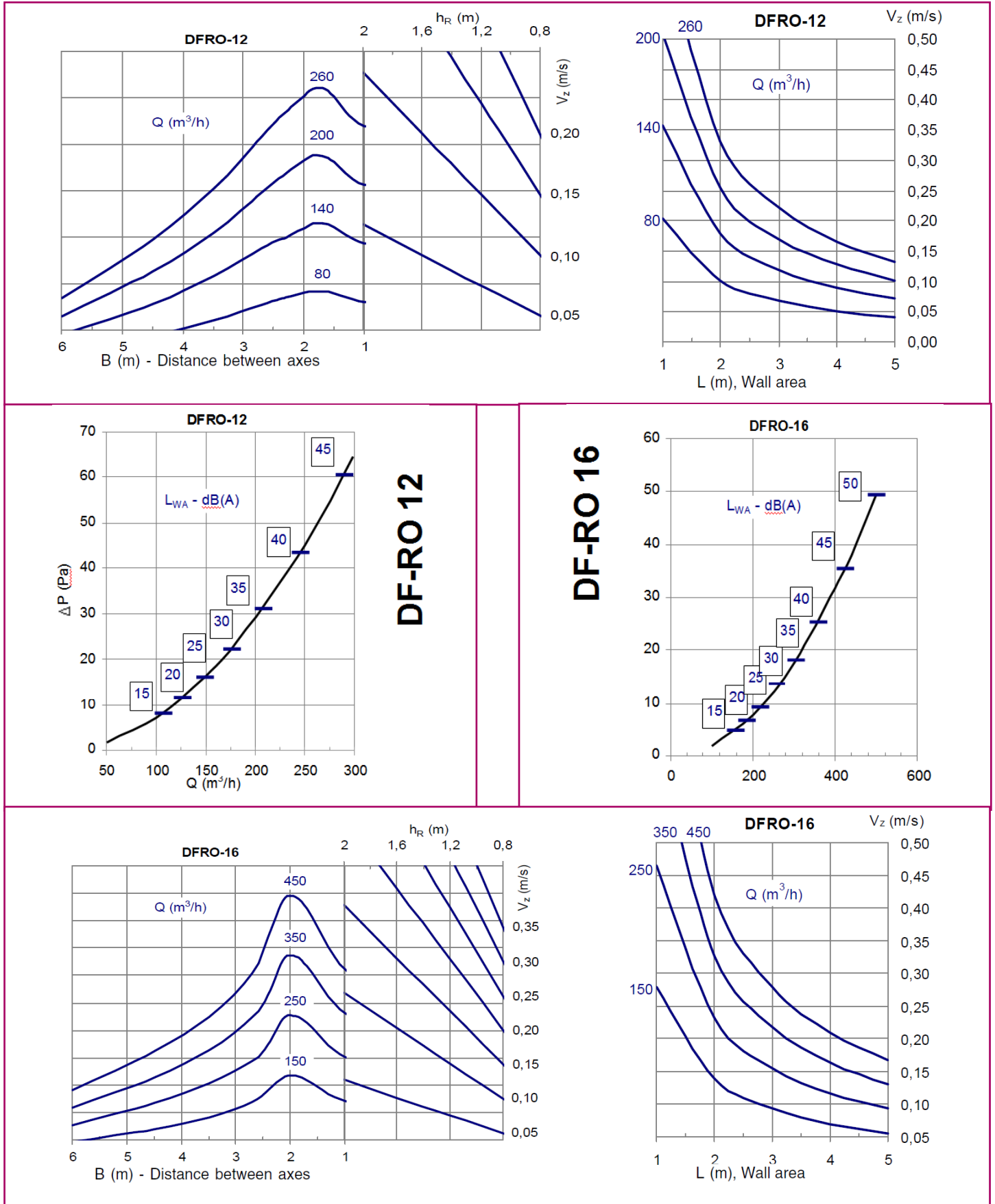
Selection table DF-RO (air stream toward the wall)

| Q | | No. Slots | 12 | | | 16 | | | 20 | | | 24 | | | 32 | | | 36 | | | 40 | | | 48 | | |
|-------------------|-------|---|----------|------|------|---|------|------|----------|------|------|----------|------|------|----------|------|------|----------|------|------|-----|-----|-----|----|--|--|
| m ³ /h | l/s | X | 0,6 | 1,5 | 2,1 | 0,6 | 1,5 | 2,1 | 0,6 | 1,5 | 2,1 | 0,6 | 1,5 | 2,1 | 0,6 | 1,5 | 2,1 | 0,6 | 1,5 | 2,1 | 0,6 | 1,5 | 2,1 | | | |
| 50 | 13,9 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,08 | 0,05 | 0,04 | <p>Example: DF-RO 3260 diffuser (32 slots).</p> <p>Initial data Q = 800 m³/h B = 2,1 m. H = 3,8 m.</p> <p>Results L_{WA} = 40 dB(A) V_z = 0,20 m/s ΔPt = 30 Pa</p>  <p>32 ranuras</p> | | | | | | | | | | | | | | | | | | | | |
| | | | 0,06 | 0,04 | 0,04 | | | | | | | | | | | | | | | | | | | | | |
| | | | 0,05 | 0,04 | 0,03 | | | | | | | | | | | | | | | | | | | | | |
| | | ΔP _t L _{WA} | 2 <15 | | | | | | | | | | | | | | | | | | | | | | | |
| 150 | 41,7 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,25 | 0,16 | 0,13 | 0,18 | 0,11 | 0,09 | 0,14 | 0,09 | 0,07 | | | | | | | | | | | | | | | |
| | | | 0,19 | 0,13 | 0,11 | 0,14 | 0,09 | 0,08 | 0,11 | 0,07 | 0,06 | | | | | | | | | | | | | | | |
| | | | 0,15 | 0,11 | 0,09 | 0,11 | 0,08 | 0,07 | 0,08 | 0,06 | 0,05 | | | | | | | | | | | | | | | |
| | | ΔP _t L _{WA} | 16 25 | | | 4 <15 | | | 3 <15 | | | | | | | | | | | | | | | | | |
| 250 | 69,4 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,42 | 0,26 | 0,21 | 0,31 | 0,19 | 0,15 | 0,24 | 0,15 | 0,12 | 0,20 | 0,12 | 0,10 | | | | | | | | | | | | |
| | | | 0,32 | 0,22 | 0,18 | 0,23 | 0,16 | 0,13 | 0,18 | 0,12 | 0,10 | 0,15 | 0,10 | 0,08 | | | | | | | | | | | | |
| | | | 0,24 | 0,18 | 0,16 | 0,18 | 0,13 | 0,11 | 0,14 | 0,10 | 0,09 | 0,11 | 0,08 | 0,07 | | | | | | | | | | | | |
| | | ΔP _t L _{WA} | 45 41 | | | 12 29 | | | 7 19 | | | 4 <15 | | | | | | | | | | | | | | |
| 350 | 97,2 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,43 | 0,27 | 0,21 | 0,33 | 0,21 | 0,17 | 0,28 | 0,17 | 0,14 | 0,24 | 0,15 | 0,12 | 0,23 | 0,14 | 0,12 | 0,22 | 0,14 | 0,11 | | | | | | |
| | | | 0,32 | 0,22 | 0,18 | 0,25 | 0,17 | 0,14 | 0,21 | 0,14 | 0,12 | 0,18 | 0,13 | 0,10 | 0,17 | 0,12 | 0,10 | 0,16 | 0,11 | 0,09 | | | | | | |
| | | | 0,25 | 0,18 | 0,16 | 0,19 | 0,14 | 0,12 | 0,16 | 0,12 | 0,10 | 0,14 | 0,10 | 0,09 | 0,13 | 0,10 | 0,08 | 0,13 | 0,09 | 0,08 | | | | | | |
| | | ΔP _t L _{WA} | 24 39 | | | 14 29 | | | 7 20 | | | 6 15 | | | 5 <15 | | | 3 <15 | | | | | | | | |
| 500 | 138,9 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,48 | 0,30 | 0,24 | 0,39 | 0,25 | 0,20 | 0,35 | 0,22 | 0,17 | 0,33 | 0,21 | 0,16 | 0,31 | 0,19 | 0,16 | 0,30 | 0,19 | 0,15 | | | | | | |
| | | | 0,36 | 0,25 | 0,20 | 0,29 | 0,20 | 0,17 | 0,26 | 0,18 | 0,15 | 0,25 | 0,17 | 0,14 | 0,23 | 0,16 | 0,13 | 0,22 | 0,15 | 0,13 | | | | | | |
| | | | 0,27 | 0,20 | 0,17 | 0,23 | 0,17 | 0,14 | 0,20 | 0,15 | 0,13 | 0,19 | 0,14 | 0,12 | 0,18 | 0,13 | 0,11 | 0,17 | 0,13 | 0,11 | | | | | | |
| | | ΔP _t L _{WA} | 29 39 | | | 14 30 | | | 12 26 | | | 11 25 | | | 7 18 | | | 5 <15 | | | | | | | | |
| 650 | 180,6 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,62 | 0,39 | 0,31 | 0,51 | 0,32 | 0,26 | 0,45 | 0,28 | 0,23 | 0,43 | 0,27 | 0,21 | 0,40 | 0,25 | 0,20 | 0,39 | 0,24 | 0,19 | | | | | | |
| | | | 0,46 | 0,32 | 0,26 | 0,38 | 0,26 | 0,22 | 0,34 | 0,23 | 0,19 | 0,32 | 0,22 | 0,18 | 0,30 | 0,21 | 0,17 | 0,29 | 0,20 | 0,17 | | | | | | |
| | | | 0,36 | 0,26 | 0,23 | 0,29 | 0,22 | 0,19 | 0,26 | 0,19 | 0,17 | 0,25 | 0,18 | 0,16 | 0,23 | 0,17 | 0,15 | 0,22 | 0,17 | 0,14 | | | | | | |
| | | ΔP _t L _{WA} | 49 47 | | | 24 38 | | | 20 34 | | | 19 32 | | | 12 26 | | | 8 21 | | | | | | | | |
| 800 | 222,2 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,63 | 0,39 | 0,31 | 0,56 | 0,35 | 0,28 | 0,53 | 0,33 | 0,26 | 0,50 | 0,31 | 0,25 | 0,48 | 0,30 | 0,24 | | | | | | | | | |
| | | | 0,47 | 0,33 | 0,27 | 0,42 | 0,29 | 0,24 | 0,39 | 0,27 | 0,23 | 0,37 | 0,26 | 0,21 | 0,36 | 0,25 | 0,20 | | | | | | | | | |
| | | | 0,36 | 0,27 | 0,23 | 0,32 | 0,24 | 0,20 | 0,30 | 0,23 | 0,19 | 0,29 | 0,21 | 0,18 | 0,27 | 0,20 | 0,17 | | | | | | | | | |
| | | ΔP _t L _{WA} | 36 45 | | | 30 40 | | | 28 39 | | | 18 32 | | | 12 27 | | | | | | | | | | | |
| 1000 | 277,8 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,70 | 0,43 | 0,35 | 0,66 | 0,41 | 0,33 | 0,62 | 0,39 | 0,31 | 0,60 | 0,37 | 0,30 | | | | | | | | | | | | |
| | | | 0,52 | 0,36 | 0,30 | 0,49 | 0,34 | 0,28 | 0,47 | 0,32 | 0,27 | 0,45 | 0,31 | 0,26 | | | | | | | | | | | | |
| | | | 0,40 | 0,30 | 0,25 | 0,38 | 0,28 | 0,24 | 0,36 | 0,27 | 0,23 | 0,34 | 0,26 | 0,22 | | | | | | | | | | | | |
| | | ΔP _t L _{WA} | 46 47 | | | 44 45 | | | 29 39 | | | 19 34 | | | | | | | | | | | | | | |
| 1250 | 347,2 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,78 | 0,48 | 0,39 | 0,74 | 0,47 | 0,37 | | | | | | | | | | | | | | | | | | |
| | | | 0,58 | 0,40 | 0,33 | 0,56 | 0,39 | 0,32 | | | | | | | | | | | | | | | | | | |
| | | | 0,45 | 0,33 | 0,28 | 0,43 | 0,32 | 0,27 | | | | | | | | | | | | | | | | | | |
| | | ΔP _t L _{WA} | 45 46 | | | 30 40 | | | | | | | | | | | | | | | | | | | | |
| 1600 | 444,4 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,95 | 0,60 | 0,48 | | | | | | | | | | | | | | | | | | | | | |
| | | | 0,71 | 0,49 | 0,41 | | | | | | | | | | | | | | | | | | | | | |
| | | | 0,55 | 0,41 | 0,35 | | | | | | | | | | | | | | | | | | | | | |
| | | ΔP _t L _{WA} | 48 48 | | | | | | | | | | | | | | | | | | | | | | | |

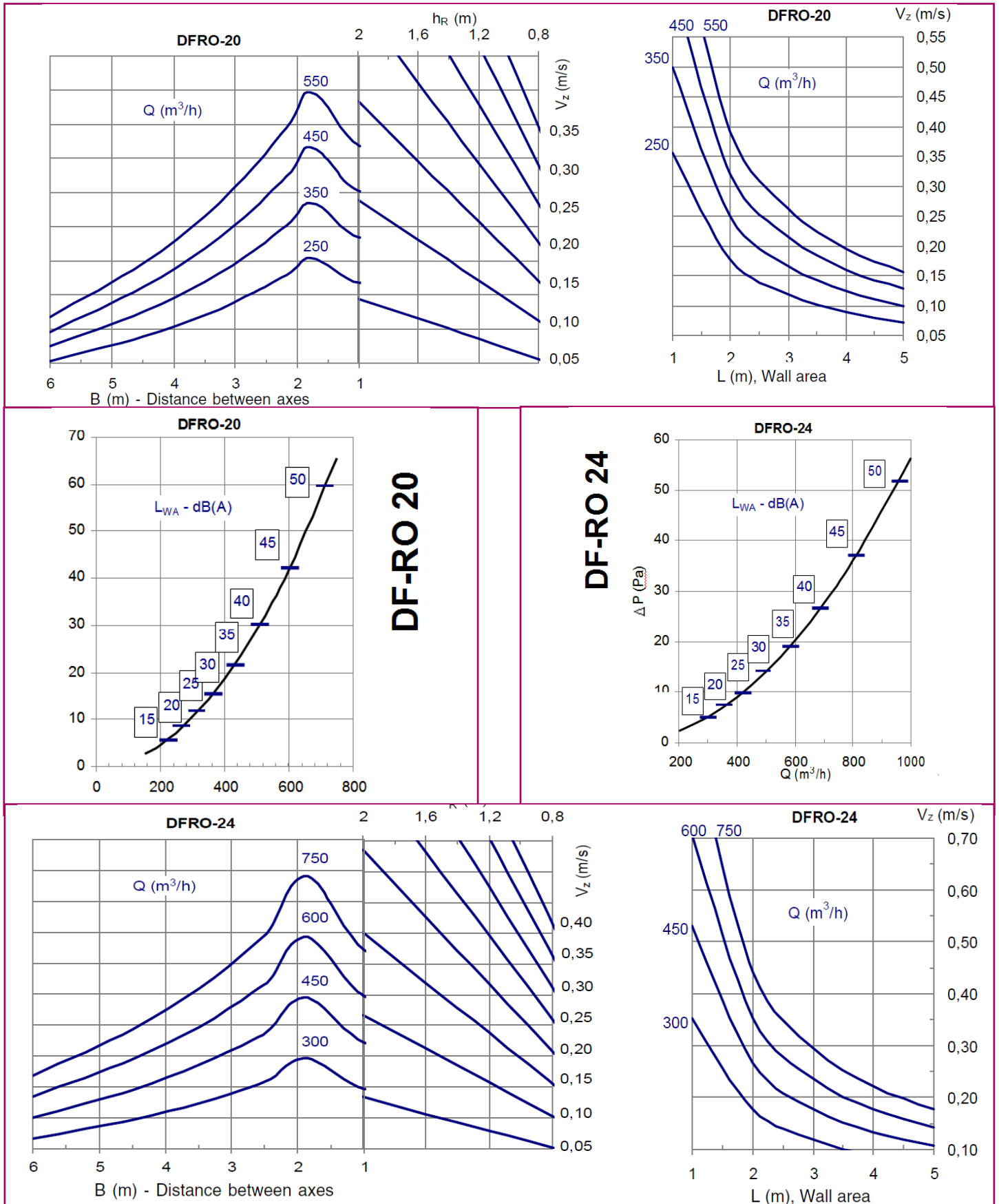
Symbols:
 Q = Air flow rate
 V_z = Velocity in occupied area, in m/s
 ΔP_t = Total pressure drop, in Pa
 L_{WA} = Sound power, inn dB(A)
 B = Distance between diffuser axes, in m.
 H = Room height, in m



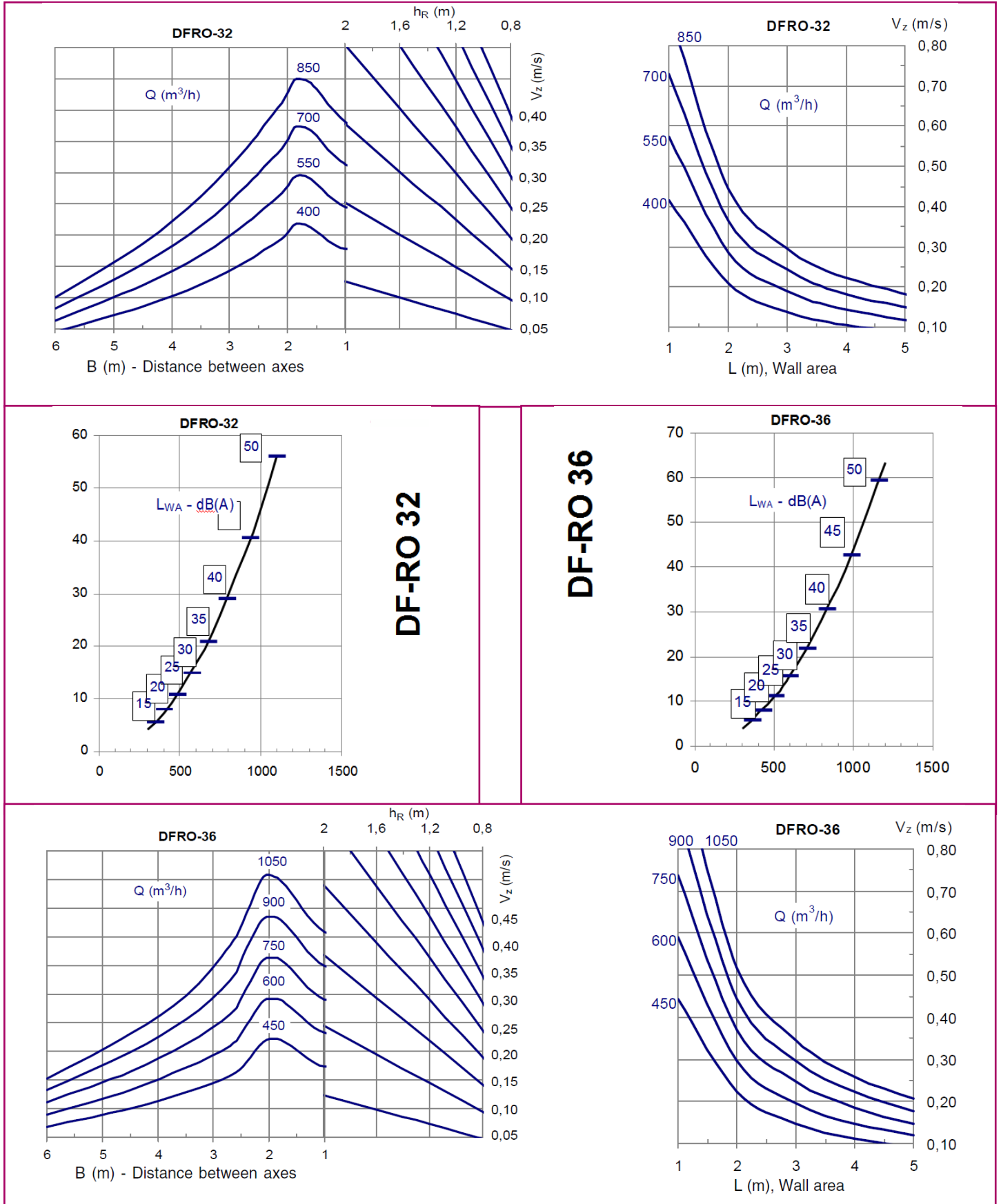
Selection graphs for DF-RO 12 and 16 slots



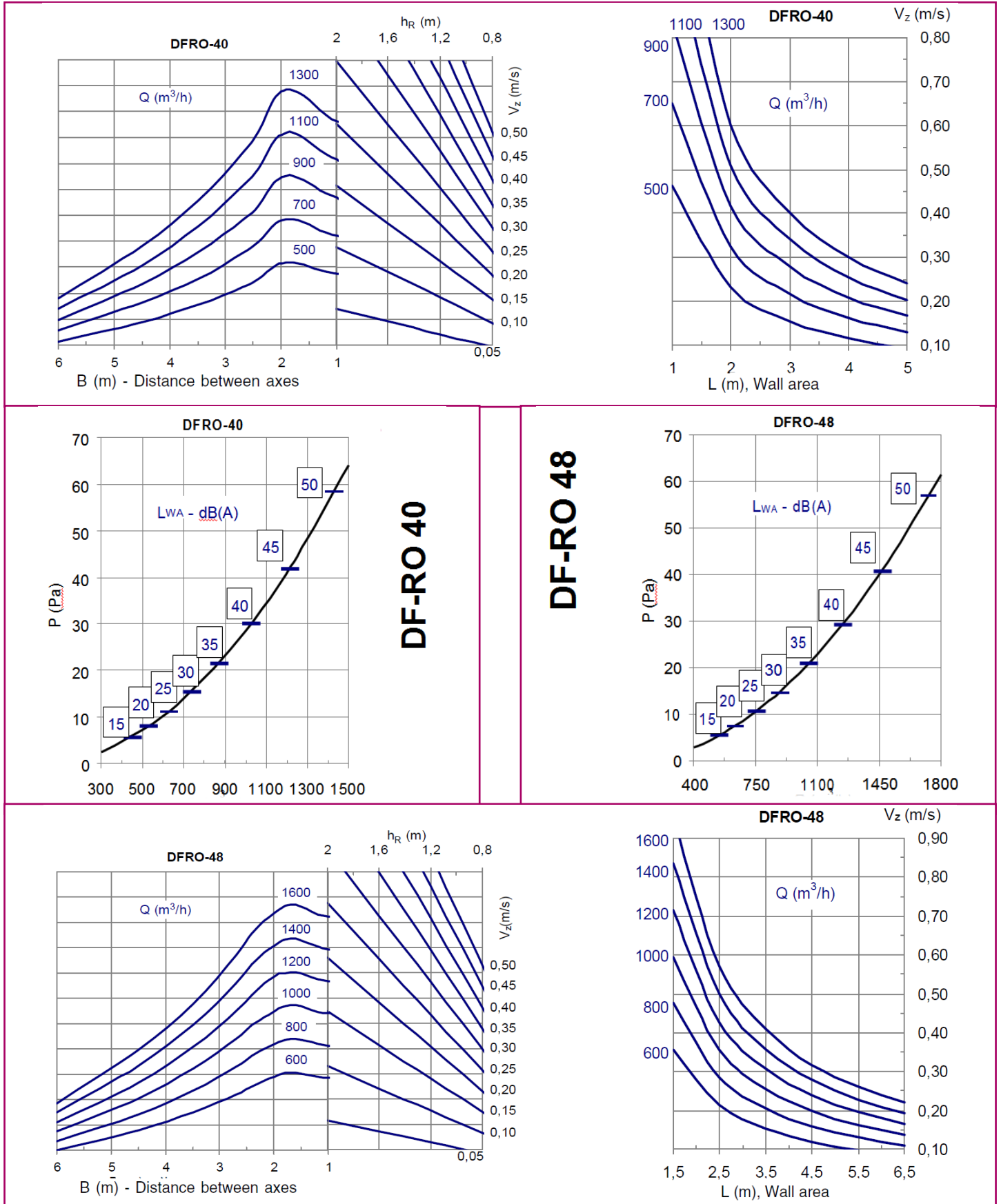
Selection graphs for DF-RO 20 and 24 slots



Selection graphs for DF-RO 32 and 36 slots



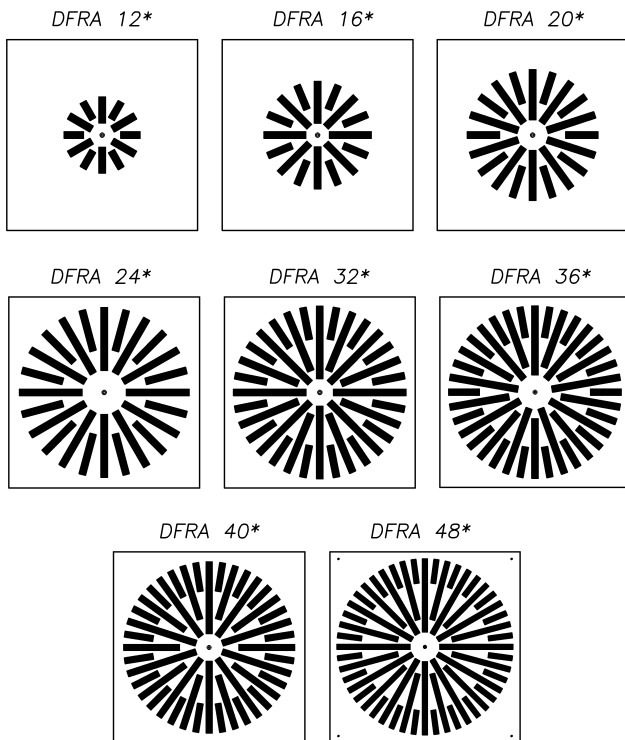
Selection graphs for DF-RO 40 and 48 slots



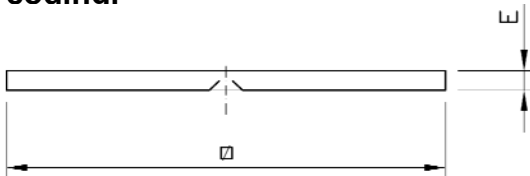
DF-RA swirl diffusers

Basic sizes.

There are eight basic slot arrays for the DF-RA, varying from 12 to 48 slots and covering a wide range of air flow rates. Since the diffusers can be integrated into different sizes and types of panel (square, rectangular, round, etc.), each basic size is coded according to the number of slots it includes.

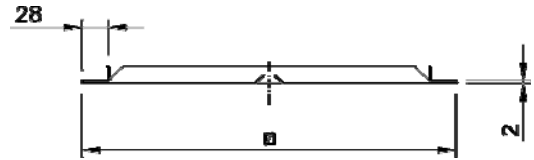


Square panels for modular false ceiling, installation type: DF-RA. Dimensions and coding.



| Panel for modular ceiling: DF-RA | | | |
|----------------------------------|----------------------------|------------|----|
| Basic size | Minimum standardized panel | | |
| | Dimensions | Panel code | E |
| 12 | 294 x 294 | 30 | 6 |
| 16 | 394 x 394 | 40 | 6 |
| 20 | 494 x 494 | 50 | 6 |
| 24 | 594 x 594 | 60 | 10 |
| 32 | 594 x 594 | 60 | 10 |
| 36 | 623 x 623 | 62 | 10 |
| 40 | 670 x 670 | 67 | 10 |
| 48 | 795 x 795 | 80 | 10 |

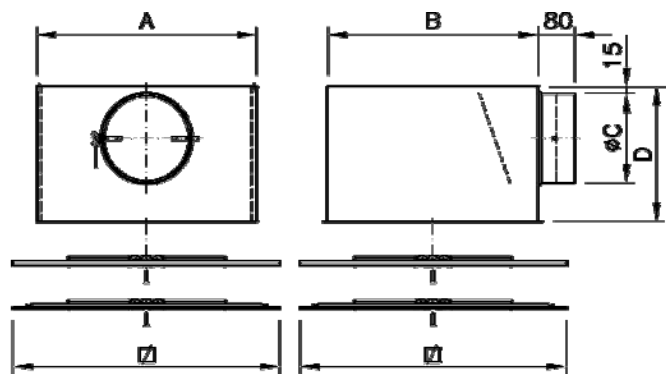
Square panels for plaster false ceiling, installation type: DF-RA-E. Dimensions and coding.



| Panel for plaster ceiling: DF-RA-E | | |
|------------------------------------|----------------------------|------------|
| Basic size | Minimum standardized panel | |
| | Dimensions | Panel code |
| 12 | 320 x 320 | 32 |
| 16 | 420 x 420 | 42 |
| 20 | 520 x 520 | 52 |
| 24 | 620 x 620 | 62 |
| 32 | 620 x 620 | 62 |
| 36 | 645 x 645 | 64 |
| 40 | 695 x 695 | 69 |
| 48 | 820 x 820 | 82 |

Note: This installation model has no sharp edges.

Plenum with lateral connection for diffusers integrated in square panels, PQ model.

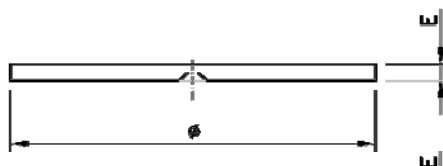


| Basic size | A | B | C | D |
|------------|-----|-----|------|-----|
| 12 | 288 | 270 | 159 | 250 |
| 16 | 388 | 370 | 199 | 300 |
| 20 | 488 | 470 | 199 | 300 |
| 24 | 588 | 570 | 249 | 350 |
| 32 | 588 | 570 | 249 | 350 |
| 36 | 616 | 598 | 249 | 350 |
| 40 | 663 | 645 | 314* | 350 |
| 48 | 788 | 770 | 314 | 410 |

(*) In oval model.

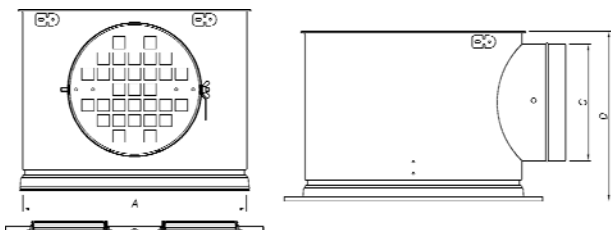
DF-RA swirl diffusers

Round panels for false ceiling, installation model: DF-RA-C. Dimensions and coding.



| Panel for plaster ceiling: DF-RA-C | | | |
|------------------------------------|----------------------------|------------|----|
| Basic size | Minimum standardized panel | | |
| | Dimensions | Panel Code | E |
| 12 | Ø 298 | 30 | 6 |
| 16 | Ø 403 | 40 | 6 |
| 20 | Ø 500 | 50 | 10 |
| 24 | Ø 594 | 60 | 10 |
| 32 | Ø 594 | 60 | 10 |
| 48 | Ø 800 | 80 | 10 |

Connection plenum, PC model for diffusers integrated in round panels.



| Size | A | B | Ø C | D |
|---------|-----|-----|-----|-----|
| 12 | 288 | 270 | 159 | 235 |
| 16 | 388 | 370 | 199 | 275 |
| 20 | 488 | 470 | 199 | 275 |
| 24 / 32 | 588 | 570 | 249 | 325 |
| 36 | 616 | 598 | 249 | 325 |
| 40 | 663 | 645 | 314 | 390 |
| 48 | 788 | 770 | 314 | 390 |

Coding for purchase orders. Example

Coding provides a unique description of the model ordered by the customer.

| | |
|----------------|------------------------------|
| DF-RA | Square panel/Modular ceiling |
| DF-RA-E | Square panel/Plaster ceiling |
| DF-RA-C | Round panel |

Standard panel finish in white (RAL 9010), other finishes available by special order.

12, 16,... 48 Basic size / N°. of slots

Standard deflectors in black (RAL 9005). White (RAL 9010) finishes available by special order.

| | |
|----------------------|---------------------------|
| 30, 40,... 80 | Panel code DF-RA |
| 32, 42,... 82 | Panel code DF-RA-E |
| 30, 40,... 80 | Panel code DF-RA-C |

Check compatibility with the basic sizes.

| | |
|--------------|--|
| PQ | Plenum with lateral connection for DF-RA and DF-RA-E |
| PQA | Same as above, internally insulated |
| PC | Plenum with lateral connection for DF-RA-C |
| PCA | Same as above, internally insulated |
| PE-45 | Polystyrene plenum box for diffusers with plate of 595 x 595 mm |

Special installations by special order

| | |
|-----------|--|
| RE | Manual damper accessible from false ceiling. |
| RL | Manual damper accessible from room. |
| RM | Damper equipped to allow motorization. |

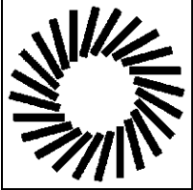
Coding example:

DF-RA/1660/ PQ/RE

Description:

Adjustable-blade swirl diffuser, DF-RA model, size 16, in square panel of 594 x 594; plenum with lateral connection and manual damper accessible from room. Front panel in white (RAL 9010) with deflectors in black (RAL 9005).

Selection table DF-RA (air stream between diffusers)

| Q | | No. Slots | 12 | | | 16 | | | 20 | | | 24 | | | 32 | | | 36 | | | 40 | | | 48 | | |
|---|-------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----|--|--|
| m ³ /h | l/s | B | 1,2 | 1,8 | 2,7 | 1,2 | 1,8 | 2,7 | 1,2 | 1,8 | 2,7 | 1,2 | 1,8 | 2,7 | 1,2 | 1,8 | 2,7 | 1,2 | 1,8 | 2,7 | 1,2 | 1,8 | 2,7 | | | |
| 50 | 13,9 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,03 | 0,04 | 0,03 | | | | | | | | | | | | | | | | | | | | | |
| | | | 0,02 | 0,02 | 0,02 | | | | | | | | | | | | | | | | | | | | | |
| | | | 0,02 | 0,02 | 0,01 | | | | | | | | | | | | | | | | | | | | | |
| | | ΔP _t (Pa) | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| | | L _{WA} | <15 | | | | | | | | | | | | | | | | | | | | | | | |
| Example: DF-RA 2460 diffuser (24 slots). Initial data Q = 650 m ³ /h B = 2,7 m. H = 2,7 m. Results L _{WA} = 37 dB(A) V _z = 0,27 m/s ΔPt = 37 Pa | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 slots | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 150 | 41,7 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,11 | 0,12 | 0,10 | 0,09 | 0,11 | 0,08 | 0,08 | 0,09 | 0,07 | | | | | | | | | | | | | | | |
| | | | 0,07 | 0,08 | 0,06 | 0,06 | 0,07 | 0,05 | 0,05 | 0,06 | 0,04 | | | | | | | | | | | | | | | |
| | | | 0,05 | 0,05 | 0,05 | 0,04 | 0,05 | 0,03 | 0,03 | 0,04 | 0,03 | | | | | | | | | | | | | | | |
| | | ΔP _t (Pa) | 16 | | | 4 | | | 3 | | | | | | | | | | | | | | | | | |
| | | L _{WA} | 25 | | | <15 | | | <15 | | | | | | | | | | | | | | | | | |
| 250 | 69,4 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,18 | 0,20 | 0,17 | 0,14 | 0,18 | 0,13 | 0,13 | 0,15 | 0,12 | 0,11 | 0,13 | 0,10 | | | | | | | | | | | | |
| | | | 0,12 | 0,13 | 0,11 | 0,09 | 0,12 | 0,08 | 0,08 | 0,10 | 0,07 | 0,07 | 0,08 | 0,07 | | | | | | | | | | | | |
| | | | 0,08 | 0,09 | 0,08 | 0,06 | 0,08 | 0,06 | 0,06 | 0,07 | 0,05 | 0,05 | 0,06 | 0,05 | | | | | | | | | | | | |
| | | ΔP _t (Pa) | 45 | | | 12 | | | 7 | | | 3 | | | | | | | | | | | | | | |
| | | L _{WA} | 41 | | | 29 | | | 19 | | | <15 | | | | | | | | | | | | | | |
| 350 | 97,2 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,20 | 0,26 | 0,18 | 0,18 | 0,21 | 0,16 | 0,15 | 0,19 | 0,15 | 0,14 | 0,17 | 0,12 | 0,13 | 0,16 | 0,11 | 0,12 | 0,13 | 0,10 | | | | | | |
| | | | 0,13 | 0,16 | 0,11 | 0,12 | 0,14 | 0,10 | 0,10 | 0,12 | 0,09 | 0,09 | 0,11 | 0,08 | 0,08 | 0,10 | 0,07 | 0,08 | 0,08 | 0,06 | | | | | | |
| | | | 0,09 | 0,11 | 0,08 | 0,08 | 0,09 | 0,07 | 0,07 | 0,08 | 0,06 | 0,06 | 0,07 | 0,05 | 0,06 | 0,07 | 0,05 | 0,05 | 0,06 | 0,04 | | | | | | |
| | | ΔP _t (Pa) | 23 | | | 14 | | | 7 | | | 6 | | | 5 | | | 3 | | | | | | | | |
| | | L _{WA} | 38 | | | 28 | | | 20 | | | 16 | | | <15 | | | <15 | | | | | | | | |
| 500 | 138,9 | V _{hR} H = 2,7 H = 3,2 H = 3,8 | 0,29 | 0,36 | 0,25 | 0,26 | 0,31 | 0,23 | 0,22 | 0,27 | 0,21 | 0,20 | 0,24 | 0,18 | 0,18 | 0,22 | 0,16 | 0,17 | 0,19 | 0,15 | 0,16 | 0,17 | 0,13 | | | |
| | | | 0,18 | 0,23 | 0,16 | 0,17 | 0,19 | 0,15 | 0,14 | 0,17 | 0,13 | 0,13 | 0,15 | 0,11 | 0,11 | 0,14 | 0,10 | 0,11 | 0,12 | 0,09 | 0,10 | 0,11 | 0,08 | | | |
| | | | 0,13 | 0,16 | 0,11 | 0,12 | 0,13 | 0,10 | 0,10 | 0,12 | 0,09 | 0,09 | 0,10 | 0,08 | 0,08 | 0,10 | 0,07 | 0,07 | 0,08 | 0,06 | 0,07 | 0,07 | 0,06 | | | |
| | | ΔP _t (Pa) | 47 | | | 28 | | | 13 | | | 11 | | | 10 | | | 6 | | | 4 | | | | | |
| | | L _{WA} | 48 | | | 38 | | | 30 | | | 26 | | | 24 | | | 18 | | | <15 | | | | | |
| 650 | 180,6 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,34 | 0,40 | 0,30 | 0,28 | 0,35 | 0,27 | 0,27 | 0,30 | 0,23 | 0,24 | 0,28 | 0,21 | 0,22 | 0,24 | 0,19 | 0,21 | 0,22 | 0,18 | 0,21 | 0,22 | 0,18 | | | |
| | | | 0,22 | 0,25 | 0,19 | 0,18 | 0,22 | 0,17 | 0,17 | 0,19 | 0,15 | 0,15 | 0,18 | 0,13 | 0,14 | 0,15 | 0,12 | 0,13 | 0,14 | 0,11 | 0,13 | 0,14 | 0,11 | | | |
| | | | 0,15 | 0,18 | 0,13 | 0,12 | 0,15 | 0,12 | 0,12 | 0,13 | 0,10 | 0,10 | 0,12 | 0,09 | 0,10 | 0,11 | 0,08 | 0,09 | 0,10 | 0,11 | 0,08 | 0,09 | 0,10 | | | |
| | | ΔP _t (Pa) | 48 | | | 23 | | | 19 | | | 18 | | | 11 | | | 8 | | | | | | | | |
| | | L _{WA} | 46 | | | 37 | | | 34 | | | 32 | | | 26 | | | 21 | | | | | | | | |
| 800 | 222,2 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,35 | 0,43 | 0,33 | 0,33 | 0,37 | 0,28 | 0,29 | 0,35 | 0,25 | 0,27 | 0,30 | 0,23 | 0,26 | 0,27 | 0,20 | 0,23 | 0,26 | 0,27 | 0,22 | | | | | |
| | | | 0,22 | 0,27 | 0,21 | 0,21 | 0,24 | 0,18 | 0,18 | 0,22 | 0,16 | 0,17 | 0,19 | 0,15 | 0,16 | 0,17 | 0,19 | 0,15 | 0,16 | 0,17 | 0,14 | | | | | |
| | | | 0,15 | 0,19 | 0,15 | 0,14 | 0,16 | 0,12 | 0,13 | 0,15 | 0,11 | 0,12 | 0,13 | 0,10 | 0,11 | 0,12 | 0,13 | 0,10 | 0,11 | 0,12 | 0,09 | | | | | |
| | | ΔP _t (Pa) | 34 | | | 29 | | | 27 | | | 16 | | | 11 | | | | | | | | | | | |
| | | L _{WA} | 43 | | | 39 | | | 37 | | | 32 | | | 27 | | | | | | | | | | | |
| 1000 | 277,8 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,41 | 0,46 | 0,35 | 0,37 | 0,43 | 0,32 | 0,34 | 0,38 | 0,29 | 0,33 | 0,34 | 0,27 | 0,33 | 0,34 | 0,27 | 0,34 | 0,29 | 0,33 | 0,34 | 0,27 | | | | |
| | | | 0,26 | 0,29 | 0,22 | 0,23 | 0,27 | 0,20 | 0,22 | 0,24 | 0,18 | 0,20 | 0,21 | 0,17 | 0,19 | 0,20 | 0,21 | 0,17 | | | | | | | | |
| | | | 0,18 | 0,20 | 0,15 | 0,16 | 0,19 | 0,14 | 0,15 | 0,16 | 0,13 | 0,14 | 0,15 | 0,16 | 0,13 | 0,14 | 0,15 | 0,12 | | | | | | | | |
| | | ΔP _t (Pa) | 45 | | | 41 | | | 25 | | | 18 | | | | | | | | | | | | | | |
| | | L _{WA} | 46 | | | 44 | | | 38 | | | 33 | | | | | | | | | | | | | | |
| 1250 | 347,2 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,43 | 0,47 | 0,36 | 0,41 | 0,42 | 0,34 | 0,43 | 0,36 | 0,41 | 0,42 | 0,34 | 0,43 | 0,36 | 0,41 | 0,42 | 0,34 | 0,43 | 0,36 | 0,41 | 0,42 | 0,34 | | | |
| | | | 0,27 | 0,30 | 0,23 | 0,26 | 0,26 | 0,21 | 0,27 | 0,20 | 0,22 | 0,24 | 0,18 | 0,20 | 0,21 | 0,17 | | | | | | | | | | |
| | | | 0,19 | 0,20 | 0,16 | 0,18 | 0,18 | 0,15 | 0,19 | 0,14 | 0,15 | 0,16 | 0,13 | 0,14 | 0,15 | 0,12 | | | | | | | | | | |
| | | ΔP _t (Pa) | 40 | | | 28 | | | 18 | | | 11 | | | | | | | | | | | | | | |
| | | L _{WA} | 44 | | | 39 | | | 32 | | | 27 | | | | | | | | | | | | | | |
| 1600 | 444,4 | V _z H = 2,7 H = 3,2 H = 3,8 | 0,52 | 0,54 | 0,44 | | | | | | | | | | | | | | | | | | | | | |
| | | | 0,33 | 0,34 | 0,28 | | | | | | | | | | | | | | | | | | | | | |
| | | | 0,23 | 0,23 | 0,19 | | | | | | | | | | | | | | | | | | | | | |
| | | ΔP _t (Pa) | 46 | | | | | | | | | | | | | | | | | | | | | | | |
| | | L _{WA} | 46 | | | | | | | | | | | | | | | | | | | | | | | |

Symbols:
 Q = Air flow rate
 V_z = Velocity in occupied area, in m/s
 ΔP_t = Total pressure drop, in Pa
 L_{WA} = Sound power, inn dB(A)
 B = Distance between diffuser axes, in m.
 H = Room height, in m

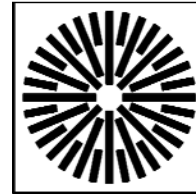
Selection table DF-RA (air stream toward the wall)

| Q | | No. Slots | 12 | | | 16 | | | 20 | | | 24 | | | 32 | | | 36 | | | 40 | | | 48 | | | | | | |
|------|-------|----------------|-----------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|--|
| m³/h | l/s | X | 0,6 | 1,5 | 2,1 | 0,6 | 1,5 | 2,1 | 0,6 | 1,5 | 2,1 | 0,6 | 1,5 | 2,1 | 0,6 | 1,5 | 2,1 | 0,6 | 1,5 | 2,1 | 0,6 | 1,5 | 2,1 | 0,6 | 1,5 | 2,1 | | | | |
| 50 | 13,9 | V _z | H = 2,7 | 0,08 | 0,05 | 0,04 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | H = 3,2 | 0,06 | 0,04 | 0,04 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | H = 3,8 | 0,05 | 0,04 | 0,03 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | ΔP _t | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | L _{WA} | <15 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 150 | 41,7 | V _z | H = 2,7 | 0,25 | 0,16 | 0,13 | 0,17 | 0,11 | 0,09 | 0,14 | 0,09 | 0,07 | | | | | | | | | | | | | | | | | | |
| | | | H = 3,2 | 0,19 | 0,13 | 0,11 | 0,13 | 0,09 | 0,07 | 0,11 | 0,07 | 0,06 | | | | | | | | | | | | | | | | | | |
| | | | H = 3,8 | 0,15 | 0,11 | 0,09 | 0,10 | 0,07 | 0,06 | 0,08 | 0,06 | 0,05 | | | | | | | | | | | | | | | | | | |
| | | | ΔP _t | 16 | | | 4 | | | 3 | | | | | | | | | | | | | | | | | | | | |
| | | | L _{WA} | 25 | | | <15 | | | <15 | | | | | | | | | | | | | | | | | | | | |
| 250 | 69,4 | V _z | H = 2,7 | 0,42 | 0,26 | 0,21 | 0,28 | 0,18 | 0,14 | 0,24 | 0,15 | 0,12 | 0,19 | 0,12 | 0,10 | | | | | | | | | | | | | | | |
| | | | H = 3,2 | 0,32 | 0,22 | 0,18 | 0,21 | 0,15 | 0,12 | 0,18 | 0,12 | 0,10 | 0,14 | 0,10 | 0,08 | | | | | | | | | | | | | | | |
| | | | H = 3,8 | 0,24 | 0,18 | 0,16 | 0,16 | 0,12 | 0,10 | 0,14 | 0,10 | 0,09 | 0,11 | 0,08 | 0,07 | | | | | | | | | | | | | | | |
| | | | ΔP _t | 45 | | | 12 | | | 7 | | | 3 | | | | | | | | | | | | | | | | | |
| | | | L _{WA} | 41 | | | 29 | | | 19 | | | <15 | | | | | | | | | | | | | | | | | |
| 350 | 97,2 | V _z | H = 2,7 | 0,40 | 0,25 | 0,20 | 0,33 | 0,21 | 0,16 | 0,27 | 0,17 | 0,13 | 0,24 | 0,15 | 0,12 | 0,22 | 0,14 | 0,11 | 0,20 | 0,13 | 0,10 | | | | | | | | | |
| | | | H = 3,2 | 0,30 | 0,21 | 0,17 | 0,25 | 0,17 | 0,14 | 0,20 | 0,14 | 0,11 | 0,18 | 0,12 | 0,10 | 0,17 | 0,11 | 0,09 | 0,15 | 0,11 | 0,09 | | | | | | | | | |
| | | | H = 3,8 | 0,23 | 0,17 | 0,15 | 0,19 | 0,14 | 0,12 | 0,15 | 0,11 | 0,10 | 0,14 | 0,10 | 0,09 | 0,13 | 0,09 | 0,08 | 0,12 | 0,09 | 0,07 | | | | | | | | | |
| | | | ΔP _t | 23 | | | 14 | | | 7 | | | 6 | | | 5 | | | 3 | | | | | | | | | | | |
| | | | L _{WA} | 38 | | | 28 | | | 20 | | | 16 | | | <15 | | | <15 | | | | | | | | | | | |
| 500 | 138,9 | V _z | H = 2,7 | 0,57 | 0,35 | 0,28 | 0,47 | 0,29 | 0,24 | 0,38 | 0,24 | 0,19 | 0,34 | 0,21 | 0,17 | 0,31 | 0,20 | 0,16 | 0,29 | 0,18 | 0,15 | 0,28 | 0,18 | 0,14 | 0,21 | 0,15 | 0,12 | | | |
| | | | H = 3,2 | 0,43 | 0,29 | 0,24 | 0,35 | 0,24 | 0,20 | 0,29 | 0,20 | 0,16 | 0,25 | 0,17 | 0,14 | 0,24 | 0,16 | 0,13 | 0,22 | 0,15 | 0,13 | 0,21 | 0,15 | 0,12 | 0,21 | 0,15 | 0,12 | | | |
| | | | H = 3,8 | 0,33 | 0,24 | 0,21 | 0,27 | 0,20 | 0,17 | 0,22 | 0,16 | 0,14 | 0,19 | 0,14 | 0,12 | 0,18 | 0,13 | 0,12 | 0,17 | 0,13 | 0,11 | 0,16 | 0,12 | 0,10 | 0,16 | 0,12 | 0,10 | | | |
| | | | ΔP _t | 47 | | | 28 | | | 13 | | | 11 | | | 10 | | | 6 | | | 4 | | | | | | | | |
| | | | L _{WA} | 48 | | | 38 | | | 30 | | | 26 | | | 24 | | | 18 | | | <15 | | | | | | | | |
| 650 | 180,6 | V _z | H = 2,7 | 0,61 | 0,38 | 0,31 | 0,50 | 0,31 | 0,25 | 0,44 | 0,27 | 0,22 | 0,41 | 0,26 | 0,20 | 0,38 | 0,24 | 0,19 | 0,37 | 0,23 | 0,18 | 0,37 | 0,23 | 0,18 | 0,37 | 0,23 | 0,18 | | | |
| | | | H = 3,2 | 0,46 | 0,32 | 0,26 | 0,37 | 0,26 | 0,21 | 0,33 | 0,23 | 0,19 | 0,31 | 0,21 | 0,18 | 0,28 | 0,20 | 0,16 | 0,27 | 0,19 | 0,16 | 0,27 | 0,19 | 0,16 | 0,27 | 0,19 | 0,16 | | | |
| | | | H = 3,8 | 0,35 | 0,26 | 0,22 | 0,29 | 0,21 | 0,18 | 0,25 | 0,19 | 0,16 | 0,24 | 0,18 | 0,15 | 0,22 | 0,16 | 0,14 | 0,21 | 0,16 | 0,13 | 0,21 | 0,16 | 0,13 | 0,21 | 0,16 | 0,13 | | | |
| | | | ΔP _t | 48 | | | 23 | | | 19 | | | 18 | | | 11 | | | 8 | | | | | | | | | | | |
| | | | L _{WA} | 46 | | | 37 | | | 34 | | | 32 | | | 26 | | | 21 | | | | | | | | | | | |
| 800 | 222,2 | V _z | H = 2,7 | 0,61 | 0,38 | 0,31 | 0,54 | 0,34 | 0,27 | 0,50 | 0,31 | 0,25 | 0,47 | 0,29 | 0,23 | 0,45 | 0,28 | 0,22 | | | | | | | | | | | | |
| | | | H = 3,2 | 0,46 | 0,32 | 0,26 | 0,40 | 0,28 | 0,23 | 0,38 | 0,26 | 0,22 | 0,35 | 0,24 | 0,20 | 0,34 | 0,23 | 0,19 | | | | | | | | | | | | |
| | | | H = 3,8 | 0,35 | 0,26 | 0,22 | 0,31 | 0,23 | 0,20 | 0,29 | 0,22 | 0,18 | 0,27 | 0,20 | 0,17 | 0,26 | 0,19 | 0,16 | | | | | | | | | | | | |
| | | | ΔP _t | 34 | | | 29 | | | 27 | | | 16 | | | 11 | | | | | | | | | | | | | | |
| | | | L _{WA} | 43 | | | 39 | | | 37 | | | 32 | | | 27 | | | | | | | | | | | | | | |
| 1000 | 277,8 | V _z | H = 2,7 | 0,67 | 0,42 | 0,34 | 0,63 | 0,39 | 0,31 | 0,58 | 0,37 | 0,29 | 0,56 | 0,35 | 0,28 | | | | | | | | | | | | | | | |
| | | | H = 3,2 | 0,51 | 0,35 | 0,29 | 0,47 | 0,33 | 0,27 | 0,44 | 0,30 | 0,25 | 0,42 | 0,29 | 0,24 | | | | | | | | | | | | | | | |
| | | | H = 3,8 | 0,39 | 0,29 | 0,25 | 0,36 | 0,27 | 0,23 | 0,34 | 0,25 | 0,21 | 0,32 | 0,24 | 0,21 | | | | | | | | | | | | | | | |
| | | | ΔP _t | 45 | | | 41 | | | 25 | | | 18 | | | | | | | | | | | | | | | | | |
| | | | L _{WA} | 46 | | | 44 | | | 38 | | | 33 | | | | | | | | | | | | | | | | | |
| 1250 | 347,2 | V _z | H = 2,7 | 0,73 | 0,46 | 0,37 | 0,70 | 0,44 | 0,35 | | | | | | | | | | | | | | | | | | | | | |
| | | | H = 3,2 | 0,55 | 0,38 | 0,31 | 0,53 | 0,36 | 0,30 | | | | | | | | | | | | | | | | | | | | | |
| | | | H = 3,8 | 0,42 | 0,31 | 0,27 | 0,41 | 0,30 | 0,26 | | | | | | | | | | | | | | | | | | | | | |
| | | | ΔP _t | 40 | | | 28 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | L _{WA} | 44 | | | 39 | | | | | | | | | | | | | | | | | | | | | | | |
| 1600 | 444,4 | V _z | H = 2,7 | 0,90 | 0,56 | 0,45 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | H = 3,2 | 0,67 | 0,47 | 0,39 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | H = 3,8 | 0,52 | 0,39 | 0,33 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | ΔP _t | 46 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | L _{WA} | 46 | | | | | | | | | | | | | | | | | | | | | | | | | | |

Example: DF-RA 3662 diffuser (36 slots).

Initial data
 Q = 1000 m³/h
 B = 2,1 m.
 H = 3,8 m.

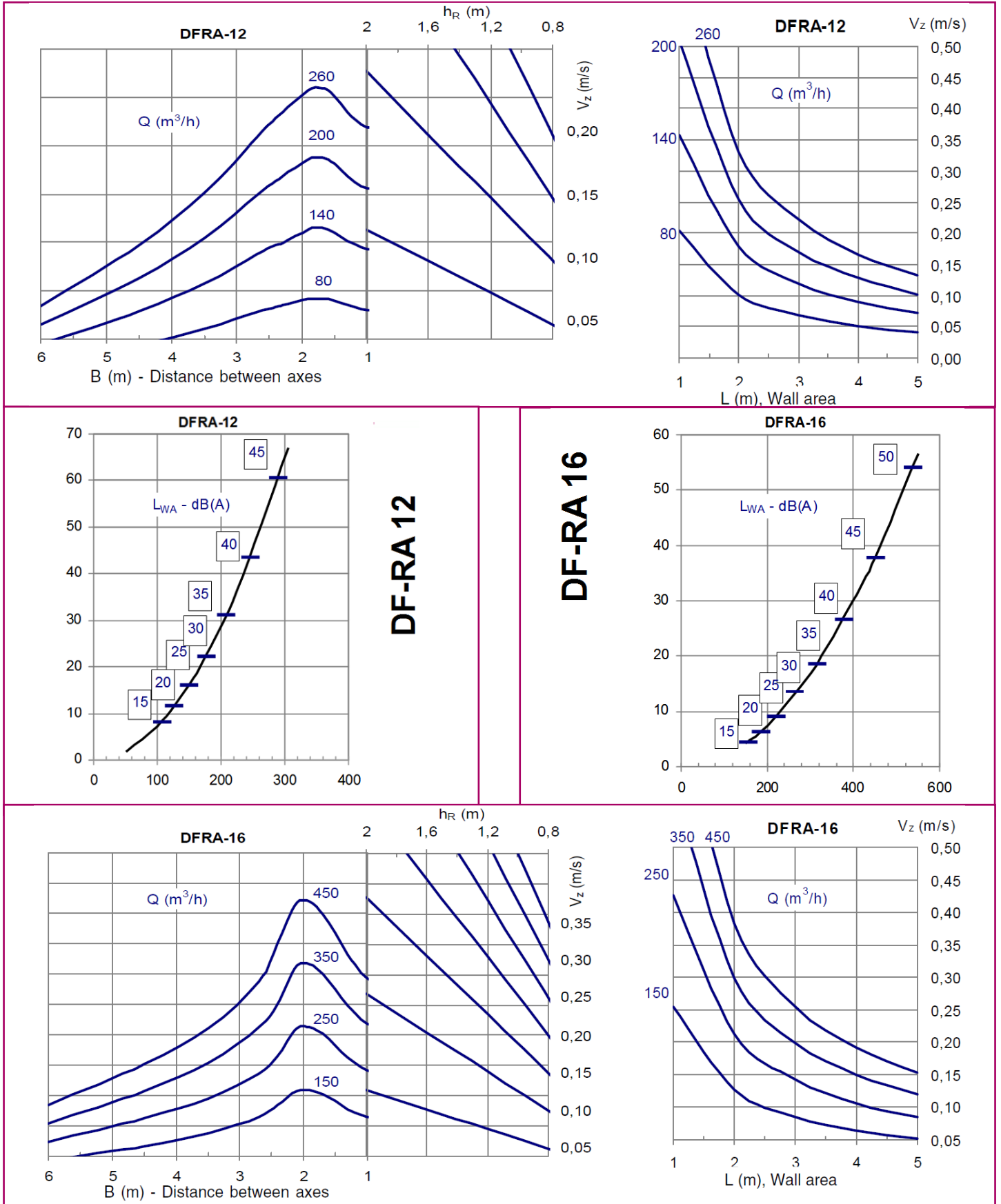
Results
 L_{WA} = 44 dB(A)
 V_z = 0,23 m/s
 ΔPt = 41 Pa



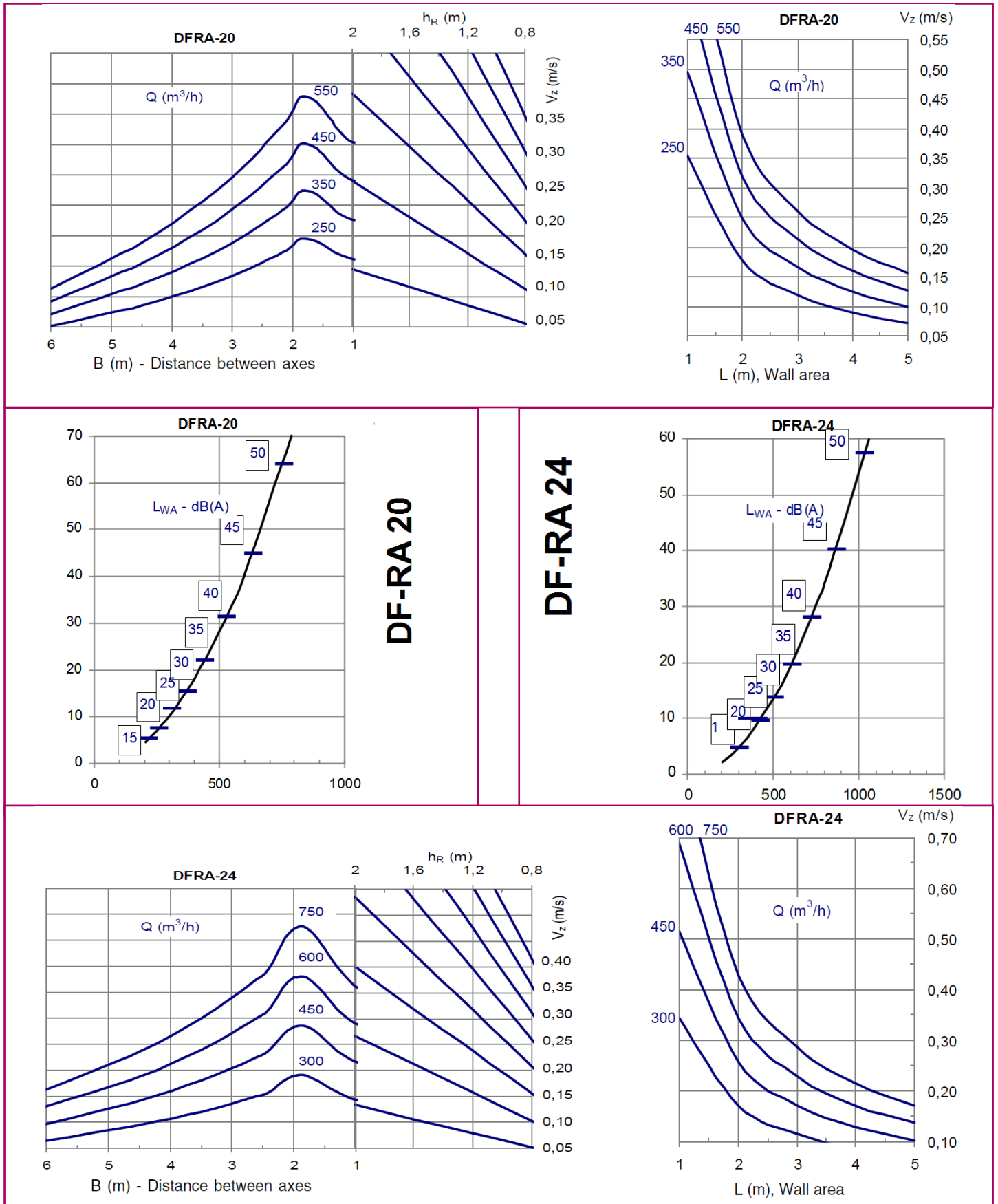
32 slots

Symbols:
 Q = Air flow rate
 V_z = Velocity in occupied area, in m/s
 ΔP_t = Total pressure drop, in Pa
 L_{WA} = Sound power, in dB(A)
 B = Distance between diffuser axes, in m.
 H = Room height, in m

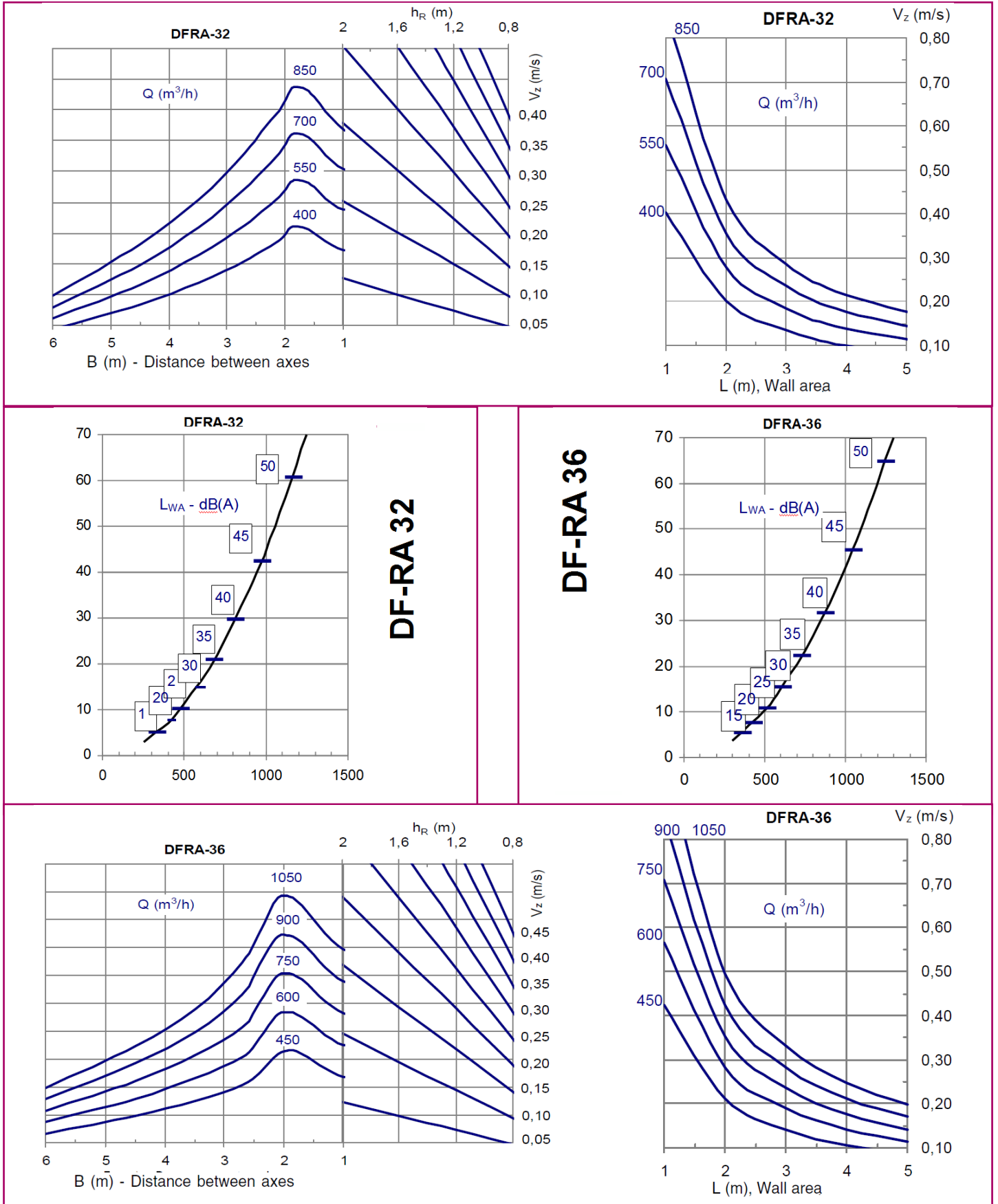
Selection graphs for DF-RA 12 and 16 slots



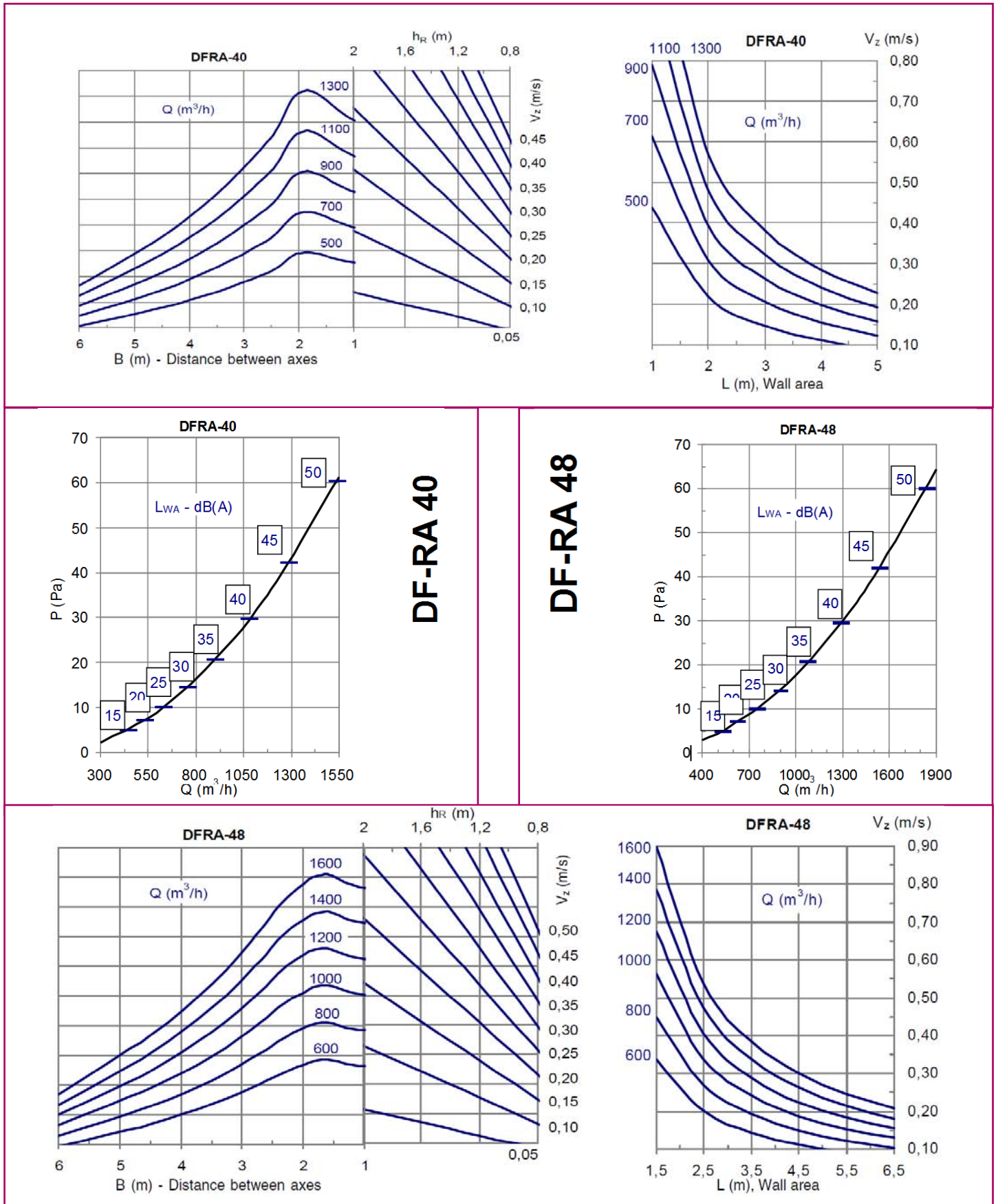
Selection graphs for DF-RA 20 and 24 slots



Selection graphs for DF-RA 32 and 36 slots



Selection graphs for DF-RA 40 and 48 slots

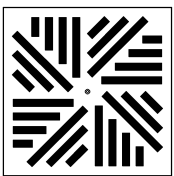


DF-RQ swirl diffusers

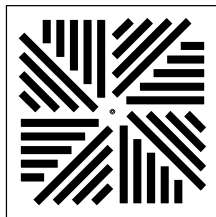
Basic sizes.

There are four basic slot arrays for the DF-RQ, varying from 28 to 48 slots and covering a wide range of air flow rates. Since the diffusers can be integrated into different sizes and types of panel (square, rectangular, round, etc.), each basic size is coded according to the number of slots it includes.

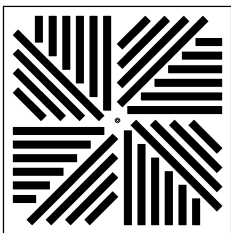
DFRQ 28*



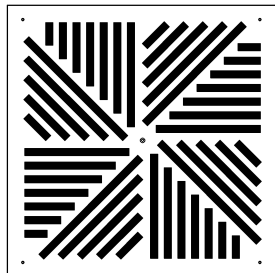
DFRQ 36*



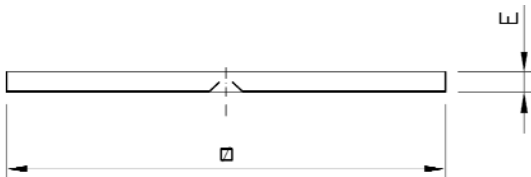
DFRQ 40*



DFRQ 48*

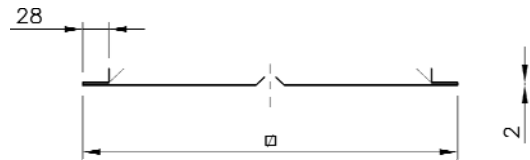


Square panels for modular false ceiling, installation type: DF-RQ. Dimensions and coding.



| Panel for modular ceiling: DF-RQ | | | |
|----------------------------------|----------------------------|------------|----|
| Basic size | Minimum standardized panel | | |
| | Dimensions | Panel code | E |
| 28 | 494 x 494 | 50 | 6 |
| 36 | 594 x 594 | 60 | 10 |
| 40 | 670 x 670 | 67 | 10 |
| 48 | 795 x 795 | 80 | 10 |

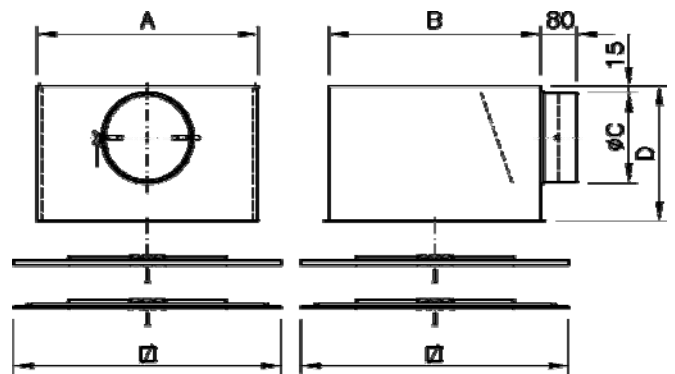
Square panels for plaster false ceiling, installation type: DF-RQ-E. Dimensions and coding.



| Panel for plaster ceiling: DF-RQ-E | | |
|------------------------------------|----------------------|------------|
| Basic size | Minimum standardized | |
| | Dimensions | Panel code |
| 28 | 520 x 520 | 52 |
| 36 | 620 x 620 | 62 |
| 40 | 695 x 695 | 69 |
| 48 | 820 x 820 | 82 |

Note: This installation model has no sharp edges.

Plenum with lateral connection for diffusers integrated in square panels, PQ model.



| Basic size | A | B | C | D |
|------------|-----|-----|------|-----|
| 28 | 488 | 470 | 199 | 300 |
| 36 | 588 | 570 | 249 | 350 |
| 40 | 663 | 645 | 314* | 350 |
| 48 | 788 | 770 | 314 | 410 |

(*) In oval model.

DF-RQ swirl diffusers

Coding for purchase orders. Example

Coding provides a unique description of the model ordered by the customer.

| | |
|----------------|------------------------------|
| DF-RQ | Square panel/Modular ceiling |
| DF-RQ-E | Square panel/Plaster ceiling |

Standard panel finish in white (RAL 9010), other finishes available by special order.

| | |
|---------------------|---------------------------|
| 28, 36,40,48 | Basic size / No. of slots |
|---------------------|---------------------------|

Standard deflectors in black (RAL 9005). White (RAL 9010) finishes available by special order.

| | |
|--------------------|---------------------------|
| 50,60,67,80 | Panel code DF-RQ |
| 52,62,69,82 | Panel code DF-RQ-E |

Check compatibility with the basic sizes.

| | |
|--------------|--|
| PQ | Plenum with lateral connection for DF-RQ and DF-RQ-E |
| PQA | Same as above, internally insulated |
| PE-45 | Polystyrene plenum box for diffusers with plate of 595 x 595 mm |

Special installations by special order.

| | |
|-----------|---|
| RE | Manual damper accessible from false ceiling |
| RL | Manual damper accessible from room |
| RM | Damper equipped to allow motorization |

Coding example:

DF-RQ/2860/ PQ/RM

Description:

Adjustable-blade swirl diffuser, DF-RQ model, size 28, in square panel of 594 x 594, with laterally connected plenum and volume control damper to allow motorization. Front panel in white (RAL 9010) with deflectors in black (RAL 9005).

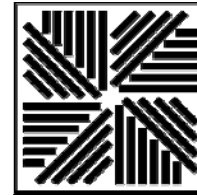
Selection table DF-RQ (air stream between diffusers)

| Q | | No. Slots | 28 | | | 36 | | | 40 | | | 48 | | | |
|------|-------|----------------------|---------|------|------|------|------|------|------|------|------|------|------|------|------|
| m³/h | l/s | B | 1,2 | 1,8 | 2,7 | 1,2 | 1,8 | 2,7 | 1,2 | 1,8 | 2,7 | 1,2 | 1,8 | 2,7 | |
| 250 | 69,4 | V _z | H = 2,7 | 0,12 | 0,14 | 0,11 | | | | | | | | | |
| | | | H = 3,2 | 0,07 | 0,09 | 0,07 | | | | | | | | | |
| | | | H = 3,8 | 0,05 | 0,06 | 0,05 | | | | | | | | | |
| | | ΔP _t (Pa) | 6 | | | | | | | | | | | | |
| | | L _{WA} | <15 | | | | | | | | | | | | |
| 400 | 111,1 | V _z | H = 2,7 | 0,19 | 0,23 | 0,18 | 0,14 | 0,17 | 0,12 | 0,13 | 0,15 | 0,11 | | | |
| | | | H = 3,2 | 0,12 | 0,15 | 0,11 | 0,09 | 0,11 | 0,08 | 0,08 | 0,09 | 0,07 | | | |
| | | | H = 3,8 | 0,08 | 0,10 | 0,08 | 0,06 | 0,07 | 0,05 | 0,06 | 0,06 | 0,05 | | | |
| | | ΔP _t (Pa) | 17 | | | 7 | | | 4 | | | | | | |
| | | L _{WA} | 29 | | | <15 | | | <15 | | | | | | |
| 550 | 152,8 | V _z | H = 2,7 | 0,26 | 0,32 | 0,25 | 0,19 | 0,23 | 0,17 | 0,18 | 0,20 | 0,15 | 0,16 | 0,17 | 0,13 |
| | | | H = 3,2 | 0,16 | 0,20 | 0,16 | 0,12 | 0,14 | 0,10 | 0,11 | 0,13 | 0,10 | 0,10 | 0,11 | 0,08 |
| | | | H = 3,8 | 0,11 | 0,14 | 0,11 | 0,08 | 0,10 | 0,07 | 0,08 | 0,09 | 0,07 | 0,07 | 0,07 | 0,06 |
| | | ΔP _t (Pa) | 31 | | | 13 | | | 7 | | | 5 | | | |
| | | L _{WA} | 38 | | | 25 | | | 18 | | | <15 | | | |
| 700 | 194,4 | V _z | H = 2,7 | 0,33 | 0,41 | 0,32 | 0,24 | 0,29 | 0,21 | 0,23 | 0,25 | 0,20 | 0,21 | 0,22 | 0,17 |
| | | | H = 3,2 | 0,21 | 0,26 | 0,20 | 0,15 | 0,18 | 0,13 | 0,15 | 0,16 | 0,12 | 0,13 | 0,14 | 0,11 |
| | | | H = 3,8 | 0,14 | 0,18 | 0,14 | 0,11 | 0,13 | 0,09 | 0,10 | 0,11 | 0,09 | 0,09 | 0,09 | 0,07 |
| | | ΔP _t (Pa) | 51 | | | 20 | | | 11 | | | 8 | | | |
| | | L _{WA} | 46 | | | 32 | | | 25 | | | 20 | | | |
| 850 | 236,1 | V _z | H = 2,7 | | | | 0,30 | 0,35 | 0,26 | 0,28 | 0,31 | 0,24 | 0,25 | 0,26 | 0,21 |
| | | | H = 3,2 | | | | 0,19 | 0,22 | 0,16 | 0,18 | 0,19 | 0,15 | 0,16 | 0,16 | 0,13 |
| | | | H = 3,8 | | | | 0,13 | 0,15 | 0,11 | 0,12 | 0,13 | 0,10 | 0,11 | 0,11 | 0,09 |
| | | ΔP _t (Pa) | | | | 30 | | | 16 | | | 12 | | | |
| | | L _{WA} | | | | 38 | | | 31 | | | 26 | | | |
| 1000 | 277,8 | V _z | H = 2,7 | 0,35 | 0,41 | 0,30 | 0,33 | 0,36 | 0,28 | 0,30 | 0,31 | 0,25 | | | |
| | | | H = 3,2 | 0,22 | 0,26 | 0,19 | 0,21 | 0,23 | 0,18 | 0,19 | 0,19 | 0,15 | | | |
| | | | H = 3,8 | 0,15 | 0,18 | 0,13 | 0,14 | 0,16 | 0,12 | 0,13 | 0,13 | 0,13 | 0,11 | | |
| | | ΔP _t (Pa) | 41 | | | 23 | | | 17 | | | | | | |
| | | L _{WA} | 43 | | | 36 | | | 31 | | | | | | |
| 1200 | 333,3 | V _z | H = 2,7 | 0,42 | 0,49 | 0,36 | 0,40 | 0,43 | 0,34 | 0,35 | 0,37 | 0,30 | | | |
| | | | H = 3,2 | 0,26 | 0,31 | 0,23 | 0,25 | 0,27 | 0,21 | 0,22 | 0,23 | 0,19 | | | |
| | | | H = 3,8 | 0,18 | 0,21 | 0,16 | 0,17 | 0,19 | 0,15 | 0,15 | 0,16 | 0,13 | | | |
| | | ΔP _t (Pa) | 60 | | | 33 | | | 25 | | | | | | |
| | | L _{WA} | 49 | | | 42 | | | 37 | | | | | | |
| 1500 | 416,7 | V _z | H = 2,7 | | | | 0,49 | 0,54 | 0,42 | 0,44 | 0,46 | 0,37 | | | |
| | | | H = 3,2 | | | | 0,31 | 0,34 | 0,27 | 0,28 | 0,29 | 0,23 | | | |
| | | | H = 3,8 | | | | 0,22 | 0,24 | 0,18 | 0,19 | 0,20 | 0,16 | | | |
| | | ΔP _t (Pa) | | | | 51 | | | 39 | | | | | | |
| | | L _{WA} | | | | 49 | | | 44 | | | | | | |
| 1800 | 500,0 | V _z | H = 2,7 | | | | | | | 0,53 | 0,55 | 0,45 | | | |
| | | | H = 3,2 | | | | | | | 0,33 | 0,34 | 0,28 | | | |
| | | | H = 3,8 | | | | | | | 0,23 | 0,24 | 0,19 | | | |
| | | ΔP _t (Pa) | | | | | | | 56 | | | | | | |
| | | L _{WA} | | | | | | | 50 | | | | | | |

Example: DF-RQ 4067 diffuser (40 slots).

Initial data
 Q = 850 m³/h
 B = 1,8 m.
 H = 3,2 m.

Results
 L_{WA} = 38 dB(A)
 V_z = 0,22 m/s
 ΔPt = 30 Pa



DF-RQ 4067
40 slots

Symbols:
 V_z = Velocity in occupied area, in m/s
 B = Distance between diffuser axes, in m.
 Q = Air flow rate
 H = Room height, in m
 ΔP_t = Total pressure drop, in Pa
 L_{WA} = Sound power, in dB(A)

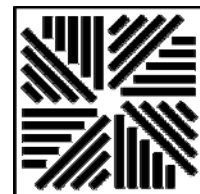
Tabla de selección DF-RQ (vena de aire hacia la pared)

| Q | | No. slots | 28 | | | 36 | | | 40 | | | 48 | | | |
|-------------------|-------|-----------------|---------|------|------|------|------|------|------|------|------|------|------|------|------|
| m ³ /h | l/s | X | 0,6 | 1,5 | 2,1 | 0,6 | 1,5 | 2,1 | 0,6 | 1,5 | 2,1 | 0,6 | 1,5 | 2,1 | |
| 250 | 69,4 | V _z | H = 2,7 | 0,22 | 0,13 | 0,11 | | | | | | | | | |
| | | | H = 3,2 | 0,16 | 0,11 | 0,09 | | | | | | | | | |
| | | | H = 3,8 | 0,12 | 0,09 | 0,08 | | | | | | | | | |
| | | ΔP _t | 6 | | | | | | | | | | | | |
| | | L _{WA} | <15 | | | | | | | | | | | | |
| 400 | 111,1 | V _z | H = 2,7 | 0,35 | 0,22 | 0,17 | 0,24 | 0,15 | 0,12 | 0,23 | 0,14 | 0,11 | | | |
| | | | H = 3,2 | 0,26 | 0,18 | 0,15 | 0,18 | 0,12 | 0,10 | 0,17 | 0,12 | 0,10 | | | |
| | | | H = 3,8 | 0,20 | 0,15 | 0,13 | 0,14 | 0,10 | 0,09 | 0,13 | 0,10 | 0,08 | | | |
| | | ΔP _t | 17 | | | 7 | | | 4 | | | | | | |
| | | L _{WA} | 29 | | | <15 | | | <15 | | | | | | |
| 550 | 152,8 | V _z | H = 2,7 | 0,47 | 0,30 | 0,24 | 0,33 | 0,21 | 0,17 | 0,31 | 0,19 | 0,16 | 0,28 | 0,17 | 0,14 |
| | | | H = 3,2 | 0,36 | 0,25 | 0,20 | 0,25 | 0,17 | 0,14 | 0,23 | 0,16 | 0,13 | 0,21 | 0,14 | 0,12 |
| | | | H = 3,8 | 0,27 | 0,20 | 0,17 | 0,19 | 0,14 | 0,12 | 0,18 | 0,13 | 0,11 | 0,16 | 0,12 | 0,10 |
| | | ΔP _t | 31 | | | 13 | | | 7 | | | 5 | | | |
| | | L _{WA} | 38 | | | 25 | | | 18 | | | <15 | | | |
| 700 | 194,4 | V _z | H = 2,7 | 0,60 | 0,38 | 0,30 | 0,42 | 0,26 | 0,21 | 0,40 | 0,25 | 0,20 | 0,35 | 0,22 | 0,18 |
| | | | H = 3,2 | 0,45 | 0,31 | 0,26 | 0,32 | 0,22 | 0,18 | 0,30 | 0,20 | 0,17 | 0,26 | 0,18 | 0,15 |
| | | | H = 3,8 | 0,35 | 0,26 | 0,22 | 0,24 | 0,18 | 0,15 | 0,23 | 0,17 | 0,14 | 0,20 | 0,15 | 0,13 |
| | | ΔP _t | 51 | | | 20 | | | 11 | | | 8 | | | |
| | | L _{WA} | 46 | | | 32 | | | 25 | | | 20 | | | |
| 850 | 236,1 | V _z | H = 2,7 | 0,51 | 0,32 | 0,26 | 0,48 | 0,30 | 0,24 | 0,43 | 0,27 | 0,21 | | | |
| | | | H = 3,2 | 0,38 | 0,27 | 0,22 | 0,36 | 0,25 | 0,21 | 0,32 | 0,22 | 0,18 | | | |
| | | | H = 3,8 | 0,30 | 0,22 | 0,19 | 0,28 | 0,21 | 0,18 | 0,25 | 0,18 | 0,16 | | | |
| | | ΔP _t | 30 | | | 16 | | | 12 | | | | | | |
| | | L _{WA} | 38 | | | 31 | | | 26 | | | | | | |
| 1000 | 277,8 | V _z | H = 2,7 | 0,60 | 0,38 | 0,30 | 0,57 | 0,35 | 0,28 | 0,50 | 0,32 | 0,25 | | | |
| | | | H = 3,2 | 0,45 | 0,31 | 0,26 | 0,42 | 0,29 | 0,24 | 0,38 | 0,26 | 0,22 | | | |
| | | | H = 3,8 | 0,35 | 0,26 | 0,22 | 0,33 | 0,24 | 0,21 | 0,29 | 0,22 | 0,18 | | | |
| | | ΔP _t | 41 | | | 23 | | | 17 | | | | | | |
| | | L _{WA} | 43 | | | 36 | | | 31 | | | | | | |
| 1200 | 333,3 | V _z | H = 2,7 | 0,72 | 0,45 | 0,36 | 0,68 | 0,42 | 0,34 | 0,61 | 0,38 | 0,30 | | | |
| | | | H = 3,2 | 0,54 | 0,37 | 0,31 | 0,51 | 0,35 | 0,29 | 0,45 | 0,31 | 0,26 | | | |
| | | | H = 3,8 | 0,42 | 0,31 | 0,26 | 0,39 | 0,29 | 0,25 | 0,35 | 0,26 | 0,22 | | | |
| | | ΔP _t | 60 | | | 33 | | | 25 | | | | | | |
| | | L _{WA} | 49 | | | 42 | | | 37 | | | | | | |
| 1500 | 416,7 | V _z | H = 2,7 | 0,85 | 0,53 | 0,42 | 0,76 | 0,47 | 0,38 | | | | | | |
| | | | H = 3,2 | 0,64 | 0,44 | 0,36 | 0,57 | 0,39 | 0,32 | | | | | | |
| | | | H = 3,8 | 0,49 | 0,36 | 0,31 | 0,44 | 0,32 | 0,28 | | | | | | |
| | | ΔP _t | 51 | | | 39 | | | | | | | | | |
| | | L _{WA} | 49 | | | 44 | | | | | | | | | |
| 1800 | 500,0 | V _z | H = 2,7 | | | | | | | | | 0,91 | 0,57 | 0,45 | |
| | | | H = 3,2 | | | | | | | | | 0,68 | 0,47 | 0,39 | |
| | | | H = 3,8 | | | | | | | | | 0,52 | 0,39 | 0,33 | |
| | | ΔP _t | | | | | | | | | 56 | | | | |
| | | L _{WA} | | | | | | | | | 50 | | | | |

Example: DF-RQ 3660 diffuser (36 slots).

Initial data
 Q = 700 m³/h
 B = 1,5 m.
 H = 3,2 m.

Results
 L_{WA} = 32 dB(A)
 V_z = 0,22 m/s
 ΔPt = 20 Pa



DF-RQ 3660
36 slots

Symbols:

V_z = Velocity in occupied area, in m/s

B = Distance between diffuser axes, in m.

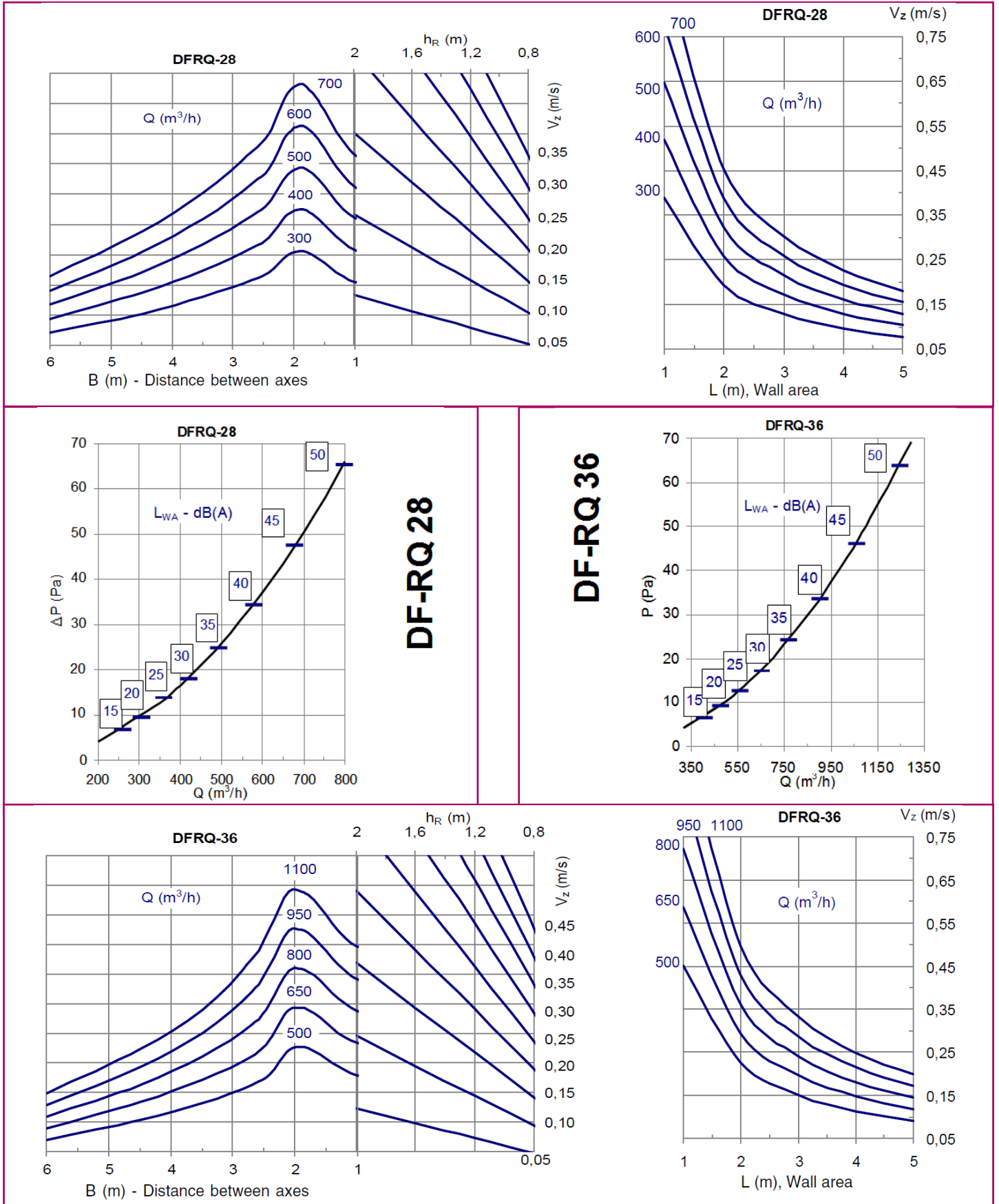
Q = Air flow rate

H = Room height, in m

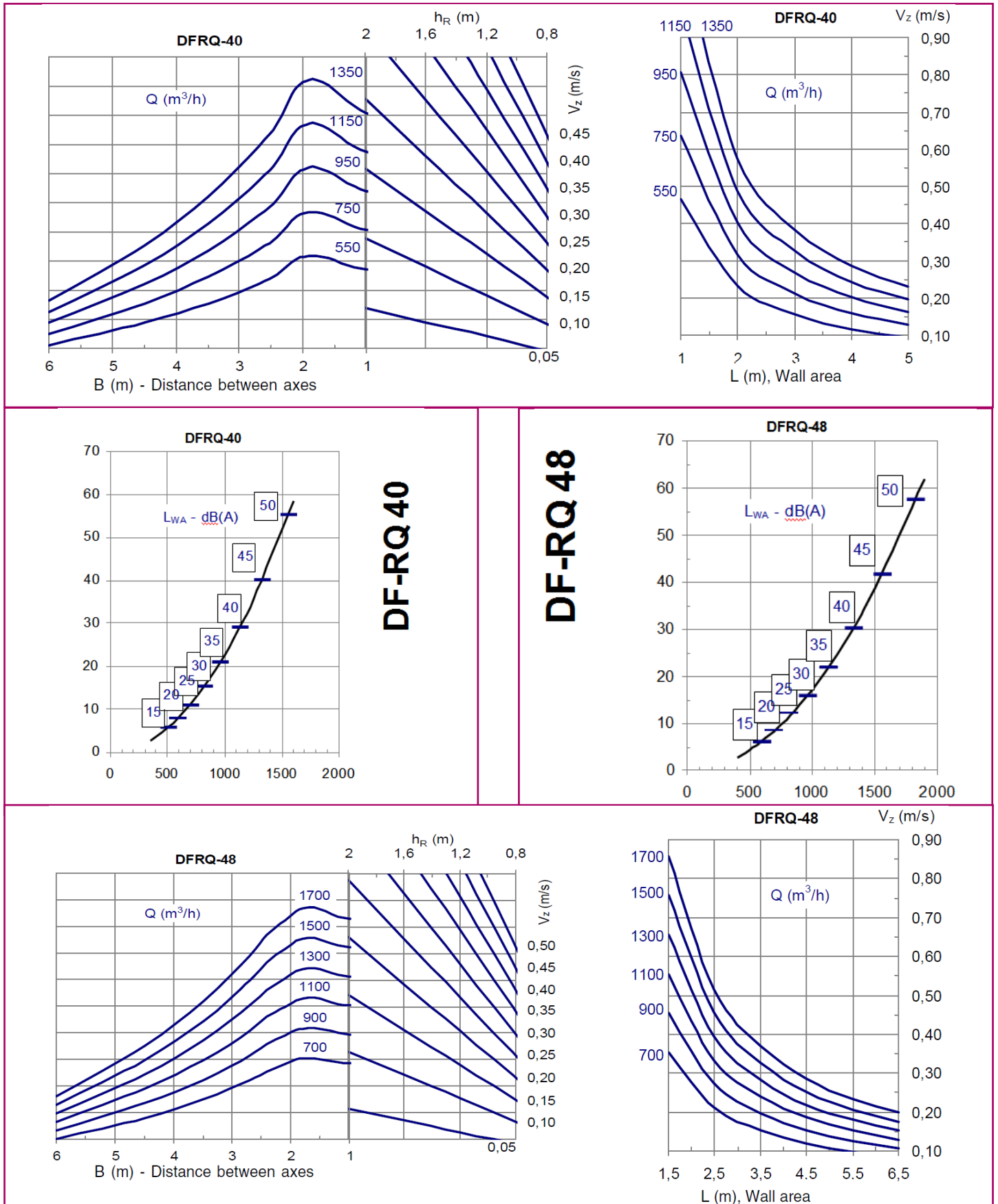
ΔP_t = Total pressure drop, in Pa

L_{WA} = Sound power, in dB(A)

Selection graphs for DF-RQ 28 and 36 slots



Selection graphs for DF-RQ 40 and 48 slots



Adjustable-blade swirl diffusers

Research, design and innovation

For facility-related reasons, it is often necessary to adapt to different kinds of modular false ceilings. The KOOLAIR R&D Department has designed an extensive variety of swirl diffusers adapted to widely different



geometries and different features than those usually offered: diffusers integrated into rectangular panels (1200x300) inserting the diffuser inside an ellipse, as shown in the photo below; variable geometry swirl diffusers with no need for outside power, such as the diffuser in the side photo, with horizontal or rotational air supply in the case of

hot air, etc.



The real differentiating component that makes KOOLAIR stand out from all the rest, however, is its strong interest in research to ensure the suitability of all new equipment (usually developed from a merely aesthetic perspective) under actual working conditions, with real-scale tests done in the air diffusion test room at the facilities owned by KOOLAIR's R&D laboratory.

The air diffusion test room (dimensions 9 m x 5.6 m; adjustable height from 2.0 to 4.0 m) allows on-site verification of the suitability of the product developed by our R&D Department or by any of the parties involved in the installations (architects, engineers, installers, etc.) with whom we work regularly on the development of new products.



The temperature, residual velocity, etc. are measured during the testing process, and air supply tests are done with smoke for clear visualization of air distribution in the room.

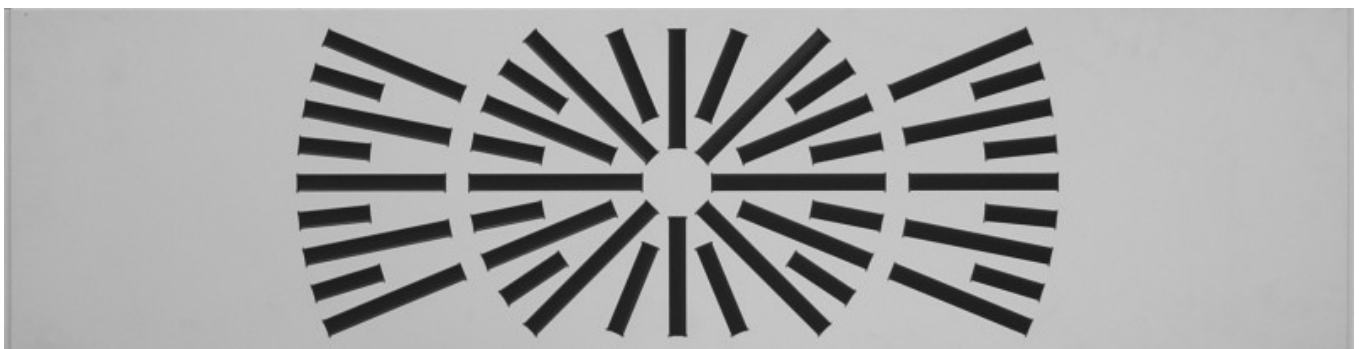
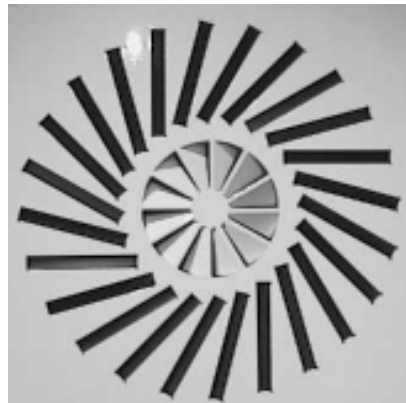
Our facilities are also equipped with a reverberation room, constructed to ISO standards, where the sound pressure levels generated by the different units can be determined with a high degree of precision.



A complete set of equipment is also available for on-site testing: calibration balometer, portable sound level meter, propeller and hot-wire air flow meters, pressure gauges, etc.

Adjustable-blade swirl diffusers

Research, design and innovation



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