



# MR MAX

## AIRFLOW & ZONE CONTROLS

### HIGH CAPACITY REGULATOR

## Product Description

The model MR MAX Constant Airflow Regulator is a modulating orifice that automatically regulates airflows in round duct systems to constant levels without the use of electric or pneumatic sensors or controls.

The MR MAX can easily be inserted between two sections of round ductwork to maintain a reliably constant airflow over a wide range of differential pressure. Flow control is achieved by an easy-moving, asymmetrical angled control damper that ensures a sensitive response, even for small amounts of airflow. The damper is inclined according to the pressure difference between upstream and downstream of the regulator module, thereby modifying the open area available for air passage and resulting in maintenance of velocity and specific airflow setpoints. This principle guarantees constant airflow regardless of the variations affecting the ductwork.

By maintaining the specified airflow, the MR MAX ensures optimal ventilation and/or thermal comfort for occupants while limiting the costs of operating the fan or air-conditioning unit.

The MR MAX is an ideal solution for meeting rooms, classrooms, and concert halls. The MR MAX will regulate airflow in supply, return, or exhaust duct systems in both low- and high-pressure installations.

The MR MAX is available in 9 diameters, each with multiple factory-calibrated setpoints. The airflow can be adjusted on site with the use of a graduated scale and an Allen/Hex key.

## Maintenance

All components are maintenance-free and corrosion-proof under normal conditions. The device and ductwork must be accessible to enable adjustment and maintenance.

## Construction

The MR MAX is constructed of a laser-welded, galvanized steel body, a translucent plastic control device, and a double-lip airtightness seal around the circumference to ensure a tight, no-leak fit. The integral control device is comprised of an aluminum damper and a stainless steel spring and shaft fitted to PTFE (polytetrafluoroethylene) bearings. A pneumatic piston damper prevents overshoot and oscillation of the control damper and ensures an accurate response and control behavior. Each MR MAX is designed and produced for control of air in temperatures ranging from -22° to 212°F (-30° to 100°C).

## Installation

Mounting can be horizontal or vertical. The MR MAX orientation must correspond to the airflow direction indicated on the device, but the position of the damper does not affect performance.

The exact balancing of the control damper is ensured by a counterweight arranged vertically on the control damper, which ensures an accurate control response in all orientations. The flow profile in front of the flow controller should be cross-section-filling, since unfavorable flow conditions (such as asymmetric flow, deflection around sharp edges, etc.) can negatively affect the response and control behavior.

## Warranty

Guaranteed for five (5) years, from date of shipment, against all defects in material or workmanship, provided that the material has been installed and used under normal conditions. This warranty is limited to the repair or replacement of the material.

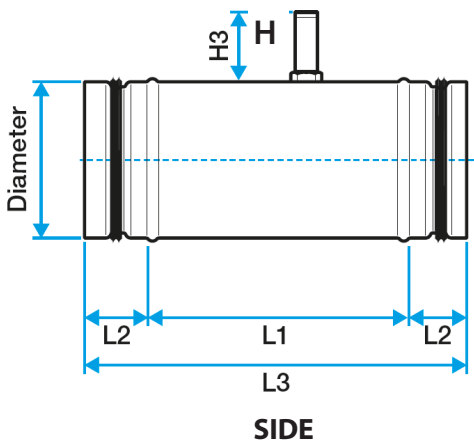
## KEY DETAILS

- 9 Diameters: 3", 4", 5", 6", 8", 10", 12", 14", and 16"
- Airflow values from 40 to 2355 CFM (70 to 4000 m<sup>3</sup>/h)
- Operating Pressure Range: 0.2 to 4.0 in. w.g. (50 to 1000 Pa)
- Recommended Air Speed: 885 FPM (4.5 m/s)
- Accuracy within ± 10% for nominal airflow > 60 CFM (100 m<sup>3</sup>/h)

## Performance

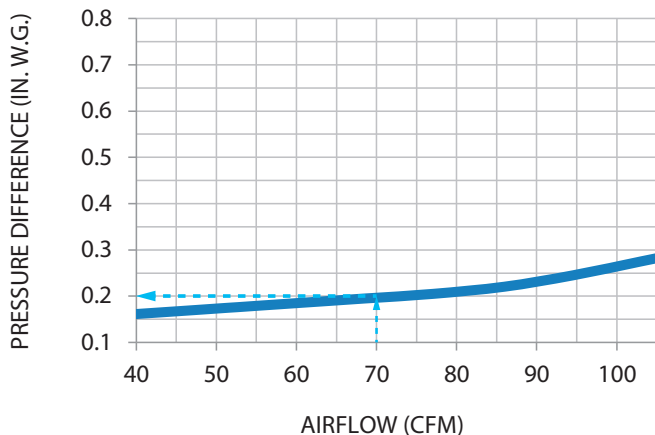
The MR MAX controls airflow accurately to within  $\pm 10\%$  for nominal airflow  $> 60$  CFM ( $100 \text{ m}^3/\text{h}$ ) and  $\pm 5$  CFM ( $10 \text{ m}^3/\text{h}$ ) for nominal airflow  $< 60$  CFM ( $100 \text{ m}^3/\text{h}$ ) throughout the target operating pressure range of 0.2 to 4.0 in. w.g. (50 to 1000 Pa). The MR MAX operates via a minimum differential pressure that depends on the airflow up to a maximum differential pressure of 4.0 in. w.g. (1000 Pa) within the stable control range. The MR MAX will regulate airflow to the range in the range of 25 to 2355 CFM (40 to 4000  $\text{m}^3/\text{h}$ ). It will operate in the air speed range of 100 to 1575 FPM (0.5 to 8 m/s). The ideal air velocity is 885 FPM (4.5 m/s), and the speed should not drop below 530 FPM (2.7 m/s).

## Dimensions, Weight, and Airflow Range



| Part Number | Ø Diameter      | L1                 | L2               | L3                 | H                 | Weight                | Airflow Range                                      |
|-------------|-----------------|--------------------|------------------|--------------------|-------------------|-----------------------|--|
| 11016389    | 3"<br>(80 mm)   | 5.31"<br>(135 mm)  | 1.57"<br>(40 mm) | 8.46"<br>(215 mm)  | 2.75"<br>(70 mm)  | 1.32 lbs<br>(0.6 kg)  | 25-75 CFM<br>(40-125 $\text{m}^3/\text{h}$ )       |
| 11016390    | 4"<br>(100 mm)  | 6.69"<br>(170 mm)  | 1.57"<br>(40 mm) | 9.84"<br>(250 mm)  | 2.76"<br>(70 mm)  | 1.32 lbs<br>(0.6 kg)  | 40-130 CFM<br>(70-220 $\text{m}^3/\text{h}$ )      |
| 11016391    | 5"<br>(125 mm)  | 6.69"<br>(170 mm)  | 1.57"<br>(40 mm) | 9.84"<br>(250 mm)  | 2.76"<br>(70 mm)  | 1.765 lbs<br>(0.8 kg) | 60-165 CFM<br>(100-280 $\text{m}^3/\text{h}$ )     |
| 11016410    | 6"<br>(150 mm)  | 6.69"<br>(170 mm)  | 1.57"<br>(40 mm) | 9.84"<br>(250 mm)  | 2.76"<br>(70 mm)  | 2.43 lbs<br>(1.1 kg)  | 100-265 CFM<br>(170-450 $\text{m}^3/\text{h}$ )    |
| 11016393    | 8"<br>(200 mm)  | 9.45"<br>(240 mm)  | 1.57"<br>(40 mm) | 12.60"<br>(320 mm) | 2.76"<br>(70 mm)  | 3.97 lbs<br>(1.8 kg)  | 150-530 CFM<br>(250-900 $\text{m}^3/\text{h}$ )    |
| 11016394    | 10"<br>(250 mm) | 9.45"<br>(240 mm)  | 1.57"<br>(40 mm) | 12.60"<br>(320 mm) | 2.76"<br>(70 mm)  | 5.51 lbs<br>(2.5 kg)  | 295-940 CFM<br>(500-1600 $\text{m}^3/\text{h}$ )   |
| 11016395    | 12"<br>(300 mm) | 8.66"<br>(220 mm)  | 3.50"<br>(89 mm) | 15.67"<br>(398 mm) | 4.33"<br>(110 mm) | 11.02 lbs<br>(5.0 kg) | 470-1650 CFM<br>(800-2800 $\text{m}^3/\text{h}$ )  |
| 11016397    | 14"<br>(355 mm) | 11.81"<br>(300 mm) | 2.36"<br>(60 mm) | 16.54"<br>(420 mm) | 4.33"<br>(110 mm) | 12.13 lbs<br>(5.5 kg) | 530-1885 CFM<br>(900-3200 $\text{m}^3/\text{h}$ )  |
| 11016396    | 16"<br>(400 mm) | 11.81"<br>(300 mm) | 2.36"<br>(60 mm) | 16.54"<br>(420 mm) | 4.33"<br>(110 mm) | 16.53 lbs<br>(7.5 kg) | 590-2355 CFM<br>(1400-4000 $\text{m}^3/\text{h}$ ) |

## How the MR MAX Works



The MR MAX operates from the minimum pressure differential, which is a function of the cfm setpoint, up to the maximum pressure differential of 4.0 in. w.g.

Example Shown: MR MAX 4" with the airflow setpoint at 70 cfm, requires a minimum pressure differential of 0.2 in. w.g. and has a maximum pressure differential of 4.0 in. w.g.

## Field of Application

Ideal for controlling heating, ventilation and air conditioning networks with high pressure and airflow values.

### APPLICATIONS OF MR MAX:

- Can be used both for air supply and exhaust.
- Airflow control ranges (see selection diagram)
- Air speed: 531-1574 FPM.
- Suitable for meeting rooms, amphitheatres, classrooms, concert halls, multi-family buildings, etc.

### MINIMUM STATIC DIFFERENTIAL PRESSURE ON CONTROLLER:

The MR MAX controls via a minimum differential pressure that depends on the airflow (see diagram) up to a maximum differential pressure of 4 in. w.g. within the stable control range.

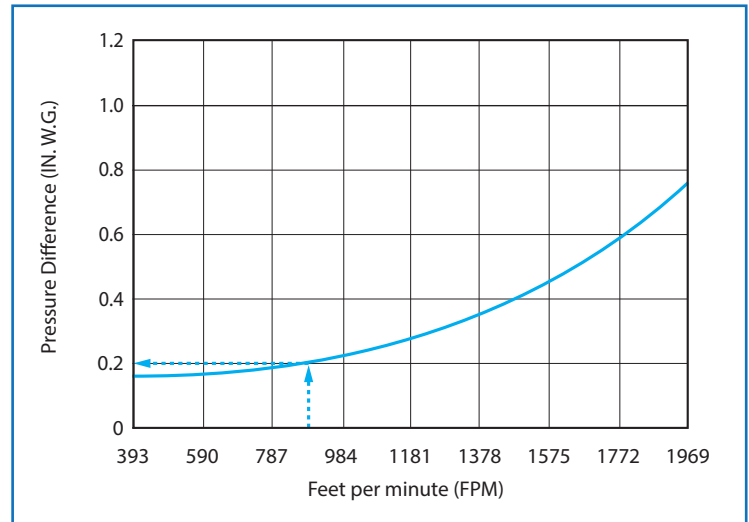
The ideal aerodynamic speed is 885 FPM and should not drop below 531 FPM.

### EXAMPLE:

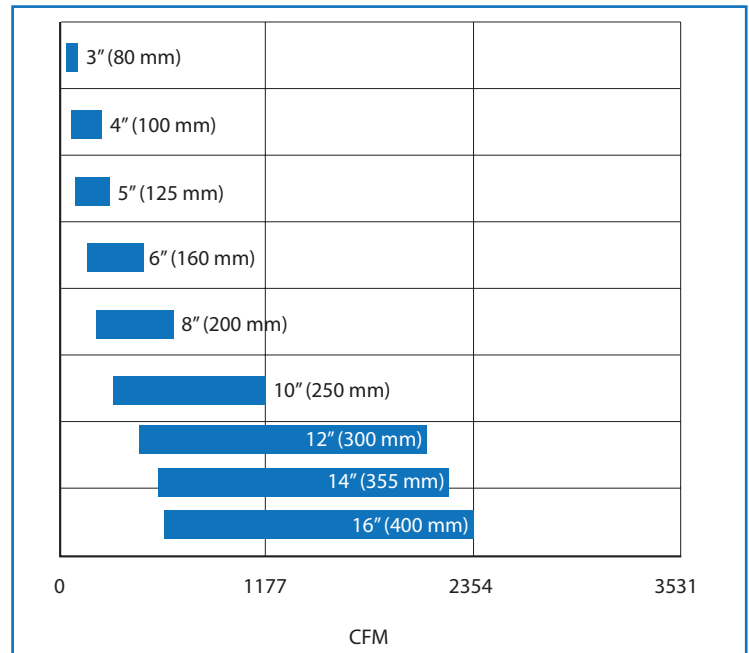
MR MAX diameter 6" with airflow set point 191 CFM

Air speed: 885 FPM

Minimum static differential pressure for operation: 0.2 in. w.g.

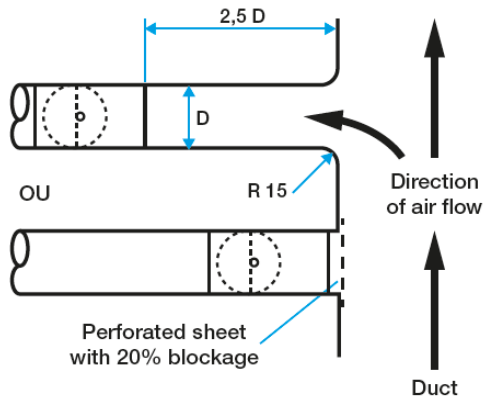
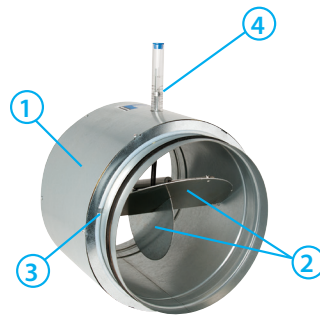


### Quick-select diagram



## Construction & Installation

1. Laser-welded galvanized steel body
2. Control device comprised of an aluminum damper and a stainless steel spring and shaft fitted to PTFE (polytetrafluoroethylene) bearings
3. Double-lip seal
4. Translucent plastic control device



When connecting to the main duct, a straight-flow section of at least 2.5 times the diagonal must be maintained and the branch point must be rounded. If the controller is attached directly to the duct, a perforated sheet with 20% blockage should be used. See diagram above.

## Recommended Specification

Model MR MAX Adjustable Constant Airflow Regulators by American ALDES Ventilation Corporation, Bradenton, Florida, shall operate solely on duct pressure and require no external power supply. Each regulator shall be capable of being field adjusted to the required airflow setpoint, as indicated on the schedule, by manual adjustment of the control device using an Allen/Hex key. The device shall be rated for use in air temperatures ranging from -22° to 212°F (-30° to 100°C).

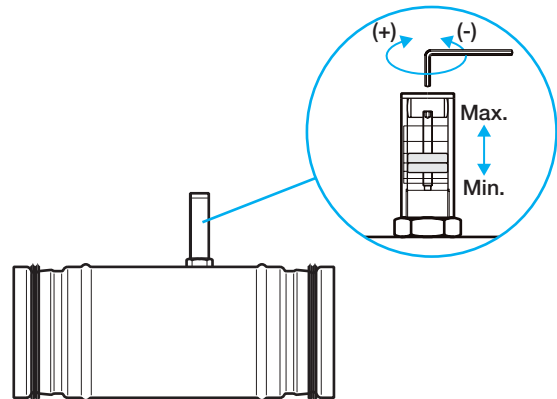
Constant Airflow Regulators shall be capable of maintaining constant airflow within  $\pm 10\%$  for nominal airflow  $> 60$  CFM (100 m<sup>3</sup>/h) and  $\pm 5$  CFM (10 m<sup>3</sup>/h) for nominal airflow  $< 60$  CFM (100 m<sup>3</sup>/h) throughout the target operating pressure range of 0.2 to 4.0 in. w.g. (50 to 1000 Pa) differential pressure.\* Sound power levels shall not exceed those for each size and CFM rating as scheduled. \*The MR MAX controls via a minimum differential pressure that depends on the airflow up to a maximum differential pressure of 4.0 in.w.g. (1000 Pa) within the stable control range.

The MR MAX is constructed of a laser-welded, galvanized steel body, a translucent plastic control device, and a double-lip airtightness seal around the circumference to ensure a tight, no-leak fit. The integral control device shall be comprised of an aluminum damper and a stainless steel spring and shaft fitted to PTFE (polytetrafluoroethylene) bearings. A pneumatic piston damper prevents overshoot and oscillation of the control damper and ensures an accurate response and control behavior.

All MR MAX Adjustable Constant Airflow Regulators will require no maintenance and must be warranted for a period of no less than five (5) years. MR MAX Adjustable Constant Airflow Regulators shall be installed in tight ducting systems in accordance with all applicable codes and manufacturer's instructions.

## Adjusting the Airflow Setpoint

Each MR MAX comes preset to a specific airflow. The airflow setpoint can be modified, even after installation, using an Allen/Hex key, as demonstrated in the diagram below. The airflow setpoint must fall within the airflow range shown in the table on Page 2.



# Acoustic Data

Airflow noise is highly dependent on local conditions, the radiating area of the duct (diameter and length) after the muffler, and the sound insulation. Data reported here were determined in a laboratory. The sound power can be increased by an additional sound source (e.g., a fan, unfavorable flow conditions, etc.). If this additional sound power level is 10 dB lower than the sound power level of the MR MAX, it does not cause an increase in the airflow noise generated by the controller.

| Nominal Diameter | Airflow |                   | Static Pressure Difference at the MR MAX                            |        |        |        |         |         |         |         |   |   |        |        |        |         |         |         |                       |   |   |        |        |        |         |         |         |         |   |
|------------------|---------|-------------------|---|--------|--------|--------|---------|---------|---------|---------|---|---|--------|--------|--------|---------|---------|---------|-----------------------|---|---|--------|--------|--------|---------|---------|---------|---------|---|
|                  |         |                   | 0.4 in. w.g. (100 Pa)   |        |        |        |         |         |         |         | 1.0 in. w.g. (250 Pa)                     |   |        |        |        |         |         |         | 2.0 in. w.g. (500 Pa) |   |   |        |        |        |         |         |         |         |   |
|                  | CFM     | m <sup>3</sup> /h | Sound Power Level/Octave Performance*<br>L <sub>w</sub> (dB/octave) |        |        |        |         |         |         |         | Total L <sub>w</sub> total A - eval dB(A) | Sound Power Level/Octave Performance*<br>L <sub>w</sub> (dB/octave) |        |        |        |         |         |         |                       | Total L <sub>w</sub> total A - eval dB(A) | Sound Power Level/Octave Performance*<br>L <sub>w</sub> (dB/octave) |        |        |        |         |         |         |         | Total L <sub>w</sub> total A - eval dB(A) |
|                  |         |                   | 63 Hz   | 125 Hz | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz | 8000 Hz |   | 63 Hz   | 125 Hz | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz | 8000 Hz               |   | 63 Hz   | 125 Hz | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz | 8000 Hz |   |
| 3" (80 mm)       | 48      | 82                | 49  | 47     | 44     | 41     | 39      | 39      | 33      | 32      | 45  | 51  | 51     | 50     | 49     | 48      | 49      | 44      | 44                    | 54  | 58  | 58     | 56     | 55     | 55      | 56      | 51      | 51      | 61  |
|                  | 74      | 125               | 52  | 51     | 48     | 45     | 44      | 44      | 38      | 37      | 49  | 61  | 60     | 57     | 54     | 53      | 53      | 47      | 46                    | 58  | 68  | 66     | 63     | 61     | 59      | 59      | 53      | 52      | 65  |
| 4" (100 mm)      | 40      | 70                | 40  | 39     | 38     | 36     | 35      | 36      | 30      | 29      | 41  | 43  | 45     | 46     | 46     | 47      | 49      | 44      | 43                    | 53  | 49  | 52     | 52     | 53     | 54      | 55      | 50      | 50      | 60  |
|                  | 80      | 135               | 50  | 48     | 45     | 42     | 41      | 40      | 34      | 33      | 46  | 59  | 57     | 54     | 51     | 50      | 49      | 43      | 42                    | 55  | 60  | 60     | 58     | 57     | 57      | 58      | 53      | 52      | 63  |
| 5" (125 mm)      | 120     | 200               | 54  | 52     | 49     | 47     | 45      | 45      | 39      | 38      | 51  | 63  | 61     | 58     | 55     | 54      | 54      | 48      | 47                    | 59  | 70  | 68     | 65     | 62     | 61      | 60      | 54      | 53      | 66  |
|                  | 60      | 100               | 41  | 40     | 38     | 36     | 35      | 36      | 30      | 29      | 41  | 45  | 47     | 47     | 48     | 48      | 49      | 44      | 43                    | 54  | 52  | 54     | 54     | 55     | 56      | 50      | 49      | 60      |   |
|                  | 110     | 190               | 51  | 49     | 46     | 42     | 41      | 40      | 34      | 32      | 46  | 55  | 54     | 53     | 51     | 51      | 51      | 46      | 45                    | 56  | 61  | 61     | 59     | 58     | 57      | 58      | 52      | 52      | 63  |
| 6" (160 mm)      | 165     | 280               | 54  | 53     | 50     | 47     | 45      | 45      | 39      | 37      | 50  | 63  | 61     | 58     | 55     | 54      | 53      | 47      | 46                    | 59  | 64  | 64     | 62     | 61     | 61      | 62      | 57      | 56      | 67  |
|                  | 105     | 180               | 44  | 43     | 41     | 39     | 38      | 38      | 32      | 31      | 43  | 48  | 50     | 50     | 50     | 51      | 46      | 45      | 56                    | 55  | 57  | 57     | 57     | 57     | 58      | 53      | 51      | 63      |   |
|                  | 94      | 340               | 53  | 51     | 48     | 44     | 43      | 42      | 36      | 34      | 48  | 62  | 60     | 56     | 53     | 51      | 51      | 44      | 43                    | 57  | 64  | 64     | 62     | 60     | 60      | 60      | 55      | 54      | 65  |
| 8" (200 mm)      | 294     | 500               | 57  | 55     | 52     | 49     | 47      | 47      | 40      | 39      | 52  | 66  | 64     | 61     | 58     | 56      | 55      | 49      | 48                    | 61  | 72  | 70     | 67     | 64     | 62      | 62      | 56      | 54      | 68  |
|                  | 150     | 250               | 45  | 43     | 41     | 39     | 38      | 37      | 31      | 30      | 43  | 51  | 52     | 52     | 51     | 51      | 51      | 45      | 44                    | 56  | 57  | 59     | 58     | 58     | 57      | 58      | 52      | 50      | 63  |
|                  | 340     | 575               | 55  | 53     | 50     | 46     | 44      | 44      | 37      | 36      | 50  | 64  | 62     | 58     | 55     | 53      | 53      | 46      | 45                    | 59  | 66  | 66     | 64     | 62     | 62      | 62      | 56      | 56      | 67  |
| 10" (250 mm)     | 530     | 900               | --  | --     | --     | --     | --      | --      | --      | --      | --  | 68  | 66     | 63     | 60     | 58      | 58      | 52      | 50                    | 64  | 75  | 73     | 70     | 67     | 65      | 65      | 58      | 57      | 70  |
|                  | 295     | 500               | 48  | 47     | 45     | 43     | 41      | 41      | 35      | 34      | 47  | 54  | 56     | 55     | 55     | 54      | 55      | 49      | 48                    | 60  | 61  | 62     | 62     | 61     | 61      | 62      | 56      | 54      | 66  |
|                  | 590     | 1000              | 57  | 55     | 52     | 49     | 47      | 46      | 39      | 38      | 52  | 66  | 64     | 61     | 57     | 55      | 55      | 48      | 47                    | 61  | 69  | 68     | 67     | 65     | 64      | 64      | 59      | 58      | 69  |
| 12" (300 mm)     | 885     | 1500              | --  | --     | --     | --     | --      | --      | --      | --      | --  | 70  | 68     | 65     | 62     | 60      | 60      | 53      | 52                    | 65  | 77  | 75     | 72     | 68     | 67      | 66      | 60      | 58      | 72  |
|                  | 470     | 800               | 48  | 46     | 44     | 41     | 39      | 39      | 32      | 31      | 44  | 55  | 56     | 55     | 54     | 53      | 53      | 46      | 44                    | 58  | 62  | 63     | 62     | 61     | 60      | 59      | 53      | 51      | 65  |
|                  | 825     | 1400              | 57  | 55     | 52     | 48     | 46      | 45      | 39      | 37      | 51  | 66  | 64     | 60     | 57     | 55      | 54      | 47      | 46                    | 60  | 70  | 69     | 67     | 65     | 64      | 64      | 58      | 57      | 69  |
| 14" (355 mm)     | 1295    | 2200              | --  | --     | --     | --     | --      | --      | --      | --      | --  | 71  | 69     | 65     | 62     | 60      | 59      | 53      | 51                    | 65  | 77  | 75     | 72     | 69     | 67      | 66      | 60      | 58      | 72  |
|                  | 530     | 900               | 50  | 48     | 46     | 43     | 42      | 41      | 35      | 33      | 47  | 57  | 58     | 57     | 56     | 55      | 55      | 49      | 47                    | 60  | 64  | 65     | 64     | 63     | 62      | 62      | 55      | 53      | 67  |
|                  | 1180    | 2000              | 59  | 57     | 53     | 50     | 48      | 47      | 40      | 39      | 53  | 68  | 66     | 62     | 59     | 57      | 56      | 49      | 47                    | 62  | 72  | 71     | 69     | 67     | 66      | 66      | 60      | 59      | 71  |
| 16" (400 mm)     | 1885    | 3200              | --  | --     | --     | --     | --      | --      | --      | --      | --  | 73  | 71     | 67     | 64     | 62      | 61      | 55      | 54                    | 68  | 79  | 77     | 74     | 71     | 69      | 68      | 62      | 60      | 74  |
|                  | 590     | 1000              | 50  | 48     | 45     | 42     | 41      | 40      | 33      | 31      | 46  | 58  | 59     | 57     | 56     | 55      | 54      | 47      | 45                    | 59  | 65  | 65     | 64     | 62     | 61      | 61      | 54      | 51      | 66  |
|                  | 1295    | 2200              | 58  | 56     | 52     | 49     | 47      | 46      | 39      | 37      | 52  | 67  | 65     | 61     | 57     | 55      | 54      | 48      | 46                    | 61  | 72  | 71     | 68     | 66     | 65      | 65      | 59      | 57      | 70  |
|                  |         | --                | --  | --     | --     | --     | --      | --      | --      | --      | --  | 73  | 71     | 67     | 64     | 62      | 61      | 55      | 53                    | 67  | 79  | 77     | 74     | 70     | 68      | 68      | 61      | 60      | 74  |

\* Sound level in dB/octave in relation to 10<sup>-12</sup>W