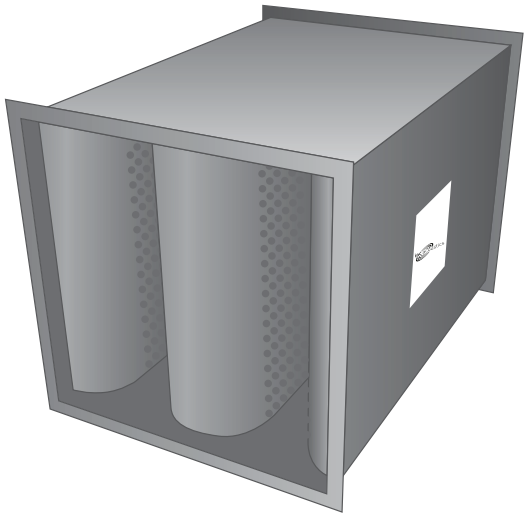
# Clean-Flow™ Quiet-Duct® Silencer Type: HLFL

Low Frequency with Forward and Reverse Flow Ratings



Standard modular widths are multiples of 300mm, other widths are also available.

HLFL silencers provide improved low frequency attenuation with low pressure drop for higher velocity HVAC systems. The acoustic fill is totally encapsulated to prevent erosion or entrainment of particulate. A honeycomb acoustic stand-off provides additional protection and performance.

**Supplied as Standard**

- Aerodynamic inlet and discharge to splitter elements to reduce pressure drop and conserve energy
- Perforated galvanised steel facings to all splitter elements to protect acoustic media from damage and erosion

**Designating Silencers: Example**

Model: 5HLFL-600-450

| Length | Type | Width | Height |
|---|---|---|---|
| 1500mm | HLFL | 600mm | 450mm |

## Self-Noise Power Levels dB re: $10^{-12}$ Watts (for a 0.37m² face area silencer)

| IAC HLFL Model | Octave Band | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| | Hz | 63 | 125 | 250 | 500 | 1K | 2K | 4K | 8K |
| | Silencer Face Velocity, m/s | Self-Noise Power Levels, dB | | | | | | | |
| HLFL All Lengths (mm) | -15 | 64 | 59 | 59 | 63 | 60 | 62 | 63 | 59 |
| | -10 | 56 | 53 | 52 | 53 | 56 | 58 | 52 | 44 |
| | -5 | 42 | 42 | 41 | 38 | 49 | 50 | 37 | 20 |
| | +5 | 39 | 35 | 30 | 27 | 26 | 28 | 28 | 20 |
| | +10 | 58 | 52 | 46 | 43 | 42 | 45 | 45 | 39 |
| | +15 | 71 | 61 | 55 | 53 | 51 | 55 | 56 | 52 |

## Face Area Adjustment Factors (add or subtract from Lw values above)

| Quiet-Duct® Face Area, m²* | 0.05 | 0.09 | 0.19 | 0.37 | 0.74 | 1.5 | 3.0 | 6.0 | 12.0 |
|---|---|---|---|---|---|---|---|---|---|
| Lw Adjustment Factor, dB | -9 | -6 | -3 | 0 | +3 | +6 | +9 | +12 | +15 |

* For intermediate face areas, interpolate to the nearest whole number

## Aerodynamic Performance

| IAC Model | Length (mm) | Static Pressure Drop N/m² | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| HLFL | 900 | 12 | 17 | 25 | 32 | 40 | 50 | 60 | 70 |
| | 1500 | 15 | 20 | 30 | 37 | 47 | 60 | 70 | 85 |
| | 2100 | 17 | 27 | 35 | 47 | 60 | 72 | 90 | 105 |
| | 3000 | 22 | 32 | 45 | 57 | 72 | 90 | 110 | 130 |
| Silencer Face Velocity, m/s | | 5.08 | 6.10 | 7.11 | 8.13 | 9.14 | 10.16 | 11.18 | 12.19 |

## Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

| IAC HLFL Model (length in mm) | Octave Band | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| | Hz | 63 | 125 | 250 | 500 | 1K | 2K | 4K | 8K |
| | Silencer Face Velocity, m/s | Dynamic Insertion Loss, dB | | | | | | | |
| 3HLFL (900) | -10 | 4 | 6 | 10 | 13 | 16 | 11 | 11 | 6 |
| | -5 | 3 | 6 | 9 | 13 | 16 | 11 | 10 | 7 |
| | 0 | 3 | 6 | 10 | 16 | 16 | 13 | 10 | 7 |
| | +5 | 3 | 6 | 10 | 17 | 18 | 15 | 10 | 7 |
| | +10 | 3 | 6 | 9 | 16 | 18 | 12 | 10 | 5 |
| 4HLFL (1200) | -10 | 5 | 7 | 13 | 17 | 20 | 14 | 13 | 8 |
| | -5 | 5 | 8 | 12 | 17 | 20 | 14 | 12 | 9 |
| | 0 | 5 | 7 | 12 | 18 | 19 | 14 | 12 | 8 |
| | +5 | 4 | 7 | 12 | 18 | 20 | 15 | 11 | 8 |
| | +10 | 4 | 7 | 12 | 17 | 20 | 14 | 11 | 7 |
| 5HLFL (1500) | -10 | 6 | 8 | 15 | 20 | 23 | 16 | 14 | 10 |
| | -5 | 7 | 9 | 15 | 20 | 23 | 17 | 13 | 10 |
| | 0 | 6 | 8 | 14 | 20 | 22 | 15 | 13 | 9 |
| | +5 | 5 | 7 | 14 | 19 | 22 | 14 | 12 | 8 |
| | +10 | 4 | 7 | 14 | 17 | 21 | 15 | 12 | 8 |
| 6HLFL (1800) | -10 | 7 | 10 | 17 | 23 | 25 | 21 | 15 | 11 |
| | -5 | 7 | 11 | 16 | 23 | 25 | 21 | 15 | 11 |
| | 0 | 6 | 10 | 15 | 23 | 24 | 20 | 15 | 10 |
| | +5 | 6 | 9 | 15 | 22 | 24 | 19 | 15 | 10 |
| | +10 | 5 | 9 | 15 | 20 | 23 | 21 | 14 | 10 |
| 7HLFL (2100) | -10 | 7 | 12 | 18 | 25 | 27 | 25 | 16 | 11 |
| | -5 | 6 | 12 | 17 | 26 | 27 | 25 | 17 | 12 |
| | 0 | 6 | 12 | 16 | 26 | 26 | 24 | 16 | 11 |
| | +5 | 6 | 10 | 16 | 25 | 25 | 24 | 18 | 11 |
| | +10 | 6 | 10 | 15 | 23 | 24 | 26 | 16 | 11 |
| 8HLFL (2400) | -10 | 8 | 13 | 20 | 28 | 30 | 25 | 17 | 11 |
| | -5 | 7 | 13 | 19 | 29 | 30 | 25 | 17 | 12 |
| | 0 | 7 | 13 | 18 | 28 | 29 | 25 | 16 | 11 |
| | +5 | 7 | 11 | 18 | 28 | 28 | 25 | 18 | 11 |
| | +10 | 7 | 11 | 17 | 26 | 27 | 26 | 16 | 11 |
| 9HLFL (2700) | -10 | 9 | 14 | 22 | 30 | 33 | 25 | 18 | 12 |
| | -5 | 7 | 14 | 22 | 32 | 33 | 26 | 18 | 12 |
| | 0 | 7 | 13 | 21 | 31 | 31 | 25 | 17 | 12 |
| | +5 | 7 | 12 | 20 | 30 | 30 | 25 | 17 | 12 |
| | +10 | 7 | 11 | 19 | 29 | 30 | 26 | 16 | 12 |
| 10HLFL (3000) | -10 | 10 | 15 | 24 | 33 | 36 | 25 | 19 | 12 |
| | -5 | 8 | 15 | 24 | 35 | 36 | 26 | 18 | 12 |
| | 0 | 8 | 14 | 23 | 33 | 34 | 26 | 17 | 12 |
| | +5 | 8 | 13 | 22 | 33 | 33 | 26 | 17 | 12 |
| | +10 | 8 | 12 | 21 | 32 | 33 | 26 | 16 | 12 |



## Note

- The tabulated air flow in $m^3/s$ is based upon tests in the IAC Acoustics R&D Laboratory, in accordance with applicable sections of internationally recognised airflow test codes. These codes require specific lengths of straight duct both upstream and downstream of the test specimen. Non-compliance with these codes can add from 0.5 to several velocity heads depending on specific conditions. The downstream measurements are made far enough downstream to include static regain. Therefore, if silencers are installed immediately before or after elbows, transitions or at the intake or discharge of the system, sufficient allowance to compensate for these factors must be included when calculating the operating static pressure loss through the silencer. See pages 10 and 11 for further details.
- Face Velocity is the airflow ($m^3/s$) divided by the Face Area ($m^2$)
- Pressure drop for any face velocity can be calculated from the equation: PD=(Actual FV/catalogue FV)$^2$ x (Catalogue PD)