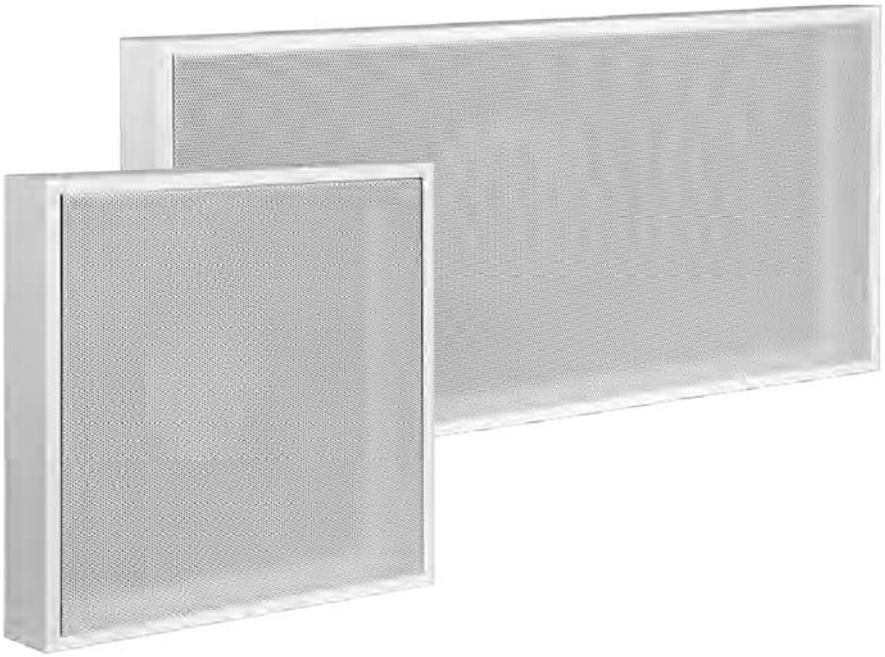
# Laminar Flow Panel

## Type LFP



**Primarily used for supply air applications but can be used for extract when matching diffusers are required. Top entry primary air connection.**

The Laminar Flow Panel Type LFP has been developed for specialist applications where the mixing of supply air with room air must be avoided.

- Recommended supply air temperature difference -5 to -10°K
- The diffuser provides a stable, low turbulence vertical discharge into the occupied zone
- This makes the TROX Type LFP ideal for clean rooms, laboratories, operating theatres, broadcasting studios and computer rooms.

Optional equipment and accessories

- All visible surfaces finished in polyester powder coat to RAL 9010 20% gloss as standard. Other paint finishes are available on request.

## Installation example

## Description

LFP

### Application

- The Laminar Flow Panel type LFP has been developed for specialist applications where the mixing of supply air with room air must be avoided. The diffuser provides a stable, low turbulence vertical discharge into the occupied zone.
- This makes the TROX type LFP ideal for clean rooms, laboratories, operating theatres, broadcasting studios and computer rooms.

### Variants

- LFP…-F Optional 30mm wide extruded aluminium mitred boarder available on LFP types 1, 2 & 3 only. Where specified, please add 60 mm to the O/A sizes stated above.
- LFP-1 Flush fixed face plate, no outward return flange on face.
- LFP-2 Removable lay in dropped face plate, no outward return flange on face.
- LFP-3 Removable screw fix dropped face plate, no outward return flange on face.
- LFP-4 Secret fix flush face plate, double border including outward return flange. Access to secret fix fasteners via enlarged hole within face plate.

### Construction

- 1 Flush fixed face plate. No outward return flange on face
- 2 Removeable lay in dropped face plate No outward return flange on face
- 3 Removeable screwfix dropped face plate No outward return flange on face
- 4 Secret fix flush face plate. Double border including outward return flange Access to secret fasteners through enlarged holes in high perforated face plate

### Nominal sizes

- 600 x 600, 1200 x 600 mm

### Materials and surfaces

- TROX type LFP comprises of a pre-galvanised steel facia panel, perforated to provide approximately 28% free area.
- An optional extruded aluminium profile (‘F’) can be specified to frame the LFP unit for integration within suspended ceiling systems.
- Integral pre-galvanised plenum box is fixed to the rear of the diffuser, installed with a top entry air connection.
- All visible surfaces finished in polyester powder coat to RAL 9010 20% gloss as standard. Other paint finishes are available on request.

## Function

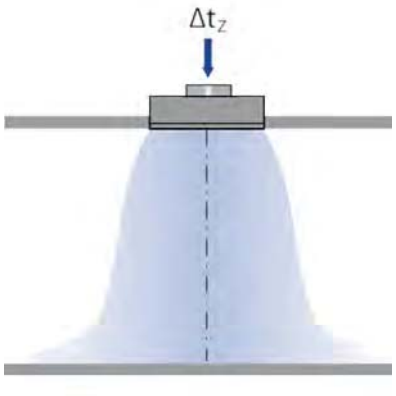
### Functional description

The Laminar Flow Panel type LFP has been developed for specialist applications where the mixing of supply air with room air must be avoided. The diffuser provides a stable, low turbulence vertical discharge into the occupied zone.

This makes the TROX type LFP ideal for clean rooms, labratories, operating theatres, broadcasting studios and computer rooms.

## Air patterns

### Vertical air discharge




## Principal dimensions

**$L_1$ [mm]**
Overall length of diffuser

**$W_1$ [mm]**
Overall width of diffuser

**$H_2$ [mm]**
Distance (height) of a ceiling diffuser with plenum box, from the lower edge of the suspended ceiling to the upper edge of the plenum box

**C [mm]**
Length of the spigot

**ØD [mm]**
Outside diameter of the spigot

**m [kg]**
Weight

## Nomenclature

**$L_{WNC}$ [dB(A)]**
NC rating of sound power level

**$\dot{V}$ [l/s]**
Volume flow rate

**$\Delta t_z$ [K]**
Supply air temperature difference

**$H_1$ [mm]**
Vertical distance below diffuser face

**$\Delta p_t$ [Pa]**
Total differential pressure

**$\Delta t_{H1}$ [K]**
Difference between core and room temperature at distance $H_1$

Quick sizing 600x600

## Pressure drop and noise level

| Nominal size | V̇ | | LFP-Z | | LFP-A | |
|---|---|---|---|---|---|---|
| | | | $\Delta p_t$ | $L_{WNC}$ | $\Delta p_t$ | $L_{WNC}$ |
| | l/s | m³/h | Pa | NC | Pa | NC |
| 600x600 | 62 | 223 | 6 | <20 | 5 | <20 |
| | 75 | 270 | 9 | <20 | 8 | <20 |
| | 87 | 313 | 12 | 25 | 12 | 25 |
| | 100 | 360 | 15 | 32 | 15 | 32 |
| | 112 | 403 | 19 | 37 | 21 | 37 |

## Air velocities

| Nominal size | V̇ | | $H_1$ | $\Delta t_z$ [°K] | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 0 | -2 | -5 | -8 | -10 |
| | l/s | m³/h | m | $V_{H1}$ [m/s] | | | | |
| 600x600 | 62 | 223 | 0.5 | 0.15 | 0.20 | 0.30 | 0.35 | 0.45 |
| | | | 1.0 | 0.15 | 0.20 | 0.25 | 0.35 | 0.40 |
| | | | 1.5 | 0.08 | 0.10 | 0.13 | 0.18 | 0.23 |
| | 75 | 270 | 0.5 | 0.20 | 0.25 | 0.30 | 0.38 | 0.48 |
| | | | 1.0 | 0.20 | 0.25 | 0.30 | 0.38 | 0.45 |
| | | | 1.5 | 0.08 | 0.10 | 0.13 | 0.18 | 0.23 |
| | 87 | 313 | 0.5 | 0.25 | 0.28 | 0.32 | 0.40 | 0.48 |
| | | | 1.0 | 0.22 | 0.28 | 0.32 | 0.40 | 0.45 |
| | | | 1.5 | 0.08 | 0.10 | 0.13 | 0.18 | 0.23 |
| | 100 | 360 | 0.5 | 0.25 | 0.30 | 0.35 | 0.40 | 0.48 |
| | | | 1.0 | 0.25 | 0.30 | 0.35 | 0.40 | 0.48 |
| | | | 1.5 | 0.08 | 0.10 | 0.15 | 0.20 | 0.28 |
| | 112 | 403 | 0.5 | 0.30 | 0.35 | 0.40 | 0.50 | 0.50 |
| | | | 1.0 | 0.30 | 0.33 | 0.40 | 0.50 | 0.50 |
| | | | 1.5 | 0.15 | 0.15 | 0.20 | 0.35 | 0.35 |

## Temperature difference

| Nominal size | V̇ | | $H_1$ | $\Delta t_z$ [°K] | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 0 | -2 | -5 | -8 | -10 |
| | l/s | m³/h | m | $\Delta t_{H1}$ [°K] | | | | |
| 600x600 | 62 | 223 | 0.5 | - | 1.0 | 2.0 | 4.0 | 5.1 |
| | | | 1.0 | - | 0.7 | 2.0 | 2.4 | 3.1 |
| | | | 1.5 | - | 0.5 | 1.4 | 2.0 | 2.5 |
| | 75 | 270 | 0.5 | - | 1.0 | 2.3 | 3.8 | 4.5 |
| | | | 1.0 | - | 0.7 | 2.0 | 2.4 | 3.7 |
| | | | 1.5 | - | 0.6 | 1.6 | 2.0 | 2.6 |
| | 87 | 313 | 0.5 | - | 1.0 | 2.6 | 4.5 | 5.0 |
| | | | 1.0 | - | 0.7 | 2.6 | 2.9 | 4.0 |
| | | | 1.5 | - | 0.6 | 1.2 | 1.7 | 2.6 |
| | 100 | 360 | 0.5 | - | 1.0 | 2.6 | 4.2 | 4.9 |
| | | | 1.0 | - | 0.7 | 2.5 | 2.6 | 3.8 |
| | | | 1.5 | - | 0.5 | 1.2 | 1.5 | 2.5 |
| | 112 | 403 | 0.5 | - | 1.0 | 2.6 | 4.2 | 5.0 |
| | | | 1.0 | - | 0.6 | 2.5 | 2.6 | 4.9 |
| | | | 1.5 | - | 0.4 | 1.4 | 1.7 | 2.6 |

Quick sizing 1200x600

## Pressure drop and noise level

| Nominal size | $\dot{V}$ | | LFP-Z | | LFP-A | |
|---|---|---|---|---|---|---|
| | | | $\Delta p_t$ | $L_{WNC}$ | $\Delta p_t$ | $L_{WNC}$ |
| | l/s | $m^3/h$ | Pa | NC | Pa | NC |
| 1200x600 | 125 | 450 | 6 | <20 | 5 | <20 |
| | 150 | 540 | 9 | <20 | 8 | <20 |
| | 175 | 630 | 12 | 25 | 12 | 25 |
| | 200 | 720 | 15 | 32 | 15 | 32 |
| | 225 | 810 | 19 | 37 | 21 | 37 |

## Air velocities

| Nominal size | $\dot{V}$ | | $H_1$ | $\Delta t_z$ [°K] | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 0 | -2 | -5 | -8 | -10 |
| | l/s | $m^3/h$ | m | $V_{H1}$ [m/s] | | | | |
| 1200x600 | 125 | 450 | 0.5 | 0.15 | 0.20 | 0.30 | 0.35 | 0.45 |
| | | | 1.0 | 0.15 | 0.20 | 0.25 | 0.35 | 0.40 |
| | | | 1.5 | 0.08 | 0.10 | 0.13 | 0.18 | 0.23 |
| | 150 | 540 | 0.5 | 0.20 | 0.25 | 0.30 | 0.38 | 0.48 |
| | | | 1.0 | 0.20 | 0.25 | 0.30 | 0.38 | 0.45 |
| | | | 1.5 | 0.08 | 0.10 | 0.13 | 0.18 | 0.23 |
| | 175 | 630 | 0.5 | 0.25 | 0.28 | 0.32 | 0.40 | 0.48 |
| | | | 1.0 | 0.22 | 0.28 | 0.32 | 0.40 | 0.45 |
| | | | 1.5 | 0.08 | 0.10 | 0.13 | 0.18 | 0.23 |
| | 200 | 720 | 0.5 | 0.25 | 0.30 | 0.35 | 0.40 | 0.48 |
| | | | 1.0 | 0.25 | 0.30 | 0.35 | 0.40 | 0.48 |
| | | | 1.5 | 0.08 | 0.10 | 0.15 | 0.20 | 0.28 |
| | 225 | 810 | 0.5 | 0.30 | 0.35 | 0.40 | 0.50 | 0.50 |
| | | | 1.0 | 0.30 | 0.33 | 0.40 | 0.50 | 0.50 |
| | | | 1.5 | 0.15 | 0.15 | 0.20 | 0.35 | 0.35 |

## Temperature difference

| Nominal size | $\dot{V}$ | | $H_1$ | $\Delta t_z$ [°K] | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 0 | -2 | -5 | -8 | -10 |
| | l/s | $m^3/h$ | m | $\Delta t_{H1}$ [°K] | | | | |
| 1200x600 | 125 | 450 | 0.5 | - | 1.0 | 2.0 | 4.0 | 5.1 |
| | | | 1.0 | - | 0.7 | 2.0 | 2.4 | 3.1 |
| | | | 1.5 | - | 0.5 | 1.4 | 2.0 | 2.5 |
| | 150 | 540 | 0.5 | - | 1.0 | 2.3 | 3.8 | 4.5 |
| | | | 1.0 | - | 0.7 | 2.0 | 2.4 | 3.7 |
| | | | 1.5 | - | 0.6 | 1.6 | 2.0 | 2.6 |
| | 175 | 630 | 0.5 | - | 1.0 | 2.6 | 4.5 | 5.0 |
| | | | 1.0 | - | 0.7 | 2.6 | 2.9 | 4.0 |
| | | | 1.5 | - | 0.6 | 1.2 | 1.7 | 2.6 |
| | 200 | 720 | 0.5 | - | 1.0 | 2.6 | 4.2 | 4.9 |
| | | | 1.0 | - | 0.7 | 2.5 | 2.6 | 3.8 |
| | | | 1.5 | - | 0.5 | 1.2 | 1.5 | 2.5 |
| | 225 | 810 | 0.5 | - | 1.0 | 2.6 | 4.2 | 5.0 |
| | | | 1.0 | - | 0.6 | 2.5 | 2.6 | 4.9 |
| | | | 1.5 | - | 0.4 | 1.4 | 1.7 | 2.6 |

## Order code

### LFP

LFP – Z – 1 – F / 1200 × 600 × 313 / P6 / RAL – ...
1 2 3 4 5 6

**1 Type**
**LFP** Laminar Flow Panel

**2 Connection**
**Z** Supply air
**A** Extract air

**3 Construction**
**1** Flush fixed face plate. No outward return flange on face
**2** Removeable lay in dropped face plate. No outward return flange on face.
**3** Removeable screwfix dropped face plate. No outward return flange on face.
**4** Secret fix flush face plate. Double border including outward return flange. Access to secret fasteners through enlarged holes in high perforated face plate.

**4 Border**
No entry: none
**F** Optional additional 30 mm outward return flange only on PF 1, 2 and 3.

**5 Size (L×W×Spigot diameter)**
**600 × 600 × 198**
**1200 × 600 × 298 or 313**

**6 Exposed surface**
**P3** Powder coat to RAL 9010:20% (white)
**P6** Powder-coated RAL CLASSIC colour. Gloss level: 30%

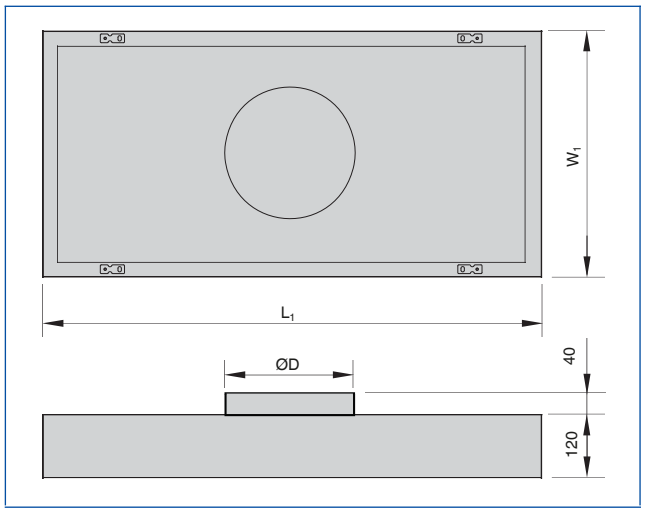
## Order example

### LFP-Z-1 / 600 × 600 × 198 / P3

| | |
|---|---|
| **Connection** | Supply air |
| **Construction** | Flush fixed face plate. No outward return flange on face |
| **Specified size** | 600 × 600 |
| **Spigot diameter** | 198 |
| **Exposed surface** | RAL 9010, pure white, gloss level 20% |

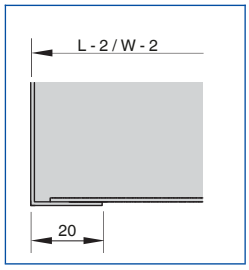
## Dimensions

### LFP...

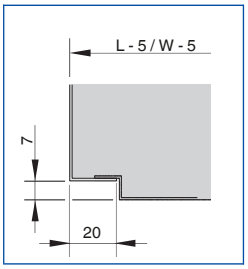



| Nominal Size | 600x600 [L x W] | 1200x600 [L x W] |
|---|---|---|
| | $L_1$x$H_1$ [mm] | |
| Type 1 | 598x598 | 1198x598 |
| Type 2 | 595x595 | 1195x595 |
| Type 3 | 598x598 | 1198x598 |
| Type 4 | 630x630 | 1230x630 |
| ØD | Ø198 | Ø313 |

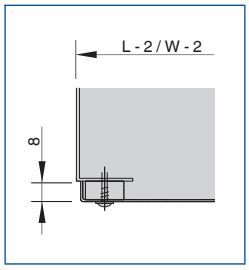
### LFP...1



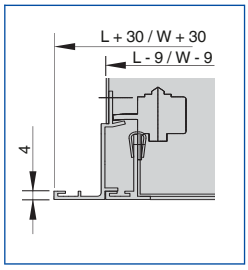

### LFP...2




### LFP...3

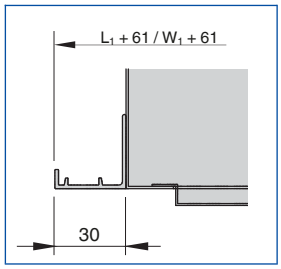



### LFP...4




## Front border

### LFP...-F (Type 1, 2 & 3 only)



## Standard text

This specification text describes the general properties of the product.

The Laminar Flow Panel type LFP has been designed for use within specialist applications which require a stable, low turbulence airflow. This makes the LFP ideal for clean rooms, laboratories, operating theatres, broadcasting studios and computer rooms.

### Application

- The Laminar Flow Panel type LFP has been developed for specialist applications where the mixing of supply air with room air must be avoided. The diffuser provides a stable, low turbulence vertical discharge into the occupied zone.
- This makes the TROX type LFP ideal for clean rooms, laboratories, operating theatres, broadcasting studios and computer rooms.

### Variants

- LFP…-F Optional 30mm wide extruded aluminium mitred boarder available on LFP types 1, 2 & 3 only. Where specified, please add 60 mm to the O/A sizes stated above.
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### Construction

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### Nominal sizes

- 600 x 600, 1200 x 600 mm

### Materials and surfaces

- TROX type LFP comprises of a pre-galvanised steel facia panel, perforated to provide approximately 28% free area.
- An optional extruded aluminium profile ('F') can be specified to frame the LFP unit for integration within suspended ceiling systems.
- Integral pre-galvanised plenum box is fixed to the rear of the diffuser, installed with a top entry air connection.
- All visible surfaces finished in polyester powder coat to RAL 9010 20% gloss as standard. Other paint finishes are available on request.

## Order options

### 1 Type

**LFP** Laminar Flow Panel

### 2 Connection

**Z** Supply air
**A** Extract air

### 3 Construction

**1** Flush fixed face plate. No outward return flange on face
**2** Removeable lay in dropped face plate. No outward return flange on face.
**3** Removeable screwfix dropped face plate. No outward return flange on face.
**4** Secret fix flush face plate. Double border including outward return flange. Access to secret fasteners through enlarged holes in high perforated face plate.

### 4 Border

No entry: none
**F** Optional additional 30 mm outward return flange only on construction types 1, 2 and 3.

### 5 Size (L×W×Spigot diameter)

**600 × 600 × 198**
**1200 × 600 × 298 or 313**

### 6 Exposed surface

**P3** Powder coat to RAL 9010:20% (white)
**P6** Powder-coated RAL CLASSIC colour. Gloss level: 30%