

# Sistemas de Indução

## (Vigas arrefecidas)

Fabricante: Trox Technik

Apresentação a cargo de: A. Sampaio <sup>(1)</sup>

*<sup>(1)</sup> Responsável Técnico e Comercial da Contimetra/Sistimetra*

## Sobre a Trox



The human being is the yardstick,  
and people's well-being is our goal.

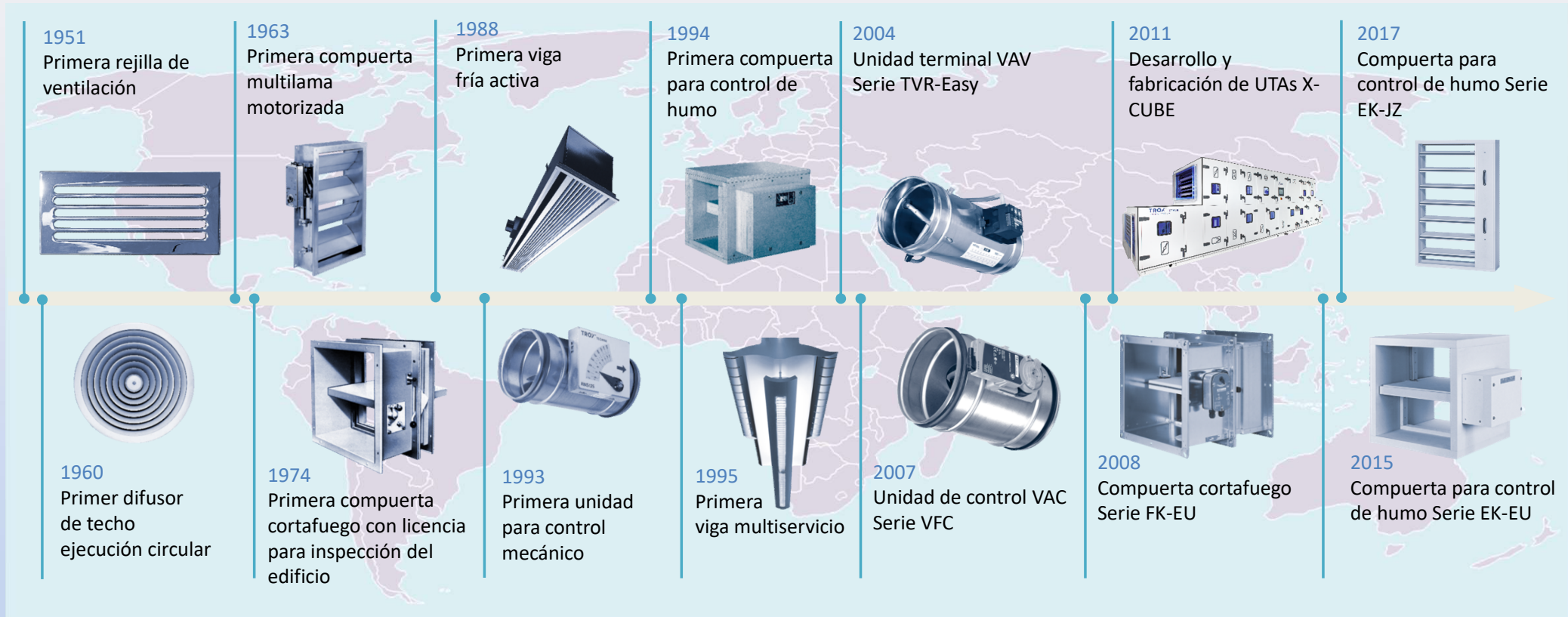
Heinz Trox

\* 29 Junho 1934

† 1 Outubro 2015

*“O ser humano é o protagonista,  
o seu bem estar o nosso objetivo”*

# Trox sempre na vanguarda



Líderes no desenvolvimento, fabricação e distribuição de componentes e sistemas para instalação de ventilação e ar condicionado.

500 Mio.



de Euros en ventas, 2017

3.770



Trabajadores

27



Filiales en  
5 Continentes

14



Plantas de fabricación  
distribuidas en 11 países

>70



países con presencia de  
representantes

Orientación al cliente



Desarrollo de soluciones a medida que  
satisfacen las necesidades de  
nuestros clientes

## Inovação através de pesquisa e desenvolvimento globais

12 millones



de inversión y 129 investigadores

12



centros  
I&D

>30



laboratorios de ensayo y  
demostración

R&D



Productos estándar innovadores y  
desarrollos a medida

>450



patentes

Colaboración



Con universidades, centros de  
investigación, y asociaciones sectoriales

Formação como pedra basilar na  
nossa presença no mercado

Mais de **500** eventos em todo mundo

Todo o tipo de perfil:  
propriedades, arquitetos, consultores de  
engenharia, instaladores, funcionários

Seminários, simpósios, conferências,  
foros e visitas às fábricas



**TROX**<sup>®</sup> ACADEMY

Desde o longínquo ano de 1964

Trox em Portugal = Contimetra & Sistimetra

A Contimetra & Sistimetra têm mantido uma presença no mercado AVAC em Portugal com elevado valor técnico no fornecimento de componentes das seguintes famílias

- **Difusão do ar**
- **Segurança contra incêndios- Registos corta fogo, TroxNetCom**
- **Regulação de caudais de ar – Registos “estáticos” e registos automáticos**
- **UTA’s**
- **Sistemas de controlo de vários tipos (conforto, laboratorial, outros)**
- **GTC**

## Edificação: Tendência do mercado

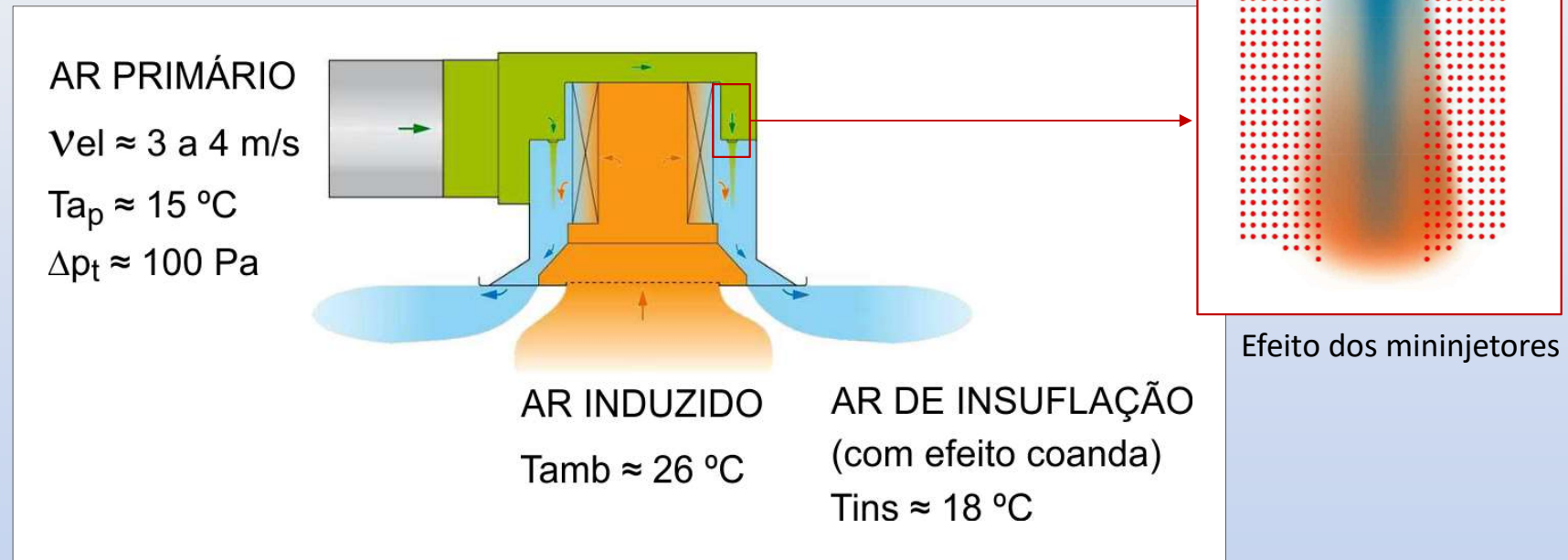
- Sustentabilidade
- Otimização energética
- Conforto





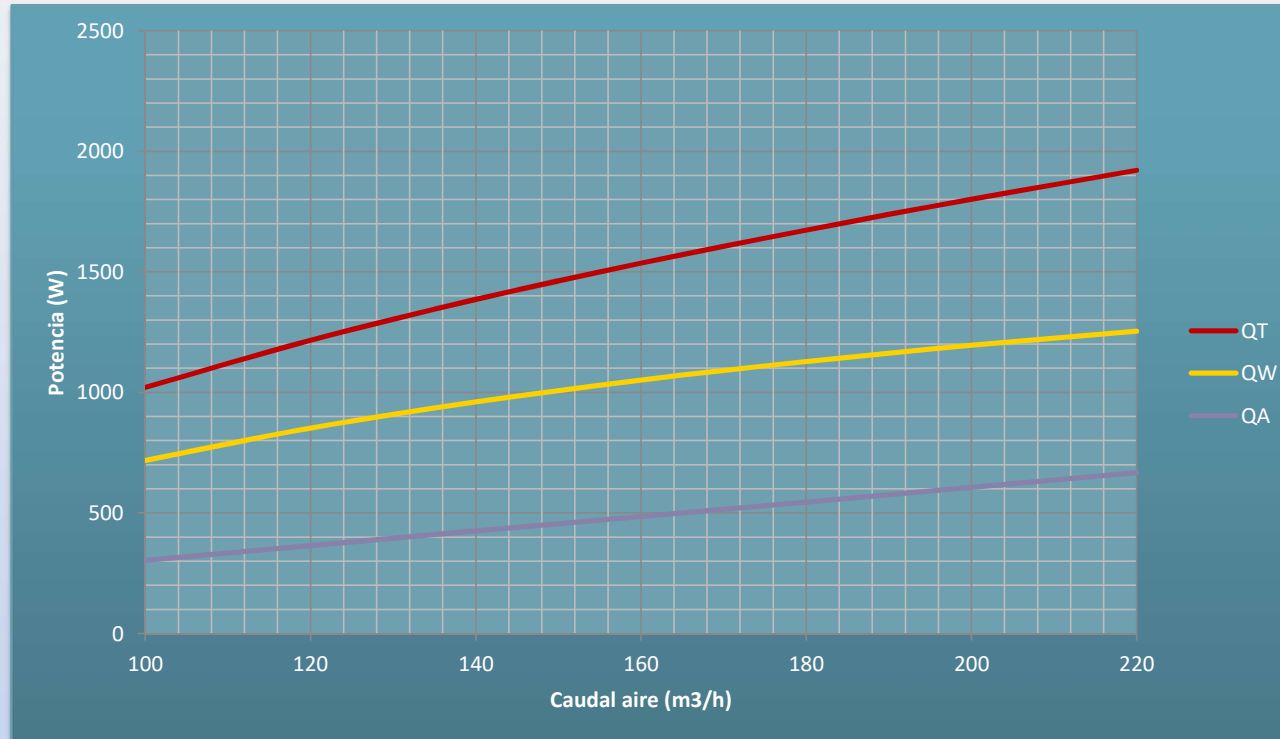
## Vigas ativas – Unidades de indução

### Princípio de funcionamento



## Vigas ativas – Unidades de indução

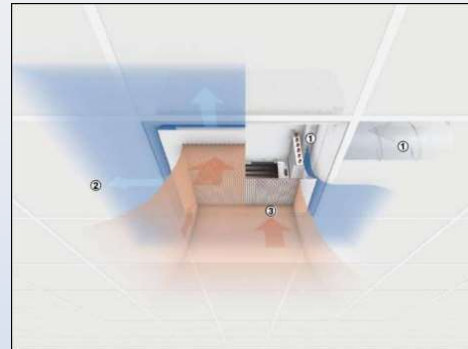
Funcionamento de uma viga fria



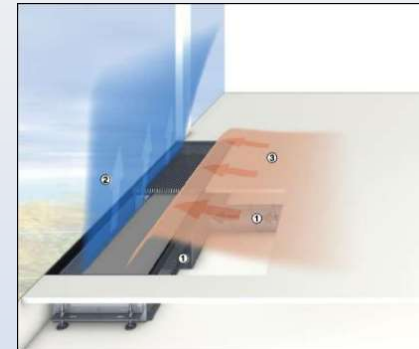
$$\text{Potência total} = 2/3 \text{ potência água} + 1/3 \text{ potência ar}$$

# Vigas ativas – Unidades de indução

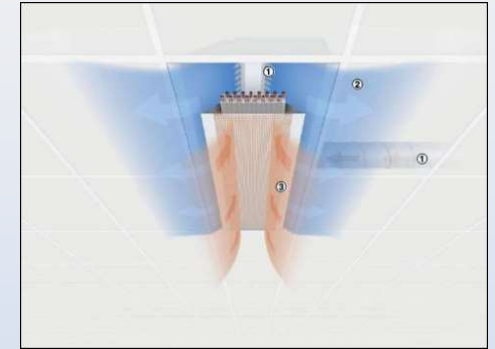
Tipo de  
vigas disponíveis



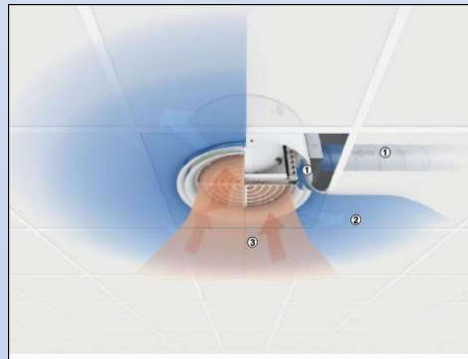
DID 614 600x600 600x 1200



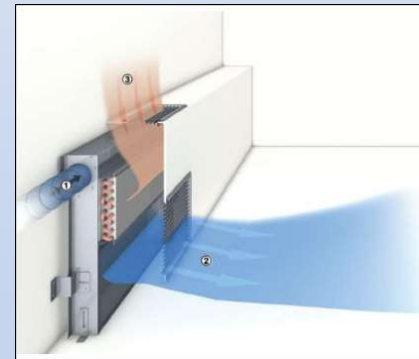
BID



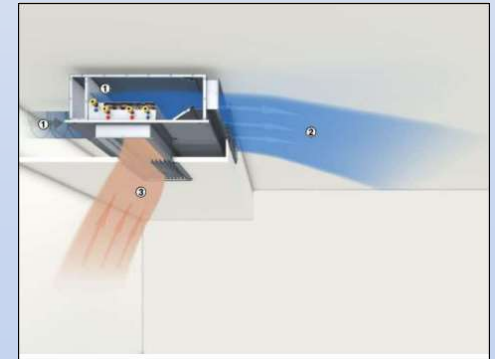
DID 641 ( H = 170 mm )



DID R



QLI



DID -E2

## Vigas ativas – Unidades de indução

Indutores de chão



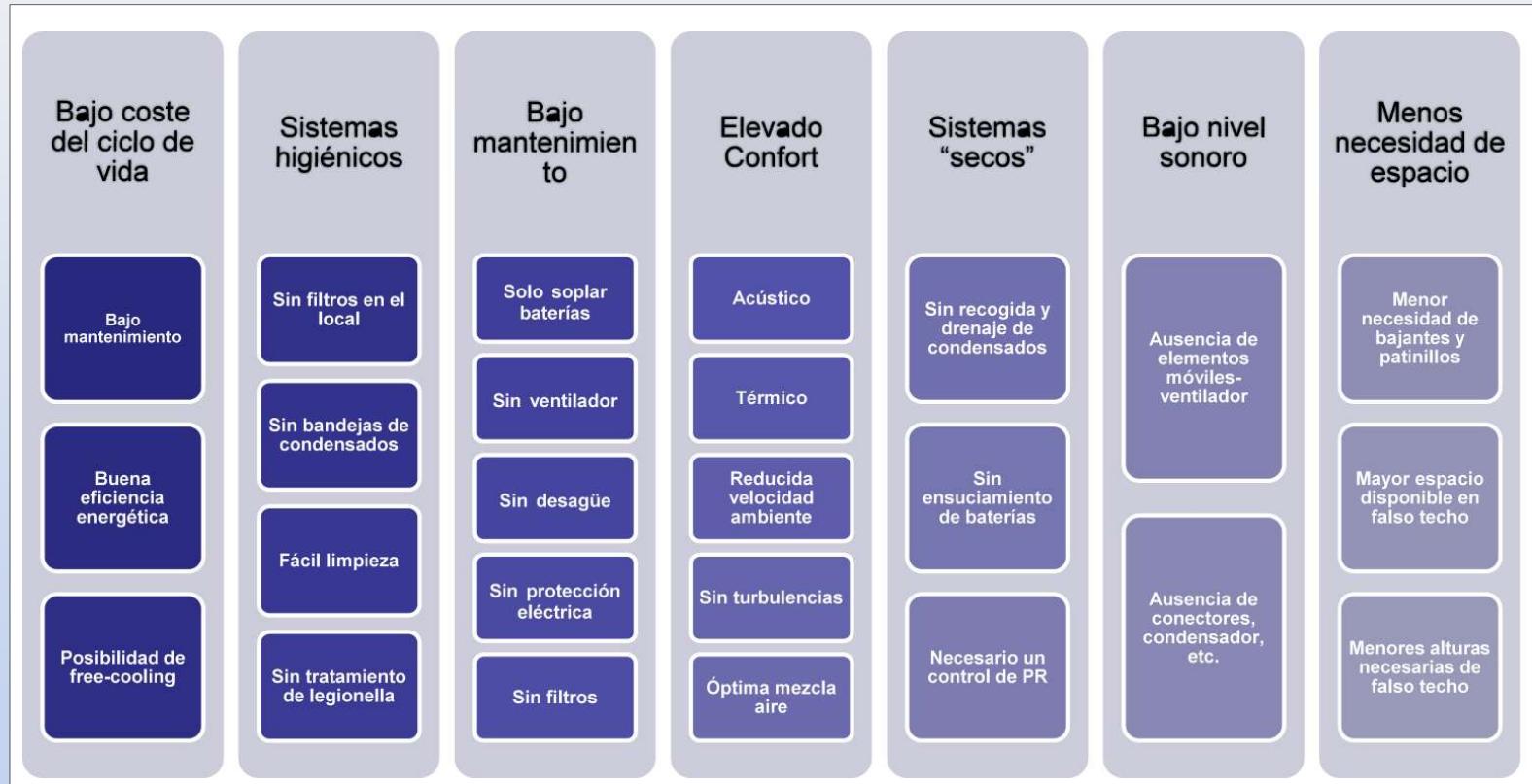
## Vigas ativas – Unidades de indução

### Indutores de teto



# Vigas ativas – Unidades de indução

## Vantagens



## Vigas ativas – Unidades de indução

Poupança na manutenção e exploração – vigas frias vs fancoils

**Edifício com 500 fancoils, ciclo de vida de 20 anos**

### Manutenção:

Poupança total em 20 anos com vigas frias: **1.112.500 € (50.625 €/ano)**

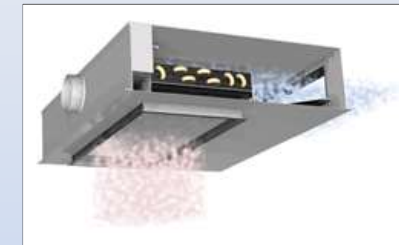
### Potência elétrica contratada:

75% menos: **89 kW menos de custo fixo**

### Consumo:

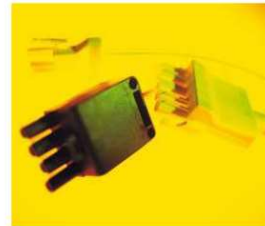
Consumo total de vida útil 20 anos **1.700.000 € (86.000 €/ano)**

**Poupança total em 20 anos: 2.732.500 € (136.625 €/ano)**



# Vigas ativas – Unidades de indução

Vigas multiserviço  
o que são:



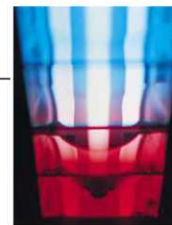
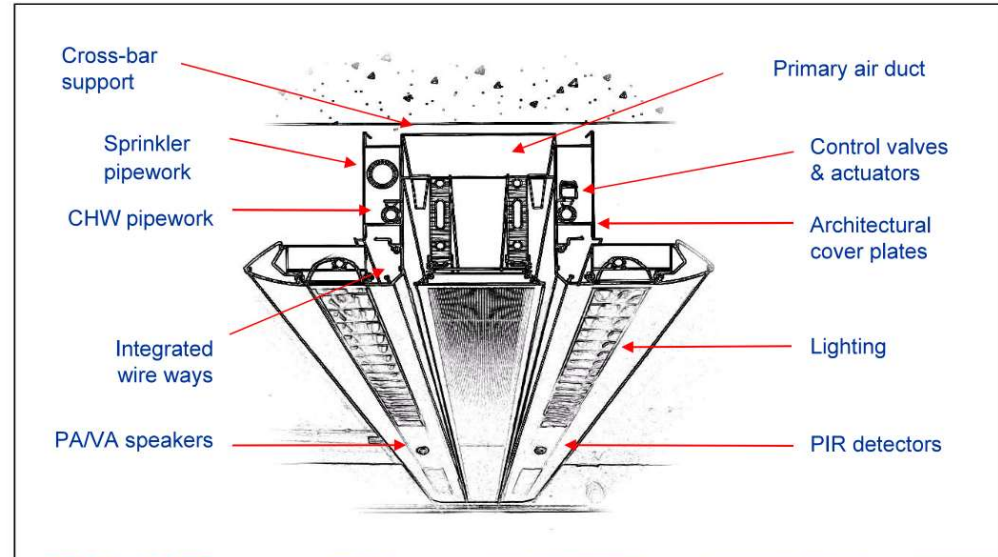
Electrical connections



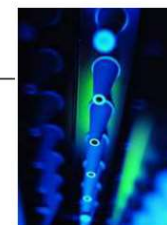
Cabling



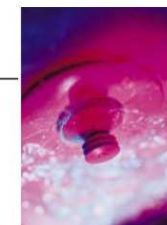
Public Address Speaker



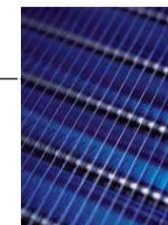
Lighting



Fresh Air



Sprinkler Head



Cooling Coil

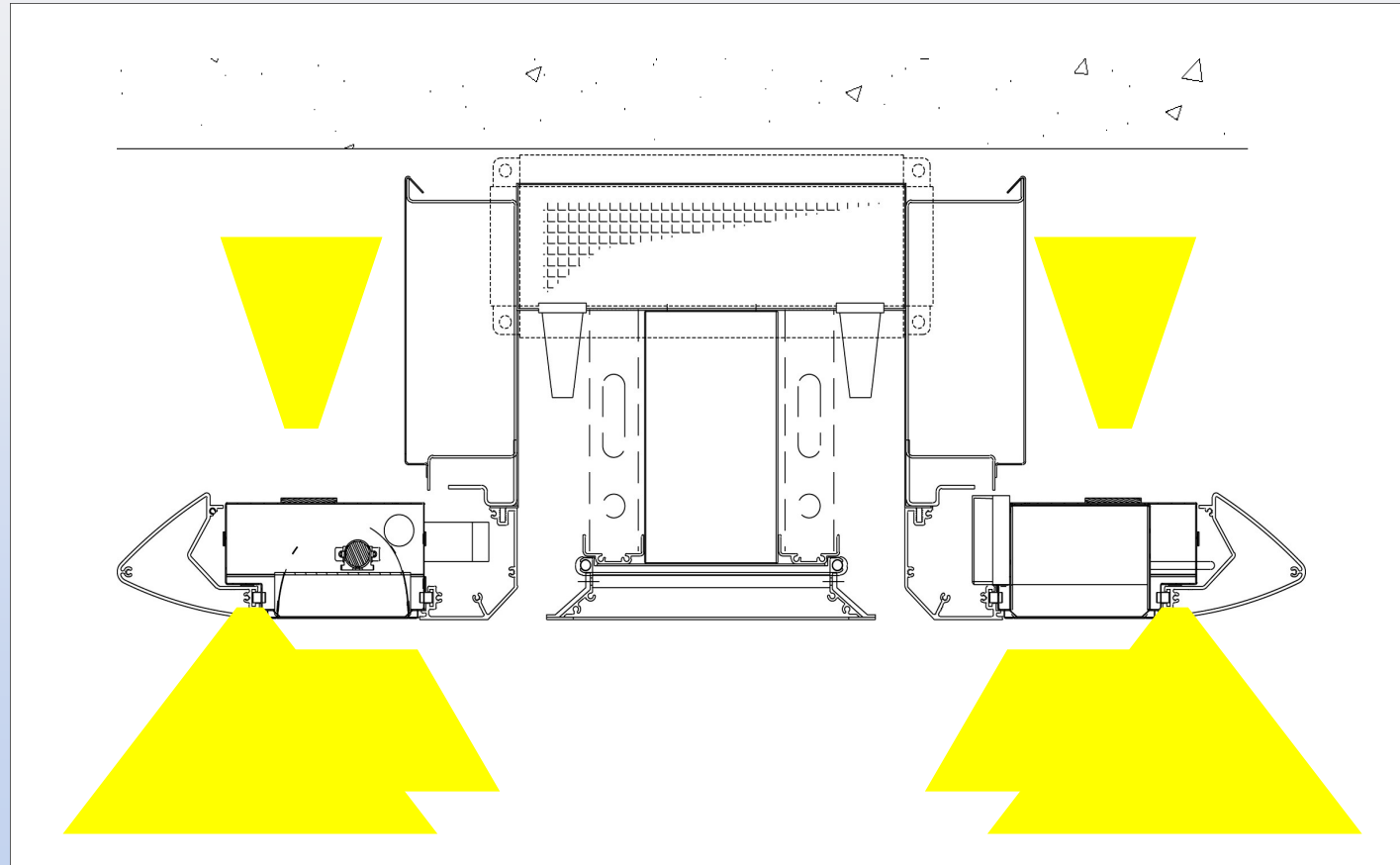


Detector



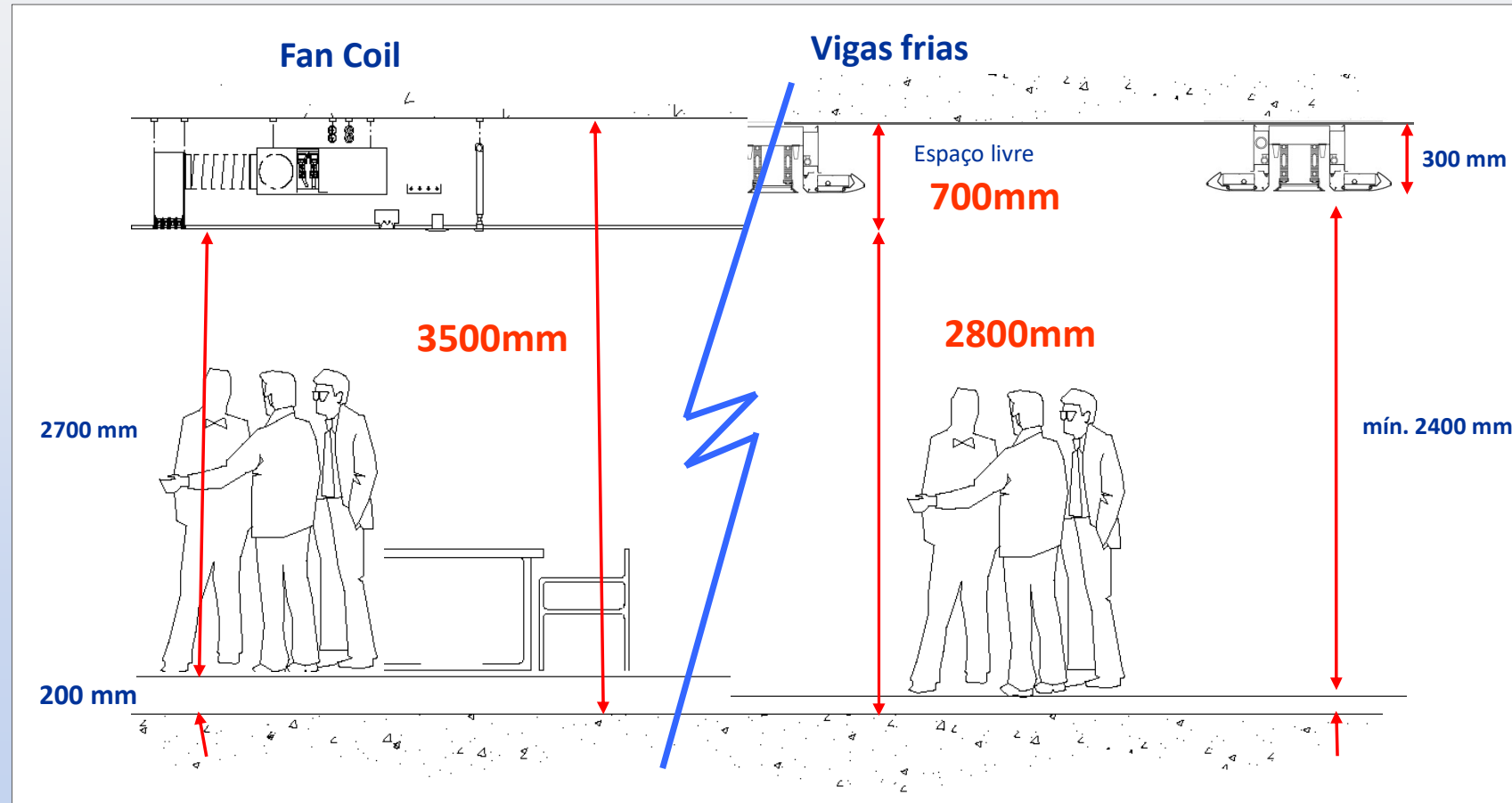
## Vigas ativas – Unidades de indução

Vigas multiserviço  
iluminação direta e indireta



## Vigas ativas – Unidades de indução

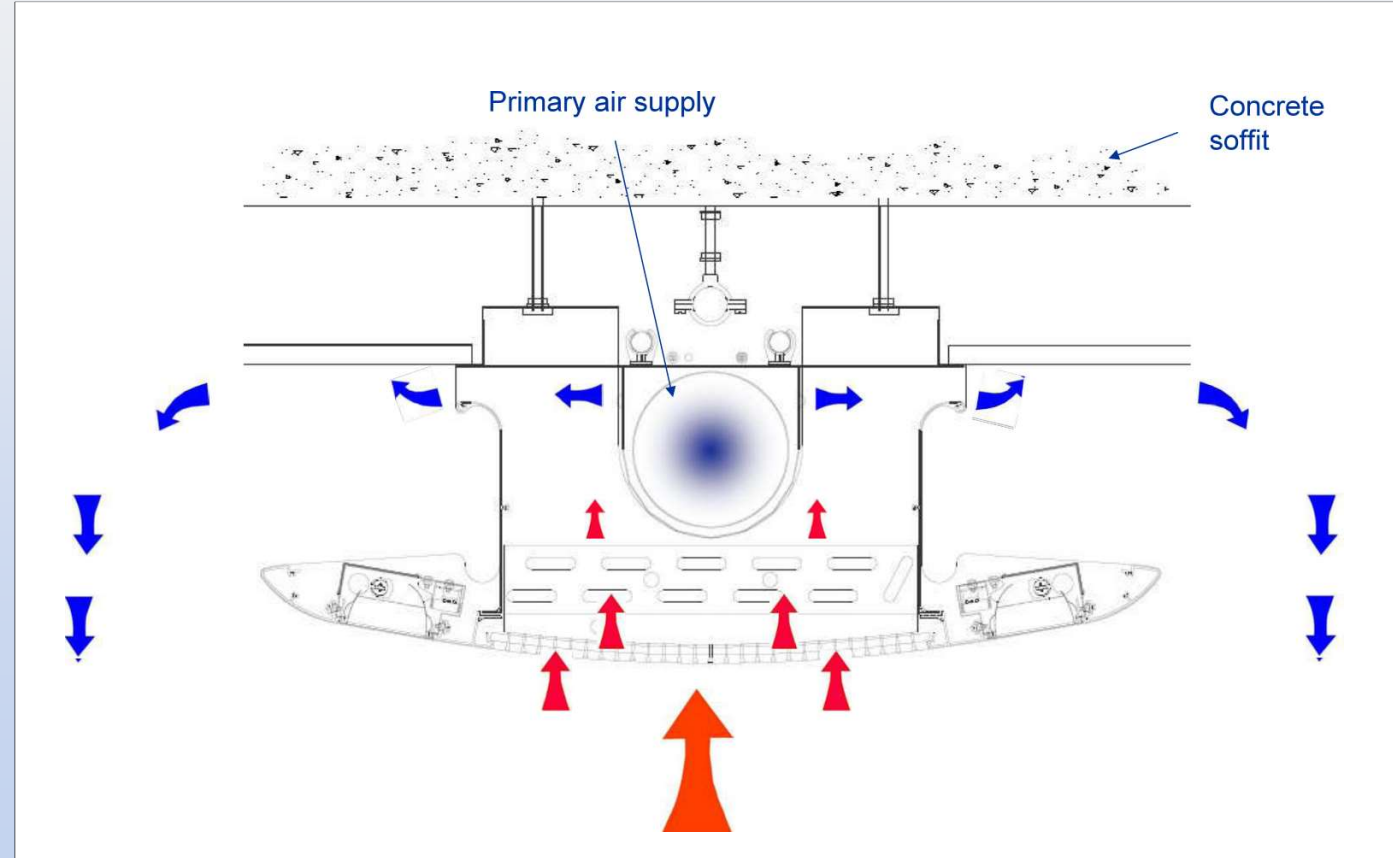
Vigas  
multiserviço  
vantagens  
(sem teto falso)



## Vigas ativas – Unidades de indução

### Vigas multiserviço vantagens (sem teto falso)

Saída ao nível do teto real = maior eficácia na movimentação do ar ( 4 ou 5 para 1)



## Vigas ativas – Unidades de indução

### Vigas multiserviço vantagens (sem teto falso)

Saída ao nível do teto real

Increased performance



OR



Reduced air volume

## Vigas ativas – Unidades de indução

## *Vigas multiserviço - referências*

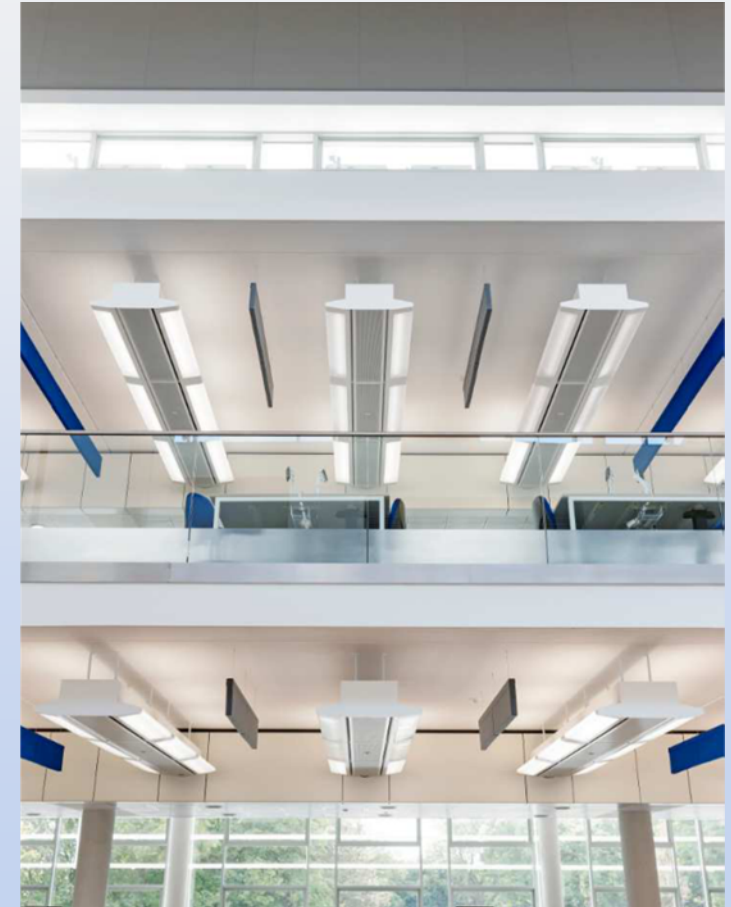
Aykley Heads Police  
Headquarters, Durham



## Vigas ativas – Unidades de indução

## *Vigas multiserviço - referências*

Aykley Heads Police  
Headquarters, Durham



## Vigas ativas – Unidades de indução

## *Vigas multiserviço - referências*

Scottish and  
Southern Offices



## Vigas ativas – Unidades de indução

## *Vigas multiserviço - referências*

Scottish and  
Southern Offices





## Vigas ativas – Unidades de indução

## *Vigas multiserviço - referências*

Bexley Civic Centre



## Vigas ativas – Unidades de indução

## *Vigas multiserviço - referências*

Newcastle Sixth  
Form College



## Vigas ativas – Unidades de indução

## *Vigas multiserviço - referências*

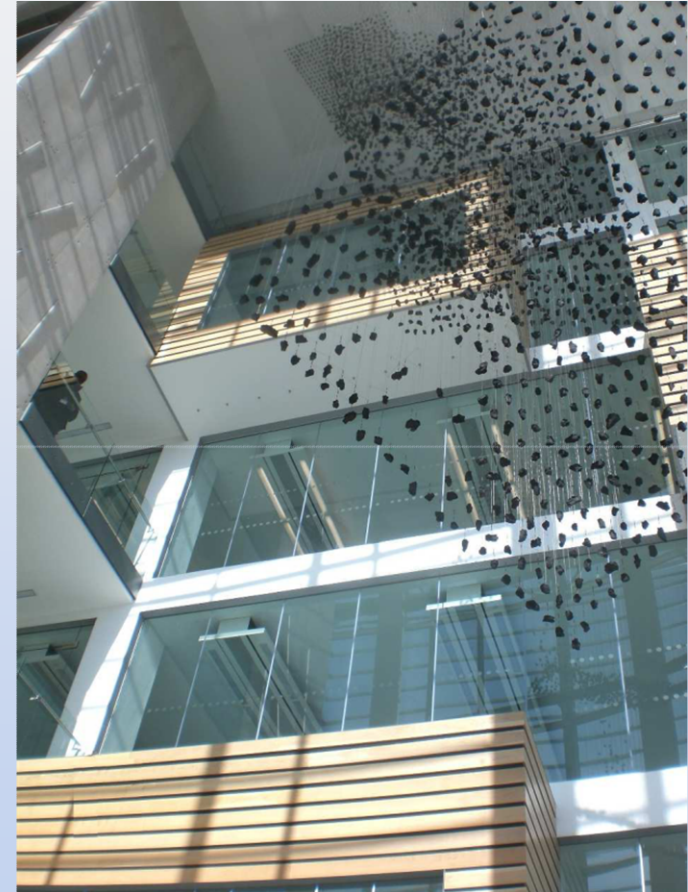
Norwich Union (Aviva), Surrey House



## Vigas ativas – Unidades de indução

## *Vigas multiserviço - referências*

Project Spinnaker



## Vigas ativas – Unidades de indução

## *Vigas multiserviço - referências*

Southampton Solent University



## Vigas ativas – Unidades de indução

## *Vigas multiserviço - referências*

5 Broadgate, London



## Vigas ativas – Unidades de indução

## *Vigas multiserviço - referências*

5 Broadgate, London



## Vigas ativas – Unidades de indução

## *Vigas multiserviço - referências*

Westminster, London





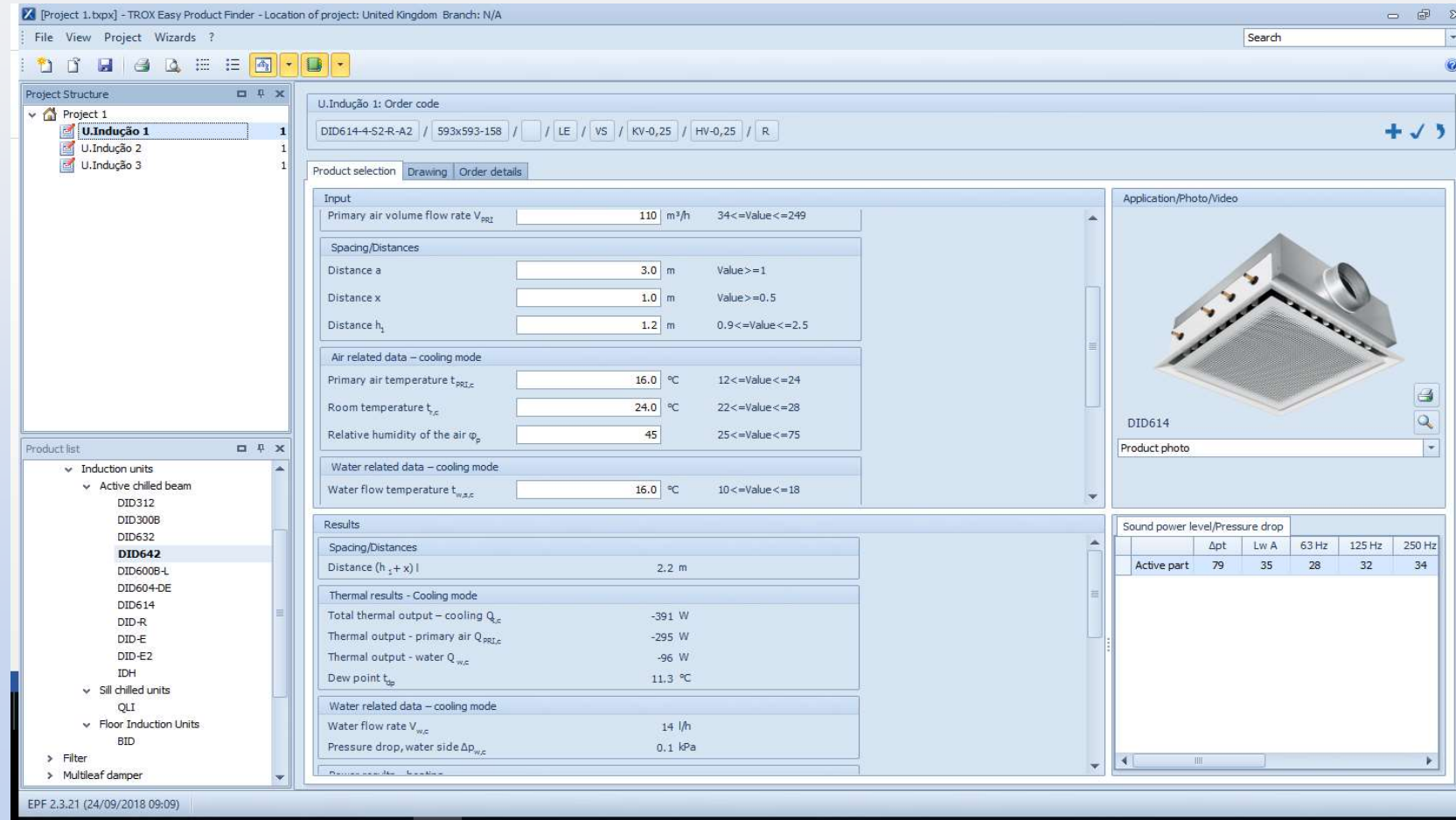
# Vigas ativas – Unidades de indução

Dimensionamento

Ferramenta:

Easy Product Finder

(EPF)



The screenshot displays the TROX Easy Product Finder (EPF) software interface. The main window is titled "[Project 1.bpx] - TROX Easy Product Finder - Location of project: United Kingdom Branch: N/A". The interface is divided into several panels:

- Project Structure:** Shows a tree view with "Project 1" containing "U.Indução 1", "U.Indução 2", and "U.Indução 3".
- Product list:** Lists various induction units under "Induction units", including "Active chilled beam" (DID312, DID300B, DID632, **DID642**, DID600B-L, DID604-DE, DID614, DID-R, DID-E, DID-E2, IDH) and "Sill chilled units" (QLI). It also includes "Floor Induction Units" (BID) and "Filter" and "Multileaf damper".
- U.Indução 1: Order code:** Shows the selected product code: DID614-4-S2-R-A2 / 593x593-158 / LE / VS / KV-0,25 / HV-0,25 / R.
- Product selection:** Includes tabs for "Drawing" and "Order-details".
- Input:**
  - Primary air volume flow rate  $V_{PR1}$ : 110 m<sup>3</sup>/h (34 ≤ Value ≤ 249)
  - Spacing/Distances:
    - Distance a: 3.0 m (Value ≥ 1)
    - Distance x: 1.0 m (Value ≥ 0.5)
    - Distance  $h_1$ : 1.2 m (0.9 ≤ Value ≤ 2.5)
  - Air related data – cooling mode:
    - Primary air temperature  $t_{PR1,c}$ : 16.0 °C (12 ≤ Value ≤ 24)
    - Room temperature  $t_{r,c}$ : 24.0 °C (22 ≤ Value ≤ 28)
    - Relative humidity of the air  $\phi_p$ : 45 (25 ≤ Value ≤ 75)
  - Water related data – cooling mode:
    - Water flow temperature  $t_{w,w,c}$ : 16.0 °C (10 ≤ Value ≤ 18)
- Results:**
  - Spacing/Distances:
    - Distance  $(h_1 + x) |$ : 2.2 m
  - Thermal results - Cooling mode:
    - Total thermal output – cooling  $Q_{t,c}$ : -391 W
    - Thermal output - primary air  $Q_{PR1,c}$ : -295 W
    - Thermal output - water  $Q_{w,c}$ : -96 W
    - Dew point  $t_{dp}$ : 11.3 °C
  - Water related data – cooling mode:
    - Water flow rate  $V_{w,c}$ : 14 l/h
    - Pressure drop, water side  $\Delta p_{w,c}$ : 0.1 kPa
- Application/Photo/Video:** Shows a 3D rendering of the DID614 induction unit.
- Sound power level/Pressure drop:**

	$\Delta p_t$	Lw A	63 Hz	125 Hz	250 Hz
Active part	79	35	28	32	34

The status bar at the bottom indicates "EPF 2.3.21 (24/09/2018 09:09)".

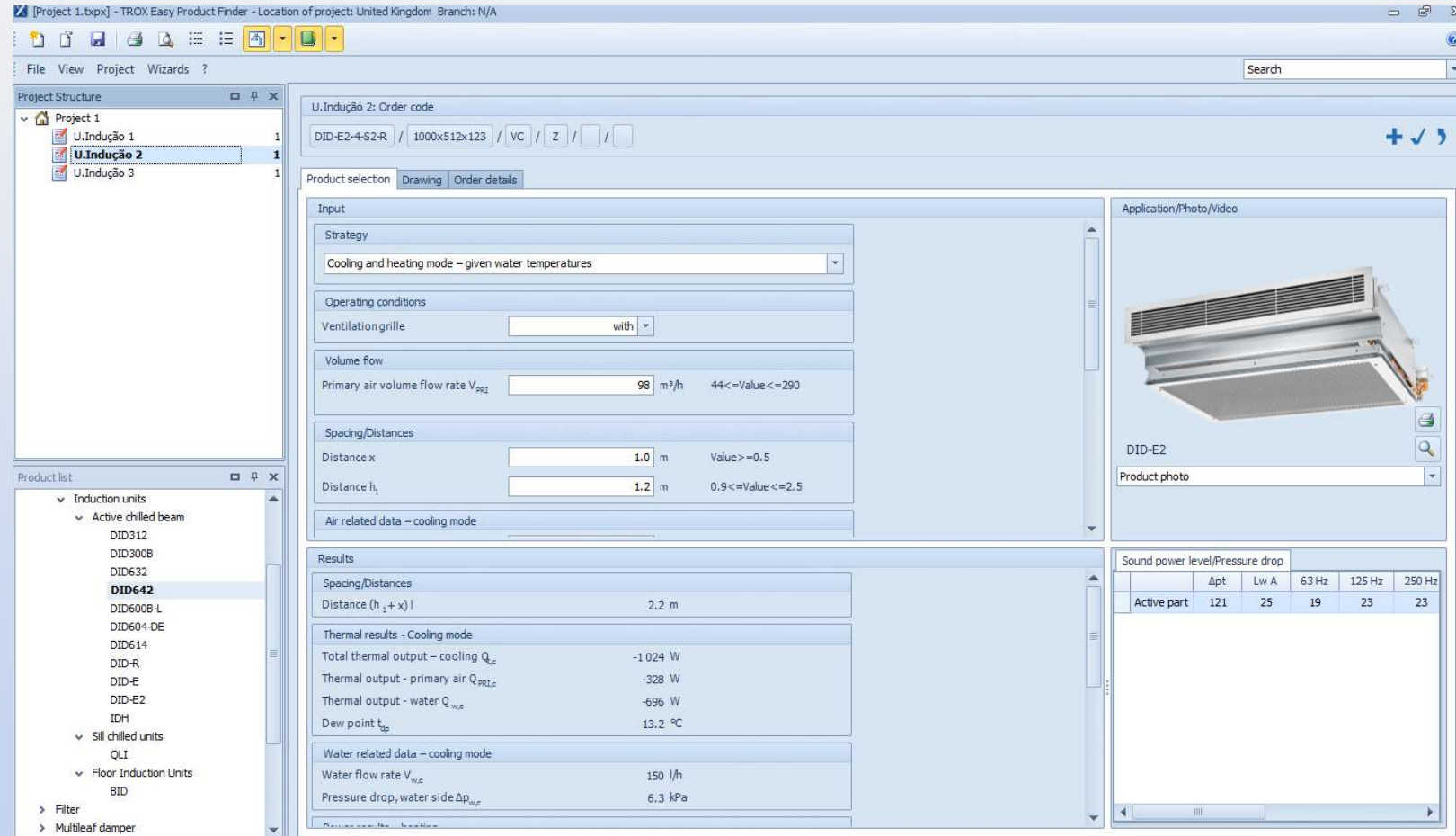
# Vigas ativas – Unidades de indução

Dimensionamento

Ferramenta:

Easy Product Finder

(EPF)



The screenshot shows the 'U.Indução 2: Order code' window in the TROX Easy Product Finder software. The interface is divided into several sections:

- Project Structure:** A tree view on the left showing 'Project 1' with three induction units: 'U.Indução 1', 'U.Indução 2' (selected), and 'U.Indução 3'.
- Product list:** A list of induction units on the bottom left, with 'DID642' highlighted under the 'Active chilled beam' category.
- Order code:** 'DID-E2-4-S2-R / 1000x512x123 / VC / Z / / / /'.
- Product selection:** 'Drawing' and 'Order details' tabs.
- Input:**
  - Strategy: 'Cooling and heating mode – given water temperatures'.
  - Operating conditions: 'Ventilation grille' set to 'with'.
  - Volume flow: 'Primary air volume flow rate  $V_{PR}$ ' set to 98 m<sup>3</sup>/h, with a range of 44 <= Value <= 290.
  - Spacing/Distances: 'Distance x' set to 1.0 m (Value >= 0.5) and 'Distance  $h_1$ ' set to 1.2 m (0.9 <= Value <= 2.5).
  - Air related data – cooling mode.
- Results:**
  - Spacing/Distances: 'Distance ( $h_1 + x$ ) |' set to 2.2 m.
  - Thermal results - Cooling mode:
 

Total thermal output – cooling $Q_{t,c}$	-1024 W
Thermal output - primary air $Q_{PRI,c}$	-328 W
Thermal output - water $Q_{w,c}$	-696 W
Dew point $t_{dp}$	13.2 °C
  - Water related data – cooling mode:
 

Water flow rate $V_{w,c}$	150 l/h
Pressure drop, water side $\Delta p_{w,c}$	6.3 kPa
- Application/Photo/Video:** A photo of the DID-E2 unit is shown.
- Sound power level/Pressure drop:** A table showing sound power levels at different frequencies:
 

	$\Delta p_t$	Lw A	63 Hz	125 Hz	250 Hz
Active part	121	25	19	23	23

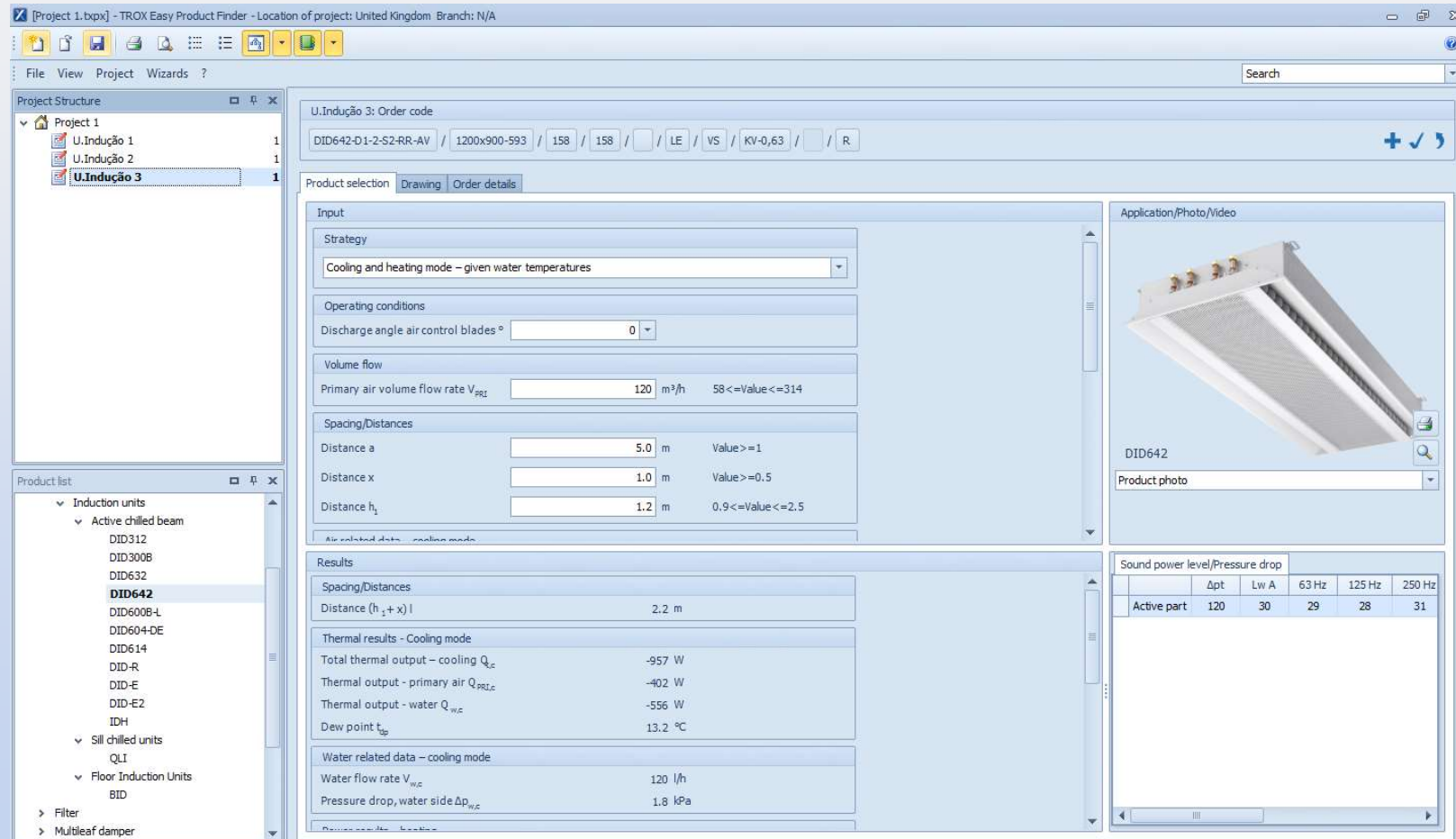
# Vigas ativas – Unidades de indução

Dimensionamento

Ferramenta:

Easy Product Finder

(EPF)



The screenshot shows the 'U.Indução 3: Order code' window in the TROX Easy Product Finder software. The interface includes a 'Project Structure' tree on the left, a 'Product list' tree at the bottom left, and a main configuration area with several input fields and a 'Results' section.

**Order code:** DID642-D1-2-S2-RR-AV / 1200x900-593 / 158 / 158 / LE / VS / KV-0,63 / R

**Input Parameters:**

- Strategy: Cooling and heating mode – given water temperatures
- Operating conditions: Discharge angle air control blades: 0°
- Volume flow: Primary air volume flow rate  $V_{pri}$ : 120 m<sup>3</sup>/h (58 ≤ Value ≤ 314)
- Spacing/Distances:
  - Distance a: 5.0 m (Value ≥ 1)
  - Distance x: 1.0 m (Value ≥ 0.5)
  - Distance  $h_1$ : 1.2 m (0.9 ≤ Value ≤ 2.5)

**Results:**

- Spacing/Distances: Distance ( $h_1 + x$ ) | 2.2 m
- Thermal results - Cooling mode:
  - Total thermal output – cooling  $Q_{t,c}$ : -957 W
  - Thermal output - primary air  $Q_{pri,c}$ : -402 W
  - Thermal output - water  $Q_{w,c}$ : -556 W
  - Dew point  $t_{dp}$ : 13.2 °C
- Water related data – cooling mode:
  - Water flow rate  $V_{w,c}$ : 120 l/h
  - Pressure drop, water side  $\Delta p_{w,c}$ : 1.8 kPa

**Product photo:** DID642

**Sound power level/Pressure drop table:**

	$\Delta p_t$	Lw A	63 Hz	125 Hz	250 Hz
Active part	120	30	29	28	31


# Vigas ativas – Unidades de indução

Dimensionamento

Ferramenta:

Easy Product Finder

(EPF)

 <b>TROX<sup>®</sup> TECHNIK</b> The art of handling air	<b>Easy Product Finder</b>	Date: 22.10.2018 / GB Project 1
<b>Project Structure</b>		
Project 1	-----	
U. Indução 1	-----	- DID614-4-S2-R-A2/563x593-158/LEV/SKV-0,25/HV-0,25/R
U. Indução 2	-----	- DID-E2-4-S2-R/1000x512x123/Z
U. Indução 3	-----	- DID642-D1-2-S2-RR-AV/1200x900-593/158/LEV/SKV-0,6
Version: 2.3.21 (24/09/2018)		
Page: 1/6		


# Vigas ativas – Unidades de indução

## Dimensionamento

Ferramenta:

Easy Product Finder

(EPF)



The art of handling air


### Easy Product Finder

Date: 22.10.2018 / GB  
Project 1  
U.Indução 1

---

DID614-4-S2-R-A2/593x593-158/LE/VS/KV-0,25/HV-0,25/R

Heat exchanger	4	4-Pipes
Nozzles	S2	Standard large
Waterconnection/position	R	Right side
Waterconnection	A2	With G½" union nut and flat seal
Length	S93	
Width	S53	
Spigot diameter	158	158 mm
Adjustable air control blades	LE	With adjustable air control blades
Valves and actuators	VS	With control components
Cooling valve	KV	With cooling valve including actuator
KVS values – cooling valve	0,25	
Heating valve	HV	With heating valve including actuator
KVS Values – heating valve	0,25	
Lockshield	R	With lockshield
Total amount	1	



---

**Input Data**

Strategy: Cooling and heating mode –

Discharge angle air control blades 0

Primary air volume flow rate  $V_{RH}$  110 m³/h

Distance a 3.0 m

Distance x 1.0 m

Distance h<sub>1</sub> 1.2 m

Primary air temperature  $t_{RH,c}$  16.0 °C

Room temperature  $t_{r,c}$  24.0 °C

Relative humidity of the air  $\phi_p$  45

Water flow temperature  $t_{w,r,c}$  16.0 °C

Water return temperature  $t_{w,r,c}$  20.0 °C

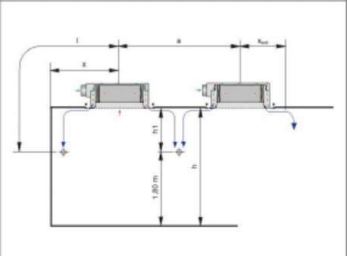
Primary air temperature  $t_{RH,h}$  22.0 °C

Room temperature  $t_{r,h}$  22.0 °C

Water flow temperature  $t_{w,r,h}$  50.0 °C

Water return temperature  $t_{w,r,h}$  45.0 °C

**Functional diagram**



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**Results**

Distance (h<sub>1</sub> + x) l 2.2 m

Total thermal output – cooling  $Q_{t,c}$  -391 W

Thermal output - primary air  $Q_{RH,c}$  -295 W

Thermal output - water  $Q_{w,c}$  -96 W

Dew point  $t_{dp}$  11.3 °C

Water flow rate  $V_{w,c}$  14 l/h

Pressure drop, water side  $\Delta p_{w,c}$  0.1 kPa

Total thermal output – heating  $Q_{t,h}$  407 W

Thermal output - primary air  $Q_{RH,h}$  0 W

Thermal output - water  $Q_{w,h}$  407 W

Water flow rate  $V_{w,h}$  70 l/h

Pressure drop, water side  $\Delta p_{w,h}$  0.1 kPa

Throw distance  $l_t$  3.9 m

Velocity at h<sub>1</sub>  $v_{h1}$  0.27 m/s

Temperature difference at h<sub>1</sub>  $\Delta t_1$  -0.53 K

Velocity at l  $v_l$  0.60 m/s

Temperature difference at l  $\Delta t_l$  -0.92 K

Air density  $\rho$  1.2 Kg/m³

**Notes \*)**

Air density ? All aerodynamic, acoustic and capacity calculations are based on this air density value.

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	Acoustic results											
	$\Delta p_1$ [dB]	LWA [dB(A)]	63Hz [dB]	125Hz [dB]	250Hz [dB]	500Hz [dB]	1kHz [dB]	2kHz [dB]	4kHz [dB]	8kHz [dB]	LWNC [dB]	LWNr [dB]
Active part	79	35	28	32	34	33	31	22	< 15	< 15	29	31

Version: 2.3.21 (24/09/2018)

Page: 2/6



# Vigas ativas – Unidades de indução

Dimensionamento

Ferramenta:

Easy Product Finder

(EPF)

 The art of handling air	Easy Product Finder	Date: 22.10.2018 / GB Project 1 U.Indução 1
<b>DID614-4-S2-R-A2/593x593-158/LE/VS/KV-0,25/HV-0,25/R</b>		
		
<p>Active chilled beams of Type DID614, with fourway air discharge and high thermal output, for airwater systems. For installation flush with the ceiling, preferably in rooms with a height up to 4.00 m. The units consist of a casing with suspension points, a spigot, noncombustible nozzles, and a horizontal heat exchanger. Five nozzle variants to optimise induction based on demand, including adjustable twin nozzles, i.e. one pair of nozzles with different diameters.</p>		
<hr/>		
Version: 2.3.21 (24/09/2018)		Page: 3/6


# Vigas ativas – Unidades de indução

Dimensionamento

Ferramenta:

Easy Product Finder

(EPF)




The art of handling air

## Easy Product Finder

Date: 22.10.2018 / GB  
Project: 1  
U.Indução 2

### DID-E2-4-S2-R/1000x512x123/Z



Heat exchanger  
Nozzles  
Arrangement of water connections  
Nominal length  
Width of heat exchanger  
Spigot diameter  
Supply air spigot  
Total amount

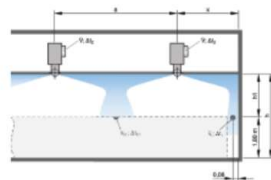
4	4-Pipes
S2	Standard large
R	right
1000	
S12	
123	
Z	with sliding socket for the supply air
1	

**Input Data**

Strategy: Cooling and heating mode –  
Ventilation grille with

Primary air volume flow rate  $V_{RH}$  98 m<sup>3</sup>/h  
Distance x 1.0 m  
Distance h<sub>1</sub> 1.2 m  
Primary air temperature  $t_{RH,L}$  16.0 °C  
Room temperature  $t_{R,L}$  26.0 °C  
Relative humidity of the air  $\phi_R$  45  
Water flow temperature  $t_{w,R,L}$  16.0 °C  
Water return temperature  $t_{w,R,R}$  20.0 °C  
Primary air temperature  $t_{R,H}$  22.0 °C  
Room temperature  $t_{R,H}$  22.0 °C  
Water flow temperature  $t_{w,R,H}$  50.0 °C  
Water return temperature  $t_{w,R,H}$  40.0 °C

**Schematic top view**



**Notes \*)**

Air density ? All aerodynamic, acoustic and capacity calculations are based on this air density value.

**Results**

Distance (h<sub>1</sub> + x) l 2.2 m  
Total thermal output – cooling  $Q_{R,L}$  -1 024 W  
Thermal output - primary air  $Q_{RH,L}$  -328 W  
Thermal output - water  $Q_{w,R,L}$  -696 W  
Dew point  $t_{d,R}$  13.2 °C  
Water flow rate  $V_{w,R,L}$  150 l/h  
Pressure drop, water side  $\Delta p_{w,R,L}$  6.3 kPa  
Total thermal output – heating  $Q_{R,H}$  836 W  
Thermal output - primary air  $Q_{RH,H}$  0 W  
Thermal output - water  $Q_{w,R,H}$  836 W  
Water flow rate  $V_{w,R,H}$  72 l/h  
Pressure drop, water side  $\Delta p_{w,R,H}$  0.4 kPa  
Throw distance  $l_t$  3.8 m  
Velocity at l  $v_l$  0.14 m/s  
Temperature difference at l  $\Delta t_l$  -0.36 K  
Air density ? 1.2 Kg/m<sup>3</sup> \*)

**Acoustic results**

	$\Delta p_l$ [Pa]	LWA [dB(A)]	63Hz [dB]	125Hz [dB]	250Hz [dB]	500Hz [dB]	1kHz [dB]	2kHz [dB]	4kHz [dB]	8kHz [dB]	LWNC	LWNR
Active part	121	25	19	23	23	22	20	18	< 15	< 15	19	21

Description

Active chilled beams of Type DID-E2, with one-way air discharge are a low-noise alternative to fan coil units, with high thermal output, providing high thermal comfort levels. For installation into ceiling butheads, preferably in rooms with a height up to 4.00 m. The units consist of a casing with suspension points, a spigot, non-combustible nozzles, and a horizontal heat exchanger. Five nozzle variants to optimise induction based on demand.

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Contimetra/Sistimetra – Dep. Ar Condicionado


# Vigas ativas – Unidades de indução

Dimensionamento

Ferramenta:

Easy Product Finder

(EPF)




**TROX® TECHNIK**  
The art of handling air

**Easy Product Finder**

Date: 22.10.2018 / GB  
Project 1  
U.Indução 3

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DID642-D1-2-S2-RR-AV/1200x900-593/158/158/LE/VS/KV-0,63/R



Induced air grille	D1	Perforated metal facing
Heat exchanger	2	For 2-pipe systems
Nozzle variant	S2	Large
Arrangement of casings and connections	RR	Casing right side, Water connections right side
Additional casing – function and arrangement	AV	Extract air, spigot at the front
Length	1200	
Nominal length	900	
Width	593	
Primary air spigot – diameter	158	
Additional casing – spigot diameter	158	
Air control blades	LE	With air control blades
Valves and actuators	VS	With control components
Cooling valve	KV	Cooling valve with actuator
KVS value	0,63	
Lockshield	R	With lockshield(s)
Total amount	1	

---

**Input Data**

Strategy: Cooling and heating mode – 0

Discharge angle air control blades 0

Primary air volume flow rate  $V_{RH1}$  120 m<sup>3</sup>/h

Distance a 5.0 m

Distance x 1.0 m

Distance h<sub>1</sub> 1.2 m

Primary air temperature  $t_{RH1,e}$  16.0 °C

Room temperature  $t_{r,e}$  26.0 °C

Relative humidity of the air  $\phi_p$  45

Water flow temperature  $t_{w,f,e}$  16.0 °C

Water return temperature  $t_{w,r,e}$  20.0 °C

Primary air temperature  $t_{RH1,s}$  22.0 °C

Room temperature  $t_{r,s}$  22.0 °C

Water flow temperature  $t_{w,f,s}$  50.0 °C

Water return temperature  $t_{w,r,s}$  40.0 °C

**Functional diagram**

---

**Results**

Distance (h<sub>1</sub> + x) l 2.2 m

Total thermal output – cooling  $Q_{th,e}$  -957 W

Thermal output - primary air  $Q_{RH1,e}$  -402 W

Thermal output - water  $Q_{w,e}$  -556 W

Dew point  $t_{dp}$  13.2 °C

Water flow rate  $V_{w,e}$  120 l/h

Pressure drop, water side  $\Delta p_{w,e}$  1.8 kPa

Total thermal output – heating  $Q_{th,s}$  1 693 W

Thermal output - primary air  $Q_{RH1,s}$  0 W

Thermal output - water  $Q_{w,s}$  1 693 W

Water flow rate  $V_{w,s}$  146 l/h

Pressure drop, water side  $\Delta p_{w,s}$  2.4 kPa

Throw distance  $l_t$  6.1 m

Velocity at h<sub>1</sub>  $v_{h1}$  0.33 m/s

Temperature difference at h<sub>1</sub>  $\Delta t_{h1}$  -0.37 K

Velocity at l  $v_l$  0.75 m/s

Temperature difference at l  $\Delta t_l$  -1.18 K

Air density  $\rho_a$  1.2 Kg/m<sup>3</sup> \*)

**Note \*)**

Air density ? All aerodynamic, acoustic and capacity calculations are based on this air density value.

---

Acoustic results											
$\Delta p_a$	LWA	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	LWNC	LWNR
[Pa]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
Active part	120	30	29	28	31	28	26	18	< 15	< 15	24 26

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Contimetra/Sistimetra – Dep. Ar Condicionado





# Vigas ativas – Unidades de indução

Dimensionamento

Ferramenta:

Easy Product Finder

(EPF)

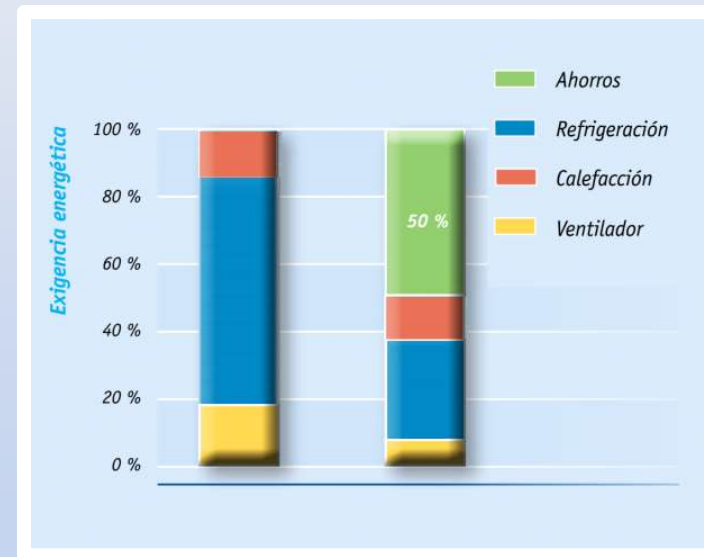
 The art of handling air	<b>Easy Product Finder</b>	Date: 22.10.2018 / GB Project 1 U.Indução 3
<b>DID642-D1-2-S2-RR-AV/1200x900-593/158/158/LE/VS/KV-0,63/R</b>		
		
<p>Active chilled beams of Type DID642, with two-way air discharge and high thermal output, providing high thermal comfort levels. For installation flush with the ceiling, preferably in rooms with a height up to 4.0 m. The units consist of a casing with suspension points, a spigot, non-combustible nozzles, and a horizontal heat exchanger. Five nozzle variants to optimise induction based on demand, including adjustable twin nozzles, i.e. one pair of nozzles with different diameters.</p>		
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## Controlo: Caudal de ar constante ou variável?



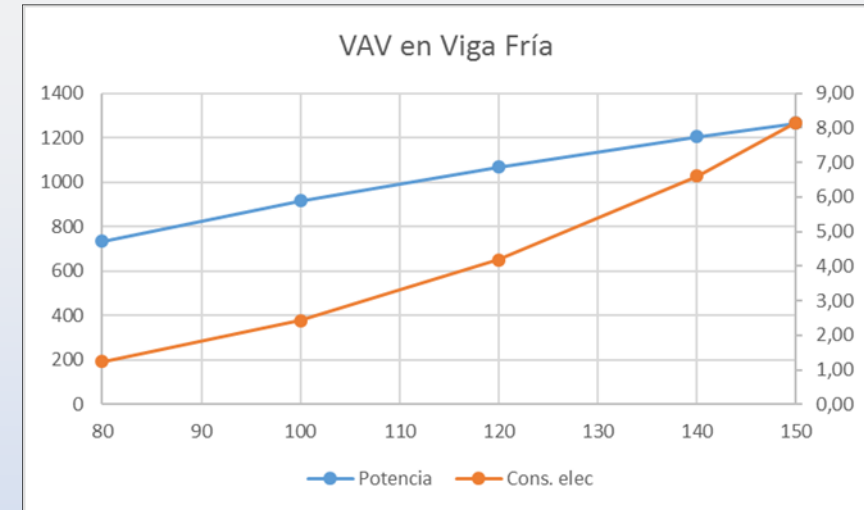
- Controlo individual de temperatura
- Caudal de ar de acordo com a ocupação variável
- Fecho total ou parcial de zonas
- Fácil ajuste de set points
- Operação diurna-nocturna da instalação (freecooling)
- Controlo de pressão
- Ligação ao BMS
- Controlo remoto
- Medição de caudal
- Monitorização do caudal e da posição da lâmina em contínuo

LVC  
Regulador de caudal  
próprios para caudais baixos



# Vigas ativas – regulação e controlo

DID-632-G/1500x1500

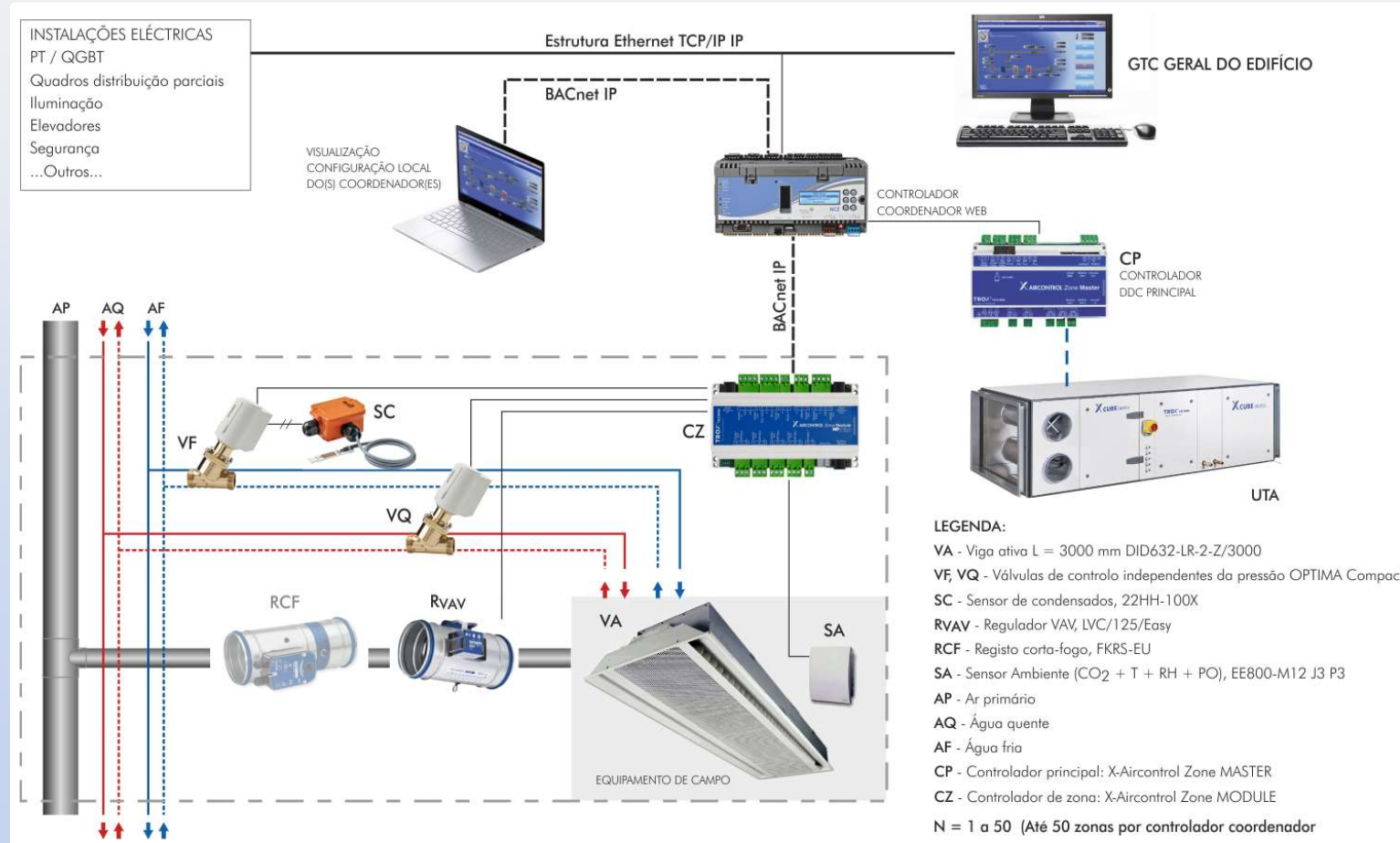


Ar primário (m3/h)	Potência Térmica (kW)	%	Pressão estática (Pa)	Potência sonora (dB(A))	Velocidade do ar na zona ocupada (m/s)	Ventilador (consumo elétrico) (kW)	%
80	735	-42%	39	22	0,07	1,24	-85%
100	916	-28%	61	28	0,1	2,42	-70%
120	1069	-16%	88	33	0,12	4,19	-49%
140	1204	-5%	119	37	0,14	6,61	-19%
150	1266	0%	137	39	0,16	8,15	0%

# Vigas ativas – Sistema de control integrado

## Exemplo 1

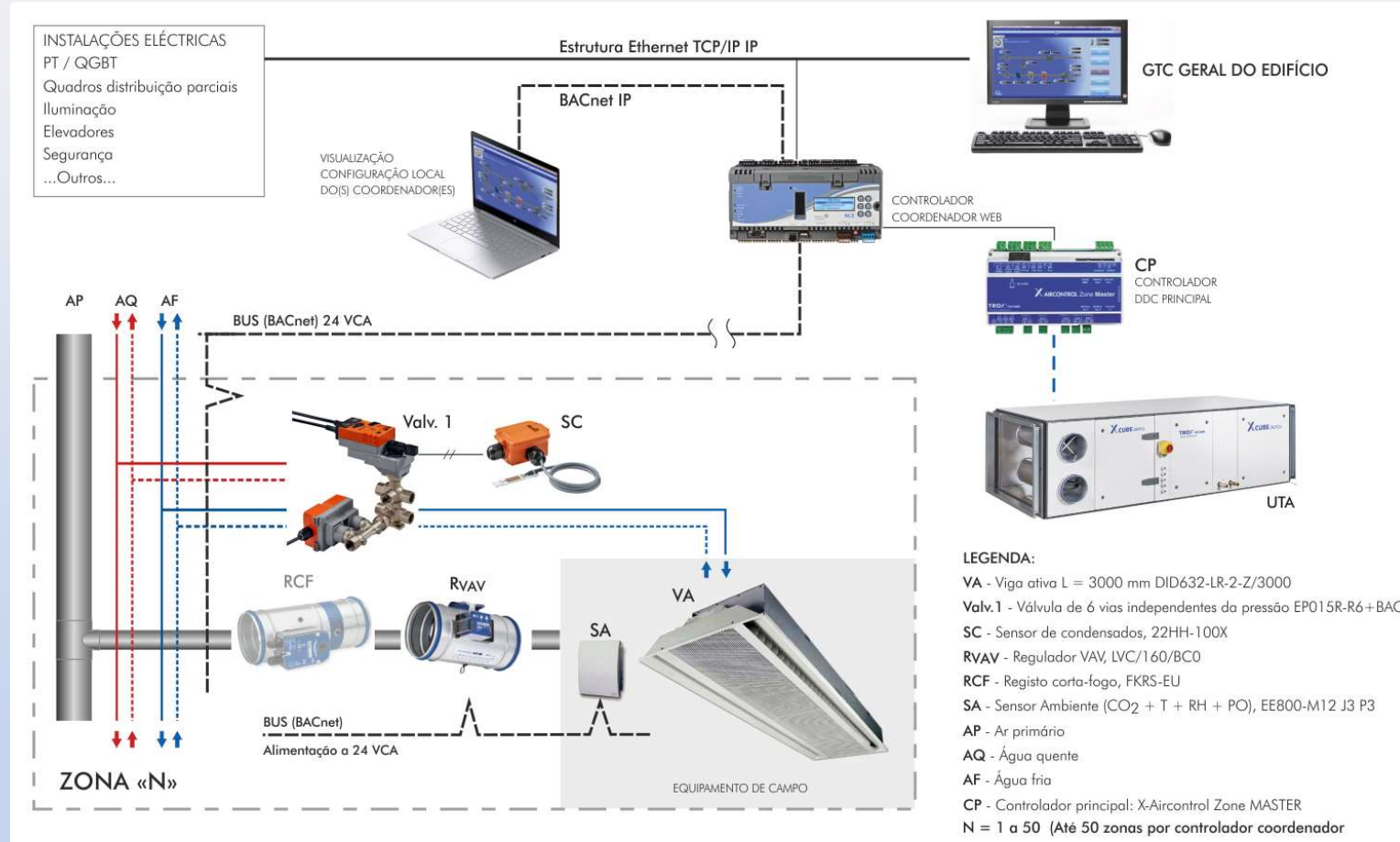
## X Aircontrol



# Vigas ativas – Sistema de control integrado

## Exemplo 2

## X Aircontrol



## Vigas ativas



Cada edifício é “O edifício”.

Dê-nos o prazer da sua consulta.

A equipa Contimetra & Sistimetra / Trox terá a maior satisfação em lhe dar a devida atenção, seguimento e apoio técnico/comercial.

Consideramos cada consulta um privilégio que nos concedem por representar a confiança que granjeámos no mercado nacional desde o longínquo ano de 1964.

Os nossos agradecimentos.

A equipa Contimetra & Sistimetra

## Por fim os agradecimentos

- Aos presentes pela paciência em me ouvir.  
(espero que tenha valido a pena ... )
- À EFRIARC – na pessoa do Eng. Carlos Lisboa – pela amabilidade e deferência para com a Contimetra & Sistimetra em colaborarmos nesta iniciativa.

Porto, 7 de Novembro de 2018

Lisboa, 8 de Novembro de 2018

A. Sampaio