



# TROCELLEN DUCT

## HVAC Applications

Thermal-Acoustic Insulation



# Duct

The function of air-conditioning plant is to guarantee the correct exchange of air and the maintenance of the best temperature in order to ensure our physical and psychic wellbeing in a comfortable environment.

The air is distributed within a building by means of ducts that need to be suitably insulated in order to avoid heat loss/increase and low energy consumption in line with current legislation.

Any condensation that may form on the air ducts also needs to be prevented to minimise energy loss and noise levels due to pumps and/or fans must be kept to the minimum.

Noise from air-conditioning plant need to be absorbed and reduced to avoid compromising environmental comfort. This is done by means of specific solutions adopted at the design stage.

**TROCELLEN DUCT** is easily applied to the metal ducts through a process of pre-adhesion. It significantly reduces wall vibrations and thus satisfies the requirement to keep noise levels down: we have found that this system makes for potential reductions in noise levels of roughly 30-40 dB.

The formation of condensation on the ducts must be avoided at all cost since, as well as compromising the efficiency of the plant, it can also create the perfect conditions for the proliferation of mold and bacteria and damage the false-ceilings owing to constantly dripping water.

To design the perfect system, you have to calculate the right thickness of insulation needed to avoid the formation of condensation and reduce the energy loss in line with legal requirements, bearing in mind the technical performance of the insulating material under the envisaged working conditions.

To the side, for example, is an extract of Italian Law n° 10/91 concerning the insulation of ventilation ducts.

**TROCELLEN DUCT** is the new brand-name for a new line of air duct insulation material.

**TROCELLEN** is a closed cell, chemically cross-linked, polyolefin resin foam offering high performance in terms of flame retardant protection in the event of fire, plus lasting constant thermal performance and soundproofing.

**TROCELLEN DUCT** can be coated and adapted to offer a series of advantages:

- Closed cells
- Constant lasting thermal/sound performance
- Ultra low toxicity and opacity of fumes in the event of fire
- Easy to clean
- Self-adhesive for easy installation
- When all's said and done, the product offering the best value for money on the market today.

Ordinary Supplement to the (Italian) Gazzetta Ufficiale n° 242 dated 14th October 1993, Annex B

DECREE OF THE PRESIDENT OF THE ITALIAN REPUBLIC  
26th August, n° 412.

Rules bearing the standards for the design, installation, running and maintenance of thermal plant for buildings in order to limit energy consumption, implementing paragraph 4 of Art. 4 of Law n° 10 dated 9th January 1991.

## INSULATION OF HEAT DISTRIBUTION NETWORKS IN THERMAL PLANT

... they must be insulated with insulating material whose minimum thickness is determined by the data in table 1 below to suit the diameter of the pipes (expressed in mm) and the thermal conductivity ( $\lambda$ ) of the insulating material (expressed in  $W/m \cdot ^\circ C$ ) at the temperature of  $40 \cdot ^\circ C$ .

Useful thermal conductivity of the insulating material ( $W/m \cdot ^\circ C$ )	Outside diameter of the pipe (mm)		
	< 20	Da 20 a 39	Da 40 ...
0,030	----	19	----
0,032	----	21	----
0,034	----	23	----
0,036	----	25	----
0,038	----	28	----
0,040	----	30	----
0,042	----	32	----
0,044	----	35	----
0,046	----	38	----
0,048	----	41	----
0,050	----	44	----

Table 1

...  
The hot air ducts used to heat the building during the Winter and run in non-heated rooms must be insulated with an insulating material whose min thickness must not be less than that shown in table 1 in the case of pipes with an outside diameter of 20 - 39 mm.

"As for values of insulation actual thermal conductivity other than those listed in table 1, the minimum thickness of the insulating material is obtained through linear interpolation of the data of the same table 1.

The vertical frame of the pipes shall be placed towards the inside of the building, and the insulation minimum thickness, as resulting from table 1, are to be multiplied by 0.5.

As for pipes within the structure, not protruding outdoor, nor to non heated areas, the thickness, as resulting from table 1, are to be multiplied by 0.3.

In case of pre-insulated pipes with heterogeneous materials or systems, or in case the system thermal conductivity is not directly measurable, the installation procedure and insulation limits are set by UNI technical standards, published before October 31, 1993 and received by the Ministry of Industry, Commerce and Handicraft activities within the following 30 days.

Hot air ducts for winter heating, placed in non heated areas, shall be insulated with thickness not lower than the values listed in table 1, for external pipe diameter 20 to 39 mm".

**Extract of Italian Law n° 10/91 concerning the insulation of ventilation ducts**

# THE LINE OF INSULATION MATERIALS FOR VENTILATION DUCTS

Within Trocellen world for duct insulation, **TROCELLEN CLASS** means CE marked and Euroclass product portfolio, according to EN 14313.



By CLASS product range, Trocellen provides the answer in relation to the "new European approach" to customers of the professional application.

## Main advantages:

- Excellent condensation barrier ability
- Excellent  $\mu$  value - it can be even 15000 (depends on type)
- Constant and long lasting  $\lambda$
- Fire reaction, flammability classification can be B-s2,d0\*; no afire dripping
- Ultra low toxicity and opacity of fumes in case of fire (F1 classification, according to FR F 16-101)
- Safe, non-toxic, non-allergen, mould resistant and reusable.

## Types:

### TROCELLEN CLASS ADHESIVE

Chemically cross-linked, closed cell polyethylene foam.

- Euroclass B-s2,d0 - BL-s1,d0 for thickness range 3-12 mm.

### TROCELLEN CLASS ALU ADHESIVE

Chemically cross-linked, closed cell polyethylene foam, laminated with aluminium sheet.

- Euroclass B-s2,d0 - BL-s1,d0 for thickness range 3-14 mm
- Euroclass C-s2,d0 - BL-s1,d0; thickness range: 15-24 mm.

### TROCELLEN CLASS ALU.S ADHESIVE

Chemically cross-linked, closed cell polyethylene foam, laminated with aluminium sheet. With improved performances.

- Euroclass B-s2,d0 - BL-s1,d0; thickness range: 3-16 mm
- Weather tolerant insulation and usable even outdoor.

Other not CE marked types available, according to the old Italian fire reaction classification:

**TROCELLEN DUCT CL1** - plain

**TROCELLEN DUCT CLO-2 ALU** - type N, laminated with smooth or embossed aluminium 50  $\mu$ m

**TROCELLEN DUCT CL1 ALU** - type CL1, laminated with smooth or embossed aluminium 50  $\mu$ m

**TROCELLEN DUCT AL CL1** - type CL1, lined with embossed scratch-proof metallic PE film

**TROCELLEN DUCT AL CL1 REF** - type CL1, laminated with a metallic polyester film

**TROCELLEN DUCT CL1 ALU-NET** - type CL1, laminated with a thin netted aluminium foil. It is also a "Class 0 surface" according to British standard BS 476-Part 6/7 (thickness 13 mm).

\* TC CLASS product range



TROCELLEN CLASS ADHESIVE



TROCELLEN CLASS ALU/ALU.S



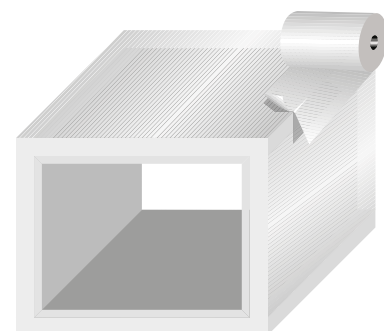
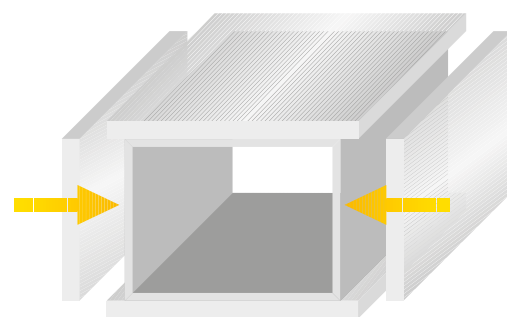
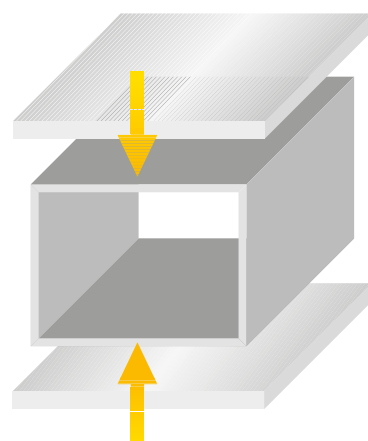


## INSTALLATION ON VENTILATION DUCTS

Hot air heating plant, where temperatures may reach 60-80 °C: we recommend using the specific MATIBLOCK glue on both of the surfaces to be joined.

When using adhesive rolls to insulate such ducts, you must bear in mind a few rules to avoid the risk of the insulation peeling off the metal:

- Do not use on particularly cold metals
- The glues used are pressure-sensitive, meaning that you must apply suitable and an even pressure across the whole surface
- The actual pressure applied (roughly 0.2-0.5 kg/cm<sup>2</sup> is enough) is not as crucial as the need to apply the same pressure across the surface to avoid the formation of air bubbles
- The best way to join the insulation material and the metal is calendaring, pressing the two layers together
- The insulation material must not be stretched: if used for external insulation of a duct, the insulation material must not be wrapped around this, but cut to size for each section (see installation diagrams)
- The metal must be clean, without any traces of oil or dust. Do not use solvents, but you can use dry cloths or naked flames to clean the metal
- Never use self-adhesive materials to insulate ducts installed outdoors: direct sunlight may heat the surfaces and can cause the insulation material to peel off the metal duct. We recommend using the specific MATIBLOCK glue, spread on both surfaces to be joined.



Installation diagram: seal edges and joints with suitable adhesive tape.

TROCELLEN CLASS RANGE					
THICKNESS mm	MAX ROLL SIZE m <sup>2</sup>	AVAILABLE ROLL SIZE m <sup>2</sup>	TC CLASS ADHESIVE	TC CLASS ALU ADHESIVE	TC CLASS ALU.S ADHESIVE
03	600	75	X	X	X
06	300	75	X	X	X
08	225	75	X	X	X
10	180	60	X	X	X
12	135	45	X	X	X
14	180	45		X	
15	180	45		X	X
16	180	45			X
20	180	30		X	
24	135	22,5		X	
Roll width: 1500 mm ± 10 mm					



# SEALS – TAPES – STRIPS – GLUE

## TROCELLEN SEALS, THICKNESS 3-6 mm

These seals should be used to join metal elements (duct flanges, the edges of refrigeration cell doors and ventilation vents) to guarantee hermetic sealing and vibration damping. Acrylic self-adhesive.

Range:

- thickness 3-6 mm, types N and CL1

## EPDM SEALS

The material used for this type of sealant is EPDM/other polyolefin resin foam, offering superior compressive strength and excellent spring.

Range:

- thickness 3-4-5 mm

## AL/CL1, AL/CL1 HR TAPES AND ALUMINIUM TAPES (adhesive)

To guarantee a good aesthetic finishing, the product range also contains a series of AL/CL1 and AL/CL1 HR tapes (50 mm wide, <1 mm thick, 25 mm long), protected by siliconized paper or siliconized PE film.

Aluminium tapes:

- thickness 50 µm, types embossed, smooth, self-adhesive (smooth or embossed), Duplex (with polyester film, improved tensile strength and adhesiveness).

## TROCELLEN CLASS STRIPS

Suitable for the technical and aesthetic finishing of the insulation, they can be used for sections of piping where it is difficult to apply insulating sleeves and for joints between insulation sleeves and sheets which must be first glued with MATIBLOCK glue.

Range:

- thickness 3 mm, types **TROCELLEN CLASS** adhesive plain and **TROCELLEN CLASS ALU** adhesive.

Other types available: AL, CL1, AL/CL1, AL/CL1 HR, CL1 ALU/L, rubber.





## STORING THE ADHESIVE ROLLS AND MATIBLOCK GLUE

To guarantee correct storage of the adhesive rolls, you must follow the recommendations below:

- The ideal storage temperature should always be kept within 10 °C and - 25 °C. Adhesives are sensitive to jumps in temperature and may lose their adhesive properties (too hot) or become brittle (too cold), leading to the risk of peeling-off after installation;
- For no reason whatsoever should the adhesive rolls be stored outdoors: humidity, water and sun will seriously alter the behaviour of the adhesion;
- Avoid storing the rolls near windows and doors, where at all possible, for the above reasons;
- The rolls should not be stored for more than period of storage 60 days in warm weather (spring and summer) or 30 days in cold weather (autumn and winter) before use;
- The rolls may, however, be exposed to higher or lower temperatures for brief periods (a few hours): this should not create problems, provided the exposure is proportional to the temperature limits and, in any case, the temperatures during actual installation must not fall outside of 2°C - 35 °C;
- Matiblock glue: properly sealed in a warehouse for a few years. However, we recommend you use it within 2 years from purchase.

MATIBLOCK glue



## ITEM SPECIFICATIONS

### TROCELLEN CLASS ADHESIVE

Chemically cross-linked, closed cell polyethylene, density 28 kg/m<sup>3</sup>, light green, adhesive.

- CE marked (CPR), according to the European Standard (PEF) EN 14313
- Euroclass B-s2,d0 - BL-s1,d0 for thickness range 3-12 mm
- Classified F1, toxicity and opacity of fumes in case of fire, according to NF F 16-101
- Thermal conductivity coefficient at 10°C ( $\lambda_D$ -value) = 0,0373 W/mK (0,0321 kcal/mh°C)
- Water vapour diffusion factor ( $\mu$ -value)  $\geq$  1000.

### TROCELLEN CLASS ALU ADHESIVE

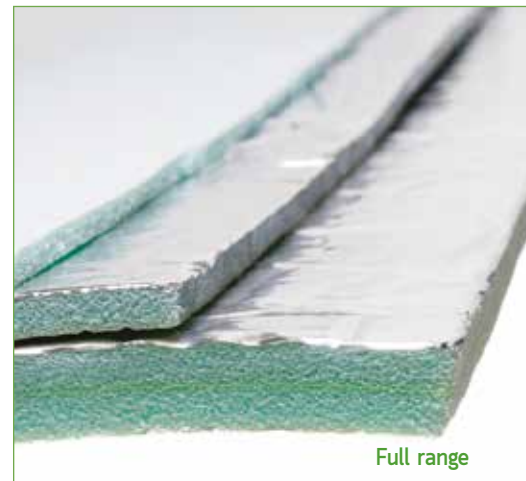
Chemically cross-linked, closed cell polyethylene, density 28 kg/m<sup>3</sup>, light green, adhesive, multilayer, laminated with a smooth aluminium sheet.

- CE marked (CPR), according to the European Standard (PEF) EN 14313
- Euroclass B-s2,d0 - BL-s1,d0 for thickness range 3-14 mm
- Euroclass C-s2,d0 - BL-s1,d0; thickness range: 15-24 mm
- Classified F1, toxicity and opacity of fumes in case of fire, according to NF F 16-101
- Thermal conductivity coefficient at 10°C ( $\lambda_D$ -value) = 0,0386 W/mK (0,0332)
- Water vapour diffusion factor ( $\mu$ -value)  $\geq$  15000.

Full range



Full range



## TROCELLEN CLASS ALU.S ADHESIVE

Chemically cross-linked, closed cell polyethylene, density 28 kg/m<sup>3</sup>, light green, adhesive, multilayer, laminated with a smooth aluminium sheet. With improved performances.

- CE marked (CPR), according to the European Standard (PEF) EN 14313
- Euroclass B-s2,d0 - BL-s1,d0; thickness range: 3-16 mm
- Classified F1, toxicity and opacity of fumes in case of fire, according to NF F 16-101
- Thermal conductivity coefficient at 10 °C ( $\lambda_D$ -value)= 0,0387 W/mK (0,0333 kcal/mh°C)
- Water vapour diffusion factor ( $\mu$ -value)  $\geq 15000$
- Weather tolerant insulation and usable even outdoor.



TECHNICAL DATA					
TECHNICAL CHARACTERISTICS	NORM	UNIT	TROCELLEN CLASS ADHESIVE	TROCELLEN CLASS ALU ADHESIVE	TROCELLEN CLASS ALU.S ADHESIVE
Reaction to fire	EN 13501-1	Euroclass	B-s2,d0 - BL-s1,d0 for thickness range 3-12 mm	B-s2,d0 - BL-s1,d0 for thickness range 3-14 mm C-s2,d0 - BL-s1,d0 for thickness range 15-24 mm	B-s2,d0 - BL-s1,d0
Smoke index value	NF F 16 - 101	-	F1	F1	F1
Trace quantities of water soluble ions	EN 13468	mg/kg	7,5	10	8
Thermal conductivity coefficient at 0 °C ( $\lambda$ -value) (12 mm)	EN 12667	W/mK kcal/mh°C	0,0352 0,0303	0,0358 0,0308	0,0355 0,0305
Thermal conductivity coefficient at 40 °C ( $\lambda$ -value) (12 mm)	EN 12667	W/mK kcal/mh°C	0,0429 0,0369	0,0435 0,0374	0,0424 0,0365
Water vapour diffusion factor ( $\mu$ -value)	EN 12086 EN ISO 12572	-	$\geq 1000$ (1270)	$\geq 15000$	$\geq 15000$
Density	EN ISO 845	kg/m <sup>3</sup>	28	28	28
Thickness	EN ISO 1923	mm	from 3 to 12 (see base specifications)	from 3 to 24 (see base specifications)	from 3 to 16 (see base specifications)
Colour	BASE spec.	-	light green	light green + aluminium sheet	light green + aluminium sheet
Compression stress at 10%	EN ISO 3386/1	kPa	12	10	12
Water absorption after 28 days	ISO 2896	Vol%	<3	<3	<3
Dimensional stability (< 5%)	ISO 2796	°C	90	90	90
Maximum operative temperature range		°C	-80 ÷ +90	-80 ÷ +100	-80 ÷ +100
Maximum operative temperature range with mechanical stress		°C	-40 ÷ +90	-40 ÷ +100	-40 ÷ +100

## INTERNATIONAL LOCATIONS

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## TROCELLEN\*

Trocellen is a multinational company owned by Furukawa Electric Co. Ltd, internationally renowned for the design and manufacture of cross-linked polyolefin foams. Through its different Business Units, the company is able to meet the specific needs of the market with a wide range of products and solutions.

It manufactures both semi-finished and finished products. The Trocellen products stand out for their manufacturing processes and the many industrial sectors in which they can be used: Insulation, automotive, footwear, sport and leisure, adhesive tapes and packaging. Trocellen makes safety a lifestyle and turns safety into a lifestyle.

### Insulation Business Unit

The Insulation Business Unit mainly specialises in Sound and Thermal insulation for the building industry. The goal is to create comfortable environments for people or rather to "help people live better!"..



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\*Trocellen is the member of Furukawa Group.



[www.trocellen.com](http://www.trocellen.com)

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from the Official Website

50° 49' N	07° 09' O	Germany
40° 28' N	03° 21' O	Spain
41° 53' N	12° 28' O	Italy
47° 30' N	19° 02' O	Hungary
02° 54' N	101° 28' O	Malaysia
35° 40' N	139° 49' O	Japan FURUKAWA

