

ACOUSTIC
COMFORT



FIRE
PROTECTION



THERMAL
EFFICIENCY



SUSTAINABLE
PRODUCT



ON-SITE
FITABILITY



MOISTURE
CONTROL

CLIMAVER[®] ductwork system

Saves valuable space, reduces installation time
and is more cost-effective

ISOVER

The World's Leading Acoustic and Thermal Insulation



The **CLIMAVER**[®] pre-insulated ductwork system solution enables you to meet the thermal, acoustic and fire performance requirements stipulated by today's stringent Building Regulations. Manufactured from glass mineral wool, the **CLIMAVER**[®] insulated panels boast up to 80% recycled glass content.

Glass mineral wool duct boards used for air conditioning were first developed in the USA more than 40 years ago. They have since been produced by the CertainTeed Corporation (a Saint-Gobain company) in the USA and by other Saint-Gobain companies in other countries.

The Isover factory in Spain is a glass mineral wool manufacturing plant that has been producing glass mineral wool pre-insulated duct boards since 1967 under the trade name **CLIMAVER**[®].

CLIMAVER[®] glass mineral wool duct boards are CE certified and manufactured at the Azuqueca de Henares mineral wool factory. This factory has been accredited to ISO 14001 and ISO 9001.

 CE Product
CLIMAVER[®] Plus R complies
with BS EN-13403:2003

The **CLIMAVER**[®] system is a practical solution for HVAC installations. The system enhances the thermal and acoustic comfort of a building's occupants whilst maximising energy efficiency. In short, it saves time, saves space and saves money.

CLIMAVER[®] is made from a high-density glass mineral wool board. The system is a more economical and more efficient alternative to conventional 'sheet metal and insulation' ductwork and will enable all thermal, fire and acoustic requirements to be met.

The fabrication process allows precision-cut joints, ensuring very low leakage rates, leading to improved performance and energy savings. The **CLIMAVER**[®] system is highly adaptable to on-site changes in design and layout whilst projects are progressing.

As **CLIMAVER**[®] is a single product replacement for the two traditional trades of metal ductwork and lagging, it offers the benefit of much faster installation time, which results in lower installed costs with minimal material waste.

As well as intrinsic thermal and acoustic properties, **CLIMAVER**[®] has a Class 'O' fire rating.

Saves time, saves space, saves money.



Environmental credentials. Energy efficiency and environmental protection with Isover glass mineral wool

- More and more specifiers and users are insisting on the use of insulation materials that not only deliver technical performance but also offer exceptional green credentials.
- Isover glass mineral wool boasts Zero ODP (Ozone Depletion Potential) and Zero GWP (Global Warming Potential).



- Isover glass mineral wool is manufactured from a combination of silica sand, the earth's most abundant naturally occurring mineral, and up to 80% recycled post-consumer glass from building regeneration projects, or flat glass manufacture, that would otherwise go to landfill.



Silica sand.



Cullet - raw material: recycled post-consumer glass

Isover is therefore one of the most environmentally sustainable insulation products on the market today.

Key benefits of the **CLIMAVER**[®] system:

- Class 'O' fire rating
- Precision-cut perfect joints
- Low air leakage rates and pressure drops
- Fast assembly and installation
- Suitable for air speeds up to 18m/s and operating air pressure up to 800Pa
- Adaptable to on-site design changes
- Inherent vapour barrier and air tightness
- Excellent thermal and acoustic performance
- Low installed cost compared to metal systems
- Greater productivity with on or off site fabrication, compared to traditional metal systems



FIRE
PROTECTION

Fire performance

EUROCLASS HARMONISATION

CLIMAVER[®] achieves Euroclass B rating (s1, d0) fire classification.

Euroclass is a harmonised European classification system for products, measuring their reaction to fire and is intended to replace old national standards such as British Standards. This system is now commonly accepted in England, Scotland and Wales.

The classification levels are A1, A2, B, C, D, E and F. A1 corresponds to the safest situation, E would be the most dangerous situation and F would mean not classified.

REACTION TO FIRE

Common materials and likely Euroclass		
Euroclass	Flashover potential	Example materials
A1 & A2	No	Glass and stone mineral wool, concrete, brick and plasterboard
B	No	Typically timber products
C	Yes 10-20 minutes	Phenolic foam (foil faced)
D	Yes 2-10 minutes	Expanded polystyrene type A Polyisocyanurate foam (foil faced) Extruded polystyrene
E	Yes < 2 minutes	Polyurethane foam (lamine faced) Polyisocyanurate foam (sprayed)
F	Yes Early failure or no data	Expanded polystyrene type N Untested or fails Euroclass E

A guide to common building materials and their likely Euroclass classification is shown in the above table which also provides a performance comparison between glass mineral wool and polyurethane foams.

One of the most important issues studied under reaction to fire performance is the potential for flashover to occur - the spontaneous ignition of hot smoke and gases which can lead to a fire spreading uncontrollably.

Glass mineral wool, and therefore **CLIMAVER**[®], is not susceptible to flashover.

CLIMAVER[®] meets and exceeds European standards.

In order to address other hazards found in real life fires and for risk assessment, two additional classifications are also available, s and d. These provide information on smoke emission and speed (s0 means the non-existence of smoke, up to s3, which means high emissions of smoke) and on the possible fall of flaming droplets d (d0 none, up to d3).

CLASS 'O' COMPLIANCE

Class 'O' compliance refers to 'surface spread of flame' or 'non-combustibility' of a product.

'Surface spread of flame' compliance refers only to the surface properties of a product and BS 476: Parts 6 and 7 need to be satisfied. The **CLIMAVER**[®] system has a Class 'O' foil and passes both these tests. The **CLIMAVER**[®] system also complies with BS 476:Part 4 (non-combustibility test). This is a measure of the combustibility or reaction to fire of the composite product. The **CLIMAVER**[®] system provides assurances of being the 'best in class' with its excellent fire credentials.

SUMMARY

The European Supplement to UK Building Regulations asks for a minimum of: Bs3-d2 as an alternative to the current Class 'O'.

CLIMAVER[®] meets and exceeds this standard.





Hunter Medical Centre, East Kilbride



THERMAL EFFICIENCY

Thermal performance

Thermal conductivity	$\lambda_{90/90} \geq 0.032 \text{ W/m.K}$
Thermal resistance	$R \geq 0.75 \text{ m}^2.\text{K/W}$

(at 10°C mean temperature) Thickness of product 25mm.

Vapour Performance

Approx value; 0.0011 g/s.MN (outer facing).

ENERGY SAVINGS

The energy efficiency of ductwork systems depends upon the thermal performance of the duct wall and also on the air leakage rate. The **CLIMAVER®** system combines good inherent Thermal Insulation with low air leakage and compares favourably with metal and insulation systems.



CLIMAVER® equates to massive energy savings.



Glasgow University

EXAMPLE

Ductwork: 40x40(cm); 20m - air velocity 8m/s
Air temperature: Inside 14°C, outside 26°C

Duct	U (W/m ² .K)	Q ₁ (KWh)	Air leakage (m ³ /h)	Q ₂ (kWh)	Total Q ₁ +Q ₂ (KWh)	%
Metal duct (no insulation)	3.84	1.66	223	1.28	2.94	100
CLIMAVER®	1.16	0.57	28	0.19	0.76	25.8

U = Thermal losses due to the different temperatures between the airflow within the duct and that of the surrounding air temperature.

Q1 = Thermal losses as above but expressed in KWh instead of W/m².K, for the parameters given.

Q2 = Thermal losses due to air leakage in the duct, expressed in KWh, for the parameters given.

SUMMARY

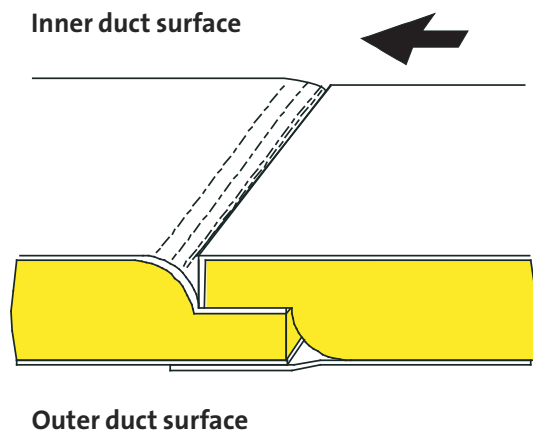
With reference to this table, if a non-insulated duct is the worst case scenario for thermal losses and is therefore the benchmark for the most energy losses, it is apparent that **CLIMAVER®** equates to massive energy savings.



Jointing, assembly and duct cleaning

The external aluminium foil facing is patterned with guidelines, providing a reference for the cutting and construction of pre-insulated ductwork.

CLIMAVER® has an exclusive male/female edge design, leading to an airtight seal and giving greater strength in the joints and easy assembly and installation. The finished joint offers continuity in the inner surface and allows easy cleaning.



Longitudinal joints and edges are formed by using specially designed **CLIMAVER®** cutting tools. The joints are then sealed with **CLIMAVER®** adhesive and **CLIMAVER®** foil tape.

MECHANICAL RIGIDITY

CLIMAVER® boards have R5 rigidity, to EN 13403:2003 (European Standard for non-metallic ducts). This rigidity is the maximum level established by this standard.

CLIMAVER® ducts can withstand static pressure under 800 Pa with no evidence of fissures or swelling (tested in accordance with EN 13403).

DUCT CLEANING

CLIMAVER® ducts will tolerate mechanical cleaning methods without tearing or breakage of the inner lining. For applications where regular cleaning is a particular requirement, **CLIMAVER®** duct boards can be used in conjunction with the **CLIMAVER®** Metal System. This ensures that internal edges are sealed and protected with the profile Perfiver L, which is incorporated in the longitudinal edges of the duct.

For further information on cleaning please consult the HVCA publication TR19 'Guide to good practice - internal cleanliness of ventilation systems'.

For specific examples please email: techinsulation@saint-gobain.com



For further information please refer to the **CLIMAVER®** installation manual. To order your copy please call 0115 969 8010.



Product performance and Building Regulations

For specific performance please consult the following guides:

- England and Wales. TIMSA Guidance for Achieving Compliance with Part L of the Building Regulations
- Scotland. BS5422: 2001. Method for specifying Thermal Insulating materials on pipes, ductwork and equipment (in the temperature range -40°C to +700°C)

Also for Scotland, refer to Technical handbooks by the SBSA. Domestic Handbook 2007 and Non-Domestic Handbook 2007 Sections 6 - Energy.

The **CLIMAVER**® system conforms with the methodology and engineering concepts as laid out in DW144- Specification for Sheet Metal Ductwork. Low, medium and high pressure/ velocity air systems.

PRESSURE DROP CALCULATIONS

ASHRAE/CIBSE FRICTION GRAPHS CAN BE USED FOR PRESSURE DROP CALCULATIONS FOR **CLIMAVER**® SYSTEM DUCTS, AS WITH TRADITIONAL METALLIC DUCTS.

A pressure loss due to friction can be reduced using the **CLIMAVER**® system dependent upon the geometry of the ducts and air speed.

For specific examples please email:
techinsulation@saint-gobain.com

CLIMAVER® ducts can be used in:

- External environments if a suitable finish is applied such as VentureClad™ 1579CW, FibaRoll or other proprietary exterior weatherproofing system. Please contact manufacturers for specific technical details

CLIMAVER® ducts are not recommended in the following cases:

- Air circulation at a temperature > 90°C
- Transport of solids or corrosive liquids

CLIMAVER® ducts manufactured from glass mineral wool to EN 13162 shall not be used for the following applications:

- Transport of solid particles or corrosive gases
- Outdoor use without additional protection
- Below ground without additional protection
- Smoke extraction from kitchens, laboratories etc
- Internal air pressure should be no higher than 800 Pa
- Airspeed in the duct should be no higher than 80m/sec
- Where the minimum air temperature is less than -30°C
- Where, under extreme temperature conditions, measures have to be taken to prevent external or internal condensation e.g. by using a ductboard of a sufficient thermal resistance and/or by application of a water vapour barrier
- At higher levels of relative humidity than those specified by the manufacturer of the ductboards

For **CLIMAVER**® glass mineral wool ducts the following restrictions also apply:

- Ducts shall not be used in vertical air duct systems higher than ten metres without additional support
- The maximum air temperature inside the duct shall not exceed 90°C and outside the duct shall not exceed 60°C

Further information can be obtained from the HVAC Ductwork Specification Manual.



CLIMAVER® Plus R.

The economical, efficient alternative to conventional ductwork

ACOUSTIC PERFORMANCE

CLIMAVER® Plus R is made from a high-density glass mineral wool board, faced on both sides with a robust aluminium surface. Glass mineral wool has excellent noise absorption properties and this makes **CLIMAVER® Plus R** not only an excellent thermal solution but an excellent acoustic solution.

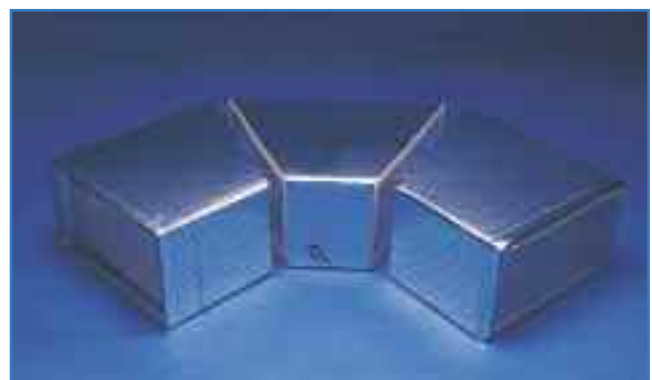
The absorption of sound depends on the sound absorption coefficient (α) which is the ratio between absorbed acoustic energy and received acoustic energy.

In this, **CLIMAVER® Plus R** has excellent sound absorption, please refer to the table below.

Sound Absorbent Coefficient					
Frequency (Hz)	125	250	500	1000	2000
CLIMAVER® Plus R Sound absorption (α)	0.20	0.20	0.20	0.60	0.50

At 1000Hz **CLIMAVER® Plus R** has approximately 12 times the level of acoustic absorption when compared to a metal duct with insulation. Tables are based on research by NAIMA.

Note: For an explanation as to how to evaluate the acoustic attenuation based on the acoustic absorption (algorithm $\Delta L = 1,05 \cdot \alpha^{1,4} \cdot \frac{p}{l}$), please refer to the HVAC Ductwork Specification Manual.



Comparison with other systems						
Acoustic Attenuation (dB/m)						
Duct 40 x 50cm	Frequency (Hz)					
	125	250	500	1000	2000	4000
Metal duct with no insulation or foam duct	0.07	0.07	0.19	0.19	0.10	0.07
CLIMAVER® Plus R	1.26	1.26	1.26	4.99	3.97	3.01

BENEFITS OF THE CLIMAVER® PLUS R SYSTEM

- Class 'O' fire rating
- Fast assembly and installation
- Adaptable to on-site design changes
- Excellent thermal and acoustic performance
- Low installed cost compared to metal systems
- Greater productivity with on or off site fabrication, compared to traditional metal systems



CLIMAVER® Neto.

Providing the same excellent benefits as the **CLIMAVER® Plus R** system but with further enhanced acoustic properties

ACOUSTIC INSULATION IN HVAC SYSTEMS

Noise (considered as unwanted sound) was declared an environmental pollutant in the International Conference for the Environment held in Stockholm in 1972.

Noise has a wide range of consequences for humans, from disturbance reducing personal comfort (such as lack of privacy or difficulty in talking) which can eventually lead to illnesses such as auditory problems and stress, etc.

HVAC installations can produce variable sound levels, depending on the design, installation and equipment power. In particular, noise generated by fans and air conditioning units could be transmitted through ducts.

CLIMAVER® Neto helps to eliminate this problem.

THE SOLUTION

CLIMAVER® Neto is a high density glass mineral wool duct board, faced on one side with reinforced aluminium, with a black glass textile facing on the other side.

The outer facing of reinforced aluminium foil provides and acts as an exceptional vapour barrier with superior airtightness. It has a smooth finish and high resistance against impact.

The internal facing ensures high acoustic absorption, making **CLIMAVER® Neto** the only choice for enhanced acoustic performance.

Attenuators can be used to reduce noise transmission. However, they also cause pressure losses. The use of **CLIMAVER® Neto** will reduce noise transmission and possibly negating the need for attenuators. By inference, **CLIMAVER® Neto** can contribute to system energy savings by reducing the air handling equipment's power usage.



Please refer to Isover's HVAC Ductwork Specification Manual for further information. To order your copy please call 0115 969 8010.

The internal facing has excellent resistance against cracking and is therefore suitable for cleaning by brushing.

The '**Neto**' facing combines maximum acoustic absorption. The acoustic absorption coefficient (α) is the relation between the acoustic energy absorbed and the incident energy.

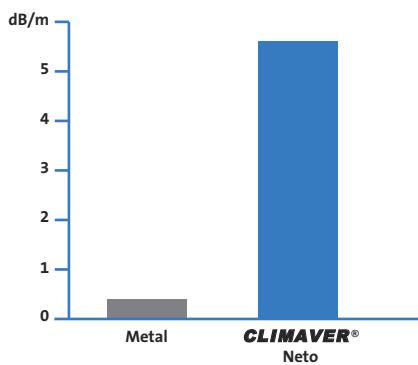
This makes **CLIMAVER® Neto** suitable for all acoustic applications such as music rooms, theatres and libraries. Also ideal for Plenum boxes in air conditioning systems.



CLIMAVER® Neto

GLOBAL ACOUSTIC ATTENUATION

Global acoustic attenuation (dB/m) in a straight duct (40cm x 50cm) at 1000Hz.



The Acoustic absorption of **CLIMAVER® Neto** is the maximum achievable in an air conditioning duct board $\alpha_{\omega} = 0.75$.

Acoustic absorption coefficients of **CLIMAVER® Neto**.

Frequency (Hz)	125	250	500	1,000	2,000
Acoustic absorption α	0.25	0.60	0.65	0.95	1.00

Straight duct noise reduction (dB/m). 40cm x 50cm.

Duct board	Frequency (Hz)					Global attenuation (dB/m)
	125	250	500	1,000	2,000	
Metal	0.07	0.07	0.19	0.19	0.10	0.10
CLIMAVER® Plus R	1.26	1.26	1.26	4.99	3.97	1.86
CLIMAVER® Neto	1.67	4.99	5.52	8.86	9.45	4.55

Straight duct noise reduction (dB/m) **CLIMAVER® Neto**.

Section (mm)	Frequency (Hz)					Global attenuation (dB/m)
	125	250	500	1,000	2,000	
200 x 200	3.71	11.09	12.26	19.70	21.00	8.45
300 x 400	2.17	6.47	7.15	11.49	12.25	5.63
400 x 500	1.67	4.99	5.52	8.86	9.45	4.55
400 x 700	1.46	4.36	4.81	7.74	8.25	4.05
500 x 1000	1.11	3.33	3.68	5.91	6.30	3.19

CLIMAVER® Plus R has a Global Attenuation of 18 times that of sheet metal in a duct of dimensions 40cm x 50cm. However, **CLIMAVER® Neto** has a Global Attenuation of 45 times that of sheet metal in a duct of dimensions 40cm x 50cm.

CLIMAVER® Neto is suitable for all acoustic applications such as music rooms, theatres and libraries. Also ideal for Plenum boxes in air conditioning systems.



Plenum box featuring a spigot.



Plenum box featuring **CLIMAVER®** Perfiver H Profile and opening made by a spigot.

CLIMAVER® Neto applications

CLIMAVER® NETO PLENUM BOXES

CLIMAVER® Neto Plenum boxes are an example of the various acoustic applications which **CLIMAVER® Neto** is especially suited for. Made from the standard **CLIMAVER® Neto** high density glass mineral wool duct board which is faced on one side with reinforced aluminium and a black glass textile facing on the other side.

The internal facing ensures the enhanced acoustic performance expected from a Plenum box.

By producing a Plenum box from **CLIMAVER® Neto** the full plenum is insulated. This is a significant benefit when compared to traditional lagging methods where it has proved almost impossible to achieve 100% insulation covering over the plenum. The Plenum box should be fitted with Perfiver H Metal Profile. This profile is used to reinforce the open ends of the plenum whilst allowing the mechanical fix to a grille.

KEY BENEFITS OF PLENUM BOXES

Lightweight

The exceptional strength to weight ratio of the 25mm **CLIMAVER® Neto** panels means the **CLIMAVER® Neto** Plenum box is easy to handle and install. It is more than 80% lighter than a traditional metal duct plus lagging.

No light reflection

CLIMAVER® Neto is faced on one side with a black glass textile facing which is non-reflective. This stops light reflecting off the inside of the Plenum box through the grille or linear diffuser.

Pre-insulated

CLIMAVER® Neto is already totally insulated and requires no lagging.

Fast installation

The **CLIMAVER® Neto** Plenum box has a single fix installation as it requires no lagging. It can therefore be fitted in around 25% of the time of a Plenum box fabricated from sheet metal and insulated as a second operation.

Ease of installation and handling

CLIMAVER® Neto Plenum boxes are up to 80% lighter than traditional equivalents. This lightweight quality means that only one person is required to install a **CLIMAVER® Neto** Plenum box, and it rarely needs any additional support.

Cost savings

The lightness, pre-insulation and speed of fitting combine to give significant cost savings compared to sheet metal and lagging Plenum boxes.

For further information please refer to the **CLIMAVER®** installation manual.

Further support is available for the **CLIMAVER**[®] system solution.



CLIMAVER[®]
Installation Manual



The HVAC Ductwork
Specification Manual



CLIMAVER[®] Installer
Status Training Programmes



For fire protection
of ducts refer to the
ULTIMATE air duct
solutions brochure

To request a copy of the above literature please contact the Iover marketing department on 0115 969 8010.

For details of all Iover products and services visit www.isover.co.uk.

For a full list of approved **CLIMAVER**[®] contractors email techinsulation@saint-gobain.com.

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