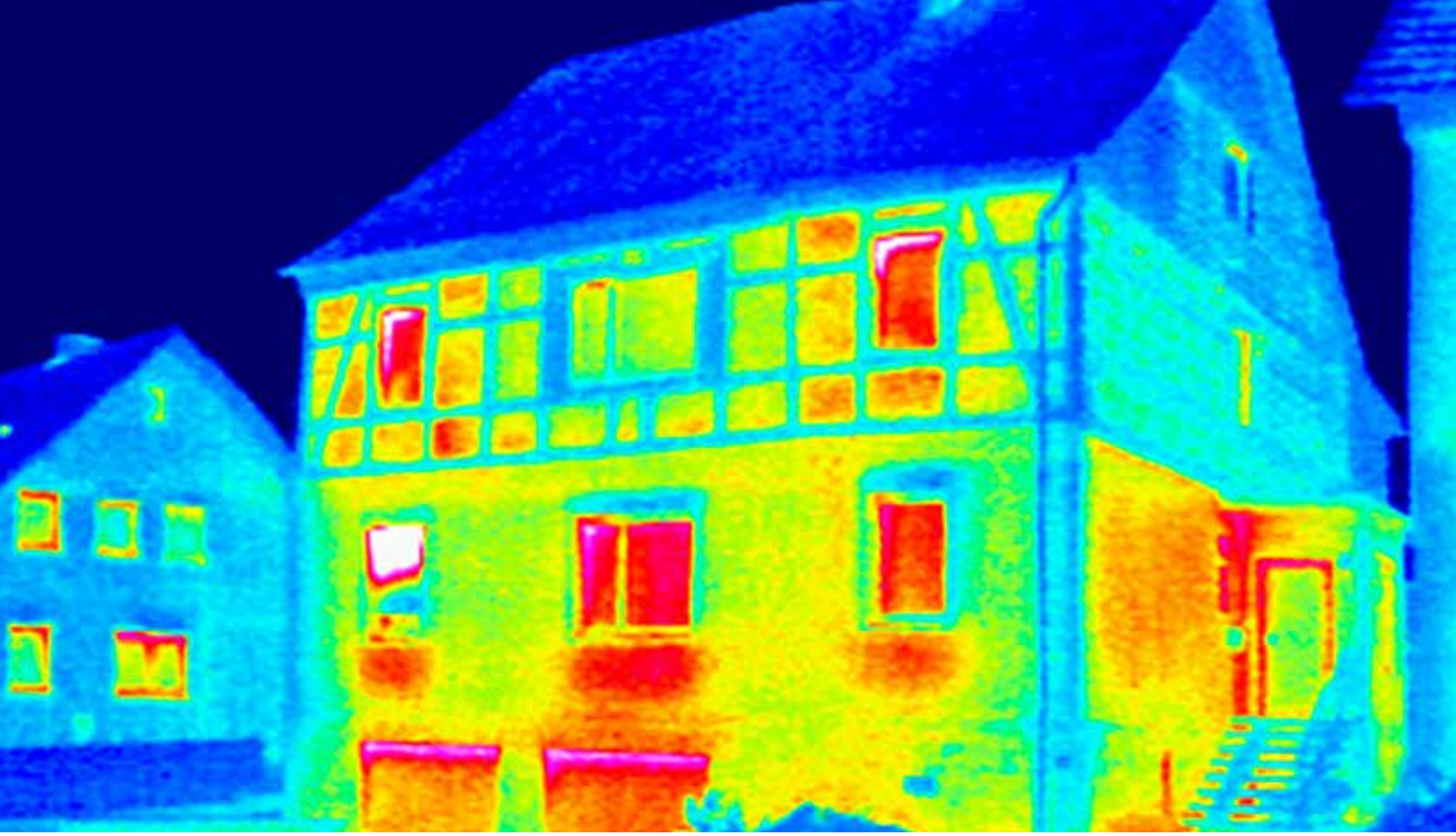
System INTELLO®

Maximum protection against structural damage and mould

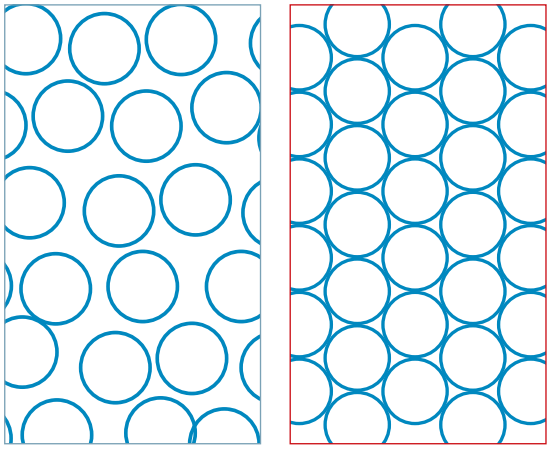
High-performance system with the pro clima INTELLO intelligent vapour check and airtight membrane

pro clima®



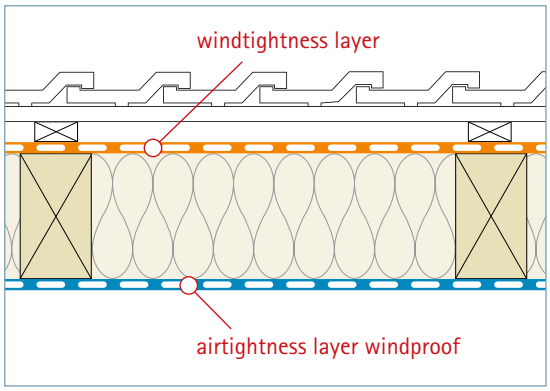
The ideal structure

Thermal insulation systems work on the basis of the inclusion of air in the insulation material (cellulose fibres, cork, wool and mineral fibres, other materials). These air pockets must be protected against air movements if the insulation is to have an insulating effect. For this reason, the insulating material should be sealed on all sides in the ideal insulating structure: i.e. airtight on the inside and windtight on the outside.



Insulation by stationary air

Left: Unprotected insulation material
Air movement in the porous structure reduces the insulating effect.
Right: Protected insulation material
No air movement possible in the porous structure, full insulation effect.
An example:
The thermal insulation effect of a woolen jumper is based on the stationary air inclusions in the fibres: as soon as a cold wind starts to blow, the insulation effect decreases. However, the effect is restored if you wear a thin wind-breaker, which itself has no significant heating function, over the jumper.



Airtight on the inside, windtight on the outside

For this reason, the insulation material is sealed on all sides in the ideal insulation structure:
outside with the windtightness layer, e.g. an underlay or facade membrane that is open to diffusion, and on the inside with an airtightness layer, e.g. a vapour retarder.

The windtightness stops cold outside air flowing through the insulation. The airtightness provides protection against the entry of humid indoor air and thus against condensation and mould.

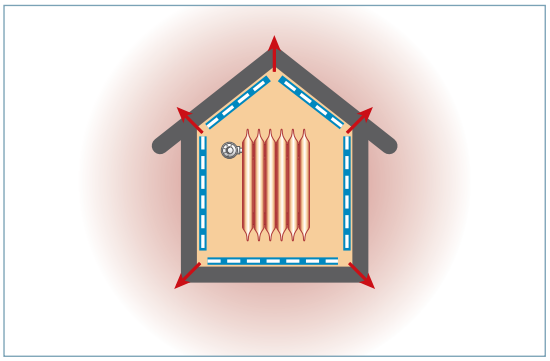
Note

Faultless installation work is important when installing air sealing, as leaks in surfaces and at joints will have consequences.

Inadequate airtightness and its consequences

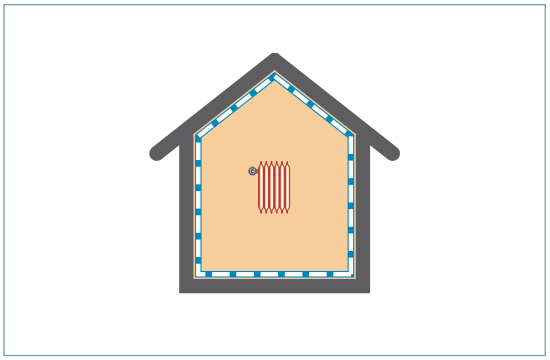
Building envelope unsealed: High heating costs

Even very small leaks in the vapour retarder layer – such as those that arise due to faulty adhesion between membrane overlaps or joints – have far-reaching consequences. This type of weakness has the same effect as a continuous gap between the window frame and the walls – and of course nobody would tolerate such a gap! Accordingly, gaps in the vapour retarder should be given the same attention.



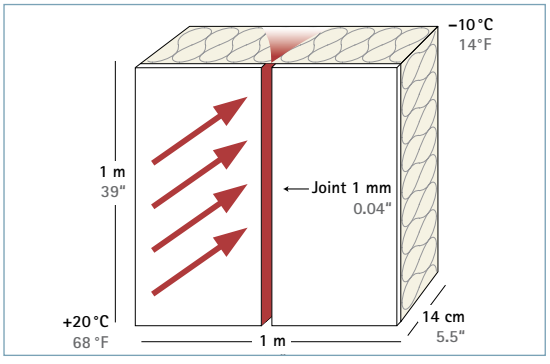
Sealed building envelope: Low costs

The higher heating costs caused by faulty seals lead to reduced cost-effectiveness of the thermal insulation for the building owner. A study by the Institute for Building Physics in Stuttgart has shown that the U-value of a thermal insulation structure is reduced by a factor of 4.8. [1] When applied to a practical case, this means that the same amount of energy is required for heating a house with a living space of 80 m² (96 yd²) where airtightness leaks are present as would be required for an airtight house with a floor area of approx. 400 m² (480 yd²).



Only a gap-free thermal insulation structure provides the full insulation value

According to a survey in the year 2000, buildings in Central Europe consume 22 l of oil/m² (220 kWh/m²) of living space for room heating on average; a passive house requires only 1 l, while a 3-litre house uses 3 l of oil/m², as the name suggests – assuming that the airtightness is perfect. Gaps in the airtightness layer of buildings lead to an increase in the energy requirement per square metre of living space.



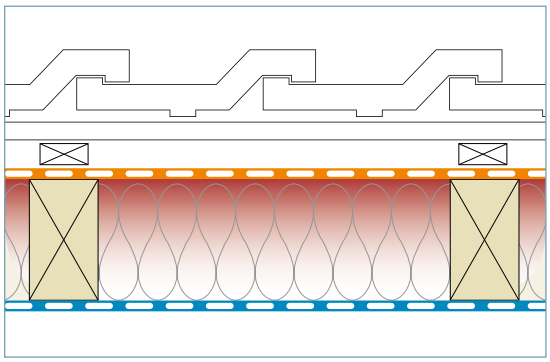
[1] The Institute for Building Physics in Stuttgart (D) has studied a 1 x 1 m sized structure with a thermal insulation thickness of 14 cm. With a joint-free, airtight design, the previously calculated thermal performance of 0.30 W/(m²·K) was confirmed. However, if the same structure features only a 1 mm wide gap in the airproofing layer, the U-value deteriorates to 1.44 W/(m²·K). This means almost 5 times more heat is lost than with the airtight construction.

Unpleasant room climate in summer

Thermal insulation in summertime is characterised by the time in hours that it takes for the heat present underneath the roof covering to reach the inside of the structure (phase shift), and by the associated increase in the interior temperature in comparison with the exterior temperature (amplitude damping).

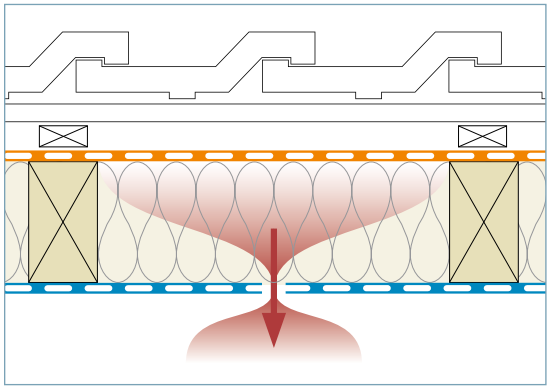
Cool rooms during summer heat

The phase shift and amplitude damping are calculated for heat protection in summer. An airtight thermal insulation structure that the heat has to work its way though pore-by-pore is assumed here.



Overheating up due to air flow

Gaps in the airtightness layer result in air flow from the outside to the inside and thus also in a high exchange of air as a result of the large difference in temperature and thus also in pressure. The thermal insulation can then no longer contribute to summer heat insulation and an unpleasant room climate that is too warm is the result.

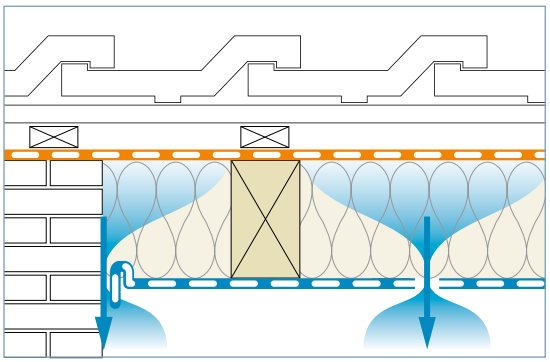


Unhealthy room climate in winter

The relative humidity in a home should be a comfortable 40 – 60 % during the heating period. A room climate that is too dry is bad for our health.

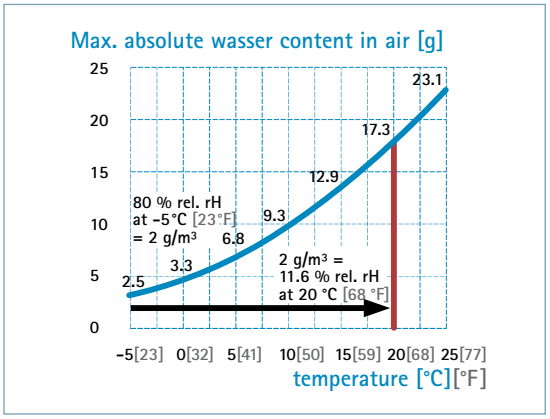
Dry cold air penetrates through gaps

The frequently observed phenomenon of dry indoor air in winter is a result of the fact that cold outdoor air enters into buildings through gaps. If this cold air is warmed up by heating, its relative humidity reduces.
For this reason, buildings with poor airtightness tend to have air that is too dry in winter, and this cannot be significantly improved by humidification equipment. The consequence is an unpleasant room climate.



Low relative humidity has a negative effect on health and comfort

Example: Cold air at -5 °C (23°F) can hold a maximum of 2.0 g/m³ of humidity at a relative humidity of 80 %. If this air is heated to 20 °C (68 °F) (standard indoor winter climate), the relative humidity (rH) falls to 11.6 %.

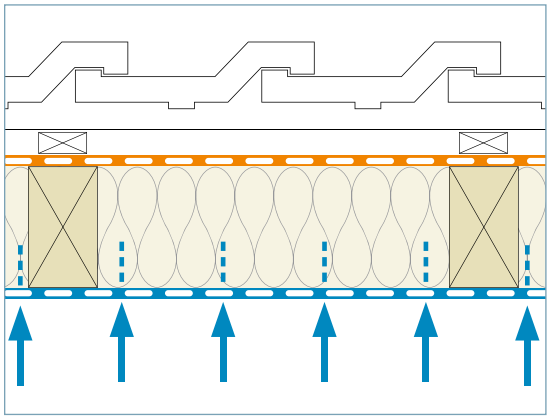


Paths taken by moisture

Thermal insulation structures have to be protected against the humidity loading from warm indoor air. This task is fulfilled by vapour retarder and airtight membranes.

Diffusion occurs in a planned manner

Diffusion:
Diffusion takes place due to the pressure difference between the inside and outside. The exchange does not occur through gaps, but instead in the form of moisture passing through a monolithic, airtight material layer. Diffusion is generally from the inside to the outside in winter and from the outside to the inside in summer. The entry of moisture into the structure depends on the diffusion resistance of the material. In Central Europe, the period with warm exterior temperatures is longer than the period with winter temperatures, which means that more moisture can dry out of the structure.

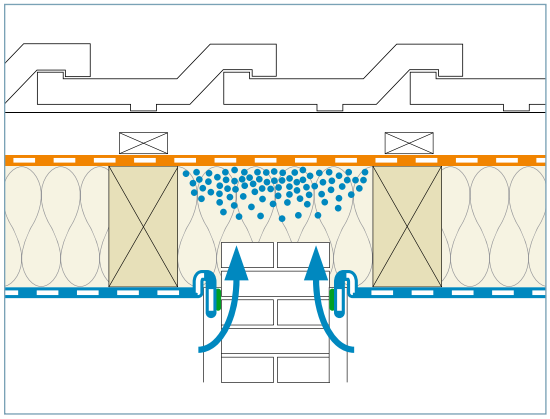


Note

A vapour retarder with an s_d value of 2.3 m (g-value: 11.5 MN·s/g) allows approx. 5 g (0.2 oz) of moisture per square metre to penetrate into the building structure each day in winter.

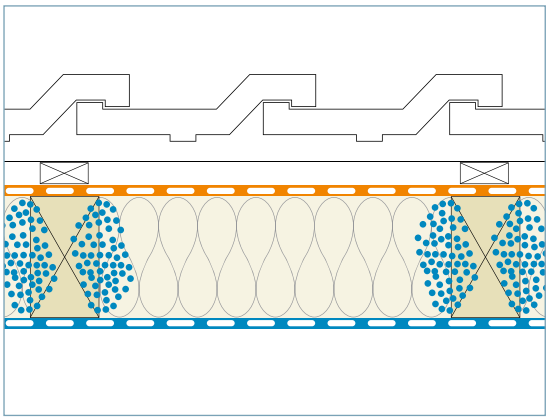
Unforeseen: Entry of moisture through adjacent components

Flank diffusion:
In this case, moisture enters into the thermal insulation through an adjacent component. This adjacent component is generally airtight, but has a lower diffusion-resistance than the vapour retarder.
A connecting masonry wall with a coating of airtight plaster would be an example here. If structures that are closed to diffusion on the outside have vapour retarders on the inside that allow little or no drying to the inside, there is a danger of an accumulation of moisture and of resulting structural damage in the case of airtight design.



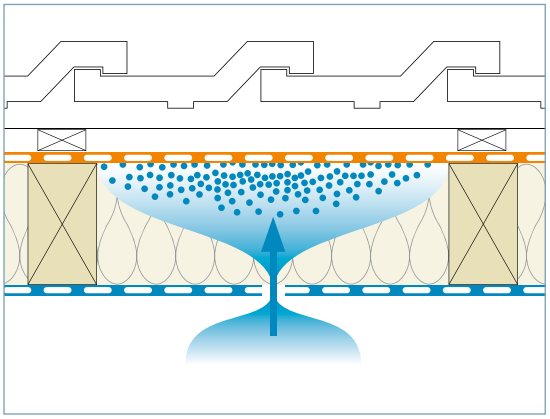
Unforeseen: Moisture from building materials

Moist construction materials:
Newly built structures often include a lot of water together with the building materials themselves. This example illustrates the amounts that can be involved: a roof with 6/22 rafters, e= 70 cm (2' 4") and a wood density of 500 kg per cubic metre will have approx. 10 kg of wood per square metre; if this wood dries by just 1%, 100 g of water will be released per square metre, or 1000 g for 10% drying or 2000 g for 20%, and this water dries out of the rafters and can enter into other parts of the building structure.



Unforeseen: Air flow (Convection)

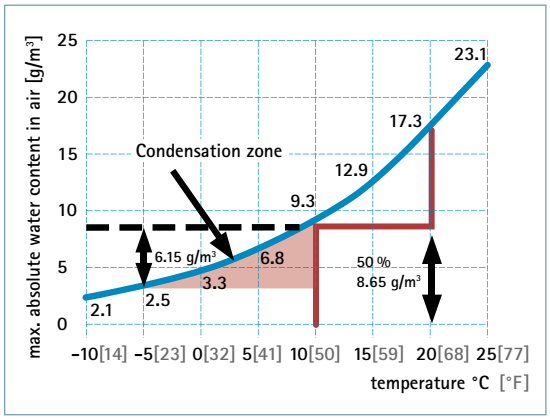
Convection:
A flowing movement of air is referred to as convection. This can occur in thermal insulation structures if there are gaps in the vapour retarder layer. The temperature difference between the interior and exterior climates also leads to a pressure difference, which the air flow attempts to balance out. Several hundred grams of moisture can enter the insulation due to convection in a single day and accumulate there in the form of condensation water.



Formation of condensation

Condensation formation at 50 % relative humidity

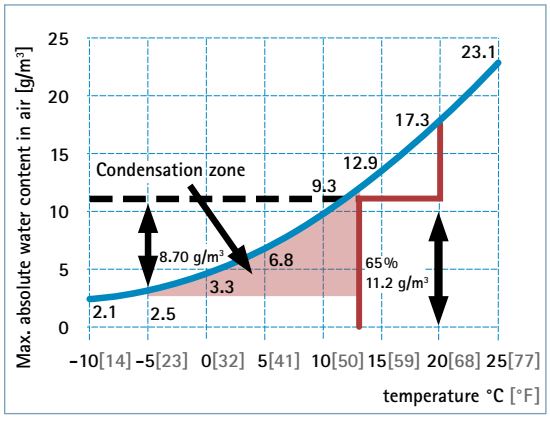
The physical behaviour of the air is responsible for the formation of condensation: warm air can hold more water than cold air.
The thermal insulation in building structures separates warm indoor air with its high moisture content from cold outdoor air with its low absolute moisture content. If warm indoor air enters into a building component during the cold season, it will cool down on its path through the structure. Liquid water can then condense out of the water vapour contained in the air.



Under standard climate conditions (20°C [68 °F]/ 50% relative humidity), the dew point is reached at 9.2 °C (49 °F). At -5 °C (23 °F), the amount of condensate formed is 6.15 g/m³ of air.

Condensation formation at 65 % relative humidity

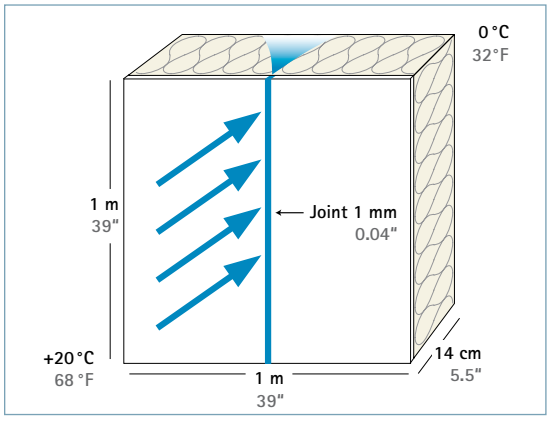
At higher relative humidity (e.g. new buildings with 65 %), the dew point temperature increases and, as a direct result, the amount of condensation increases too.
Condensation occurs when a component layer that is more closed to diffusion is present below the the dew point temperature. From a building physics viewpoint, this means that component layers that are more closed to diffusion on the outside of the thermal insulation than the component layers on the inside are unfavourable. It is a major problem when warm air can enter the building component by convective flows, i.e. as a result of leaks in the airtight membrane.



The dew point is already reached at 13.2 °C (56 °F) at an increased room humidity of 65% r.h. At -5 °C (23 °F), the amount of condensate formed is 8.7 g/m³ of air.

800 g (28.2 oz) of condensation through a 1 mm (0.04") gap

An example:
0.5 g (0.17 oz) of water per square metre will diffuse into the building structure per standard winter day through a gap-free insulation structure with a vapour retarder with an s_d value of 30 m (g-value: 150 MN·s/g).
In the same period, 800 g (28.2 oz) of moisture per metre of gap length will flow into the structure by convection through a gap with a width of 1 mm (0.04") in the vapour retarder. This corresponds to an increase by a factor of 1600.



Note

The humidity of air increases when it is cooled. When the temperature falls below the dew point, condensation will form. The dew point temperature increases at higher indoor air humidity. The result is that condensation forms earlier.

Mould due to condensation

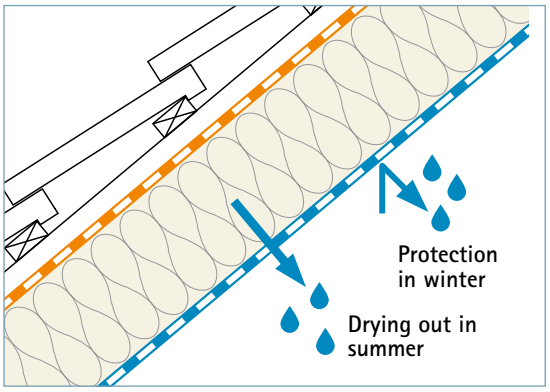
Structural damage due to mould formation may occur when humid, warm indoor air enters into the thermal insulation structure in winter – e.g. through gaps in the vapour retarder and airtightness layers – and large amounts of condensation are formed. Many mould fungi release poisons – such as MVOCs (microbial volatile organic compounds) – and spores as secondary metabolic products that are harmful to human health. These are a leading cause of allergies. Humans should avoid all contact with mould fungi. It is not important here whether the MVOCs or spores enter into the human body through food, i.e. through the stomach, or through the air into the lungs.

Conclusion

- ✔ Moisture can enter into a building structure in many different ways. It is impossible to prevent a certain level of moisture loading.
- ✔ However, if moisture levels are too high, structural damage can result.
- ✔ Vapour retarders are more reliable than vapour barriers. Vapour barriers with high diffusion resistances allow for barely any drying from the component to the inside and thus quickly become moisture traps.
- ✔ The decisive factor in keeping a building structure free of damage is the presence of significant drying reserves.

The best approach: Intelligent membranes

The best protection:
Vapour retarder membranes with a humidity-variable diffusion resistance provide the best protection against condensation water damage to building structures. They become more impermeable to diffusion in winter and protect the insulation against moisture penetration in an ideal manner. In summer, they can reduce their diffusion resistance very significantly and thus ensure the best possible drying-out conditions.



The INTELLO® system

European Technical Approval
ETA – 18/1146

CERTIFIED COMPONENT
Passive House Institute

100X humidity variable
s_d 0,25 - >25 m
g value 1,25 - >125 MNs/g
Hydrosafe Value 2 m

Made in Germany

For use on roofs, walls, ceilings and floors on structures that are open or closed to diffusion on the exterior, e.g. flat/steep roofs and green roofs, after appropriate design calculations.

Advantages

- ✔ Best possible protection against damage to structures and mould because this product is humidity-variable with a variation of a factor of over 100
- ✔ Permanent protection: officially tested and certified performance (ETA-18/1146)
- ✔ Protected winter building sites thanks to hydrosafe behaviour
- ✔ Can be combined with all fibrous insulation mats and boards
- ✔ Easy to work with: dimensionally stable, no splitting or tear propagation
- ✔ Excellent values in the hazardous substance test, has been tested according to the ISO 16000 evaluation scheme

System core components

INTELLO/INTELLO PLUS
Protects structures and insulation thanks to its high-performance humidity-variability

ORCON F
Creates reliable joints with rough or mineral adjacent building components

ORCON MULTIBOND
Creates reliable joints with rough or mineral adjacent building components; joints can be subjected to loading immediately

TESCON VANA
Provides permanent, reliable adhesion that is airtight and rainproof – both indoors and outdoors

Supplementary products for detail solutions

TESCON PROFECT
Provides permanent, reliable adhesion in corners in an airtight and rainproof manner – both indoors and outdoors

CONTEGA PV/ CONTEGA SOLIDO SL
Ensures reliable, airtight joints with subsurfaces that are to be plastered over for all building trades

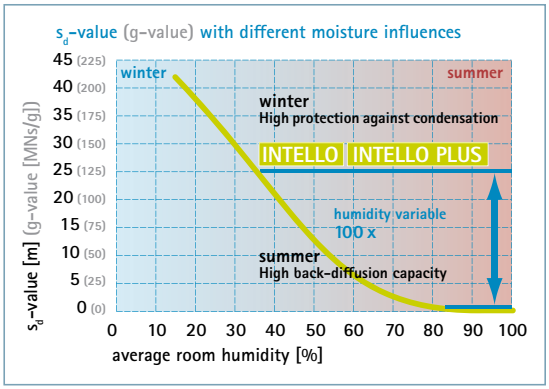
Officially certified reliability, quality and suitability

- ✔ Independently demonstrated durability according to ETA-18/1146
- ✔ Planning and construction of structures in accordance with the DIN 68800-2 standard, which provides legal security
- ✔ Roofs, walls, ceilings and floors
- ✔ Use class 0, without chemical wood preservation
- ✔ Reliable performance and quality, monitored by a third-party body

Humidity-variable airtight membranes **with ageing tests (ETA-18/1146)** for planning and construction of structures **in accordance with the DIN 68800-2 standard,** which provides legal security

European Technical Approval ETA – 18 / 1146

Maximal protection against structural damage and mould

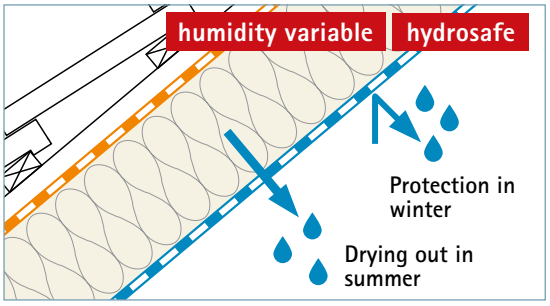


A tried-and-tested principle

INTELLO work on the principle of climate-controlled membranes: the fleece membranes provide a seal against moisture in winter, whereas the molecular structure becomes more open in summer and facilitates drying out in a reliable manner. The variability of the diffusion resistance of the high-performance INTELLO systems guarantees impressive protection against structural damage, even on demanding structures that are impermeable to diffusion to the outside such as steep roofs with sheet metal covering, roof linings with asphalt roof membranes, flat roofs and green roofs.
The durability of the humidity-variable properties of INTELLO and INTELLO PLUS has been independently tested and confirmed by a testing institute. They will protect the structure for the whole service life of the building.

Seasonal intelligence

In winter, INTELLO reduce or stop the penetration of moisture into roofs and walls with their s_d value of over 25 m (g-value: > 125 MN·s/g ; vapor permeance < 0.13 US perms) – moisture transport of less than 7 g/m² per week. In summer, the vapour retarders allow water vapour to escape. The s_d value of 0.25 m (g-value: 1.25 MN·s/g ; vapor permeance 13 US perms) corresponds to moisture transport of over 500 g/m² per week – which represents an exceptional drying-out capacity! Low moisture transport in winter – high degree of drying in summer: unforeseen moisture can dry out of the insulation over and over again, meaning that mould has no chance to form!
This intelligent diffusion adaptation behaviour is designed to be particularly powerful and adheres to pro clima's reliability philosophy: to achieve the best possible protection against structural damage, the drying reserve must be greater than the largest theoretically possible moisture loading!



With INTELLO, winter building sites are not a problem! With its high hydrosafe value of over 2 m, it keeps building components dry – even if there is a lot of moisture arising from new building work in winter. And with its sd value with a variation of a factor of over 100, INTELLO ensures reliably protected building components for the whole service life of the building.

BEST POSSIBLE PROTECTION AGAINST STRUCTURAL DAMAGE pro clima

More information

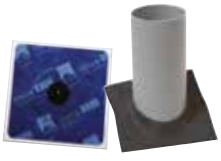
Study
Detailed information on the building physics of thermal insulation can be found in the study »Calculating Potential Freedom from Structural Damage of Thermal Insulation structure in Timber-Built Systems«.

Web
proclima.com

Movie
INTELLO function:

CONTEGA SOLIDO IQ
Ensures particularly reliable window and door joints. Is humidity-variable: airtight and vapour-retarding on the inside, open to diffusion and resistant to driving rain on the outside

TESCON PRIMER RP / TESCON SPRIMER
Primes and strengthens sub-surfaces in a simple, quick and permanently reliable manner



KAFLEX/ROFLEX
Allows for quick, reliable joints to cables and pipes – airtight on the inside, and resistant to driving rain and windtight on the outside

INSTAABOX
Allows for airtight installation of mounting boxes and switches without a service void

AEROSANA VISCONN
Sprayable airtightness sealant with a humidity-variable s_d value (g value, permeance)

Planning and construction guidelines

Area of application

The vapour retarding and airtightness membranes INTELLO and INTELLO PLUS can be used as an inner boundary for thermal insulation:

- In roofs, walls, ceilings, and floors
- In residential and commercial buildings with temporary increased levels of humidity
- In residential buildings or buildings with residential-like use in all rooms such as living rooms and bedrooms, kitchens and bathrooms
- In external permeable and external impermeable structures
- In the event of high indoor air quality requirements

Application in complex or demanding structures

By global standards, the INTELLO PLUS system also offers a particularly high level of potential freedom from structural damage for critical structures that are externally impermeable such as pitched roofs having a metal covering and sub-roofs made from bitumen roof sheeting, for flat roofs, green roofs etc. – even in locations with an extremely cold climate.
Detailed information on the physics of thermal insulation is given in the study »Calculating potential freedom from structural damage of thermal insulation structure in timber-built systems«.

Use of fibrous insulation materials

The high degree of protection against structural damage offered by humidity-variable vapour retarders is achieved by using fibrous thermal insulation materials that are open to diffusion, as the moisture must be able to diffuse through to the vapour retarder for the purpose of drying during the summer climate. Fibrous thermal insulation materials such as cellulose, flax, hemp, wood fibre and rock or mineral wool are ideal here.

Can also be used for diffusion-impermeable roof linings

The pro clima INTELLO system can be used with all commonly available diffusion-permeable underlays and diffusion-impermeable roof linings. Underlays made of wood fibreboards are advantageous from an energy viewpoint.
In certain cases, structures must fulfil the requirements for exemption from proof of performance in the relevant standard with regard to moisture protection or must be measured using a suitable calculation method (e.g. time-dependent calculation methods).

Use of diffusion-open interior cladding

To take full advantage of the potential of humidity-variable vapour retarders to provide protection against damage to structures, diffusion-open cladding should be installed internally relative to the vapour retarder – e.g. gypsum boards or wooden board cladding. Diffusion-inhibiting layers such as OSB or multi-layer wooden panels hinder drying out to the inside in summer.

Protection of the airtightness layer

The airtightness and windtightness layer is one of the most important functional layers on thermally insulated structures. Particular protection against harmful influences such as UV radiation and mechanical stresses should be provided for this layer. Membranes with a double protective fleece, e.g. pro clima INTESANA, should be used on structures that could be subject to such effects.

Correct work process provides protection against condensation

The ideal time for installation is two weeks after the adjacent walls have been plastered. Check the moisture content of the wooden structure before insulating and sealing. Alternatively, installation is also possible before plastering is carried out.
To avoid condensation formation, the vapour retarder and airtightness layer should then be completed immediately after the installation of mat or panel-shaped insulation materials.
Blown-in insulation should be inserted immediately after airtight sticking of the membrane. If necessary, carry out this work gradually in steps. This applies particularly to work carried out in winter. Ventilate any increased relative humidity quickly and systematically.

Moisture due to normal use

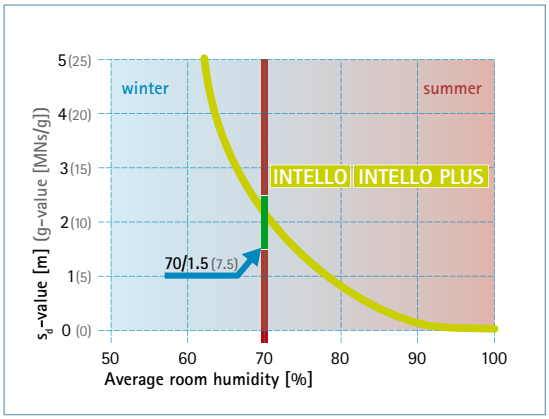
The diffusion resistance of INTELLO has been chosen to ensure that there is a reliable vapour-retarding effect even in the case of high indoor humidity, which can occur in new buildings as a result of construction work or during short-term increases in relative humidity in bathrooms or kitchens, for example. As a rule, moisture due to construction work must be able to escape the building quickly by ventilation through open windows. Dehumidifiers can help to speed up the drying process in wintertime. This helps to avoid permanently high levels of relative humidity.

Note for DIY enthusiasts

Install the vapour retarder together with the thermal insulation. If the thermal insulation is left without a vapour retarder for a long period in winter, there is a risk of condensation formation.

Construction phase: Hydrosafe value (70/1.5 rule)

A vapour retarder should have a hydrosafe value of 1.5 m (g-value: 7.5 MN·s/g ; 2.2 US perms) in order to protect structures against dampness even in the case of the increased relative humidity that can be present during construction work.
The hydrosafe value specifies how well sealed a humidity-variable vapour retarder still is at an average humidity of 70 %. Average humidity of 70 % will be present if there is 90 % indoor air humidity and 50 % humidity in the space between the rafters, for example; this level of indoor air humidity can occur when installing screed or plastering walls. The requirement that s_d should be > 1.5 m (g-value: 7.5 MN·s/g ; 2.2 US perms) and < 2.5 m (g-value: 12.5 MN·s/g ; 1.3 US perms) comes from the German wood preservation standard and is described in further detail by the 70/1.5 rule. INTELLO fulfils these requirements reliably.



Quality assurance

Airtightness is the critical factor in protecting the thermal insulation structure against damage. pro clima recommends that the airtightness layer be checked for leaks and that any leaks be located and rectified using pro clima WINCON or a blower door test, for example.

Proof of durability

There is currently no standard that contains a validation procedure for testing the behaviour and durability of humidity-variable properties. Only vapour retarders with constant diffusion resistances can be tested in accordance with European standards (EN 13984), for example. For this reason, the durability of the humidity-variable behaviour of INTELLO and INTELLO PLUS has been demonstrated according to a procedure specified by an independent committee of experts of the German Institute of Construction Engineering (DIBt). As part of this testing, the two vapour retarders were subjected to accelerated ageing with significantly more demanding conditions (increased temperature and doubled ageing period) as compared with EN 13984. In addition, the permitted deviations of the aged diffusion resistances from the unaged diffusion resistances have been made significantly more demanding in this evaluation as compared to the European standard. With the European Technical Assessment (ETA-18/1146), INTELLO and INTELLO PLUS have proof of the durability of the humidity-variable properties.

Technical hotline

If you have questions on applications, please contact: proclima.com/service/technical-support

ETA
European Technical Approval
ETA – 18 / 1146

Installation instructions

Note:
Blown-in insulation

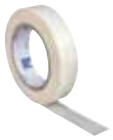
Insert insulation material immediately after completion of the airtightness layer with INTELLO PLUS.
Max. distance of 5–10 cm (1.9"–3.9") between staples when using blown-in insulation materials – Orient staples parallel with the supporting structure so that the membrane does not tear when insulation material is being blown in.

Installing membranes

Roll out the membrane and fasten it using galvanised staples with a width of at least 10 mm (3/8") and a length of 8 mm (5/16") at intervals of 10-15 cm (4" to 6"). In case of blown-in insulation: 5-10 cm (2" to 4") for. Install the membrane to stop approx. 4 cm (2") short of adjacent building components so that an airtight bond can be applied here subsequently.

Fastening to stud wall frame members

Fastening of membranes to metal frame members on stud wall and ceiling structures using pro clima DUPLEX. Stick the membrane, ensuring that there are no folds or tension. Rub using the PRESSFIX application tool to secure.



DUPLEX
Sticks membrane overlaps and joints

Overlapping the membranes

Allow for an overlap of approx. 10 cm (4") between the membranes. The marking that is printed onto the membrane will serve as a guide here.

Cleaning the subsurface

Clean the subsurface (dry and free of dust, silicone and grease) and carry out an adhesion test, if necessary.

TESCON VANA
Provides permanent, reliable adhesion that is airtight and rainproof – both indoors and outdoors

Sticking the overlaps

Centre the TESCON VANA system adhesive tape on the overlap and gradually stick it in place, ensuring that there are no folds or tension.

Rubbing the adhesive joint firmly

Rub the tape firmly using PRESSFIX, taking care to ensure that there is sufficient resistance pressure.

Sealing to smooth, non-mineral subsurfaces ...

... (e.g. knee walls made of wood-based panels) should also be implemented using TESCON VANA system adhesive tape. Centre the tape and gradually stick it in place, ensuring that there are no folds or tension. Rub tape firmly into place using the pro clima PRESSFIX.

Sealing to rough or mineral subsurfaces

Clean the subsurface. Apply a line of ORCON F system adhesive of at least d = 5 mm (3/16"), or more in the case of very rough subsurfaces if necessary. Place INTELLO onto the adhesive bed, leaving slack to allow for expansion. Do not press the adhesive completely flat.

ORCON F
Creates reliable joints with rough or mineral adjacent building components

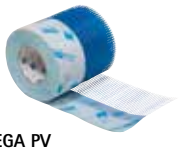
Alternative: Sealing to mineral subsurfaces

Position ORCON MULTIBOND on the subsurface, roll it out and gradually stick it to the subsurface. Gradually remove the release film.

Sticking the membrane/Rubbing the joint firmly

Apply the membrane onto the adhesive strip, leaving slack for expansion so as to allow for relative motion between components. Rub tape firmly into place using the pro clima PRESSFIX. Ensure that there is sufficient resistance pressure.

ORCON MULTIBOND
Creates reliable joints with rough or mineral adjacent building components; joints can be subjected to loading immediately



CONTEGA PV
Ensures reliable, airtight joints with subsurfaces that are to be plastered over for all building trades

Sealing to unplastered subsurfaces

Stick the CONTEGA PV plaster sealing tape onto INTELLO using self-adhesive strips. Ensure the tape remains in place by using ORCON F at discrete points. First plaster behind the tape, then apply the tape to the wet plaster and plaster over it fully.

Masonry gable end wall, creating an airtight joint

Put the vapour retarder in place. Leave slack for expansion so as to allow for relative motion between components. Remove all release films from CONTEGA SOLIDO SL. Put the tape in place, gradually stick it, and then rub using the pro clima PRESSFIX application tool to secure it.

CONTEGA SOLIDO SL
Forms adhesive bonds with mineral subsurfaces, can be plastered over; ensures reliable, airtight joints with subsurfaces that are to be plastered over for all building trades

Note on installation

Movie
INTELLO installation:

Installation instructions continued

Sealing to roughly sawn timber

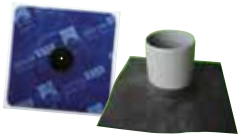
Clean the subsurface. Apply a line of ORCON F system adhesive of at least d = 5 mm (3/16"), or more in the case of very rough subsurfaces if necessary. As an alternative, a roll of ORCON MULTIBOND joint adhesive can be used.

Place INTELLO onto the adhesive bed, leaving slack to allow for expansion. Do not press the adhesive completely flat.

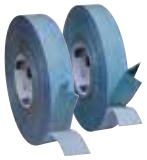
Sealing to plastered chimney (insulated or double-shelled)

Seal INTELLO using ORCON F as shown in Figure 7.

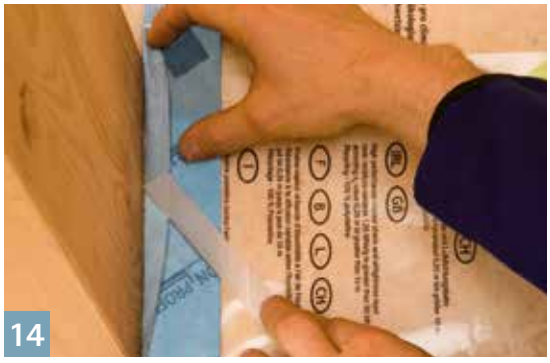
Then cut into short pieces of TESCON VANA as far as the centre, create corner shapes and then stick in place.



KAFLEX / ROFLEX
Allows for quick, reliable joints to cables and pipes – airtight on the inside, and resistant to driving rain and windtight on the outside



TESCON PROFECT
Provides permanent, reliable adhesion in corners in an airtight and rainproof manner – both indoors and outdoors



Joints to pipes and cables

Place a KAFLEX or ROFLEX sealing grommet over the cable or pipe and stick to INTELLO. The cable grommets are self-adhesive. Stick the pipe grommets to the membrane using TESCON VANA.

Corner bonding

Guide TESCON PROFECT prefolded corner sealing tape into the corner on the release film and stick the first independent adhesive strip. Then remove the release film and stick the second independent adhesive strip.

Note: Blown-in insulation

In the case of blown-in insulation and insulation materials with a tendency to sag significantly, an additional supporting batten should be fitted over the membrane overlaps.

15

Battens, interior cladding

Install battens (e ≤ 50 cm; 1' 8") to bear the weight of the insulation, and install interior cladding to provide protection against UV light and other damage.


16

Quality assurance

It is recommended that airtightness should be checked using a BlowerDoor test.

Installation and fastening

Where possible, INTELLO and INTELLO PLUS are installed in such a way that adhesion can be carried out using single-sided adhesive tape on the smooth (printed) side of the sheeting. They can be installed taut and without slack either in parallel with or perpendicular to the supporting structure, e.g. the rafters. In the case of horizontal installation (perpendicular to the supporting structure), the separation distance of the supporting structure is limited to a maximum of 100 cm (3'). After installation, perpendicular battens on the inside at a separation distance of a maximum of 50 cm (1' 8") must be fitted to carry the weight of the insulation material. If regular tensile loads on adhesive tape bonds are to be expected – for example, due to the weight of the insulation material – when using mat or panel-shaped insulation materials, an additional supporting batten should be fitted over the overlap bonding.
When attaching the membranes in the case of mat or panel-shaped insulation materials, a maximum separation distance of 10 to 15 cm (4" to 6") applies for the fastening staples, which must be at least 10 mm (3/8") wide and 8 mm (5/16") long. The overlaps between the membrane strips must be approx. 8 to 10 cm (3" to 4").
Airtight seals can only be achieved on vapour control membranes that have been laid without folds or creases.
Ventilate regularly to prevent excessive humidity (e.g. during the construction phase). Occasional rush/inrush ventilation is not adequate to quickly evacuate large amounts of construction-related humidity from the building. Use a dryer if necessary.
To prevent condensation, INTELLO should be stuck down so that it is airtight immediately after installing the thermal insulation. This particularly applies when working in winter.

Additional instructions for blown-in insulation materials

INTELLO PLUS can also be used as a boundary layer for blown-in insulation materials of all types. A reinforcement structure ensures that there is little expansion during the blowing-in process. Installation in parallel with the supporting structure has the advantage that the joint will be on a solid base and is protected by this base. The separation distance between the staples used to fasten the membrane strips must be a maximum of 5 to 10 cm (2" to 4"). Staples should be oriented parallel with construction timber so that membranes do not tear at the staples when insulation material is being blown in. If installation is carried out perpendicular to the supporting structure, a supporting batten should be fitted directly over the membrane strip overlap with its airtight bonding in order to avoid tensile loading on the adhesive bond.
When working in cold outdoor climates, the blown-in insulation material should be inserted immediately after installation of INTELLO PLUS. This will protect the membrane against condensation formation.

Note on installation

Movie
INTELLO installation:

Technical data

INTELLO / INTELLO PLUS

Material		INTELLO	INTELLO PLUS
Fleece		Polypropylene	Polypropylene
Membrane		Polyethylene copolymer	Polyethylene copolymer
Reinforcement		-	Polypropylene non-woven fabric
Attribute	**Regulation**	**Value**	**Value**
Colour		white-transparent	white-transparent
Surface weight	EN 1849-2	85 g/m² ; 0.28 oz/ft²	110 g/m² ; 0.36 oz/ft²
Thickness	EN 1849-2	0.25 mm ; 10 mils	0.4 mm ; 16 mils
Water vapor resistance factor μ	EN 1931	56 000	35 000
s_d-value	EN 1931	14 m	14 m
s_d-value humidity variable	EN ISO 12572	0.25 - >25 m	0.25 - >25 m
g-value		70 MN·s/g	70 MN·s/g
g-value humidity variable		1.25 - >125 MN·s/g	1.25 - >125 MN·s/g
Vapor permeance	ASTM E96-A	0.23 US perms	0.23 US perms
Vapor permeance humidity variable	EN ISO 12572	< 0.13 - 13 US perms	< 0.13 - 13 US perms
Hydrosafe value (s_d)	DIN 68800-2	2 m	2 m
Surface burning characteristics	ASTM E84	Class A (Flame Spread 0; Smoke development index 35)	Class A (Flame Spread 0; Smoke development index 35)
Reaction to fire	EN 13501-1	E	E
Airtightness	ASTM E2178	≤ 0.004 cfm/ft²	≤ 0.004 cfm/ft²
Airtightness	EN 12114	tested	tested
Tensile strength MD/CD	EN 12311-2	110 N/5 cm / 80 N/5 cm ; 13 lb/in / 9 lb/in	-
Tensile strength MD/CD	EN 13859-1 (A)	-	340 N/5 cm / 220 N/5 cm ; 39 lb/in / 25 lb/in
Elongation MD/CD	EN 12311-2	40 % / 35 %	-
Elongation MD/CD	EN 13859-1 (A)	-	15 % / 15 %
Nail tear resistance MD/CD	EN 12310-1	60 N / 60 N ; 13 lbf / 13 lbf	-
Nail tear resistance MD/CD	EN 13859-1 (B)	-	200 N/5 cm / 200 N/5 cm ; 23 lb/in / 23 lb/in
Durability after artificial ageing	ETA-18/1146	passed	passed
Temperature resistance		permanent -40 °C to 80 °C ; -40 °F to 176 °F	permanent -40 °C to 80 °C ; -40 °F to 176 °F
Thermal conductivity		2.3 W/(m·K) ; 16 BTU·in/(h·ft²·F)	2.3 W/(m·K) ; 16 BTU·in/(h·ft²·F)
CE labelling	ETA-18/1146	available	available

ORCON F

		Substance
Material		Dispersion based on acrylic acid copolymers and ethanol. Free from plasticisers, halogens
Attribute	**Regulation**	**Value**
Colour		green
Properties		very tensile
Requirement for bond strength, non-aged/aged	DIN 4108-11	passed
Application temperature		-10 °C to 50 °C ; 14 °F to 122 °F
Temperature resistance		permanent -40 °C to 80 °C ; -40 °F to 176 °F
Storage		up to -20 °C; -4 °F, cool and dry

ORCON MULTIBOND

		Substance
Material		SOLID acrylate, no plasticisers, solvents, emulgators or preservatives
Release film		Silicone-coated PP film
Attribute	**Regulation**	**Value**
Colour		translucent green
Width of adhesive bead		11 mm ; 7/16"
Thickness of adhesive bead		3 mm ; 1/8"
Moisture resistance		waterproof
Requirement for bond strength, non-aged/aged	DIN 4108-11	passed
Adhesion	EN 1939	16 N/cm
Application temperature		from -15 °C ; 5 °F
Temperature resistance		permanent -40 °C to 100 °C ; -40 °F to 212 °F
Storage		horizontal, cool and dry, protect from direct sunlight

TESCON VANA

		Substance
Backing		special PP fleece
Adhesive		waterproof SOLID adhesive
Release film		siliconized paper
Attribute	**Regulation**	**Value**
Colour		dark blue
Exposure time		6 months
Requirement for bond strength, non-aged/aged	DIN 4108-11	passed
Can be plastered over		yes
Application temperature		above -10 °C ; 14 °F
Temperature resistance		permanent -40 °C to 90 °C ; -40 °F to 194 °F
Storage		cool and dry

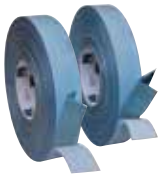
CONTEGA PV

		Substance
Backing		PET fleece with functional membrane and plaster reinforcement
Adhesive		special acrylate adhesive
Release film		silicone-coated PE film
Attribute	**Regulation**	**Value**
Colour		light blue / dark blue
Thickness		1.3 mm
s_d-value	EN 1931	2.3 m
g-value		11.5 MN·s/g
Vapor permeance	ASTM E 96	1.43 US perms
Requirement for bond strength, nonaged/aged	DIN 4108-11	passed
Application temperature		above -10 °C ; 14 °F
Temperature resistance		permanent -40 °C to 90 °C ; -40 °F to 194 °F
Storage		cool and dry

Technical data

CONTEGA SOLIDO SL

		Substance
Backing		PP backing fleece, PP copolymer special membrane
Adhesive		modified waterproof SOLID adhesive
Release film		one or two split silicone-coated PE sheet
Attribute	**Regulation**	**Value**
Colour		white
s_d-value	EN 1931	2.8 m
g-value		14 MN·s/g
Vapor permeance	ASTM E 96	1.17 US perms
Airtightness	ift, MO-01/1: 2007-01, Abs. 5	up to 1000 Pa, surrounding
Requirement for bond strength, nonaged/aged	DIN 4108-11	passed
Can be plastered over		yes
Application temperature		above -10 °C ; 14 °F
Temperature resistance		permanent -40 °C to 90 °C ; -40 °F to 194 °F
Storage		cool and dry



TESCON POFECT

		Substance
Fleece		special PP fleece
Adhesive		special pressure sensitive acrylic adhesive
Release film		silicone-coated PE film
Attribute	**Regulation**	**Value**
Colour		light blue
Thickness		0.5 mm
Exposure time		3 months
Requirement for bond strength, non-aged/aged	DIN 4108-11	passed
Can be plastered over		yes
Application temperature		above -10 °C ; 14 °F
Temperature resistance		permanent -40 °C to 90 °C ; -40 °F to 194 °F
Storage		cool and dry

CONTEGA SOLIDO IQ / CONTEGA SOLIDO IQ-D

		Substance
Backing		PP backing fleece, PE copolymer special membrane
Adhesive		modified waterproof SOLID adhesive
Release film		one or two split silicone-coated PE sheet
Attribute	**Regulation**	**Value**
Colour		white, print: green
s_d-value humidity variable	EN ISO 12572	0.4 – > 25 m
g-value humidity variable		2 – > 125 MN s/g
Vapor permeance humidity variable	ASTM E 96	< 0.13 – 8 US perms
Outdoor exposure		3 months
Water column	EN ISO 811	> 2 500 mm
Can be plastered over		yes
Application temperature		above -10 °C ; 14 °F
Temperature resistance		permanent -40 °C to 90 °C ; -40 °F to 194 °F
Storage		cool and dry

TESCON PRIMER RP

	Substance
Material	acrylic copolymer, solvent-free
Attribute	**Value**
Colour	white
Application temperature	-10 °C to 45 °C ; 14 °F to 113 °F
Temperature resistance	permanent -40 °C to 90 °C ; -40 °F to 194 °F
Storage	protect from frost, cool and dry

TESCON SPRIMER

	Substance
Material	Synthetic rubber
Attribute	**Value**
Colour	translucent
Application temperature	-5 °C to 40 °C ; 23 °F to 104 °F
Temperature resistance	permanent -25 °C to ~90 °C, short-term up to 100 °C (1h); °F: -13 to ~195; 212
Storage	12 months, protect from frost, cool and dry

Technical data

KAFLEX mono / duo

		Substance
Material		TESCON VANA width EPDM
Adhesive		waterproof SOLID adhesive
Release film		siliconized paper
Attribute	**Regulation**	**Value**
Colour		dark blue / black
Exposure time		6 months
Requirement for bond strength, non-aged/aged	DIN 4108-11	passed
Can be plastered over		yes
Application temperature		above -10 °C ; 14 °F
Temperature resistance EPDM		permanent -40 °C to 150 °C ; -40 °F to 302 °F
Storage		cool and dry

ROFLEX 30 – 300

		Substance
Material		EPDM
Attribute	**Regulation**	**Value**
Colour		black
Exposure time		6 months
Application temperature		above -10 °C ; 14 °F
Temperature resistance		permanent -40 °C to 150 °C ; -40 °F to 302 °F
Storage		cool and dry

INSTAABOX

		Substance
Material		polyethylene, flexible and extensible
Attribute	**Regulation**	**Value**
Colour		translucent
Length / width installation space/cavern		260 mm / 130 mm ; 10.24" / 5.12"
Length / width over all		320 mm / 190 mm ; 12.6" / 7.48"
Depth		55 mm ; 2.17"
Cable diameter		max. 20 mm ; 0.79"
s_d-value	EN 1931	> 10 m
g-value		> 50 MNs/g
Vapor permeance	ASTM E 96	< 0.33 US perms
Reaction to fire	EN 13501-1	E
Temperature resistance		permanent -10 °C to 80 °C ; 14 °F to 176 °F
Storage		cool and dry

AEROSANA VISCONN / AEROSANA VISCONN white

		Substance
Material		modified aqueous acrylate polymer dispersion
Attribute	**Regulation**	**Value**
Colour AEROSANA VISCONN		dark blue, when fully dry dark blue/black
Colour AEROSANA VISCONN white		white, when fully dry dark white
Surface weight	EN 1849-2	approx. 200 g/m² ; 0.66 oz/ft² (dried), depending on subsurface and applied thickness
Coating application		0.2 - 1.0 mm ; 8 - 39 mils - wet film
s_d-value / humidity variable	EN 1931 / EN ISO 12572	6 m (at 0.3 mm thickness) / 0.13 - 10.00 m
g-value / humidity variable		30 MN·s/g (at 0.3 mm thickness) / 0.65 - 50 MN·s/g
Vapour permeance / humidity variable	ASTM E96-A	0.55 US perms (at 0.3 mm ; 12 mils thickness) / 0.33 - 25 US perms
Water column	EN ISO 811	2 000 mm ; 6' 7"
Water tightness to liquid water	EN 1928	W1
Can be plastered/painted over		yes, and pro clima adhesive tapes can be stuck onto it
Application temperature		5 °C to 60 °C ; 40 °F to 140 °F
Temperature resistance		permanent -40 °C to 90 °C ; -40 °F to 194 °F (dried)
Coverage		approx. 750 g/m² ; 2.46 oz/ft², depending on applied thickness

AEROSANA VISCONN FIBRE

		Substance
Material		modified aqueous acrylate polymer dispersion, fibre-reinforced
Attribute	**Regulation**	**Value**
Colour		dark blue, when fully dry black
Surface weight	EN 1849-2	approx. 200 - 400 g/m² ; 0.65 - 1.3 oz/ft², depending on subsurface and applied thickness
Coating application		0.6 - 1.4 mm ; 24 - 55 mils - wet film
s_d-value / humidity variable	EN 1931 / EN ISO 12572	3.5 m (at 0.3 mm thickness) / 0.15 - 5.00 m
g-value / humidity variable		17.5 MN·s/g (at 0.3 mm thickness) / 0.75 - 25 MN·s/g
Vapour permeance / humidity variable	ASTM E96-A	0.94 US perms (at 0.3 mm thickness) / 0.66 - 22 US perms
Water column	EN ISO 811	2.000 mm ; 6' 7"
Water tightness to liquid water	EN 1928	W1
Can be plastered/painted over		yes, and pro clima adhesive tapes can be stuck onto it
Application temperature		5 °C to 60 °C ; 41 °F to 140 °F
Temperature resistance		permanent -40 °C to 90 °C ; -40 °F to 194 °F (dried)
Coverage		400-800 g/m² ; 1.3-2.6 oz/ft², depending on subsurface and applied thickness

AEROSANA FLEECE

		Substance
Material		PET
Attribute	**Regulation**	**Value**
Surface weight		63 g/m² ; 0,21 oz/ft²
Thickness		0,7 mm ; 28 mils
Tensile strength MD/CD		90 N/5 cm / 145 N/5 cm ; 10 lb/in / 17 lb/in
Elongation MD/CD		75 % / 90 %

WARRANTY AGREEMENT

comprehensive • transparent • fair

Moll bauökologische Produkte GmbH, Rheintalstraße 35-43, 68723 Schwetzingen, Germany

Version: March 2019

1. Subject of this Warranty Agreement

Moll bauökologische Produkte GmbH (hereinafter referred to as "Moll") hereby assumes a limited manufacturer's warranty in accordance with the conditions of this Warranty Agreement for pro clima standard products supplied by Moll (hereinafter referred to as "product") for the benefit of the party entitled to make claims as per Clause 2 for the warranty period as per Clause 4.

2. Party entitled to make claims

The party entitled to make claims shall be the customer that purchased the product directly from Moll as well as this customer's end customer that processes the products, insofar as this end customer can prove that it has purchased the products from a direct customer of Moll (hereinafter referred to as the "Claimant"). Presentation of the purchase receipt or – insofar as no written contract exists – of the invoice (hereinafter referred to as the "proof of entitlement to make claims") shall suffice as proof of entitlement to make claims.

3. Warranty event

A warranty event in the sense of this Warranty Agreement shall only exist if a deviation in the characteristics of the product with respect to the specification from Moll that was valid at the time of the purchase becomes evident within the warranty period as per Clause 4 and if this deviation cannot be ascribed to an error in the use of the product – in particular, to non-observance of the operating, maintenance or installation instructions – or to external influences on the product. Moll explicitly refuses to provide any warranty that goes beyond this.

4. Warranty period

The warranty period for products shall begin at the time of the sale of the product to the first customer by Moll and shall end six years after this time. The warranty period shall extend to ten years after the time of the sale of the product to the first customer by Moll if installation of the products is carried out solely in combination with pro clima standard products, insofar as products for the relevant application are available as part of the pro clima system.

5. Notification of a warranty event

If a warranty event as per Clause 3 occurs within the warranty period as per Clause 4, the Claimant must notify Moll of this in writing without delay within the warranty period as per Clause 4, but at the latest within fourteen days of the Claimant becoming aware of the warranty event, and the Claimant must include proof of entitlement to make claims with this notification.

6. Warranty claims

If the Claimant has notified Moll properly as per Clause 5 of a warranty event as per Clause 3 within the warranty period as per Clause 4, Moll shall at its own discretion supply a replacement product to the Claimant at the place of use of the defective product at Moll's own expense or shall rectify the fault with the product.
If the product has already been installed, Moll shall at its own discretion either bear the documented, reasonable costs for its installation and removal or else commission a third party to carry out installation and removal. The Claimant who makes a claim in this manner must present a binding cost estimate to Moll at the Claimant's own expense and obtain a decision from Moll as to whether Moll will bear these costs or commission a third party to carry out installation and removal. The warranty claims of the claimant described above shall be final and MOLL shall assume no further liability.

7. Period of limitation

The warranty claims as per Clause 6 shall expire within one year of notification of these claims being provided.

8. Legal claims

Any legal claims by the Claimant against Moll or against a customer of Moll as a seller shall remain unaffected by this Warranty Agreement.

9. Final provisions

Schwetzingen is hereby agreed as exclusive place of jurisdiction for both parties. However, Moll shall also be entitled to take legal action against the Claimant at the Claimant's generally applicable place of jurisdiction.
This Warranty Agreement shall be solely subject to German law to the exclusion of the United Nations Convention on Contracts for the International Sale of Goods (CISG).
Should individual provisions of these Terms and Conditions be or become legally invalid, the legal validity of the remaining provisions shall remain unaffected. In this case, the parties shall be obliged to conduct negotiations in good faith with the aim of replacing the invalid provision with a valid provision that corresponds as closely as possible to the intended economic purpose of the invalid provision. This shall apply accordingly in cases of loopholes in this Warranty Agreement.

CONFIRMED BY TESTS

100 years

Permanent airtightness with pro clima!
Tested for the entire usage period

- ✔ Reliable functioning tested for 100 years
- ✔ Independently confirmed
- ✔ Minimum requirements significantly exceeded

Thermal insulation and airtightness should perform for more than 50 years

Adhesive tapes which are applied to attain airtightness in accordance with DIN 4108-7, SIA 180 or OENORM B 8110-2 should have a durability of 50 to 100 years – after all, this is the expected service life of thermal insulation layers, to ensure that they protect against damage due to convection and moisture vapour ingress.
This period corresponds with reality as airtightness is currently being optimised and thermal insulation is being replaced or adapted for today's legal requirements on structures dating from the 1950s, 1960s and 1970s.

As little as 17 years can be regarded as permanent

A process for accelerated aging of adhesive tape joints has been developed at the University of Kassel as part of a research project on "Quality assurance for adhesive-based joint technology in airtightness layers". With this process, adhesive tapes have to demonstrate certain specified minimum tensile strengths after being stored at increased air temperature and humidity (65 °C and 80% relative humidity) for a period of 120 days (this corresponds to around 17 years in reality). On successful completion of this test an adhesive tape can be regarded as permanent.

pro clima adhesive tapes have been successfully tested for 100 years

As part of tests to ascertain the durability of airtight joints, pro clima's TESCON VANA, UNI TAPE and TESCON No.1 adhesive tapes have also been subjected to accelerated aging at the University of Kassel under the conditions described above. At the request of pro clima, the test period was increased from 120 days to 700 days. Accelerated aging for 700 days corresponds to 100 years in reality. The test results for the three adhesive tapes from pro clima were also positive for this increased period of accelerated aging.

You are on the safe side with pro clima!

These demanding tests with increased test periods have confirmed the suitability of TESCON VANA, UNI TAPE and TESCON No.1 adhesive tapes for the creation of permanent airtightness which surpass the requirements of DIN 4108-7, SIA 180 and OENORM B 8110-2. This confirms that vapour check and airtightness membranes and airtight wood-based panels can be reliably bonded using pro clima products!

TESCON® Vana

UNI TAPE

TESCON® №1

pro clima partners

pro clima is one of the pioneers in intelligent air sealing. Today, we are active all around the world and provide complete sealing systems for interior and exterior use that include intelligent membranes, joining agents, quality assurance and comprehensive service.

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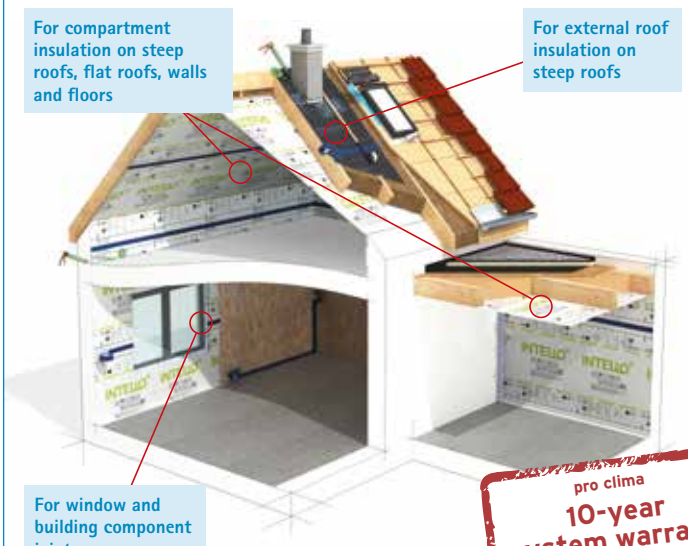
Additional system solutions for sealing the building envelope

Interior air sealing for new buildings



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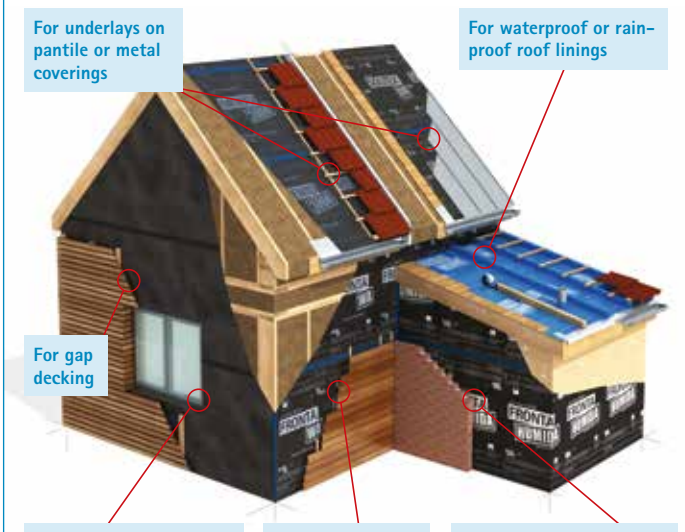
proclima.com/service/system-warranty

Interior air sealing for refurbishment projects

Exterior wind sealing for roofs and walls



Secure bonding and detail solutions

- All-round adhesive tapes and joint adhesives for interior and exterior use
- Plaster sealing tapes
- Sealing grommets

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Further information and background information at

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Information and ordering

You can obtain information on all pro clima systems, tender information and brochures quickly and simply by contacting our information service:
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