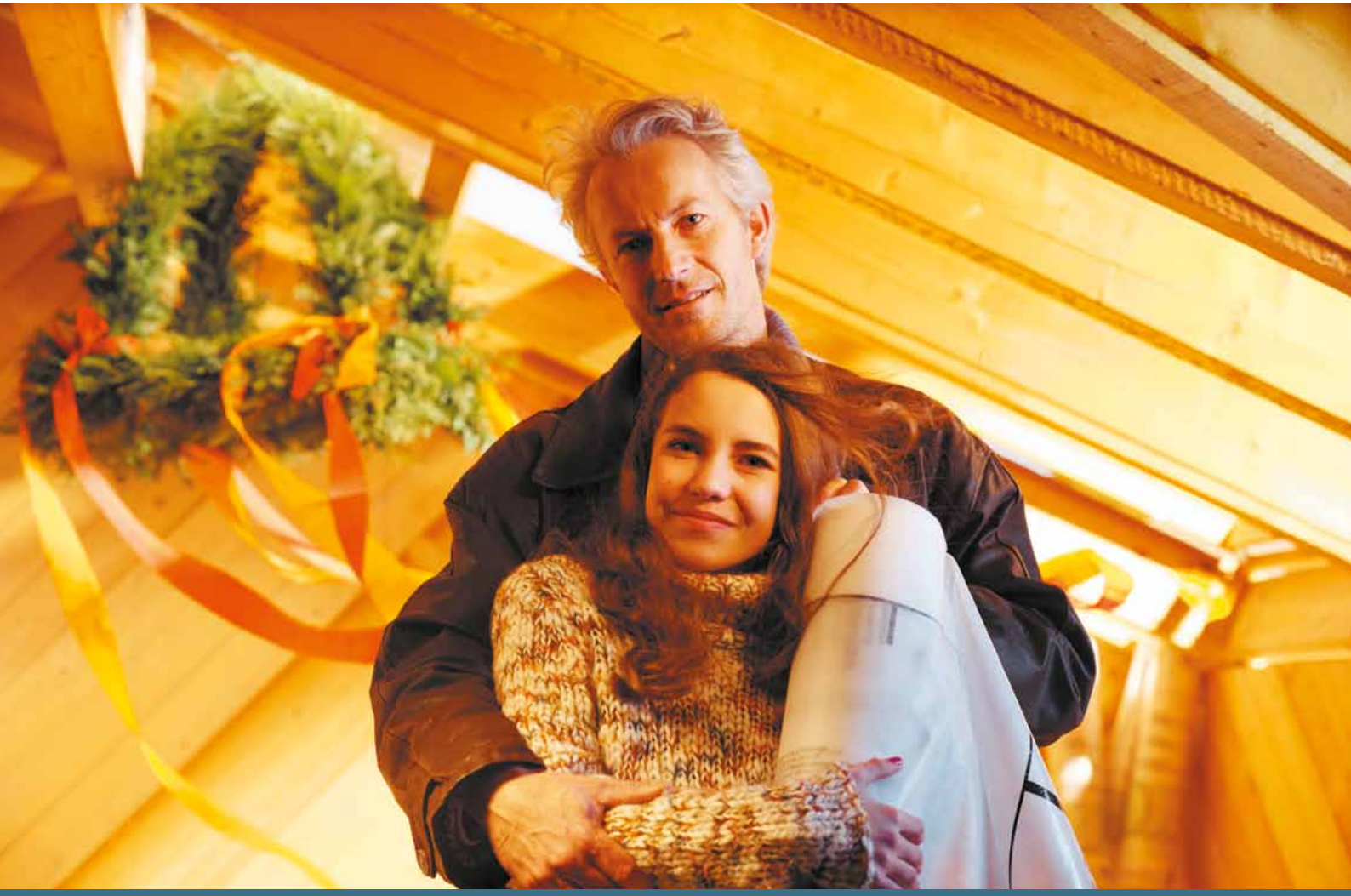
INTELLO System

Maximum protection against structural damage and mold



INTELLO, high performance airsealing membrane and intelligent vapor retarder

INTELLO®

pro clima®

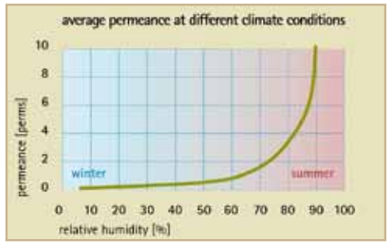
Interior airtightness – New construction and renovation

INTELLO Plus

Variable vapor retarder and airsealing membrane.
Pro clima's high performance airsealing system gives maximum protection, even for structures with demanding physical/building science attributes.

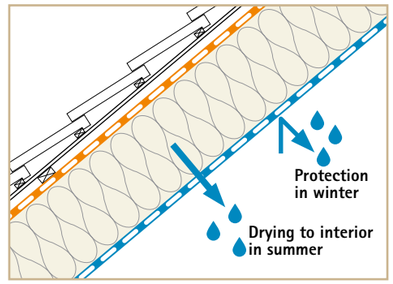
- ✔ Variable vapor resistance/perm rating with 40 fold spread.
- ✔ Protection in Winter: perm below 0.3, s_d-value over 10 m
- ✔ Inward drying capabilities: perm over 12, s_d-value under 0,25 m
- ✔ Airtight according to ASTM 2178
- ✔ Application ease, no rips or continuing tears

Maximum Protection agains structural damage and mold



INTELLO is a membrane that intelligently responds to its surrounding climatic conditions: In winter the pores close and make the membrane a vapor retarder (class II). in summer the molacular structure opens up and allow vapor to dry inwards (vapor permeable, Perm>10).
The large range of vapor variablity/perm ratings of INTELLO membranes, give even critical build ups - for instance roofs vapor closed exterior finishes (flatroofs, pitched roofs with asphalt shingles, greenroofs) - an increased safety margin against structural damage. Even in severe climatic conditions (cold winters, short summers).

A proven concept



Studies

Detailed information regarding building physics of insulation in „Calculation Potential Freedom from Structural Damage of Thermal Insulation Structures in Timber-Built Systems" on proclima.com

Seasonal intelligence

In the winter INTELLO is a vapor retarder with a perm rating below 0.3 (a s_d-value over 10 m). This limits vapor diffusion into the insulation layer in walls and roofs to 0.04 oz/ft2 (7 g/m^2).

In summer the INTELLO vapor control layer becomes vapor open. Perm rating is over 12 (s_d-value below 0,25 m) which allows more than 1.64 oz/sf (500 g/m^2) per week to dry inwards – offering an exceptional high drying potential!

Low vapor diffusion in winter - high inward drying in summer: unexpected humidity in the insulation are able to be removed from the insulation; mold and rot are thus prevented.

This intelligent and tailored diffusion variablilty follows pro clima's security protocol: the drying potential exceeds the largest conceiveable wetting risk and offers optimal protection against moisture related damages to the structure,

Principles

Diffusion into the insulation in winter is limited to 0.04 oz/sf (7 g/m^2)per week.

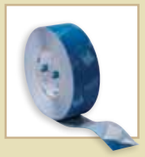
Inward diffusion out of the insulation in summer 1.84 oz/sf (560 g/m^2) per week.

System elements

INTELLO
Innovative membrane that offers maximum protection against damage

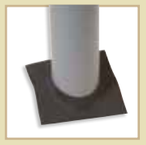
TESCON No.1 / TESCON VANA
To connect membrane joints

CONTEGA HF
To connect to adjacent building components



TESCON PROFIL
To connect to windows, doors and corners

CONTEGA FC
To connect to plastered building components



ROFLEX
Pipe gaskets for secure airsealing around large services.

INSTAABOX
Installation box for airtight seals to cables surrounding outlets when a service cavity is not possible.

KAFLEX mono/duo
Gaskets for airtight seals around cables and small pipes

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Design and construction recommendations

Insulation and interior finishes

Uses
pro clima vapor retarder can be used in all typical rooms in houses, offices and apartments (living-rooms, bedrooms, kitchens and bathrooms) as interior protection/vapor retarder for the insulation layer.

Application
INTELLO PLUS is applied with the smooth/printed side facing inwards. Staple it taut and without slack either perpendicular or paralel to the studs or rafters.

When applying in horizontal direction (perpendicular to the structure) the maximum distance of studs is 40" (100 cm) on center. After membrane is fixed, interior horitzontal battens are mounted at 20" (50cm) o.c. or less, which will carry the weigth of the insulation. If insulation batts or boards will exert permanent force on the taped seams (tension), then an supporting batten should be placed over these taped seams. The membrane should be stapled with T50 staples - 3/8" (10mm) crowns and 5/16" (8mm) legs. Spaced maximum of 4"-6" (10-15cm) apart and overlap membrane 3"-4" (8-10cm).

Vapor open finishes on interior
To take full advantage of the vapor variable properties of INTELLO, there shouldn't be any vapor retarding materials on the interior of the membrane (ie no OSB or plywood).

Suitable materials are sheetrock or cement board. If no interior finishes are planned, the membrane shouldn't be exposed to long term sun/UV exposure. If there is direct sunlight expected then pro clima INTESANA can be used - which offers a higher resistance to UV as well as better protection against mechanical damage.

Dense pack recommendations
INTELLO PLUS can also be used as netting for blow-in installation of a large variety of dense packed insulation materials. The integrated reinforcing layer reduces the elongation during the densepacking process. Applying the membrane paralel to the structure in case of densepacking, has as an advantage that the membrane seams and tape connections are supported by the structure behind it and seams thus protected from stress.

The maximum distance of staples is 2"-3" (5 to 7.5cm) for densepacking - apply the staples paralel to the stud they are stapled into, for maximum hold and to prevent tearing of membrane.

When membrane is applied perpendiculair to the structure, a supporting batten over each horizontal membrane joint is required to prevent stress on those taped connections.

If installing in cold seasons, the insulation should be blown in immediately after the installation of the membrane, to prevent condensation from occuring on the INTELLO.

Hygroscopic insulation materials
The high level of protection against building damage by installating INTELLO is solely acheived when using fibrous insulation materials that have hygroscopic properties, as the drying potential in summer is aided by the humidty being transported through the material towards this vapor control layer. Ideal are cellulose, hemp, flax, wood-fiber or mineral wool etc.

DIY tip

Apply INTELLO at the same time as the insulation. Work section by section if needed. This to prevent condensation to occur in winter if insulation isn't covered by a vapor retarder.

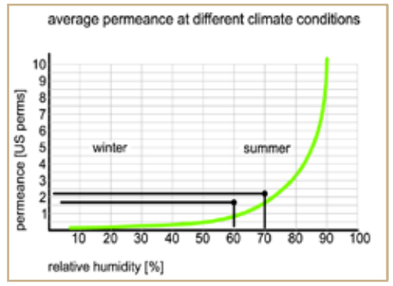
Coordination prevents condensation
The ideal installation time is 2 weeks after neighboring walls have been plastered. Alternatively you can also install membrane before the walls are plastered. To prevent condensation build-up the vapor control and airtight layer should be placed immediately after the batt or board insulation is installed. Blown-in insulation should be installed immediately after the membrane is installed. If possible work section by section. This is especially important during cold winter weather. In any case high interior humidity levels should be reduced promptly by venting.

Use with vapor closed roofing materials
The INTELLO system can be used with all vapor open and vapor closed roofing/waterproofing materials. To asses that the inward drying potential is larger than the maximum moisture stress, and the construction is safe, please use rules displayed to the right as a guide. Depending on climate, sun exposure, materials used, etc. a hygroscopic study should be completed. Especially when roofs aren't vented or vapor closed. Please contact us with any project specific questions.

Note: Plywood & OSB are class II-III (perm 1-3) vapor retarders and when used on exterior of the (roof) structure are much more vapor closed than solid timber decking and thus more dependant on inward drying properties of INTELLO.

Use dependant humidity
The diffusion resistance of INTELLO was designed that even when higher interior humidities occur, the vapor retarding properties are still sufficient to prevent damage. Especially during construction high humidity levels can occur (plastering, tiling, etc). These levels should be lowered as much as possible with window ventilation or dehumidifiers.

High humidty levels in bathrooms and kitchens are temporary which means they will not effect long term humidty levels of the insulation, if the 60/2 rule is followed.



60/1,65 and 70/2.2 Rules

The 60/1.65-rule
The interior relative humidity (RH) in new buildings, is high due to the construction work recently completed it also occurs briefly by local vapor production (cooking/bathing). The diffusion permeability of a vapor retarder should be designed in such a way that even at 60% RH the sd-value > 2m / below 1.65 US perms, which will adequately protect the construction from moisture.

At a relative humidity of 60% INTELLO has a sd-value of 4m (a permeance of 0.83 US perms) and meets this demand easily.

The 70/2.2rule
During the construction period after plastered or installing tile the relative humidity in a building is very high. At a RH of 70% the diffusion permeability of a vapor retarder should be above a sd-value of 1.5m / below 2.2 US perms in order to protect the construction against excessive entry of moisture from the intrerior and mold growth.

This is especially important when woodbased panels that are class II vapor retarders (OSB or plywood) are used on the exterior.

Product specifics
INTELLO membranes are made from 100 % Polyolefin – its cover is made from Polyethylen-co-polymer, the protective layer and reinfrocement is made from Polypropylen. All allow for easy recycling The pro clima intelligent vapor retarder INTELLO PLUS conforms to DIN EN 13984 and carries the CE-logo.

Quality assurance
To assure that the insulation remains free of vapor related damage and mold, the verification of the airtightness of the installation is crucial. pro clima recommends the testing of the installed airtight layer with a blowerdoor test.

Verification of airtightness

Use recommendations for temperate/mixed climates

Pitched roofs	Ballasted flat roofs up to 12" insulation	Greenroofs up to 8" of insulation	Walls
up to 5,000 feet altitude exterior vapor closed and without venting (airtightness verified, no shading, no interior vapor retarding finishes)	**up to 2,250 feet alt.** max. 2"/5 cm gravel without venting (airtightness verified, no shading, no interior vapor retarding finishes)	**up to 2,250 feet alt.** max. 4"/10 cm soil depth without venting (airtightness verified, no shading, no interior vapor retarding finishes)	**up to 2,250 feet alt.** exterior vapor closed, without venting (no interior vapor retarding finishes)
over 5,000 feet altitude exterior diffusion open	**over 2,250 feet alt.** contact the TECHNICAL-HOTLINE	**over 2,250 feet alt.** contact the TECHNICAL-HOTLINE	**up to 5,000 feet alt.** exterior perm >3, or Sd below 10 m (no interior vapor retarding finishes)
			over 5,000 feet altitude exterior vapor open

TECHNICAL-HOTLINE

For different assemblies please contact:
USA: 718-622-1600
E-Mail: info@foursevenfive.com
Non USA: +49 (0) 62 02 - 27 82.45
E-Mail: technik@proclima.de

Application guide

Initial conditions

Insulation is placed inbetween the rafters. A batt insulation is shown in the image above. It is very important that there are no void, cavities or other imperfections in the insulation.

On the exterior the insulation should be sealed with a wind- and waterrtight layer (for instance SOLITEX Mento, woodfiber insulation boards or other subroof materials). These elements assure that the insulation doesn't get windwashed and therefore can function optimally.

In the cold season, the vapor retarder / airtight layer should be applied and tape/sealed immediately after the insulation is placed. To prevent any condensation from occuring.

Blow-in recommendation

In cold weather, blow insulation in immediately after membrane is installed

INTELLO is applied on the interior of the insulation layer with the print facing inwards. Tape is applied to the printed/smooth side only.

Staples should be T50 3/8" (10 mm) wide with 5/16" (8 mm) legs and spaced max. 4" (10cm).

INTELLO can be applied perpendiculair or paralel to the structure. The membrane should be applied and stapled without any creases.

Paralel application has the advantage that the overlaps are made at studs/rafters and thus offer solid backing for tape pressurisation.

Perpendiculair application is material efficient (less cutting losses).

Take note: At material transitions overlap at least 1.5" (3cm) and staple there if possible. This extra transition piece allow easy and airtight adhesion to the neigboring element.

Densepack Stapling

When using membrane as dense pack mesh - space staples 2"-3" apart

Direction of the staple should be paralel with the studs. This improves the staple's hold on the membrane during dense packing of insulation - see also note 12 about battens.

Membrane overlaps

After applying the first membrane course, start a second row that overlaps the first by approximately 4" (10cm). The printed lines can be used as guides.

Wipe the membrane clean with a piece of cloth or vacuum it before applying tape.
For durable connections the adhesion substrate should be suitable for tape application (tape adheres to INTELLO very well). Substate should be taut, dry, smooth, with out creases and free of dust, dirt, silicones and grease.

Frozen surface are not suiteable to tape to. Best results are acheived when using high quality vapor retarders/airtight membranes or wood-based panels (Plywood, etc.). Adhesion tests are recommended when there is doubt of suitablility of substrate.

Overlaps of INTELLO should be taped with TESCON Vana or TESCON No.1. These joints shouldn't be exposed to premanent structural stress or tension. Creases should be prevented when taping overlaps. If they do occur they should be either cut out or sealed with tape to prevent any leaks.

Apply tape on the center of the joint, the dotted line printed on INTELLO can be used as a guide. Press tape down firmly with PRESSFIX or by hand. Make sure there is sufficient back pressure (membrane is taut or supported by studs) to assure a durable and secure bond is made.

Taping overlaps

Just as important is the connection of the membrane to adjacent building elements. Smooth wood panels (for instance sheets of plywood/OSB) can be connected with TESCON No.1 or TESCON VANA.

Press membrane into CONTEGA HF bead with some slack (room for expansion/building setteling).

Do not press adhesive completely flat, this will assure that movement/expansion stresses can be absorbed by adhesive.

If substrate is solid and secure, clamping strips are NOT required for and assured and long lasting seal.

Transitions

TESCON No.1 / TESCON VANA
Allround tape to connec memrbane overlaps.

Airtight connections to solid walls

To make airtight connections to already plastered walls use CONTEGA HF or ECO COLL. Apply straight from the cartridge in app. 3/8" (5 mm) wide bead. Increase bead width in case of rough surfaces.

CONTEGA HF
Allround-adhesive in cartridges. To make connections to rough or cementitous materials.

steps 7b–12 on the next pages

... Application guide (continued)

Plastered walls

CONTEGA FC
Plaster connection tape,

If a membrane needs to be connected to a wall that will be plastered later, use CONTEGA FC. This tape will allow a defined and airtight seal to be made at this junction. The tape is adhered to the membrane (to printed/smooth side).

Fold the felt tape back and apply a first coat of plaster on the wall. Embed the CONTEGA FC in this plaster bed and add an additional layer of plaster ontop of the felt. The CONTEGA FC is now completely embedded in the plaster, make sure that at a minimum 1" of felt is covered by plaster.

Gypsum and cement based plaster bond well to the CONTEGA FC felt. Chalk or lime plaster require the addition of reinforcing mortar to their mix to assure a proper bond.

Rough cut beams

On rough cut beams us CONTEGA HF or ECOCOLL.

Apply a 3/8" (5 mm) wide bead. Use a wider bead on very rough surfaces. Fold membrane onto bead, if possible with room for movement/ expansion.

Press membrane into adhesive bead, but not completely flat, so connection can absorb movements of elements without compromising connection and airtightness.

Solid walls and chimneys

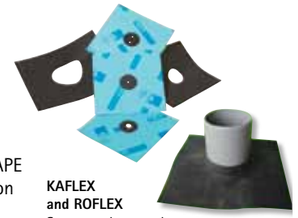
For connections to insulated/plastered chimneys, overlap INTELLO approximately 1.5" (3 cm) down over the chimney. Apply a 3/8" (5 mm) wide bead of CONTEGA HF or ECO COLL (on rough surfaces use wider bead). Adhere membrane to bead with some room for movement. Press membrane down, but do not flatten bead completely.

Seal corners cut out with 3" pieces of TESCON Vana or TESCON No.1. Cut tape halfway through in middle, so it can easly be formed around the corner.

Cables and pipes

If pipes or cables have to penetrate the airtight membrane, then these connections should be airsealed. The best solution is to do this with ROFLEX and KAFLEX, made from EPDM. This flexible material forms tightly around the pipes/ cables and is available for all common sizes.

KAFLEX cable gaskets have a intergrated UNITAPE adhesive section: Remove release paper, position over cable and press down on membrane.
ROFLEX pipe gaskets are taped to membrane with TESCON Vana or TESCON No.1. Press down tape with sufficient force.



KAFLEX and ROFLEX
Secure seals around cables and pipes that pass through the airtight layer

Corner connections

Airsealing at corners and junctions is very important. These difficult areas can be securely connected with corner tape TESCON PROFIL (3-strip), The three release papers allow you to activate just one strip of adhesive and precisely apply the tape in a corner.

The second step is to remove the other two release papers and press down the tape with force to establish a good bond.
Slice the 1" tape extension at a 45 degree angle and press down firmly. Repeat process on all sides of the beam for a complete airseal.

TESCON PROFIL
All-around corner tape to connect windows, doors and beams..

Quality assurance

Counter battens with a maximum distance of 20" (50cm) is recommended to support membrane in containing blown-in insulation.

Sheetrock will protect the membrane from damage, puncturing and UV/sunlight..

When all airtight connections are made, the protection of insulation is complete. It is highly recommendd to test the quality of the airseal by doing a BLOWER DOOR test.

Densepack insulation

When blowing in densepack insulation, especially when the insulation's weight/pressure causes bulging and stress on the joints, secure a batten over taped joints for support - or add 10" vertical tape stips every 12".

Note stapling instruction on page 7 as well.

Complimentary Systems for the.....

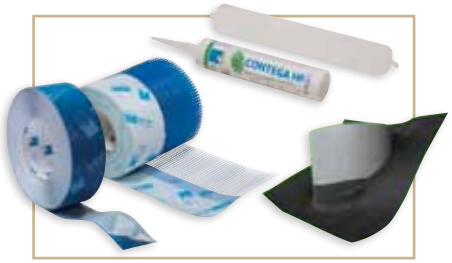
Optimization of the insulation

Maximum protection – INTELLO system

Vapor variable and airtight membrane – INTELLO Plus
Optimal protection against structural damage and mold –
also suitable for building physically challenging assemblies.
Vapor variable: Perm rating 0.17 to 13.2
s_d-value 0,25 to >10 m.
.

Best protection of roof and walls – SOLITEX Mento

Highly diffusion open subroof and WRB membranes
First class quality for secure, damage and mold free structures in roof and walls.
Perm rating >34 per ASTM E96 - Sd-value below 0.10m



Airtight connections for details

- All-around airsealing tapes and specialty tapes for connections on interior and exterior
- Plaster connection tapes
- Pipe, cable and duct gaskets

Additional information

blog posts, case studies, practical tips and application guides:

www.foursevenfive.com
www.proclima.com

Additional information

For all pro clima systems, brochures and samples, please contact us.

USA: info@foursevenfive.com
Outside USA: info@proclima.com

www.proclima.com
www.foursevenfive.com

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USA Partner:
475
High Performance Building Supply
131 Union street
Brooklyn NY 11238 USA
Tel: +1 718-622-1600
Web:www.foursevenfive.com

MOLL
Bauökologische Produkte GmbH
Rheintalstraße 35 – 43
68723 Schwetzingen

TEl: +49 (0) 62 02 – 27 82.0
Fax: +49 (0) 62 02 – 27 82.21
eMail: info@proclima.com

This text, descriptions, solutions and recommendations are based on current experience and test results. We reserve the right to change recommendations and application guides depending on continued product development, building codes and changing quality assurance goals. Please request current technical information at time of use.