



## **Advisory: Using Ampack air seal products**

### **1.0 Products and how to use them**

#### **1.1 Vapour retarders**

- 1.1.1 Ampatex® DB 2, DB 90, SB 130, Cento
- 1.1.2 Sisalex™ 500, 303 (EU)
- 1.1.3 Ampatex® Resano®

#### **1.2 Vapour / moisture / radon barrier**

- 1.2.1 Sisalex™ 514, 518
- 1.2.2 Sisalex™ 871

### **2.0 Main types of structure and applications**

#### **2.1 Permeable structures**

- 2.1.1 Timber frame construction
- 2.1.2 Insulation between rafters without boxing (on rafters)

#### **2.2 Vapour retarding structures**

- 2.2.1 Timber frame construction
- 2.2.2 Solid wood construction (e.g. block boards)
- 2.2.3 Insulation between rafters with boxing (on rafters)
- 2.2.4 Timber frame construction with additional thermal insulation
- 2.2.5 Insulation on top of rafters
- 2.2.6 External roof renovation

#### **2.3 Non permeable structures**

- 2.3.1 Steel reinforced concrete wall with internal insulation
- 2.3.2 Flat roofs in timber with gravel bed
- 2.3.3 Old rubble masonry
- 2.3.4 Single wythe or mono-block walls with internal insulation



## Introduction

Vapour retarders / barriers have two different functions. They regulate the amount of water vapour that enters the structure. The sd-value of the product is an indication of the retardant effect that it has on water vapour. Membranes with an sd value of  $> 0.5\text{m}$  are considered to be retardant (in AT  $> 0.3\text{m}$ ), whereas membranes with an sd of  $> 1500\text{m}$  are regarded as being impermeable to water vapour. The market still refers to vapour retarders and vapour barriers, a distinction that originated in older standards. In Switzerland, membranes with an sd value of  $0.5\text{m} - 130\text{m}$  were known as vapour retarders, whereas where the sd  $> 130\text{m}$ , this was described as a vapour barrier. In Germany and the EU, a vapour barrier must have an sd value of  $> 100\text{m}$ . The second function is to ensure the required standard of air-tightness is achieved, permitting the maximum air exchange rates consistent with the optimal use of heat.

We can distinguish between two types of vapour retarders. Membranes with a fixed sd-value, and those with variable sd-values.

Vapour retarders with a variable sd-value change their value depending on the moisture content in the environment. The main argument is that they have a greater potential for drying out structures where the moisture level is critical, compared to vapour retarders with static sd values. Using a variable vapour retarder can reduce the potential risk of damage in these structures. This requires several conditions to be met, in particular a high difference in pressure between hot and cold. Before using them, the conditions need to be clarified in order to evaluate the design.

In contrast, there are also vapour retarders that have a static value. These have the advantage that they are easier and safer to use, both in design and implementation. This is because the evaluation and behaviour of the diffusing vapour in the structure is only considered in one direction, from the inside to the outside.

Our vapour retarders exhibit important properties such as

- Proven performance over decades
- System component
- Dimensionally stable
- No stretching and shrinking when subject to temperature differences
- Resistant to tearing
- Resistant to chemicals
- Slight transparency (Ampatex)
- Compatibility with other materials commonly used in construction

**The designation of the product and the sd-value result from the construction, materials used, and the internal and external climates.**



## **1.0 Products and their material construction**

### **1.1 Vapour retarders**

The vapour retarder is used on the warm side of the structure. It controls the input of water vapour into the structure. The optimal sd-value (the permitted amount of water vapour) is determined by the structure together with the materials used in the overall construction.

#### **1.1.1 Ampatex® DB 2, DB 90, SB 130, Cento**

These products are composed of the following layers. The carrier material is a polypropylene fleece, which also promotes tear resistance. A coating of pure polypropylene or copolymer then follows. These products have a high degree of resistance to tearing, are dimensionally stable, translucent, and maintain a constant moisture level, etc. Most of the products are recyclable.

#### **1.1.2 Sisalex™ 500, 303**

These products are composed of the following layers. Two-ply kraft paper with glass fibre matting in the centre to improve tear resistance. In the case of Sisalex 500, the papers are held together by paraffin, and by polythene for Sisalex 303. Because they are paper-based, these products are viewed favourably from an environmental aspect. They are also tear resistant and dimensionally stable. Because it is 100% pure cellulose, and the products are neither impregnated nor have they been treated with fungicides, special care is needed when installing in construction sites where humidity levels are high.

#### **1.1.3 Ampatex® Resano®**

This product is composed of the following layers. The carrier material is a polypropylene fleece, which also promotes tear resistance. A coating of copolymer then follows, in which a polypropylene fleece has been embedded. Ampatex Resano is moisture variable. The product has a high tear resistance and dimensional stability.



## **1.2 Vapour barrier**

Vapour barriers are used on the warm side of the structure. They prevent the ingress of moisture and water vapour. The decision to use a vapour barrier depends on the construction, usage, and the interior and exterior climate.

### **1.2.1 Sisalex™ 514 / 518**

This product is composed of the following layers. Two-ply kraft paper with glass fibre matting in the centre to improve tear resistance. Laminated on one side with aluminum foil (7 µ). In the case of Sisalex™ 518, this aluminum foil is given the additional protection of a polythene coating to provide resistance to alkaline materials. They are also tear resistant and dimensionally stable.

### **1.2.2 Sisalex™ 871**

This is a composite of two polythene films, with glass fibre matting in the centre to improve tear resistance and aluminum foil (20 µ). This provides the required barrier against radon. The product is tear resistant, dimensionally stable and has a tremendously high mechanical strength.

Note: The decision to use paper or plastic based products ultimately rests with the customer.

## **2.0 Principle structures and their application**

We will assume that there are three possible variants. Basically, we will differentiate between them according to their building physics.

### **2.1. Permeable**

In permeable structures, we recommend the following products



### **2.1.1. Timber frame construction, with functioning rear ventilation.**

Applicable products: Ampatex DB 2, Sisalex 500, Sisalex 303

The requirements are as follows: Use in the Central Plateau (<1,000m above sea level), 100% airtight, mineral / cellulose fibre insulation, protection of the structure during construction to prevent excessive moisture penetration, functioning rear ventilation, normal interior humidity

### **2.1.2. Insulation between rafters, with a functioning rear ventilation**

Applicable products: Ampatex DB2, Sisalex 500, Sisalex 303

The requirements are as follows: Use in the Central Plateau (<1,000m above sea level), 100% airtight, mineral / cellulose fibre insulation, protection of the structure during construction to prevent excessive moisture penetration, functioning rear ventilation, normal interior humidity

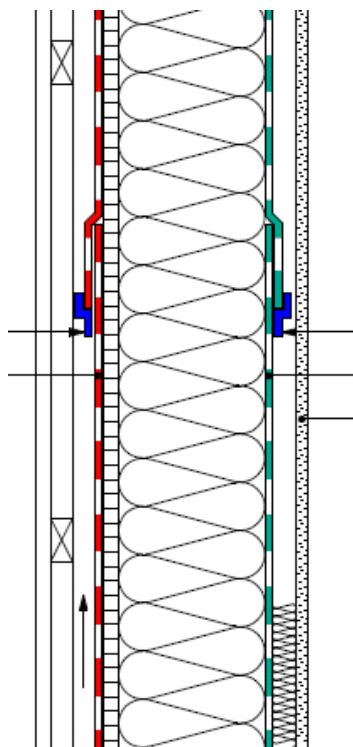
Note: Because of the statics, wood-based panels can also be used as vapour retarders. This is possible from a building physics point of view, seen in relation to the sd-value, but 100% sealing must be guaranteed with masking tape on all the joints between the boards etc.

## **2.2. Diffusion retardant**

These are undoubtedly the most common designs, where the use of a vapour retarder depends on the materials used and the climatic conditions



## 2.2.1 Timber frame with boxing on the cold side



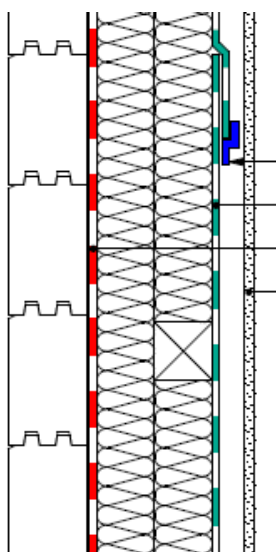
**Central Plateau** - Recommended product: Ampatex® DB 90

The requirements are: Use in the Central Plateau (<1,000m above sea level), 100% airtight, mineral / cellulose fibre insulation, protection of the structure during construction to prevent excessive moisture penetration, functioning rear ventilation, normal interior humidity

**Alpine location** - Recommended product: Ampatex® Cento

The requirements are: Use in alpine conditions (> 1,000m above sea level.), 100% airtight, mineral / cellulose fibre insulation, protection of the structure during construction to prevent excessive moisture penetration, functioning rear ventilation, normal interior humidity

## 2.2.2 Solid wood construction (e.g. block board)



**Central Plateau** - Recommended product: Ampatex® DB 90/ Ampatex® Cento

The requirements are: Use in the Central Plateau (<1,000m above sea level), 100% airtight, mineral / cellulose fibre insulation, protection of the structure during construction to prevent excessive moisture penetration, normal interior humidity

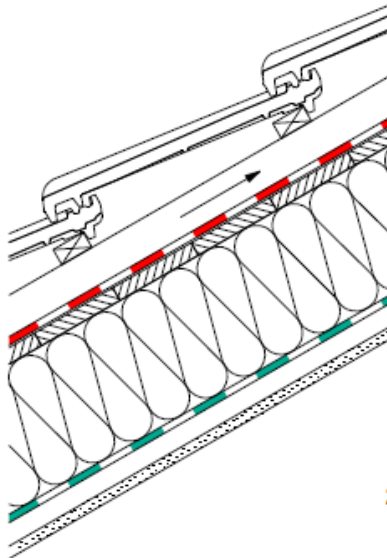
**Alpine location** - recommended product: Ampatex® Cento

The requirements are: Use in an Alpine location (>1,000m above sea level.), 100% airtight, mineral / cellulose fibre insulation, protection of the structure during construction to prevent excessive moisture penetration, functioning rear ventilation, normal interior humidity



### 2.2.3 Insulation between rafters with boxing (on rafters)

**Central Plateau** - recommended product: Ampatex® DB 90

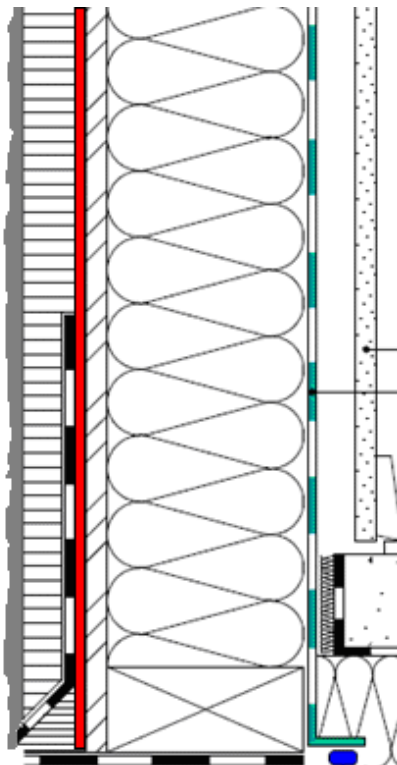


The requirements are: Use in the Central Plateau (<1,000m above sea level), 100% airtight, mineral / cellulose fibre insulation, protection of the structure during construction to prevent excessive moisture penetration, functioning rear ventilation, normal interior humidity

**Alpine location** - recommended product: Ampatex® Cento

The requirements are: Use in an alpine location (> 1,000m above sea level), 100% airtight, mineral / cellulose fibre insulation, protection of the structure during construction to prevent excessive moisture penetration, functioning rear ventilation, normal interior humidity

### 2.2.4 Timber frame construction with additional external insulation



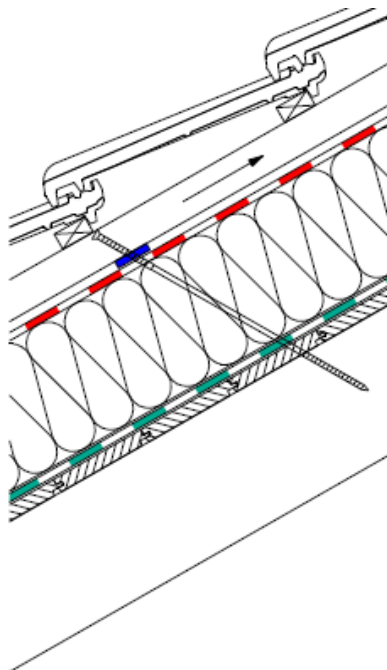
Recommended product: Ampatex® Cento

Diffusion retardant external insulation is mainly used here, with polymer modified adhesive and plaster

The requirements are: Use in the Central Plateau, also in Alpine locations, mineral / cellulose fibre insulation, protection of the structure during construction to prevent excessive moisture penetration, normal interior humidity



## 2.2.5 Insulation on top of rafters

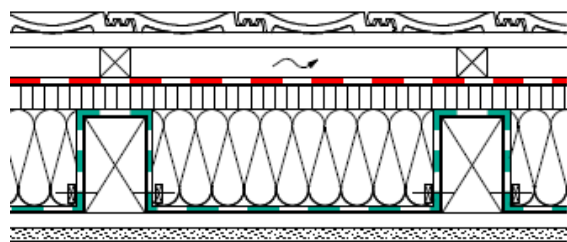


Recommended product: Ampatex® SB 130

Vapour retarder, resistant to mechanical stress and can be exposed to the weather for 3 months

The requirements are: Use in the Central Plateau and also in Alpine locations, protection of the structure during construction to prevent excessive moisture penetration, functioning rear ventilation, normal interior humidity

## 2.2.6 External roof renovation



Recommended product: Ampatex® Resano®

The requirements are: use in the Central Plateau (<1,000m above sea level), 100% airtight, mineral / cellulose fibre insulation, adequate insulation over the rafters (min 35mm wood fibre) protection of the structure during construction to prevent excessive moisture penetration, functioning ventilation, normal indoor humidity

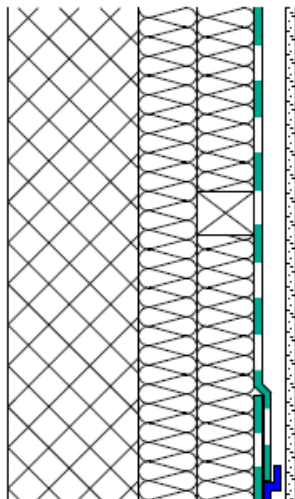
Note: Use in alpine conditions (> 1,000m above sea level.) must be assessed for the property.



## **2.3 Non permeable constructions**

In general, non-permeable constructions place high demands on the quality of workmanship. Not only is it vital to have a 100% covering that is airtight, but also testing it to ensure that it has been installed correctly is of equal importance.

### **2.3.1 Steel reinforced concrete wall with internal insulation**



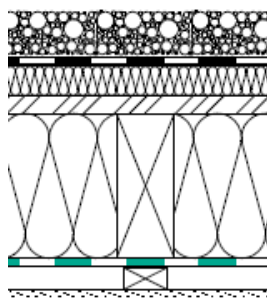
Recommended product: Sisalex™ 514 / 518

100% airtight, protection of the structure during construction to prevent excessive moisture penetration, no contact with alkaline materials, avoid the inclusion of excessive moisture

Note: Sisalex™ 518 should be used as a moisture barrier or in the case of contact with alkaline materials (see also 2.3.3)



### 2.3.2 Flat roofs in timber with gravel bed



#### **Central Plateau** - recommended product: Ampatex<sup>®</sup> Resano<sup>®</sup>

The requirements are: If anything is unclear please contact us. For use in the Central Plateau (< 1,000m above sea level), detached and in a sunny position, 100% airtight, protection of the structure during construction to prevent excessive moisture penetration, functioning rear ventilation, normal interior humidity

Note: Green roofs are challenging from a building physics point of view. The property should be assessed by a structural engineer on a case-by-case basis.

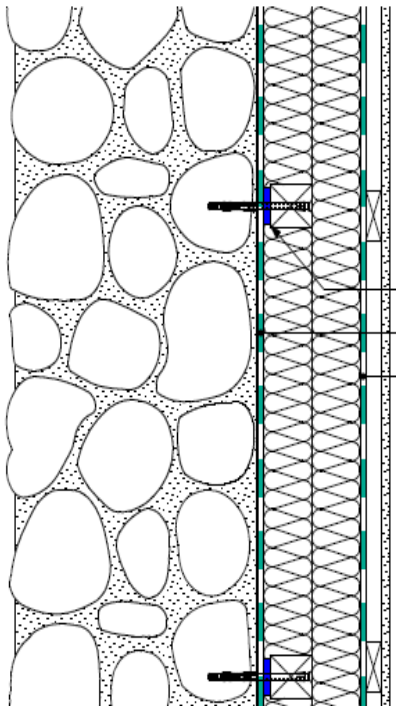
#### **Alpine location** - recommended product: Sisalex<sup>™</sup> 514 / 518

100% airtight, protection of the structure during construction to prevent excessive moisture penetration, avoid the inclusion of excessive moisture.

The alternative, Ampatex<sup>®</sup> Resano<sup>®</sup>, can also present challenging problems from a building physics point of view when used in an Alpine location (>1,000m above sea level) for the use in alpine location in turn physically challenging. The property should be assessed by a structural engineer on a case-by-case basis.



### 2.3.3 Old rubble masonry



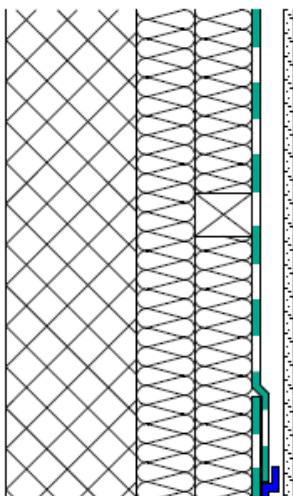
Recommended products: Sisalex™ 514 and Sisalex™ 518

100% airtight, protection of the structure during construction to prevent excessive moisture penetration, Sisalex™ 514 must not make contact with alkaline materials, avoid the inclusion of excessive moisture

Note: Sisalex™ 518 should be used as a moisture barrier or in the case of contact with alkaline materials

This system is to be used where the wall is being constructed below ground

### 2.3.4 Single wythe or mono-block walls with internal insulation



Recommended product: Ampatex® Cento

The requirements are: 100% airtight, protection of the structure during construction to prevent excessive moisture penetration, avoid the inclusion of excessive moisture, the masonry must be no more than 30 cm thick, normal interior humidity

To deal with any moisture that may come from the outside, a moisture barrier can be placed directly on the masonry (see 2.3.3)