SISMACTIVE®
THERMAL SYSTEM

SOLUTIONS FOR
STRUCTURAL AND THERMAL
REINFORCEMENT OF
MASONRY

CORK, THE RESILIENCE OF MATERIAL

INHALTSVERZEICHNIS

THE CRM SYSTEM: COMPOSITE REINFORCED MORTAR

THE SEISMIC UPGRADING OF MASONRY STRUCTURES AND BUILDINGS IS A MAJOR GLOBAL CHALLENGE. THE GOALS ARE TO PREVENT THE DESTRUCTIVE EFFECTS OF EARTHQUAKES, INVESTING IN PEOPLE'S SAFETY, ENHANCING AND RECOVERING EXISTING PROPERTIES IN SEISMIC PRONE ZONES.

The CRM system – expressed in Diasen's Sismactive Thermal System - offers an effective response to this widespread building conservation requirement. Improving on the traditional technique of reinforced concrete, its approach is aimed at seismic performance improvement and upgrading and structural reinforcement and consolidation work.
Composite Reinforced Mortar is a reinforcement system based on pre-formed fibreglass mesh and corner beads which are embedded in a lime-based structural mortar.
With this system, mesh and corner beads are connected using pre-formed connectors which are, in turn, connected to the masonry with special high-performance anchors.

THE CRM SYSTEM CAN BE USED TO ACHIEVE SEVERAL OBJECTIVES:

- uniform, global reinforcement of existing masonry of different types and characteristics;
- significant improvements in terms of mechanical performance;
- enhanced flexibility and durability of the structure;
- full compatibility with historical buildings.

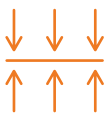
SEISMIC UPGRADING AND THERMAL ADVANTAGES: SISMACTIVE THERMAL SYSTEM

Diasen interprets the opportunity of seismic upgrading through CRM systems with an original proposal: the Sismactive Thermal System.

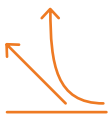
This innovative solution guarantees seismic and thermal insulation performances, enhancing all the benefits afforded by a multitasking system designed to meet the safety and comfort requirements of buildings.
This is made possible thanks to the use of Diathonite Sismactive, an M10 structural thermal mortar formulated with cork and lime, developed to offer excellent performances in terms of the seismic safety of buildings as well as thermal wellbeing and living comfort.

THEREFORE SISMACTIVE THERMAL SYSTEM OFFERS ITS USERS SIMPLE, HIGH-QUALITY INTERVENTIONS WITH AN OUTSTANDING COMBINATION OF OPPORTUNITIES AND ADVANTAGES:

MINIMUM INVASIVENESS
The application of the reinforced mortar just on the exterior of the masonry allows uninterrupted use of the building even during the intervention.



MINIMUM THICKNESSES
Unlike reinforced concrete mortar, which required considerable thicknesses (7-8 cm) to cover the electrowelded wire mesh, with the CRM system 3-5 cm is sufficient;



MINIMUM RIGIDITY
The limited thicknesses guarantee a negligible increase in rigidity restricted to the application points, without completely changing the original distribution of rigidity;

MAXIMUM REVERSIBILITY

The technology respects the principle of reversibility, essential in restoration, meaning that the CRM system can be removed without causing any damage or alterations to the original structure.

ZERO CORROSION

Unlike the electrowelded wire mesh used in traditional solutions, alkali-resistant fibreglass mesh composing the CRM systems does not corrode

MINIMUM ENVIRONMENTAL IMPACT

Diathonite Sismactive is formulated with NHL5 hydraulic lime, cork and diatomaceous earth, making the system totally eco-friendly;

MAXIMUM INSULATION

Thanks to the designed mix of natural raw materials, Diathonite Sismactive can be used to achieve extremely high performance in terms of thermal insulation.

FIRE RESISTANCE

Diathonite Sismactive is class A1 according to EN ISO 13501-1, meaning that no flames are produced and no smoke is emitted.

MAXIMUM BREATHABILITY

Allows walls to breathe and thanks to its high permeability, ambient humidity is always perfectly balanced.

SISMACTIVE THERMAL SYSTEM: THE COMPONENTS OF AN INNOVATIVE SOLUTION

The Sismactive Thermal System, in terms of its seismic and thermal properties, is closely linked to the balance of its components and the way they interact to achieve the final improvement.

THE FUNCTION OF THE MESH WITHIN THE SYSTEM IS RELATED TO ABSORPTION OF TENSILE STRESSES, WHILE THE M10 STRUCTURAL THERMAL INSULATING MORTAR FORMULATED WITH CORK AND LIME HELPS ABSORBING COMPRESSION STRESS FORCES. AT THE SAME TIME, THE CONNECTORS ARE DESIGNED TO STRUCTURALLY ANCHOR TOGETHER THE MASONRY AND THE MORTAR, EXPLOITING A STRESS TRANSFER MECHANISM BETWEEN THE SUPPORT AND THE MESH.

BELOW ARE REPORTED THE KEY CHARACTERISTICS OF THE DIFFERENT SISMACTIVE THERMAL SYSTEM COMPONENTS:

DIATHONITE SISMACTIVE

It is a ready-to-use natural thermal insulating mortar formulated with cork (grain size 0-3 mm), NHL5 hydraulic lime and diatomaceous earth. Diathonite Sismactive is suitable for the consolidation of masonry structures and vaults, through the construction of reinforced repointing systems.

Diathonite Sismactive is a **Low VOC** product that meets **Minimum Environmental Criteria (MEC)** and boasts double **CE** marking, attesting to the product's performance.

Characteristics:

Strength
this is an M10 mortar with compressive strength of 10 N/mm^2

Eco-friendly
it is a product with low emission of Volatile Organic Compounds

Fire resistant
it is a class A1 with no flames produced and no smoke emitted

Thermal
The product has a lambda value (indicating thermal conductivity) of 0.065 W/mK

Breathability
its porosity allows walls to act as a hygrometric "lung"

CALCE STORICA

This is a mortar with excellent mechanical strength.
It is made of NHL 5 natural hydraulic lime, hydrated lime and natural aggregates, and it is ideal for the consolidation and renovation of masonry structures in seismic areas.

Performance guaranteed by double **CE** marking.

Characteristics:

Strength
this is an M15 mortar with compressive strength of 15 N/mm^2

Eco-friendly
it is produced with natural inorganic materials

Functional for renovation
it is recommended for conservative restoration work on historical buildings

Antibacterial
high alkalinity ensures disinfectant and antibacterial properties

Breathability
thanks to the natural microporosity of hydraulic lime

POLITES AR 330

This fibreglass mesh is used as a reinforcement material in CRM structural systems, providing global improvement of strength and flexibility.

Characteristics:

Strength
the alkalinity of the mesh is key to excellent corrosion resistance

Primed
Mesh performance is increased thanks to a special primer treatment.

Flexible
its flexibility allows its use on corners and enhances adaptation to any seismic quakes.

ELITES L

A preformed connector made of fibreglass with resin, designed for the structural reinforcement of masonry and suitable for the upgrading of buildings in seismic prone areas.

Characteristics:

Handy
In conjunction with lime-based mortars, it creates a functional, high-strength system.

Strength
it has high tensile and shear strength

Compatible
compatible with any hydraulic or chemical matrix used for anchorage

Functional for renovation
it is compatible with conservative restoration work on historical buildings

ELITES F1 - F2

An AR fibreglass transversal connector designed for the structural reinforcement of masonry, arches and vaults. Characterised by a rigid preformed central segment and one or two tassel ends.

Characteristics:

Strength
The tassel extremities ensure that the product is fully integrated in the lime-based mortar.

Compatible
compatible with any hydraulic or chemical matrix used for anchorage.

Strength
it has high tensile and shear strength

Strength
it has high tensile and shear strength

SISMABOND

A high-performance resin for anchoring heavy loads and seismic fixing, with excellent mechanical and thermal characteristics. It is ideal for the anchorage of fibreglass connectors in CRM structural reinforcement systems.

Characteristics:

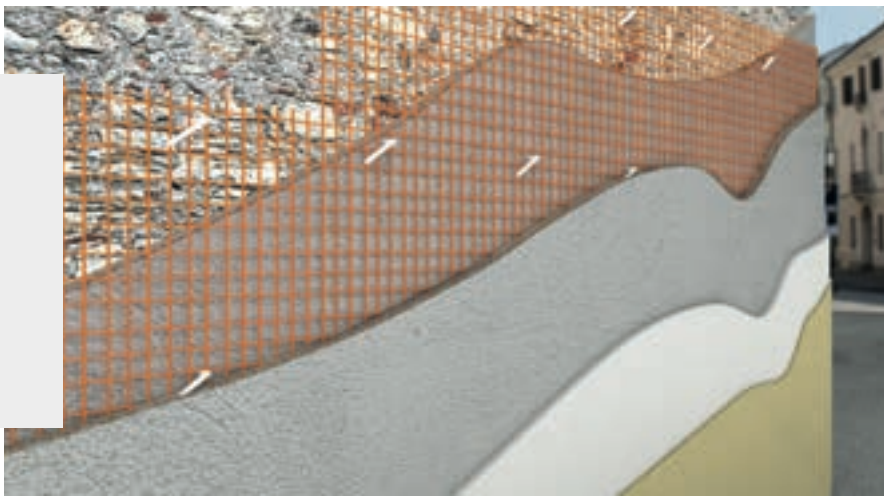
Thixotropy
easy use in vertical as well as horizontal applications due to its non-drip formula.

Fire resistance
zero thermal potential makes Sismabond non-reactive and non-combustible

Anchoring
its adhesive strength allows the system to absorb static and seismic stresses

Functional for renovation it is compatible with conservative restoration work on historical buildings

MASONRY REINFORCEMENT ON ONE SIDE ONLY WITH "L"-SHAPED CONNECTORS



MATERIALS

1. DIATHONITE SISMACTIVE
2. POLITES AR 330
3. ELITES L
4. SISMABOND

APPLICATION CYCLE

- Wet the surface of the support and, if necessary, rebuild any parts of missing or damaged masonry.
- Drill the holes for the connectors, inserting guides to help identify the holes subsequently.
- Apply a first layer of *Diathonite Sismactive*, by hand or by machine, without covering the holes.
- Partially anchor the *Polites Ar 330* mesh in the fresh mortar.
- While the mortar is still fresh, remove the guides and inject the epoxy resin *Sismabond* into the holes.
- Insert the *Elites L* connectors, with the long section in the holes and the short section turned downwards.
- Turn the short section of *Elites L* through 45° until it lies diagonally across the mesh
- After the first layer of mortar has set (12-24h) apply the second layer by hand or by machine.

MASONRY REINFORCEMENT ON TWO SIDES WITH “L”-SHAPED CONNECTORS

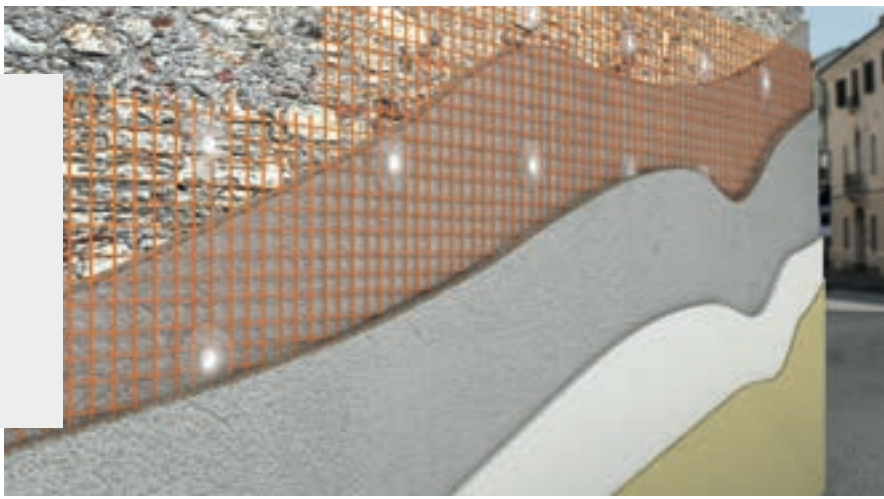
MATERIALS

1. DIATHONITE SISMACTIVE
2. POLITES AR 330
3. ELITES L
4. SISMABOND

APPLICATION CYCLE

- Wet the surface of the support and, if necessary, rebuild any parts of missing or damaged masonry.
- Drill through-holes for the connectors, from one side of the masonry to the other, inserting guides to help identify the holes subsequently.
- Apply a first layer of *Diathonite Sismactive*, by hand or by machine, without covering the holes.
- Partially anchor the *Polites Ar 330* mesh in the fresh mortar.
- While the mortar is still fresh, remove the guides and inject the epoxy resin *Sismabond* into the holes.
- Insert the *Elites L* connectors, with the long section in the holes and the short section turned downwards.
- Turn the short section of *Elites L* through 45° until it lies diagonally across the mesh
- After the first layer of mortar has set (12-24h) apply the second layer by hand or by machine.

MASONRY REINFORCEMENT ON ONE SIDE ONLY WITH TASSEL



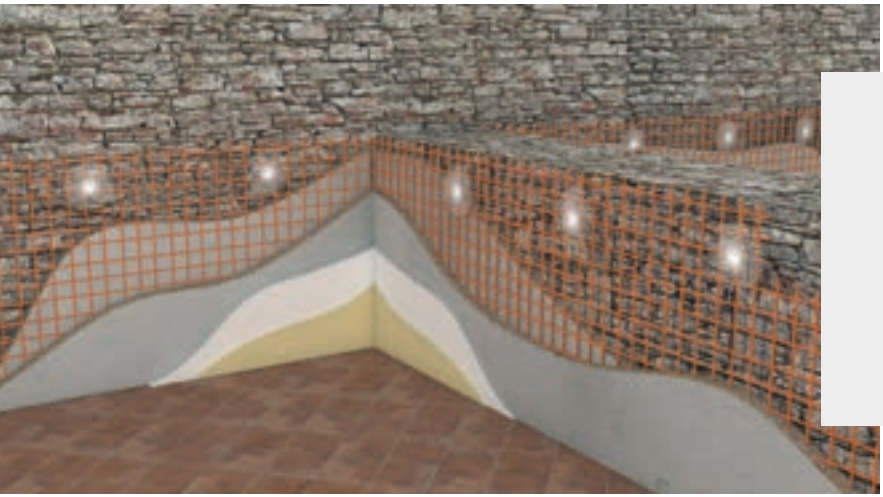
MATERIALS

1. DIATHONITE SISMACTIVE
2. POLITES AR 330
3. ELITES F1
4. SISMABOND

APPLICATION CYCLE

- Wet the surface of the support and, if necessary, rebuild any parts of missing or damaged masonry.
- Drill the holes for the connectors to a depth of 2/3 the thickness of the masonry, inserting guides to help identify the holes subsequently.
- Apply a first layer of *Diathonite Sismactive*, by hand or by machine, without covering the holes.
- Partially anchor the *Polites Ar 330* mesh in the fresh mortar.
- While the mortar is still fresh, remove the guides and inject the epoxy resin *Sismabond* into the holes.
- Insert an *Elites F1* connector into each hole, splay the tassel end and sink the fibres into the fresh mortar.
- After the first layer of mortar has set (12-24h) apply the second layer by hand or by machine.

MASONRY REINFORCEMENT ON BOTH SIDES WITH TASSEL



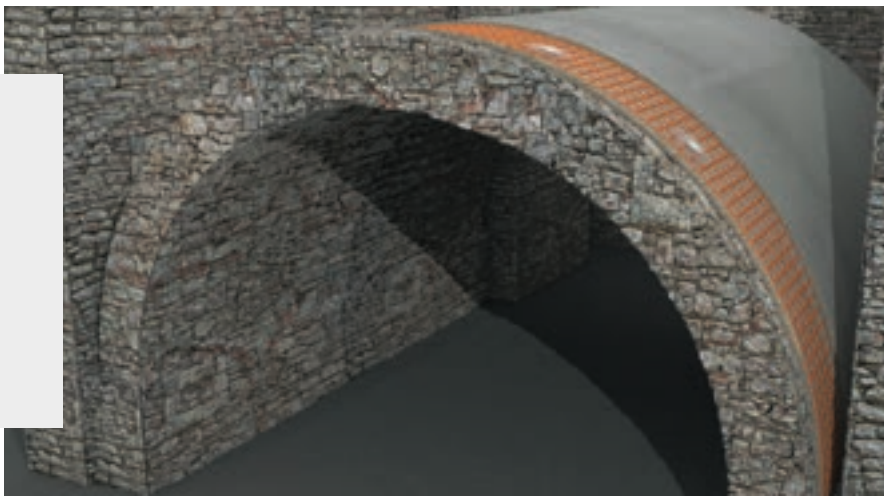
MATERIALS

1. DIATHONITE SISMACTIVE
2. POLITES AR 330
3. ELITES F2
4. SISMABOND

APPLICATION CYCLE

- Wet the surface of the support and, if necessary, rebuild any parts of missing or damaged masonry.
- Drill through-holes for the connectors, from one side of the masonry to the other, inserting guides to help identify the holes subsequently.
- Apply a first layer of *Diathonite Sismactive*, by hand or by machine, without covering the holes.
- Partially anchor the *Polites Ar 330* mesh in the fresh mortar.
- While the mortar is still fresh, remove the guides and insert an *Elites F2* connector in each hole, pushing all the way through to the other side.
- Splay both of the tassel ends, sinking the fibres into the fresh mortar.
- After the first layer of mortar has set (12-24h) apply the second layer by trowel or by machine.

EXTRADOS REINFORCEMENT OF VAULTS WITH TASSEL ON ONE SIDE



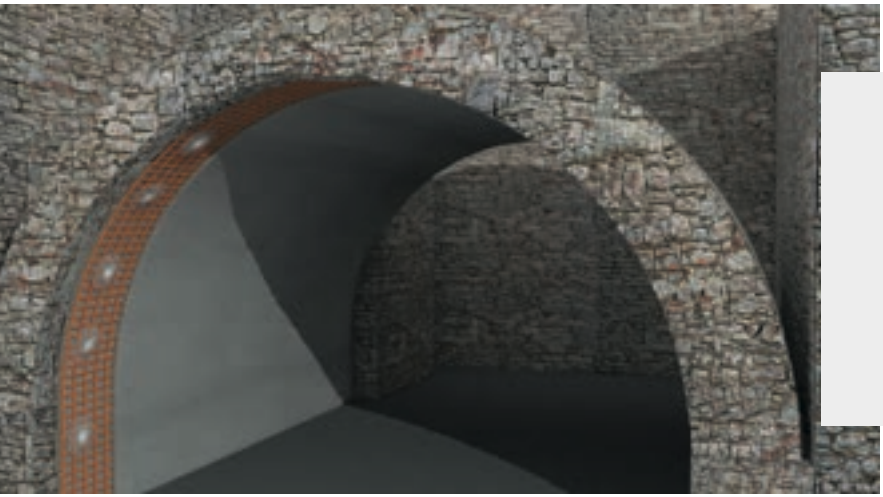
MATERIALS

1. CALCE STORICA
2. POLITES AR 330
3. ELITES F1
4. SISMABOND

APPLICATION CYCLE

- Wet the surface of the support and, if necessary, rebuild any parts of missing or damaged masonry.
- Drill the holes for the connectors to a depth of 2/3 the thickness of the vault, inserting guides to help identify the holes subsequently.
- Apply a first layer of *Calce Storica* without covering the holes.
- Partially anchor the *Polites Ar 330* mesh in the fresh mortar.
- While the mortar is still fresh, remove the guides and inject the epoxy resin *Sismabond* into the holes.
- Insert an *Elites F1* connector into each hole, splay the tassel end and sink the fibres into the fresh mortar.
- After the first layer of mortar has set (12-24h) apply the second layer by hand or by machine.

INTRADOS REINFORCEMENT OF VAULTS WITH TASSEL



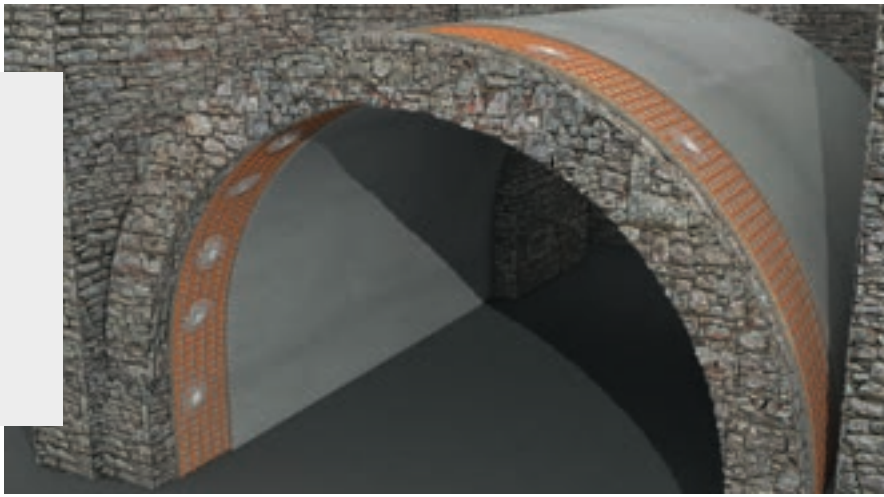
MATERIALS

1. CALCE STORICA
2. POLITES AR 330
3. ELITES F1
4. SISMABOND

APPLICATION CYCLE

- Wet the surface of the support and, if necessary, rebuild any parts of missing or damaged masonry.
- Drill the holes for the connectors to a depth of 2/3 the thickness of the vault, inserting guides to help identify the holes subsequently.
- Apply a first layer of *Calce Storica* without covering the holes.
- Partially anchor the *Polites Ar 330* mesh in the fresh mortar.
- While the mortar is still fresh, remove the guides and inject the epoxy resin *Sismabond* into the holes.
- Insert an *Elites F1* connector into each hole, splay the tassel end and sink the fibres into the fresh mortar.
- After the first layer of mortar has set (12-24h) apply the second layer by hand or by machine.

INTRADOS AND EXTRADOS REINFORCEMENT OF VAULTS



MATERIALS

1. CALCE STORICA
2. POLITES AR 330
3. ELITES F2
4. SISMABOND

APPLICATION CYCLE

- Wet the surface of the support and, if necessary, rebuild any parts of missing or damaged masonry.
- Drill through-holes for the connectors, from one side of the vault to the other, inserting guides to help identify the holes subsequently.
- Apply a first layer of *Calce Storica*, by hand or by machine, without covering the holes.
- Partially anchor the *Polites Ar 330* mesh in the fresh mortar.
- While the mortar is still fresh, remove the guides and insert an *Elites F2* connector in each hole, pushing all the way through to the other side.
- Splay both of the tassel ends, sinking the fibres into the fresh mortar.
- After the first layer of mortar has set (12-24h) apply the second layer by trowel or by machine.

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SOLUTIONS FOR
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