

Mauertrockenlegung

WALL DRYING

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Extremly wet wall















WALL DRYING SYSTEM



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Wall dehydration is based on the active electroosmosis method:



motion.

relation between moisture and certain electrical polarity within the wall. Similar to the upward flow of water through the capillaries of plants, moisture in walls also rises against gravity. The potential is measurable and has an upward negative

A largely unnoticed factor is the direct

Natural electrical field

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Various construction materials used in higher and lower sections of buildings cause a difference in electrochemical potential. Concrete in comparison to brick masonry is electro negative. Water always moves towards the negative field. Buildings which were dry over hundreds of years developed moisture after being reinforced with concrete or after addition of a concrete floor. It's even possible that masonry of various types and ages exhibits a difference in potential.

All restorations must include preventive measures against an increase in capillary suction due to polarization.



The physical operating method of electro-osmosis has been known for almost 200 years. The first practical application took place approximately 70 years ago. Some industrial branches implement electro-osmosis procedures routinely. In the field of wall dehydration electro-osmosis has played a successful role for 15 years.



The process seems unbelievably simple moisture rises to the upper negative parts of a wall and through the application of electrodes polarity is artificially reversed.



The negative pole is reversed and moisture trickles back into the ground.

The artificially created electrical field functions as a horizontal barrier permanently preventing moisture from rising up the wall. A specific application of the electrodes enables - no matter what wall type or depth not only a horizontal barrier of capillary moisture suction but with relatively little effort also a vertical blockage.



To create an electrical field the osmosis-method requires a certain kind of alternating current of max. 6 volts corresponding to the effect of approx. 2.8 volts of direct current. It is extremely important not to exceed this maximum voltage as any stronger current will cause an effect of electrolysis in form of corrosion of mortar-binding materials and metals (pipes, steel girders etc.). With it's low current the osmosis-method prevents these kinds of reactions.

A further advantage of the electro-osmosis wall dehydration is the minimal loss of salt during restoration. The majority of the moisture trickles back into the ground through the capillary system within the wall, therewith also transporting the salts back into the ground. Only a small amount of moisture evaporates on the surface of the wall limiting also the amount of salt deposits.

Dehydration begins with the reversal of the electrical field. The current chooses the path of lowest resistance between the positive and negative electrodes within the wall substance. The immediate area between the electrodes dries first. The resistance of this area increases. The current flows until all moisture has been expelled from the electrical field. The resistance of the dry masonry is so strong, that it reduces the current of the electrical field to 10-20% of the original voltage. Therefore the osmosis-method represents a gentle and safe method of wall dehydration.

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Type:NGF3

Input: 220 V/50 Hz; 70 mA Output: max. 6 V / 600 mA





CONTROL UNIT

Osmosis control unit encapsulated for wet room installation, safety inspected.

Current indicated by specific amplitude of max. 6 V (effectively 2.8 V) prevents unwanted polarizing effects on the electrode surfaces. The long term activity of the electrodes is therefore guaranteed.

High and low voltage current are electrically separated through an integrated transformer.

The digital mA measuring device indicates the amount of constant current within the unit. The effectivity of the device is therefore controllable. A decrease in current indicates an increase in dryness.

The integrated timer keeps track of the actual usage time. It is therefore able to reconstruct all system shutdowns, power outages as well as other interferences.

The capacity extends over a wall of 200 meters.





CONTACT CONDUCTOR

GRIDDED ELECTRODE (ANODE)

The gridded electrode is constructed of 29.5 cm long fiberglass is transported by a contact conductor. This conductor is insulated also with conducting material, preventing a direct contact of metal with masonry.





RODDED ELECTRODE (CATHODE)

The rodded electrode has a length of 63.5 cm, a diameter of 28 mm and is made of current conducting graphite filled plastic. The materials of the gridded and rodded electrodes are tuned to prevent unwanted electrolytical fields. An expert opinion has confirmed that the osmosis electrodes are undestroyable when using a maximum of 6 volts. The long term performance is

therewith guaranteed.





For application of gridded electrodes remove strips of plaster to expose masonry, if necessary removal of all damaged plaster surfaces.



Attach gridded electrodes and contact conductor, secure with contact plaster.





Holes are drilled into the ground, rodded electrode set and opening filled with conducting mass.

To ensure the proper flow of current, the distance between the rodded electrodes has to be adjusted to the conductibility of the ground.

approx. 30 cmlong gridded electrode control unit is attached to the masonry





Distance between rodded electordes based on ground structure

Electrodes are hooked up to the control unit.

The gridded electrode is connected via contact conductor to the positive output, the rodded electrodes to the negative output of the control unit. Gridded and rodded electrodes are supplied with power from two sides through a ring main. An external power outage therefore has no effect on the performance of the system.



CORROSION PROTECTION

The electro osmosis procedure has an advantageous effect on all metals within the masonry (i.e. water pipes, heating systems etc.)

The metal is indirectly influenced by the electrical field. Due to the positive charge the metal surfaces emit all moisture to the negative poles.

Electro osmosis as prevention of corrosion is routinely used in the pipeline as well as the ship-building industry.

POWER OUTAGE

The longer the osmosis system is installed and in use the longer the artificially created electrical field takes to break down during a power outage. Since power outages over several days are not to be expected in industrial nations, they play a very minor role in wall dehydration.

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HEALTH PROMOTING

Dehydration through the osmosis method is considered health promoting. No chemicals are used in the process. Moisture in the indoor living areas is eliminated in a natural way.

Damp walls

- •constitute an excellent ground for fungi whose spores function as allergens.
- •lead to a wide range of illnesses, i.e. chronic rheumatism and bronchial asthma.
- •All rooms include electrical power supplies of 220 and 380 volts whose electrical fields influence many people's state of health.

In most cases installation of the osmosis system prevents these health hazards. negatively affecting electromagnetic fields were diverted through the walls.

Diverse and long term use of the osmosis system has revealed health promoting effects.

OPERATING COSTS



Moist walls

- •repeatedly cause expenses for plaster and mortar repairs
- reduce heat insulation up to 80% therefore increasing heating costs

In comparison the operating costs for the osmosis system are very low, i.e. 100 meters of wall length:

•Initially approx. 1 kWh/month, depending on the kW price a maximum of DM 5.- per year; after dehydration of the wall operating costs amount to approx. DM 1.- per year.

Power usage is proportional to power costs:

•Initial moisture requires approx. 250 mA;

●after 1 to 2 years approx. 10 to 20 mA.

•Long term minimal power is required to ensure the potential reversal and the blockage of rising moisture.



GUARANTEE

- Appropriation of the system guarantees potential reversal, no further rise of moisture and dehydration of the wall according to plan.
- •Guaranteed is the best possible performance of the system.
- •Guarantee takes effect on the day of inspection and approval of the system and continues for 10 years.
- •This guarantee does not cover damage resulting from any cause other than normal use and operation of the system.

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OUR SERVICE INCLUDES

Development plan of dehydration system

Delivery and installation of all required mechanisms and electrical parts

Preparatory removal of all damaged and salt stained plaster to attach gridded electrodes with all connecting circuits

Drilling of holes for ground electrodes

Slits for connecting wires

Spray plastering of gridded electrodes as well as connecting circuits with contact plaster

Moisture and potential measurings

Testing, operation and delivery of system with protocol

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The "Osmosis"-system enables multiple application possibilities of wall dehydration.

The method is not suitable for the removal of pressure, slope and ground water.

Enclosed please find some methods of application demonstrated in a way in which the current travels from gridded anode to rodded cathode.

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•Wall up to 1 meter thick

•Bare ground

•Foundation and ground on an equal level



APPLICATION OF ELECTRODES

Gridded anode: Outside above the ground

Rodded cathode: Outside in the ground

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•Wall up to 1 meter thick

•Bare ground

•Ground on a higher level than foundation



APPLICATION OF ELECTRODES

Gridded anode (+): Outside above the ground

Rodded cathode (-): Outside in the ground

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•Wall up to 5 meters thick



APPLICATION OF ELECTRODES

Gridded anode (+): Inside above the foundation

Rodded cathode (-): Outside in the ground



Thick wall with hollow

–Walls with a large hollow or clamshell masonry require two anode grids.



APPLICATION OF ELECTRODES

Gridded anode (+): Outside above ground

Gridded anode (+): Inside above the foundation

Rodded cathode (-): Outside in the ground

Rodded cathode (-): Inside under the foundation



•In the absence of horizontal and vertical barriers

Basement ceiling higher than bare ground



APPLICATION OF

ELECTRODES

Gridded anode (+): 1 x inside partially above ground level

1 x inside above foundation

Rodded cathode (-): Outside in the ground in an equal distance to the gridded electrodes



•In the absence of horizontal and vertical barriers

•Basement ceiling and bare ground on the same level



APPLICATION OF ELECTRODES

Gridded anode: 1 x Outside above ground 1 x Inside above the foundation

Rodded cathode: Outside in the ground in an equal distance to the gridded lectrodes

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- •Construction on the outside ground not possible Sidewalk, street, pipes
- •Drill through wall for rodded cathode



APPLICATION OF ELECTRODES

Gridded anode: Inside partially above ground

Rodded cathode: Outside in the ground

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 Construction only possible in the basement, no water entry from the side



APPLICATION OF ELECTRODES

Gridded anode (+): Inside under the basement ceiling

Rodded cathode (-): Inside under the foundation

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•With outside ground drainage system



APPLICATION OF ELECTRODES

Gridded anode (+): Inside above the foundation alternatively outside above ground

Rodded cathode (-): Under the drainage system

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•Underground vault with thick walls



APPLICATION OF ELECTRODES

Gridded anode (+): 1 x Outside above ground

1 x Inside upper section of vault

Rodded cathode (-): Inside under basement floor, holes drilled into the ground

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•Cascade circuiting for tall buildings with an extremely high level of moisture - churches, towers, historical sites



APPLICATION OF ELECTRODES

Gridded anode: 1 x Inside at the upper moisture rim or higher 1 x Inside above ground

Rodded cathode: Outside or inside in the ground

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APPLICATION PROCEDURES

•Visible masonry - quarrystone, sandstone, brick, fieldstone etc.



APPLICATION OF ELECTRODES

Gridded anode: Is replaced by contact conductor inserted in the cracks

Rodded cathode: Inside or outside in the ground



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EARTHWORKS WITH DRAINAGES



Open trench with a drainage for the slope and pressure water.

The water entry from the side will be cut off. The moisture does not rise of the fundament.

A horizontal barrier is also necessary.





INJEKTAGEN (CHEM. PROCEDURE)

On injektagen the wall only dries above the horizontal barriers.



MAUERSCHNITTVERFAHREN



At a strong wall the execution is very complicated.

It will be engaged very strongly in the static structure.





EINSCHLAGVERFAHREN

Because of the drive in of the plates and the strong vibration it can cause movements of the stones and static changes of the basic fabric.

At this procedures the area stays damp below the plates.









SPERRPUTZ, WATERPROFF COLOURS



The moisture rises up because of the less ventilation.





THE BORE PROCESS

Durch die von außen in die Wände gebohrten Löcher soll eine Luftzirkulation den Trocknungseffekt im Mauerinnern auslösen.

A horizontal barrier will not be reached. The water can rise up between the bores.











































































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