



PRESENTS

THE FIRST EVER
PERMANENT SOLUTION TO
RISING DAMP!

1. Overview

AQUAPOL SOUTH AFRICA (PTY) LTD

Aquapol South Africa (Pty) Ltd is a company that resolves rising damp permanently without the use of chemicals, wall-cutting or electricity.

The AQUAPOL masonry dehydration system is the latest development in wall drying technology. Its main application area is the dehydration of buildings affected by rising damp. The heart of the system is a small, lampshade-like device which is installed onto the ceiling. The device uses wireless technology to dry out the walls. It captures and amplifies certain natural vibrations from Earth's vast energy field, which will result in the nullification of the capillary forces. As a result water cannot rise in the walls anymore, the building dries out and it will stay dry thereafter.

By using simple physical laws, the Aquapol masonry dehydration system permanently handles the root cause of rising damp.



*Pictures are installations in the Gauteng region

2. The construct of the Aquapol Device

Internally, the device consists of a system of receiving and transmitting antennas, and it is composed of three main parts:

1. The receiving unit: situated at the bottom of the device, will capture Earth's natural gravomagnetic waves in a conic shape. This unit is basically a filtering system which will only let through certain frequencies and will suppress the rest. More about this in the next section.

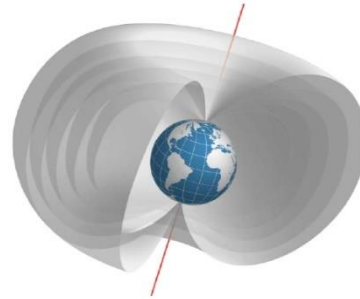
2. The polarization unit: will polarize (align, amplify) the incoming waves filtered earlier, orienting all of them in the same direction, clockwise. By aligning all these random waves in one direction, the output of the device is greatly increased.

3. The transmission unit: will finally project the aligned waves onto the surrounding walls, resulting in the cancellation of the capillary forces inside the walls and the dehydration of the masonry within the active range of the device.

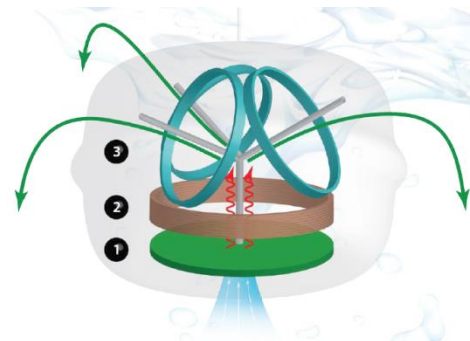
The device is sized according to the size of the building to be dehydrated; its radius of action covers all walls within a range of 50 to 400 m².

Similar to a crystal radio¹, the Aquapol device does not use any electricity for its operation, it will power itself from the waves it captures through its antenna system.

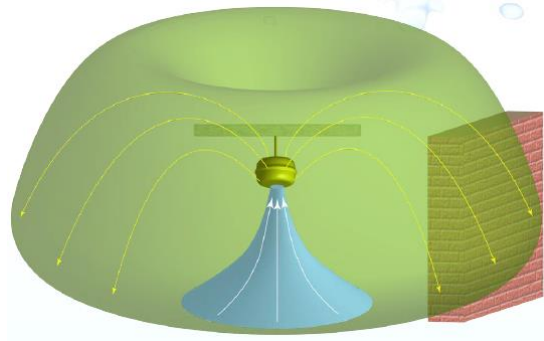
Earth is surrounded by a vast sea of energy



construction of the Aquapol Device



Energy enters at the bottom in a conic shape (blue zone) and exits around the top (green output zone)



Negative effects of Rising Damp

With damp comes the associated mould.

Additional effort should be made to keep away from damp and mould:

- babies and children,
- elderly people,
- those with existing skin problems, such as eczema,
- or respiratory problems, such as allergies and asthma,
- anyone who is immuno-compromised (e.g., chemotherapy patients).

(excerpt from the World Health Organization Damp and Mould Brochure)



Reference:

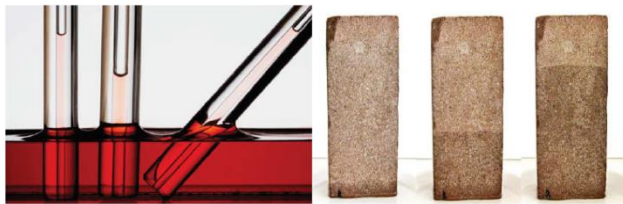
1). http://www.wikipedia.org/wiki/Crystal_radio

3. Working Principles

To understand how the Aquapol system works and how it dries out the walls, some basic understanding of certain physical phenomena is required. For easier understanding of the key concepts, the explanations in this chapter have been deliberately kept simple and the complex scientific terminology has been largely omitted.

CAPILLARY ATTRACTION

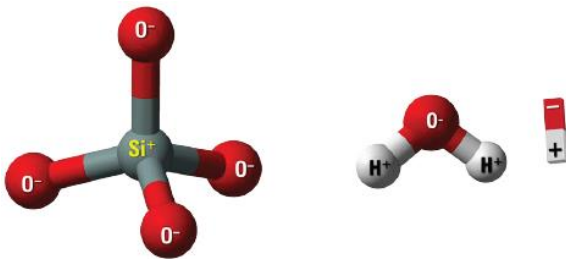
Paper, sponge and brickwork have all something in common: they are porous, their structure consists of millions of thin, microscopic channels called capillaries. Because of certain physical laws, water will rise inside the capillaries; the thinner they are the higher water will go. This is called *capillary attraction* or *capillarity*.



Water rises in the capillaries and brickwork

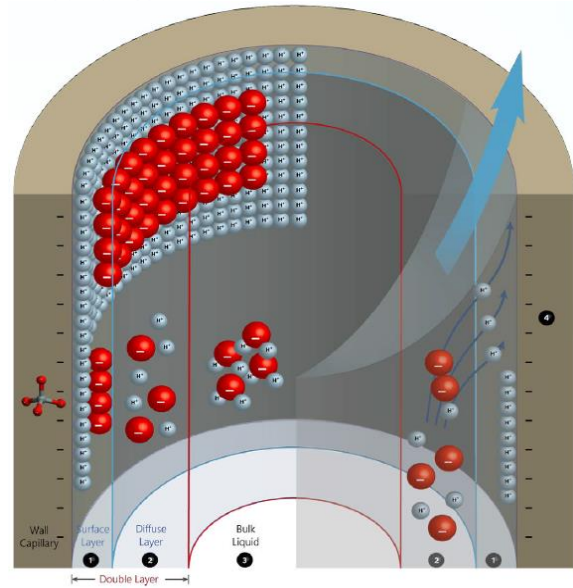
SURFACE CHARGES

About 90% of Earth's crust is composed of silicate based minerals consisting mainly of silicon and oxygen. Most building materials — including bricks, cement, sand, quartz, granite, sandstone, clay, glass etc. — are all silicate based. They have a pyramidal crystalline structure, in which the positive silicon atom (Si^+) is surrounded by several negative oxygen atoms (O^-). As a result silicate surfaces have negative surface charge.



Molecular structure of a silicate and water

Water, commonly known as H_2O , is a dipole (two-pole) molecule. One end of the water molecule is negative (the O side), while the other end is positive (H_2 side). This structural arrangement makes water molecules behave like tiny liquid magnets. They can be easily influenced by external charges and fields.



The electrical double layer between a solid and a liquid:
 1 Surface layer; 2 Diffuse layer; 3 Bulk liquid; 4 Capillary attraction

THE ELECTRICAL DOUBLE LAYER

When a charged wall surface comes in contact with the charged water molecules, a specific interaction will take place between them. This will result in the formation of an electrical potential system called the double layer¹, shown in the figure above:

1. The first layer (Surface layer 1): is made of a layer of positively charged hydrogen gas atoms firmly attached to the surface of the negative wall, followed by negative oxygen atoms attracted by the hydrogen. This layer is very thin and stationary, with no fluid motion.

2. The second layer (Diffuse layer 2): is composed of loosely connected particles (water and salt ions) which can move slowly under the influence of the wall's surface charges.

In addition there is water inside the capillary which flows and behaves normally (Bulk liquid 3).

CAPILLARY ATTRACTION

Water will rise inside a capillary because of the electrical attraction between the wall and the double layer.

The strong negative surface charge of the capillary will keep pulling water molecules up from the slowly moving diffuse layer until its force (capillarity) will be nullified by the weight of the lifted water column (gravity).

The narrower the capillary, the less the water volume, the higher it will be moved. So capillarity is an electrical attraction phenomenon.

THE AQUAPOL EFFECT

Every atom in the universe is in motion or vibration. Atoms vibrate at their own natural frequencies. For example the hydrogen atom's natural vibration frequency (also called resonant frequency) is at 1.42 GHz, these atoms oscillate at over 1 billion times per second.

Because hydrogen is the most abundant element of the universe — about 75% of it — a dim but perceptible “background” native hydrogen vibration is available everywhere.

The internal circuits of the Aquapol device capture this background vibration, amplify it and project it onto the surrounding walls, where it will interact with the hydrogen atoms of the surface layer, causing them to vibrate harder and harder until they break away from the wall.

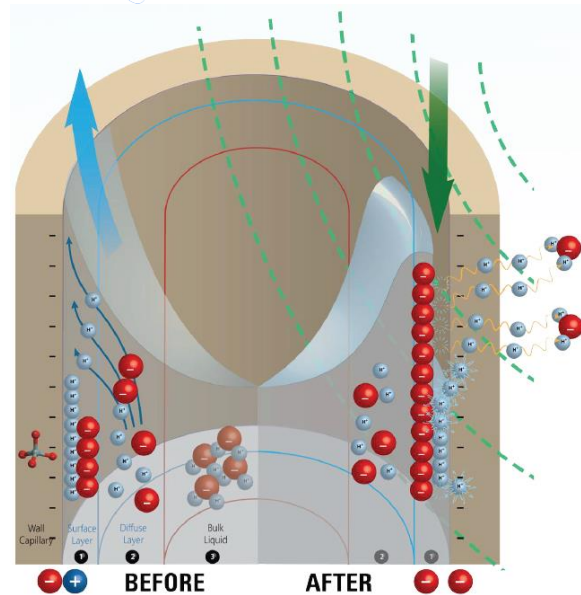
This will happen because of the physical phenomenon called resonance, an oscillation state that only occurs at native frequencies, when small external vibrations (in our case the amplified background vibration) can produce very large vibrations in a structure (in our case the surface layer), to the point of destroying it. Other well-known examples of resonance would be wine glasses being shattered by an external high pitched sound, or soldiers marching through a bridge could set up extreme vibrations in the bridge to the point of collapsing it; that's why soldiers need to break step when crossing a bridge.

The missing hydrogen atoms will result a minus-minus potential between the negatively charged capillary wall and the negative oxygen atoms of the surface layer. Water will be literally pushed away from the wall, resulting in the nullification of the capillary attraction forces. Under the effect of gravity water can now gradually flow back into the ground and the masonry will gradually become dry.

The Aquapol field will only affect the hydrogen atoms in the surface layer which are subject to heavy electrostatic forces from both directions: these atoms are being literally “pulled apart” by the negative wall surface potential and the negative oxygen atoms. The Aquapol system will not affect other hydrogen atoms from the bulk water, and has no adverse effect on the human organism.

Recapping the key concepts:

- Building materials have a negative surface charge.
- Water molecules have 2 poles, a positive and a negative, and they behave like tiny magnets.
- When water interacts with a building material, an electrical double layer will be formed at the boundary; this creates the capillary attraction.
- The Aquapol system amplifies the hydrogen atoms' natural vibration.



The Aquapol effect: freeing hydrogen atoms from the surface layer will result in the cancellation of the capillary forces.

- This vibration will make the hydrogen atoms of the surface layer resonate till they break away from the wall, resulting in the nullification of the capillary forces. With no capillary attraction present, water will gradually flow back into the ground.

ADVANTAGES

- No chemicals, no electricity
- No construction work, no mess
- It works on any type of masonry, wall thickness or building type
- Permanent solution, doesn't need to be reapplied
- Environmentally clean and green
- It can dry out underground walls and cellars
- Naturally gets rid of mould and fungi by cutting their water supply
- Improves the thermal insulation of the building, reducing the heating costs and saving money
- Non disruptive installation and operation
- Totally silent and maintenance-free
- Zero running cost
- 20 years functional warranty (however the system is estimated to work 80-100 years as it has no moving parts)
- Money back guarantee
- Easy, hassle-free solution

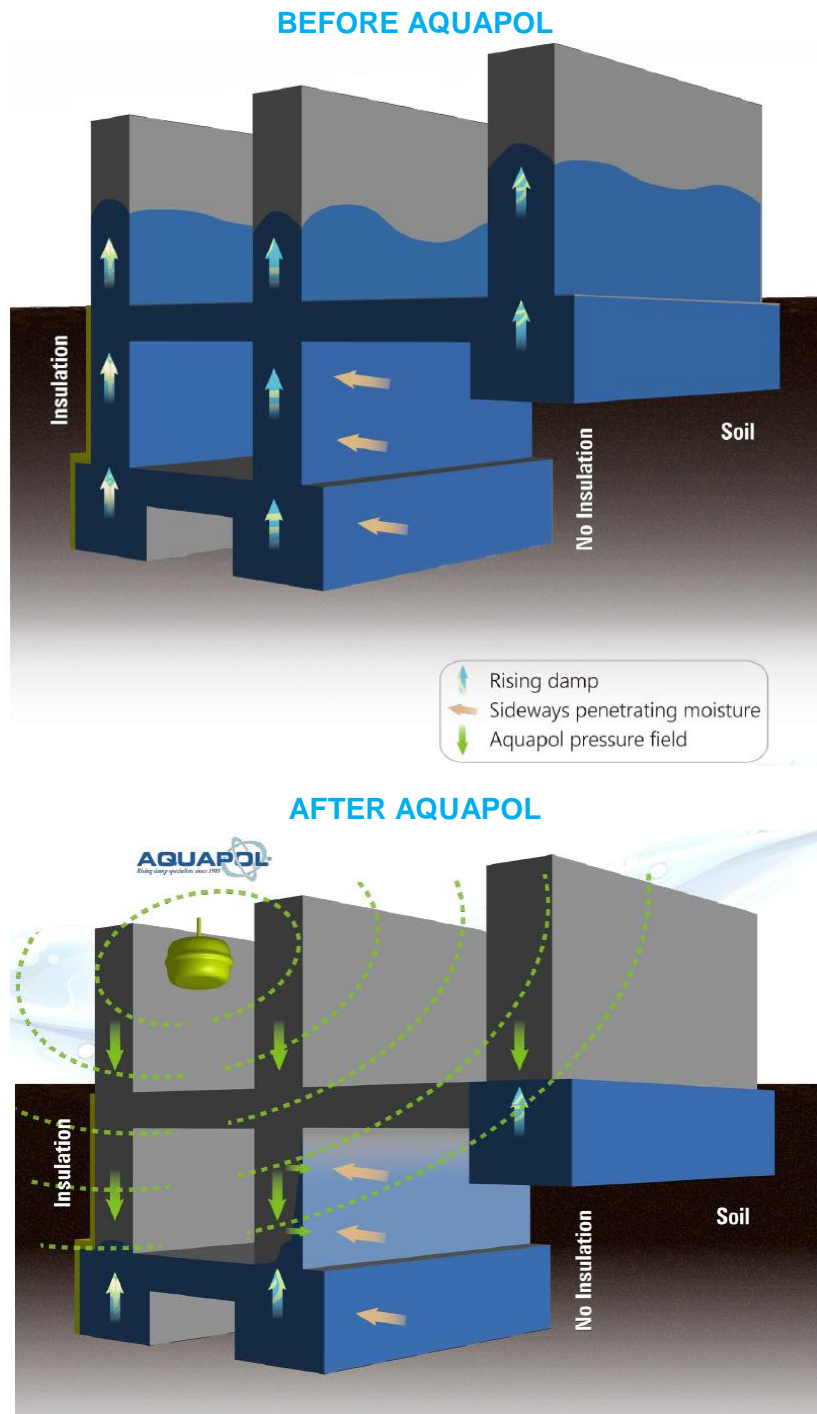
4. Application Examples

The Aquapol system can be used to dry out not only free standing walls above the ground but underground walls too (cellars, storages etc).

For underground walls with no vertical insulation the extent of the dehydration depends mainly on the thickness of the walls: the thicker the better, as thicker wall will dampen more the sideways penetrating moisture.

Aquapol guarantees the dehydration of all walls situated above ground level. Aquapol guarantees the dehydration of those underground walls which have a workable vertical insulation, are free of sideways penetrating moisture and only have rising damp.

Aquapol does not guarantee the dehydration of underground walls with no vertical insulation as the extent of the sideways penetrating moisture is unknown. Based on past experience, the dehumidification is successful in most such cases, however each case is different. For these cases we provide a rental option so the effects of the Aquapol dehumidification system can be tested first.



5. Installation

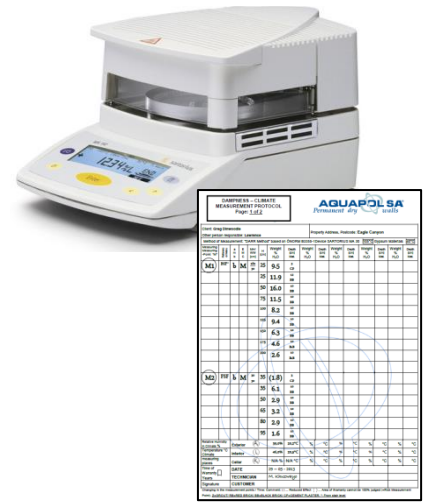
The AQUAPOL system needs to be professionally installed by a qualified Aquapol Engineer. The average installation time is about 6 hours.

The installation will cover a number of steps to ensure a fast and effective dehydration of the building, which includes:

1. **A building floor plan:** we will start with a detailed floor plan of the property. All key data will go onto the floor plan to give you a snapshot view of the property.
2. **Field intensity measurements:** as mentioned earlier, the Aquapol system uses some of Earth's natural gravomagnetic vibration to power itself and to move the water molecules out of the masonry. The intensity of this field varies even within small areas. We measure the intensity of this field and install the Aquapol device in a spot where the signal is strong to increase the system's output, resulting in shorter drying-out times.
3. **Electronic pollution (E-smog) measurements:** the large number of wireless devices — WiFi-routers, smartphones, Bluetooth etc. — results in lots of "junk" electromagnetic radiation also known as electrosmog. The Aquapol system has been found to be working best away from such electronic pollution sources, so we will perform the appropriate measurements in this regards.
4. **Installation of the Aquapol device:** after all the preliminary measurements the Aquapol device will be installed on the ground floor or basement of the building and will start drying out the building right away. The proper functioning of the device is verified right after the installation.
5. **Wall moisture measurements:** the moisture content of the walls will be closely monitored throughout the dehydration process. For moisture measurements we use the gravimetric method, the most accurate measurement method. The masonry moisture content is determined from drilled powdered samples taken from the depth of the wall, from different heights, using a precision scale and a drying oven. Each wall sample is first weighted (wet weight), dried in the oven, then weighted again (dry weight). The moisture content will be calculated from the difference between the wet and the dry weights.



6. **Climate and temperature measurements:** we will log relative humidity and temperature values (both internally and externally) each time when we do masonry moisture measurements.
7. **Salt content measurements:** depending on the condition of the wall, we may also perform salt content measurements.
8. **Condensation handling and renovation advice:** As part of the Aquapol installation, we will do a full moisture assessment of the property. If we detect mould or condensation problems, or additional moisture sources that need to be addressed (e.g. leaks), we will give you a tailor made program specifying in detail what repairs to perform and when.

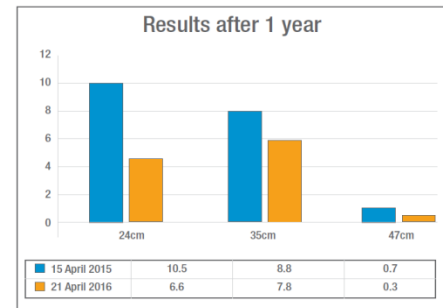


After the installation all collected information will go into a folder, soft and hard copy. We will send you a soft copy of all the relevant documents including floor plans, moisture measurement values, renovation checklists etc.

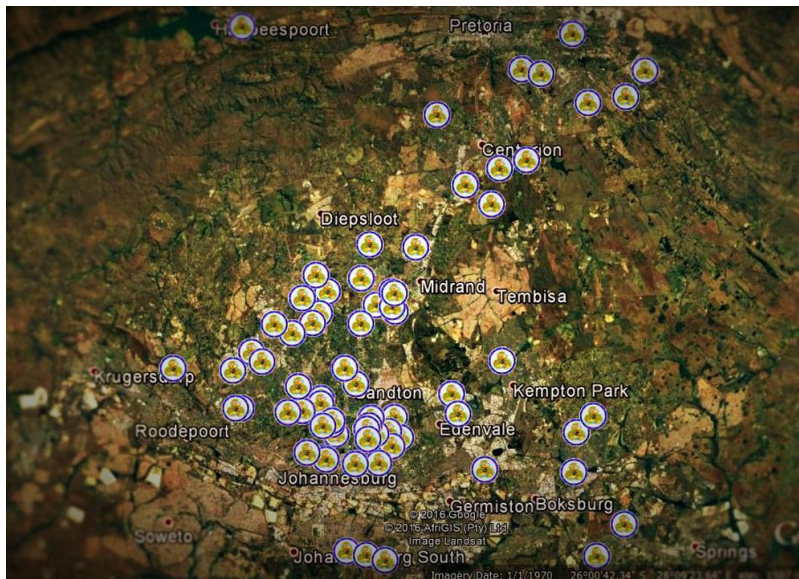
Follow-up Moisture Measurements

Following the installation we will do yearly follow-up checks to monitor the drying-out progress. At the yearly moisture checks we will:

- Do new moisture measurements to see the dehydration progress.
- Check the proper functioning of the Aquapol device
- Update the documentation with the new data
- Discuss with you the renovation measures, or any questions you might have



To date Aquapol South Africa has successfully done over 170 installations.



*snapshot image using Google earth of installations in the Gauteng region

Rising Damp

Rising damp is not only a cosmetic problem; its damages can be far more reaching. It can create:

- Structural damages: when ground salts crystallize they can increase their volume up to 12 times resulting in high pressures between the plaster and the masonry. The plaster comes off and with parts of the wall, which long term can weaken the structure of the building.
- Health damages: mould spores can cause colds, sinusitis, arthritis, rheumatism etc.
- Financial damages: high heating costs due to the constant evaporation, paint and plaster damages, ruined floors and furniture etc. Rising damp can be recognized based on the following signs:

Salt pockets or bands



Destroyed building fabric



Tide marks – Damp patches



Destroyed plaster



Bubbling paint



Brittle, sandy plaster



High damp meter readings



6. Traditional Damp Proofing Systems

About 50-60 years after the construction of a building the original damp proof course (short: DPC) is likely to get damaged, for several reasons:

1. Normal aging of the materials
2. Corrosive effects of the ground salts
3. Frost and temperature fluctuations
4. Mechanical stress and vibrations
5. Micro-organisms, mould and bacteria
6. Radioactive fallout

To reverse or fix the damage, several damp proofing systems have been developed. Here is a quick overview of the most important ones:

1. PHYSICAL PROCEDURES

Physical or mechanical procedures attempt to insert a new damp proof course into the masonry. The wall is drilled or cut-through horizontally and a new solid damp proof course is inserted into the gap.

Several such technologies have been developed, the main ones are the following:

1. Wall substitution: several layers of bricks in the base area are replaced by new material, and a new damp proof course is also inserted.
2. Metal plates insertion: the wall is cut through horizontally in its length with a diamond chainsaw and special chromium-nickel-molybdenum steel plates are shot into the brickwork.
3. Drill core procedure: 8-10 cm diameter holes are drilled alternatively into the wall base, and then the holes are filled with waterproof concrete.



Metal plates insertion by compressed air driven jackhammer

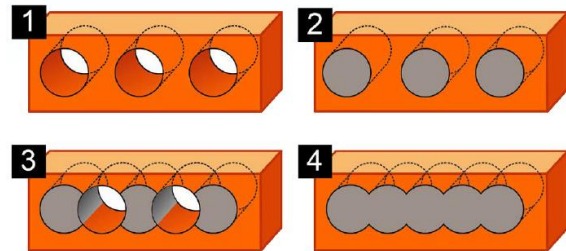
Advantages:

- If done right, physical damp proof courses can last a long time and give full protection.

Disadvantages:

- Very noisy, labor intensive and costly.
- Severely interferes with the structure of the building, high level of shocks and vibrations.
- High risk of settlement cracks especially at the window or door frames as the masonry might skid on the metal plates.
- Metal plates insertion is not suitable for certain types of houses, such as stone masonry (the plates must be horizontal), houses on the hillside or for walls with lateral stress.
- Corrosion: ground salts can corrode some metal plates and changing the sheets thereafter can be a major problem.

Mechanical procedures are not widely used in SA.



Drill core procedure: alternate drilling and filling



Metal plates installed at the base of a building

2. CHEMICAL PROCEDURES

Chemical procedures attempt to block rising damp by injecting water-repellent chemicals into the walls. This is a 2 step process:

1. **Installation of a “liquid damp proof course”:** holes are drilled alongside the base of the wall 10-15 cm apart then the chemicals are injected into the drilled holes with or without pressure. The chemicals should spread enough in the masonry to form a continuous water repellent layer to prevent future water infiltration.
2. **Replastering:** rising damp will carry the diluted ground salts up into the wall fabric. When water evaporates the salts will be deposited into the plaster. Because salts attract the moisture from the air, the plaster can become wet again. To prevent this salty plaster will be replaced with fresh, non-salty plaster. Normally special water- and salt resistant plaster is used for this purpose.

There is a complex set of chemical reactions taking place inside the wall in which a multitude of factors can influence the final outcome.

The weak points of the technology that account for a 25-40% failure rate¹ are:

- **Distribution of the chemicals in the masonry:** the injected chemicals do not spread as evenly as some of the animated videos show, leaving spots untreated where water can still rise.
- **The aging of chemicals:** as water evaporates the chemicals in the capillaries will shrink. As a result a new, secondary capillary system will form and the moisture will rise again.
- **Chemicals impacted by other factors:** there are several other factors that impact the injected chemicals, such as wall's temperature, salt content and pH value (acidic or basic nature). Low temperatures (typically under 5°C) slow down the reaction of the chemical agents and their water repellent properties might not fully develop. Salts can inhibit the reactions altogether.
- **Wall thickness limitations:** water repellents develop their water-repellency after certain chemical reactions. Some chemicals (e.g. silicates) need to react with atmospheric CO₂ to become water repellent. Deep inside the thicker walls there is less CO₂ present, which limits the maximum injectable depth of these chemicals to about 50cm.

Research has shown that the method of injection is just as important as the properties of the chemical agents. The failure rate can be worsened to over 60%² by the following common mistakes in application:

- **No or incorrect selection of the chemical agent:** each masonry type works best with a specific chemical agent. For example: building materials with smaller pores need chemicals with smaller molecules (e.g. silans). Some chemicals react best in high pH (basic) environments so they are suitable for sandstone and cement but not bricks. Precise knowledge of both the building materials and chemicals is needed to make the best choice³.
- **No pre-drying of the masonry with heating elements:** research results have shown that drying out the walls before and after the injection in order to reduce its water content has significantly increased the long-term reliability of the chemical DPC. Yet this step is frequently omitted for financial reasons or lack of proper equipment.
- **Too short injection times⁴:** the injection times are often too short for the chemical to fully saturate the brickwork. E.g. pressure injections may need between 5-20 minutes per drill hole which is often reduced to less than 1 minute. This will result in low penetration depth and insufficient spread.

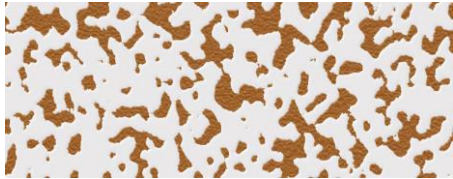
References:

- 1). Ing. C.A.M. (Kees) Snepvangers: "The distribution of injection fluids against rising damp in masonry: models and risk factors", OTB Research Institute for Housing, Urban and Mobility Studies, The Netherlands
- 2). Dipl. Eng. Dr. Balak, M: "Injection technology for post-construction damp proofing of masonry – Latest findings", Masonry Magazine 11 (2007), Ernst & Sohn Publications
- 3). Loek J.A.R van der Klugt & Jaap A.G. Koek: "The Effective Use of Water Repellents", TNO Building and Construction Research, The Netherlands
- 4). I'Anson, S J; Hoff (1990). "Chemical Injection Treatment for Rising Damp - II. Calculation of Injection Times". Building and Environment 25 (1): 63-70

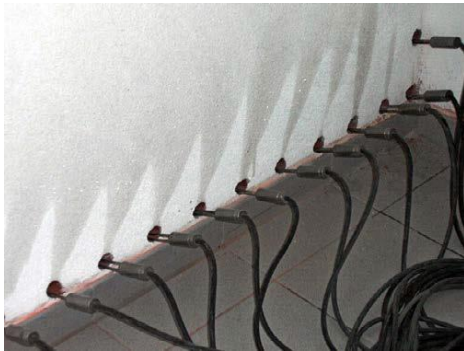
Replastering:

There is a considerable debate in professional circles about how much replastering is needed after a chemical injection. Professionals acknowledge, that replastering fulfills not one but two major functions:

1. the replacement of the old, salty plaster, and
2. the hiding of an unreliable chemical DPC⁵.



Injected chemical with untreated gaps in the brickwork



Pre-drying of masonry with heating elements



Chemical injected under pressure

Advantages:

- Relatively cheap if only short wall sections have rising damp.

Disadvantages:

- Work intensive, requires messy building work.
- Not a permanent solution.
- Relatively high failure rate in the long run.
- Replastering masks the potential failure of the DPC, giving you a false peace of mind that the dampness problem has been fixed when it hasn't.
- Does not offer a solution to the problem of existing dampness inside the walls. Walls supposed to dry out through the slow natural evaporation.
- Damp walls degrade the thermal insulation of the building resulting in increased heating costs.
- Non-reversible: the chemicals can't be removed from the walls once injected
- Not suitable for old historical buildings where interfering with the building structure is prohibited.
- Not suitable for underground walls.
- The bottom part of the wall always remains wet.
- Injecting stone walls or perforated brick walls can be problematic.
- The outcome is often operator dependent, prone to errors.



Liquid damp proof course

Reference:

5). Burkinshaw, Ralf: "Remedying Damp." RICS Books, page 81. ISBN 978-1-84219-305-1

Comparison Chart

	Aquapol method	Physical method	Chemical method
Green, eco-friendly	✓	✓	✗
Re-plastering required	Sometimes	Always	Always
No messy construction work at installation	✓	✗	✗
The dehydration of the masonry is verified by follow-up measurements	✓	✗	✗
Suitable for any masonry type	✓	✗	✗
Maximum wall thickness (in cm)	Any ¹	80 ³	50 ³
Suitable for drying-out damp cellars	✓	✗	✗
Non-invasive for the building structure	✓	✗	✗
Reversible	✓	✗	✗
Failure rate	0%	20%	25-60% ⁴
Real-world life span (years)	80-100	40-60	2-15 ⁴
Warranty period (years)	20	20-25 ²	10-25 ²
Money back guarantee	✓	✗	✗

References:

1. The system has successfully dried out walls as thick as 3m
2. Depending on the manufacturer or builder
3. Depending on technology and masonry structure
4. Does vary widely depending on the factors described on pages 11-12

7. The Inventor

Mr. Wilhelm Mohorn is an Austrian Engineer













Recipient of numerous awards including the prestigious Kaplan Medal, the highest award one can receive for scientific innovation, for his novel dehydration system which we will be elaborating on a little later. Aquapol International started up in 1985 and celebrates its 31th anniversary this year.



8. Presence in South Africa

Aquapol South Africa came into existence in early 2012 when the license was acquired. Being the first country in the southern hemisphere to take on this product we decided to do testing to confirm its efficacy. Having gotten excellent results here we are commercially in existence.

Our portfolio includes:

Hospitality groups		
	 PROTEA HOTEL BALALAIKA SANDTON Est. 1949	
Government		
	 public works Department: Public Works REPUBLIC OF SOUTH AFRICA	
Commercial Properties		
 THE INTERNATIONAL ACADEMY OF REFLEXOLOGY & MERIDIAN THERAPY Established in 1983	 KWAGGA HOLDINGS www.kwaggaholdings.co.za	
Residential Properties		
		

9. Customer Feedback

One of our clients was recently surveyed and he said the following:

- **What made you choose the Aquapol System?**
I was told about the system by a friend and then investigated it more and it fulfilled a need I had.
- **What are your comments on the initial interaction with the Aquapol Sales Consultant including the assessment of your property?**
Very professional and knowledgeable and not pushing for a sale.
- **What are your comments regarding the level of service from Aquapol's technical department?**
Very efficient, tidy and unobtrusive.
- **Please describe your overall experience in dealing with the Aquapol Company?**
It has been really good and the follow-up results show the system is working which is great considering I'm by the river.
- **How likely is it that you would recommend Aquapol to others?**
Very likely.

...and feedback from another client:

- **What made you choose the Aquapol System?**
The fact that it's low maintenance, neat, quick to install and a long term solution targeting the root cause of the problem.
- **What are your comments on the initial interaction with the Aquapol Sales Consultant including the assessment of your property?**
Thorough, professional and the consultant was able to give me a Noddy guide to the system and the science behind the technology.
- **What are your comments regarding the level of service from Aquapol's technical department?**
Efficient during the installation process.
- **Please describe your overall experience in dealing with the Aquapol Company?**
Quick and efficient and looking forward to the results after the 12 month period.
- **How likely is it that you would recommend Aquapol to others?**
Very likely.

Summary

- **Gentle to the basic structure of the building**
The Aquapol System is a gentle procedure that mimics nature. It requires no massive interventions into masonry with the unwanted consequences to the static structure of the building. It leaves the building structure alone while specifically addressing the problem of rising masonry moisture.
- **Insulation**
It is a well-known fact that dry walls insulate much better than wet. Aquapol's highly effective drying out procedure significantly improves the heat insulation properties of a wall.
- **No energy costs**
The Aquapol device uses renewable energy, which means it will continue to operate regardless of such things as load shedding, and has no associated energy costs.
- **Healthier living conditions**

This includes much more than the mere preservation of buildings. As mentioned above wet walls lead to mould, produce musty smells, and can be dangerous to health. This applies especially to persons suffering from asthma, skin allergies, etc. who may be affected by such conditions.

