

bere:architects
73 Poets Road
London N5 2SH
T +44(0)20 7359 4503
www.bere.co.uk

Masonry Permeability Re-Test Report

91 Dyne Road

January 2012



bere:architects

Test purpose:

When specifying internal insulation for building refurbishments it is important to calculate and assess the potential risks of this method of insulating. Internal insulation is widely considered to be a second-best option compared to external insulation due to the increase in disruption to the occupants, lifecycle maintenance, cost and risk of moisture damage as well as loss of internal space and reduced thermal performance when compared to external insulation.

In this case however it was necessary to employ internal insulation, due to planning restrictions and we therefore had to ensure the appropriate level of protection for the brickwork against water penetration. We were interested in specifying Stormdry's Masonry Protection Cream, which claims to create a moisture barrier while still allowing it to remain vapour permeable and therefore potentially provide the protection required for this application.

The purpose of this test is to determine the effectiveness of the Stormdry product 2 months after application, compared to the previous test carried out in November 2011 on the untreated brick work. We hope to understand how the bricks respond to the Stormdry product and whether it provides sufficient protection against potential moisture ingress and damage due to the installation of internal insulation.

In order to get the best range of results, the best (least absorbent) and worst (most absorbent) performing brick types from the last test were re-tested, namely:

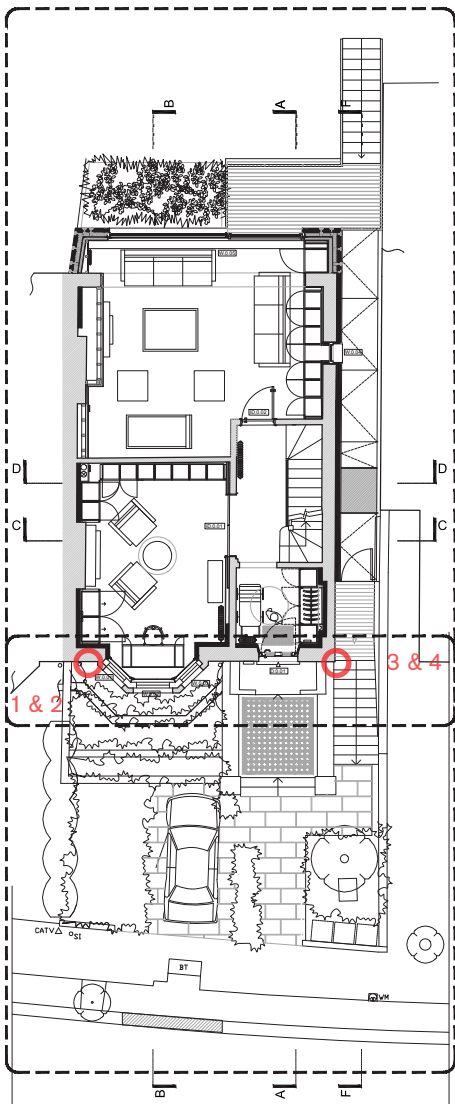
- The uniform and dense white brick, best performing
- The textured yellow brick, worst performing

As stated before, it is also useful to perform a 'before and after' test to enable us to determine the quantity required and suitability of the Stormdry Masonry Protection Cream for different masonry types. It is understood from consultation with Stormdry that the average coverage for the product should be around 150g/m², but can range from 50-250g/m² depending on the permeability of the surface.

The test sites can be seen on the ground floor plan to the left.

On the NE side of the building two tests were carried out on the white brick, with and without the mortar.

On the SE front facade two more tests were carried out on the yellow brick next to the bay window, again with and without mortar.



The Tests:

Applied in pairs, one gauge was placed over a brick face and the other over the mortar line. This would ensure that a comparison and average between the two could be made in order to generate a more accurate permeability estimate for larger areas.



The tests were carried out for up to 60 mins depending on the rate of absorption observed.

Measurements were taken at intervals of 5mins for the first 15mins and then 15mins and 30mins for the last two readings.

The measurements were recorded in a table for comparison which can be seen overleaf.



The image above shows the tests carried out on the yellow brick at the front of the site. The yellow brick was rough and had many more cracks and imperfections.

The image to the left shows the tests performed on the NE side on the white bricks.

The Results:

For comparison, the table below shows the results from the previous test:

Location	Test no.	Time ->					
		0mins	5mins	10mins	15mins	30mins	60mins
yellow with mortar	1	0ml	6	/	/	/	/
yellow without	2	0ml	4.5	/	/	/	/
white with mortar	3	0ml	0.1	0.2	0.4	1.7	/
white without	4	0ml	0.1	0.15	0.2	0.3	0.6

The table below shows the results for each of the 4 tests:

Location	Test no.	Time ->					
		0mins	5mins	10mins	15mins	30mins	60mins
yellow with mortar	1	0ml	2.9	4.2	5.0	/	/
yellow without	2	0ml	2.9	1.5	1.8	2.8	4.7
white with mortar	3	0ml	0.1	0.2	0.2	0.2	0.2
white without	4	0ml	0.1	0.2	0.2	0.2	0.2

It is clear, as before, that the best performing masonry in terms of impermeability is the white brick. The total water absorption for the two tests (with and without mortar) was around 0.2ml over 60mins, which implies a very dense and impervious brick. As the brick was already so impermeable the Stormdry Protection Cream has only improved the results a little; whereas previously the brick absorbed as much as 1.7ml in 30mins, the re-test saw the brick fail to absorb more than 0.2ml over an hour.

The yellow brick averaged around 4.8ml total absorption over 30mins, these results show a marked improvement over the last test where the brick absorbed all the water (6ml) within 5mins. This shows a significantly slowed down rate of absorption; taking approximately 6x longer to absorb roughly the same amount of water.

We can confirm our previous recommendation that the amount of the Stormdry product to be used on each masonry type was correct as follows:

White brick:	50-100g/m ²
Red brick:	100-200g/m ²
Yellow brick:	200-250g/m ²

Conclusions:

This report demonstrates an important check that is required in correctly specifying internal insulation.

This study is of importance to people who are proposing to add internal insulation to old or historic buildings, where external insulation may not be allowed or may be considered unsuitable. The conservation architect lobby often wrongly claims that historic buildings cannot be insulated and should be left un-insulated. It is correct to say that if internal insulation is specified wrongly, it will lead to damage. However, if specified correctly, damage will not occur, and occupants and the environment will benefit.

The suitability of insulation design solutions can also be supported by calculations using advanced long term moisture analysis software, such as WUFI.

It should be noted that internal insulation is very much a second-best solution compared to external insulation. External insulation is much more effective in terms of performance and it is cheaper, less disruptive to occupants and significantly reduces lifecycle maintenance costs compared to internal insulation (eg avoiding the need for brickwork re-pointing and avoiding seasonal fabric expansion and contraction that is particularly problematic in long brickwork terraces or 'row housing'). However in the UK there is currently considerable resistance to the use of external insulation on existing buildings from planners and even from many architects, on aesthetic grounds. In such cases, internal insulation can be a very good 'second best' solution.

If designed and installed correctly, insulation is in the long term best interests of the building occupants. If heating cannot be afforded then lack of insulation may leave occupants cold, uncomfortable and suffering from damp. Structural degradation of the fabric can also be caused by condensation in un-insulated buildings. In our view insulating a building should be standard practice in all major refurbishments of old or historic buildings and we do not know of any technical conditions that would prevent insulating a historic building - we believe that a technically sound solution can always be found.

As stated in Stormdrys literature, the product should improve in performance as it cures over the period of a year or so, therefore we intend to repeat the test in June to establish the improvement after 6 months.