



Basic properties

Permeability to water vapour

The issue that conditions the durability of traditional masonry is the transfer of humidity from the concrete surface to the outside. It is possible to obtain positive characteristics with low dosage *Prompt* natural cement mortars.

Capillary absorption, porosity to water and to water vapour:

The table below indicates the compositions of mortars studied, as well as the water absorption, porosity to water and permeance to water vapour values after six months of wet treatment followed by seven days of dry at 50% relative humidity. These results are therefore close to maximum hydration.

Characteristics of porosity, absorption and permeance in low dosage mortars:

| Composition volume | 1 :2 | 1 :2,5 | 1 :3 | 1 :4 | Procedure |
|---|-------|--------|-------|-------|---------------------------|
| % <i>Prompt</i> natural cement weight | 19,85 | 16,58 | 14,3 | 11,30 | |
| Mortar/cement | 0,67 | 0,825 | 0,95 | 1,12 | |
| Bulk density (kg/m ³) | 1941 | 1908 | 1923 | 1945 | AFREM |
| Capillary absorption at C(kg/(m ² .min0,5) | 0,7 | 0,8 | 1,4 | 1,6 | EN1015 |
| Capillary absorption at 24h C(kg/m ²) | 16,56 | 17,44 | 17,54 | 15,88 | EN1015 |
| Absorption of water (%) up to constant weight | 12 | 12,5 | 13 | 11,8 | CERIB DQI/DEE FG-02/12/02 |
| Total porosity of water (%) | 25,67 | 25,88 | 23 | 22,89 | AFREM |
| Permeance to water vapour (g/m ² .h.mmHg) | 0,42 | 0,43 | 0,46 | 0,45 | Cahier CSTB 08/1993 |

The permeance values are between 0.4 and 0.5, which is slightly lower than NHL; for reasons of comparison, values for NHL 5 based mortars, with the same dosing levels, are between 0.5 and 0.6.

Capillary absorption measured at 3 hours is the measurement which correlates the best with the water/cement ratio.

This same measure gives similar values after 24 hours, and therefore the greater the water/cement ratio, the quicker the capillary absorption. These permeance absorption values were obtained after an ideal cure (> 90% RH) in a laboratory.



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Outside, concrete curing conditions are very different and varied, for reasons of both temperature and humidity, according to the local microclimate and exposure of the concrete surface. As a general rule drying occurs very early on a worksite, which runs contrary to the hydration of the mortar. The porosity of mortar kept on a worksite will therefore be greater than it would be for the same mortar that has undergone an ideal cure in laboratory. The values given, produced by test labs, are optimum hydration values. The setting time for these mortars, with the addition of the Tempo retardant, is at least 40 minutes at 20°C.