

Job No.
Your Ref.

To Whom It May Concern:

RECOMMENDATION FOR MATROLAN DEHUMIDIFICATION UNIT

Product: MATROLAN Wall Dehumidification Unit
Local Representative: MEMO Technology Limited
Address: 111/2 St. Lucia Street, Valletta VLT09, MALTA

Site of Installation: Fort Manoel, Manoel Island, Malta

Fort Manoel is an 18th century fortification system, including a Fort surrounded by high bastions, a deep ditch and extensive outworks, built by the Knights of St. John, during their stay in Malta, in order to protect the entrance into Marsamxetto Harbour, on the north side of the peninsula on which Valletta is founded. It is located on an island inside this harbour, Manoel Island, and is therefore completely surrounded by the sea. The Fort is built out of limestone blocks cut out of the rock from the same site, and on the same rock that is located in the sea. The Fort consists of a number of Barracks buildings, a Polverista and a Chapel, surrounded by high bastion walls, and, on the landward side, by a heavy stone construction, known as the Casemate, which was used as a platform for guns of the Fort. The walls of this Casemate consist completely of limestone and are between 1 to 3 meters thick.

The Fort was used from the 18th century, when it was built, right up to the Second World War, during which it was heavily damaged during aerial bombardments. In the seventies, the Fort was abandoned, and thirty years of neglect led to serious deterioration of the stonework, and historic buildings. The exposure of the buildings to the elements has led to the accumulation of a high amount of humidity inside the walls, in addition to the humidity that rises from the rocks.

The restoration of the Fort is part of the Manoel Island Re-Development Project, which aims at restoring the extensive complex of historic buildings on Manoel Island, together with the development of a large marina, and a residential village, geared up for the up-market, both local and foreign.

In order to study possible solutions for the control of humidity in the historic fabric of the Fort, trials using the MATROLAN dehumidification process were proposed. The objective of the study was to improve the condition of the historic fabric, before conventional restoration work could be undertaken.

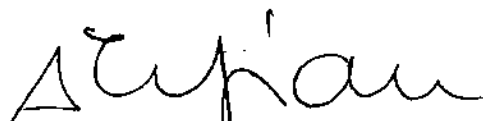
The MATROLAN dehumidification unit is based on the physical effect of electro-osmosis, a principle that has been in use for many years, and that was applied in systems designed to protect ships from corrosion. The unit distributes an electric field, from electrodes inserted in the building. This electric field stops rising humidity from the ground, and prevents it from entering the main structure of the building.

A heavily deteriorated and damaged part of the historic building was chosen to perform the installation and testing of the MATROLAN unit. The difficulty consisted of the enormously thick walls, of massively thick limestone, with an extremely high degree of humidity, combined with a high concentration of salts. The MATROLAN test unit was installed on the 31st July 2001 and is still in operation today.

First of all, the roof was properly sealed to prevent rain-water and humidity from entering the walls through the ceiling. A permanent and stable electricity line was installed to supply the MATROLAN unit with the very little but constantly required electric power. After operating the unit for the short period of three months, the controlled measurements and tests showed dehumidification results that begun from the top of the walls, and increased gradually to the ground. Increased salt efflorescence on the wall surface, as a result of the humidity transported by MATROLAN, from the interior to the exterior of the walls, is typical, as the electro-osmosis process reduces the salt volume inside the wall.

The test clearly showed that the installation of the MATROLAN unit improves the wall conditions and can therefore lower restoration costs. The investment in the MATROLAN dehumidification unit compared to the conventional restoration costs of wet and humid walls is very small. Since the walls are dry, and will remain dry, the restoration work will last longer. This is an additional benefit of the electro-osmosis technology by MATROLAN.

The tests at the Fort Manoel, on Manoel Island, have been very successful; the extreme conditions under which it was tested proved clearly the durable effect of dehumidification by the MATROLAN unit, in wet and thick limestone masonry.



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