

# Temporary Climate Solutions Case Study: Accelerated Concrete Drying.

Building Company, Gilbane was constructing a new stand-alone (21,112) square foot precast concrete gymnasium for Deerfield High School, Illinois. The concrete slab required maximum moisture content prior to the installation of the maple sports floor. The specification required use of the ASTM-F-2170 method for moisture measurement in the slab. The unit of measure with this test is relative humidity (RH) as measured by a hygromograph; this is inserted into a hole drilled to a depth of 40% of the thickness of a slab on grade. A vapor barrier is placed on the slab prior to the flooring being laid. Maximum moisture readings are required to be below 95% RH before installation. However, if the test results are below 85%, a much less expensive vapor barrier can be used.



## Problem

The hardwood, maple gymnasium floor was to be installed roughly 60 days after the slab had been poured. After a 28 day cure, there would only be a month left to remove the residual moisture in order to reach the optimum level. Construction was required to continue throughout the period to enable the tight construction schedule to be met. This included the painting and installation of large windows on the north side of the structure as well as the installation of mechanicals. Moisture levels in the concrete at the end of the 28 day cure period were still 99%+.

## Solution

Polygon were appointed to accelerate the drying process and lower the moisture levels due to their experience as a global leader in providing temporary climate solutions to the construction industry. Polygon not only created a bespoke solution to lower the moisture levels to below the 90% maximum, but also with the aim to reduce moisture levels to below the 85% which would allow a less expensive vapor barrier to be used.

A 9000cfm desiccant dehumidifier was used to lower the vapor pressure in the space which promoted optimum drying conditions. The building did not have sufficient power to run a standard desiccant dehumidifier using electric heat for reactivation.



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Polygon worked with the project superintendent, Robert Moore to utilize the available natural gas connection to reactivate the desiccant lowering the three-phase power required. With this configuration, there was sufficient energy on site to operate the unit without using a portable generator.

The unit was positioned near a service door and flexible ducting was used to supply the conditioned air to the space as well as to return air back to the unit. Inside the gym, disposal 'lay-flat' ducting was used to distribute the air evenly throughout the space. 36" floor fans were used to keep the air moving over the floor and ensure optimum conditions in all areas.



Polygon also utilized their 'ExactAire' remote monitoring device. This enabled the monitoring and recording of conditions during the drying period, ensuring the best possible humidity levels. This data was made available online through a secure website and was able to be viewed from any computer with access. This allowed Polygon to ensure that the customer was getting a high level of value from the service and in turn less disruption to their working schedule.

Conditions were consistently maintained at or below 20% RH in the space, whilst the dry bulb temperature remained in the 80's. This condition, created a radical vapor pressure difference between the concrete and the air above it. This resulted in a greatly accelerated moisture removal rate.

## Benefits

After four weeks of drying, moisture content readings in the concrete slab had dropped to levels at or below the 85% level. This allowed the use of the less expensive vapor barrier. In addition to meeting the maximum moisture levels, the available savings to Gilbane Building Company were \$3445.

