

Technical Brief

Resilient, energy-efficient precast for data centers



Above left: Georgia Data Center, Alpharetta, Ga.
Precaster: Metromont Corporation

Above right: DigiPlex Fetsund, Oslo, Norway
This data center uses the Graphic Concrete finish to incorporate an attractive, modern pattern to the exterior of the data center's precast wall.

Energy efficiency

Data centers require significant HVAC capacity to offset the heat generated by the servers. The sophisticated HVAC systems draw large amounts of energy off the grid.

Using CarbonCast High Performance Insulated Wall Panels with continuous insulation can provide R-values of R-20 or more depending on insulation thickness. The C-GRID carbon fiber grid wythe connectors mitigate thermal transfer, eliminating thermal shorts and result in lower energy demand and use. The high R-values may even allow for smaller HVAC equipment depending on layout and structure.

Strength and resilience

The renowned strength of precast concrete offers unparalleled production against natural disasters such as hurricanes, tornados, straight-line winds, heavy rain and seismic activity. Todd Smith, chief technology officer of data center solutions at national commercial real estate firm Transwestern, said in a Nov. 16, 2017, article in *Construction Drive*, that the primary objective is fortification.

"You want a hardened shell to deal with any sort of disaster situation. For example, a data center located along the West Coast would require more funds geared toward ensuring its resiliency against earthquakes, while a structure along the Gulf Coast might be designed to withstand high winds," he said.

In addition, it is imperative to have a reliable perimeter moisture barrier to limit the chance of infiltration. Furthermore, a non-flammable wall system such as precast concrete will dramatically reduce the chance of fire, which can severely damage or cripple servers with smoke or water if the sprinkler systems engage. Additionally, the sandwich construction of the panels limits vibration concerns from sound or noise with a properly designed matching floor and roof.

Flexibility for expansion

Despite servers and electronics getting smaller and smarter over time, demand is inevitable for more servers that will hold evermore data given the current trends. Many facilities are being designed to accommodate easy expansion. The use of fully composite CarbonCast High Performance Insulated Wall panels can facilitate expansion. The load-bearing capacity of the fully

composite panels means the walls require only a limited support structure. Because roofs can be supported by the exterior walls, roof designs can be simplified to accommodate wiring and airflow needs. Compared to solid precast, the lighter CarbonCast panels can reduce the robustness of the foundation and superstructure, lowering costs.

Quality and speed

Factory fabricated precast panels and CarbonCast High Performance Insulated Wall Panels are manufactured in a controlled environment with rigorous quality control procedures. In contrast, tilt-up panels are limited in aesthetic design and structural capability due to site casting and are subject to the weather and inconsistent conditions on the jobsite. Precast panels can be made in advance and stored, then brought to the jobsite as soon as erection is feasible. Prefabrication speeds the time required to enclose the building, thereby speeding interior work, commissioning and use. Speed of construction saves time and money!

As the need for data centers grows, the demand for durable, resilient and insulating exterior walls will grow, too. The performance characteristics of CarbonCast High Performance Insulated Wall panels make them the ideal enclosure option for data centers.

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Todd Smith, chief technology officer of data center solutions, Transwestern. From a Nov. 16, 2017, article in *Construction Drive*.



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