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FEATURE ARTICLE

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TEMCOR ALUMINUM DOME SYSTEMS OFFER CUSTOMIZATION; DESIGN AND CONSTRUCTION FLEXIBILITY FOR UNIQUE NEEDS

Temcor Aluminum Domes, in service at cement and other bulk storage facilities around the world, are custom-designed for specific needs. Customization considerations include the dome's site location, material being stored, how that material is being stored and handled, existing site and weather conditions, and more. Even the erection method may be customized. Temcor is the world's largest Aluminum Dome builder.

Early on, geography and location are taken into consideration. If a plant is located in an area that experiences extreme weather, the domes can be engineered to support heavy snow loads, withstand hurricane-force winds, and are water-tight against heavy rain. In areas that experience earthquakes, Temcor will engineer the dome to ride out extreme seismic activity.

Taiwan Cement Corporation experienced the loss of a dome when it was destroyed by a typhoon. The original dome, built by another manufacturer, was less than 10 years old. Temcor was hired to build the replacement dome, measuring 135m and engineered to withstand wind speeds of 65m/s, 3-second average.

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Typhoon winds were also considered in the design of 11 Temcor Aluminum Domes at the Formosa Plastics Group No. 6 naphtha-cracking complex in Mai Liao, Taiwan. Each of the massive 120m domes was designed with a flattened crown that lowers the potential for uplift forces.

Site conditions often dictate foundation/support wall needs. When Temcor was selected by the St. Lawrence Cement Co in Hagerstown, Maryland to build a 220' Aluminum Dome for limestone storage, they were met with a formidable challenge: bedrock near the surface would mean extraordinary costs if a typical foundation was used. Temcor custom-designed a dome that required a reduced number of foundation supports – only 14 piers versus a traditional 42.

How materials will be stored may also be considered at the design stage. Pile height will often dictate the rise of a dome and if a customer will be using trucks or bulldozers inside the dome, Temcor can customize the design to allow for access doors and roads. Temcor's 93m-diameter aluminum limestone storage dome built at the new Essroc Cement Corporation plant in Martinsburg, West Virginia was customized with 23 skylight panels, a conveyor opening, man doors, truck doors and more.

Customer's materials handling equipment is also considered during design. For example, the location and height of entrances/exits and access hatches are customized for stacker/reclaimer equipment. Temcor has designed five Aluminum domes for the Hyundai Steel Co. Ltd. plant in Dangjin, South Korea. The span-to-rise ratio of each dome was

determined by the clearance requirements of the stacker/reclaimer that will be used. Three of the domes will have a rise of 40m above their 20m-high concrete walls, and the other two will rise 30.23m above 7m walls.

Generally, Temcor domes have been built with either of two methods: a traditional scaffold or man lift method from the outside to the center or for larger domes, the company's Center Tower Erection method. During this latter method, the dome is built on the ground from the center-out while attached to a center tower. As each ring of panels is installed, the dome is raised until completion. This method keeps workers safely on the ground and helps to speed erection times. But there are times when the erection method may be customized.

Temcor completed a 90.5m clinker storage dome at Riverside Cement Company's Oro Grande, California plant last year. The plant uses an Aumund MOLE clinker reclaim system in which the storage area is filled via a stacking tube in the center of the building. To accommodate this tube, Temcor modified its Center Tower erection method by attaching winches to the top of the tube and then using lift lines to raise the dome as it is assembled. The dome was designed to withstand the 150° F above ambient processed clinker temperature.

Temcor also custom-designed an erection method when building the replacement dome for the previously mentioned Taiwan Cement Corporation. The company wanted to keep its operation at least partially in service, and that was accomplished with a design process developed for just that purpose.

The value of a Temcor Aluminum Dome goes beyond its design flexibility.

A Temcor Dome, made entirely of aluminum is strong, but weighs a fraction of what a steel structure weighs, so foundation costs are reduced. Since Temcor Aluminum Domes are clear –span, no supporting columns are required adding to the storage capacity and further keeping construction costs in line.

The inherent corrosion-resistant properties of aluminum add to the long-term value of a Temcor Aluminum Dome by keeping the facility virtually maintenance-free for the life of the structure. Temcor domes will not rust like steel, rot like wood, spall like cement, or solar degrade. And, Temcor domes won't react to the caustic environments caused by their contents – the aluminum can also withstand temperature swings common to some contents such as clinker. Further, the aluminum is not affected by environmental conditions such as high salinity or humidity. The savings in maintenance costs is significant; especially considering the facility is designed to last for decades.

Temcor's unique Center Tower Erection method allows a typical 300-foot diameter dome to be erected by an average crew of 12 in approximately 12 weeks – much more economical than the process for a typical building.

Virtually any bulk storage need can be met with a Temcor dome. Coal, cement, various ores and salt are all stored securely and efficiently.

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But perhaps the most important aspect of a Temcor Aluminum Dome is the company itself. Decades of experience and steadfast attention to detail contribute to the company's success. Company headquarters, sales, design and engineering departments have been in Southern California since the company's founding some 44 years ago. Temcor's state-of-the-art manufacturing facilities are near Savannah, Georgia.

The company's reputation extends to other industrial applications as well, including the water/wastewater treatment and storage, and petroleum storage. Domes and roof systems for architectural applications are in place as sports arenas, cruise terminals, planetariums, churches, and more.

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