

SUPPLIERS' TIPS

What are my options for dry bulk storage vessels and how should I evaluate them?

When considering the various storage options for your material, first consider the supplier's experience. The number of similar installations the supplier has in the field means more than any other comparable metric when evaluating storage silos. This information is critical because many materials require special silo or vessel designs, many of which require unique accessories to efficiently manage, store, and promote proper flow of that specific material. For example, an experienced company has seen almost every type of material and likely has had to troubleshoot past material flow issues in order to safely and effectively store and induce proper flow for past client's requirements. Various types of sugar or salts can move differently, depending on each one's material characteristics. A material may require different flow aids, specialty sanitary welding, or a combination of these two options.

The second thing that people should remember is that when faced with two different proposals, and each proposal is suggesting a different style of field bolted silo, I would suggest asking more questions to understand more deeply why the supplier is suggesting its proposal is the best. Does the supplier offer more than one style of bolted silo? Do they offer different construction methods to satisfy each unique project and project location? Listen to each supplier's logic on how they plan to supply and erect your silo; does one of the two potential suppliers have a better erection method for constructing a silo or multiple silos within the constraints of your build location? There is no singular design that fits best for every application, rather the application dictates which design and installation method provides the best advantages for the client.

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Equipment suppliers are a valuable source of information about equipment and processes. In light of this, each month we ask suppliers a question of concern to our readers. Answers reflect the suppliers' general expertise and don't promote the suppliers' equipment. If you have a question you'd like suppliers to answer, send it to Kayla Carrigan, Associate Editor, *Powder and Bulk Engineering*, 1155 Northland Drive, St. Paul, MN 55120; fax 651-287-5650 (kcarrigan@cscpub.com).

As part of a company that's routinely resolving material flow issues in bulk storage silos and other process and transport vessels, I've seen the results of storing material in a vessel that wasn't designed for the application at hand. There's no "one-size/type-fits-all" design in the bulk storage world. To minimize material flow and discharge issues, a vessel should be designed to meet the stored material's flow characteristics. Ideally, a flow study should be conducted by qualified engineers based on variables such as material density, moisture content, climate, angle of repose, the application's filling and discharge rates, and volume of material to be stored, among others. All these variables can significantly impact the end user's operation, from causing simple flow issues like ratholing, blocked discharges, or intermittent flow, to causing major events such as silo or vessel bridging, material hardening, smoldering material, or even fires. Many of these issues could be limited or eliminated by enlisting the services of professionals to make sure the vessel is the right choice for the application.

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Typically, for small silos that can be built in a fabrication facility and then loaded onto a truck for delivery, steel construction is the best option. The maximum silo diameter for these smaller vessels is usually 14 feet (or less).

If you need a silo larger than 14 feet in diameter and smaller than 20 feet in diameter, either welded steel, bolted steel, or concrete silos are most often used. Steel silos that are bolted together are typically very lightly built, making them unsuitable for heavy stored materials or materials that may leak. Both welded and bolted steel silos can experience corrosion, wear, and wall bending. Concrete silos offer lower overall lifetime storage cost because they can provide robust structural and service characteristics at a more economical cost than with steel fabrication.

Concrete silos larger than 20 feet in diameter are most often selected because of costs and structural characteristics. For example, if a client requires a 20-foot-diameter silo with a discharge cone, the silo should be constructed from concrete because large-diameter steel discharge cones can be unsafe, potentially leading to cone failures and silo collapse.

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