

How do I choose an appropriate interior finish when selecting a storage vessel?

The internal surface profile slickness (RMS) is an important input variable when designing a silo configuration for reliable flow and discharge. In addition, material protection, corrosion protection, abrasion protection, food-grade application requirements, and exposed environment protection are pertinent considerations when selecting internal and external coating systems.

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When choosing a silo for your application, the interior coating is one of the most important considerations. High-tech coatings offer protection against a silo's three key enemies: corrosion, abrasion, and chemicals. These wear on the silo's surface, resulting in increased maintenance, the potential need for re-coating, and a shorter lifespan.

The coatings you consider should offer proven long-term resistance to corrosion and abrasion for your particular material. Abrasion resistance is commonly tested using the falling sand test, which measures the stream of falling sand required to wear through a coating. Manufacturers should provide corrosion and abrasion testing data for each coating.

Flow testing of your material and the silo coating is essential for determining the proper slope for the hopper and hopper outlet and the requirements for flow or blending equipment. Consider the coating's slickness, which promotes flow of all material out of the silo. A relatively smooth wall and slick coating will achieve good flow promotion, continuing to pull out material and minimize residue.

The coating's application is key, so make sure you ask each manufacturer about their application process. The highest-quality coatings are electrostatically applied and then thermally cured at the factory. Coatings that are dried with ambient heat at the factory are exposed to dust and humidity, and silos that are field-

coated are subject to missed spots and environmental effects on the cure. If you're likely to ever need to expand or move a silo, consider that silos with factory-applied coatings are more mobile and expandable because each panel is individually coated. Coatings applied in the field are painted on the entire surface, and therefore will tear or break when moved, requiring re-coating.

Keep in mind that high-quality coatings may have a higher up-front cost, but often last years longer and reduce life maintenance and re-coating requirements. Ask the silo manufacturer about the cost and likelihood of re-coating, which is usually an expensive process. Make sure you select a silo manufacturer that has been in business for many years and is experienced in silos and coatings, particularly in your market. Ask whether the coatings are proprietary and if the manufacturer has ISO 9000 quality certification and adequate quality-control measures.

Additionally, if you're thinking of recycling an old silo, for safety reasons you should have the silo and the coating evaluated for safety, flow, corrosion resistance, and chemical resistance. Incorrect silo use can result in clogs, massive material drop, or safety issues.

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The interior surface finish often goes hand-in-hand with selecting the material of construction for your storage vessel (such as a Type 304 stainless steel sheet with a 2B finish), but there are important distinctions and implications of the interior surface that must also be considered. These include corrosion, oxidation, abrasion, and impact resistance; thermal protection and heat transfer; material buildup; friction; appropriateness for the industry (such as FDA or USDA requirements); thermal, chemical, or other compatibility with your material and substrate; static; risk of material contamination; suitability for method of fabrication; and life cycle cost and ease of repair in the field.

If you need low wall friction to achieve mass flow, run bulk solids tests at representative conditions against various wall surfaces to determine acceptable choices. For additional information, consult ASTM Standard D6128, which describes accepted testing protocol.

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