HDPE Silo Capacity

One of the most important questions that a resin processor faces on a daily basis is: "How much resin is left in my silo?" If the diameter of a resin storage silo and the height of the resin in the silo from the top of the cone are known, it is possible to estimate the amount of resin stored in the silo with a fair degree of accuracy using simple mathematical relationships.

In order to simplify this process even further, INEOS Olefins & Polymers USA, has constructed the attached chart for common resin silo diameters. If the diameter of the silo is known and the height of the resin in the silo is measured, the amount of resin left in the silo (in pounds) can be read from the intersecting lines. For silos with different diameters, the calculations required to estimate the amount of resin remaining or to construct a similar chart for internal use are presented below.

The following variables affect the accuracy of the calculations below.

1. Actual resin bulk density
2. Pellet count (number of pellets per gram)
3. Bulk density gradient due to compaction
4. The angle of repose (37°) is not considered. This angle changes from converse to inverse as pellets are removed from the bottom of the silo.
5. The cone angle may not be 45° in all silos.

Formulas:

Volume of a cylinder = height x 0.7854 x diameter^2
Volume of a 45° cone = 1/3 height x 0.7854 x diameter^2
Bulk density range of 35 - 38 lb. /ft^3
Long term storage in silos can lead to compaction that will affectively raise the bulk density. For conservative estimates use an average of 36 lb. /ft^3; for compacted silos, use an average of 38 lb. /ft^3 or consult an INEOS O&P Technical Service professional.

Examples:

9' Diameter, 45° Cone Silo
Cone volume = 95.4 ft^3 = 3,623 pounds
Per foot cylinder volume = 63.6 ft^3 = 2,290 pounds
Total silo capacity = cone weight + weight per foot above cone

Example:
24 feet of resin above the cone = how many total pounds?

24 ft x 2,290 lbs =	54,965
+ cone weight =	3,623
Total pounds	58,588

12' Diameter, 45° Cone Silo
Cone volume = 226 ft^3 = 8,136 lbs
Per foot cylinder volume = 113.1 ft^3 = 4,072 lbs

Example:
32 feet of resin above the cone = how many total pounds?

32 ft x 4,072 lbs =	130,288
+ cone weight =	8,136
Total Pounds	138,424

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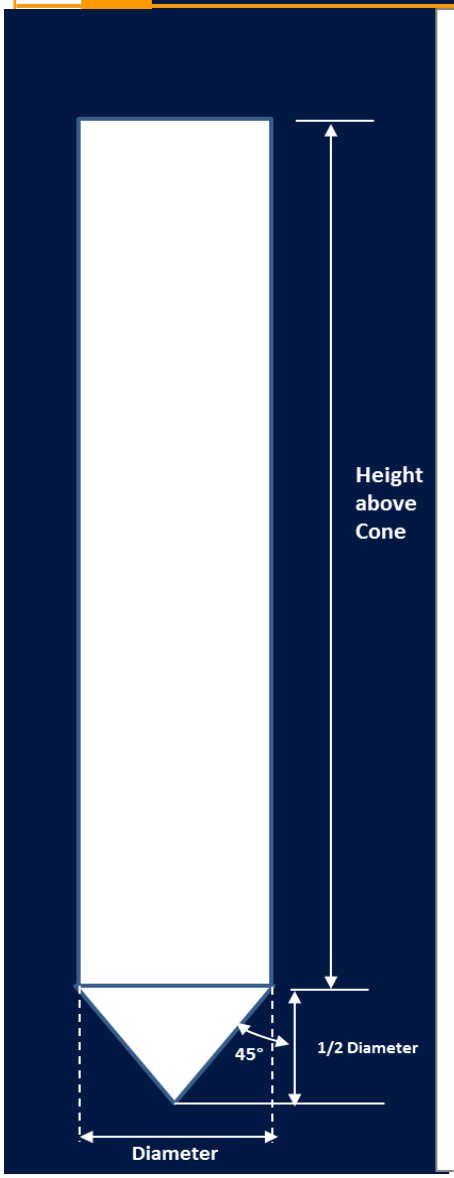

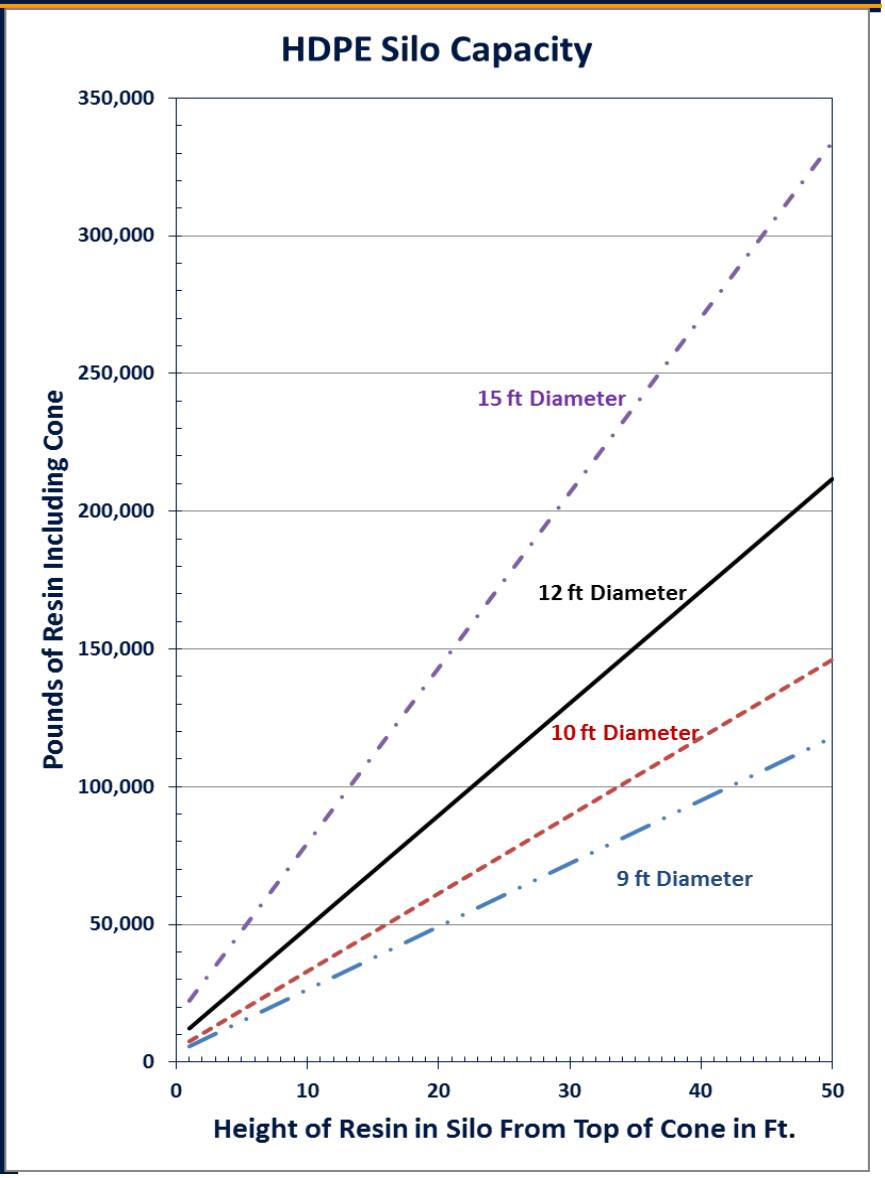

Product inquiries:

Marina View Headquarters
2600 South Shore Blvd.
Suite 500
League City, Teas 77573
Telephone: 281-535-6600
Fax: 281-535-6764
Customer Service: 800-527-5419

Battleground Manufacturing Complex
1230 Battleground Road
La Porte, Texas 77571
Telephone: 713-307-3000
Fax: 713-307-3521
Technical Center: 800-338-0489

www.ineos-op.com

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