



HDPE Silo Capacity

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One of the most important questions that a resin process 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 diameter²

Volume of a 45° cone = 1/3 height x 0.7854 x diameter²

Bulk density range of 36-40 lb/ft³

For HDPE use average of 38 lb/ft³

Examples:

9' Diameter, 45° Cone Silo

Cone volume = 95.4 ft³ = 3,623 pounds

Per foot cylinder volume = 63.6 ft³ = 2417 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 2,417 lbs = 58,008

+ cone weight = 3,623

Total pounds 61,631

12' Diameter, 45° Cone Silo

Cone volume = 226 ft³ = 8,587 lbs

Per foot cylinder volume = 113.1 ft³ = 4,298 lbs

Example:

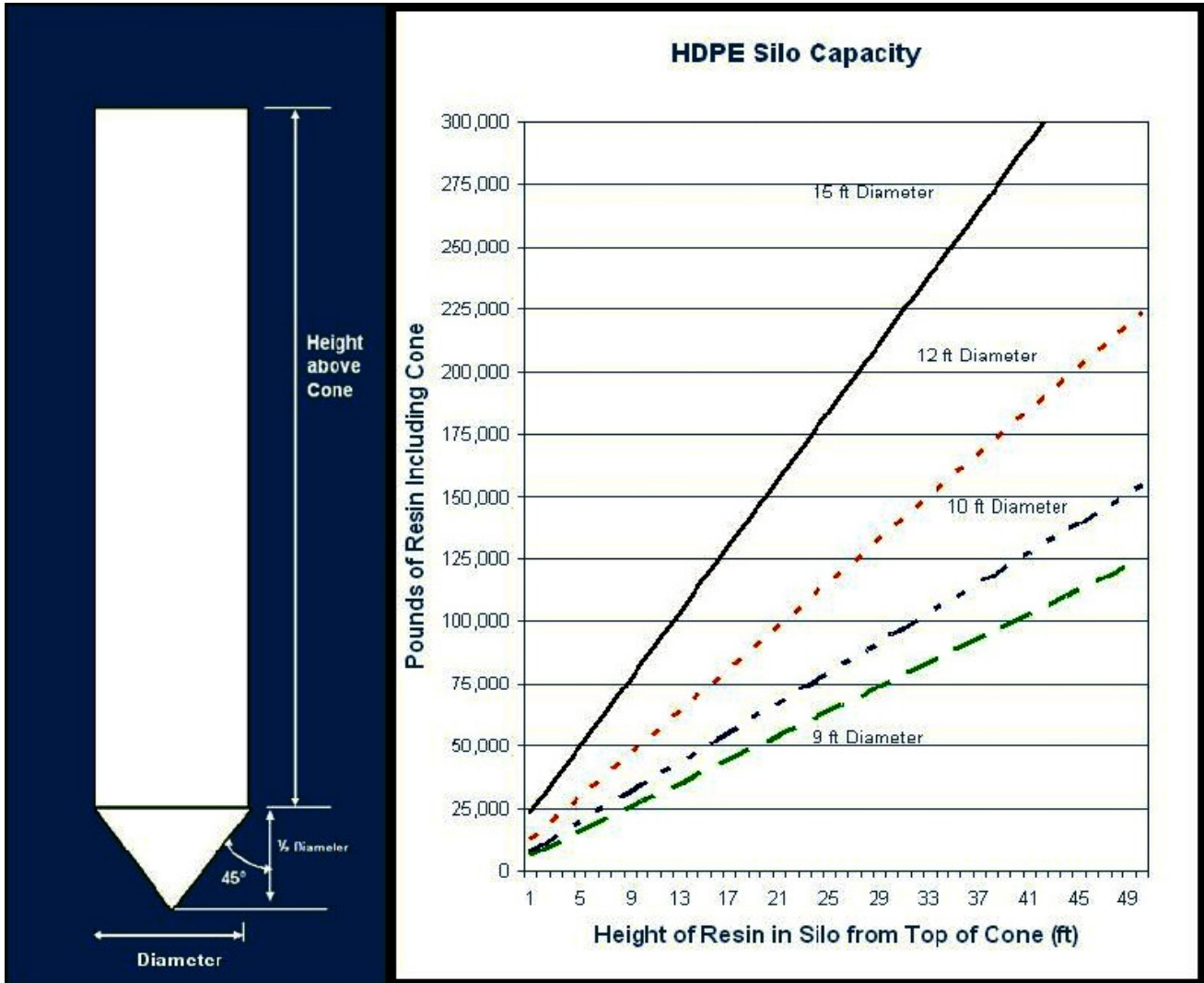
32 feet of resin above the cone = how many total pounds?

32 ft x 4,298 lbs = 137,536

+ cone weight = 8,587

Total Pounds 146,123

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