



# Polypropylene Silo Capacity

## Polypropylene Silo Capacity

---

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 chart and the calculations shown 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 ( $37^\circ$ ) is not considered
5. In order to simplify the calculations, the cone angle is assumed to be  $45^\circ$ . This may not be true in all silos. (Note that the height of a  $45^\circ$  degree cone is generally half of the cylinder diameter)

### Formulas:

Volume of a Cylinder = (height) x (0.7854) x (diameter)<sup>2</sup>

Volume of a  $45^\circ$  Cone =  $1/3$ (height) x (0.7854) x (diameter)<sup>2</sup>

Average Bulk Density of PP = 32 lbs. / ft<sup>3</sup>

### Examples:

#### 9' Diameter, $45^\circ$ Cone Silo

Cone volume =  $1/3(4.5) \times (0.7854) \times (81) = 95.4 \text{ ft}^3$

Weight of resin in cone =  $95.4 \text{ ft}^3 \times 32 \text{ lbs. / ft}^3 = 3,053 \text{ lbs.}$

Per foot cylinder volume =  $(0.7854) \times (81) = 63.6 \text{ ft}^3$

Weight of resin per foot of cylinder volume =  $63.6 \text{ ft}^3 \times 32 \text{ lbs. / ft}^3 = 2,035 \text{ lbs.}$

**Total Silo capacity = cone weight + weight per foot above cone.**

If there is 24 feet of resin above the cone then the silo contains how much resin?

$$3,053 + (24 \times 2,035) = 51,893 \text{ lb.}$$

#### 12' Diameter, $45^\circ$ Cone Silo

Cone volume =  $1/3(6) \times (0.7854) \times (144) = 226 \text{ ft}^3$

Weight of resin in cone =  $226 \text{ ft}^3 \times 32 \text{ lbs. / ft}^3 = 7,238 \text{ lbs.}$

Per foot cylinder volume =  $(0.7854) \times (144) = 113 \text{ ft}^3$

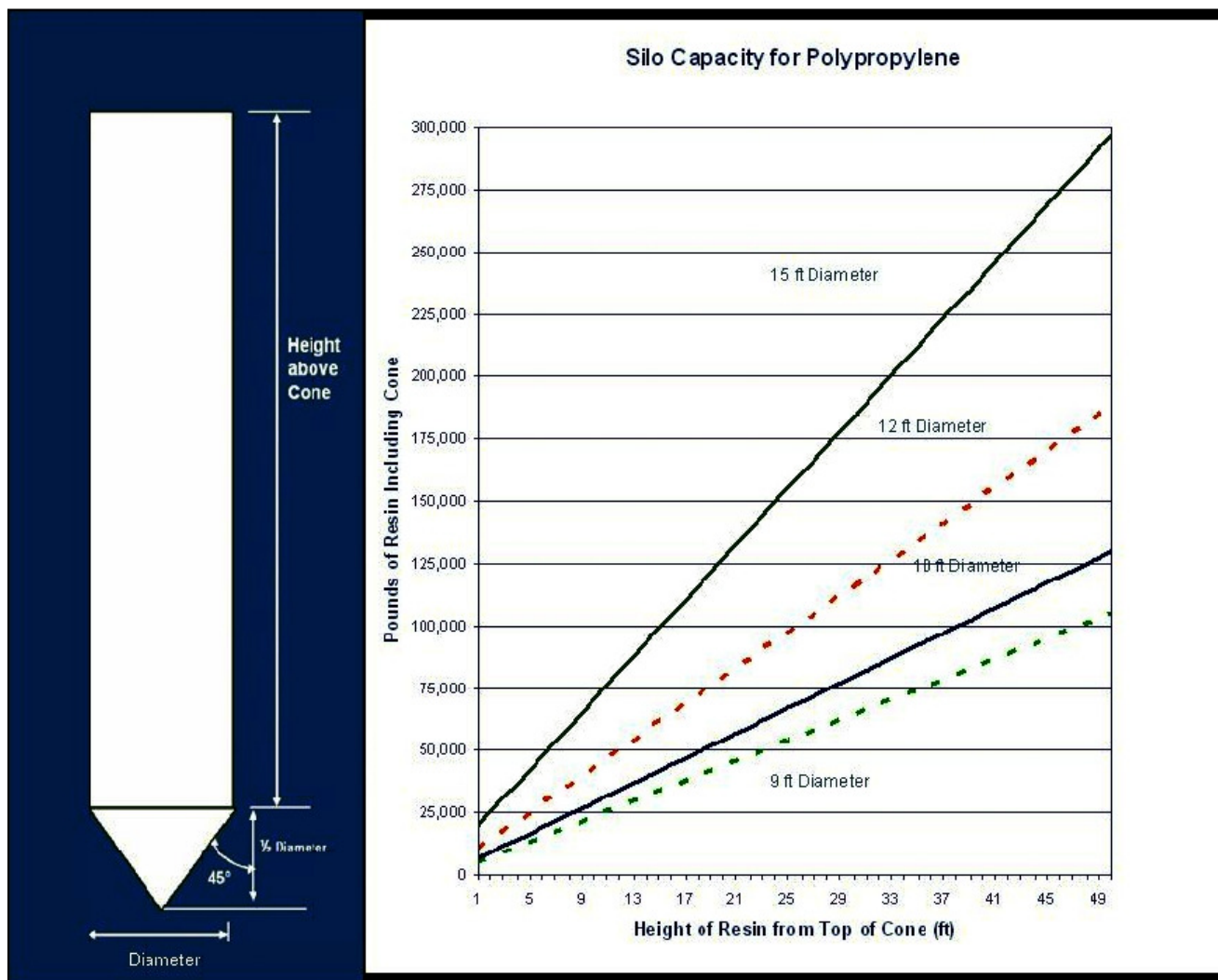
Weight of resin per foot of cylinder volume =  $113 \text{ ft}^3 \times 32 \text{ lbs. / ft}^3 = 3,619 \text{ lbs.}$

**Total Silo capacity = cone weight + weight per foot above cone.**

If there is 32 feet of resin above the cone then the silo contains how much resin?

$$7,238 + (32 \times 3,619) = 123,046 \text{ lbs.}$$

# Polypropylene Silo Capacity



**Product inquiries:**

Marina View Headquarters  
 2600 South Shore Blvd.  
 League City, Texas 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.innovene.com](http://www.innovene.com)  
[www.innovene.com/orders](http://www.innovene.com/orders)  
[www.innovene.com/technicalservice](http://www.innovene.com/technicalservice)

Technical information contained herein is furnished without charge or obligation, and is given and accepted at recipient's sole risk. Because conditions of use may vary and are beyond our control, Ineos Olefins & Polymers USA makes no representation about, and is not responsible or liable for the accuracy or reliability of data, nor for toxicological effects or Industrial Hygiene requirements associated with particular uses of any product described herein. Nothing contained in this document shall be considered a recommendation for any use that may infringe patent rights, or an endorsement of any particular material, equipment, service, or other item not supplied by INEOS Olefins & Polymers USA. To the best of our knowledge, the information contained herein is accurate. However, neither INEOS Olefins & Polymers USA, nor any of its affiliates assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Any "Properties" and/or "Applications" listed in this document are not specifications. They are provided as information only and in no way modify, amend, enlarge, or create any specification or warranty, and ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXCLUDED.

The name INEOS Olefins & Polymers USA and its logo are trademarks of INEOS USA LLC or its affiliated companies. © 2006 INEOS Olefins & Polymers USA