

Evaporation Loss From Low-Pressure Tanks

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ABSTRACT

Low-pressure tanks, operating at positive pressures from just above atmospheric pressure to 15 psig, are normally used for storage of motor gasoline, pentanes, and natural gasolines having up to 30 lb RVP. Because insufficient data are available to establish equations by correlation, the loss equations presented in this bulletin are based on a theoretical study made by the API Committee on Evaporation Loss Measurement.

Using a theoretical equation, the design pressure, confirmed by experience, which will prevent breathing loss from motor fuel having a Reid vapor pressure of 14 lb calculates to be 2.5 psig. The pressure required to prevent boiling loss may be determined by use of another equation. Losses from tanks venting at pressures below the pressure required to prevent breathing may be estimated as a percent of the loss which would have attended storage in an atmospheric pressure tank.

The appropriate application of low-pressure tanks is for storage of stocks having a true vapor pressure of more than 14.7 psia, wherein working losses can theoretically be completely eliminated. In practice, working loss does occur and depends upon the rate of pump-in, dissipation of heat, and pump-out. No equations are presented for these conditions.

Because low-pressure tanks for storing stocks having a true vapor pressure of less than 15 psia are limited in number, a field test program for refinement of the breathing loss equation for those tanks is not justified. Data are needed for a wide range of pump-in rates and vessel sizes under summer conditions to establish the safe working pressure which will prevent working loss for products having a true vapor pressure of more than 15 psia.

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