

**ANSI/ASAE EP545 MAR1995 (R2019)**

**Loads Exerted by Free-Flowing Grain on Shallow Storage Structures**



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ASABE, 2950 Niles Road, St. Joseph, MI 49085-9659, USA, phone 269-429-0300, fax 269-429-3852, [hq@asabe.org](mailto:hq@asabe.org)

## ANSI/ASAE EP545 MAR1995 (R2019)

Approved February 1996; reaffirmed November 2019 as an American National Standard

# Loads Exerted by Free-Flowing Grain on Shallow Storage Structures

*Developed by the ASAE Loads Due to Bulk Grains, Fertilizers and Silage Subcommittee of the Structures Group; approved by the Structures and Environment Division Standards Committee; adopted by ASAE March 1995; approved as an American National Standard February 1996; reaffirmed by ASAE December 1999; reaffirmed by ANSI June 2000; reaffirmed by ASAE February 2005; reaffirmed by ANSI March 2005; revised editorially March 2005; reaffirmed by ASABE January 2010; reaffirmed by ANSI February 2010; reaffirmed by ASABE January 2015; reaffirmed by ANSI January 2015; reaffirmed by ASABE and ANSI November 2019.*

**Keywords:** Grain, Loads, Pressure, Structures

## 1 Purpose

1.1 This Engineering Practice presents methods of estimating the grain pressures within shallow storage structures used to store free-flowing, agricultural whole grains.

## 2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this Engineering Practice. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Engineering Practice are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Standards organizations maintain registers of currently valid standards.

ANSI/ASAE D241.4 FEB93, *Density, Specific Gravity, and Mass-Moisture Relationships of Grain for Storage*

## 3 Terminology

3.1 Terms used in this Engineering Practice are defined as follows:

3.1.1 **shallow storage structure:** Grain storage with a square or rectangular floor plan used to store grain where the width of the building is greater than 2 times the height of the grain at the wall.

## 4 Nomenclature

$k$  is ratio of lateral to vertical pressure, dimensionless;

$z$  is equivalent grain depth at a discrete point, m (ft);

$G$  is gravity acceleration constant,  $9.8 \times 10^{-3}$  kN/kg (1.0 lbf/lb);