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Procedure for Establishing Volumetric Capacities of Cylindrical Grain Bins

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1 Purpose and Scope

1.1 The purpose of this Standard is to define the method for determining the volumetric capacity and the calculated storage capacity of cylindrical grain bins. This method assumes that the bins are centrically filled.

1.2 The purpose is also to establish an industry standard for the estimation of compaction factors for all cylindrical bins.

2 Definitions and Nomenclature

2.1 bin diameter ($D$): Diameter of the bin measured from the centerline or neutral axis of the corrugated sidewalls, or the inside diameter of a smooth-walled bin.

2.2 open eave bins: Bins in which free passage of air between the sidewall and the roof is possible. These bins should be filled only to a height which is 25 mm (1 in.) below the eave height because of the likelihood of small grain passing through this space.

2.3 tight eave bins: Bins in which free passage of air between the sidewall and the roof is restricted. Although not airtight, the seal between the sidewall and roof prevents small grains from passing through this space.

2.4 roof slope: Slope or inclination of the bin roof measured in degrees from horizontal.

2.5 maximum angle of fill ($\alpha$): Maximum angle that may be used for calculating the capacity of the roof area. This angle is measured from horizontal and shall be assumed as 28 deg.

2.6 eave height ($EH$): For the purpose of volume calculations, eave height is defined in Figure 1, along with other conditions described in this section.

2.6.1 bins with roof slopes greater than 28 deg: For these bins the eave height is defined as the distance from the top of the permanent structural floor to the top of the bin sidewall for tight eave bins or 25 mm (1 in.) less than the top of the sidewall for open eave bins (see Figs. 1a and 1b).

2.6.2 bins with roof slopes less than 28 deg: For these bins the eave height is defined as the distance from the top of the permanent structural floor to the height at which the grain intersects the bin sidewall (see Figure 1c).