Venting Atmospheric and Low-pressure Storage Tanks

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Introduction

This standard has been developed from the accumulated knowledge and experience of qualified engineers of the oil, petroleum, petrochemical, chemical, and general bulk liquid storage industry.

Engineering studies of a particular tank can indicate that the appropriate venting capacity for the tank is not the venting capacity estimated in accordance with this standard. The many variables associated with tank-venting requirements make it impractical to set forth definite, simple rules that are applicable to all locations and conditions.

In this standard, where practical, U.S. customary (USC) units are included in parentheses or in separate tables, for information.

Venting Atmospheric and Low-pressure Storage Tanks

1 Scope

This standard covers the normal and emergency vapor venting requirements for aboveground liquid petroleum or petroleum products storage tanks and aboveground and underground refrigerated storage tanks designed for operation at pressures from full vacuum through 103.4 kPa (ga) (15 psig). Discussed in this standard are the causes of overpressure and vacuum; determination of venting requirements; means of venting; selection and installation of venting devices; and testing and marking of relief devices.

This standard is intended for tanks containing petroleum and petroleum products, but it can also be applied to tanks containing other liquids; however, it is necessary to use sound engineering analysis and judgment whenever this standard is applied to other liquids.

This standard does not apply to external floating-roof tanks.

2 Terms, Definitions, and Abbreviated Terms

For the purposes of this document, the following terms, definitions, and abbreviated terms apply.

2.1
accumulation
Pressure increase over the maximum allowable working pressure or design pressure of the vessel during discharge through the pressure-relief device.

NOTE Accumulation is expressed in units of pressure or as a percentage of maximum allowable working pressure or design pressure. Maximum allowable accumulations are established by pressure-design codes for emergency operating and fire contingencies.

2.2
adjusted set pressure
Inlet static pressure at which a pressure-relief valve is adjusted to open on the test stand.

See **set pressure** (2.20).

NOTE 1 Adjusted set pressure is equivalent to set pressure for direct-mounted end-of-line installations.

NOTE 2 The adjusted set pressure includes corrections for service conditions of superimposed back-pressure.

2.3
British thermal unit
Btu
Unit of heat that increases the temperature of one pound of water by one degree Fahrenheit.

2.4
bubble point
Temperature at which the first vapor bubble is produced from a liquid mixture of two or more components heated at constant pressure. For single component systems the bubble point is referred to as the boiling point.

2.5
emergency venting
Venting required for external fire or other abnormal conditions (see 3.2.5).