

DEP SPECIFICATION

DESIGN AND SUPPLY OF BULK SOLIDS BINS AND HOPPERS

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DESIGN AND ENGINEERING PRACTICE



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1. INTRODUCTION

1.1 SCOPE

This new DEP specifies requirements for the design and procurement of general purpose storage vessels for bulk solid products. It applies to shop and field fabricated vessels of steel and alloy construction that operate at or near atmospheric pressure, and covers the requirements for shop detailing, fabrication, shop assembly, shop coating and delivery of general purpose bulk solids bins and hoppers.

The contents of this DEP has been transitioned from former standards EGG 10GS-50 and EGG 10GS-51.

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This DEP is intended for use in facilities related to oil and gas production, gas handling, oil refining, chemical processing, gasification, distribution and supply/marketing. This DEP may also be applied in other similar facilities.

When DEPs are applied, a Management of Change (MOC) process shall be implemented; this is of particular importance when existing facilities are to be modified.

If national and/or local regulations exist in which some of the requirements could be more stringent than in this DEP, the Contractor shall determine by careful scrutiny which of the requirements are the more stringent and which combination of requirements will be acceptable with regards to the safety, environmental, economic and legal aspects. In all cases, the Contractor shall inform the Principal of any deviation from the requirements of this DEP which is considered to be necessary in order to comply with national and/or local regulations. The Principal may then negotiate with the Authorities concerned, the objective being to obtain agreement to follow this DEP as closely as possible.

1.3 DEFINITIONS

1.3.1 General definitions

The **Contractor/Purchaser** is the party that carries out all or part of the design, engineering, procurement, construction, commissioning or management of a project or operation of a facility. The Principal may undertake all or part of the duties of the Contractor.

The **Manufacturer/Supplier** is the party that manufactures or supplies equipment and services to perform the duties specified by the Contractor.

The **Principal** is the party that initiates the project and ultimately pays for it. The Principal may also include an agent or consultant authorised to act for, and on behalf of, the Principal.

The word **shall** indicates a requirement.

The word **should** indicates a recommendation.

1.3.2 Specific definitions

Term	Definition
Angle of Repose	The slope of the surface of bulk solids when formed as a pile by pouring solids onto a horizontal plane. The angle is measured from the horizontal plane. It is not a flow property.

Term	Definition
Arching	No-flow condition where the bulk solid forms a stable arch across the bin. Usually, this forms at the bottom outlet opening, but may form at a higher location in the hopper or bin. At a sufficiently large discharge opening, a stable arch cannot be sustained. The term "bridging" is also used to describe this condition.
Funnel Flow	Flow pattern where the product moves in a central channel about the size of the active discharge opening, and a thin "slice" of the top surface which falls into the channel. Funnel flow occurs in bins having hoppers with less steep walls and where the coefficient of friction between the walls and the product is high.
Live Load	Weight produced by personnel, moveable equipment, tools and other items that may be placed on, but are not permanently attached to, the bin, hopper or silo excluding stored product.
Mass Flow	Flow pattern where all product is in motion at substantially every point in the bin whenever any product is withdrawn from the outlet. This flow pattern prevails when the walls of the hopper are sufficiently steep and smooth. Mass flow is easily distinguished from funnel flow by product sliding along the hopper wall.
Operating Load	Weight of the stored product, based on the maximum bulk density of the product, and internal pressure, if any.
Piping (Rathole)	Flow obstruction in a hopper caused by cohesiveness of the contained product and an undersized discharge opening. When the discharge opening is sufficiently large, the stress in the "pipe" exceeds the product's strength, so that the "pipe" cannot sustain the stress and promotes flow.

1.3.3 Abbreviations

Term	Definition
ACI	American Concrete Institute
ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing Materials
AWS	American Welding Society

1.4 CROSS-REFERENCES

Where cross-references to other parts of this DEP are made, the referenced section number is shown in brackets (). Other documents referenced by this DEP are listed in (6).

1.5 COMMENTS ON THIS DEP

Comments on this DEP may be sent to the Administrator at standards@shell.com, using the DEP Feedback Form. The DEP Feedback Form can be found on the main page of "DEPs on the Web", available through the Global Technical Standards web portal <http://swwww.shell.com/standards> and on the main page of the DEPs DVD-ROM.

1.6 DUAL UNITS

This DEP contains both the International System (SI) units, as well as the corresponding US Customary (USC) units, which are given following the SI units in brackets. When agreed by the Principal, the indicated USC values/units may be used.