

DEP SPECIFICATION

LOSS-IN-WEIGHT FEEDERS

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DESIGN AND ENGINEERING PRACTICE



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1. INTRODUCTION

1.1 SCOPE

This new DEP specifies requirements and gives recommendations for the design, manufacture, shop assembly test calibration, and delivery of loss-in-weight type gravimetric bulk solids feeders.

1.2 DISTRIBUTION, INTENDED USE AND REGULATORY CONSIDERATIONS

Unless otherwise authorised by Shell GSI, the distribution of this DEP is confined to Shell companies and, where necessary, to Contractors and Manufacturers/Suppliers nominated by them. Any authorised access to DEPs does not for that reason constitute an authorisation to any documents, data or information to which the DEPs may refer.

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** 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
Volumetric Feeder	Volumetric feeding is the simplest, most economical feeding solution available. Bulk material is held in a hopper and constantly fed into a process per unit of time. A mass feed rate may be inferred through a calibration process where a timed sample is taken and weighed, and a screw conveyor or other mechanical conveying device speed adjusted accordingly. Although there is no weight feedback to assure feeding accuracy over time, this may not be a concern for materials with consistent bulk density.
Gravimetric feeder	A bulk solids feeder which controls the rate of product by measuring the weight of the product being fed. Thus, a gravimetric feeder will cause the volume rate of the controlled

Term	Definition
	product to vary if the density of the bulk product varies.
Loss in Weight Feeder	A type of gravimetric feeder which generally weighs the product in a hopper, the hopper itself and a screw or other mechanical feed device. Sequential weighments over a known time interval indicate the weight rate of change (i.e., feed rate) through the feeder. The actual transfer rate is varied by varying the speed of the screw, or other device.
Sigma (σ)	When used with accuracy statements, refers to the standard deviation obtained from consecutive sampling, and is the square root of the sum of the squares of individual deviations divided by the number of readings. Thus, the accuracy required at two sigma means that about 96 % of the readings will fall within the stated accuracy range.
Operating Capacity	The average capacity to be expected under normal operating conditions, including down-time periods for regular maintenance and repair.
Peak Capacity	The maximum capacity ever to be expected, for any period of time as required by the operation.
Design Capacity	The design capacity shall be 115 % of the peak capacity. The capacity on which basis the structural and mechanical design calculations are made.
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.

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 (5).

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://www.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.