

DEP SPECIFICATION

PREPARATION OF PROCESS FLOW SCHEMES AND PROCESS ENGINEERING FLOW SCHEMES

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DESIGN AND ENGINEERING PRACTICE

DEM1



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1. INTRODUCTION

1.1 SCOPE

This DEP specifies requirements and recommendations for the preparation of Process Flow Schemes (PFS) and Process Engineering Flow Schemes (PEFS).

PFS and PEFS shall not only be prepared for process units in a narrower sense, but also for utility units and for common facilities where such schemes are appropriate.

This DEP is also relevant for Process Flow Diagrams (PFD), which are the same as PFS. All specifications required for PFS apply to PFD.

Similarly, Piping and Instrumentation Diagrams (P&ID) are the same as PEFS, and all specifications required for PEFS apply to P&IDs.

The requirements and recommendations in this DEP are independent of the tools with which the schemes are produced. If a Computer Aided Design (CAD) drafting system is used it shall be compatible with an intelligent drawing and database system and an Electronic Document Management System (EDMS) to be specified by the Principal.

This DEP contains mandatory requirements to mitigate process safety risks in accordance with Design Engineering Manual DEM 1 – Application of Technical Standards.

This is a revision of the DEP of the same number dated January 2010; see (1.5) regarding the changes.

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 authorization 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 should 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 its design and construction. The Principal will generally specify the technical requirements. 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 capitalised term **SHALL [PS]** indicates a process safety requirement.

The word **should** indicates a recommendation.

1.3.2 Abbreviations

PEFS	Process engineering flow scheme(s)
PFD	Process flow diagram(s)
PFS	Process flow scheme(s)
P&ID	Piping and instrumentation diagram(s)

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 (4).

1.5 SUMMARY OF CHANGES SINCE PREVIOUS EDITION

The previous edition of this DEP was dated January 2010.

The content of the previous version that was background information, explanation and guidance and therefore not required to be communicated to the Contractor, has been moved into a companion document called "DEP Informative" accessible from the Shell Standards web page.

The following are the main, non-editorial, changes:

Old section	New Section	Change
1.1	1.1	Incorporated requirement for P&ID and PFD to follow this DEP.
2.1	2.1	Add description of objectives of PFS.
2.1	2.1	Add requirements for material balance datasheet to be included as part of the PFS package
2.3	2.3	Requirements for additional equipment information (equipment ID, design pressure and temperature, materials of construction) added for each equipment in PFS.
2.3	2.3.13-2.3.16	Added Equipment Identifiers for pig launcher, pig receiver, piping manifold and wellhead
2.4	2.4	Removed requirement to specify liquid density in the form d 15/4
2.4	2.4	Added that the information to be specified for PFS, could also be specified in the material balance datasheet.
2.4	2.4	Removed units from information listed to be specified.
2.4	2.4	Removed requirement for PFS streams to leave one PFS and enter the next at the same height.
3.1	3.1	Add guideline for number of equipment per PEFS to avoid clutter.
3.2	3.2	Requirements added to show size and capacity, materials of construction, power or duty requirements, and insulation or jacketing requirements for equipment.
3.2	3.2	Requirement added to show manways for column/reactors/vessel in PEFS.

Old section	New Section	Change
3.2	3.2	Removed requirement to show flanges on PEFS
3.2	3.2	Guideline added to show sizing information of rupture disc and conventional vent in PEFS.
3.3 c	3.3 c	Modified language such that complex controls need not be described fully on the PEFS, but must be properly referenced.
3.3	3.3	Requirements added to show insulation type and thickness, AG/UG line break, piping specialty items for piping
3.3	3.3	Requirements added to show interlock, any bypass hand switch for IPS, winterization requirements for instrumentation and analyzers.
3.3	3.3	Requirements added to show fail actions and tight shutoff characteristics of automated valves
3.3	3.3	Removed requirement for PEFS streams to leave one PEFS and enter the next at the same height.
none	3.4	Requirements added to show Notes in PEFS

1.6 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.

1.7 DUAL UNITS

**Amended per
Circular 37/11**

Dual units have been incorporated throughout this DEP.

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.