DEP SPECIFICATION

PREPARATION OF PROCESS FLOW SCHEMES AND PROCESS ENGINEERING FLOW SCHEMES

DEP 01.00.02.11-Gen.

February 2017

ECCN EAR99

DESIGN AND ENGINEERING PRACTICE

DEM1

© 2017 Shell Group of companies

All rights reserved. No part of this document may be reproduced, stored in a retrieval system, published or transmitted, in any form or by any means, without the prior written permission of the copyright owner or Shell Global Solutions International BV.

This document contains information that is classified as EAR99 and, as a consequence, can neither be exported nor re-exported to any country which is under an embargo of the U.S. government pursuant to Part 746 of the Export Administration Regulations (15 C.F R. Part 746) nor can be made available to any national of such country. In addition, the information in this document cannot be exported nor re-exported to an end-user or for an end-use that is prohibited by Part 744 of the Export Administration Regulations (15 C.F.R. Part 744).

Copyright Shell Group of Companies. No reproduction or networking permitted without license from Shell. Not for resale

Documents
Document Sharing Hub

This document has been supplied under license by Shell to:
UOP Honeywell ted.fuger@honeywell.com 19/01/2018 02:47:41

Full document details: SHELL 01.00.02.11 2017

PREFACE

DEP (Design and Engineering Practice) publications reflect the views, at the time of publication, of Shell Global Solutions International B.V. (Shell GSI) and, in some cases, of other Shell Companies.

These views are based on the experience acquired during involvement with the design, construction, operation and maintenance of processing units and facilities. Where deemed appropriate DEPs are based on, or reference international, regional, national and industry standards.

The objective is to set the standard for good design and engineering practice to be applied by Shell companies in oil and gas production, oil refining, gas handling, gasification, chemical processing, or any other such facility, and thereby to help achieve maximum technical and economic benefit from standardization.

The information set forth in these publications is provided to Shell companies for their consideration and decision to implement. This is of particular importance where DEPs may not cover every requirement or diversity of condition at each locality. The system of DEPs is expected to be sufficiently flexible to allow individual Operating Units to adapt the information set forth in DEPs to their own environment and requirements.

When Contractors or Manufacturers/Suppliers use DEPs, they shall be solely responsible for such use, including the quality of their work and the attainment of the required design and engineering standards. In particular, for those requirements not specifically covered, the Principal will typically expect them to follow those design and engineering practices that will achieve at least the same level of integrity as reflected in the DEPs. If in doubt, the Contractor or Manufacturer/Supplier shall, without detracting from his own responsibility, consult the Principal.

The right to obtain and to use DEPs is restricted, and is typically granted by Shell GSI (and in some cases by other Shell Companies) under a Service Agreement or a License Agreement. This right is granted primarily to Shell companies and other companies receiving technical advice and services from Shell GSI or another Shell Company. Consequently, three categories of users of DEPs can be distinguished:

1) Operating Units having a Service Agreement with Shell GSI or another Shell Company. The use of DEPs by these Operating Units is subject in all respects to the terms and conditions of the relevant Service Agreement.

2) Other parties who are authorised to use DEPs subject to appropriate contractual arrangements (whether as part of a Service Agreement or otherwise).

3) Contractors/subcontractors and Manufacturers/Suppliers under a contract with users referred to under 1) or 2) which requires that tenders for projects, materials supplied or - generally - work performed on behalf of the said users comply with the relevant standards.

Subject to any particular terms and conditions as may be set forth in specific agreements with users, Shell GSI disclaims any liability of whatsoever nature for any damage (including injury or death) suffered by any company or person whomsoever as a result of or in connection with the use, application or implementation of any DEP, combination of DEPs or any part thereof, even if it is wholly or partly caused by negligence on the part of Shell GSI or other Shell Company. The benefit of this disclaimer shall inure in all respects to Shell GSI and/or any Shell Company, or companies affiliated to these companies, that may issue DEPs or advise or require the use of DEPs.

Without prejudice to any specific terms in respect of confidentiality under relevant contractual arrangements, DEPs shall not, without the prior written consent of Shell GSI, be disclosed by users to any company or person whomsoever and the DEPs shall be used exclusively for the purpose for which they have been provided to the user. They shall be returned after use, including any copies which shall only be made by users with the express prior written consent of Shell GSI. The copyright of DEPs vests in Shell Group of companies. Users shall arrange for DEPs to be held in safe custody and Shell GSI may at any time require information satisfactory to them in order to ascertain how users implement this requirement.

All administrative queries should be directed to the DEP Administrator in Shell GSI.

Documents
Document Sharing Hub

This document has been supplied under license by Shell to:
UOP Honeywell ted.fuger@honeywell.com 19/01/2018 02:47:41

Full document details: SHELL 01.00.02.11 2017

TABLE OF CONTENTS

1. INTRODUCTION 4
1.1 SCOPE 4
1.2 DISTRIBUTION, INTENDED USE AND REGULATORY CONSIDERATIONS 4
1.3 DEFINITIONS 5
1.4 CROSS-REFERENCES 5
1.5 SUMMARY OF MAIN CHANGES 5
1.6 COMMENTS ON THIS DEP 6
1.7 DUAL UNITS 6
1.8 NON NORMATIVE TEXT (COMMENTARY) 6

2. PROCESS FLOW SCHEMES (PFS) 7
2.1 GENERAL 7
2.2 EQUIPMENT REPRESENTATION 8
2.3 EQUIPMENT IDENTIFICATION AND TYPICAL DATA 8
2.4 PROCESS, UTILITY AND DISPOSAL LINES AND INSTRUMENTATION 8

3. PROCESS ENGINEERING FLOW SCHEMES (PEFS) 9
3.1 GENERAL 9
3.2 EQUIPMENT REPRESENTATION 10
3.3 PROCESS, UTILITY AND DISPOSAL LINES AND INSTRUMENTATION 11
3.4 NOTES 13
3.5 LEGEND SHEETS 13
3.6 ABBREVIATIONS 13

4. REFERENCES 14

APPENDICES

APPENDIX A PROCESS FLOW SCHEMES (PFS) EQUIPMENT TYPES AND KEY DATA 15

APPENDIX B TYPICAL ABBREVIATIONS 19

Documents
Document Sharing Hub

This document has been supplied under license by Shell to:
UOP Honeywell ted.fuger@honeywell.com 19/01/2018 02:47:41

Full document details: SHELL 01.00.02.11 2017

1. INTRODUCTION

1.1 SCOPE

This DEP specifies requirements and gives recommendations for the preparation of Process Flow Schemes (PFS) for greenfield and brownfield capital projects.

P&ID (Piping and Instrumentation Diagram), EFS (Engineering Flow Diagram). MFD (Mechanical Flow Diagram) and UEFS (Utility Engineering Flow Scheme) are synonyms for PEFS. All specifications required for PEFS apply to all these synonyms and are covered within the scope of this DEP.

PFD (Process Flow Diagram) is equivalent to PFS and is covered within this DEP.

The requirements and recommendations in this DEP are independent of the tools with which the schemes are produced.

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 February 2011 (amended September 2011); see (1.5) regarding the changes.

P&ID (Piping and Instrumentation Diagram), EFD (Engineering Flow Diagram). MFD (Mechanical Flow Diagram) and UEFS (Utility Engineering Flow Scheme) are synonyms for PEFS. All specifications required for PEFS apply to all these synonyms and are covered within the scope of this DEP.

PFD (Process Flow Diagram) is equivalent to PFS and is covered within this DEP.

The requirements and recommendations in this DEP are independent of the tools with which the schemes are produced.

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 February 2011 (amended September 2011); 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 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.

Documents
Document Sharing Hub

This document has been supplied under license by Shell to:
UOP Honeywell ted.fuger@honeywell.com 19/01/2018 02:47:41

Full document details: SHELL 01.00.02.11 2017

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 capitalised term **SHALL [PS]** indicates a process safety requirement.

The word **should** indicates a recommendation.

The word **may** indicates a permitted option.

1.3.2 Specific Definitions

Term	Definition
Conservation Vent	Breather valve or pressure / vacuum valve. It is a protection device mounted on top of a storage tank that protects against overpressure or vacuum due to influx or outflow of the tank while reducing the emission of vapour from the tank headspace to the atmosphere

1.3.3 Abbreviations

Term	Definition
IPS	Instrumented Protection System
IPF	Instrumented Protection Function
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 or clause number is shown in brackets ( ). Other documents referenced by this DEP are listed in (4).

1.5 SUMMARY OF MAIN CHANGES

This DEP is a full revision of the DEP of the same number dated February 2011 (amended September 2011). The following are the main, non-editorial changes.

Section/Clause	Change
General	Tagging and symbols employed for equipment and instrument are referred to DEP 01.00.09.10-Gen.

Documents
Document Sharing Hub

This document has been supplied under license by Shell to:
UOP Honeywell ted.fuger@honeywell.com 19/01/2018 02:47:41

Full document details: SHELL 01.00.02.11 2017

Section/Clause	Change
2.3	Description and key data that should be displayed for equipment is moved to Appendix to enhance the organization of the text.
3.1, item 3	Clarify DEM1 requirement.
3.6	Examples of Abbreviation are moved to Appendix to enhance the organization of the text.

1.6 COMMENTS ON THIS DEP

Comments on this DEP may be submitted to the Administrator using one of the following options:

Shell DEPs Online (Users with access to Shell DEPs Online)	Enter the Shell DEPs Online system at https://www.shelldeps.com Select a DEP and then go to the details screen for that DEP. Click on the "Give feedback" link, fill in the online form and submit.
DEP Feedback System (Users with access to Shell Wide Web)	Enter comments directly in the DEP Feedback System which is accessible from the Technical Standards Portal http://sww.shell.com/standards. Select "Submit DEP Feedback", fill in the online form and submit.
DEP Standard Form (other users)	Use DEP Standard Form 00.00.05.80-Gen. to record feedback and email the form to the Administrator at standards@shell.com.

Feedback that has been registered in the DEP Feedback System by using one of the above options will be reviewed by the DEP Custodian for potential improvements to the DEP.

1.7 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.

1.8 NON NORMATIVE TEXT (COMMENTARY)

Text shown in italic style in this DEP indicates text that is non-normative and is provided as explanation or background information only.

Non-normative text is normally indented slightly to the right of the relevant DEP clause.

Documents
Document Sharing Hub

This document has been supplied under license by Shell to:
UOP Honeywell ted.fuger@honeywell.com 19/01/2018 02:47:41

Full document details: SHELL 01.00.02.11 2017