DEP SPECIFICATION

FILTER PRESSES TECHNOLOGY SELECTION, DESIGN AND MANUFACTURE

DEP 31.27.00.28-Gen.

September 2012

ECCN EAR99

DESIGN AND ENGINEERING PRACTICE

© 2012 Shell Group of companies
All rights reserved. No part of this publication 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).

Documents
Document Sharing Hub

Full document details: SHELL 31.27.00.28 0

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

Full document details: SHELL 31.27.00.28 0

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 7
1.5 COMMENTS ON THIS DEP 7
1.6 DUAL UNITS 7

2. FILTER SELECTION - OVERVIEW 8

3. DETERMINING THE FILTER RATING - FILTER RATING PROCEDURE 9

4. EQUIPMENT, MATERIALS AND SERVICES SUPPLIED BY THE CONTRACTOR 9

5. EQUIPMENT, MATERIALS AND SERVICES SUPPLIED BY THE MANUFACTURER/SUPPLIER 9

6. EQUIPMENT WARRANTY BY THE MANUFACTURER/SUPPLIER 10

7. REQUIREMENTS 10
7.1 GENERAL REQUIREMENTS 10
7.2 PIPING 11
7.3 CLOSING MECHANISM 11
7.4 PLATE SHIFTERS 11
7.5 SLURRY FEED PUMPS 11
7.6 FEED CONDITIONING SYSTEMS 12

8. OTHER REQUIREMENTS 12

9. REFERENCES 13

Documents
Document Sharing Hub

Full document details: SHELL 31.27.00.28 0

1. INTRODUCTION

1.1 SCOPE

This new DEP specifies requirements and gives recommendations for design, manufacture, shop assembly, shop protective coating and delivery of general purpose, semi-automatic filter presses, hereafter referred to simply as the filter.

Excluded from this scope are pressure filters of the following types:

covered in DEP 31.27.00.25-Gen.	disposable cartridge filters; manually cleanable disposable cartridge filters; manually cleaned metal candle filters; filters packed with polypropylene wool blankets/mattresses; automatic backwash or backflush filters; deep bed filters; automatic self-cleaning filters (advanced version of automatic backwash filters with unique and more efficient backwash design)
covered in DEP 31.27.00.29-Gen.	vacuum belt filters
covered in DEP 31.27.00.30-Gen.	rotary drum vacuum filters
covered by DEP 31.27.21.10-Gen.	filters for removing particles from hydro processor feeds (type selection and design rules)

The equipment covered by this DEP includes recessed plate and membrane plate designs. Flush plate and frame designs are not included in this DEP.

This new DEP includes information derived from and supersedes former Shell Oil Company Engineering Guide and General Specification 10 GS-41.

1.2 DISTRIBUTION, INTENDED USE AND REGULATORY CONSIDERATIONS

Unless otherwise authorized 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 authorized 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 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

Full document details: SHELL 31.27.00.28 0

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 authorized 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
Absolute Particle Retention	The smallest particle size that will be retained at 99.9 % of all particles of that size presented to the media.
Backwashing	Cleaning in place of the filter media by dislodging insoluble particulates by reversing the direction of fluid flow through the media. The backwashing fluid may be the filtrate or another compatible fluid.
Bubble Point Test	A method to determine the largest pore size at the surface of a filter element. The method measures the capillary pressure of the largest pore, which is correlated to the dimensions of that pore.
Filtration Area	The surface area of the filter medium used for filtration in parallel flow, independently of the porosity of the medium and the number of stacked medium layers. For multilayer pleated filters, the unfolded surface area of a single layer should be used although a part of this area may be inaccessible for flow. In that case, an effective filtration area can be defined as the filtration area accessible for fluid flow, but this may be difficult to quantify. Besides the filtration area, the open area is used for slotted and wire screen filter surfaces as the smallest cross sectional area accessible for flow. It is often expressed as a percentage of the filtration area.
Filter Heel	The volume of solids-containing liquid remaining in a filter housing at the end of a filtration cycle.
Filter Rating	A relative measure of the size of particles retained by the filter, expressed in microns. It is usually only used consistently for one type of filter supplied by the same Manufacturer/Supplier. One single Manufacturer/Supplier may use different ratings for different types of filters having the same particle removal efficiency. Different Manufacturers/Suppliers of the same type of filter may use different ratings for the same particle removal efficiency. Addition of the removal efficiencies for the specified filter rating makes it possible to compare the same type of filters from different Manufacturers/Suppliers. Different types of filters should be compared on the basis of the entire grade efficiency curve. The term absolute filter rating is used by a number of Manufacturers/Suppliers to indicate the particle size removed with an efficiency of 99.98 %; i.e., essentially the same as Absolute Particle Retention. Other Manufacturers/Suppliers associate the term “absolute” with the invariance of the pore structure of the filter medium. (Some types of

Documents
Document Sharing Hub

Full document details: SHELL 31.27.00.28 0