

DEP SPECIFICATION

PIPING CLASSES - EXPLORATION AND PRODUCTION

DEP 31.38.01.15-Gen.

February 2012

DESIGN AND ENGINEERING PRACTICE

DEM1



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.

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1. INTRODUCTION

1.1 SCOPE

This DEP specifies requirements and gives recommendations for the piping classes for exploration and production facilities.

The basis of design of the piping classes is given in DEP 31.38.01.10-Gen.

The general requirements for piping systems are specified in DEP 31.38.01.11-Gen.

Excluded from the scope of this DEP are:

- oil and gas transmission pipeline systems;
- piping classes for refineries and chemical plants, which are included in DEP 31.38.01.12-Gen.

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. A summary of the changes since the last revision is included in (1.5).

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 exploration and production facilities, within the property limits as defined in ASME B31.3:2010, Section 300.1. 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 capitalised term **SHALL [PS]** indicates a process safety requirement.

The word **should** indicates a recommendation.

1.3.2 Specific definitions

Term	Definition
Low Temperature	Metal temperature of 0°C (32°F) and lower.
Piping Class	Assembly of piping components in a piping system, suitable for a defined service within design limits.
Post Weld Heat Treatment	Heat treatment carried out after welding to reduce residual stresses and to temper hardened microstructures created by welding.
Very Toxic (Substances)	Substances that are very hazardous for the environment or human health, as specified in DEP 01.00.01.30-Gen. (which also identifies "toxic" substances by reference to chemical substances databases).

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 SUMMARY OF MAIN CHANGES

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

1.5.1 Introduction

Shell GSI organized a series of alignment meetings with refining and chemicals operating company specialists from Manufacturing and EP in the USA and Canada in order to capture experience on selection and application of piping components and align the definition of piping systems for the future. From the learnings of these sessions, the following items were incorporated:

- DN 15-40 (NPS ½ -1 ½) socket welded fittings in certain piping classes with class 150-600 flange rating.
- Extension of piping classes with lowest design temperature of -20°C (-4°F) to -29°C (-20°F).

The development of piping classes for services, not available in the February 2011 issue of the service index, has not been incorporated.

Additionally, the piping class portfolio was adapted in line with business development requirements, new and updated international standards, and feedback from third party clients and manufacturers. A number of cost saving developments were introduced.

The most substantial changes are explained below.

For a detailed overview of the changes in each piping class reference is made to (Appendix A). The piping class revision history is indicated in (Appendix B). For both documents reference is made to separate excel files.

This DEP has reference to MESC 13^A onwards. MESC numbers referred to in the piping classes contained in this DEP shall be extracted from MESC version 13^A and above.

1.5.2 Design code update

A new revision of ASME B31.3 was issued in 2010. Piping classes have been checked for alignment with the latest code requirements. The update has not affected the content of the piping classes.

1.5.3 Fittings

In piping classes with class 150-600 flange rating, socket-welded fittings have been introduced in line with the philosophy depicted in DEP 31.38.01.10-Gen.

1.5.4 Valves

In order to align valve design and type approval testing procedures with the new range of lowest design temperature of -29°C (-20°F), valve buying descriptions have been updated. Where required, elastomeric seals have been replaced with grades of the same elastomers suitable for the lower design temperature.

1.5.5 Branch table

Branch tables have not been updated. Where socket-welded fittings are introduced, for standard branch connections reference to plain (and flanged) branch nipples is maintained.

1.5.6 Assemblies

For socket-welded hydrotest vents and drains, reference is made to Standard Drawing S 38.154.

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

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.

2. PIPING CLASSES – SERVICES AND MATERIALS SELECTION INDEX

This index is presented as a spreadsheet in Standard Form DEP 31.38.01.84-Gen.

3. PIPING CLASSES

The piping classes for ASME class ratings 150, 300, 600, 900, 1500 and 2500 are contained in separate files for each ASME class rating.

These piping classes SHALL [PS] be used for services as specified in the Services and Materials Selection Index, DEP 31.38.01.84-Gen. (e.g., fluid service, ASME pressure rating, temperatures, sizes, materials, valves, etc.).

For services not covered in DEP 31.38.01.84-Gen., piping classes shall be developed based on the philosophies outlined in DEP 31.38.01.10-Gen. and DEP 31.38.01.11-Gen. Guidance on the development of project-specific piping classes is given in DEP 31.38.01.21-Gen.

Requests for new piping classes can be made through the Request for Piping Class Form in (Appendix 3). Project-specific requests shall be sent to SGSI - EPT-EMMI Piping Systems Team.

For updates in the framework of the DEP, the Request for Piping Class Form should be attached to the DEP Feedback System form.

4. PIPING CLASSES FOR USE IN EUROPEAN SITES

Piping classes contained in this DEP have been certified by Lloyds Register Netherlands B.V. acting as Notified Body in the framework of the European Pressure Equipment Directive (PED) to be compliant with Module B1 of the PED.

For Exploration and Production (E&P) piping classes (DEP 31.38.01.15-Gen.), the relevant design appraisal dossier number is: PED/B1/9004356 issue 1.

All applicable Particular Material Appraisals (PMAs) will be made available through the Global Technical Standards web portal <http://www.shell.com/standards>.

Piping classes contained in this DEP may be used in member states of the European Union (EU) where the Pressure Equipment Directive (PED) applies, without restrictions.

5. REFERENCES

In this DEP, reference is made to the following publications:

- NOTES:
1. Unless specifically designated by date, the latest edition of each publication shall be used, together with any amendments/supplements/revisions thereto.
 2. The DEPs and most referenced external standards are available to Shell staff on the SWW (Shell Wide Web) at <http://sww.shell.com/standards/>.
 3. Excluded from this list are the standards referenced in the piping classes themselves, a list of which would be too extensive.

SHELL STANDARDS

Definition of temperature, pressure and toxicity levels	DEP 01.00.01.30-Gen.
Piping classes – Basis of design	DEP 31.38.01.10-Gen.
Piping – General requirements	DEP 31.38.01.11-Gen.
Piping classes - Refining and chemicals	DEP 31.38.01.12-Gen.
Piping classes – Exploration and production	DEP 31.38.01.15-Gen.
Compilation of a specification for piping systems	DEP 31.38.01.21-Gen.
Standard Form: Piping class index	DEP 31.38.01.84-Gen.
Design Engineering Manual – Application of Technical Standards.	DEM 1

STANDARD DRAWING

Pressure test vents and drains	S 38.154
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AMERICAN STANDARDS

Pipe flanges and flanged fittings NPS 1/2 through NPS 24 metric/inch standard	ASME B16.5
Large diameter steel flanges NPS 26 through NPS 60 metric/inch standard	ASME B16.47
Process piping	ASME B31.3:2008

EUROPEAN STANDARDS

Directive of the European Parliament and of the Council on the Approximation of the Laws of the Member States Concerning Pressure Equipment	97/23/EC
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NOTE: Commonly known as the European Pressure Equipment Directive (PED)

Issued by: EU/EC - European Union/Commission Legislative Documents

**APPENDIX A DETAILED CHANGES PER PIPING CLASS BETWEEN THE FEBRUARY 2011
EDITION AND THE FEBRUARY 2012 EDITION**

This index is presented as a separate spreadsheet, with the number 31.38.01.15-Gen and
title:

“Exploration and Production (E&P) - Appendix A: Detailed changes per piping class”

APPENDIX B HISTORY OF DEP PIPING CLASSES INDEX

This index is presented as a separate spreadsheet, with the number 31.38.01.15-Gen. and title:

“Exploration and Production (E&P) - Appendix B: History of DEP piping classes index”

APPENDIX C REQUEST FOR PIPING CLASS FORM

Originator Information									Activity Code:					Piping Class Number		
Originator ^(M)																
Reference Indicator ^(M)																
Company Name ^(M)																
Location ^(M)																
Market Sector ^(M)				Upstream				Downstream	X							
Plant																
Project ^(M)																
Revision ^(M)		0														
Revision Date ^(M)																
Service Information																
Medium ^(M)																
Properties ^(M)																
Chemical Formula																
Chemical Abstracts Service																
Registry Number (CAS No.)																
Material Safety Data Sheet ^(M)			Attached													
Liquid and/or Gas ^(M)		Liquid	X		Gas	X		Both	X							
Rich or Lean		Rich			Lean											
Sour Service ^(M)								(Refer to DEP 31.38.01.11-Gen App. 10)								
Upstream		Yes			No	X										
Downstream		High			Moderate			Low								
Hydrogen Partial Pressure > 7bara/101psia ^(M)		Yes	X		No			(Applicable only if Hydrogen is present)								
Operating Condition 1		min T			max T			mech design		max T						
Temperature (T) ^(M)	[°C]				[°F]											
Pressure (P) ^(M)	[barg]				[psig]											

<i>Operating Condition 2</i>		min T		max T		(Applicable in case of more than one operating condition)											
Temperature (T)	[°C]			[°F]													
Pressure (P)	[barg]			[psig]													
ASME Class Rating				(Based on ASME B16.5 and B16.47)													
LODMAT ^(M)	[°C]			[°F]	(Lowest One Day Mean Ambient Temperature)												
Full Vacuum ^(M)		Yes	X	No													
Additional Information																	
Material Information																	
Base Material ^(M)																	
Corrosion Allowance ^(M)	[mm]			[in]													
Design Life	[years]																
Corrosion Rate	[mm/yr]			[in/yr]													
Material Specification																	
Pipe Seamless																	
Pipe Welded																	
Bolting																	
Casting																	
Fitting																	
Forging																	
Gasket																	
Plate																	
Valve Internals/Trim																	
....																	
....																	
Piping Component Information																	
Diameter Range ^(M)												Minimum		Maximum			
												[DN]		[NPS]			
Valves		Valve Type												Minimum		Maximum	

Type 1		Gate																	
Type 2		Globe								[DN]									
Type 3		Check								[DN]									
Type 4										[DN]									
Type 5										[DN]									
Type 6										[DN]									
Type 7										[DN]									
Valve End Type																			
Remarks																			
Comments																			
<i>EPT-EMMI-Piping Systems</i>																			
Proposed DEP Piping Class				DEP Piping Class No.															
<i>EPT-EMMI-Materials</i>		(If DEP Piping Class has been proposed)																	
Remarks																			
Completion Instructions																			
Customer shall where possible fill in the shaded areas.																			
Items marked with ^(M) indicate that the information must be provided and/or endorsed by the Customer.																			
Project-specific Request for Piping Class Forms shall be sent to SGSI - EPT-EMMI Piping Systems Team																			
For updates in the framework of the DEP, the form should be attached to the DEP Feedback System form.																			