

DEP SPECIFICATION

SHOP AND FIELD PRESSURE TESTING OF PIPING SYSTEMS

DEP 74.00.10.10-Gen.

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DESIGN AND ENGINEERING PRACTICE

DEM1



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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	SUMMARY OF MAIN CHANGES.....	7
1.6	COMMENTS ON THIS DEP	9
1.7	DUAL UNITS.....	9
1.8	NON NORMATIVE TEXT (COMMENTARY).....	9
2.	PRESSURE TESTING	10
2.1	GENERAL	10
2.2	STRUCTURAL SUPPORT AND LOADING GENERATED BY TESTING	11
2.3	PRESSURE TESTING EQUIPMENT	11
3.	HYDROSTATIC TESTING	12
3.1	TEST EQUIPMENT	12
3.2	TEST LIQUID QUALITY	12
3.3	PROCEDURES.....	15
4.	PNEUMATIC TESTING APPLICATION CRITERIA	16
5.	PRESSURE TESTING SAFETY CONSIDERATIONS	17
5.1	SAFETY DISTANCES	17
5.2	PERSONNEL RESTRICTIONS FOR ZONES 1, 2, AND 3 (PNEUMATIC TESTING)	18
5.3	NEARBY OPERATING EQUIPMENT	18
5.4	RISK ASSESSMENTS	19
6.	PRESSURE TEST PLANNING	20
6.1	GENERAL REQUIREMENTS FOR ENGINEERING AND INSPECTION.....	20
6.2	SPECIAL REQUIREMENTS FOR ENGINEERING AND INSPECTION.....	20
6.3	APPROVALS	21
6.4	TEST LEADER	21
6.5	TEST PLAN	21
6.6	SAFETY PLAN.....	21
6.7	PRESSURE TESTING EQUIPMENT	22
6.8	CONTROL OF PERSONNEL	22
6.9	CONTINGENCY PLANNING.....	22
6.10	PNEUMATIC TEST FLUIDS.....	22
6.11	PRECAUTIONS WITH NITROGEN.....	22
7.	PROCEDURE FOR PNEUMATIC TESTING	22
7.1	TEST PRESSURE.....	22
7.2	PRESSURIZATION	23
7.3	BOLT TIGHTENING	23
7.4	FINAL INSPECTION.....	23
7.5	DEPRESSURING	23
7.6	AIR FREEING AFTER TEST	24
7.7	DOCUMENTATION	24
8.	REFERENCES	25

APPENDICES

APPENDIX 1	PNEUMATIC TESTING PROCEDURE FORM	26
APPENDIX 2A	SAFETY DISTANCE FOR EACH ZONE (SI UNITS)	28
APPENDIX 2B	SAFETY DISTANCE FOR EACH ZONE (US CUSTOMARY UNITS)	29

1. INTRODUCTION

1.1 SCOPE

This DEP specifies requirements and gives recommendations for performing shop and field pressure testing of piping systems to establish integrity.

The testing of equipment is included in the field pressure testing of piping for certain cases (2.1).

Shop pressure testing of new equipment is excluded from the scope of this DEP. Reference is made to the relevant equipment/pressure vessel DEPs.

Pressure testing of new pipelines is excluded from the scope of this DEP and is covered in DEP 31.40.40.38-Gen.

This DEP is limited to application for new piping systems, and hence does not address risks associated with re-pressurisation after deterioration of condition of the pressure boundary, such as temper embrittlement or hydrogen embrittlement.

This DEP incorporates content that was previously in DEP 61.10.08.11-Gen. The relevant pressure testing information has been revised and placed in this DEP. The section on hydrostatic testing is a compilation of information that was in DEP 61.10.08.11-Gen. and the piping and pressure vessel DEPs.

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 2012; 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.

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
Hydrostatic Test	A test carried out using water or other relatively incompressible liquid to prove the integrity of a component or system, at a pressure specified by the design code. (In ASME B31.3 para. 345.4 referred to as Hydrostatic leak test.)
Piping Components	Mechanical elements suitable for joining or assembly into pressure-tight fluid-containing piping systems. Components include pipe, tubing, fittings, flanges, gaskets, bolting, valves, and devices such as expansion joints, flexible joints, pressure hoses, traps, strainers, inline portions of instruments, and separators.
Pipeline	System of pipes and other components used for the transportation of fluids between (but not within) plants. A pipeline typically extends from pig trap to pig trap (including the pig traps). If no pig trap is fitted, the pipeline extends to the first isolation valve within the plant boundaries.
Piping System	Assembly of straight and bent pipes, fittings, flanges, gaskets, valves and other components (e.g., expansion joints, swivel joints, strainers, devices for mixing, separating, distributing, metering and flow control. It also includes pipe supporting elements and insulation. Piping does not include supporting structures (such as frames of buildings, stanchions or foundations) or equipment (e.g., heat exchangers, vessels, columns, pumps) or instrument impulse pipes.
Positive Isolation	A means of isolation that establishes a verifiable pressure gap between the pressure side and isolated side.
Pneumatic Test	A test carried out using air or inert gas to prove the integrity of a component or system, at a pressure specified by the design code.(In ASME B31.3 para. 345.5 referred to as Pneumatic leak test.)
Test Pack	The pressure envelop for a single pressure test scope envelope, inclusive of equipment and piping systems.

1.3.3 Abbreviations

Term	Definition
ALARP	As Low As Reasonably Practicable
ITP	Inspection and Test Plan
NDE	Non-Destructive Examination
PMI	Positive Materials Identification
RT/UT	Radiographic Testing / Ultrasonic Testing

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 (8).

1.5 SUMMARY OF MAIN CHANGES

This DEP is a full revision of the DEP of the same number dated February 2012. The following are the main, non-editorial changes.

Section/Clause	Change
1.3.2	Added terms
1.3.3	Added NDE
2	Restructured and clarified requirements. Requirements common to hydrostatic and pneumatic sections have been moved to section of 2.
2.1	Figure 1 reflects latest ASME rules
2.1 Item 3	Added; joining 3.3.1 Item 3 and 6.1 Item 10 as a common requirement.
2.1 Item 6	DEM 1 statement and Figure 1 moved to General Section 2.1 to reflect applicability to both pneumatic and hydraulic testing.
2.3 Item 1	DEM 1 statement moved to Pressure Testing Equipment Section 2.3 to gather all testing equipment into a common section.
2.3 Item 3	DEM 1 statement moved to Pressure Testing Equipment Section 2.3 to gather all testing equipment into a common section.
2.3 Item 13	DEM 1 statement moved to Pressure Testing Equipment Section 2.3 to reflect applicability to both pneumatic and hydraulic testing.
3	Restructured and clarified requirements.
3.2.1	Terms (e.g., potable) have been replaced with a specification of chloride content to capture the specific requirement.
3.3.1 Item 3	DEM 1 statement moved to "General Section 2.1" Item 3
3.3.2 Item 3	DEM 1 statement moved to "General Section 2.1" Item 6
4	Restructured and clarified requirements.
4 Item 4a	DEM 1 statement restructured and renumbered (4 Item 4). Clarification made to responsibility of Principal.
5	Restructured and clarified requirements.
5.1.1 Item 1	DEM 1 statement revised to avoid application to all of section 5.2.
5.2 Item 1a	Renumbered to 5.2.1 Item 1; DEM 1 statement restructured for clarity.
5.2 Item 1c	Renumbered to 5.2.1 Item 2; DEM 1 statement restructured for clarity.
5.2 Item 2b	Renumbered to 5.2.2 Item 1; DEM 1 statement restructured for clarity.

Section/Clause	Change
5.4 Item 1	Correction made to structure "probability of failure" added Table 1.
6	Restructured and clarified requirements.
6.1 Item 9	Renumbered to 6.1 Item 7; DEM 1 statement restructured for clarity.
6.1 Item 10	DEM 1 statement Moved to "General Section 2.1" Item 3
6.7	Requirements common to hydrostatic and pneumatic sections have been moved to section of 2.
6.7 Item 1	DEM 1 statement Moved to Section 2.3 Item 1 and restructured for clarity.
6.7 Item 1a	DEM 1 statement Moved to Section 2.3 Item 3 and restructured for clarity.
6.8 Item 1	DEM 1 statement was determined to be invalid and was deleted.
7	Restructured and clarified requirements. Subsection 7.1 deleted and section renumbered to reflect this.
7.1 Item 1	1st DEM 1 statement was determined to be redundant with 3.3.2 Item 2 and was deleted.
7.1 Item 1	2 nd - DEM 1 statement was determined to be invalid and was deleted.
7.4 Item 1	Renumbered to 7.3 Item 1.
7.7 Item 2	Renumbered to 7.6 Item 2.
7.7 Item 3	Renumbered to 7.6 Item 3.



1.6 COMMENTS ON THIS DEP

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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.
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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.