

DEP SPECIFICATION

HYPERBARIC WELDING OF PIPELINES (AMENDMENTS/SUPPLEMENTS TO ISO 13847)

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(DEP Circular 54/12 has been incorporated)

DESIGN AND ENGINEERING PRACTICE



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PART I INTRODUCTION AND GENERAL

1. INTRODUCTION

1.1 SCOPE

This new DEP specifies requirements and gives recommendations for hyperbaric welding of pipelines and related facilities.

This DEP will be used only when there is a need to perform underwater welded pipeline tie-ins and underwater pipeline repairs by welding.

This DEP is based on ISO 13847:2000 (including Technical Corrigendum 1). Part II of this DEP amends, supplements and deletes various clauses of ISO 13847:2000 (including Corrigendum 1, 2001).

All clauses of ISO 13847 not modified by this DEP remain valid as written.

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 on pipeline projects related to oil and gas production, gas handling, oil refining, chemical processing, 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 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 word **should** indicates a recommendation.

1.3.2 Specific definitions

Where the term **Company** has been used, this shall be understood to mean the **Principal** as defined in paragraph 1.3 above.

A **Pipeline** is a system of pipes and other components used for the transportation of fluids between (but excluding) plants. A pipeline extends from pig trap to pig trap (including the pig traps), or, if no pig trap is fitted, to the first isolation valve within the plant.

1.4 ABBREVIATIONS

AUT	Automatic Ultrasonic Testing
CCTV	Closed Circuit Television
CE	Carbon Equivalent
ECA	Engineering Critical Assessment
GS-FCAW	Gas Shielded Flux Cored Arc Welding
GMAW	Gas Metal Arc Welding
GTAW	Gas Tungsten Arc Welding
HAZ	Heat-Affected Zone
ISO	International Standards Organization
IQI	Image Quality Indicator
MPE	Magnetic Particle Examination
MSW	Metres of Seawater
NDE	Non Destructive Examination
OD	Outside Diameter
PWHT	Post-Weld Heat Treatment
pWPS	Proposed Welding Procedure Specification
SMAW	Shielded Metal Arc Welding
SMYS	Specified Minimum Yield Strength
WPS	Welding Procedure Specification
WPQR	Welding Procedure Qualification Record

1.5 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 (Part III).

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://swwww.shell.com/standards> and on the main page of the DEPs DVD-ROM.

1.7 UNITS

For simplicity, the common industry practice of indicating nominal pipe diameters in inches has been followed. For other dimensions, SI units have been used.

2. GENERAL

Part II of this DEP is written as amendments and supplements to ISO 13847:2000, including Technical Corrigendum 1.

Wherever reference is made to ISO Standard 13847, it shall be understood to mean the ISO Standard ISO Standard 13847:2000 including Technical Corrigendum 1, as amended/supplemented by this DEP.

For ease of reference, the clause numbering of the ISO Standard has been used throughout Part II of this DEP.

The clauses of ISO Standard 13847:2000 not mentioned in this DEP shall apply as written.

PART II AMENDMENTS/SUPPLEMENTS TO ISO STANDARD 13847:2000

1 SCOPE

Replace this clause with the following:

This standard covers the underwater welding of pipelines in a dry environment inside a chamber from which the water has been displaced and where the atmosphere acting upon the welding arc and weld pool is at a pressure determined by the water depth to a maximum of 200 msw. If it is proposed to carry out welding at a depth greater than 200 msw, then more extensive testing shall be required.

This standard will be used only when there is a need to perform underwater welded pipeline tie-ins and underwater pipeline repairs by welding.

Welding in a "wet" underwater environment with the welding arc exposed to water is not covered by this standard.

Welding may be carried out by hydrogen-controlled manual or automatic processes or a combination of these. Acceptable welding processes are as follows:

Process	Abbreviation	ISO Process Number
Shielded Metal Arc Welding	SMAW	ISO 4063-111
Gas Tungsten Arc Welding	GTAW	ISO 4063-111

This standard covers the requirements for the following:

- Qualification of welding procedures
- Qualification of welders and welding operators (for automatic welding processes)
- Production welding
- Non-destructive testing of procedure qualification welds and production welds
- Habitat environmental control

2 NORMATIVE REFERENCES

Add the following to this clause:

Refer to (Part 1, section 2) of this DEP.

3 TERMS AND DEFINITIONS

Add the following to this clause:

In addition, the terms and definitions given in (Part I, 1.3) of this DEP apply.

3.3 APPROVED WELDING PROCEDURE SPECIFICATION

Replace reference to ISO 9956-1:1995 with ISO 15609:2004

3.18 WELDING PROCEDURE

Replace reference to ISO 9956-1:1995 with ISO 15609:2004