

DEP SPECIFICATION

FIRETUBE HEATERS

DEP 31.24.67.10-Gen.

February 2017

DESIGN AND ENGINEERING PRACTICE



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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	4
1.4	CROSS-REFERENCES	6
1.5	SUMMARY OF MAIN CHANGES.....	6
1.6	COMMENTS ON THIS DEP	6
1.7	DUAL UNITS.....	7
1.8	NON NORMATIVE TEXT (COMMENTARY).....	7
2.	GENERAL REQUIREMENTS	8
2.1	GENERAL.....	8
2.2	THERMAL DESIGN	8
3.	MECHANICAL DESIGN	10
3.1	GENERAL.....	10
3.2	FIREBOX DESIGN	10
3.3	AIR INTAKE FLAME ARRESTOR.....	12
3.4	FUEL PIPING AND APPURTENANCES.....	12
4.	MATERIALS OF CONSTRUCTION.....	12
5.	COMBUSTION SAFEGUARDING REQUIREMENTS.....	13
5.1	GENERAL.....	13
6.	INSTRUMENT AND AUXILIARY CONNECTIONS	14
6.1	TUBE-SKIN THERMOCOUPLES.....	14
6.2	FLUE GAS SAMPLING	15
7.	REFERENCES	16

APPENDICES

APPENDIX A	REQUIREMENTS FOR PROCESS COILS	17
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1. INTRODUCTION

1.1 SCOPE

This DEP specifies requirements and gives recommendations for the design and fabrication of packaged firetube heaters operated in the following services at oil and gas production well-sites and treatment facilities:

- heater treaters;
- free water knock-out vessels;
- indirect fired heaters (e.g. water bath line heaters, indirect oil bath heaters for condensate stabilization);
- glycol reboilers.

This DEP is applicable to natural draft and forced draft firetube heaters equipped with fuel gas fired pilots and main burners. Fuel-oil fired firetube heaters are not covered in this DEP.

Direct firetube steam boilers (requirements as per EN 12953 or ASME section I) are not covered by this DEP.

(Appendix A) provides additional requirements for the thermal and hydraulic design of process coils installed in indirect fired heaters.

This is a revision of the DEP of the same number dated February 2013; 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. 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 word **should** indicates a recommendation.

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

1.3.2 Specific definitions

Term	Definition
Burner Rated Duty	Burner design duty multiplied with a safety factor (e.g., to account for control margin)
Burner Design Duty	Sum of radiant and stack losses and firetube duty transferred to the process fluid.
Firetube Duty	Sum of required process duty and heat loss through the insulated vessel wall.
Firetube Heat Flux (average)	Maximum firetube duty divided by the total installed outside surface area of the firetube.
Inlet Leg	The 1 st (hot) pass of the firetube that connects the burner and the return bend.
Remote site	A site with none of the following within a 450 m (1,500 ft) radius: • 10 or more occupied buildings or permanent campsites of any type, (e.g., residences, recreational vehicle parking spots) • Hospital • Multi-family dwelling • Church • School • Sports park • Place of business • Multi-lane roads, meaning two lanes or more in each direction; • Habitable building or public road that, in the event of a release, public receptors would be exposed to hydrocarbons >50% of the Lower Flammability Limit (LFL) or very toxic-acute substances > IDLH (Immediately Dangerous to Life or Health).
Return Leg	The 2 nd (cold) pass of the firetube that connects the return bend with the stack. The return leg may consist of multiple small diameter tubes connected to a tube sheet and a return box.
Stack Losses	Heat losses through the stack exhaust as a result of unused sensible and latent heat of the exhaust gases.
Unmanned site	A site is unmanned if the site does NOT have employees regularly assigned to work at the location on a daily shift basis (i.e., personnel are physically present on site for at least a single shift of 8 - 12 hours). If the site is operated, maintained, or serviced by employees who visit the site only periodically to check its operation and to perform necessary operating or maintenance tasks, then this is not considered a regular assigned shift basis.

Term	Definition
Very toxic (substances)	Very toxic substances are those which are as specified either “very toxic-acute”, “very toxic-chronic”, or “very toxic-environment” in Part III of DEP 01.00.01.30-Gen.

1.3.3 Abbreviations

Term	Definition
BMS	Burner Management System
ESD	Emergency Shut Down
LSL	Low-level Shutdown Switch
MDMT	Minimum Design Metal Temperature
MEG	Monoethylene Glycol
PSH	Pressure Switch High (High Pressure Trip)
PSL	Pressure Switch Low (Low Pressure Trip)
PSV	Pressure Safety Valve
TEG	Triethylene Glycol
TSO	Tight Shut-Off

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 (6).

1.5 SUMMARY OF MAIN CHANGES

This DEP is a full revision of the DEP of the same number dated February 2013. The following are the main, non-editorial changes.

Section/Clause	Change
All	This has been a major rewrite and the changes are too numerous to mention in detail.

1.6 COMMENTS ON THIS DEP

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