DEP SPECIFICATION

SPARK IGNITED AND COMPRESSION IGNITED ENGINES

DEP 31.29.80.30-Gen.

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ECCN EAR99

DESIGN AND ENGINEERING PRACTICE

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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.

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APPENDICES

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1. INTRODUCTION

1.1 SCOPE

This DEP specifies requirements and gives recommendations for stationary spark ignited gas fueled engines (SI) and compression ignited engines (CI) used to power compressors, generators, pumps, and similar services. It is intended to cover the basic engine and its essential auxiliaries produced as a proprietary item by an engine Manufacturer. This DEP does not include packaging with the driven equipment nor is it intended to cover integral engines driving compressors.

All statements regarding engine power in this DEP are in accordance with ISO 3046-1.

This is a revision of the DEP of the same number dated December 2000; 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 word **should** indicates a recommendation.

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1.3.2 Specific definitions

Term	Definition
Auxiliaries	That equipment necessary for the operation of the engine but not an intrinsic part of the engine. Auxiliaries are provided by the engine Manufacturer, but could be manufactured by a third party.
BICERA valve	Crankcase Explosion Relief device
Hazardous area	An area in which an explosive gas mixture is or may be expected to be present in a quantity such as to require special precautions for the construction, installation and use of electrical apparatus.
ISO Power	The continuous power output of the engine at rated speed at the standard ambient conditions given in ISO 3046-1 (77 °F (25 °C) and 29.61 in Hg (100 kPa)) using dry natural gas with a LHV of 920 BTU/ft^3 (36.2 mJ/Nm^3). The ISO power is to be derated to the service power at the most severe ambient conditions under which the engine will operate as defined above.
Lean and Ultra Lean Burn Engines	These engines admit as much as 75 % more air than is theoretically needed for complete combustion in the combustion chambers. The air / fuel ratio is such that the engine exhaust contains up to 9 % oxygen. The higher air to fuel ratio results in a cooler combustion chamber temperature. This, in turn, produces very low levels of NOx but may produce excessive levels of CO. The CO must then be reduced by using an oxidizing catalyst in the exhaust stream.
Package	This refers to the complete assembly of the engine, its auxiliaries, the driven machine and controls with or without a baseplate which fulfils the Principal's desire for generation of electricity or the movement of gas or liquid. The package may include any associated process equipment relating to the driven machine. Liability for the package is to the Contractor or the Principal, depending on who the contract is with.
Packager	The Packager is the party responsible for the design, fabrication, assembly and testing of a package.
Requisition	Information exchanged prior to order placement using data/requisition sheets or project specific specifications, or similar documents that describe the conditions of service of the application.
Rich Burn Engine	The “rich burn” engine is as close to a true stoichiometric engine as is possible. It is used with catalytic converters to achieve high emissions performance. It is a low technology, environmentally dirty engine. Combined with external exhaust scrubbers and catalyst after after-treatement it is capable of producing some of the cleanest emissions available. The air / fuel ratio is generally 0.5% oxygen in the exhaust. Because of the low oxygen it does not burn all of the fuel. It is normally tuned to produce equal amounts of CO and NOx. The CO and NOx are converted to CO_2 and N_2 in the catalytic converter. The disadvantages of this type of engine include the high operating cost due to the exhaust treatment required and the high maintenance cost of due to the elevated exhaust temperatures.

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Service Power	The engine power available at the most severe ambient conditions in accordance with ISO 3046-1. It is the continuous power available at the drive coupling of the engine after deduction of all losses including engine driven components and auxiliaries. The Manufacturer shall state the auxiliaries driven by the engine and their power absorbed in computing the rated power. For the computing of power as defined in ISO 3046-1, engine driven lubricating oil pumps and separate lubricators for valve gear or cylinders are regarded as engine components and not auxiliaries.
Vital Service	A service in which, if equipment fails in operation or fails when called upon to operate, an unsafe condition on the installation or jeopardy to life or major damage to the installation can be caused. The requisition will identify whether the service is vital.

1.3.3 Abbreviations

Term	Definition
BICERA	British Internal Combustion Research Association
CI	Compression ignited engine, typically a diesel fueled engine
CSA	Canadian Standards Association or CSA International is a Nationally Recognized Testing Laboratory
DF	Dual fuel engines, typically an engine that uses a porton of natural gas as an ignition source to burn a combination of natural gas and diesel. Ratios of fuels could include over 50 % natural gas, as defined as what is currently available in the industry.
ESD	Emergency Shutdown Device
FM	FM Approvals LLC is a Nationally Recognized Testing Laboratory
SAE	Society for Automotive Engineers
SI	Spark ignited engine, typically a natural gas fueled engine
UL	Underwriters Laboratories Inc is a Nationally Recognized Testing Laboratory

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 (10).

1.5 SUMMARY OF MAIN CHANGES

This DEP is a revision of the DEP of the same number dated December 2000. This revision also incorporates the contents of DEP 31.29.90.30-Gen. Since modifications to the original documents were extensive, the entire document should be reviewed.

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1.6 COMMENTS ON THIS DEP

Comments on this DEP may be submitted to the Administrator using one of the following options:

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.
DEP Feedback System (Users with access to Shell Wide Web)	Enter comments directly in the DEP Feedback System which is accessible from the Technical Standards Portal http://sww.shell.com/standards. Select "Submit DEP Feedback", fill in the online form and submit.
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 ORDER OF PRECEDENCE

In the event of conflict between documents relating to the inquiry or purchase order, the following hierarchy of documents shall apply:

- First level: purchase order and variations thereto
- Second level: data/requisition sheets and drawings
- Third level: this DEP

Any apparent conflict between the requirements of this DEP and any other relevant document in the purchase order shall be notified to the Principal for clarification purposes.

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