

DEP SPECIFICATION

**SYNCHRONOUS AC MACHINES FOR NORTH AMERICAN  
APPLICATION  
(AMENDMENTS/SUPPLEMENTS TO API 546)**

DEP 33.65.11.34-Gen.

February 2012

ECCN EAR99

**DESIGN AND ENGINEERING PRACTICE**



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## PART I INTRODUCTION

### 1.1 SCOPE

This DEP specifies requirements and gives recommendations for synchronous AC motors and generators, and their excitation systems and auxiliary equipment for use in North American applications.

Part II of this DEP contains general information and requirements. Part III is written in the form of amendments and supplements to API Std 546, 3<sup>rd</sup> Edition 2008. This DEP requires the use of the API 546 motor or generator data sheets as applicable.

The specific requirements for motors that are part of an Adjustable Speed Drive (ASD) system are included in this DEP, but a complete ASD specification is not included.

This is a revision of the DEP of the same number dated September 2011; see (1.6) 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.

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 for 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 may 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 Electrical Technical Authority 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 Electrical Technical Authority 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 which carries out all or part of the design, engineering, procurement, construction, commissioning or management of a project or operation of a facility. The Principal (or Electrical Technical Authority) may undertake all or part of the duties of the Contractor. The contractor may also be referred to as purchaser or buyer.

The **Electrical Technical Authority** is the discipline engineer appointed by the Principal and is responsible for all technical decisions associated with the work. The Electrical Technical Authority is responsible for technical integrity.

The **Manufacturer/Supplier** is the party which manufactures or supplies equipment and services to perform the duties specified by the Contractor. The Manufacturer may also be referred to as vendor or seller.

The **Principal** is the party which 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 Principal may also be referred to as the owner or user.

The word **shall** indicates a requirement.

The word **should** indicates a recommendation.

**1.3.2 Specific definitions**

| <b>Term</b>                  | <b>Definition</b>                                                                                                                                        |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contract documents</b>    | Purchase order, specification, attachments, drawings, sketches, reports or any other information provided by the Principal to the Manufacturer/Supplier. |
| <b>Extra Work</b>            | Changes initiated by the Principal after approved drawings are submitted to the Manufacturer/Supplier to commence fabrication.                           |
| <b>Offshore installation</b> | An installation located near open saliferous water, e.g. platforms, jetties, floating production storage and offloading vessels (FPSO).                  |

**1.3.3 Abbreviations**

|      |                                          |
|------|------------------------------------------|
| ACO  | Accredited Certification Organization    |
| NRTL | 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 (Part IV).

**1.5 COMMENTS ON THIS DEP**

Comments on this DEP may be sent to the Administrator at [standards@shell.com](mailto: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.

**1.6 SUMMARY OF MAIN CHANGES**

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

| <b>Section</b>       | <b>Change</b>                                                                                                            |
|----------------------|--------------------------------------------------------------------------------------------------------------------------|
| Part II,<br>2.4.2.13 | Deleted reference to OPS0055 Lifting and Hoisting Standard.<br>Added requirements for lifting and hoisting into the DEP. |

**1.7 DATASHEETS**

The following data sheets are applicable to this DEP:

|                      |                                                                     |
|----------------------|---------------------------------------------------------------------|
| DEP 33.65.11.95-Gen. | MV Synchronous Motors for applications using US customary units     |
| DEP 33.65.11.96-Gen. | MV Synchronous Motors for applications using Metric units.          |
| DEP 33.65.11.97-Gen. | MV Synchronous Generators for applications using US customary units |
| DEP 33.65.11.98-Gen. | MV Synchronous Generators for applications using Metric units       |

The applicable data sheet sections shall be completed and returned by the Manufacturer/Supplier as a part of the quotation.

## PART II GENERAL

### 1.1 STATEMENT OF COMPLIANCE

The Manufacturer of the machine(s) and its ancillary equipment shall confirm that the equipment fully complies with the quotation and the whole system is properly designed, constructed and suitable for the specified duty.

All performance values established in the pre-ordering meeting or quotation (whichever is later) shall be regarded as maximum or minimum values as applicable.

These values shall also be guaranteed by the Manufacturer under the most arduous conditions specified in this DEP and the requisition.

Tolerances shall be in accordance with this DEP and the relevant reference publications. All the equipment forming part of the order shall be tested individually and in combination at the Manufacturer's works to prove their capability and compliance with the specification and the performance data.

The Manufacturer shall comply with regulatory requirements applicable to the equipment for the location in which it will be installed; see also (Part I-1.2).

Whenever equipment proposed by the Manufacturer cannot fully meet the requirements of this specification, such exceptions shall be clearly stated in Manufacturer's proposal with cross-references to the specific sections and subsections to which exceptions are taken. No exceptions are allowed unless approved by the Shell Electrical Technical Authority in writing.

If no exceptions are taken to these specifications or drawings, a specific statement to that effect shall be included.

If any one of the components or the whole system does not comply with the specification and any agreed amendments, the Manufacturer shall rectify and re-test the machine(s) within a mutually agreed upon time.

### 1.2 LIFETIME AND RELIABILITY

The equipment (including auxiliaries) covered by this DEP shall be suitable for the specified operating conditions. Equipment shall be designed and constructed for a minimum service life and uninterrupted continuous operation as specified in API Std. 546, Section 2.1.1. It is recognized that this is a design criterion and that uninterrupted operation for this period of time involves factors beyond the Manufacturer's control.

### 1.3 PRE-ORDERING MEETING

If deemed necessary by one of the parties involved, a pre-ordering meeting shall be arranged to define clearly the overall scope of supply, individual responsibilities and test methods.

### 1.4 STUDIES

For large machines, one or more specific studies and/or reviews may be required. Requirements of these studies shall be given by the Principal in the notes section on page 11 of the data sheets. The Principal and the Manufacturer and, if necessary, other parties shall participate in these studies at a mutually agreed time.

Examples of studies/reviews that may be specified are:

- SAFOP (Safety and Operability study – electrical focus)
- HAZOP (Hazard and Operability study – process focus)
- IPF (Instrumented Protected Function study)
- SRCM (Shell Reliability Centred Maintenance study)

## 1.5 BULLETS

API Std. 546 Clause 1.1.1 Note 1 describes the use of bullets to indicate where the purchaser is required to make a decision or provide information. The amendments and supplements in this DEP do not supersede the bullets (•) shown in API Std. 546 but they do provide guidance on the decisions to be made.

**PART III AMENDMENTS/SUPPLEMENTS TO API 546, 3<sup>RD</sup> EDITION SEPTEMBER 2008****1 GENERAL****1.2 ALTERNATIVE DESIGNS**

*Add to this clause:*

Any deviation from this standard requires prior written approval from the Shell Electrical Technical Authority.

**1.3 DIMENSIONS AND STANDARDS****1.3.2 Delete from this clause:**

When specified by the purchaser, the corresponding international standards are acceptable for use as alternatives; however, this must not be construed that they are identical to the North American standards.

NOTE: The purchaser should be aware that specific requirements contained within corresponding standards may differ.

**1.3.3 Add new clause:**

For Canadian Applications the motor shall meet the requirements of CSA C22.2, No. 100, *Motors and Generators* and where applied in Zone 1 hazardous locations, CSA C22.2, No. 145, *Motors and Generators for Hazardous Locations*. In Zone 2 hazardous locations, the requirements of CSA C22.1, para. 18-168 shall be met. If the motor is supplied by an adjustable speed drive, the provisions of CSA C22.2, No. 100, para. 12 shall also apply.

**1.4 CONFLICTING REQUIREMENTS**

*Replace this clause with:*

In the event of conflicts between and/or among documents, the Manufacturer shall contact the Contractor for resolution. In general, the order of precedence in resolving any conflict between and/or among the Purchase Order, this specification, the above referenced industry codes and standards, and the equipment data sheets shall be (listed from highest authority to lowest):

- Purchase Order
- Motor Data Sheet
- This DEP
- Industry Codes and Standards

**1.5** DEFINITION OF TERMS**1.5.7 Owner**

*Replace this clause with:*

Owner is also known as the Principal, as defined in (Part I - 1.3) of this DEP.

**1.5.13 Purchaser**

*Replace this clause with:*

Purchaser is also known as the Contractor, as defined in (Part I -1.3.) of this DEP.

**1.5.21 Vendor (also known as supplier)**

*Replace this clause with:*

Vendor is also known as the Manufacturer/Supplier as defined in (Part I - 1.3.) of this DEP.