

DEP SPECIFICATION

AREA CLASSIFICATION AND ELECTRICAL EQUIPMENT PLACEMENT FOR NORTH AMERICAN APPLICATION (AMENDMENTS/SUPPLEMENTS TO API RP 505 AND API RP 500)

DEP 80.00.10.13-Gen.

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DESIGN AND ENGINEERING PRACTICE

DEM1



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PART I INTRODUCTION

1.1 SCOPE

This DEP specifies requirements and gives recommendations for the determination of hazardous (classified) areas in facilities handling flammable fluids and combustible dusts.

This DEP provides requirements and recommends practices for electrical equipment placement related to hazardous (classified) locations in petroleum facilities.

This DEP is used in conjunction with DEP 33.64.20.10-Gen. for the design of electrical installations in North America.

This DEP is based on the American Petroleum Institute API RP 505, 1st edition, November 1997, reaffirmed 2013 and API RP 500, 3rd edition, December 2012. (Part III) of this DEP amends, supplements and deletes various clauses of American Petroleum Institute API RP 505, 1st edition, November 1997, reaffirmed 2013 and API RP 500, 3rd edition, December 2012. (Part III) follows the clause numbering of API RP 505 and API RP 500 for easy reference.

All clauses of API RP 505 and API RP 500 not modified by this DEP remain valid as written.

In North America, and global installations based on North American standards, the classification of process areas for the purpose of specifying electrical equipment is typically performed in accordance with API RP 500 or API RP 505, which are industry consensus standards. Elsewhere in the world, the classification of process areas is typically performed in accordance with EI 15. For the classification of areas based on EI 15, refer to DEP 80.00.10.10-Gen. While the fundamentals of flammable vapor ignition by electrical equipment are similar, equipment protection techniques and how equipment is tested and certified differ globally. These differences are reflected in how areas are classified.

For drilling rigs, area classification requirements may be in accordance with either this DEP or DEP 80.00.10.10-Gen. The selection of which DEP to be applied is not dependent on the physical location of the facility. However, it is important that the selected DEP (one or the other) is applied in its entirety.

This DEP does not apply to temporary electrical installations under the control of a gas-free permit. Refer to local permit-to-work and gas-free permit procedures for acceptable installation methods.

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 2017; 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 permanent and temporary installations in oil refineries, chemical plants, oil sands facilities, gas plants, exploration and production facilities as well as distribution storage depots and installations. 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 capitalized 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
Area Classification	Method of analysing and classifying the environment where explosive gas atmospheres or combustible dusts may occur so as to facilitate the proper selection and installation of equipment to be used safely in that environment. Area classification considers the probability that explosive gas atmospheres can be present and the ignition characteristics of such gases.
Authority Having Jurisdiction (AHJ)	Organization, office, or individual responsible for enforcing the local regulatory requirements. Consult with the Principal for the applicable AHJs for the specific installation.
Fire Area	A plant (surface) area where a sustained and intense fire is considered credible.
General-purpose Electrical Equipment	Electrical equipment that is not tested and suitable for use in hazardous (classified) locations.
Manifold	Assembly of pipe flanges, valves, and miscellaneous fittings used to collect or distribute a common fluid or gas to or from a multiple of flowlines.
Suitable	Indicates equipment that is approved, listed, certified, or otherwise determined to be safe by a Nationally Recognized Testing Laboratory (NRTL) in accordance with nationally recognized product safety standards for the hazardous location listed.

Term	Definition
Unprotected Fired Equipment	Fired vessel that is not designed to eliminate the air intake, exhaust and hot surfaces as sources of ignition. Protected fired equipment is normally provided with flame arresters, stack temperature shutdowns, forced draft burners with safety controls, spark arresters and insulation/cladding of external surfaces.

1.3.3 Abbreviations

Term	Definition
SIF	Safety Instrumented Function (previously referred to as IPF in Shell DEPs)
TA	Technical Authority

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 (PART V).

1.5 SUMMARY OF MAIN CHANGES

This DEP is a revision of the DEP of the same number dated February 2017. The following are the main non-editorial changes:

Section/Clause	Change
Part II, 2	Added guidance for scope not covered by API RP/505/API RP 500
Part IV	Content has been deleted or moved to DEP 33.64.20.10-Gen. References are to section numbers in the previous version
2.1	Content including SHALL [PS] moved to DEP 33.64.20.10-Gen., Section 6.1.1
2.2	Content including SHALL [PS] moved to DEP 33.64.20.10-Gen., Section 6.1.2 and 6.3.2
3	Content moved to DEP 33.64.20.10-Gen., Section 6.1.3
4	Content moved to DEP 33.64.20.10-Gen., Section 6.2.1
5	Content moved to DEP 33.64.20.10-Gen., Section 6.4.4
6	Content including SHALL [PS] moved to DEP 33.64.20.10-Gen., Section 4.15.1
7	Renumbered as Section 1 of Part IV. Section 7.2 on Flare Stacks moved to DEP 33.64.20.10-Gen., Section 6.10

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://swwww.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 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.

PART II GENERAL REQUIREMENTS

1 INTRODUCTION

Area classification provides a basis for the selection of electrical equipment appropriate for the defined areas and can be used as criteria for the safe positioning of other potential or continuous sources of ignition, (e.g., fired heaters and internal combustion engines).

Area classification refers to normal operating conditions and does not apply to catastrophic situations such as well blowouts or the rupture of process vessels. These extreme conditions require emergency measures to mitigate the risk.

1. To permit the proper selection of electrical apparatus in areas where the presence of flammable gas or combustible dust create a risk of ignition, area classification drawings SHALL [PS] be prepared.

2 APPLICABILITY OF API RP 505/API RP 500

1. New facilities that handle flammable and combustible fluids shall be classified in accordance with API RP 505/API RP 500, as amended and supplemented by (Part III) of this DEP as follows:
 - a. Use API RP 505 in locations applying the North American “zone method” of classifying areas.
 - b. Use API RP 500 in locations applying the North American “division method” for classifying areas.
2. The choice between using the zone and division methods for classifying areas should include the following:
 - a. a review of the current practices at the location, and
 - b. an evaluation of the economic benefits of both methods.
3. For new installations, only one method shall be used at the same location (i.e., no mixing of divisions and zones).
4. For brownfield projects, if it is intended to reclassify an existing installation on the basis of this DEP, reclassification should cover the entire installation.

This is to prevent the application of multiple area classification standards within the same installation.

5. In areas where national or local codes other than API RP 505/API RP 500 apply, these codes shall be reviewed and supplemented with the requirements of this DEP.
6. If API RP 505/API RP 500 do not provide sufficient guidance to properly classify an area, one of the following alternatives should be used:
 - a. use international area classification standards such as EI 15 or IEC 60079-10-1 applicable to the installation;
 - b. conduct dispersion modelling based on the anticipated site conditions and release rates.

EI 15, Table C13 provides guidance on hole sizes for dispersion modelling.

3 APPLICABILITY OF OTHER STANDARDS

1. For additional information for classifying areas containing combustible dusts, refer to NFPA 499.
2. For additional information for classifying chemical plants, refer to NFPA 497.