

DEP SPECIFICATION

NAVIGATIONAL AIDS FOR FIXED OFFSHORE STRUCTURES

DEP 33.80.00.30-Gen.

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DESIGN AND ENGINEERING PRACTICE

DEM1



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1. INTRODUCTION

1.1 SCOPE

This DEP specifies requirements and gives recommendations for the design and manufacture of audible and visual navigational aids systems for permanent use on offshore fixed structures, including floating structures that are permanently moored or tendered.

Navigational aids comprise foghorns, white main and secondary marine lanterns, radar beacons, red subsidiary marine lanterns, wave-off lights, red obstruction lights, helideck perimeter lights, helideck floodlights and illuminated windsocks. Apart from the white main marine lanterns, all are fed from UPS systems.

Temporary navigational aids, equipment associated with platform or structure identification, and installations specifically constructed as aids to navigation are excluded from the scope of this DEP.

Information relating to a specific installation should be given in the project specification or requisition.

The light and sound signal characteristics requirements for some countries are summarised in Appendix 1.

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 January 2010; 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 authorization to any documents, data or information to which the DEPs may refer.

This DEP is intended for use in facilities related 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 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 capitalised term **SHALL [PS]** indicates a process safety requirement.

The word **should** indicates a recommendation.

1.3.2 Specific definitions

Amended per
Circular 71/12

AtoN	Aids to Navigation
Autonomy time	duration for which the battery can supply its rated load within its specified voltage limits
AWG	American Wire Gauge
CAA	Civil Aviation Authority
candela (cd)	expression of light intensity
certificate	document issued by a recognised authority certifying that it has examined a certain type of apparatus and, if necessary, has tested it and concluded that the apparatus complies with the relevant standard for such apparatus
certificate of conformity	certificate stating that the electrical apparatus complies with the relevant standards for use in potentially explosive atmospheres.
decibel (dB)	expression of sound pressure level (measured at a distance of 1 m (3 ft)
declaration of compliance	document issued by the Manufacturer declaring that the electrical apparatus complies with the requirements of IEC 60079
effective intensity	effective intensity calculated in accordance with the IALA Recommendations E-200-4
expected lifetime	time during which the system remains suitable for the application for which it was made, provided it is used, regularly inspected, examined and serviced in accordance with the Manufacturer's instructions and with replacement of parts subject to mechanical wear
FAA	Federal Aviation Administration
hazardous area, (IEC 60050, Chapter 426-03-01)	area in which an explosive gas atmosphere is or may be expected to be present in quantities such as to require special precautions for the construction, installation and use of electrical apparatus
Helicopter Landing Officer (HLO)	a platform based officer, responsible for the safe landing of a helicopter.
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
Limited Obstacle Sector, (LOS)	A limited obstacle area on a helicopter deck, having an angle of 150° on an elevated helicopter deck where obstacles of a certain height are allowed.
marking	data put on the electrical apparatus by the Manufacturer giving information for safe use of the apparatus
mean high water spring (MHWS)	mean value of the high water spring tides

Morse Code “U”	a signal to the mariner (dot-dot-dash) indicating that the platform is unable to manoeuvre.
Nautical Mile (NM)	1852 m (6076 ft)
NCCP	Navigational aids Central Control Panel
nominal value, (IEC 60050, Section 151-16-09)	suitable approximate quantity value used to designate or identify a component, device or equipment
offshore installation	installation located near open saliferous water, e.g. platforms, jetties, floating drilling/production facilities
racon	radar beacon
rated value, (IEC 60050, Section 151-16-08)	quantity value assigned, generally by a manufacturer, for a specific operating condition of a component, device or equipment
Safe Landing Area (SLA)	an obstacle free area on a helicopter deck, having an angle of 210° where obstacles higher than 250 mm (10 in) are not allowed.
test report	document prepared by the Manufacturer indicating in detail the tests and verifications to which the electrical apparatus has been subjected and their results
usual range	range of a sound signal calculated in accordance with the IALA recommendation E-109
vital service	service which, if failing in operation or when called upon, can cause an unsafe condition of the process and/or electrical installation, jeopardise life, or cause major damage to the installation
zone 1 (in the classification of hazardous gas areas), IEC 60050, Chapter 426-03-04	area in which an explosive gas atmosphere is likely to occur in normal operation

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 (11).

1.5 SUMMARY OF MAIN CHANGES

This DEP is a revision of the DEP of the same number dated January 2010. A summary of the main technical changes is given below:

Subject	Section
Figure 1&2 deleted, duplication	Fig 1 section 2.4.1
Note removed (duplication)	Section 2.4.1
Performance requirements for maritime lights to be as that indicated in appendix 1	Section 3.1.1 to 3.1.4
Requirement for Fresnel removed as LED can be used	Section 4.1.1
Minimum number of terminals now 10 from 25%	Section 4.5
Minimum number of cable glands now four M25 instead of 25%	Section 4.6

Subject	Section
Statement on integral control gear removed, redundant statement	Section 6.2
Statement on helideck lights and bird spikes removed, as these are only maximum 250 mm (10 in) above deck	Section 6.2
Reference to Xenon stroboscopic discharge lamp removed as LED technology used Comment on the non use of status lights if platform is not ready removed	Section 6.3
Requirement for 50cd modified to be in line with CAP 437 requirements	Section 7.1
Equipment located in hazardous area to be designed to be proofed against heavy vibration removed.	Section 7.2
CAP437 latest edition updated	References
Letter ref 10A/253/16/3Q deleted as included in CAP437	References
IALA Recommendation for the marking of man-made offshore structures, updated to latest edition	References
Appendix 1 updated	Appendix 1

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

1.7 DUAL UNITS

**Amended per
Circular 71/12**

Dual units have been incorporated throughout this DEP.

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.

2. BASIC REQUIREMENTS

2.1 GENERAL

The navigational aids system SHALL [PS] be installed and designed in accordance with this specification and suitable for continuous operation at full load within the specified service conditions. Special requirements shall be stated in the requisition.

The navigational aids system shall be designed for an expected lifetime of 20 years independent on the type of battery system adopted.

The navigational aids system shall have a minimum availability of 0.998 and a minimum Reliability of 0.84 in accordance with IALA Guideline No. 1035.

In addition to the requirements stated in the requisition, the following drawings should be supplied to the Manufacturer:

- a layout drawing showing the proposed location of the individual equipment items such as lanterns, sound signals, aeronautical obstruction lights;
- a helideck layout showing the outlines and configuration of the helideck and the obstacle-free zones;
- a block diagram indicating the main and alternative power supply units and the basic control, alarm and trip functions.

2.2 SAFETY

The navigational aids system shall be designed to avoid any risk of short circuits and to ensure personnel and operational safety under all conditions of operation, inspection and maintenance.

Components shall be capable of withstanding the thermal and dynamic stresses resulting from internal and external short circuits and circuit switching operations, etc. Damage arising from component failure should be confined to the component concerned.

Component materials shall be non-flame propagating.

Electrolytes, e.g. for capacitors, shall be non-toxic and totally free from PolyChlorinated Biphenyls (PCBs).

2.3 SERVICE CONDITIONS

The equipment shall in all respects be suitable for operation in service conditions typically found on offshore structures.

Unless otherwise specified, the following conditions shall apply:

2.3.1 Site Conditions

The conditions pertaining to the location where the equipment is to be installed shall be specified in the requisition.

2.3.2 Location

The control panel and battery shall be located in a closed, ventilated room or alternatively the battery shall be located in Ex e ventilated battery boxes unless otherwise specified in the requisition.

All other equipment shall be located outdoors in the open air.

2.3.3 Area Classification

The equipment and all its accessories shall be suitable for the area classification as specified in the requisition. For the additional requirements for navigational aids units in hazardous areas see (5).

2.3.4 Altitude

The equipment and all its accessories shall be suitable for altitudes up to 200 m (656 ft).

2.3.5 Electricity Supply System

The AC supply to the navigational aids control panel shall be single-phase or symmetrical three-phase with a nominal voltage and frequency as indicated in the requisition. The waveform of the input voltage, with the navigational aids system disconnected, will be sinusoidal. The input supply variations shall be limited under steady state conditions to:

nominal system voltage	±10%
nominal system frequency	±5 %

In addition to the above variations, the input voltage may be subject to:

- transients comprising voltage depressions up to 20% of the nominal voltage during motor starting
- voltage interruptions during system short circuits.

Transient high-frequency voltages of up to 2 kV peak may also be superimposed on the input voltage as a consequence of system switching operations, etc.

The requisition shall state the method of neutral earthing of the incoming AC supply to enable the Manufacturer to select the proper insulation level.

The battery backed-up DC supply to the sound signal and light control panel shall be floating and equipped with a sensitive earth fault monitoring system or shall be negatively grounded.

2.4 DESCRIPTION OF THE NAVIGATIONAL AIDS SYSTEM

The navigational aids system for offshore installations shall comprise (in part or total as defined in the project specification or requisition) the following:

- maritime audible/visual navigational aids;
- maritime radar beacon (Racon);
- power supply units.

The navigational aids system shall comply with the IALA O-139 and CAP437 for helicopter operations.

The navigational aids shall be purchased as integral packages complete with all wiring between those panels, which are mounted on a common frame. Provision shall be made to accept interconnecting cables provided by others.

The Manufacturer shall provide type approval for each individual AtoN from the relevant local authorities or an independent third party.

2.4.1 Maritime Visual Navigational Aids

The visual navigational aids system may include the following units:

- One or more main lights. If more than one main light is required they shall operate in unison. The main lights shall be fitted in such a way that at least one light can be seen by a passing mariner from any direction in the horizontal plane. The number of lights depend on the shape and dimensions of the platform.
- One or more secondary lights with intensity less than the main lights. The secondary lights shall automatically come into operation upon failure of the main lights.

- One or more subsidiary lights which mark the horizontal extremities of the structure, if not covered by the main and secondary lights specified above.

The lights shall be arranged so that the main and subsidiary lights provide the normal marking. In the event of the main light failing (whether due to a fault or a mains power failure) the secondary light shall take over its duty. The subsidiary lights shall be unaffected by failure of the main lights.

The main and secondary lights (if required) shall be located in the same place. A combined single-lift unit is preferred. The following configurations are possible depending on the local marine requirements (see Appendix 1).

The main (if secondary not fitted), secondary and subsidiary lights shall be powered and controlled from the NCCP with status and alarm annunciators and sub-distribution equipment. Codes and code monitors where required need to be incorporated into the overall AtoN system.

NOTE: See (3.1.2) for power and coding requirements for main lights.

2.4.2 Maritime Audible Navigational Aids

One omni-directional type sound signal may be used for relatively small structures where sound propagation is unimpeded in all directions.

Two directional type sound signals may be used on relatively large structures or bridge-connected platform configurations.

The main and secondary sound signals shall be located in the same place. A combined single-lift unit is preferred.

The sound signals shall be powered and controlled from the NCCP with status and alarm annunciators and sub-distribution equipment. Codes and code monitors need to be incorporated into the overall AtoN system. It shall be stated on the requisition if a visibility detector for automatic start/stop of the sound signals is required, see (3.2.2).

2.4.3 Power Supplies

The power supplies shall consist of:

- a normal AC power supply (emergency source if available), without battery back-up, for main lights if they are 12,000 cd effective intensity (see appendix 1)
- a battery backed-up power supply for vital services such as main lights (if main lights are of 1,400 cd effective intensity (10 NM), see appendix 1), sound signals, secondary lights, subsidiary lights and associated controls.

The battery backed-up power supply system shall comply to DEP 33.65.50.31-Gen. It shall be dedicated to navigational aids consumers and shall be assembled as part of the NCCP.

Photo-Voltaic power supply systems (PV systems) shall comply with DEP 33.65.60.30-Gen., IALA specification for PV systems and the relevant requisition.

2.5 INFORMATION TO BE SUBMITTED WITH THE TENDER

The Manufacturer shall submit substantiating documentation for the AtoN, which shall include a description of the design, operation, construction, performance and maintenance aspects of the equipment.

The information shall include relevant calculations of the nominal battery capacity and the number of battery cells that are needed to meet the specified performance requirements of the navigational aids system.

The Manufacturer shall include information on the voltage and current of the lights and sound signals.

The Manufacturer shall submit the information requested on the following documents with the tender;

- DEP 33.80.00.94-Gen., requisition for navigational aids,

- DEP 33.65.50.93-Gen. requisition for DC UPS unit,

The Manufacturer shall state in the requisition the country of origin of the main parts.

For maintenance back-up at site, the Manufacturer shall indicate the nearest service organisation for the location at which the system will be installed.

The Manufacturer shall confirm in writing that the navigational aids system fully complies with this DEP and the requisitions, or shall provide a detailed listing of proposed deviations.

The Manufacturer shall submit copies of the light intensity and sound pressure test reports of all quoted lights and sound signals, issued by the relevant and acceptable institution.

The Manufacturer shall submit availability and reliability calculations, including the assumptions used in the calculations.