

GENERAL SPECIFICATION

SURVEYS

GS EP GEO 202

ROV Survey Work for the Installation and/or the Inspection of Offshore Structures and Flowlines

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1. Scope

This General Specification describes the survey work to be carried out in relation with the development of offshore oil & gas field including pre-lay survey of flowline route, flexible lines and umbilicals, mooring legs of production floating structure, subsea structures installation, as-laid and as-built surveys of all infield system flowline, flexible lines and umbilicals, mooring legs of fixed floating structure, subsea structures, export lines. When sea lines (flowline, flexible, umbilical, cable) require to be trenched and/or covered by dumped material, additional surveys are required.

This General Specification describes the tasks to be performed in order to successfully carry out ROV surveys and inspections, in full accordance with the state of the art practice and to the satisfaction of the Company.

This General Specification outlines the minimum requirements for ROV survey work with associated charting and reporting. It defines the content and summary of Survey reports.

This specification mainly applies to:

- The pre-lay survey performed to confirm that the laying corridors, the installation sites and the existing structures are clear of debris that may prove hazardous to the operations prior to the start of the installation operations
- Accurate monitoring of the touchdown point while laying products at sea within the lay corridor, including curves, and at the required distance from existing lines and structures
- Visual inspection, accurate positioning and mapping of all installed pipelines, flowlines, umbilicals and structures to be issued immediately after laying / installation is complete
- Final inspection, positioning and mapping of all installed pipelines, flowlines, umbilicals, risers and moored subsea structures, after all connections, precommissioning activities and remedial work have been performed
- Cathodic Protection (CP) survey that may be required at the same time.

Each operation must be covered by a separate report which will therefore be prepared and issued as a preliminary report onboard the survey vessel, then issued as final reports, within a month. This applies to:

- Pre-lay survey
- Permanent structure installation
- Pipelines, flowlines and umbilical laying including Inline structures
- Mooring legs of large floating structures installation
- Mooring of large floating structures FPSO, FSO, FPU, OOB, etc.
- Export line installation
- Riser installation
- Cathodic protection inspection.

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And in specific cases, to:

- Trenching
- Backfilling or material dumping
- OOS survey for upheaval and lateral buckling assessment.

Finally, after completion of all installation works, after tie-in, precommissioning activities and remedial works have been completed, an "as-built" report shall be issued, comprising all positioning and survey results. It will provide the basis of the reference document to be used for later inspection.

This General Specification shall be read in conjunction with the Particular Specifications valid for the project.

All positioning minimum requirements are detailed in Company specification [GS EP POS 001](#) and [GS EP POS 002](#).

Survey sensors specification requirements for ROV surveys are detailed in [GS EP GEO 207](#).

Pre-engineering survey, which is carried out as a basis for Front End Engineering Design (FEED) is covered by Company specification [GS EP GEO 201](#).

2. Reference documents

The reference documents listed below form an integral part of this General Specification.

In addition, applicable codes and Standards which are to be used in conjunction with this specification will be listed in the Particular Specification.

The order of precedence of the applicable documents shall be:

- The Particular Specification
- The present General Specification
- The Codes and Standards in reference.

Where this specification states no overriding requirements, the referenced Codes and Standards shall apply in full. Standards equivalent to those referenced herein shall not be substituted without written approval from the Company.

External Documents

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the effective date of this document.

Reference	Title
IAGC	Marine Geophysical Operations Safety Manual 7 th edition, 1991
ISO 9000	Quality Management Systems - Fundamentals and Vocabulary
ISO 9001	Quality management systems - Requirements

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Reference	Title
OGP Guidelines	Guidelines for GNSS positioning in the oil & gas industry - - June 2013
OCP Report No 373-19	Guidelines for the conduct of offshore drilling site survey
OGP Report No 213 6.38	Service Vessel Marine Safety Guidelines
OGP Report No 343	Managing Health for field operations in oil & gas activities

Total General Specifications

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published in the applicable yearly collection.

Reference	Title
GS EP COR 502	Control by electrical measurements of cathodic protection of submerged pipelines
GS EP GEO 110	Requirements for Offshore Survey Vessels
GS EP GEO 201	Offshore Geophysical Site Investigation
GS EP GEO 203	Geophysical survey for offshore flowline inspection
GS EP GEO 207	ROV Seabed Survey
GS EP GEO 401	GIS requirements for engineering site surveys and studies
GS EP GEO 402	GIS Requirements for Field Development Project
GS EP GEO 501	Meteorological and Oceanographic survey
GS EP GEO 505	Monitoring of Metocean Conditions for Offshore Units
GS EP LSO 306	Selection and Operation of Dynamically Positioned Vessels
GS EP POS 001	Offshore surface positioning works
GS EP POS 002	Subsea positioning works
GS EP POS 004	The use of Differential Global Navigation Satellite System
GS EP SPS 027	WOROV spread minimum requirements

3. Abbreviations

BATHY-SYSTEM	System coupling Digiquartz pressure sensor and sounder
CTD	Conductivity, Temperature, Density
C-O	Calculated minus Observed correction
CRS	Coordinate Reference System
DCC	Distance Cross Course
DHSS	Dual Head Scanning Sonar

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DTM	Digital Terrain Model
DGPS	Differential Global Positioning System
DP	Dynamic Positioning
DVL	Doppler Velocity Log
FPSO	Floating production storage and offloading
FPU	Floating Production Unit
FSO	Floating Storage Unit
GIS	Geographical Information System
HD	High definition
ILT	In Line Tee
INS	Inertial Navigation System
ITP	Inspection and Test Plan
KP	Kilometre Post
LARS	Launch and Recovery System
LAT	Lowest Astronomical Tide
LBL	Long Base Line
MBES	Multi Beam Echo Sounder
MRU	Motion Reference Unit
OAS	Obstacle Avoidance Sonar
OD	Outside Diameter
OOB	Offloading Offshore Buoy
OOS	Out Of Straightness
PLET	Pipe Line End Termination
QC	Quality Control
RAID	Redundant Array of Independent/Inexpensive Disks
SBP	Sub Bottom Profiler
SDU/A	Subsea Distribution Unit/Assembly
SIT	Silicon Intensifier Target
SSS	Side Scan Sonar
SV	Sound Velocity
TDP	Touch Down Point
TMS	Tether Management System
USBL	Ultra Short Base Line
WOROV	Work Class Remotely operated Vehicle

4. Scope of work

4.1 Shallow water requirements

In water depth shallower than 15 m, Contractor may consider performing pre-lay survey and as-laid survey using conventional geophysical sensors from a small surface vessel.

4.1.1 Pre-lay survey

Not earlier than one month before the start of the laying operation (two months for deep water developments greater than 300 m water depth), a survey using MBES, SSS and SBP shall be performed along the intended routes, in order to determine precisely the position and dimensions of any obstacle, buried or unburied, natural or man-made obstructions (wrecks, debris, depressions, rock outcrops, etc.) within the laying corridor.

When buried pipes or power cable are present, high resolution magnetometer shall be used in order to provide a good cartography of their position.

When an anchored laying barge is involved in operation, an additional SSS survey shall be carried out over the areas of interaction of barge anchors and anchor wire with the seabed.

The minimum requirements for geophysical surveys are detailed in Company General Specification [GS EP GEO 201](#).

4.1.2 As-laid survey

As-laid Survey shall be carried out using MBES and SSS.

Free spans shall be identified using SSS imagery. SSS fish shall be positioned using an USBL system.

The minimum requirements for geophysical surveys for flowline inspections are detailed in Company General Specification [GS EP GEO 203](#).

4.2 Standard requirements

At each step of the field installation, surveys shall be carried out with a survey vessel and/or an Inspection/ Work ROV, fully equipped with required survey sensors and positioned with an USBL system, or with an LBL array according to installation tolerances as defined in the Particular Specifications valid for the project.

The minimum requirements for ROV survey sensors are detailed in Company General Specification [GS EP GEO 207](#).

4.2.1 Pre-lay survey

Not earlier than one month before the start of the laying operation (two months for deep water developments greater than 300m water depth), a pre-lay survey over a ± 15 m wide corridor shall be carried-out with a ROV equipped with OAS, Video, BATHY-SYSTEM and pipetracker.

The speed of the ROV shall be maintained below 1 knot in order to obtain the best possible recording quality. The requirements include, but are not limited to the following:

- Continuous sonar and visual inspection, production of commented HD colour video recording of the flowline route as per latest revision of alignment sheets
- Visual inspection and commented HD colour video recording of any subsea structure

- Visual identification and positioning of any obstacle or obstruction, located close to the installation areas, identified during pre-engineering survey, any sonar target or structure detected during the actual survey
- Buried lines and/or obstacles detection with pipetracker
- Visual inspection and positioning of any existing flowline, electrical cable or umbilical
- Selected still photographs or good quality video-grabs in areas of interest
- Trench profiling along the route
- Cartography of the ROV survey plot and event listing.

The video recordings and video-grabs shall include at least the following overlaid information: identification, date, time, projected coordinates (Easting and Northing), KP of intended route, ROV heading, ROV depth and ROV altitude above seabed.

In areas where permanent poor visibility does not allow carrying out a visual inspection, the video recording shall include sequences with OAS recording and SSS. Where poor visibility is expected, Contractor shall provide high definition 2D imaging sonar.

4.2.2 TDP monitoring

During laying operations, a ROV shall monitor continuously, the flowline touchdown position in order to ascertain engineering parameters are satisfied, maintain a minimum distance from existing structures, perform crossing monitoring, laying over mattresses, etc.

This task shall be performed continuously either directly from the installation vessel or from the survey vessel with video transmitted to installation vessel.

Offset from existing structures shall be measured, directly by ROV positioning system or using the OAS. If an existing flowline is buried, it shall be relocated at regular intervals, using the pipetracker, in order to keep the required minimum distance from the flowline being laid.

4.2.3 As-laid survey

As-laid survey shall be performed as a standalone survey different from TDP monitoring for rigid flowline installation.

For flexible / umbilical lines and flying leads, the as-laid surveys data can be produced from the data recorded during TDP monitoring if the product are naturally buried in soft sediment during laying activity.

As-laid survey shall be carried-out with ROV equipped with OAS, DHSS, BATHY-SYSTEM, dual boom cameras and pipetracker positioned from survey vessel immediately after the completion of the installation of each sea line.

The speed of the ROV shall be maintained below 1 knot in order to obtain the best possible recording quality.

The aim of this survey is to provide the following information:

- Integrity of the coating (and strapping if flowlines are laid in bundles)
- Integrity, functioning and projected coordinates (Easting and Northing) of all anodes
- Evidence of any anomaly such as damage to coating, anodes, obstructions or obstacles within the corridor