

GENERAL SPECIFICATION

SURVEYS

GS EP GEO 501

Meteorological and Oceanographic survey
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1. Scope

This General Technical Specification covers both land surveys and offshore surveys, differences between requirements of each type of survey being highlighted when necessary.

A meteorological survey at a land or offshore location consists of collecting wind and meteorological measurements in order to characterize the local climatology for a project.

A metocean (METeorological-OCEANographic) survey consists of collecting not only wind and meteorological measurements, but also waves, current, tide and other oceanographic parameters in order to characterize the metocean parameters for an offshore project.

The general objective of a meteorological (land) or metocean (offshore) survey is to develop a comprehensive meteorological and, if applicable, oceanographic database relevant to a specific project. It may consist of:

- Comprehensive survey required for a development project, for instance in a data sparse area. Generally, the measurement of meteorological and, if applicable, oceanographic parameters for at least one year is necessary in order to capture a representative range of conditions in the measurements.
- Complementary survey required for the verification of assumptions in the design basis of a project. It can be limited to one or two months, for example a tide or tidal current survey.
- Spot checks for particular projects, for example, measurements of seawater temperature and salinity profiles or measurements of sea water turbidity.

This General Technical Specification describes the general requirements for data acquisition, processing, analysis and reporting. It indicates the minimum standards required by Company. However, Company may specify additional requirements, as detailed in the Particular Technical Specifications.

The duration of the data acquisition, the number of parameters measured and the equipment used depend on the objective of the survey, which is described in the Particular Technical Specification issued as part of the Invitation to Tender (I.T.T).

The work defined in this specification shall be performed in accordance with the Contract.

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2. Reference documents

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

External Documents

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

Reference	Title
IOGP Report 447	HSE guidelines for metocean surveys including Arctic areas - Oct. 2011
ISO 19901-1	Petroleum and natural gas industries - Specific requirements for offshore structures - Part 1: Metocean design and operating conditions
WMO no. 8	Guide to Meteorological Instruments and Methods of Observation - 2008

Total General Specifications

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and addendums, is the latest revision published.

Reference	Title
GS EP COR 100	Cathodic protection of offshore structures
GS EP COR 201	Galvanic anodes
GS EP GEO 504	Comprehensive evaluation of metocean conditions
GS EP GEO 505	Monitoring of Metocean Conditions for Offshore Units
GS EP POS 001	Offshore surface positioning works
GS EP POS 002	Subsea positioning works
GS EP POS 003	Land surveying and positioning works
GS EP STR 203	Forged materials for steel structures
GS EP STR 661	FPSO - Design requirements for mooring and anchoring systems

3. General conditions

The general conditions of meteorological (land) or metocean (offshore) surveys are specified hereunder.

English is the required language for any documentation and correspondence.

If a subcontractor is involved, they shall comply with the same requirements as Contractor.

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3.1 Survey work

The work defined in this specification shall include all works necessary for, or incidental to, the execution of meteorological or metocean surveys for the project.

The work shall include, but not necessarily be limited to the following:

- Meteorological and, if applicable, oceanographic data acquisition
- Analysis of recorded meteorological and, if applicable, oceanographic data
- Preparation of reports providing sufficient information for the project engineering studies
- Supply to Company of recorded meteorological and, if applicable, oceanographic data.

3.2 Survey requirements

Contractor shall ensure that sufficient data are collected to produce a meaningful analysis, as defined in this General Specification and in the Particular Technical Specification. Contractor shall take all reasonable precautions to ensure the integrity, accuracy and security of the equipment, measurements and the processed data.

All data, all results and all information that are provided by Contractor to Company shall be checked and approved by a recognised meteorological or oceanographic expert, whose resume, details and certificates shall be provided in Contractor's offer.

3.3 Personnel

Contractor personnel shall always note that the survey or survey preparation area may cover private land and that the personnel must behave correctly with owners and property even though necessary authorisation to enter property has been obtained.

Contractor shall demonstrate that the personnel involved in the metocean survey answer all requirements listed in section 5.5 of the [OGP Report 447](#).

If multiple vessels are proposed for the survey, each vessel shall have a designated survey leader in addition to an overall survey leader.

3.4 Working environment

3.4.1 General requirements

Contractor shall take into account the local working environment for the definition and the design of the survey, for the logistics, for the maintenance of equipment and for the surveillance of equipment. Where possible Company will provide details of environmental conditions and climate in the survey area. Contractor can also consult the Regional Annexes of [ISO 19901-1](#). Company will also provide where possible region specific information (for example political situation, operating regulations).

Contractor shall be responsible for obtaining all necessary permits, licenses etc. for all personnel and equipment to operate at the sites.

When possible, Company will give assistance to Contractor for logistics.

In general, the working environment is one of the following categories, with regard to logistics. Section 3.4.3 is only relevant to offshore surveys.

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3.4.2 Area with existing installations

In such environment, Contractor will generally find:

- Structures for support of sensors
- Positioning system or the means to easily install such a system
- Land and/or marine logistics for deployment, maintenance, inspection and watching of equipment.

In such an environment, Company will generally be able to give assistance to Contractor for land and/or marine logistics.

In general, Contractor will be authorized to take advantage of existing structures to deploy the sensors, providing:

- Necessary approvals shall be obtained from Company
- Equipment shall comply with safety requirements according to the operating mode (radio transmission) and power supply
- Deployment shall comply with safety requirements pertaining to the area of installation (safety zones)
- Equipment shall not impair or interfere with existing installation (transmission frequencies, underwater acoustic frequencies, etc.).

Application for deployment of equipment shall be made to Company with supporting documents:

- Safety certificates of equipment
- Deployment description
- Deployment procedure.

3.4.3 Area without marine logistics

In such environment, Contractor will generally not find any installation close to the survey area.

Contractor shall arrange the following:

- Marine logistics for deployment, for regular maintenance and inspection and for final recovery.

In case the vessel is supplied by Contractor, the logistics during the mobilisation and the demobilisation phase will be under the Contractor's responsibility with Company's approval. The logistics will include but not be limited to the following:

- Transportation of the equipment from Contractor's yard to port of embarkation and back
- Transportation of the Contractor personnel to the port of embarkation and back
- Room and board of the Contractor personnel in port of embarkation
- Transportation of the equipment from port of embarkation to site and back
- Transportation of the Contractor and Company personnel from port of embarkation to site and back

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- Room and board of the personnel on site
- Necessary marine support or others for equipment deployment at sea and for recovery
- Provision of helpers
- All the technical equipment required for the performance of the WORK
- Telecommunications (INMARSAT portable station, talky-walky, etc.)
- Positioning system
- Surveillance of equipment by security personnel, satellite tracking or other appropriate means as discussed between Company and Contractor.

Contractor shall also refer to section 4.2 of this document.

3.4.4 Area without marine nor land logistics

In such environment, Contractor will generally not find any assistance from Company, neither offshore nor onshore.

Contractor shall arrange the following:

- Land logistics, as necessary
- If relevant, marine logistics for deployment, for regular maintenance and inspection and for final recovery (see section 3.4.3)
- Positioning system
- Surveillance of equipment by security personnel, satellite tracking or other appropriate means as discussed between Company and Contractor.

3.5 Health, Safety and Environment (HSE)

Complementary to specific HSE requirements disseminated in the present General Specification, additional HSE documentation shall be given to Company post award of Contract. As a minimum, this will likely include:

- Project Safety Plan (Appendix E of the [OGP Report 447](#) refers)
- Emergency Response Plan (Appendix F of the [OGP Report 447](#) refers)
- A Job Hazard/Safety Analysis (JHA/JSA) associated with the different types of operation should accompany these plans.

Note that, for a land survey, [OGP Report 447](#) Appendices E & F are still relevant, as most HSE information required for the vessel is also needed for the onshore installation.

Contractor should also refer to the Appendix 2.

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3.6 Equipment

3.6.1 General requirements

The term 'equipment' includes all instruments and sensors, all acquisition, processing, recording, transmission and display systems and all other materials and complementary equipment necessary to complete the survey.

Contractor shall supply all equipment. The equipment shall include all spare parts and repair kits that may be necessary to provide normal and continuous operations.

Contractor shall guarantee that equipment is designed to perform the work in accordance with Company requirements and as specified in the General and Particular Technical Specifications.

Equipment shall be properly maintained, in a clear and orderly condition, and shall be in good operating condition at the start of the survey. It shall be sufficient at any time to perform the whole operation within the time stated in the Particular Technical Specification. In particular, Contractor shall carry out tests on all equipment, prior to commencing operations, to ensure that everything is in perfect working order. Contractor shall provide certification of all lifting/lowering gear to be used during the survey, including design breaking strains and safe working loads.

Contractor shall guarantee that instruments are selected to provide accuracy of measurements within the tolerances specified in the General and Particular Technical Specifications.

Contractor shall ensure and provide evidence that all sensors are calibrated just prior to deployment, in order to guarantee the accuracy of measurements, and just after the end of the survey in order to check drift in measurements and to correct it if necessary. In addition, Contractor shall supply prior to commencement of operations Manufacturer's calibration certificates.

Company may request Contractor to perform complementary in-situ calibration for surveys lasting more than six months, and for sensors requesting frequent calibration (dissolved oxygen, humidity, for instance). In such case, Contractor shall submit for approval to Company, in-situ calibration procedures.

Typical values of requested measurement ranges, accuracy and sampling are given in section 5. Contractor shall state the range, resolution and accuracy of each instrument included in his offer.

The instruments and their mountings shall be designed and deployed in accordance with the specifications of the instrument Manufacturers.

When several instruments have to be located in the same area, their locations shall be defined, and they shall be deployed, so that they will not interfere with each other during deployment, measurement and recovery.

When specified, the data acquisition system shall include a real time data transmission system able to transmit measured data to the requested location. When specified, the data acquisition system shall include a display unit and a printing unit, able to display specified data on a computer screen and to print all necessary data. Reference is made to the [GS EP GEO 505](#), sections 5.4 and 9.

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The acquisition, transmission, processing, display and recording systems shall be able to process all measured/recorded data and to store all raw and processed data as specified in the Particular Technical Specification. "Raw" is defined as "instantaneous prior to any processing".

3.6.2 Additional requirements for an offshore survey

The moorings, including the mooring lines, the frames, the ballast weights, the floatation buoys and the acoustic release systems, etc. shall be designed in order to limit the environmental loads on the moorings and to limit the environmental disturbance by the moorings. They shall be designed and deployed in accordance with the specifications of the Manufacturers.

Contractor shall follow [GS EP COR 100](#) requirements on corrosion and cathode protection. The fabrication anodes shall follow [GS EP COR 201](#) recommendations.

Argos beacons or GPS shall allow for the monitoring of the position of the instruments in case of breaking of the mooring line.

The arrangement and the characteristics of the mooring lines including the additional installation equipment shall be submitted by Contractor and shall be approved by Company.

Contractor shall provide ballast dimensions in addition to ballast weights in order for Company to assess the sinking of the ballast onto the seabed depending on the soil type. Following this assessment Contractor shall discuss with Company to ensure an optimum mooring line design limiting the ballast weights sinking.

Shackles used shall be selected in accordance with [GS EP STR 203](#) Appendix 1 and [GS EP STR 661](#) section 6.2. Corrosion allowance on the shackle's & mooring links / chain diameter shall be discussed with Company and shall be applied to estimate the life expectancy of the mooring system.

Contractor shall describe its mooring design procedures (for example, model or software used in the design process) and provide evidence that the mooring design is appropriate to the proposed location of deployment and for the duration of the survey.

3.7 Site conditions

Contractor shall carry out a study of site conditions in the area of survey, in order to characterize the environmental conditions prior to designing the survey equipment and the site operation procedures. Company will assist where possible as detailed in section 3.4 of this General Specification.

In particular, the topography or bathymetry of the area, the soil or sea bottom conditions and the long term land or marine weather conditions shall be characterized. The equipment shall be designed to withstand long term meteorological and, if applicable, oceanographic conditions. The procedures shall be adapted to ensure safe and rapid site operations.

Contractor shall liaise with Company to establish the location and activity of all existing installations in the general area of the proposed survey, including (for example, but not necessarily limited to) drilling operations, vehicle or vessel movements, pipelines and cables, escape routes, contingency plans, and when applicable ROV operations or diving operations, etc. Contractor shall take into account these issues when designing mountings or moorings, equipment deployment and recovery procedures.

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3.8 Weather

Contractor shall be required to cease operations in adverse weather conditions only when it is considered that such adverse conditions may affect:

- The safety of personnel and of equipment
- Or the quality of the work.

Company and Contractor representatives shall define such adverse conditions in common agreement. In case of an offshore survey, the vessel master may order the cessation of operations if, in his opinion, the safety of the vessel or personnel thereon, is at risk.

3.9 Documents

In its offer, Contractor shall specify the proposed instruments, the equipment, the method of operation, the procedures, the data processing, quality control, analysis and the reporting, as well as the personnel involved in the work. This information shall be provided in the relevant Exhibits to the Contract as follows:

- Particular Technical Specification:
 - Specification of data quality control, processing, analysis and reporting
 - Schedule of work.
- Personnel (section 3.3 of this General Specification refers, and for metocean surveys [OGP Report 447](#) section 5.5 and Appendix D):
 - List of personnel involved in the work with resumes, certificates, and details, including where appropriate academic and professional training certificates. Contractor shall demonstrate in his offer that:
 - . All personnel selected for the survey are qualified, competent and medically fit to undertake the tasks assigned to them
 - . The number of operators is sufficient at all times in order to perform the operation as stated by Contractor in his offer.
 - Name of the project manager, Contractor's representative and name of survey operation leader.
- List of Equipment and Specifications (section 5 of this General Specification refers):
 - List of all instruments, with their performance, including proof of accuracy and calibration, including navigation and positioning equipment, when relevant
 - List of all acquisition, processing, recording and transmission systems, with their performance
 - List of spares, complementary equipment and all other materials
 - Basic design of instrument moorings or mountings and fittings, including a first estimate of mooring line watch circle under extreme environment, when relevant
 - Description of deployment and retrieval procedures
 - Description of maintenance/inspection procedures.

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- If relevant, Crew and Specification of Vessel: where Company has NOT assisted with the provision of a vessel (refer to [OGP Report 447](#) section 5.4 and Appendix C):
 - Specification of support vessels used for operations and their equipment
 - Specification of navigation and positioning system
 - Specification of onboard gear for instrument deployment/recovery.

Contractor shall also refer to section 4.2 of this document.

Prior to site operations, Contractor shall provide Company with following documents that shall be approved by Company:

- Instrument calibration certificates
- Design of instrument mountings or moorings and fittings, including calculation of mooring line watch circle under extreme environment, when relevant
- Detailed procedures
- As per section 3.5, Emergency Response Plan and Project Safety Plan.

After any site operations, Contractor shall provide Company with relevant reports listed in section 7.

3.10 Measured data

Data recorded by Contractor are the property of Company.

Contractor shall provide Company with all raw, processed and quality controlled data relative to the measurements. The data shall be given in electronic files, in a format compatible with PC based computer programs (see section 7.4).

3.11 Units

The required system of units is the S.I. (Metric) system.

In case other units are used, the conversion factors shall be given.

All units, directional and other conventions and frames of reference for all measured and derived parameters shall be clearly defined.

Time references shall be given in UTC. For ease of operation local user interfaces could show local time or UTC clearly marked.

4. Operations

The operations to be carried out by Contractor personnel are specified hereunder.

Contractor shall submit for approval to Company the design, the operating procedures and all necessary requirements for the transport to site, the deployment and the setting up of all survey equipment.

Company shall approve the design and the procedures prior to the mobilisation of equipment and personnel.