PROSJEKT OCEAN SPACE CENTRE

SCOPE OF WORK DESCRIPTION
WAVE GENERATION TOWING TANK

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1 Table of Content

1 Introduction

1.1 Objective

The purpose of this document is to define the Scope of Work for the manufacturing, delivery, installation and commissioning of new wave generation units to the existing shortened Towing Tank at the hydrotechnical laboratories at Tyholt, Trondheim. The 5 new wave generation units shall be delivered complete with motor drives as well as local control system.

1.2 Definitions and abbreviations

Definitions:

Company:	Statsbygg, which is the Norwegian government's key advisor in construction and property affairs, building commissioner, property manager and property developer.
Purchaser:	Company
Contractor:	The party named as such in the Form of Agreement
Subcontractor:	Third Party who has entered into an agreement with the Contractor for the supply of goods or services in connection with the Work.
EPC K202	EPC Contractor responsible for demolition works, ground works for building B and shortening of existing towing tank.
End-user:	Sintef Ocean and NTNU
Plant:	The machinery, apparatus, materials, articles, documentation, software and other products to be supplied by the Contractor under the Contract.
Works:	The plant, installation of the plant and any other work to be carried out by the Contractor under the contract.

Company Materials:	Equipment, systems, and/or materials supplied by Company and which are to be incorporated in the Contract Object.

Abbreviations:

DFO	-	Documentation for Operation
HLCC	-	Hydro Laboratory Centralized Control
MC	-	Mechanical completion
MDP	-	Master Document Plan
NS	-	Norwegian Standard
OB	-	Ocean Basin
OSC	-	Ocean Space Centre
SMB	-	Seakeeping and Manoeuvring Basin

2 The Works

The Works consists of the following main elements:

a) Engineering, manufacturing, assembly, delivery

b) Documentation

c) On-site supervision and Installation work

d) Mechanical completion and Commissioning work

e) On-site system acceptance test

f) Training Courses

The new wave generators shall fulfil the requirements described herein and in the following documents:

- OSC-SB-M-SD-00001 Requirements for towing tank wave generators
- OSC-SB-T-SD-00001 Requirements for tow tank wave generation control- and safety systems

2.1 Engineering, manufacturing, assembly and delivery

The engineering, manufacturing, assembly and delivery comprise of such items as:

- Provision of own organisation including head office support services, administration and a project organisation to manage and control the execution of the Work including complying with all requirements of document OSC-SB-Q-SD-0003, Administrative Procedures.
- Provision, maintenance, operation and demobilisation of all required facilities to complete the engineering, manufacturing, assembly and delivery.
- Contractor's system engineering and fabrication engineering
- Provision of materials for fabrication, manufacturing and assembly
- Fabrication, manufacturing, assembly of the complete wave generation units and electrical drives/control cabinets
- Programming
- Inhouse testing including witness tests
- Documentation of own equipment and functions
- Miscellaneous

Contractor shall perform the system engineering, fabrication engineering, design and documentation required for the manufacturing, fabrication, assembly, and completion of the Works. Contractor shall also produce all documentation required for the civil interfaces and interfaces to technical systems. Contractor's engineering shall include such as:

- Wave generation system documentation and calculations
- Exchange of engineering data
- Engineering documentation
- Coordination of subcontractors and sub suppliers

- Tag numbering
- Identify necessary civil works, or any works by others required for the towing tank wave generation system.

Contractor shall in good time provide drawings and descriptions showing the manner in which the Plant is to be installed, together with all information required for preparing suitable foundations, for providing access for the Plant and any necessary equipment to the Site and for making all necessary connections to the Works. Contractor shall specify in detail requirements regarding electrical supply and communication network interfaces.

Equipment and main components shall be tagged according to requirements described in document OSC-SB-O-SD-00004, Tagging Requirements.

Inhouse testing including witness testing shall include Factory Acceptance Test (FAT) of assembled equipment, units and systems. Contractor shall prepare suitable test procedures for performance of the FAT. FAT shall contain a complete test of as many functions and signals as practical possible according to OSC-SB-O-SD-00008, Project Completion Requirements.

2.2 Documentation

Contractor shall provide alle engineering and manufacturing documentation necessary to compete the Work in accordance with the requirements prescribed below:

- OSC-SB-O-SD-00003, Requirements for supplier documentation including DFO
- BIM requirements for special equipment
- SIMBA 2.0 General requirements
- Action plan for digitalization
- General attributes and properties in BIM models

The DFO shall be delivered in English and Norwegian language. The DFO shall enable the End-user to operate, calibrate, and maintain the Plant throughout its intended lifetime. The DFO shall specify in detail all maintenance activities necessary to be performed in order to fulfil the guarantee requirements.

2.3 On-site supervision and Installation work

Contractor shall perform desktop review of steel reinforcement documentation prior to casting to ensure clashes between support bracket bolts and the reinforcement steel. Relevant documentation will be provided by Company in due time prior to casting.

Contractor shall perform installation of the Plant in the shortened towing tank. Before the Work starts, Contractor shall ensure that the installation site including foundations are ready for start of the installation work.

The installation work to be performed by Contractor will include the following main activities:

- Verification of construction tolerances of foundations
- Installation of wave generator support brackets
- Installation of the wave generation modules
- Installation of electrical drive control panel(s)
- Electrical wiring between wave generators and electrical drive control panel(s)

Necessary cranes, lifting equipment and equipment for transport on the Site will be provided by Company.

Company will provide the following:

- Cable supports, cabling and termination of electrical supply to the electrical drive control panel(s) from existing electrical local distribution board.

2.4 Mechanical completion and Commissioning work

Contractor shall perform mechanical completion activities and commissioning work according to the following requirements:

- OSC-SB-O-SD-00008, Project Completion Requirements

All mechanical completion and commissioning activities shall be documented in PIMS365.

The original Mechanical Completion documentation shall be filed by Contractor. All MC documentation, which also shall include MC documentation for Subcontractors, shall be compiled in MC dossiers and kept in good order until final delivery to Company. All works, inspections and tests shall be completed, and all punch items shall be identified. Any transfer of punch items to the commissioning phase must be approved by Company.

Contractor shall perform all commissioning of the Contract Object, including the provision of procedures, special tools, commissioning spares etc.

2.5 On-site system acceptance test

Contractor shall prepare a detailed on-site acceptance test procedure, as well as a test schedule for the new wave generation units in the shortened towing tank. The on-site acceptance test procedure shall be submitted to Company for approval.

Contractor shall perform the on-site acceptance test including interface to end-user's HLCC system. The on-site acceptance test shall be witnessed by representatives from Company and end-user. Contractor shall specify in writing his requirements concerning performance of the on-site acceptance test including any assistance needed at the latest one month prior to agreed date for starting the acceptance test.

2.6 Training Courses

Contractor shall provide professional training of end-user operators and service/maintenance personnel. Each type of course shall be described, including required equipment and facilities. Training documentation shall be presented latest 4 weeks prior to the training courses will take place. Training shall be held in Norwegian or English language.

3 Attachments

4 References

- OSC-SB-M-SD-00001 Requirements for towing tank wave generators
- OSC-SB-T-SD-00001 Requirements for towing tank wave generator control- and safety system
- OSC-SB-O-SD-00003 Requirements for supplier documentation including DFO
- OSC-SB-O-SD-00008 Project completion requirements
- OSC-SG-O-TEG-00001 System diagram, Wave generation for towing tank
- OSC-SB-O-RA-00001 K662-01 Equipment list from dRofus
- C-00-B-20-50-001 “Forkorting av slepetank” (Shortening of towing tank)
- OSC-SB-Q-SD-0003 Administrative Procedures