Base Load Power Hub (BLPH)

Technical Specification for Progressive Cavity Pump

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Table of contents

1 INTRODUCTION 6

1.1 PROJECT OVERVIEW 6

1.1.1 Project Location 6

1.1.2 Project Concept 7

2 DOCUMENT SCOPE 8

2.1 International Codes, Standards and Regulations 8

2.3 DEFINITIONS AND ABBREVIATIONS 9

2.4 UNITS OF MEASUREMENT 10

2.5 SUPPLIER'S RESPONSIBILITIES 10

3 HEALTH, SAFETY AND ENVIRONMENTAL REGULATIONS 11

3.1 AREA CLASSIFICATION 11

3.2 NOISE AND VIBRATIONS CONTROL 11

4 QUALITY 11

4.1 QUALITY MANAGEMENT SYSTEM 11

5. BASIC DESIGN 12

5.1 GENERAL 12

5.2 ROTORS 12

5.3 MECHANICAL SEALS 13

5.4 GEAR UNITS 13

5.5 BEARINGS AND BEARING HOUSINGS 13

5.6 VIBRATION LIMITS 14

5.7 PRESSURE EQUIPMENT 14

5.8 CONNECTIONS 14

5.9 EXTERNAL FORCES AND MOMENTS 14

5.10 CASING LINERS 14

5.11 TIMING GEARS 14

5.12 LUBE OIL SYSTEM 15

5.13 MATERIAL 15

6. ACCESSORIES 16

This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy

6.1 DRIVERS 16
6.1.1 General 16
6.1.2 Motors 16
6.2 COUPLING AND COUPLING GUARDS 16
6.3 BASEPLATE/SKID/mounting flange 16
6.4 PAINTING AND COATING 17
6.5 NAME PLATE AND ROTATION ARROWS 17
6.6 THERMAL INSULATION 17
6.7 CONTROLS AND INSTRUMENTATION 18
7. INSPECTIONS AND TESTS 18
7.1 GENERAL 18
7.2 INSPECTION 18
7.3 TESTING 18
7.3.1 Performance Test 18
7.3.2 Mechanical run Test 19
7.3.3 Test tolerances 19
7.3.4 Optional test (NPIP/NPSH Test) 19
8 Cyber security basic requirements 19
9 Digital documents requirements 21
10 Nameplates 22
11 EC Declaration of Conformity and CE marking 23
12 painting 23
13 Materials 24
14 Fabrication 24
14.1 General Requirements 24
14.2 Qualification of Weld Procedures 25
15 INSPECTION AND TESTING 25
15.1 General 25
15.2 Visual Inspection 26
15.3 Suppliers Quality System 26

List of Figures

Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map 6
Figure 2 - Wind Park Details 7
Figure 3 – BLPH Concept 7

List of tables

Table 1 - Reference Documents.....9
Table 2 - Definitions and Abbreviations.. 10
Table 3 – Glossary.....12
Table 4 – Tolerances.....20

List of Attachments

Attachment 1 Statement of Compliance

Attachment 2 SMIR

1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity. Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

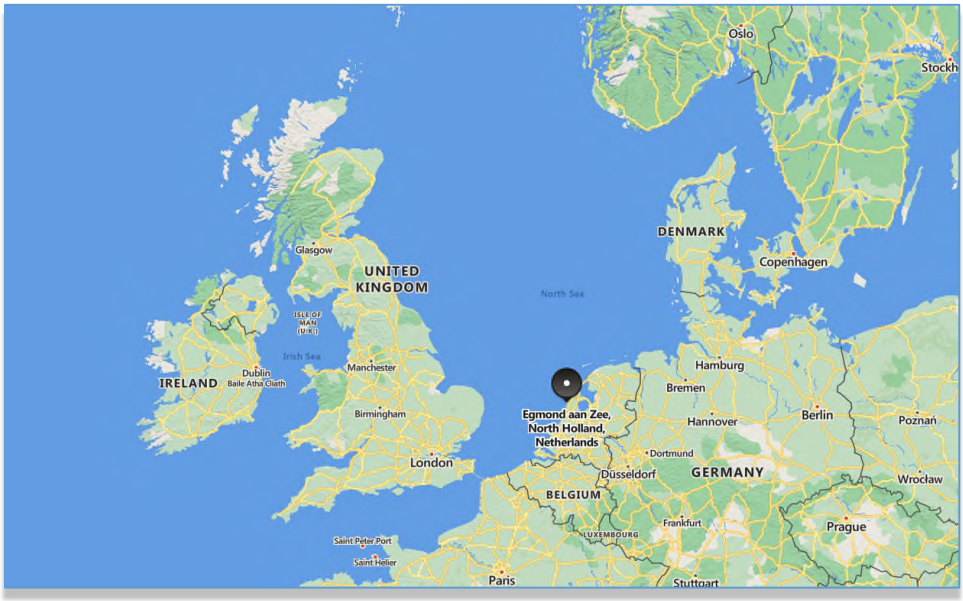


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

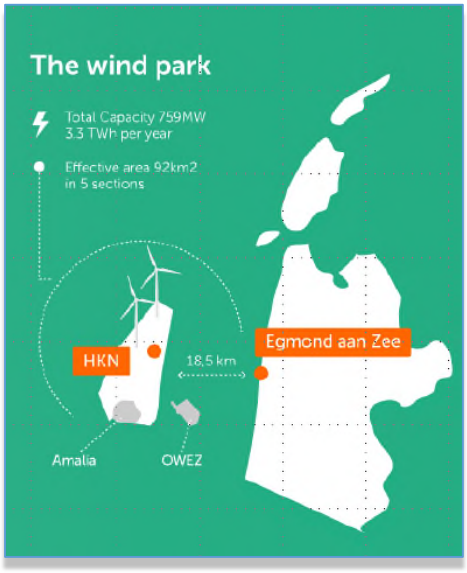


Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

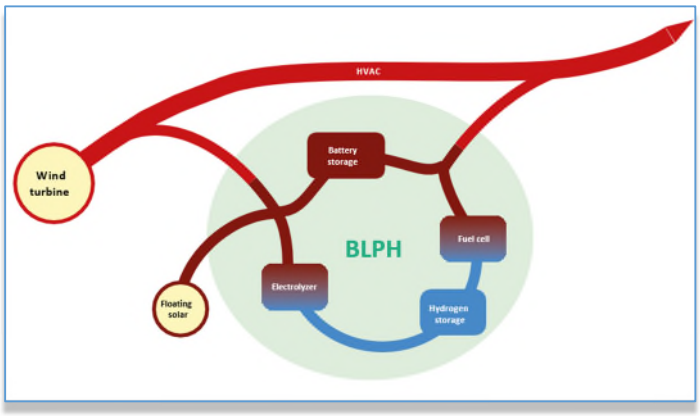


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

2 DOCUMENT SCOPE

This specification defines the minimum requirements for Rotary Pumps (screw or gear type) for on-shore or off-shore installation. Pumps covered by this Specification shall be designed, manufactured, and tested in accordance with last edition of API Standard 676 "Positive Displacement Pumps-Rotary".

The present Specification amends, supplements or summarizes (highlights) various clauses of API Standard 676.

Supplier shall state a "general compliance" with this document and other document therein listed/cited, provided that are guaranteed performances/characteristics according to DS, safety, continuous and trouble-free operation.

With respect to API Standards, paragraphs are marked as follows:

+ clause added to API Standard
❖ clause that modifies API Standard
• clause that makes a decision, as required by API Standard
✓ clause that summarizes the corresponding API Standard clause.

2.1 INTERNATIONAL CODES, STANDARDS AND REGULATIONS

The Codes, Standards and Regulations listed below shall be applicable. Unless specifically designed by date, the latest edition of each publication shall be used, together with any amendments/supplements/revisions thereto.

Doc. No.	Description
API 676	Positive Displacement Pumps - Rotary
API 682	Pumps–Shaft Sealing Systems for Centrifugal and Rotary Pumps
ASTM	Standards for Materials, Welding and Test Methods
ISA S 5.1	Instrumentation Symbols and Identification

Doc. No.	Description
2014/68/EU	Directive 2014/68/EU (PED - ''Pressure Equipment Directive'').
1999/92/EC	ATEX 153 Workplace Directive
2014/34/EU	2014/34/EU
2014/35/EU	Low Voltage Directive
2006/42/EC	Machinery Directive MD)
ASME B 16.5	Pipe flanges and flanged fittings – NPS ½ through NPS 24.
API 520 2020	Sizing, Selection, and Installation of Pressure-relieving Devices - Part
API 521 2020	Pressure-relieving and Depressuring Systems
API 526 2017	Flanged Steel Pressure-relief Valves
ASME B31.3	Process Piping
ASME V ed. 2021	Non-Destructive Examination
ASME II ed. 2023	Ferrous Material Specification
ASME B 16.5 ed. 2020	Pipe Flanges and Pipe Fittings
IEC 60079	Installation & Maintenance of Electrical apparatus for use in Potential explosive atmosphere
IEC 60034-30-1:2014	Rotating electrical machines - Part 30-1: Efficiency classes of line operated AC motors (IE code)
ASME B 16.47 Series B ed. 2020	Large Diameter Steel Flanges (over 24")
IEC 61892	Mobile and fixed offshore units - Electrical installations
ISO 12944 ed. 2018	Corrosion Protection
EN 10204:2004	Metallic products - Types of inspection documents
ISO 9001	Quality Management Standard

Table 1 - Reference Documents

2.3 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

MANUFACTURER	the party that manufactures the pump and performs the design, engineering, procurement, installation, commissioning and management of the pump package, procuring other components from Sub-suppliers.
SUB-SUPPLIER	The party that manufactures or supplies equipment and services to perform the duties specified by the Manufacturer, typically sub-systems and components of the main equipment
SHALL	indicates a requirement.
SHOULD	indicates a recommendation

Table 2 - Definitions and Abbreviations

API	American Petroleum Institute
USC	U.S. Customary unit of measurement
NDE	Non-Destructive Examination
SI	International system
IDS	Inspection Data Sheet
MAWP	Maximum Allowable Working Pressure
NPSHR	Net Positive Suction Head Required
NPSHA	Net Positive Suction Head Available
PQR	Welding Procedure Qualification Records
WPS	Welding Procedure Specification
PLC	Programmable Logic Control
PLV	Pressure Limiting Valve
IT	Information Technology
CPU	Central Processing Unit
SOW	Scope of Work
SW	Software
PWHT	Post Weld Heat Treatment

Table 3 - Glossary

2.4 UNITS OF MEASUREMENT

- ✓ The SI system of units and dimensions is used in this Standard. Any data or drawings related to equipment supplied to this Specification shall use the SI system. The U.S. Customary system may be employed for piping components dimensions (inches).
- + Pressure shall be relative, and it shall be expressed in bar(g).

2.5 SUPPLIER'S RESPONSIBILITIES

- + This Specification is primarily intended to define the minimum requirements and does not relieve the Supplier of its responsibility for the design, performance and safe operation of the whole unit.

+ The Supplier shall be responsible for the design, performance, guarantees, co-ordination, manufacture, inspection, testing, preservation and packaging of the entire unit, in accordance with the requirements of this General Specification and Project Specifications and Data Sheets. This shall include as a minimum:
+ provision of documentation.
+ control and co-ordination of Manufacturer and Sub-suppliers;
+ compliance with Statutory Requirements, Codes and Standards;
+ identification of all technical exceptions and deviations from this General Specification, Project Specifications and all referenced Industry Codes and Standards;
+ consideration of equipment design and shipping arrangements for ease of delivery to the site;
+ provision of all necessary design certification.

3 HEALTH, SAFETY AND ENVIRONMENTAL REGULATIONS

+ The Supplier shall be responsible for ensuring that the goods and services supplied meet all applicable regulations on health, safety and environmental issues.
+ The equipment shall be designed to operate safely and satisfactorily in all expected combinations of process, utilities, climates and environmental conditions including start-up, shutdown, part load operation, and emergency cases, while retaining the overall system security, reliability and availability.

3.1 AREA CLASSIFICATION

+ Electrical equipment protection level shall be appropriate to the hazardous area classification of the Rotary Pump unit installation.
+ Area Classification: Safe Area

3.2 NOISE AND VIBRATIONS CONTROL

The equipment shall be compliant with vibrations limitation requirements as per API Standard 676 levels.

Noise levels shall not be higher than 85 dB(A)

4 QUALITY

4.1 QUALITY MANAGEMENT SYSTEM

+ The Supplier's proposed quality management system shall be certified as in compliance with the ISO 9001 Standard. The Supplier's Quality Management System Certification shall be valid

for design, engineering, project management, manufacturing, maintenance, and service of the Multiphase Pump unit.

+ A non-numbered copy of the Supplier's Quality Management System Manual shall be submitted with the Proposal.

+ If the quality management system of the Supplier's first tier Sub-Suppliers is not certified as in compliance with the ISO 9001 Standard, the Supplier's shall submit to the Company the sub-supplier's quality management system for approval before issuing any suborder to that Sub-Supplier.

5. BASIC DESIGN

5.1 GENERAL

✓ The equipment including auxiliaries, shall be designed, and constructed for a minimum service life of 2 years and 2 years of uninterrupted operation without maintenance.

- The Contractor shall specify the normal operating point, rated operating point, and all other required operating points. If a range of operating conditions is specified, the pump vendor shall advise the Company about the pump's minimum and maximum capacity at its rated differential pressure and its required brake horsepower. Anticipated process variations that may affect the sizing of the pump and the driver (such as changes in pressure, temperature, or properties of fluids handled, and special plant startup conditions) shall be specified.

✓ The equipment provided by the vendor shall conform to the maximum allowable sound pressure level specified. In order to determine compliance, the vendor shall provide both maximum sound pressure and sound power level data per octave band for the equipment.

- The equipment, including all auxiliaries, shall be suitable for operation under the environmental conditions specified by the Company. The environmental conditions shall include whether the installation is indoors (heated or unheated) or outdoors (with or without a roof), maximum and minimum temperatures, unusual humidity, dusty, or corrosive conditions.

✓ All equipment shall be designed to permit rapid and economical maintenance, particularly regarding packing and seals. Major parts such as casing components and bearing housings shall be designed and manufactured to ensure accurate alignment on reassembly. This may be accomplished by the use of shouldering, cylindrical dowels, or keys.

5.2 ROTORS

✓ Rotors shall be a single piece and show greater hardness as compared to the internal parts of casings or to the jackets with which they form a seal. If possible, the rotor will be contained in a replaceable pump sleeve that cannot be used to contain pressure.

+ Rotor bodies not integral with the shaft shall be positively attached to the shaft to prevent relative motion under any condition. Structural welds on rotors shall be full-penetration continuous welds and shall be stress relieved with appropriate ASTM heat treatment procedure.

- If specified, hardened rotors shall be provided for screw pumps.

5.3 MECHANICAL SEALS

✓ Unless otherwise specified, cartridge mechanical shaft seals shall be furnished.

✓ Seal selection shall be suitable for specified variations in suction and/or discharge conditions during start-up, operation, or shutdown, including possible upset conditions.

✓ Unless otherwise specified, shaft seals shall be provided in accordance with API 682/ISO 21049. "General Compliance" is required, but not mandatory.

- If specified, manufacturer's standard seal meeting the intent of API 682/ISO 21049 shall be supplied. The following items shall be provided in the proposal:

  a) category,

  b) type,

  c) arrangement and geometry,

  d) materials of construction,

  e) reference list.

NOTE: Space or design parameters for some pump types, sizes, or applications make the use of API 682/ISO 21049 seals impractical.

5.4 GEAR UNITS

- Type of Gear unit and its compliance to the API standard (API 613 or 677) shall be agreed upon between the Contractor and the Supplier.

✓ The gear service factor shall be mutually agreed upon by both the gear and pump manufacturers for given service conditions.

5.5 BEARINGS AND BEARING HOUSINGS

✓ Antifriction bearings shall have a minimum L-10 rated life (see AFBMA 9) of either 25,000 hours with continuous operation at rated conditions, or 16,000 hours at maximum axial and radial loads and rated speed.

NOTE . The rated life is the number of hours at rated bearing load and speed that 90 % of the group of identical bearings will complete or exceed before the first evidence of failure. It is recognized that this life may not be achieved where bearings are operated in fluids other than clean lubricating oil.

5.6 VIBRATION LIMITS

Vibration Limits for Liquid Pumps

Measurement on Bearing Housing Bearings	Rolling Element
Steady state vibration at any speed within operating range on test or in the field where Vu is the unfiltered velocity; RMS is the root mean squared.	Vu < 3.8 mm/s RMS (0.15 in./s RMS)

The Manufacturer shall submit guaranteed vibration levels of the equipment.

5.7 PRESSURE EQUIPMENT

The pressure equipment of the Package shall be designed, manufactured and tested in accordance to the Pressure Code (97/23/EC Pressure Equipment Directive (PED), or

ASME VIII Boiler and Pressure Vessel Code) specified by or agreed upon with the Company.

5.8 CONNECTIONS

- ✓ The pump connections must comply with the requirements set forth in API 676.

  Should the Manufacturer be unable to supply flanges conforming to ANSI, he shall supply the associated counter flanges, gaskets and bolts including spare gaskets for commissioning.

5.9 EXTERNAL FORCES AND MOMENTS

The Vendor shall specify, in the quotation, the magnitude of forces and moments which may be applied, simultaneously, to the inlet and outlet connections at the rated operating conditions. As a minimum, the pump inlet

- ✓ and outlet connections must be capable of withstanding the limits contained in API Standard 676.

5.10 CASING LINERS

- If specified, replaceable liners shall be provided for screw pumps.

5.11 TIMING GEARS

- ✓ Timing gears, when furnished, may be spur, helical, or herringbone (double helical) type. All gears shall be the coarse-pitch type, and the gear quality shall be at least nine as defined by AGMA. The gears shall be designed in accordance with AGMA 6010 with a minimum service factor of 1.5.
- If specified, the gear enclosing chamber shall not be subject to contact with the process fluid.
- ✓ For external timing gears, inspection ports or other means shall be provided on the housing covers, such that timing gears may be inspected without disassembly of the unit.

5.12 LUBE OIL SYSTEM

✓ Unless otherwise specified for twin screw pumps, bearings and bearing housings shall be splash lubrication and designed for mineral (hydrocarbon) oil.

- If specified, or as recommended by the pump vendor, the bearing lubrication may be splash, positive pressure, or gravity lubricated. A sight glass, gauge, or oil-level dipstick shall be provided.
- If specified or if recommended by the vendor and approved by the Company, a pressure lubrication system shall be provided to supply oil at a suitable pressure and temperature to the pump, the driver, and any other driven equipment, including gears.

5.13 MATERIAL

- All the parts of the machines shall be in accordance with the requirements indicated on the data sheet. Manufacturer standard materials properly selected for the operating conditions specified, shall be subject to Contractor's approval. Selection shall be made based on a reference list relating to machines manufactured and operating under identical or similar services. For off shore installation, casings in cast iron are not accepted.
- The Contractor shall specify any erosive or corrosive agents (including trace quantities) present in the process fluids and in the site environment, including constituents that may cause stress-corrosion cracking or attack elastomers.

  Note that Typical agents of concern are hydrogen sulfide, amines, chlorides, bromides, iodides, cyanides, fluorides, naphthenic acid and polythionic acid. Other agents affecting elastomer selection include ketones, ethylene oxide, sodium hydroxide, methanol, benzene and solvents.
- The Contractor shall specify the amount of wet H2S that may be present, considering normal operation, start-up, shutdown, idle standby, upsets, or unusual operating conditions such as catalyst regeneration.

  Note that in many applications, small amounts of wet H2S are sufficient to require materials resistant to sulfide stress-corrosion cracking. If there are trace quantities of wet H2S known to be present, or if there is any uncertainty about the amount of wet H2S that may be present, the Company should consider specifying that reduced hardness materials are required.
- The Company shall specify if reduced hardness materials are required. If reduced hardness materials are specified, they shall be supplied in accordance with NACE MR 0175 (ISO 15156).

  Note that NACE MR 0175 applies to oil and gas production facilities and natural gas sweetening plants. NACE MR 0175 applies to materials potentially subject to sulfide stress corrosion cracking. NACE MR 0175 is equivalent to ISO 15156.

6. ACCESSORIES

6.1 DRIVERS

6.1.1 General

- ✓ The type of driver shall be specified. The driver shall be designed and sized to meet all the specified operating conditions, including external gear and/or coupling losses, and shall be in accordance with applicable specifications, as stated in the inquiry and order. The driver shall be sized for satisfactory operation under the utility and site conditions specified.

  Note: For electric motors, normally this is achieved by specifying constant torque.

- ✓ The driver shall be sized to meet all process variations such as changes in the pressure, temperature, or properties of the fluid handled, and conditions specified in the inquiry, including plant start-up conditions.

- ✓ The driver shall be capable of starting under the conditions specified and the starting method shall be agreed by the Company and the vendor. The driver's starting-torque capabilities shall exceed the speed-torque requirements of the driven equipment by a minimum of 10 %.

6.1.2 Motors

- ✓ Motor drives shall conform to internationally recognized standards

  For applications that utilize an adjustable speed drive, coordination between the pump, motor, and adjustable speed drive vendors may be required. The motor rating shall be at least 110 % of the greatest power required (including gear and/or coupling losses) for any of the specified operating conditions. The motor nameplate rating, including service factor, shall be suitable for operation at 100% of the PLV (pressure limiting valve) accumulation pressure.

  Consideration shall be given to the starting conditions of both the driver and driven equipment and the possibility that these conditions may be different from the normal operating conditions. Equipment driven by induction motors shall be rated at the actual motor speed for the rated load conditions. Note that the 110 % applies to the design phase of a project. After testing, this margin might not be available due to performance tolerances of the driven equipment.

  Note that where possible, the electrical adjustable speed drive and motor should be purchased from the same vendor.

6.2 COUPLING AND COUPLING GUARDS

- ❖ Couplings shall be to Manufacturer's standard unless otherwise specified in the data sheet. The manufacturer shall supply spark-proof removable guards for the couplings.

6.3 BASEPLATE/SKID/MOUNTING FLANGE

- If a baseplate is specified, the Contractor shall indicate the major equipment to be mounted on it. A baseplate shall be a single fabricated steel unit, unless the Company and the vendor mutually agree

that it may be fabricated in multiple sections. A multiple section baseplate shall have machined and doweled mating surfaces which shall be bolted together to ensure accurate field reassembly.

NOTE A baseplate with a nominal length of more than 12 m (40 ft) or a nominal width of more than 4 m (12 ft) may have to be fabricated in multiple sections because of shipping restrictions.

- If specified, the baseplate shall be designed for column mounting (that is, of sufficient rigidity to be supported at specified points) without continuous grouting under structural members. The baseplate design shall be mutually agreed upon by the Company and the vendor.

  Vertical pumps shall be provided with a circular flange, according to ANSI standard and relevant gasket, to allow mounting on vessel, pit, caisson, etc.

6.4 PAINTING AND COATING

+ Painting and coating of equipment shall comply with the Technical Specification cited in the Material requisition. Manufacturer's standard painting system may be proposed as an alternative but shall be subject to Contractor review and approval.

6.5 NAME PLATE AND ROTATION ARROWS

A nameplate shall be securely attached at a readily visible location on the equipment and on any other major piece of auxiliary equipment.

Rotation arrows shall be cast in or attached to each major item of rotating equipment in a readily visible location. Nameplates and rotation arrows (if attached) shall be of ANSI Standard Type 300 stainless steel or of nickelcopper alloy (Monel®16 or its equivalent).

Attachment pins shall be of the same material. Welding is not permitted.

The Company's item number, the vendor's name, the machine's serial number, and the machine's size and type, as well as its minimum and maximum allowable design limits and rating data (including pressures, temperatures, speeds, and power), MAWPs and temperatures, hydrostatic test pressures and critical speeds, shall appear on the machine's nameplate. The Company will specify on the datasheet whether USC or SI units are to be shown.

6.6 THERMAL INSULATION

❖ Non-asbestos, chemically inert, thermal insulation shall be applied to all normally accessible exposed surfaces of equipment which may exceed a temperature of 65^0C, when the ambient temperature is 50^0C.

The insulation shall be encased by metal cladding or other approved means. Where the cladding is readily accessible to personnel during set operation its surface temperature shall not exceed 65^0C. If this is not practical, additional guarding or warning notices shall be provided. This prescription is applicable also to the portions of ducts inside the enclosures.

Any type of insulation proposed by the Supplier shall be well referenced and be a standard design type for the Supplier.

Any insulation or shielding on hot parts shall be easily removable.

All connections to electrical transmitters shall protrude through the insulation. Cables shall be installed outside the insulation. The hot insulation, if applicable, shall be based Technical Specification indicated in the Material requisition

6.7 CONTROLS AND INSTRUMENTATION

- The instrumentation and Pump unit Control, if applicable, shall conform to Technical Specification, indicated in the Material Requisition

Instrumentation and controls shall be designed and manufactured for use in the area classification (class, group and division or zone) specified by the Contractor and shall comply with any local codes and regulations.

7. INSPECTIONS AND TESTS

7.1 GENERAL

- Inspections & tests shall be in accordance with Inspection Data Sheet (I.D.S.) included in this Technical Specification
- Contractor's required and witnessed tests shall be indicated i I.D.S.
- Manufacturer must present his inspection plan for Contractor's approval, with a description of equipment at disposal in his workshop.

7.2 INSPECTION

- ✓ NDE shall be performed as required in I.D.S. If additional radiographic, ultrasonic, magnetic particle or liquid penetrant examination of the welds or materials is specified by the Company, the methods and acceptance criteria shall be in accordance with the API 676 standards. Alternative standards may be proposed by the vendor or specified by the Contractor and they shall be mutually agreed to by both Company and vendor.
- ✓ Plate used in fabrications shall be inspected prior to starting fabrication in accordance with the material standard to which the plate was purchased.
- ✓ The NDE should be done on finished machined surfaces.
- ✓ If NDE testing is specified for nodular iron castings, it will be conducted using the magnetic particle and liquid penetrant test methods.

7.3 TESTING

7.3.1 Performance Test

- ✓ Unless otherwise specified, tests shall be conducted in accordance with Section 3.6 of the Hydraulic Institute pump standards, according to the tolerances specified in the following Table 2. The

manufacturer shall operate the pump in their shop for sufficient period to obtain complete test data, including speed, discharge pressure, suction pressure, power, and capacity.

✓ If specified, and if the pump is to be operated at variable speeds, the pump shall be tested at speeds within five percentage points of 30, 60, 90, and 100 of the rated speed.

7.3.2 Mechanical run Test

- If specified, a mechanical run test shall be performed either before or consecutively following the performance test. The mechanical run test shall be one hour or until oil temperatures have stabilized.
- If specified, the pump shall be mechanically run for four hours. Unless otherwise specified or agreed, this shall be performed at the rated flow.

7.3.3 Test tolerances

Characteristic Capacity	Tolerance (⁰/0)
At 100% speed	+3,-0 of rated capacity
At 90% speed	+3,-0 of rated capacity
At 60% speed	+5,-0 of rated capacity
At 30% speed	+10,-0 of rated capacity
rated power (at rated pressure and capacity)	+4
NPSHR (at rated capacity)	+0

Table 4 -Tolerances

7.3.4 Optional test (NPIP/NPSH Test)

- If specified, the pump shall be tested for NPSH. At rated speed and with NPSHA equal to quoted NPSHR, the pump capacity shall be within three percent of the non-cavitating capacity. Warning—The pump shall not be run while cavitating.

Note1: The vendor must confirm if the mechanical seal included in their scope can operate in a suction lift condition.

8 CYBER SECURITY BASIC REQUIREMENTS

Cyber security scope of supply is to provide a basic list of cyber security activities in according with CPY's requirements and with IT best practices. It involves all equipment with data interfaces such as (but not limited to):

- IT devices such as laptops, workstations, servers and so on
- Networking devices such as hubs, switches, routers and so on

- Industrial devices such as PLCs, CPUs and so on

This paragraph describes the general requirements for cyber security so it could be applicable only partially to the supply. Vendor shall inform CTR of what it is really deliverable as per relevant Scope of supply.

Activities to be carried out can be summarized as it follows:

- Asset inventory / Vendor shall provide all hardware & software specification to identify, within its supply, all possible equipment which can be exposed to a cyber attack

Activity / Deliverable description: Vendor shall fulfill the table as per *attachment Asset inventory*

Deliverable: "IT Asset Inventory list" document (encrypted) *

- Protection of access data / Vendor shall protect access data (not limited to login credentials such as username/password but including all useful access information such as IP addresses, ports, etc.) from unauthorized access. The distribution of these information shall be restricted (E.G. login credentials to data equipment should not be included into user manuals).

Activity / Deliverable description: Vendor shall extrapolate access data from the standard documentation to provide with its SOW. Vendor shall fulfill the table as per *attachment IP address & Access Credential List*

Deliverable: "IP address & access credential list" document (encrypted) *

- Patching management & software maintenance methodology / Vendor shall provide, referring to supplied assets, a safe methodology for mentioned activities. This is valid for all provided softwares such as Operating Systems, Server SWs, Client SWs, etc.

Activity / Deliverable description: Vendor shall provide a document containing this methodology

Deliverable: "SW patching & maintenance procedure" document (encrypted) *

- Disaster recovery procedure / Vendor shall provide, referring to supplied assets, all information necessary for a restore of the systems starting from the supplied "systems backups".

Activity / Deliverable description: Vendor shall provide a document containing this procedure

Deliverable: "SW disaster recovery procedure" document (encrypted) *

- Backup register / Vendor shall provide, referring to supplied assets, all information relevant to the supplied SW backups. This is valid for all provided softwares such as Operating Systems, Server SWs, Client SWs, etc.

Activity / Deliverable description: Vendor shall provide a document containing the backup register. The backup register shall contain (as minimum): project ID, system, equipment, operator name, backup date, description, backup filename

Deliverable: "SW backup register" document (encrypted) *

- Systems Backup / Vendor shall provide, referring to supplied assets, a collection of all SW backups, SW images useful to restore the supplied systems in case of damage. If a SW backup is technically not deliverable, at least a document with images/text of the configuration shall be provided

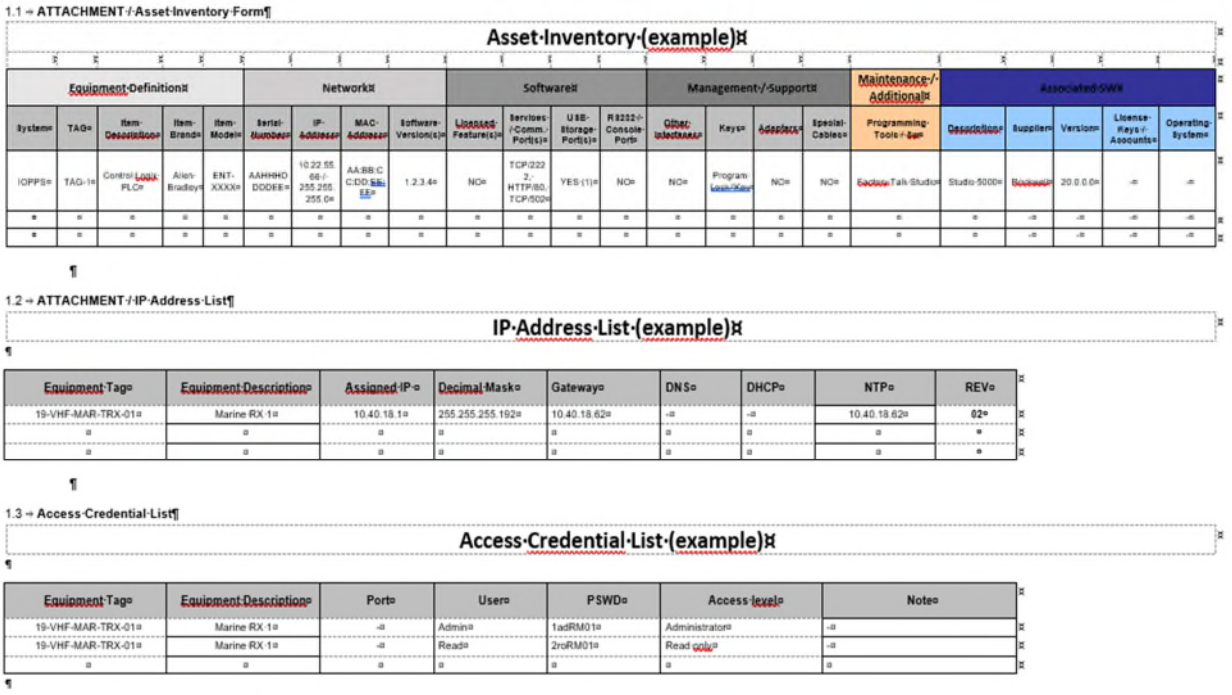
Activity / Deliverable description: Vendor shall provide a physical support (USB key or USB HDD depending the size of the backup) containing the collection of the backups. All provided backups shall be listed and detailed into the Backup register (see above) and how to install them shall be explained in the Disaster recovery procedure (see above).

Note: USB key or USB HDD shall be supplied to CTR encrypted and password for decryption shall be distributed separately

- Physical hardening / Vendor shall provide, referring to supplied assets, data equipment where all spare data ports (USB, Ethernet and so on), actually not to be used, are inoperative

Activity / Deliverable description: Vendor shall disable (at the configuration level if possible) all spare data ports and install data port blockers (its key to unlock them will also be supplied to CTR). See examples:

*** = these documents shall be part of the supply and included into the relevant document list**



1.1 ⇒ ATTACHMENT / Asset Inventory Form

Asset Inventory (example)

Equipment Definition					Network				Software				Management / Support				Maintenance / Additional	Associated SW				
System	TAG	Item Description	Item Brand	Item Model	Serial Number	IP Address	MAC Address	Software Version(s)	Licensed Feature(s)	Services / Comm. Port(s)	USB Storage Port(s)	RS232 / Console Port	Other Interfaces	Keys	Adapters	Special Cables	Programming Tools / Sw	Description	Supplier	Version	License Keys / Accounts	Operating System
IOPPS	TAG-1	Control Logix PLC	Allen-Bradley	ENT-XXXX	AAHHHO DDDEE	10.22.55.66 / 255.255.255.0	AA:BB:CC:DD:EE:FF	1.2.3.4	NO	TCP/2222, HTTP/80, TCP/502	YES (1)	NO	NO	Program Logic Key	NO	NO	Factory Talk Studio	Studio 5000	Rockwell	20.0.0.0	-	-

1.2 ⇒ ATTACHMENT / IP Address List

IP Address List (example)

Equipment Tag	Equipment Description	Assigned IP	Decimal Mask	Gateway	DNS	DHCP	NTP	REV
19-VHF-MAR-TRX-01	Marine RX 1	10.40.18.1	255.255.255.192	10.40.18.62	-	-	10.40.18.62	02

1.3 ⇒ Access Credential List

Access Credential List (example)

Equipment Tag	Equipment Description	Port	User	PSWD	Access level	Note
19-VHF-MAR-TRX-01	Marine RX 1	-	Admin	1adRM01	Administrator	-
19-VHF-MAR-TRX-01	Marine RX 1	-	Read	2roRM01	Read only	-

9 DIGITAL DOCUMENTS REQUIREMENTS

3D CAD MODEL FROM SUBCONTRACTORS & SUPPLIERS

As part of the scope of supply, the SUPPLIER shall develop and deliver a 3D model of the supplied equipment to be integrated by CONTRACTOR in the overall 3D model of the Plant.

Package equipment shall be modelled in sufficient detail to facilitate the review of access to all components and instrumentation for operation and maintenance, ergonomic design, piping, instrument and electrical connections.

All interfaces including nozzles and tie-ins shall be detailed and identified, as per the following example, with the same level of detail of the CONTRACTOR's overall 3D model of the Plant:

As a general requirement, model information for all package equipment shall contain information and details to ensure overall design integrity of the plant and to support inspection and maintenance programs.

SUPPLIER is requested to specify in the offer which items will be modelled and with which tool, considering the selected 3D model SW for the Project is Aveva E3D 3.1.

It may be tolerated to receive 3D CAD Model of equipment or packages in an exchange format compatible with Aveva E3D, provided that the equipment or package hasn't process functionality and is not represented on a P&ID (e.g. Pumps).

The exchange format shall be one of the following:

- AutoCAD Files (.dwg dxf)
- Autodesk DWF Files (.dwf*.dwfx)
- Inventor Files (*.ipt, *.iam)
- Revit Files (*.rvt, *.rfa)
- Rhino Files (*.3dm)
- SolidEdge Files (*.par, *.asm, *.pwd,*.psm)
- SolidWorks Files (*.sldprt, *.sldasm, *.sldfpp, *asm)
- STEP Files (*.stp, *.step, *.stpz, *.stp.z) / STEP XML (*.stpx, *.stepxz, *.stpxml)

In the other cases, i.e. for packages/skids with tagged objects on P&ID, the Aveva E3D is the preferred option.

Any deviation must be specified and agreed with CONTRACTOR.

Supplier's Data Management

As per COMPANY contractual requirement, all plant main assets and all assets with high impact on operation & maintenance activities must be tagged as per the below specification:

123A90-PML-DIG-PRO-00002 Equipment and System Tag Numbering

For example, all items shown on SUPPLIER's P&IDs must have a project specific tag, as well as any other major component even if P&ID doesn't exist.

Asset Register

SUBCONTRACTOR will develop and deliver a complete Asset Register consistent with the information in process flow diagrams, equipment drawings and maintenance manuals, for loading into COMPANY Asset and Maintenance Management Systems.

This Asset Register will contain a list of all Production Assets split over Process Assets (e.g. process, process support, utility, materials handling, etc.) and Non-Process Assets (e.g. buildings, special tools, personnel movement related, etc.), together with below information, ref to documentation and data, including:

10 NAMEPLATES

PURCHASER will submit to SUBCONTRACTOR during the PO execution phase an excel template with the list of concerned tags. It shall be SUBCONTRACTOR duty to validate the tag list and return to PURCHASER the filled list.

1. Item Tag
2. Description
3. Location in the plant
4. Manufacturer
5. SUBCONTRACTOR
6. Model
7. Specifications project number
8. Maintenance item & plan project number
9. Criticality (HSSE, Production or other)
10. Manufacturers name.
11. Manufacturers serial number.
12. Purchasers order number and item number
13. Manufacturers type designation (if applicable)
14. Tag number (if applicable)
15. Operating Process Conditions
16. Design Process Conditions
17. Weights
18. PED CERTIFICATION
19. Hazardous area classification (if applicable)

Nameplates shall be made of stainless steel AISI 316L with the information being punched or engraved on.

11 EC DECLARATION OF CONFORMITY AND CE MARKING

As per scope of supply, Supplier shall be subjected to the Conformity Assessment according to

the applicable EU as Manufacturer of each of the below mentioned Items to be considered as Products to be placed on the EU Economic Area (EEA).

12 PAINTING

Surface preparation and Painting as per 123A90-DDL-MAT-SP-60006_00 Coating and Painting spec

13 MATERIALS

If not otherwise specified in Data Sheet, materials used shall be new and shall be exclusively those listed in the relevant tables of the applicable Design Code. Materials quality shall be as specified in the datasheets. However, the supplier shall confirm the suitability of specified materials in accordance with the process conditions, environmental conditions, design codes and good industry practice. The use of different materials from the specified ones shall require the written approval of the Company/Contractor during to the Bid Phase.

All Carbon Steel Materials shall be supplied in fully killed and normalized conditions. Low temperature materials shall be supplied with impact test at the minimum design temperature.

If not otherwise specified in Data Sheet, maximum carbon content on ladle analysis and maximum carbon equivalent base on ladle analysis shall be maintained in the suitable range as per applicable materials standards to assure the metal weldability.

All Stainless-Steel Materials for the pressure parts shall be supplied with relevant intergranular corrosion test certificate

Plate material shall not be used for flanges. Only forged materials shall be used for nozzle and manholes flanges.

Gaskets containing asbestos shall not be allowed.

Materials substitution during manufacturing activities is forbidden.

Materials shall be certified EN 10204 type 3.1 for pressure parts and type 2.2 for other parts.

14 FABRICATION

14.1 GENERAL REQUIREMENTS

Prior to commencement of manufacture, the Supplier shall submit fabrication drawings and welding, heat treatment, Coating, NDT and final testing procedures for Company/Contractor review and approval.

Upon completion of construction, testing, and final acceptance the Supplier shall provide as- built drawings.

All welds joining pressure-containing parts and welds which are subjected to mechanical loading, shall be made in accordance with a dedicate WPS/PQR which complies with ASME Section IX. A separate WPS shall be defined for weld repairs, including all relevant details about the repair procedure.

Testing shall be carried out on welds in their final condition (after post weld heat treatment if applicable). The test records shall be verified by the Company/Contractor inspector.

Welders/operators employed on the fabrication of pressure vessels within the scope of this specification shall be qualified in accordance with ASME IX. The WPQR shall be verified by the Company/Contractor before starting of fabrication activities.

The vessel or parts of the vessel that require PWHT shall be supported and protected so that deformation cannot occur. Machined surfaces, flange faces, etc., shall be protected from oxidation during heat treatment. No welding, hammering or deformation is permitted after PWHT.

14.2 QUALIFICATION OF WELD PROCEDURES

Welding procedures that are used, qualified by a previously Recognized Authority approved by the Company/Contractor at Supplier's expense, shall be approved by the Company/Contractor and shall follow the codes referred to in the drawings or specifications and by the laws in force in the locality where the vessel is to be installed.

Welds on pressure vessels shall be carried out by welders or welding operators suitably qualified for the welding procedure, the filler material used and the position of the welds to be made.

All welding parameters detailed in the ASME IX WPS format shall be measured during weld procedure qualification. Each welding pass shall be monitored for Volts, Amps, travel speed and arc time and an average Heat Input calculated.

Preheat and interpass temperatures shall be continuously monitored throughout the qualification.

15 INSPECTION AND TESTING

15.1 GENERAL

The responsibility for inspection and testing rests in the Supplier scope of work. However, the Company/Contractor reserves the right to inspect the vessels at any time during fabrication to ensure that the materials and workmanship are in accordance with the specification and drawings.

Inspection and testing shall be carried out by the Supplier in accordance with the quality inspection and testing plan submitted by the Supplier and approved by the Company/Contractor.

Material certificates shall be available at the time of inspection. The material markings shall be stamped on the material used for the pressure vessels and *shall be ringed in white.*

15.2 VISUAL INSPECTION

The pressure vessel shall be visually inspected to assure conformity with the approved design drawings, datasheets, and specifications. The visual inspection shall be in accordance with the approved test and inspection plan and will include the following as a minimum:

1. dimensional check.
2. surface quality.
3. paint quality.
4. execution of appurtenances.
5. die-stamped identification.
6. marking and shipping requirements.

15.3 SUPPLIERS QUALITY SYSTEM

The Supplier's quality control system shall be in accordance with the applicable codes. Moreover, the following requirements shall be met:

1. Identification of the materials used in the fabrication of the vessel or parts thereof ensuring that parts taken from semi-finished materials are punch marked.
2. Welding procedure qualifications and qualifications of manual welders and automatic welding machine operators shall be available before beginning fabrication.
3. Employers' approval of any type of repair.
4. Availability of documents for repairs attesting that they have been carried out using appropriate methods required by the codes and specifications.
5. Availability of documents relating to all heat treatment performed on the vessel or parts thereof.
6. Availability of documents relating to non-destructive tests performed on the vessel or parts thereof. If the results of examinations and inspections show defects, the Supplier shall take the necessary corrective action. In the event of serious or systematic deficiencies or of difficulty in interpreting the result of checks the Supplier shall carry out
7. additional examinations and consider alternative tests and inspection. In particular:
8. Ultrasonic examination of welds where radiographs are difficult to interpret.
9. Re-qualification of the welding procedure if there are systematic defects.
10. All NDE inspection shall be performed by operators having an internationally recognized qualification

ROTARY PUMP INSPECTION & TEST DATA SHEET (IDS)

EQUIPMENT

TAG	_____
DESCRIPTION	_____

CONCERNED PARTIES

C	:	COMPANY	**S**	:	SUPPLIER	_	:	_____

CERTIFYING AUTHORITIES

OTHER	_____		OFFICIAL AUTHORITY

TYPE OF INTERVENTION

H	:	the inspector inspects items during the hold on the production process
W	:	the inspector witnesses items, without a hold for inspection on the production process
R	:	the inspector reviews documented results of inspection performed by Manufacturer

PROJECT SPECIFICATIONS / DATA SHEETS

_____
_____
_____
_____
_____
_____

COMPANY GENERAL SPECIFICATIONS

INDUSTRY CODES & STANDARDS

API 676 "Nov 2009, Positive Displacement Pumps - Rotary"

NOTES

(1)	Inspections & tests shall be performed in accordance with the Manufacturer's Procedures and Quality Control Plan approved by the Company.		
(2)	Notification of "H" and "W" type inspections & tests shall be issued to the inspector	**(a)**	days in advance.
(3)	MT: Magnetic Particle examination; UT: Ultrasonic examination; PT: Liquid Penetrant examination; RT: Radiographic examination; _____		
(4)	VI: Visual examination_____		
(5)	_____		

(a) to be agreed at Kick-off Meeting after order placement

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ROTARY PUMP INSPECTION & TEST DATA SHEET (IDS)

ITEM	DESCRIPTION OF INSPECTIONS AND TESTS	TYPE OF INTERVENTION				REFERENCES
		C			S	
1	Documentation review - Check of Drawings & Data Sheets approved by Company	R				
2	Documentation review - Welding Specification/Procedures and welders qualification (WPS+WQP+PQR)	R				
3	Documentation review - Welding Repair Procedures	R				
4	Documentation review - NDE Procedures and NDE Personnel Qualifications	R				
5	Documentation review - PWHT Procedures	R				
6	Material inspections - Check of materials certificates (chemical analysis and mechanical test) relevant to: pump body, heating/cooling Jacket, shaft sleeves and rotor	R				
7	Fabrication inspections - Casing: 100%U.T. Control of forged parts after roughing	R				
8	Fabrication inspections - Shaft & Rotor: P.T. on finished shaft	W				
9	Fabrication inspections - Casing & covers: 100%M.T. on raw surfaces after final HT	W				
10	Fabrication inspections - Casing: Locking bolts Hardness Test after final HT	W				
11	Fabrication inspections - Pressure casing parts Visual Inspection (VI)	R				
12	Fabrication tests - Hydrostatic test on Pump body, heating Jacket and cooling Jacket	H				
13	Fabrication tests - Check of Material certification and Test Certification (Hydrotest and Setting) for Safety Valves	R				
14	Machining inspections - Pressure casing	R				
15	Machining inspections - Shaft (incl. runouts and coupling fits)	R				
16	Machining inspections - R.T. 100%check of suction and discharge manifold welds	R				
17	Assembly inspections - Parts installed against Bill of Materials	R				
18	Assembly inspections - Overall dimensions and connection locations	R				
19	Assembly inspections - Electrical equipment wiring	R				
20	Assembly inspections - Piping connections	R				
21	Assembly inspections - Instrument lines	R				
22	Assembly inspections - Oil, Gears and Control system	R				
23	Assembly inspections - Rotor balancing	R				
23	Functional tests - Lube & control oil system test	H				
24	Functional tests - Mechanical running test (as string test)	H				
25	Functional tests - Type, routine and Performance Test of Electric Motor	W				
26	Post-test inspections - Visual and dimensional check according to the G.A. Approved by the Client	H				
27	Garantee Tests - Performance test (check Q-H-absorbed Power)	H				
28	Garantee Tests - Check Vibrations within tolerance	R				
29	Pre-shipment inspections - Plugs for tapped openings	H				
30	Pre-shipment inspections - Nameplates Check	W				
31	Pre-shipment inspections - Cleaning	H				
32	Pre-shipment inspections - Painting inspection (type, colour, surface preparation, primer, final, dry film thickness and certifications)	W				
33	Pre-shipment inspections - Packing & protection	W				
34	Pre-shipment inspections - Parts tagging and identification	W				
35	Pre-shipment inspections - Piping & auxiliary equipment fit-up	H				
36	Pre-shipment inspections - Spare parts tagging and identification	W				
37	Pre-shipment inspections - Supply completeness (Packing List against Purchase Order)	H				
38	Pre-shipment documentation review - Installation Manual	H				
39	Pre-shipment documentation review - Operation & Maintenance Manual	H				

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ROTARY PUMP INSPECTION & TEST DATA SHEET (IDS)

ITEM	DESCRIPTION OF INSPECTIONS AND TESTS	TYPE OF INTERVENTION				REFERENCES
		C			S	
40	Pre-shipment documentation review - Hydrotest Certifications	H				
41	Pre-shipment documentation review - As-built Data Sheets	H				
42	Pre-shipment documentation review - Packing, marking and packing list check	W				
43	Pre-shipment documentation review - Special Tools	H				
44	Pre-shipment documentation review - Complete Spare Parts List	H				
45	Pre-shipment documentation review - Final documentation Review (Data Book)	H				
46	Pre-shipment documentation review - Tropicalization Certificate check (if required)	R				
47	Pre-shipment documentation review - Motors and electrical components area classification	H				
48	Noise Level Tests	W				
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ATTACHMENT 1 STATEMENT OF COMPLIANCE

STATEMENT OF COMPLIANCE	

List of proposed deviations

All deviations shall be clearly stated on this sheet, with reference to VENDOR's quotation. Each proposed deviation shall be supported by a Deviation Request Form. A proposed deviation is accepted if the related Deviation Request Form as been reviewed by Purchaser and APPROVED by COMPANY before the Purchase Order placement.

Item #	Subject	Proposed deviation description + reference to the section of the Requisition and SPECIFICATIONS concerned by the deviation

Remarks :

Date : Signature :

Name : Function :

Purchaser	**XXX**	**Requisition no**	**XXX**
PO number	**XXX**	**Sheet**	**1 of 1**
Project	**123A90**	**Rev.**	**XX**

ATTACHMENT 2 SMIR

SMIR - REGISTRO DOCUMENTI / *SMIR - SUPPLIER MASTER INFORMATION REGISTER* - ATT2of 123A90-DDL-MAC-SP-50013

Ordine n°/*order nr.*		Fornitore/*Supplier*:			
data / *dated*:		Codice F./ *S. Code*:			
Commessa / *Job*:		Indirizzo/ *address* :			
Descrizione / *Description*	VERTICAL VOLUMETRIC PUMP	Persona di riferim./ *contact person*:			
Macrofase / *Phase*					

Pos.	Document nr. Client (1)	Doc Client Rev. (1)	Document nr. Internal	Document nr. Internal Rev. (2)	Document nr. Supplier (3)	Doc Supplier Rev. (3)	SMIR -SUPPLIER MASTER INFORMATION REGISTER VERTICAL VOLUMETRIC PUMP	Disciplina / *Discipline* (5)	Blocco Classe / *Class Block* (6)	Docum. Format (7)	first issue date Proposed by RM (8)	first issue date Proposed by Vendor (8)	Third Party Approval (I/A)	KEY Document Ingegneria	Documents subject to liquidated damages	Document Approval (I/A)
							CONTROL DOCUMENTS									
1							SUPPLIER MASTER INDEX REGISTER (SMIR)	MAC			4W FROM PO			X		A
2							SUB-SUPPLIER LIST	EXP			4W FROM PO					A
3							FABRICATION / PRODUCTION SCHEDULE (Bar Chart [A3 max.])	EXP			4W FROM PO				X	A/I
4							SUB-ORDER SCHEDULE / SUB-ORDER COPIES	EXP			4W FROM PO					I
5							PROGRESS REPORT (A4 document)	EXP			4W FROM PO					I
							QUALITY DOCUMENTS									
6							QUALITY CONTROL PLAN or INSPECTION AND TEST PLAN (A4 sheets)	QUA			4W FROM PO				X	A
							ENGINEERING DOCUMENTS									
7							VIBRATION ANALYSIS DATA	Eng-Mechanical			6W FROM PO					I
8							CERTIFIED GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, SEAL SYSTEMS, FOUNDATION LOADS, NOZZLES LOADS, BATTERY LIMITS, LIFTING DETAILS)	Eng-Mechanical			4W FROM PO			X	X	A
9							CERTIFIED ELECTRIC MOTOR OUTLINE DRAWING	Eng-Mechanical			6W FROM PO			X	X	A
10							PUMP CROSS SECTIONAL DRAWING AND BILL OF MATERIAL (INCLUDING SPEED REDUCER)	Eng-Mechanical			6W FROM PO					I
11							ELECTRIC MOTOR CROSS SECTIONAL DRAWING AND BILL OF MATERIAL	Eng-Mechanical			6W FROM PO					I
12							ELECTRICAL AND INSTRUMENTATION ARRANGEMENT DRAWING AND LIST OF CONNECTIONS (WITH JUNCTION BOX LAY OUT/DIMENSIONAL DWG & TERMINAL STRIPS)	Eng-Mechanical			6W FROM PO			X	X	A
13							SHAFT SEAL DRAWING AND BILLS OF MATERIAL	Eng-Mechanical			6W FROM PO					I
14							SHAFT COUPLING ASSEMBLY DRAWING AND BILL OF MATERIALS	Eng-Mechanical			6W FROM PO					I
15							SPEED REDUCER ASSEMBLY DRAWING AND BILL OF MATERIALS				6W FROM PO					
16							LUBRICATING SYSTEM ARRANGEMENT DRAWING	Eng-Mechanical			4W FROM PO			X	X	A
17							PRIMARY AND AUXILIARY FLUSH PIPING SCHEMATICS AND BILL OF MATERIALS	Eng-Mechanical			4W FROM PO			X		A
18							ELECTRICAL AND INSTRUMENTATION SCHEMATICS,WIRING DIAGRAM , BILLS OF MATERIAL, INSTRUMENT DATA SHEETS	Eng-Mechanical			6W FROM PO			X	X	A
19							WEIGHT DATA SHEET	Eng-Mechanical			6W FROM PO			X		A
20							PUMP DATA SHEETS	Eng-Mechanical			6W FROM PO			X	X	A
21							PUMP AND MOTOR NOISE DATA SHEET	Eng-Mechanical			6W FROM PO			X	X	A
22							ELECTRIC MOTOR DATA SHEET	Eng-Mechanical			6W FROM PO			X	X	A
23							PUMP PERFORMANCE CURVES	Eng-Mechanical			6W FROM PO			X	X	A
24							ELECTRIC MOTOR PERFORMANCE DATA	Eng-Mechanical			6W FROM PO			X	X	A
25							MATERIAL SAFETY DATA SHEET (PUMP & MOTOR)	Eng-Mechanical			6W FROM PO					I
26							ELECTRICAL LOAD LIST	Eng-Mechanical			6W FROM PO			X	X	A
27							COATING PROCEDURE (including surface preparation) (A4)	Eng-Mechanical			6W FROM PO			X		A
28							WELD LOCATION PLAN (Detail drawings to scale. Maximum drawing size A1)	QUA			6W FROM PO					I
29							WELD PROCEDURE SPECIFICATION (WPS) AND QUALIFICATIONS (PQR) RECORDS (Supplier's standard forms in accordance with purchaser's requirements)	WEL			6W FROM PO					A
30							WELD OPERATORS LIST and WELDER QUALIFICATIONS RECORDS (WPQ)	WEL			6W FROM PO					A
31							NON-DESTRUCTIVE EXAMINATIONS PROCEDURES (NDE) (Supplier's procedure)	QUA			6W FROM PO					A
32							NDE OPERATORS LIST and QUALIFICATIONS	QUA			6W FROM PO					A
33							HYDROSTATIC AND OR PNEUMATIC TEST PROCEDURE	Eng-Mechanical			6W FROM PO					I
34							FAT (FINAL ACCEPTANCE TEST) PROCEDURES	Eng-Mechanical			6W FROM PO					A
35							PRE-COMMISSIONING / COMMISSIONING PROCEDURES (A4 procedure)	COM			6W FROM PO					A
36							EQUIPMENT MANUFACTURER RECORD BOOK (FINAL DOSSIER) - INDEX	QUA			1W FROM FAT			X		A
							CERTIFICATES (ref. to notes in the RDDS)									
37							FACTORY ACCEPTANCE TEST (FAT) REPORT (A4 report)	QUA			1W FROM FAT					I
38							PUMP AS BUILT CLEARANCE CERTIFICATE	Eng-Mechanical			1W FROM FAT					I
39							CERTIFICATION MATRIX (ATEX, PED, ANY OTHER CERTIFICATION REQUIRED BY THE STATUTORY DIRECTIVES)	QUA			1W FROM FAT					A
40							ATEX REGISTER	Eng-Mechanical			1W FROM FAT					A
41							EQUIPMENT MANUFACTURERS RECORD BOOK – COMPLETE (A4 bound volume(s) to Purchaser specifications)	CERT			1W FROM FAT			X	X	A
42							PURCHASER's RELEASE NOTE (Issued by Purchaser)	EXP			1W FROM FAT					I
43								QUA			1W FROM FAT					I
							SPARES & MAINTENANCE DATA									
44							SPARE PART INDEX REGISTER (COMMISSIONING, OPERATION AND INSURANCE)	COM			10W FROM PO					I
45							SPECIAL TOOLS LIST (PUMP & MOTOR)	Eng-Mechanical			10W FROM PO					I
46							INSTALLATION, OPERATING AND MAINTENANCE MANUAL INDEX (PUMP & MOTOR)	Eng-Mechanical			10W FROM PO				X	I
47							INSTALLATION, OPERATING AND MAINTENANCE MANUAL (PUMP & MOTOR, INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)	Eng-Mechanical			10W FROM PO				X	I
							HANDLING, SHIPPING & SITE INSTALLATION									
48							PREPARATION FOR SHIPPING PROCEDURES (A4 procedure)	LOG			10W FROM PO					I
49							PREPARATION FOR HANDLING AND STORAGE PROCEDURES (A4 procedure)	COSTR			10W FROM PO					I
50							ERECTION AND INSTALLATION PROCEDURES (A4 Manuals & Drawings)	METODI			10W FROM PO					A
51							LIFTING BEAM / FRAME / SLING DRAWINGS / LIFTING ARRANGEMENT DRAWINGS	MAC			10W FROM PO					I

Notes:

(1) Numero documento Cliente
Document number assigned by final Client
(2) Numero documento interno
Document number internal
(3) *Numero documento Fornitore (assegnato dal Fornitore)*
Document number assigned by Supplier
(4) *Assegnare il Titolo del documento (assegnato dal Fornitore)*
Fill in the document title (to be assigned by Vendor)
(5) Specific are la disciplina (compilato da Rosetti)
Quality dep., Expediting. Dep., Commissioning dep., Engineering dep.
(6) Blocco Classe: Specifica, Disegno, Report, Data Sheet, etc. (compilato da Rosetti)
Procedure, list, drawing, data sheet, etc. (to be filled by Rosetti)
(7) A4, A3, A1 (compilato dal Fornitore)
A4, A3, A1 (Supplier)
(8) Data prevista per l'emissione del documento (compilato dal Fornitore)
Foreseen date for the first issue (Supplier)