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	PROGRAM: WELLS		FOLHA: 1 of 12
	AREA: WELL STRUCTURE - SUBSEA WELLHEAD SYSTEMS (SCPS)		
POCOS/SPO/ PEP/PROJ-EP	TITLE: SCPS EQUIPMENT: 36" BAJA, INCLINATION METER, UP FUNNEL (REMOVABLE) AND FUNNEL TOOL		PUBLIC
			NO SCALE

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1. NAMES AND ACRONYMS

AAP	High Pressure Housing
ABP	Low Pressure Housing
AISI	American iron and steel institute
ANP	National Petroleum Agency
APCAP	High Pressure Preload Housing
APCBP	Low Pressure Preload Housing
API	*American Petroleum Institute*
BAJA	Sandblasting Base
BAP	Production Adapter Base
COMICS	Wear bushing
BDC	Short Wear Bushing
BDL	Long wear bushing
BHA	*Bottom Hole Assembly*, *Bottom* Drill String Composition
BOP	*Blowout Preventer*
BRSA-ML	Submudline Support *Bit Run*
BTMMT	Test Base, Maintenance Assembly and Transportation
BUT	Temporary Single Base
CABP	Wellhead Management
CAT	Temporary Abandonment Cap
CRA	Corrosion Resistant Alloy
CV	Sealing set
CVE	Emergency seal set
CV-ML	Submudline Seal Set
ULC	Universal Seal Set
DNV	Det Norske Veritas
EVE	Emergency Seal Spacer
FECIM	Cementing Tool
FECAF UNIV	FECAF UNIV - Universal Cap and Funnel Tool
GT	Technical Group
ICPLP	Complete, standardized, legible identification in Portuguese
ISO	International Organization for Standardization
JETCAM	Blasting Tool
LDB	Lock Down Bushing
LDS	Lock Down Sleeve
MI	Inclination Meter
ML	Submudline system
NACE	National Association of Corrosion Engineers
NORSOK	Norsk Sokkels Konkuranseposisjon
NP	Product number
NS	Serial Number
PATEC	Technical report
PMT	Maximum Working Pressure

POS	Position
PSL	*Product Specification Level*
SA-ML	Submudline Support
SCPS	Subsea Wellhead System
SINPEP	Integrated Electronic Standardization System Petrobras
SR	Casing Hanger
SR-ML	*Submudline* Hanger
TFI	Internal Factory Test
TFO	Official Factory Test
XO	*Crossover*

2. OBJECT

2.1. This specification deals with the minimum supply conditions for the equipment listed below and used in the construction of subsea wells:

- Blasting Base - BAJA (36");
- inclination meters - MI (2 units for each BAJA);
- UP Funnel (removable);
- Funnel tool.

***Note 1**: in the texts of this specification, the typical nomenclature of PETROBRAS equipment used to carry out the functions described has been used, with the aim of better describing the desired operations and functionalities of the equipment, based on PETROBRAS experience.*

3. REQUIRED FUNCTIONS AND CHARACTERISTICS

3.1. BAJA

3.1.1. The BAJA is attached to the ABP and its main function is to increase the compression, by increasing the weight applied to the BHA, for blast drilling at the start of an open subsea well (without a BOP) and to allow the cement to return during casing cementing. It is installed together with the ABP by the blasting tool (JETCAM).

3.1.2. It can also be used in a drilled subsea well to provide cathodic protection for the wellhead and also to increase the distribution of stresses due to the weight of the assembly on the seabed (ABP, AAP and conductive casing), acting as a MUD MAT due to the increased area of contact with the seafloor.

3.1.3. The BAJA must have compatible geometry and dimensions in order to be installed and locked on the outside of the ABP.

3.1.4. When the BAJA is installed in a well, it is not expected to be removed after completion and will therefore be a permanent part of the subsea well.

3.2. INCLINATION METERS

3.2.1. Two Inclination Meter units must be installed on the respective inclination meter supports of each BAJA, in diametrically opposite positions, to measure the maximum inclination of the ABP - BAJA - UP Funnel assembly, which must be limited to 1.5 degrees during the entire well start operation. The two Inclination Meters (IM) installed on the BAJA must be retrieved via the ROV.

3.2.2. The inclination gauges must have a scale of 0 to 2.5 degrees and must be removable so that they can be retrieved after installation.

3.3. FUNNEL UP AND FUNNEL TOOL

3.3.1. The removable Up Funnel must be connected to the BAJA, with the conical region facing upwards; in PETROBRAS equipment, the removable feature is achieved by means of shearable pins that allow it to be seated and recovered in the vessel.

3.3.2. The funnel has the function of allowing and facilitating the entry and/or coupling of: drill bit, casing shoe, drilling BOP connector, in their respective phases of the well, preventing blows to areas of interest of the equipment that could damage them.

3.3.3. The funnel has a proximity interface with other equipment (connector and/or down funnel of the BOP, BAP) and must not interfere with the installation and operation of this equipment.

Note 2: Within PETROBRAS, the tool that allows the Funnels to be recovered is FECAF UNIV - Universal Funnel and Cap Tool.

4. REFERENCE DOCUMENTS

4.1. BAJAS and FUNIS UP

4.1.1. The BAJA and FUNIL UP, when installed in an ABP, interface with other equipment (BOP connector and/or funnel down, BAP, BAP sleeve, etc.) and must meet the dimensional limits given in the drawings below, without which it will not be possible to continue constructing the well. Reference drawings:

- DE-2000.00-1170-61A-PWS-007 - PERFIL DE TOPO DOS ALOJADORES DE ALTA PRESSÃO AAP 18-3/4” (Dimensões requeridas para interfaces do SCPS com a BAP, BOP, Tampão Suíço, CAT – Capa de Abandono Temporário);
- DE-2000.00-1170-61A-PWS-010 - PERFIL EXTERNO DO SISTEMA DE CABEÇA DE POÇO SUBMARINO 18-3/4”.

Note 3: the geometric characteristics and dimensional limits given in the drawings above correspond to the requests made to the supplier for the SCPS to be supplied and for the assembly to be carried out in the wells without interfering with the other equipment that interfaces with the SCPS.

4.1.2. The equipment, BAJAS and FUNIS UP, used by PETROBRAS, has the characteristics, conditions and design details specified in the respective manuals, informed below, according to the latest revision, and whose concept can be used in the equipment to be supplied:

- MA-MOM-3500.00-9300-277-PEQ-411 - MANUAL DE OPERACAO E MANUTENCAO - MOM CORPO DE BAJA 36 PP X I;
- MA-MOM-DE-3500.00-9300-277-PEQ-418 - MANUAL DE OPERACAO E MANUTENCAO - MOM / FUNIL 36 PP X 74 X I X DQB / NP: PEQ-418;
- MA-MOM-DE-3500.00-9300-277-PEQ-419 - MANUAL DE OPERACAO E MANUTENCAO - MOM / FUNIL 36 PP X 74 X I X GE / NP: PEQ-419;
- ET-2000.00-1000-277-PEK-009 - Corpo de Baja 36 PP x I com compartimentos para lastro, dutos para retorno e cimentação, suportes medidores de inclinação e pinos antirrotacionais.

Note 4: Specification ET-2000.00-1000-277-PEK-009 gave rise to the equipment and should serve as a guide for this supply, where applicable.

Note 5: The equipment mentioned in the manuals in item 4.1.2. is installed in the systems listed below, and installation between them is not interchangeable:
36" x 18 3/4" (FB) MS-800 BR GE;
36" x 18 3/4" BB DQB.

4.1.3. Below is a summary table with information from the BAJAS reference documents already provided to PETROBRAS:

Equipment (SCPS System 36" x 18-3/4")	Nominal Diameter of BOP Connector	Nominal Diameter (Funnel)	Manufacturer of the SCPS where it is applied	Manual	Original Technical Specification from the manuals
BAJA 36" PP Type I	NA	NA	DQB	MA-MOM-3500.00-9300-277-PEQ-411	ET-2000.00-1000-277-PEK-009
			GE		
	72"	74"	DQB	MA-MOM-DE-3500.00-9300-277-PEQ-418	
			GE	MA-MOM-DE-3500.00-9300-277-PEQ-419	

4.1.4. Below is a summary table with information from the reference documents for the UP FUNIS already supplied to PETROBRAS:

Funnel (SCPS System)	Nominal Diameter of BOP Connector	Nominal Diameter (Funnel)	Manufacturer of the SCPS where it is applied
Funnel 36" PP Type I (SCPS 36"x18-3/4")	66"	69-1/2"	DQB
			GE
	72"	74"	DQB
			GE

4.1.5. Other documents referenced in the specifications:

- ET-3000.00-1500-940-PEK-001- PROJETO DE PROTECAO CATODICA PARA EQUIPAMENTOS SUBMARINOS;
- ABNT NBR 10387 - Anodos de liga de alumínio para proteção catódica.

4.2. FECAF UNIV (FERR. CAPA ABAND. TEMP E FUNIL UNIVERSAL 74") and its BTMMT:

4.2.1. The installation tool for the UP Funnel and its respective BTMMT (FECAF UNIV 74") used by PETROBRAS has the characteristics, conditions and design details specified in the manual below, as last revised, and whose concept may be used in the equipment to be supplied:

- MA-MOM-DE-3500.00-9300-277-PEQ-443 - FECAF UNIV 74" and BTMMT UNIV
- • ET-2000.00-1000-277-PEK-009 - Corpo de Baja 36 PP x I com compartimentos para lastro, dutos para retorno e cimentação, suportes medidores de inclinação e pinos antirrotacionais.

Note 6: ***Specification ET-2000.00-1000-277-PEK-009 gave rise to the equipment and should serve as a guide for this supply, where applicable.***

4.3. INCLINATION METERS

4.3.1. The inclination meters have the characteristics, conditions and design details specified in the manual below, according to the latest revision, the concept of which can be used in the equipment to be supplied:

- ET-3500.00-1516-273-PSE-021 - PETROBRAS STANDARD SLOPE INDICATOR - Scale from 0 to 2.5 degrees.

5. EQUIPMENT REQUIREMENTS AND CHARACTERISTICS

5.1. GENERAL REQUIREMENTS

5.1.1. The equipment must be developed and is indicated to be installed in the SCPS characterized with dimensions: 36" x 18 3/4" (ABP x AAP); specific to the supplier.

5.1.2. The supplier may use as a reference the concepts of the projects used within PETROBRAS to develop the equipment to be supplied and meet the requested interfaces.

5.1.3. Changes proposed by the supplier in relation to the PETROBRAS equipment concept that offer potential improvements to the equipment or services (safety, reduction in operating times, etc.) will be evaluated.

5.1.4. As this is new equipment installed in a new SCPS and due to its interfaces with other equipment, an Official Factory Test (TFO) must be carried out for the first supply, simulating the field operations of assembling an SCPS in a well and also with other interface equipment (BOP connector and/or down funnel, BAP); based on a test procedure previously approved by PETROBRAS.

5.2. CHARACTERISTICS REQUIRED FOR THE BAJA

5.2.1. It must have dimensions and characteristics that allow it to be interconnected to the supplier's ABP and its conductive casing, and to the UP Funnel (removable) without interfering with the other stages of the well;

5.2.2. Provide mass to allow compression of the ABP and casing;

5.2.3. It must have compartments that allow the base to be ballasted in order to increase the concentrated weight to enable traction blasting;

5.2.4. It is desirable that the total volume of the ballast compartments allows the mass of the BAJA to double when filled with cement;

5.2.5. Have ducts that send the cement to the BAJA's ballast compartments;

5.2.6. Have windows that allow cement to be returned through the ABP's cement return holes, in case cementing is necessary;

5.2.7. It must have at least two (2) supports with an inclination meter to monitor the inclination of the well;

5.2.8. It must have at least two (2) indicator rods so that the base can be seen when it is seated on the seabed;

5.2.9. Have at least four (4) cementing ducts around the base in case it swinging in subsequent operations;

5.2.10. Have cathodic protection with aluminum anodes that provide corrosion protection for 30 years immersed in seawater;

5.2.11. The equipment must meet the following operational capacities:

- Maximum jet pressure: 2,000 psi;
- Jet flow range: 100 to 300 gpm (gallons per minute);
- BAJA mass: 9,000 Kg (minimum, without ballast cement).

5.3. CHARACTERISTICS REQUIRED FOR UP FUNNELS (REMOVABLE):

5.3.1. This equipment has the function of allowing and facilitating the entry and/or coupling of: drill bit, casing shoe, drilling BOP connector, in their respective phases of the well, preventing blows in areas of interest to the equipment that could damage them;

5.3.2. It must have dimensions and characteristics that allow it to be interconnected to the BAJA and the connection interface with the BOP without interfering with the other stages of the well;

5.3.3. To allow easy retrieval after the BOP has been removed; in PETROBRAS equipment, the removable feature is achieved by means of shear pins that allow it to be seated and retrieved by a boat.

5.3.4. It is desirable that it has characteristics that allow it to be laid and recovered using a cable tool (FLC-UNIV) by special dynamic positioning vessels (AHTS or SESV) and with the aid of an ROV, as well as being able to be recovered using the funnel tool (FECAF -UNIV);

5.3.5. It must have at least two (2) supports with an inclination meter to monitor the inclination of the well;

5.3.6. Capacity: Mass required for the hopper: 9,000 Kg (minimum);

5.4. REQUIRED CHARACTERISTICS FOR INCLINATION METERS

5.4.1. Inclination meter with a scale of 0 (zero) to 2.5º (two and a half degrees) for use in ultra-deep-water depths of up to 3,000 meters;

5.4.2. Desirable, accuracy: 1/8° (one eighth of a degree);

5.4.3. Desirable, largest external diameter (after coating or painting): 16 inches;

5.4.4. Outer diameter tolerance desirable: +/- 1/8 inch (one eighth of an inch);

5.4.5. Yellow meter background (track) desirable;

5.4.6. Desirable, circular scale markings every 0.5º (half a degree) in black (average thickness 8 millimeters);

5.4.7. Desirable, 1.5º (one and a half degrees) marking in red (operational limit of wellhead equipment);

5.4.8. Desirable, thickness of red band indicating 1.5º (one and a half degrees): 6 millimeters

5.4.9. Paint two diametrical stripes perpendicular to each other to divide the quadrants, numbering them clockwise (from 1 to 4);

5.4.10. Track width equal to half of the circular track.

6. MISCELLANEOUS CLARIFICATIONS

6.1. DETAIL DESIGN OF THE BASE AND UP FUNNELS

6.1.1. The design data for the UP Base and Funnels are given in manuals MA-MOM-3500.00-9300-277-PEQ-411 / 418 / 419 and their concepts must be followed in this delivery.

6.1.2. Item B (Conceptual Design: submit drawings) of ET-2000.00-1000-277-PEK-009 states that "Conceptual Design" gave rise to these manuals. The supplier must present the design of the equipment, with drawings, informing the interface dimensions that prove compliance with this specification, and the list of materials that must be submitted to PETROBRAS for approval. Only after PETROBRAS approval will the successful bidder detail the design, manufacture the BAJA, the UP Funnel and the Slope Gauges.

6.2. MOVING / LIFTING EQUIPMENT

6.2.1. The characteristics and requirements for handling and lifting the equipment are specified in the respective design documents cited as a concept. The supplier must specify and supply these parts (lifting slings, load rings, rigging eyelet, shackles, etc.) according to the characteristics of their project for the respective equipment: BAJA, FUNIL UP, Inclination Meter.

7. MISCELLANEOUS COMMENTS

7.1. It is not permitted to reproduce/distribute COMPLETELY or PARTIALLY this specification and its references without prior authorization from PETROBRAS.

7.2. All information contained in the documents delivered to the CONTRACTED PARTY is the property of PETROBRAS, and its disclosure or total and/or partial use without prior authorization is prohibited;