
 <b>PETROBRAS</b>	TECHNICAL SPECIFICATION		N°		I-ET-2000.00-1170-61A-P4W-004				
	PROGRAM: <b>WELLS</b>				FOLHA: 1 of 7				
	AREA: <b>WELL STRUCTURE - SUBSEA WELLHEAD SYSTEMS (SCPS)</b>								
POCOS/SPO/PEP/PROJ-PERF		TITLE: <b>PETROBRAS STANDARD SLOPE INDICATOR - SCALE FROM 0 TO 2.5 DEGREES</b>				<b>PUBLIC</b>			
						NO SCALE			
<b>REVIEW INDEX</b>									
<b>REV.</b>	<b>DESCRIPTION AND/OR LEAVES AFFECTED</b>								
0	Original Issue								
	REV. 0	REV. A	REV. B	REV. C	REV. D	REV. E	REV. F	REV. G	REV. H
DATE	18/092023								
PROJECT	PROJ-PERF								
EXECUTION	UPFY								
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## 1. NAMES AND ACRONYMS

### GLOSSARY OF TERMS AND ACRONYMS USED

- ET = TECHNICAL SPECIFICATION
- CABP = WELLHEAD
- POL = INCH
- REV = REVIEW
- ROV = REMOTE OPERATED VEHICLE
- mm = MILLIMETERS
- cm = CENTIMETERS
- m = METERS
- NP = PART NUMBER
- NS = SERIAL NUMBER
- PCS = PURCHASE AND SERVICE ORDER
- MOM = OPERATION AND MAINTENANCE MANUAL
- TFO = OFFICIAL FACTORY TEST (accompanied by Petrobras or a certifying company authorized by Petrobras)
- NS = SERIAL NUMBER
- DE = OUTSIDE DIAMETER
- DI = INTERNAL DIAMETER
- LAP = WIDTH x HEIGHT x DEPTH
- TBC = TIE BACK CONNECTOR
- ICPLP = COMPLETE, STANDARDIZED, LEGIBLE IDENTIFICATION IN PORTUGUESE
- MI = INCLINATION METER
- AAP = HIGH PRESSURE HOUSING

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## 2. OBJECTIVES

Define the minimum and necessary characteristics of the equipment known as the SLOPE INDICATOR, with a scale of **0** (zero) to **2.5°** (two and a half degrees) for use in ultra-deep-water depths of up to 3,000 meters. This specification replaces ET 3500.00-1516-273-PSE\_021-MEDIDOR DE INCLINAÇÃO (slope indicator) PADRÃO PETROBRAS – Escala de 0 a 2,5 graus.

## 3. MAIN FEATURES OF THE SLOPE INDICATOR

3.1. Measuring scale: 0° (zero degree) to 2.5° (two and a half degrees);

3.2. Accuracy: 1/8° (one eighth of a degree);

3.3. Largest external diameter (after coating or painting): 16 inches;

3.3.1. Tolerance on outside diameter: +/- 1/8 inch (one eighth of an inch)

3.4. Bottom of the slope indicator (track):

3.4.1. In yellow;

3.4.2. Circular scale markings every 0.5° (half a degree) in black (average thickness 8 millimeters);

3.4.3. Marking of 1.5° (one and a half degrees) in red (operational limit of wellhead equipment);

- Thickness of the red band indicating 1.5° (one and a half degrees): 6 millimeters

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

- Strip width equal to half the circular track;

3.5. It should basically consist of:

a) A-36 steel body (minimum);

b) Acrylic track (bottom of the slope indicator), homogeneous, "smooth" and free of imperfections;

c) Plug for filling/replacing fluid;

d) Stainless steel ball;

e) Acrylic dome;

f) Screws, washers, o-rings;

g) 2 Lifting/handling eyes and shackles;

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h) Sling in AISI 316;

i) Filling fluid.

3.6. Sling to be supplied with each SLOPE INDICATOR:

3.6.1. Material: STAINLESS STEEL or galvanized;

3.6.2. Cable diameter: 1/4" (one quarter of an inch);

3.6.3. Approximate total length: 85 centimeters

3.6.4. Made up of 2 cables, attached by 5/16" (five sixteenths of an inch) galvanized straight shackles, with clips at the ends; one end is attached to the lifting eye and the other to a "pear eye";

3.7. Approximate weight: between 40kg and 45kg

3.8. Filling fluid: mixture of water and glycerin

3.9. Paint type: EPOXY (according to NORMA N-2037)

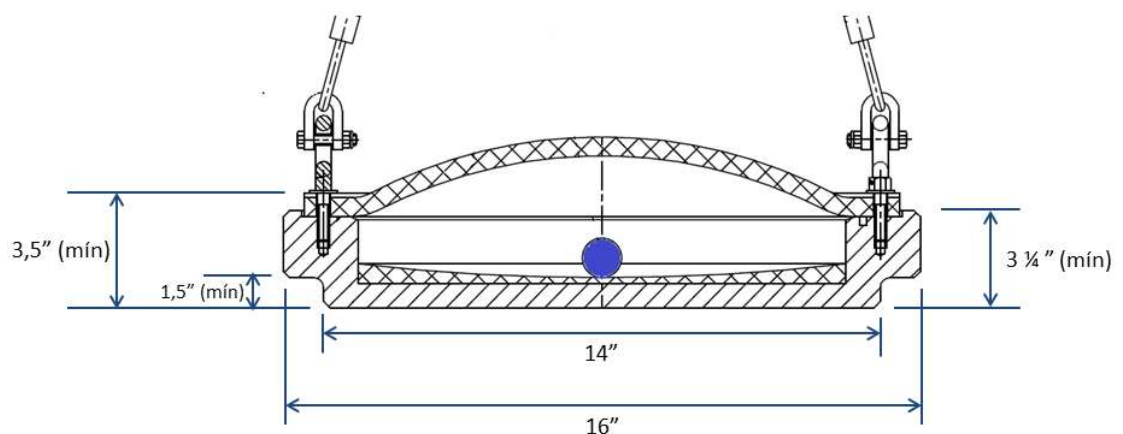
3.10. Type of finish: Sandblasted / Polished / Painted / Galvanized

3.11. Height of characters in quadrants (quadrant numbers): 12 millimeters


- Quadrant numbers should be in Arabic numerals; e.g., 1, 2, 3 and 4;

3.12. The 2.5° limit must be identified on the track (4 markings - 1 in each quadrant);

3.13. Main dimensions (standardized) and illustrations:





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#### 4. HYPERBARIC CHAMBER TEST OF THE SLOPE INDICATOR

- 4.1. The supplier must provide a certificate and test report from a hyperbaric chamber in order to approve the slope indicator to be supplied;
- 4.1.1. If you have already approved the product, you must submit a report endorsed by a certifying body;
- 4.2. Basic hyperbaric test requirements:
- 4.2.1. Simulate hydrostatic pressure of at least the equivalent of 3,000 m of water depth;
- 4.2.2. Period of exposure to pressure: at least 30 minutes;
- 4.2.3. There must be no damage to any of the SLOPE INDICATOR's components;
- 4.2.4. Check for air bubbles inside the slope indicator (these must not interfere with the reading of the values);
- 4.2.5. Check the possibility of carrying out the test with fluid at a temperature of 4°C (four degrees Celsius), which is the temperature normally found at the bottom of the sea, in water depths greater than 2,000 meters;
- 4.2.6. Present tables and graphs with the data obtained: pressure drop, time elapsed, fluid temperature, etc;
- 4.2.7. Record all the data from the equipment being tested;
- 4.2.8. Record in clear, dated photographs;
- 4.2.9. A certifying company must certify the test;

#### 5. APPLICABLE GENERAL CONDITIONS and MISCELLANEOUS OBSERVATIONS

- 5.1. It is not permitted to reproduce/distribute COMPLETELY or PARTICULARLY this specification without prior authorization from Petrobras;