



Quality Plan

Zinc Anode

Anode Code : DT070
Doc No : DT070
Order No :
Date :

Client :
Project :
Order No :
Date :

Standard : MIL -A- 18001K DNV RPB401 NACE RP0387-99 NORSOK M-501

| ITEM | TEST | REF.STANDARD | PROCEDURE | REQUIREMENTS | COMMENTS |
|------|---|----------------------------|---|---|---|
| 1 | Anode alloy | Table 1 para.3.1.1 | <p>1- Take the chips sample for chemical analysis (The drilling for chemical analysis shall be made with a special analysis drill bit)</p> <p>2-Do the chemical analysis of samples (using the atomic absorption , inductively coupled plasma ,or directly coupled plasma spectrophotometers)</p> | <p>Pb<0.006 % wt Fe<0.005 %wt CU<0.005 % wt Al=0.1 - 0.5 % wt Cd=0.025 - 0.07 % wt</p> | <p>Total constituents shall not exceed 0.1 percent Pb>0.007 Fe>0.006 Cu>0.006</p> |
| 2 | Anode weight | para.3.3.3 | weigh each of anode | The weight of each anode must be within ±3% of the nominal weight or 2 kg whichever greater. | |
| 3 | cast galvanic anode identification | ABSORPTION. 3.5.2 | <p>Each anode shall be cast or die-stamped with the following:</p> <p>1-Manufactures symbol 2-Heat number</p> | | |
| 4 | Carbon equivalent at insert | para.3.7.2 | calculate the carbon equivalent (CE) by the following formula : $CE=C+(1/6)Mn+(1/5)(Cr+Mo+V)+(1/15)(Ni+Cu)$ | CE<0.45 | |
| 5 | Laboratory tests for measuring the electrochemical efficiency | Appendix A DNV RP B 401 | <p>1- select the 3 samples for each 15 tones of anodes .</p> <p>2- provide specimen with dimension $\varnothing 10 \pm 1mm \times 50 \pm 5mm$ by machining .</p> <p>3- Drill one of the ends with 2mm diameter then connect the support rod in Titanium and coat the connection by electrically insulation coating .</p> <p>4- Weigh the samples by 0.1mg balance . (W1)</p> | | |



Quality Plan

Zinc Anode

Client :

Project :

Order No :

Anode Code :

Doc No : DT070

Standard : MIL -A- 18001K DNV RPB401 NACE RP0387-99 NORSOK M-501

| ITEM | TEST | REF.STANDARD | PROCEDURE | REQUIREMENTS | COMMENTS |
|------|------------------------------------|-----------------------------|---|--|----------|
| 6 | Cast galvanic anode identification | Para . 3.2\ Nace RP 0387 | <p>5- Fill the tube cathode with sea water . The minimum area of cathode must be 400 cm2 (20 times the anode area) and minimum of water is 1 lit .</p> <p>6- Impress the current at the following program</p> <ul style="list-style-type: none"> - Day 1: 1.5mA\cm2 for anode surface - Day 2: 0.4mA\cm2 for anode surface - Day 3: 4.0mA\cm2 for anode surface - Day 4: 1.5mA\cm2 for anode surface <p>7- The accuracy of current is ± 0.1 mAcm2 and the time period is 24 ± 1 hr .</p> <p>8- Measure the potential at the end of each period base on reference electrode .</p> <p>9- After the test , clean the specimens for 10 min at 80°C in a solution containing 20 gr chromium trioxide and 30cc concentrated phosphoric acid per liter water .</p> <p>10- dry the specimens by tap water and ethanol .</p> <p>11- Weigh the specimens to the nearest 0.1mg (W2)</p> <p>12- Calculate the efficiency $\epsilon = \frac{W}{W_2 - W_1} \times 100$</p> <p>c: Total current charge (A.hr)</p> | Each anode must be marked for cast No . & heat treatment bath No . | |



Quality Plan
Zinc Anode

Anode Code :
Doc No : DT070

Client :
Project :
Order No :
Date :

Standard :MIL -A- 18001K DNV RPB401 NACE RP0387-99 NORSOK M-501

| ITEM | TEST | REF.STANDARD | PROCEDURE | REQUIREMENTS | COMMENTS |
|------|------------------------------------|----------------------------|---|--|---|
| 7 | Dimensions & Straightness of anode | Para 3.4 / Nace RP0387 | Measure the following items — mean length of anode — mean width — mean thickness — straightness | <ul style="list-style-type: none"> — mean length must be within $\pm 3\%$ nominal length or $\pm 25\text{mm}$ whichever is smaller — mean width must be $\pm 5\%$ of the nominal mean width — mean depth must be $\pm 10\%$ of thenominal mean depth — straightness must not deviate more then 2% of anode nominal length from the longitudinal of anode . | inspection frequency is $\geq 10\%$ of all anodes |
| 8 | Insert dimensions and positions | para 3.5/ NACE RP 0387 | — Measure the insert location | <ul style="list-style-type: none"> — insert location within the anodes must not deviate from nominal position more then 5% of the nominal anode width and length and 10% of the nominal anode depth | Inspection frequency: all of the anode must be checked for critical dimensions — 10% of all anodes |
| 9 | Surface irregularations | para 3.7.1 MIL - A- 18001K | inspect the following items : — shrinkage depression — Flash burrs — Surface slag — Crack | <ul style="list-style-type: none"> — shrinkage depression shall be accepted . — shall not exrrd 1/4 inch in depth | |