



T.M.U

# Tarbiat Modares University

## Faculty of Engineering

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### CHEMICAL ANALYSIS TEST REPORT

Type Of Material	Ti-MMO Ribbon Anode
Client	BORNA Electronics Co.
Date	12 Mar 2016
Report Number	94122202
Hologram Number	172970

Chemical Composition Of Titanium Substrate			
Sample Number	Fe	C	N
01	0.08 %	0.01 %	0.017 %
H	O	Ti	
0.005 %	0.11 %	99.78 %	

Acceptance Criteria According To ASTM B 265 Grade 1 Standard		
Fe	C	N
0.20 % Max.	0.08 % Max.	0.03 % Max.
H	O	Ti
0.015 % Max.	0.18 % Max.	Rem.

Corrosion & Protection Lab  
Dr. T. Shahrabi

*T. SHARABI*  
Manager Of Corrosion  
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### ACCELERATED LIFE TEST REPORT

Type Of Material	Ti-MMO Ribbon Anode
Client	BORNA Electronics Co.
Date	12 Mar 2016
Report Number	94122201
Hologram Number	172970
Anode Size	6.35 mm × 0.635 mm × 1000 mm
Anode Surface Area	0.014 m <sup>2</sup> per linear metre
Anode Current Output	42 mA per linear metre
Anode Current Density	3 A/m <sup>2</sup>
Anode Design life	25 years
Anode Charge Density	657000 A-h/m <sup>2</sup>
Anode Accelerated Life	66 h

Accelerated Life Of MMO Ribbon Anode Coating	
Sample Number	Accelerated Life (h)
01	79
Total Charge Density (A-h/m <sup>2</sup> )	Anode Lifetime (yr)
790000	30.1

Acceptance Criteria According To NACE TM0108 Standard	
Accelerated Life	Total Charge Density
Equal or more than the anode accelerated life	Equal or more than the anode charge density

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Test Condition	
Sample Size	6.35 mm × 0.635 mm × 12 mm
Coating Area	167 mm <sup>2</sup>
Current	1.67 A
Current Density	10000 A/m <sup>2</sup>
Electrolyte	1.0 M Na <sub>2</sub> SO <sub>4</sub> Solution
pH	6.3
Resistivity	10.7 ohm-cm
Temperature	30±5 °C
Initial Cell Voltage	9.4 V
Final Cell Voltage	10.9 V
The accelerated time of anode is recorded when the cell voltage increases by 1.5 V above its initial value	

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