ELECTRODE SPECIFICATION

Customer name

Model :

Customer	Issued	Checked	Approved
.			
Date (YY. MM. DD)			

	Prepared by	Checked by	Approved by
Date (YY. MM. DD)			

ENERTECH INTERNATIONAL, INC.

269, Chungjuhosu-ro, ChungJu-city, Chungbuk , Korea
TEL: 82-43-850-1955 FAX: 82-43-855-9175
www.enertechint.com

Revision History

Rev. No	Date (YY. MM. DD)	Description	Remark
1.0	19. 09. 03	Initial release	

목 차

I. Descriptions and Model

1. Scope

This Electrode Specification ('Specification' hereinafter) covers the requirements of the electrode for Lithium ion Battery manufactured
and supplied by Enertech International **INC.** to _____

2. Description of Model

2.1 Description of Model Electrode for Lihium ion Battery

2.2 Model Electrodo for _____

II Electrode Specification

Item			Unit	Specification	Remark
Chemistry	Active material				
	Conducting Agent				
	Binder				
	Additive				
Current Collector	Material				
	Thickness		um		
Electrode Specification	Loading Density		mg/cm^2		
	Dimension	Non-Coated width (Tab)	mm		
		Non-Coated width (Bottom)	mm		
		Coating Width	mm		
		Mismatch	mm		
	Thickness after Pressing		㎛		
	Slitting Width		mm		

Ⅲ. Requirement

1. Loading Density

Check the 3 point of in 90mm(Figure.1) with square shape in 90mm electrode(Figure 2).
Tolerances of loading density are within electrode specification of Reference.
The loading density is defined as a average loading density of three pieces about electrode specimen
(50mmX50mm, Figure 2).
The status of electrode is before calendaring

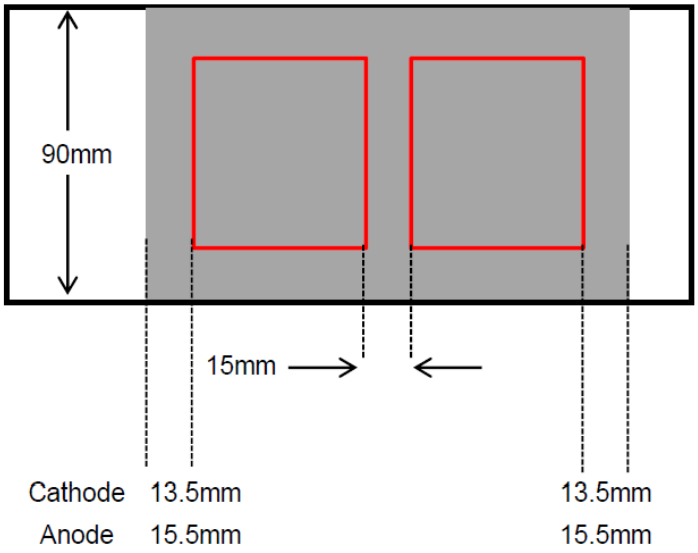


Figure 1.

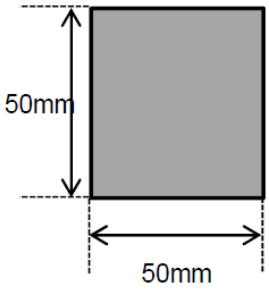


Figure 2.

2. Thickness

Thickness of electrode, which is after calendering, will be measured with micrometer (Maker : Mitutoyo, Japan).
The check points (7points) of thickness are same as figure. 3.

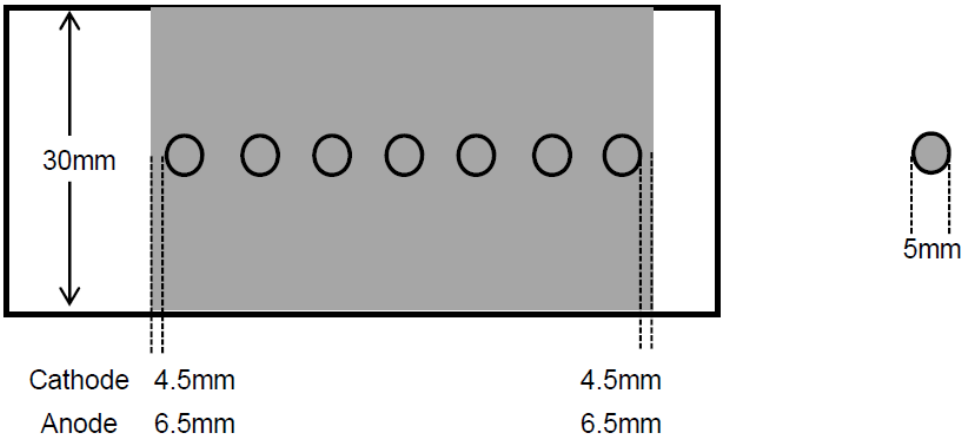


Figure 3.

3. Electrolyte immersion test

The electrode will be soaked in the electrolyte after vacuum dry.

The vacuum dry condition of electrode is 130℃, 12hrs.

The electrode should stand without peeling off during 30 minutes in the electrolyte.

The kind of electrolyte is standard electrolyte of **ENER1 KOREA INC.**

The water contents of electrolyte should be less than 20ppm and the immersion test will be conducted in 60℃ chamber, which is located in the dry-room and room temperature (25±3℃).

4. Splice of electrode

In the one roll of electrode, the splice point should be less than three point.

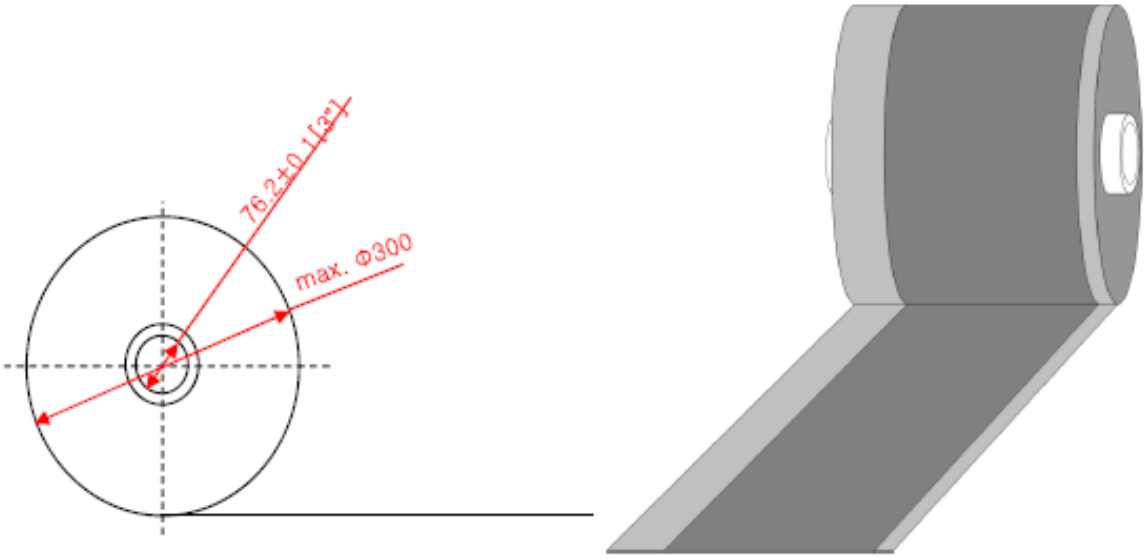
Enertech International should mark the splice point with marking paper in the electrode roll.

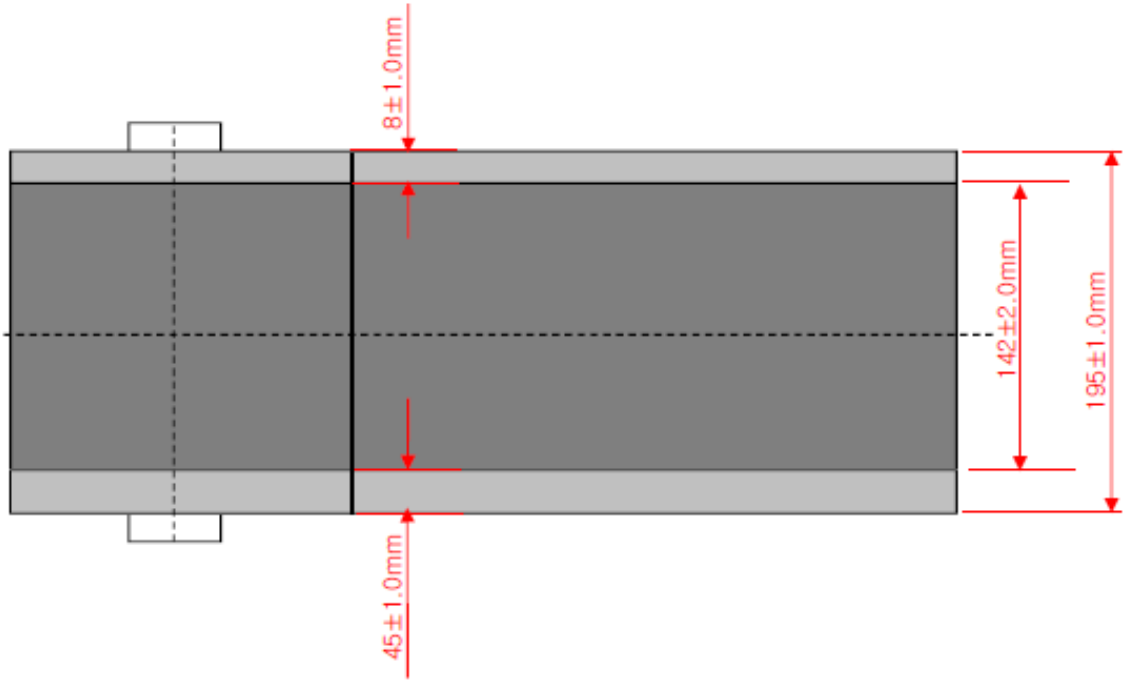
5. Electrode drawings and Final winding direction

The drawings of electrode and final winding direction of electrode are as follows.

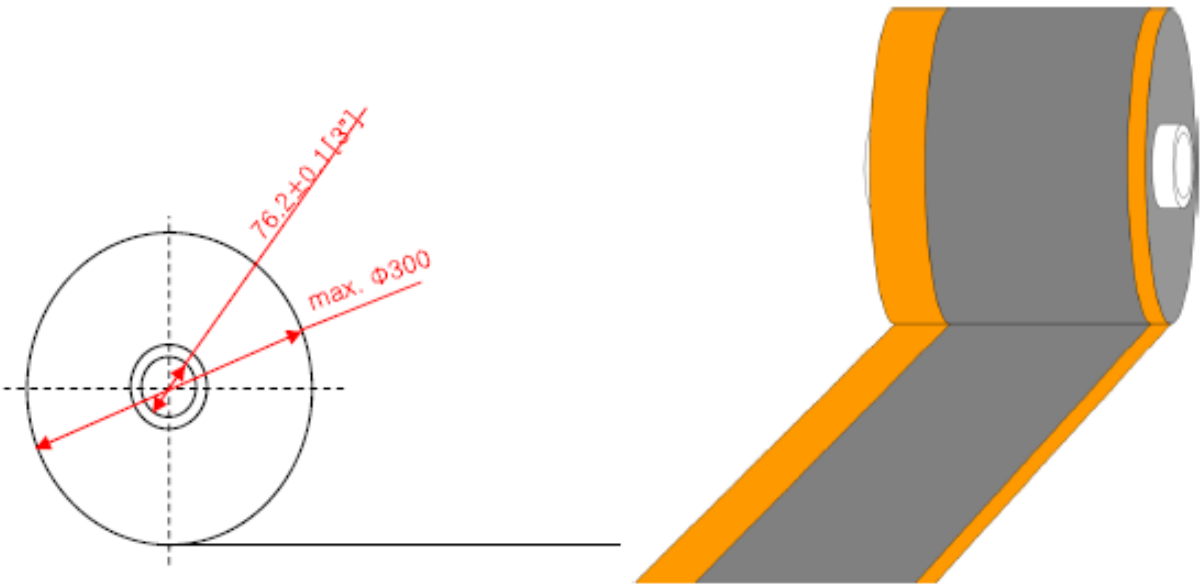
*Non-coated(tab) area should be on the left.

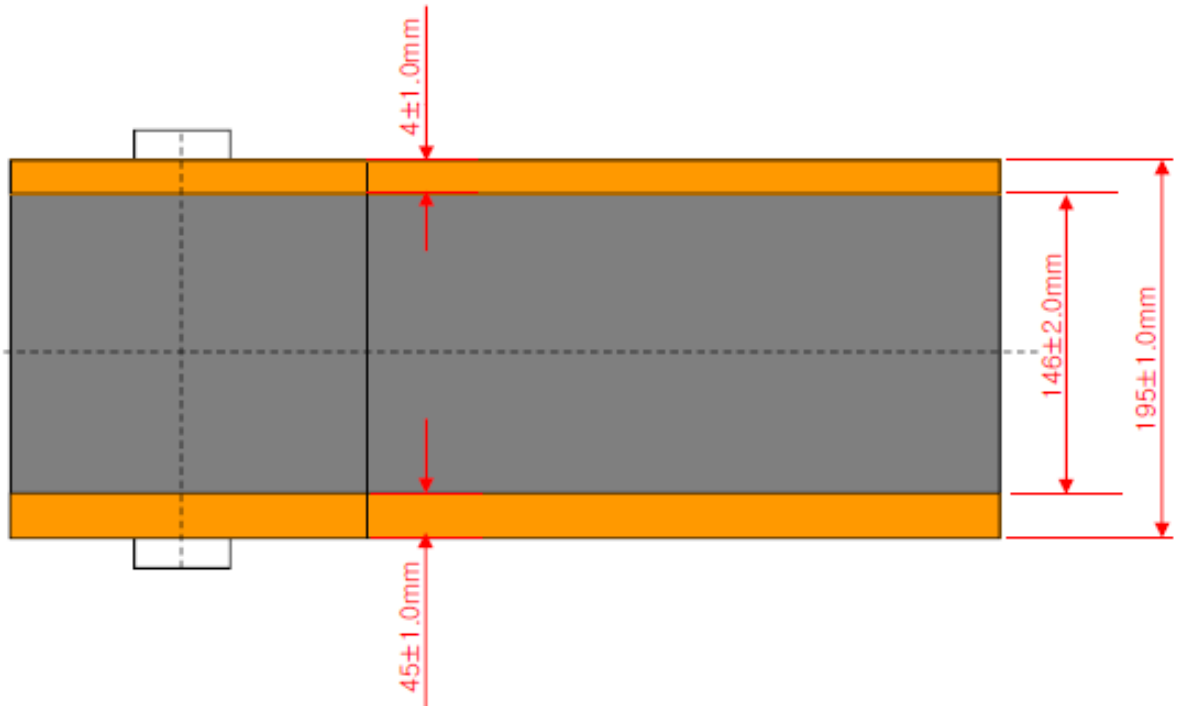
5-1. Cathode Double Electrode (size is example)



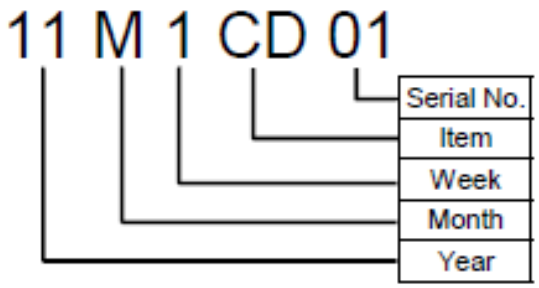


6-2. Anode Double Electrode (size is example)





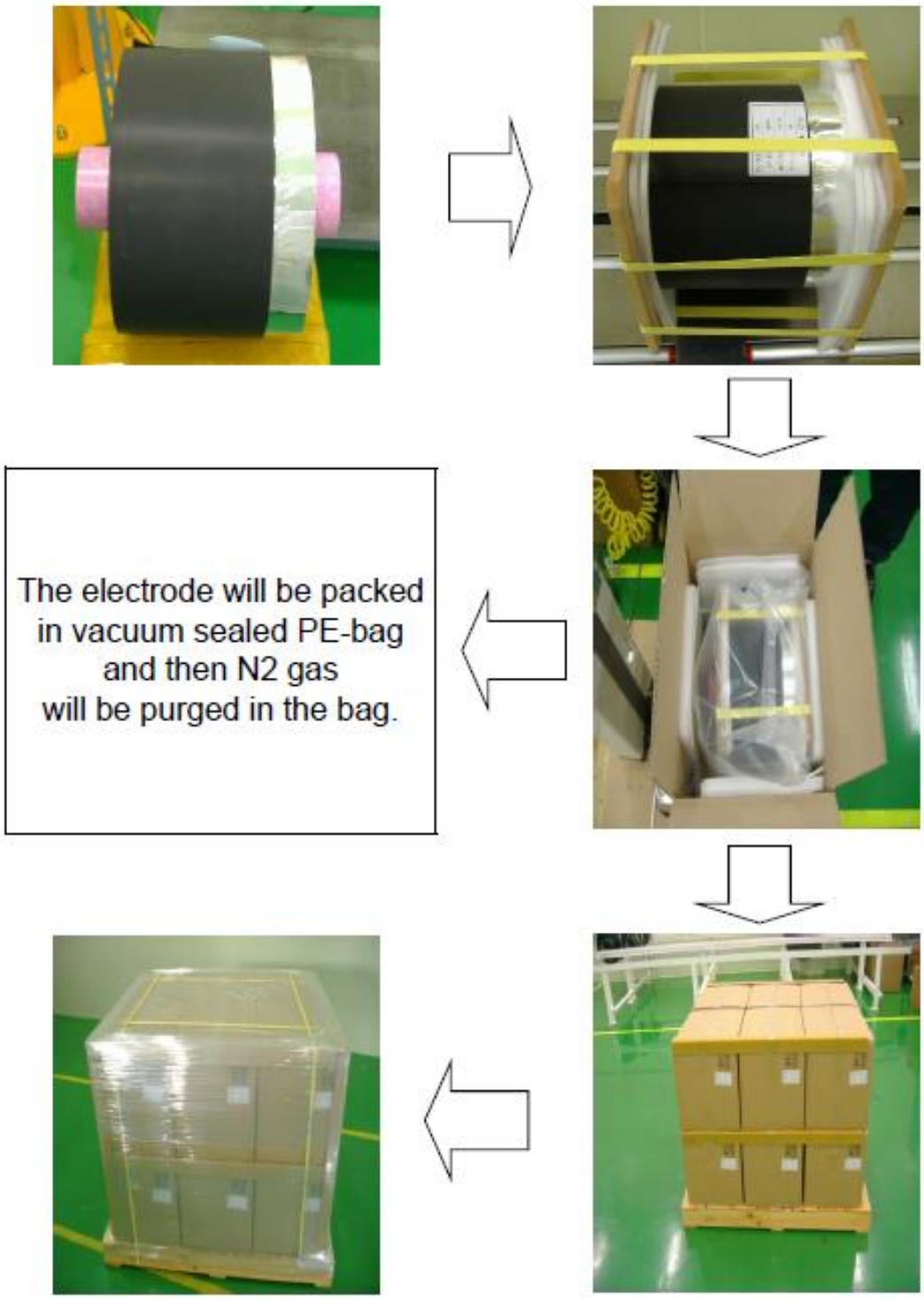
IV. Lot No. Specification

LOT NO. Printing method		
Method		

LOT NO CODE

No	ITEM	DIG	CODE	Remark
1	Year	2 Dig	11 : 2011 12 : 2012 13 : 2013 14 : 2014 •	
2	Month	1 Dig	A Jan / G Jul B Feb / H Aug C Mar / J Sep D Apr / K Oct E May / L Nov F Jun / M Dec	
3	Week	1 Dig	1 = 1st week, 2 = 2nd week, 3 = 3rd week, 4 = 4th week, 5 = 5th week	
4	Item	2 Dig	CD Cathode Double AD Anode Double AS Anode Single	
5	Serial No.	2 Dig	1 Serial No. 1 2 Serial No. 2 •	

V. Packing Specification



VI. Outgoing Inspection Sheet

ENERTECH

CERTIFICATE OF COMPLIANCE

◇ DATE : 2019.06.27

◇ Customer : Solid energy

◇ Material(Ecopro 148W) : EY-392-1

◇ Product : Cathode _Batch #18

Inspector : Bong Gil. Choi

MANAGER OF QA :

No	Lot No	Loading Density(mg/cm²)			Thickness(㎛)			Length (M)	Slitting width (mm)	Coating width (mm)	Non-Coated width (mm)	Mismatch (mm)	REMARKS	Electrode Density(g/cc)
		1	2	3	1	2	3							
	Specification	4850±0.5			163±T.B.D			-	70±T.B.D	58±T.B.D	12±T.B.D	1.0↓	-	-
1	19F4C001	48.84	48.80	48.88	160	163	165	130	69.4	57.9	11.6	0.1	Foil 10㎛	3.20
2	19F4C002	48.84	48.68	48.84	162	164	165	130	69.7	58.2	11.5	0.1	"	3.17
							Total :	260						

◇ Material(Ecopro 148W) : EY-392-1

No	Lot No	Loading Density(mg/cm²)			Thickness(㎛)					Length (M)	Slitting width (mm)	Coating width (mm)	Non-Coated T-width (mm)	Non-Coating B-width (mm)	Mismatch (mm)	REMARKS	Electrode Density(g/cc)
		1	2	3	1	2	3	4	5	6							
	Specification	4850±0.5			163±T.B.D					-	140±T.B.D	116±T.B.D	12±T.B.D	12±T.B.D	1.0↓	-	-
3	19F4C003	48.24	48.28	48.24	160	163	164	164	165	161	140	139.2	116.5	11.5	11.2	0.1	Foil 10㎛	3.16
									Total :	40							

◇ Material(Ecopro 148W) : EY-392-1

No	Lot No	Loading Density(mg/cm²)			Thickness(㎛)			Length (M)	Slitting width (mm)	Coating width (mm)	Non-Coated T-dth (mm)	Non-Coating B-width (mm)	Mismatch (mm)	REMARKS	Electrode Density(g/cc)
		1	2	3	1	2	3								
	Specification	3360±0.5			115±T.B.D			-	70±T.B.D	58±T.B.D	12±T.B.D	12±T.B.D	1.0↓	-	-
4	19F4C004	33.64	33.56	33.64	113	116	117	310	69.8	58.5	11.3	11.6	0.1	Foil 10㎛	3.19
5	19F4C005	33.60	33.64	33.60	113	116	117	310	69.9	58.1	11.8	11.5	0.1	"	3.19
							Total :	620							

◇ Material(Ecopro 12BW) : DY-683-3

No	Lot No	Loading Density(mg/cm²)			Thickness(㎛)					Length (M)	Slitting width (mm)	Coating width (mm)	Non-Coated T-width (mm)	Non-Coating B-width (mm)	Mismatch (mm)	REMARKS	Electrode Density(g/cc)
		1	2	3	1	2	3	4	5	6							
	Specification	4810±0.5			155±T.B.D					-	140±T.B.D	116±T.B.D	12±T.B.D	12±T.B.D	1.0↓	-	-
6	19F4C006	47.99	48.03	47.99	153	156	155	156	155	153	195	139.4	116.4	11.3	11.6	0.1	Foil 12㎛	3.36
7	19F4C007	48.31	48.31	48.27	153	156	156	157	157	153	180	139.3	116.5	11.3	11.5	0.1	"	3.37
8	19F4C008	48.27	48.39	48.27	154	155	157	157	156	152	50	139.1	116.2	11.4	11.5	0.1	"	3.37
9	19F4C009	48.11	48.11	47.91	150	152	153	154	153	150	50	139.8	116.7	11.5	11.5	0.1	"	3.43
									Total :	475							

Enertech International QA Team

Ⅵ. Handling Instruction Guide

1. General

The electrodes, supplied by **Enertech International INC**. have to be handled carefully according to the specification. Here are some more to be followed.

2. Storage of electrode

The electrode are requested to be stored under the following conditions:

a. Indoor storage in a cool circumstances without direct sun light on the electrode or cartons

b. Store the electrode in a dry location with low humidity, and a temperature range of 25±3℃ and a humidity range of less than RH 60% without opening the PE-bag.

c. In case of the long term storage

As long-term storage can lead to the deactivation of the electrode performance.

To minimize the deactivation effect, store the electrode in the dry room a temperature range of +20℃ to +30℃ and dew point less than -28℃.

3. Protection from unexpected damaged to electrodes

a. Do not drop boxes from height in order to prevent them from possible malfunction or damage.

b. Do not twist or bend electrodes in order to prevent possible damage.

4. For Safety

a. Do not use the electrodes when something abnormal found such as smells, deformation, discoloration, and so on.

b. Do not have electrodes in the hot-temperature (50°C or more).

c. Do not put the electrodes into fire.

5. Others

a. Storage for a long term

If the electrode is kept for a long term (3 months or more),

it is strongly recommended that the electrode be preserved at dry room and low temperature atmosphere.

b. Warranty

Manufacturer will be responsible for replacing the electrode against defects or poor workmanship. for 3 months from the date of shipping.

In case the PE bag is not opened and stored in the dry-room, manufacturer can guarantee the performance of electrode for 3 month.

Enertech International INC. strongly recommends using up the electrode as fast as possible after opening of PE-ba After opening of bag, If the customer find some defect or quality problems, the electrode should be re-sealed and kept in the dry room until the final decision of manufacturer and customer