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# Service Reference

## Topic: Stainless Steel Electrode Weight Sampling Program

*Please read carefully before performing work or unpacking any further*

### Required Materials

- None

### Required Tools

- Weight scale with 0.1 kg (0.25 lbs) graduations

Most materials are sacrificial when used as an anode in an aqueous solution. Knowing this, it is important to estimate the eventual replacement period in order to prepare a maintenance budget. The purpose of this bulletin is to assist with the planning and implementation of a sampling program. For most ED systems there is some symmetry. Membrane Electrodes are arrayed down two sides of the ED bath and the ware passes between them. This can help reduce the weight measurement effort. It is not necessary to weigh every Electrode either. A good sampling program consists of a minimum of six (6) or 10% of the total number of Membrane Electrodes, whichever is greater. Example: If there were 30 Membrane Electrodes on each side, six should be weighed, since 10% would only be three units.

Please read all the instructions listed below to familiarize yourself with the project before attempting to perform any of the work.

1. Select the locations to weigh every six months.

**Monorail Systems:** Select more in the front, less at the exit, and fewest in the middle. With 30 Electrodes per side select numbers 2, 5, 10, 16, 26, and 30. (All on the same side of the ED tank.)

**Hoist Systems:** Due to more even loading of all the Cells, select the ones on the ends and then evenly for the rest. With 20 Electrodes per side select numbers 1, 4, 8, 12, 16, and 20. (All on the same side of the ED tank.)

2. To weigh the Electrode it is not necessary to remove the Supply Tubing, Cable Lead, Bulkhead fitting (for Low Profile Cells), etc., since the weight of these items will not change over time. Remove the Electrode, weigh it, and record the weight

on the attached form. (Make copies as needed). If you have access to a portable, hand-held scale, then it is not necessary to remove the Electrode. (Not true for Low profile Cells.) Attach the scale to the lower hole in the Electrode Tab and raise about 25 mm (1"). The displaced electrolyte will affect the reading, but if the same technique is used each time, **it is the weight loss that is important.**

3. Make a copy of the attached form. Use that copy to record the weight of the selected Electrodes.
4. Electrodes should be changed once they have lost a significant portion of their original weight, or if they are beginning to erode at the bottom. Once an Electrode begins to erode at the bottom, the Electrode Tab will enter the membrane window and it will also wear away. If the

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*Think and act in a safe manner. Always disconnect power and use a lockout before you work on the E-coat system, or any of the related subsystems. Observe any confined space conditions. Use the appropriate safety equipment & clothing for the task.more*

Tab is allowed to wear away, then the electrical connection will be lost.

5. The attached chart (316L Stainless Steel Weight Replacement Chart) shows what the weight will be when 60% of the original mass is lost. You may want to use this as a threshold value that once an Electrode is at this weight, it needs to be replaced within the next 3 – 6 months time frame. Select the chart based upon the type of TECTRON ME Cell you have. The original TECTRON Cell has an Electrode with an OD of 48.26 mm (1.900 in). The larger TECTRON Cell has an Electrode with an OD of 60.33 mm (2.375 in).
6. If you begin this process after the system has started up and do not know what the original weight of your Electrode was, it is an easy matter to reconstruct. The major component is the pipe portion. This can be one of three different types: Schedule 10, 40, or 80. All three of these pipes have the same O.D. (I.E. 48.3 mm or 1.9”) Measure ID (at the top of the Electrode): Schedule 10 has an I.D. of 42.7 mm (1.682”); Schedule 40 has an I.D. of 40.9 mm (1.610”); and Schedule 80 has an I.D. of 38.1 mm (1.500”). Refer to the table for the weight/unit length.
7. The rest of the Electrode weight can be estimated by the other items that are attached to it. Refer to the table.

Weight

<u>Item</u>	<u>Kg</u>	<u>lbs</u>
316L Sch 10 (1-1/2”)	3.13/m	2.10/ft
316L Sch 40 (1-1/2”)	4.08/m	2.74/ft
316L Sch 80 (1-1/2”)	5.46/m	3.67/ft
316L Sch 10 (2”)	3.97/m	2.66/ft
316L Sch 40 (2”)	5.52/m	3.70/ft
316L Sch 80 (2”)	7.56/m	5.07/ft
316L Sch 10 (3”)		4.3/ft
316L Sch 40 (3”)		7.6/ft
316L Sch 80 (3”)		10.2/ft
316L Sch 10 (5”)		7.8/ft
316L Sch 40 (5”)		15/ft
316L Sch 80 (5”)		21/ft
Supply Tubing 1500 mm (60”) extension	0.240	0.53
Electrode Tab, ea	0.150	0.33
Al Heat Sink, ea	0.030	0.07
30A Pigtail, ea	0.015	0.03
75A Pigtail, ea	0.050	0.11
75A Pigtail & Diode	0.085	0.19
Bolt set, ea	0.01	0.02
Bulkhead, ea	0.550	1.21

You can call Wagner Instruments for a hand held, mechanical weight scale at +800-345-4188. The model FDK 20 has an upper limit of 10 kg (20 lbs) and the FDK 40 has an upper limit of 20 kg (40 lbs). Note: Select the correct scale for your Electrode. Typically you want to read a scale in the middle of its range. Make sure that your Electrode’s weight is not greater than the maximum of the weight scale.

**For more information** see the original manual that came with the equipment or call UFSc at the phone number shown on the first page.



**1-1/2" diameter (i.e. 48.26 mm, 1.9" OD) 316L Stainless Steel Weight Replacement Chart**

(Weights below represent 40% of the original weight)

Replace 316L SS Electrode when its' mass is less than listed below

Cell Effective Length		Sch 10		Sch 40		Sch 80	
mm	in	kg	lbs	kg	lbs	kg	lbs
750	29.5	3.13		4.09		5.47	
800	31.5	0.94	2.1	1.23	2.7	1.64	3.6
850	33.5	1.00	2.2	1.31	2.9	1.75	3.9
910	35.8	1.06	2.3	1.39	3.1	1.86	4.1
950	37.4	1.14	2.5	1.49	3.3	1.99	4.4
1000	39.4	1.19	2.6	1.55	3.4	2.08	4.6
1050	41.3	1.25	2.8	1.63	3.6	2.19	4.8
1100	43.3	1.32	2.9	1.72	3.8	2.30	5.1
1150	45.3	1.38	3.0	1.80	4.0	2.41	5.3
1200	47.2	1.44	3.2	1.88	4.1	2.52	5.5
1250	49.2	1.50	3.3	1.96	4.3	2.63	5.8
1300	51.2	1.57	3.4	2.04	4.5	2.74	6.0
1350	53.1	1.63	3.6	2.12	4.7	2.85	6.3
1400	55.1	1.69	3.7	2.21	4.9	2.96	6.5
1450	57.1	1.75	3.9	2.29	5.0	3.06	6.7
1500	59.1	1.82	4.0	2.37	5.2	3.17	7.0
1550	61.0	1.88	4.1	2.45	5.4	3.28	7.2
1600	63.0	1.94	4.3	2.53	5.6	3.39	7.5
1650	65.0	2.00	4.4	2.62	5.8	3.50	7.7
1700	66.9	2.07	4.5	2.70	5.9	3.61	7.9
1750	68.9	2.13	4.7	2.78	6.1	3.72	8.2
1800	70.9	2.19	4.8	2.86	6.3	3.83	8.4
1850	72.8	2.26	5.0	2.94	6.5	3.94	8.7
1900	74.8	2.32	5.1	3.02	6.7	4.05	8.9
1950	76.8	2.38	5.2	3.11	6.8	4.16	9.2
2000	78.7	2.44	5.4	3.19	7.0	4.27	9.4
2050	80.7	2.51	5.5	3.27	7.2	4.38	9.6
2100	82.7	2.57	5.7	3.35	7.4	4.49	9.9
2150	84.6	2.63	5.8	3.43	7.6	4.60	10.1
2200	86.6	2.69	5.9	3.51	7.7	4.71	10.4
2250	88.6	2.76	6.1	3.60	7.9	4.82	10.6
2300	90.6	2.82	6.2	3.68	8.1	4.93	10.8
2350	92.5	2.88	6.3	3.76	8.3	5.04	11.1
2400	94.5	2.94	6.5	3.84	8.4	5.14	11.3
2450	96.5	3.01	6.6	3.92	8.6	5.25	11.6
2500	98.4	3.07	6.8	4.00	8.8	5.36	11.8
2550	100.4	3.13	6.9	4.09	9.0	5.47	12.0
2600	102.4	3.19	7.0	4.17	9.2	5.58	12.3
2650	104.3	3.26	7.2	4.25	9.3	5.69	12.5
2700	106.3	3.32	7.3	4.33	9.5	5.80	12.8
2750	108.3	3.38	7.4	4.41	9.7	5.91	13.0
2800	110.2	3.45	7.6	4.49	9.9	6.02	13.2
2850	112.2	3.51	7.7	4.58	10.1	6.13	13.5
2900	114.2	3.57	7.9	4.66	10.2	6.24	13.7
		3.63	8.0	4.74	10.4	6.35	14.0

1. Replace Electrode if its weight equals or is less than above for Cell's proper Eff. length.
2. Figures include allowance for Supply Tubing & Cable Lead Pigtail.
3. Add 0.25 kg (0.5 lb) if Bulkhead Fitting is attached to Electrode.
4. Replace if any portion is completely worn through.
5. Figures above represent approximately 40% of the original mass.

**2" diameter (i.e. 60.33 mm, 2.375" OD) 316L Stainless Steel Weight Replacement Chart**

(Weights below represent 40% of the original weight)

Replace 316L SS Electrode when its' mass is less than listed below

Cell Effective Length	Sch 10		Sch 40		Sch 80	
	kg	lbs	kg	lbs	kg	lbs
750						
800						
850						
910						
950						
1000						
1050						
1100						
1150						
1200						
1250						
1300						
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2150						
2200						
2250						
2300						
2350						
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2450						
2500						
2550						
2600						
2650						
2700						
2750						
2800						
2850						
2900						

1. Replace Electrode if its weight equals or is less than above for Cell's proper Eff. length.
2. Figures include allowance for Supply Tubing & Cable Lead Pigtail.
3. Add 0.25 kg (0.5 lb) if Bulkhead Fitting is attached to Electrode.
4. Replace if any portion is completely worn through.
5. Figures above represent approximately 40% of the original mass.

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