



## Sizing Report Using IEEE-485 Method

<b>Customer Name:</b>	Iowa State University	<b>Prepared by:</b>	Madissen Lawrence
<b>Location:</b>	Roswell, NM	<b>Phone:</b>	7152939879
<b>Project:</b>	Senior Design	<b>Date:</b>	3/3/23
<b>Email:</b>	lawrenmm@iastate.edu		

<b>Lowest Expected Electrolyte Temp.</b>	77.0 °F (25.0 °C)	<b>Minimum Cell Voltage</b>	1.75
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(1)	(2)	(3)	(4)	(5)	(6)	(7)	
PERIOD	LOAD (AMPERES)	CHANGE IN LOAD (AMPERES)	DURATION OF PERIOD (HH:MM:SS)	TIME TO END OF SECTION (HH:MM:SS)	CAPACITY AT T MIN RATE K FACTOR (Kt)	REQUIRED SECTION SIZE (3) * (6) = RATED AMP HOURS	
						POS VALUE	NEG VALUE
SECTION 1 - FIRST PERIOD ONLY - IF A2 IS GREATER THAN A1. GO TO SECTION 2							
1	19.61	19.61	00:00:00	00:00:00	0.625	12.255	0.000
					Sub Total	12.255	0.000
					Section 1 Total	12.255	
SECTION 2 - FIRST 2 PERIOD ONLY - IF A3 IS GREATER THAN A2. GO TO SECTION 3							
1	19.61	19.61	00:00:00	00:01:00	0.733	14.364	0.000
2	3.11	-16.50	00:01:00	00:01:00	0.733	0.000	-12.087
					Sub Total	14.364	-12.087
					Section 2 Total	2.277	
SECTION 3 - FIRST 3 PERIOD ONLY - IF A4 IS GREATER THAN A3. GO TO SECTION 4							
1	19.61	19.61	00:00:00	04:01:00	4.822	94.544	0.000
2	3.11	-16.50	00:01:00	04:01:00	4.822	0.000	-79.558
3	21.10	17.99	04:00:00	04:00:00	4.807	86.482	0.000
					Sub Total	181.026	-79.558
					Section 3 Total	101.468	

MAXIMUM SECTION(8) 101.47 + RANDOM SECTION SIZE(9) 0.00 = UNCORRECTED SIZE - (US)(10) 101.47  
 (US)(11) 101.47 x TEMP CORR(12) 1.000 x DESIGN MARGIN(13) 1.10 x AGING FACTOR(14) 1.25 = (15) 139.52  
 WHEN THE CELL SIZE IS GREATER THAN A STANDARD CELL SIZE, THE NEXT LARGER CELL IS REQUIRED.  
 REQUIRED CELL SIZE(16) = 150 AH (PRODUCT RATING PER STRING IS 150 AH)

THEREFORE 1 STRING OF (20) CA-07M IS RECOMMENDED	
Margin : 7.5%	
Total AH Removed for System: 84	Number of Cells for System: 60

## Summary Margin Report

<b>Customer:</b> Iowa State University
<b>Location:</b>
<b>Project:</b>
<b>Date Prepared:</b> 3/3/23
<b>Prepared By:</b> Madissen Lawrence
<b>Phone:</b> 7152939879
<b>E-Mail:</b> lawrenmm@iastate.edu

<b><u>Sizing Parameters</u></b>
<b>Application:</b> Utility
<b>Lowest Temp (°F):</b> 77.00
<b>Min. Voltage (Vpc):</b> 1.75
<b>Design Margin:</b> 1.10
<b>Aging Factor:</b> 1.25

<u>Line</u>	<u>Cell Model</u>	<u>Margin</u>
1	CA-07M	7.5%
2	CC-07M	7.6%
3	6 OGi 140	13.3%
4	ESG-05	32.4%
5	6 OGi 80 (2 Strings)	36.0%
6	CA-05M (2 Strings)	43.4%
7	CC-05M (2 Strings)	43.5%
8	EA-05M	48.1%
9	EC-05M	48.6%
10	4 OPzS 200	58.6%
11	DSG-05	113.6%
12	GC-09M	514.5%
13	Vb 2408	587.0%

<u>Battery Load Details</u>		
Number of Cells: 60		
Total Time (Minutes): 241.00		
Amp Hour Removed: 84.45		
<u>Period</u>	<u>Time (Mins.)</u>	<u>Load</u>
1	0.00	19.61 A
2	1.00	3.11 A
3	240.00	21.10 A

# Flooded System Configuration Report

Customer:	Iowa State University	Prepared By:	Madissen Lawrence
Location:	N/A	Phone Number:	7152939879
Date Prepared:	03/21/2023	Email:	lawrenmm@iastate.edu

Cells:	60 of CA-07M	AZMS Code:	UD12
Application:	Utility Switchgear (60)	Seismic Zone:	UBC Zone 2L, at or Below Grade
Strings:	1	Rack Style:	2 Tier
Jar/Cover:	SAN Jar/PVC Cover (NFR)	Rack Layout:	Standalone
Plate Orientation:	Perpendicular	Support Rails:	2 Painted rails per tier or step

Quantity	Part Number	Description	Weight (ea.)
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## Battery

20	602040-CW	3CA-07M Charged & Wet (12.20L x 9.00W)	114 lb
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## Accessories - Smart Part Number: S06011091620T1SS

1	88330	Thermometer, 30-130 F/0-55 C	
1	81332	Hydrometer, 1100-1300 S.G.	
1	27717	Hydrometer Holder Kit	
60	81099	Flame Arrestor, Black	
40	827279TP	Connector, 4.96x1.00x0.06, 3.96, Sn	
18	827281TP	Connector, 5.82x1.00x0.06, 4.66, Sn	
120	88589TP	Washer, Post Back-Up, 1.00 Sq.x0.13, Sn	
60	803963	Hardware Pkg, 1/4-20x1.50, (2) per Pkg.	
1	90991-042	Cable Assy, #2, (2)1-Hole, 5/16 Stud Lug, Sn, 42 inches	
1	US-FL-IOM	Instruction Manual, Flooded	
1	802372	Cell Number Labels, Small, 1-60	
1	82853	No-Ox Post Grease, 8oz, 227g	

## Rack(s)

1	UC2L2T132AP	Rack, UBC Zone 2L, 2 Tier, 132" long	412 lb
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## Spill Containment

1	WUL-25-136	EnerSys UL System, 25" wide x 136" long	191 lb
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## Optional Accessories (Additional charges may apply)

7	827437	Connector Cover, Grey, 72" Long, w/Holes, PVC	3 lb
11	827510	Connector Cover, Clear, 48" Long, w/Holes, PVC	2.25 lb
11	827435	Connector Cover, Clear, 48" Long, No Holes, PVC	2.25 lb
4	808770TP	Terminal Plate Pkg, 4 Runs, 601614TP, Sn	9 lb
4	825472	Terminal Plate Cover, 7.75" x 3.00" x 3.75"	1 lb

Rack Style	Standard Termination	Rack Style	Standard Termination
1 Tier	End-to-End (opposite end)	2 Step	Top-to-Bottom (same end)
2 Tier	Top-to-Bottom (same end)	3 Step	Top-to-Bottom (opposite end)
3 Tier	Top-to-Bottom (opposite end)	2 Step / 2 Tier	Top (same end)
2 Tier / 2 Row	Top (same end)	* Please call if not standard termination *	

Cables not supplied for "Across Aisle", "L", or "U" Shape configurations

ALL DATA SUBJECT TO CHANGE WITHOUT NOTICE.



# Flooded Rack Configuration Report

Customer:	Iowa State University	Prepared By:	Madissen Lawrence
Location:	N/A	Phone Number:	7152939879
Date Prepared:	03/21/2023	Email:	lawrenmm@iastate.edu

Cells:	60 of CA-07M	AZMS Code:	UD12
No. Of Jars:	20	Seismic Zone:	UBC Zone 2L, at or Below Grade
Strings:	1	Rack Style:	2 Tier
Cells per String:	60	Rack Layout:	Standalone
System Voltage:	120	Support Rails:	2 Painted rails per tier or step
Plate Orientation:	Perpendicular		

## Rack Information:

Qty	Part Number	Capacity	Length	Depth	Weight	Frames
1	UC2L2T132AP	20 Jars	132.00 in	20.56 in	412 lb	3

## Spill Containment Information:

Qty	Part Number	Weight
1	WUL-25-136	191 lb

## System Weights:

Weight of Racks:	412 lb
Weight of Accessories:	57 lb
Weight of Spill Containment:	191 lb
Weight of Batteries:	2,280 lb
Total System Weight:	2,940 lb

## Floor Loading:

Contact Weight:	21 lb/in <sup>2</sup>
Projected / Shadow Weight:	156 lb/ft <sup>2</sup>

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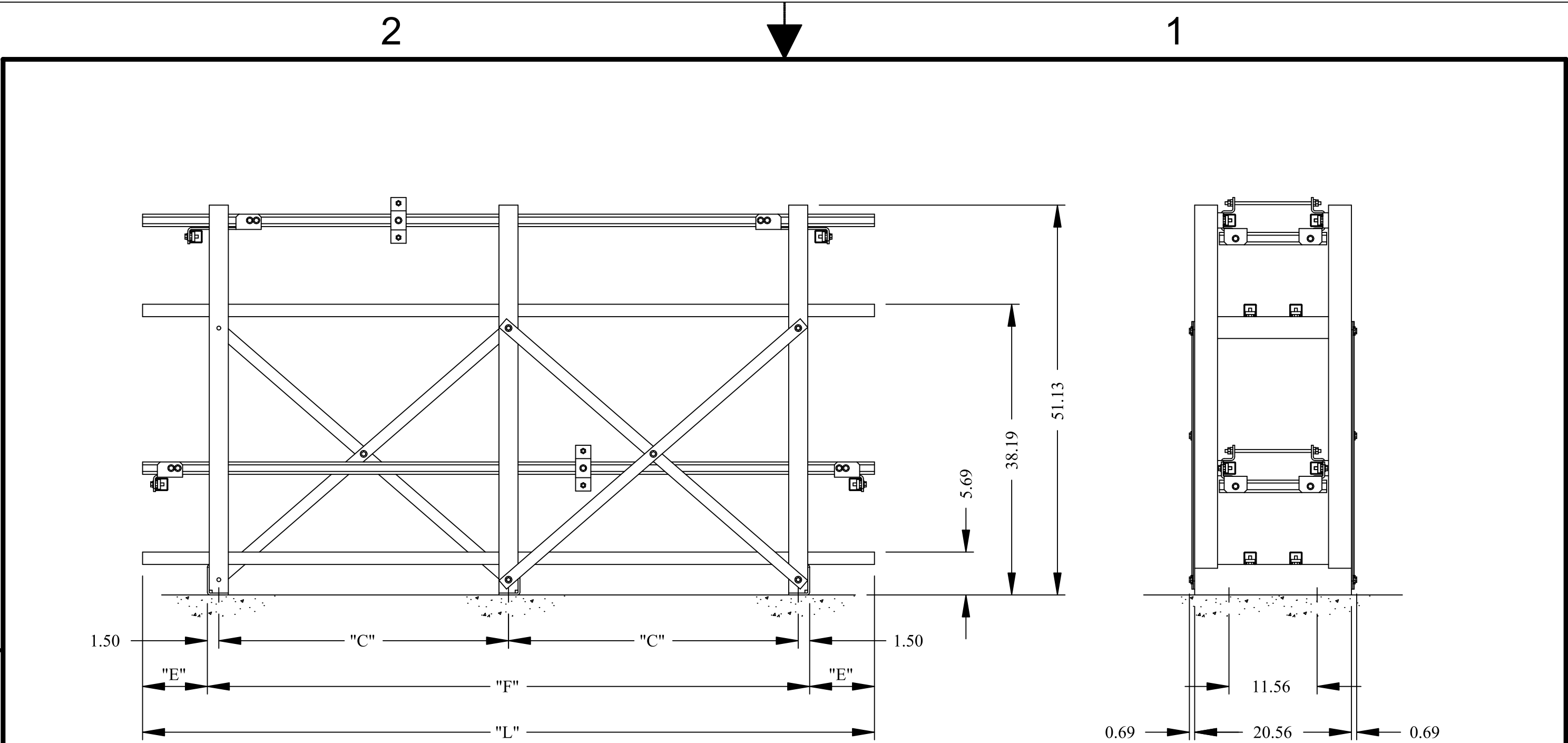
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B

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B


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CATALOG NO.	AZMS NO.	"L" (in.)	"F" (in.)	"E" (in.)	"C" (in.)	WT. (lbs.)	# FRAMES
UC2L2T036AP	UD12-036	36.00	29.00	3.50	26.00	172	2
UC2L2T048AP	UD12-048	48.00	29.00	9.50	26.00	188	
UC2L2T060AP	UD12-060	60.00	43.00	8.50	40.00	204	
UC2L2T072AP	UD12-072	72.00	57.00	7.50	54.00	220	
UC2L2T084AP	UD12-084	84.00	57.00	13.50	54.00	292	3
UC2L2T096AP	UD12-096	96.00	83.00	6.50	40.00	308	
UC2L2T108AP	UD12-108	108.00	83.00	12.50	40.00	324	
UC2L2T120AP	UD12-120	120.00	111.00	4.50	54.00	340	
UC2L2T132AP	UD12-132	132.00	111.00	10.50	54.00	412	4
UC2L2T144AP	UD12-144	144.00	111.00	16.50	54.00	435	
UC2L2T156AP	UD12-156	156.00	147.00	4.50	48.00	451	
UC2L2T168AP	UD12-168	168.00	147.00	10.50	48.00	524	
UC2L2T180AP	UD12-180	180.00	165.00	7.50	54.00	540	5
UC2L2T194AP	UD12-192	192.00	165.00	13.50	54.00	556	
UC2L2T204AP	UD12-204	204.00	195.00	4.50	48.00	572	
UC2L2T216AP	UD12-216	216.00	195.00	10.50	48.00	644	
UC2L2T232AP	UD12-228	228.00	219.00	4.50	54.00	660	5
UC2L2T240AP	UD12-240	240.00	219.00	10.50	54.00	676	

RAIL OPTIONS, IDENTIFIED BY CATALOG NO. SUFFIX:  
AP - 2 PAINTED RAILS PER TIER (STANDARD)  
A3RP - 3 PAINTED RAILS PER TIER

TITLE: RACK, UBC ZONE 2L, 2 TIER



RESERVE POWER  
READING, PA. 19605

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BATTERY: CA, CC, CX

CODE: UD12

REF.: N/A

RACK FAMILY:  
UC2L2TxxxAP

REV.  
A

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DATE: 06/11/2009