

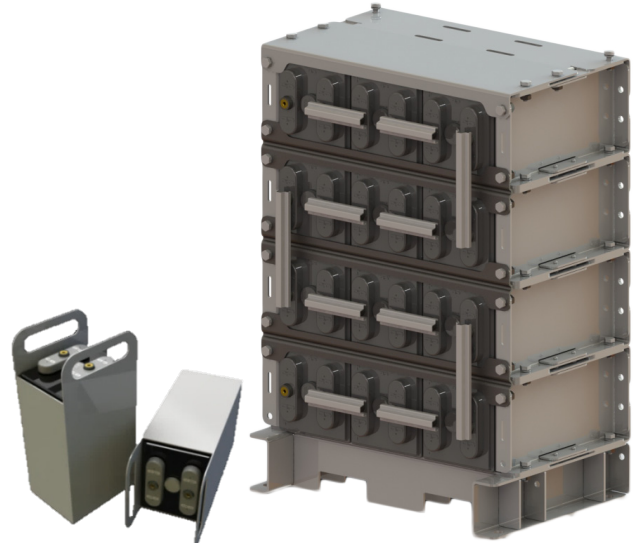


# Liberty<sup>®</sup> MSE

## THE LIBERTY MSE 50 SERIES FLOAT SERVICE BATTERY

### For Standby Power Applications

The Liberty MSE features the latest battery technology in a space efficient, cost effective package. MSE technology provides for low operating float current and resulting unmatched operational life.



Modular systems & single jacketed cells available

### APPLICATIONS

- Network Operation Centers
- Central Offices
- Manufacturing Facilities
- Emergency 911 Response Centers
- Industrial Process Controls
- Mobile Switching Centers
- Wireless Sites
- Wireline Sites
- Broadband Headend
- Microwave Sites
- Emergency Lighting Systems

### FEATURES & BENEFITS

#### ADVANCED SYSTEM FEATURES

- Modular design for ease of installation and stacking flexibility
- Reduced system hardware for rapid installation
- Space saving design for the greatest amount of power in a small footprint
- Meets IBC and UBC seismic requirements
- Tin-plated copper alloy connectors minimize maintenance
- Advanced micro-porous Absorbent Glass Mat separators for ultra low float current-reduces grid corrosion for a long, usable service life
- Proprietary calcium alloys to minimize positive grid corrosion and growth - maximizes battery life
- Robust polypropylene container and cover - enhances product quality and improves strength of materials for safe operation
- Flame retardant, UL94V0/28% LOI is optional
- Non-Spillable design is classified as non-hazardous for any mode of transportation (land, air and water)

- Highly efficient, proprietary plate processing for high utilization of active material - results in high energy density and low float current

#### ADVANCED PROCESSES

- Advanced formation process results in a narrow float voltage window making on-site float matching unnecessary
- Highly controlled manufacturing processes for exceptional and consistent performance

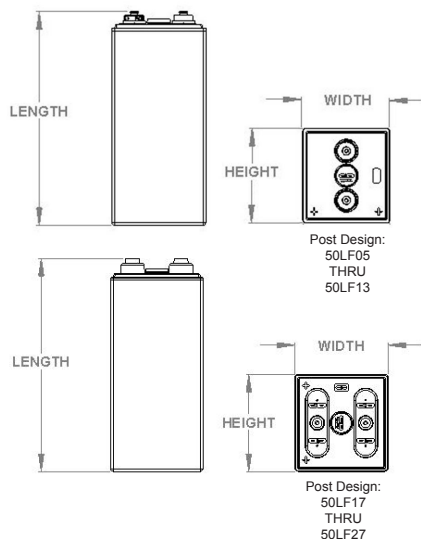
#### ADVANCED SERVICE LIFE & WARRANTY

- Proprietary cell design and manufacturing process provides for 20 year design life and documented long-lasting MSE technology service life
- Industry leading warranty

#### ADVANCED EXPERIENCE

- Over 100 years of experience in the battery industry
- The only producer and marketer of complete battery and electronics systems for total power solutions
- Fully backed by a worldwide network for local service

## DIMENSIONS



Liberty MSE Model	Height		Width		Length		Weight	
	inches	mm	inches	mm	inches	mm	lbs	kg
50LF05	6.19	157	2.00	51	13.96	355	18	8.2
50LF09			3.50	89			29	13.2
50LF13			5.00	127			42	19.1
50LF17	6.50	165	6.25	159	14.23	361	56	25.4
50LF19	7.25	184					61	27.7
50LF21	8.00	203					68	30.8
50LF23	8.75	222					74	33.6
50LF25	9.50	241					80	36.6
50LF27	10.25	260					90	40.8
50LF29	11.00	279					96	43.5
50LF31	11.75	299					103	46.7
50LF33	12.50	318					108	49.0

## SPECIFICATIONS

Cells, Voltage per unit	1 cell, 2 VDC
Typical Operating Temperature	77°F (25°C)
Connection Torque	110 in-lbs (12.4 N-m)
Recommended float charging voltage	2.25 - 2.27 Volts per cell @ 77°F (25°C)
Recommended cycle service voltage	2.35 - 2.40 Volts per cell @ 77°F (25°C)
Recommended charging current limit	6 x I10 w/voltage limit of 2.40 Volts per cell @ 77°F (25°C)
Charger temperature compensation (not recommended for cycle service)	-2mV/cell/°F above 77°F (25°C) +2mV/cell/°F below 77°F (25°C)

## DISCHARGE RATINGS

Hours	Amperes to 1.75 VPC @ 77°F (25°C)									
	1	2	4	5	6	8	10	12	20	24
50LF05	54.1	34.2	20.6	17.5	15.3	12.4	10.6	9.2	6.2	5.3
50LF09	112.9	71.6	42.4	35.8	31.1	24.9	20.9	18.0	11.7	10.0
50LF13	169.3	107.6	63.6	53.7	46.7	37.4	31.3	27.0	17.6	15.0
50LF17	225.7	143.5	84.8	71.6	62.3	49.8	41.8	36.0	23.5	20.0
50LF19	253.9	161.4	95.4	80.6	70.1	56.1	47.0	40.5	26.4	22.5
50LF21	282.1	179.4	106.0	89.5	77.9	62.3	52.2	45.0	29.3	25.0
50LF23	310.3	197.3	116.6	98.5	85.7	68.5	57.4	49.5	32.2	27.5
50LF25	338.6	215.3	127.2	107.4	93.4	74.8	62.6	54.0	35.2	30.0
50LF27	366.8	233.2	137.8	116.4	101.2	81.0	67.9	58.5	38.1	32.5
50LF29	375.2	238.6	141.0	119.0	103.6	82.9	69.4	59.9	39.0	33.3
50LF31	402.0	255.6	151.1	127.5	111.0	88.8	74.4	64.2	41.8	35.6
50LF33	428.8	272.7	161.1	136.0	118.4	94.7	79.3	68.4	44.6	38.0

\*All ratings are subject to change by C&D Technologies, Inc.

## MODULE CONFIGURATIONS

Module Type	Volts	Nominal Ah Capacity (8 hr)	Stacking Dimensions						Module Weight	
			Width		Height*		Depth**		lbs	kg
			in	mm	in	mm	in	mm		
12-50LF05	24	100	16.84	428	13.07	332	13.69	348	257	117
12-50LF09	24	200	25.78	655					410	186
12-50LF13	24	300	34.78	883					586	266
3-50LF17	6	400	21.91	557	6.88	175	16.08	408	212	96
4-50LF17	8	400	28.25	718					275	125
3-50LF19	6	450	21.91	557	7.63	194			294	133
4-50LF19	8	450	28.25	718					226	103
3-50LF21	6	500	21.91	557	8.38	213			249	112
4-50LF21	8	500	28.25	718					325	147
3-50LF23	6	550	21.91	557	9.13	232			266	121
4-50LF23	8	550	28.25	718					348	158
3-50LF25	6	600	21.91	557	9.88	251			290	132
4-50LF25	8	600	28.25	718					376	171
3-50LF27	6	650	21.91	557	10.63	270			318	144
4-50LF27	8	650	28.25	718					416	189
3-50LF29	6	700	21.91	557	11.38	289	336	152		
4-50LF29	8	700	28.25	718			439	199		
3-50LF31	6	750	21.91	557	12.13	308	358	162		
4-50LF27	8	750	28.25	718			469	213		
3-50LF33	6	800	21.91	557	12.88	327	378	171		
4-50LF27	8	800	28.25	718			494	224		

\*Height does not include base. Typical base height is 4.00" (102 mm)

\*\* Depth does not include terminal protection. Typical terminal protection adds 0.50" (12.7 mm)

## SINGLE CELL TRAY DIMENSIONS



Liberty MSE Model	Height		Width		Length		Weight	
	in	mm	in	mm	in	mm	lbs	kg
50LF05	17.12	435	2.20	56	6.37	162	23	10
50LF09			3.69	94			35	16
50LF13			5.19	132			48	22
50LF17	17.13	435	6.78	172	6.58	167	69	31
50LF19			7.53	191			74	34
50LF21			8.28	210			82	37
50LF23			9.03	229			89	40
50LF25			9.78	248			95	43
50LF27			10.53	267			106	48
50LF29	11.34	288	6.64	169	118	53		
50LF31	12.09	307			126	57		
50LF33	12.84	326			131	60		

\*All dimensions are subject to change by C&D Technologies, Inc.

## C&D TECHNOLOGIES, INC.

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# Liberty® MSE

## THE LIBERTY MSE SERIES BATTERY For Standby Power Applications CAPACITIES FROM 400 TO 1600 AMPERE-HOURS

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### APPLICATIONS

- Network Operation Centers
- Central Offices
- Manufacturing Facilities
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- Industrial Process Controls
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### FEATURES & BENEFITS

#### ADVANCED SYSTEM FEATURES

- Modular design for ease of installation and stacking flexibility
- Reduced system hardware for rapid installation
- Space saving design for the greatest amount of power in a small footprint
- Meets IBC and UBC seismic requirements
- Tin-plated copper alloy connectors minimize maintenance
- Advanced micro-porous Absorbent Glass Mat separators for ultra low float current-reduces grid corrosion for a long, usable service life
- Proprietary calcium alloys to minimize positive grid corrosion and growth - maximizes battery life
- Robust polypropylene container and cover - enhances product quality and improves strength of materials for safe operation
- Flame retardant, UL94V0/28% LOI is optional
- Non-Spillable design is classified as non-hazardous for any mode of transportation (land, air and water)

- Highly efficient, proprietary plate processing for high utilization of active material - results in high energy density and low float current

#### ADVANCED PROCESSES

- Advanced formation process results in a narrow float voltage window making on-site float matching unnecessary
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#### ADVANCED SERVICE LIFE & WARRANTY

- Proprietary cell design and manufacturing process provides for 20 year design life and documented long-lasting MSE technology service life

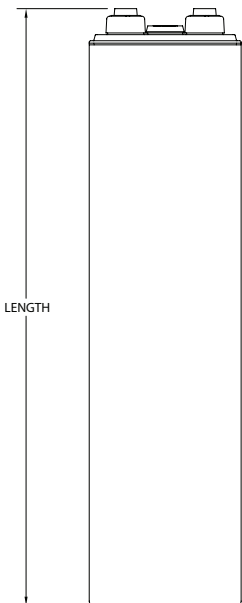
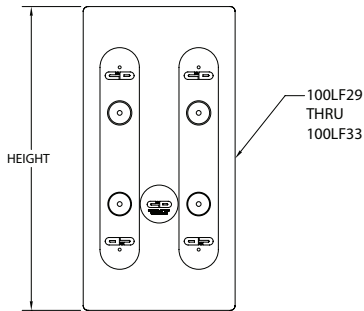
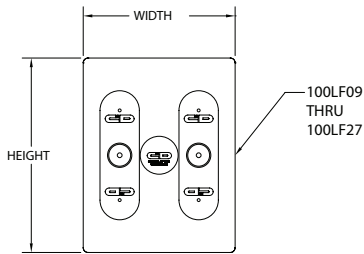
- Industry leading warranty

#### ADVANCED EXPERIENCE

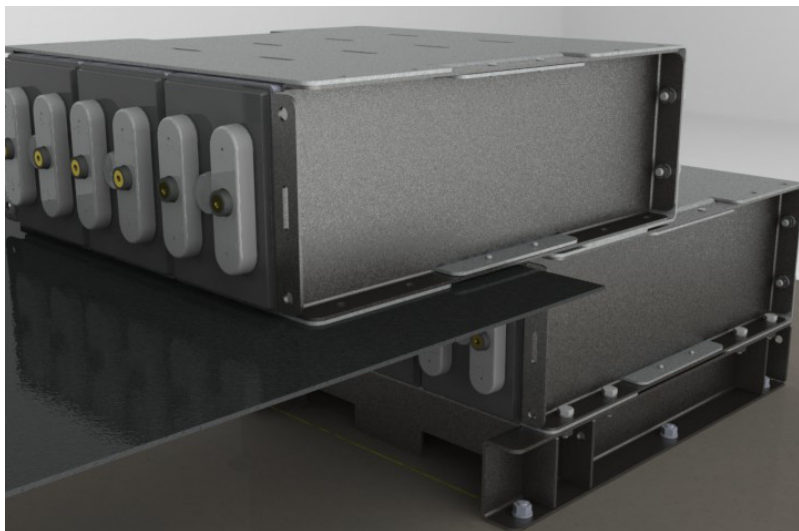
- Over 100 years of experience in the battery industry
- The only producer and marketer of complete battery and electronics systems for total power solutions
- Fully backed by a worldwide network for local service

# CELL SPECIFICATIONS

Voltage	1 cell, 2 VDC Nominal
Energy saving operating temperature	77°F (25°C)
Connection Torque	110 in-lbs (12.4 N-m)
Recommended float charging voltage	2.25 - 2.27 Volts per cell average @ 77°F (25°C)
Charger compensation temperature/voltage	- 2 mV/cell/°F above 77°F (-3.6 mV/cell/°C above 25°C) + 2 mV/cell/°F below 77°F (+3.6 mV/cell/°C below 25°C)



Individual Cell Dimensions (not including module)								
Liberty MSE Model	Height		Width		Length		Weight	
	inches	mm	inches	mm	inches	mm	lbs	kg
100LF09	3.50	88.9	6.19	157	24.22	615	54	25
100LF13	5.00	127					75	34
100LF17	6.50	165	6.25	159	24.55	624	102	46
100LF19	7.25	184					114	52
100LF21	8.00	203					127	58
100LF23	8.75	222					139	63
100LF25	9.50	241					152	69
100LF27	10.25	260					164	74
100LF29	11.00	279					176	80
100LF31	11.75	299					189	86
100LF33	12.50	318					201	91



Rapid System Assembly

## PERFORMANCE SPECIFICATIONS

Amperes to 1.75 Final Volts Per Cell @ 25°C (77°F)											
Model	1 HR	2 HR	3 HR	4 HR	5 HR	6 HR	7 HR	8 HR	10 HR	12 HR	24 HR
100LF09	196	135	104	85	72	63	56	50	42	36	19
100LF13	294	202	156	127	108	94	84	75	63	54	29
100LF17	392	269	208	170	144	126	111	100	83	71	39
100LF19	442	303	233	191	162	141	125	113	94	80	44
100LF21	491	337	259	212	180	157	139	125	104	89	48
100LF23	540	370	285	234	198	173	153	138	115	98	53
100LF25	589	404	311	255	216	188	167	150	125	107	58
100LF27	638	438	337	276	234	204	181	163	135	116	63
100LF29	687	471	363	297	252	220	195	175	146	125	68
100LF31	736	505	389	318	270	235	209	188	156	134	73
100LF33	785	539	415	340	288	251	223	200	167	143	77

Amperes to 1.80 Final Volts Per Cell @ 25°C (77°F)											
Model	1 HR	2 HR	3 HR	4 HR	5 HR	6 HR	7 HR	8 HR	10 HR	12 HR	24 HR
100LF09	180	127	99	82	70	61	54	49	41	35	19
100LF13	269	190	148	122	104	91	81	73	61	53	29
100LF17	359	254	198	163	139	122	108	97	82	71	38
100LF19	404	286	223	183	157	137	122	110	92	79	43
100LF21	449	317	247	204	174	152	135	122	102	88	48
100LF23	494	349	272	224	191	167	149	134	112	96	53
100LF25	539	381	297	245	209	182	163	146	122	105	58
100LF27	584	412	321	265	226	198	176	159	132	114	62
100LF29	629	444	346	285	244	213	189	171	143	123	67
100LF31	674	476	371	306	261	228	203	183	153	131	72
100LF33	718	508	396	326	278	243	216	195	163	140	77

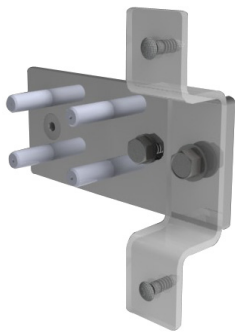
You may also access the product ratings by logging onto the C&D Battery Sizing program at [www.cdstandbypower.net](http://www.cdstandbypower.net)

# MODULE CONFIGURATIONS

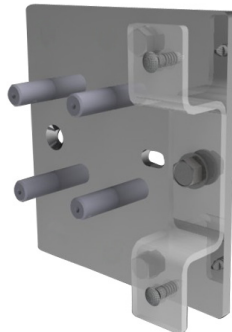
MODULE TYPE	VOLTS	NOMINAL AH CAPACITY (8HR)	STACKING DIMENSIONS						UNPACKED WEIGHT	
			WIDTH		HEIGHT		DEPTH		LBS	KGS
			IN	MM	IN	MM	IN	MM		
3-100LF09	6	400	21.73	552	3.88	99	26.25	667	240	109
4-100LF09	8	400	28.01	712	3.88	99	26.25	667	309	140
3-100LF13	6	600	21.73	552	5.38	137	26.25	667	303	137
4-100LF13	8	600	28.01	712	5.38	137	26.25	667	393	178
3-100LF17	6	800	21.91	557	6.88	175	26.25	667	370	168
4-100LF17	8	800	28.25	718	6.88	175	26.25	667	487	221
3-100LF19	6	900	21.91	557	7.63	194	26.25	667	408	185
4-100LF19	8	900	28.25	718	7.63	194	26.25	667	537	244
3-100LF21	6	1000	21.91	557	8.38	213	26.25	667	449	204
4-100LF21	8	1000	28.25	718	8.38	213	26.25	667	591	268
3-100LF23	6	1100	21.91	557	9.13	232	26.25	667	487	221
4-100LF23	8	1100	28.25	718	9.13	232	26.25	667	641	291
3-100LF25	6	1200	21.91	557	9.13	232	26.25	667	528	239
4-100LF25	8	1200	28.25	718	9.88	251	26.25	667	695	315
3-100LF27	6	1300	21.91	557	10.63	270	26.25	667	566	257
4-100LF27	8	1300	28.25	718	10.63	270	26.25	667	745	338
3-100LF29	6	1400	21.91	557	11.38	289	26.25	667	604	274
4-100LF29	8	1400	28.25	718	11.38	289	26.25	667	795	361
3-100LF31	6	1500	21.91	557	12.13	308	26.25	667	645	293
4-100LF31	8	1500	28.25	718	12.13	308	26.25	667	849	385
3-100LF33	6	1600	21.91	557	12.88	327	26.25	667	683	310
4-100LF33	8	1600	28.25	718	12.88	327	26.25	667	899	408

You may also access the complete product binder by logging onto the C&D Battery Sizing Program at [www.cdstandbypower.net](http://www.cdstandbypower.net)

## Terminal Plates

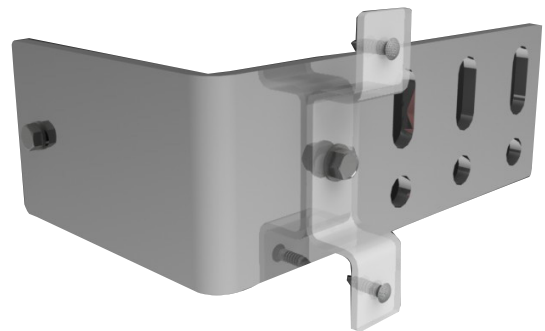


For 100LF-17 through 100LF-27  
(Cover removed for clarity)



For 100LF-29 through 100LF-33  
(Cover removed for clarity)

## Side Termination (optional)



For 100LF-17 through 100LF-33



# SYSTEM CONFIGURATIONS

No. Cells/Module	Model No.	System Voltage	No. of Stacks	System Configuration	Total No. of Modules	8 HR Rate to 1.75 VPC @ 77°F		Width		*Height		Depth		Weight	
						AH	Watts/Cell	in	mm	in	mm	in	mm	lbs	kgs
3	3-100LF09	24	1	3x4	4	400	99	21.73	552	20.02	508	26.38	670	1013	459
		48	1	3x8	8	400	99	21.73	552	35.54	903	26.38	670	1976	896
4	4-100LF09	24	1	4x3	3	400	99	28.01	712	16.14	410	26.38	670	998	453
		48	1	4x6	6	400	99	28.01	712	27.78	706	26.38	670	1915	869
3	3-100LF13	24	1	3x4	4	600	148	21.73	552	26.02	661	26.38	670	1265	574
		48	1	3x8	8	600	148	21.73	552	47.54	1208	26.38	670	2480	1125
4	4-100LF13	24	1	4x3	3	600	148	28.01	712	20.64	524	26.38	670	1240	562
		48	1	4x6	6	600	148	28.01	712	36.78	934	26.38	670	2419	1097
3	3-100LF17	24	1	3x4	4	800	197	21.91	557	32.02	813	26.38	670	1571	713
		48	1	3x8	8	800	197	21.91	557	59.54	1512	26.38	670	3091	1402
4	4-100LF17	24	1	4x3	3	800	197	28.25	718	25.14	639	26.38	670	1549	703
		48	1	4x6	6	800	197	28.25	718	45.78	1163	26.38	670	3040	1379
3	3-100LF19	24	1	3x4	4	900	222	21.91	557	35.02	890	26.38	670	1728	784
		48	1	3x8	8	900	222	21.91	557	65.54	1665	26.38	670	3405	1544
4	4-100LF19	24	1	4x3	3	900	222	28.25	718	27.39	696	26.38	670	1703	772
		48	1	4x6	6	900	222	28.25	718	50.28	1277	26.38	670	3349	1519
3	3-100LF21	24	1	3x4	4	1000	247	21.91	557	38.02	966	26.38	670	1884	855
		48	1	3x8	8	1000	247	21.91	557	71.54	1817	26.38	670	3718	1686
4	4-100LF21	24	1	4x3	3	1000	247	28.25	718	29.64	753	26.38	670	1858	843
		48	1	4x6	6	1000	247	28.25	718	54.78	1391	26.38	670	3658	1659
3	3-100LF23	24	1	3x4	4	1100	271	21.91	557	41.02	1042	26.38	670	2041	926
		48	1	3x8	8	1100	271	21.91	557	77.54	1970	26.38	670	4031	1828
4	4-100LF23	24	1	4x3	3	1100	271	28.25	718	31.89	810	26.38	670	2013	913
		48	1	4x6	6	1100	271	28.25	718	59.28	1506	26.38	670	3968	1800
3	3-100LF25	24	1	3x4	4	1200	296	21.91	557	44.02	1118	26.38	670	2197	997
		48	1	3x8	8	1200	296	21.91	557	83.54	2122	26.38	670	4344	1970
4	4-100LF25	24	1	4x3	3	1200	296	28.25	718	34.14	867	26.38	670	2167	983
		48	1	4x6	6	1200	296	28.25	718	63.78	1260	26.38	670	4277	19403
3	3-100LF27	24	1	3x4	4	1300	321	21.91	557	47.02	1194	26.38	670	2354	1068
4	4-100LF27	24	1	4x3	3	1300	321	28.25	718	36.39	924	26.38	670	2322	1053
		48	1	4x6	6	1300	321	28.25	718	68.28	1734	26.38	670	4586	2080
3	3-100LF29	24	1	3x4	4	1400	345	21.91	557	50.02	1271	26.38	670	2511	1139
4	4-100LF29	24	1	4x3	3	1400	345	28.25	718	38.64	981	26.38	670	2486	1123
		48	1	4x6	6	1400	345	28.25	718	72.78	1849	26.38	670	4895	2220
3	3-100LF31	24	1	3x4	4	1500	370	21.91	557	53.02	1347	26.38	670	2667	1210
4	4-100LF31	24	1	4x3	3	1500	370	28.25	718	40.89	1039	26.38	670	2631	1193
		48	1	4x6	6	1500	370	28.25	718	77.28	1963	26.38	670	5204	2360
3	3-100LF33	24	1	3x4	4	1600	395	21.91	557	56.02	1423	26.38	670	2824	1281
4	4-100LF33	24	1	4x3	3	1600	395	28.25	718	43.14	1096	26.38	670	2786	1264
		48	1	4x6	6	1600	395	28.25	718	81.78	2077	26.38	670	5514	2501

\* Height includes base. Typical base height is 4.0" (102mm).

## C&D TECHNOLOGIES, INC.

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