Delivering quality

ALCAD

LSe RANGE

Lead Selenium Cells

LSe Range Lead Selenium Cells

General
Alcad's LSe range utilizes lead selenium, pasted plate technology. With capacities from 115 to 2000Ah the LSe provides the versatility of selecting the most economical solution for your lead acid battery requirements.

Capacity
The available capacity of a cell varies with the discharge rate, state of charge, temperature and other factors. The Ah capacity used in this brochure is calculated at the 8-hour discharge rate to 1.75V at 77°F (25°C).

Electrolyte
The electrolyte is a solution of sulfuric acid (H_2SO_4) and de-ionized water with specific gravity of 1.240.

Plates
Both the positive and negative plates are of pasted construction with grids cast from lead selenium alloy.

Separators
Microporous plastic separators matched with fiberglass mats allow maximum electrolyte utilization while minimizing internal resistance.

Containers
Injection molded in high-quality, acid-resistant styrene acrylonitrile (SAN). Containers are transparent for easy inspection of cell status.

Lids
Lids are molded from acrylonitrile butadiene styrene (ABS) and joined by tongue and groove to the container, forming a peramanent air- and liquid-tight seal. Also available in flame-retardant version.

Vent Caps
Each cell is fitted with a vent that prevents acid spray from escaping and external sparks from igniting gases within the cell. The flip-top design means the vent does not have to be removed for water addition, providing additional safety by maintaining the flame arrestor properties.

Technological Advantages
Antimony and Calcium are the two most common hardeners used in lead grids. Both metals produce desirable results but are plagued with inherent deficiencies.

Adding calcium provides stable float charge characteristics and low water consumption. However, it also leads to unpredictable failure, poor cycling ability and wide voltage spreads.

Antimony increases the cycling ability and provides a predictable life. However, antimonial poisoning leads to increased water consumption, reduced charge efficiency and increased open circuit losses.

Replacing a small amount of antimony with selenium in the grid alloy produces a fine, dense grain structure. The alloy virtually eliminates inter-granular corrosion, one of the most common causes of cell failure. The LSe, therefore, combines the advantages of calcium and antimony without suffering the negative effects inherent in those alloys.

Some of the virtues of the design include:

- Long life with maximum reliability
- Improved charge efficiency
- Stable float charge characteristics
- Good deep discharge capability (>1000 cycles)
- Excellent high-rate performance
- Very little positive plate growth
- Extended topping-up intervals

Electrical Characteristics

Voltage

Nominally, each LSe cell is 2V. End-of-discharge voltages vary by application. Rates to end voltages of 1.75 and 1.81 per cell are included. For other rates, contact Alcad or your local sales representative.

Charging

Float: 2.23V per cell to maintain battery in fully charged state

Equalize: 2.33V - 2.4V per cell

Short Circuit Current

LSe100 -LSe 450:

$$I = 15 \times C_8$$

LSe500 - LSe2000:

$$I = 9 \times C_8$$

Where C_8 = nominal Ah capacity

Internal Resistance

Typical values for new, fully-charged cells at 77°F (25°C)

LSe100 - LSe450:

$$R = \frac{0.135}{C_8}\Omega$$

LSe500 - LSe1400:

$$R = \frac{0.255}{C_8}\Omega$$

LSe1500 - LSe2000:

$$R = \frac{0.235}{C_8}\Omega$$

Where C_8 = nominal Ah capacity

Discharge Current (A) to 1.75V at 77°F (25°C)

Cell Type	Minutes								Hours			
	1	5	7	10	12	15	20	30	1	2	3	8
LSe 100	213	168	152	136	129	119	106	87.8	58.8	37.2	28.5	14.4
LSe 150	309	252	233	210	198	182	161	131	86.7	53.3	39.5	19.2
LSe 200	412	336	311	281	264	243	215	175	115	71.1	52.7	25.7
LSe 250	510	417	385	348	327	301	267	217	143	88.0	65.2	31.8
LSe 300	612	500	462	417	393	361	320	260	171	105	78.2	38.1
LSe 350	721	589	545	492	463	425	377	306	202	124	92.1	44.9
LSe 400	824	673	623	562	529	486	431	350	231	142	105	51.3
LSe 450	899	735	680	613	577	530	470	382	252	155	114	56.0
LSe 500	610	550	523	491	472	447	411	357	263	178	136	64.4
LSe 600	712	643	612	574	552	523	481	417	307	208	159	75.2
LSe 700	831	750	714	669	644	610	561	487	359	243	185	87.8
LSe 800	950	858	816	765	736	697	641	556	410	278	212	100
LSe 900	1069	965	918	861	828	784	721	626	461	312	238	112
LSe 1000	1188	1072	1020	957	921	872	801	696	513	347	265	125
LSe 1100	1306	1180	1122	1052	1013	959	882	765	564	382	291	137
LSe 1200	1425	1287	1224	1148	1105	1046	962	835	615	417	318	150
LSe 1300	1513	1366	1299	1219	1173	1110	1021	886	653	442	337	159
LSe 1400	1629	1471	1399	1313	1263	1196	1100	954	703	476	363	172
LSe 1500	1782	1609	1530	1435	1381	1308	1202	1044	769	521	397	188
LSe 1600	1900	1716	1632	1531	1473	1395	1283	1113	820	556	424	200
LSe 1700	1979	1787	1699	1594	1534	1452	1335	1159	854	578	441	208
LSe 1800	2138	1931	1836	1722	1657	1569	1443	1252	923	625	477	225
LSe 1900	2257	2038	1938	1818	1749	1656	1523	1322	974	660	503	238
LSe 2000	2376	2145	2040	1914	1842	1744	1603	1392	1026	695	530	250

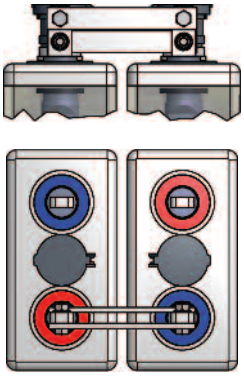
Cell Specifications

	LSe100 - LSe450	LSe500 - LSe2000
Positive plate dimensions	9.00”H x 7.10”L x .25”W	17.80”H x 7.10”L x .25”W
Negative plate dimensions	8.80”H x 7.10”L x .19”W	17.70”H x 7.10”L x .19”W
Sediment space	0.9”	1.26”
Container material	Transparent Styrene Acrylonitrile (SAN)	
Cover material	Acrylonitrile Butadiene Styrene (ABS)	
Separators	Microporous plastic + fiberglass mat	
Terminal post type	Lead with copper insert and 2 holes for dual connectors	
Plate suspension	Bottom supported	
Intercell connectors	Lead-plated copper	
Connector hardware	Stainless steel	
Vent caps	Flip-top flame arrestors	
Specific gravity of fully-charged cell	1.240 ± .010	

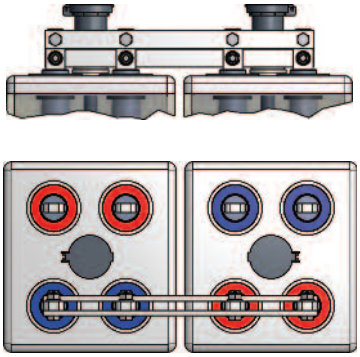
Capacities, Weights & Dimensions

Cell Type	Ah Capacity	Dimensions (in.)			Weight (lb.)		Volume of Acid (gal.)	No. of Posts
		Length	Width	Height	Empty	Filled		
LSe 100	115	4.1	8.1	16.1	21.4	32.2	1.05	2
LSe 150	154	4.1	8.1	16.1	26.7	37.0	1.00	2
LSe 200	206	4.9	8.1	16.1	32.0	44.9	1.25	2
LSe 250	254	4.9	8.1	16.1	37.3	49.1	1.14	2
LSe 300	305	5.7	8.1	16.1	42.8	57.3	1.40	2
LSe 350	359	7.4	8.1	16.1	50.1	71.0	2.02	2
LSe 400	410	7.4	8.1	16.1	54.5	73.7	1.85	2
LSe 450	448	7.4	8.1	16.1	59.0	77.2	1.75	2
LSe 500	515	5.7	8.1	28.6	70.5	100.2	2.87	2
LSe 600	602	5.7	8.1	28.6	80.0	109.0	2.80	2
LSe 700	702	7.5	8.3	28.6	100.8	137.4	3.53	4
LSe 800	800	7.5	8.3	28.6	110.3	145.9	3.43	4
LSe 900	896	9.2	8.3	28.6	123.3	169.1	4.43	4
LSe 1000	1000	9.2	8.3	28.6	132.8	178.2	4.39	4
LSe 1100	1096	10.8	8.3	28.6	145.7	201.8	5.42	4
LSe 1200	1200	10.8	8.3	28.6	155.2	210.5	5.34	4
LSe 1300	1272	10.8	8.3	28.6	164.7	218.8	5.23	4
LSe 1400	1376	10.8	8.3	28.6	174.1	227.6	5.17	4
LSe 1500	1504	14.5	8.6	27.6	194.0	264.6	6.82	6
LSe 1600	1600	14.5	8.6	27.6	203.5	273.2	6.74	6
LSe 1700	1664	14.5	8.6	27.6	212.9	281.8	6.66	6
LSe 1800	1800	17.7	8.6	27.6	229.1	319.5	8.73	6
LSe 1900	1904	17.7	8.6	27.6	238.6	327.6	8.60	6
LSe 2000	2000	17.7	8.6	27.6	248.0	336.2	8.52	6

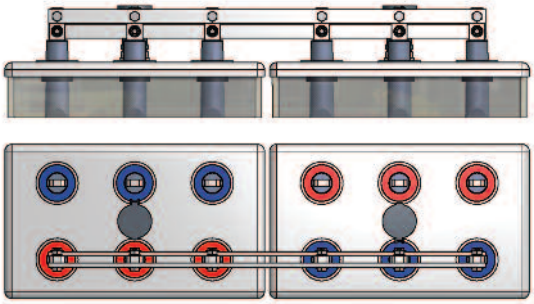
Side and Top Views of Range



LSe 100 - 600



LSe 700 - 1400



LSe 1500 - 2000

Discharge Current (A) to 1.81V at 77°F

Cell Type	Minutes								Hours			
	1	5	7	10	12	15	20	30	1	2	3	8
LSe 100	160	135	126	116	110	103	93.9	79.0	54.4	35.7	27.5	14.3
LSe 150	249	211	198	181	172	159	143	119	80.3	50.9	39.3	18.6
LSe 200	332	282	264	242	230	213	191	159	107	67.9	51.0	24.7
LSe 250	411	349	327	300	285	164	237	197	132	84.0	63.2	30.6
LSe 300	493	419	373	360	342	316	284	236	159	100	75.8	36.8
LSe 350	581	494	463	424	402	373	335	278	187	118	89.3	43.3
LSe 400	664	565	529	484	460	426	382	318	214	135	102	49.5
LSe 450	725	617	578	529	502	465	418	347	233	148	111	54.0
LSe 500	533	487	469	444	430	408	378	333	250	169	129	62.6
LSe 600	622	569	548	519	502	476	442	389	292	198	151	73.1
LSe 700	726	664	640	605	583	556	516	454	341	231	176	85.3
LSe 800	830	759	731	692	670	635	590	519	390	264	201	97.5
LSe 900	934	854	823	778	753	715	664	584	439	297	226	109
LSe 1000	1038	949	914	865	837	794	738	649	488	330	251	121
LSe 1100	1141	1044	1006	951	921	874	811	713	536	363	276	134
LSe 1200	1245	1139	1097	1038	1005	953	885	778	585	396	302	146
LSe 1300	1322	1209	1165	1102	1066	1012	940	826	621	420	320	155
LSe 1400	1424	1302	1254	1187	1149	1090	1012	890	669	452	345	167
LSe 1500	1557	1423	1371	1297	1256	1192	1107	973	732	495	377	182
LSe 1600	1660	1518	1463	1384	1340	1271	1180	1038	780	528	402	195
LSe 1700	1729	1581	1523	1441	1395	1324	1229	1081	813	549	419	203
LSe 1800	1868	1708	1646	1557	1507	1430	1328	1168	878	594	453	219
LSe 1900	1972	1803	1737	1643	1591	1510	1402	1233	927	627	478	231
LSe 2000	2076	2898	1829	1730	1675	1589	1476	1298	976	660	503	243

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