

DT Series

Pure Lead VRLA Monobloc Telecom Battery



Technical Manual

The Company

HBL dedicated to providing engineered power solutions around a number of technologies. It is one of a few battery and energy businesses in the world to offer the full range of battery technologies.

The many specialized battery technologies offered by HBL, reflecting its strengths, include:

- ◆ Nickel Cadmium (Pocket Plate, Fibre Plate, Sintered Plate)
- ◆ Silver Zinc (Primary & Secondary)
- ◆ Lithium (Thionyl Chloride & Iron di Sulphide)
- ◆ Valve Regulated Lead Acid (Flat plate AGM & Tubular Gel)

The company has one of the highest levels of engineers to direct its work forces.

This unique combination of technologies and talent pool gives us an opportunity to provide customers purpose made solutions for their application needs.

Pure Lead Technology

A battery is a critical component of any power supply system and has a significant impact on its performance and reliability. Today, there is a distinct preference for high-performance, compact and light weight batteries.

The technology enables continuous manufacture of thin plates using automated assembly lines complete with sophisticated equipment and online quality checks.

These batteries employ Pure Lead, thin plate design for long float life. These Valve Regulated Lead Acid (VRLA) batteries are designed using Absorbent Glass Mat (AGM) separators that render the batteries spill-proof. Use of AGM separators in combination with self-resealing, pressure regulating valves and a starved electrolyte design enable recombination of gasses generated during normal operation. This eliminates the need for electrolyte top-up.

These batteries are delivered fully charged and can be commissioned immediately without delay.

Superior Features

- ◆ Long Float life (12+ years, high integrity design)
- ◆ Maintenance-free and spill-proof. This enables flexible mounting
- ◆ Compact and light weight for easy handling
- ◆ Wide operating temperature range (-40°C to +50°C)
- ◆ High energy density (gravimetric and volumetric)
- ◆ Good charge retention leading to long storage life
- ◆ Low internal resistance ensures quick recharge
- ◆ Excellent high rate capability permits use of smaller capacity batteries
- ◆ Superior raw materials for good performance and life
- ◆ Excellent deep discharge recovery characteristics
- ◆ UL recognized plastic components

Applications

Pure Lead batteries are the ideal choice for all applications requiring reliable and long float life. Typical applications include

- ◆ Telecommunications
- ◆ Signalling
- ◆ Standby Power

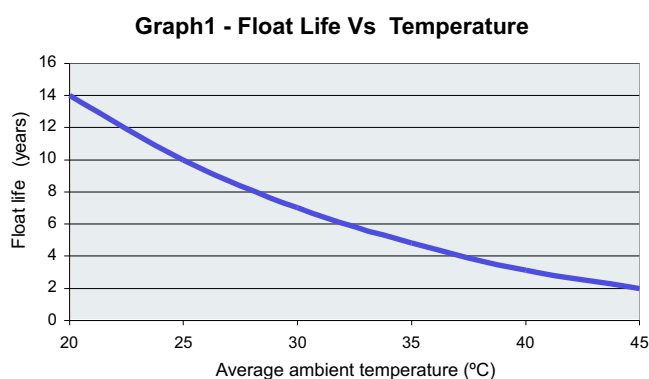
These Batteries conform to IEC 60896-2: 1995, Eurobat and Bellcore Specifications.

Float Life

In a float arrangement, the battery is kept connected across a charger which continually replenishes the drain in the battery caused due to self-discharge.

The expected life of a battery, also known as its designed life, is influenced by the ambient temperature. Based on the Arrhenius Equation, which relates ambient temperature and the rate of positive-grid corrosion of the battery, it is estimated that the expected life of lead acid batteries is reduced by 50% for every 8 to 10°C rise in the average ambient temperature.

The expected float life of batteries at various average ambient temperatures, when floated at a float voltage of 2.25 volts per cell, is shown in Graph1.



When a lead acid battery reaches the end of its life, the failure mode is positive grid corrosion. Grid corrosion reduces the available cross section of the grid which is required to carry current. While this reduced cross section is adequate to deliver low currents while carrying out capacity tests, it is not adequate to sustain high currents.

The special Pure Lead alloy minimizes positive grid corrosion.

Charging

Constant voltage charging is the most preferred charging method for these batteries.

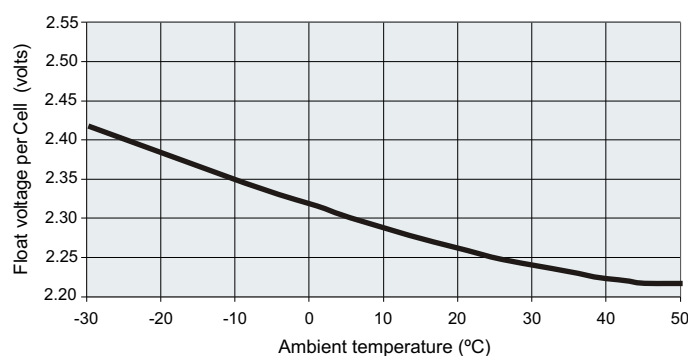
When charging the battery with a constant voltage charger in float applications, the charger must be set at the following voltages.

Boost: 2.4V per cell at 25°C
 Float: 2.25V per cell at 25°C

No current limit is required during constant voltage charging. However, the charger should be capable of giving at least $0.1C_8$ A (where C_8 is the capacity of battery at 8 hr rate of discharge to end 1.75V per cell). The charger should automatically sense the current drawn by the battery and switch over to the float mode when the battery is fully charged.

The charger should preferably provide temperature compensation (as shown in Graph 3) to ensure optimum charging of the battery. The charger should also have an AC voltage ripple of <3% RMS.

Graph 3 - Temperature Compensation



Storage

Batteries lose capacity when not in use, a phenomenon termed as self-discharge. The use of pure raw materials decreases the rate of self-discharge and enhances storage life. Loss of capacity during storage is to be compensated for by giving a freshening charge to the battery. In case the batteries are stored for very long periods or at high temperatures without giving a freshening charge, there will be an irreversible sulphation leading to permanent loss in capacity.

These batteries can be stored for a maximum period of two years at 20°C with open circuit voltage (OCV) monitoring every 4 months. If the OCV falls to 2.1V per cell, the battery should be given a freshening charge at 2.4V per cell for 12hrs. OCV Monitoring interval with respect to temperature of storage is given in Table 1 below.

Table 1

Temperature (°C)	Monitoring Frequency (months)
< 20	6
20 - 29	4
30 - 35	3
36 - 40	2
41 - 50	1

Range of 12V Monoblocs

Model	Capacity C_{8hr} 1.75 (Ah)	Dimensions (mm)			Approx. Wt. (kgs)	Terminal
		L	W	H		
DT 12-13	11	175	85	130	5	M6 (F)
DT 12-16	14	181	76	168	6	M6 (F)
DT 12-24	21	249	97	151	10	Ø6
DT 12-25	22	175	166	125	11	M6 (F)
DT 12-37	33	249	97	201	13	M6 (F)
DT 12-38	34	197	165	170	13	Ø6
DT 12-50	45	220	121	250	17	M6 (F)
DT 12-70	63	330	168	176	23	M6 (F)
DT 12-80	72	286	268	182	32	M8 (F)
DT 12-106	96	410	175	250	40	M6 (F)
DT 12-110 FT	100	556	125	230	47	M8 (F)
DT 12-160 FT	144	556	125	325	56	M8 (F)

Nominal capacity is at 8 hour rate of discharge to 1.75 Vpc at 20° C

Range of 6V Monoblocs

Model	Capacity C_{8hr} 1.75 (Ah)	Dimensions (mm)			Approx. Wt. (kgs)	Terminal
		L	W	H		
DT 6-115	103	205	197	234	23	M8 (F)
DT 6-136	122	205	197	234	25	M8 (F)

Nominal capacity is at 8 hour rate of discharge to 1.75 Vpc at 20° C

Constant Current Performance at 20°C

End Voltage 1.60 VPC

Discharge Current in Amperes

Model	Minutes						Hours										
	5	10	15	20	30	45	1	2	3	4	5	6	7	8	9	10	20
DT 12-13	57	35.7	27.1	20.7	15.9	11.8	9.4	5.3	3.72	2.85	2.39	2.05	1.77	1.56	1.42	1.38	0.72
DT 12-16	70	43.9	33.3	25.4	19.5	14.5	11.6	6.5	4.57	3.51	2.94	2.52	2.17	1.91	1.75	1.70	0.88
DT 12-24	106	66	50	38.1	29.2	21.7	17.3	9.8	6.9	5.3	4.41	3.78	3.26	2.87	2.63	2.54	1.32
DT 12-25	110	69	52	39.8	30.5	22.6	18.1	10.2	7.2	5.5	4.61	3.95	3.40	3.00	2.74	2.65	1.38
DT 12-37	163	101	77	59	45.1	33.4	26.7	15.1	10.6	8.1	6.8	5.8	5.0	4.43	4.05	3.92	2.04
DT 12-38	167	104	79	60	46.3	34.3	27.4	15.5	10.8	8.3	7.0	6.0	5.2	4.54	4.16	4.02	2.09
DT 12-50	220	137	104	80	61	45.3	36.2	20.4	14.3	11.0	9.2	7.9	6.8	6.0	5.5	5.3	2.76
DT 12-70	309	192	146	111	86	63	51	28.6	20.0	15.4	12.9	11.1	9.5	8.4	7.7	7.4	3.86
DT 12-80	352	219	167	127	97	72	58	32.6	22.8	17.5	14.7	12.6	10.9	9.6	8.8	8.5	4.40
DT 12-106	466	291	221	168	129	96	77	43.2	30.3	23.3	19.5	16.7	14.4	12.7	11.6	11.2	5.8
DT 12-110 FT	492	307	233	177	136	101	81	45.6	31.9	24.5	20.6	17.6	15.2	13.4	12.2	11.8	6.1
DT 12-160 FT	704	439	333	254	195	145	116	65	45.7	35.1	29.4	25.2	21.7	19.1	17.5	17.0	8.8
DT 6-115	505	315	239	182	140	104	83	46.7	32.8	25.2	21.1	18.1	15.6	13.7	12.6	12.2	6.3
DT 6-136	598	373	283	216	166	123	98	55	38.8	29.8	25.0	21.4	18.5	16.3	14.9	14.4	7.5

End Voltage 1.63 VPC

Discharge Current in Amperes

Model	Minutes						Hours										
	5	10	15	20	30	45	1	2	3	4	5	6	7	8	9	10	20
DT 12-13	57	35.3	26.8	20.5	15.7	11.6	9.3	5.3	3.68	2.83	2.37	2.03	1.75	1.54	1.41	1.37	0.71
DT 12-16	70	43.5	33.0	25.2	19.3	14.3	11.4	6.5	4.53	3.48	2.92	2.50	2.15	1.90	1.73	1.68	0.87
DT 12-24	105	65	49.5	37.7	29.0	21.5	17.2	9.7	6.8	5.2	4.37	3.75	3.23	2.84	2.60	2.52	1.31
DT 12-25	109	68	52	39.4	30.2	22.4	17.9	10.1	7.1	5.4	4.57	3.91	3.37	2.97	2.72	2.63	1.37
DT 12-37	161	101	76	58	44.7	33.1	26.5	14.9	10.5	8.0	6.7	5.8	4.98	4.38	4.01	3.88	2.02
DT 12-38	165	103	78	60	45.8	34.0	27.2	15.3	10.7	8.3	6.9	5.9	5.1	4.50	4.12	3.99	2.07
DT 12-50	218	136	103	79	60	44.8	35.9	20.2	14.2	10.9	9.1	7.8	6.7	5.9	5.4	5.3	2.73
DT 12-70	306	191	145	110	85	63	50	28.3	19.8	15.2	12.8	11.0	9.4	8.3	7.6	7.4	3.82
DT 12-80	349	217	165	126	97	72	57	32.3	22.6	17.4	14.6	12.5	10.8	9.5	8.7	8.4	4.36
DT 12-106	462	288	219	167	128	95	76	42.8	30.0	23.0	19.3	16.6	14.3	12.6	11.5	11.1	5.8
DT 12-110 FT	487	304	231	176	135	100	80	45.1	31.6	24.3	20.4	17.5	15.0	13.2	12.1	11.7	6.1
DT 12-160 FT	697	435	330	252	193	143	114	65	45.3	34.8	29.2	25.0	21.5	19.0	17.3	16.8	8.7
DT 6-115	500	312	237	180	138	103	82	46.3	32.4	24.9	20.9	17.9	15.4	13.6	12.4	12.0	6.2
DT 6-136	592	369	280	214	164	122	97	55	38.4	29.5	24.8	21.2	18.3	16.1	14.7	14.3	7.4

End Voltage 1.67 VPC

Discharge Current in Amperes

Model	Minutes						Hours										
	5	10	15	20	30	45	1	2	3	4	5	6	7	8	9	10	20
DT 12-13	56	35.0	26.6	20.3	15.6	11.5	9.2	5.2	3.65	2.80	2.35	2.01	1.73	1.53	1.40	1.35	0.70
DT 12-16	69	43.0	32.7	24.9	19.1	14.2	11.3	6.4	4.48	3.44	2.89	2.47	2.13	1.88	1.72	1.66	0.86
DT 12-24	104	65	49.0	37.4	28.7	21.3	17.0	9.6	6.7	5.2	4.33	3.71	3.20	2.82	2.58	2.49	1.29
DT 12-25	108	67	51	39.0	30.0	22.2	17.8	10.0	7.0	5.4	4.52	3.88	3.34	2.94	2.69	2.60	1.35
DT 12-37	160	100	76	58	44.2	32.8	26.2	14.8	10.4	8.0	6.7	5.7	4.93	4.34	3.97	3.85	2.00
DT 12-38	164	102	78	59	45.4	33.7	26.9	15.2	10.6	8.2	6.9	5.9	5.1	4.46	4.08	3.95	2.05
DT 12-50	216	135	102	78	60	44.4	35.5	20.0	14.0	10.8	9.0	7.8	6.7	5.9	5.4	5.2	2.70
DT 12-70	303	189	143	109	84	62	49.7	28.1	19.7	15.1	12.7	10.9	9.4	8.2	7.5	7.3	3.79
DT 12-80	345	215	163	125	96	71	57	32.0	22.4	17.2	14.4	12.4	10.7	9.4	8.6	8.3	4.32
DT 12-106	458	285	217	165	127	94	75	42.4	29.7	22.8	19.1	16.4	14.1	12.4	11.4	11.0	5.7
DT 12-110 FT	483	301	228	174	134	99	79	44.7	31.3	24.1	20.2	17.3	14.9	13.1	12.0	11.6	6.0
DT 12-160 FT	691	430	327	249	191	142	113	64	44.8	34.4	28.9	24.7	21.3	18.8	17.2	16.6	8.6
DT 6-115	495	309	234	179	137	102	81	45.9	32.1	24.7	20.7	17.7	15.3	13.5	12.3	11.9	6.2
DT 6-136	587	366	278	212	162	120	96	54	38.1	29.2	24.5	21.0	18.1	15.9	14.6	14.1	7.3

Constant Current Performance at 20°C

End Voltage 1.70 VPC

Discharge Current in Amperes

Model	Minutes						Hours										
	5	10	15	20	30	45	1	2	3	4	5	6	7	8	9	10	20
DT 12-13	55	34.3	26.1	19.9	15.3	11.3	9.0	5.1	3.58	2.75	2.30	1.97	1.70	1.50	1.37	1.33	0.69
DT 12-16	68	42.2	32.1	24.4	18.8	13.9	11.1	6.3	4.40	3.38	2.83	2.43	2.09	1.84	1.69	1.63	0.85
DT 12-24	102	63	48.1	36.7	28.1	20.9	16.7	9.4	6.6	5.1	4.25	3.64	3.14	2.76	2.53	2.45	1.27
DT 12-25	106	66	50	38.3	29.4	21.8	17.4	9.8	6.9	5.3	4.44	3.80	3.28	2.88	2.64	2.55	1.33
DT 12-37	157	98	74	57	43.4	32.2	25.7	14.5	10.2	7.8	6.6	5.6	4.84	4.26	3.90	3.77	1.96
DT 12-38	161	100	76	58	44.5	33.0	26.4	14.9	10.4	8.0	6.7	5.8	4.96	4.37	4.00	3.87	2.01
DT 12-50	212	132	100	77	59	43.6	34.8	19.7	13.8	10.6	8.9	7.6	6.6	5.8	5.3	5.1	2.65
DT 12-70	297	185	141	107	82	61	48.8	27.5	19.3	14.8	12.4	10.6	9.2	8.1	7.4	7.2	3.71
DT 12-80	339	211	160	122	94	70	56	31.4	22.0	16.9	14.2	12.1	10.5	9.2	8.4	8.2	4.23
DT 12-106	449	280	212	162	124	92	74	41.6	29.1	22.4	18.8	16.1	13.9	12.2	11.2	10.8	5.6
DT 12-110 FT	473	295	224	171	131	97	78	43.8	30.7	23.6	19.8	17.0	14.6	12.9	11.8	11.4	5.9
DT 12-160 FT	677	422	321	244	188	139	111	63	44.0	33.8	28.3	24.3	20.9	18.4	16.9	16.3	8.5
DT 6-115	486	303	230	175	134	100	80	45.0	31.5	24.2	20.3	17.4	15.0	13.2	12.1	11.7	6.1
DT 6-136	575	359	272	208	159	118	94	53	37.3	28.7	24.1	20.6	17.8	15.6	14.3	13.9	7.2

End Voltage 1.75 VPC

Discharge Current in Amperes

Model	Minutes						Hours										
	5	10	15	20	30	45	1	2	3	4	5	6	7	8	9	10	20
DT 12-13	54	33.7	25.6	19.5	15.0	11.1	8.9	5.0	3.51	2.69	2.26	1.94	1.67	1.47	1.34	1.30	0.68
DT 12-16	66	41.4	31.4	24.0	18.4	13.6	10.9	6.2	4.31	3.31	2.78	2.38	2.05	1.80	1.65	1.60	0.83
DT 12-24	100	62	47.2	35.9	27.6	20.4	16.4	9.2	6.5	4.97	4.16	3.57	3.08	2.71	2.48	2.40	1.25
DT 12-25	104	65	49.2	37.5	28.8	21.4	17.1	9.6	6.8	5.2	4.35	3.73	3.21	2.83	2.59	2.50	1.30
DT 12-37	154	96	73	55	42.5	31.5	25.2	14.2	10.0	7.7	6.4	5.5	4.74	4.18	3.82	3.70	1.92
DT 12-38	158	98	75	57	43.7	32.4	25.9	14.6	10.2	7.9	6.6	5.6	4.87	4.28	3.92	3.80	1.97
DT 12-50	208	130	98	75	58	42.7	34.1	19.3	13.5	10.4	8.7	7.5	6.4	5.7	5.2	5.0	2.60
DT 12-70	291	182	138	105	81	60	47.8	27.0	18.9	14.5	12.2	10.4	9.0	7.9	7.2	7.0	3.64
DT 12-80	332	207	157	120	92	68	55	30.8	21.6	16.6	13.9	11.9	10.3	9.0	8.3	8.0	4.15
DT 12-106	440	274	208	159	122	90	72	40.8	28.6	21.9	18.4	15.8	13.6	12.0	10.9	10.6	5.5
DT 12-110 FT	464	289	220	167	129	95	76	43.0	30.1	23.1	19.4	16.6	14.3	12.6	11.5	11.2	5.8
DT 12-160 FT	664	414	314	240	184	136	109	62	43.1	33.1	27.8	23.8	20.5	18.0	16.5	16.0	8.3
DT 6-115	476	297	225	172	132	98	78	44.1	30.9	23.7	19.9	17.1	14.7	12.9	11.8	11.5	6.0
DT 6-136	564	352	267	203	156	116	93	52	36.6	28.1	23.6	20.2	17.4	15.3	14.0	13.6	7.1

End Voltage 1.80 VPC

Discharge Current in Amperes

Model	Minutes						Hours										
	5	10	15	20	30	45	1	2	3	4	5	6	7	8	9	10	20
DT 12-13	51	32.0	24.3	18.5	14.2	10.5	8.4	4.75	3.33	2.56	2.14	1.84	1.58	1.39	1.28	1.24	0.64
DT 12-16	63	39.3	29.9	22.8	17.5	13.0	10.4	5.8	4.09	3.15	2.64	2.26	1.95	1.71	1.57	1.52	0.79
DT 12-24	95	59	44.8	34.1	26.2	19.4	15.5	8.8	6.1	4.72	3.96	3.39	2.92	2.57	2.35	2.28	1.18
DT 12-25	99	62	46.8	35.6	27.4	20.3	16.2	9.2	6.4	4.93	4.13	3.54	3.05	2.69	2.46	2.38	1.24
DT 12-37	146	91	69	53	40.4	30.0	24.0	13.5	9.5	7.3	6.1	5.2	4.51	3.97	3.63	3.51	1.82
DT 12-38	150	93	71	54	41.5	30.7	24.6	13.9	9.7	7.5	6.3	5.4	4.62	4.07	3.72	3.61	1.87
DT 12-50	198	123	94	71	55	40.6	32.4	18.3	12.8	9.9	8.3	7.1	6.1	5.4	4.92	4.76	2.47
DT 12-70	277	172	131	100	77	57	45.4	25.6	18.0	13.8	11.6	9.9	8.5	7.5	6.9	6.7	3.46
DT 12-80	315	197	149	114	87	65	52	29.2	20.5	15.7	13.2	11.3	9.7	8.6	7.8	7.6	3.94
DT 12-106	418	261	198	151	116	86	69	38.7	27.1	20.8	17.5	15.0	12.9	11.4	10.4	10.1	5.2
DT 12-110 FT	441	275	209	159	122	91	72	40.8	28.6	22.0	18.4	15.8	13.6	12.0	11.0	10.6	5.5
DT 12-160 FT	631	393	299	228	175	130	104	58	40.9	31.5	26.4	22.6	19.5	17.1	15.7	15.2	7.9
DT 6-115	452	282	214	163	125	93	74	41.9	29.4	22.5	18.9	16.2	14.0	12.3	11.3	10.9	5.7
DT 6-136	536	334	254	193	148	110	88	49.6	34.8	26.7	22.4	19.2	16.5	14.6	13.3	12.9	6.7

Constant Current Performance at 20°C

End Voltage 1.85 VPC

Discharge Current in Amperes

Model	Minutes						Hours										
	5	10	15	20	30	45	1	2	3	4	5	6	7	8	9	10	20
DT 12-13	47.0	29.3	22.2	17.0	13.0	9.6	7.7	4.35	3.05	2.34	1.96	1.68	1.45	1.28	1.17	1.13	0.59
DT 12-16	58	36.0	27.3	20.8	16.0	11.9	9.5	5.4	3.75	2.88	2.42	2.07	1.78	1.57	1.44	1.39	0.72
DT 12-24	87	54	41.0	31.3	24.0	17.8	14.2	8.0	5.6	4.32	3.62	3.11	2.68	2.36	2.16	2.09	1.08
DT 12-25	90	56	42.8	32.6	25.1	18.6	14.9	8.4	5.9	4.51	3.78	3.24	2.79	2.46	2.25	2.18	1.13
DT 12-37	134	83	63	48.2	37.0	27.4	21.9	12.4	8.7	6.7	5.6	4.79	4.13	3.63	3.32	3.22	1.67
DT 12-38	137	85	65	49.5	38.0	28.2	22.5	12.7	8.9	6.8	5.7	4.91	4.23	3.73	3.41	3.30	1.71
DT 12-50	181	113	86	65	50	37.2	29.7	16.8	11.7	9.02	7.6	6.5	5.6	4.92	4.50	4.36	2.26
DT 12-70	253	158	120	91	70	52	41.6	23.5	16.4	12.6	10.6	9.1	7.8	6.9	6.3	6.1	3.17
DT 12-80	289	180	137	104	80	59	47.4	26.8	18.7	14.4	12.1	10.4	8.9	7.9	7.2	7.0	3.61
DT 12-106	383	239	181	138	106	79	63	35.5	24.8	19.1	16.0	13.7	11.8	10.4	9.5	9.2	4.79
DT 12-110 FT	404	252	191	146	112	83	66	37.4	26.2	20.1	16.9	14.5	12.5	11.0	10.0	9.7	5.05
DT 12-160 FT	578	360	273	208	160	119	95	54	37.5	28.8	24.2	20.7	17.8	15.7	14.4	13.9	7.2
DT 6-115	414	258	196	149	115	85	68	38.4	26.9	20.6	17.3	14.8	12.8	11.3	10.3	10.0	5.2
DT 6-136	491	306	232	177	136	101	81	45.5	31.9	24.5	20.5	17.6	15.2	13.3	12.2	11.8	6.1

End Voltage 1.90 VPC

Discharge Current in Amperes

Model	Minutes						Hours										
	5	10	15	20	30	45	1	2	3	4	5	6	7	8	9	10	20
DT 12-13	42.1	26.3	19.9	15.2	11.7	8.6	6.9	3.90	2.73	2.10	1.76	1.51	1.30	1.14	1.05	1.01	0.53
DT 12-16	52	32.3	24.5	18.7	14.3	10.6	8.5	4.80	3.36	2.58	2.17	1.86	1.60	1.41	1.29	1.25	0.65
DT 12-24	78	48.4	36.8	28.0	21.5	16.0	12.8	7.2	5.0	3.87	3.25	2.78	2.40	2.11	1.93	1.87	0.97
DT 12-25	81	51	38.4	29.3	22.5	16.7	13.3	7.5	5.3	4.04	3.39	2.91	2.50	2.21	2.02	1.95	1.01
DT 12-37	120	75	57	43.2	33.2	24.6	19.7	11.1	7.8	6.0	5.0	4.29	3.70	3.26	2.98	2.89	1.50
DT 12-38	123	77	58	44.4	34.1	25.2	20.2	11.4	8.0	6.1	5.1	4.41	3.80	3.34	3.06	2.96	1.54
DT 12-50	162	101	77	59	44.9	33.3	26.6	15.0	10.5	8.1	6.8	5.8	5.0	4.41	4.04	3.91	2.03
DT 12-70	227	142	108	82	63	46.6	37.3	21.0	14.7	11.3	9.5	8.1	7.0	6.2	5.7	5.5	2.84
DT 12-80	259	161	123	93	72	53	42.5	24.0	16.8	12.9	10.8	9.3	8.0	7.0	6.4	6.2	3.24
DT 12-106	343	214	162	124	95	70	56	31.8	22.3	17.1	14.3	12.3	10.6	9.3	8.5	8.3	4.29
DT 12-110 FT	362	226	171	131	100	74	59	33.5	23.5	18.0	15.1	13.0	11.2	9.8	9.0	8.7	4.52
DT 12-160 FT	518	323	245	187	143	106	85	48.0	33.6	25.8	21.7	18.6	16.0	14.1	12.9	12.5	6.5
DT 6-115	371	231	176	134	103	76	61	34.4	24.1	18.5	15.5	13.3	11.5	10.1	9.2	8.9	4.64
DT 6-136	440	274	208	159	122	90	72	40.7	28.6	21.9	18.4	15.8	13.6	12.0	10.9	10.6	5.5

Battery Sizing and Selection

Sizing and selection of a battery is application specific. Certain correction factors also have to be applied before arriving at the final battery capacity.

Correction factors

- 1) K factor (designated C_K)
It is the ratio of 'Rated Capacity' to 'Amperes' that can be supplied for the required 't' time.
- 2) Temperature correction factor (designated C_{TC}) See Table 2
It is the ratio of the 'Rated Capacity' to the Capacity obtainable at $t^\circ\text{C}$.
- 3) Aging factor (designated C_{AF})
Normally taken to be 1.25 (1/0.8) considering 80% as the end of life criterion.
- 4) Design margin (designated C_{DM})
A nominal 10% cushion is taken as standard over-sizing to take care of design errors in the load specifications. This may also be specified by the user.
- 5) Over load factor (designated C_{OL})
Reserve capacity that may be installed to take care of future additional loads. Normally 10% is considered. This again depends on customer's requirement.

Temperature correction Factor (C_{TC})

Table 2

Temp. (°C)	Discharge Duration in minutes															
	5	10	15	20	30	45	60	120	180	240	300	360	420	480	540	600
-30	3.644	3.403	3.283	3.205	3.107	3.021	2.967	2.854	2.802	2.769	2.749	2.738	2.726	2.710	2.704	2.698
-25	2.869	2.680	2.585	2.524	2.446	2.379	2.337	2.248	2.207	2.180	2.165	2.156	2.147	2.135	2.130	2.125
-20	2.416	2.257	2.177	2.126	2.060	2.004	1.968	1.893	1.858	1.836	1.823	1.816	1.808	1.797	1.793	1.789
-15	2.186	2.042	1.998	1.923	1.864	1.813	1.780	1.712	1.681	1.661	1.649	1.643	1.636	1.626	1.622	1.619
-10	1.882	1.757	1.695	1.655	1.604	1.560	1.532	1.474	1.447	1.430	1.420	1.414	1.408	1.400	1.396	1.393
-5	1.676	1.565	1.522	1.474	1.429	1.389	1.365	1.312	1.289	1.273	1.264	1.259	1.254	1.246	1.244	1.241
0	1.572	1.468	1.404	1.383	1.340	1.304	1.280	1.232	1.209	1.195	1.186	1.181	1.176	1.170	1.167	1.164
5	1.418	1.340	1.302	1.277	1.245	1.217	1.199	1.164	1.143	1.136	1.130	1.127	1.123	1.119	1.117	1.115
10	1.287	1.233	1.206	1.188	1.166	1.145	1.134	1.107	1.096	1.089	1.085	1.083	1.080	1.078	1.076	1.075
15	1.176	1.143	1.125	1.114	1.100	1.087	1.079	1.064	1.056	1.052	1.049	1.048	1.047	1.045	1.044	1.044
20	1.082	1.066	1.057	1.052	1.045	1.040	1.035	1.028	1.025	1.022	1.021	1.021	1.020	1.019	1.019	1.018
25	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
30	0.929	0.943	0.951	0.956	0.962	0.968	0.972	0.978	0.981	0.983	0.984	0.985	0.985	0.986	0.986	0.986
35	0.867	0.895	0.910	0.919	0.931	0.943	0.949	0.962	0.969	0.972	0.974	0.974	0.975	0.977	0.977	0.977
40	0.813	0.851	0.874	0.888	0.906	0.922	0.932	0.951	0.961	0.965	0.967	0.968	0.969	0.971	0.971	0.971



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