

**EXIDE
INDUSTRIAL**

EXIDE

PLANTÉ
STANDBY
BATTERIES



EXIDE INDUSTRIES LTD.

The Leader in Storage Power Technology



For over 60 years, Exide Industries Limited, has pioneered battery technology in India. It is the only company in the country to design and manufacture batteries from 2.5Ah - 20400 Ah in conventional flooded and VRLA design. The leader in packaged power technology, Exide today is India's largest storage battery company with widest range of both conventional flooded as well as latest VRLA batteries. It has 9 factories strategically located all over India.

It's collaborations with Shin Kobe and Furukuwa of Japan and East Penn manufacturing USA give it a global dimension in manufacturing capability. The company has subsidiaries in Singapore and Sri Lanka. Exports span over 18 countries across five continents in a growing list of overseas customers.

Technology, innovation, quality and country-wide service network are the four pillars on which Exide achieves its high pedestal.

- The R&D Centre, set up in 1976, is counted among the premier battery research facilities in the world and is recognised by the Department of Scientific & Industrial Research under Ministry of Science & Technology, Govt of India.



We have also received ISO 14001 Certificate in recognition of our eco-friendly production process.

Recognition of our pursuit of quality was achieved when RWTUV of Germany awarded us the ISO 9001.



For customers its unique attributes transcend Exide from a manufacturing company to a solution provider. After all who can provide all these benefits together with its wide range of products, the ability and competence to guide a user to select the right battery for a particular application, skilled and experienced engineers for erection commissioning and assured professional assistance throughout the service life of a battery. In flooded type batteries, Exide has mastered Planté plate technology in addition to its long experience in making conventional flat pasted and tubular batteries.

Advantage Planté

EXIDE High Performance Planté cells



- Unmatched high discharge performance
- Expected service life is greater than 20 years.
- 100% capacity retained throughout life span and therefore no aging factor to be considered during battery sizing – as referred in IEEE485.
- Very Low maintenance – Topping up frequency : once in 12/18 months.
- Superior all round voltage profile and energy (Wh) output. Maximum energy output within a narrow operating voltage band.
- Capable of rapid recharging.
- Transparent containers for ease of inspection and maintenance.
- Much higher energy output compared to Tubular Cells of similar capacity and therefore, for a given application, Planté capacity will be much lower than Tubular.
- Higher Ampere-hour and Watt-hour efficiencies.
- Conforms to IS 1652 : 2013 and IEC 896-1995.

Application



- | | | |
|----------------|-----------------------------|-------------------------------|
| • Power Plants | • Space Research | • Emergency lighting |
| • Substations | • Process Industries | • Petrochemicals & Refineries |
| • UPS Systems | • Control & Instrumentation | • Oil & Gas Pipelines |

Main Components

1 Planté Positive Plates
Unique lamellar construction from Ultra-pure lead (99.99%) to ensure least open circuit loss and no reduction in capacity throughout their long life.



2 Negative Plates
Pasted grid construction. Designed for balanced performance and life.



3 Containers
Moulded from transparent Styrene Acrylonitrile (SAN) giving excellent clarity, outstanding chemical resistance, rigidity and toughness with very high insulating qualities which eliminate the need for separate cell insulators. Transparency enables the electrolyte level and the cell condition to be monitored at a glance.



7 High Conductivity Cell Pillars & Connectors
ZHP range of cells are especially suited for high current duties as they have tinned copper insert pillars and lead plated copper connectors as per table-1 :



4 Microporous Ceramic Vent Plugs
Specially designed microporous ceramic filter which effectively returns all acid spray to the cell, but allows free exit of oxygen and hydrogen which is generated towards the end of boost charging.



5 Cell Lids
Moulded from opaque SAN and sealed to the Container. Can be easily removed if the need for repair occurs.



6 Separators
Microporous resin based separator providing a complete diaphragm between the plates. Separators are inert chemically, have excellent oxidation resistance and their high degree of porosity ensures minimum internal resistance.

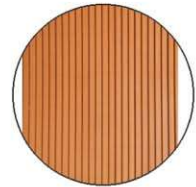


Table: 1

Cell Type	Ampere Hour		
	535-750	865-1500	1605-2250
Pillars	Single Pillars per Pole	Twin Pillars per Pole	Three Pillars per Pole
Connectors	Single intercell connectors	Twin intercell connectors	Triple intercell connectors

Table : 2
Technical Specification

Type of Cell	Capacity at 10 Hrs rate upto 1.85 Vpc @27 deg C(Ah)	Capacity at 10 Hrs rate upto 1.80 Vpc @20 deg C(Ah)	Charging Current (A)		Total Input during Initial Charging (Ah)	Weight of cell +/- 5% (KG)		Approx Qty of acid 1.205 sp. gr. (Litres)	Overall Cell Dimensions +/- 3 mm			Corresponding cell centres (mm)	Trickle Charge Current (mA)	
			Starting Rate	Finishing Rate		Without Acid	With Acid		Length	Breadth	Height*		Min	Max
ZHP 11	535	550	75.00	37.50	2943	60.5	93.3	27.20	230	368	682	238	300	600
ZHP 13	645	660	90.00	45.00	3548	70.4	101.4	25.70	230	368	682	238	360	720
ZHP 15	750	770	105.00	52.50	4125	79.2	108.7	24.50	230	368	682	238	420	840
ZHP 17	860	880	120.00	60.00	4730	98.4	174.7	63.30	433	368	682	376	480	960
ZHP 19	965	990	135.00	67.50	5308	108.0	182.7	62.00	433	368	682	376	550	1100
ZHP 21	1070	1100	150.00	75.00	5885	117.6	190.7	60.70	433	368	682	376	600	1200
ZHP 23	1180	1210	165.00	82.50	6490	127.3	198.9	59.40	433	368	682	376	660	1320
ZHP 25	1285	1320	180.00	90.00	7068	136.9	206.9	58.10	433	368	682	376	720	1440
ZHP 27	1395	1430	195.00	97.50	7673	146.6	212.6	54.80	433	368	682	376	780	1560
ZHP 29	1500	1540	210.00	105.00	8250	156.2	220.7	53.50	433	368	682	376	850	1700
ZHP 31	1605	1650	225.00	112.50	8828	171.3	251.6	66.60	509	368	682	376	900	1800
ZHP 33	1715	1760	240.00	120.00	9433	181.0	259.6	65.20	509	368	682	376	960	1920
ZHP 35	1820	1870	255.00	127.50	10010	190.6	267.6	63.90	509	368	682	376	1025	2050
ZHP 37	1930	1980	270.00	135.00	10615	203.6	296.1	76.80	585	368	682	376	1100	2200
ZHP 39	2035	2090	285.00	142.50	11193	212.9	304.0	75.60	585	368	682	376	1150	2300
ZHP 41	2140	2200	300.00	150.00	11770	222.5	311.8	74.10	585	368	682	376	1200	2400
ZHP 43	2250	2310	315.00	157.50	12375	232.3	319.9	72.70	585	368	682	376	1250	2500

Note : The length of a cell is measured at right angles to the plates. The width is measured parallel to the plates.

*Tolerance for Overall Height : +/- 5 mm

The height is measured upto the top of the pillars.

Table : 3

Capacity : Ampere-hour output as percentage of 10-hrs capacity when discharging in :

Hour	1	2	3	4	5	6	7	8	9	10
Final voltage	1.75	1.78	1.8	1.81	1.82	1.83	1.83	1.84	1.84	1.85
% of 10 Hrs Capacity	60	73.8	81.1	86.2	90	93	95.1	97.1	98.8	100

Table : 4
ecv = 1.70 v

Discharge Data

Type of Cell	Discharge Current (A) at 20°C														
	1'	5'	15'	30'	45'	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h
ZHP 11	983	875	667	500	404	338	212	154	124	104	90	79	71	64	58
ZHP 13	1180	1050	800	600	484	406	254	185	149	125	108	95	85	77	70
ZHP 15	1377	1225	933	700	565	474	297	216	174	146	126	111	99	90	82
ZHP 17	1573	1400	1067	800	646	541	339	247	199	167	144	127	113	102	93
ZHP 19	1770	1575	1200	900	726	609	381	278	224	188	162	143	127	115	105
ZHP 21	1967	1750	1333	1000	807	677	424	308	249	208	180	159	142	128	117
ZHP 23	2163	1925	1467	1100	888	744	466	339	274	229	198	174	156	141	128
ZHP 25	2360	2100	1600	1200	969	812	508	370	298	250	216	190	170	154	140
ZHP 27	2557	2275	1733	1300	1049	880	551	401	323	271	234	206	184	166	152
ZHP 29	2753	2450	1867	1400	1130	947	593	432	348	292	252	222	198	179	163
ZHP 31	2950	2625	2000	1500	1211	1015	635	463	373	313	270	238	212	192	175
ZHP 33	3147	2800	2133	1600	1291	1083	678	493	398	333	288	254	227	205	187
ZHP 35	3343	2975	2267	1700	1372	1150	720	524	423	354	306	269	241	217	198
ZHP 37	3540	3150	2400	1800	1453	1218	763	555	448	375	324	285	255	230	210
ZHP 39	3737	3325	2533	1900	1534	1286	805	586	472	396	342	301	269	243	222
ZHP 41	3933	3500	2667	2000	1614	1353	847	617	497	417	360	317	283	256	233
ZHP 43	4130	3675	2800	2100	1695	1421	890	648	522	438	378	333	297	269	245

Table : 5
ecv = 1.75 v

Discharge Data

Type of Cell	Discharge Current (A) at 20°C														
	1'	5'	15'	30'	45'	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h
ZHP 11	11818	767	592	458	375	318	208	154	124	104	90	79	71	64	58
ZHP 13	982	920	710	550	450	381	249	185	149	125	108	95	85	77	70
ZHP 15	1146	1073	828	642	525	445	291	216	174	146	126	111	99	90	82
ZHP 17	1309	1227	947	733	600	508	332	247	199	167	144	127	113	102	93
ZHP 19	1473	1380	1065	825	675	572	374	278	224	188	162	143	127	115	105
ZHP 21	1637	1533	1183	917	750	635	415	308	249	208	180	159	142	128	117
ZHP 23	1800	1687	1302	1008	825	699	457	339	274	229	198	174	156	141	128
ZHP 25	1964	1840	1420	1100	900	762	498	370	298	250	216	190	170	154	140
ZHP 27	2128	1993	1538	1192	975	826	540	401	323	271	234	206	184	166	152
ZHP 29	2291	2147	1657	1283	1050	889	581	432	348	292	252	222	198	179	163
ZHP 31	2455	2300	1775	1375	1125	953	623	463	373	313	270	238	212	192	175
ZHP 33	2619	2453	1899	1467	1200	1016	664	493	398	333	288	254	227	205	187
ZHP 35	2782	2607	2012	1558	1275	1080	706	524	423	354	306	269	241	217	198
ZHP 37	2946	2760	2130	1650	1350	1143	747	555	448	375	324	285	255	230	210
ZHP 39	3110	2913	2248	1742	1426	1207	789	586	472	396	342	301	269	243	222
ZHP 41	3273	3067	2367	1833	1501	1270	830	617	497	417	360	317	283	256	233
ZHP 43	3437	3220	2485	1925	1576	1334	872	648	522	438	378	333	297	269	245

Discharge Data

Table : 6
ecv = 1.80 v

Type of Cell	Discharge Current (A) at 20°C														
	1'	5'	15'	30'	45'	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h
ZHP 11	650	650	539	418	347	296	199	150	123	104	88	77	68	61	55
ZHP 13	780	780	647	502	416	355	239	180	148	125	106	92	81	73	66
ZHP 15	910	910	755	586	485	414	279	210	172	146	124	107	95	85	77
ZHP 17	1040	1040	863	669	555	473	319	240	197	167	141	123	108	97	88
ZHP 19	1170	1170	971	753	624	533	358	270	221	188	159	138	122	109	99
ZHP 21	1300	1300	1078	837	693	592	398	300	246	208	177	153	136	121	110
ZHP 23	1430	1430	1186	920	762	651	438	330	270	229	194	169	149	134	121
ZHP 25	1560	1560	1294	1004	832	710	478	360	295	250	212	184	163	146	132
ZHP 27	1690	1690	1402	1088	901	769	518	390	320	271	230	199	176	158	143
ZHP 29	1820	1820	1510	1171	970	828	557	420	344	292	247	215	190	170	154
ZHP 31	1950	1950	1618	1255	1040	888	597	450	369	313	265	230	203	182	165
ZHP 33	2080	2080	1725	1339	1109	947	637	480	393	333	283	246	217	194	176
ZHP 35	2210	2210	1833	1422	1178	1006	677	510	418	354	300	261	231	206	187
ZHP 37	2340	2340	1941	1506	1248	1065	717	540	443	375	318	276	244	219	198
ZHP 39	2470	2470	2049	1590	1317	1124	756	570	467	396	336	292	258	231	209
ZHP 41	2600	2600	2157	1673	1386	1183	796	600	492	417	353	307	271	243	220
ZHP 43	2730	2730	2265	1757	1456	1243	836	630	516	438	371	322	285	255	231

Discharge Data

Table : 7
ecv = 1.83 v

Type of Cell	Discharge Current (A) at 20°C														
	1'	5'	15'	30'	45'	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h
ZHP 11	543	543	471	371	309	265	177	133	111	95	83	73	65	59	54
ZHP 13	652	652	565	445	371	318	213	160	133	114	99	88	78	71	65
ZHP 15	761	761	659	519	433	371	248	187	155	133	116	102	92	83	76
ZHP 17	869	869	753	593	495	424	284	213	178	152	132	117	105	95	87
ZHP 19	978	978	848	668	556	477	319	240	200	171	149	131	118	107	98
ZHP 21	1087	1087	942	742	618	530	355	267	222	190	165	146	131	119	108
ZHP 23	1195	1195	1036	816	680	583	390	293	244	209	182	161	144	130	119
ZHP 25	1304	1304	1130	890	742	636	426	320	266	228	198	175	157	142	130
ZHP 27	1413	1413	1224	964	804	689	461	347	288	247	215	190	170	154	141
ZHP 29	1521	1521	1318	1038	866	742	497	373	311	266	231	204	183	166	152
ZHP 31	1630	1630	1413	1113	927	795	532	400	333	285	248	219	196	178	163
ZHP 33	1739	1739	1507	1187	989	848	568	427	355	304	264	234	209	190	173
ZHP 35	1847	1847	1601	1261	1051	901	603	453	377	323	281	248	222	201	184
ZHP 37	1956	1956	1695	1335	1113	954	639	480	399	342	297	263	235	213	195
ZHP 39	2065	2065	1789	1409	1175	1007	674	507	422	361	314	277	249	225	206
ZHP 41	2173	2173	1883	1483	1236	1060	710	533	444	380	330	292	262	237	217
ZHP 43	2282	2282	1978	1558	1298	113	745	560	466	399	347	307	275	249	228

Table : 8
ecv = 1.85 v

Discharge Data

Type of Cell	Discharge Current (A) at 20°C														
	1'	5'	15'	30'	45'	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h
ZHP 11	478	478	425	345	291	252	174	133	110	93	82	72	65	59	54
ZHP 13	573	573	510	414	349	302	209	160	132	112	98	87	78	71	65
ZHP 15	669	669	595	483	407	352	244	187	154	131	114	101	91	83	76
ZHP 17	764	764	680	552	466	403	279	213	176	149	130	116	104	95	87
ZHP 19	860	860	765	621	524	453	314	240	198	168	147	130	117	106	98
ZHP 21	955	955	850	690	582	503	349	267	220	187	163	145	130	118	108
ZHP 23	1051	1051	935	759	640	554	383	293	242	205	179	159	143	130	119
ZHP 25	1146	1146	1020	828	698	604	418	320	264	224	196	174	156	142	130
ZHP 27	1242	1242	1105	897	757	654	453	347	285	243	212	188	169	154	141
ZHP 29	1337	1337	1190	966	815	705	488	373	307	261	228	203	182	166	152
ZHP 31	1433	1433	1275	1035	873	755	523	400	329	280	245	217	195	177	163
ZHP 33	1528	1528	1360	1104	931	805	558	427	351	299	261	232	208	189	173
ZHP 35	1624	1624	1445	1173	990	856	593	453	373	317	277	246	221	201	184
ZHP 37	1719	1719	1530	1242	1048	906	628	480	395	336	294	261	234	213	195
ZHP 39	1815	1815	1615	1311	1106	956	662	507	417	355	310	275	247	225	206
ZHP 41	1910	1910	1700	1380	1164	1007	697	533	439	373	326	290	260	237	217
ZHP 43	2006	2006	1785	1449	1222	1057	732	560	461	392	342	304	273	248	228

Table : 9
ecv = 1.90 v

Discharge Data

Type of Cell	Discharge Current (A) at 20°C														
	1'	5'	15'	30'	45'	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h
ZHP 11	300	300	300	371	237	210	150	117	98	86.9	74	66	60	54	50
ZHP 13	360	360	360	325	284	252	180	140	117	104.7	89	79	72	65	60
ZHP 15	420	420	420	379	331	294	210	163	137	121.8	104	93	84	76	70
ZHP 17	480	480	480	433	379	336	240	187	156	139.6	118	106	96	87	80
ZHP 19	540	540	540	433	426	378	270	210	176	156.7	133	119	107	98	90
ZHP 21	600	600	600	542	473	420	300	233	196	173.7	148	132	119	109	100
ZHP 23	660	660	660	596	520	462	330	257	215	191.6	163	145	131	120	110
ZHP 25	720	720	720	650	568	504	360	280	235	208.6	178	159	143	131	120
ZHP 27	780	780	780	704	615	546	390	303	254	226.5	193	172	155	141	130
ZHP 29	840	840	840	758	662	588	420	327	274	243.5	207	185	167	152	140
ZHP 31	900	900	900	813	710	630	450	350	293	260.6	222	198	179	163	150
ZHP 33	960	960	960	867	757	672	480	373	313	278.4	237	212	191	174	160
ZHP 35	1020	1020	1020	921	804	714	510	397	332	295.5	252	225	203	185	170
ZHP 37	1080	1080	1080	975	852	756	540	420	352	313.3	267	238	215	196	180
ZHP 39	1140	1140	1140	1029	899	798	570	443	372	330.4	281	251	227	207	190
ZHP 41	1200	1200	1200	1083	946	840	600	467	391	347.4	296	264	239	218	200
ZHP 43	1260	1260	1260	1138	994	882	630	490	411	365.3	311	278	251	229	210

Charging Instructions

Initial Charging

- Filling -in-specific gravity : 1.205 ± 0.005 at 27°C
- Rest Period 12-18 hours.
- Charging may be commenced at any rate between the starting and finishing rates.
- Once cell voltages reach 2.36V, reduce current to finishing rate and continue charging, till the cells are fully charged.
- If during any time of charging, temperature exceeds 50°C , suspend charging. Allow temperature to come down to 40°C and continue charging at finishing rate. Ensure total Ah input is maintained. If however, the time taken for the cell to cool down to 40°C is inordinately long, recharging may be started at 45°C .
- Cells are considered to be fully charged once three successive hourly readings of cell voltage and electrolyte gravity are found to be constant. All cells should also gas freely. The voltage of each cells should be around 2.75V on top of charge condition. However, the minimum total Ah input, as mentioned in the table must be provided to the cells even if the voltages and specific gravities are observed to be constant before that. On completion of charge, adjust acid level to 'Maximum' after correcting specific gravity of electrolyte to 1.215 ± 0.005 at 27°C .

Note: Charger output or load induced current ripple can cause permanent damage and a reduction in battery life. The RMS limit is 5% in amperes of the C10 capacity over the frequency range of 100 Hz to 360 Hz.

Recharge

Float / Trickle Charge

All Planté cells should strictly be floated at voltages as mentioned in Table 10. In case of lower float voltage because of any system constraint, an equalising charge must be given once in 3 months.

Trickle charging currents should be so adjusted, anywhere between the maximum and minimum allowed levels given in the Table 2, such individual cells remain fully charged.

Table : 10

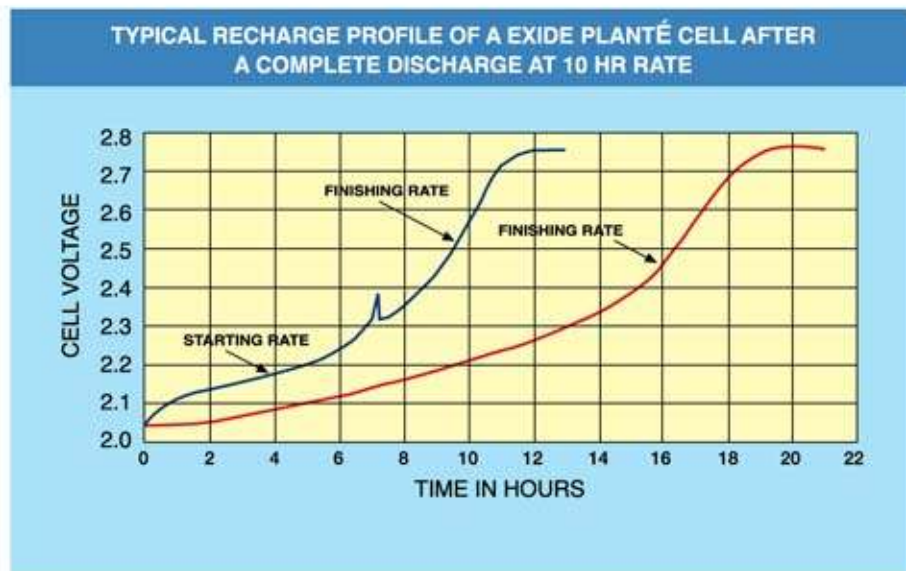
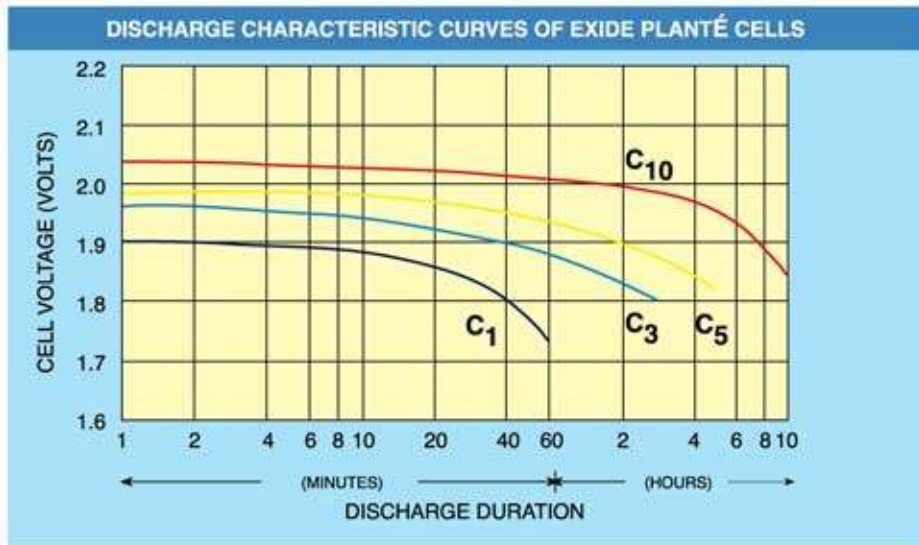
Temperature	Float Voltage
$<5^{\circ}\text{C}$	2.30 ± 0.02 VPC.
$5^{\circ}\text{C} - 19^{\circ}\text{C}$	2.27 ± 0.02 VPC
$20^{\circ}\text{C} - 35^{\circ}\text{C}$	2.25 ± 0.02 VPC
$36^{\circ}\text{C} - 45^{\circ}\text{C}$	2.23 ± 0.02 VPC

Quick Recharge

Exide Planté cells after a deep discharge can also be recharged quickly by applying the Starting Rates mentioned in the table. However, currents will have to be reduced to the Finishing Rate once individual cells attain a voltage level of 2.36 volts. Care will also have to be taken so that electrolyte temperature does not exceed the maximum of 50°C in which case the charging has to be discontinued until the temperature drops below 40°C . Charging may be resumed at the finishing rate from this point.

Equalising Charge

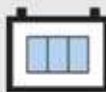
Periodical Equalising Charge to be done, depending on the Float Voltage, by charging at Constant Current Charge at Finishing Rate, upto 2.75vpc, till Sp. Gravity reaches steady value and all cells gas freely, followed by a Constant Current Charge at half the Finishing rate for 16 to 24 hours.



25 years
design
life



635-2250 Ah



Plante plate



Recyclable



Low maintenance

Specifications :

Battery Grade Sulfuric Acid :

The Acid to be used for filling initially shall conform to the specification no. IS : 266 (1993). Maximum impurity levels shall be as follows :

Table - 11

Sl. No.	Impurities	Maximum Contamination	
		% Wt	ppm
1	Arsenic	0.00004	0.4
2.	Chlorine	0.0003	3.0
3.	Copper	0.001	10.0
4	Iron	0.001	10.0
5.	Manganese	0.00003	0.3
6.	Zinc	0.001	10.0
7.	Nitrogenous Matter (as N)	0.0003	3.0
8.	Residue on Ignition	0.02	200

Water

The Water to be used for preparing battery electrolyte (dilute Sulphuric acid) and also for topping up shall conform to IS1069-1993

Table - 12

Sl. No.	Impurities	Maximum Contamination	
		% Wt	ppm
1.	Total Volatile solids	0.01	100.0
2.	Chlorine	0.0001	1.0
3.	Copper	0.0003	3.0
4.	Iron	0.00001	0.1
5.	Manganese	0.00001	0.1
6.	Ammonia as NH ₃	0.001	10.0

Sp. Electrical Conductivity at 25°C (Micromhos per cm.) : 5 max.

PH : 6.5-7.5

PAN INDIA PRESENCE

NORTH	EAST	WEST	SOUTH
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Exide is the largest Power Storage Solutions Company in South and South Asia. It is the only company in India – and one of the few globally – to design, manufacture, market the complete range of lead acid storage batteries – from 2.5 Ah to 20,400 Ah capacity. This includes Plante, OPzS/TBS, HR Tubular, Flat Pasted, Gel Tubular and SMF VRLA batteries.

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For more information please contact us:

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