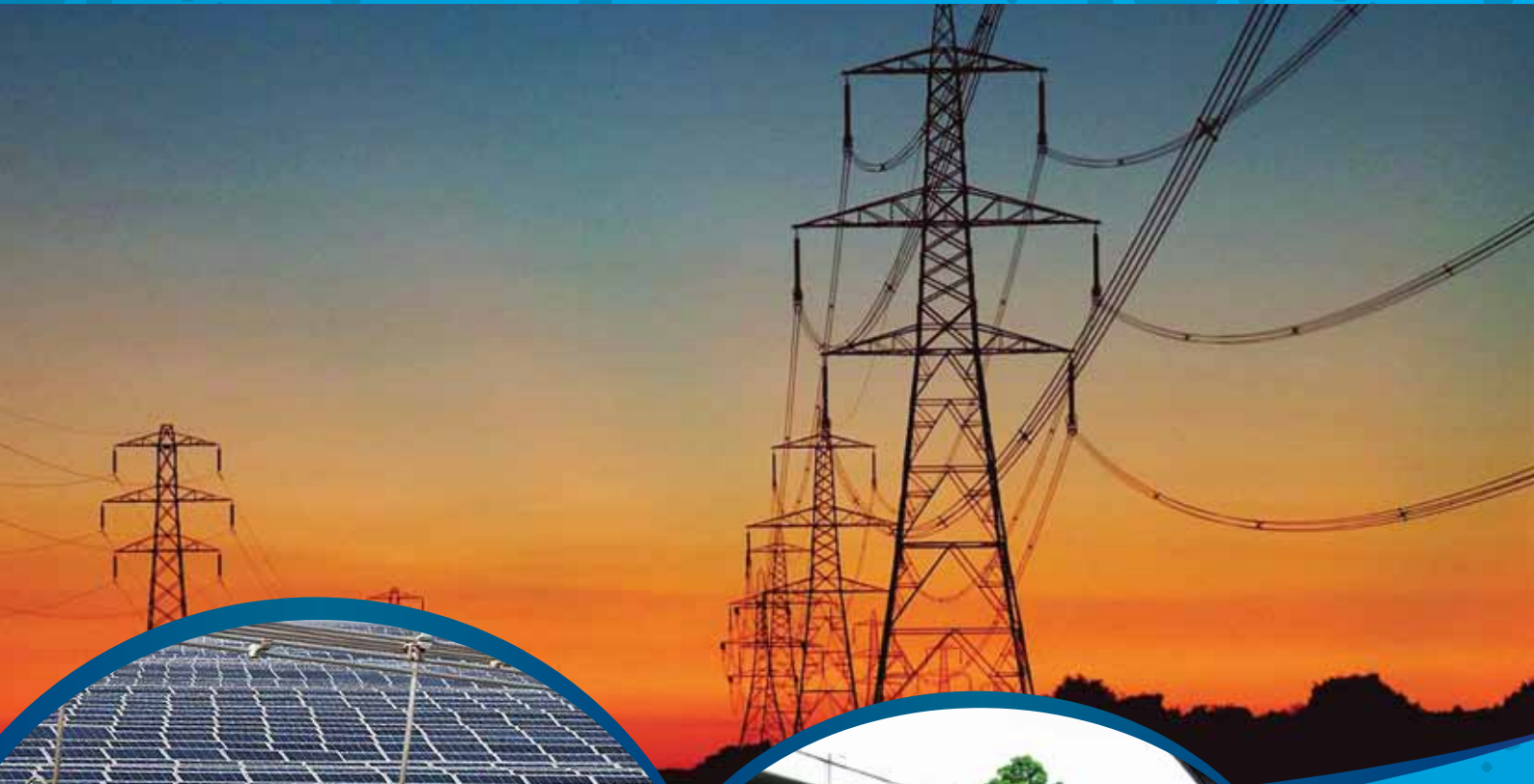


NIMAC - Nickel Cadmium Battery

NIMAC is our name of reliability....



NPL battery series works by an electro-chemical reaction between a nickel oxide of positive plates and cadmium oxide at the negative plates with alkaline electrolyte of potassium hydroxide (KOH) to produce a nominal voltage of 1.2volt per cell. No decay of the plates during the charging and discharging process, hence NPL calls are designed for life expectancy of up to 15 years.

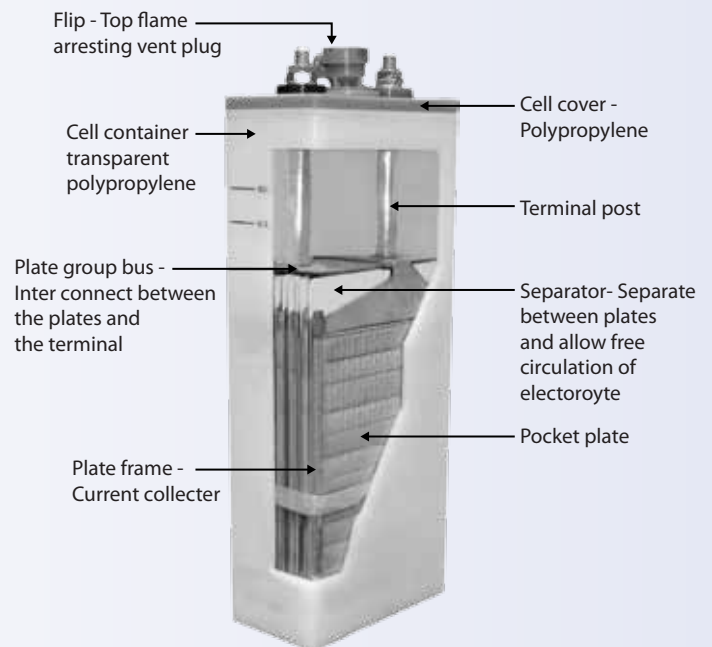
Nimac NPL cells of pocket plate long rate series with polypropylene translucent container meets the design requirement of IEC60623

Application

NIMAC NPL nickel cadmium batteries are suitable for the following application:

- Power backup and switchgear tripping and closing operation in the substation control and protection system.
- Power back up for instrumentation on SCADA control system in the Oil & Gas industries and water treatment plant.
- Power back up for lighting, signaling and communication system for trains and rails.
- UPS back up system for hospital operation room, financial institution and IT industries.

NPL cell construction features.



Charging

For standby application, the NPL cells are recommended for constant voltage current limiting (1μ) charging method. Recommended charging voltage for standby operation.

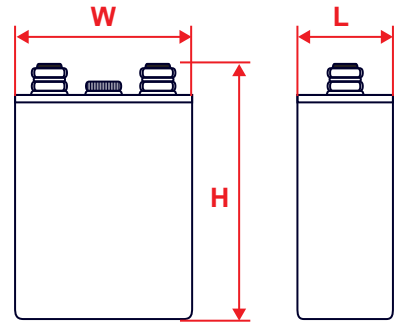
Float - 1.40 ± 0.01 vpc

Boost - 1.60 ± 0.01 vpc

For a new installation, a commissioning charge at 1.70 ± 0.11 vpc is recommended before the battery is out into operation.

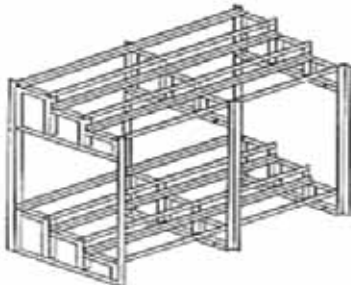
Charging current at $0.15 - 0.2 C_s$ is recommended. Higher charging current up to $0.4C$ may be applied but it shall be limited to not more than 2.5 hours.

CELL CAPACITY AND DIMENSIONS NPL Series

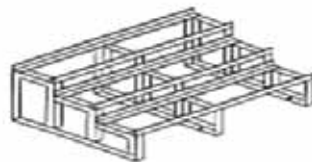


Model	Rated Voltage	Rated Capacity C5Ah	Max.External Dimension mm			Max. Weight (KG)	Electrolyte Volume L	Screw Thread of terminal poles
			Length	Width	Height			
NPL 20	1.2	20	32	113	220	1.2	0.3	M6
NPL 30	1.2	30	68	134	245	2.8	0.8	M10X1
NPL 40	1.2	40	68	134	245	3	0.8	M10X1
NPL 50	1.2	50	68	134	245	3.2	0.7	M10X1
NPL 60	1.2	60	70	134	285	4.2	0.9	M16
NPL 70	1.2	70	80	141	365	5.5	2	M10X1
NPL 80	1.2	80	80	141	365	5.8	1.7	M10X1
NPL100	1.2	100	80	141	365	6.2	1.6	M10X1
NPL 120	1.2	120	80	141	365	6.8	1.2	M10X1
NPL150	1.2	150	106	164	345	9	2.5	M20
NPL180	1.2	180	106	164	345	9.5	2	M20
NPL200	1.2	200	106	164	345	10	1.8	M20
NPL250	1.2	250	164	167	345	13.5	2.8	M20
NPL300	1.2	300	164	167	345	15	2.7	M20
NPL350	1.2	350	152	170	385	17.2	2.8	M20
NPL400	1.2	400	152	170	385	17.5	2.7	M20
NPL500	1.2	500	138	276	490	27	6.1	2XM16
NPL600	1.2	600	176	291	510	38	9.2	2XM20
NPL700	1.2	700	176	291	510	39	8.4	2XM20
NPL800	1.2	800	186	398	570	59	17.2	3XM20
NPL900	1.2	900	186	398	570	60	15.6	3XM20

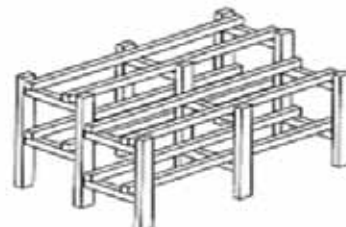
Battery Rack Configuration



Steel Rack - 2 Steps Tiers Steps



Steel Rack - 2 Steps 3 Tiers Steps



Wooden Rack - 2 Row 2 Tiers Steps



Diagram 1
1 tier, 2 steps, normal connection

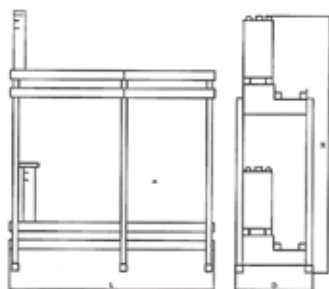


Diagram 2
2 tier, 2 steps, normal connection

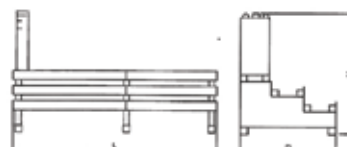


Diagram 3
1 tier, 3 steps, normal connection

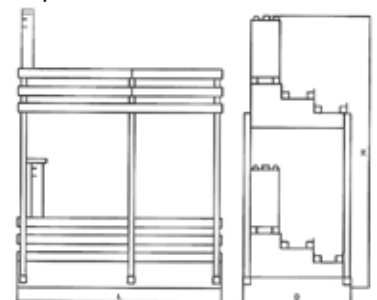


Diagram 4
2 tier, 3 steps, normal connection

Cell performance data after fully charged

AVAILABLE CURRENT UNDER 20°C ± 5°C

END VOLTAGE 1.14V/Cell

Model	C5 Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
NPL20	20	2.02	2.40	3.76	5.90	7.50	8.70	10.1	12.6	13.8	14.7	16.5	19.1	25.0	27.0	29.2	30.0
NPL30	30	3.03	3.60	5.64	8.85	11.3	13.1	15.1	18.8	20.8	22.1	24.8	28.7	37.5	40.5	43.8	45.0
NPL40	40	4.04	4.80	7.52	11.8	15.0	17.4	20.2	25.2	27.6	29.4	33.0	38.2	50.0	54.0	58.5	60.0
NPL50	50	5.05	6.00	9.40	14.8	18.8	21.8	25.2	31.4	34.6	36.8	41.3	47.9	62.5	67.5	73.0	75.0
NPL60	60	6.06	7.20	11.3	17.7	22.5	26.1	30.2	37.7	41.5	44.1	49.5	57.4	75.2	81.0	87.6	90.0
NPL70	70	7.07	8.40	13.2	20.7	26.3	30.5	35.2	44.0	48.4	51.5	57.8	67.0	87.5	94.5	102	105
NPL80	80	8.08	9.60	15.0	23.6	30.0	34.8	40.2	50.2	55.4	58.8	66.0	76.6	100	108	117	120
NPL100	100	10.1	12.0	18.8	29.5	37.5	43.5	50.3	62.8	69.2	73.5	82.5	95.7	125	135	146	150
NPL120	120	11.6	14.2	21.5	31.5	40.1	46.3	54.3	68.7	76.4	79.7	90.9	101	135	149	189	210
NPL150	150	15.2	18.0	28.2	44.2	56.2	65.2	75.4	94.2	103	110	123	143	187	202	222	225
NPL180	180	17.6	20.7	29.8	53	67.4	78	90.5	112	123.6	132	147	171.5	224	242	266	270
NPL200	200	20.2	24.0	37.6	59.0	75.0	87.0	100	125	138	147	165	191	250	270	291	300
NPL250	250	25.3	30.0	47	73	93	108	125	157	171	183	206	239	312	337	369	375
NPL300	300	30.3	36.0	56.4	88.4	112	130	150	188	206	220	246	286	374	404	443	450
NPL350	350	35.4	42.0	65.8	103	132	151	175	216	244	255	285	335	436	469	510	525
NPL400	400	40.4	48.0	75.2	118	150	174	202	252	276	294	330	382	500	540	581	599
NPL500	500	50.5	60.0	94.0	146	186	216	250	314	342	366	412	478	624	674	738	750
NPL600	600	60.6	72.0	113	176	224	260	300	376	412	440	492	572	748	808	886	900
NPL700	700	70.7	84.0	132	207	265	303	350	432	489	510	570	671	873	939	1020	1050
NPL800	800	80.8	96.0	150	236	300	348	404	504	552	588	660	764	1000	1080	1162	1198
NPL900	900	90.9	108	169	265	335	390	450	564	618	660	738	858	1122	1212	1314	1350

AVAILABLE CURRENT UNDER 20°C ± 5°C

END VOLTAGE 1.10V/Cell

Model	C5 Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
NPL20	20	2.04	2.46	3.80	6.14	8.50	10.0	11.8	14.7	16.5	17.8	19.4	23.0	29.5	31.1	34.3	34.8
NPL30	30	3.06	3.69	5.70	9.21	12.8	15.0	17.7	22.0	24.8	26.6	29.0	34.5	44.1	46.8	55.5	57.6
NPL40	40	4.08	4.92	7.60	12.3	16.9	20.0	23.6	29.3	33.0	35.5	38.7	46.0	59.0	62.2	68.5	69.5
NPL50	50	5.10	6.15	9.50	15.4	21.1	25.0	29.5	36.7	41.3	44.4	48.4	57.5	73.5	78.0	85.5	87.0
NPL60	60	6.12	7.38	11.4	18.4	25.5	30.0	35.4	44.0	49.5	53.3	58.0	69.0	88.2	93.6	103	104
NPL70	70	7.14	8.61	13.3	21.5	29.5	35.0	41.3	51.3	57.8	62.2	67.7	80.5	103	109	120	122
NPL80	80	8.16	9.84	15.2	24.6	33.8	40.0	47.2	58.6	66.0	71.0	77.4	92.0	118	125	137	139
NPL100	100	10.2	12.3	19.0	30.7	42.2	50.0	59.0	73.3	82.5	88.8	96.7	115	147	156	171	174
NPL120	120	11.9	14.8	22.9	34.9	46.3	54.3	66.3	82.1	90.9	96.0	108	124	159	176	218	243
NPL150	150	15.3	18.5	28.5	46.2	63.5	75	88.5	110	124	133	145	173	221	234	278	288
NPL180	180	18	22.1	34.2	55	76.2	90	106	132	149	159	179	207.5	265	280	333	340
NPL200	200	20.4	24.6	38.0	61.4	84.2	100	118	147	165	177	193	230	294	312	342	347
NPL250	250	25.5	30.8	47.5	76.5	106	125	148	183	207	222	242	288	368	390	429	434
NPL300	300	30.6	36.9	57.0	92.0	127	150	177	220	248	266	290	345	440	468	555	565
NPL350	350	35.7	43.1	66.5	107	147	175	207	257	289	311	339	403	515	546	647	650
NPL400	400	40.8	49.2	76.0	122	168	200	236	293	330	355	387	460	588	624	682	694
NPL500	500	51.0	61.5	95.0	152	212	250	295	365	413	444	484	575	735	780	858	868
NPL600	600	61.2	73.8	114	184	254	300	354	440	495	525	580	685	870	936	1110	1130
NPL700	700	71.4	86.1	133	213	294	350	413	513	578	620	678	802	1021	1092	1294	1300
NPL800	800	81.6	98.4	152	245	336	400	472	586	660	710	796	920	1176	1248	1364	1388
NPL900	900	91.8	111	171	276	378	450	531	660	743	800	896	1035	1323	1404	1540	1560

Cell performance data after fully charged

AVAILABLE CURRENT UNDER 20°C ± 5°C

END VOLTAGE 1.05V/Cell

Model	C5 Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
NPL20	20	2.06	2.50	3.96	6.32	9.0	11.1	13.4	17.1	19.1	21.2	23.0	26.9	34.2	37	42.6	43.2
NPL30	30	3.09	3.74	5.94	9.48	13.5	16.6	20.0	25.9	28.6	31.8	34.5	39.9	51.2	58.2	63.9	64.8
NPL40	40	4.12	4.99	7.92	12.6	18	22.2	26.8	34.2	38.2	42.4	46.0	53.8	68.2	74.0	85.2	86.4
NPL50	50	5.15	6.24	9.9	15.8	22.5	27.7	33.4	43.2	47.7	53.0	57.5	66.5	85.5	92.0	106	108
NPL60	60	6.18	7.49	11.9	19.1	27	33.2	40.0	51.8	57.2	63.6	69.0	79.8	102	110	127	130
NPL70	70	7.21	8.73	13.9	22.1	31.2	38.8	46.8	60.5	66.8	74.2	80.5	93.1	120	129	148	151
NPL80	80	8.24	10.0	15.8	25.3	36	44.4	53.6	68.4	76.4	84.8	92.0	108	136	148	165	172
NPL100	100	10.3	12.5	19.8	31.5	44.9	55.4	66.7	85.5	95.4	106	115	133	171	184	206	215
NPL120	120	12.1	15	23.6	37.5	51.4	61.8	76.3	99.9	113	120	133	158	191	210	260	285
NPL150	150	15.5	18.7	29.7	47.3	67.3	83.1	100	129	143	159	172	199	256	276	319	322
NPL180	180	18.4	22.9	35.6	55.8	69.6	78.4	93	118	130	135	150	176	202	222	266	289
NPL200	200	20.6	25.0	39.6	63.0	89	110	133	172	190	212	230	266	342	368	412	430
NPL250	250	25.8	31.2	49.5	78.8	112	138	166	215	237	265	287	332	427	460	515	537
NPL300	300	30.9	37.4	59.4	94.5	134	163	200	258	286	318	344	398	512	552	618	644
NPL350	350	36.1	43.7	69.3	110	157	194	237	302	334	370	400	463	598	643	721	751
NPL400	400	41.2	49.9	79.2	126	178	220	266	342	380	424	460	532	684	736	824	860
NPL500	500	51.5	62.4	99	158	220	275	332	427	475	530	575	665	855	920	1030	1075
NPL600	600	61.8	74.9	119	189	268	326	400	516	572	636	688	796	1024	1104	1236	1288
NPL700	700	72.1	87.3	139	220	313	387	474	603	668	740	800	925	1195	1285	1442	1502
NPL800	800	82.4	100	158	252	352	440	531	683	760	848	920	1064	1368	1472	1648	1720
NPL900	900	92.7	112	178	284	398	495	598	769	855	954	1035	1197	1539	1656	1854	1935

AVAILABLE CURRENT UNDER 20°C ± 5°C

END VOLTAGE 1.00V/Cell

Model	C5 Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
NPL20	20	2.10	2.58	4.00	6.54	9.36	11.8	15.0	19.4	22.2	24.0	26.6	30.4	39.4	42.6	48.5	51.0
NPL30	30	3.15	3.86	6.00	9.81	14.0	17.6	22.5	29.1	33.3	36.0	39.9	45.6	59.1	63.9	72.5	76.5
NPL40	40	4.20	5.15	8.00	13.1	18.7	23.6	30.0	38.8	44.4	48.0	53.2	60.8	78.8	85.2	97.0	102
NPL50	50	5.25	6.44	10.0	16.4	23.4	29.4	37.5	48.5	55.5	60.0	66.5	76.0	98.5	107	121	128
NPL60	60	6.30	7.73	12.0	19.6	28.0	35.2	45.0	58.2	66.6	72.0	79.8	91.2	118	128	145	153
NPL70	70	7.35	9.01	14.0	22.9	32.7	41.2	52.5	67.9	77.7	84	93.1	106	138	149	169	179
NPL80	80	8.40	10.3	16.0	25.8	37.0	46.4	60.0	77.0	88.0	95.0	106	122	156	168	190	196
NPL100	100	10.5	12.9	20.0	32.7	46.8	58.8	75.0	97.0	111	120	133	152	197	210	238	245
NPL120	120	12.2	15.2	24.0	38.4	54.7	67.4	86.7	118	135	145	158	177	219	238	297	326
NPL150	150	15.8	17.9	30.0	49.0	70.2	88.0	112	145	166	180	199	228	295	315	357	368
NPL180	180	18.6	23	36	57.4	75.3	88.6	109	145	162	173	190	207	252	270	324	348
NPL200	200	21.0	25.8	40.0	65.1	93.2	117	148	192	220	238	265	302	392	420	475	490
NPL250	250	26.3	32.2	50.0	81.5	116	145	180	240	275	295	330	375	484	525	595	613
NPL300	300	31.5	38.6	60.0	97.0	140	176	224	290	331	358	395	450	580	625	713	735
NPL350	350	36.8	45.1	70.0	113	162	204	262	339	387	419	464	532	688	735	833	858
NPL400	400	42.0	51.5	80.0	130	185	231	296	384	440	476	530	604	784	840	950	975
NPL500	500	52.5	64.4	100	163	232	290	360	480	550	590	660	750	968	1050	1190	1225
NPL600	600	63.0	77.3	120	194	277	348	429	572	655	702	790	900	1158	1248	1428	1470
NPL700	700	73.5	90.1	140	227	324	408	524	678	774	838	928	1063	1375	1470	1666	1715
NPL800	800	84.0	103	160	258	370	462	592	764	875	938	1050	1200	1544	1664	1900	1950
NPL900	900	94.5	116	180	292	416	520	665	860	985	1056	1180	1350	1737	1872	2142	2205



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