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Технические характеристики на никель-кадмиевые аккумуляторы для железных дорог серии SPL+

Trackside power
that's always there

Reliability, continuity and safety

Signaling and communication are complex and critical parts of a railroad's operating system. Reliability is paramount to guarantee the safe movements of trains and to provide effective control of trains and traffic at grade crossings. This means ensuring a highly reliable power supply for trackside signals, flashers, switches, remote monitoring and control, communications and other equipment.

Stationary batteries, housed in trackside bungalows and cabinets, play a vital role in ensuring continuity of suppling power to these critical signaling and communication operations including Positive Train Control and Communications Based Train Control systems. Batteries are also used to meet peak electricity demand and to provide backup power to all systems in case of an emergency.

SPL+ Ni-Cd (nickel-cadmium) batteries are optimized for the specific requirements of railroad trackside power. They are extremely reliable, require minimal maintenance, and cost less over their lifetime than comparable batteries.

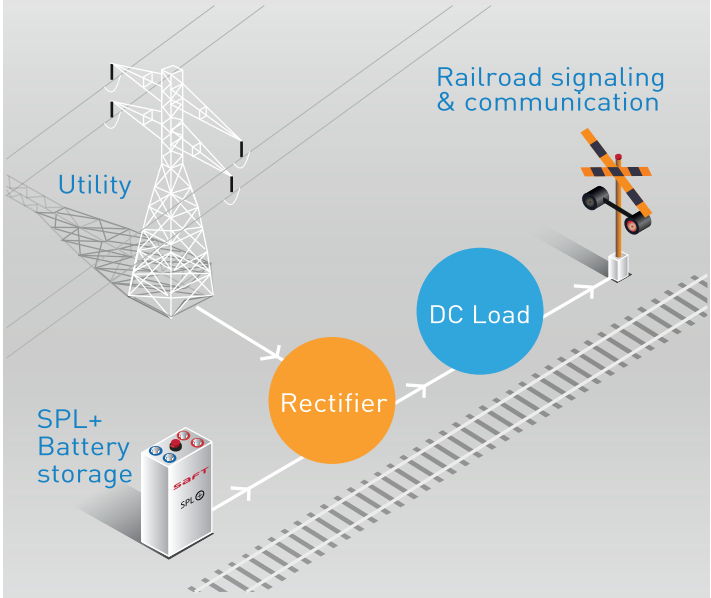
Your trusted partner for rail battery applications

has over 100 years experience in delivering well-proven Ni-Cd battery solutions optimized to ensure the total security and availability of multiple applications.

products and components are designed and manufactured to the very highest quality standards. SPL is operating in ten of thousands of locations accross North America, from Alaska to the Panama canal.

comprehensive global service provides expert support throughout every stage of your battery's life from initial concept through volume supply, installation and training to end-of-life recycling.

Typical signal power application



Reliability wherever you need it

Built for today's trackside equipment

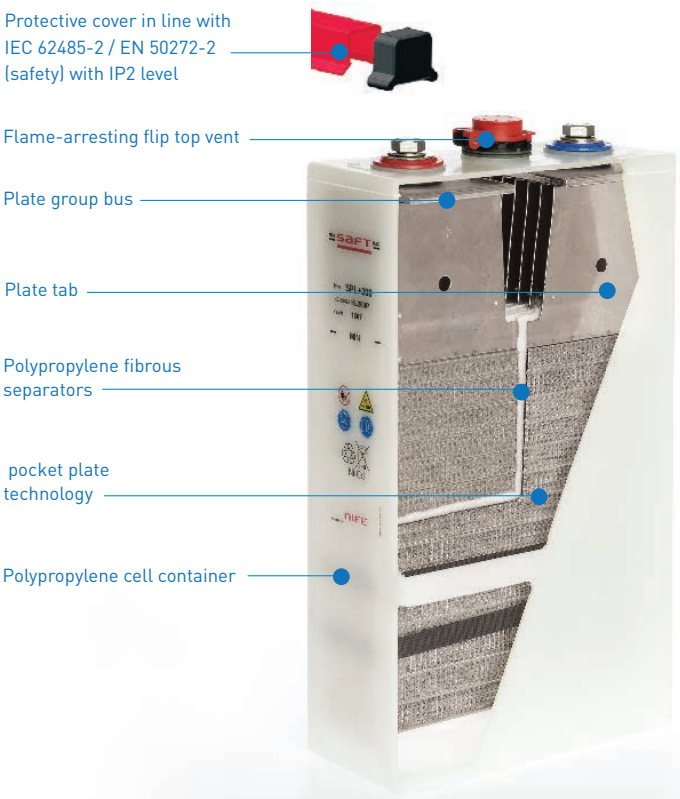
Today's trackside systems are increasingly all electronic: cabinets full of relays have been largely replaced by microprocessors and electronic circuitry along with relays, to support and operate the entire signal system.

Battery backup systems ensure continuity of power supply to these systems in the event of failure of the normal mains power supply. In railroad applications, this is vital to maintain the safe operation of trains, for good traffic control at crossings and to ensure the integrity of information about safety and control and for system management.

These trackside battery systems must be able to operate across a wide range of temperatures. They must offer a good, predictable lifetime, even at high temperatures, good low temperature performance and minimal maintenance requirements, without risk of sudden failures.

The stationary batteries must be capable of receiving their charge from the mains supply (continuous or intermittent) or from small solar panels or wind generators.

> "Over the lifetime of our trackside systems, it's clear that nickel-cadmium batteries offer far superior performance and optimized operational costs than equivalent lead acid types."



SPL+ Ni-Cd batteries help ensure complete system reliability and security by offering several advantages:

- lifetime in excess of 20 years
- infrequent and straightforward maintenance needs
- longer lifetime at higher operating temperature than lead acid batteries, together with superior low-temperature performance
- little or no need for replacement, due to long lifetime and reliability
- performance optimized for the duty cycle (cycling ability is well within the requirements of trackside applications)
- low Total Cost of Ownership, thanks to high reliability and low operating costs.

Performance
where it matters

Field-proven, robust nickel-cadmium pocket plate construction provides extremely reliable solutions for demanding railroad applications

SPL+ Ni-Cd batteries offer reliability even in the most demanding conditions:

- 20-plus year lifetime
- excellent electrical performance
- high resistance to electrical and mechanical abuse
- no "sudden-death", thermal runaway and cell dry-out as seen with VRLA batteries
- thousands of charge-discharge cycles while retaining excellent electrical performance, dependant on Depth Of Discharge (DOD).

SPL+ batteries offer ultra-low operating maintenance needs

Trackside batteries can be hundreds of miles from the nearest maintenance depot, and the cost of frequent inspection and maintenance visits over the battery's life can easily outweigh the purchase price. SPL+ Ni-Cd batteries reduce maintenance needs dramatically compared with lead acid designs:

- the high level of gas recombination is beyond the requirements of IEC 62259 (recombination level higher than 90 percent) and reduces water consumption and gas emissions
- one topping up interval during the entire battery life at + 20°C (+ 68°F) or + 40°C (+ 104°F)
- fast and simple charging within a narrow window for minimal downtime and maximum availability.

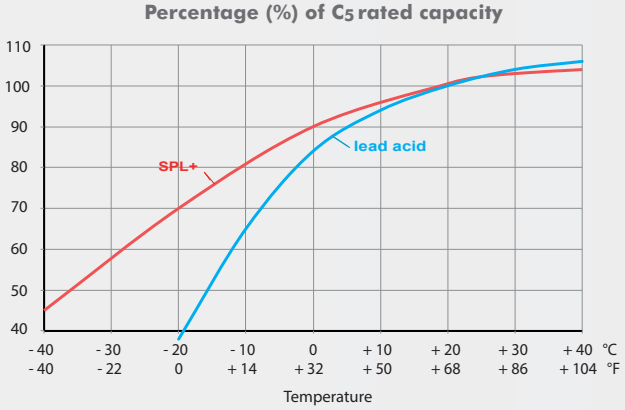
SPL+ batteries are able to perform in harsh conditions and remote areas

The temperature in an outdoor battery cabinet can be up to + 10°C (+ 18°F) or higher than the outside air. While high temperatures reduce the life of all batteries, SPL+ batteries cope better than the alternatives.

SPL+ batteries operate in ambient temperatures ranging from – 30°C (– 22°F) to + 40°C (+ 104°F), and are able to withstand extremes of – 40°C (– 40°F) to + 55°C (+ 131°F).

SPL+ batteries are able to operate with renewable energy sources.

SPL+ batteries outperform lead acid batteries at low temperatures

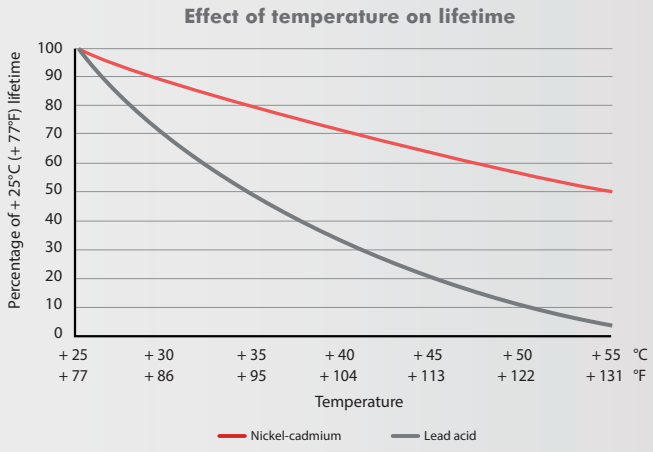


SPL+ batteries simplify handling and installation

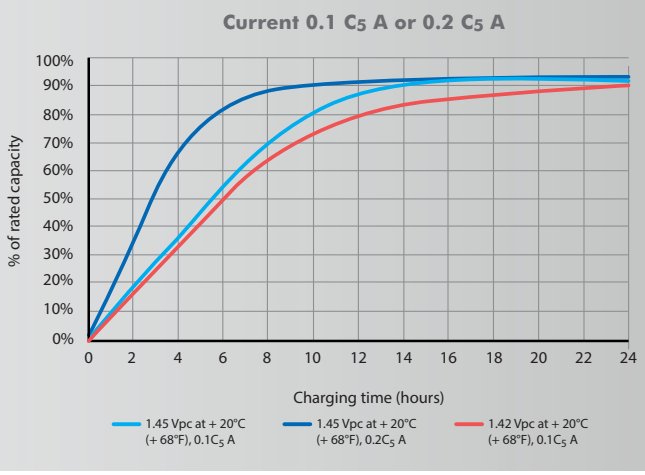
SPL+ batteries make transportation, installation and operation fast and easy:

- batteries are only delivered filled with electrolyte and in electrically charged condition
- batteries may be stored for up to two years in normal conditions, and in some circumstances also at higher temperatures
- cell containers are polypropylene with visible electrolyte levels and are equipped with flame arresting flip top vents
- design eliminates need for special handling equipment.

Ni-Cd batteries have superior high temperature performance compared with lead acid batteries



Available capacity after constant voltage charge



Proven performance and reliability

Dimensions

Cell type	Capacity C_5Ah	Height*		Width		Length		Approx. weight		Internal resistance	Terminal
		mm	in	mm	in	mm	in	Kg	lb	mOhm**	bolt per pole
SPL+80	80	349	13,74	192	7,56	68	2,68	6,8	15,0	1,94	M10
SPL+100	100	349	13,74	192	7,56	68	2,68	6,8	15,0	1,55	M10
SPL+130	130	349	13,74	192	7,56	68	2,68	7,5	16,5	1,19	M10
SPL+165	165	349	13,74	192	7,56	93	3,66	9,8	21,6	0,94	M10
SPL+200	200	349	13,74	192	7,56	93	3,66	10,4	22,9	0,78	M10
SPL+250	250	405	15,94	192	7,56	101	3,98	12,4	27,3	0,66	M10
SPL+290	290	405	15,94	192	7,56	130	5,12	16,0	35,3	0,57	2xM10
SPL+340	340	405	15,94	192	7,56	130	5,12	16,7	36,8	0,49	2xM10
SPL+380	380	400	15,75	195	7,68	146	5,75	18,4	40,6	0,43	2xM10
SPL+420	420	400	15,75	195	7,68	159	6,26	19,8	43,7	0,39	2xM10
SPL+470	470	400	15,75	195	7,68	171	6,73	21,8	48,1	0,35	2xM10
SPL+510	510	400	15,75	195	7,68	183	7,20	23,5	51,8	0,32	2xM10

*Height including IP2 terminal cover - ** Rigid connector included*

Charge voltages

• Two level charge:	High level: 1.45 ± 0.01 V/cell - Float level: 1.42 ± 0.01 V/cell
• Single level charge:	1.42 ± 0.01 V/cell

SPL+ batteries are designed in full compliance with the highest quality, safety and environmental standards

Electrical characteristics

- Certified IEC 62259 – Secondary cells and batteries containing alkaline or other non-acid electrolytes – Nickel-cadmium prismatic secondary single cells with partial gas recombination. SPL+ exceeds gas recombination requirements.
- Certified IEC 60623 – Secondary cells and batteries containing alkaline or other non-acid electrolytes – Vented nickel-cadmium prismatic rechargeable single cells.

Safety

- Complies with EN 50272-2/ IEC 62485-2 - Safety requirements for secondary batteries and battery installations – Part 2: Stationary batteries – The protective covers for terminals and connectors, the insulated cables are compliant with IP2 level protection against electrical shocks according to safety standard.

Quality

- ISO 9001 and ISO 14001.
- world-class continuous program.

Environment & recycling

- Fully recyclable.
- RoHS – Although batteries and accumulators are not within the scope of the RoHS directive, has taken voluntary measures to make sure that the substances forbidden by RoHS are not present in the battery, with the exception of the electrochemical core.
- REACH – The Group has adopted internal procedures to ensure conformity with the European REACH (Registration, Evaluation, Authorization and Restriction of Chemical Substances) regulations.

Performance data - All trackside applications

Performance after prolonged float charge of fully charged cells

Available Amperes at + 20°C ± 5°C (+ 68°F± 9°F) — Final voltage: 1.00 V/cell

Cell type	C_5 Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1,5	1	30	20	15	10	5	1	30	5	1
SPL+80	80	8,88	11,0	16,7	26,9	36,6	44,7	54,5	62,2	69,3	68,1	74,7	80,1	90,8	96,4	110	124
SPL+100	100	11,1	13,7	20,8	33,7	45,8	55,9	68,1	77,7	86,6	85,1	93,4	100	114	120	137	155
SPL+130	130	14,4	17,9	27,1	43,8	59,6	72,6	88,6	101	113	111	121	130	148	157	178	201
SPL+165	165	18,3	22,7	34,4	55,5	75,6	92,2	112	128	143	140	154	165	187	199	227	255
SPL+200	200	22,2	27,5	41,7	67,3	91,6	112	136	155	173	170	187	200	227	241	275	309
SPL+250	250	27,7	34,4	52,1	84,2	115	140	170	194	216	213	233	250	284	301	343	386
SPL+290	290	32,2	39,9	60,4	97,6	133	162	198	225	251	247	271	290	329	349	398	448
SPL+340	340	37,7	46,7	70,8	114	156	190	232	264	294	289	318	340	386	410	467	525
SPL+380	380	42,2	52,2	79,1	128	174	212	259	295	329	323	355	380	431	458	522	587
SPL+420	420	46,6	57,7	87,5	141	192	235	286	327	364	358	392	420	477	506	577	649
SPL+470	470	52,1	64,6	97,9	158	215	263	320	365	407	400	439	470	534	566	645	726
SPL+510	510	56,6	70,1	106	172	234	285	348	396	442	434	476	510	579	615	700	788

Available Amperes at + 20°C ± 5°C (+ 68°F± 9°F) — Final voltage: 1.05 V/cell

Cell type	C_5 Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1,5	1	30	20	15	10	5	1	30	5	1
SPL+80	80	8,43	10,4	16,5	24,5	32,1	38,0	43,8	51,3	56,4	57,5	59,6	65,7	77,9	81,9	95,6	106
SPL+100	100	10,5	13,0	20,6	30,6	40,1	47,5	54,8	64,1	70,5	71,9	74,4	82,1	97,4	102	119	132
SPL+130	130	13,7	16,9	26,8	39,7	52,1	61,8	71,2	83,3	91,6	93,5	96,8	107	127	133	155	172
SPL+165	165	17,4	21,5	34,0	50,4	66,2	78,5	90,4	106	116	119	123	135	161	169	197	218
SPL+200	200	21,1	26,0	41,2	61,1	80,2	95,1	110	128	141	144	149	164	195	205	239	264
SPL+250	250	26,3	32,5	51,4	76,4	100	119	137	160	176	180	186	205	243	256	299	330
SPL+290	290	30,5	37,7	59,7	88,6	116	138	159	186	204	209	216	238	282	297	346	383
SPL+340	340	35,8	44,3	70,0	104	136	162	186	218	240	245	253	279	331	348	406	449
SPL+380	380	40,0	49,5	78,2	116	152	181	208	243	268	273	283	312	370	389	454	502
SPL+420	420	44,2	54,7	86,4	128	168	200	230	269	296	302	313	345	409	430	502	555
SPL+470	470	59,5	61,2	96,7	144	189	223	258	301	331	338	350	386	458	481	561	621
SPL+510	510	53,7	66,4	105	156	205	242	279	327	359	367	380	419	497	522	609	674

Available Amperes at + 20°C ± 5°C (+ 68°F± 9°F) — Final voltage: 1.10 V/cell

Cell type	C_5 Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1,5	1	30	20	15	10	5	1	30	5	1
SPL+80	80	7,95	9,86	14,4	21,3	28,4	31,6	35,9	41,3	43,4	46,1	47,1	52,3	61,9	66,3	72,0	80,6
SPL+100	100	9,94	12,3	18,0	26,6	35,6	39,5	44,9	51,6	54,2	57,6	58,9	65,4	77,4	82,9	90,0	101
SPL+130	130	12,9	16,0	23,4	34,6	46,2	51,4	58,4	67,1	70,5	74,8	76,6	85,0	101	108	117	131
SPL+165	165	16,4	20,3	29,7	44,0	58,7	65,2	74,1	85,2	89,5	95,0	97,2	108	128	137	149	166
SPL+200	200	19,9	24,6	36,0	53,3	71,1	79,0	89,8	103	108	115	118	131	155	166	180	202
SPL+250	250	24,9	30,8	45,0	66,6	88,9	98,8	112	129	136	144	147	164	193	207	225	252
SPL+290	290	28,8	35,7	52,2	77,2	103	115	130	150	157	167	171	190	224	240	261	292
SPL+340	340	33,8	41,9	61,2	90,6	121	134	153	176	184	196	200	222	263	282	306	343
SPL+380	380	37,8	46,8	68,4	101	135	150	171	196	206	219	224	249	294	315	342	383
SPL+420	420	41,8	51,7	75,7	112	149	166	189	217	228	242	247	275	325	348	378	423
SPL+470	470	46,7	57,9	84,7	125	167	186	211	243	255	271	277	307	364	390	423	474
SPL+510	510	50,7	62,8	91,9	136	181	201	229	263	276	294	300	334	395	423	459	514

Available Amperes at + 20°C ± 5°C (+ 68°F± 9°F) — Final voltage: 1.14 V/cell

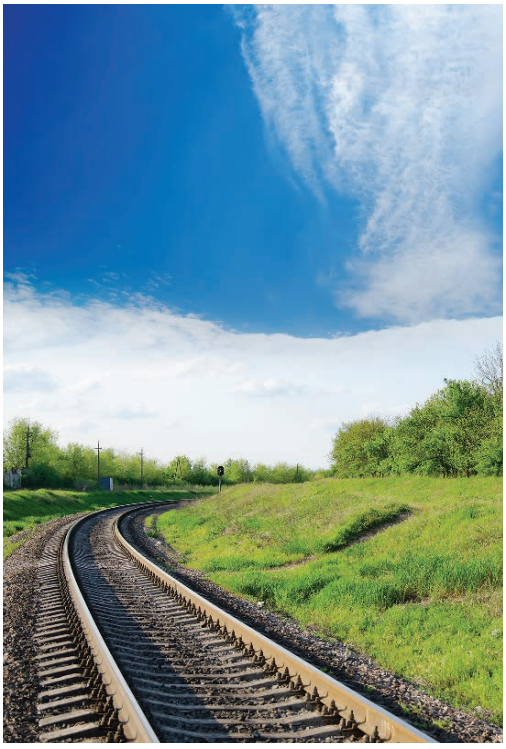
Cell type	C_5 Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1,5	1	30	20	15	10	5	1	30	5	1
SPL+80	80	7,38	9,23	12,4	18,3	22,9	23,6	26,3	28,2	31,0	32,5	33,8	38,9	46,9	50,7	58,6	66,2
SPL+100	100	9,22	11,5	15,5	22,9	28,7	29,6	32,9	35,3	38,8	40,6	42,2	48,6	58,6	63,3	73,3	82,7
SPL+130	130	12,0	15,0	20,1	29,8	37,3	38,4	42,8	45,8	50,5	52,7	54,9	63,2	76,1	82,3	95,3	108
SPL+165	165	15,2	19,0	25,6	37,8	47,3	48,8	54,3	58,2	64,0	66,9	69,7	80,2	96,6	104,5	121	136
SPL+200	200	18,4	23,1	31,0	45,8	57,4	59,1	65,8	70,5	77,6	81,1	84,4	97,2	117	126,7	147	165
SPL+250	250	23,0	28,9	38,7	57,2	71,7	73,9	82,2	88,1	97,0	101	106	121	146	158,3	183	207
SPL+290	290	26,7	33,7	44,9	66,4	83,2	85,7	95,4	102	113	118	122	141	170	184	213	240
SPL+340	340	31,3	39,2	52,7	77,8	97,5	100	112	120	132	138	144	165	199	215	249	281
SPL+380	380	35,0	43,9	58,9	87,0	109	112	125	134	147	154	160	185	223	241	279	314
SPL+420	420	38,7	48,5	65,1	96,2	120	124	138	148	163	170	177	204	246	266	308	347
SPL+470	470	43,3	54,2	72,8	108	135	139	155	166	182	191	198	228	275	298	345	389
SPL+510	510	47,0	58,9	79,0	117	146	151	168	180	198	207	215	248	299	323	374	422

the highest standards of environmental stewardship

As part of its environmental commitment, gives priority to recycled raw materials over virgin raw materials, reduces its manufacturing plants' air and water releases year after year, minimizes water usage, reduces fossil energy consumption and associated CO_2 emissions, and ensures that its customers have recycling solutions for their spent batteries.

Regarding industrial nickel-based batteries, has had partnerships for many years with collection companies in most EU and North American countries. This collection network receives and dispatches our customers' batteries at the end of their lives to fully approved recycling facilities, in compliance with the laws governing trans-boundary waste shipments. This collection network meets the requirements of the EU batteries directive. A list of our collection points is available on our web site.

In other countries, assists users of its batteries in finding environmentally sound recycling solutions. Please contact your sales representative for further information.



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