



PerfectRail™ Batteries: Technical Data

LEAD-ACID BATTERY TECHNOLOGY FOR ROLLING STOCK APPLICATIONS

PerfectRail™ batteries deliver a high level of power and reliability for all rolling stock railway vehicle applications. Featuring low-maintenance, low-antimony tubular plate cells, PerfectRail™ batteries are produced in accordance with the DIN standard and approved for railway vehicle use. The low antimony design reduces internal resistance, minimizing heat generation and significantly reducing the need for water topping. Enjoy dependable performance with less upkeep.

PerfectRail™ batteries are comprised of 2V lead acid flooded cells with an automatic water refill system that makes watering maintenance easy, and connectors that simplify battery replacement. Flexible connectors with adapted cross section also allow the batteries to carry high currents.

- **High Operational Reliability:** Expertly designed to the highest specifications, ensuring consistent and dependable performance you can trust.
- **Shock and Vibration Resistant:** Built to withstand the toughest rail environments, offering superior durability and peace of mind on every journey.
- **High Performance:** Delivers exceptional longevity with consistent power and long-term value.

HAWKER
PerfectRail™
BATTERIES

KEEPING YOU ON TRACK



Cell Range

Cell type	Nominal cell voltage	Nominal capacity 1.7 Vpc @30°C	Cell length	Total cell height		Cell width	Cell weight ±2%	Charge current IU or IUOU	Internal resistance	Short circuit current	Heat loss during float service at 20°C
				Height of cell	Over terminal cover						
#	Vdc	C _g Ah	mm	mm	mm	mm	kg	Wh	Wh	kA	W
2PzS110	2	110	47	340	370	198	8.5	20-30	1.85	1.08	0.15
2PzS140	2	140	47	405	435	198	10	25-38	1.6	1.26	0.19
3PzS165	2	165	65	340	370	198	12	30-45	1.23	1.62	0.23
3PzS210	2	210	65	405	435	198	14.2	38-57	1.07	1.9	0.29
4PzS220	2	220	83	340	370	198	15.4	40-60	0.93	2.16	0.3
5PzS275	2	275	101	340	370	198	19	50-75	0.74	2.7	0.38
4PzS280	2	280	83	405	435	198	18.4	51-76	0.8	2.53	0.38
6PzS330	2	330	119	340	370	198	23	60-90	0.62	3.24	0.45
5PzS350	2	350	101	405	435	198	22.6	64-95	0.64	3.16	0.48
7PzS385	2	385	137	340	370	198	26	70-105	0.53	3.78	0.53
6PzS420	2	420	119	405	435	198	26.7	76-115	0.53	3.79	0.57
8PzS440	2	440	155	340	370	198	29.5	80-120	0.46	4.32	0.6
7PzS490	2	490	137	405	435	198	31.3	89-134	0.46	4.42	0.67
8PzS560	2	560	155	405	435	198	35.1	102-153	0.4	5.06	0.76

Electrical Data

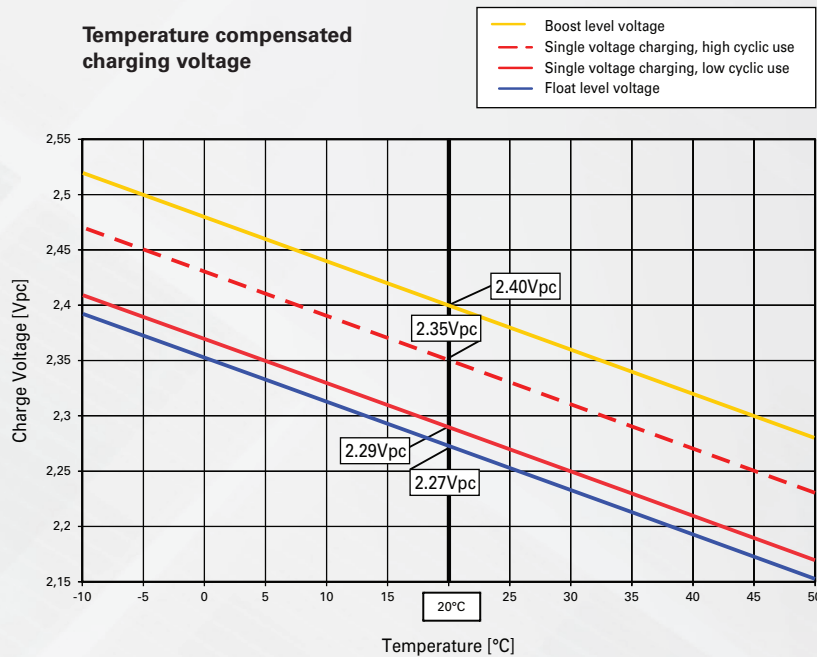
Conversion to capacity at 25°C	103% of current power at 20°C
Self discharge at 20°C	Max 6% / month

Mechanical Data

Number of terminals	1 + / 1-
Dimension of terminal screw hole	M10 x 22 deep, female thread
Torque terminal screw	25Nm ±2
Terminal insulation class according to IEC/EN 60529	IP 20
Diameter of diagnostic hole for voltage probe	2 mm
Maximum cable cross section	95mm ²
Connector and terminal connection	Use flexible EVO or PerfectPlus – connectors
Connector (copper, tin-coated and insulated)	For Rolling stock flexible connectors are recommended
Shock & Vibration rating	Category 1, Class B (IEC 61373)

Environmental Data

Installation	Vertical	
Cell assembly distance	Not required; for higher loads 5-10mm recommended for cooling	
Material of case/ cover	PP-FR	PP (on request)
Flame retardancy rating	EN45545-2 I2 / F1 (NF F 16-101)	HB (UL94)
Rail service life expected at 15°C	6 years (max 30% DoD / day)	
Cycle Endurance (DB Test : 30% DoD/8h)	>80% Cnom after 1300 cycles	
Design life	12+ Long life, according Eurobat classification	
Shipping name	Batteries, wet, filled with acid	



Temperature compensated charging voltage

Temperature in °C	Percentage of the rated capacity (C _g)
40	113
35	109
30	106
25	103
20	100
15	97
10	93
5	89
0	84
-5	77
-10	70
-15	62
-20	52
-25	40
-30	29

*Estimated Values
Should be verified with actual load profile*

Battery Installation and Operation

Recommended charging for rolling stock applications (standby parallel operation)	IU0U- charging : 2 level charging (acc. DIN 41773) with current limitation and temperature compensation
Boost level voltage setting at 20°C	2.40 Vpc (Volt per cell)
Lower or single level voltage setting at 20°C	2.29 ... 2.35 Vpc (low ... high cyclic use)
Charge current for IU or IU0U-charging (DIN 41773)	See specific cell type
Voltage compensation in function of temperature	- 4 mV/K per cell
Float level voltage setting at 20°C (± 1%)	2.27 Vpc (valid for long term trickle charging at workshop and storage)
Air exchange	According to EN IEC 62485-2 $Q = 0.05 * N_{cells} * I_{gas} * C_{AhC10} * 10^{-3} [m^3/h]$ $I_{gas} = 5$ (at 2.29 Vpc) ; $I_{gas} = 20$ (at 2.40 Vpc)
Water refill	manual / optional 'aquamatic' system
Preferred operating temperature range	Between 15°C- 25°C
Maximum long term operating temperature	+40°C with ventilation assured (reduced service life)
Maximum short term operating temperature (< 3h)	+50°C with ventilation assured (reduced service life)
Minimum operating and storage temperature	- 40°C (in charged condition)