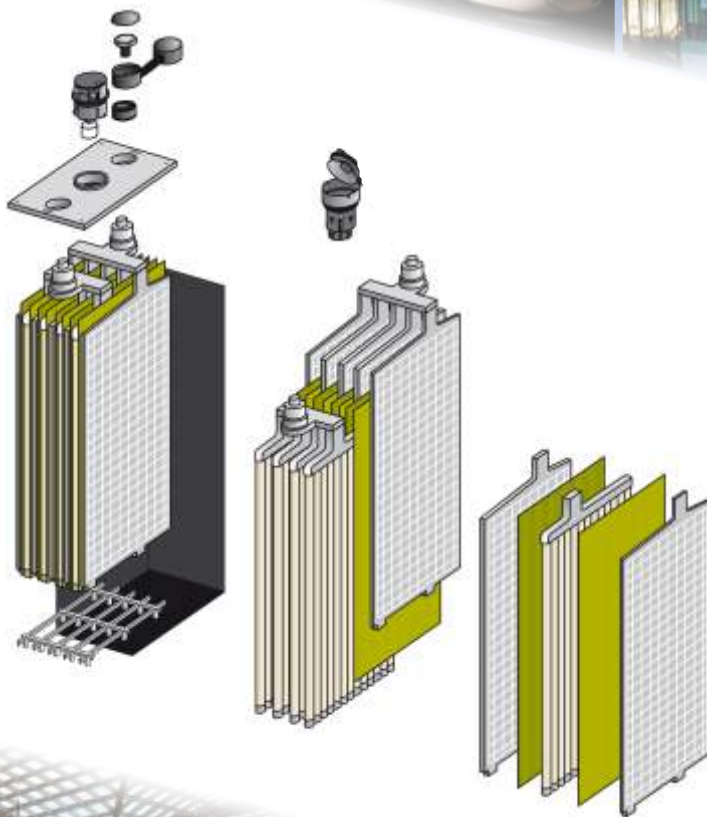


# PerfectRail™ 7PzS385



*Lead-Acid Battery Technology  
for Rolling Stock Applications*



*Robust cell construction*

*Low maintenance*

*Shock and vibration resistant*

*Very high cycle performance*

*V-0 Flame retardant*



*Keeping you on track*

# Hawker® PerfectRail™ 7PzS385

## Technical specifications

Part number: 3563047

### Electrical Data

Nominal voltage	2 V
Number of cells	1 (Lead-Acid tubular Technology)
Specific gravity of acid	1.24 kg/l (at 30°C) on request 1.27 and 1.29 available
Rated capacity C <sub>10</sub> to 1.80 Vpc at 20 °C	399 Ah
Rated capacity C <sub>5</sub> to 1.70 Vpc at 30 °C	385 Ah
Current/Power for 0.25 h back-up time 1.60 Vpc 20 °C	509.7 A / 837 W
Current/Power for 0.5 h back-up time 1.60 Vpc 20 °C	370.3 A / 630 W
Current/Power for 1.0 h back-up time 1.60 Vpc 20 °C	236.6 A / 423 W
Current/Power for 3.0 h back-up time 1.70 Vpc 20 °C	105.2 A / 197 W
Current/Power for 5.0 h back-up time 1.75 Vpc 20 °C	70.4 A / 134 W
Current/Power for 8.0 h back-up time 1.75 Vpc 20 °C	49.0 A / 95 W
Current/Power for 10.0 h back-up time 1.80 Vpc 20 °C	39.9 A / 77 W
Current/Power for 24.0 h back-up time 1.80 Vpc 20 °C	19.0 A / 37 W
Conversion to capacity at 25 °C	103 % of Current/Power at 20°C
Internal resistance	0.53 mΩ
Short circuit current	3.78 kA
Self discharge at 20 °C	max. 6% / Month
Heat loss during float service at 20°C	≈ 0.53 W

### Mechanical Data

Weight	26 kg ±2%
Height of cell / over terminal cover	340 mm / 370 mm
Width	198 mm
Depth	137 mm
Number of terminals	1 + / 1 -
Dimension of terminal screw hole	M10 x 22 deep, female thread
Torque terminal screw	25 Nm ±2
Terminal insulation class according to IEC/EN 60529	IP 20
Diameter of diagnostic hole for voltage probe	2 mm
Maximum cable cross-section	95 mm <sup>2</sup>
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 (according)	Category 1, Class B (IEC 61373:2011)

### Environmental Data

Installation	vertically
Cell assembly distance	not required; for higher loads 5-10 mm recommended for cooling
Material of case/cover; Flame retardancy rating (according to)	PP - FR or PP (on request) V-0 (UL94); I2 / F1 (NF F 16-101) or HB (UL94)
Rail service life expected at 15 °C	6 Years (max 30% DoD / day)
Cycle Endurance (DB Test : 30% DOD/8h)	> 80% C <sub>nom</sub> after 1'300 cycles
Design life	12+ Long Life, according Eurobat Classification
Shipping name	Batteries, wet, filled with acid

# Hawker® PerfectRail™ 7PzS385

## Operating specifications

Figure 1



Figure 2

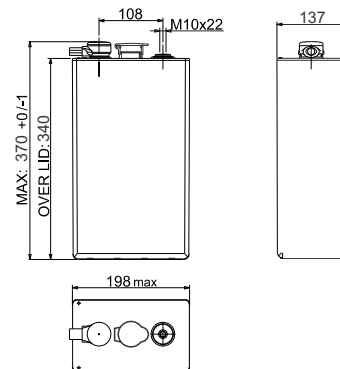
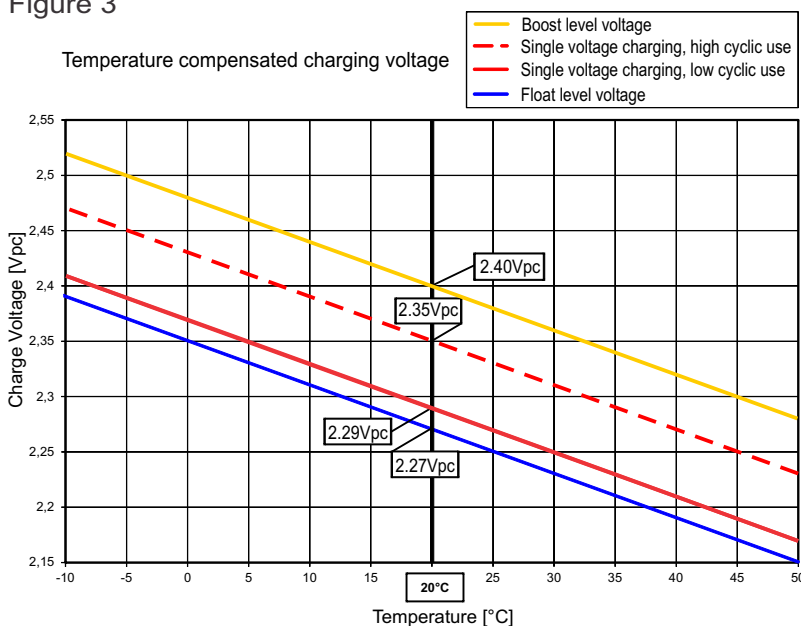


Figure 3



Temperature in °C	Percent of the rated capacity (C <sub>5</sub> )
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)	70 ... 105 A (minimum for cyclic use: 88 A)
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 50272-2 : 2001 $Q = 0.05 * N_{cells} * I_{gas} * C_{AhC10} * 10^{-3} [m^3/h]$ $I_{gas} = 5$ (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)

# Hawker® PerfectRail™ 7PzS385

## Discharge data per cell

### Constant current performance [Ampere] to the defined end of discharge voltage

Voltage [Vpc]	Temp	Discharge time [h:min]																		
		0:01	0:05	0:10	0:15	0:20	0:25	0:30	0:40	0:50	1:00	1:30	2:00	3:00	4:00	5:00	8:00	10:00	12:00	24:00
1.90	20°C	268.0	267.9	267.9	249.0	230.6	215.7	202.5	181.3	165.0	151.3	122.7	103.9	80.6	66.9	57.5	40.9	34.4	29.7	16.5
	25°C	268.0	268.0	267.9	253.4	235.8	220.8	207.8	186.5	170.1	156.3	127.0	107.7	83.5	69.2	59.5	42.3	35.6	30.7	17.0
1.85	20°C	361.1	361.1	330.1	301.0	277.4	257.6	241.0	213.9	193.0	176.3	141.0	118.4	90.7	74.3	63.7	45.0	37.7	32.6	18.1
	25°C	361.1	361.1	335.6	307.0	284.3	264.7	248.0	220.8	199.7	182.6	146.5	123.0	94.3	77.2	66.0	46.6	39.1	33.7	18.7
1.80	20°C	453.2	436.0	385.9	348.8	319.8	295.4	275.2	242.2	216.9	196.8	155.5	129.3	97.9	79.7	67.8	47.6	39.9	34.4	19.0
	25°C	453.2	441.3	392.9	357.2	328.3	304.2	284.2	251.0	225.3	204.7	162.0	134.9	102.0	82.9	70.4	49.3	41.3	35.6	19.7
1.75	20°C	550.0	499.4	438.8	394.1	358.3	329.3	305.1	266.5	236.5	213.3	166.1	137.1	102.8	83.2	70.4	49.0	40.9	35.2	19.4
	25°C	550.0	506.2	447.9	404.3	369.2	340.4	316.1	277.0	246.7	222.7	173.7	143.3	107.4	86.7	73.3	50.9	42.5	36.5	20.0
1.70	20°C	646.3	559.9	488.4	435.4	393.7	359.5	330.9	286.3	252.4	225.8	173.6	142.3	105.2	84.3	71.0	49.0	40.9	35.2	19.4
	25°C	646.3	568.4	499.2	448.2	406.9	372.8	344.1	298.6	264.1	236.6	182.0	149.0	110.1	88.0	74.0	50.9	42.5	36.5	20.0
1.65	20°C	679.1	615.8	535.0	474.3	425.5	385.5	352.7	301.7	264.3	235.0	176.5	142.8	105.2	84.3	71.0	49.0	40.9	35.2	19.4
	25°C	679.1	625.8	548.2	489.4	441.3	401.4	368.3	316.0	277.3	247.0	185.8	150.0	110.1	88.0	74.0	50.9	42.5	36.5	20.0
1.60	20°C	679.1	667.2	578.4	509.7	453.5	407.8	370.3	313.5	269.7	236.6	176.5	142.8	105.2	84.3	71.0	49.0	40.9	35.2	19.4
	25°C	679.1	678.9	593.4	527.0	471.9	426.2	388.1	329.5	285.0	250.1	185.8	150.0	110.1	88.0	74.0	50.9	42.5	36.5	20.0

### Constant power performance [Watt per cell] to the defined end of discharge voltage

Voltage [Vpc]	Temp	Discharge time [h:min]																		
		0:01	0:05	0:10	0:15	0:20	0:25	0:30	0:40	0:50	1:00	1:30	2:00	3:00	4:00	5:00	8:00	10:00	12:00	24:00
1.90	20°C	508.1	508.1	508.1	474.7	441.3	413.2	388.9	349.3	317.5	292.0	238.0	202.6	157.7	131.3	113.4	80.8	68.2	59.0	32.7
	25°C	508.0	508.0	508.0	482.9	450.3	422.3	398.6	359.3	327.3	301.2	246.2	209.6	163.5	135.7	117.3	83.6	70.4	60.8	33.5
1.85	20°C	664.3	664.2	611.6	558.8	517.3	481.7	452.0	403.5	365.5	334.7	268.9	227.0	175.5	143.8	124.0	88.0	74.0	64.1	35.5
	25°C	664.2	664.2	620.8	569.8	528.8	494.3	464.5	415.7	377.8	346.4	279.1	235.8	182.3	149.4	128.4	91.2	76.6	66.2	36.5
1.80	20°C	814.7	786.0	697.1	632.8	582.2	539.7	504.3	447.0	403.3	367.8	291.5	244.6	187.0	152.8	130.3	92.3	77.4	67.0	37.2
	25°C	814.8	795.1	709.4	647.0	596.4	555.3	519.8	461.9	417.9	381.7	303.9	254.7	194.6	159.1	135.1	95.7	80.2	69.3	38.2
1.75	20°C	961.3	874.5	772.1	697.2	637.7	589.1	548.2	481.7	431.6	392.1	308.5	255.9	194.0	158.2	133.9	94.6	79.0	68.3	37.7
	25°C	961.3	886.4	787.2	714.2	656.2	607.6	566.5	500.0	448.4	408.1	322.3	267.1	202.2	164.9	139.5	98.2	82.1	70.7	38.8
1.70	20°C	1097.4	955.0	836.1	751.7	684.6	629.7	583.4	509.2	451.8	409.1	319.3	262.6	197.4	160.0	134.8	94.7	79.0	68.3	37.7
	25°C	1097.4	969.6	853.8	771.9	706.1	650.8	604.8	530.1	471.8	426.8	334.3	275.0	206.5	167.0	140.7	98.3	82.1	70.7	38.8
1.65	20°C	1142.6	1022.9	892.8	797.8	722.9	661.5	610.7	529.7	467.3	419.7	324.5	263.9	197.4	160.0	134.8	94.7	79.0	68.3	37.7
	25°C	1142.6	1038.8	914.0	820.7	747.2	685.8	634.7	552.8	489.4	438.9	340.9	277.3	206.5	167.0	140.7	98.3	82.1	70.7	38.8
1.60	20°C	1142.6	1084.9	941.2	836.6	753.5	685.5	630.4	543.5	477.0	423.1	324.5	263.9	197.4	160.0	134.8	94.7	79.0	68.3	37.7
	25°C	1142.6	1093.0	964.4	863.1	780.9	713.3	657.1	568.6	501.1	445.4	340.9	277.3	206.5	167.0	140.7	98.3	82.1	70.7	38.8

Constant discharge values without voltage loss in connectors and cables!  
Our technical support offers to calculate the discharge curve for a specific load profile.



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