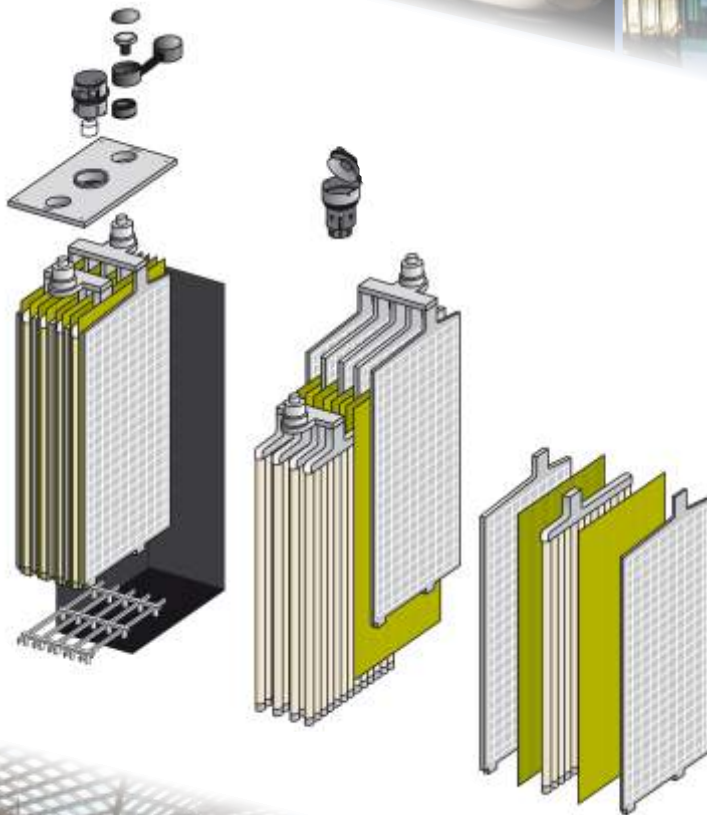


PerfectRail™ 6PzS420



*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™ 6PzS420

Technical specifications

Part number: 3563128

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 ₁₀ to 1.80 Vpc at 20 °C	436 Ah
Rated capacity C ₅ to 1.70 Vpc at 30 °C	420 Ah
Current/Power for 0.25 h back-up time 1.60 Vpc 20 °C	533.8 A / 871 W
Current/Power for 0.5 h back-up time 1.60 Vpc 20 °C	396.7 A / 670 W
Current/Power for 1.0 h back-up time 1.60 Vpc 20 °C	259.1 A / 459 W
Current/Power for 3.0 h back-up time 1.70 Vpc 20 °C	114.9 A / 215 W
Current/Power for 5.0 h back-up time 1.75 Vpc 20 °C	76.5 A / 145 W
Current/Power for 8.0 h back-up time 1.75 Vpc 20 °C	53.3 A / 102 W
Current/Power for 10.0 h back-up time 1.80 Vpc 20 °C	43.6 A / 85 W
Current/Power for 24.0 h back-up time 1.80 Vpc 20 °C	21.3 A / 44 W
Conversion to capacity at 25 °C	103 % of Current/Power at 20°C
Internal resistance	0.53 mΩ
Short circuit current	3.79 kA
Self discharge at 20 °C	max. 9% / Month
Heat loss during float service at 20°C	≈ 0.57 W

Mechanical Data

Weight	26.7 kg ±2%
Height of cell / over terminal cover	405 mm / 435 mm
Width	198 mm
Depth	119 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 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 (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 _{nom} after 1'300 cycles
Design life	12+ Long Life, according Eurobat Classification
Shipping name	Batteries, wet, filled with acid

Hawker® PerfectRail™ 6PzS420

Operating specifications

Figure 1



Figure 2

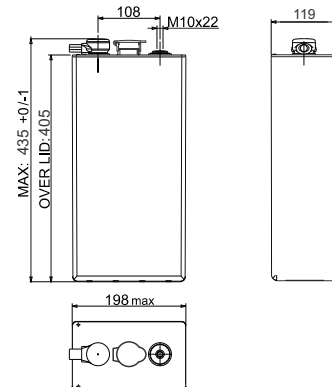
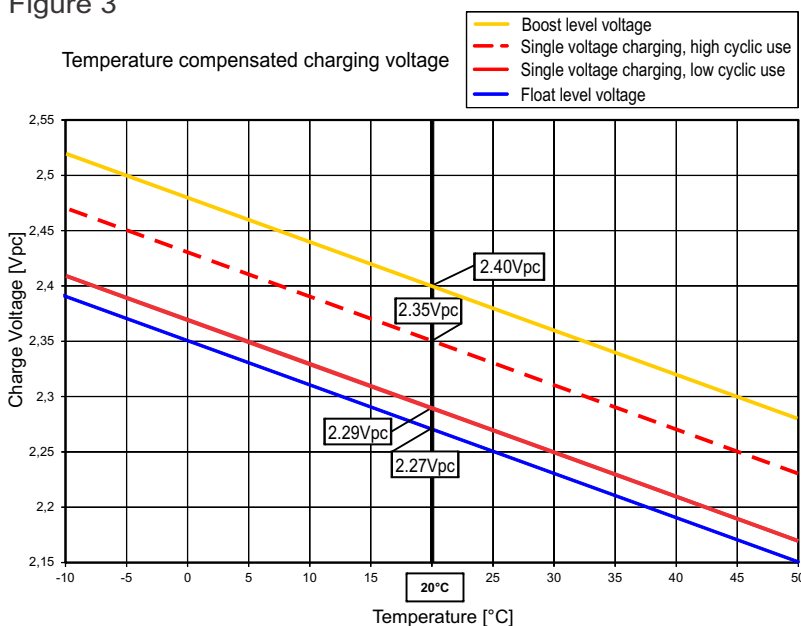


Figure 3



Temperature in °C	Percent of the rated capacity (C ₅)
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)	76 ... 115 A (minimum for cyclic use: 95 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™ 6PzS420

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	258.5	258.5	258.5	251.9	235.6	221.4	209.0	188.5	172.2	158.6	129.4	110.4	86.2	71.8	62.0	44.5	37.7	32.7	18.6
	25°C	258.5	258.5	258.5	255.9	240.1	226.1	214.0	193.5	177.2	163.5	133.7	114.2	89.3	74.3	64.1	46.0	38.9	33.7	19.1
1.85	20°C	352.0	352.0	333.4	307.0	285.1	266.1	250.2	224.0	203.2	186.1	149.9	126.4	97.4	80.1	68.7	48.9	41.3	35.8	20.3
	25°C	352.0	352.0	338.1	312.7	291.2	272.8	256.8	230.8	209.9	192.6	155.5	131.2	101.1	83.0	71.2	50.6	42.7	37.0	20.8
1.80	20°C	449.2	436.3	391.5	358.0	330.6	307.9	288.2	255.2	229.6	209.2	166.3	138.9	105.7	86.2	73.4	51.8	43.6	37.8	21.3
	25°C	449.2	441.1	397.9	365.4	338.4	315.9	296.8	264.0	238.0	217.2	173.1	144.6	110.1	89.7	76.3	53.7	45.2	39.1	21.9
1.75	20°C	545.8	502.2	447.5	406.1	373.0	345.2	321.4	282.5	252.1	228.1	178.9	148.1	111.6	90.4	76.5	53.3	44.7	38.6	21.6
	25°C	545.8	508.3	455.5	415.6	383.0	355.3	332.0	293.2	262.4	237.8	186.8	154.7	116.5	94.3	79.7	55.4	46.3	39.9	22.2
1.70	20°C	640.0	565.4	500.6	451.6	412.0	378.7	350.5	305.4	270.5	242.9	188.0	154.5	114.9	92.0	77.3	53.3	44.7	38.6	21.6
	25°C	640.0	572.8	510.4	463.0	424.4	391.5	363.4	317.9	282.5	254.2	196.9	161.8	120.3	96.1	80.6	55.4	46.3	39.9	22.2
1.65	20°C	731.2	625.8	550.9	494.4	447.7	408.5	375.7	323.8	284.9	254.2	193.0	156.1	114.9	92.0	77.3	53.3	44.7	38.6	21.6
	25°C	735.3	634.7	562.7	507.8	462.5	424.1	391.1	338.4	298.5	266.7	203.3	164.0	120.3	96.1	80.6	55.4	46.3	39.9	22.2
1.60	20°C	750.3	682.7	598.9	533.8	479.5	434.2	396.7	338.3	295.6	259.1	193.0	156.1	114.9	92.0	77.3	53.3	44.7	38.6	21.6
	25°C	750.3	692.9	612.7	550.1	497.4	452.6	414.6	354.8	310.5	274.0	203.3	164.0	120.3	96.1	80.6	55.4	46.3	39.9	22.2

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	488.6	488.6	488.5	480.0	449.5	423.1	400.4	361.8	330.9	305.9	250.6	214.7	168.5	141.0	121.8	88.3	76.0	66.7	38.7
	25°C	488.6	488.6	488.6	487.2	457.5	432.1	409.3	371.4	340.5	314.6	259.0	221.7	174.6	145.7	126.1	90.9	78.1	68.5	39.7
1.85	20°C	646.8	646.8	616.0	570.0	530.3	497.0	468.4	421.4	383.4	352.0	285.4	241.6	187.9	154.5	133.4	95.4	81.6	71.8	41.8
	25°C	646.7	646.7	624.4	579.6	541.8	509.2	480.1	433.3	395.4	364.1	295.5	250.9	195.1	160.4	138.1	98.7	84.1	73.9	42.9
1.80	20°C	806.7	784.2	705.3	647.1	599.8	560.4	526.3	470.0	425.5	389.4	310.9	261.9	201.4	164.9	140.9	99.9	84.7	74.6	43.6
	25°C	806.8	792.3	716.5	659.8	613.3	574.2	541.1	485.0	440.3	403.5	323.6	272.5	209.4	171.6	146.1	103.5	87.5	76.9	44.7
1.75	20°C	951.9	878.9	786.1	716.2	660.6	614.2	574.4	508.4	458.4	417.7	330.6	275.6	209.9	171.5	145.4	102.3	86.1	75.6	44.0
	25°C	952.0	888.7	800.2	731.9	677.7	631.6	592.3	526.5	475.3	434.1	344.9	287.3	218.6	178.7	151.4	106.3	89.3	77.9	45.2
1.70	20°C	1086.8	961.4	855.9	777.2	713.3	659.7	614.2	540.1	482.2	437.9	343.8	284.1	214.6	174.1	146.7	102.4	86.1	75.6	44.0
	25°C	1086.8	973.9	871.2	796.6	733.2	680.5	635.4	560.9	502.0	456.1	359.6	297.0	224.3	181.7	153.1	106.5	89.3	77.9	45.2
1.65	20°C	1208.9	1036.7	915.7	828.2	757.0	696.8	646.1	563.9	500.4	451.3	352.2	286.8	214.6	174.1	146.7	102.4	86.1	75.6	44.0
	25°C	1212.4	1050.3	934.3	849.1	779.9	720.8	669.8	587.2	522.8	471.2	369.0	301.3	224.6	181.7	153.1	106.5	89.3	77.9	45.2
1.60	20°C	1229.8	1100.1	969.4	871.3	791.9	725.6	669.9	581.2	513.4	458.9	352.4	286.8	214.6	174.1	146.7	102.4	86.1	75.6	44.0
	25°C	1232.0	1115.8	991.4	895.3	818.1	752.7	696.5	606.9	537.5	482.2	370.1	301.3	224.6	181.7	153.1	106.5	89.3	77.9	45.2

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



Global & Americas
Headquarters
EnerSys
2366 Bernville Road
Reading,
Pennsylvania 19605
USA
Tel. + 1-610-208-1991

EMEA
Headquarters
EH Europe GmbH
Löwenstrasse 32
8001 Zürich
Switzerland
Tel: +41 (0)44 215 74 10
Fax: +41 (0)44 215 74 11

EH Europe GmbH
PDAC EMEA
Hagnastrasse 27
4132 Muttenz
Switzerland
Tel: +41 61 706 36 36
Fax: +41 61 706 36 37