



The **WISE** Choice

## EASTMAN WORLD

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Welcome to Eastman World - Your Global Partner in Energy Solutions!



## AGM VRLA BATTERY

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HIGH RATE SERIES



# AGM VRLA High Rate Series

## 5Ah ~ 155Ah

### Certifications



### Characteristics

- Power range: 21W to 520W.
- Available in: 12V blocks.
- Self-discharge per month:  $\leq 3\%$  at 25°C.
- High performance at high current discharges over 2°C.
- EUROBAT design life:  
12V  $\leq 110$ W: 3 - 5 years, Standard Commercial.  
12V  $> 110$ W: 10/12 years, Long Life.
- Operation temperature range: - 20°C to + 50°C .
- Recommended operation temperature: 25°C.

### Introduction

Eastman High Rate series batteries are specially designed for applications that require high power output. With their high-power density and low internal resistance, the HR series are the right choice for your most demanding applications.

### Product Features

- Operation at a low internal pressure.
- Positive and negative plates in lead-calcium-tin alloy.
- Superior energy density.
- Very high power output.
- Container available in flame retardant (UL 94-V0).

### Application Scenarios

UPS, High-power UPS, Data Centers, Telecommunication & Electric Power Systems.

### Product Specifications

Battery Model	Nominal Voltage [V]	Rated Power [W/cell] @15min 1.67V/cell, 25°C	Rated Capacity [Ah]		Internal Resistance [mΩ]	Terminal Type	Terminal Location	Design Life [years]		Weight [kg]	Length [mm]	Width [mm]	Height [mm]	Total Height [mm]
			20Hr 1.80V/cell					JIS 25°C	EUROBAT 20°C					
EM12-21W-HR	12	21	5		23.0	T1/T2	C	5	3-5	1.62±4%	90±1	70±1	101±1	107±1
EM12-24W-HR	12	24	6		19.0	T1/T2	F	5	3-5	1.94±4%	151±1.5	51±1	94±1	99±1
EM12-34W-HR	12	34	9		14.0	T1/T2	F	5	3-5	2.60±4%	151±1.5	65±1	94±1	100±1
EM12-51W-HR	12	51	12		11.0	T1/T2	F	5	3-5	4.00±4%	151±1.5	98±1	95±1	101±1
EM12-76W-HR	12	76	18		12.0	T12	D	5	3-5	5.80±3%	181±2	77±1	167±1	167±2
EM12-100W-HR	12	100	28		9.0	T12	D	5	3-5	8.80±3%	166±2	175±2	125±2	125±2
EM12-110W-HR	12	110	28		9.0	T14	D	5	3-5	8.80±3%	166±2	126±2	174±2	174±2
EM12-130W-HR	12	130	35		8.0	T14	C	10	10/12	11.50±3%	195±2	130±2	155±2	167±2
EM12-160W-HR	12	160	48		7.0	T14	D	10	10/12	14.30±3%	197±2	165±2	170±2	170±2
EM12-200W-HR	12	200	58		6.5	T14	C	10	10/12	17.30±3%	230±2	138±2	211±2	215±2
EM12-280W-HR	12	280	80		5.0	T14	C	10	10/12	25.30±3%	260±2	168±2	211±2	215±2
EM12-330W-HR	12	330	100		5.0	T14	C	10	10/12	28.50±3%	306±2	169±2	211±2	215±2
EM12-390W-HR	12	390	115		4.0	T16	C	10	10/12	32.70±3%	330±2	171±2	214±2	220±2
EM12-475W-HR	12	475	145		3.8	T16	C	10	10/12	44.00±3%	342±2	172±2	280±2	285±2
EM12-520W-HR	12	520	155		3.4	T16	C	10	10/12	47.00±3%	342±2	172±2	280±2	285±2

# Technical Information

## Charging & Discharging | Characteristics & Cycle Life

### Charge Voltage & Charge Current

Ambient Temperature: 25°C

Usage	Standby Use				Cycle Use			
	2V Cell	4V Battery	6V Battery	12V Battery	2V Cell	4V Battery	6V Battery	12V Battery
Charge Voltage (V)	2.25-2.30	4.50-4.60	6.75-6.90	13.5-13.8	2.40-2.50	4.80-5.00	7.25-7.50	14.5-15.0
Max Charge Current (A)	0.3C*	0.3C	0.3C	0.3C	0.3C	0.3C	0.3C	0.3C
Max Charge Current HR (A)	0.08P*	0.08P	0.08P	0.08P	0.08P	0.08P	0.08P	0.08P

### Discharge Voltage & Final Voltage

Ambient Temperature: 25°C

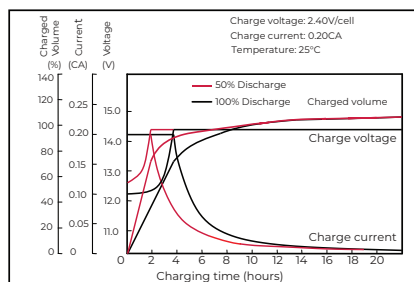
Discharge Current (A)	Final Voltage (V)			
	2V Battery	4V Battery	6V Battery	12V Battery
0.05C <sub>20</sub>	1.75	3.50	5.35	10.50
0.1C <sub>10</sub> ~ 0.25C <sub>10</sub>	1.80	3.60	5.40	10.80
0.55C <sub>20</sub>	1.75	3.50	5.25	10.50
1C <sub>10</sub> ~ 3C <sub>10</sub>	1.60	3.20	4.80	9.60

### Notes

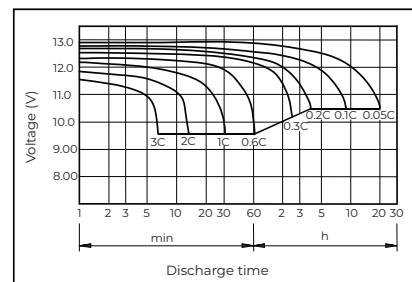
- "C" means Ah value of battery's rated capacity. "P" means watt value of battery's rated power (HR series).
- When the ambient temperature is outside of 15°C to 35°C range, use a temperature compensation factor  $\pm 3 \text{ mV}/^\circ\text{C}/\text{cell}$  (standby charge) or  $\pm 5 \text{ mV}/^\circ\text{C}/\text{cell}$  (cycle charge), starting from the standard centre point at 25°C.
- When charging, the ambient temperature should be in the range of -10°C to +50°C.
- End of discharge voltage should vary according to the discharge current.
- Battery voltage must be higher than its corresponding end voltage when discharge.
- Charge the batteries immediately after discharge.
- When discharging, the ambient temperature should be in the range of -15°C to +50°C.

## Characteristics & Cycle Life

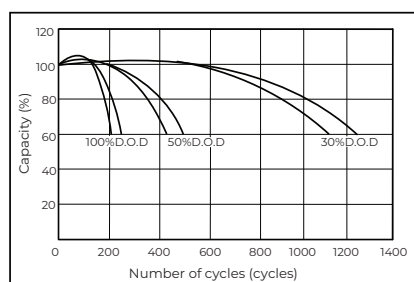
Charging Characteristics (25°C)



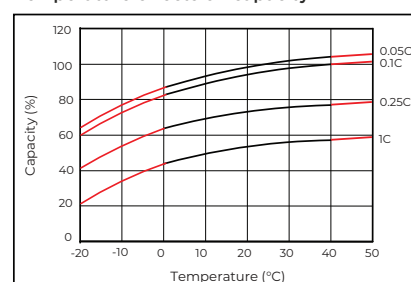
Discharge Characteristics (25°C)



Cycle Life on D.O.D (25°C)

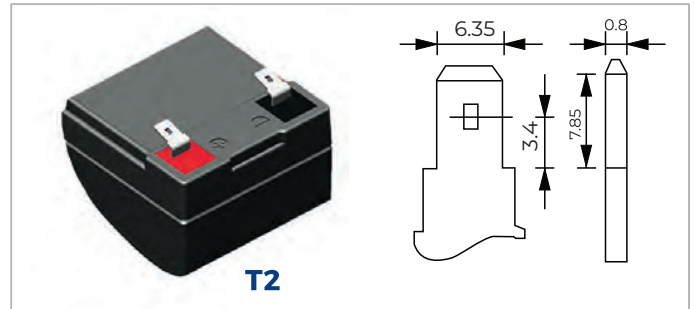
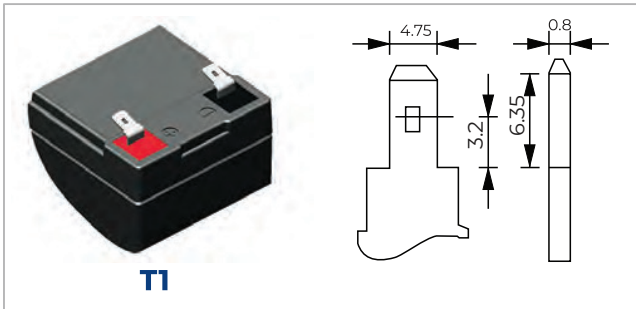


Temperature effects on capacity



# Technical Information

## Terminal Type & Position



### Flat Terminal

Type	A (mm)	B (mm)	C (mm)	D (mm)	Material
T3	12	6	12	2	Cu
T4	14	6	14	2	Cu
T5	16	7	17	8	Pb
T6	18	8	18	7	Pb
T7	18	7	20	8	Pb
T8	24	9	24	7	Pb
T9	26	9	25	8	Pb
T10	26	9	21	7	Pb
T21	20	6	18	3	Cu
T22	22	9	23	3	Cu
T25	25	9	23	3	Cu
T64	20	6	16	3	Cu

### Insert Terminal

Type	A (mm)	B (mm)	C (mm)	Material
T12	12	5	2	Cu
T14	14	6	4	Cu
T16	16	8	5	Cu
T16A	16	6	5	Cu
T18	18	8	5	Cu
T20	20	8	5	Cu

Torque specificatio	N.m
T12	3.0 ± 0.6
T14	5.1 ± 0.6
T16	12.3 ± 2.5
T16A	5.1 ± 0.6
T18	12.3 ± 2.5
T20	12.3 ± 2.5



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