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## EASTMAN WORLD

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## AGM VRLA BATTERY

DEEP CYCLE GEL



# AGM VRLA Deep Cycle Gel 100Ah ~ 250Ah

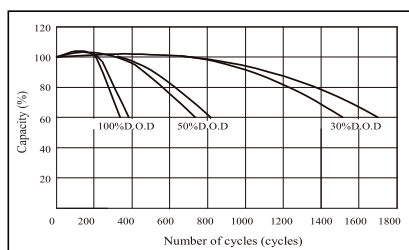
## Certifications



## Applications

- Home, UPS, Hospitals, Power plant, Solar Street light

## DOD vs Number of cycles



## Product Specifications

Model	ES-100 GEL	ES-150 GEL	ES-200 GEL	ES-250 GEL
Nominal Voltage (V)	12V (6 Cells Per Unit)			
Rated Capacity (10HR)	100Ah/10.8V	150Ah/10.8V	200Ah/10.8V	250Ah/10.8V
Dimensions(L*W*H)mm	330*171*214 (Total H 220mm)	485*172*240*240 (Total H 240mm)	552*238*218 (Total H 222mm)	521*269*220 (Total H 224mm)
Approx. Weight	30.50Kg	44.50Kg	62.50Kg	74.50Kg
Capacity (25°C)	10Hour Rate (10.8V) : 100Ah 3Hour Rate (10.8V) : 75Ah 1Hour Rate (10.5V) : 55Ah	10Hour Rate (10.8V) : 150Ah 3Hour Rate (10.8V) : 112.5Ah 1Hour Rate (10.5V) : 83Ah	10Hour Rate (10.8V) : 200Ah 3Hour Rate (10.8V) : 150Ah 1Hour Rate (10.5V) : 110Ah	10Hour Rate (10.8V) : 250Ah 3Hour Rate (10.8V) : 187.5Ah 1Hour Rate (10.5V) : 140Ah
Terminal	T16			
Internal Resistance(Fully Charged, 25°C)	Approx. 5mΩ	Approx. 3.8mΩ	Approx. 3.3mΩ	Approx. 2.8mΩ
Capacity Affected by Temperature (10HR)	40°C - 102% 25°C - 100% 0°C - 85% -15°C - 65%			
Self-Discharge	Discharge: -15°C ~ 50°C (5°C~122°F) Charge: -10°C ~ 50°C (14°C~122°F) Storage: -20°C ~ 50°C (-4°C~122°F)			
Nominal Operating Temp	25°C±3°C (77°F±5°F)			
Operating Temp	3 Months - Remaining Capacity: 91% 6 Months - Remaining Capacity: 82% 12 Months - Remaining Capacity: 65%			
Floating Charging current(25°C)	13.50 to 13.80V Temperature Compensation: -18mV/°C/Block			
Cycle Charging Voltage(25°C)	14.50 to 14.70V Temperature Compensation: -30mV/°C/Block			
Cycle Life	>750 Cycles @ 0.2C 50% DOD.			
Maximum Charging Current	20A	30A	40A	50A
Pulse Discharge Current	800A (5 Sec.)	1200A (5 Sec.)	1400A (5 Sec.)	1500A (5 Sec.)
Design life	12 Years for floating(25°C) Eurobat (20°C): 10-12 Years, Long Life.			

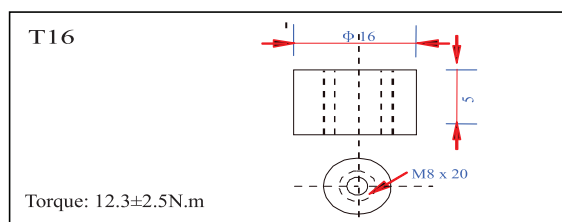
## Introduction

Eastman AGM VRLA GEL Series are manufactured following the highest demands in the deep cycle and renewable energy applications. The batteries use colloidal or foamed silica gel to immobilize the electrolyte, which further enhances the cycling stability. Available in top and front terminal types.

## Product Features

- Superior deep cycle design
- Very long life in deep cycle applications
- Superior recovery from deep discharge
- Wide working environment

## Terminal Type





## Charging & Discharging | Characteristics & Cycle Life

### Construction

Component	Positive plate	Negative plate	Container	Cover	Separator	Electrolyte	Safety valve	Terminal
Raw material	Lead dioxide	Lead	ABS	ABS	AGM	Gel	Rubber	Copper

### Constant Current Discharge Characteristics Unit: A/Cell (25°C, 77°F)

#### ES-100GEL 12V100Ah

F.V/Time	10min	15min	30min	60min	2h	3h	4h	5h	8h	10h	20h
9.60V	195	160	97.0	60.0	36.5	26	20.4	17.3	12.2	10.2	5.40
9.90V	189	156	95.1	59.1	36.3	25.9	20.3	17.2	12.2	10.2	5.38
10.2V	181	150	92.2	57.6	36.0	25.7	20.1	17.1	12.1	10.1	5.37
10.5V	174	145	89.9	55.8	35.5	25.5	20.0	17.0	12.0	10.1	5.34
10.8V	164	138	86.6	54.0	34.6	25.0	19.4	16.5	11.6	10.0	5.30

#### ES-150GEL 12V150Ah

F.V/Time	10min	15min	30min	60min	2h	3h	4h	5h	8h	10h	20h
9.60V	293	240	146	90.0	54.8	39.0	30.6	26.0	18.4	15.3	8.09
9.90V	284	234	143	88.7	54.5	38.8	30.4	25.9	18.3	15.2	8.08
10.2V	272	226	138	86.4	54.0	38.5	30.2	25.7	18.1	15.2	8.05
10.5V	260	218	135	83.7	53.2	38.3	30.0	25.5	18.0	15.1	8.01
10.8V	246	206	130	81.0	51.8	37.5	29.1	24.7	17.5	15.0	7.95

#### ES-200GEL 12V200Ah

F.V/Time	15min	30min	60min	2h	3h	4h	5h	6h	8h	10h	20h
9.60V	320	194	120	73.1	52.0	40.8	34.7	30.6	24.5	20.4	10.8
9.90V	312	190	118	72.6	51.7	40.6	34.5	30.4	24.3	20.3	10.8
10.2V	301	184	115	72.0	51.4	40.3	34.2	30.2	24.2	20.3	10.7
10.5V	291	180	112	70.9	51.0	40.0	34.0	30.0	24.0	20.1	10.7
10.8V	275	173	108	69.1	50.0	38.8	33.0	29.1	23.3	20.0	10.6

#### ES-250GEL 12V250Ah

F.V/Time	15min	30min	60min	2h	3h	4h	5h	6h	8h	10h	20h
9.60V	400	243	150	91.4	65.0	51.0	43.4	38.3	30.6	25.5	13.5
9.90V	390	238	148	90.8	64.6	50.7	43.1	38.0	30.4	25.4	13.5
10.2V	376	230	144	90.0	64.2	50.4	42.8	37.8	30.2	25.3	13.4
10.5V	363	225	140	88.7	63.8	50.0	42.5	37.5	30.0	25.2	13.3
10.8V	344	217	135	86.4	62.5	48.5	41.2	36.4	29.1	25.0	13.3



## Charging & Discharging | Characteristics & Cycle Life

### Constant Power Discharge Characteristics Unit: W/Cell (25°C, 77°F)

#### ES-100GEL 12V100Ah

F.V/Time	10min	15min	30min	60min	2h	3h	4h	5h	8h	10h	20h
9.60V	2106	1757	1088	684	423	306	240	205	145	122	64.7
9.90V	2043	1715	1067	674	421	304	238	204	145	121	64.6
10.2V	1959	1651	1034	657	417	302	237	202	144	121	64.4
10.5V	1874	1595	1009	636	411	300	235	201	143	120	64.0
10.8V	1769	1511	972	616	400	294	228	195	138	119	63.6

#### ES-150GEL 12V150Ah

F.V/Time	10min	15min	30min	60min	2h	3h	4h	5h	8h	10h	20h
9.60V	3159	2635	1633	1026	635	459	360	307	218	182	97.1
9.90V	3064	2572	1600	1011	631	456	358	306	217	182	96.9
10.2V	2938	2477	1551	985	625	453	355	304	215	181	96.6
10.5V	2812	2393	1513	954	616	450	353	301	214	180	96.1
10.8V	2654	2266	1458	923	600	441	342	292	207	179	95.4

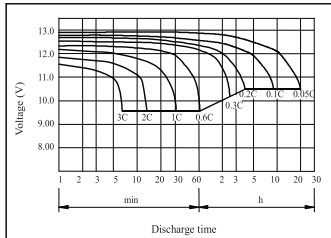
#### ES-200GEL 12V200Ah

F.V/Time	15min	30min	60min	2h	3h	4h	5h	6h	8h	10h	20h
9.60V	3514	2177	1368	846	612	480	410	362	291	243	129
9.90V	3429	2133	1347	841	608	477	408	360	289	243	129
10.2V	3303	2068	1313	834	604	474	405	357	287	242	129
10.5V	3190	2018	1272	821	600	470	402	355	285	240	128
10.8V	3022	1944	1231	800	588	456	390	344	277	239	127

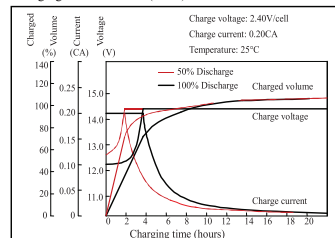
#### ES-250GEL 12V250Ah

F.V/Time	15min	30min	60min	2h	3h	4h	5h	6h	8h	10h	20h
9.60V	4392	2721	1710	1058	765	600	512	452	364	304	162
9.90V	4287	2666	1684	1052	760	596	509	449	361	303	162
10.2V	4128	2585	1642	1042	755	592	506	446	359	302	161
10.5V	3988	2522	1590	1027	750	588	502	443	356	301	160
10.8V	3777	2430	1539	1001	735	570	487	430	346	299	159

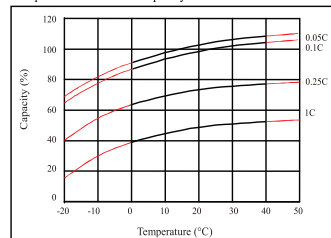
Discharge characteristics (25°C)



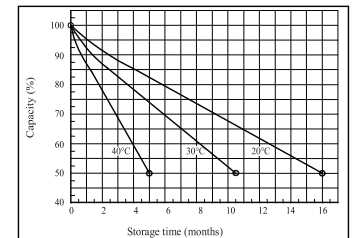
Charging characteristics (25°C)



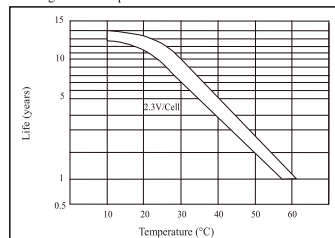
Temperature effects on capacity



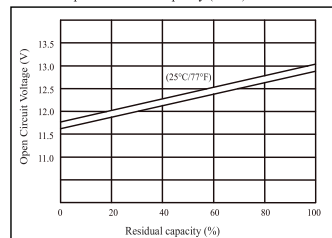
Self-discharge characteristics



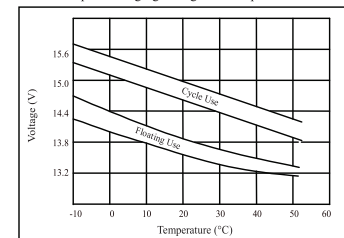
Floating life on temperature



Relationship for OCV and capacity (25°C)



Relationship for charging voltage and temperature





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