



Powering Motion

with **Hankook & Company**

 US version



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## | Hankook & Company ES America Corp.



### U.S. Location, Global Experience

The Hankook & Company ES America Corporation headquarters opened in Nashville, Tennessee in 2017.

To support our growing demand in the U.S., we are building a state-of-the-art manufacturing facility in Clarksville, TN.

Battery production began in early 2020, and this facility manufactures lead acid batteries for both original equipment and the aftermarket.

Both the standard SMF (Sealed Maintenance Free) and AGM (Absorbed Glass Mat) batteries are manufacturing at this facility.

Our Tennessee plant will continue our company's over 70 year tradition of innovative technology, high quality manufacturing, and a commitment to our customer's success.

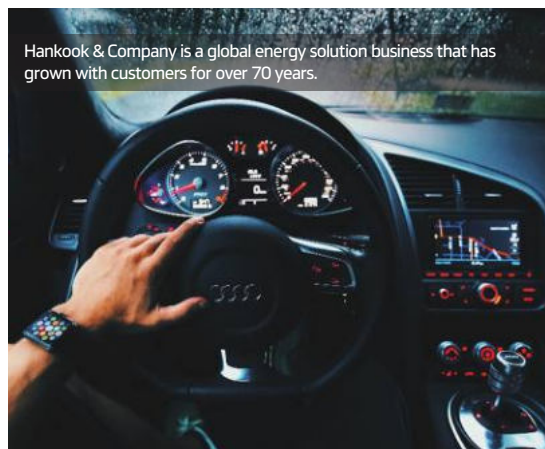


## | Contact Us

We welcome your questions and feedback.  
Please contact your sales representative.

## History Of the Company

### Global Battery Company, Hankook & Company



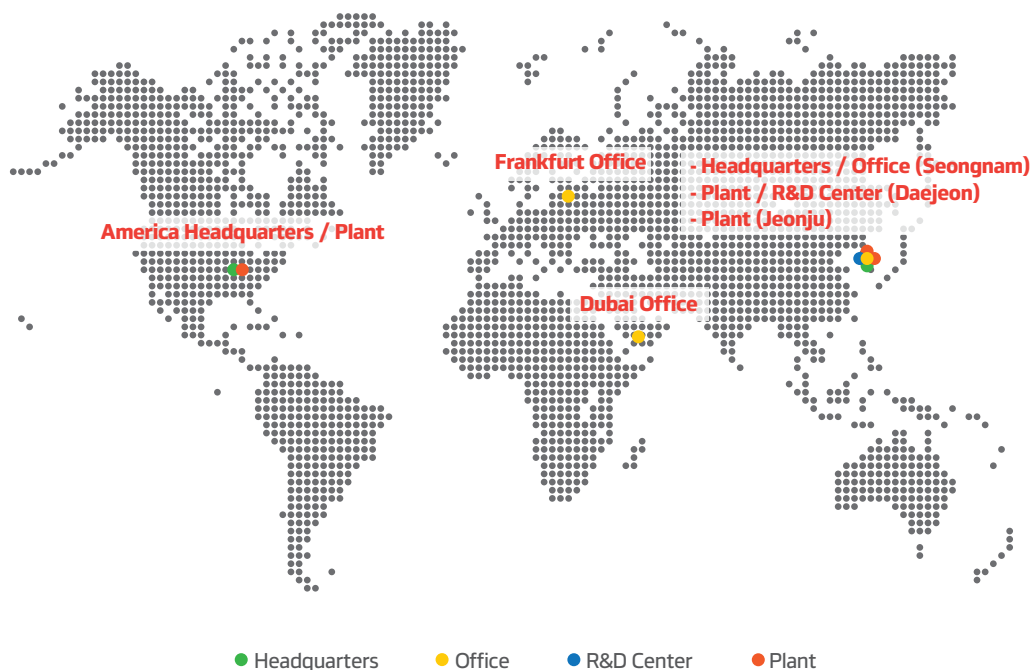
#### Battery Industry Pioneer

As the developer of the first Korean SMF battery in 1982 and the first Korean AGM battery in 2005, Hankook & Company has been a pioneer in the battery industry for the past 75 years improving the quality and capacity of the battery industry in Korea.

#### Continuing Growth: From Domestic to Global

With an entrepreneurial mindset, Hankook & Company has continued to expand its global distribution capabilities by adding to its plants in Daejeon, Jeonju and Tennessee.

## Global Network

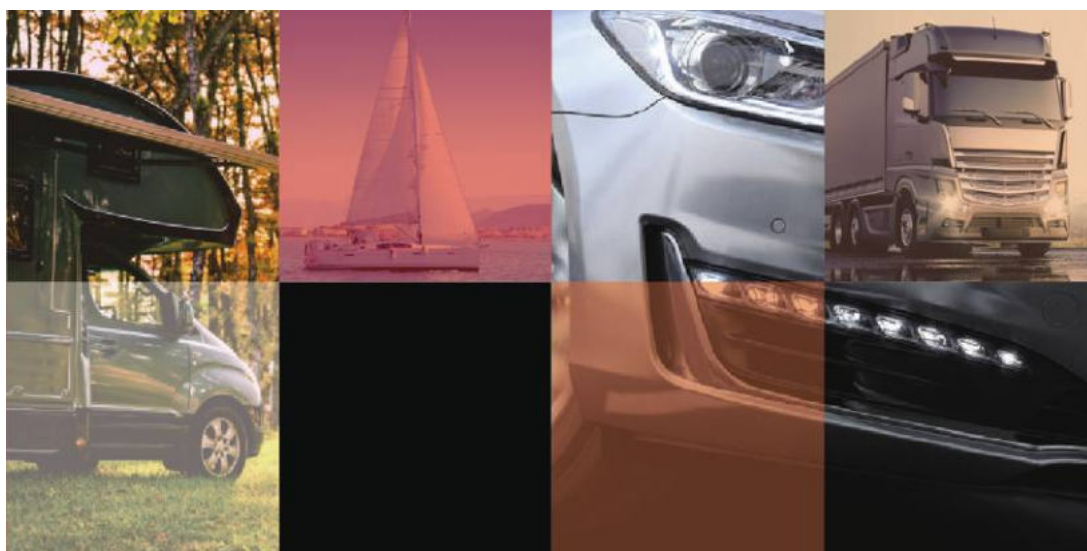




# ACCELERATE YOUR POWER WITH **HANKOOK** BATTERIES

Innovative thinking.  
Advanced technology.

Wherever you are going, HANKOOK batteries will move you forward.

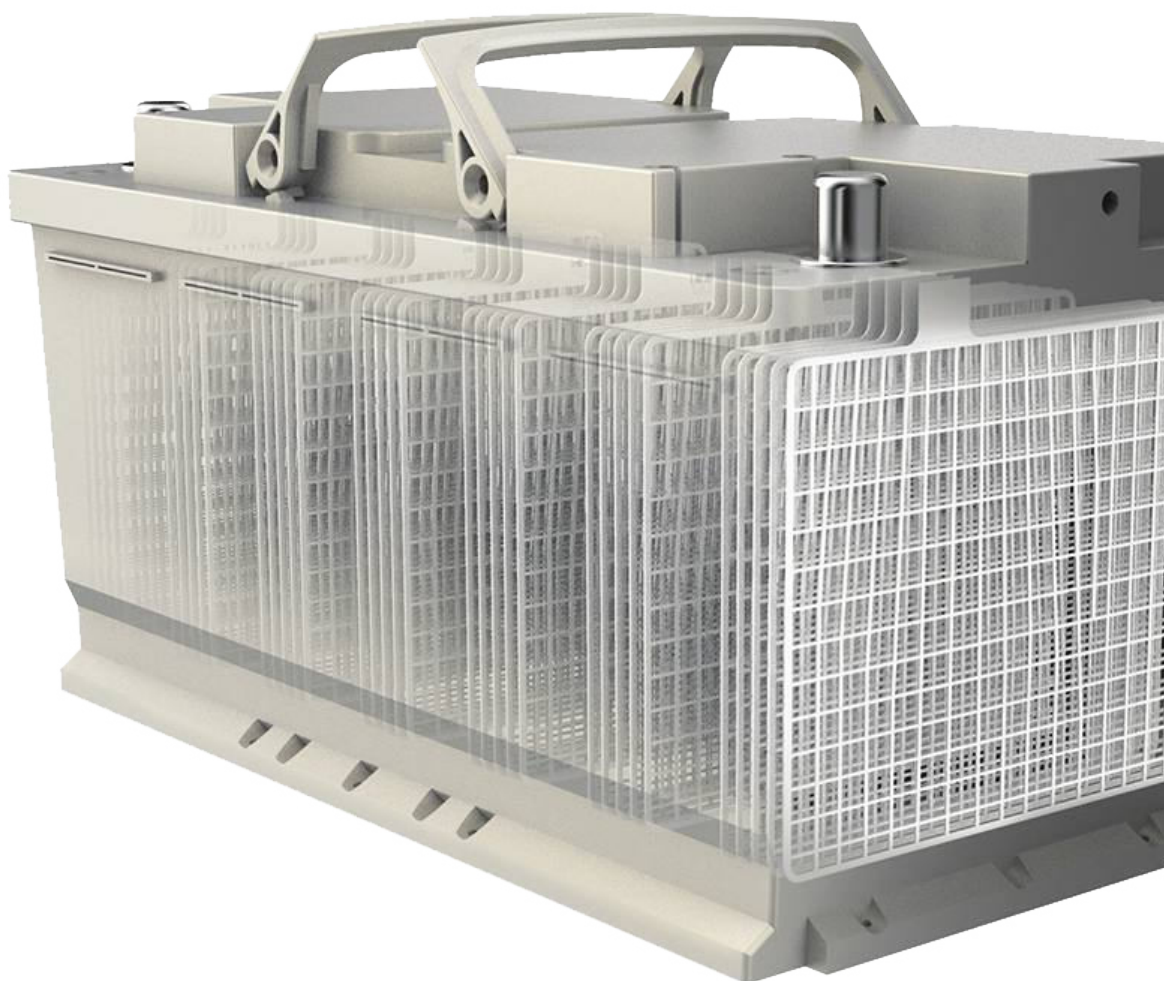


# HANKOOK's Innovative Technology

Take a powerful ride with HANKOOK starter batteries.

Whether it's for an entry level vehicle or a high-end performance car, HANKOOK batteries provide reliable starting power that goes all the way through to the end of your journey.

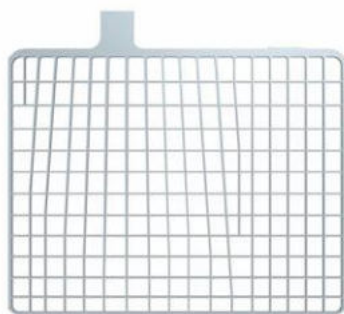
As always, HANKOOK's outstanding product quality is the result of our innovative technology.



## X-FRAME Technology

### MAXIMIZED POWER & ENHANCED STABILITY

A battery is only as good as its grid. Hankook's X-FRAME Technology creates grids that are fully framed and patterned to deliver more power to the posts using a "stamping" method.



#### The Advanced Grid Structure for Long Life

- Full Framed Grid Design : prevents grid growth and shorts from exposed wire
- The latest production process : Continuous and high precision punching process ensures robust structure and excellent adhesion of the active mass paste

#### The Advanced Grid Design for Extra Power

- Built for maximum current flow, the advanced grid design enables faster recharge acceptance and optimal conductivity. The design ensures there is more lead where electrical current is the greatest

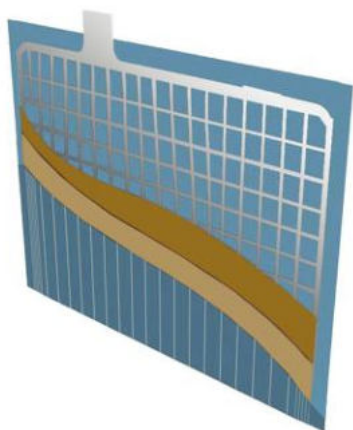
#### Eco-Friendly

- Eco-friendly production process reduces airborne contaminants creating a healthier environment

## High Durability Technology

### EXTENDED BATTERY LIFE

HANKOOK batteries provide extended life through HIGH DURABILITY TECHNOLOGY. Using cutting-edge materials, the HIGH DURABILITY PLATE SYSTEM protects the grid until the end of the battery's life and improves the battery performance

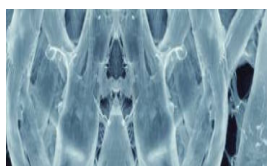


#### Provides Lasting Reinforcement

Reinforced active mass with ultra micro fiber provides better service life to ensure high bonding strength of lead dioxide.

#### Significant Improvement in Plate Protection

Nonwoven Tissue increases plate durability by significantly reducing the loss of active mass.



Conventional  
Common Pulp Tissue



HANKOOK  
Non-woven Tissue

\* These images taken under an electron microscope show the surface of the tissue after a life cycle test.

# Automotive Batteries

## Trust HANKOOK's Innovative Technology

Power your ride with Hankook's automotive batteries.

Whether your vehicle has minimal power needs or has high power demands, Hankook batteries provide reliable power that will serve you until the end of your journey.

Hankook's outstanding product quality is the result of our innovative technology.



### Automotive AGM

Dynamic Starting and High Cycling batteries  
(including Start Stop Applications)

#### Core Technology

- VRLA AGM Technology
- X-FRAME plus
- Carbon plus
- Ultra Micro Fiber

#### Advantages

- 4x longer idling stop life cycle
- 150% increase in charge acceptance
- 130% increase in starting power
- Optimal safety for passenger compartment installation



### Automotive EFB

Dynamic Starting and Cycling batteries  
(Including Start Stop Application)

#### Core Technology

- X-FRAME plus
- Thicker Plate
- Carbon plus
- Ca/Ca

#### Advantages

- 3x longer idling stop life cycle
- 130% increase in charge acceptance
- 115% increase in starting power
- Rapid charging through latest carbon plus tech



### Automotive SMF

Reliable Starting Applications

#### Core Technology

- X-FRAME plus
- Sealed Double Lid
- Nonwoven Tissue

#### Advantages

- Reliable starting power with X-Frame Technology
- High Durability Technology delivers longer service life
- A complete product line offering for 99% of vehicles on the market



## Product List

## Automotive

## Automotive AGM Batteries

Gr.No	Type No.	SAE CCA (0°F)	RC (min.)	Dimension (Inches)			Layout	Terminal	Hold -Down
				L	W	TH			
24	AGM24-750	750	140	10 1/4	6 13/16	8 7/8	10	SAE Post	B1
24R	AGM24R-750	750	140	10 1/4	6 13/16	8 7/8	11	SAE Post	B1
27	AGM27-750	750	175	12	6 3/4	8 11/16	10	SAE Post	B1
27R	AGM27R-750	750	175	12	6 3/4	8 11/16	11	SAE Post	B1
C31	AGMC31-800	800	180	13 1/16	6 13/16	9 7/16	18	Threaded Post	B0
	AGMC31-925	925	200	13 1/16	6 13/16	9 7/16	18	Threaded Post	B0
140R	AGM55020	540	80	8 1/8	6 15/16	7 1/2	24	SAE Post	B13
47	AGM47-680	680	110	9 9/16	6 15/16	7 1/2	24	SAE Post	B13
48	AGM48-760	760	140	11	6 15/16	7 1/2	24	SAE Post	B13
49	AGM49-850	850	180	13 15/16	6 15/16	7 1/2	24	SAE Post	B13
34	AGM34-750	750	120	10 1/4	6 13/16	7 15/16	10	SAE Post	B1
35	AGM35-650	650	100	9 21/32	6 7/8	8 11/16	11	SAE Post	B1
65	AGM65-775	775	150	12	7 7/16	7 1/2	10	SAE Post	B8
78	AGM78-775	775	120	10 1/4	7 5/16	7 1/16	17	SIDE	B1
94R	AGM94R-800	800	160	12 7/16	6 15/16	7 1/2	24	SAE Post	B13
95R	AGM60520	950	205	15 1/2	6 15/16	7 1/2	24	SAE Post	B13

## Automotive EFB Batteries

140R	EFB 55010	470	100	8 1/8	6 15/16	7 1/2	24	SAE Post	B13
47	EFB 47-560	560	120	9 9/16	6 15/16	7 1/2	24	SAE Post	B13
91	EFB 91-650	650	105	11	6 15/16	6 15/16	24	SAE Post	B13
48	EFB 48-650	650	135	11	6 15/16	7 1/2	24	SAE Post	B13
92	EFB 92-730	730	125	12 7/16	6 15/16	6 15/16	24	SAE Post	B13
94R	EFB 94R-730	730	160	12 7/16	6 15/16	7 1/2	24	SAE Post	B13
49	EFB 49-900	900	180	13 15/16	6 15/16	7 1/2	24	SAE Post	B13
95R	EFB 95R-950	950	200	15 1/2	6 15/16	7 1/2	24	SAE Post	B13
B20	EFB M42(55B20L)	420	55	7 3/4	5	8 11/16	11	JIS Pencil Post	B0
51R	EFB 51R-460	460	71	9 3/8	5 1/16	8 3/4	11	SAE Post	B1
35	EFB 35-670	670	100	9 1/16	6 15/16	8 7/8	11	SAE Post	B1
24	EFB 24-730	730	130	10 1/4	6 13/16	8 7/8	10	SAE Post	B1
27	EFB 27-800	800	145	12 1/16	6 13/16	8 7/8	10	SAE Post	B1
65	EFB 65-750(*T)	750	130	12 1/16	7 9/16	7 9/16	10	SAE Post	B8
34	EFB 34-750(*T)	750	120	10 1/4	6 13/16	7 7/8	10	SAE Post	B1
78	EFB 78-750(*T)	750	120	10 1/4	7 1/16	7 5/16	17	SIDE	B1

## Automotive Hybrid / EV Auxiliary Batteries

51	AGM S46B24R (AGM51-325)	325	70	9 3/8	5 1/16	8 3/4	10	JIS Pencil Post	B0
	MF 85B24LS (*T) (MF51-650)	650	85	9 3/8	5 1/16	8 3/4	11	SAE Post	B0
25	AGM S55D23R (AGM35-550)	550	85	8 13/16	6 7/8	8 11/16	10	SAE Post	B0
151	MF 60B19RS (*T)	450	60	7 3/8	5	8 11/16	10	SAE Post	B0
U1	AGM U1-450 (*T)	450	55	7 3/4	5 3/16	7 5/16	11	SAE Post	B0

\*T : For Tesla EV models.

## Automotive Sealed Maintenance Free Batteries

Gr.No	Type No.	SAE CCA (0°F)	RC (min.)	Dimension (Inches)			Layout	Terminal	Hold-Down
				L	W	TH			
21	MF21-325	325	85	8 <sup>3</sup> / <sub>16</sub>	6 <sup>13</sup> / <sub>16</sub>	8 <sup>3</sup> / <sub>4</sub>	10	SAE Post	B1
21R	MF21R-325	325	85	8 <sup>3</sup> / <sub>16</sub>	6 <sup>13</sup> / <sub>16</sub>	8 <sup>3</sup> / <sub>4</sub>	11	SAE Post	B1
22F	MF22F-425	425	65	9 <sup>1</sup> / <sub>2</sub>	6 <sup>15</sup> / <sub>16</sub>	8 <sup>5</sup> / <sub>16</sub>	11F	DUAL FIT	B9
	MF22F-580	580	95	9 <sup>1</sup> / <sub>2</sub>	6 <sup>15</sup> / <sub>16</sub>	8 <sup>5</sup> / <sub>16</sub>	11F	DUAL FIT	B9
24	MF24-480	480	100	10 <sup>1</sup> / <sub>4</sub>	6 <sup>13</sup> / <sub>16</sub>	8 <sup>7</sup> / <sub>8</sub>	10	SAE Post	B1
	MF24-575	575	115	10 <sup>1</sup> / <sub>4</sub>	6 <sup>13</sup> / <sub>16</sub>	8 <sup>7</sup> / <sub>8</sub>	10	SAE Post	B1
	MF24-630	630	125	10 <sup>1</sup> / <sub>4</sub>	6 <sup>13</sup> / <sub>16</sub>	8 <sup>7</sup> / <sub>8</sub>	10	SAE Post	B1
	MF24-750	750	155	10 <sup>1</sup> / <sub>4</sub>	6 <sup>13</sup> / <sub>16</sub>	8 <sup>7</sup> / <sub>8</sub>	10	SAE Post	B1
24F	MF24F-480	480	100	10 <sup>3</sup> / <sub>4</sub>	6 <sup>13</sup> / <sub>16</sub>	9	11F	SAE Post	B9
	MF24F-580	580	115	10 <sup>3</sup> / <sub>4</sub>	6 <sup>13</sup> / <sub>16</sub>	9	11F	SAE Post	B9
	MF24F-630	630	125	10 <sup>3</sup> / <sub>4</sub>	6 <sup>13</sup> / <sub>16</sub>	9	11F	SAE Post	B9
	MF24F-750	750	155	10 <sup>3</sup> / <sub>4</sub>	6 <sup>13</sup> / <sub>16</sub>	9	11F	SAE Post	B9
25	MF25-450	450	80	9 <sup>1</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	8 <sup>7</sup> / <sub>8</sub>	10	SAE Post	B1
	MF25-540	540	90	9 <sup>1</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	8 <sup>7</sup> / <sub>8</sub>	10	SAE Post	B1
	MF25-700	700	130	9 <sup>1</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	8 <sup>7</sup> / <sub>8</sub>	10	SAE Post	B1
26	MF26-400	400	70	8 <sup>3</sup> / <sub>16</sub>	6 <sup>13</sup> / <sub>16</sub>	7 <sup>3</sup> / <sub>4</sub>	10	SAE Post	B1
	MF26-500	500	80	8 <sup>3</sup> / <sub>16</sub>	6 <sup>13</sup> / <sub>16</sub>	7 <sup>3</sup> / <sub>4</sub>	10	SAE Post	B1
	MF26-580	580	110	8 <sup>3</sup> / <sub>16</sub>	6 <sup>13</sup> / <sub>16</sub>	7 <sup>3</sup> / <sub>4</sub>	10	SAE Post	B1
26R	MF26R-400	400	70	8 <sup>3</sup> / <sub>16</sub>	6 <sup>13</sup> / <sub>16</sub>	7 <sup>3</sup> / <sub>4</sub>	11	SAE Post	B1
	MF26R-500	500	80	8 <sup>3</sup> / <sub>16</sub>	6 <sup>13</sup> / <sub>16</sub>	7 <sup>3</sup> / <sub>4</sub>	11	SAE Post	B1
	MF26R-580	580	110	8 <sup>3</sup> / <sub>16</sub>	6 <sup>13</sup> / <sub>16</sub>	7 <sup>3</sup> / <sub>4</sub>	11	SAE Post	B1
27	MF27-750	750	150	12 <sup>1</sup> / <sub>16</sub>	6 <sup>13</sup> / <sub>16</sub>	8 <sup>11</sup> / <sub>16</sub>	10	SAE Post	B1
	MF27-840	840	180	12 <sup>1</sup> / <sub>16</sub>	6 <sup>13</sup> / <sub>16</sub>	8 <sup>11</sup> / <sub>8</sub>	10	SAE Post	B1
27F	MF27F-750	750	150	12 <sup>1</sup> / <sub>2</sub>	6 <sup>13</sup> / <sub>16</sub>	8 <sup>11</sup> / <sub>16</sub>	11F	SAE Post	B9
	MF27F-840	840	180	12 <sup>1</sup> / <sub>2</sub>	6 <sup>13</sup> / <sub>16</sub>	8 <sup>11</sup> / <sub>16</sub>	11F	SAE Post	B9
34	MF34-585	585	100	10 <sup>1</sup> / <sub>4</sub>	6 <sup>13</sup> / <sub>16</sub>	7 <sup>7</sup> / <sub>8</sub>	10	SAE Post	B1
	MF34-690	690	130	10 <sup>1</sup> / <sub>4</sub>	6 <sup>13</sup> / <sub>16</sub>	7 <sup>7</sup> / <sub>8</sub>	10	SAE Post	B1
	MF34-750	750	155	10 <sup>1</sup> / <sub>4</sub>	6 <sup>13</sup> / <sub>16</sub>	7 <sup>7</sup> / <sub>8</sub>	10	SAE Post	B1
35	MF35-450	450	80	9 <sup>1</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	8 <sup>7</sup> / <sub>8</sub>	11	SAE Post	B1
	MF35-540	540	90	9 <sup>1</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	8 <sup>7</sup> / <sub>8</sub>	11	SAE Post	B1
	MF35-550	550	100	9 <sup>1</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	8 <sup>7</sup> / <sub>8</sub>	11	SAE Post	B1
	MF35-700	700	130	9 <sup>1</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	8 <sup>7</sup> / <sub>8</sub>	11	SAE Post	B1
36	MF36R-650	650	130	10 <sup>1</sup> / <sub>4</sub>	7 <sup>3</sup> / <sub>16</sub>	7 <sup>7</sup> / <sub>8</sub>	11	SAE Post	B1
40R	MF40R-560	560	100	11	6 <sup>15</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	24	SAE Post	B1
	MF40R-650	650	125	11	6 <sup>15</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	24	SAE Post	B1
41	MF41-560	560	100	11 <sup>9</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	24	SAE Post	B4
	MF41-800	800	135	11 <sup>9</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	24	SAE Post	B4
42	MF42-410	410	70	9 <sup>9</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	24	SAE Post	B4
	MF42-550	550	90	9 <sup>9</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	24	SAE Post	B4

## Automotive Sealed Maintenance Free Batteries

Gr.No	Type No.	SAE CCA (0°F)	RC (min.)	Dimension (Inches)			Layout	Terminal	Hold-Down
				L	W	TH			
47	MF47-490	490	90	9 <sup>9</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>2</sub>	24	SAE Post	B13
	MF47-500	500	90	9 <sup>9</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>2</sub>	24	SAE Post	B13
	MF47-650	650	125	9 <sup>9</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>2</sub>	24	SAE Post	B13
48	MF48-550	550	105	11	6 <sup>15</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>2</sub>	24	SAE Post	B13
	MF48-690	690	130	11	6 <sup>15</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>2</sub>	24	SAE Post	B13
	MF48-790	790	150	11	6 <sup>15</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>2</sub>	24	SAE Post	B13
49	MF49-770	770	150	13 <sup>15</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>2</sub>	24	SAE Post	B13
	MF49-900	900	200	13 <sup>15</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>2</sub>	24	SAE Post	B13
51	MF51-430	430	75	9 <sup>3</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>16</sub>	8 <sup>3</sup> / <sub>4</sub>	10	SAE Post	B1
	MF51-500	500	88	9 <sup>3</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>16</sub>	8 <sup>3</sup> / <sub>4</sub>	10	SAE Post	B1
51R	MF51R-430	430	75	9 <sup>3</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>16</sub>	8 <sup>3</sup> / <sub>4</sub>	11	SAE Post	B1
	MF51R-500	500	88	9 <sup>3</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>16</sub>	8 <sup>3</sup> / <sub>4</sub>	11	SAE Post	B1
56	MF56-590	590	95	10 <sup>1</sup> / <sub>16</sub>	5 <sup>7</sup> / <sub>8</sub>	8 <sup>5</sup> / <sub>16</sub>	11	SAE Post	B1
58	MF58-450	450	73	10 <sup>1</sup> / <sub>16</sub>	7 <sup>3</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	26	SAE Post	B8
	MF58-510	510	90	10 <sup>1</sup> / <sub>16</sub>	7 <sup>3</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	26	SAE Post	B8
	MF58-550	550	90	10 <sup>1</sup> / <sub>16</sub>	7 <sup>3</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	26	SAE Post	B8
	MF58-580	580	100	10 <sup>1</sup> / <sub>16</sub>	7 <sup>3</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	26	SAE Post	B8
58R	MF58R-450	450	73	10 <sup>1</sup> / <sub>16</sub>	7 <sup>3</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	19	SAE Post	B8
	MF58R-510	510	90	10 <sup>1</sup> / <sub>16</sub>	7 <sup>3</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	19	SAE Post	B8
	MF58R-550	550	90	10 <sup>1</sup> / <sub>16</sub>	7 <sup>3</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	19	SAE Post	B8
	MF58R-580	580	100	10 <sup>1</sup> / <sub>16</sub>	7 <sup>3</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	19	SAE Post	B8
59	MF59-590	590	100	9 <sup>9</sup> / <sub>16</sub>	7 <sup>9</sup> / <sub>16</sub>	7 <sup>9</sup> / <sub>16</sub>	10	SAE Post	B8
65	MF65-615	615	120	12	7 <sup>7</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>2</sub>	10	SAE Post	B8
	MF65-700	700	115	12	7 <sup>7</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>2</sub>	10	SAE Post	B8
	MF65-765	765	140	12	7 <sup>7</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>2</sub>	10	SAE Post	B8
	MF65-780	780	140	12	7 <sup>7</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>2</sub>	10	SAE Post	B8
	MF65-850	850	145	12	7 <sup>7</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>2</sub>	10	SAE Post	B8
70	MF70-500	500	80	8 <sup>3</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	17	SIDE	B1
75	MF75-500	500	80	9 <sup>1</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	17	SIDE	B1
	MF75-585	585	90	9 <sup>1</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	17	SIDE	B1
	MF75-635	635	120	9 <sup>1</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	17	SIDE	B1
	MF75-650	650	120	9 <sup>1</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	17	SIDE	B1
	MF78-500	500	80	10 <sup>1</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	17	SIDE	B1
78	MF78-580	580	90	10 <sup>1</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	17	SIDE	B1
	MF78-750	750	120	10 <sup>1</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	17	SIDE	B1
79	MF79-840	840	140	12 <sup>1</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>4</sub>	17	SIDE	B1
85	MF85-530	530	90	9 <sup>1</sup> / <sub>16</sub>	6 <sup>13</sup> / <sub>16</sub>	8	11	SAE Post	B1
	MF85-550	550	90	9 <sup>1</sup> / <sub>16</sub>	6 <sup>13</sup> / <sub>16</sub>	8	11	SAE Post	B1
	MF85-610	610	105	9 <sup>1</sup> / <sub>16</sub>	6 <sup>13</sup> / <sub>16</sub>	8	11	SAE Post	B1

## Automotive Sealed Maintenance Free Batteries

Gr.No	Type No.	SAE CCA (0°F)	RC (min.)	Dimension (Inches)			Layout	Terminal	Hold-Down
				L	W	TH			
86	MF86-530	530	90	9 1/16	6 13/16	8	10	SAE Post	B1
	MF86-550	550	90	9 1/16	6 13/16	8	10	SAE Post	B1
	MF86-610	610	105	9 1/16	6 13/16	8	10	SAE Post	B1
90	MF90-550	550	100	9 9/16	6 15/16	6 15/16	24	SAE Post	B13
	MF90-600	600	100	9 9/16	6 15/16	6 15/16	24	SAE Post	B13
91	MF91-690	690	130	11	6 15/16	6 15/16	24	SAE Post	B13
	MF91-700	700	130	11	6 15/16	6 15/16	24	SAE Post	B13
	MF91-800	800	135	11	6 15/16	6 15/16	24	SAE Post	B13
93	MF93-800	800	150	13 15/16	6 15/16	6 15/16	24	SAE Post	B13
94R	MF94R-750	750	135	12 7/16	6 15/16	7 1/2	24	SAE Post	B13
	MF94R-800	800	170	12 7/16	6 15/16	7 1/2	24	SAE Post	B13
	MF94R-900	900	180	12 7/16	6 15/16	7 1/2	24	SAE Post	B13
96R	MF96R-610	610	110	9 1/2	7	6 15/16	15	SAE Post	B1
121R	MF121R-530	530	96	8 1/4	6 15/16	8 7/8	11H	SAE Post	B1
124R	MF124R-670	670	130	10 1/4	6 13/16	8 7/8	11H	SAE Post	B1
151R	MF151R-330	330	55	7 7/16	4 15/16	8 7/8	28	SAE Post	B0

## Dual Terminal Automotive

70DT	MF70DT-400	400	60	8 3/16	7 1/16	7 7/8	17	SIDE&SAE	B1
	MF70DT-500	500	80	8 3/16	7 1/16	7 7/8	17	SIDE&SAE	B1
	MF70DT-550	550	90	8 3/16	7 1/16	7 7/8	17	SIDE&SAE	B1
75DT	MF75DT-500	500	80	9 1/16	7 1/16	7 7/8	17	SIDE&SAE	B1
	MF75DT-585	585	90	9 1/16	7 1/16	7 7/8	17	SIDE&SAE	B1
	MF75DT-635	635	120	9 1/16	7 1/16	7 7/8	17	SIDE&SAE	B1
	MF75DT-650	650	120	9 1/16	7 1/16	7 7/8	17	SIDE&SAE	B1
78DT	MF78DT-500	500	80	10 1/4	7 1/16	7 7/8	17	SIDE&SAE	B1
	MF78DT-580	580	90	10 1/4	7 1/16	7 7/8	17	SIDE&SAE	B1
	MF78DT-750	750	120	10 1/4	7 1/16	7 7/8	17	SIDE&SAE	B1



# Heavy Duty Batteries

## PERFECT POWER SOLUTION

POWERFUL, RELIABLE, DURABLE

Demanding commercial vehicles require nothing less than the most powerful, reliable, and durable batteries. Hankook heavy duty batteries provide outstanding starting power and a higher reserve capacity for deep discharge cycling applications.

Hankook's heavy duty battery line is the perfect solution with quality products to get the job done.



### Heavy Duty AGM

Dynamic Starting and High Cycling batteries

#### Core Technology

- X-FRAME plus
- VRLA AGM Technology
- Carbon plus

#### Advantages

- Maximize power & heavy cycling service
- Highest vibration resistance
- Extreme endurance
- Absolutely spill and leakage proof



### Heavy Duty HD

Reliable Starter Batteries

#### Core Technology

- X-FRAME plus
- Advance Ca/Ca
- Heat sealed lid

#### Advantages

- High cycling performance
- High starting power
- Extra reserve capacity
- Absolutely maintenance free
- High vibration resistance

## Product List

# Heavy Duty

### 12 Volt Heavy-Duty AGM Batteries

Gr.No	Type No.	SAE CCA (0°F)	RC (min.)	Dimension (Inches)			Layout	Terminal	Hold-Down
				L	W	TH			
C31	AGM C31-800	800	180	13 1/16	6 3/16	9 1/8	18	Threaded Post	B0
	AGM C31-925	925	200	13 1/16	6 3/16	9 1/8	18	Threaded Post	B0
	KR 200	1200	420	6 3/16	6 3/16	6 3/16	8	SAE Post	B0

### 12 Volt Heavy-Duty Flooded Batteries

4DLT	4DLT-840	840	260	20	8 3/16	7 15/16	16L	SAE Post	B0
4D	4D-950	950	300	20 3/4	8 7/16	9 13/16	8	SAE Post	B0
8D	8D-950	950	300	20 3/4	11 1/8	9 13/16	8	SAE Post	B0
	8D-1200	1200	420	20 3/4	11 1/8	9 13/16	8	SAE Post	B0
F51	MF135F51	870	230	19 15/16	7 3/16	9 1/16	8	SAE Post	B0
G51	MF160G51	1000	300	19 15/16	8 3/8	9 1/16	8	SAE Post	B0
H52	MF210H52	1200	400	20 1/16	10 13/16	9 3/8	8	SAE Post	B0
	MF245H52	1400	460	20 1/16	10 13/16	9 3/8	8	SAE Post	B0
C31	HD C31*	850	210	13	6 13/16	9 7/16	18	Threaded Post	B0
31	MF31-650	650	125	13	6 13/16	9 7/16	18	SAE Post	B0
	MF31-750	750	155	13	6 13/16	9 7/16	18	SAE Post	B0
	MF31-850	850	175	13	6 13/16	9 7/16	18	SAE Post	B0
	MF31-950	950	185	13	6 13/16	9 7/16	18	SAE Post	B0
	MF31-1000	1000	200	13	6 13/16	9 7/16	18	SAE Post	B0
31S	MF31S-650	650	125	13	6 13/16	9 7/16	18	Threaded Post	B0
	MF31S-750	750	155	13	6 13/16	9 7/16	18	Threaded Post	B0
	MF31S-850	850	185	13	6 13/16	9 7/16	18	Threaded Post	B0
	MF31S-950	950	175	13	6 13/16	9 7/16	18	Threaded Post	B0
	MF31S-1000	1000	200	13	6 13/16	9 7/16	18	Threaded Post	B0

HD C31\* : Severe Service / Dual Purpose

# Marine & RV Batteries

## More Power through Innovation

Hankook Marine & RV batteries offer extraordinary performance. Hankook's consumer research helps guide our efforts to build batteries that satisfy the diverse requirements of marine and RV owners.



### Marine & RV AGM

AGM Technology  
Deep Cycling & Starting

#### Core Technology

- X-FRAME plus
- Ultra Micro Fiber
- Heat sealed lid
- Carbon plus

#### Advantages

- Longer deep cycle life
- Delivers stable power with moderate energy requirements
- Protection against vibration and deep cycle damage
- Safer handling with a spill proof design



### Marine & RV XDC

Extreme  
Deep Cycling & Starting

#### Core Technology

- X-FRAME plus
  - Ultra Micro Fiber
  - Heat sealed lid
- #### Advantages
- High starting and deep cycle capability
  - Delivers stable power with moderate energy requirements
  - Maintenance free design
  - Robust dual terminal for convenient connection



### Marine & RV XV

Starting

#### Core Technology

- X-FRAME plus
  - Ultra Micro Fiber
  - High density Fiber
  - Heat sealed lid
- #### Advantages
- High cranking power for quick engine start
  - Robust dual terminal for convenient connection
  - Maintenance free design

## Product List

## Marine &amp; RV

## Leisure AGM Batteries (Dual Purpose)

Gr.No	Type No.	SAE CCA (0°F)	RC (min.)	Dimension (Inches)			Layout	Terminal	Hold-Down
				L	W	TH			
24	AGM24-750	750	140	10 1/4	6 13/16	8 7/8	10	Marine Twin	B1
24R	AGM24R-750	750	140	10 1/4	6 13/16	8 7/8	11	Marine Twin	B1
27	AGM27-750	750	175	12	6 3/4	8 11/16	10	SAE Post	B1
27R	AGM27R-750	750	175	12	6 3/4	8 11/16	11	SAE Post	B1
C31	AGMC31-800	800	180	13 1/16	6 13/16	9 1/8	18	Threaded Post	B0
	AGMC31-925	925	200	13 1/16	6 13/16	9 1/8	18	Threaded Post	B0

## Deep Cycle &amp; Starting Batteries

24	XDC24-500	500	120	10 1/4	6 13/16	8 7/8	10	Marine Twin	B1
27	XDC27-600	600	150	12 1/16	6 13/16	8 7/8	10	Marine Twin	B1
31	XDC31-650	650	180	13	6 13/16	9 7/16	18	Marine Twin	B0

## Dual Purpose Batteries

24	DC24-680	680	140	10 1/4	6 13/16	8 7/8	10	Marine Twin	B1
27	DC27-750	750	170	12 1/16	6 13/16	8 7/8	10	Marine Twin	B1
31	DC31-800	800	180	13	6 13/16	9 7/16	18	Marine Twin	B0

## Starting Batteries

24	XV24-560	560	105	10 1/4	6 13/16	8 7/8	10	Marine Twin	B1
	XV24-600	600	125	10 1/4	6 13/16	8 7/8	10	Marine Twin	B1
	XV24-720	720	155	10 1/4	6 13/16	8 7/8	10	Marine Twin	B1
	XV24-800	800	140	10 1/4	6 13/16	8 7/8	10	Marine Twin	B1
27	XV27-720	720	155	12 1/16	6 13/16	8 7/8	10	Marine Twin	B1
	XV27-800	800	180	12 1/16	6 13/16	8 7/8	10	SAE Post	B1
31	XV31-800	800	180	13	6 13/16	9 7/16	18	Marine Twin	B0



# TECHNICAL INFORMATION

## Layout / Terminals / Hold-down

### LAYOUT

10		11	
11F		17	
18		19	
24		26	

### TERMINALS

Terminal	SAE Post	JIS Pencil Post	Dual Fit	4F	Threaded Post	Side	Marine Twin	U1 Lug
Positive					 3/8"-16 Threads		 5/16"-18 THREADS	
Negative					 3/8"-16 Threads		 5/16"-18 THREADS	

### HOLD-DOWN

B1		B4	
B5		B6	
B8		B9	
B13		B14	

\* For B0 there is no Hold-Down

# Handling Batteries

## PRECAUTION

If treated with care and taking the proper precautions, lead acid batteries can be handled safely with minimum risk. However, lead acid batteries contain sulfuric acid which is both poisonous and corrosive. This makes them potentially hazardous and it can cause serious injury when standard handling procedures and safety measures are not followed.

## Safety

- Always wear acid resistant clothing, protective goggles, PVC gloves and rubber boots
- Avoid smoking, sparks and flames near operating or charging lead acid batteries
- Keep metal objects away from terminals
- Batteries are heavy. Lift carefully and do not place on unstable surfaces
- Keep away from children.

## Emergency Action

- Splashes in eyes : Wash out eyes with plenty of water for at least 15 minutes
- Splashes on skin : Remove contaminated clothing carefully and wash the affected skin areas with plenty of water
- Swallowed : Drink copious amounts of milk of magnesia, water or milk. Do not induce vomiting

## Storage

- Keep batteries upright
- Batteries should not be directly exposed to the sun
- Keep batteries clean and always store in a cool, dry place
- Never stack over 4 layers
- Never drop, never throw
- In all cases, storage procedure should be applied

## Installation

- Check the vehicle's engine is turned off
- Remove the negative terminal connection of the old battery
- Remove the positive terminal connection, and then remove the Hold-down bracket or clamp
- Prior to replacing the new one, inspect the tray for corrosion. Clean battery holder and battery terminals using a wire brush, if necessary
- Replace the old battery with the new battery and fix the new one in the tray
- Connect the positive terminal first
- Connect the negative terminal. The negative terminal should always be replaced last

## Disposal

- Batteries must NEVER be disposed of in household waste
- Batteries are recyclable
- Do not throw away



NEVER DROP  
NEVER OVERTHROW



NEVER STACK  
OVER 4 LAYERS



KEEP UPRIGHT



NEVER TIP  
OVER 45°



RECYCLE



Pb



No smoking,  
no naked flames,  
no sparks



Shield  
eyes



Keep  
away from  
children



Battery  
acid



Explosive  
gas



Note  
operating  
instructions

## BATTERY TESTING PROCEDURES

### A. Visual Check

- Check the Container, Cover and Terminals. Where physical damage is present, replace the battery.
- Check the Indicator (If the battery has the Indicator). Always look right down when viewing the Indicator and lightly tap the Indicator on the battery to dislodge any air bubbles.



TABLE 1. State of Charge

Approx. State of Charge	OCV	
	Flooded	AGM
100%	> 12.75V	> 12.90V
> 75%	> 12.40V	> 12.50V
> 50%	> 12.20V	> 12.25V
> 25%	> 12.00V	> 12.00V
Discharged	< 11.99V	< 11.99V

\* For Reference Only

### B. Voltage Check

- If OCV is below 12.4V(Flooded) or 12.5V(AGM), recharge the battery immediately.

### C. Discharge Test (Load Test)

- Connect the battery tester to battery terminals.
- Measure the temperature of the battery around.
- Set the battery tester ampere values for ½ of the CCA rating.
- Apply the load for 15 seconds and then read the voltage.
- Compare measured values with values in TABLE 2.
- If the values are outside of the table values, recharge the battery and test again.
- If the battery fails the load test twice, replace it.
- Sometimes, electronic testers such as MIDTRONICS, SNAP-ON and etc are used instead of load tester.
- Electronic testers are only suitable for batteries that have been in use for a certain time.
- They cannot rate the performance of new or unused batteries
- For this reason, Hankook AtlasBX recommends the test defined in global standards to confirm rated specifications.

TABLE 2. Load Test

Minimum Voltage	Temperature
9.6V	21°C & Above
9.4V	10°C
9.1V	-1°C
8.9V	-7°C
8.5V	-18°C

## BATTERY CHARGE

If the battery is below 12.4V or fails to pass the load test, battery must be recharged as soon as possible to prevent lead sulfation. During charge, if the battery sprays electrolyte through the vent holes or gets hot (over 52°C), the charge must be stopped for a time to allow the battery to be cool down.

### Constant Voltage Charge

Another method is to charge a battery at a specified voltage(Flooded : 16.0V or AGM : 14.4V) in below table. When charging starts, a high rate current flows into the battery. As the battery is being charged, the current is reduced. Generally this method needs more time than the constant-current-charge, but overcharge risk is lower

### Constant Current charge

General guidelines for constant-current-charge are given in TABLE 3 and TABLE 4. The summarizes approximate amperes and hours in need of charge according to Reserve capacity and OCV.

### End of Charge

If a battery has been properly charged, voltage output across battery terminals on charge will be maintained for 2 hours.

TABLE 3. Constant Current Charge Condition - Flooded

OCV	Charging Time (Hours)	Charging Current (Amperes)																			
		50-70min	71-90min	91-110min	111-125min	126-145min	146-160min	161-180min	181-200min	201-215min	216-235min	236-250min	251-270min	271-290min	291-305min	306-325min	325-340min	341-360min	361-375min	376-400min	401-415min
12.4 - 12.49V	6 Hr.																				
12.3 - 12.39V	10 Hr.																				
12.2 - 12.29V	14 Hr.	2.0 A	2.5 A	3.0 A	3.5 A	4.0 A	4.5 A	5.0 A	5.5 A	6.0 A	6.5 A	7.0 A	7.5 A	8.0 A	8.5 A	9.0 A	9.5 A	10.0 A	10.5 A	11.0 A	11.5 A
12.1 - 12.19V	16 Hr.																				
12.0 - 12.09V	20 Hr.																				
Below 11.99V	24 Hr.																				

TABLE 4. Constant Current Charge Condition - AGM

OCV	Charging Time (Hours)	Charging Current (Amperes)							
		40 - 60min	61 - 80min	81 - 100min	101 - 120min	121 - 140min	141 - 160min	161 - 180min	181 - 205min
12.5 - 12.59V	6 hr.								
12.4 - 12.49V	9 hr.								
12.3 - 12.39V	12 hr.								
12.2 - 12.29V	15 hr.	2.0 A	2.5 A	3.0 A	3.5 A	4.0 A	4.5 A	5.0 A	5.5 A
12.1 - 12.19V	18 hr.								
12.0 - 12.09V	21 hr.								
Below 11.99V	24 hr.								



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