PRODUCT CATALOG

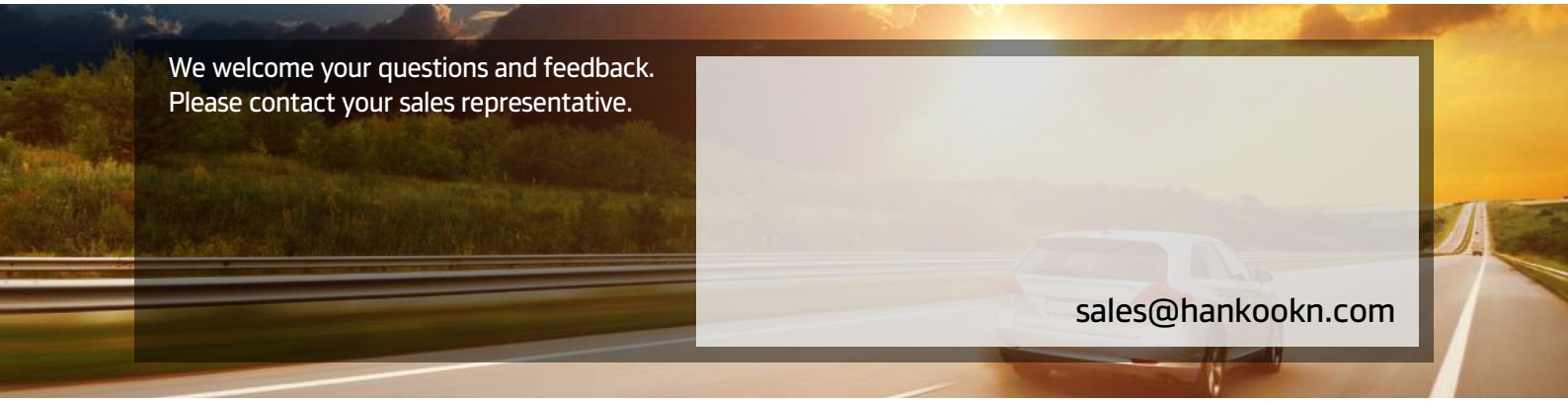
US EDITION

Powering Motion
With HANKOOK Batteries

Global Network

HQ Office R&D Plant DC

Contact Us



Automotive **AGM**

AGM Technology | High DURABILITY Plate Tech. | X FRAME Stamped Grid | Start Stop

Hankook AGM Batteries feature highly reliable Absorbent Glass Mat technology, providing the best solution for start-stop and premium vehicle applications.

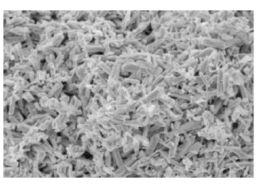
- Up to 4x the battery life compared to regular MF batteries (for start-stop vehicles)
- Strengthened cranking power with Advanced X-Frame Technology
- Fast charging time via Dynamic Charging Control Technology
- Enhanced cycle life designs for all vehicles
- Spill proof design for enhanced safety

Technology

Hankook AGM Features
- Enhanced Cycle Life Performance
- Advanced Tetrabasic Lead Sulfate
- AGM Dynamic Charging Capability
- Carbon Black Technology

High Durability Plate Features
- Thicker Grid X-FRAME yields thicker plate
- Advanced Grid Structure for Long Life
- Advanced Grid Design for Extra Power

Other Features
- AGM Separator
- 6 Valve Design
- Micro Fiber
- Ca/Ca-Sn
- Eco-Friendly
- Spark Arrestor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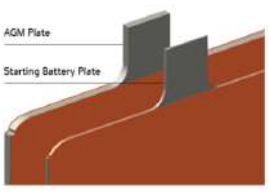

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Automotive EFB

EFB Technology | High DURABILITY Plate Tech. | X FRAME Stamped Grid | Start Stop

Hankook EFB Batteries provide significant improvements to the traditional flooded battery designs. These batteries offer improved life cycles for start-stop as well as standard vehicle applications.

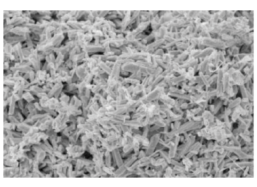
- Up to 3x the battery life compared to regular MF batteries (for start-stop vehicles)
- Increased cranking power with Advanced X-Frame Technology
- Fast charging time via Dynamic Charging Control Technology
- Enhanced deep discharge with cycle proof design for start-stop vehicles

Technology

Hankook EFB Features
- Increased Cycle Life
- Advanced Tetrabasic Lead Sulfate
- Dynamic Charging Control Tech
- Carbon Black Additive

High Durability Plate Features
- Thicker Grid X-FRAME
- Advanced Grid Structure for Long Life
- Advanced Grid Design for Extra Power

Other Features
- PET Tissue
- Micro Fiber
- Ca/Ca-Sn
- Eco-Friendly
- Spark Arrestor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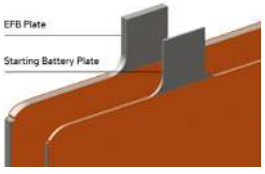

<X-FRAME plate>


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Automotive **SMF**

SMF Technology | High DURABILITY Plate Tech. | X FRAME Stamped Grid

Hankook sealed maintenance free batteries are the ideal choice for vehicles with standard power and battery life requirements. With the advantage of maintenance free designs, they provide reliable power for many applications.

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

Technology

Hankook SMF Features

- The Electrolyte-Retrieving Cover Structure Minimizes Electrolyte Loss Even Under Prolonged Use or Harsh Environments

High Durability Plate Features

- The Advanced Grid Structure for Long Life
  The Advanced Grid Design for Extra Power

Other Features

- PET Tissue
- Micro Fiber
- Eco-Friendly
- Spark Arrestor

<Advanced Sealed Double Lid>


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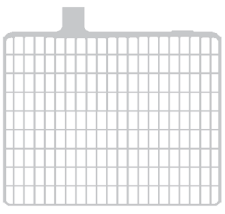
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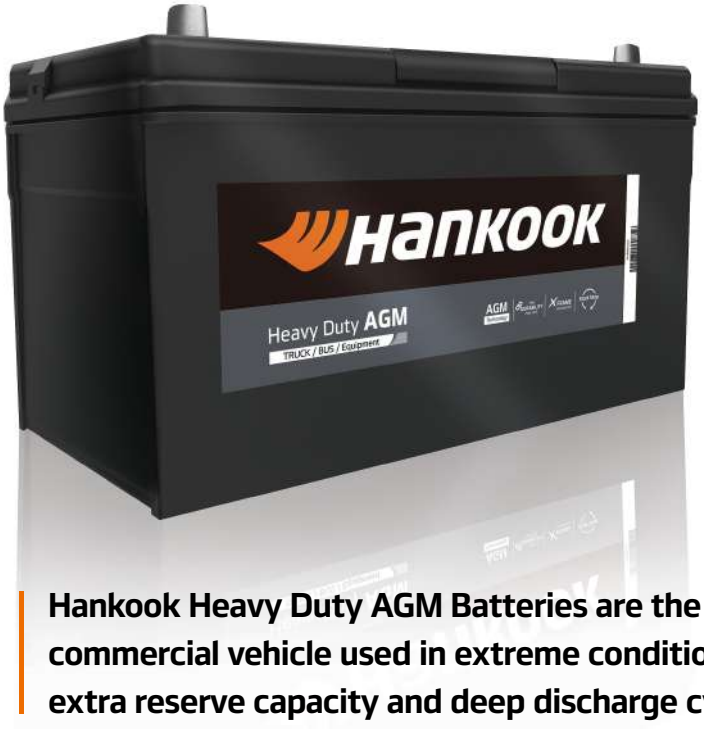
Heavy-Duty **AGM**



AGM Technology | High DURABILITY Plate Tech. | X FRAME Stamped Grid | Start Stop

Hankook Heavy Duty AGM Batteries are the perfect power solution for modern commercial vehicle used in extreme conditions. They provide the high starting power, extra reserve capacity and deep discharge cycle life for the most demanding applications.

- Up to 4x the battery life compared to regular MF batteries (for start-stop vehicles)
- Strengthened cranking power with Advanced X-Frame Technology
- Fast charging time via Dynamic Charging Control Technology
- Enhanced deep discharge with cycle proof design for start-stop vehicles
- Premium safety and high performance with AGM VRLA design

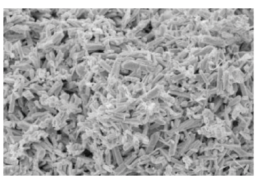
Technology

Hankook AGM Features

- Enhanced Starting Power and Cycle Life
- Highest Vibration resistance
- Extreme endurance
- Spill proof design

Other Features

- X-Frame plus
- VRLA AGM Tech.
- Carbon plus
- Spark Arrestor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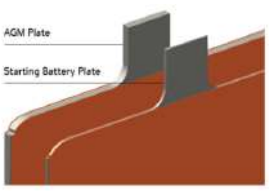


<AGM Plate>

<AGM Separator>

Heavy-Duty Maintenance Free

SMF Technology | High DURABILITY Plate Tech. | X FRAME Stamped Grid

Hankook heavy duty batteries are the ideal choice for commercial vehicles with high power demands. They are maintenance free and provide power support that you can rely on.

- Long service life in most common vehicle use conditions
- Increased cranking power compared with standard batteries
- Maintenance free Designs that meet the water consumption requirements of HD battery applications
- Long lasting and designs that extend battery

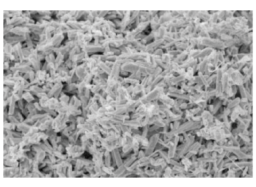
Technology

Hankook HD Features

- Reliable starting power
- Stable Reserve Capacity
- Absolutely maintenance Free
- High vibration resistance

Other Features

- X-Frame plus
- Advance Ca/Ca
- HD Standard
- Heat sealed lid
- Spark Arrestor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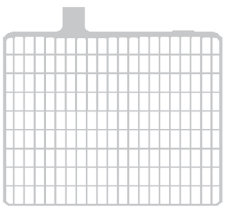

<X-FRAME plate>


<PET Tissue>

Marine & RV

Marine and RV AGM

AGM Tech. Deep Cycling & Starting

Hankook Dual Purpose AGM can be used to start the engine and deliver service power for accessories and electronics.
It's premium spill-proof design brings essential convenience and safety to the water sports & RV enthusiast.

- Longer deep cycle life
- Stable power supply
- Protection against vibration and deep cycle damage
- Easy handling and safety with spill-proof design

Marine and RV XDC

SMF Deep Cycle

Extreme Deep Cycle Battery is for ideal deep cycle service.
With long lasting battery life that is maintenance-free, it's ideal for seasonal use.

- Deep cycle capability
- Stable power supply with moderate energy requirements
- Maintenance free design
- Robust Dual terminal for convenient connection

Marine and RV DC

SMF Dual Purpose

Dual Purpose Battery is the ideal compromise between high cranking power and extra reserve power for accessory loads.

- Extra reserve capacity for accessory loads
- Stable power supply with moderate energy requirements
- Maintenance free design
- Robust Dual terminal for convenient connection

Marine and RV XV

SMF Starting

Hankook XV Battery is developed to meet the needs of water sports & RV enthusiasts by offering stronger power while using electronic system compared to any other general battery.

- High cranking power for quick engine start
- Robust Dual terminal for convenient connection
- Maintenance free design

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
C31	AGMC31-925	925	200	13 1/16	6 13/16	9 7/16	18	Threaded Post	B0
140R	AGM140R-540	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
51R	AGM51R-450	450	80	9 3/8	5 1/16	8 3/4	11	SAE Post	B1
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	AGM95R-950	950	205	15 1/2	6 15/16	7 1/2	24	SAE Post	B13
B20	AGM S34B20R	340	57	7 23/32	5	8 15/16	10	SAE Post	B0

Automotive EFB Batteries

47	EFB 47-560	560	120	9 9/16	6 15/16	7 1/2	24	SAE Post	B13
48	EFB 48-650	650	135	11	6 15/16	7 1/2	24	SAE Post	B13
94R	EFB 94R-730	730	160	12 7/16	6 15/16	7 1/2	24	SAE Post	B13

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
35	"AGM S55D23R (AGM35-550)"	550	85	8 13/16	6 7/8	8 11/16	10	SAE Post	B0
151	MF 60B19RS (*T)	450	75	7 3/8	5	8 11/16	10	SAE Post	B0
402R	402R (*T)	450	30	7 3/4	5 3/16	7 5/16	11	SAE Post	B0

*T : For T 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			
22F	MF22F-425	425	65	9 1/2	6 15/16	8 5/16	11F	DUAL FIT	B9
	MF22F-580	580	95	9 1/2	6 15/16	8 5/16	11F	DUAL FIT	B9
24	MF24-480	480	100	10 1/4	6 13/16	8 7/8	10	SAE Post	B1
	MF24-575	575	115	10 1/4	6 13/16	8 7/8	10	SAE Post	B1
	MF24-630	630	125	10 1/4	6 13/16	8 7/8	10	SAE Post	B1
	MF24-750	750	155	10 1/4	6 13/16	8 7/8	10	SAE Post	B1
24F	MF24F-480	480	100	10 3/4	6 13/16	9	11F	SAE Post	B9
	MF24F-580	580	115	10 3/4	6 13/16	9	11F	SAE Post	B9
	MF24F-630	630	125	10 3/4	6 13/16	9	11F	SAE Post	B9
	MF24F-750	750	155	10 3/4	6 13/16	9	11F	SAE Post	B9
25	MF25-450	450	80	9 1/16	6 15/16	8 7/8	10	SAE Post	B1
	MF25-540	540	90	9 1/16	6 15/16	8 7/8	10	SAE Post	B1
26	MF26-580	580	110	8 3/16	6 13/16	7 3/4	10	SAE Post	B1
26R	MF26R-400	400	70	8 3/16	6 13/16	7 3/4	11	SAE Post	B1
	MF26R-500	500	80	8 3/16	6 13/16	7 3/4	11	SAE Post	B1
	MF26R-580	580	110	8 3/16	6 13/16	7 3/4	11	SAE Post	B1
27	MF27-750	750	150	12 1/16	6 13/16	8 11/16	10	SAE Post	B1
	MF27-840	840	180	12 1/16	6 13/16	8 11/8	10	SAE Post	B1
27F	MF27F-750	750	150	12 1/2	6 13/16	8 11/16	11F	SAE Post	B9
	MF27F-840	840	180	12 1/2	6 13/16	8 11/16	11F	SAE Post	B9
34	MF34-585	585	100	10 1/4	6 13/16	7 7/8	10	SAE Post	B1
	MF34-690	690	130	10 1/4	6 13/16	7 7/8	10	SAE Post	B1
	MF34-750	750	155	10 1/4	6 13/16	7 7/8	10	SAE Post	B1
35	MF35-450	450	80	9 1/16	6 15/16	8 7/8	11	SAE Post	B1
	MF35-540	540	90	9 1/16	6 15/16	8 7/8	11	SAE Post	B1
	MF35-700	700	130	9 1/16	6 15/16	8 7/8	11	SAE Post	B1
36R	MF36R-650	650	130	10 1/4	7 3/16	7 7/8	11	SAE Post	B1
40R	MF40R-650	650	125	11	6 15/16	6 15/16	24	SAE Post	B1
41	MF41-800	800	135	11 9/16	6 15/16	6 15/16	24	SAE Post	B4
42	MF42-550	550	90	9 9/16	6 15/16	6 15/16	24	SAE Post	B4
47	MF47-500	500	90	9 9/16	6 15/16	7 1/2	24	SAE Post	B13
	MF47-650	650	125	9 9/16	6 15/16	7 1/2	24	SAE Post	B13
48	MF48-550	550	105	11	6 15/16	7 1/2	24	SAE Post	B13
	MF48-690	690	130	11	6 15/16	7 1/2	24	SAE Post	B13
	MF48-790	790	150	11	6 15/16	7 1/2	24	SAE Post	B13
49	MF49-770	770	150	13 15/16	6 15/16	7 1/2	24	SAE Post	B13
	MF49-900	900	200	13 15/16	6 15/16	7 1/2	24	SAE Post	B13

Automotive Sealed Maintenance Free Batteries

Gr. No.	Type No.	SAE CCA (0°F)	RC (min.)	Dimension (Inches)			Layout	Terminal	Hold -Down
				L	W	TH			
51	MF51-430	430	75	9 3/8	5 1/16	8 3/4	10	SAE Post	B1
	MF51-500	500	88	9 3/8	5 1/16	8 3/4	10	SAE Post	B1
51R	MF51R-430	430	75	9 3/8	5 1/16	8 3/4	11	SAE Post	B1
	MF51R-500	500	88	9 3/8	5 1/16	8 3/4	11	SAE Post	B1
56	MF56-590	590	95	10 1/16	5 7/8	8 5/16	11	SAE Post	B1
58	MF58-450	450	73	10 1/16	7 3/16	6 15/16	26	SAE Post	B8
	MF58-510	510	90	10 1/16	7 3/16	6 15/16	26	SAE Post	B8
	MF58-550	550	90	10 1/16	7 3/16	6 15/16	26	SAE Post	B8
58R	MF58R-580	580	100	10 1/16	7 3/16	6 15/16	19	SAE Post	B8
59	MF59-590	590	100	9 9/16	7 9/16	7 9/16	10	SAE Post	B8
65	MF65-615	615	120	12	7 7/16	7 1/2	10	SAE Post	B8
	MF65-700	700	115	12	7 7/16	7 1/2	10	SAE Post	B8
	MF65-780	780	140	12	7 7/16	7 1/2	10	SAE Post	B8
	MF65-850	850	145	12	7 7/16	7 1/2	10	SAE Post	B8
70	MF70-500	500	80	8 3/16	7 1/16	7 5/16	17	SIDE	B1
75	MF75-585	585	90	9 1/16	7 1/16	7 5/16	17	SIDE	B1
	MF75-635	635	120	9 1/16	7 1/16	7 5/16	17	SIDE	B1
	MF75-700	700	100	9 1/16	7 1/16	7 5/16	17	SIDE	B1
78	MF78-580	580	90	10 1/4	7 1/16	7 5/16	17	SIDE	B1
	MF78-800	800	110	10 1/4	7 1/16	7 5/16	17	SIDE	B1
79	MF79-840	840	140	12 3/64	7 3/64	7 1/8	17	SIDE	B1
85	MF85-610	610	105	9 1/16	6 13/16	8	11	SAE Post	B1
86	MF86-530	530	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	MF91-700	700	130	11	6 15/16	6 15/16	24	SAE Post	B13
93	MF93-800	800	150	13 15/16	6 15/16	6	24	SAE Post	B13
94R	MF94R-750	750	135	12 7/16	6 15/16	7	24	SAE Post	B13
	MF94R-800	800	170	12 7/16	6 15/16	7	24	SAE Post	B13
	MF94R-900	900	180	12 7/16	6 15/16	7	24	SAE Post	B13
96R	MF96R-610	610	110	9 1/2	7	6	15	SAE Post	B1
121R	MF121-600	600	98	8 1/4	6 15/16	8	11H	SAE Post	B1
124R	MF124R-700	700	120	10 1/4	6 13/16	8	11H	SAE Post	B1
151R	MF151R-330	330	55	7 7/16	4 15/16	8	28	SAE Post	B0

Dual Terminal Automotive

Gr. No.	Type No.	SAE CCA (0°F)	RC (min.)	Dimension (Inches)			Layout	Terminal	Hold -Down
				L	W	TH			
70DT	MF70DT-400	400	60	8 3/16	7 1/16	7 7/8	17	SIDE and SAE	B1
	MF70DT-500	500	80	8 3/16	7 1/16	7 7/8	17	SIDE and SAE	B1
75DT	MF75DT-500	500	80	9 1/16	7 1/16	7 7/8	17	SIDE and SAE	B1
	MF75DT-585	585	90	9 1/16	7 1/16	7 7/8	17	SIDE and SAE	B1
	MF75DT-650	650	120	9 1/16	7 1/16	7 7/8	17	SIDE and SAE	B1
78DT	MF78DT-500	500	80	10 1/4	7 1/16	7 7/8	17	SIDE and SAE	B1
	MF78DT-580	580	90	10 1/4	7 1/16	7 7/8	17	SIDE and SAE	B1
	MF78DT-750	750	120	10 1/4	7 1/16	7 7/8	17	SIDE and SAE	B1

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	C31-800	800	180	13 1/16	6 3/16	9 1/8	18	Threaded Post	B0
	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
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

*8D Bus Terminal is available.

Product List

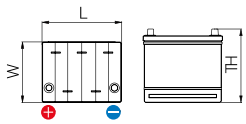
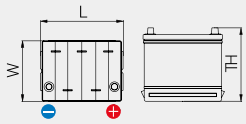
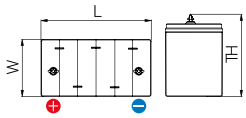
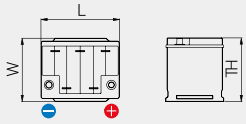
Marine and RV

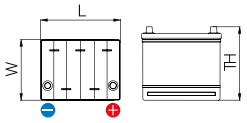
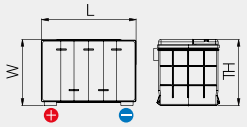
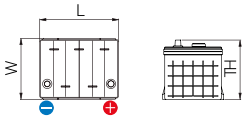
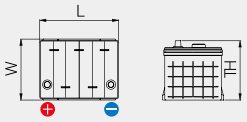
Gr. No.	Type No.	SAE CCA (0°F)	MCA (0°C)	RC (min.)	Dimension (Inches)			Layout	Terminal	Hold -Down
					L	W	TH			
Marine and RV AGM Batteries (Dual Purpose)										
24	AGM24-750	750	900	140	10 1/4	6 13/16	8 7/8	10	Marine Twin	B1
24R	AGM24R-750	750	900	140	10 1/4	6 13/16	8 7/8	11	Marine Twin	B1
27	AGM27-750	750	900	175	12	6 3/4	8 11/16	10	Marine Twin	B1
27R	AGM27R-750	750	900	175	12	6 3/4	8 11/16	11	Marine Twin	B1
C31	AGMC31-800	800	960	180	13 1/16	6 13/16	9 1/8	18	Threaded Post	B0
	AGMC31-925	925	1000	200	13 1/16	6 13/16	9 1/8	18	Threaded Post	B0
XDC - Deep Cycle										
24	XDC24-500	500	625	120	10 1/4	6 13/16	8 7/8	10	Marine Twin	B1
27	XDC27-600	600	750	150	12 1/16	6 13/16	8 7/8	10	Marine Twin	B1
31	XDC31-650	650	810	180	13	6 13/16	9 7/16	18	Marine Twin	B0
DC - Dual Purpose										
24	DC24-680	680	850	140	10 1/4	6 13/16	8 7/8	10	Marine Twin	B1
27	DC27-750	750	920	170	12 1/16	6 13/16	8 7/8	10	Marine Twin	B1
31	DC31-800	800	1000	180	13	6 13/16	9 7/16	18	Marine Twin	B0
XV - Marine and RV Starting										
24	XV24-600	600	750	125	10 1/4	6 13/16	8 7/8	10	Marine Twin	B1
	XV24-800	800	1000	140	10 1/4	6 13/16	8 7/8	10	Marine Twin	B1
27	XV27-720	720	900	155	12 1/16	6 13/16	8 7/8	10	Marine Twin	B1
31	XV31-800	800	1000	180	13	6 13/16	9 7/16	18	Marine Twin	B0

TECHNICAL INFORMATION

Layout / Terminals / Hold-down

LAYOUT

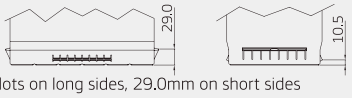
10	
11F	
18	
24	

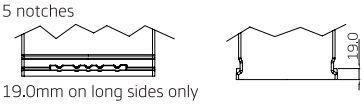
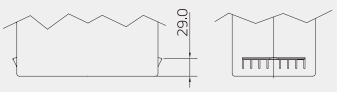
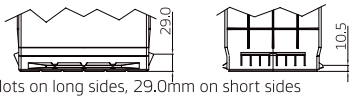
11	
17	
19	
26	

TERMINALS

Termial	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	 10.5mm on long sides only
B5	 slots on long sides, 29.0mm on short sides
B8	 13.5mm on long sides only
B13	5 notches  10.5mm on all four sides

B4	5 notches  19.0mm on long sides only
B6	
B9	 slots on long sides, 29.0mm on short sides
B14	5 notches  19.0mm on all long sides, 10.5mm on short sides

** 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


KEEP
UPRIGHT


NEVER TIP
OVER 45°


RECYCLING


NO SPARKS,
FLAMES OR SMOKING


SHIELD
EYES


KEEP AWAY
FROM CHILDREN


CORROSIVE
HAZARD


EXPLOSION
HAZARD


READ INSTRUCTION
MANUAL CAREFULLY

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.

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 recommeds the test defined in global standards to confirm rated specifications.

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*

TABLE 2. Load Test

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

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.	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
12.3 - 12.39V	10 Hr.																				
12.2 - 12.29V	14 Hr.																				
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.	2.0 A	2.5 A	3.0 A	3.5 A	4.0 A	4.5 A	5.0 A	5.5 A
12.4 - 12.49V	9 hr.								
12.3 - 12.39V	12 hr.								
12.2 - 12.29V	15 hr.								
12.1 - 12.19V	18 hr.								
12.0 - 12.09V	21 hr.								
Below 11.99V	24 hr.								

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