



# RENEWABLE ENERGY & PARTIAL STATE OF CHARGE SOLUTIONS



DESIGNED FOR USE IN SOLAR,  
RENEWABLE, WIND AND HYBRID  
ENERGY SYSTEMS AND SOLUTIONS

# POWER YOU CAN DEPEND ON

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C&D Technologies delivers world-class power solutions for mission-critical industrial applications around the world. As a trusted power solutions provider for more than 100 years, C&D is committed to providing high quality, reliable and cost-effective products and services.

C&D Technologies has been producing batteries used in deep cycle applications for more than 20 years. As industry requirements change, C&D developed products for emerging Renewable Energy that required Partial State of Charge (PSoC). The AES Series of sealed VRLA AGM batteries feature advanced DCS technology and C&D Nano-Carbon™ technology for extensive cycle life. The AES series is built around a space efficient and cost effective case that allows for scalable installations.

Since uptime is essential to the renewable energy market, incorporating C&D's AES Series into a system ensures enhanced customer satisfaction and retention while delivering a proven cost-effective solution. **All day, every day.**

## APPLICATIONS

- ◆ Remote/Hybrid Sites
- ◆ Grid Scale Energy Storage
- ◆ Communications
- ◆ Cycling Applications
- ◆ Off-Grid/Renewable

# PROTECT YOUR POWER WITH OUR EFFECTIVE ANTI-THEFT DEVICE

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Our simple, yet effective, anti-theft solution is designed to provide added security to any power grid, giving you the confidence and peace-of-mind in knowing your batteries are secured wherever they're stored.

## BENEFITS:

- ◆ Strength in design
- ◆ Hardened stainless steel covers
- ◆ Stainless steel shear bolts intentionally break off during installation
- ◆ Added security for individual batteries through cover bar lengths and assembly
- ◆ Kit availability for AES Series batteries

## COMPONENTS PER CONNECTION:

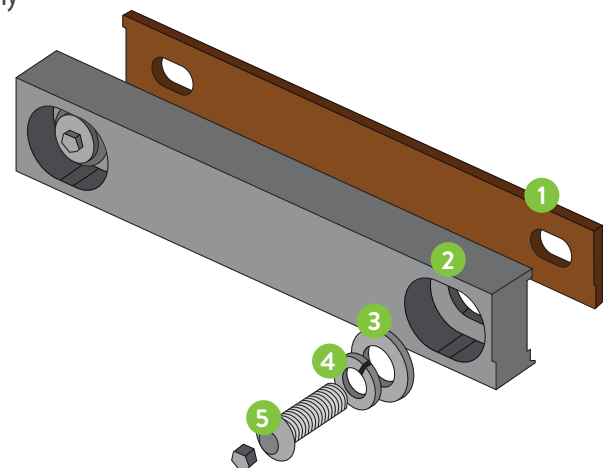
**Item 1:** Copper connector

**Item 2:** Hardened stainless steel connector cover

**Item 3:** ¼" flat-&-lock washer

**Item 4:** ¼"-20×¾" shear bolt button head screws – A2 stainless steel

**Item 5:** Disposed shear bolt stud – breaks off at assembly



# ADVANCED ENERGY STORAGE

AES AGM batteries with C&D Nano-Carbon™ technology offer a longer service life in demanding deep-cycle applications (see application charts on page 5). They are designed to meet the demanding needs of grid-tied and off-grid energy applications requiring back-up power. These versatile maintenance-free batteries can be used in upright, side or end mounted orientations—no watering required.

- ◆ C&D Nano-Carbon™ technology enhanced active material to maximize cycle performance and PSoC operation
- ◆ Terminal versatility – ease of ohmic readings with C&D Ohmic Ring®  
(Available on front terminal batteries: AES12-2170F and AES 12-2870F)
- ◆ Threaded copper alloy inserts for reduced maintenance and increased safety
- ◆ High-strength, leak-free polymer container allows for non-restricted shipping:  
Water: non-hazardous per IMDG Amendment 27 Surface:  
non-hazardous per DOT-CFR title 49, 171-189 Air: IATA/ICAO, provision A67
- ◆ 100% helium leak tested and dielectric tested to ensure seal integrity
- ◆ Design uses UL certified vents
- ◆ Non-Hazardous for Transportation
- ◆ Extended service life in elevated temperature applications
- ◆ UL94-V0 Compliant Case and Cover



## STRONG DESIGN

In any application where the battery may face extreme temperature, shock, or vibration conditions, a rugged case is key to maintaining battery performance over time. All AES batteries are encased in a strong propylene case that protects all the battery's components and ensures that the battery will work day after day in the most demanding environments.

AES 7.5-1600



AES 8.0-1600



AES 12-2170F



AES 12-2870F



# WHAT IS C&D NANO-CARBON™ TECHNOLOGY?

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Traditional lead calcium batteries suffer pre-mature failure in cycling applications due to deterioration of the active material on the plates. C&D's Nano-Carbon technology is the solution. By enhancing the negative active material with C&D Nano-Carbon™ technology, the AES series is able to provide a long service life in cycling applications.

## HIGH SURFACE AREA CARBON

- ◆ Specially formulated carbon additive for improving the Negative Active Material (NAM)
- ◆ Increases conductivity and adds additional capacitance to the negative electrode
- ◆ Improves cell to cell consistency for balance in larger systems

## NANO-SCALE ADDITIVES

- ◆ Provides additional surface area needed to maintain discharge reactions
- ◆ Maintains the NAM in deep cycle applications
- ◆ Improves charge efficiency and allows Partial state of charge (PSoC) operation
- ◆ Improves deep discharge recovery



## HIGH TEMPERATURE CARBON ADDITIVES

- ◆ Preserves more carbon material in the plate
- ◆ High temperature resistance for cycle applications in hot environments and heavy cycle applications that keep the battery operating at higher temperatures

## ACHIEVING LONGER LIFE

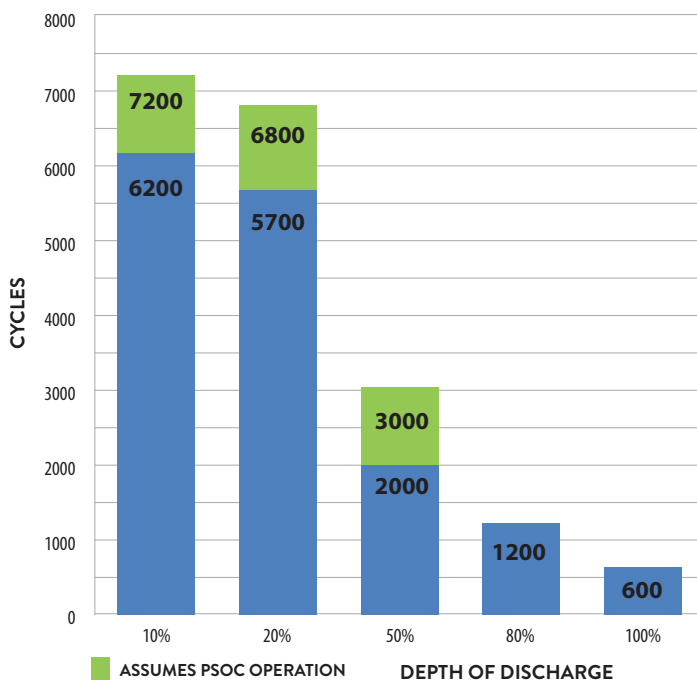
The key to the long service life of our AES batteries is our robust proprietary technologies. C&D Nano-Carbon™ technology formulation enhances life by improving charging efficiency while supporting cyclic PSoC operation. C&D's DCS technology features advanced plate technology for recharge efficiency and rugged cases are proven in real world environments. Quality manufacturing processes along with 100+ years of battery design helps provide AES batteries will last for years in your application.

# AES BATTERY SPECIFICATIONS

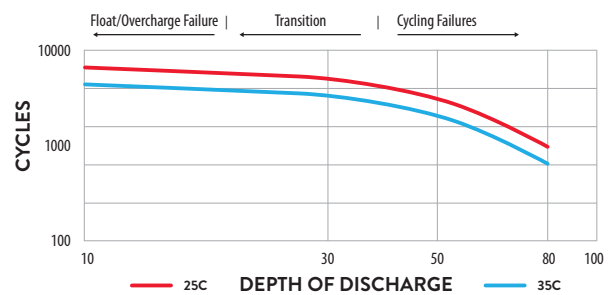
MODEL NAME	VOLTAGE	CAPACITY AMP-HOURS (Ah) @ 77°F (25°C)	CAPACITY AMP-HOURS (Ah) @ 77°F (25°C)	MAX DISCHARGE	INTERNAL RESISTANCE	MAX SHORT CIRCUIT CURRENT (PER IEC 60986)	DIMENSIONS INCHES (mm)			WEIGHT LBS. (kg)
		20-Hr RATE	100-Hr RATE				LENGTH	WIDTH	HEIGHT	
<b>ADVANCED ENERGY STORAGE</b>										
<b>AES 7.5-1600</b>	7.5 VOLT	168	182	800A	2.60	3270	10.4 (263)	7.1 (180)	11.3 (286)	82 lbs (37 kg)
<b>AES 8.0-1600</b>	8.0 VOLT	168	182	800A	2.60	3270	10.4 (263)	7.1 (180)	11.3 (286)	82 lbs (37 kg)
<b>AES 12-2170F</b>	12 VOLT	192	209	800A	4.60	2729	22.0 (559)	5.0 (126)	12.7 (322)	134 lbs (61 kg)
<b>AES 12-2870F</b>	12 VOLT	224	242	800A	3.60	3477	22.0 (559)	6.1 (154)	12.7 (322)	161 lbs (73 kg)

<b>SPECIFICATIONS</b>			
<b>OPERATING TEMPERATURE</b>	Discharge: -40°C (-40°F) to +60°C (160°F) Charge: -23°C (-10°F) to +60°C (140°F)		
<b>MAXIMUM CHARGING CURRENT LIMIT</b>	0.6 C <sub>10</sub>		
<b>FLOAT CHARGING VOLTAGE</b>	12.27V per Cell at 25°C (77°F)		
<b>SELF DISCHARGE</b>	Battery can be stored up to 6 months at 25°C (77°F) before freshening charge is required. Batteries stored at temperatures greater than 25°C (77°F) will require recharge sooner than batteries stored at lower temperatures. See C&D operational anual 41-7272, Self-Discharge andn Inventory Control for details.		
<b>EQUALIZE CHARGING &amp; CYCLE SERVICE VOLTAGE</b>	2.4V per Cell at 25°C (77°F)		
<b>TERMINAL</b>	<b>AES 7.5-1600 &amp; AES 8.0-1600</b> Threaded copper alloy insert terminal to accept: 1/4-20 UNC bolt	<b>AES 12-2170F</b> Threaded copper alloy insert terminal to accept: M8 bolt	<b>AES 12-2870F</b> Threaded copper alloy insert terminal to accept: M8 bolt
<b>TERMINAL HARDWARE TORQUE</b>	<b>AES 7.5-1600 &amp; AES 8.0-1600</b> 12.4N-M (110in. -lbs)	<b>AES 12-2170F</b> 18N-M (160in. -lbs)	<b>AES 12-2870F</b> 18N-M (160in. -lbs)

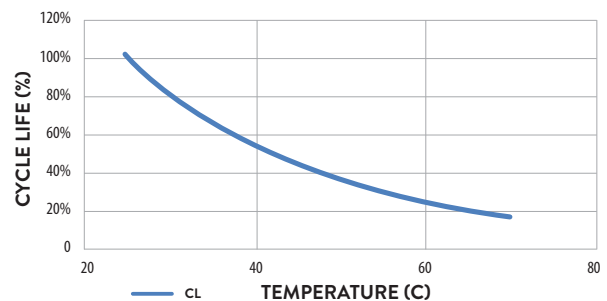
**DEPTH OF DISCHARGE VS. CYCLES<sup>1</sup>**



**APPLICATION AND TYPICAL FAILURE MODE<sup>1</sup>**

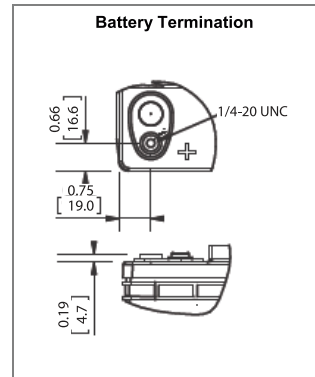
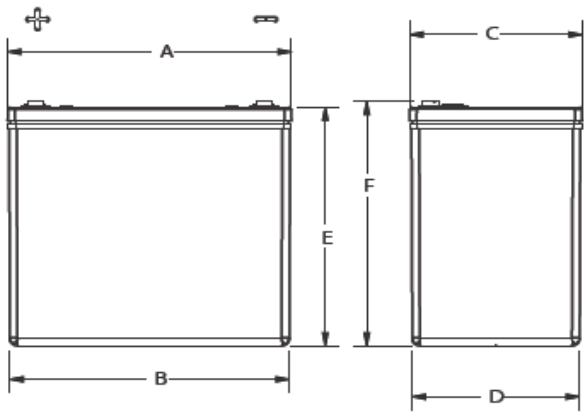


**CYCLE LIFE VS. TEMPERATURE<sup>1</sup>**



1 - Data taken from AES-2170F and representative of AES battery family

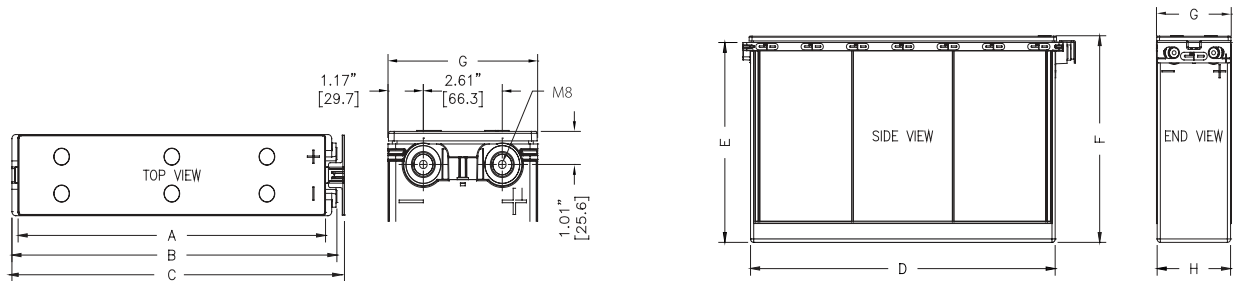
# DIMENSIONS & WEIGHTS



AES 7.5-1600 & AES 8.0-1600					
A	B	C	D	E	F
10.4 (263)	9.4 (239)	7.1 (180)	6.8 (172)	11.2 (283)	11.3 (286)

\*All dimensions in inches and (millimeters). All dimensions are for reference only. Contact a C&D Representative for complete dimensions information.

\*Note: Batteries to be mounted with 0.5 IN (12.5MM) spacing minimum and free air ventilation.



AES 12-2170F & AES 12-2870F								
MODEL	A	B	C	D	E	F	G	H
<b>AES 12-2170F</b>	20.4 (518)	21.6 (547)	22 (559)	20 (512)	12.2 (311)	12.7 (322)	5 (126)	4.9 (123)
<b>AES 12-2870F</b>	20.4 (518)	21.6 (547)	22 (557)	20 (512)	12.2 (311)	12.7 (322)	6.1 (155)	6 (153)

\*All dimensions in inches and (millimeters). All dimensions are for reference only. Contact a C&D Representative for complete dimensions information.

\*Note: Batteries to be mounted with 0.5 IN (12.5MM) spacing minimum and free air ventilation.



# PERFORMANCE RATINGS

## CONSTANT CURRENT DISCHARGE RATINGS - AMPERES @ 77°F (25°C)

MODEL	VOLTAGE	Operating Time (hr.) to 1.8 Volts per Cell									
		5	8	10	12	20	24	48	72	100	120
AES 7.5-1600	8	28.3	18.9	15.5	13.1	8.3	7.1	3.6	2.5	1.8	1.5
AES 8.0-1600	8	28.3	18.9	15.5	13.1	8.3	7.1	3.6	2.5	1.8	1.5
AES 12-2170F	12	31.3	20.9	17.2	14.7	9.5	8.1	4.2	2.8	2.1	1.7
AES 12-2870F	12	35.4	23.8	20.0	17.0	11.0	9.4	4.8	3.3	2.4	2.0

## CONSTANT CURRENT DISCHARGE RATINGS - AMPERES @ 86°F (30°C)

MODEL	VOLTAGE	Operating Time (hr.) to 1.8 Volts per Cell									
		5	8	10	12	20	24	48	72	100	120
AES 7.5-1600	8	29.6	19.8	16.2	13.7	8.7	7.4	3.8	2.6	1.88	1.6
AES 8.0-1600	8	29.6	19.8	16.2	13.7	8.7	7.4	3.8	2.6	1.88	1.6
AES 12-2170F	12	32.7	21.9	18.0	15.4	9.9	8.5	4.4	2.9	2.14	1.8
AES 12-2870F	12	37.0	24.9	20.9	17.8	11.5	9.8	5.0	3.5	2.49	2.1

## CONSTANT POWER DISCHARGE RATINGS - WATTS PER CELL @ 77°F (25°C)

MODEL	VOLTAGE	Operating Time (hr.) to 1.8 Volts per Cell									
		1	3	4	5	8	10	12	20	24	100
AES 7.5-1600	8	192.5	79.9	63.2	52.7	36.0	30.0	25.7	16.3	13.9	3.5
AES 8.0-1600	8	192.5	79.9	63.2	52.7	36.0	30.0	25.7	16.3	13.9	3.5
AES 12-2170F	12	206.0	89.4	70.6	59.2	40.8	34.1	29.1	18.6	15.9	4.0
AES 12-2870F	12	230.6	100.6	80.6	67.7	46.9	39.1	33.5	21.7	18.5	4.6

## CONSTANT POWER DISCHARGE RATINGS - WATTS PER CELL @ 86°F (30°C)

MODEL	VOLTAGE	Operating Time (hr.) to 1.8 Volts per Cell									
		1	3	4	5	8	10	12	20	24	100
AES 7.5-1600	8	201.4	83.6	66.2	55.2	37.6	31.4	26.9	17.0	14.5	3.6
AES 8.0-1600	8	201.4	83.6	66.2	55.2	37.6	31.4	26.9	17.0	14.5	3.6
AES 12-2170F	12	215.5	93.5	73.8	61.9	42.7	35.6	30.4	19.5	16.6	4.2
AES 12-2870F	12	241.2	105.2	84.3	70.8	49.0	40.8	35.1	22.6	19.3	4.8



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