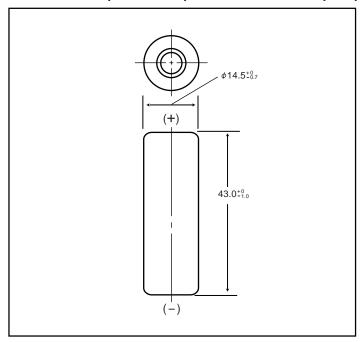
## HHR120AA Cylindrical 4/5AA size (HR 15/43)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 14.5+0/-0.7 | 0.57+0/-0.03 |
| Height      | 43.0+0/-1.0 | 1.69+0/-0.04 |
| Approximate | Grams       | Ounces       |
| Weight      | 23          | 0.81         |

| Nominal Voltage        |  | 1.2V                   |                         |               |
|------------------------|--|------------------------|-------------------------|---------------|
| Discharge<br>Capacity* |  | Average**              | 1220 mAh                |               |
|                        |  | Rated (Min.)           | 1150 mAh                |               |
|                        | prox. Internal impedance<br>1000Hz at charged state. |                        | 19mΩ                    |               |
| Charge Standard        |  | 120mA (0.1lt) x 16hrs. |                         |               |
|                        | 90   | Rapid                  | 1200mA (1lt) x 1.2 hrs. |               |
|                        |  | Standard               | °C                      | °F            |
| gu                     | Charge   | Standard               | 0°C to 45°C             | 32°F to 113°F |
| i i j                  |  | Rapid                  | 0°C to 40°C             | 32°F to 104°F |
| bie                    | Dis  | charge                 | -10°C to 65°C           | 14°F to 149°F |
| Ambient<br>Temperature |  | < 1 year               | -20°C to 35°C           | -4°F to 95°F  |
| <u> </u>               | Storage  | < 3 months             | -20°C to 45°C           | -4°F to 113°F |
|                        |  | < 1 month              | -20°C to 55°C           | -4°F to 131°F |

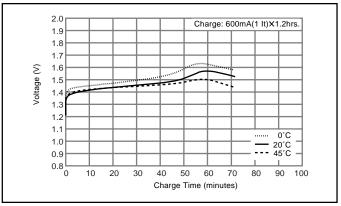
- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.

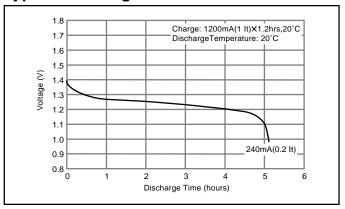
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

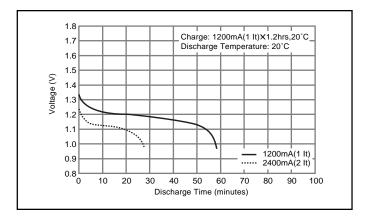
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



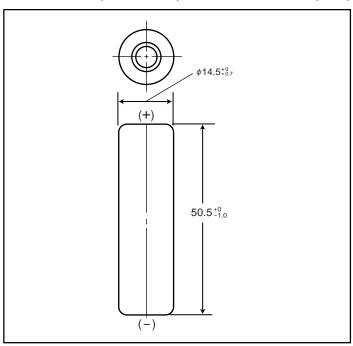




## HHR150AA Cylindrical AA size (HR 15/51)

## **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 14.5+0/-0.7 | 0.57+0/-0.03 |
| Height      | 50.0+0/-1.0 | 1.97+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 26          | 0.92         |

| Nominal Voltage  |         | 1.2V                   |                         |               |
|--|---------|------------------------|-------------------------|---------------|
| Discharge<br>Capacity*                                 |         | Average**              | 1580 mAh                |               |
|  |         | Rated (Min.)           | 1500 mAh                |               |
| Approx. Internal impedance at 1000Hz at charged state. |         | 20mΩ                   |                         |               |
| Charge Standard  |         | 150mA (0.1lt) x 16hrs. |                         |               |
|  | 90      | Rapid                  | 1500mA (1lt) x 1.2 hrs. |               |
|  |         | Standard               | °C                      | °F            |
| gy .   | Charge  | Standard               | 0°C to 45°C             | 32°F to 113°F |
| 其其   |         | Rapid                  | 0°C to 40°C             | 32°F to 104°F |
| Ambient<br>Temperature                                 | Dis     | charge                 | -10°C to 65°C           | 14°F to 149°F |
| m M m  |         | < 1 year               | -20°C to 35°C           | -4°F to 95°F  |
| <u>P</u>   | Storage | < 3 months             | -20°C to 45°C           | -4°F to 113°F |
|  |         | < 1 month              | -20°C to 55°C           | -4°F to 131°F |

- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.

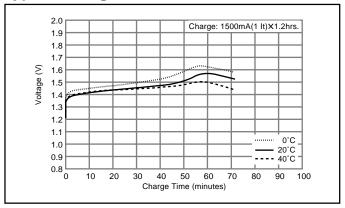
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

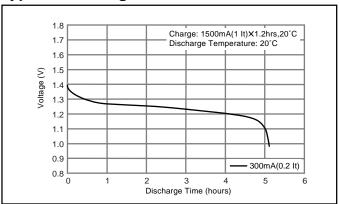
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:

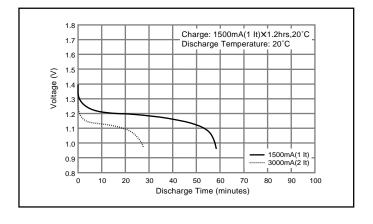
It(A) = Cn (Ah)/1h.

- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



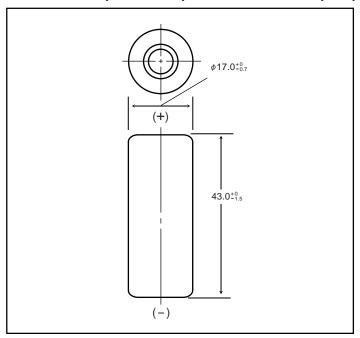




# HHR200A Cylindrical 4/5A size (HR 17/43)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 17.0+0/-0.7 | 0.67+0/-0.03 |
| Height      | 43.0+0/-1.5 | 1.69+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 32          | 1.13         |

| Nominal Voltage  |         | 1.2V                   |                         |               |
|--|---------|------------------------|-------------------------|---------------|
| Discharge<br>Capacity*                                 |         | Average**              | 2040 mAh                |               |
|  |         | Rated (Min.)           | 2000 mAh                |               |
| Approx. Internal impedance at 1000Hz at charged state. |         | 20mΩ                   |                         |               |
| Charge Standard  |         | 200mA (0.1lt) x 16hrs. |                         |               |
|  | 90      | Rapid                  | 2000mA (1lt) x 1.2 hrs. |               |
|  |         | Standard               | °C                      | °F            |
| ø  | Charge  | Standard               | 0°C to 45°C             | 32°F to 113°F |
| 별  |         | Rapid                  | 0°C to 40°C             | 32°F to 104°F |
| bie  | Dis     | charge                 | -10°C to 65°C           | 14°F to 149°F |
| Ambient<br>Temperature                                 |         | < 1 year               | -20°C to 35°C           | -4°F to 95°F  |
| _ P  | Storage | < 3 months             | -20°C to 45°C           | -4°F to 113°F |
|  |         | < 1 month              | -20°C to 55°C           | -4°F to 131°F |

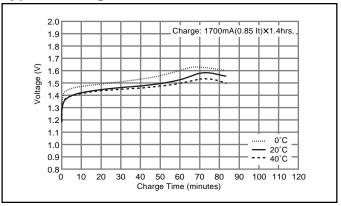
- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.

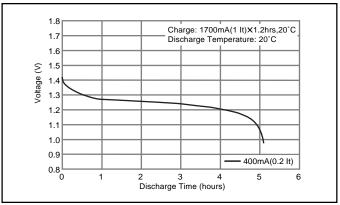
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

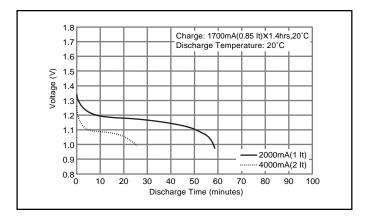
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



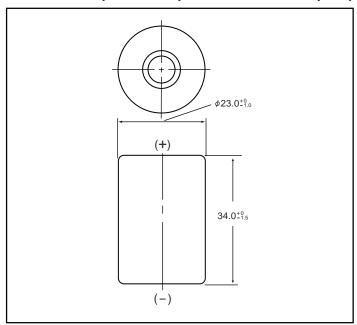




## HHR200SCP Cylindrical 4/5SC size (HR 23/34)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 23.0+0/-0.1 | 0.91+0/-0.04 |
| Height      | 34.0+0/-1.5 | 1.34+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 42          | 1.48         |

| Nominal Voltage  |         | 1.2V                   |                         |               |
|--|---------|------------------------|-------------------------|---------------|
| Discharge<br>Capacity*                                 |         | Average**              | 2100 mAh                |               |
|  |         | Rated (Min.)           | 1900 mAh                |               |
| Approx. Internal impedance at 1000Hz at charged state. |         | 5mΩ                    |                         |               |
| Charge Standard  |         | 200mA (0.1lt) x 16hrs. |                         |               |
|  | 90      | Rapid                  | 2000mA (1lt) x 1.2 hrs. |               |
|  |         | Standard               | °C                      | °F            |
| rt ure   | Charge  | Standard               | 0°C to 45°C             | 32°F to 113°F |
| ien  |         | Rapid                  | 0°C to 40°C             | 32°F to 104°F |
| m<br>be  | Dis     | charge                 | -10°C to 65°C           | 14°F to 149°F |
| Ambient<br>Temperature                                 | Ctoroso | < 2 years              | -20°C to 35°C           | -4°F to 95°F  |
|  | Storage | < 6 months             | -20°C to 45°C           | -4°F to 113°F |

- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.

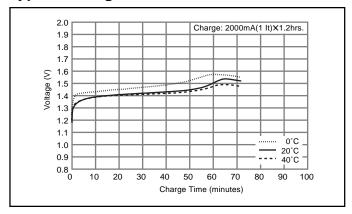
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

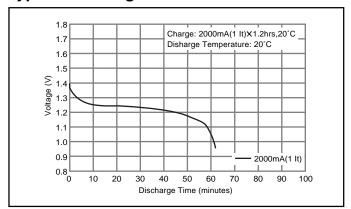
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

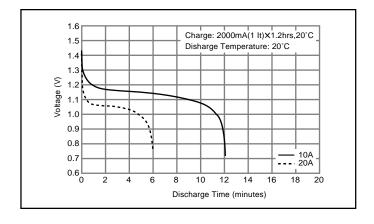
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



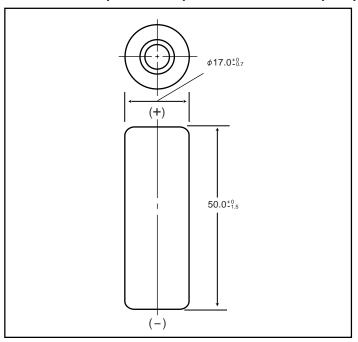




## HHR210A Cylindrical A size (HR 17/50)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 17.0+0/-0.7 | 0.67+0/-0.03 |
| Height      | 50.0+0/-1.5 | 1.97+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 38          | 1.34         |

| Nominal Voltage  |         | 1.2V                   |                         |               |
|--|---------|------------------------|-------------------------|---------------|
| Discharge<br>Capacity*                                 |         | Average**              | 2200 mAh                |               |
|  |         | Rated (Min.)           | 2100 mAh                |               |
| Approx. Internal impedance at 1000Hz at charged state. |         | 20mΩ                   |                         |               |
| Charge Standard  |         | 210mA (0.1lt) x 16hrs. |                         |               |
|  | 90      | Rapid                  | 2100mA (1lt) x 1.2 hrs. |               |
|  |         | 01                     | °C                      | °F            |
| gy .   | Charge  | Standard               | 0°C to 45°C             | 32°F to 113°F |
| 별  |         | Rapid                  | 0°C to 40°C             | 32°F to 104°F |
| bie  | Dis     | charge                 | -10°C to 65°C           | 14°F to 149°F |
| Ambient<br>Temperature                                 |         | < 1 year               | -20°C to 35°C           | -4°F to 95°F  |
| _ P  | Storage | < 3 months             | -20°C to 45°C           | -4°F to 113°F |
|  |         | < 1 month              | -20°C to 55°C           | -4°F to 131°F |

- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.

Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

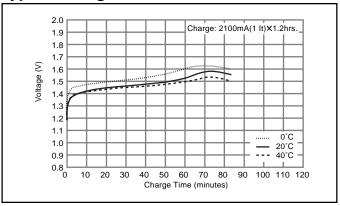
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:

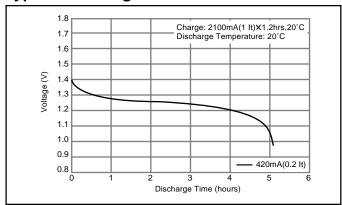
It(A) = Cn (Ah)/1h.

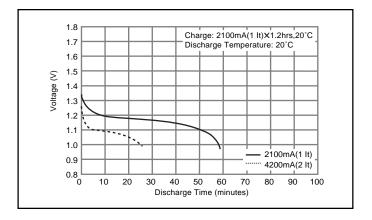
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

### **Typical Charge Characteristics**



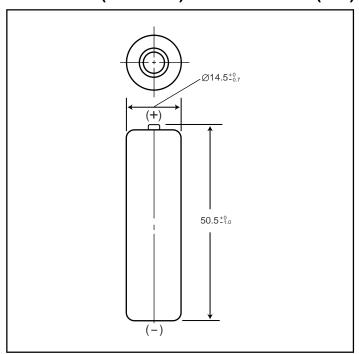




# HHR210AA/B Cylindrical AA size (HR 15/51)

### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm           | inch         |
|-------------|--------------|--------------|
| Diameter    | 14.5 +0/-0.7 | 0.57 +0/-0.3 |
| Height      | 50.5 +0/-1.0 | 1.99 +0/-0.5 |
| Approximate | Grams        | Ounces       |
| Weight      | 29           | 1.02         |

| Nominal Voltage  |              | 1.2V         |                         |               |
|--|--------------|--------------|-------------------------|---------------|
| Discharge<br>Capacity*                                 |              | Average**    | 2080mAh                 |               |
|  |              | Rated (Min.) | 2000mAh                 |               |
| Approx. internal Impedance at 1000Hz at charged state. |              | 25m <b>Ω</b> |                         |               |
| Charge Standard  |              | Standard     | 200mA (0.1lt) x 16 hrs. |               |
|  | Charge Rapid |              | 1200mA (1lt) x 2 hrs.   |               |
|  |              | Standard     | °C                      | °F            |
| ب ا  | Charge       |              | 0°C to 45°C             | 32°F to 113°F |
| ent  |              | Rapid        | 0°C to 40°C             | 32°F to 113°F |
| Ambient<br>Temperature                                 | Disch        | narge        | -10°C to 65°C           | 14°F to 149°F |
| Ar<br>em   |              | < 1 year     | -20°C to 35°C           | -4°F to 95°F  |
| -  | Storage      | < 3 months   | -20°C to 45°C           | -4°F to 113°F |
|  |              | < 1 month    | -20°C to 55°C           | -4°F to 131°F |

<sup>\*</sup> After charging at 0.1lt for 16 hours, discharging at 0.2lt.

Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

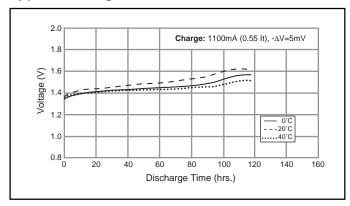
#### Note:

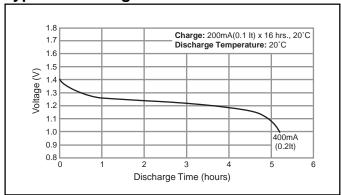
[It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:  $It(A) = Cn \ (Ah)/1h$ 

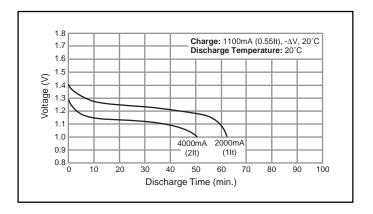
- \* [It] is the reference test current in ampres
- \* [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

### **Typical Charge Characteristics**





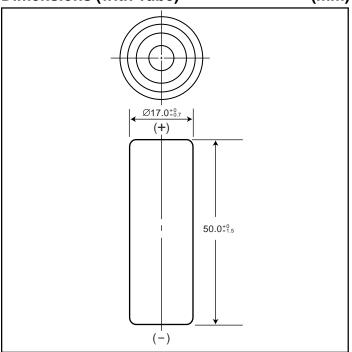


<sup>\*\*</sup> For reference only.

## HHR210AH Cylindrical A size (HR 17/50)

#### **Dimensions (with Tube)**





#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 17.0+0/-0.7 | 0.67+0/-0.03 |
| Height      | 50.0+0/-1.5 | 1.97+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 38          | 1.34         |

| Nominal Voltage  |              | 1.2V                 |               |               |
|--|--------------|----------------------|---------------|---------------|
| Discharge<br>Capacity <sup>1</sup>                     |              | Average <sup>2</sup> | 2050          | )mAh          |
|  |              | Rated (Min.)         | 1900mAh       |               |
| Approx. internal Impedance at 1000Hz at charged state. |              | 20mΩ                 |               |               |
| Standard   |              | 210mA (0.1           | It) x 16 hrs. |               |
| j  | Charge Rapid |                      | -             |               |
|  |              | Standard             | °C            | °F            |
|  | Charge       | Standard             | -10°C to 60°C | 14°F to 140°F |
| it<br>ure  |              | Rapid                | -             | -             |
| bier<br>erat   | Discl        | narge                | -10°C to 60°C | 14°F to 140°F |
| Ambient<br>Temperature                                 |              | < 1 year             | -20°C to 35°C | -4°F to 95°F  |
|  | Storage      | < 3 months           | -20°C to 45°C | -4°F to 113°F |
|  | Storage      | < 1 month            | -20°C to 55°C | -4°F to 131°F |
|  |              | < 1 week             | -20°C to 60°C | -4°F to 140°F |

- After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- <sup>2</sup> For reference only.

Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

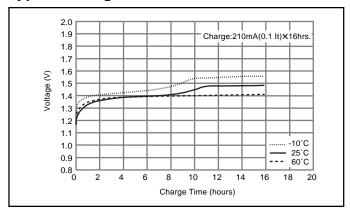
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:

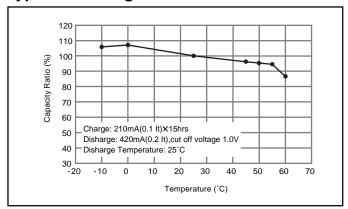
It(A) = Cn (Ah)/1h.

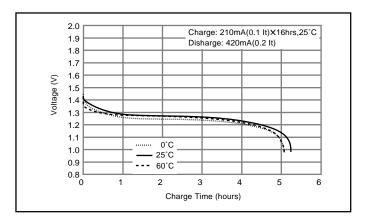
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



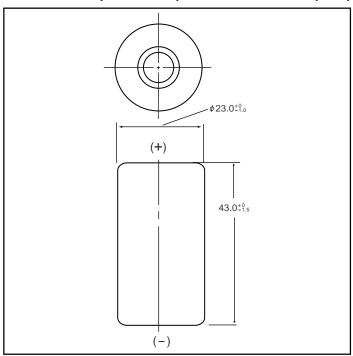




## HHR250SCH Cylindrical SC size (HR 23/43)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 23.0+0/-1.0 | 0.91+0/-0.04 |
| Height      | 43.0+0/-1.5 | 1.69+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 55          | 1.94         |

| Nominal Voltage                    |  |                                   | 1.2V                       |                            |  |
|------------------------------------|--|-----------------------------------|----------------------------|----------------------------|--|
| Discharge Average <sup>2</sup>     |  | 2650 mAh                          |                            |                            |  |
| Capacity <sup>1</sup> Rated (Min.) |  | 2500                              | mAh                        |                            |  |
|                                    | pprox. Internal impedance<br>it 1000Hz at charged state. |                                   | 5n                         | 5mΩ                        |  |
| Standard                           |  | 250mA                             | x 16hrs.                   |                            |  |
| CI                                 | narge  | Rapid <sup>3</sup>                | 1250mA                     | x 2.4 hrs.4                |  |
| Low Rate                           |  | 125mA x 32 hrs.<br>83mA x 48 hrs. |                            |                            |  |
|                                    | Charge   | Standard                          | <b>°C</b><br>-10°C to 60°C | <b>°F</b><br>14°F to 140°F |  |
| Ambient<br>Temperature             | Onlange  | Rapid                             | -10°C to 45°C              | 14°F to 113°F              |  |
| ien<br>ratı                        | Dis  | charge                            | -10°C to 60°C              | 14°F to 140°F              |  |
| nb<br>pe                           |  | < 1 year                          | -20°C to 35°C              | -4°F to 95°F               |  |
| en Al                              | Storage < 6 months                                       | < 6 months                        | -20°C to 45°C              | -4°F to 113°F              |  |
| -                                  | Otorage  | < 1 month                         | -20°C to 55°C              | -4°F to 131°F              |  |
|                                    |  | < 1 week                          | -20°C to 65°C              | -4°F to 149°F              |  |

- $\stackrel{1}{\circ}$  After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- <sup>2</sup> For reference only.
- Need specially designed control system Control System:

dT/dt cut-off; 1 to 2°C/min

 $-\triangle V$  cut-off;  $-\triangle V$  per cell = 5 to 10 mV

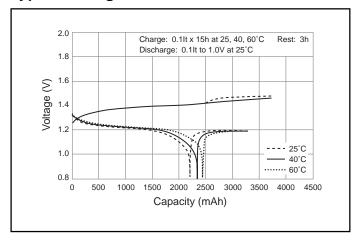
T-control; T=65°C

Rapid charger timer; 2.4h (at 1.25a)

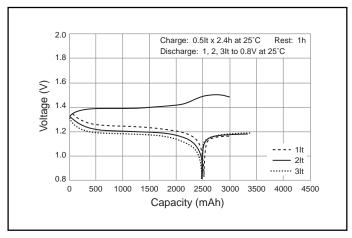
Trickle timer; within 2h 4 With control system

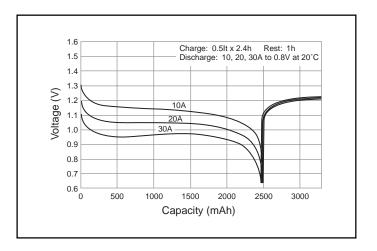
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

#### **Typical Charge Characteristics**



### **Typical Discharge Characteristics**





[It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: lt(A) = Cn (Ah)/1h

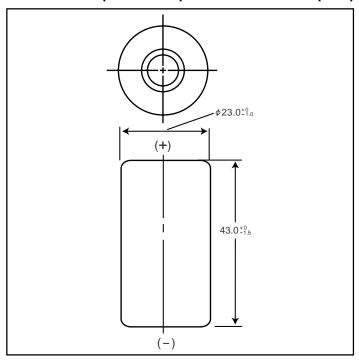
- \* [It] is the reference test current in ampres
- \* [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared



# HHR260SCP Cylindrical SC size (HR 23/43)

### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 23.0+0/-1.0 | 0.91+0/-0.04 |
| Height      | 43.0+0/-1.5 | 1.69+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 55          | 1.94         |

| Nominal Voltage                |                                    | 1.2V           |                   |               |  |
|--------------------------------|------------------------------------|----------------|-------------------|---------------|--|
| Discharge Average <sup>2</sup> |                                    | 2600 mAh       |                   |               |  |
| Cap                            | Capacity <sup>1</sup> Rated (Min.) |                | 2450              | mAh           |  |
|                                |                                    | impedance      | 5n                | <b>~</b> O    |  |
| at 100                         | 00Hz at cha                        | rged state.    | 311               | 122           |  |
| Charge Standard                |                                    | 260mA x 16hrs. |                   |               |  |
| Ci                             | large                              | Rapid          | 2600mA x 1.2 hrs. |               |  |
|                                |                                    | Standard       | °C                | °F            |  |
| อ                              | Charge                             | Stariuaru      | 0°C to 45°C       | 32°F to 113°F |  |
| atn                            |                                    | Rapid          | 10°C to 40°C      | 50°F to 104°F |  |
| bio                            | Dis                                | charge         | -10°C to 65°C     | 14°F to 149°F |  |
| Ambient<br>Temperature         |                                    | < 1 year       | -20°C to 35°C     | -4°F to 95°F  |  |
| e                              | Storage                            | < 3 months     | -20°C to 45°C     | -4°F to 113°F |  |
|                                |                                    | < 1 month      | -20°C to 55°C     | -4°F to 131°F |  |

<sup>&</sup>lt;sup>1</sup> After charging at 0.1lt for 16 hours, discharging at 0.2lt.

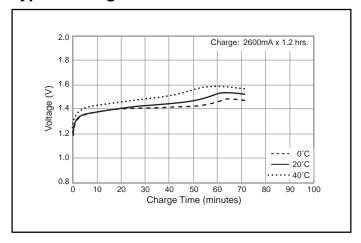
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

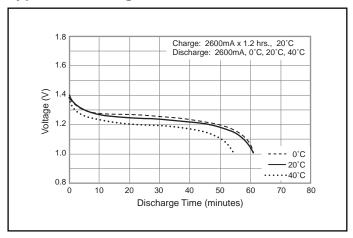
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h

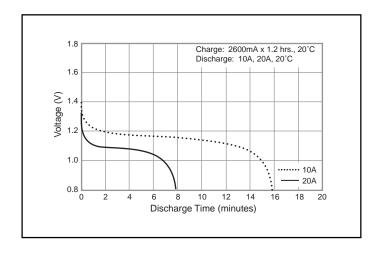
- \* [It] is the reference test current in ampres
- \* [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**





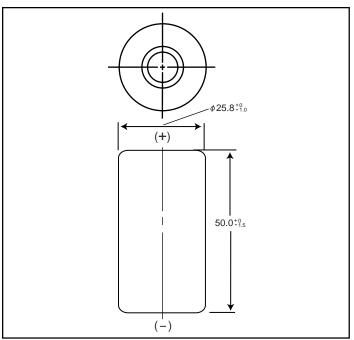


<sup>&</sup>lt;sup>2</sup> For reference only.

# HHR300CH Cylindrical C size (HR 26/50) for backup use

## **Dimensions (with Tube)**

(mm)



### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 25.8+0/-1.0 | 1.02+0/-0.04 |
| Height      | 50.0+0/-1.5 | 1.97+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 80          | 2.82         |

| Nominal Voltage   |               | 1.2V                               |               |               |  |
|---|---------------|------------------------------------|---------------|---------------|--|
| Discharge Average <sup>2</sup> Capacity <sup>1</sup> Rated (Min.) |               | 3300 mAh                           |               |               |  |
|   |               | Rated (Min.)                       | 3100          | mAh           |  |
| Approx. Internal impedance at 1000Hz at charged state.            |               | 5mΩ                                |               |               |  |
| Charge Standard  Charge Rapid <sup>3</sup> Low Rate               |               | 300mA (0.1                         | 1lt) x 16hrs. |               |  |
|   |               | 1500mA (1lt) x 2.4 hrs.4           |               |               |  |
|   |               | 155mA x 32 hrs.<br>100mA x 48 hrs. |               |               |  |
|   |               | Standard                           | °C            | °F            |  |
|   | Chargo        | Standard                           | 0°C to 45°C   | 32°F to 113°F |  |
| t<br>ure  | Charge        | Rapid                              | 10°C to 40°C  | 32°F to 104°F |  |
| ien<br>ratı   |               | Low Rate                           | -10°C to 45°C | 14°F to 149°F |  |
| mb<br>odr   | Discharge     |                                    | -10°C to 65°C | 14°F to 113°F |  |
| A<br>Ten  | Storage < 3 m | < 1 year                           | -20°C to 35°C | -4°F to 95°F  |  |
| •   |               | < 3 months                         | -20°C to 35°C | -4°F to 95°F  |  |
|   |               | < 1 month                          | -20°C to 55°C | -4°F to 131°F |  |

- <sup>1</sup> After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- 2 For reference only.
- <sup>3</sup> Need specially designed control system

#### Control System:

dT/dt cut-off; 1 to 2°C/min

- $\triangle$ V cut-off; - $\triangle$ V per cell = 5 to 10 mV

T-control; T=65°C

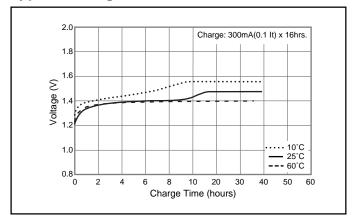
Rapid charger timer; 2.4h (at 1.25a)

Trickle timer; within 2h

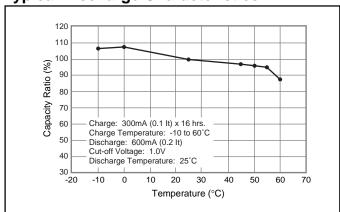
<sup>4</sup> With control system

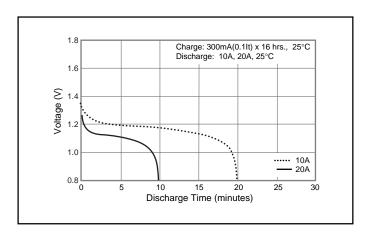
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

#### **Typical Charge Characteristics**



### **Typical Discharge Characteristics**





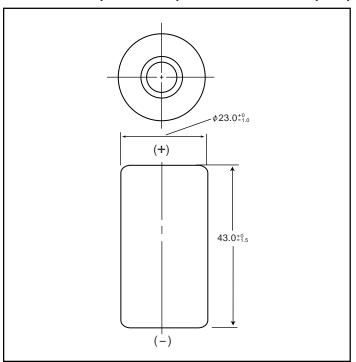
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

# HHR300SCP Cylindrical SC size (HR 23/43)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 23.0+0/-0.1 | 0.91+0/-0.04 |
| Height      | 43.0+0/-1.5 | 1.69+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 57          | 2.01         |

| Nominal Voltage  |            | 1.2V                   |                         |               |
|--|------------|------------------------|-------------------------|---------------|
| Discharge<br>Capacity*                                 |            | Average**              | 3050 mAh                |               |
|  |            | Rated (Min.)           | 2800 mAh                |               |
| Approx. Internal impedance at 1000Hz at charged state. |            | 4mΩ                    |                         |               |
| Charge Standard  |            | 300mA (0.1lt) x 16hrs. |                         |               |
|  | g-         | Rapid                  | 3000mA (1lt) x 1.2 hrs. |               |
| _  |            | Standard               | °C                      | °F            |
| ıt<br>ure  | Charge     | Standard               | 0°C to 45°C             | 32°F to 113°F |
| ien  |            | Rapid                  | 0°C to 40°C             | 32°F to 104°F |
| m<br>adu   | Discharge  |                        | -10°C to 65°C           | 14°F to 149°F |
| Ambient<br>Temperature                                 | Ctorogo    | < 2 years              | -20°C to 35°C           | -4°F to 95°F  |
| ⊢ Storage  | < 6 months | -20°C to 45°C          | -4°F to 113°F           |               |

- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.

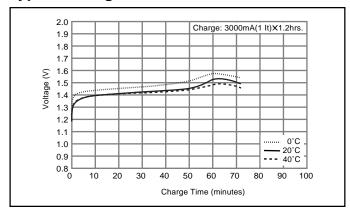
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

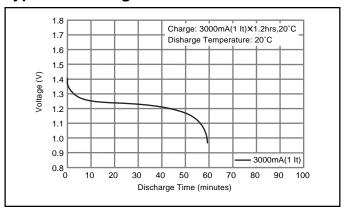
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

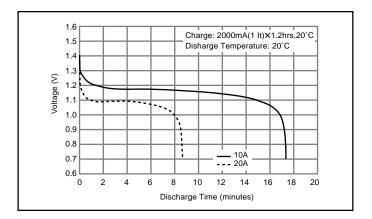
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



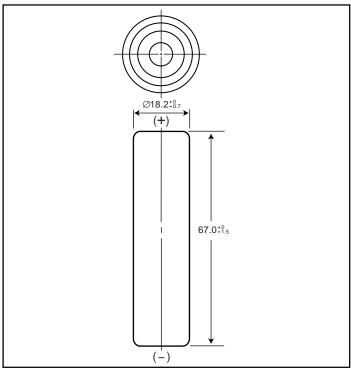




# HHR330APH Cylindrical L-Fat A size (HR 18/67)

### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 18.2+0/-0.7 | 0.72+0/-0.03 |
| Height      | 67.0+0/-1.5 | 2.64+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 60          | 2.12         |

|                                | Nominal Voltage                    |                    | 1.2V            |               |
|--------------------------------|------------------------------------|--------------------|-----------------|---------------|
| Discharge Average <sup>2</sup> |                                    | 3300 mAh           |                 |               |
| Cap                            | Capacity <sup>1</sup> Rated (Min.) |                    | 3200            | mAh           |
| Appro                          | x. Internal                        | impedance          | 5.5             | mΩ            |
| at 100                         | 00Hz at cha                        | rged state.        | 5.5             | 11122         |
|                                | Standard                           |                    | 330mA           | x 16hrs.      |
| CI                             | harge                              | Rapid <sup>3</sup> | 1650mA          | x 2.4 hrs.4   |
|                                |                                    | Low Rate           | 165mA x 32 hrs. |               |
|                                |                                    | LOW Rate           | 110mA x 48 hrs. |               |
|                                |                                    | Standard           | °C              | °F            |
| •                              | Charge                             | Standard           | -10°C to 60°C   | 14°F to 140°F |
| ıt<br>ure                      |                                    | Rapid              | -10°C to 45°C   | 14°F to 113°F |
| ien<br>rat                     | Dis                                | charge             | -10°C to 60°C   | 14°F to 140°F |
| Ambient<br>Temperature         |                                    | < 1 year           | -20°C to 35°C   | -4°F to 95°F  |
| A E Storog                     | Storage                            | < 6 months         | -20°C to 45°C   | -4°F to 113°F |
| <u> </u>                       | Otorage                            | < 1 month          | -20°C to 55°C   | -4°F to 131°F |
|                                |                                    | < 1 week           | -20°C to 65°C   | -4°F to 149°F |

- After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- <sup>2</sup> For reference only.
- Need specially designed control system

#### Control System:

dT/dt cut-off; 1 to 2°C/min

 $-\triangle V$  cut-off;  $-\triangle V$  per cell = 5 to 10 mV

T-control; T=65°C

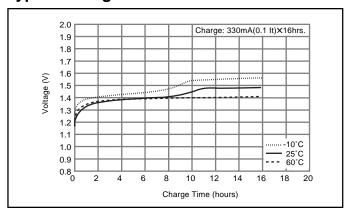
Rapid charger timer; 2.4h (at 1.25a)

Trickle timer; within 2h

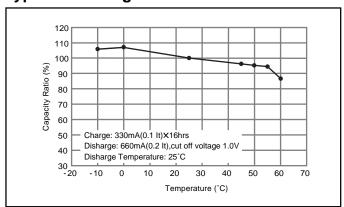
<sup>4</sup> With control system

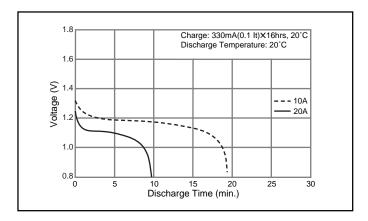
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

#### **Typical Charge Characteristics**



#### **Typical Discharge Characteristics**





Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

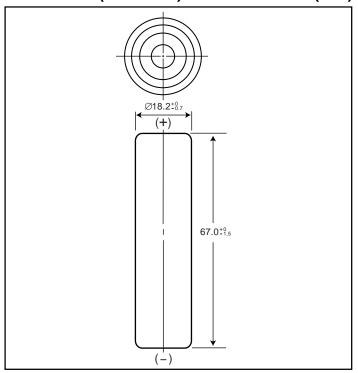
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared



## HHR370AH Cylindrical L-Fat A size (HR 18/67)

#### **Dimensions (with Tube)**

(mm)



### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 18.2+0/-0.7 | 0.72+0/-0.03 |
| Height      | 67.0+0/-1.5 | 2.64+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 60          | 2.12         |

| Nominal Voltage  |                    |                                    | 1.2V          |               |  |  |
|--|--------------------|------------------------------------|---------------|---------------|--|--|
| Discharge  |                    | Average <sup>2</sup>               | 3700 mAh      |               |  |  |
| Cap  | acity <sup>1</sup> | Rated (Min.)                       | 3500 mAh      |               |  |  |
| Approx. Internal impedance at 1000Hz at charged state. |                    | 20mΩ                               |               |               |  |  |
| Standard   |                    | 370mA                              | x 16hrs.      |               |  |  |
| CI   | narge              | Rapid <sup>3</sup>                 | 1750mA        | x 2.4 hrs.4   |  |  |
| Low Rate   |                    | 185mA x 32 hrs.<br>123mA x 48 hrs. |               |               |  |  |
|  |                    | Standard                           | °C            | °F            |  |  |
| 4  | Charge             | Stariuaru                          | -10°C to 60°C | 14°F to 140°F |  |  |
| # E  |                    | Rapid                              | -10°C to 45°C | 14°F to 113°F |  |  |
| ien  | Dis                | charge                             | -10°C to 60°C | 14°F to 140°F |  |  |
| nb<br>pe   |                    | < 1 year                           | -20°C to 35°C | -4°F to 95°F  |  |  |
| Ambient<br>Temperature                                 | Storage            | < 6 months                         | -20°C to 45°C | -4°F to 113°F |  |  |
|  | Otorage            | < 1 month                          | -20°C to 55°C | -4°F to 131°F |  |  |
|  |                    | < 1 week                           | -20°C to 65°C | -4°F to 149°F |  |  |

- After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- <sup>2</sup> For reference only.
- Need specially designed control system

#### Control System:

dT/dt cut-off; 1 to 2°C/min

 $-\triangle V$  cut-off;  $-\triangle V$  per cell = 5 to 10 mV

T-control; T=65°C

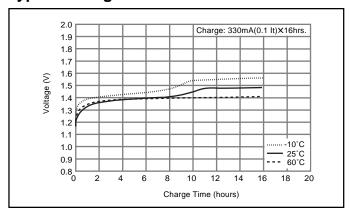
Rapid charger timer; 2.4h (at 1.25a)

Trickle timer; within 2h

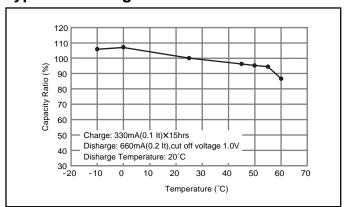
<sup>4</sup> With control system

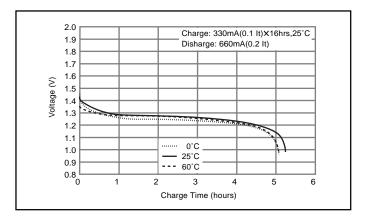
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

#### **Typical Charge Characteristics**



#### **Typical Discharge Characteristics**





Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

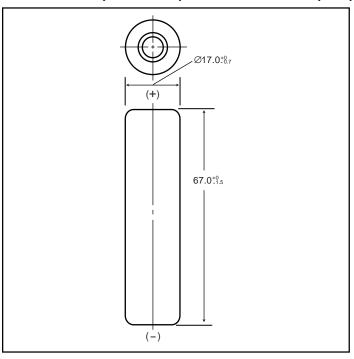
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared



## HHR380A Cylindrical L-A size (HR 17/67)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 17.0+0/-0.7 | 0.67+0/-0.03 |
| Height      | 67.0+0/-1.5 | 2.64+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 53          | 1.87         |

| Nominal Voltage        |          | 1.2V                     |               |               |
|------------------------|----------|--------------------------|---------------|---------------|
| Discharge              |          | Average**                | 3800 mAh      |               |
| Сар                    | acity*   | Rated (Min.)             | 3700 mAh      |               |
|                        |          | impedance<br>rged state. | 25mΩ          |               |
| Charge Standard        |          | 370mA (0.1               | IIt) x 16hrs. |               |
|                        | Rapid*** |                          | 2000mA dT/dt  |               |
|                        |          | Standard                 | °C            | °F            |
| စ                      | Charge   |                          | 0°C to 45°C   | 32°F to 113°F |
| t I                    |          | Rapid                    | 0°C to 40°C   | 32°F to 104°F |
| Ambient<br>Temperature | Dis      | charge                   | -10°C to 65°C | 14°F to 149°F |
| Am                     |          | < 1 year                 | -20°C to 35°C | -4°F to 95°F  |
| ₽                      | Storage  | < 3 months               | -20°C to 45°C | -4°F to 113°F |
|                        |          | < 1 month                | -20°C to 55°C | -4°F to 131°F |

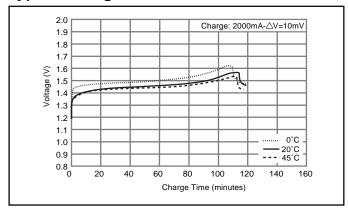
- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.
- \*\*\* For rapid charge: use dT/dt charge termination method. Refer to the Nickel Metal Hydride "Charge Methods" section for further details. Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

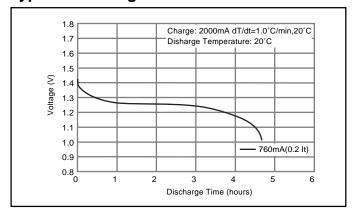
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

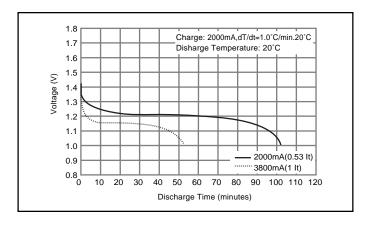
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



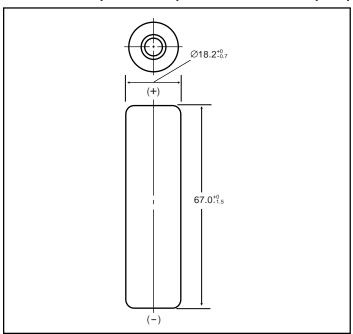




## HHR450A Cylindrical L-fat A size (HR 18/67)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 18.2+0/-0.7 | 0.72+0/-0.03 |
| Height      | 67.0+0/-1.5 | 2.64+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 60          | 2.12         |

| Nominal Voltage  |         | 1.2V                   |               |               |
|--|---------|------------------------|---------------|---------------|
| Discharge Average*                                     |         | Average**              | 4500          | mAh           |
| Сар  | acity*  | Rated (Min.)           | 4200          | mAh           |
| Approx. Internal impedance at 1000Hz at charged state. |         | 25mΩ                   |               |               |
| Charge Standard  |         | 420mA (0.1lt) x 16hrs. |               |               |
|  | g-      | Rapid***               | 2000mA dT/dt  |               |
|  |         | Standard               | °C            | °F            |
| ė  | Charge  | Staridard              | 0°C to 45°C   | 32°F to 113°F |
| 별  |         | Rapid                  | 0°C to 40°C   | 32°F to 104°F |
| Ambient<br>Temperature                                 | Dis     | charge                 | -10°C to 65°C | 14°F to 149°F |
| Am   |         | < 1 year               | -20°C to 35°C | -4°F to 95°F  |
| ₽  | Storage | < 3 months             | -20°C to 45°C | -4°F to 113°F |
|  |         | < 1 month              | -20°C to 55°C | -4°F to 131°F |

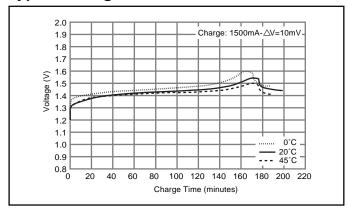
- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.
- \*\*\* For rapid charge: use dT/dt charge termination method. Refer to the Nickel Metal Hydride "Charge Methods" section for further details. Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

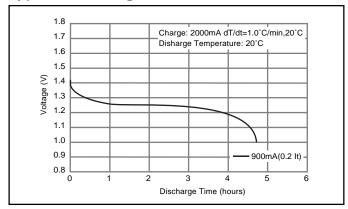
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

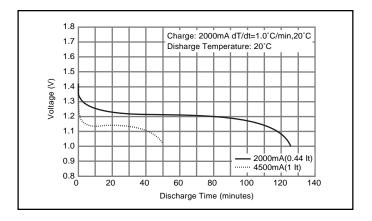
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



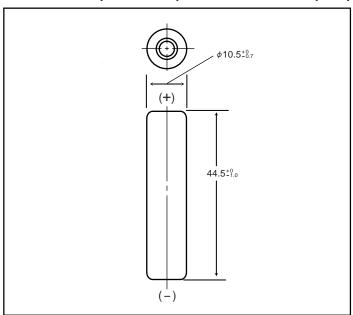




# HHR60AAAH Cylindrical AAA size (HR 11/45)

#### **Dimensions (with Tube)**

(mm)



## **Specifications**

|             | mm           | inch          |
|-------------|--------------|---------------|
| Diameter    | 10.5 +0/-0.7 | 0.41 +0/-0.03 |
| Height      | 44.5 +0/-1.0 | 1.75 +0/-0.04 |
| Approximate | Grams        | Ounces        |
| Weight      | 13           | 0.46          |

| Nominal Voltage  |                    | 1.2V                 |                |               |
|--|--------------------|----------------------|----------------|---------------|
| Disc   | harge              | Average <sup>2</sup> | 550 mAh        |               |
| Cap  | acity <sup>1</sup> | Rated (Min.)         | 500            | mAh           |
| Approx. Internal impedance at 1000Hz at charged state. |                    | 35mΩ                 |                |               |
|  |                    | Standard             | 50mA >         | c 16hrs.      |
| CI   | narge              | Rapid <sup>3</sup>   | 250mA x        | 2.4 hrs.4     |
|  | 3                  | Low Rate             | 25mA x 32 hrs. |               |
|  |                    | LOW Rate             | 17mA x 48 hrs. |               |
|  |                    | Standard             | °C             | °F            |
|  | Charge             | Staridard            | -10°C to 60°C  | 14°F to 140°F |
| # P  |                    | Rapid                | -10°C to 45°C  | 14°F to 113°F |
| ien  | Dis                | charge               | -10°C to 60°C  | 14°F to 140°F |
| Ambient<br>mperatu                                     |                    | < 1 year             | -20°C to 35°C  | -4°F to 95°F  |
| Ambient<br>Temperature                                 | Storage            | < 6 months           | -20°C to 45°C  | -4°F to 113°F |
| -  | O.O. age           | < 1 month            | -20°C to 55°C  | -4°F to 131°F |
|  |                    | < 1 week             | -20°C to 65°C  | -4°F to 149°F |

- After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- For reference only.
- Need specially designed control system Control System:

dT/dt cut-off; 1 to 2°C/min

-△V cut-off; -△V per cell = 5 to 10 mV

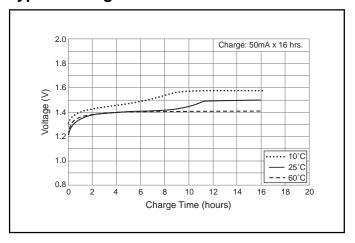
T-control; T=65°C

Rapid charger timer; 2.4h (at 1.25a)

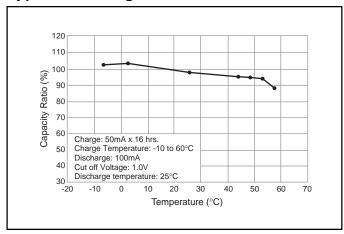
Trickle timer; within 2h

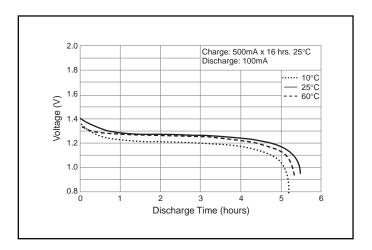
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design

#### **Typical Charge Characteristics**



### **Typical Discharge Characteristics**





Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h

- \* [It] is the reference test current in ampres
- $^{\star}$  [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

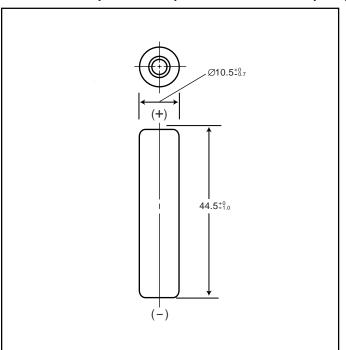


<sup>&</sup>lt;sup>4</sup> With control system

## HHR70AAAJ Cylindrical HR AAA size (HR 11/45)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 10.5+0/-0.7 | 0.41+0/-0.03 |
| Height      | 44.5+0/-1.0 | 1.75+0/-0.04 |
| Approximate | Grams       | Ounces       |
| Weight      | 13          | 0.46         |

| Nominal Voltage  |                       | 1.2V         |                        |               |
|--|-----------------------|--------------|------------------------|---------------|
| Discharge<br>Capacity*                                 |                       | Average**    | 720 mAh                |               |
|  |                       | Rated (Min.) | 700 mAh                |               |
| Approx. Internal impedance at 1000Hz at charged state. |                       | 30mΩ         |                        |               |
| CI   | Charge Standard Rapid |              | 70mA (0.1lt) x 16hrs.  |               |
|  |                       |              | 650mA (1lt) x 1.2 hrs. |               |
|  |                       | Standard     | °C                     | °F            |
| ري   | Charge                | Standard     | 0°C to 45°C            | 32°F to 113°F |
| t ţ  |                       | Rapid        | 0°C to 40°C            | 32°F to 104°F |
| Ambient<br>Temperature                                 | Dis                   | charge       | -10°C to 65°C          | 14°F to 149°F |
| Am   |                       | < 1 year     | -20°C to 35°C          | -4°F to 95°F  |
| <u>P</u>   | Storage               | < 3 months   | -20°C to 45°C          | -4°F to 113°F |
|  |                       | < 1 month    | -20°C to 55°C          | -4°F to 131°F |

- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.

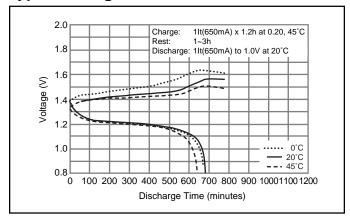
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

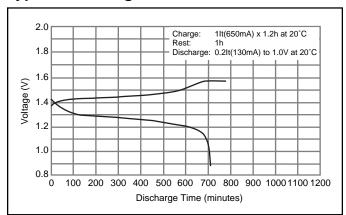
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: lt(A) = Cn (Ah)/1h.

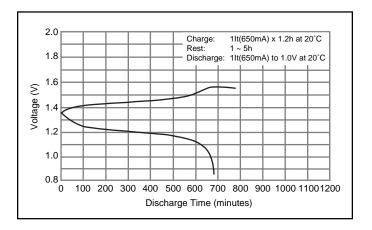
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



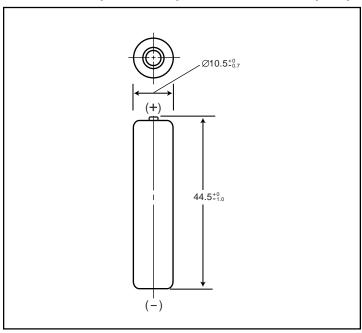




## HHR75AAA/B Cylindrical AAA size (HR 11/45)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 10.5+0/-0.7 | 0.41+0/-0.03 |
| Height      | 44.5+0/-1.0 | 1.75+0/-0.04 |
| Approximate | Grams       | Ounces       |
| Weight      | 12          | 0.42         |

| Nominal Voltage  |         | 1.2V          |                  |               |
|--|---------|---------------|------------------|---------------|
| Discharge<br>Capacity*                                 |         | Average**     | 730 mAh          |               |
|  |         | Rated (Min.)  | 700 mAh          |               |
| Approx. Internal impedance at 1000Hz at charged state. |         | 35mΩ          |                  |               |
| Charge Standard  |         | 70mA x 16hrs. |                  |               |
|  | 90      | Rapid         | 450mA x 1.7 hrs. |               |
|  |         | Standard      | °C               | °F            |
| ø  | Charge  | Standard      | 0°C to 45°C      | 32°F to 113°F |
| 별  |         | Rapid         | 0°C to 40°C      | 32°F to 104°F |
| bie  | Dis     | charge        | -10°C to 65°C    | 14°F to 149°F |
| Ambient<br>Temperature                                 |         | < 1 year      | -20°C to 35°C    | -4°F to 95°F  |
|  | Storage | < 3 months    | -20°C to 45°C    | -4°F to 113°F |
|  |         | < 1 month     | -20°C to 55°C    | -4°F to 131°F |

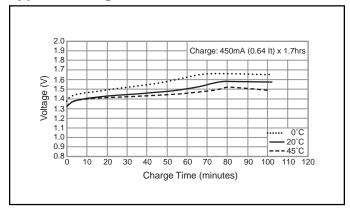
<sup>\*</sup> After charging at 0.1lt for 16 hours, discharging at 0.2lt.

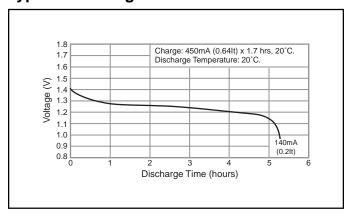
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

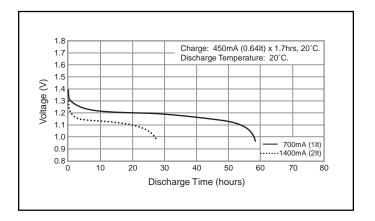
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**





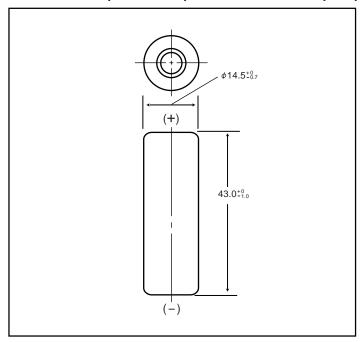


<sup>\*\*</sup> For reference only.

## HHR120AA Cylindrical 4/5AA size (HR 15/43)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 14.5+0/-0.7 | 0.57+0/-0.03 |
| Height      | 43.0+0/-1.0 | 1.69+0/-0.04 |
| Approximate | Grams       | Ounces       |
| Weight      | 23          | 0.81         |

| Nominal Voltage        |  | 1.2V                   |                         |               |
|------------------------|--|------------------------|-------------------------|---------------|
| Discharge<br>Capacity* |  | Average**              | 1220 mAh                |               |
|                        |  | Rated (Min.)           | 1150 mAh                |               |
|                        | Approx. Internal impedance at 1000Hz at charged state. |                        | 19mΩ                    |               |
| Charge Standard        |  | 120mA (0.1lt) x 16hrs. |                         |               |
|                        | 90   | Rapid                  | 1200mA (1lt) x 1.2 hrs. |               |
|                        |  | Standard               | °C                      | °F            |
| gu                     | Charge   | Standard               | 0°C to 45°C             | 32°F to 113°F |
| i i j                  |  | Rapid                  | 0°C to 40°C             | 32°F to 104°F |
| bie                    | Dis  | charge                 | -10°C to 65°C           | 14°F to 149°F |
| Ambient<br>Temperature |  | < 1 year               | -20°C to 35°C           | -4°F to 95°F  |
| <u> </u>               | Storage  | < 3 months             | -20°C to 45°C           | -4°F to 113°F |
|                        |  | < 1 month              | -20°C to 55°C           | -4°F to 131°F |

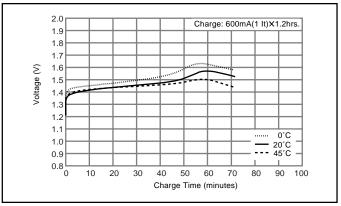
- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.

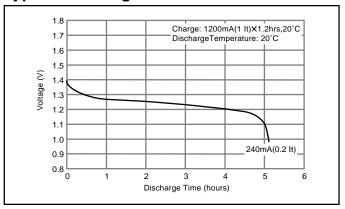
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

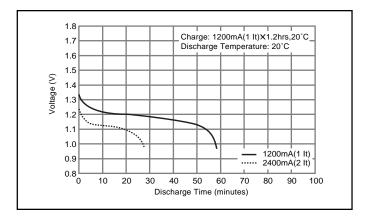
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



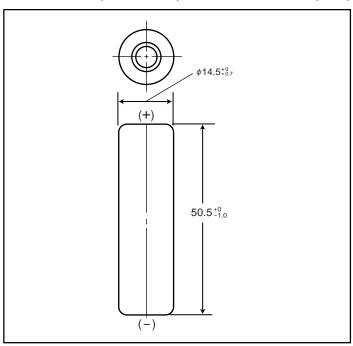




## HHR150AA Cylindrical AA size (HR 15/51)

## **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 14.5+0/-0.7 | 0.57+0/-0.03 |
| Height      | 50.0+0/-1.0 | 1.97+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 26          | 0.92         |

| Nominal Voltage  |         | 1.2V                   |                         |               |
|--|---------|------------------------|-------------------------|---------------|
| Discharge<br>Capacity*                                 |         | Average**              | 1580 mAh                |               |
|  |         | Rated (Min.)           | 1500 mAh                |               |
| Approx. Internal impedance at 1000Hz at charged state. |         | 20mΩ                   |                         |               |
| Charge Standard  |         | 150mA (0.1lt) x 16hrs. |                         |               |
|  | 90      | Rapid                  | 1500mA (1lt) x 1.2 hrs. |               |
|  |         | Standard               | °C                      | °F            |
| gy .   | Charge  | Standard               | 0°C to 45°C             | 32°F to 113°F |
| 其其   |         | Rapid 0°               | 0°C to 40°C             | 32°F to 104°F |
| Ambient<br>Temperature                                 | Dis     | charge                 | -10°C to 65°C           | 14°F to 149°F |
| Am   |         | < 1 year               | -20°C to 35°C           | -4°F to 95°F  |
| <u>P</u>   | Storage | < 3 months             | -20°C to 45°C           | -4°F to 113°F |
|  |         | < 1 month              | -20°C to 55°C           | -4°F to 131°F |

- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.

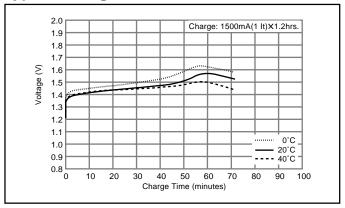
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

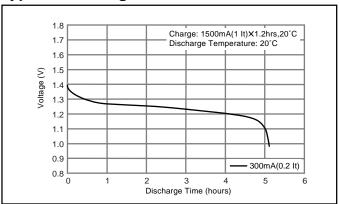
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:

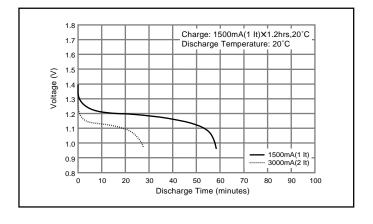
It(A) = Cn (Ah)/1h.

- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



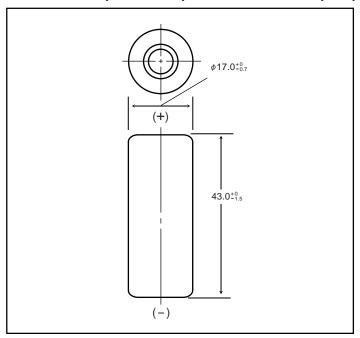




# HHR200A Cylindrical 4/5A size (HR 17/43)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 17.0+0/-0.7 | 0.67+0/-0.03 |
| Height      | 43.0+0/-1.5 | 1.69+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 32          | 1.13         |

| Nominal Voltage        |         | 1.2V                     |                         |               |
|------------------------|---------|--------------------------|-------------------------|---------------|
| Discharge<br>Capacity* |         | Average**                | 2040 mAh                |               |
|                        |         | Rated (Min.)             | 2000 mAh                |               |
|                        |         | impedance<br>rged state. | 20m()                   |               |
| Charge Standard        |         | 200mA (0.1lt) x 16hrs.   |                         |               |
|                        | 90      | Rapid                    | 2000mA (1lt) x 1.2 hrs. |               |
|                        |         | Standard                 | °C                      | °F            |
| ø                      | Charge  | Standard                 | 0°C to 45°C             | 32°F to 113°F |
| 별                      |         | Rapid                    | 0°C to 40°C             | 32°F to 104°F |
| Ambient<br>Temperature | Dis     | charge                   | -10°C to 65°C           | 14°F to 149°F |
| Am p                   |         | < 1 year                 | -20°C to 35°C           | -4°F to 95°F  |
| _ P                    | Storage | < 3 months               | -20°C to 45°C           | -4°F to 113°F |
|                        |         | < 1 month                | -20°C to 55°C           | -4°F to 131°F |

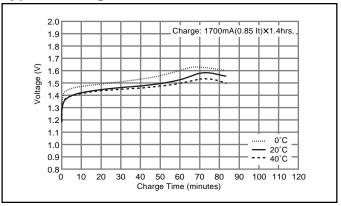
- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.

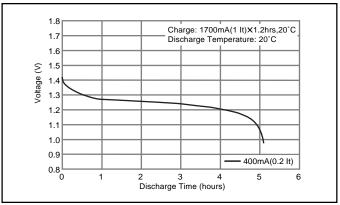
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

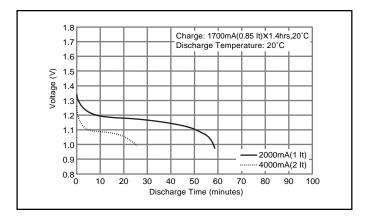
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



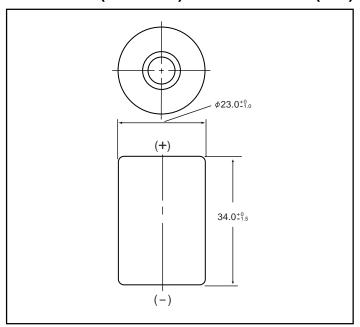




(mm)

## HHR200SCP Cylindrical 4/5SC size (HR 23/34)

### **Dimensions (with Tube)**



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 23.0+0/-0.1 | 0.91+0/-0.04 |
| Height      | 34.0+0/-1.5 | 1.34+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 42          | 1.48         |

|  | Nominal V | oltage                 | 1.2V                    |               |
|--|-----------|------------------------|-------------------------|---------------|
| Discharge<br>Capacity*                                 |           | Average**              | 2100 mAh                |               |
|  |           | Rated (Min.)           | 1900 mAh                |               |
| Approx. Internal impedance at 1000Hz at charged state. |           | 5mΩ                    |                         |               |
| Charge Standard  |           | 200mA (0.1lt) x 16hrs. |                         |               |
|  | g-        | Rapid                  | 2000mA (1It) x 1.2 hrs. |               |
|  |           | Standard               | °C                      | °F            |
| rt ure   | Charge    | Standard               | 0°C to 45°C             | 32°F to 113°F |
| ien  |           | Rapid                  | 0°C to 40°C             | 32°F to 104°F |
| m<br>bedr  | Dis       | charge                 | -10°C to 65°C           | 14°F to 149°F |
| Ambient<br>Temperature                                 | Storogo   | < 2 years              | -20°C to 35°C           | -4°F to 95°F  |
|  | Storage   | < 6 months             | -20°C to 45°C           | -4°F to 113°F |

- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.

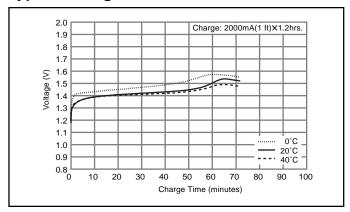
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

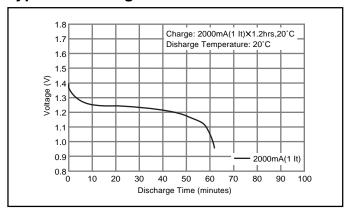
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

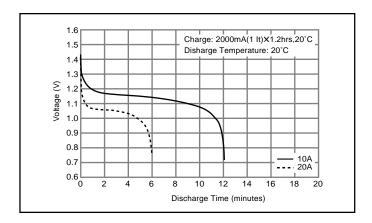
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



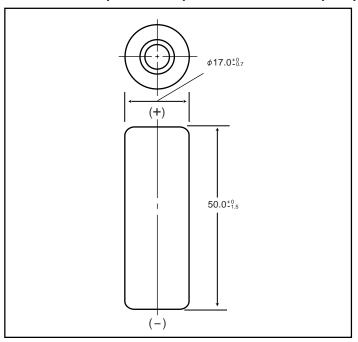




## HHR210A Cylindrical A size (HR 17/50)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 17.0+0/-0.7 | 0.67+0/-0.03 |
| Height      | 50.0+0/-1.5 | 1.97+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 38          | 1.34         |

| Nominal Voltage  |         | 1.2V                   |                         |               |
|--|---------|------------------------|-------------------------|---------------|
| Discharge<br>Capacity*                                 |         | Average**              | 2200 mAh                |               |
|  |         | Rated (Min.)           | 2100 mAh                |               |
| Approx. Internal impedance at 1000Hz at charged state. |         | 20mΩ                   |                         |               |
| Charge Standard  |         | 210mA (0.1lt) x 16hrs. |                         |               |
|  | 90      | Rapid                  | 2100mA (1lt) x 1.2 hrs. |               |
|  |         | 01                     | °C                      | °F            |
| gy .   | Charge  | Standard               | 0°C to 45°C             | 32°F to 113°F |
| 별  |         | Rapid                  | 0°C to 40°C             | 32°F to 104°F |
| bie  | Dis     | charge                 | -10°C to 65°C           | 14°F to 149°F |
| Ambient<br>Temperature                                 |         | < 1 year               | -20°C to 35°C           | -4°F to 95°F  |
| _ P  | Storage | < 3 months             | -20°C to 45°C           | -4°F to 113°F |
|  |         | < 1 month              | -20°C to 55°C           | -4°F to 131°F |

- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.

Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

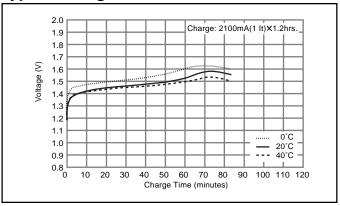
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:

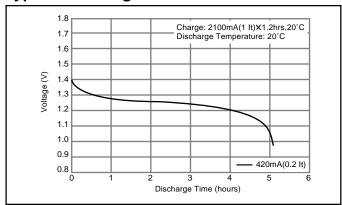
It(A) = Cn (Ah)/1h.

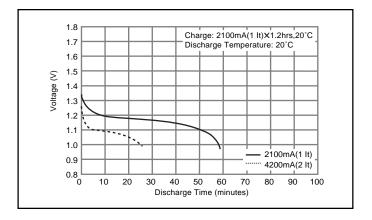
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

### **Typical Charge Characteristics**



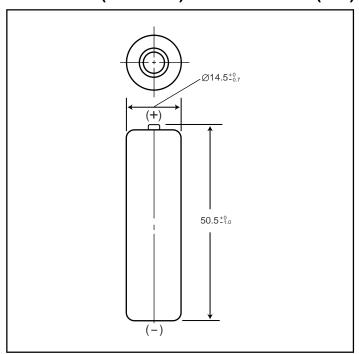




# HHR210AA/B Cylindrical AA size (HR 15/51)

### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm           | inch         |
|-------------|--------------|--------------|
| Diameter    | 14.5 +0/-0.7 | 0.57 +0/-0.3 |
| Height      | 50.5 +0/-1.0 | 1.99 +0/-0.5 |
| Approximate | Grams        | Ounces       |
| Weight      | 29           | 1.02         |

| Nominal Voltage  |              | 1.2V                    |                       |               |
|--|--------------|-------------------------|-----------------------|---------------|
| Discharge<br>Capacity*                                 |              | Average**               | 2080mAh               |               |
|  |              | Rated (Min.)            | 2000mAh               |               |
| Approx. internal Impedance at 1000Hz at charged state. |              | 25mΩ                    |                       |               |
| Charge Standard  |              | 200mA (0.1lt) x 16 hrs. |                       |               |
|  | Charge Rapid |                         | 1200mA (1lt) x 2 hrs. |               |
|  |              | Standard                | °C                    | °F            |
| ب ا  | Charge       |                         | 0°C to 45°C           | 32°F to 113°F |
| ent  |              | Rapid                   | 0°C to 40°C           | 32°F to 113°F |
| Ambient<br>Temperature                                 | Disch        | narge                   | -10°C to 65°C         | 14°F to 149°F |
| Ar   |              | < 1 year                | -20°C to 35°C         | -4°F to 95°F  |
| -  | Storage      | < 3 months              | -20°C to 45°C         | -4°F to 113°F |
|  |              | < 1 month               | -20°C to 55°C         | -4°F to 131°F |

<sup>\*</sup> After charging at 0.1lt for 16 hours, discharging at 0.2lt.

Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

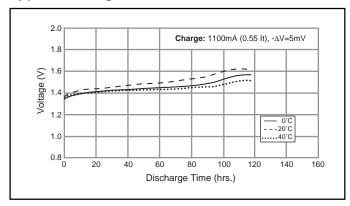
#### Note:

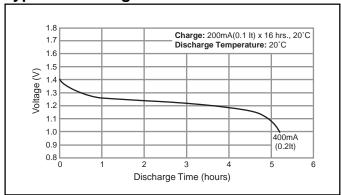
[It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:  $It(A) = Cn \ (Ah)/1h$ 

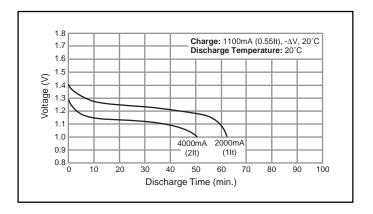
- \* [It] is the reference test current in ampres
- \* [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

### **Typical Charge Characteristics**





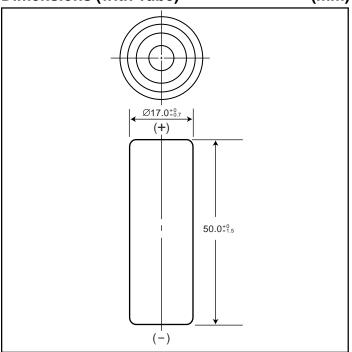


<sup>\*\*</sup> For reference only.

## HHR210AH Cylindrical A size (HR 17/50)

#### **Dimensions (with Tube)**





#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 17.0+0/-0.7 | 0.67+0/-0.03 |
| Height      | 50.0+0/-1.5 | 1.97+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 38          | 1.34         |

| Nominal Voltage  |              | 1.2V                 |               |               |
|--|--------------|----------------------|---------------|---------------|
| District L   |              | Average <sup>2</sup> | 2050          | )mAh          |
|  |              | Rated (Min.)         | 1900mAh       |               |
| Approx. internal Impedance at 1000Hz at charged state. |              | 20mΩ                 |               |               |
| Standard   |              | 210mA (0.1           | It) x 16 hrs. |               |
| j  | Charge Rapid |                      | -             |               |
|  |              | Standard             | °C            | °F            |
|  | Charge       | Standard             | -10°C to 60°C | 14°F to 140°F |
| it<br>ure  |              | Rapid                | -             | -             |
| bier<br>erat   | Discl        | narge                | -10°C to 60°C | 14°F to 140°F |
| Ambient<br>Temperature                                 |              | < 1 year             | -20°C to 35°C | -4°F to 95°F  |
|  | Storage      | < 3 months           | -20°C to 45°C | -4°F to 113°F |
|  | Storage      | < 1 month            | -20°C to 55°C | -4°F to 131°F |
|  |              | < 1 week             | -20°C to 60°C | -4°F to 140°F |

- After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- <sup>2</sup> For reference only.

Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

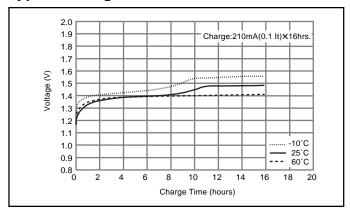
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:

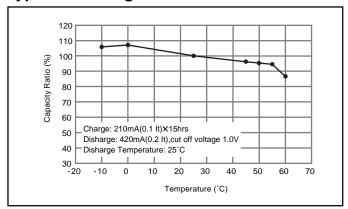
It(A) = Cn (Ah)/1h.

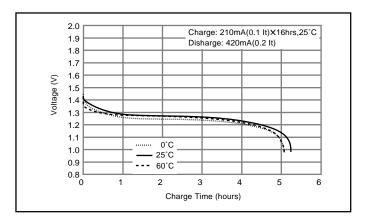
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



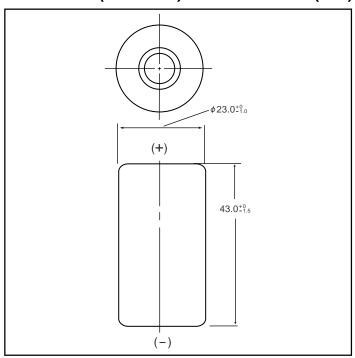




# HHR250SCH Cylindrical SC size (HR 23/43)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 23.0+0/-1.0 | 0.91+0/-0.04 |
| Height      | 43.0+0/-1.5 | 1.69+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 55          | 1.94         |

| Nominal Voltage  |                    |                    | 1.2V            |               |
|--|--------------------|--------------------|-----------------|---------------|
| Discharge Average <sup>2</sup>                         |                    | 2650 mAh           |                 |               |
| Сар  | acity <sup>1</sup> | Rated (Min.)       | 2500            | mAh           |
| Approx. Internal impedance at 1000Hz at charged state. |                    | $5 \text{m}\Omega$ |                 |               |
| Standard   |                    | 250mA              | x 16hrs.        |               |
| Cł   | narge              | Rapid <sup>3</sup> | 1250mA          | x 2.4 hrs.4   |
|  |                    | Low Rate           | 125mA x 32 hrs. |               |
|  |                    | LOW Rate           | 83mA x 48 hrs.  |               |
|  |                    | Standard           | °C              | °F            |
|  | Charge             | Staridard          | -10°C to 60°C   | 14°F to 140°F |
| T Z  |                    | Rapid              | -10°C to 45°C   | 14°F to 113°F |
| ien  | Dis                | charge             | -10°C to 60°C   | 14°F to 140°F |
| nb<br>pe   |                    | < 1 year           | -20°C to 35°C   | -4°F to 95°F  |
| Ambient<br>Temperature                                 | Storage            | < 6 months         | -20°C to 45°C   | -4°F to 113°F |
| -  | Otorage            | < 1 month          | -20°C to 55°C   | -4°F to 131°F |
|  | < 1 week           | -20°C to 65°C      | -4°F to 149°F   |               |

- $\stackrel{1}{\circ}$  After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- <sup>2</sup> For reference only.
- Need specially designed control system Control System:

dT/dt cut-off; 1 to 2°C/min

 $-\triangle V$  cut-off;  $-\triangle V$  per cell = 5 to 10 mV

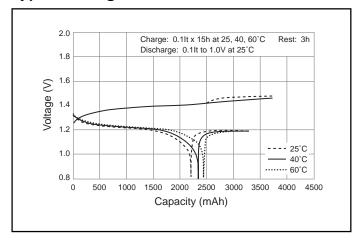
T-control; T=65°C

Rapid charger timer; 2.4h (at 1.25a)

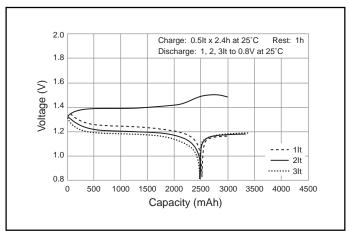
Trickle timer; within 2h 4 With control system

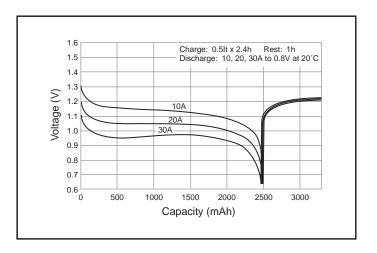
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

#### **Typical Charge Characteristics**



### **Typical Discharge Characteristics**





e: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h

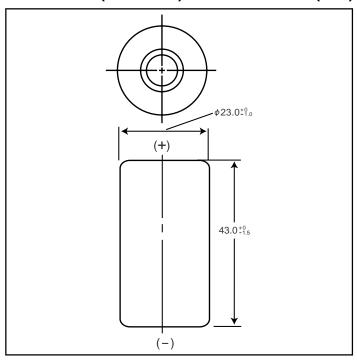
- \* [It] is the reference test current in ampres
- \* [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared



# HHR260SCP Cylindrical SC size (HR 23/43)

### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 23.0+0/-1.0 | 0.91+0/-0.04 |
| Height      | 43.0+0/-1.5 | 1.69+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 55          | 1.94         |

| Nominal Voltage                |                    | 1.2V           |                   |               |
|--------------------------------|--------------------|----------------|-------------------|---------------|
| Discharge Average <sup>2</sup> |                    | 2600 mAh       |                   |               |
| Cap                            | acity <sup>1</sup> | Rated (Min.)   | 2450              | mAh           |
|                                |                    | impedance      | 5n                | nΩ            |
| at 100                         | 00Hz at cha        | rged state.    | 311               | 122           |
| Charge Standard                |                    | 260mA x 16hrs. |                   |               |
| Ci                             | large              | Rapid          | 2600mA x 1.2 hrs. |               |
|                                |                    | Standard       | °C                | °F            |
| อ                              | Charge             | Stariuaru      | 0°C to 45°C       | 32°F to 113°F |
| atn                            |                    | Rapid          | 10°C to 40°C      | 50°F to 104°F |
| bio                            | Dis                | charge         | -10°C to 65°C     | 14°F to 149°F |
| Ambient<br>Temperature         |                    | < 1 year       | -20°C to 35°C     | -4°F to 95°F  |
| e                              | Storage            | < 3 months     | -20°C to 45°C     | -4°F to 113°F |
|                                |                    | < 1 month      | -20°C to 55°C     | -4°F to 131°F |

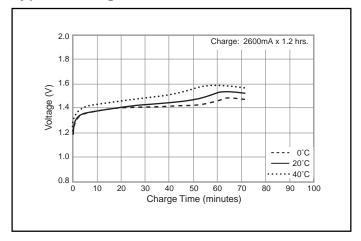
<sup>&</sup>lt;sup>1</sup> After charging at 0.1lt for 16 hours, discharging at 0.2lt.

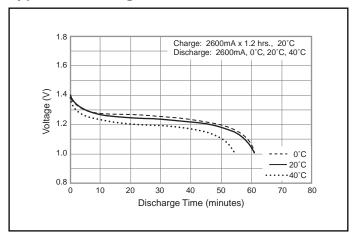
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

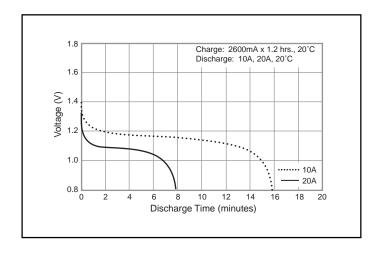
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h

- \* [It] is the reference test current in ampres
- \* [Cn] is the rated capacity of the cell or battery in Ampere-hours.
- n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**





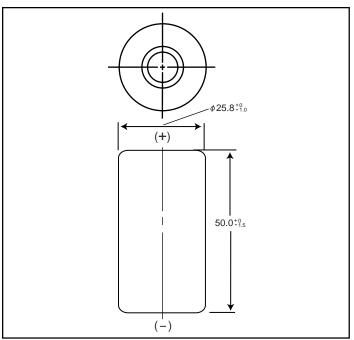


<sup>&</sup>lt;sup>2</sup> For reference only.

# HHR300CH Cylindrical C size (HR 26/50) for backup use

## **Dimensions (with Tube)**

(mm)



### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 25.8+0/-1.0 | 1.02+0/-0.04 |
| Height      | 50.0+0/-1.5 | 1.97+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 80          | 2.82         |

| Nominal Voltage   |                | 1.2V                               |               |               |
|---|----------------|------------------------------------|---------------|---------------|
| Discharge Average <sup>2</sup> Capacity <sup>1</sup> Rated (Min.) |                | 3300 mAh                           |               |               |
|   |                | Rated (Min.)                       | 3100          | mAh           |
| Approx. Internal impedance at 1000Hz at charged state.            |                | 5mΩ                                |               |               |
| Charge Standard Rapid³ Low Rate                                   |                | 300mA (0.1                         | 1lt) x 16hrs. |               |
|   |                | 1500mA (1lt) x 2.4 hrs.4           |               |               |
|   |                | 155mA x 32 hrs.<br>100mA x 48 hrs. |               |               |
|   |                | Standard                           | °C            | °F            |
|   | Chargo         | Standard                           | 0°C to 45°C   | 32°F to 113°F |
| t<br>ure  | Charge         | Rapid                              | 10°C to 40°C  | 32°F to 104°F |
| ien<br>ratı   |                | Low Rate                           | -10°C to 45°C | 14°F to 149°F |
| mb<br>odr   | Discharge      |                                    | -10°C to 65°C | 14°F to 113°F |
| A<br>Ten  | Storage < 3 mo | < 1 year                           | -20°C to 35°C | -4°F to 95°F  |
| •   |                | < 3 months                         | -20°C to 35°C | -4°F to 95°F  |
|   |                | < 1 month                          | -20°C to 55°C | -4°F to 131°F |

- <sup>1</sup> After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- 2 For reference only.
- <sup>3</sup> Need specially designed control system

#### Control System:

dT/dt cut-off; 1 to 2°C/min

- $\triangle$ V cut-off; - $\triangle$ V per cell = 5 to 10 mV

T-control; T=65°C

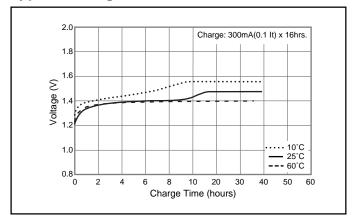
Rapid charger timer; 2.4h (at 1.25a)

Trickle timer; within 2h

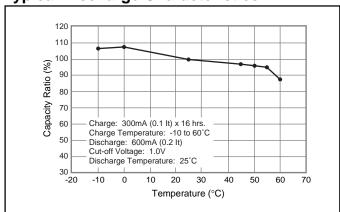
<sup>4</sup> With control system

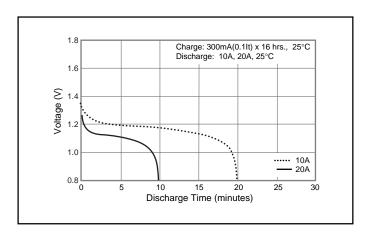
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

#### **Typical Charge Characteristics**



### **Typical Discharge Characteristics**





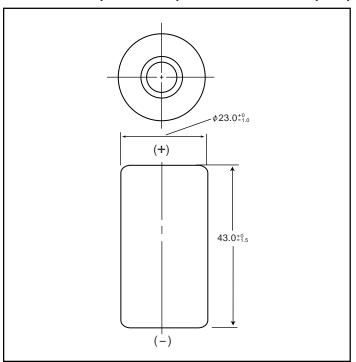
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

# HHR300SCP Cylindrical SC size (HR 23/43)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 23.0+0/-0.1 | 0.91+0/-0.04 |
| Height      | 43.0+0/-1.5 | 1.69+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 57          | 2.01         |

| Nominal Voltage  |            | 1.2V                   |                         |               |
|--|------------|------------------------|-------------------------|---------------|
| Discharge<br>Capacity*                                 |            | Average**              | 3050 mAh                |               |
|  |            | Rated (Min.)           | 2800 mAh                |               |
| Approx. Internal impedance at 1000Hz at charged state. |            | 4mΩ                    |                         |               |
| Charge Standard  |            | 300mA (0.1lt) x 16hrs. |                         |               |
|  | g-         | Rapid                  | 3000mA (1lt) x 1.2 hrs. |               |
| _  |            | Standard               | °C                      | °F            |
| ıt<br>ure  | Charge     | Standard               | 0°C to 45°C             | 32°F to 113°F |
| ien  |            | Rapid                  | 0°C to 40°C             | 32°F to 104°F |
| m<br>adu   | Discharge  |                        | -10°C to 65°C           | 14°F to 149°F |
| Ambient<br>Temperature                                 | Ctorogo    | < 2 years              | -20°C to 35°C           | -4°F to 95°F  |
| ⊢ Storage  | < 6 months | -20°C to 45°C          | -4°F to 113°F           |               |

- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.

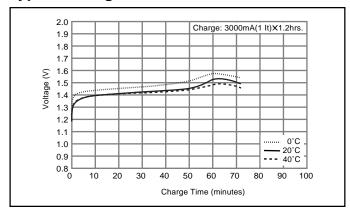
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

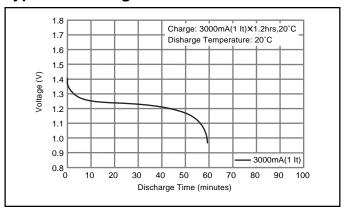
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

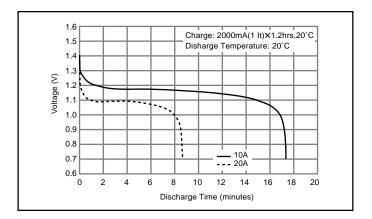
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



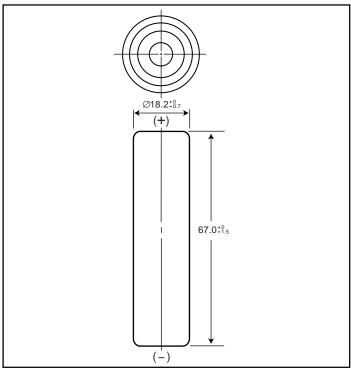




# HHR330APH Cylindrical L-Fat A size (HR 18/67)

### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 18.2+0/-0.7 | 0.72+0/-0.03 |
| Height      | 67.0+0/-1.5 | 2.64+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 60          | 2.12         |

|                                | Nominal Voltage                    |                    | 1.2V            |               |
|--------------------------------|------------------------------------|--------------------|-----------------|---------------|
| Discharge Average <sup>2</sup> |                                    | 3300 mAh           |                 |               |
| Cap                            | Capacity <sup>1</sup> Rated (Min.) |                    | 3200            | mAh           |
| Appro                          | x. Internal                        | impedance          | 5.5             | mΩ            |
| at 100                         | 00Hz at cha                        | rged state.        | 5.5             | 11122         |
|                                | Standard                           |                    | 330mA           | x 16hrs.      |
| CI                             | harge                              | Rapid <sup>3</sup> | 1650mA          | x 2.4 hrs.4   |
| Low Rate                       |                                    | 165mA x 32 hrs.    |                 |               |
|                                |                                    | LOW Rate           | 110mA x 48 hrs. |               |
|                                |                                    | Standard           | °C              | °F            |
| •                              | Charge                             | Standard           | -10°C to 60°C   | 14°F to 140°F |
| ıt<br>ure                      |                                    | Rapid              | -10°C to 45°C   | 14°F to 113°F |
| ien<br>rat                     | Dis                                | charge             | -10°C to 60°C   | 14°F to 140°F |
| Ambient<br>Temperature         |                                    | < 1 year           | -20°C to 35°C   | -4°F to 95°F  |
| A E Storogo                    | Storage                            | < 6 months         | -20°C to 45°C   | -4°F to 113°F |
| <u> </u>                       | Otorage                            | < 1 month          | -20°C to 55°C   | -4°F to 131°F |
|                                |                                    | < 1 week           | -20°C to 65°C   | -4°F to 149°F |

- After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- <sup>2</sup> For reference only.
- Need specially designed control system

#### Control System:

dT/dt cut-off; 1 to 2°C/min

 $-\triangle V$  cut-off;  $-\triangle V$  per cell = 5 to 10 mV

T-control; T=65°C

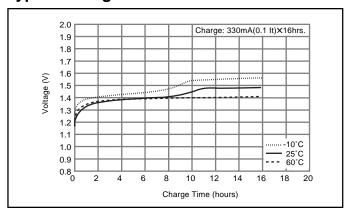
Rapid charger timer; 2.4h (at 1.25a)

Trickle timer; within 2h

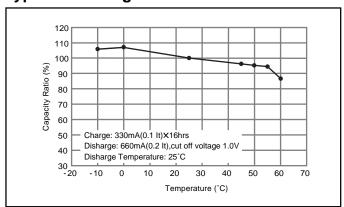
<sup>4</sup> With control system

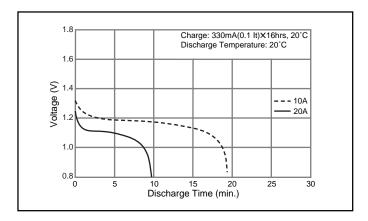
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

#### **Typical Charge Characteristics**



#### **Typical Discharge Characteristics**





Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

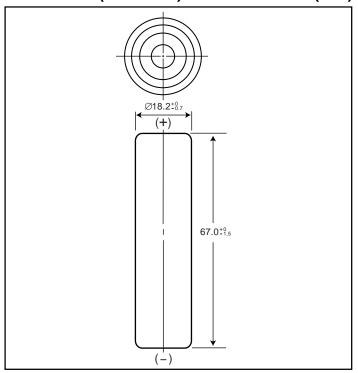
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared



## HHR370AH Cylindrical L-Fat A size (HR 18/67)

#### **Dimensions (with Tube)**

(mm)



### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 18.2+0/-0.7 | 0.72+0/-0.03 |
| Height      | 67.0+0/-1.5 | 2.64+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 60          | 2.12         |

| Nominal Voltage  |                    |                                    | 1.2V          |               |  |  |
|--|--------------------|------------------------------------|---------------|---------------|--|--|
| Discharge  |                    | Average <sup>2</sup>               | 3700 mAh      |               |  |  |
| Cap  | acity <sup>1</sup> | Rated (Min.)                       | 3500 mAh      |               |  |  |
| Approx. Internal impedance at 1000Hz at charged state. |                    | 20mΩ                               |               |               |  |  |
| Standard   |                    | 370mA                              | x 16hrs.      |               |  |  |
| CI   | narge              | Rapid <sup>3</sup>                 | 1750mA        | x 2.4 hrs.4   |  |  |
| Low Rate   |                    | 185mA x 32 hrs.<br>123mA x 48 hrs. |               |               |  |  |
|  |                    | Standard                           | °C            | °F            |  |  |
| 4  | Charge             | Stariuaru                          | -10°C to 60°C | 14°F to 140°F |  |  |
| # E  |                    | Rapid                              | -10°C to 45°C | 14°F to 113°F |  |  |
| ien  | Dis                | charge                             | -10°C to 60°C | 14°F to 140°F |  |  |
| nb<br>pe   |                    | < 1 year                           | -20°C to 35°C | -4°F to 95°F  |  |  |
| Ambient<br>Temperature                                 | Storage            | < 6 months                         | -20°C to 45°C | -4°F to 113°F |  |  |
|  | Otorage            | < 1 month                          | -20°C to 55°C | -4°F to 131°F |  |  |
|  |                    | < 1 week                           | -20°C to 65°C | -4°F to 149°F |  |  |

- After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- <sup>2</sup> For reference only.
- Need specially designed control system

#### Control System:

dT/dt cut-off; 1 to 2°C/min

 $-\triangle V$  cut-off;  $-\triangle V$  per cell = 5 to 10 mV

T-control; T=65°C

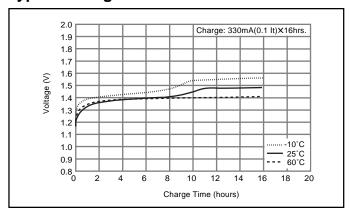
Rapid charger timer; 2.4h (at 1.25a)

Trickle timer; within 2h

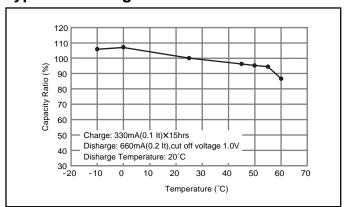
<sup>4</sup> With control system

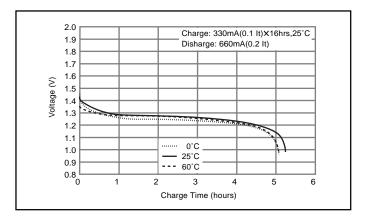
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

#### **Typical Charge Characteristics**



#### **Typical Discharge Characteristics**





Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

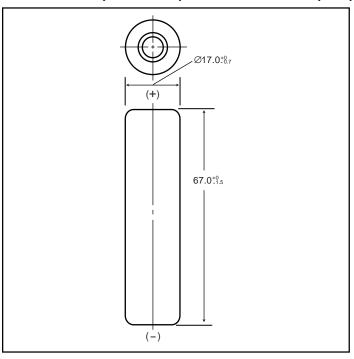
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared



## HHR380A Cylindrical L-A size (HR 17/67)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 17.0+0/-0.7 | 0.67+0/-0.03 |
| Height      | 67.0+0/-1.5 | 2.64+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 53          | 1.87         |

| Nominal Voltage        |          | 1.2V                     |               |               |
|------------------------|----------|--------------------------|---------------|---------------|
| Discharge              |          | Average**                | 3800 mAh      |               |
| Сар                    | acity*   | Rated (Min.)             | 3700 mAh      |               |
|                        |          | impedance<br>rged state. | 25mΩ          |               |
| Charge Standard        |          | 370mA (0.1               | IIt) x 16hrs. |               |
|                        | Rapid*** |                          | 2000mA dT/dt  |               |
|                        |          | Standard                 | °C            | °F            |
| စ                      | Charge   |                          | 0°C to 45°C   | 32°F to 113°F |
| t I                    |          | Rapid                    | 0°C to 40°C   | 32°F to 104°F |
| Ambient<br>Temperature | Dis      | charge                   | -10°C to 65°C | 14°F to 149°F |
| Am                     |          | < 1 year                 | -20°C to 35°C | -4°F to 95°F  |
| ₽                      | Storage  | < 3 months               | -20°C to 45°C | -4°F to 113°F |
|                        |          | < 1 month                | -20°C to 55°C | -4°F to 131°F |

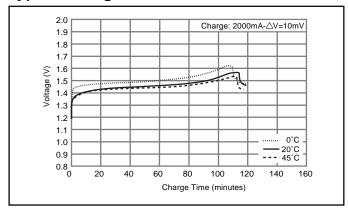
- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.
- \*\*\* For rapid charge: use dT/dt charge termination method. Refer to the Nickel Metal Hydride "Charge Methods" section for further details. Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

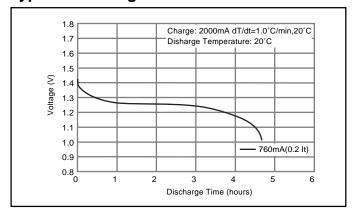
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

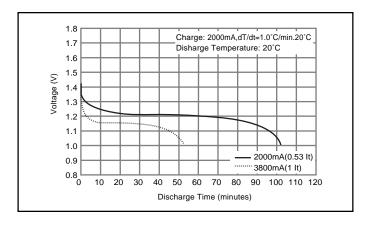
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



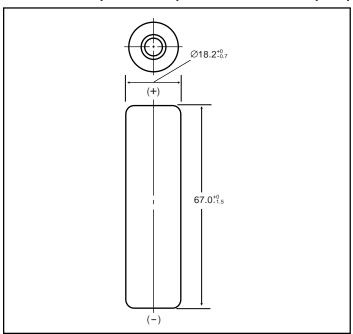




## HHR450A Cylindrical L-fat A size (HR 18/67)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 18.2+0/-0.7 | 0.72+0/-0.03 |
| Height      | 67.0+0/-1.5 | 2.64+0/-0.06 |
| Approximate | Grams       | Ounces       |
| Weight      | 60          | 2.12         |

| Nominal Voltage  |         | 1.2V                   |               |               |
|--|---------|------------------------|---------------|---------------|
| Discharge Average*                                     |         | Average**              | 4500          | mAh           |
| Сар  | acity*  | Rated (Min.)           | 4200          | mAh           |
| Approx. Internal impedance at 1000Hz at charged state. |         | 25mΩ                   |               |               |
| Charge Standard  |         | 420mA (0.1lt) x 16hrs. |               |               |
|  | g-      | Rapid***               | 2000mA dT/dt  |               |
|  |         | Standard               | °C            | °F            |
| ė  | Charge  | Staridard              | 0°C to 45°C   | 32°F to 113°F |
| 별  |         | Rapid                  | 0°C to 40°C   | 32°F to 104°F |
| Ambient<br>Temperature                                 | Dis     | charge                 | -10°C to 65°C | 14°F to 149°F |
| Am   |         | < 1 year               | -20°C to 35°C | -4°F to 95°F  |
| ₽  | Storage | < 3 months             | -20°C to 45°C | -4°F to 113°F |
|  |         | < 1 month              | -20°C to 55°C | -4°F to 131°F |

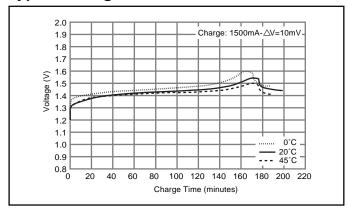
- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.
- \*\*\* For rapid charge: use dT/dt charge termination method. Refer to the Nickel Metal Hydride "Charge Methods" section for further details. Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

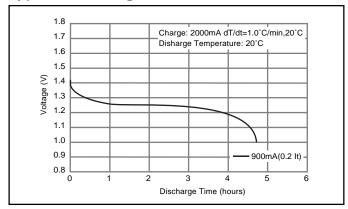
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

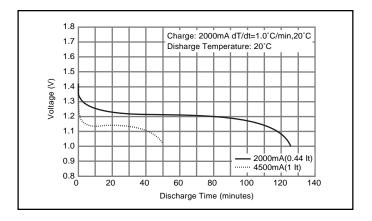
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



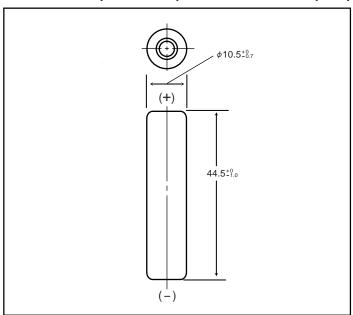




# HHR60AAAH Cylindrical AAA size (HR 11/45)

#### **Dimensions (with Tube)**

(mm)



## **Specifications**

|             | mm           | inch          |
|-------------|--------------|---------------|
| Diameter    | 10.5 +0/-0.7 | 0.41 +0/-0.03 |
| Height      | 44.5 +0/-1.0 | 1.75 +0/-0.04 |
| Approximate | Grams        | Ounces        |
| Weight      | 13           | 0.46          |

| Nominal Voltage  |                    | 1.2V                 |                |               |
|--|--------------------|----------------------|----------------|---------------|
| Disc   | harge              | Average <sup>2</sup> | 550 mAh        |               |
| Cap  | acity <sup>1</sup> | Rated (Min.)         | 500            | mAh           |
| Approx. Internal impedance at 1000Hz at charged state. |                    | 35mΩ                 |                |               |
|  |                    | Standard             | 50mA >         | c 16hrs.      |
| CI   | narge              | Rapid <sup>3</sup>   | 250mA x        | 2.4 hrs.4     |
|  | 3                  | Low Rate             | 25mA x 32 hrs. |               |
|  |                    | LOW Rate             | 17mA x 48 hrs. |               |
|  |                    | Standard             | °C             | °F            |
|  | Charge             | Staridard            | -10°C to 60°C  | 14°F to 140°F |
| # P  |                    | Rapid                | -10°C to 45°C  | 14°F to 113°F |
| ien  | Dis                | charge               | -10°C to 60°C  | 14°F to 140°F |
| Ambient<br>mperatu                                     |                    | < 1 year             | -20°C to 35°C  | -4°F to 95°F  |
| Ambient<br>Temperature                                 | Storage            | < 6 months           | -20°C to 45°C  | -4°F to 113°F |
| -  | O.O. age           | < 1 month            | -20°C to 55°C  | -4°F to 131°F |
|  |                    | < 1 week             | -20°C to 65°C  | -4°F to 149°F |

- After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- For reference only.
- Need specially designed control system Control System:

dT/dt cut-off; 1 to 2°C/min

-△V cut-off; -△V per cell = 5 to 10 mV

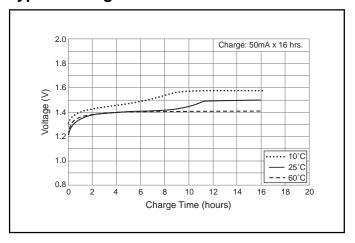
T-control; T=65°C

Rapid charger timer; 2.4h (at 1.25a)

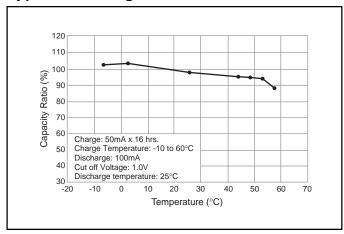
Trickle timer; within 2h

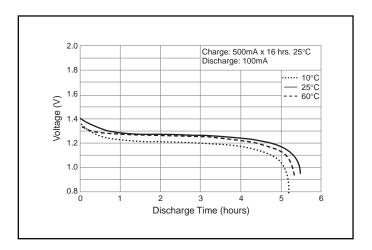
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design

#### **Typical Charge Characteristics**



### **Typical Discharge Characteristics**





Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h

- \* [It] is the reference test current in ampres
- $^{\star}$  [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

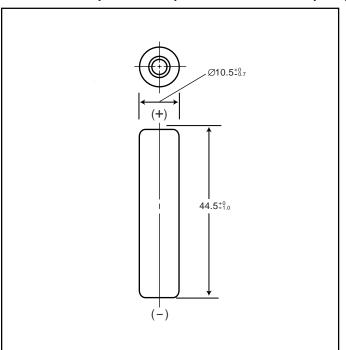


<sup>&</sup>lt;sup>4</sup> With control system

## HHR70AAAJ Cylindrical HR AAA size (HR 11/45)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 10.5+0/-0.7 | 0.41+0/-0.03 |
| Height      | 44.5+0/-1.0 | 1.75+0/-0.04 |
| Approximate | Grams       | Ounces       |
| Weight      | 13          | 0.46         |

| Nominal Voltage  |                       | 1.2V         |                        |               |
|--|-----------------------|--------------|------------------------|---------------|
| Discharge<br>Capacity*                                 |                       | Average**    | 720 mAh                |               |
|  |                       | Rated (Min.) | 700 mAh                |               |
| Approx. Internal impedance at 1000Hz at charged state. |                       | 30mΩ         |                        |               |
| CI   | Charge Standard Rapid |              | 70mA (0.1lt) x 16hrs.  |               |
|  |                       |              | 650mA (1lt) x 1.2 hrs. |               |
|  |                       | Standard     | °C                     | °F            |
| ري   | Charge                | Standard     | 0°C to 45°C            | 32°F to 113°F |
| t ţ  |                       | Rapid        | 0°C to 40°C            | 32°F to 104°F |
| Ambient<br>Temperature                                 | Dis                   | charge       | -10°C to 65°C          | 14°F to 149°F |
| Am   |                       | < 1 year     | -20°C to 35°C          | -4°F to 95°F  |
| <u>P</u>   | Storage               | < 3 months   | -20°C to 45°C          | -4°F to 113°F |
|  |                       | < 1 month    | -20°C to 55°C          | -4°F to 131°F |

- \* After charging at 0.1lt for 16 hours, discharging at 0.2lt.
- \*\* For reference only.

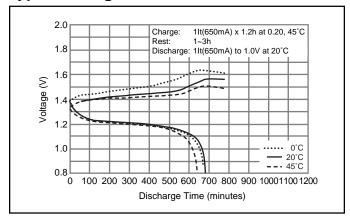
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

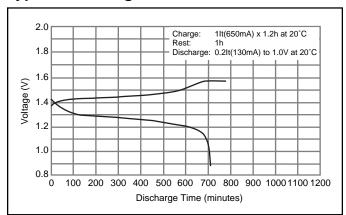
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: lt(A) = Cn (Ah)/1h.

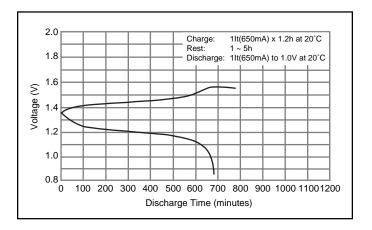
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.

  n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**



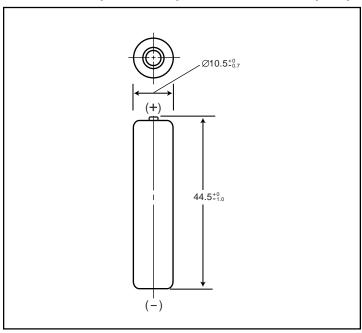




## HHR75AAA/B Cylindrical AAA size (HR 11/45)

#### **Dimensions (with Tube)**

(mm)



#### **Specifications**

|             | mm          | inch         |
|-------------|-------------|--------------|
| Diameter    | 10.5+0/-0.7 | 0.41+0/-0.03 |
| Height      | 44.5+0/-1.0 | 1.75+0/-0.04 |
| Approximate | Grams       | Ounces       |
| Weight      | 12          | 0.42         |

| Nominal Voltage  |         | 1.2V          |                  |               |
|--|---------|---------------|------------------|---------------|
| Discharge<br>Capacity*                                 |         | Average**     | 730 mAh          |               |
|  |         | Rated (Min.)  | 700 mAh          |               |
| Approx. Internal impedance at 1000Hz at charged state. |         | 35mΩ          |                  |               |
| Charge Standard  |         | 70mA x 16hrs. |                  |               |
|  | 90      | Rapid         | 450mA x 1.7 hrs. |               |
|  |         | Standard      | °C               | °F            |
| ø  | Charge  | Standard      | 0°C to 45°C      | 32°F to 113°F |
| 별  |         | Rapid         | 0°C to 40°C      | 32°F to 104°F |
| bie  | Dis     | charge        | -10°C to 65°C    | 14°F to 149°F |
| Ambient<br>Temperature                                 |         | < 1 year      | -20°C to 35°C    | -4°F to 95°F  |
|  | Storage | < 3 months    | -20°C to 45°C    | -4°F to 113°F |
|  |         | < 1 month     | -20°C to 55°C    | -4°F to 131°F |

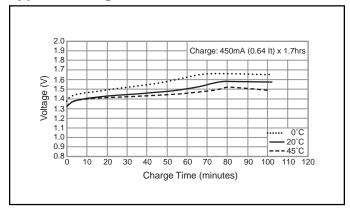
<sup>\*</sup> After charging at 0.1lt for 16 hours, discharging at 0.2lt.

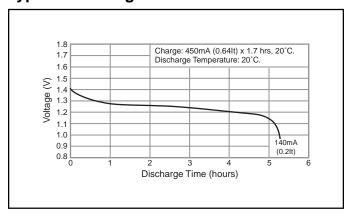
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

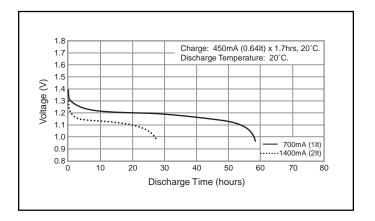
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

#### **Typical Charge Characteristics**







<sup>\*\*</sup> For reference only.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

#### Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов:
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001:
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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