Intec Industries Co., Ltd.
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SPECIFICATION

Type:	Ni-CD Cylindrical Cell
Model No.:	ETL-4500D
Prepared:	FHY
Approved:	LFX
Date:	Dec 18, 2002

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1. PREFACE

This specification applies to the Intec Nickel Cadmium Cylindrical batteries or battery packs. Intec reserves the right to alter the product design or amend this specification without prior notice.

2. SCOPE

This specification applies to nickel cadmium cylindrical rechargeable single cell ETL-4500D. This cell is suitable for the permanent charge application at high temperature.

3. REFERENCE DOCUMENTS

IEC 285-1993《sealed Ni-CD cylindrical rechargeable single cells》.

4. GENERAL ELECTRICAL SPECIFICATION

	SPECIFICATION	***REMARKS***
Intec Cell Designation	ETL-4500D	
IEC Cell Designation	KRHT 35/62	
Nominal Voltage	1.2V	
Rated Capacity	4500mAh	At 20℃
Charge Current		
Permanent	225mA	0.05C
Normal	450mA	0.1C
Quick	1350mA	0.3C
Charge Duration		
Normal	14~16hrs	
Quick	4~5hrs	
Maximum continuous discharge current	20A	
Operating Temperature		
Permanent Charge (recommended)	15 to 45℃	
Permanent Charge (permitted)	-20 to 70℃	Short duration (<1 month)
Storage Recommended	5 to 25℃	
Extended Storage	-40 to 65℃	Short duration (<1 month)
In discharge	-20 to 70℃	

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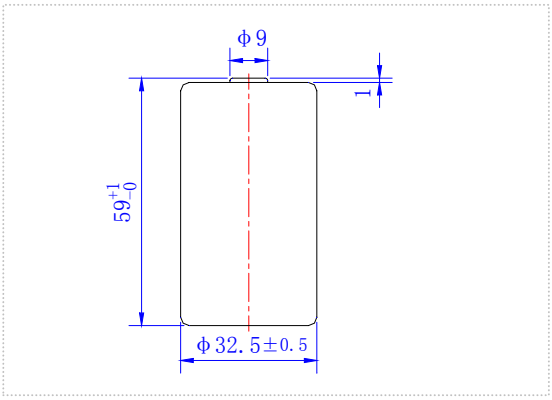
5. GENERAL MECHANICAL SPECIFICATION

Bare Cell Drawing (mm)	Bare Cell Dimensions
	Maximum Diameter(mm): 33.0 Maximum Height(mm): 60
	Typical Weight (g): 141

6. CAPACITY

6.1 IEC capacity:

IEC capacity is rated as follow:
Temperature: 20±5℃;
Charge current: 0.1C=450mA;
Charge duration: 16h;
Rest: 1 to 4h;
Discharge current: 0.2C=900mA;
Discharge end voltage: 1.0V/cell
The discharge continues until the voltage drops to 1.0V/cell, and the duration must not be less than 300 minutes. 3 Cycles are permitted. Therefore, the IEC capacity is 4.5Ah minimum.

6.2 Available capacity

The following table gives the minimum available capacity of ETL-4500D battery under various charge and discharge conditions. The temperature is 20±5℃ and the batteries are fully charged prior to testing.

Charge	***Permanent***	***Normal***
Rate	0.05C	0.1C
Current(mA)	225	450
Duration(h)	>48	16
Rest after charged(h)	0	1
Discharge*	***Capacity(mAh)***	***Capacity(mAh)***
0.2C(900mA)	4050	4500
C(4500mA)	3600	4100
2C(9000mA)	3300	3600

Discharge end voltage: 1.0V/cell.

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7. CHARGE

7.1 Permanent Charge

The ETL-4500D cells can be permanently charged between 15 to 45℃ with a constant current of 225mA(0.05C).

Occasional temperature (0 ~ 70℃) is acceptable for a short duration.

7.2 Standard Charge

0.1C (450mA) for 14 to 16h.

The temperature during charge is ranged 10 to 70℃.

8. TEMPERATURE CHARACTERISTIC

The following table gives the minimum available capacity of ETL-4500D battery under various charge and discharge temperatures.

Test condition: charge current 0.05C (225mA), duration 48h;

discharge current 900mA(0.2C), end voltage 1.0V.

Charge and discharge should be performed at the same temperature.

Temperature	***Available capacity***
20℃	0.9C
40℃	1C
70℃	0.65C

9. CHARGE RETENTION

After 28 days' storage at 20±5℃, a fully charged cell should retain typically 65% of its rated capacity.

10. STORAGE

Batteries should be stored in cool dry places. The storage temperature should be conditioned within the range of 5 to 25℃, and relative humidity should be 65±20%. Short-term storage under temperature –40~+65℃ is possible.

11. SERVICE LIFE FOR PERMANENT CHARGE APPLICATION

Battery service life depends mainly on battery temperature and overcharge capacity. When the capacity falls to 60% of initial capacity, the battery life is over.

At the following average operating conditions, the battery life is 4 years:

Battery operational temperature : 40℃;

Permanent charge current: 0.05C;

Discharge current: 0.5C;

Work for 1~2 cycles per month.

12. REFERENCE

Please refer to Intec's Customer Service if there is any question on using batteries.