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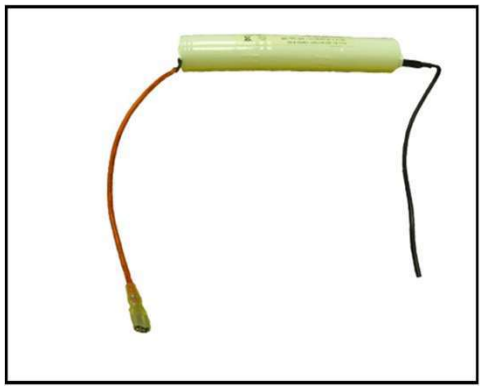
Product Datasheet

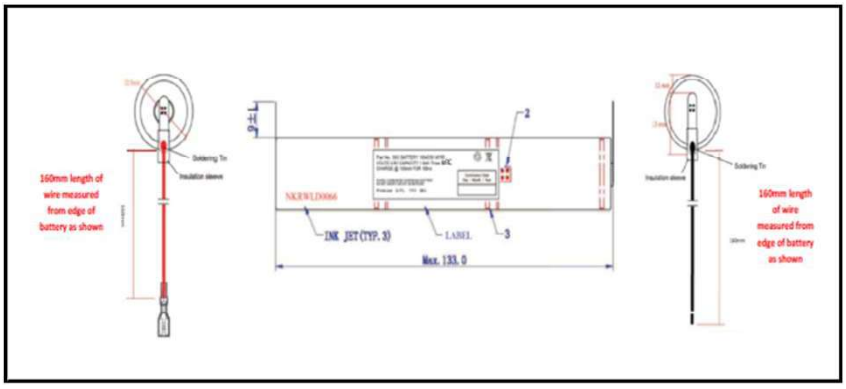
Battery model **3SC BATTERY 16NC70 WIRE**

IEC61951-1(2003)7.4.1.1 Cycle life

Nickel Cadmium battery pack (sealed rechargeable cells)

type	format
Sub C	Stick



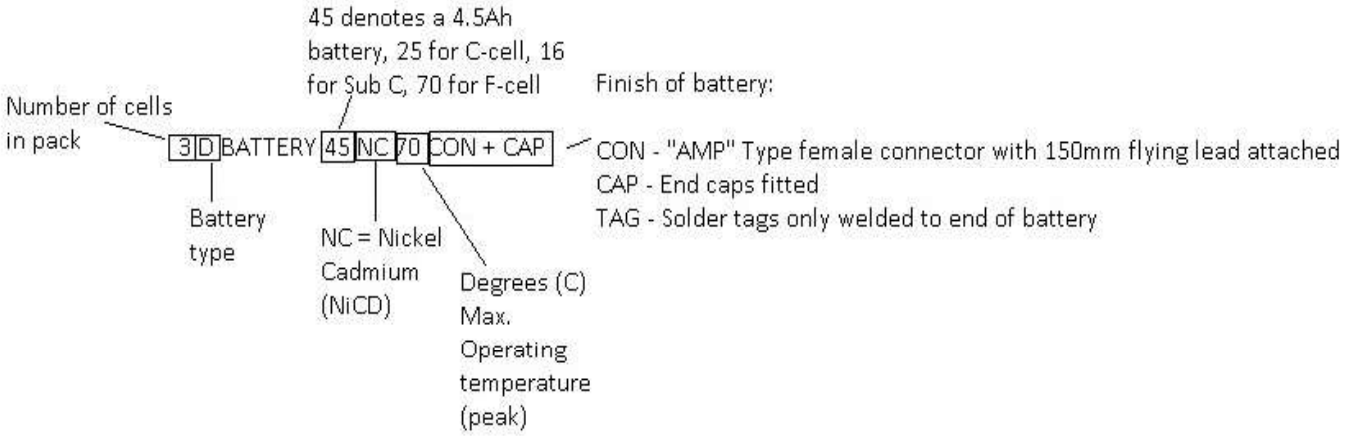


Battery voltage per pack (1.2V per cell)	3.6V
Nominal Capacity (Ah)	**1.6**
Maximum Operating Temperature (continuous not peak)	**55 degree**
Peak Operating Temperature (not continuous) if applicable	**70 degree**
Typical weight per cell (grams)	40
Typical weight per pack (grams)	120g

Dimensions

Length		Width		Height
133mm	x	24mm	x	24mm

Part Number Assistance:



1. This specification governs the performance of the following Nickel-Cadmium Cylindrical cell and its stack-up battery.

   3SC BATTERY 16NC70 WIRE

2. Data of stack-up batteries:

   All data involves voltage and weight to stack-up battery are equal to the value of unit cell times the number of unit cell which consisted in the stack-up batteries.

   Example:

   Stack-up battery consisting unit cells (number dependent on specification)

   Nominal voltage of unit cell = 1.2V

   Nominal voltage of stack-up batteries = 1.2V x 2 = 2.4V for example

3. Ratings:

Description	Unit	Specification	Conditions
Nominal Voltage	V/ Cell	1.2V per cell	
Nominal capacity	mAh	1600	Standard Charge/Discharge
Standard Charge	mA	160(0.1C)	Ambient Temperature Ta= 20± 5°C
	Hour	16	
Trickle Charge		(0.03C)~(0.05C)	Ta = 0~70ºC
Standard Discharge	mA	320(0.2C)	Ta = 0~70°C Humidity： Max 85%
Discharge cut-off voltage	V/ Cell	1.0	
Storage Temperature	ºC	-	Charged state of 30%, Humidity Max. 85% (see note (3)
Typical weight	Gram	40	Unit cell (approximate)

4. Performance

   Unless otherwise stated, tests should be done within one month of delivery under the following conditions:

   Ambient Temperature: T 20 +/-5ºC

   Relative Humidity: 50 +/- 15%

Test	Unit	Specification	Other condition	Remarks
Min. Capacity	mAh (0.2C)	1600	Standard Charge Discharge	Up to 3 cycles are allowed
Open Circuit Voltage (OCV)	V/ Cell	> 1.25	Within 2 weeks after standard charge	
Internal Impedance	m Ω / Cell	< 28	Upon fully charged (1 KHz)	
High rate discharge (0.5C)	minute	≥108	Standard Charge, I hour rest Before Discharge by 0.5C to 1.0 V	Up to 3 cycles are allowed
Charge Efficiency (50°C)	mAh	>1360 85%	Cycle1： 0.05C Charge 48 hrs, Discharge by 0.2C to 1.0V Cycle2： 0.07C Charge 24 hrs, Discharge by 0.2C to 1.0V Cycle3： 0.07C Charge 24 hrs, Discharge by 0.2C to 1.0V	Cycle2/cycle3 Capacity Discharge ≥ 90% Nominal Capacity
Overcharge		No leakage nor explosion	0.1C Charge10 days/ 0.1C	
Charge Retention	mAh	≥1040(65%)	Standard charge, Storage: 7 day rest at 45ºC Ambient Temperature, Standard Discharge	
Permanent Charge Endurance	min	FOR A	IEC61951-1(2003) 7.4.2.3	Permanent Charge Endurance
IEC Cycle Life	Cycle	≥500	IEC 61951- (2003) 7.4.1.1	See note (4)
Leakage Test		No leakage nor deformation	Fully charged at 0.5C for 2.5 hour stand for 14 days	
Security Test		No explosion, but leakage or deformation is allowed	Charge the cell 0.1C 16 hrs, Then <100 m Ω Impedance short circuit for 1 hour	Ambient Temperature: Ta = 20 +/- 5ºC
Impact Resistance		Change of voltage should be under 0.02V/ Cell Change of impedance should be under 5 m Ω/ Cell/ <20mV	Charge the cell 0.1C 16hrs Then leave for 1-4 hrs, check battery before/after dropped. Height 50cm, wooden board thickness 30mm. Direction not specified, 3 times.	Ambient Temperature Ta = 20+/- 5ºC
Vibration Resistance		Change of voltage should be under 0.02V/ Cell. Change of impedance should be under 5 milli-ohm/cell/<0.02V	Charge the battery 0.1C 16hrs, then leave for 24 hrs, check battery before/after vibration Amplitude 1.5mm vibration 3000 CPM Any direction for 60 mins	Ambient Temperature Ta = 20+/- 5ºC

Tamtec Electronics, Stafford Park 12, Telford, Shropshire, TF3 3BJ

1. Configuration, Dimensions and packing:
   Please refer to the attached drawing.

2. External appearance
   The cell/battery shall be free from cracks, scars, breakage, rust, discolouration, leakage nor deformation.

3. Caution
   a. Reverse charging is not acceptable
   b. Charge before use. The cells/batteries are delivered in an uncharged state.
   c. Do not charge/discharge with more than our specified current.
   d. Do not short-circuit the cell/battery/ Permanent damage to the cell/battery may result.
   e. Do not incinerate or mutilate the cell/battery.
   f. Do not solder directly to the cell/battery.
   g. The life expectancy may be reduced if the cell/battery is subjected to adverse conditions like: extreme temperature, deep cycling, excessive overcharge/over-discharge.
   h. Store the cell/battery uncharged in a cool dry place. Always discharge batteries before bulk storage or shipment.

Notes:

(1) Ta: Ambient Temperature

(2) Approximate charge time from discharged state is for reference only

(3) If the battery or battery packs are subjected to storage for such a long term more than 3 months, it is recommended to recharge the battery or battery packs periodically e.g. every 3 months or before the open circuit voltage (OCV) of the batteries comes down to 1.1Volts in order to obtain reasonably good capacity recovery and prevent battery performance degradation.

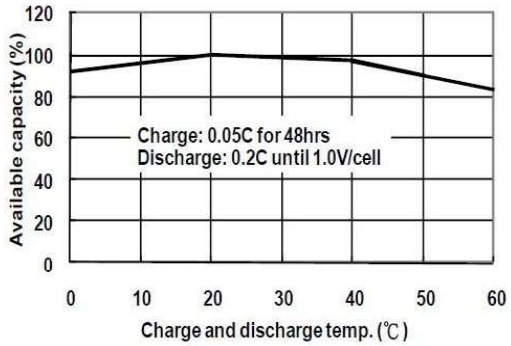
(4) IEC61951-1(2003)7.4.1.1 Cycle life

Cycle No.	Charge	Rest	Discharge
1	0.1C x 16h	None	0.25C x 2h 20min
2-48	0.25C x 3h 10 min	None	0.25C x 2h 20 min
49	0.25C x 3h 10 min	None	0.25C to 1.0V/Cell
50	0.1C x 16h	1-4h	0.2C to 1.0V/Cell
Cycles 1 to 50 shall be repeated until the discharge duration on any 50th cycle becomes less than 3h			

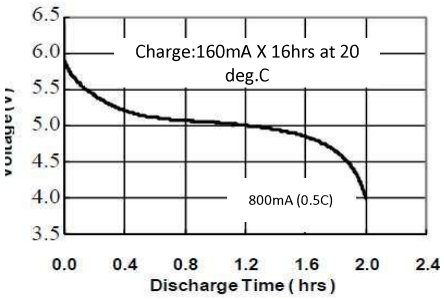
1. The information (subject to change without prior notice) contained in this document is for reference only and should not be used as a basis for product guarantee or warranty. For applications other than those described here, please consult your nearest Tamtec/Tamlite Lighting office.

2. Manufacturer reserves the right to alter or amend the design, model and specification without prior notice.

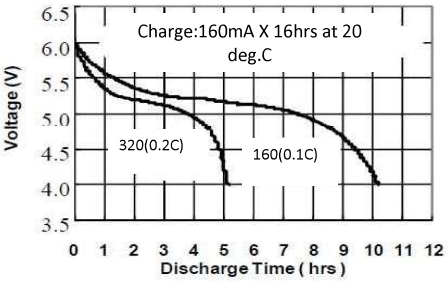
Charge & Discharge efficiency Vs. temp.



High Rate Discharge



Low Rate Discharge



Material Safety Data Sheet

Section 1 - Manufacturer's Information	
	Tamtec Electronics c/o Tamlite Lighting
	Stafford Park 12
Telephone Number	Telford
(+44) 1952 736 500	Shropshire
	TF3 3BJ
	United Kingdom

Section 2 -Hazardous Ingredients/Identity Information

Hazardous Components:

Description: Approximate % of total weight

Battery Model: Nickel-Cadmium Battery

Chemical composition	Chemical Formula	CAS No.	Weight %
Nickel	Ni	7440-02-0	3-5
Nickel Hydroxide	Ni(OH)2	12054-48-7	15-25
Cadmium	Cd	7440-43-9	8-13
Iron	Fe	7439-89-6	25-55
Cobalt	Co	7440-48-4	2-6
Potassium Hydroxide (Liquid)	KOH	1310-58-3	2.5-6
PP Paper	-	-	1-5
Cadmium Oxide	CdO	1306-19-0	8-18
Water	H2O	231-791-2	4-9

Section 3 – Physical/Chemical Characteristics			
Boiling Point	N.A	Specific Gravity (H2O=1)	N.A.
Vapor Pressure (mm Hg)	N.A	Melting Point	N.A.
Vapor Density (AIR=1)	N.A	Evaporation Rate	
Solubility in Water	N.A	(Butyl Acetate=1)	N.A.
Appearance and Odour: Cylindrical Shape. odourless			

Section 4 – Hazard Classification	
Classification	N.A.

Section 5 – Reactivity Data				
Stability	Unstable			
	Stable	X		
Incompatibility (Materials to Avoid)		N.A	Conditions to Avoid	Heating, fire, mechanical abuse and electrical abuse
Hazardous Decomposition or Byproducts		N.A	Conditions to Avoid	N.A.
HazardousPolymerization	May Occur			
	Will Not Occur	X		

Section 6 – Health Hazard Data

Health Hazard (Acute and Chronic) / Toxicological information

No specific health hazards for normal use.

Routes of Entry

Eyes, Skin, Inhalation, Ingestion.

Health Hazards

These chemicals are contained in a sealed can. Risk of exposure occurs only if the battery is mechanically or electrically abused. The most likely risk is acute exposure when a battery vents. Leaking material exposure to skin, eyes may cause irritation. Inhalation of fumes may cause respiratory irritation.

Sign/Symptoms of Exposure

May be a reproductive hazard. Leaking can cause thermal and chemical burns upon contact with the skin.

Section 7 – First Aid Measures

First Aid Procedures

If electrolyte leakage occurs and makes contact with skin, wash with plenty of water immediately.

If electrolyte comes into contact with eyes, wash with copious amounts of water for fifteen (15) minutes, and contact a physician.

If electrolytes vapours are inhaled, provide fresh air and seek the attention if respiratory irritation develops. Ventilate the contaminated area.

Section 8 – Fire and Explosion Hazard Data

Flash Point (Method Used)	Ignition Temp	Flammable Limits	LEL	UEL
N.A.	N.A.	N.A.	N.A.	N.A.

Extinguishing Media: Carbon Dioxide or Dry Chemical Extinguishers

Special Fire Fighting Procedures: Self-contained breathing apparatus

Unusual Fire and Explosion Hazards

Do not dispose of battery in fire – may explode.

Carbon monoxide, carbon dioxide, other metallic oxide fumes. In case of PVC sleeved products, the combustion releases chloride gas

Do not short circuit battery – may cause burns.

Section 9 – Accidental Release or Spillage

Steps to be Taken in case Material is Released or Spilled

If the battery is accidental broken and leaks out, wipe it up with a cloth, and dispose of it in a plastic bag and put into a steel can. The preferred response is to leave the area and allow the batteries to cool and vapors to dissipate. Provide maximum ventilation. Avoid skin and eye contact or inhalation of vapors. Remove spilled material with absorbent material

Waste Disposal Method

It is recommended to discharge the battery to the end, recycle zinc, copper and other metal, handing in the abandoned batteries to related department unified, and dispose of the batteries in accordance with approved local, state, and federal requirements. Consult state environmental protection agency and/or federal EPA

Section 10 – Handling and Storage

Safe handling and storage advice

The batteries should not be opened, destroyed or incinerate, since they may leak or rupture and release to the environment the ingredients that they contain in the hermetically sealed container. Do not short circuit terminals, or charge the battery, forced over-discharge, throw to fire. Do not crush or puncture the battery, or immerse in liquids.

Avoid mechanical or electrical abuse. Storage preferably in cool, dry and ventilated area, which is subject to little temperature change. Storage at high temperatures should be avoided. Do not place the battery near heating equipment, nor expose to direct sunlight for long periods.

Do not short or install with incorrect polarity.

Do not breathe call vapours or touch internal material with bare hands.

Keep batteries between -30 C and 45 C for prolong storage.

Section 11 – Exposure Controls / Person Protection

Occupational Exposure Limits:	LTEP N.A.	STEP N.A
Respiratory Protection (Specify Type) :	N.A under conditions of normal use	
Ventilation	Local Exhaust	Special
	N.A.	N.A.
	Mechanical (General)	Other
	N.A.	N.A.
Protective Gloves	Eye Protection	
N.A.	N.A under conditions of normal use	
Other Protective Clothing or Equipment	N.A	
Work/Hygienic Practices	N.A	

Other Protective Clothing or Equipment

Personal Protection is recommended for venting batteries: Respiratory Protection,Protective Gloves, Protective Clothing and Safety Glass with side shields.

Section 12 - Ecological Information

When promptly used or disposed the battery does not present environmental hazard. In case of product destruction or opening, the metals content in a Ni-CD battery, and specifically the cadmium, are toxic for environment.

If not recycled, it must be disposed of in accordance with all state and local regulations.

Section 13 - Disposal Method

Incineration

Never incinerate Ni-CD batteries.

Landfill

Never dispose Ni-CD batteries as landfill.

Recycling

Ni-CD batteries can be fully recyclable. They are submitted to the European community directive 91-157/CE. We recommend proper recycling of these batteries whenever possible.

Appropriate Method of Disposal of Substance or Preparation

Dispose of the batteries in accordance with approved local, state, and federal requirements. Consult state environmental agency.

Section 14 - Transportation arrangements

Sealed Ni-CD batteries with sleeve are considered as “dry batteries” which transport is not checked. They are not submitted to specific transport obligations for land, maritime (IMDG) or air (IATA) transport, as they are protected against short-circuits.

Sealed Ni-CD batteries without sleeve are submitted to ADR prescription under UNO code 2800, except in case of qualified packaging use (IATA group 2 type).

Separate batteries when shipping to prevent short-circuiting. They should be packed in strong packaging for support during transport.

Sealed Ni-CD batteries are compliant to Special Provision A123 which states: “An electrical battery or battery powered device having the potential of dangerous evolutions of heat that is not prepared so as to prevent a short-circuit.”

According to IATA Dangerous Goods Regulations (DGR) 56th Editions, Sealed Ni-CD batteries is not subject to IATA DGR.

Section 15 - Regulatory Information

Law Information

《Dangerous Goods Regulation》

《Recommendations on the Transport of Dangerous Goods Model Regulations》

《International Maritime Dangerous Goods》

《Technical Instructions for the Safe Transport of Dangerous Goods》

《Classification and code of dangerous goods》

《Occupational Safety and Health Act》(OSHA)

《Toxic Substances Control Act》(TSCA)

《Consumer Product Safety Act》(CPSA)

《Federal Environmental Pollution Control Act》(FEPCA)

《The Oil Pollution Act》(OPA)

《Superfund Amendments and Reauthorization Act Title 111 (302/311/312/313》(SARA)

《Resource Conservation and Recovery Act》(RCRA)

《Safety Drinking Water Act》(CWA)

《California Proposition 65》

《Code of Federal Regulations》(CFR)

In accordance with all Federal, State and Local laws

Section 16 - Other Information

The data in this Material Safety Date Sheet relates only to the specific material designated herein.

Section 17 – Measures for Fire Extinction

In case of fire, it is permissible to use any class of extinguishing medium on these batteries or their packing material. Cool exterior of batteries if exposed to fire to prevent rupture. Fire fighters should wear self-contained breathing apparatus.