Bontek Compliance Laboratory

EN 50033: 1991

Specification for construction and testing of miners' cap lamps in relation to the risk of explosions, for mines susceptible to firedamp

MEASUREMENT AND TEST REPORT

For

NEW WISDOM INVESTMENT LIMITED

4-306, Xianglixincun, Hongli West Road, Shenzhen, China

Model: KL5M

November 1, 2006

This Report Concerns: ☒ Original Report	**Equipment Type:** Miner's cap lamp

Test Engineer:	Victor Feng / Victor Feng
Report Number:	BCT06KR071S
Test Date:	October 2-28, 2006
Reviewed By:	Bain Ye / Bain Ye
Prepared By:	**Bontek Compliance Laboratory Ltd.** Rm 802~804, Jinmin Bld., Zizhu 6th Rd., Zhuzhi Lin, Futian, Shenzhen 518040, Guangdong, P. R. China Tel: 86-755-82871080, 82871207 Fax: 86-755-82871368

TEST REPORT
EN50033: 1991
Specification for construction and testing of miners' cap lamps in relation to the risk of explosions, for mines susceptible to firedamp

Report		
Report reference No.	:	BCT06KR071S
Tested by (+signature)	:	Victor Feng / test engineer
Approved by (+ signature)	:	Bain Ye / project engineer
Date of issue	:	Nov. 1, 2006
Testing laboratory		
Name	:	**Bontek Compliance Laboratory Ltd.**
Address	:	Rm 802~804, 8/F, Jinmin Bld., Zizhu 6th Rd.,Zhuzi Lin, Futian, Shenzhen 518040, P.R. China
Test location	:	**Bontek Shenzhen**
Client		
Name	:	**NEW WISDOM INVESTMENT LIMITED**
Address	:	4-306, Xianglixincun, Hongli West Road, Shenzhen, China
Test specification		
Standard	:	EN 50033: 1991
Non-standard test method	:	N.A.
Test item		
Description	:	**Miner's cap lamp**
Trademark	:	N.A.
Model No	:	**KL5M**
Power rating	:	Input: 3.3VDC 0.35A
Manufacturer	:	**NEW WISDOM INVESTMENT LIMITED**
Address	:	Building A1-4, Shenbao Industry Park, Longgang district, Shenzhen, China
Model difference	:	--
Note	:	All test performance on model: **KL5M**

Rm 802~804, 8/F, Jinmin Building, Zizhu 6th Road, Zhuzi Lin, Futian, Shenzhen 518040, P.R. China
Tel : 0755-82871080-801(16 Lines) Fax: 0755-82871368

Particulars: test item vs. test requirements	
Equipment mobility	: portable equipment
Operating condition	: Continuous
Tested for IT power systems	: No
IT testing, phase-phase voltage (V)	: N.A.
Class of equipment	: Class III
Mass of equipment (kg):	: Less than 600g
Protection against ingress of water	: IP20
Test case verdicts	
Test case does not apply to the test object	: N(.A.)
Test item does meet the requirement	: P(ass)
Test item does not meet the requirement	: F(ail)
General remarks:	

""See remark #)""refers to a remark appended to the report.
""See appended table)""refers to a table appended to the report.
Throughout this report a comma is used as the decimal separator.
The test results presented in this report relate only to the object tested.
This report shall not be reproduced except in full without the written approval of the testing laboratory.

Remarks:
1. This report containing the content of EN50033: 1991
2. The following contents are included in this test report:
Test report pages 1 to 9

3. Copy of the marking plate:
See Appendix

Rm 802~804, 8/F, Jinmin Building, Zizhu 6th Road, Zhuzi Lin, Futian, Shenzhen 518040, P.R. China
Tel : 0755-82871080-801(16 Lines) Fax: 0755-82871368

EN 50033 : 1991			
Clause	Requirement – Test	Result - Remark	Verdict
1	**GENERAL**		P
3	**Terms and definitions**		P
3.1	Apparatus comprising a headpiece, connecting cable and rechargeable secondary cell battery in a container		P
3.2	Assembly of electrodes and electrolyte in an enclosure which constitutes the basic unit of a battery		P
3.3	Electrochemical system capable of storing under chemical form the electrical energy received and which can give it back by reconversion		P
3.4	Cell which remains closed when it is operated within its design specified limits but permits the escape of gas through either a resetting or a non-resetting pressure release device if the internal pressure exceeds a predetermined value		P
3.5	Two or more cells electrically connected and suitable for use as a source of energy		N
4	**General**		
	The caplight shall be constructed in such a manner that		P
	- the nominal voltage is not greater than 6 V	3.3V DC	P
	- the value of the current in normal use is not greater than 1.5 A	0.35A DC	P
	- the nominal rating of the lamp is not greater than 6 W	1.155W	P
	- the circuit shall behave as if solely resistive; this circuit shall be protected by a fuse in accordance with 6.8		P
5	**Headpiece**		
5.1	The enclosure of the headpiece of the caplight shall provide protection against the ingress of dust and water of at least degree of protection by enclosure IP 54 according to IEC 529		P
5.2	The fastening of the enclosure of the headpiece shall be by a special fastener, in the form of a hexagon socket head cap screw M3, M4 or M5 with a protective shroud or counter bore ,complying with the following requirements	counter bore used	P

Rm 802~804, 8/F, Jinmin Building, Zizhu 6th Road, Zhuzi Lin, Futian, Shenzhen 518040, P.R. China
Tel : 0755-82871080-801(16 Lines) Fax: 0755-82871368

EN 50033 : 1991			
Clause	Requirement – Test	Result - Remark	Verdict
5.3	The lamp shall be protected against mechanical damage by a transparent protective disk, which is protected by a raised rim with a height of not less than 2mm or by a protective grill. The protective grill may be omitted only if the free surface of the protective disk does not exceed 25 cm^2 or if the protective disk withstands the impact test for the protective grill according to 9.3		P
	The protective disk, protective grill and protective rim required by the previous paragraph shall be removable only after releasing the special fastener according to 5.2	Use the special screw fixed	P
5.4	If the headpiece is fitted with one or more single filament lamps, either:	Use one LED light	N
	a) there shall be a distance of at least 1mm between a lamp in its correct operating position and the protective disk; or		N
	b) the lamps shall be held in such a manner that the power supply to the lamps is automatically cut off if the protective disk breaks		N
5.5	If the headpiece is fitted with a) lamp (s) with two or more filaments, the power supply to all filaments shall be automatically cut off if the protective disk breaks		N
5.6	The caplight shall have a switch controlling the operation of the lamps, this switch shall be located in the headpiece		P
5.7	All electrical contacts shall ensure an effective and reliable conductive path. As an exception to 3.2 of EN50019, spring contacts are permissible as current-carrying elements in the lamp circuit,		P
6.1	The battery container shall provide protection for the electrical connections against the ingress of dust and water of at least degree of protection IP 54 according to IEC 529(see 9.2 for the method of test)	IP54	P
6.2	The fastening of the battery container shall be		P
	a) by a special fastener complying with the requirement for a headpiece fastening according to 5.2 or	Use the special screw fixed	P
	b) by a magnetically-actuated fastening if this affords equivalent security to a) or b)		N
6.3	Leakage of electrolyte from the cells, filled to a correct level, shall not occur, whatever the position of the battery, during any time appropriate to normal use	Use the Li battery	P

Rm 802~804, 8/F, Jinmin Building, Zizhu 6th Road, Zhuzi Lin, Futian, Shenzhen 518040, P.R. China
Tel : 0755 82871080-801(16 Lines) Fax: 0755-82871366

EN 50033 : 1991			
Clause	Requirement – Test	Result - Remark	Verdict
6.4	The battery container or cell shall be provided with a pressure relief device		P
	The pressure above atmospheric inside the battery container and the cells shall not exceed 30kPa. In "sealed" cells, a higher pressure is permissible but each cell shall then be provided with a pressure relief device to limit the pressure to a value which can be contained by the cell	Use the Li battery	P
	Where the concentration of hydrogen in the free volume of the battery container under any conditions can exceed 2% by volume, the degassing apertures of all cells shall be so arranged that escaping gases are not vented into any enclosure of the apparatus containing electrical or electronic components or connections	Sealed Li battery container, atmosphere can not ingress	P
6.5	All electrical contacts shall ensure an effective and reliable conductive path. The connections to the battery shall remain secure, that is there shall be no interruption of the circuit, when the battery container, including the battery, is subjected to the drop test in 9.4.2. as an exception to 3.2 of EN50019, spring contacts are permissible for the connections to the battery	Battery container from a height of 100m on to a concrete floor， no damage after test four times	P
6.6	The plates of the cells shall be designed and manufactured so as to prevent the possibility of short circuit. To this effect, the separators shall be constructed so as to prevent contact between the plates if these swell. It is particularly necessary to prevent fractures or detachment of pieces of the supports of the active material of the plates		P
6.7	The cells shall be insulated from the container if this is metallic. There shall not be at any point between the metallic surfaces of the battery container and/or the headpiece, in the event of an electrical fault, a difference of potential which could give rise to a current greater than 50mA		P
6.8	The fuse which is prescribed in clause 4 to protect against the effects of a short circuit external to the battery shall comply with the following requirements		N
6.8.1	The fuse shall be protected so that in the event of fusing there is no ignition of a surrounding mixture of air and gas (methane or gas given off during charge)		N
	The fuses shall be tested according to 9.5		

Rm 802~804, 8/F, Jinmin Building, Zizhu 6th Road, Zhuzi Lin, Futian, Shenzhen 518040, P.R. China
Tel : 0755-82871080-801(16 Lines) Fax: 0755-82871368

EN 50033 : 1991			
Clause	Requirement – Test	Result - Remark	Verdict
6.8.2	The fusing current and fusing time shall be as charging and discharging characteristics of the battery. The following values shall not be exceeded	No fuse used	N
	-- fusing time at 12A: 1S		N
	-- fusing time at 15A: 200ms		N
6.9	The arrangement of the fuse and of the cable within the battery container shall be such that a short circuit not passing through the fuse is unlikely		N
7	**Cable**		
7.1	The cable between the battery container and the headpiece shall be flexible and it shall have both:		P
	-- a centre load bearing member; and		P
	-- a sheath which is resistant to fatty acids and to fire		P
	The resistance of the sheath to fatty acids shall be verified according to 9.6 its resistance to fire shall be verified according to 9.7		P
7.2	The cable entries, the anchoring devices, and the cable shall comply with the tensile strength type test according to 9.8		P
7.3	The cable conductors shall be of copper and have a nominal cross-sectional area of at least 1 mm^2 with an individual wire diameter of between 0.14 mm and 0.21 mm. all the wires in each conductor shall have the same nominal diameter		P
7.4	The free length of the cable shall not exceed 1.65m	1.5m	P
8	**External charging contacts**		
	Caplights which are recharged by means of external contacts shall include a mechanical device or an electrical device preventing the withdrawal of current during the use of the caplight. When the device incorporates diode protection, one diode is sufficient. The diode shall be rated such that the maximum battery charging current is not more than two-thirds of the rated current for the diode		P
	Battery charging equipment should be designed to check automatically the integrity of diodes and trigger an alarm device in the case of a diode failure		P

Rm 802~804, 8/F, Jinmin Building, Zizhu 6th Road, Zhuzi Lin, Futian, Shenzhen 518040, P.R. China
Tel : 0755-82871080-801(16 Lines) Fax: 0755-82871368
http: // www.bontek.com.cn

EN 50033 : 1991			
Clause	Requirement – Test	Result - Remark	Verdict
9.1	The requirements of 22.1 22.2 22.3 and 22.4 of EN 60079-0 shall be applied		P
9.2	Test to verify the protection against ingress of dust and water		P
	The test for degree of protection IP 54 shall be carried out on one sample of the headpiece and one sample of the battery container according to IEC529 except that the "wire test" in 7.5b) of that standard is not required. The test shall be carried out with any drain plugs and pressure relief devices in position. If there are drain holes which are normally open, these shall be open for the test	IP54	P
9.2.1	At the conclusion of the test for the first numeral 5 talcum powder shall not have accumulated in the interior of the enclosure in a quantity or location such that it could interfere with the correct operation, mechanical and/or electrical of the caplight		P
9.2.2	At the conclusion of the test for the second numeral 4, the interior of the enclosures shall be inspected for signs for the ingress of water. If water has entered and enclosure, it shall not:		P
	a) be sufficient to interfere with the satisfactory mechanical and/or electrical operation of the apparatus		P
	b) reach live parts not designed to operate when wet		P
9.3	Impact test shall be carried out in accordance with 22.4.3.1 of EN 60079-0 with the values of impact energy and temperature, the number of tests and the number of samples, and the acceptance criteria in table 2. when the lower temperature of -10℃ is specified, the caplight is to be additionally marked	Refer to EN60079	P
9.4	The test shall be carried out at a temperature between 15℃ and 35℃ on one sample of the headpiece and one sample of the battery container with cable attached and arranged to provide an electrical circuit		P
9.4.1	The headpiece, ready for use , shall not have suffered any damage which would impair its safety after falling four times in ay manner from a height of 200m on to a concrete floor		P
9.4.2	The battery container, containing the battery, shall not have suffered any damage which would impair its safety after falling four times in any manner from a height of 100m on to a concrete floor		P

Rm 802~804, 8/F, Jinmin Building, Zizhu 6th Road, Zhuzi Lin, Futian, Shenzhen 518040, P.R. China
Tel : 0755-82871080-801(16 Lines) Fax: 0755-82871368
http: // www.bontek.com.cn

EN 50033 : 1991			
Clause	Requirement – Test	Result - Remark	Verdict
9.5	The test shall be carried out with a current of 15 A on 20 fuse conforming to 6.8.1 in a mixture of hydrogen and oxygen containing from 66% to 74% by volume of hydrogen		P
	No ignition of the gas mixture shall occur during the test		P
9.6	Test to verify the resistance of the cable sheath to fatty acids		P
	A sample of the cable sheath, with the cores removed, about 80mm long shall be weighed and then immersed in a mixture of fatty acids of commercial quality having the following nominal composition by mass:		P
	Oleic acid 60%		P
	Stearic acid 20%		P
	Palmitic acid 20%		P
	In addition, a sample of the complete cable, of which the maximum diameter has been measured before the test, about 300mm long, bent into U-form, shall be suspended in the same mixture with its ends just above the mixture		P
	Both samples shall remain immersed in the mixture for 96 ± 1 h at a temperature of 70 ± 1 ℃, after which they shall be removed, wiped clean, and cooled to room temperature		P
	The increase in mass of the sample of sheath and the increase in diameter of the sample of cable at the point where its diameter was a maximum before the test shall not exceed the following values:		P
	Increase in mass 50%		P
	Increase in diameter 50%		P
9.7	Test to verify the resistance of the cable sheath to fire		P
	A sample of cable 600±25 mm in length shall be tested according to IEC 332-1 except that the application time of the flame T (clause 7 of IEC 332-1) shall be taken as 10s	1.5m	P
9.8	Test to verify the strength of cable entries, anchoring devices and cable		P
	A sample comprising the cable and the parts of the battery container and headpiece to be tested shall withstand, without mechanical deformation that could impair safety, a tensile force 150 N for 10S		P

Rm 802~804, 8/F, Jinmin Building, Zizhu 6th Road, Zhuzi Lin, Futian, Shenzhen 518040, P.R. China
Tel : 0755-82871080-801(16 Lines) Fax: 0755-82871368
http: // www.bontek.com.cn

EN 50033 : 1991			
Clause	Requirement – Test	Result - Remark	Verdict
10	**Marking**		
	The marking of the caplight shall be legible and durable, taking into account possible chemical corrosions, and include at least the following		P
10.1	On the headpiece		P
	--- the name or registered trade mark of the caplight manufacturer		P
10.2	On the battery container		P
	--- the name or registered trade mark of the caplight manufacturer		P
	--- the caplight manufacturer's type identification for the caplight and the battery		P
	--- the symbol EEx I, which indicates that the caplight complies with the requirements of this European standard		P
	--- the lower temperature for the impact test when this is –10 ℃		P
	--- when required to comply with 6.3 of EN 60079-0, a warning label station "ELECTROSTATIC HAZARD" and giving the necessary safety measures		P
10.3	On the battery container or cells		P
	--- the year of manufacture of the battery or cells		P
10.4	On the fuse, or when encapsulated on the outer surface of the encapsulation, the lamp and the protective disc	No fuse used	N
	--- the type identification for the component		N
10.5	And, where a certificate for the caplight has been obtained		P
	--- the indication of the testing of the testing station and the certificate reference in the following form: the year of certification followed by the serial number of the certificate in that year		P
	--- if the testing station considers that it is necessary to indicate special conditions for safe use of the caplight, the sign X placed after the certificate reference		P

Rm 802~804, 8/F, Jinmin Building, Zizhu 6th Road, Zhuzi Lin, Futian, Shenzhen 518040, P.R. China
Tel : 0755-82871080-801(16 Lines) Fax: 0755-82871368
http: // www.bontek.com.cn