TEST REPORT

EN IEC 60079- 0: 2018
Electrical apparatus for explosive gas atmospheres general requirement

EN 60079- 11: 2012
Explosive atmospheres. Part 11:Equipment protection by intrinsic safety "i"

Report		
Report reference No.	:	TH19JR-1993S
Tested by (+signature)	:	Fan
Reviewed by (+ signature)		Prince Huang
Approved by (+ signature)	:	Prince Huang
Date of issue	:	October 31, 2019
Testing laboratory		
Name	:	**Shenzhen Tian Hai Test Technology Co.,Ltd.**
Address	:	4F, A3 BLDG, The Silicon Valley Power intelligent terminal industrial park, Guanlan street, Longhua district, Shenzhen
Client		
Name	:	SHENLI ELECTRICAL TECHNOLOGY CO.,LTD
Address		Mechanical and Electrical business park,Zeguo, wenling city, zhejiang Province, China
Test specification		
Standard	:	EN IEC 60079-0: 2018; EN 60079-11: 2012
Non-standard test method	:	N.A.
Test item		
Description	:	**Explosion proof duct**
Trademark	:	--
Model No	:	YT-30
Power rating	:	--
Manufacturer	:	SHENLI ELECTRICAL TECHNOLOGY CO.,LTD
Address	:	Mechanical and Electrical business park,Zeguo, wenling city, zhejiang Province, China
Explosion-proof form	:	Ex **II 3G Ex ic IIA T4 Gc**
Note	:	--

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Particulars: test item vs. test requirements		
Equipment mobility	:	Fixing equipment
Operating condition	:	Continuous
Tested for IT power systems	:	No
IT testing, phase-phase voltage (V)	:	N.A.
Class of equipment	:	--
Protection against ingress of water	:	--
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 EN IEC 60079-0: 2018, EN 60079-11: 2012
2. The following contents are included in this test report:
Test report pages 1 to 8
Appendices 9 to 10

3. Copy of the marking plate:

See appendix

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EN IEC 60079-0: 2018 & EN 60079-11: 2012			
Clause	Requirement – Test	Result - Remark	Verdict
4	**Grouping and classification of intrinsically safe apparatus and associated apparatus**		**P**
	Intrinsically safe and associated apparatus which has a type of protection listed in IEC 60079-0 for use in the appropriate explosive atmosphere, shall be grouped in accordance with equipment grouping requirements of IEC 60079-0 and shall have a maximum surface temperature or temperature class assigned in accordance with the temperature requirements of IEC 60079-0.		P
	Associated apparatus which has no such type of protection shall only be grouped in accordance with the equipment grouping requirements of IEC 60079-0.		P
5	**Levels of protection and ignition compliance requirements of electrical apparatus**		**P**
5.1	**General**		**P**
5.2	Level of protection "ia"		N
5.3	Level of protection "ib"		N
5.4	Level of protection "ic"		P
5.5	Spark ignition compliance		P
	The circuit shall be assessed and/or tested for the successful limitation of the spark energy that may be capable of causing ignition of the explosive atmosphere, at each point where an interruption or interconnection may occur, in accordance with 10.1.		P
5.6	Thermal ignition compliance		P
5.6.1	General		P
5.6.2	Temperature for small components for Group I and Group II		P
5.6.3	Wiring within intrinsically safe apparatus for Group I and Group II		P
5.6.4	Tracks on printed circuit boards for Group I and Group II		P
5.6.5	Intrinsically safe apparatus and component temperature for Group III		N
5.7	Simple apparatus		P
6	**Apparatus construction**		**P**
6.1	Enclosures		P

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6.1.1	General		P
6.1.2	Enclosures for Group I or Group II apparatus		P
6.1.2.1	General		P
6.1.2.2	Apparatus complying with Table 5		N
6.1.2.3	Apparatus complying with Annex F		N
6.1.3	Enclosures for Group III apparatus		N
6.2	Facilities for connection of external circuits		N
6.3	Separation distances		P
6.4	Protection against polarity reversal		P
6.5	Earth conductors, connections and terminals		N
6.6	Encapsulation		P

7	**Components on which intrinsic safety depends**		**P**
7.1	Rating of components		P
7.2	Connectors for internal connections, plug-in cards and components		P
7.3	Fuses		N
7.4	Primary and secondary cells and batteries		N
7.4.1	General		N
7.4.2	Battery construction		N
7.4.3	Electrolyte leakage and ventilation		N
7.4	Cell voltages		N
7.4.5	Internal resistance of cell or battery		N
7.4.6	Batteries in equipment protected by other types of protection		N
7.4.7	Batteries used and replaced in explosive atmospheres		N
7.4.8	Batteries used but not replaced in explosive atmospheres		N
7.4.9	External contacts for charging batteries		N
7.5	Semiconductors		N
7.6	Failure of components, connections and separations		N
7.7	Piezo-electric devices		N
7.8	Electrochemical cells for the detection of gases		N

8	**Infallible components, infallible assemblies of components and infallible connections on which intrinsic safety depends**		**P**
8.1	Level of Protection “ic”		P

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8.2	Mains transformers		N
8.3	Transformers other than mains transformers		N
8.4	Infallible windings		N
8.5	Current-limiting resistors		P
8.6	Capacitors		P
8.7	Shunt safety assemblies		P
8.8	Wiring, printed circuit board tracks, and connections		P
8.9	Galvanically separating components		N

9	**Supplementary requirements for specific apparatus**		P
9.1	Diode safety barriers		P
9.1.1	General		P
	The diodes within a diode safety barrier limit the voltage applied to an intrinsically safe circuit and a following infallible current-limiting resistor limits the current which can flow into the circuit. These assemblies are intended for use as interfaces between intrinsically safe circuits and non-intrinsically safe circuits, and shall be subject to the routine test of 11.1.		P
9.1.2	Construction		P
9.1.2.1	Mounting		P
	The construction shall be such that, when groups of barriers are mounted together, any incorrect mounting is obvious, for example by being asymmetrical in shape or colour in relation to the mounting		P
9.1.2.2	Facilities for connection to earth		N
9.1.2.3	Protection of components		P
	The assembly shall be protected against access, in order to prevent repair or replacement of any components on which safety depends either by encapsulation in accordance with 6.6 or by an enclosure which forms a non-recoverable unit. The entire assembly shall form a single entity.		P
	FISCO apparatus		N

10	**Type verifications and type tests**		**P**
10.1	Spark ignition test		P
10.1.1	General		P
	All circuits requiring spark ignition testing shall be tested to show that they are incapable of causing ignition under the conditions specified in Clause 5 for the appropriate level of protection of apparatus.		
	Normal and fault conditions shall be simulated during		P

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	the tests. Safety factors shall be taken into account as described in Annex A. The spark test apparatus shall be inserted in the circuit under test at each point where it is considered that an interruption, short circuit, or earth fault may occur. A circuit may be exempted from a type test with the spark-test apparatus if its structure and its electrical parameters are sufficiently well defined for its safety to be deduced from the reference curves, Figures A.1 to A.6 or Tables A.1 and A.2, by the methods described in Annex A.		
10.1.2	Spark test apparatus		P
10.1.3	Test gas mixtures and spark test apparatus calibration current		P
10.1.4	Tests with the spark test apparatus		P
10.1.5	Testing considerations		P
	No ignition shall occur in any test series at any of the chosen test points.		P
10.2	Temperature tests		P
	All temperature data shall be referred to a reference ambient temperature of 40 ° C or the maximum ambient temperature marked on the apparatus. Tests to be based on a reference ambient temperature shall be conducted at any ambient temperature between 20 ° C and the reference ambient temperature. The difference between the ambient temperature at which the test was conducted and the reference ambient temperature shall then be added to the temperature measured unless the thermal characteristics of the component are non-linear, for example batteries.	Max.60℃	P
	Temperatures shall be measured by any convenient means. The measuring element shall not substantially lower the measured temperature.		P
10.3	Dielectric strength tests	AC 500V	P
10.4	Determination of parameters of loosely specified components		N
10.5	Tests for cells and batteries		P
10.5.1	General		P
10.5.2	Electrolyte leakage test for cells and batteries		P
	The test samples shall be placed with any case discontinuities, for example seals, facing downward or in the orientation specified by the manufacturer of the device, over a piece of blotting paper for a period of at least 12 h after the application of the above tests. There shall Bbe no visible sign of electrolyte on the blotting paper or on the external surfaces of the test samples. Where encapsulation has been applied to		P

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	achieve conformance to 7.4.2, examination of the cell at the end of the test shall show no damage which would invalidate conformance with 7.4.2.		
10.5.3	Spark ignition and surface temperature of cells and batteries		P
	If a battery comprises a number of discrete cells or smaller batteries combined in a well- defined construction conforming to the segregation and other requirements of this standard, then each discrete element shall be considered as an individual component for the purpose of testing. Except for specially constructed batteries where it can be shown that short-circuits between cells cannot occur, the failure of each element shall be considered as a single fault. In less well-defined circumstances, the battery shall be considered to have a short-circuit failure between its external terminals.		P
	For ‘ia’ and ‘ib’ all current-limiting devices external to the cell or battery shall be short- circuited for the test. The test shall be carried out both with internal current-limiting devices in circuit and with the devices short-circuited using 10 cells in each case. The 10 samples having the internal current-limiting devices short-circuited shall be obtained from the cell/battery manufacturer together with any special instructions or precautions necessary for safe use and testing of the samples. If the internal current limiting devices protect against internal shorts then these devices need not be removed. However, such devices shall only be considered for Level of Protection ‘ib’.		N
	For ‘ic’ the maximum surface temperature shall be determined by testing in normal operating conditions with all protection devices in place.		P
10.5.4	Battery container pressure tests		N
	Five samples of the battery container shall be subjected to a pressure test to determine the venting pressure. Pressure shall be applied to the inside of the container. The pressure is to be gradually increased until venting occurs. The maximum venting pressure shall be recorded and shall not exceed 30 kPa.		N
	The maximum recorded venting pressure shall be applied to a sample of the battery container for a period of at least 60 s. After testing the sample shall be subjected to a visual inspection. There shall be no visible damage or permanent deformation.		N
10.6	Mechanical tests		P
10.6.1	Casting compound		P
	A force of 30 N shall be applied perpendicular to the exposed surface of casting compound with a 6 mm diameter flat ended metal rod for 10 s. No		P

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	damage to or permanent deformation of the encapsulation or movement greater than 1 mm shall occur.		
10.6.2	Determination of the acceptability of fuses requiring encapsulation		N
10.6.3	Partitions		N
10.7	Tests for intrinsically safe apparatus containing piezoelectric devices		N
10.8	Type tests for diode safety barriers and safety shunts		N
10.9	Cable pull test		N
10.10	Transformer tests		N
10.11	Optical isolators tests		N

11	**Routine verifications and tests**		**N**
11.1	Routine tests for diode safety barriers.		N
11.2	Routine tests for infallible transformers		**N**

12	**Marking**		**P**
12.1	**General**		P
	Intrinsically safe apparatus and associated apparatus shall carry at least the minimum marking specified in IEC 60079-0. The text of the warning markings, when applicable, shall be derived from the text of warning marking table of IEC 60079-0.		P
	Apparatus meeting the requirements of 5.4 shall be marked with the symbol “ic”. Where it is necessary to include marking from one of the other methods of protection listed in IEC 60079-0, the symbol “ic” shall occur first.		P
	For associated apparatus the symbol Ex ia, Ex ib or Ex ic (or ia or ib or ic, if Ex is already marked) shall be enclosed in square brackets.		N
12.2	**Marking of connection facilities**		N
12.3	**Warning markings**	See Marking	P

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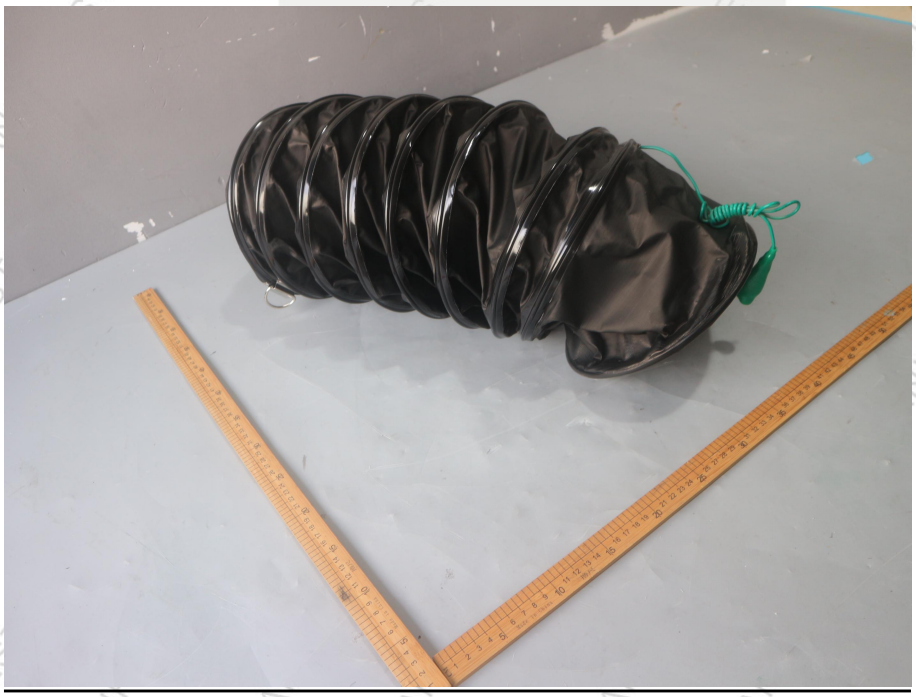
Appendix for EUT photos



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**********END OF THE REPORT**********

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China National Accreditation Service for Conformity Assessment

LABORATORY ACCREDITATION CERTIFICATE

(Registration No. CNAS L5885)

Shenzhen Tianhai Test Technology Co., Ltd.

(Legal Entity: Shenzhen Tianhai Test Technology Co., Ltd.)

4B/F., Building A3, The Silicon Valley Power Intelligent Terminal Industrial Park, Guanlan Street, Longhua District, Shenzhen, Guangdong, China

is accredited in accordance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence to undertake the service described in the schedule attached to this certificate.

The scope of accreditation is detailed in the attached schedule bearing the same registration number as above. The schedule forms an integral part of this certificate.

Effective Date：2019-01-22

Expiry Date：2025-01-21

Signed on behalf of China National Accreditation Service for Conformity Assessment

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