



CERTIFICADO DE CUMPLIMIENTO / CERTIFICATE OF COMPLIANCE

PC25020094

**DISPOSITIVO DE PRESEÑALIZACIÓN DE PELIGRO V-16 GEOLOCALIZADO /
V-16 GEOLOCATED HAZARD WARNING DEVICE**

Real Decreto 1030/2022, de 20 de diciembre, por el que se modifica el Real Decreto 159/2021, de 16 de marzo, por el que se regulan los servicios de auxilio en las vías públicas. / Real Decreto 1030/2022 of 20 December amending Real Decreto 159/2021 of 16 March regulating roadside assistance services.

Nombre y dirección del solicitante /
Applicant's name and address

: LIMBURG TECHNOLOGY LIMITED
291 BRIGHTON ROAD
SOUTH CROYDON
UNITED KINGDOM CR2 6EQ

Nombre y dirección del fabricante /
Manufacturer's name and address

: NINGBO TIANQI INTELLIGENT TECHNOLOGY CO., LTD
XINLIAN VILLAGE, GAOQIAO TOWN, HAISHU
DISTRICT 315016 NINGBO ZHEJIANG (CHINA)

Marca comercial / *Trade mark*

: ORFLECT

Modelo / *Model*

: Beacon Light IoT

Informe de ensayo / *Test report*

: PC25020094

Marca de identificación /
Identification marking

: IDIADA PC25020094

CONCLUSIONES / CONCLUSIONS: El dispositivo descrito ha sido ensayado y **CUMPLE** con las prescripciones indicadas en el Real Decreto 1030/2022, de 20 de diciembre, por el que se modifica el Real Decreto 159/2021, de 16 de marzo, por el que se regulan los servicios de auxilio en las vías públicas. / *The device described above has been tested and **FULFILLS** with the requirements of Real Decreto 1030/2022 of 20 December, amending Real Decreto 159/2021 of 16 March, which regulates roadside assistance services.*

L'Albornar, Santa Oliva (Tarragona), 06/02/2025

Realizado por / *Performed by:*



Joan Fonts Sala
INGENIERO DE ENSAYOS

V. B°. / *Revised by:*



Ramon Santafè Guiu
JEFE DE DEPARTAMENTO



INFORME N° / REPORT No. PC25020094

RELATIVO A LA CERTIFICACIÓN DE DISPOSITIVO DE PRESEÑALIZACIÓN DE PELIGRO V-16
GEOLOCALIZADO SEGÚN EL REAL DECRETO 1030/2022, DE 20 DE DICIEMBRE, POR EL QUE SE
MODIFICA EL REAL DECRETO 159/2021, DE 16 DE MARZO, POR EL QUE SE REGULAN LOS
SERVICIOS DE AUXILIO EN LAS VÍAS PÚBLICAS / *CONCERNING THE CERTIFICATION OF V-16
GEOLOCATED HAZARD WARNING DEVICE ACCORDING TO THE REAL DECRETO 1030/2022 OF 20
DECEMBER AMENDING REAL DECRETO 159/2021 OF 16 MARCH REGULATING ROADSIDE
ASSISTANCE SERVICES.*

Nombre y dirección del solicitante /
Applicant's name and address

: LIMBURG TECHNOLOGY LIMITED
291 BRIGHTON ROAD
SOUTH CROYDON
UNITED KINGDOM CR2 6EQ

Nombre y dirección del fabricante /
Manufacturer's name and address

: NINGBO TIANQI INTELLIGENT TECHNOLOGY CO., LTD
XINLIAN VILLAGE, GAOQIAO TOWN, HAISHU
DISTRICT 315016 NINGBO ZHEJIANG (CHINA)

Marca comercial / *Trade mark*

: ORFLECT

Modelo / *Model*

: Beacon Light IoT

Marca de identificación /
Identification marking

: IDIADA PC25020094

Lugar y fecha de emisión del informe /
Place and date of test report issue

: L'Albornar, Santa Oliva (Tarragona)
06/02/2024

CONCLUSIONES / *CONCLUSIONS*: El dispositivo descrito ha sido ensayado y **CUMPLE** con las prescripciones indicadas en el Real Decreto 1030/2022, de 20 de diciembre, por el que se modifica el Real Decreto 159/2021, de 16 de marzo, por el que se regulan los servicios de auxilio en las vías públicas, según se detalla en el anexo que se adjunta a este informe. / *The device described above has been tested and **FULFILLS** with the requirements of Real Decreto 1030/2022 of 20 December, amending Real Decreto 159/2021 of 16 March, which regulates roadside assistance services, as detailed in the annex to this report.*

Realizado por / *Performed by:*

V. B°. / *Revised by:*



Joan Fonts Sala
INGENIERO DE ENSAYOS



Ramon Santafè Guiu
JEFE DE DEPARTAMENTO

* LOS RESULTADOS PRESENTADOS SE REFIEREN ÚNICAMENTE A LA MUESTRA ENSAYADA.

THE PRESENTED RESULTS REFER ONLY TO THE TESTED SAMPLE

* QUEDA TERMINANTEMENTE PROHIBIDA LA REPRODUCCIÓN PARCIAL DE ESTE INFORME SIN PERMISO EXPRESO DE IDIADA.

THE PARTIAL REPRODUCTION OF THIS REPORT WITHOUT THE PERMISSION OF IDIADA IS COMPLETELY FORBIDDEN



ANEXO AL INFORME / ANNEX TO THE REPORT

Nombre y dirección del solicitante / <i>Applicant's name and address</i> ⁽¹⁾	: LIMBURG TECHNOLOGY LIMITED 291 BRIGHTON ROAD SOUTH CROYDON UNITED KINGDOM CR2 6EQ
Nombre y dirección del fabricante / <i>Manufacturer's name and address</i> ⁽¹⁾	: NINGBO TIANQI INTELLIGENT TECHNOLOGY CO., LTD XINLIAN VILLAGE, GAOQIAO TOWN, HAISHU DISTRICT 315016 NINGBO ZHEJIANG (CHINA)
Marca comercial / <i>Trade mark</i>	: ORFLECT
Modelo / <i>Model</i> ⁽¹⁾	: Beacon Light IoT
Variantes / <i>Variants</i> ⁽¹⁾	: CH-009
Identificación de las muestras / <i>Sample identification</i>	: HTC-2309/00708
Patrones de destello / <i>Flash patterns</i> ⁽¹⁾	: Destello quintuple / <i>Fivefold flash</i>
Color / <i>Colour</i>	: Amarillo auto V-16 / <i>Amber V-16</i>
Número y categoría de la(s) fuente(s) luminosa(s) / <i>Light source(s) number and category</i> ⁽¹⁾	: 12 x LED
Alimentación del dispositivo / <i>Supplying system</i> ⁽¹⁾⁽²⁾	: Batería recargable / Rechargeable battery – Pila / <i>Cell</i>

⁽¹⁾ Información proporcionada por el cliente. El laboratorio no se hace responsable de dicha información /
Information provided by the client. The laboratory is not responsible for such information

⁽²⁾ Táchese lo que no proceda / *Strike out what does not apply*

Se adjuntan los siguientes documentos / *The following documents are attached:*

- Anexo I. Servicio de comunicaciones móviles corporativas de banda estrecha para internet de las cosas para balizas V-16. Cumplimiento de requisitos en materia de comunicaciones (CERTIFICADO TELCO) / *Annex I. Narrowband corporate mobile communications service for internet of things for V-16 beacons. Compliance with communications requirements (TELCO CERTIFICATE)*
- Anexo II. Pruebas de conexión de los dispositivos V-16 a la plataforma de coche conectado de la Dirección General de Tráfico, DGT3.0 / *Annex II. Connection tests of V-16 devices to the DGT3.0 connected car platform of the Dirección General de Tráfico.*
- Certificado UCA / *UCA Certificate*: E1 61522401

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* EL LABORATORIO HA CALCULADO LA INCERTIDUMBRE DE MEDIDA ASOCIADA A LOS RESULTADOS.
MEASUREMENT UNCERTAINTY OF THE RESULTS HAS BEEN CALCULATED BY THE LABORATORY.


ESPECIFICACIONES GENERALES / GENERAL SPECIFICATIONS

COLOR: dispositivo luminoso de color amarillo auto. / <i>COLOUR: luminous device of amber colour.</i>	CORRECTO / CORRECT
IRRADIACIÓN: el sistema óptico estará diseñado de forma que la luz cubra un campo de visibilidad horizontal de 360 grados y en vertical un mínimo ± 8 grados hacia arriba y hacia abajo. / <i>IRRADIATION: the optical system shall be designed so that the light covers a horizontal visibility field of 360 degrees and vertically, a minimum of ± 8 degrees up and down.</i>	CORRECTO / CORRECT
INTENSIDAD LUMINOSA: la intensidad debe ser en el grado 0 entre 40 y 700 candelas efectivas, y en los grados ± 8 entre 25 y 600 candelas efectivas. En ambos casos, dicha intensidad se mantendrá durante al menos 30 minutos. El tiempo de encendido, "ON time" según se define en el Reglamento CEPE/ONU 65, será como máximo 0.4/frecuencia de destello. El tiempo de apagado, "OFF time" según se define en el Reglamento CEPE/ONU 65, será como mínimo de 0.1 segundos. El tiempo entre destellos inmediatamente consecutivos (Δt) para señales luminosas consistentes en grupos de varios destellos será el definido en el Reglamento ECE 65, Anexo 5. / <i>LUMINOUS INTENSITY: the intensity shall be at 0 degrees between 40 and 700 effective candles, and at grade ± 8 between 25 and 600 effective candles. In both cases, this intensity shall be maintained for at least 30 minutes.</i> <i>The ON time, as defined in UN/ECE Regulation 65, shall be a maximum of 0.4/flash rate.</i> <i>The OFF time as defined in UN/ECE Regulation 65 shall be a minimum of 0.1 seconds.</i> <i>The time between immediately consecutive flashes (Δt) for light signals consisting of groups of several flashes shall be as defined in ECE Regulation 65, Annex 5.</i>	CORRECTO / CORRECT
GRADO DE PROTECCIÓN IP: al menos será IP54. / <i>IP PROTECTION GRADE: at least it shall be IP54.</i>	CORRECTO / CORRECT
ESTABILIDAD: el equipo estará diseñado para quedar estable sobre una superficie plana, no desplazándose frente a una corriente de aire que ejerza una presión dinámica de 180 Pa, en la dirección más desfavorable para su estabilidad. / <i>STABILITY: The equipment shall be designed to remain stable on a flat surface, not moving in front of a current of air that exerts a dynamic pressure of 180 Pa, in the most unfavorable direction for its stability.</i>	CORRECTO / CORRECT
FRECUENCIA DE DESTELLO: entre 0,8 y 2 Hz. / <i>FLASH FREQUENCY: between 0.8 and 2 Hz.</i>	CORRECTO / CORRECT
RESISTENCIA CLIMÁTICA: se garantizará el funcionamiento de la luz a temperaturas de -10 °C y 50 °C. / <i>CLIMATIC RESISTANCE: the operation of the light shall be guaranteed at temperatures of -10 °C and 50 °C.</i>	CORRECTO / CORRECT
ALIMENTACIÓN: será autónoma a través de una pila o batería que deberá garantizar su uso al cabo de 18 meses. Se considerará que los dispositivos que utilicen una batería recargable y siempre que la carga del mismo se pueda realizar en el propio vehículo cumplen con este requisito. / <i>SUPPLYING SYSTEM: it shall be autonomous through a battery that must guarantee its use after 18 months. Devices using a rechargeable battery and provided that the battery can be charged in the vehicle itself shall be deemed to comply with this requirement.</i>	CORRECTO / CORRECT

- * LOS RESULTADOS PRESENTADOS SE REFIEREN ÚNICAMENTE A LA MUESTRA ENSAYADA.
THE PRESENTED RESULTS REFER ONLY TO THE TESTED SAMPLE.
- * QUEDA TERMINANTEMENTE PROHIBIDA LA REPRODUCCIÓN PARCIAL DE ESTE INFORME SIN PERMISO EXPRESO DE IDIADA.
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MEASUREMENT UNCERTAINTY OF THE RESULTS HAS BEEN CALCULATED BY THE LABORATORY.


RESULTADOS COLORIMÉTRICOS: AMARILLO AUTO / COLORIMETRIC RESULTS: AMBER ZONE

- Límite hacia el verde / *Limit towards the green*: $y \leq x - 0.120$
- Límite hacia el rojo / *Limit towards the red*: $y \geq 0.390$
- Límite hacia el blanco / *Limit towards the white*: $y \geq 0.790 - 0.670x$

Coordenadas cromáticas (eje de referencia) / <i>Chromatic co-ordinates (reference axis)</i>		
x	0.563	CORRECTO / CORRECT
y	0.419	
z	0.018	

RESULTADOS FOTOMÉTRICOS / PHOTOMETRIC RESULTS

Frecuencia / <i>Frequency</i> (f): $0.8 \text{ Hz} \leq f \leq 2 \text{ Hz}$	f = 1.03 Hz	CORRECTO / CORRECT
Tiempo de encendido / <i>On time</i> : $t_{\text{ON}} \leq 0.4/f$	$t_{\text{ON}} = 360.0 \text{ ms} \leq 0.4/f = 388.3 \text{ ms}$	CORRECTO / CORRECT
Tiempo de apagado / <i>Off time</i> : $t_{\text{OFF}} \geq 100 \text{ ms}$	$t_{\text{OFF}} = 610.8 \text{ ms}$	CORRECTO / CORRECT
Diferencia de tiempo / <i>Time distance measurements</i> : Δt	$\Delta t = 27.6 \text{ ms}$	CORRECTO / CORRECT

Valores mínimos de intensidad luminosa efectiva / *Minimum values of effective luminous intensity* (J_e):

	Medidas tras 1 minuto de encendido / <i>Measures after 1 minute of operation</i> (cd_{ef})		Medidas tras 30 minutos de encendido / <i>Measures after 30 minutes of operation</i> (cd_{ef})	
0° V	$40 \leq J_e \leq 700$	62.8	$40 \leq J_e \leq 700$	54.7
+8° V	$25 \leq J_e \leq 600$	55.8	$25 \leq J_e \leq 600$	48.5
-8° V	$25 \leq J_e \leq 600$	52.4	$25 \leq J_e \leq 600$	45.6

Valor máximo de intensidad luminosa efectiva / *Maximum value of effective luminous intensity* (J_e):

	Medidas tras 1 minuto de encendido / <i>Measures after 1 minute of operation</i> (cd_{ef})		Medidas tras 30 minutos de encendido / <i>Measures after 30 minutes of operation</i> (cd_{ef})	
0° V	$40 \leq J_e \leq 700$	70.0	$40 \leq J_e \leq 700$	61.0
+8° V	$25 \leq J_e \leq 600$	58.9	$25 \leq J_e \leq 600$	51.3
-8° V	$25 \leq J_e \leq 600$	54.9	$25 \leq J_e \leq 600$	47.8

Irradiación / <i>Irradiation</i>	CORRECTO / <i>CORRECT</i>
Intensidad luminosa / <i>Luminous intensity</i>	CORRECTO / <i>CORRECT</i>

Lugar del ensayo / *Test place*: L'Albornar, E-43710 Santa Oliva (Tarragona)

Fecha del ensayo / *Test date*: 19/09/2023 – 03/10/2023



Joan Fonts Sala
INGENIERO DE ENSAYOS

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THE PRESENTED RESULTS REFER ONLY TO THE TESTED SAMPLE.

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ANEXO I

Servicio de comunicaciones móviles corporativas de banda estrecha para internet de las cosas para balizas V-16. Cumplimiento de requisitos en materia de comunicaciones (CERTIFICADO TELCO)

El operador Telefónica IoT & Big Data Tech, S.A.U. de conformidad con lo dispuesto en el Anexo II de la Resolución de 30 de noviembre de 2021, de la Dirección General de Tráfico, por la que se define el protocolo y el formato para el envío de datos desde la señal V-16 al Punto de Acceso Nacional, en el ámbito de la Directiva 2010/40/UE del Parlamento Europeo y del Consejo, de 7 de julio de 2010, por la que se establece el marco para la implantación de los sistemas de transporte inteligente en el sector del transporte por carretera,

MANIFIESTA

1. Que en fecha **5 de Septiembre de 2023**, la entidad **LIMBURG TECHNOLOGY LIMITED**, (en adelante, el "Cliente"), con C.I.F. 14259827 y el operador Telefónica IoT & Big Data Tech, S.A.U., finalizaron la ejecución de las pruebas aplicadas para la prestación del Servicio de Comunicaciones Móviles Corporativas de Banda Estrecha para Internet de las Cosas para balizas conectadas v16 para su modelo CH-009 y versión FW v0.3.
2. Que el alcance del citado Contrato recoge y da cumplimiento a los requisitos que en materia de conectividad han de cumplirse de acuerdo con lo dispuesto en la citada Resolución de 30 de noviembre de 2021, y en concreto:
 - 2.1. Tecnología de comunicaciones. El servicio de conectividad será prestado bajo el uso de tecnología celular en banda licenciada dentro de los estándares 4G/5G LPWA de 3GPP, garantizando de este modo la permanencia en funcionamiento de dicha tecnología durante el transcurso del Contrato, evitando de este modo la obsolescencia temprana.
 - 2.2. Gestión, seguridad y privacidad en las comunicaciones. El servicio será prestado por el operador Telefónica IoT & Big Data Tech, S.A.U.:
 - Bajo un entorno privado y seguro de comunicaciones (APN privado).
 - Sin oportunidad de extracción de la tarjeta SIM del dispositivo.
 - Mediante la provisión automática y desatendida, y ello con objeto de evitar procedimientos de activación intermedios que puedan interferir en el momento de un accidente o avería.
 - Incluyendo una herramienta de gestión de alarmas para el control del fraude por malos usos con posibilidad de bloqueo automático de las comunicaciones.
 - El Cliente y el operador Telefónica IoT & Big Data Tech, S.A.U. ha acordado establecer un plazo de duración en la prestación del servicio de conectividad no inferior a 12 años.
3. Validación de dispositivo. Con el fin de garantizar los requisitos en materia de validación de los dispositivos se adjuntan como apéndice al presente Anexo los certificados aportados por el fabricante, así como el resultado de las pruebas de laboratorio efectuadas por el operador Telefónica IoT & Big Data Tech, S.A.U. y el porcentaje de cobertura actual y previsto en la tecnología LPWA seleccionada en el territorio nacional.

En Madrid, a **5 de Septiembre** del año 2023

Por
LIMBURG TECHNOLOGY LIMITED

Por el Operador
Telefónica IoT & Big Data Tech, S.A.U.

Fdo:
D. FENG ZHENG
IDIADA Automotive Technology, S.A.

N.I.F. A43581610

Fdo:
D. Carlos Carazo Cepedano
Servicio Técnico Designado de Homologación (TS)



Índice de apéndices

- Apéndice I: Certificados de fabricante
- Apéndice II: Informe de pruebas de laboratorio
- Apéndice III: Declaración de cobertura NB-IoT

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APENDICE I

CERTIFICACIONES DE FABRICANTE



精准检测
PRECISE TESTING



VERIFICATION OF CONFORMITY

No. : PTC23080110701E-RF01
Applicant : LIMBURG TECHNOLOGY LIMITED
Address : 291 BRIGHTON ROAD SOUTH CROYDON UNITED KINGDOM CR2 6EQ
Manufacturer : NINGBO TIANQI INTELLIGENT TECHNOLOGY CO., LTD
Address : XINLIAN VILLAGE, GAOQIAO TOWN, HAISHU DISTRICT 315016
NINGBO ZHEJIANG (CHINA)
Product : Beacon Light IoT
Trade Mark : CHALLUX
Model : CH-009
Ratings : DC 4.5V, 1.5V*3 AA Batteries

The submitted sample of the above equipment has been tested and found to comply with the following European Directive:

Radio equipment Directive - 2014/53/EU

The standard(s) used for showing compliance with the essential requirements:

Applicable Standard(s)	Test Report(s) Number
ETSI EN 301 908-1 V15.2.1 (2023-01)	PTC23080110701E-EM01
ETSI EN 301 908-13 V13.2.1 (2022-02)	
ETSI EN 303 413 V1.2.1 (2021-04)	PTC23080110701E-EM02
ETSI EN 301 489-1 V2.2.3 (2019-11)	PTC23080110701E-EM03
ETSI EN 301 489-19 V2.2.1 (2022-09)	
ETSI EN 301 489-52 V1.2.1 (2021-11)	
EN IEC 62311:2020; EN 50665:2017	PTC23080110701E-EM04
EN IEC 62368-1:2020+A11:2020	PTC23080110701S-LD01

This verification is part of the full test report(s) and should be read in conjunction with it. This verification is based on an evaluation of one sample of above mentioned product. It does not imply assessment of the production of the product. Without the written approval of Precise Testing & Certification (Guangdong) Co., Ltd., this verification is not permitted to be reproduced, except in full. It is not permitted to use the test lab's logo. The CE marking may only be used if all the relevant and effective European Directives are applicable.



Jacky Ou

Jacky Ou
Manager

Date: 2023-08-16



Precise Testing & Certification (Guangdong) Co., Ltd.
Building 1, No.6, Tongxin Road, Dongcheng Street,
Dongguan, Guangdong, China
Tel: 86 769 38808222 Web: www.ptc-testing.com
Mail: inquiry@ptc-testing.com





Report No.: PTC23080110701E-EM04

TEST REPORT

EN IEC 62311:2020

EN 50665:2017

Product : Beacon Light IoT
Model Name : CH-009
Brand : CHALLUX
Report No. : PTC23080110701E-EM04

Prepared for

LIMBURG TECHNOLOGY LIMITED
291 BRIGHTON ROAD SOUTH CROYDON UNITED KINGDOM CR2 6EQ

Prepared by

Precise Testing & Certification (Guangdong) Co., Ltd.
Building 1, No. 6, Tongxin Road, Dongcheng Street, Dongguan, Guangdong, China.





Report No.: PTC23080110701E-EM04

1 TEST RESULT CERTIFICATION

Applicant's name : LIMBURG TECHNOLOGY LIMITED
Address : 291 BRIGHTON ROAD SOUTH CROYDON UNITED KINGDOM CR2 6EQ
Manufacture's name : NINGBO TIANQI INTELLIGENT TECHNOLOGY CO., LTD
Address : XINLIAN VILLAGE, GAOQIAO TOWN, HAISHU DISTRICT 315016 NINGBO ZHEJIANG (CHINA)
Product name : Beacon Light IoT
Model name : CH-009

The above-mentioned device is tested by PTC to determine the maximum emission level produced by the device and the severity level that the device can withstand and its performance standards. The measurement results are contained in this test report. In addition, this report shows that EUT (equipment under test) technically meets the requirements of 62311

This report only applies to the above-mentioned test samples, and cannot be partially copied or modified without written approval by PTC

Date of Test

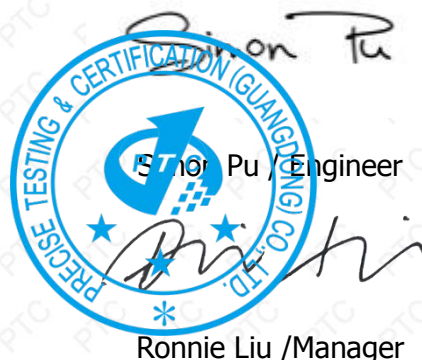
Date (s) of performance of tests: Aug. 03, 2023 to Aug. 16, 2023

Date of Issue: Aug. 16, 2023

Test Result: **Pass**

Test Engineer:

Technical Manager:



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Report No.: PTC23080110701E-EM04

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Report No.: PTC23080110701E-EM04

2 Test Summary

Test	Test Requirement	Test Method	Limit / Severity	Result
RF Exposure	EN IEC 62311:2020; EN 50665:2017	EN IEC 62311:2020; EN 50665:2017	-	PASS

Remark:

N/A: Not Applicable

RF: In this whole report RF means Radio Frequency.

A.M. Amplitude Modulation.

P.M. Pulse Modulation.

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Report No.: PTC23080110701E-EM04

3 General Information

3.1 General Description of E.U.T.

Product Name	:	Beacon Light IoT
Model Number	:	CH-009
Operating frequency	:	NB-IoT NB1+NB2 LTE Band 8/20 NB-IoT Band 8: 880.1-914.9MHz(TX) NB-IoT Band 20: 832.1-861 MHz (TX) NB-IoT Band 8: 925.1-959.9MHz(RX) NB-IoT Band 20: 791.1-820.9MHz(RX)
Modulation	:	UL:BPSK+QPSK DL:QPSK
Antenna installation	:	Integral Antenna
Power supply	:	DC 4.5V, 1.5V*3 AA Batteries
Hardware Version	:	SMTK_Y7080E_HW_V1.01
Software Version	:	2212B05Y7080E

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4 RF Exposure Evaluation

4.1 Limits

According to Council Recommendation: the criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation.

Reference levels for electric, magnetic and electromagnetic fields (0Hz to 300GHz, unperturbed RMS values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (nT)	Equivalent plane wave power density Seq(W/m2)
0-1Hz	-	3.2×10^4	4×10^4	-
1-8Hz	10000	$3.2 \times 10^4 / f^2$	$4 \times 10^4 / f^2$	-
8-25Hz	10000	$4000 / f$	$5000 / f$	-
0.025-0.8kHz	$250 / f$	$4 / f$	$5 / f$	-
0.8-3kHz	$250 / f$	5	6.25	-
3-150kHz	87	5	6.25	-
0.15-1MHz	87	$0.73 / f$	$0.92 / f$	-
1-10MHz	$87 / f^{1/2}$	$0.73 / f$	$0.92 / f$	-
10-400MHz	28	0.73	0.92	2
400-2000MHz	$1,375 f^{1/2}$	$0.0037 f^{1/2}$	$0.0046 f^{1/2}$	$f / 200$
2-300GHz	61	0.16	0.20	10

Note:

1. f as indicated in the frequency range column.
2. For frequencies between 100 kHz and 10 GHz, Seq, E2, H2 and B2 are to be averaged over any six-minute period.
3. For frequencies exceeding 10 GHz, Seq, E2, H2 and B2 are to be averaged over any 68 / f1.05 minute period (f in GHz).
4. No E-field value is provided for frequencies <1 Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 25 kV/m. Spark discharges causing stress or annoyance should be avoided.



Report No.: PTC23080110701E-EM04

4.2 Evaluation Methods

The antenna of the product, under normal use condition is at least 20 cm away from the body of the user.
Warning

statement to the user to keeping at least 20 cm separation distance and the prohibition of operating to a person has been printed on the user's manual. So, this product under normal use is located on electromagnetic far field between the human body.

$$E = \frac{\sqrt{30 * P * G \varphi, \theta}}{r}$$

Note: G=antenna gain relative to an isotropic antenna θ ; φ =elevation and azimuth angles to point of investigation; r=distance from observation point to the antenna

4.3 RF Exposure test procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 18°C and 78% RH.

4.4 Test Result of RF Exposure Evaluation

The maximum power density at a distance of 0.2 m is shown as below:

Frequency (MHz)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (W)	Calculated RF Exposure (W/ m ²)	Limit (W/ m ²)
LTE Band8	1.78	25.7	0.281838	0.997080	4.400
LTE Band20	1.78	25.7	0.281838	0.997080	4.160

Remark: Since the max. peak output power is less than the applicable low-power exclusion level Pmax, this device is deemed to comply with the provisions of this standard without further testing.

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



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CERTIFICATE OF CONFORMITY

No.: PTC23080110701C-EN01

Applicant : LIMBURG TECHNOLOGY LIMITED
Address : 291 BRIGHTON ROAD SOUTH CROYDON UNITED KINGDOM CR2 6EQ
Manufacturer : NINGBO TIANQI INTELLIGENT TECHNOLOGY CO., LTD
Address : XINLIAN VILLAGE, GAOQIAO TOWN, HAISHU DISTRICT 315016 NINGBO ZHEJIANG (CHINA)
Product Name : Beacon Light IoT
Model No. : CH-009

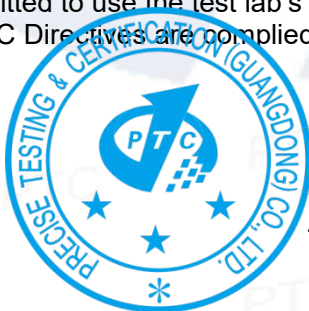
The submitted sample of the above equipment has been tested and found to comply with the following European Directive:

RoHS Directive 2011/65/EU & EU No.2015/863

The standard(s) used for showing compliance with the essential requirements:

Applicable Standard(s)	Test Report(s) Number
IEC 62321-1:2013, IEC 62321-2:2021 IEC 62321-3-1:2013, IEC 62321-3-2:2013 IEC62321-4: 2013+AMD1:2017 IEC 62321-5:2013 IEC 62321-6:2015, IEC 62321-7-1: 2015 IEC 62321-7-2: 2017, IEC 62321-8:2017	PTC23080110701C-EN01

This certificate is part of the full test report(s) and should be read in conjunction with it. This certificate is based on an evaluation of one sample of above mentioned product. It does not imply assessment of the production of the product. Without the written approval of Precise Testing & Certification (Guangdong) Co., Ltd., this certificate is not permitted to be reproduced, except in full. It is not permitted to use the test lab's logo. The CE Marking may only be used if all relevant and effective EC Directives are complied with.



Jacky Ou

Jacky Ou
Manager

Date: Aug. 08, 2023

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Dongguan, Guangdong, China
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Test Report



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Issue Date: Aug. 17, 2023

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Applicant: LIMBURG TECHNOLOGY LIMITED

Address: 291 BRIGHTON ROAD SOUTH CROYDON UNITED KINGDOM CR2 6EQ

The following merchandise was (were) submitted and identified by client as:

Sample Name: Beacon Light IoT

Model: CH-009

Manufacturer: NINGBO TIANQI INTELLIGENT TECHNOLOGY CO., LTD

Address: XINLIAN VILLAGE, GAOQIAO TOWN, HAISHU DISTRICT 315016 NINGBO
ZHEJIANG (CHINA)

Sample Received Date: Aug. 02, 2023

Completed Date: Aug. 08, 2023

Test Requested: As specified by client, with reference to RoHS Directive 2011/65/EU and its subsequent amendments regulation EU No.2015/863.(Lead (Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr^{6+}), PBBs and PBDEs, Phthalates (DBP, BBP,DEHP,DIBP))

Conclusion(s): According to the test results of below test parameters, the tested materials of submitted samples complied with the requirements for RoHS Directive 2011/65/EU and its subsequent amendments regulation EU No.2015/863.

Test Result(s) and Test Method(s): Please refer to next page(s).



Prepared by: Anne

Checked by: Crystal

Approved by: Miya

Anne

Crystal

Miya

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Test Report

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Test Result(s):

1.1) RoHS Directive 2011/65/EU -(Lead (Pb)/Cadmium(Cd)/Mercury(Hg)/Hexavalent Chromium(Cr⁶⁺)/PBBs/PBDEs)

Test Method: IEC62321-3-1: 2013, IEC62321-6:2015, analyzed by EDXRF & GC-MS.

No.	Materials Description	EDXRF Result(s) (mg/kg)					Chemical Result (mg/kg)	Conclusion
		Pb	Cd	Hg	Cr	Br		
1	Black plastic (case)	BL	BL	BL	BL	BL	--	PASS
2	Transparent plastic (lid)	BL	BL	BL	BL	BL	--	PASS
3	Red soft plastic (keys)	BL	BL	BL	BL	BL	--	PASS
4	Orange soft plastic (gasket)	BL	BL	BL	BL	BL	--	PASS
5	Silver metal copper-colored metal with white coating (lamp strip)	BL	BL	BL	BL	--	--	PASS
6	White/yellow plastic (light)	BL	BL	BL	BL	BL	--	PASS
7	White plastic (light frame)	BL	BL	BL	BL	BL	--	PASS
8	Silver metal (spring)	BL	BL	BL	BL	--	--	PASS
9	Silver magnet (core)	BL	BL	BL	BL	--	--	PASS
10	Silver metal (screws)	BL	BL	BL	BL	--	--	PASS
11	Green PCB (PCB "SMTK-V6")	BL	BL	BL	BL	IN	PBBs: N.D. PBDEs: N.D.	PASS
12	Silver metal with black printing (case, capacitor, PCB "SMTK-V6")	BL	BL	BL	BL	--	--	PASS
13	Silver metal (fixed frame, PCB "SMTK-V6")	BL	BL	BL	BL	--	--	PASS
14	Silvery solder (semi-product)	BL	BL	BL	BL	--	--	PASS

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- Note:**
1. mg/kg = milligram per kilogram (ppm).
 2. N.D. = Not Detected
 3. The result are obtained by EDXRF for primary screening, if the result exceeds the below limit (BL), and further chemical testing.
 4. For EDXRF screening, the result(s) of Cr VI was (were) reported as total chromium and the result(s) of PBBs and PBDEs was (were) reported as total bromine.

Screening limits in mg/kg for regulated elements in various matrices

Elements	Polymer	Metal	Composite Materials
Pb	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Cd	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$LOD < X < (150+3\sigma) \leq OL$
Hg	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Cr	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X$	$BL \leq (500-3\sigma) < X$
Br	$BL \leq (300-3\sigma) < X$	--	$BL \leq (250-3\sigma) < X$

BL = Below Limit, OL = Over Limit, IN = Inconclusive, LOD = Limit of Detection

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Chemical Testing - Detection Limit & 2011/65/EU Limit:

Name of Chemicals	Detection Limit (mg/kg)	2011/65/EU Limit (mg/kg)
Lead (Pb)	5	1000
Cadmium (Cd)	5	100
Mercury (Hg)	5	1000
Chromium VI (Cr VI)	Non-metal: 10 Metal: Negative	Non-metal: 1000 Metal: Negative
Polybromobiphenyls (PBBs) -Bromobiphenyl (MonoBB) -Dibromobiphenyl (DiBB) -Tribromobiphenyl (TriBB) -Tetrabromobiphenyl (TetraBB) -Pentabromobiphenyl (PentaBB) -Hexabromobiphenyl (HexaBB) -Heptabromobiphenyl (HeptaBB) -Octabromobiphenyl (OctaBB) -Nonabromobiphenyl (NonaBB) -Decabromobiphenyl (DecaBB)	Each 5	Sum: 1 000
Polybromodiphenyl ethers (PBDEs) -Bromodiphenyl ether (MonoBDE) -Dibromodiphenyl ether (DiBDE) -Tribromodiphenyl ether (TriBDE) -Tetrabromodiphenyl ether (TetraBDE) -Pentabromodiphenyl ether (PentaBDE) -Hexabromodiphenyl ether (HexaBDE) -Heptabromodiphenyl ether (HeptaBDE) -Octabromodiphenyl ether (OctaBDE) -Nonabromodiphenyl ether (NonaBDE) -Decabromodiphenyl ether (DecaBDE)	Each 5	Sum: 1 000

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Test Result(s):

1.2) RoHS Directive 2011/65/EU and its subsequent amendments regulation EU No.2015/863 - (Phthalates DIBP,DBP, BBP, DEHP)

Method: IEC 62321-8: 2017, analyzed by Gas Chromatograph-Mass Spectrometry (GC-MS).

Substances	DBP	BBP	DEHP	DIBP	Conclusion
CAS No.	84-74-2	85-68-7	117-81-7	84-69-5	
Limit(s) (mg/kg)	1000	1000	1000	1000	
RL (mg/kg)	50	50	50	50	
Material No.	Result (mg/kg)				
1+2+7	N.D.	N.D.	N.D.	N.D.	PASS
3+4	N.D.	N.D.	N.D.	N.D.	PASS
6+11	N.D.	N.D.	N.D.	N.D.	PASS

- Note:**
1. mg/kg = milligram per kilogram (ppm).
 2. N.D. = Not Detected (<RL).
 3. RL=Reporting Limit.

Test Material List

The following materials apply only to the samples submitted for phthalates testing.

Material No.	Description (Location)
1	Black plastic (case)
2	Transparent plastic (lid)
3	Red soft plastic (keys)
4	Orange soft plastic (gasket)
6	White/yellow plastic (light)
7	White plastic (light frame)
11	Green PCB (PCB "SMTK-V6")

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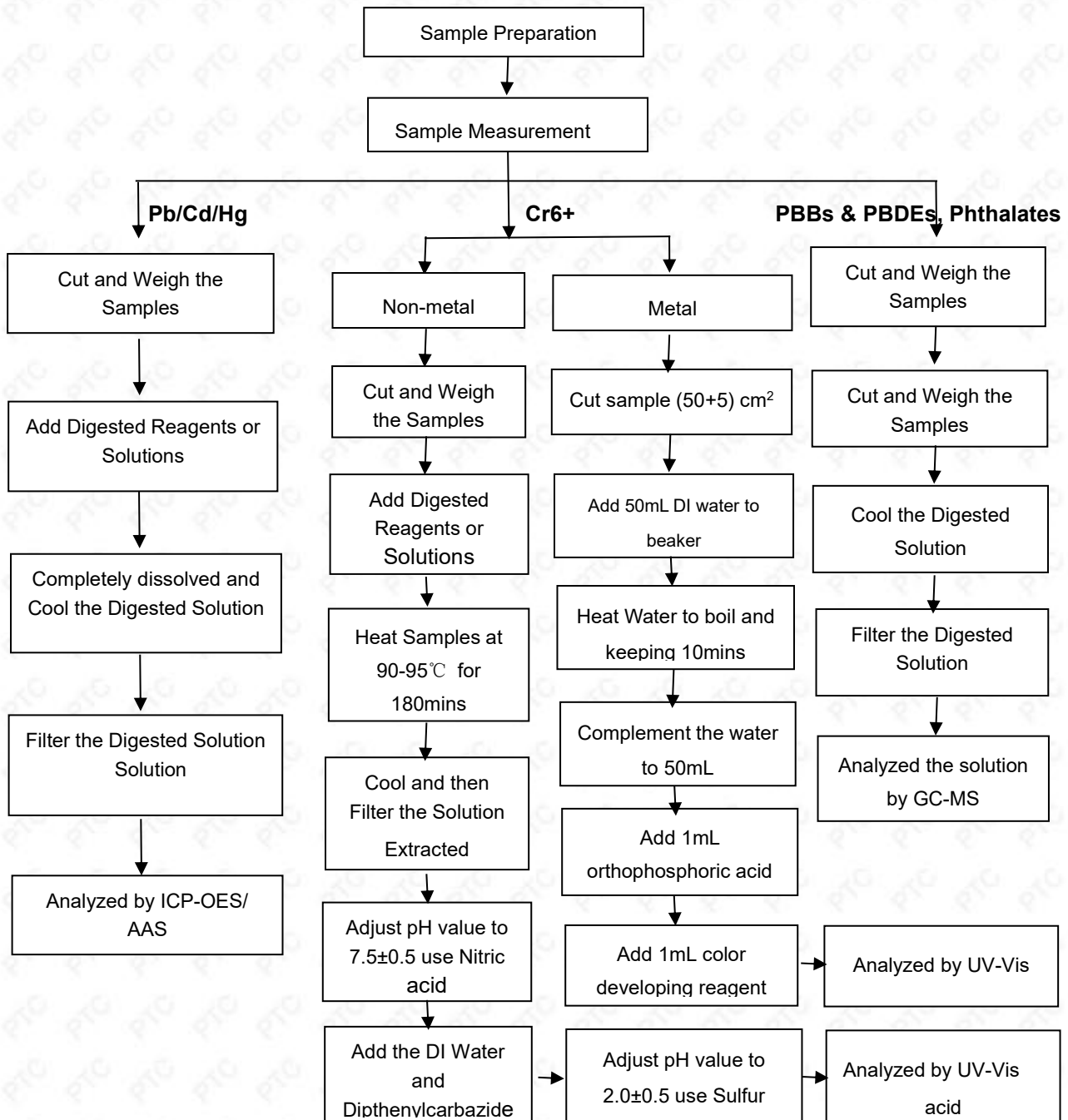
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Pb/Cd/Hg/Cr6+/PBBs/PBDEs, Phthalates Testing Flow Chart



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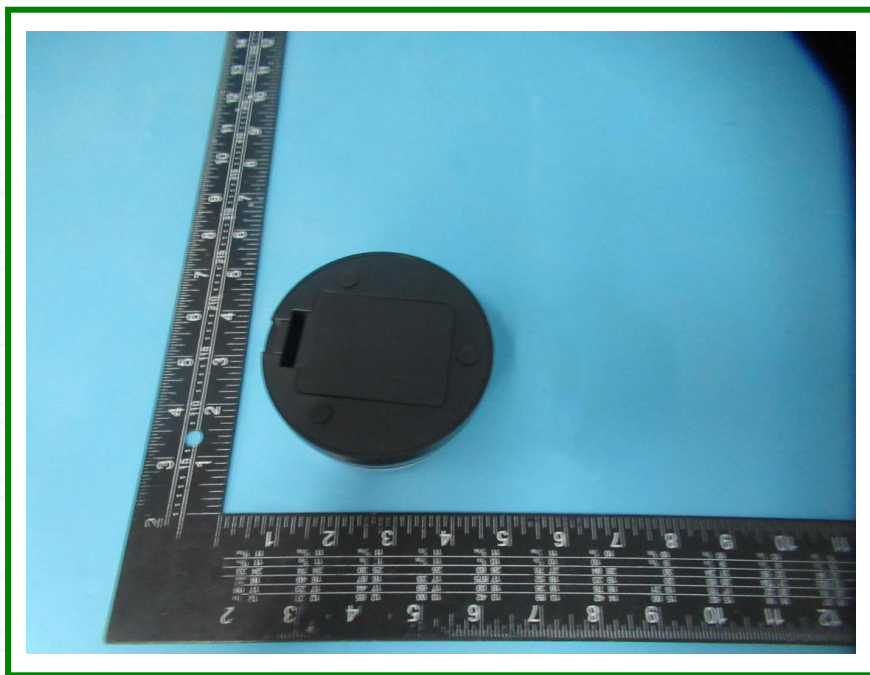
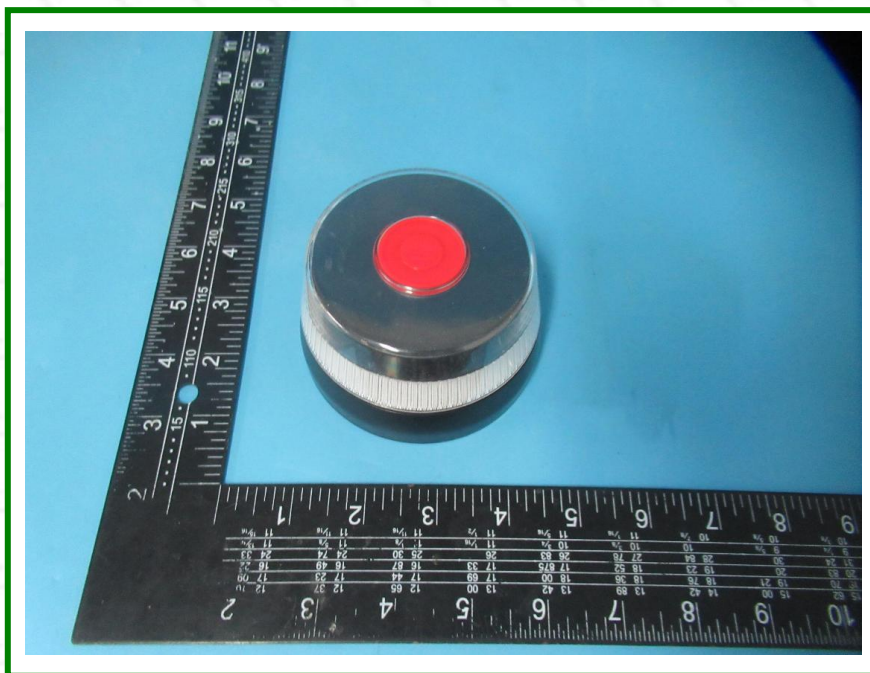
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Photo(s) of Sample:



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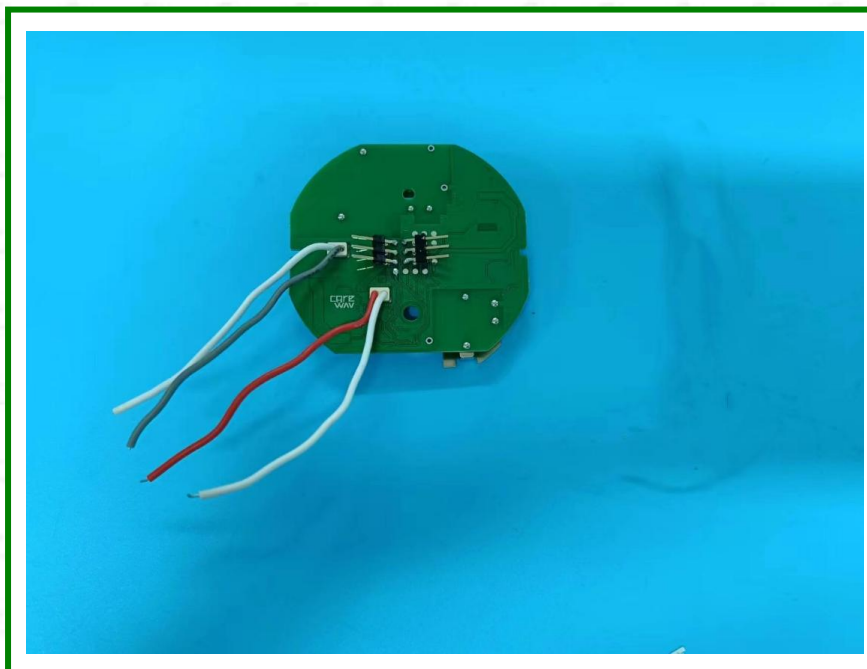


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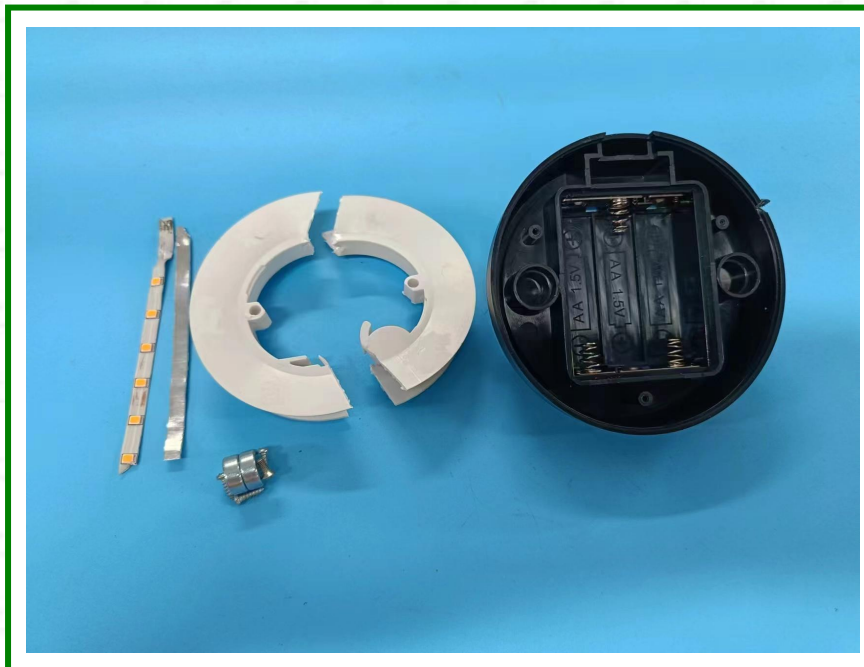
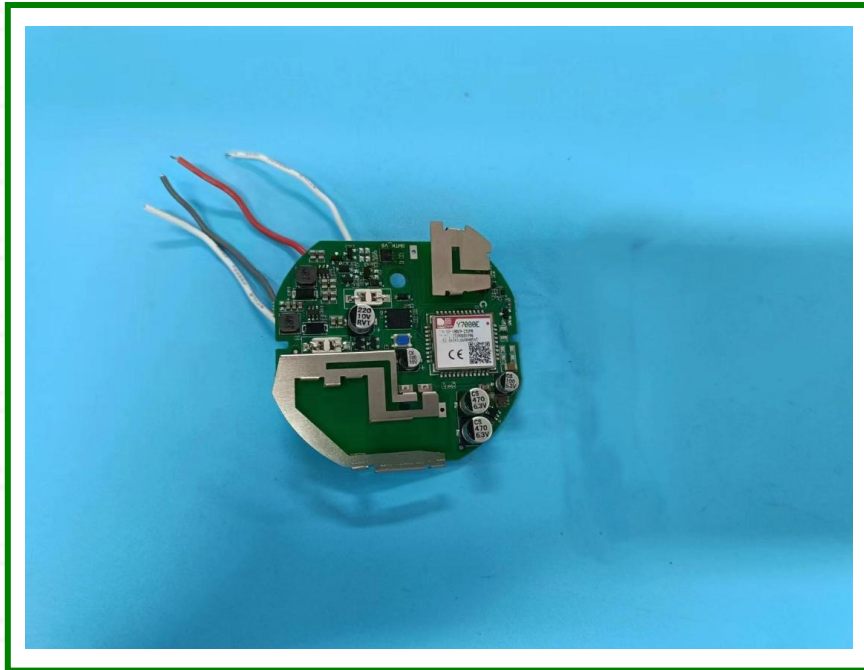
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CERTIFICATE

The Global Certification Forum Ltd advises that
SIMCom Wireless Solutions Limited

has successfully demonstrated compliance
with the GCF certification requirements of GCF-CC

For
Y7080E
IoT Module

On
19-Aug-2022

GCF CC Version:
3.85.1

Status:
Published

GCF Ref. Number:
11004

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APENDICE II

INFORME DE PRUEBAS DE LABORATORIO



Challux - CH-009

Global Telefonica Device on Boarding Report

Addressed to: Limburg

Manufacturer: Challux

Device Type: IoT/M2M Device

Model: CH-009

Technology NB-IoT

SW Version v0.3

Photo:



Challux - CH-009 end device, in its v0.3 version, is compatible with Telefónica IoT/M2M solution according to specific functionalities tested in the mobile networks specified.

Some issues have been detected and they may affect device functionality.

Challux shall deliver to Telefonica a solution plan to solve open issues.



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IDIADA PC25020094



Madrid, 5th September 2023

To whom it may concern,

Please, be informed the **Challux - CH-009** has finished IoT/M2M Device Validation process according to the data detailed in this testing report.

1. Validation result¹

As a result of Device Validation process, Telefonica has verified that the tested device under testing, **Challux - CH-009** has several non-blocking issues.

Summarizing, this document records all the issues found, and Telefonica strongly recommends solving, as soon as possible:

- “P2-High” issues (6) because they may affect the device.
- “P3-Medium” issues (2) because they might affect the device functionality.
- “P4-Low” issues (8) are related to those features to take into account. Telefonica's recommendation is to solve them to achieve important product improvements.

It is important to point out that:

- **Device behaviour regarding retry scheme** is **partially supported** by this version of device under testing. See details in [section 5](#).
 - DuT is not following Telefónica guidelines recommendation about reboot scheme (randomised and exponential delayed on time reboot scheme). However, due to it use case, it has been agreed that the DuT follows a retry policy that consists of rebooting in a range of 1min 30 sec and 2 min 50 sec approximately after receiving a reject from network.
- **Subscription SWAP²** is **NOT supported** by this version of the device under testing.

¹ Please, refer to Annex III for more detailed information about bug priority.

² eUICC remote provisioning” is the feature standardized by the GSMA “SGP.02 - Remote Provisioning Architecture for Embedded UICC Technical Specification. Version 3.2”



2. Validated version

The tested version is:

	Device under Testing
Model version	CH-009
SW/FW version	v0.3
HW version	v0.4
Module Model	Y7080E
Module SW version	2212B04Y7080E ³
Chipset Model	Y7080E

3. Scope of testing

The testing of **Challux - CH-009** has been executed using Telefonica Spain mobile communications network and infrastructure as a reference network and Global Kite Platform as the Telefonica managed connectivity platform.

DEKRA Testing and Certification, S.A.U., as the Telefonica Global Testing House, has performed the testing according to Telefónica IoT/M2M Device Validation testing plan for Device on Boarding service.

The testing dates have been:

- Start of Testing: 21st August 2023.
- End of testing: 1st September 2023.

The testing scope has been based on the following testing blocks:

General testing	
M	Management & Setup (Full Testing)
M	Certificates & Documents
M	RAT Independent
M	Conformance CIoT for NB-IoT
M	SAT USAT
M	SIM USIM
M	SMS
M	SW Update x2
O	AT Commands
O	Satellite Positioning (GPS)

³ Latest SW version certified by Telefónica IoT & Big Data TECH (https://okapi.telefonica.com/iot_modules/)



IoT/M2M Platform	
M	Retry Scheme
M	Kite Platform
Radio testing	
M	NB-IoT

4. Testing environment

The testing environment has been:

Communication features	
Live NB-IoT frequency bands tested:	B20 (800MHz)
Live mobile network:	Spain
IoT/M2M platform features	
IoT/M2M platform:	Telefonica Kite Platform
SIM card type:	Telefonica Spain UICC (Global SIM); electrical profile: M16 / E14 Telefonica Spain eUICC; electrical profile: E02 (ProfileType "ES-A16-VS-00215")
APN:	balizadgt.movistar.com
Lab resources	
Network simulators:	Anite R&S CWM500
SIM tracer:	Comprion



5. Testing results.

Testing has finished with 16 bugs: 6 bugs with priority P2 (High), 2 bugs with priority P3 (Medium) and 8 bugs with priority P4 (Low/Notification).

Please, refer to Annex I for more detailed information about open bugs.

Please, refer to Annex II for more detailed information about testing results.

a. Highlights of the testing.

- DuT behaviour regarding retry scheme has the following highlights:
 - DuT is not following Telefónica guidelines recommendation about reboot scheme (randomised and exponential delayed on time reboot scheme). However, due to its use case, it has been agreed that the DuT follows a retry policy that consists of rebooting in a range of 1min 30 sec and 2 min 50 sec approximately after receiving a reject from network.
 - DuT is not following 3GPP and Telefónica requirements after receiving DETACH REQUEST cause #14 (EPS services not allowed in this PLMN) and #7 (EPS services not allowed). The DuT does not perform any reboot, instead, it immediately retries the attach procedure.
 - DuT is not behaving as expected after receiving DETACH REQUEST cause #40 (No EPS bearer context activated). It does not take into account back-off timer in order to retry the Attach procedure and also it does not perform any reboot. Therefore, it does not meet 3GPP and Telefónica requirements.
 - DuT is not behaving as expected after receiving ATTACH REJECT cause #19 (ESM Failure). It does not take into account timer T3402 (12 minutes), therefore it is not meeting 3GPP requirements. Also it does not perform any reboot, so it is not following Telefónica requirements.
- DuT does not support some SIM toolkit commands.
- The device does not avoid a synchronized behaviour, and does not employ a randomised pattern for signalling.
- Not possible to get level 3 RRC traces of radio interface (3GPP protocol) from device.
- Lack of support for FW upgrade method. Vendor does not have any method available in order to test this feature.
- Lack of support for Serial port Update method. Vendor does not have any method available in order to test this feature.
- The DuT does not support RPM functionality.



b. Device Performance Information

	Device Under testing
Model version	CH-009
HW Version	v0.4
SW/FW version	v0.3
3GPP Release	Release 14
PDP context activation time and PDN connectivity opening (TC-MIPLF-PRFTC-001a) ⁴	TC Blocked due to bug 140948 [Regional] Logging tool not provided
Reselection signal strength (TC-RATIN-OPCHG-001a)	TC Blocked due Reselection not completed with predefined scenario
Avg. current drain	169,05 mA
Test Cases not supported by DuT	10
Blocked Test Cases	65 ⁵

⁴ Tested in initial validation.

⁵ TC blocked due to scenario not available and bug140948 [Regional] Logging tool not provided.



6. Disclaimers

- This report takes effect only to the version tested by Telefonica.
- The device under testing has been tested in a standalone configuration, so any other app/platform are not validated by Telefonica.
- This report does not have any effect on any functionality not tested.
- In any case, the device under testing shall fulfil Telefonica requirements according to TDDC (Telefonica Device Design Council).
- Telefonica will not be responsible of any damage or loss provoked by the device under testing.

Best Regards,

José Rubén García Muñoz

Alberto Ramos Pérez

On behalf of:
Technology & Integration | AI of Things
Telefónica IoT & Big Data TECH

On behalf of:
Technology & Integration | AI of Things
Telefónica IoT & Big Data TECH

Verifique el informe con código de seguridad «JEPKLMGX» en: <https://homportal.idiada.com/#/document-verification>

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ANNEX I: Open Bugs

From Khepera collaborative tool:

Bug ID	Priority	Summary	High level analysis and impact
141200	P2 - High	[Regional] Device does not completed cell redirection	Does the device follow 3GPP standard? No Does the device follow Telefonica requirements? N/A Impact: DuT is not able to complete a cell redirection from network. As consequence it will remains in the current cell or trying to reconnect following its retry scheme.
141090	P2 - High	[Regional] Wrong behaviour after receive DETACH REQUEST with cause #14 in HPLMN in NB-IoT	Does the device follow 3GPP standard? No Does the device follow Telefonica requirements? No Impact: DuT immediatly retries the Attach procedure after receiving DETACH REQUEST cause #14 instead of following a retry scheme based on reboots. This behaviour is MODERATELY affecting to the network.
141086	P2 - High	[Regional] Wrong behaviour after receive DETACH REQUEST with cause #40 in HPLMN in NB-IoT	Does the device follow 3GPP standard? No Does the device follow Telefonica requirements? No Impact: DuT does not take into account back-off timer of 12 minutes after receiving DETACH REQUEST cause #40. It immediatly retries the Attach procedure. This behaviour is MODERATELY affecting to the network.
141085	P2 - High	[Regional] Wrong behaviour after receive DETACH REQUEST with cause #7 in HPLMN in NB-IoT	Does the device follow 3GPP standard? No Does the device follow Telefonica requirements? No Impact: DuT immediatly retries the Attach procedure after receiving DETACH REQUEST cause #7 instead of following a retry scheme based on reboots. This behaviour is MODERATELY affecting to the network.
141045	P2 - High	[Regional] Wrong behaviour after receive ATTACH REJECT with cause #19 & PDN CONNECTIVITY REJECT with cause #32 in NB-IoT in HPLMN	Does the device follow 3GPP standard? No Does the device follow Telefonica requirements? No Impact: DuT is not taking into account timer T3402 (12 minutes) when reaching a maximum of 5 Attach requests after timer T3411 expiration. It retries the Attach procedure before timer T3402 expiration. This behaviour is MODERATELY affecting to the network.
140952	P2 - High	[Regional] Terminal Profile: Several toolkit commnads not supported	Does the device follow 3GPP standard? No Does the device follow Telefonica requirements? No Impact: Some actions between the module and the SIM will not be executed.



Bug ID	Priority	Summary	High level analysis and impact
140951	P3 - Medium	[Regional] Synchronized behaviour between devices	Does the device follow 3GPP standard? N/A Does the device follow Telefonica requirements? No Impact: The device does not avoid a synchronized behaviour, and does not employ a randomised pattern for signalling.
140950	P3 - Medium	[Regional] Synchronized behaviour in one device	Does the device follow 3GPP standard? N/A Does the device follow Telefonica requirements? No Impact: The device does not avoid a synchronized behaviour, and does not employ a randomised pattern for signalling.
141088	P4 - Notification	[Regional] Wrong behaviour after receive ATTACH REJECT with cause #14 in VPLMN in NB-IoT	Does the device follow 3GPP standard? Yes Does the device follow Telefonica requirements? No (accepted by the use case) Impact: DuT has followed more retries that the ones recommended by Telefónica. However, this behaviour has been accepted
141044	P4 - Notification	[Regional] Wrong behaviour after receive ATTACH REJECT with cause #15 in VPLMN in NB-IoT	Does the device follow 3GPP standard? Yes Does the device follow Telefonica requirements? No (accepted by the use case) Impact: DuT has followed more retries that the ones recommended by Telefónica. However, this behaviour has been accepted
141043	P4 - Notification	[Regional] Wrong behaviour after receive ATTACH REJECT with cause #7 in VPLMN in NB-IoT	Does the device follow 3GPP standard? Yes Does the device follow Telefonica requirements? No (accepted by the use case) Impact: DuT has followed more retries that the ones recommended by Telefónica. However, this behaviour has been accepted
141041	P4 - Notification	[Regional] Wrong behaviour after receive ATTACH REJECT with cause #3 in VPLMN in NB-IoT	Does the device follow 3GPP standard? Yes Does the device follow Telefonica requirements? No (accepted by the use case) Impact: DuT has followed more retries that the ones recommended by Telefónica. However, this behaviour has been accepted
140949	P4 - Notification	[Regional] RPM is not supported by DuT	Does the device follow 3GPP standard? N/A Does the device follow Telefonica requirements? No Impact: RPM feature not supported by the DuT.
140948	P4 - Notification	[Regional] Logging tool not provided	Does the device follow 3GPP standard? N/A Does the device follow Telefonica requirements? No Impact: Not possible to get level 3 RRC traces of radio interface. As consequence, several TC were blocked because they could not be analyzed with the corresponding DuT logs.
140904	P4 - Notification	Serial port update procedure not provided	Does the device follow 3GPP standard? N/A Does the device follow Telefonica requirements? No Impact: : The DuT will not be able to be updated by serial port procedure.



Bug ID	Priority	Summary	High level analysis and impact
140903	P4 - Notification	Lack of support of OTA FW upgrade method	Does the device follow 3GPP standard? N/A Does the device follow Telefonica requirements? No Impact: The DuT will not be able to be updated by OTA FW method.



ANNEX II: Testing Details.

a. Tested versions (Device under Testing)

- Model: CH-009
- SW version: v0.3

b. History of testing

	1st Validation
End of Testing date	1 st September 2023
SW versions	v0.3

c. Bug tracking.



ANNEX III: Telefonica bug Priority definition

Telefónica bug Priority		Severity	Highlight	Description	Examples
P1	Highest	Critical	Most important: showstopper, blocking.	DuT can NOT be approved with this bug.	Bug is blocking device running or product tests or security and there is no workaround. DuT is not presenting mandatory certificates/documents. DuT behaviour is affecting network or other service users.
P2	High	Medium	Very important, but not showstopper.	DuT's vendor must deliver a "solution plan": when it will be fixed. Telefonica will decide what to do then.	Bug is blocking device running or product tests or security and there is uneasy workaround.
P3	Medium	Low	Should be solved.	DuT's vendor should provide a solution but a wontfix is acceptable. Solution is less priority than P2 bug.	Bug is blocking device running or product tests or security but there is easy workaround. Bug is affecting secondary feature.
P4	Low	Notification	Something to highlight.	Something to consider for the future. The only difference between P3 and P4 is that the P3's is preferred to be solved before the P4's.	Improvement or inconvenience to consider. DuT behaviour is not following Telefonica device behaviour recommendations.

Telefónica bug Severity

Severity field is in practice not considered for Telefónica to avoid the possibility of giving contradictory messages between the Priority and Severity fields

Please feel free to ignore it.

The default value is Critical, Medium, Low or Notification for bugs of priorities P1, P2, P3 and P4, respectively, but the testers could change it.



APENDICE III

DECLARACIÓN DE COBERTURA NB-IOT

Verifique el informe con código de seguridad «JEPKLMGX» en: <https://homportal.idiada.com/#/document-verification>

IDIADA PC25020094

Declaración de cobertura NB-IoT en territorio nacional

Telefónica IoT & Big Data Tech, S.A.U. en el marco del proyecto de la plataforma DGT 3.0, y como compañía operadora que ofrece servicios de conectividad NB-IoT al dispositivo baliza V-16, regulado en el Real Decreto 159/2021, provee de **cobertura NB-IoT en el 98,5% del territorio nacional español**.

Verifique el informe con código de seguridad «JEPKLMGX» en: <https://homportal.idiada.com/#/document-verification>

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Telefónica



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ANEXO II

Pruebas de conexión de los dispositivos V-16 a la plataforma de coche conectado de la Dirección General de Tráfico, DGT 3.0

El responsable de la Subdirección General de Gestión de la Movilidad y Telemática, de la dirección General de Tráfico, de conformidad con lo dispuesto en el Anexo I de la Resolución de 30 de noviembre de 2021, de la Dirección General de Tráfico, por la que se define el protocolo y el formato para el envío de datos desde la señal V-16 al Punto de Acceso Nacional, en el ámbito de la Directiva 2010/40/UE del Parlamento Europeo y del Consejo, de 7 de julio de 2010, por la que se establece el marco para la implantación de los sistemas de transporte inteligente en el sector del transporte por carretera.

MANIFIESTA

Que en fecha 21 de JUNIO de 2023, la entidad **LIMBURG TECHNOLOGY LIMITED**

- (en adelante el "Cliente"), con CIF **14259827** y los responsables de la plataforma de vehículo conectado de la Dirección General de Tráfico (en adelante "DGT3.0") han llevado a cabo las pruebas descritas en dicha Resolución.
- Que el Cliente ha satisfecho correctamente los siguientes requisitos recogidos en la citada Resolución de 30 de noviembre de 2021, siendo estos los siguientes:
 - Acceder a la plataforma de gestión del Punto de Acceso Nacional (NAP) mediante certificado digital proporcionado por la Dirección General de Tráfico.
 - Implementar los protocolos e interfaces descritos en esta resolución para el envío de los mensajes generados por la señal V-16.
 - Enviar un mensaje de activación y otro de desactivación del dispositivo por cada Evento.
 - Enviar la señal de activación 100 segundos después del encendido físico del dispositivo.
 - Mantener una frecuencia de envío de mensajes cada 100 segundos.
 - Proporcionar una precisión inferior a 5 metros en el posicionamiento del dispositivo.
- Que el Cliente ha realizado correctamente las pruebas de conexión mediante los protocolos A y B descritos en el Anexo I de dicha Resolución de 30 de noviembre de 2021, utilizando los interfaces y modelos de datos establecidos en la misma
- Que las pruebas y requisitos anteriormente descritos han sido satisfechos por:

Solicitante: LIMBURG TECHNOLOGY LIMITED	Versión del Hardware: SMTK_Y7080E_HW_V1.01
Fabricante: NINGBO TIANQI INTELLIGENT TECHNOLOGY CO., LTD	Versión del Software: 2212B05Y7080E
Modelo: CH-009	Tecnología de Conexión LPWA: NB-IoT

Firmado en Madrid



FUNDACIÓN PARA EL FOMENTO DE
LA INNOVACIÓN INDUSTRIAL



Certificado Evaluación Inicial N°: **E1 61522401**

CERTIFICADO DE EVALUACIÓN INICIAL PARA LA CERTIFICACIÓN

de dispositivos de preseñalización de peligro V-16 fabricados por:

Solicitante:

LIMBURG TECHNOLOGY CO., LIMITED

291 Brighton Road
CR2 6EQ, South Croydon, GREATER LONDON (REINO UNIDO)

Fabricante:

Fabricante	Dirección
Ningbo Tianqi Intelligent Technology Co., Ltd.	Xinlian Village, Gaoqiao Town, Haishu District, 315016, Ningbo, ZHEJIANG (CHINA)
Ningbo Chakesi Electronic Co., Ltd.	No.1609, Bingmasi Road, Fengshan Street, Yuyao City, 315499, Ningbo, ZHEJIANG (CHINA)

Tras los controles realizados por la Unidad de Certificación del Automóvil el 26 de noviembre de 2024, se determina que el sistema de gestión, así como los controles iniciales, planificados y establecidos por el solicitante, cumplen con lo dispuesto en el:

- *Punto 10 de la sección "V-16 Dispositivo de preseñalización de peligro" del anexo XI del Real Decreto 2822/1998, de 23 de diciembre, por el que se aprueba el Reglamento General de Vehículos, en su última actualización.*

UNIDAD DE CERTIFICACIÓN DEL AUTOMÓVIL

FUNDACIÓN PARA EL FOMENTO DE LA INNOVACIÓN INDUSTRIAL

C/ José Gutiérrez Abascal, 2, 28006, Madrid

Fecha de emisión (*): 17.12.2024

(*) la vigencia y el mantenimiento de los requisitos establecidos se asegura, al año de la emisión del presente certificado, con la emisión del Certificado de verificación periódica de la producción.

D. José M^a Martínez-Val Peñalosa
Director F²I²

DOCUMENTACIÓN TÉCNICA

DESCRIPCIÓN TÉCNICA / INFORMATION FOLDER

FECHA / DATE: 14/12/2024

1. Información técnica / Specification data

Tipo / Type	Beacon Light IoT	
Marca commercial / Trade mark	ORFLECT	
Variantes / Variants	CH-009	
Función / Function	V-16 Dispositivo de preseñalización de peligro Dispositivo luminoso (opcional) / <i>V-16 Luminous devices for pre-signalization of danger (optional)</i>	
Reglamento aplicable / Applicable Regulation	Anexo XI “Señales en los Vehículos”, V-16 “Dispositivos de preseñalización de peligro”, Apartado 4 “Dispositivo luminoso” del Real Decreto 2822/1998 del Reglamento General de Vehículos / <i>Annex XI “Señales en los Vehículos”, V-16 “Dispositivos de preseñalización de peligro”, Paragraph 4 “Dispositivo luminoso” of the Real Decreto 2822/1998 of Reglamento General de Vehículos</i>	
Patrón de destello / Flash Pattern	Destello quintuple / <i>Fivefold flash</i>	
Color / Colour	Amarillo auto V-16 / <i>Amber V-16</i>	
Número y categoría de fuentes luminosas / Number and category of light sources	12 x LED	
Alimentación del dispositivo / Supplying system	Batería recargable / Rechargeable battery – Pila / Cell * * Táchese lo que no proceda / Strike out what does not apply	
Marca de identificación / Identification marking	Código / Code	IDIADA PC25020094
	Ubicación del marcaje / Location of marking	Marcado arriba / Marked on Top

2. Nombre y dirección del fabricante / Name and address of manufacturer

NINGBO TIANQI INTELLIGENT TECHNOLOGY CO., LTD
XINLIAN VILLAGE, GAOQIAO TOWN, HAISHU DISTRICT 315016 NINGBO
ZHEJIANG (CHINA)

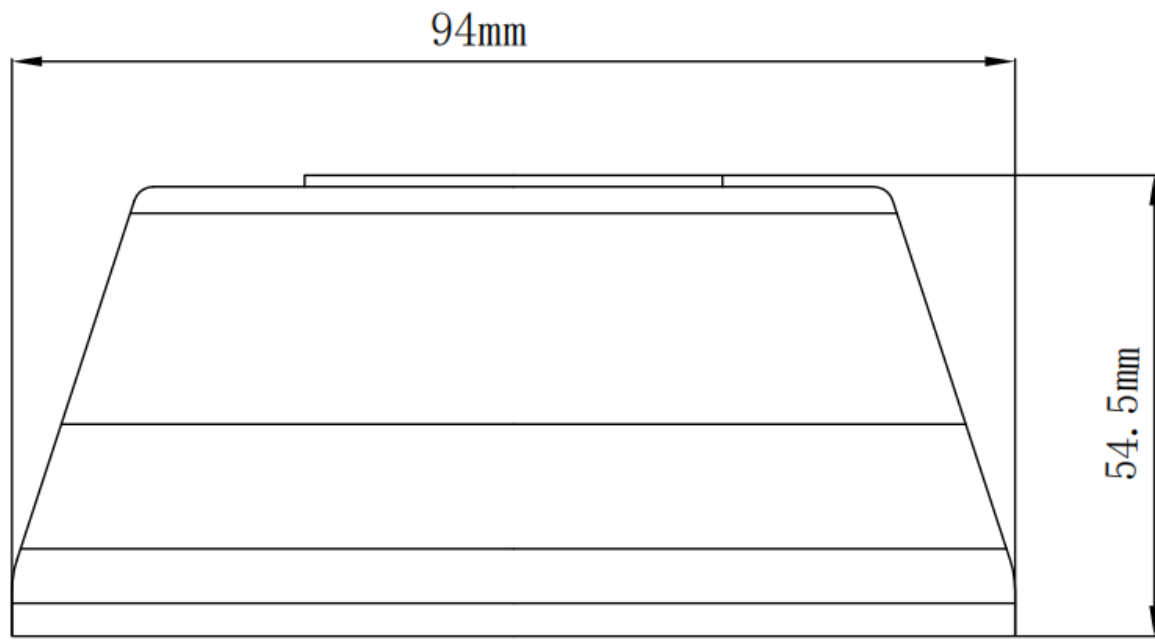
3. Nombre y dirección del solicitante (si aplica) / Name and address of applicant (if applicable)

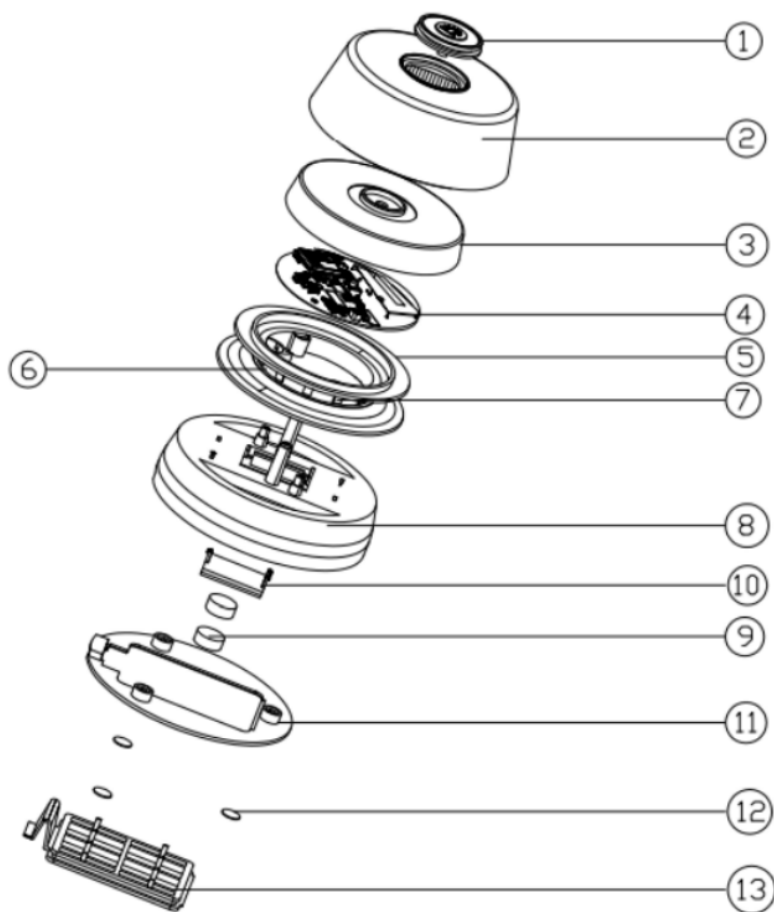
LIMBURG TECHNOLOGY LIMITED
291 BRIGHTON ROAD
SOUTH CROYDON
UNITED KINGDOM CR2 6EQ

NOTA / NOTE: LA MARCA DE IDENTIFICACIÓN SE MUESTRA EN LOS PLANOS
ADJUNTOS. / *APPROVAL MARKING IS SHOWN IN THE ATTACHED DRAWINGS.*

IDIADA PC25020094







Number	Name	Material
1	Switch Button	Silica gel
2	Lens	PC
3	Top cover	ABS
4	PCB	FR-4
5	Sealing ring	ABS
6	LED Chip	Aluminum
7	Top reflector	ABS
8	Housing	ABS
9	Battery cover	ABS
10	Magnet	N35
11	Battery compartment cover	ABS
12	Non-slip mat	Silica gel
13	Battery compartment cover	ABS

CERTIFICATE

of Conformity

Registration No.: AK 50609870 0001
Report No.: CN23AK06 001
Holder: ZHEJIANG MUSTANG BATTERY CO., LTD.
NO. 818 Rongji Road, Luotuo
Ningbo
315202 Zhejiang
P.R. China
Product: Portable Battery
Alkaline battery

Type designation listed on the next page

The certificate of conformity refers to the above-mentioned product. This is to certify that the specimen is in conformity with the assessment requirement mentioned on the next page. This certificate does not imply assessment of the production of the product and does not permit the use of a TÜV Rheinland mark of conformity.

Certification Body

Date: 2023-12-07



A. Chen



TÜV Rheinland LGA Products GmbH - Tillystraße 2 - 90431 Nürnberg

CERTIFICATE

of Conformity

Registration No.: AK 50609870 0001

Product: Portable Battery
Alkaline battery

Tested according to: Regulation (EU) 2023/1542

Identification: Type Designation
LR6, LR03, LR14, LR20, LR8D425, LR1
Serial No. : n.a.
Remark(s): Refer to test report CN23AK06 001 for details.
Evaluated according to Article 6, 18-20 of Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries, amending Directive 2008/98/EC and Regulation (EU) 2019/1020 and repealing Directive 2006/66/EC.



TÜV Rheinland LGA Products GmbH - Tillystraße 2 - 90431 Nürnberg

Prüfbericht-Nr.: <i>Test report no.:</i>	CN23AK06 001	Auftrags-Nr.: <i>Order no.:</i>	168445494	Seite 1 von 22 Page 1 of 22
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2023-09-25	
Auftraggeber: <i>Client:</i>	ZHEJIANG MUSTANG BATTERY CO., LTD. NO.818 Rongji Road, Luotuo, Ningbo, 315202 Zhejiang, P.R. China			
Prüfgegenstand: <i>Test item:</i>	Alkaline battery			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	LR6, LR03, LR14, LR20, LR8D425, LR1			
Auftrags-Inhalt: <i>Order content:</i>	Certificate of conformity			
Prüfgrundlage: <i>Test specification:</i>	REGULATION (EU) 2023/1542 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 July 2023			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2023-09-21	See Attachment 2 for Photo documentation		
Prüfmuster-Nr.: <i>Test sample no.:</i>	A003567224-001~004			
Prüfzeitraum: <i>Testing period:</i>	2023-10-08 - 2023-10-25			
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
erstellt von: <i>created by:</i>			genehmigt von: <i>authorized by:</i>	
Datum: <i>Date:</i>	2023.12.06	Jason Tang	Ausstellungsdatum: <i>Issue date:</i>	2023.12.06 Joe Wang
Stellung / Position:	Project Engineer		Stellung / Position:	Reviewer
Sonstiges / <i>Other:</i>	Article 6, 18-20 of (EU) 2023/1542 evaluated in this report, valid until 2025.08.17 This report does not evidence compliance of the provided sample with the relevant standards but only with the referred tests. This test report documents the findings of examination conducted on the delivered product mentioned above only. This report does not entitle the applicant to carry any safety mark on this or similar products. Further for sales or other application purposes of the tested product, any reference to TÜV Rheinland or a test through TÜV Rheinland is only permissible with prior written consent of TÜV Rheinland.			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet			
* Legend:	P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested			
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

TUV Rheinland (Shenzhen) Co., Ltd., 1601-1604, 17-18F, Tower A Building 2, Shenzhen International Innovation Valley, Dashi 1st Road, Xili Street, Xili Community, Nanshan District, Shenzhen 518052, P.R. China
Mail: service-gc@tuv.com · Web: www.tuv.com

Prüfbericht-Nr.: CN23AK06 001
Test report no.:

Seite 2 von 22
Page 2 of 22

Anmerkungen
Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. <i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system.</i> <i>Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i>
2	Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben. Informationen zur Verifizierung der Authentizität unserer Dokumente erhalten Sie über folgenden Link: Einführung in digitale Signaturen <i>As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged. For information on verifying the authenticity of our documents, please visit the following link: Introduction to Digital Signature</i>
3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. <i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i> <i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i>
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. <i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i>

TEST REPORT

**REGULATION (EU) 2023/1542 OF THE EUROPEAN PARLIAMENT AND OF THE
COUNCIL of 12 July 2023
concerning batteries and waste batteries, amending Directive 2008/98/EC and
Regulation (EU) 2019/1020 and repealing Directive 2006/66/EC**

Report Number CN23AK06 001

Date of issue See cover page

Total number of pages See cover page

Testing location TÜV Rheinland (Shenzhen) Co., Ltd.
1F East & 3F West -4F, Cybio Technology Building No.1, No.16
Kejibei 2nd Road, High-Tech Industrial Park North Nanshan
District, 518057, Shenzhen, China

Testing Laboratory TÜV Rheinland (Shenzhen) Co., Ltd.

Applicant's name See cover page

Address See cover page

Test specification:

Standard See cover page

Test procedure See cover page

Non-standard test method N/A

Test Report Form No. Rev. 2023-08-21

Test Report Form(s) Originator TÜV Rheinland (Shenzhen) Co., Ltd.

Master TRF Dated 2023-09

List of Attachments (including a total number of pages in each attachment):

- Attachment 1: Chemical report 168445494a 001 (17 pages).
- Attachment 2: Photo documentation (1 page)

Test item particulars:

Information about the product needed to establish a correct test program, such as product mobility, type of power connections and similar. (Test item particulars are selected by the TRF Originator base on the requirements in the standard)

Test item description.....: Alkaline battery

Battery Category: Portable battery

Trade mark.....:



Manufacturer.....: Same as client in cover page

Model/Type reference: LR6, LR03, LR14, LR20, LR8D425, LR1

Portable battery of general use: ☒ Yes (for LR6, LR03, LR14, LR20, LR8D425)
☒ No (for LR1)

Stationary battery energy storage system: ☐ Yes ☒ No

Possible test case verdicts:

Test case does not apply to the test object: N(/A)

Test object does meet the requirement: P(ass)

Test object does not meet the requirement: F(ail)

Testing:

Date of receipt of test item: See cover page

Date(s) of performance of tests: See cover page

General remarks:

This report shall not be reproduced, except in full, without the written approval of the testing laboratory.

The test results presented in this report relate only to the object tested.

"(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 point is used as the decimal separator.

General product information and other remarks:

The batteries LR6, LR03, LR14, LR20, LR8D425, LR1 consist of the positive electrode, negative electrode, separator, electrolyte, steel can, current collector and assembled sealing cap. The positive and negative electrodes are housed in the can in the state being separated by the separator, and the assembled sealing cap is fitted to the can.

The manufacturer declares that all the models are identical (same material, same manufacturing process, same construction), except the dimension. LR6 is chosen as representative to be tested in this report.

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks



Battery surface label and immediate package label for LR6

Remark

1. LR6 label shown as representative, other models are identical except model name.
2. The color of the battery surface and blister card may be various as declared by manufacturer.
3. CE marking shall be at least 5mm high.
4. For the industrial alkaline batteries, other required information will be marked on the packaging and documents accompanied with the battery.

Factory location

Same as client in cover page

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Clause	Requirement + Test	Result - Remark	Verdict

Chapter I	General provisions		P
Chapter II	Sustainability and safety requirements		P
Article 6	Restrictions on substances		P
1.	In addition to the restrictions set out in Annex XVII to Regulation (EC) No 1907/2006 and in Article 4(2), point (a), of Directive 2000/53/EC, batteries shall not contain substances for which Annex I to this Regulation contains a restriction unless the conditions of that restriction are complied with.	See Attachment 1.	P
2.	In the event of an unacceptable risk to human health or the environment, arising from the use of a substance in the manufacture of batteries or from the presence of a substance in the batteries when they are placed on the market, or arising during their subsequent life cycle stages, including during repurposing or the treatment of waste batteries, that is not adequately controlled and needs to be addressed on a Union-wide basis, the Commission shall adopt a delegated act in accordance with Article 89 to amend the restrictions in Annex I, pursuant to the procedure laid down in Articles 86, 87 and 88.		N/A
3.	Restrictions adopted pursuant to paragraph 2 of this Article shall not apply to the use of a substance in scientific research and development as defined in Article 3, point (23), of Regulation (EC) No 1907/2006, carried out in relation to batteries.		N/A
4.	Where a restriction adopted pursuant to paragraph 2 of this Article does not apply to product and process orientated research and development, as defined in Article 3, point (22), of Regulation (EC) No 1907/2006, that exemption, as well as the maximum quantity of the substance exempted, shall be specified in Annex I to this Regulation.		N/A
5.	By 31 December 2027, the Commission, assisted by the European Chemicals Agency set up under Regulation (EC) No 1907/2006 ('the Agency'), shall prepare a report on substances of concern, namely substances having an adverse effect on human health or the environment or hampering recycling for safe and high quality secondary raw materials, present in batteries or used in their manufacture. The Commission shall submit that report to the European Parliament and to the Council detailing its findings and shall consider the appropriate follow-up measures including the adoption of delegated acts as referred to in paragraph 2 of this Article.		N/A
Article 7	Carbon footprint of electric vehicle batteries, rechargeable industrial batteries and LMT batteries	Not applicable to portable batteries.	N/A
Article 8	Recycled content in industrial batteries, electric vehicle batteries, LMT batteries and SLI batteries	Not applicable to portable batteries.	N/A
Article 9	Performance and durability requirements for portable batteries of general use		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
1.	From 18 August 2028 or 24 months after the date of entry into force of the delegated act referred to in paragraph 2, whichever is the latest, portable batteries of general use, excluding button cells, shall meet the minimum values for the electrochemical performance and durability parameters set out in Annex III as laid down in the delegated act adopted pursuant to paragraph 2.	Not request by client. Not mandatory until the specified date.	N/A
2.	By 18 August 2027, the Commission shall adopt a delegated act in accordance with Article 89 to supplement this Regulation by establishing mandatory minimum values for the electrochemical performance and durability parameters set out in Annex III for portable batteries of general use, excluding button cells.		N/A
	The Commission is empowered to adopt delegated acts in accordance with Article 89 to amend the minimum values referred to in the first subparagraph or add electrochemical performance and durability parameters to those set out in Annex III in view of technical and scientific progress.		N/A
	In preparing the delegated act referred to in the first subparagraph, the Commission shall consider the need to reduce the life cycle environmental impact of portable batteries of general use, including by means of increasing the resource efficiency thereof, and shall take into consideration relevant international standards and labelling schemes.		N/A
	The Commission shall also ensure that the provisions laid down by the delegated act referred to in the first subparagraph do not have a significant adverse impact on the safety and functionality of those batteries or the appliances, light means of transport or other vehicles into which those batteries are incorporated, the affordability and the cost for end-users and the industry's competitiveness.		N/A
3.	By 31 December 2030, the Commission shall assess the feasibility of measures to phase out non-rechargeable portable batteries of general use with a view to minimising their environmental impact based on the life cycle assessment methodology and viable alternatives for end-users. To that end, the Commission shall submit a report to the European Parliament and to the Council and consider taking the appropriate measures, including the adoption of legislative proposals for either the phase out or the setting of eco-design requirements.		N/A
Article 10	Performance and durability requirements for rechargeable industrial batteries, LMT batteries and electric vehicle batteries	Not applicable to portable batteries.	N/A
1.	From 18 August 2024, rechargeable industrial batteries with a capacity greater than 2 kWh, LMT batteries and electric vehicle batteries shall be accompanied by a document containing values for the electrochemical performance and durability parameters set out in Part A of Annex IV.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For batteries referred to in the first subparagraph, the technical documentation referred to in Annex VIII shall contain an explanation of the technical specifications, standards and conditions used to measure, calculate or estimate the values for the electrochemical performance and durability parameters. That explanation shall include, at least, the elements set out in Part B of Annex IV.		N/A
2.	From either 18 August 2027 or 18 months after the date of entry into force of the delegated act referred to in the first subparagraph of paragraph 5, whichever is the latest, rechargeable industrial batteries with a capacity greater than 2 kWh, except those with exclusively external storage, shall meet the minimum values laid down in the delegated act adopted pursuant to the first subparagraph of paragraph 5 for the electrochemical performance and durability parameters set out in Part A of Annex IV.		N/A
3.	From either 18 August 2028 or 18 months after the date of entry into force of the delegated act referred to in the second subparagraph of paragraph 5, whichever is the latest, LMT batteries shall meet the minimum values laid down in the delegated act adopted pursuant to the second subparagraph of paragraph 5 for the electrochemical performance and durability parameters set out in Part A of Annex IV.		N/A
4.	Paragraphs 1, 2 and 3 shall not apply to a battery that has been subject to preparation for re-use, preparation for repurposing, repurposing or remanufacturing, where the economic operator placing that battery on the market or putting it into service demonstrates that the battery, before undergoing such operations, has been placed on the market or put into service before the dates on which those obligations become applicable in accordance with those paragraphs.		N/A
5.	By 18 February 2026, the Commission shall adopt a delegated act in accordance with Article 89 to supplement this Regulation by establishing minimum values for the electrochemical performance and durability parameters set out in Part A of Annex IV that rechargeable industrial batteries with a capacity greater than 2 kWh, except those with exclusively external storage, shall attain.		N/A
	By 18 February 2027, the Commission shall adopt a delegated act in accordance with Article 89 to supplement this Regulation by establishing minimum values for the electrochemical performance and durability parameters set out in Part A of Annex IV that LMT batteries shall attain.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	In preparing the delegated acts referred to in the first and second subparagraph, the Commission shall consider the need to reduce the life cycle environmental impact of rechargeable industrial batteries with a capacity greater than 2 kWh, except of those with exclusively external storage, and of LMT batteries, and ensure that the requirements laid down therein do not have a significant adverse impact on the functionality of those batteries or the appliances, light means of transport or other vehicles into which those batteries are incorporated, their affordability and industry's competitiveness.		N/A
6.	The Commission is empowered to adopt delegated acts in accordance with Article 89 to amend the electrochemical performance and durability parameters set out in Annex IV in light of market developments and technical and scientific progress, including, in particular, related to technical specifications of the informal UNECE Working Group on Electric Vehicles and the Environment.		N/A
Article 11	Removability and replaceability of portable batteries and LMT batteries	To be evaluated with end product.	N/A
Article 12	Safety of stationary battery energy storage systems	Not applicable to portable batteries.	N/A
1.	Stationary battery energy storage systems placed on the market or put into service shall be safe during their normal operation and use.		N/A
2.	By 18 August 2024, the technical documentation referred to in Annex VIII shall:		N/A
	(a) demonstrate that the stationary battery energy storage systems are compliant with paragraph 1 and include evidence that they have been successfully tested for the safety parameters set out in Annex V, for which state-of-the-art testing methodologies shall be used. The safety parameters shall only apply in so far as a corresponding hazard exists for the stationary battery energy storage system in question when it is used under the conditions envisaged by the manufacturer;		N/A
	(b) include an assessment of possible safety hazards of the stationary battery energy storage system that are not addressed in Annex V;		N/A
	(c) include evidence that the hazards referred to in point (b) have been successfully mitigated and tested; state-of-the-art testing methodologies shall be used for such testing;		N/A
	(d) include mitigation instructions in case the identified hazards could occur, for example a fire or explosion.		N/A
	The technical documentation shall be reviewed if a battery is prepared for re-use, prepared for repurposing, remanufactured or repurposed.		N/A
3.	The Commission is empowered to adopt delegated acts in accordance with Article 89 to amend the safety parameters set out in Annex V in view of technical and scientific progress.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
CHAPTER III	Labelling, marking and information requirements		P
Article 13	Labelling and marking of batteries		P
1.	From 18 August 2026 or 18 months after the date of entry into force of the implementing act referred to in paragraph 10, whichever is the latest, batteries shall bear a label containing the general information on batteries set out in Part A of Annex VI.	Not requested by client for this report, not mandatory until the specified date.	N/A
2.	From 18 August 2026 or 18 months after the date of entry into force of the implementing act referred to in paragraph 10, whichever is the latest, rechargeable portable batteries, LMT batteries and SLI batteries shall bear a label containing information on their capacity.		N/A
3.	From 18 August 2026 or 18 months after the date of entry into force of the implementing act referred to in paragraph 10, whichever is the latest, non-rechargeable portable batteries shall bear a label containing information on their minimum average duration when used in specific applications and a label indicating 'non-rechargeable'.		N/A
4.	From 18 August 2025, all batteries shall be marked with the symbol for separate collection of batteries ('separate collection symbol') as shown in Part B of Annex VI.	Separate collection symbol marked.	P
	The separate collection symbol shall cover at least 3 % of the area of the largest side of the battery up to a maximum size of 5 × 5 cm.		P
	In the case of cylindrical battery cells, the separate collection symbol shall cover at least 1,5 % of the surface area of the battery and shall have a maximum size of 5 × 5 cm.		P
	Where the size of the battery is such that the separate collection symbol would be smaller than 0,47 × 0,47 cm, the battery does not need to be marked with that symbol. Instead, a separate collection symbol measuring at least 1 × 1 cm shall be printed on the packaging.		P
5.	All batteries containing more than 0,002 % cadmium or more than 0,004 % lead, shall be marked with the chemical symbol for the metal concerned: Cd or Pb.	Not exceed the limit.	N/A
	The relevant chemical symbol indicating the heavy metal content shall be printed beneath the separate collection symbol and shall cover an area of at least one-quarter the size of that symbol.		N/A
6.	From 18 February 2027, all batteries shall be marked with a QR code as described in Part C of Annex VI. The QR code shall provide access to the following:	Not requested by client for this report, not mandatory until the specified date.	N/A
	(a) for LMT batteries, industrial batteries with a capacity greater than 2kWh and electric vehicles batteries, the battery passport in accordance with Article 77;		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	(b) for other batteries, the applicable information referred to in paragraphs 1 to 5 of this Article, the declaration of conformity referred to in Article 18, the report referred to in Article 52(3) and the information regarding the prevention and management of waste batteries laid down in Article 74(1), points (a) to (f);		N/A
	(c) for SLI batteries, the amount of cobalt, lead, lithium or nickel recovered from waste and present in active materials in the battery, calculated in accordance with Article 8.		N/A
	This information shall be complete, up-to-date and accurate.		N/A
7.	The labels and the QR code referred to in paragraphs 1 to 6 shall be printed or engraved visibly, legibly and indelibly on the battery. Where this is not possible or not warranted on account of the nature and size of the battery, the labels and the QR code shall be affixed to the packaging and to the documents accompanying the battery.		N/A
8.	The Commission is empowered to adopt delegated acts in accordance with Article 89 to amend this Regulation to provide for alternative types of smart labels for use instead of or in addition to the QR code, in view of technical and scientific progress.		N/A
9.	Batteries that have been subject to preparation for re-use, preparation for repurposing, repurposing or remanufacturing shall bear new labels or shall be marked with markings in accordance with this Article, and containing information on their change of status in accordance with point 4 of Annex XIII, which shall be accessible through the QR code.		N/A
10.	The Commission shall, by 18 August 2025, adopt implementing acts to establish harmonised specifications for the labelling requirements referred to in paragraphs 1, 2 and 3 of this Article. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 90(3).		N/A
Article 14	Information on the state of health and expected lifetime of batteries	Not applicable to portable batteries.	N/A
1.	From 18 August 2024, up-to-date data for the parameters for determining the state of health and expected lifetime of batteries as set out in Annex VII shall be contained in the battery management system of stationary battery energy storage systems, LMT batteries and electric vehicle batteries.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
2.	Read-only access to the data for the parameters set out in Annex VII through the battery management system referred to in paragraph 1 shall be provided, respecting the intellectual property rights of the battery manufacturer, on a non-discriminatory basis to the natural or legal person who has legally purchased the battery, including independent operators or waste management operators, or any third party acting on their behalf at any time, for the purpose of: (a) making the battery available to independent aggregators or market participants through energy storage; (b) evaluating the residual value or remaining lifetime of the battery and capability for further use, based on the estimation of the state of health of the battery; (c) facilitating the preparation for re-use, preparation for repurposing, repurposing or remanufacturing of the battery.		N/A
3.	The battery management system shall include a software reset function, in case economic operators carrying out preparation for re-use, preparation for repurposing, repurposing or remanufacturing need to upload different battery management system software. If the software reset function is used, the original battery manufacturer shall not be held liable for any breach of the safety or functionality of the battery that could be attributed to battery management system software uploaded after that battery was placed on the market.		N/A
4.	The Commission is empowered to adopt a delegated act in accordance with Article 89 to amend the parameters for determining the state of health and expected lifetime of batteries set out in Annex VII in view of market developments and technical and scientific progress and to ensure synergies with parameters set in UN Global Technical Regulation No 22 on in-vehicle battery durability for electrified vehicles, with due regard to the intellectual property rights of the battery manufacturer.		N/A
5.	The provisions of this Article shall apply in addition to those laid down in Union law on type approval of vehicles.		N/A
CHAPTER IV	Conformity of batteries		P
Article 18	EU declaration of conformity		P
1.	The EU declaration of conformity shall state that the compliance with the requirements laid down in Articles 6 to 10 and Articles 12, 13 and 14 has been demonstrated.	Applicable article stated.	P

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Clause	Requirement + Test	Result - Remark	Verdict
2.	The EU declaration of conformity shall have the model structure set out in Annex IX, shall contain the elements specified in the relevant modules set out in Annex VIII, and shall be kept up to date. It shall be translated into the language or languages required by the Member State in which the battery is placed or made available on the market or put into service. It shall be drawn up in electronic format and, where requested, it shall be provided in paper format.		P
3.	Where a battery is subject to more than one Union act requiring an EU declaration of conformity, a single EU declaration of conformity shall be drawn up in respect of all such Union acts. That declaration shall state the Union acts concerned and their publication references.		N/A
4.	By drawing up the EU declaration of conformity, the manufacturer shall assume responsibility for the compliance of the battery with the requirements laid down in this Regulation.		P
5.	Without prejudice to paragraph 3, a single EU declaration of conformity may be made up of one or more individual EU declarations of conformity already drawn up in compliance with a different Union act or acts, in order to reduce the administrative burden on economic operators.		N/A
Article 19	General principles of the CE marking		P
	The CE marking shall be subject to the general principles set out in Article 30 of Regulation (EC) No 765/2008.		P
Article 20	Rules and conditions for affixing the CE marking		P
1.	The CE marking shall be affixed visibly, legibly and indelibly to the battery. Where that is not possible or not warranted due to the nature of the battery, it shall be affixed to the packaging and to the documents accompanying the battery.		P
2.	The CE marking shall be affixed before the battery is placed on the market or put into service.		P
3.	The CE marking shall be followed by the identification number of the notified body where required under Annex VIII. That identification number shall be affixed by the notified body itself or, under its instructions, by the manufacturer or by its authorised representative.	Currently not applicable for portable batteries.	N/A
4.	The CE marking and the identification number referred to in paragraph 3 may be followed, if applicable, by any pictogram or other mark indicating a special risk, use or any danger linked to the use, storage, treatment or transport of the battery.		N/A
5.	Member States shall build upon existing mechanisms to ensure correct application of the regime governing the CE marking and shall take appropriate action in the event of improper use of that marking.		N/A
CHAPTER V	Notification of conformity assessment bodies		N/A
CHAPTER VI	Obligations of economic operators other than the obligations in Chapters VII and VIII		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
CHAPTER VII	Obligations of economic operators as regards battery due diligence policies	Not mandatory until the specified date.	N/A
Article 47	Scope of this Chapter		N/A
Article 48	Battery due diligence policies		N/A
1.	From 18 August 2025, economic operators that place batteries on the market or put them into service shall fulfil the due diligence obligations laid down in paragraphs 2 and 3 of this Article, and in Articles 49, 50 and 52 and shall, to that end, set up and implement battery due diligence policies.		N/A
2.	Economic operators referred to in paragraph 1 of this Article shall have their battery due diligence policies verified by a notified body in accordance with Article 51 ('third-party verification') and periodically audited by that notified body to make sure that the battery due diligence policies are maintained and applied in accordance with Articles 49, 50 and 52. The notified body shall provide the audited economic operator with an audit report.		N/A
3.	Economic operators referred to in paragraph 1 of this Article shall keep documentation demonstrating their fulfilment of the obligations laid down in Articles 49, 50 and 52, including the verification report and approval decision referred to in Article 51 and the audit reports referred to in paragraph 2 of this Article, for 10 years after the last battery manufactured under the relevant battery due diligence policy has been placed on the market.		N/A
4.	Without prejudice to the individual responsibility of economic operators for their battery due diligence policies, economic operators referred to in paragraph 1 of this Article may, for the purposes of compliance with the requirements laid down in Articles 48, 49, 50 and 52, collaborate with other actors, including through due diligence schemes recognised under this Regulation.		N/A
5.	By 18 February 2025, the Commission shall publish guidelines as regards the application of the due diligence requirements laid down in Articles 49 and 50, with regard to the risks referred to in point 2 of Annex X, and in line, in particular, with the international instruments referred to in points 3 and 4 of Annex X.		N/A
6.	Member States may, in order to provide information and support to economic operators in fulfilling the due diligence obligations under this Regulation, set up and operate, individually or jointly, dedicated websites, platforms or portals.		N/A
7.	The Commission may complement the Member State support measures referred to in paragraph 6, by building on existing Union action to support due diligence in the Union and in third countries, and may devise new measures to help economic operators fulfil their obligations under this Regulation.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.	The Commission shall regularly assess the need to update the list of raw materials and risk categories set out in Annex X. The Commission is empowered to adopt delegated acts in accordance with Article 89 to: (a) amend the list of raw materials in point 1 of Annex X and of risk categories in point 2 of Annex X, in view of scientific and technological progress in battery manufacturing and chemistries and amendments to Regulation (EU) 2017/821; (b) amend the list of international instruments in point 3 of Annex X, in accordance with developments within the relevant international fora concerning standards related to due diligence policies and to protection of the environment and of social rights; (c) amend the obligations on the economic operators referred to in paragraph 1 of this Article which are laid down in Articles 49 and 50 in view of amendments to Regulation (EU) 2017/821, and amend the list of internationally recognised due diligence instruments set out in point 4 of Annex X.		N/A
Article 49	Economic operator's management system		N/A
1.	Each economic operator referred to in Article 48(1) shall:		N/A
	(a) adopt, and clearly communicate to suppliers and the public, a company battery due diligence policy, concerning raw materials listed in point 1 of Annex X, and associated social and environmental risk categories listed in point 2 of Annex X;		N/A
	(b) incorporate in its battery due diligence policy standards that are consistent with the standards set out in the internationally recognised due diligence instruments listed in point 4 of Annex X;		N/A
	(c) structure its internal management system to support its battery due diligence policy by assigning responsibility to its top management level to oversee its battery due diligence policy as well as maintain records of that system for a minimum of 10 years;		N/A
	(d) establish and operate a system of controls and transparency regarding the supply chain, including a chain of custody or traceability system, identifying upstream actors in the supply chain;		N/A
	(e) incorporate its battery due diligence policy, including risk management measures, into contracts and agreements with suppliers; and		N/A
	(f) establish a grievance mechanism, including an early-warning risk-awareness system and a remediation mechanism, or provide for such mechanisms through collaborative agreements with other economic operators or organisations or by facilitating recourse to an external expert or body, such as an ombudsman; such mechanisms shall be based on the UN Guiding Principles on Business and Human Rights.		N/A
2.	The system referred to in paragraph 1, point (d), shall be supported by documentation that provides at least the following information:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	(a) a description of the raw material, including its trade name and type;		N/A
	(b) the name and address of the supplier that supplied the raw material present in the batteries to the economic operator that places the batteries containing the raw material in question on the market;		N/A
	(c) the country of origin of the raw material and the market transactions from the raw material's extraction to the immediate supplier to the economic operator that places the battery on the market;		N/A
	(d) the quantities of the raw material present in the battery placed on the market, expressed in percentage or weight;		N/A
	(e) third-party verification reports issued by a notified body and concerning the suppliers as referred to in Article 50(3);		N/A
	(f) if the reports referred to in point (e) are not available and where the raw material originates from a conflict-affected and high-risk area, additional information in accordance with the specific recommendations for upstream economic operators, as set out in the OECD Due diligence guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas, where relevant, such as the mine of origin, locations where the raw material is consolidated, traded and processed, and taxes, fees and royalties are paid.		N/A
	Third party verification reports referred to in point (e) of the first subparagraph shall be made available by suppliers as referred to in Article 50(3) to the downstream operators of the supply chain.		N/A
Article 50	Risk management obligations		N/A
1.	The economic operator referred to in Article 48(1) shall:		N/A
	(a) identify and assess the risk of adverse impacts in its supply chain, associated with the risk categories listed in point 2 of Annex X as part of its management plan, including on the basis of the information provided pursuant to Article 49 and any other relevant information that is either publicly available or provided by stakeholders, by reference to its battery due diligence policy;		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	(b) design and implement a strategy to respond to the identified risks to prevent, mitigate and otherwise address adverse impacts by: (i) reporting findings of its risk assessment to its top management level assigned in accordance with Article 49(1), point (c); (ii) adopting risk management measures that are consistent with the internationally recognised due diligence instruments listed in point 4 of Annex X, considering its ability to influence, and where necessary take steps to exert pressure on, suppliers, including their subsidiaries and subcontractors, who can most effectively prevent or mitigate the identified risk; (iii) designing and implementing a risk management plan, monitoring and tracking performance of risk mitigation efforts, reporting back to its top management level assigned in accordance with Article 49(1), point (c), and considering suspending or discontinuing engagement with a supplier or its subsidiary or subcontractor after failed attempts at mitigation, based on relevant contracts and agreements referred to in Article 49(1), point (e); (iv) undertaking additional fact and risk assessments for risks requiring mitigation, or after a change of circumstances.		N/A
2.	If the economic operator referred to in Article 48(1) pursues risk mitigation efforts while continuing trade or temporarily suspending trade, it shall consult with suppliers and with the stakeholders concerned, including local and national government authorities, international or civil society organisations and affected third parties such as local communities, before establishing a strategy for measurable risk mitigation in the risk management plan referred to in paragraph 1, point (b)(iii), of this Article.		N/A
3.	The economic operator referred to in Article 48(1) shall identify and assess the probability of adverse impacts in the risk categories listed in point 2 of Annex X, in its supply chain. That economic operator shall identify and assess the risks in its supply chain as part of its own risk management systems. The economic operator shall carry out third party verifications of its own due diligence chains via a notified body in accordance with Article 51. The economic operator may use third-party verification reports issued pursuant to Article 51(2) by such a notified body concerning battery due diligence policies implemented by suppliers in that chain in accordance with this Chapter. The economic operator may also use those third-party verification reports to assess, as appropriate, the due diligence practices of those suppliers.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
4.	The economic operator referred to in Article 48(1) shall report the findings of the risk assessment referred to in paragraph 3 of this Article to its top management level to which responsibility has been assigned in accordance with Article 49(1), point (c), and shall implement the strategy referred to in paragraph 1, point (b), of this Article.		N/A
Article 51	Third-party verification of battery due diligence policies		N/A
Article 52	Disclosure of information on battery due diligence policies		N/A
1.	The economic operator referred to in Article 48(1) shall make available upon request to Member States' market surveillance authorities or national authorities the verification report and approval decision issued in accordance with Article 51, the audit reports referred to in Article 48(2) and available evidence of compliance with a due diligence scheme recognised by the Commission in accordance with Article 53.		N/A
2.	The economic operator referred to in Article 48(1) shall make available to its immediate downstream purchasers all relevant information gained and maintained pursuant to its battery due diligence policy, with due regard for business confidentiality and other competitive concerns.		N/A
3.	The economic operator referred to in Article 48(1) shall on an annual basis review and make publicly available, including on the internet, a report on its battery due diligence policy. That report shall contain, in a manner that is easily comprehensible for end-users and clearly identifies the batteries concerned, the data and information on steps taken by that economic operator to comply with the requirements laid down in Articles 49 and 50, including findings of significant adverse impacts in the risk categories listed in point 2 of Annex X, and how they have been addressed, as well as a summary report of the third-party verifications carried out in accordance with Article 51, including the name of the notified body, with due regard for business confidentiality and other competitive concerns. That report shall also cover, where relevant, access to information, public participation in decision-making and access to justice in environmental matters in relation to the sourcing, processing and trading of the raw materials present in batteries.		N/A
4.	Where the economic operator referred to in Article 48(1) can demonstrate that the raw materials listed in point 1 of Annex X, that are present in the battery are derived from recycled sources, it shall publicly disclose its conclusions in reasonable detail, with due regard for business confidentiality and other competitive concerns.		N/A
Article 53	Recognition of due diligence schemes		N/A
CHAPTER VIII	Management of waste batteries		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
CHAPTER IX	Digital battery passport	Not applicable to portable batteries	N/A
Article 77	Battery passport		N/A
1.	From 18 February 2027 each LMT battery, each industrial battery with a capacity greater than 2 kWh and each electric vehicle battery placed on the market or put into service shall have an electronic record ('battery passport').		N/A
2.	The battery passport shall contain information relating to the battery model and information specific to the individual battery, including resulting from the use of that battery, as set out in Annex XIII.1.		N/A
	The information in the battery passport shall comprise: (a) information accessible to the general public in accordance with point 1 of Annex XIII; (b) information accessible only to notified bodies, market surveillance authorities and the Commission in accordance with points 2 and 3 of Annex XIII; and (c) information accessible only to any natural or legal person with a legitimate interest in accessing and processing that information for the purposes referred to in points (a) and (b) of the third subparagraph in accordance with points 2 and 4 of Annex XIII.		N/A
	The purposes for accessing and processing the information as referred to in point (c) of the second subparagraph, shall: (a) concern dismantling of the battery, including safety measures to be taken during the dismantling, and the detailed composition of the battery model and be essential to allow repairers, remanufacturers, second-life operators and recyclers to conduct their respective economic activities in accordance with this Regulation; (b) in the case of individual batteries, be essential to the purchaser of the battery or parties acting on the purchaser's behalf, for the purpose of making the individual battery available to independent energy aggregators or energy market participants.		N/A
	The information referred to in the second subparagraph shall be included in the battery passport to the extent applicable to the category or sub-category of battery concerned.		N/A
	The Commission is empowered to adopt delegated acts in accordance with Article 89 to amend Annex XIII as regards the information to be included in the battery passport in view of technical and scientific progress.		N/A
3.	The battery passport shall be accessible through the QR code referred to in Article 13(6) which links to a unique identifier that the economic operator placing the battery on the market shall attribute to it.		N/A
	The QR code and the unique identifier shall comply with the ISO/IEC standards 15459-1:2014, 15459-2:2015, 15459-3:2014, 15459-4:2014, 15459-5:2014 and 15459-6:2014 or their equivalent.		N/A

(EU) 2023/1542			
Clause	Requirement + Test	Result - Remark	Verdict
	The Commission is empowered to adopt delegated acts in accordance with Article 89 to amend the second subparagraph of this paragraph in light of technical and scientific progress by replacing the standards referred to in that subparagraph or adding other European or international standards with which the QR code and the unique identifier shall comply.		N/A
4.	The economic operator placing the battery on the market shall ensure that the information in the battery passport is accurate, complete and up to date. It may give written authorisation to any other operator to act on its behalf.		N/A
5.	All information included in the battery passport shall be based on open standards and be in an interoperable format, transferable through an open interoperable data exchange network without vendor lock-in, machine-readable, structured and searchable, in accordance with the essential requirements laid down in Article 78.		N/A
6.	The access to information included in the battery passport shall be regulated in accordance with the essential requirements laid down in Article 78.		N/A
7.	For a battery that has been subject to preparation for re-use, preparation for repurposing, repurposing or remanufacturing, the responsibility for the fulfilment of the obligations under paragraph 4 of this Article shall be transferred to the economic operator that has placed that battery on the market or has put it into service. Such battery shall have a new battery passport linked to the battery passport or passports of the original battery or batteries.		N/A
	Where the status of a battery changes to that of a waste battery, the responsibility for the fulfilment of the obligations under paragraph 4 of this Article shall be transferred either to the producer or, where appointed in accordance with Article 57(1), the producer responsibility organisation, or the waste management operator selected in accordance with Article 57(8).		N/A
8.	A battery passport shall cease to exist after the battery has been recycled.		N/A
9.	By 18 August 2026, the Commission shall adopt implementing acts specifying which persons are to be considered persons with a legitimate interest as referred to in points 2 and 4 respectively of Annex XIII for the purposes of paragraph 2, point (c), of this Article and to which information listed in those points they shall have access, and to what extent they can download, share, publish and re-use that information. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 90(3).		N/A

(EU) 2023/1542			
Clause	Requirement + Test	Result - Remark	Verdict
	The criteria for specifying the persons referred to in paragraph 2, point (c), and for determining the extent to which they can download, share, publish and re-use the information referred to in points 2 and 4 of Annex XIII shall be the following: (a) the necessity of having such information in order to evaluate the status and residual value of the battery and its capability for further use; (b) the necessity of having such information for the purpose of preparation for re-use, preparation for repurposing, repurposing, remanufacturing or recycling of the battery, or for choosing between those operations; (c) the need to ensure that the accessing and processing of information in the battery passport that is commercially sensitive is limited to the minimum necessary in accordance with applicable Union law.		N/A
Article 78	Technical design and operation of the battery passport		N/A
	The technical design and operation of the battery passport shall comply with the following essential requirements:		N/A
	(a) the battery passport shall be fully interoperable with other digital product passports required by Union law concerning eco-design, in relation to the technical, semantic and organisational aspects of end-to-end communication and data transfer;		N/A
	(b) consumers, economic operators and other relevant actors shall have access to the battery passport free of charge and based on their respective access rights set out in Annex XIII and the implementing act adopted pursuant to Article 77(9);		N/A
	(c) the data included in the battery passport shall be stored by the economic operator responsible for the fulfilment of the obligations under Article 77(4) or (7), or by operators authorised to act on their behalf;		N/A
	(d) if the data included in the battery passport are stored or otherwise processed by operators authorised to act on behalf of the economic operator responsible for the fulfilment of the obligations under Article 77(4) or (7), those operators shall not be allowed to sell, re-use or process such data, in whole or in part, beyond what is necessary for the provision of the relevant storing or processing services;		N/A
	(e) the battery passport shall remain available after the economic operator responsible for the fulfilment of the obligations under Article 77(4) or (7) ceases to exist or ceases its activity in the Union;		N/A
	(f) the rights to access, introduce, modify or update information in the battery passport shall be restricted based on the access rights specified in Annex XIII and the implementing act adopted pursuant to Article 77(9);		N/A
	(g) data authentication, reliability and integrity shall be ensured;		N/A

(EU) 2023/1542			
Clause	Requirement + Test	Result - Remark	Verdict
	(h) the battery passport shall be such that a high level of security and privacy is ensured and fraud is avoided.		N/A
CHAPTER X	Union market surveillance and Union safeguard procedures		N/A
CHAPTER XI	Green public procurement and procedure for amending restrictions on substances		N/A
CHAPTER XII	Delegated powers and committee procedure		N/A
CHAPTER XIII	Amendments		N/A
CHAPTER XIV	Final provisions		N/A
ANNEX I	RESTRICTION ON SUBSTANCES		P
ANNEX II	CARBON FOOTPRINT		N/A
ANNEX III	ELECTROCHEMICAL PERFORMANCE AND DURABILITY PARAMETERS FOR PORTABLE BATTERIES OF GENERAL USE		N/A
ANNEX IV	ELECTROCHEMICAL PERFORMANCE AND DURABILITY REQUIREMENTS FOR LMT BATTERIES, INDUSTRIAL BATTERIES WITH A CAPACITY GREATER THAN 2 KWH AND ELECTRIC VEHICLE BATTERIES		N/A
ANNEX V	SAFETY PARAMETERS		N/A
ANNEX VI	LABELLING, MARKING AND INFORMATION REQUIREMENTS	See Article 13, for separate collection symbol only.	P
ANNEX VII	PARAMETERS FOR DETERMINING THE STATE OF HEALTH AND EXPECTED LIFETIME OF BATTERIES		N/A
ANNEX VIII	CONFORMITY ASSESSMENT PROCEDURES		N/A
ANNEX IX	EU DECLARATION OF CONFORMITY No* ... * (identification number of the declaration)	EU DECLARATION OF CONFORMITY content provided.	P
ANNEX X	LIST OF RAW MATERIALS AND RISK CATEGORIES		N/A
ANNEX XI	CALCULATION OF COLLECTION RATES FOR WASTE PORTABLE BATTERIES AND WASTE LMT BATTERIES		N/A
ANNEX XII	STORAGE AND TREATMENT, INCLUDING RECYCLING, REQUIREMENTS		N/A
ANNEX XIII	INFORMATION TO BE INCLUDED IN THE BATTERY PASSPORT		N/A
ANNEX XIV	MINIMUM REQUIREMENTS FOR SHIPMENTS OF USED BATTERIES		N/A
ANNEX XV	CORRELATION TABLE		N/A

--End of Main Report--

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Client: ZHEJIANG MUSTANG BATTERY CO., LTD.

Contact Information: NO. 818 Rongji Road, Luotuo, Ningbo, 315202 Zhejiang, P.R. China

Test item(s): 6 materials

**Identification/
Model No(s):** Alkaline battery
LR6, LR03, LR14, LR20, LR8D425, LR1

Sample obtaining method: Sending by customer

Condition at delivery: Test item complete and undamaged.

Sample Receiving date: 2023-09-21

Testing Period: 2023-10-08 to 2023-10-25

Place of testing: Chemical laboratory Shenzhen

Test Specification:

Please refer to "Test Result Summary List" on page 2 for details

For and on behalf of
TÜV Rheinland (Shenzhen) Co., Ltd.



2023-12-13

Grid Guo / Engineer

Date

Name/Position

Sample information is provided by customer. Test result is drawn according to the kind and extent of tests performed.
This test report relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.
"Decision Rule" document announced in our website (<https://www.tuv.com/landingpage/en/qm-gcn/>) describes the statement of conformity and its rule of enforcement for test results are applicable throughout this test report.

Test Result Summary :**Test Specification:****Test result:**

Restrictions of hazardous substances for Battery - according to Article 6(1) of Regulation (EU) 2023/1542	
1 Heavy Metal Test for Battery - according to Annex I of Regulation (EU) 2023/1542	PASS
2 Total Cadmium Content in accordance to: REACH regulation (EC) No. 1907/2006 Annex XVII Item 23 and its amendments (EC) No. 552/2009, (EU) No. 494/2011 and (EU) No. 835/2012 and (EU) No.217/2016.	PASS
3 Selected Perfluorinated carboxylic acids (C9-C14 PFCAs) and related substances accordance to: REACH regulation (EC) No. 1907/2006 and its amendment regulations on Annex XVII entry 68	PASS
4 Organotin compounds content according to REACH Regulation (EC) No. 1907/2006 Annex XVII Item 20 and amendment Commission Regulation (EU) No. 276/2010 (formerly known as 2009/425/EC)	PASS
5 Octabromodiphenylether (OctaBDE) content accordance to: REACH regulation (EC) No. 1907/2006 Annex XVII entry 45	PASS
6 REACH regulation (EC) No. 1907/2006 and its amendment regulations on Annex XVII entry 51: Phthalates	PASS
7 Dimethyl fumarate Content - According to REACH regulation (EC) No. 1907/2006 Annex XVII Entry 61 and its amendments	PASS
8 Polycyclic aromatic hydrocarbons (PAHs) - REACH regulation (EC) No. 1907/2006 with Amendment No. 552/2009 Annex XVII Item No. 50 and (EU) No.1272/2013	PASS

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Material List:

Item: Alkaline battery
LR6, LR03, LR14, LR20, LR8D425, LR1

Material No.	Material	Color	Location
M025	Battery	Multicolor	Refer to photo
M026	Plastic	White/ multicolor	Refer to photo
M027	Plastic	Green	Refer to photo
M028	Plastic	Translucent	Refer to photo
M029	Glue	Black	Refer to photo
M030	Paper	Off white	Refer to photo

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1. Heavy Metal Test for Battery - according to Annex I of Regulation (EU) 2023/1542

Test Method: Acid digestion, analyzed by ICP-OES/AAS

Test result

Test No.	Material No.	Test Parameter	Unit	RL	Regulatory requirement		Test Result
					Maximum Permissible Limit	Labelling Limit	
T006	M025	Cadmium	%	0.001	Portable batteries: 0.002	0.002	< RL
		Lead	%	0.001	Portable batteries: 0.01#	0.004	< RL
		Mercury	%	0.0005	0.0005	n.a.	< RL

Abbreviation: Pb = Lead
Cd = Cadmium
Hg = Mercury
n.a.= not applicable
RL = Reporting Limit
< = Less than

Remark:

- # According to Annex I of the Regulation (EU) 2023/1542, the Lead restriction shall apply to portable batteries and portable zinc-air button cells from 18 August 2024 and 18 August 2028 respectively.
- * According to Article 13(4) and 13(5) of the Regulation (EU) 2023/1542, all batteries shall be marked with the symbol indicating 'separate collection'; and all batteries containing more than 0.002% cadmium or more than 0.004% lead shall be marked with the chemical symbol for the metal concerned.

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2.Total Cadmium Content

Test Method: Acid digestion, analyzed by AAS/ ICP-OES

Test Result:

Test No.	Material No.	Test Parameter	Unit	RL	Regulatory Requirement	Test Result
T012	M026 + M027 + M028	Cadmium	mg/kg	10	100	< RL
T013	M029	Cadmium	mg/kg	10	100	< RL
T014	M030	Cadmium	mg/kg	10	100	< RL

Abbreviation: < = less than
 RL = Reporting Limit
 mg/kg = milligram per kilogram

Remark:

* Regulations on Cadmium

		Maximum Permissible Limit				
EU	Legislation	Plastic materials	Paint (wet state)	Paint on the painted articles	Paint (high zinc content)	Metal parts of jewellery and imitation jewellery articles and hair accessories
EC	REACH regulation (EC) No. 1907/2006 Annex XVII Item 23 and its amendments (EC) No. 552/2009, (EU) No. 494/2011, (EU) No. 835/2012 and (EU) No. 217/2016.	100mg/kg	100mg/kg	1000mg/kg	1000mg/kg	100mg/kg

		Maximum Permissible Limit
Country	Legislation	Paint, plastic, plating/ coating of surface treatment
Switzerland	Switzerland Chemikalien-Risikoreduktions-Verordnung-ChemRRV, 814.81, 18 May 2005	100mg/kg

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3. Selected Perfluorinated carboxylic acids (C9-C14 PFCAs) and related substances

Test Method: In house method, determination by CI-GCMS, GC-MSMS and LC-MSMS

Test No.					T014	T015
Material No.					M026	M027+M028
Test Parameter	CAS NO	Unit	RL	Regulatory Requirement	Result	Result
Perfluorononan-1-oic acid (PFNA)	375-95-1	mg/kg	0.01	-	< RL	< RL
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	0.01	-	< RL	< RL
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	0.01	-	< RL	< RL
Perfluorododecanoic acid (PFDoDA)	307-55-1	mg/kg	0.01	-	< RL	< RL
Perfluorotridecanoic acid (PFTrA)	72629-94-8	mg/kg	0.01	-	< RL	< RL
Perfluorotetradecanoic acid (PFTeA)	376-06-7	mg/kg	0.01	-	< RL	< RL
Perfluoro-3,7-dimethyloctanoic acid (PF-3,7-DMOA)	172155-07-6	mg/kg	0.01	-	< RL	< RL
Sum of C9-C14 PFCAs	--	mg/kg	--	0.025	< RL	< RL
1H,1H,2H,2H-Perfluoro-1-decanol (8:2 FTOH)	678-39-7	mg/kg	0.25	-	< RL	< RL
1H,1H,2H,2H-Perfluoro-1-dodecanol (10:2 FTOH)	865-86-1	mg/kg	0.25	-	< RL	< RL
Perfluorodecanesulfonate (PFDS)	335-77-3	mg/kg	0.01	-	< RL	< RL
2H,2H,3H,3H-Perfluoroundecanoic acid (H4PFUnA)	34598-33-9	mg/kg	0.01	-	< RL	< RL
1H,1H,2H,2H-Perfluorododecanesulfonic acid (10:2 FTS)	120226-60-0	mg/kg	0.1	-	< RL	< RL
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2-FTSA)	39108-34-4	mg/kg	0.1	-	< RL	< RL
1H,1H,2H,2H-perfluorotetradecan-1-ol (12:2 FTOH)	39239-77-5	mg/kg	0.1	-	< RL	< RL
1H,1H,2H,2H-Perfluorododecylacrylate (10:2 FTA)	17741-60-5	mg/kg	0.1	-	< RL	< RL
1H, 1H, 2H, 2H-Perfluorodecyl dichloromethylsilane (C8-PFSi)	3102-79-2	mg/kg	0.1	-	< RL	< RL
8:2 Fluorotelomer olefin (8:2 FTO)	21652-58-4	mg/kg	0.1	-	< RL	< RL
1H,1H,2H,2H-Perfluorodecyl acrylate (8:2 FTA)	27905-45-9	mg/kg	0.1	-	< RL	< RL

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Perfluorooctylethyl Methacrylate (8:2-FTMAC)	1996-88-9	mg/kg	0.1	-	<RL	<RL
1H,1H,2H,2H-Heptadecafluoro-1-iododecane (8:2-FTI)	2043-53-0	mg/kg	0.1	-	<RL	<RL
2-(Perfluorodecyl)ethyl methacrylate (10:2 FTMA)	2144-54-9	mg/kg	0.1	-	<RL	<RL
1H,1H,2H,2H-Perfluorododecyl iodide (10:2 FTI)	2043-54-1	mg/kg	0.1	-	<RL	<RL
1H,1H,2H,2H-Perfluorotetradecyl iodide (12:2 FTI)	30046-31-2	mg/kg	0.1	-	<RL	<RL
Sum of C9-C14 PFCA related substances	--	mg/kg	--	0.26	< RL	< RL
Conclusion	--	--	--	--	Pass	Pass

Test No.					T016	T017
Material No.					M029	M030
Test Parameter	CAS NO	Unit	RL	Regulatory Requirement	Result	Result
Perfluorononan-1-oic acid (PFNA)	375-95-1	mg/kg	0.01	-	< RL	< RL
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	0.01	-	< RL	< RL
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	0.01	-	< RL	< RL
Perfluorododecanoic acid (PFDoDA)	307-55-1	mg/kg	0.01	-	< RL	< RL
Perfluorotridecanoic acid (PFTrA)	72629-94-8	mg/kg	0.01	-	< RL	< RL
Perfluorotetradecanoic acid (PFTeA)	376-06-7	mg/kg	0.01	-	< RL	< RL
Perfluoro-3,7-dimethyloctanoic acid (PF-3,7-DMOA)	172155-07-6	mg/kg	0.01	-	< RL	< RL
Sum of C9-C14 PFCAs	--	mg/kg	--	0.025	< RL	< RL
1H,1H,2H,2H-Perfluoro-1-decanol (8:2 FTOH)	678-39-7	mg/kg	0.25	-	< RL	< RL
1H,1H,2H,2H-Perfluoro-1-dodecanol (10:2 FTOH)	865-86-1	mg/kg	0.25	-	< RL	< RL
Perfluorodecanesulfonate (PFDS)	335-77-3	mg/kg	0.01	-	< RL	< RL
2H,2H,3H,3H-Perfluoroundecanoic acid (H4PFUnA)	34598-33-9	mg/kg	0.01	-	< RL	< RL
1H,1H,2H,2H-Perfluorododecanesulfonic acid (10:2 FTS)	120226-60-0	mg/kg	0.1	-	< RL	< RL
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2-FTSA)	39108-34-4	mg/kg	0.1	-	<RL	<RL
1H,1H,2H,2H-perfluorotetradecan-1-ol (12:2 FTOH)	39239-77-5	mg/kg	0.1	-	<RL	<RL

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1H,1H,2H,2H-Perfluorododecylacrylate (10:2 FTA)	17741-60-5	mg/kg	0.1	-	< RL	< RL
1H, 1H, 2H, 2H-Perfluorodecyldichloromethylsilane (C8-PFSi)	3102-79-2	mg/kg	0.1	-	< RL	< RL
8:2 Fluorotelomer olefin (8:2 FTO)	21652-58-4	mg/kg	0.1	-	< RL	< RL
1H,1H,2H,2H-Perfluorodecyl acrylate (8:2 FTA)	27905-45-9	mg/kg	0.1	-	< RL	< RL
Perfluorooctylethyl Methacrylate (8:2-FTMAC)	1996-88-9	mg/kg	0.1	-	<RL	<RL
1H,1H,2H,2H-Heptadecafluoro-1-iododecane (8:2-FTI)	2043-53-0	mg/kg	0.1	-	<RL	<RL
2-(Perfluorodecyl)ethyl methacrylate (10:2 FTMA)	2144-54-9	mg/kg	0.1	-	<RL	<RL
1H,1H,2H,2H-Perfluorododecyl iodide (10:2 FTI)	2043-54-1	mg/kg	0.1	-	<RL	<RL
1H,1H,2H,2H-Perfluorotetradecyl iodide (12:2 FTI)	30046-31-2	mg/kg	0.1	-	<RL	<RL
Sum of C9-C14 PFCA related substances	--	mg/kg	--	0.26	< RL	< RL
Conclusion	--	--	--	--	Pass	Pass

Abbreviation: < = Less than
 RL = Reporting Limit
 mg/kg = milligram per kilogram

Remark:

* Requirements according to Annex XVII of Regulation (EC) No 1907/2006 entry 68 (REACH) for perfluorinated carboxylic acids (C9-C14-PFCA) their salts and C9-C14-PFCA related substances amended by Regulation (EU) 2021/1297.

Shall not be used or placed on the market after 25 February 2023:

- (a) another substance, as a constituent;
- (b) in a mixture;
- (c) in an article,

except if the concentration in the substance, the mixture, or the article is below 25 ppb for the sum of C9-C14 PFCA and their salts or 260 ppb for the sum of C9-C14 PFCA-related substances.

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4.Organotin compounds content

Test Method: Organic solvent extraction, GCMS
 Ref. to ISO/TS 16179:2012

Test No.				T012	T013	T014
Material No.				M026 + M027 + M028	M029	M030
Test Parameter	Unit	RL	Regulatory Requirement	Result	Result	Result
TBT(Tributyltin) by weight of tin	%	0.01	--	< RL	< RL	< RL
TPT(Triphenyltin) by weight of tin	%	0.01	--	< RL	< RL	< RL
TOT(Trioctyltin) by weight of tin	%	0.01	--	< RL	< RL	< RL
TCyT(Tricyclohexyltin) by weight of tin	%	0.01	--	< RL	< RL	< RL
TPrT(Tripopyltin) by weight of tin	%	0.01	--	< RL	< RL	< RL
Sum of Tin of tri-substituted organotins	%	NA	0.1	<RL	<RL	<RL
DBT(Dibutyltin) by weight of tin	%	0.01	0.1	< RL	< RL	< RL
DOT(Dioctyltin) by weight of tin	%	0.01	0.1	< RL	< RL	< RL

Abbreviation: < = less than
 RL = Reporting Limit
 % = percentage
 NA = Not Applicable

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Remark:

- * Single components with an amount of <0.01% were not considered in the calculation of the sum. In the case of all five tri-substituted organotins were not detected, the result is stated < RL
- ** The assessment for tri-substituted organotins is based on the sum of TBT, TPT, TOT, TCyT and TPrT by weight of tin only.
- *** According to REACH Regulation (EC) No. 1907/2006 Annex XVII Entry 20 and amendment Commission Regulation (EU) No. 276/2010 (formerly known as 2009/425/EC), organostannic compounds shall not be used or be placed on the market.

Type of organostannic compounds	Maximum Permissible Limit	Implementation date
Tri-substituted organostannic compounds, e.g. tributyltin (TBT) compounds and triphenyltin (TPT) compounds	0.1 % by weight of tin	1 July 2010
Dibutyltin (DBT) compounds in mixtures and articles for supply to the general public	0.1 % by weight of tin	1 January 2012 The below products will not be applicable until 1 January 2015: - one-component and two-component room temperature vulcanisation sealants (RTV-1 and RTV-2 sealants) and adhesives, - paints and coatings containing DBT compounds as catalysts when applied on articles, - soft polyvinyl chloride (PVC) profiles whether by themselves or coextruded with hard PVC, - fabrics coated with PVC containing DBT compounds as stabilisers when intended for outdoor applications, - outdoor rainwater pipes, gutters and fittings, as well as covering material for roofing and facades
Diocetyl tin (DOT) compounds - textile articles intended to come into contact with the skin, - gloves, - footwear or part of footwear intended to come into contact with the skin, - wall and floor coverings - childcare articles, - female hygiene products, - nappies, - two-component room temperature vulcanisation moulding kits (RTV-2 moulding kits)	0.1 % by weight of tin	1 January 2012

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5. Octabromodiphenylether (OctaBDE) content

Test Method: Organic solvent extraction, analyzed by GCMS & LCMS

Test No.					T020	T021
Material No.:					M026	M027
Test Parameter	CAS No.	Unit	RL	Regulatory Requirement	Result	Result
Octabromodiphenylether (OctaBDE)	32536-52-0	mg/kg	50	1000	< RL	< RL

Test No.					T022	T023
Material No.:					M028	M029
Test Parameter	CAS No.	Unit	RL	Regulatory Requirement	Result	Result
Octabromodiphenylether (OctaBDE)	32536-52-0	mg/kg	50	1000	< RL	< RL

Test No.					T024
Material No.:					M030
Test Parameter	CAS No.	Unit	RL	Regulatory Requirement	Result
Octabromodiphenylether (OctaBDE)	32536-52-0	mg/kg	50	1000	< RL

Abbreviation: < = less than
 RL = Reporting Limit
 mg/kg = milligram per kilogram

Remark:

- * According to REACH regulation (EC) No. 1907/2006 entry 45 of octabromo derivative (Octabromodiphenyl ether), shall not be used as substance, or as a constituent of other substances/in mixtures, or as constituents of the flame-retarded parts or articles, in concentrations greater than 0.1 % by weight.

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6. Phthalates content

Test Method:

			Test No.	T012	T013
			Material No.:	M026 +M027+M028	M029
Parameter	CAS No.	Unit	RL	Result	Result
Diethylhexyl phthalate (DEHP)	117-81-7	%	0.01	<RL	<RL
Dibutyl phthalate (DBP)	84-74-2	%	0.01	<RL	<RL
Benzylbutyl phthalate (BBP)	85-68-7	%	0.01	<RL	<RL
Diisobutyl phthalate (DIBP)	84-69-5	%	0.01	<RL	<RL
Sum (DEHP+DBP+BBP+DIBP)	--	%	0.01	<RL	<RL
Conclusion: REACH regulation (EC) No. 1907/2006 and its amendment Annex XVII entries 51				Pass	Pass

			Test No.	T014
			Material No.:	M030
Parameter	CAS No.	Unit	RL	Result
Diethylhexyl phthalate (DEHP)	117-81-7	%	0.01	<RL
Dibutyl phthalate (DBP)	84-74-2	%	0.01	<RL
Benzylbutyl phthalate (BBP)	85-68-7	%	0.01	<RL
Diisobutyl phthalate (DIBP)	84-69-5	%	0.01	<RL
Sum (DEHP+DBP+BBP+DIBP)	--	%	0.01	<RL
Conclusion: REACH regulation (EC) No. 1907/2006 and its amendment Annex XVII entries 51				Pass

Abbreviation: < = less than
 RL = Reporting Limit
 % = percentage

Remark:

- Requirement of REACH regulation (EC) No. 1907/2006 and its amendment Annex XVII entries 51:

Parameter	Unit	Maximum Permissible Limit
Plasticised materials in toys and childcare articles, or other articles# place on the market;		
Diethylhexyl phthalate (DEHP) Dibutyl phthalate (DBP) Benzylbutyl phthalate (BBP) Diisobutyl phthalate (DIBP)	%	0.1 (individually or sum of the four phthalates) Effective after 7 July 2020.

Denote:

Examples of articles that are excluded from the restriction

- 1) Articles exclusively for industrial / agricultural use / use in open air, provided that no plasticised material comes into contact with human mucous membranes or into prolonged contact with human skin (i.e. Continuous contact of more than 10 minutes duration or intermittent contact over a period of 30 minutes per day.)
- 2) Aircraft and motor vehicles (Directive 2007/46/EC) placed on the market before 7 January 2024, or articles for use exclusively in the maintenance or repair of them
- 3) Measuring devices for laboratory use;
- 4) Food contact material and articles within the scope of Regulation (EC) No 1935/2004 or Commission Regulation (EU) No 10/2011
- 5) Medical devices (Directive 90/385/EEC, 93/42/EEC or 98/79/EC)
- 6) Electrical and electronic equipment within the scope of Directive 2011/65/EU
- 7) Immediate packaging of medicinal products (Regulation (EC) No 726/2004, Directive 2001/82/EC or Directive 2001/83/EC)

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7. Dimethyl fumarate (CAS No. 624-49-7)

Test Method: Organic solvent extraction, GCMS analysis

Test Result:

Test No.	Material No.	Test Parameter	Unit	RL	Regulatory Requirement	Test Result
T012	M026 + M027 + M028	Dimethyl fumarate	mg/kg	0.025	0.1	< RL
T013	M029	Dimethyl fumarate	mg/kg	0.025	0.1	< RL
T014	M030	Dimethyl fumarate	mg/kg	0.025	0.1	< RL

Abbreviation: < = less than
RL = Reporting Limit
mg/kg = milligram per kilogram

Remark:

- * According to REACH Regulation (EC) No. 1907/2006 Annex XVII Item 61 and amendment Commission Regulation (EU) No. 412/2012 (formerly known as 2012/48/EU), dimethylfumarate (DMF) shall not be used in articles or any parts thereof in concentrations greater than 0.1 mg/kg. Articles or any parts thereof containing DMF in concentrations greater than 0.1 mg/kg shall not be placed on the market.

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8. Polycyclic aromatic hydrocarbons (PAHs)

Test Method: Organic solvent extraction, GCMS

Test No.					T003
Material No.					M026
Test Parameter	CAS NO	Unit	RL	Regulatory Requirement	Result
Benzo[a]anthracene (BaA)	56-55-3	mg/kg	0.2	1	< RL
Benzo[a]pyrene (BaP)	50-32-8	mg/kg	0.2	1	< RL
Benzo[b]fluoranthene (BbFA)	205-99-2	mg/kg	0.2	1	< RL
Benzo[k]fluoranthene (BkFA)	207-08-9	mg/kg	0.2	1	< RL
Benzo[j]fluoranthene (BjFA)	205-82-3	mg/kg	0.2	1	< RL
Benzo[e]pyrene (BeP)	192-97-2	mg/kg	0.2	1	< RL
Chrysene (CHR)	218-01-9	mg/kg	0.2	1	< RL
Dibenzo[a,h]anthracene (DBA _h A)	53-70-3	mg/kg	0.2	1	< RL

Abbreviation: < = less than
 RL = Reporting Limit
 NA = Not Applicable
 mg/kg = milligram per kilogram

Remark:

* Requirement according to REACH regulation (EC) No. 1907/2006 with Amendment No. 552/2009 Annex XVII Item No. 50 and (EU) No.1272/2013, are summarized as below:

Scope	Parameter	Unit	Maximum permissible limit
Articles with direct as well as prolonged or short-term repetitive contact with the human skin or the oral cavity, under normal or reasonably foreseeable conditions of use, made of plastic and rubber shall follow below limit:			
Such articles include amongst others: ---sport equipment such as bicycles, golf clubs, racquets ---household utensils, trolleys, walking frames ---tools for domestic use ---clothing, footwear, gloves and sportswear ---watch-straps, wrist-bands, masks, head-bands	Each of 8 listed PAHs	mg/kg	1
Toys, including activity toys, and childcare articles	Each of 8 listed PAHs	mg/kg	0.5

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Sample Photos



Product (test sample)

- END -

PC25020094
TÜV

General Terms and Conditions of Business of TÜV Rheinland in Greater China

1.	Scope	3.8	TÜV Rheinland shall be entitled to raise its fees at the beginning of a month if overheads and/or purchase costs have increased. In this case, TÜV Rheinland shall notify the client in writing of the rise in fees. This notification shall be issued one month prior to the date on which the rise in fees shall come into effect (period of notice of changes in fees). If the rise in fees remains under 5% per annum, the client shall not have the right to object. If the rise in fees exceeds 5% per annum, the client shall be entitled to terminate the contract with the end of the month in which the rise in fees is notified. The client is not entitled to demand a refund of the fees already paid. The fees shall be deemed to have been agreed upon by the time of the expiry of the notice period.	13.2	The performance of a contract with the client is subject to the proviso that there are no obstacles to performance due to national or international trade legislation or embargoes and/or sanctions. In the event of a violation, TÜV Rheinland shall be entitled to terminate the contract with immediate effect and the client shall compensate for the losses incurred thereof by TÜV Rheinland.
1.1	These General Terms and Conditions of Business of TÜV Rheinland in Greater China ("GTBCB") is made between the client and one or more natural entities of TÜV Rheinland in Greater China as applicable as the case may be ("TÜV Rheinland"). The Greater China hereof refers to Mainland China, Hong Kong and Taiwan. The client hereby includes:	3.9	Only legally established and undisputed claims may be offset against claims by TÜV Rheinland. TÜV Rheinland shall have the right at all times to set off any amount due or payable by the client, in whole or in part, by offsetting the claim against the claim by the client under any contracts, agreement and/or orders/quotations reached with TÜV Rheinland.	14.	Data protection notice
1.2	a) a natural person capable to form legally binding contracts under the applicable laws who concludes the contract not for the purpose of a daily use;	3.10	Acceptance of work	14.1	The client understands and agrees that TÜV Rheinland processes personal data (including but not limited to personal information) of the client and its related parties (including but not limited to the supplier of the client) for the purpose of fulfilling the contract. The client confirms that it has reviewed the sample content of the data subject, which includes the personal data to access, use, or process the personal data that the client collected or processed by itself and transferred to TÜV Rheinland. For certain services, we may also process sensitive personal data. TÜV Rheinland will use and process the data in accordance with the relevant legal basis. If any personal data has to be disclosed or transferred to any third party or any overseas party outside of the district in which the personal data was collected, the client also confirms that it has obtained the prior consent of the data subject. TÜV Rheinland will carry out cross-border data transmission and protect the data in compliance with the privacy and personal data security related laws and regulations in China and the local country. TÜV Rheinland will take measures to avoid fraud, misuse, abuse, manipulation, damage or unauthorized access of personal data. The personal data will be deleted immediately as soon as a corresponding reason for deletion arises. Data subjects may exercise the following rights: right of information, right of decision, right of rectification, right of deletion, right of processing limitation, right of objection, right of data transferability. In addition, persons concerned by the data processing have the right to revoke their consent at any time for the future, as well as the right to file a complaint with the competent data protection supervisory authority. For further details on the processing of personal data by TÜV Rheinland as the person responsible or contract processor, please refer to the respective data protection information. You can contact the Group Data Protection Officer of TÜV Rheinland at e-mail: dataprotektion@tuv.com or by post at the following address: TÜV Rheinland AG, c/o Group Data Protection Officer, Am Grauen Stein, 51105 Cologne, Germany.
1.3	Any standard terms and conditions of the client of any nature shall not apply and shall hereby be expressly excluded. No standard contract conditions of the client shall form part of the contract even if TÜV Rheinland does not explicitly object to them.	3.11	Any part of the work result ordered which is complete in itself may be presented by TÜV Rheinland for acceptance as an instalment. The client shall be obliged to accept it immediately.	15.	Retention of test material and documentation
1.4	In the event of an ongoing business relationship with the client, this GTBCB shall also apply to future contracts with the client without TÜV Rheinland having to refer to them separately in each individual case.	3.12	If acceptance is required or contractually agreed in an individual case, this shall be deemed to have taken place two (2) weeks after completion and handover of the work, unless the client refuses acceptance within this period starting at least one fundamental breach of contract by TÜV Rheinland. The client is not entitled to refuse acceptance due to insignificant breach of contract by TÜV Rheinland.	15.1	The test samples submitted by the client to TÜV Rheinland for testing will be scrapped following testing or will be returned to the client at the client's expense. The only exceptions are test samples, which are placed in storage on the basis of statutory regulations or of another agreement with the client.
2.	Quotations	3.13	If acceptance is excluded according to the nature of the work performance of TÜV Rheinland, the completion of the work shall take its place.	15.2	Charges apply if the test samples are stored at the premises of TÜV Rheinland. The cost of placing a test sample into storage will be disclosed to the client in the quotation.
2.1	Unless otherwise agreed, all quotations submitted by TÜV Rheinland can be changed by TÜV Rheinland without notice prior to its acceptance and confirmation by the other party.	3.14	During the Follow-Audit stage, if the client was unable to make use of the time windows provided for the scope of a certification procedure for auditing performance by TÜV Rheinland and the certificate is therefore to be withdrawn (e.g. performance of surveillance audits), or if the client cancels or postpones a confirmed audit within two (2) weeks before the agreed date, TÜV Rheinland is entitled to immediately charge a lump-sum compensation of 10% of the order amount as compensation for expenses. The client reserves the right to demand a refund of the fees incurred no damage whatsoever or only a considerably lower damage than the above lump sum. In the event of a claim under the clause undertaken in the event of a suspension of the certification, TÜV Rheinland is entitled to charge lump-sum damages in the amount of 10% of the order amount as compensation for expenses if the service is not called within one year after the order has been placed. The client reserves the right to prove that the TÜV Rheinland incurred no damage whatsoever or only a considerably lower damage than the above mentioned lump sum.	15.3	If reference samples or documentations are given to the client to be placed in storage at their premises, the reference samples or documentations must be made available to TÜV Rheinland upon request promptly and free of charge. If the client, in response to such a request, is incapable of making available the reference samples and/or documentations, any liability claims for material and pecuniary damage resulting from the respective testing and certification that is brought forward by the client against TÜV Rheinland shall be excluded.
3.	Coming into effect and duration of contracts	3.15	If acceptance is excluded according to the nature of the work performance of TÜV Rheinland, the completion of the work shall take its place.	15.4	The retention period for the documentation shall be 10 (ten) years after the expiry of the test mark certificates or shall meet the applicable legal requirements for EUCEC certificates of conformity and GS mark certificates.
3.1	The contract shall come into effect after the agreed terms upon the quotation letter of TÜV Rheinland or a separate contractual document being signed by both contracting parties, or upon the works requested by the client being carried out by TÜV Rheinland. If the client instructs TÜV Rheinland without receiving a quotation from TÜV Rheinland (TÜV Rheinland AG), it is in its sole discretion, entitled to accept the order by giving written notice of such acceptance (including notice sent via electronic means) or by performing the respective service.	3.16	During the Follow-Audit stage, if the client was unable to make use of the time windows provided for the scope of a certification procedure for auditing performance by TÜV Rheinland and the certificate is therefore to be withdrawn (e.g. performance of surveillance audits), or if the client cancels or postpones a confirmed audit within two (2) weeks before the agreed date, TÜV Rheinland is entitled to immediately charge a lump-sum compensation of 10% of the order amount as compensation for expenses. The client reserves the right to demand a refund of the fees incurred no damage whatsoever or only a considerably lower damage than the above lump sum. In the event of a claim under the clause undertaken in the event of a suspension of the certification, TÜV Rheinland is entitled to charge lump-sum damages in the amount of 10% of the order amount as compensation for expenses if the service is not called within one year after the order has been placed. The client reserves the right to prove that the TÜV Rheinland incurred no damage whatsoever or only a considerably lower damage than the above mentioned lump sum.	15.5	The costs of the handover and dispatch of the test samples for storage on the client's premises are borne by the client. TÜV Rheinland will be liable for the loss of test samples or reference samples from the laboratories or warehouses of TÜV Rheinland only in case of gross negligence.
3.2	The contract term starts upon the coming into effect of the contract in accordance with article 3.1 and shall continue for the term agreed in the contract.	4.	Confidentiality	16.	Termination of the contract
3.3	If the contract provides for an extension of the contract term, the contract term will be extended by the term provided for in the contract unless terminated in writing by either party with a three-month notice prior to the end of the contractual term.	4.1	For the purpose of these terms and conditions, "confidential information" means all know-how, trade secrets, patents, designs, drawings, documents, data, information, reports, test results, samples, project documents, pricing and financial information, customer and supplier information, and marketing techniques and materials, tangible or intangible, that are supplied, transferred or otherwise made available to the client by TÜV Rheinland in writing or orally, in printed or electronic form. Confidential information is expressly not the data and know-how collected, compiled or otherwise obtained by TÜV Rheinland (non-personal and not proprietary to the client) within the scope of the provision of services by TÜV Rheinland. TÜV Rheinland is entitled to store, use, further develop and pass on the data obtained in connection with the provision of services for the purposes of developing new services, improving services and enabling the provision of services.	16.1	Notwithstanding clause 3.3 of the GTBCB, TÜV Rheinland and the client are entitled to terminate the contract in its entirety or, in the case of services combined in one contract, each of the combined services, if the client or TÜV Rheinland, independently of TÜV Rheinland, has terminated the remaining services with six (6) months' notice to the end of the contractually agreed term. The notice period shall be shortened to six (6) weeks in case TÜV Rheinland is prevented from performing the services due to loss or deterioration of the certificate or its accreditation or notification.
4.	Scope of services	4.2	The disclosing party shall mark all confidential information disclosed in written form as confidential information and shall receive a copy of the confidential information transferred to the receiving party by e-mail. If confidential information is disclosed orally, the receiving party shall be appropriately informed in advance and the disclosing party shall confirm in writing the confidentiality nature of the information. The disclosing party shall be liable for damages if it discloses confidential information to a third party without the written consent of the disclosing party. The disclosing party shall be liable for damages if it discloses confidential information to a third party without the written consent of the disclosing party. The disclosing party shall be liable for damages if it discloses confidential information to a third party without the written consent of the disclosing party.	16.2	For good causes, TÜV Rheinland may consider giving a written notice to the client to terminate the contract and/or to suspend the services and the client shall pay the relevant service fees for the services provided by TÜV Rheinland up to the termination date of the contract.
4.1	The scope and type of the services to be provided by TÜV Rheinland shall be specified in the contractually agreed service scope of TÜV Rheinland by both parties. If no such separate service scope of TÜV Rheinland exists, then the written confirmation of order by TÜV Rheinland shall be decisive for the service to be provided. Unless otherwise agreed, services beyond the scope of the service description (e.g. checking the correctness and functionality of parts, product processes, installations, organizations not listed in the service description, as well as the intended use and application of such) are not covered. In particular, no responsibility is assumed for the design, selection of materials, construction and use of an existing part, product, process or plant, unless this is expressly stated in the order.	4.3	The disclosing party shall mark all confidential information disclosed in written form as confidential information and shall receive a copy of the confidential information transferred to the receiving party by e-mail. If confidential information is disclosed orally, the receiving party shall be appropriately informed in advance and the disclosing party shall confirm in writing the confidentiality nature of the information. The disclosing party shall be liable for damages if it discloses confidential information to a third party without the written consent of the disclosing party. The disclosing party shall be liable for damages if it discloses confidential information to a third party without the written consent of the disclosing party. The disclosing party shall be liable for damages if it discloses confidential information to a third party without the written consent of the disclosing party.	16.3	For good causes, TÜV Rheinland may consider giving a written notice to the client to terminate the contract and/or to suspend the services and the client shall pay the relevant service fees for the services provided by TÜV Rheinland up to the termination date of the contract.
4.2	The agreed services shall be performed in compliance with the regulations in force at the time the contract is entered into.	4.4	On execution of the work there shall be no simultaneous assumption of any guarantee of the correctness (in part quality) and working order of either tested or examined parts nor of the installation as a whole and its upstream and/or downstream processes, organizations, use and application in accordance with regulations, nor of the systems on which the installation is based. In particular, TÜV Rheinland shall assume no responsibility for the construction, selection of materials and assembly of installations examined, nor for their use and application in accordance with regulations, unless these questions are expressly covered by the contract.	16.4	For good causes, TÜV Rheinland may consider giving a written notice to the client to terminate the contract and/or to suspend the services and the client shall pay the relevant service fees for the services provided by TÜV Rheinland up to the termination date of the contract.
4.3	In the case of inspection work, TÜV Rheinland shall not be responsible for the accuracy or checking of the safety programmes or safety regulations or for the compliance of the inspection process unless otherwise expressly agreed in writing.	4.5	On execution of the work there shall be no simultaneous assumption of any guarantee of the correctness (in part quality) and working order of either tested or examined parts nor of the installation as a whole and its upstream and/or downstream processes, organizations, use and application in accordance with regulations, nor of the systems on which the installation is based. In particular, TÜV Rheinland shall assume no responsibility for the construction, selection of materials and assembly of installations examined, nor for their use and application in accordance with regulations, unless these questions are expressly covered by the contract.	16.5	For good causes, TÜV Rheinland may consider giving a written notice to the client to terminate the contract and/or to suspend the services and the client shall pay the relevant service fees for the services provided by TÜV Rheinland up to the termination date of the contract.
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4.5	In the case of inspection work, TÜV Rheinland shall not be responsible for the accuracy or checking of the safety programmes or safety regulations or for the compliance of the inspection process unless otherwise expressly agreed in writing.	4.7	On execution of the work there shall be no simultaneous assumption of any guarantee of the correctness (in part quality) and working order of either tested or examined parts nor of the installation as a whole and its upstream and/or downstream processes, organizations, use and application in accordance with regulations, nor of the systems on which the installation is based. In particular, TÜV Rheinland shall assume no responsibility for the construction, selection of materials and assembly of installations examined, nor for their use and application in accordance with regulations, unless these questions are expressly covered by the contract.	16.7	For good causes, TÜV Rheinland may consider giving a written notice to the client to terminate the contract and/or to suspend the services and the client shall pay the relevant service fees for the services provided by TÜV Rheinland up to the termination date of the contract.
4.6	If mandatory legal regulations and standards or official requirements for the agreed service scope change after conclusion of the contract, TÜV Rheinland shall be entitled to demand additional remuneration for resulting additional expenses.	4.8	On execution of the work there shall be no simultaneous assumption of any guarantee of the correctness (in part quality) and working order of either tested or examined parts nor of the installation as a whole and its upstream and/or downstream processes, organizations, use and application in accordance with regulations, nor of the systems on which the installation is based. In particular, TÜV Rheinland shall assume no responsibility for the construction, selection of materials and assembly of installations examined, nor for their use and application in accordance with regulations, unless these questions are expressly covered by the contract.	16.8	For good causes, TÜV Rheinland may consider giving a written notice to the client to terminate the contract and/or to suspend the services and the client shall pay the relevant service fees for the services provided by TÜV Rheinland up to the termination date of the contract.
4.7	The services to be provided by TÜV Rheinland under the contract are agreed exclusively with the client. A contract of third parties with the services of TÜV Rheinland, as well as making available of and justifying conformity in the work results (test reports, test results, expert reports, etc.) is not part of the agreed services. The client also assumes responsibility for the inspection process in full or in extracts - to third parties in accordance with clause 11.4.	4.9	On execution of the work there shall be no simultaneous assumption of any guarantee of the correctness (in part quality) and working order of either tested or examined parts nor of the installation as a whole and its upstream and/or downstream processes, organizations, use and application in accordance with regulations, nor of the systems on which the installation is based. In particular, TÜV Rheinland shall assume no responsibility for the construction, selection of materials and assembly of installations examined, nor for their use and application in accordance with regulations, unless these questions are expressly covered by the contract.	16.9	For good causes, TÜV Rheinland may consider giving a written notice to the client to terminate the contract and/or to suspend the services and the client shall pay the relevant service fees for the services provided by TÜV Rheinland up to the termination date of the contract.
4.8	The client understands and agrees that in order to perform the contract with TÜV Rheinland, the client may need to sign one or more contracts/agreements with a third party(ies) and/or establish legal relationships with third party(ies) according to such contracts/agreements. TÜV Rheinland shall not be responsible for the construction, selection of materials and assembly of installations examined, nor for their use and application in accordance with regulations, unless these questions are expressly covered by the contract.	5.	Performance periods/dates	17.	Force Majeure
4.9	The client understands and agrees that in order to perform the contract with TÜV Rheinland, the client may need to sign one or more contracts/agreements with a third party(ies) and/or establish legal relationships with third party(ies) according to such contracts/agreements. TÜV Rheinland shall not be responsible for the construction, selection of materials and assembly of installations examined, nor for their use and application in accordance with regulations, unless these questions are expressly covered by the contract.	5.1	The contractually agreed periods/dates of performance are based on estimates of the work involved which are prepared in line with the details provided by the client. They shall only be binding if being confirmed as binding by TÜV Rheinland in writing.	17.1	The force majeure means the occurrence of an event or circumstance that prevents or impedes a Party from performing one or more of its contractual obligations under the contract, and if to the extent that that Party proves: (a) that such impediment is beyond its reasonable control; and (b) that it had not reasonably been able to prevent or overcome the event or circumstance; and (c) that the effects of the impediment could not reasonably have been avoided or overcome by the affected Party.
5.	Performance periods/dates	5.2	If binding periods of performance have been agreed, these periods shall not commence until the client has submitted all required documents to TÜV Rheinland.	17.2	In the absence of proof to the contrary, the following events affecting a Party shall be presumed to fulfil conditions (a) and (b) under paragraph 1 of this Clause: (i) war (whether declared or not), hostilities, invasion, act of foreign enemies, armed conflict, terrorism, civil unrest, riot, rebellion and revolution, military or usurped power, insurrection, act of terrorism, sabotage or piracy; (ii) currency and trade restriction, embargo, sanction; (iii) act of authority whether lawful or unlawful, compliance with any law or governmental order, disturbance such as boycott, strike and lock-out, regulation, nationalization; (iv) plague, epidemic, natural or extreme natural event; (v) explosion, fire, destruction of equipment, prolonged break-down of transport, telecommunication, information system or energy; (vi) general labour disturbance such as boycott, strike and lock-out, go-slow, occupation of factories and premises.
5.1	The contractually agreed periods/dates of performance are based on estimates of the work involved which are prepared in line with the details provided by the client. They shall only be binding if being confirmed as binding by TÜV Rheinland in writing.	5.3	If binding periods of performance have been agreed, these periods shall not commence until the client has submitted all required documents to TÜV Rheinland.	17.3	The Party successfully claiming force majeure shall be relieved from its duty to perform its obligations under the contract and from any liability in damages or from any other contractual remedy for breach of contract, from the time at which the impediment causes inability to perform, provided that the notice was given without delay. If notice thereof is not given without delay, the relief is effective from the time at which notice thereof reaches the other Party. Where the effect of the impediment or event involved is temporary, the above consequences shall apply only as long as the impediment impedes performance by the affected Party. Where the effect of the impediment is permanent, the Party has the effect of substantially depriving the contracting Parties of what they were reasonably entitled to expect under the contract, either Party has the right to terminate the contract by giving notice of termination to the other Party. The Party terminating the contract shall expressly agree that the contract may be terminated by either Party if the duration of the impediment exceeds 120 days.
5.2	If binding periods of performance have been agreed, these periods shall not commence until the client has submitted all required documents to TÜV Rheinland.	5.4	Articles 5.1 and 5.2 also apply, even if the client expressly approves by the client, to all extensions of agreed periods of performance not caused by TÜV Rheinland.	18.	Hardship
5.3	If binding periods of performance have been agreed, these periods shall not commence until the client has submitted all required documents to TÜV Rheinland.	5.5	TÜV Rheinland is not responsible for a delay in performance, in particular if the client has not fulfilled his duties to cooperate in accordance with article 11.4. In particular, if the client has not provided TÜV Rheinland with all documents and information required for the performance of the service as specified in the contract.	18.1	The Parties are bound to perform their contractual duties even if events have rendered performance more onerous than could reasonably have been anticipated at the time of the conclusion of the contract.
5.4	Articles 5.1 and 5.2 also apply, even if the client expressly approves by the client, to all extensions of agreed periods of performance not caused by TÜV Rheinland.	5.6	If the client is obliged to postpone performance for a reasonable period of time which corresponds at least to the duration of the hindrance plus any time period which may be required to resume performance.	18.2	Notwithstanding paragraph 1 of this Clause, where a Party proves that: (a) the continued performance of its contractual duties has become excessively onerous due to an event beyond its reasonable control which it could not reasonably have been expected to have taken into account at the time of the conclusion of the contract; and that (b) it could not reasonably have avoided or overcome the event or circumstance, the Parties are bound, within a reasonable time of the invocation of this Clause, to negotiate alternative contractual terms which reasonably allow to overcome the consequences of the event.
5.5	TÜV Rheinland is not responsible for a delay in performance, in particular if the client has not fulfilled his duties to cooperate in accordance with article 11.4. In particular, if the client has not provided TÜV Rheinland with all documents and information required for the performance of the service as specified in the contract.	6.	The client's obligation to cooperate	18.3	Where Clause 18.2 applies, but where the Parties have been unable to agree alternative contractual terms as provided in that paragraph, the Party invoking this Clause is entitled to terminate the contract, but cannot request adaptation by the judge or arbitrator without the agreement of the other Party.
5.6	If the client is obliged to postpone performance for a reasonable period of time which corresponds at least to the duration of the hindrance plus any time period which may be required to resume performance.	6.1	The client shall guarantee that all cooperation required on its part, its agents or third parties will be provided in good time and at no cost to TÜV Rheinland.	19.	Partial invalidity, written form, place of jurisdiction and dispute resolution
6.	The client's obligation to cooperate	6.2	Design documents, supplies, auxiliary staff, etc. necessary for performance of the services shall be made available free of charge by the client. Moreover, collaborative action of the client must be undertaken in accordance with legal provisions, standards, safety regulations and accident prevention instructions. And the client represents and warrants that:	19.1	All amendments and supplements must be in writing in order to be effective. This also applies to amendments and supplements to this clause 17.1.
6.1	The client shall guarantee that all cooperation required on its part, its agents or third parties will be provided in good time and at no cost to TÜV Rheinland.	6.3	a) it has required statutory qualifications;	19.2	If the contract or several of the provisions under these terms and conditions are found to be ineffective, the contracting parties shall replace the invalid provision with a legally valid one that comes closest to the content of the invalid provision and which is not more disadvantageous to the contracting parties.
6.2	Design documents, supplies, auxiliary staff, etc. necessary for performance of the services shall be made available free of charge by the client. Moreover, collaborative action of the client must be undertaken in accordance with legal provisions, standards, safety regulations and accident prevention instructions. And the client represents and warrants that:	6.4	b) the product, service or management system to be certified complies with applicable laws and regulations; and	19.3	Unless otherwise stipulated in the contract, the governing law of the contract and these terms and conditions shall be construed following the rules as below:
6.3	a) it has required statutory qualifications;	6.5	c) it doesn't have any illegal and dishonest behaviours or is not included in the list of Enterprises with Serious Illegal and Dishonest Acts of People's Republic of China.	19.4	TÜV Rheinland in question is legally registered and existing in the People's Republic of China, the contracting parties hereby agree that the contract and these terms and conditions shall be governed by the laws of the People's Republic of China.
6.4	b) the product, service or management system to be certified complies with applicable laws and regulations; and	6.6	If the client breaches the aforesaid representations and warranties, TÜV Rheinland is entitled to (i) immediately terminate the contract without prior notice; and (ii) to withdraw the issued testing/recertification certificates if any.	20.	Dispute Resolution
6.5	c) it doesn't have any illegal and dishonest behaviours or is not included in the list of Enterprises with Serious Illegal and Dishonest Acts of People's Republic of China.	6.7	The client shall bear any additional cost incurred on account of work having to be redone or being delayed as a result of late, incorrect or incomplete information provided by or lack of proper cooperation from the client. Even where a fixed or maximum price is agreed, TÜV Rheinland shall be entitled to charge extra fees for such additional expense.	20.1	Any dispute in connection with the contract and these terms and conditions or the execution thereof shall be settled firstly through negotiations.
6.6	If the client breaches the aforesaid representations and warranties, TÜV Rheinland is entitled to (i) immediately terminate the contract without prior notice; and (ii) to withdraw the issued testing/recertification certificates if any.	7.	Prices	20.2	If no settlement or no agreement in respect of the extension of the negotiation period can be reached within two months of the arising of the dispute, the dispute shall be referred to arbitration.
6.7	The client shall bear any additional cost incurred on account of work having to be redone or being delayed as a result of late, incorrect or incomplete information provided by or lack of proper cooperation from the client. Even where a fixed or maximum price is agreed, TÜV Rheinland shall be entitled to charge extra fees for such additional expense.	7.1	If the scope of performance is not laid down in writing when the order is placed, invoicing shall be based on costs actually incurred and on price in agreed in writing, invoicing shall be made in accordance with the price list of TÜV Rheinland at the time of performance.	20.3	In the case of TÜV Rheinland in question being legally registered and existing in the People's Republic of China, the contracting parties hereby agree that the contract and these terms and conditions shall be governed by the laws of the People's Republic of China.
7.	Prices	7.2	Unless otherwise agreed, work shall be invoiced according to the progress of the work.	20.4	In the case of TÜV Rheinland in question being legally registered and existing in Hong Kong, the contracting parties hereby agree that the contract and these terms and conditions shall be governed by the laws of Hong Kong.
7.1	If the scope of performance is not laid down in writing when the order is placed, invoicing shall be based on costs actually incurred and on price in agreed in writing, invoicing shall be made in accordance with the price list of TÜV Rheinland at the time of performance.	7.3	If the execution of the work is delayed or interrupted by the client, the contract or the agreed fixed price of 25,000.00 or equivalent value in local currency, TÜV Rheinland shall be deemed to have been agreed upon by the time of the expiry of the notice period.	20.5	Any dispute in connection with the contract and these terms and conditions or the execution thereof shall be settled firstly through negotiations.
7.2	Unless otherwise agreed, work shall be invoiced according to the progress of the work.	8.	Payment terms	20.6	If no settlement or no agreement in respect of the extension of the negotiation period can be reached within two months of the arising of the dispute, the dispute shall be referred to arbitration.
7.3	If the execution of the work is delayed or interrupted by the client, the contract or the agreed fixed price of 25,000.00 or equivalent value in local currency, TÜV Rheinland shall be deemed to have been agreed upon by the time of the expiry of the notice period.	8.1	All invoice amounts shall be due for payment within 30 days of the invoice date without deduction on receipt of the invoice. No discounts and rebates shall be granted.	20.7	In the case of TÜV Rheinland in question being legally registered and existing in the People's Republic of China, the contracting parties hereby agree that the contract and these terms and conditions shall be governed by the laws of the People's Republic of China.
8.	Payment terms	8.2	Payments shall be made to the bank account of TÜV Rheinland as indicated on the invoice, stating the invoice and client numbers.	20.8	In the case of TÜV Rheinland in question being legally registered and existing in Hong Kong, the contracting parties hereby agree that the contract and these terms and conditions shall be governed by the laws of Hong Kong.
8.1	All invoice amounts shall be due for payment within 30 days of the invoice date without deduction on receipt of the invoice. No discounts and rebates shall be granted.	8.3	In cases of default of payment, TÜV Rheinland shall be entitled to claim default interest at the applicable short loan interest rate publicly announced by a reputable commercial bank in the country where TÜV Rheinland is located. At the same time, TÜV Rheinland reserves the right to claim further damages.	20.9	Any dispute in connection with the contract and these terms and conditions or the execution thereof shall be settled firstly through negotiations.
8.2	Payments shall be made to the bank account of TÜV Rheinland as indicated on the invoice, stating the invoice and client numbers.	8.4	Should the client default in payment of the invoice despite being granted a reasonable grace period, TÜV Rheinland shall be entitled to cancel the contract, involving the returned certificate, claim damages for non-performance and refuse to continue and/or to terminate the contract.	21.	Export control
8.3	In cases of default of payment, TÜV Rheinland shall be entitled to claim default interest at the applicable short loan interest rate publicly announced by a reputable commercial bank in the country where TÜV Rheinland is located. At the same time, TÜV Rheinland reserves the right to claim further damages.	8.5	The provisions set forth in article 8.4 shall also apply in cases withdrawing returned cheques, cessation of payment, commencement of insolvency proceedings against the client's assets or cases in which the commencement of insolvency proceedings has been declared due to the client's assets.	21.1	When passing on the services provided by TÜV Rheinland or parts thereof to third parties in Greater China or other regions, the client must comply with the respectively applicable regulations of national and international export control law.
8.4	Should the client default in payment of the invoice despite being granted a reasonable grace period, TÜV Rheinland shall be entitled to cancel the contract, involving the returned certificate, claim damages for non-performance and refuse to continue and/or to terminate the contract.	9.	Liability of TÜV Rheinland		
8.5	The provisions set forth in article 8.4 shall also apply in cases withdrawing returned cheques, cessation of payment, commencement of insolvency proceedings against the client's assets or cases in which the commencement of insolvency proceedings has been declared due to the client's assets.	9.1	Respective of the legal basis, to the fullest extent permitted by applicable law, in the event of a breach of contractual obligations or tort, the liability of TÜV Rheinland for all damages, losses and reimbursement of expenses caused by TÜV Rheinland, its legal representatives and/or employees shall be limited to: (i) in the case of a contract with a fixed overall fee, three times the overall fee for the entire contract; (ii) in the case of a contract for annual recurring services, the agreed annual fee; (iii) in the case of a contract expressly charged on a time and material basis, a maximum of 20,000.00 Euro or equivalent amount in local currency; and (iv) in the case of a framework agreement that provides for the possibility of placing individual orders, three times of the fee for the individual order in which the damage is incurred, as a "fundamental breach". In the case of a material contractual obligation, the performance of which permits the due performance of the contract. Any claim for damages for a fundamental breach of contract shall be limited to the actual amount of damages reasonably foreseeable as a possible consequence of such breach of contract at the time of the breach (reasonably foreseeable damages), unless any of the circumstances described in article 12.2 applies.		
8.6	Objections to the invoices of TÜV Rheinland shall be submitted in writing within two weeks of receipt of the invoice.	9.2	The limitation of liability according to article 12.1 shall also apply to damages and/or losses caused by fraud, intentional or gross negligence on the part of TÜV Rheinland or its vicarious agents. Such limitation shall not apply to damages for a person's death, physical injury or illness.		
8.7	TÜV Rheinland shall be entitled to demand appropriate advance payments.	9.3	In cases involving a fundamental breach of contract, TÜV Rheinland will be liable even where there is no negligence involved. For this purpose, a "fundamental breach" is a breach of a material contractual obligation, the performance of which permits the due performance of the contract. Any claim for damages for a fundamental breach of contract shall be limited to the actual amount of damages reasonably foreseeable as a possible consequence of such breach of contract at the time of the breach (reasonably foreseeable damages), unless any of the circumstances described in article 12.2 applies.		
		9.4	TÜV Rheinland shall not be liable for the acts of the personnel made available by the client to support TÜV Rheinland in the performance of its services under the contract, unless such personnel is negligent or intentionally causes damage to the client or third parties. TÜV Rheinland shall be liable for the acts of the personnel made available by the client under the foregoing provision, if the client internally instructs the personnel against any claims made by third parties arising from or in connection with such personnel's acts.		
		9.5	Unless otherwise contractually agreed in writing, TÜV Rheinland shall only be liable under the contract to the client.		
		9.6	The limitation periods for claims for damages shall be based on statutory provisions.		
		9.7	None of the provisions of this article 12 changes the burden of proof to the disadvantage of the client.		
		10.	Export control		
		10.1	When passing on the services provided by TÜV Rheinland or parts thereof to third parties in Greater China or other regions, the client must comply with the respectively applicable regulations of national and international export control law.		

Product: Alkaline battery

Type Designation: LR6, LR03, LR14, LR20, LR8D425, LR1



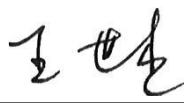
Figure 1 View 1 of battery (LR6 as representative, final label see page 5 in report)



Figure 2 View 2 of battery (LR6 as representative, final label see page 5 in report)

PRODUCT SPECIFICATION

产品规格书

Type Designation:	LR6(AA) Extra Long life
电池型号:	
Prepared by:	
编制:	
Checked by:	
审核:	
Approved by:	
批准:	
Issued Date:	2022-5-13
发布日期:	

CHANGE HISTORY 变更履历				
Type Designation: 电池型号		LR6(AA) Extra Long life		
Rev. 版本	Reason 变更原因	Contents 明细	Date 变更日期	Prepare 编制
A0	Initial 初始版本		2020-10-30	He Bianliang
A1	Update performance 升级性能	8.Battery capacity 电池容量 11.Discharge test (service life) 放电测试（性能）	2022-5-13	He Bianliang
A1	The IEC60086 standard updated IEC60086 标准 升级	Test environment: “20±2℃,60%±15%R.H” to “20±2℃,55%±20%R.H” 测试环境修改 11.Discharge test quantity 测试数量修改 13.Safety test 安全测试修改	2022-5-13	He Bianliang

Mustang PRODUCT SPECIFICATION 产品规格书			
Product 产品	Alkaline Zinc Manganese Dioxide battery; 1.5Volts 碱性锌-二氧化锰电池, 1.5V	Page 页码	1 of 4
Designation 规格	LR6(AA) Extra Long life	Document No.	J/PT311156.22-2020(A1)

LR6(Extra Long life) battery specification 电池规格书

1.Type designation 电池型号: IEC: LR6

JIS: AM3

ANSI: 15A

2.Chemical system 电池化学体系:

Electrolyte-zinc-manganese dioxide (mercury & cadmium free)
碱性电解液-锌-二氧化锰 (无汞无镉)

3.Dimension 尺寸: Diameter 电池直径: 13.7-14.5mm

Height 电池高度: 49.5-50.5mm

4.Nominal voltage 标称电压: 1.5Volts

5.Nominal weight 标称重量:

The weight of each battery is approximately 每只电池的重量大约是: **23.3g**

6.Heavy Metal content 重金属含量 (%):

Mercury 汞	Cadmium 镉	Lead 铅
≤1ppm	≤10ppm	≤40ppm

7.Appearance and terminal 电池外观和极端:

Battery shall be clean and have no dirt, no leakage, and no deformation which may affect their performance and actual use and shall have clearly visible markings.

电池外观干净整洁, 无脏物、无漏液、无变形以影响电池的性能和实际使用, 标志清晰。

8.Battery capacity 放电容量: (Test environment 测试环境: 20±2℃,55%±20%R.H)

(Load resistance:**43ohms**, Daily period:**24h/d**, Cut off voltage:**0.8V**; According to as the above the same discharge condition, the capacity of each battery is approximately:**2700mAh**)

(放电负载: **43Ω**, 放电方式: **24h/d**, 终止电压: **0.8V**; 电池的容量大约是: **2700mAh**)

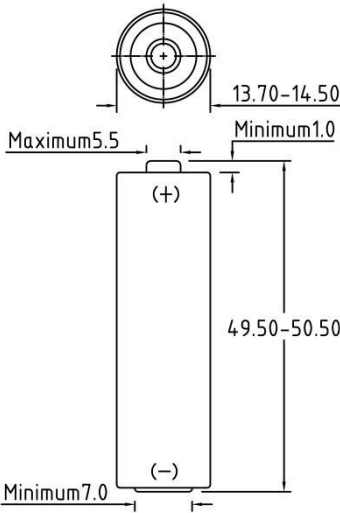
9.Storage characteristics 贮存性能:

After 12 months storage at 20℃, 90% capacitance of fresh cells.

20℃条件下贮存 12 个月后, 电池的容量是新电容量的 90%。

After 24 months storage at 20℃, 85% capacitance of fresh cells.

20℃条件下贮存 24 个月后, 电池的容量是新电容量的 85%。



Mustang PRODUCT SPECIFICATION 产品规格书			
Product 产品	Alkaline Zinc Manganese Dioxide battery; 1.5Volts 碱性锌-二氧化锰电池, 1.5V	Page 页码	2 of 4
Designation 规格	LR6(AA) Extra Long life	Document No.	J/PT311156.22-2020(A1)

10.Electrical characteristics 电气特性:

Item 项目	Initial 初始值	After 12 months storage 贮存 12 个月后
OCV (V)	≥1.59	≥1.57
SCC (A)	≥8.0	≥6.0

Remark1: OCV: Open Circuit Voltage 开路电压;SCC: Short Circuit Current 短路电流.

Remark2: Test environment:20±2℃,55%±20%R.H;测试环境：20±2℃,相对湿度 55%±20%

Remark3: All samples shall be normalized for a minimum of 8 hours at the above environment prior to measurement. 测试前，应在上述环境放置至少 8 小时。

11.Discharge test (service life)放电性能:

Applications 应用	Load 负载	Daily Period 放电方式	Cut off Voltage 截止电压	Initial 初始值	After 12 months storage 贮存 12 个月后
High drain application 高功率应用	1.5W/0.65W	2s/28s,5m/h,24h/d	1.05V	100pulses	80pulses
Motor/Toy 电动机/玩具	3.9Ω	1h/d	0.8V	7.5h	7.0h
Toy,non-motorized 玩具(非机动)	250mA	1h/d	0.9V	8.3h	7.7h
Portable lighting(LED) 手电筒(LED)	3.9Ω	4min/h,8h/d	0.9V	400min	365min
Radio/Clock/Remote Control 收音机/时钟/遥控	50mA	1h/8h,24h/d	1.0V	49.0h	45.0h
CD,digital audio,wireless gaming and accessories CD/电子游戏机/数码录音机	100mA	1h/d	0.9V	23.5h	21.5h

Remark1: Test environment:20±2℃,55%±20%R.H
测试环境：20±2℃,相对湿度 55%±20%

Remark2: The initial discharge test shall commence within 30 days of manufacture.
初始放电测试在电池生产后 30 天内进行；

Remark3: The discharge time is the minimum average duration (MAD).
放电时间均指最小平均放电时间（MAD）

Remark4: Test quantity: n=8pcs (for per discharge test).
检测数量 n=8 节（每一种放电检测）。

12.Leakage-proof structure 防漏性能:

- 12.1 The sealing location of the battery is provided with double beading scores to make the structure tighter.使用二次刻线封口技术，保证封口结构更加紧密；
- 12.2 Using special nylon sealing ring, with more reliable leakage-proof performance.
使用特种尼龙密封圈，保证更好的防漏液性能。

 PRODUCT SPECIFICATION 产品规格书			
Product 产品	Alkaline Zinc Manganese Dioxide battery; 1.5Volts 碱性锌-二氧化锰电池, 1.5V	Page 页码	3 of 4
Designation 规格	LR6(AA) Extra Long life	Document No.	J/PT311156.22-2020(A1)

13.Safety test (Test environment: 20±2℃,55%±20%R.H)

安全测试（测试环境：20±2℃,相对湿度 55%±20%）：

Test item 测试项目	Test method 测试方法	Quantity 数量	Requirements 测试要求
Storage after partial use 部分使用（部分放电）后贮存	See IEC 60086-5 Edition 5.0 6.3.2.1 Test A - Storage after partial use 具体测试方法见 IEC 60086-5（版本 5.0） 6.3.2.1 测试 A-部分使用（部分放电）后贮存	5	No leakage 不泄露 No fire 不着火 No explosion 不爆炸
Transportation-shock 运输-冲击	See IEC 60086-5 Edition 5.0 6.3.2.2 Test B-1 - Transportation-shock 具体测试方法见 IEC 60086-5（版本 5.0） 6.3.2.2 测试 B-1-运输-冲击	5	No leakage 不泄露 No fire 不着火 No explosion 不爆炸
Transportation-vibration 运输-振动	See IEC 60086-5 Edition 5.0 6.3.2.3 Test B-2 - Transportation-vibration 具体测试方法见 IEC 60086-5（版本 5.0） 6.3.2.3 测试 B-2-运输-振动	5	No leakage 不泄露 No fire 不着火 No explosion 不爆炸
Climatic-temperature cycling 气候-温度循环	See IEC 60086-5 Edition 5.0 6.3.2.4 Test C - Climatic-temperature cycling 具体测试方法见 IEC 60086-5（版本 5.0） 6.3.2.4 测试 C-气候-温度循环	5	No fire 不着火 No explosion 不爆炸
Incorrect installation 不正确的安装	See IEC 60086-5 Edition 5.0 6.4.2.1 Test D - Incorrect installation(four batteries in series) 具体测试方法见 IEC 60086-5（版本 5.0） 6.4.2.1 测试 D-不正确的安装（四节电池串联）	20	No fire 不着火 No explosion 不爆炸
External short circuit 外部短路	See IEC 60086-5 Edition 5.0 6.4.2.2 Test E - External short circuit 具体测试方法见 IEC 60086-5（版本 5.0） 6.4.2.2 测试 E-外部短路	5	No fire 不着火 No explosion 不爆炸
Overdischarge 过放电	See IEC 60086-5 Edition 5.0 6.4.2.3 Test F - Overdischarge 具体测试方法见 IEC 60086-5（版本 5.0） 6.4.2.3 测试 F-过放电	20	No fire 不着火 No explosion 不爆炸
Free fall test 自由跌落	See IEC 60086-5 Edition 5.0 6.4.2.4 Test G - Free fall test 具体测试方法见 IEC 60086-5（版本 5.0） 6.4.2.4 测试 G-自由跌落	5	No fire 不着火 No explosion 不爆炸

Mustang	PRODUCT SPECIFICATION 产品规格书		
Product 产品	Alkaline Zinc Manganese Dioxide battery; 1.5Volts 碱性锌-二氧化锰电池, 1.5V	Page 页码	4 of 4
Designation 规格	LR6(AA) Extra Long life	Document No.	J/PT311156.22-2020(A1)

14.Expiry period: 5 years 有效期: 5 年

15.Expiry period marking 有效期表示方法:

15.1 Expiry date marked on the bottom plate of finished battery .

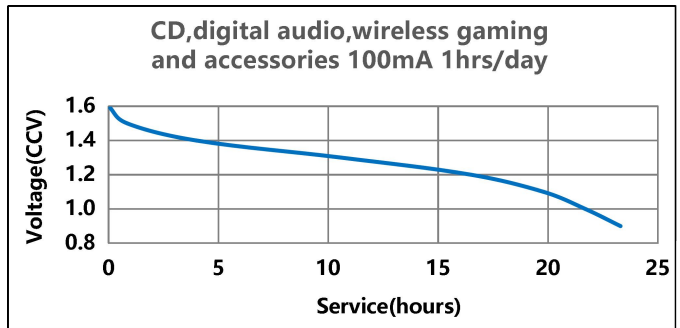
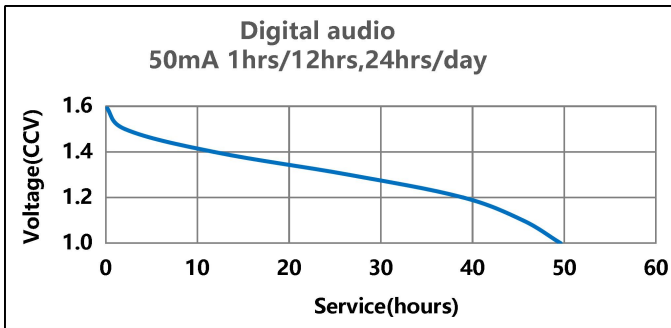
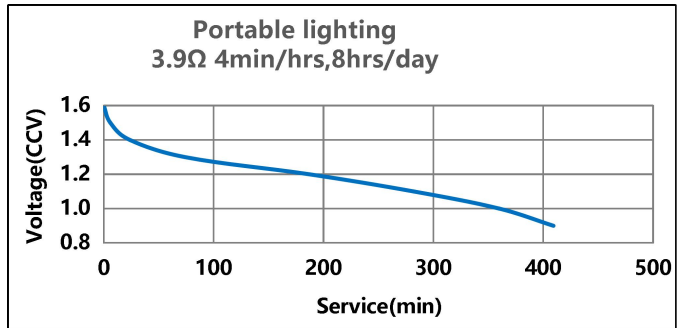
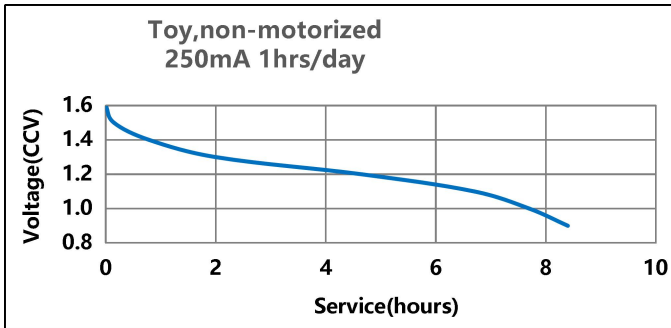
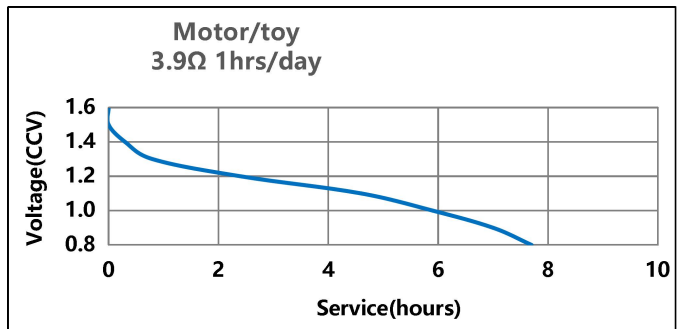
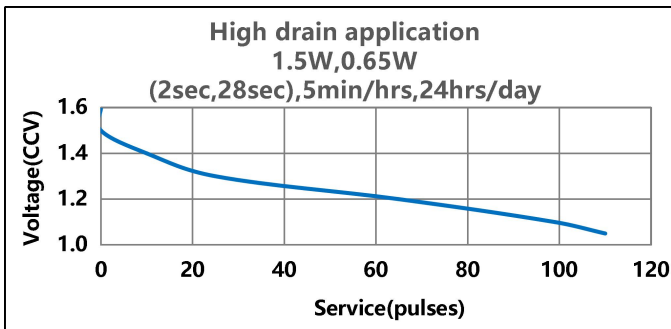
For example:“2027-08” means the expiry date is August 2027.

有效期标在电池的底部: 如 “2027-08” 表示电池的有效期至 2027 年 8 月。

15.2 For private label, can mark according to customer’s requirement.

做 OEM 定牌电池时, 可以根据客户的要求进行标示。

16.Discharge curve 放电曲线:





中国认可
检验
INSPECTION
CNAS IB0071



NO.2624010475

SAFETY DATA SHEET

Product Name: LR6 AA ALKALINE BATTERY 1.5V

Effective Date: 2024-01-09

Compiler: Chen Yushuang

Checker: Liu Wangqing

Approver: Dongxuesheng



Shanghai Institute of Chemical Industry Testing Co., Ltd.

PC25020094

DiADA



声 明

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Unless noted otherwise, the test type is consignment test.

7. 本报告的真伪性可登入本公司网站 <http://www.ghs.cn> 查询

The authenticity of the report can be checked via our website: <http://www.ghs.cn>.

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ZHEJIANG MUSTANG BATTERY CO.,LTD

SAFETY DATA SHEET

LR6 AA ALKALINE BATTERY 1.5V

SECTION1 PRODUCT AND COMPANY IDENTIFICATION

Product name: LR6 AA ALKALINE BATTERY 1.5V
Company: ZHEJIANG MUSTANG BATTERY CO.,LTD
Address: NO. 818, Rongji Road, Luotuo, Zhenhai District, Ningbo City, Zhejiang
Province, 315200, P. R. China
Email: lxj@mustangbattery.com
Fax: 86-574-86593227
Emergency Phone: 86-574-86653777
Recommend use of the chemical and restrictions on use: /
SDS Number: 2624010475
Effective Date: 2024-01-09

SECTION2 HAZARDS IDENTIFICATION

The product is outside of the scope of GHS system.

Main Hazards:

Health Hazards:

The internal materials of battery are corrosive to the eyes and skin. Avoid directly inhaling and contacting with the internal materials of battery.

Environmental Hazards:

The internal materials of battery may be harmful to the environment. Pay attention to water system.

SECTION3 INFORMATION ON INGREDIENTS

Product name: LR6 AA ALKALINE BATTERY 1.5V

Ingredient	Concentration	CAS No.	EC No.
Manganese dioxide	33-40%	1313-13-9	215-202-6
Iron	14-20%	7439-89-6	231-096-4
Zinc	13-20%	7440-66-6	231-175-3

Water	7-11%	7732-18-5	231-791-2
Potassium hydroxide	5-9%	1310-58-3	215-181-3
Copper	2-4%	7440-50-5	231-159-6
Graphite	2-3%	7782-42-5	231-955-3
Nylon	1-2%	63428-84-2	805-352-6
PVC	1-2%	9002-86-2	618-338-8
Aluminum	0.2-0.6%	7429-90-5	231-072-3

SECTION4 FIRST-AID MEASURES

Skin Exposure:

If in contact with the internal materials of battery, remove the contaminated clothing, shoes and socks, immediately flush with plenty of water for at least 20 minutes. Call a physician.

Eye Exposure:

If in contact with the internal materials of battery, lift your eyelids immediately and rinse them with running water for more than 20 minutes. Call a physician.

Inhalation Exposure:

If the internal materials of battery are inhaled, immediately remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Call a physician.

Oral Exposure:

Do not induce vomiting if the internal materials of battery are swallowed. Call a physician immediately.

Most Important Symptoms/Effects, Acute and Delayed:

No data available.

Indication of Immediate Medical Attention and Special Treatment Needed, if Necessary:

No data available.

SECTION5 FIRE FIGHTING MEASURES

Suitable Extinguishing Media:

Suitable: Dry chemical, Carbon dioxide and appropriate foam.

Specific Hazards Arising from the Chemical:

The battery may leak liquid, leak gas or explode. The leaking electrolyte may be corrosive. Under the conditions of short circuits, overcharging, over-discharging, puncture, squeezing, and exposing the battery over the maximum rated temperature specified by manufacture, the battery may burn or explode.

Special Protective Action for Fire-fighters:

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Fire-extinguishing work is done from the windward. Uninvolved persons should evacuate to a safe place.

SECTION6 ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures:

Use personal protective equipment. Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Entry to noninvolved personnel should be controlled around the leakage area by roping off. Remove all sources of ignition.

Environmental Precautions:

Avoid leakage getting into the earth, ditches or waters. Avoid directly releasing the washing waste-water into the environment.

Methods and Materials for Containment and Cleaning up:

If the electrolyte leaks, use dry soil, dry sand or other non-combustible materials to absorb and cover the leakage. Sweep up with spade and transfer to a dry, clean, lidded container for disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

SECTION7 HANDLING AND STORAGE**Precautions for Safe Handling:**

Operators should be trained and strictly abide by operating procedures. Wear appropriate protective clothing and safety gloves. Avoid inhaling and contacting with the internal materials of battery. Handling is performed in a well ventilated place. No smoking at working site. Incompatibilities: strong oxidizing agents, corrosives. If it is not intend to do, the battery should not be short-circuited, overcharged, over-discharged, punctured and crushed. Do not expose the battery over the maximum rated temperature specified by manufacture.

Conditions for Safe Storage, Including Any Incompatibilities:

Store in a cool, dry, and well-ventilated area. Keep away from ignition sources, heat and flame. Store in a tightly closed container. Incompatibilities: strong oxidizing agents, corrosives. The battery must be firmly packed in inner packaging so as to effectively prevent short circuits and short circuits caused by movement. Storage place should be equipped with appropriate varieties and quantities of fire fighting equipment and leakage emergency treatment equipment.

SECTION8 EXPOSURE CONTROL/PPE**Control Parameters:**

GBZ 2.1-2019 Occupational Exposure Limits for Hazardous Agents in the Workplace - Part 1: Chemical Hazardous Agents:

Manganese and inorganic compounds, as MnO_2 PC-TWA $0.15mg/m^3$

Copper (calculated as Cu) : Copper dust PC-TWA $1mg/m^3$; Copper smoke PC-TWA $0.2mg/m^3$

Aluminum metal, aluminum alloy dust: PC-TWA $3mg/m^3$ (Total dust)

Graphite dust: PC-TWA $4mg/m^3$ (Total dust) ; PC-TWA $2mg/m^3$ (Inhalable dust)

Polyvinyl chloride dust :PC-TWA $5mg/m^3$ (Total dust)

Potassium hydroxide: MAC $2mg/m^3$

ACGIH:

Copper: TLV-TWA $1mg(Cu)/m^3$ Dust, smoke; TLV-TWA $0.2mg(Cu)/m^3$ Smoke

Aluminum: TLV-TWA $1mg/m^3$

Graphite: TLV-TWA $2mg/m^3$

Polyvinyl chloride: TLV-TWA $1mg/m^3$

Potassium hydroxide: TLV-CL $2mg/m^3$

Appropriate Engineering Controls:

Mechanical exhaust required. Safety shower and eye bath.

Individual Protection Measures:**Eye/Face Protection:**

Wear chemical safety glasses if needed.

Skin Protection:

Hand Protection: Wear safety gloves. Body Protection: Wear appropriate protective clothing.

Respiratory Protection:

Wear government approved respirator if needed.

Thermal Hazards:

No data available.

Other Protect:

No smoking, drinking and eating at working site. Wash thoroughly after handling.

SECTION9 PHYSICAL/CHEMICAL PROPERTIES**Appearance:** Yellow and white cylinder plastics film shell**Odor:** Odorless**pH Value:** 11-12**Solubility:** Partial soluble in water**Boiling Point,** No data available**Initial Boiling
Point and Boiling****Range:****Melting** >300°C**Point/Freezing****Point:****Flash Point** No data available**(Closed Cup):****Density/Relative** No data available**Density:****Kinematic** No data available**Viscosity:****Lower/Upper** No data available**Explosion****Limit/Flammabili****ty Limit:****Vapour Pressure:** No data available**Relative Vapor** No data available**Density:****Partition** No data available**Coefficient****N-Octanol/Water(****Log Value):****Autoignition** No data available**Temperature:****Decomposition** No data available**Temperature:****Particle** No data available**Characteristics:****Flammability** No data available**(Solid, Gas):****SECTION10 STABILITY AND REACTIVITY****Reactivity:**

No data available.

Chemical Stability:

Stable under normal temperatures and pressures.

Possibility of Hazardous Reactions:

No data available.

Conditions to Avoid:

Avoid exposure the battery over the maximum rated temperature specified by manufacture. Avoid charging, over-discharging, puncture, squeezing, short circuits and short circuits caused by movement.

Incompatible Materials:

Strong oxidizing agents, corrosives.

Hazardous Decomposition Products:

Carbon oxides, zinc and manganese oxides, etc.

SECTION11 TOXICOLOGICAL INFORMATION**Acute Toxicity:**

No data available.

Skin Corrosion/Irritation:

The electrolyte in the battery causes severe skin burns.

Serious Eye Damage/Irritation:

The electrolyte in the battery causes serious eye damage.

Respiratory Sensitization:

No data available.

Skin Sensitization:

No data available.

Carcinogenicity:

No data available.

Germ Cell Mutagenicity:

No data available.

Reproductive Toxicity:

No data available.

Specific Target Organ Toxicity -Single Exposure:

No data available.

Specific Target Organ Toxicity -Repeated Exposure:

No data available.

Aspiration Hazard:

No data available.

SECTION12 ECOLOGICAL INFORMATION**Toxicity:**

No data available.

Persistence and Degradability:

No data available.

Bioaccumulative Potential:

No data available.

Mobility in Soil:

No data available.

Other Adverse Effects:

No data available.

SECTION13 DISPOSAL CONSIDERATION**Disposal Methods:**

The discarded battery is listed in "Catalogue of Hazardous Waste", Number: HW23, Category: Zinc-containing Waste.

The disposal of discarded battery shall comply with the requirements of relevant laws, regulations, policies and standards such as the "Law of the People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Waste" and "Technical Policy for the Prevention and Control of Waste Battery Pollution". Contact a licensed professional waste disposal service to dispose of wastes. Used battery being transported for disposal or reclamation should be carefully checked prior to shipment to ensure the integrity of each battery and its suitability for transport.

SECTION14 TRANSPORT INFORMATION

RID/ADR (2023 Edition) : The product is not subject to RID/ADR.

IATA DGR (65th Edition) : The product is not subject to IATA DGR according to special provision A123.

IMO IMDG CODE (2022 Edition) : The product is not subject to IMO IMDG CODE.

SECTION15 REGULATORY INFORMATION

Domestic Regulations:

Regulations Concerning Road Transportation of Dangerous Goods (JT/T 617-2018) :
The product is not subject to JT/T 617-2018.

List of Dangerous Goods (GB 12268-2012) :
The product is not subject to GB 12268-2012.

List of Dangerous Goods by Rail (TB/T 30006-2022) :
The product is not subject to TB/T 30006-2022.

International Regulations:

Directive (EU) 2023/1542 and 2013/56/EU:
The label, disposal and recycling of the battery shall meet the requirements of EU Directive (EU) 2023/1542 and 2013/56/EU.

SECTION16 OTHER INFORMATION

Preparation Date:
2024-01-09

Preparation Department:
Shanghai Institute of Chemical Industry Testing Co., Ltd. Tel(Fax):+86-21-52815377/31765555

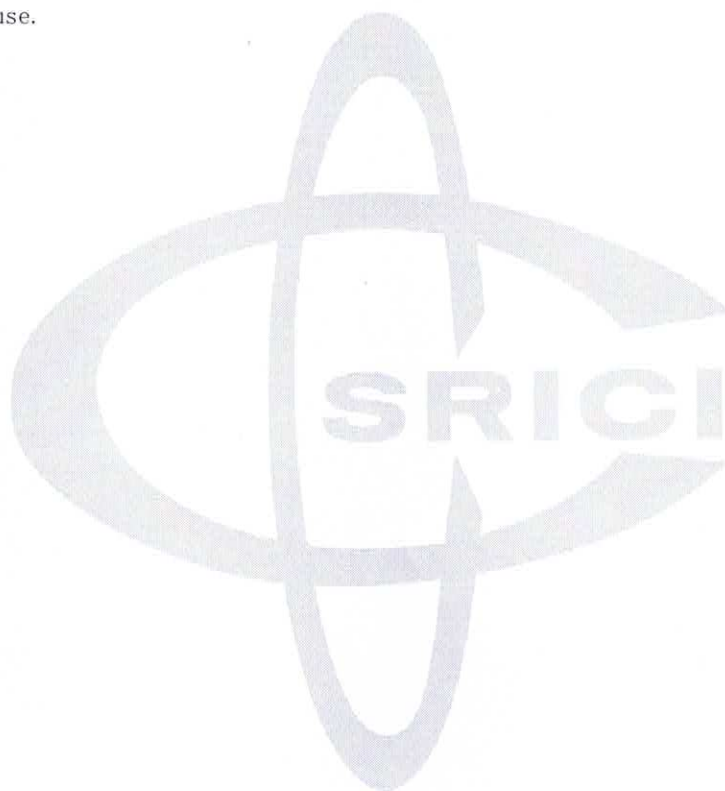
Revision:
0

Abbreviations and Acronyms:

CAS: Chemical Abstracts Service EC: European Commission PC-TWA: Permissible concentration-time weighted average TLV-TWA: Threshold limit value-time weighted average TLV-CL: Threshold limit value-ceiling limit MAC: Maximum allowable concentration ACGIH: American Conference of Governmental Industrial Hygienists RID: Regulations concerning the International Carriage of Dangerous Goods by Rail ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road IATA DGR: International Air Transport Association Dangerous Goods Regulations IMO IMDG CODE: International Maritime Organization International Maritime Code for Dangerous Goods EU: European Union

Other Information:

This SDS is only compiled for battery and based on the information such as ingredients provided by the applicant and our current knowledge. This SDS shall be used only as a guide. If the battery is used as a component in another product, the information in this SDS may not be applicable. The users of this SDS must make independent judgments on the correctness and completeness and then decide its suitability according to the actual situation. The users should take the relevant legal responsibilities for the consequences of use.





END OF REPORT

Test Report

Number: 2401B1316SHA-004

Applicant: ZHEJIANG MUSTANG BATTERY CO., LTD.
NO.818, RONGJI RD., ZHENHAI, LUOTUO,
NINGBO, ZHEJIANG, CHINA.

Date: Feb. 06, 2024

Sample Description:

One (1) submitted sample said to be: **Battery with Colorful Printing**

Item Name : Battery

Model No. : LR6

Tests conducted:

As requested by the applicant, for details refer to attached page(s).

Conclusion:

<u>Tested sample</u>	<u>Standard</u>	<u>Result</u>
Submitted sample	Heavy Metals Content Requirement in Annex I to the EU Regulation (EU) 2023/1542 concerning batteries and waste batteries	Pass
	Labelling Requirement of Separate Collection Symbol and Chemical Symbol in Article 13(4) and (5) of the EU Regulation (EU) 2023/1542 concerning batteries and waste batteries	Pass
	U.S. Mercury Containing and Rechargeable Battery Management Act — Public Law 104-142 (May 13,1996)	Pass

To be continued

Authorized by:
For Intertek testing services Ltd., Shanghai

Wenjia

Wenjia Gu
Senior Manager



Test Report

Number: 2401B1316SHA-004

Tests Conducted

1. Heavy Metals Content (EU Batteries Regulation (EU) 2023/1542)

With reference to EPA/SW-846, by Atomic Absorption Spectrophotometric analysis / Inductively Coupled Argon Plasma Spectrometry (ICP) analysis.

<u>Element</u>	<u>Result (%)</u>	<u>Detection Limit (%)</u>	<u>Limit (%)</u>
Mercury (Hg)	ND	0.0001	0.0005
Cadmium (Cd)	ND	0.001	0.002
Lead (Pb)	ND	0.002	0.01

The limit and reference value were quoted according to EU Regulation (EU) 2023/1542 concerning batteries and waste batteries, Article 6(1), Article13(5) and Annex I on heavy metals content.

ND = Not detected (less than detection limit)

Date sample received: Jan. 26, 2024

Testing period: Jan. 26, 2024 To Feb. 02, 2024

2. Examination of Labelling on Batteries of Separate Collection and Chemical Symbol(s) (EU Batteries Regulation (EU) 2023/1542)

<u>Item</u>	<u>Result</u>	<u>Requirement</u>
Separate collection symbol	Compliant	Appropriate separate collection symbol is required.

Date sample received: Jan. 26, 2024

Testing period: Jan. 26, 2024 To Feb. 02, 2024

To be continued

Test Report

Number: 2401B1316SHA-004

Tests Conducted

3. Mercury (Hg) content

With reference to USEPA 3052, acid digestion method was used and determined by Inductively Coupled Plasma (ICP).

Result: ND

Limit: 1mg/kg

Detection Limit: 1mg/kg

Remark: ND = Not Detected

Date sample received: Jan. 26, 2024

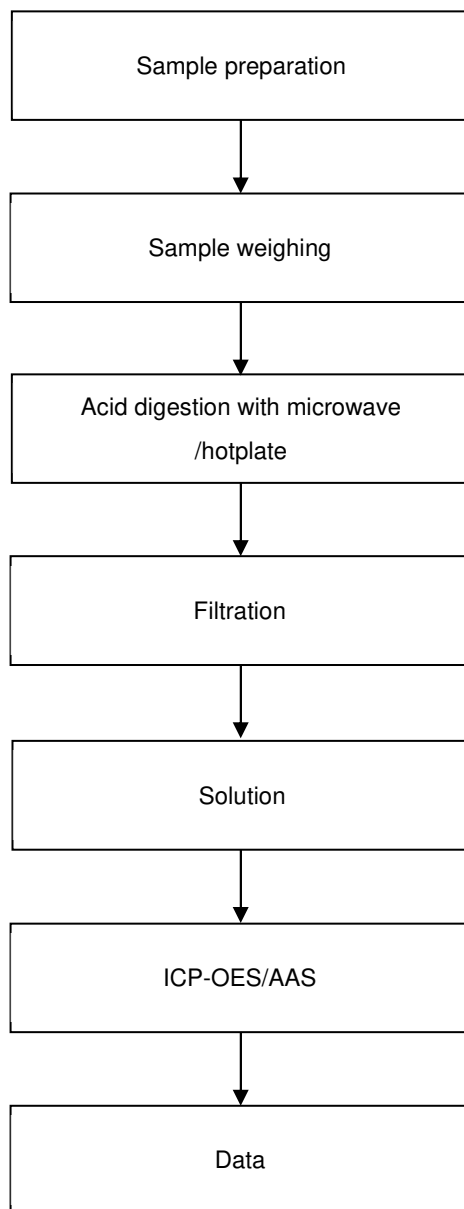
Testing period: Jan. 26, 2024 To Feb. 02, 2024

To be continued



Tests Conducted

Testing flow chart : Pb/Cd/Hg



End of report

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