No.: 171801-4962-2

TEST REPORT

UN 38.3

NAME OF SAMPLE: Gama Akümülatör Sanayi ve Ticaret Limited Şirketi
Çalı Mah. OSB 4, Çalı, 410. Sk. No.:4, 16110 Nilüfer /Bursa/
Türkiye

CLIENT: LİTYUM AKÜ GAMALLON

CLASSIFICATION OF TEST: **PTC ÜRÜN TEST VE BELGELENDİRME SAN. TİC. LTD. ŞTİ**

TEST REPORT

Name of samples: Lithium Iron Phosphate Battery Pack	Type/Model: 83.2 V ; 46.59 kW ; Class II ; IP65
Colour: Silver	Physical shape: Prismatic
Commissioned by: Gama Akümülatör Sanayi ve Ticaret Limited Şirketi	Commissioner address:NO. Çalı Mah. OSB 4, Çalı, 410. Sk. No.:4, 16110 Nilüfer /Bursa/ Türkiye
Manufacturer: Gama Akümülatör Sanayi ve Ticaret Limited Şirketi	Manufacturer address: Çalı Mah. OSB 4, Çalı, 410. Sk. No.:4, 16110 Nilüfer /Bursa/ Türkiye
Factory: Same as manufacturer	Factory address: Same as manufacturer
Classification of test: Commission Test	Quantity of sample: GAMALLON-80V-560AH
Tested according to:	Sample identification: LİTYUM AKÜ
Receiving date: 01. 10. 2026	Means of receiving: Submitted by commissioner
Completing date: 01.10.2026	Test item: 7 items

Test conclusion:

The Lithium iron phosphate Batteries Pack submitted by Gama Akümülatör Sanayi ve Ticaret Limited Şirketi are tested according to Section 38.3 of the Seventh revised edition of the Manual of Tests and Criteria (ST/SG/AC.10/11/Rev.7/Section 38.3). The test items are full items. The test results comply with the relevant requirements of the standard.

Date of issue: 01.10.2026

Title: Manager

Approved by:

Person in Performing the Test

PTC ÜRÜN TEST ve BELGELENDİRME San. Tic. Ltd. Şti. Quality Assurance Service

Description and illustration of the sample:

The sample's status is good

Cell Dimensions: 400,8mm*109,5mm*39,5mm

Watt-hour rating of each battery: 83.2 V ; 46.59 kW ; Class II ; IP65

Test item	Sample No.	State	Remark
T.1~T.5	b1#~b2#	at first cycle, in fully charged states	-
	b3#~b4#	after 25 cycles ending in fully charged states	
T.6	c1#~c5#	at first cycle at 50% of the design rated capacity	-
	c6#~c10#	after 25 cycles ending at 50% of the design rated capacity	
T.8	c11#~c20#	at first cycle, in fully discharged states	-
	c21#~c30#	after 25 cycles ending in fully discharged states	-

Description of the sampling procedure:

/

Description of the deviation from the standard, if any:

/

Remarks:

Throughout this report a comma is used as the decimal separator.

The Batteries have not equipped with overcharge protection. According to commissioner, the batteries are designed for use only in equipments, Which affords such protection, According to the UN38.3 standard, the sample is not subject to the requirements of overcharge.

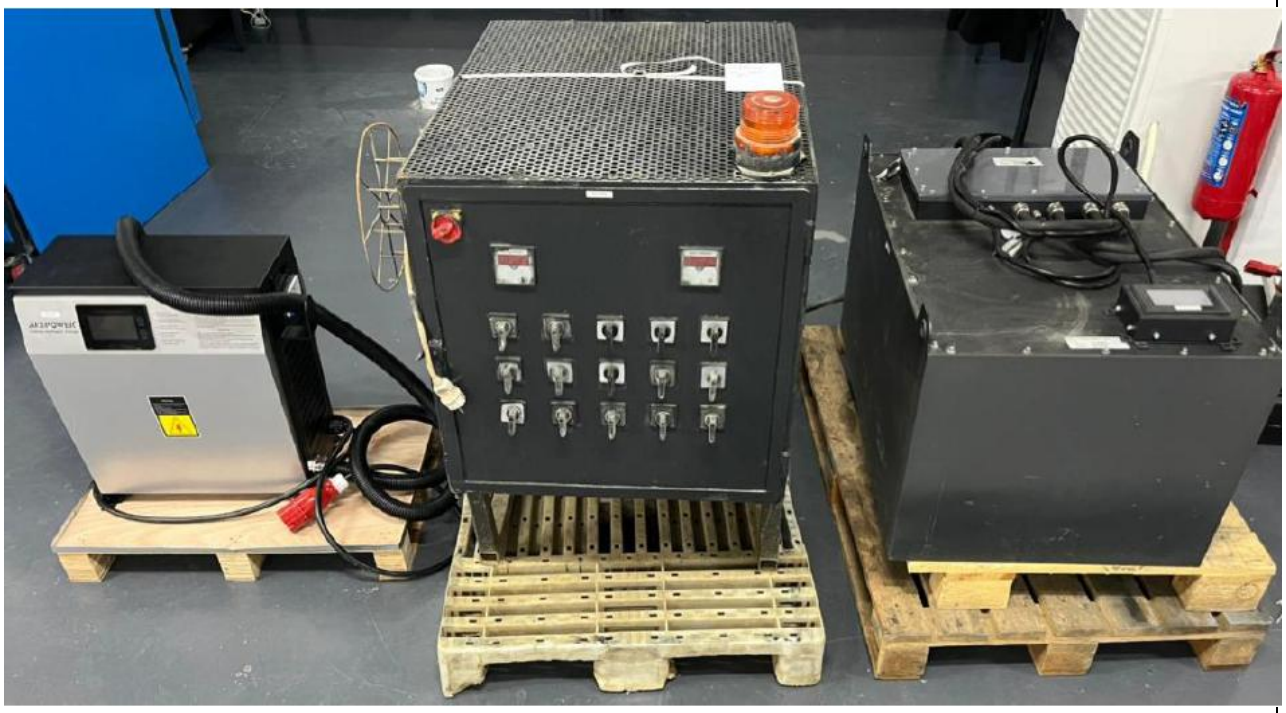
Photos of Samples and Labels

Battery（8 83.2 V ; 46.59 kW ; Class II ; IP65

7.3.3	TABLE: Propagation test (battery system)				P
Sample No.	**OCV of Battery System Before Test, (V dc)**	**OCV of Target Cell Before Test, (V dc)**	**Maximum Cell Case Temperature, (°C)**	**Maximum DUT Enclosure Temperature, (°C)**	**Results**
1	91,0	3,35	612	78	A

Photos of Samples and Labels

Component Cell



38.3.4	**Procedure**	—
38.3.4.1	**Test T.1: Altitude simulation T.1** Test cells and batteries shall be stored at a pressure of 11,6kPa or less for at least six hour at ambient temperature (20±5℃) Requirement 1 Cells and batteries Mass loss limit: ≤0,1% 2 Open circuit voltage not less than 90%, The requirement relating to voltage is not applicable to test cells and batteries at full discharged states. 3 No leakage, no venting, no disassembly, no rupture and no fire The samples b1#~b4# : No leakage, no venting, no disassembly, no rupture and no fire/ The data is shown in Table	**P**
38.3.4.2	**Test T.2: Thermal testT. 2:** Test cells and batteries are to be stored for： 1 For small cells and batteries: one temperature cycle: 72±2℃(6h) —-40±2℃(6h) 72±2℃(6h) —-40±2℃(6h) For large cells and batteries: one temperature cycle: 72±2℃(12h) —-40±2℃(12h) 72±2℃(12h) —-40±2℃(12h) 2 The maximum time interval between test temperature extremes is 30 minutes 30min 3 This procedure is to be repeated 10 times/ 4 after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20±5℃) Requirements/ 1 Cells and batteries Mass loss limit: ≤0,1% 2 Open circuit voltage not less than 90%, The requirement relating to voltage is not applicable to test cells and batteries at full discharged states. 3 No leakage, no venting, no disassembly, no rupture and no fire The samples b1#~b4# : No leakage, no venting, no disassembly, no rupture and no fire/ The data is shown in Table	**P**

38.3.4.3	**Test T.3: Vibration** 1 Cells and batteries are firmly secured to the platform of the vibration machine /电 2 The vibration: a sinusoidal waveform with a logarithmic sweep between 7Hz and 200Hz and back to 7Hz traversed in 15 minutes/ 3 For cells and small batteries: from 7 Hz a peak acceleration of 1gn is maintained until 18Hz is reached. The amplitude is then maintained at 0,8mm (1,6mm total excursion) and the frequency increased until a peak acceleration of $8g_n$ occurs (approximately 50Hz). A peak acceleration of $8g_n$ is then maintained until the frequency is increased to 200Hz. / For large batteries: from 7Hz a peak acceleration of $1g_n$ is maintained until 18Hz is reached. The amplitude is then maintained at 0,8mm (1,6mm total excursion) and the frequency increased until a peak acceleration of $2g_n$ occurs (approximately 25Hz). A peak acceleration of $2g_n$ is then maintained until the frequency is increased to 200Hz. / 4 This cycle repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting position of the cell. One of the directions of vibration must be perpendicular to the terminal face.		**P**
	Requirements 1 Cells and batteries Mass loss limit: ≤0,1% 2 Open circuit voltage not less than 90%, The requirement relating to voltage is not applicable to test cells and batteries at full discharged states. 3 No leakage, no venting, no disassembly, no rupture and no fire	The samples b1#~b4#: No leakage, no venting, no disassembly, no rupture and no fire b1#~b4# The data is shown in Table	

38.3.4.4	**Test T.4: ShockT. 4:** 1 Test cells and batteries shall be secured to the testing machine 2 Each cell shall be subjected to a half-sine shock of peak acceleration of 150 g_n and pulse duration of 6 milliseconds. Large cells may be subjected to a half-sine shock of peak acceleration of 50 gn and pulse duration of 11 milliseconds. / Small batteries shall be subjected to a half-sine shock of peak acceleration of 150 g_n (or Acceleration(g_n)= $\sqrt{\left(\frac{100850}{mass}\right)}$, which is smaller) and pulse duration of 6 milliseconds, large batteries shall be subjected to a half-sine of peak acceleration of 50 g_n (or Acceleration(g_n)= $\sqrt{\left(\frac{30000}{mass}\right)}$, which is smaller) and pulse duration of 11 milliseconds $150g_n$ $\left(\frac{100850}{mass}\right)$ 3 Each cell or battery shall be subjected to three shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks/		**P**
	Requirements/ 1 Cells and batteries Mass loss limit: ≤0,1% 2 Open circuit voltage not less than 90%, The requirement relating to voltage is not applicable to test cells and batteries at full discharged states. 3 No leakage, no venting, no disassembly, no rupture and no fire	The samples b1#~b4# : Acceleration= 30.8g_n No leakage, no venting, no disassembly, no rupture and no fire b1#~b4： = 30.8g_n The data is shown in Table	

38.3.4.5	**Test T.5: External Short Circuit/ T.5**		**P**
	1The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches 57±4℃/ 2 the cell or battery shall be subjected to a short circuit condition with a total external resistance of less than 0,1 ohm at 57±4℃, This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to 57±4℃, or in the case of the large batteries, has decreased by half of the maximum temperature increase observed during the test and remains below that value. / 3 the cell or battery must be observed for a further six hour for the test to be concluded,		
	Requirements During the test and within six hours after test ,the cells or batteries 1. External temperature not exceed 170℃ 2. No disassembly, no rupture and no fire.	The samples b1#~b4# : no disassembly, no rupture and no fire b1#~b4# The data is shown in Table	



	Test T.6: Impact / Crush / T.6:		**P**
	Impact (applicable to cylindrical cells not less than 18mm in diameter) /		
	1 This test sample cell or component cell is to be placed on a flat smooth surface/ 2 A 15,8 mm diameter bar is to be placed across the center of the sample, A 9,1kg mass is to be dropped from a height of 61±2,5cm onto the sample./ 3 The test sample is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15,8 mm ± 0,1mm diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single impact./		**N/A**
	Requirements 1 Cells external temperature not exceed 170℃. 2 No disassembly, no fire within six hours of this test	-	
38.3.4.6	Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18mm in diameter)		**P**
	1 A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1,5 cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached. / (a) applied force reaches 13 kN ± 0,78 kN. /13±0,78 (b) The voltage of the cell drops by at least 100 mV,/ 100 (c) The cell is deformed by 50% or more of its original thickness./。 2. A prismatic or pouch cell shall be crushed by applying the force to the widest side. A button/coin cell shall be crushed by applying the force on its flat surfaces. For cylindrical cells, the crush force shall be applied perpendicular to the longitudinal axis. /		
	Requirements/ 1 Cells external temperature not exceed 170℃. 2 No disassembly, no fire within six hours of this test	The samples c1#~c10#: no disassembly and no fire/ The data is shown in Table	

38.3.4.7	**Test T.7: OverchargeT. 7:**		**N/A**
	1 The charge current shall be twice the manufacturer's recommended maximum continuous charge current 2 2 The minimum voltage of the test shall be as follows/		
	a) When the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or b) When the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1,2 times the maximum charge voltage/ 3 Tests are to be conducted at ambient temperature 20±5℃, The duration of the test shall be 24 hours/20±5	-	
	Requirements/ No disassembly and no fire within seven days of this test	-	
38.3.4.8	**Test T.8: Forced dischargeT. 8:**		**P**
	Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12 V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer,		
	The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere)		
	Requirements/ No disassembly and no fire within seven days of this test	The samples c11#~c30#: no disassembly and no fire/ The data is shown in Table	

Table1：T1~T5 /											
Sample No.	**Mass prior to test (kg)**	**OCV prior to test (V)**	**Test T.1: Altitude simulation/**		**Test T.2: Thermal test/**		**Test T.3: Vibration/**		**Test T.4: Shock/**		**Test T.5: External Short Circuit/**
			Mass Loss(%)	OCV Retention Ratio(%)	Mass Loss(%)	OCV Retention Ratio(%)	Mass Loss(%)	OCV Retention Ratio(%)	Mass Loss(%)	OCV Retention Ratio(%)	Temp. (℃)
b1#	31,69	13,538	0,000	99,49	0,000	98,97	0,000	99,98	0,000	100,00	57,7
b2#	31,76	13,376	0,000	99,83	0,000	99,73	0,000	99,98	0,000	100,00	57,2
b3#	31,75	13,393	0,000	99,76	0,000	99,70	0,000	99,98	0,000	100,00	57,3
b4#	31,73	13,429	0,000	99,62	0,000	99,59	0,000	99,98	0,000	100,00	57,9

Table2: Crush											
Test T.6: Crush/	Sample No.	c1#	c2#	c3#	c4#	c5#	c6#	c7#	c8#	c9#	c10#
	OCV prior to test /	3,293	3,293	3,293	3,294	3,295	3,294	3,294	3,294	3,292	3,292
	Temp. (℃)	24,2	24,8	24,5	24,3	24,3	24,9	24,3	24,2	24,7	24,6

Table 3：Forced discharge /											
Test T.8: Forced discharge **/**	Sample No.	c11#	c12#	c13#	c14#	c15#	c16#	c17#	c18#	c19#	c20#
	OCV prior to test	2,801	2,803	2,801	2,805	2,802	2,802	2,804	2,805	2,803	2,803
	Sample No.	c21#	c22#	c23#	c24#	c25#	c26#	c27#	c28#	c29#	c30#
	OCV prior to test /	2,808	2,802	2,805	2,805	2,801	2,804	2,801	2,807	2,803	2,802

Important

1. 。
   The test report is invalid without the seal of CVC.
   Nobody is allowed to photocopy or partly photocopy this test report without written permission of CVC.
2. 。
   The test report is invalid without the signatures of Ratifier, Reviewer and Testing engineer.
   The test report is invalid if altered,
3.
   Objections to the test report must be submitted to CVC within 15 days,
   The test report is valid for the tested samples only.
   As for the Verdict, “-” means “no need for judgement”, “P” means “pass” ， “F” means “fail” and “N/A” means “not applicable”.

The test data and test results given in this test report should only be used for purposes of scientific research, teaching and internal quality control when the CMA symbol is not presented.

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