
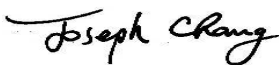





Test Report issued under the responsibility of:



TEST REPORT IEC 62133, Second Edition Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications	
Report Number	BATT-4786793087-A-1
Date of issue	2015-06-12, Correction 1: 2015-06-15
Total number of pages	23
Applicant's name	E-ONE MOLI ENERGY CORP
Address	NO.10, DALI 2ND RD., SHANHUA DIST, TAINAN CITY, 74144 TAIWAN
Test specification:	
Standard	IEC 62133: 2012 (Second Edition)
Test procedure	CB Scheme
Non-standard test method	N/A
Test Report Form No.	IEC62133B
Test Report Form(s) Originator	UL(Demko)
Master TRF	Dated 2013-03
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Test item description	Rechargeable Lithium-Ion Battery
Trade Mark	MoliceL or 
Manufacturer	E-ONE MOLI ENERGY CORP No.10, Dali 2nd Rd., Shanhua Dist., Tainan City 74144, Taiwan
Model/Type reference	MCR-1821J/1-H, 2ICR19/66
Ratings	7.4V dc, 2.4Ah/17.76Wh

Testing procedure and testing location:		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	
Testing location/ address :		Underwriters Laboratories Taiwan Co., Ltd. 260 Da-Yeh Road, 112 Peitou Taipei City, Chinese Taipei
<input type="checkbox"/>	Associated CB Testing Laboratory:	
Testing location/ address :		
Tested by (name + signature) :		Joseph Chang 
Approved by (name + signature) :		Daniel Chiang 
<hr/>		
<input type="checkbox"/>	Testing procedure: TMP	
Testing location/ address :		
Tested by (name + signature) :		
Approved by (name + signature) :		
<hr/>		
<input type="checkbox"/>	Testing procedure: WMT	
Testing location/ address :		
Tested by (name + signature) :		
Witnessed by (name + signature) :		
Approved by (name + signature) :		
<hr/>		
<input type="checkbox"/>	Testing procedure: SMT	
Testing location/ address :		
Tested by (name + signature) :		
Approved by (name + signature) :		
Supervised by (name + signature) .. :		

<p>List of Attachments (including a total number of pages in each attachment): National Differences (0 pages) Enclosures (9 pages)</p>	
<p>Summary of testing:</p>	
<p>Tests performed (name of test and test clause): For Rechargeable Li-ion Battery, Model MCR-1821J/1-H, 2ICR19/66 by E-One Moli Energy Corp.:</p> <p>8.2.2 – Moulded case stress at high ambient temperature (battery) 8.3.2 – External short circuit 8.3.3 – Free fall 8.3.6 – Overcharge</p>	<p>Testing location: Underwriters Laboratories Taiwan Co., Ltd. 260 Da-Yeh Road, 112 Peitou Taipei City, Chinese Taipei</p>
<p>Summary of compliance with National Differences List of countries addressed: No difference for EN 62133: 2013.</p> <p><input checked="" type="checkbox"/> The product fulfils the requirements of IEC 62133:2012</p>	

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.



Test item particulars.....:	
Classification of installation and use.....:	N/A
Supply connection.....:	N/A
Recommend charging method declared by the manufacturer.....:	CC / CV
Discharge current (0,2 I, A)	480mA
Specified final voltage	5.0Vdc
Chemistry	<input type="checkbox"/> nickel systems <input checked="" type="checkbox"/> lithium systems
Recommend of charging limit for lithium system	
Upper limit charging voltage per cell.....:	4.25V for cell, 8.45V for pack.
Maximum charging current	1650mA
Charging temperature upper limit	45°C
Charging temperature lower limit.....:	0°C
Polymer cell electrolyte type	<input type="checkbox"/> gel polymer <input type="checkbox"/> solid polymer
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item	2015-05-14
Date (s) of performance of tests	2015-05-21
General remarks:	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.	
Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.	

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided

- Yes**
 Not applicable

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies)..... : E-ONE MOLI ENERGY CORP
 No.10, Dali 2nd Rd., Shanhua Dist., Tainan City
 74144, Taiwan

General product information:**Product Description:**

- Electronic components mounted on PWB with 2 series by 1 parallel cell housed in plastic enclosure and secured by adhesive.
- Model 2ICR19/66 is the marking of IEC 62133 requirement for the model, MCR-1821J/1-H.
- The battery pack is also investigated to EN 62133:2013.

Correction1 Report:

This test report shall be read in conjunction with the original report, number: BATT-4786793087-A-1 issue date 2015-06-12, CB Certification Number (DK-46264-UL) issued date 2015-06-12.

- This report was deemed to correction due to:
 1. Remove Cover page of page information and report information.
 2. Correct cell rating from 3.6V to 3.7V.

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
4	Parameter measurement tolerances		P
	Parameter measurement tolerances		P
5	General safety considerations		P
5.1	General		P
5.2	Insulation and wiring		P
	The insulation resistance between the positive terminal and externally exposed metal surfaces of the battery (excluding electrical contact surfaces) is not less than 5 MΩ	No metal surface.	N/A
	Insulation resistance (MΩ) :		—
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements		P
	Orientation of wiring maintains adequate creepage and clearance distances between conductors		P
	Mechanical integrity of internal connections accommodates reasonably foreseeable misuse		P
5.3	Venting		P
	Battery cases and cells incorporate a pressure relief mechanism or are constructed so that they relieve excessive internal pressure at a value and rate that will preclude rupture, explosion and self-ignition		P
	Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation nor inhibit pressure relief		P
5.4	Temperature/voltage/current management		P
	Batteries are designed such that abnormal temperature rise conditions are prevented	Regulating network, IC, MOSFET and Thermal Link were used.	P
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer	Batteries follow cell's charging limits.	P
	Batteries are provided with specifications and charging instructions for equipment manufacturers so that associated chargers are designed to maintain charging within the temperature, voltage and current limits specified	Battery charging instruction and spec were provided.	P
5.5	Terminal contacts		P
	Terminals have a clear polarity marking on the external surface of the battery		P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current		P
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance		P
	Terminal contacts are arranged to minimize the risk of short circuits		P
5.6	Assembly of cells into batteries		P
5.6.1	If there is more than one battery housed in a single battery case, cells used in the assembly of each battery have closely matched capacities, be of the same design, be of the same chemistry and be from the same manufacturer	No multi batteries in one case, and only one cell source was used.	N/A
	Each battery has an independent control and protection		N/A
	Manufacturers of cells make recommendations about current, voltage and temperature limits so that the battery manufacturer/designer may ensure proper design and assembly	Pack follow the recommendations in cell spec.	P
	Batteries that are designed for the selective discharge of a portion of their series connected cells incorporate separate circuitry to prevent the cell reversal caused by uneven discharges		N/A
	Protective circuit components are added as appropriate and consideration given to the end-device application	See Critical components information Table for details.	P
	When testing a battery, the manufacturer of the battery provides a test report confirming the compliance according to this standard	Cell was approved.	P
5.6.2	Design recommendation for lithium systems only		P
	For the battery consisting of a single cell or a single cellblock: - Charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Clause 8.1.2, Table 4; or		N/A
	- Charging voltage of the cell does not exceed the different upper limit of the charging voltage determined through Clause 8.1.2, NOTE 1.		N/A
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks: - The voltages of any one of the single cells or single cellblocks does not exceed the upper limit of the charging voltage, specified in Clause 8.1.2, Table 4, by monitoring the voltage of every single cell or the single cellblocks; or	Battery and cell's upper charging voltage is in the range of Table 4.	P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	- The voltages of any one of the single cells or single cellblocks does not exceed the different upper limit of the charging voltage, determined through Clause 8.1.2, NOTE 1, by monitoring the voltage of every single cell or the single cellblocks		N/A
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks: - Charging is stopped when the upper limit of the charging voltage, specified in Clause 8.1.2, Table 4, is exceeded for any one of the single cells or single cellblocks by measuring the voltage of every single cell or the single cellblocks; or		N/A
	- Charging is stopped when the upper limit of the different charging voltage, determined through Clause 8.1.2, NOTE 1, is exceeded for any one of the single cells or single cellblocks by measuring the voltage of every single cell or the single cellblocks		N/A
5.7	Quality plan		P
	The manufacturer prepares and implements a quality plan that defines procedures for the inspection of materials, components, cells and batteries and which covers the whole process of producing each type of cell or battery	Refer to ISO 9001 certification	P
6	Type test conditions		P
	Tests were made with the number of cells or batteries specified in Table 1 for nickel-cadmium and nickel-metal hydride systems and Table 2 for lithium systems, using cells or batteries that are not more than six months old	Lithium System	P
	Unless noted otherwise in the test methods, testing was conducted in an ambient of 20°C ± 5°C.		P
7	Specific requirements and tests (nickel systems)		N/A
7.1	Charging procedure for test purposes		N/A
7.2	Intended use		N/A
7.2.1	Continuous low-rate charging (cells)		N/A
	Results: No fire. No explosion		N/A
7.2.2	Vibration		N/A
	Results: No fire. No explosion. No leakage		N/A
7.2.3	Moulded case stress at high ambient temperature		N/A
	Oven temperature (°C)		—
	Results: No physical distortion of the battery casing resulting in exposure of internal components		N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
7.2.4	Temperature cycling		N/A
	Results: No fire. No explosion. No leakage.		N/A
7.3	Reasonably foreseeable misuse		N/A
7.3.1	Incorrect installation cell		N/A
	The test was carried out using: - Four fully charged cells of the same brand, type, size and age connected in series, with one of them reversed; or		N/A
	- A stabilized dc power supply.		N/A
	Results: No fire. No explosion..... :		N/A
7.3.2	External short circuit		N/A
	The cells or batteries were tested until one of the following occurred: - 24 hours elapsed; or		N/A
	- The case temperature declined by 20% of the maximum temperature rise		N/A
	Results: No fire. No explosion..... :		N/A
7.3.3	Free fall		N/A
	Results: No fire. No explosion.		N/A
7.3.4	Mechanical shock (crash hazard)		N/A
	Results: No fire. No explosion. No leakage.		N/A
7.3.5	Thermal abuse		N/A
	Oven temperature (°C)..... :		—
	Results: No fire. No explosion.		N/A
7.3.6	Crushing of cells		N/A
	The crushing force was released upon: - The maximum force of 13 kN ± 1 kN has been applied; or		N/A
	- An abrupt voltage drop of one-third of the original voltage has been obtained		N/A
	The cell is prismatic type and a second set of samples was tested, rotated 90° around longitudinal axis compared to the first set		N/A
	Results: No fire. No explosion..... :		N/A
7.3.7	Low pressure		N/A
	Chamber pressure (kPa)..... :		—
	Results: No fire. No explosion. No leakage.		N/A
7.3.8	Overcharge		N/A
	Results: No fire. No explosion..... :		N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
7.3.9	Forced discharge		N/A
	Results: No fire. No explosion..... :		N/A
8	Specific requirements and tests (lithium systems)		P
8.1	Charging procedures for test purposes		P
8.1.1	First procedure: This charging procedure applied to tests other than those specified in 8.1.2		P
8.1.2	Second procedure: This charging procedure applied to the tests of 8.3.1, 8.3.2, 8.3.4, 8.3.5, and 8.3.9	For battery pack, clause 8.3.2 was considered.	P
	If a cell's specified upper and/or lower charging temperature exceeds values for the upper and/or lower limit test temperatures of Table 4, the cells were charged at the specified values plus 5 °C for the upper limit and minus 5 °C for the lower limit		P
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1)		P
	For a different upper limit charging voltage (i.e. other than for lithium cobalt oxide systems at 4,25 V), the applied upper limit charging voltage and upper limit charging temperatures were adjusted accordingly		P
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1)		P
8.2	Intended use		P
8.2.1	Continuous charging at constant voltage (cells)		N/A
	Results: No fire. No explosion..... :		N/A
8.2.2	Moulded case stress at high ambient temperature (battery)		P
	Oven temperature (°C)	70°C	—
	Results: No physical distortion of the battery casing resulting in exposure if internal components	No physical distortion of the battery casing resulting in exposure.	P
8.3	Reasonably foreseeable misuse		P
8.3.1	External short circuit (cell)		N/A
	The cells were tested until one of the following occurred: - 24 hours elapsed; or		N/A
	- The case temperature declined by 20% of the maximum temperature rise		N/A
	Results: No fire. No explosion..... :		N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.2	External short circuit (battery)		P
	The cells were tested until one of the following occurred: - 24 hours elapsed; or		N/A
	- The case temperature declined by 20% of the maximum temperature rise		N/A
	In case of rapid decline in short circuit current, the battery pack remained on test for an additional one hour after the current reached a low end steady state condition	Battery shut down immediately and remained on test for an additional one hour.	P
	Results: No fire. No explosion..... :	(See Table 8.3.2)	P
8.3.3	Free fall		P
	Results: No fire. No explosion.		P
8.3.4	Thermal abuse (cells)		N/A
	The cells were held at 130°C ± 2°C for: - 10 minutes; or		N/A
	- 30 minutes for large cells (gross mass of more than 500 g as defined in IEC 62281)		N/A
	Oven temperature (°C)		—
	Gross mass of cell (g)		—
	Results: No fire. No explosion.		N/A
8.3.5	Crush (cells)		N/A
	The crushing force was released upon: - The maximum force of 13 kN ± 1 kN has been applied; or		N/A
	- An abrupt voltage drop of one-third of the original voltage has been obtained; or		N/A
	- 10% of deformation has occurred compared to the initial dimension		N/A
	Results: No fire. No explosion..... :		N/A
8.3.6	Over-charging of battery		P
	Test was continued until the temperature of the outer casing: - Reached steady state conditions (less than 10°C change in 30-minute period); or		N/A
	- Returned to ambient		P
	Results: No fire. No explosion..... :	(See Table 8.3.6)	P
8.3.7	Forced discharge (cells)		N/A
	Results: No fire. No explosion..... :		N/A
8.3.8	Transport tests		P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	Manufacturer's documentation provided to show compliance with UN Recommendations on Transport of Dangerous Goods	UN38.3 Report was provided.	P
8.3.9	Design evaluation – Forced internal short circuit (cells)		N/A
	The cells complied with national requirement for:		—
	The pressing was stopped upon: - A voltage drop of 50 mV has been detected; or		N/A
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) has been reached		N/A
	Results: No fire:		N/A
9	Information for safety		P
	The manufacturer of secondary cells ensures that information is provided about current, voltage and temperature limits of their products.		N/A
	The manufacturer of batteries ensures that equipment manufacturers and, in the case of direct sales, end-users are provided with information to minimize and mitigate hazards.	Refer to Enclosure ID-05 and 08	P
	Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product	Ditto.	P
	As appropriate, information relating to hazard avoidance resulting from a system analysis is provided to the end user:	Ditto.	P
10	Marking		P
10.1	Cell marking		N/A
	Cells marked as specified in the applicable cell standards: IEC 61951-1, IEC 61951-2 or IEC 61960.		N/A
10.2	Battery marking		P
	Batteries marked in accordance with the requirements for the cells from which they are assembled.	2ICR19/66	P
	Batteries marked with an appropriate caution statement.	See the copy of marking plate	P
10.3	Other information		P
	Storage and disposal instructions marked on or supplied with the battery.	Refer to Enclosure ID-05 and ID-08	P
	Recommended charging instructions marked on or supplied with the battery.		P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
11	Packaging		P
	The materials and packaging design are chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants.	Refer to Enclosure ID-07	P

Annex A	Charging range of secondary lithium ion cells for safe use		P
A.1	General		P
A.2	Safety of lithium-ion secondary battery		P
A.3	Consideration on charging voltage		P
A.3.1	General		P
A.3.2	Upper limit charging voltage		P
A.3.2.1	General		P
A.3.2.2	Explanation of safety viewpoint		P
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied	8.45 V	P
A.4	Consideration of temperature and charging current		P
A.4.1	General		P
A.4.2	Recommended temperature range		P
A.4.2.1	General		P
A.4.2.2	Safety consideration when a different recommended temperature range is applied	0 to 45°C	P
A.4.3	High temperature range		P
A.4.3.1	General		P
A.4.3.2	Explanation of safety viewpoint		P
A.4.3.3	Safety considerations when specifying charging conditions in high temperature range		P
A.4.3.4	Safety consideration when specifying new upper limit in high temperature range	Tested with 45°C.	P
A.4.4	Low temperature range		P
A.4.4.1	General		P
A.4.4.2	Explanation of safety viewpoint		P
A.4.4.3	Safety considerations, when specifying charging conditions in low temperature range		P
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range	Tested with -5°C	P
A.4.5	Scope of the application of charging current		N/A
A.5	Sample preparation		N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
A.5.1	General		N/A
A.5.2	Insertion procedure for nickel particle to generate internal short		N/A
	The insertion procedure carried out at 20°C±5°C and under -25 °C of dew point		N/A
A.5.3	Disassembly of charged cell		N/A
A.5.4	Shape of nickel particle		N/A
A.5.5	Insertion of nickel particle to cylindrical cell		N/A
A.5.5.1	Insertion of nickel particle to winding core		N/A
A.5.5.2	Mark the position of nickel particle on the both end of winding core of the separator		N/A
A.5.6	Insertion of nickel particle to prismatic cell		N/A

IEC 62133					
Clause	Requirement + Test	Result - Remark			Verdict
TABLE: Critical components information					P
Object/part no.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity ¹⁾
01. Plastic Enclosure	SABIC INNOVATIVE PLASTICS US L L C	Lexan 940 (f1)	V-0, minimum 1.1 mm thickness, Overall 71.0mm by 39.0mm by 20.6mm.	UL 94, UL746C	UL
02. Battery cell (2 cells provided, 1-parallel, 2-series)	E-ONE MOLI ENERGY CORP	ICR-18650J	3.7V, 2.37Ah.	IEC 62133 Report No.: FR 646573	IEC
03. PWB	Interchangeable	Interchangeable	V-1 minimum, 105°C	UL 796	UL
04. Thermal links (F1)	TAMURA CORP	T6D	50Vdc, Tf=139°C	UL 60691	UL
05. Current Fuse (F2)	AEM COMPONENTS (SUZHOU) CO LTD	F1206HI5000V0 32TM	Rated 5 A, 32 Vdc	UL 248-1	UL
06. MOSFET (Q1)	International Rectifier	IRF7313PbF	--	--	--
07. Protective IC (U1)	Seiko Instruments Inc.	S-8242B	--	--	--
08. Wiring, internal secondary ELV/SELV circuits	Interchangeable	Interchangeable	Rated minimum 80 °C, FEP, PTFE, PVC, TFE, neoprene or polyimide; or surface marked VW-1 or FT-1 or better.	UL 758	UL
Supplementary information: None.					

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

7.2.1	TABLE: Continuous low rate charge (cells)					N/A
Model	Recommended charging method, (CC, CV, or CC/CV)	Recommended charging voltage V_c , (Vdc)	Recommended charging current I_{rec} , (A)	OCV at start of test, (Vdc)	Results	
Supplementary information: <ul style="list-style-type: none"> - No fire or explosion - No leakage - Leakage - Fire - Explosion - Bulge - Others (please explain) 						

7.2.2	TABLE: Vibration			N/A
Model	OCV at start of test, (Vdc)		Results	
Supplementary information: <ul style="list-style-type: none"> - No fire or explosion - No leakage - Leakage - Fire - Explosion - Bulge - Others (please explain) 				

7.3.1	TABLE: Incorrect installation (cells)			N/A
Model	OCV of reversed cell, (Vdc)		Results	
Supplementary information: <ul style="list-style-type: none"> - No fire or explosion - No leakage - Leakage - Fire - Explosion - Bulge - Others (please explain) 				

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.2	TABLE: External short circuit					N/A
Model	Ambient (at 20°C ± 5°C or 55°C ± 5°C)	OCV at start of test, (Vdc)	Resistance of circuit, (Ω)	Maximum case temperature rise ΔT, (°C)	Results	
Supplementary information: - No fire or explosion - No leakage - Leakage - Fire - Explosion - Bulge - Others (please explain)						

7.3.6	TABLE: Crush			N/A
Model	OCV at start of test, (Vdc)	OCV at removal of crushing force, (Vdc)	Results	
Supplementary information: - No fire or explosion - No leakage - Leakage - Fire - Explosion - Bulge - Others (please explain)				

7.3.8	TABLE: Overcharge				N/A
Model	OCV prior to charging, (Vdc)	Maximum charge current, (A)	Time for charging, (hours)	Results	
Supplementary information: - No fire or explosion - No leakage - Leakage - Fire - Explosion - Bulge - Others (please explain)					

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.9	TABLE: Forced discharge (cells)				N/A
Model	OCV before application of reverse charge, (Vdc)	Measured reverse charge I_r , (A)	Time for reversed charge, (minutes)	Results	
Supplementary information: <ul style="list-style-type: none"> - No fire or explosion - No leakage - Leakage - Fire - Explosion - Bulge - Others (please explain) 					

8.2.1	TABLE: Continuous charging at constant voltage (cells)				N/A
Model	Recommended charging voltage V_c , (Vdc)	Recommended charging current I_{rec} , (A)	OCV at start of test, (Vdc)	Results	
Supplementary information: <ul style="list-style-type: none"> - A: No fire or explosion - B: No leakage - C: Leakage - D: Fire - E: Explosion - F: Bulge - G: Others (please explain) 					

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

8.3.1	TABLE: External short circuit (cell)					N/A
Model	Ambient, (°C)	OCV at start of test, (Vdc)	Resistance of circuit, (Ω)	Maximum case temperature rise ΔT , (°C)	Results	
Samples charged at charging temperature upper limit:						
Samples charged at charging temperature lower limit:						
Supplementary information:						
<ul style="list-style-type: none"> - A: No fire or explosion - B: No leakage - C: Leakage - D: Fire - E: Explosion - F: Bulge - G: Others (please explain) 						

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

8.3.2	TABLE: External short circuit (battery)					Pass
Model	Ambient, (°C)	OCV at start of test, (Vdc)	Resistance of circuit, (mΩ)	Maximum case temperature rise ΔT, (°C)	Results	
Samples charged at charging temperature lower limit: 45°C						
MCR-1821J/1-H	55.8	8.4480	69.1	0.0	A,F	
MCR-1821J/1-H	55.8	8.4400	68.5	0.1	A,F	
MCR-1821J/1-H	55.8	8.4465	69.0	0.0	A,F	
MCR-1821J/1-H	55.8	8.4550	74.5	-0.1	A,F	
MCR-1821J/1-H	55.8	8.4490	69.6	-0.2	A,F	
Samples charged at charging temperature lower limit: -5°C						
MCR-1821J/1-H	55.8	8.4295	68.6	0.1	A,F	
MCR-1821J/1-H	55.8	8.4225	68.8	0.0	A,F	
MCR-1821J/1-H	55.8	8.4300	70.0	0.3	A,F	
MCR-1821J/1-H	55.8	8.4260	70.0	0.2	A,F	
MCR-1821J/1-H	55.8	8.4255	69.0	0.1	A,F	
Supplementary information:						
A – No fire or Explosion						
B – Fire						
C – Explosion						
D – The test was completed after 24 h						
E – The test was completed after the pack casing cooled to 20% of the maximum temperature rise.						
F – The battery pack shut down immediately and remain on test for an additional one hour.						

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Clause	Requirement + Test	Result - Remark	Verdict

8.3.5	TABLE: Crush					N/A
Model	OCV at start of test, (Vdc)	OCV at removal of crushing force, (Vdc)	Width/diameter of cell before crush, (mm)	Required deformation for crush, (mm)	Results	
Samples charged at charging temperature upper limit						
Samples charged at charging temperature lower limit						
Supplementary information:						
<ul style="list-style-type: none"> - A: No fire or explosion - B: No leakage - C: Leakage - D: Fire - E: Explosion - F: Bulge - G: Others (please explain) Maximum forced was applied.						

8.3.6	TABLE: Over-charging of battery				P
Constant charging current (A)			4.8 A	—	
Supply voltage (Vdc)			8.45 V	—	
Model	OCV before charging, (Vdc)	Resistance of circuit, (Ω)	Maximum outer casing temperature, ($^{\circ}$ C)	Results	
MCR-1821J/1-H	5.4915	-	32.8	A	
MCR-1821J/1-H	5.5840	-	30.0	A	
MCR-1821J/1-H	5.5000	-	34.1	A	
MCR-1821J/1-H	5.4880	-	31.8	A	
MCR-1821J/1-H	5.4220	-	33.6	A	
Supplementary information:					
A - No fire or explosion B - No leakage C - Leakage D - Fire E - Explosion F - Bulge					

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

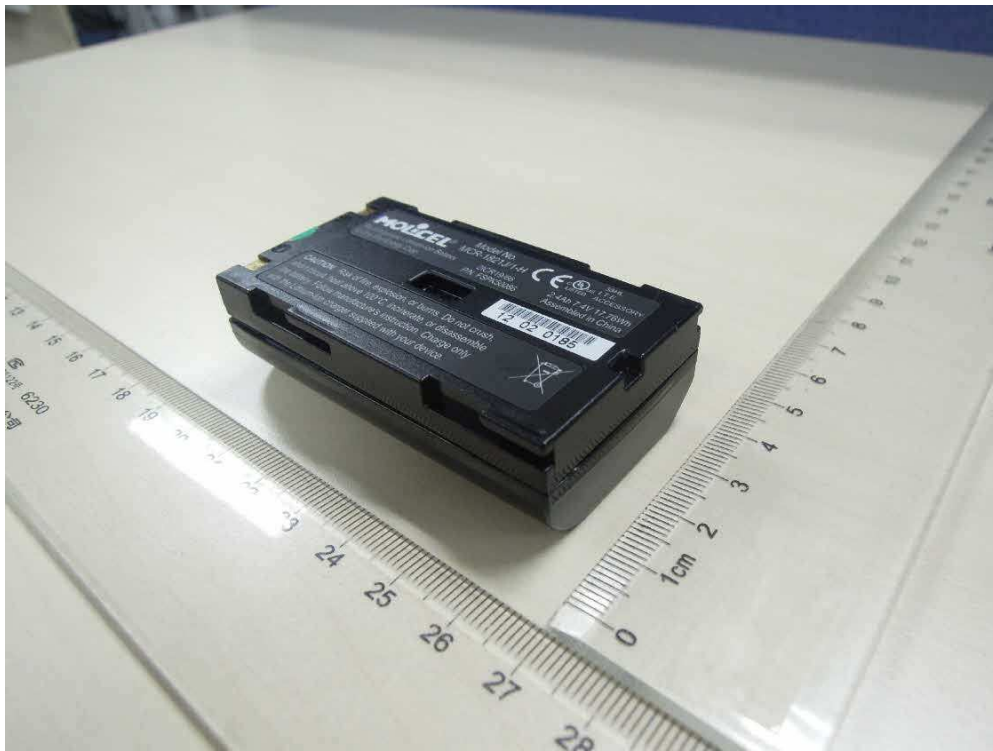
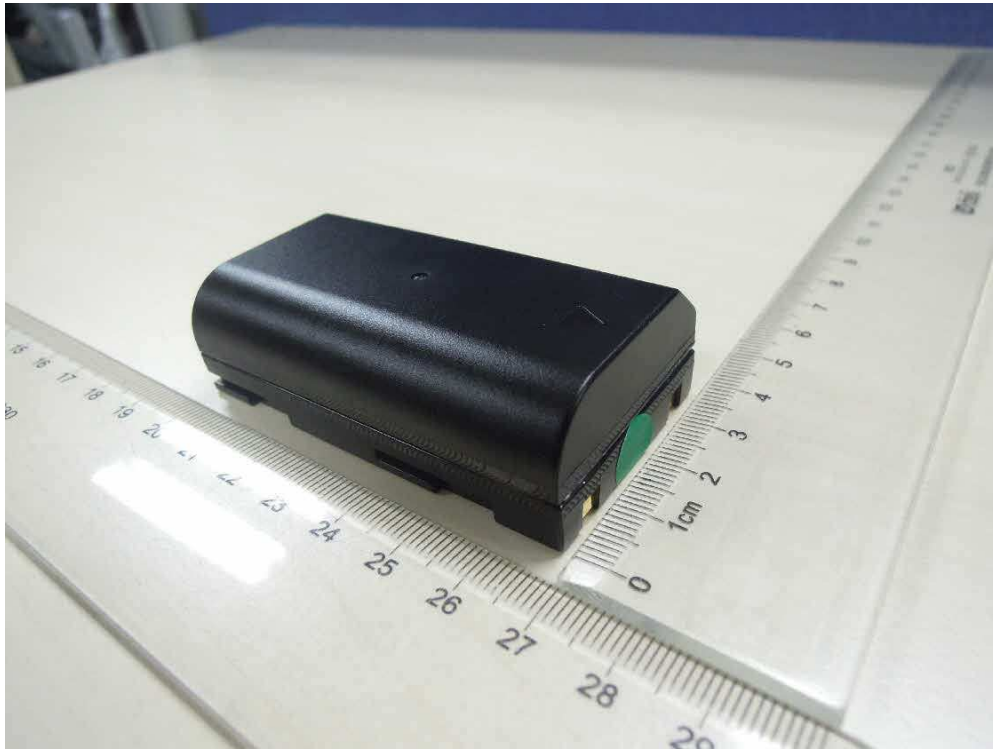
8.3.7	TABLE: Forced discharge (cells)				N/A
Model	OCV before application of reverse charge, (Vdc)	Measured Reverse charge I_r , (A)	Time for reversed charge, (minutes)	Results	
Supplementary information: - A: No fire or explosion - B: No leakage - C: Leakage - D: Fire - E: Explosion - F: Bulge - G: Others (please explain)					

8.3.9	TABLE: Forced internal short circuit (cells)				N/A
Model	Chamber ambient, (°C)	OCV at start of test, (Vdc)	Particle location ¹⁾	Maximum applied pressure, (N)	Results
Supplementary information: ¹⁾ Identify one of the following: 1: Nickel particle inserted between positive and negative (active material) coated area. 2: Nickel particle inserted between positive aluminium foil and negative active material coated area. - No fire or explosion - No leakage - Leakage - Fire - Explosion - Bulge - Others (please explain)					

ENCLOSURE

Supplement ID	Description
01	Overall view for Model MCR-1821J/1-H
02	Internal view for Model MCR-1821J/1-H
03	PWB top and bottom view for Model MCR-1821J/1-H
04	PWB Layout for Model MCR-1821J/1-H
05	Specification for Model MCR-1821J/1-H
06	Date code information
07	Packaging Method for Model MCR-1821J/1-H
08	Safety Instruction

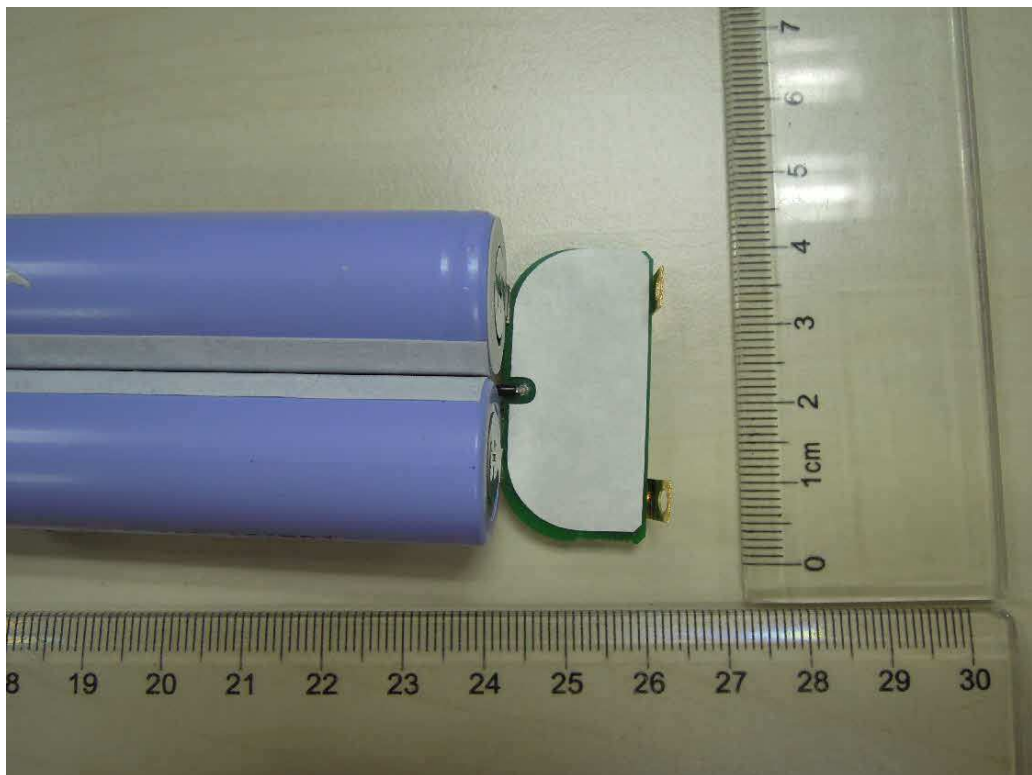
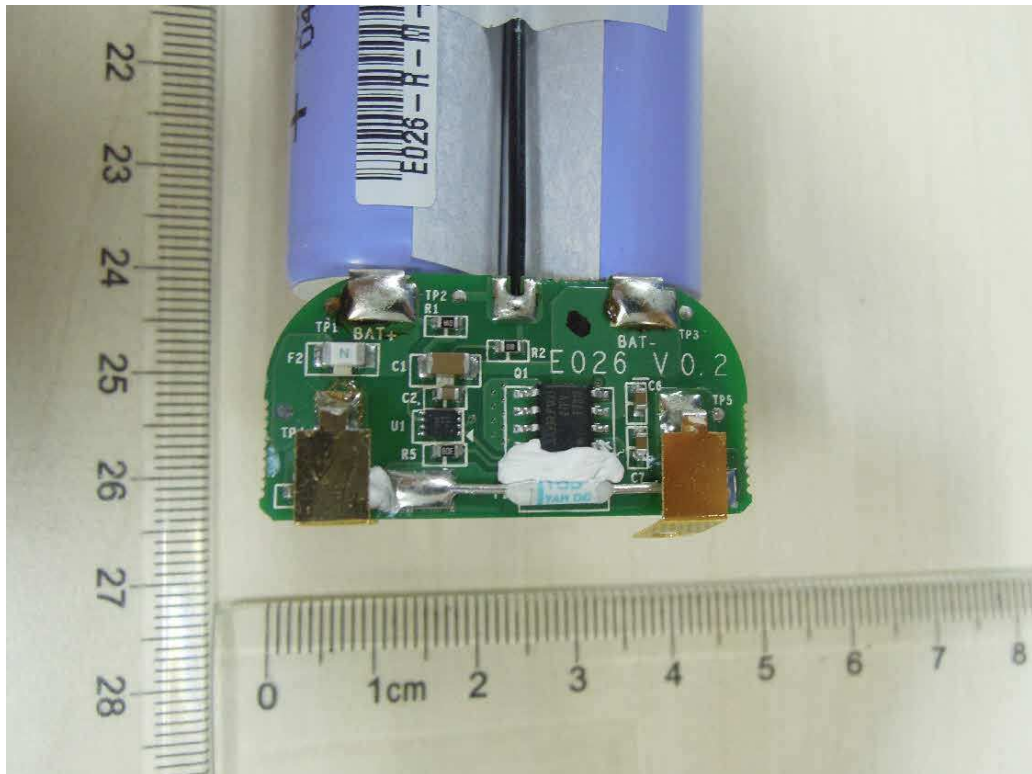
ID 01



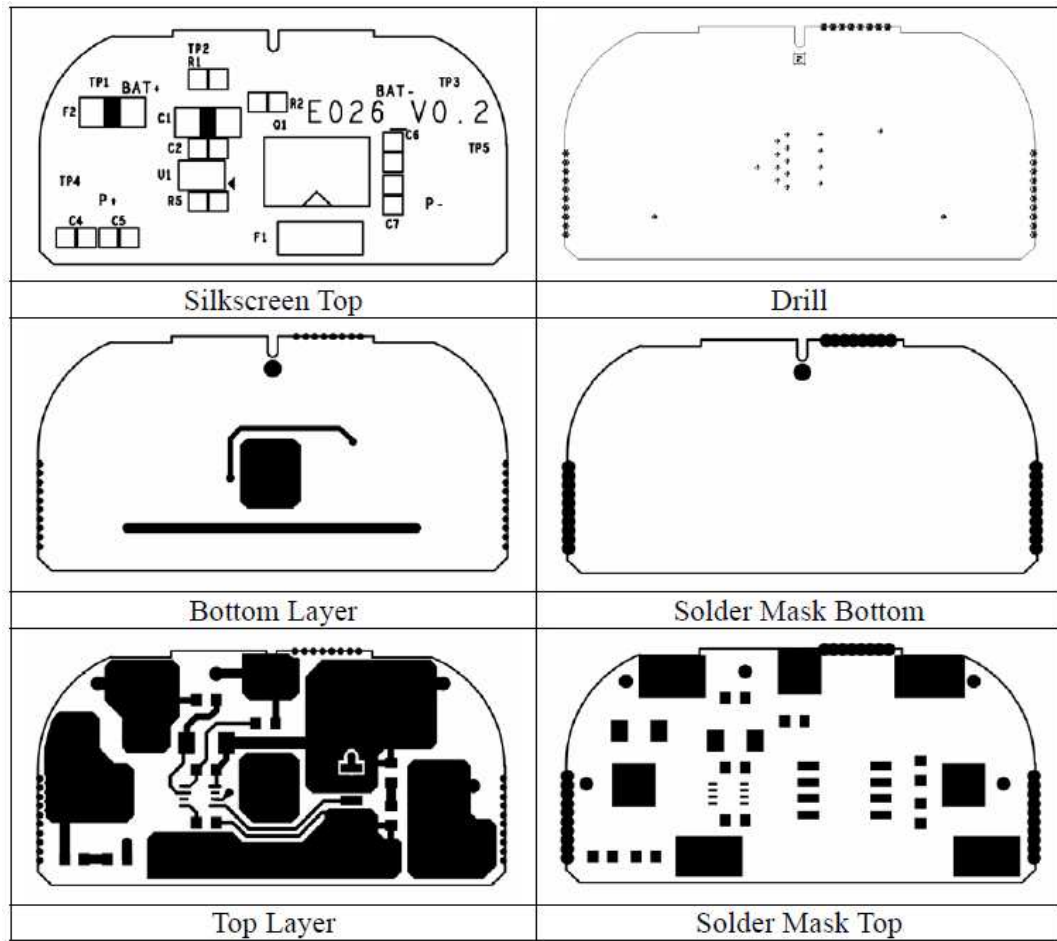
ID 02



ID 03



ID 04



ID 05

No	Items	Specifications	Remarks
1	Rated charge	Limiting 1.25A (0.5C) and constant 8.4V charge for 3.0 hours at 23°C.	
2	Rated discharge	Constant 0.48A discharge (0.2C) until 5.0V at 23°C.	
3	Rated capacity (Typical)	2.4Ah	Rated discharge capacity after rated charge and discharge at cycle 2 of new pack.
4	Nominal voltage	7.4V	Mean operation voltage during rated discharge after rated charge.
5	Shipping voltage	~7.5V	Approximate state of charge 50%.
6	End of charge voltage	8.4±0.05V	
7	End of discharge voltage	5.0V	Stop discharge when the pack voltage reaches 5.0V. Recommended voltage 6.0V.
8	Charging time	3.0h	Rated charge, 23°C.
9	Maximum continuous charging current	1.65A	
	Maximum continuous discharging current	2.4A	
10	Operating temperature	0 ~ 45°C	Charging
		-20 ~ 60°C	Discharging
11	Storage temperature	<35°C	Recommended Temperature for long term storage is ≤23°C, low humidity

ID 06



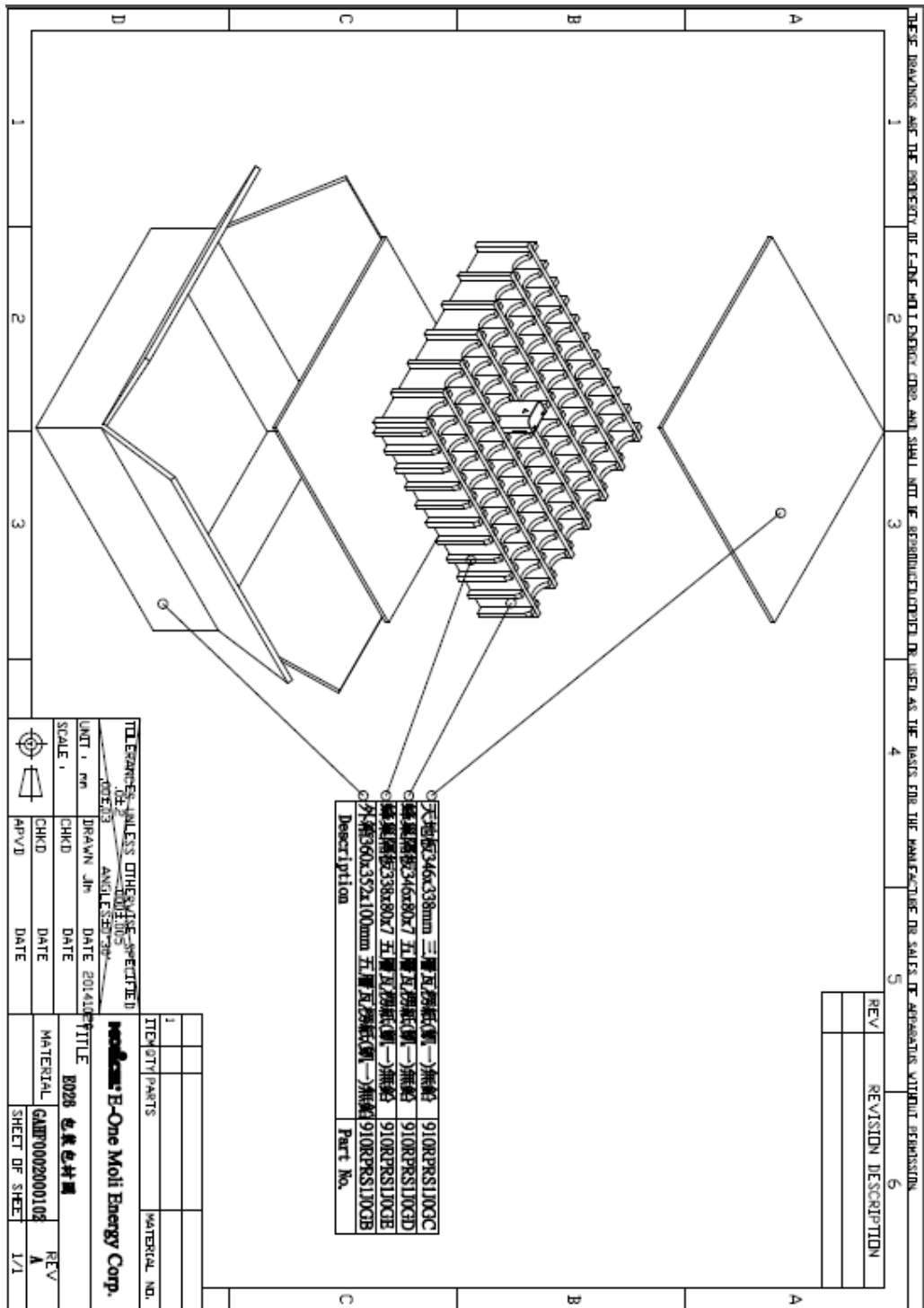
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ID 07



ID 08

Instructions

- A. Model Name : MCR-1821J/1-H
- B. Rated Charging Voltage/Maximum Charging Voltage : 8.4/ 8.45V
- C. Rated Charging Current/Maximum Charging Current : 1.25A/ 1.65A
- D. Operation Environment : Discharging -20°C~60°C/Charging 0°C~45°C
- E. Maximum Continuous Discharging Current : 2.4A
- F. Discharge Cut-Off Voltage : 5V
- G. Do not short terminals
- H. Do not immerse in water
- I. Do not heat or throw in fire
- J. Do not leave in conditions of over than 60°C or in a heated car.
- K. Do not attempt to crush or drop
- L. Do not attempt to modify
- M. Do not solder to terminals
- N. Leave in cool and dry places
- O. Do not put it in a microwave oven or pressurized container
- P. If charging time exceeds specification, stop charge
- Q. If the battery voltage is less than the specified discharge voltage, pre-charge the pack at a very low current less than 0.03C. Do not use the battery if it does not recover during the conditioning noted above
- R. During assembly, charging, normal use or storage of battery pack, if something unusual occurs such as smell, change in color or mechanical changes are detected, discontinue use immediately.
- S. In case of leakage or odors resulting from thermal conditions, rinse off the liquid with clean water.
- T. In case of contact with eyes, wash off with water and consult your doctor
- U. Any discrepancies should be resolved by mutual discussion.