

Dear FDK Customers

FDK CONFIDENTIAL

Notification of small change to ingredients in cell label ink

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Technical Support Dept.
Ni-MH Battery Div.
FDK CORPORATION

Request Summary

Our cell label manufacturer announced that they will change 2 low quantity ingredients in our cell label ink to more eco-friendly ingredients based on the Japan domestic printing ink manufacturers association's self-regulation (NL Regulations). FDK confirmed that the substituted ink ingredients have equal reliability to current ingredients. From the above, we would like to receive approval for this change.

		Current	Substitute
1	Ingredient 1 CAS No. Content Ratio (vs. cell label weight) Type	2-Methyl-1-[4-(methylthio)phenyl]-2-morpholinopropan-1-one 71868-10-5 <1000ppm Polymerization initiator	Eco-friendly ingredient Detailed information is confidential. However not listed in any hazardous material regulations.
2	Ingredient 2 CAS No. Content Ratio (vs. cell label weight) Type	Trimethylolpropane triacrylate 15625-89-5 <1000ppm monomer	
Reliability	Cross cut test (JIS K5600-5-6)	Passed	Passed (See P4-5)
	Coin test	Passed	Passed (See P6-7)
	Tape peeling test	Passed	Passed (See P8-9)
	Discoloration test	Passed	Passed (See P10-11)

Appendix

Cell label test result with substituted ink ingredients

Cell label test result with substituted ink ingredients

Test 1: Cross cut test (JIS K5600-5-6)

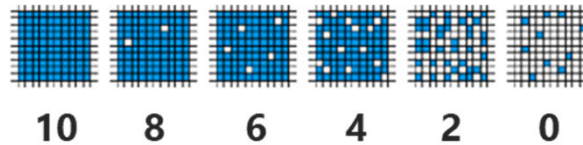
1) Purpose:

Confirmed adhesion to cell label base material using NL regulated alternative ink.

2) Condition:

Cross-cut into 5 squares x 5 squares with a 1.5 mm square in the center of the label, firmly press the tape (24 mm wide tape made by *Nichiban*) down with fingers, affix the tape, and peel it off instantly (60 degree angle).

Criteria: Total score is 10.
6 score or more as pass.



3) Result:

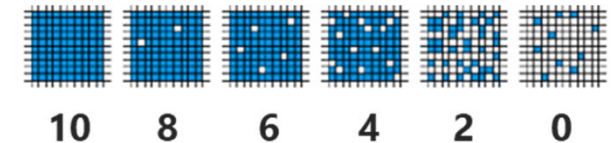
No ink adhered to the cellophane tape on all three sheets. Since there is no ink peeling, it is judged as passing with 10 points.

Cell label test result with substituted ink ingredients

4) Reference pictures:

	Before test	After test	Result
1			Pass (10)
2			Pass (10)
3			Pass (10)

Criteria
Total score is 10.
6 score or more as pass.



Cell label test result with substitute ingredients in ink

Test 2: Coin test

1) Purpose:

Confirmed adhesion to cell label base material using NL regulated alternative ink.

2) Condition:

Rub the center of the label strongly with a 50-yen coin (circular motion x 10).

Criteria: No peeling of the ink layer

3) Result:

No exposure of the base material for all three labels. Judged as passing because there is no peeling of the ink layer.

Cell label test result with substituted ink ingredients

4) Reference pictures:

	Before test	After test	Result
1			Pass
2			Pass
3			Pass

Cell label test result with substituted ink ingredients

Test 3: Tape peeling test

1) Purpose:

Check ink strength.

2) Condition:

Firmly press the tape (24 mm wide tape made by Nichiban) down with fingers, affix the tape, and peel it off instantly (90 degree angle).

Criteria: No adhering ink on the tape (allowance dot points)

3) Result:

No ink adhered to the cellophane tape on all three labels. Judged as passed because there is no ink on the tape.

Cell label test result with substituted ink ingredients

4) Reference pictures:

	Before test	After test	Result
1	<p>Before test image for battery 1. The label shows 'Fujitsu Low Self Discharge Rechargeable Battery' and 'HR-3UTC 1.2V Min. 1000mAh'. A date stamp '2021.1.6' is visible at the bottom.</p>	<p>After test image for battery 1. The label is identical to the 'Before test' image, but a yellow border highlights the central area of the label.</p>	Pass
2	<p>Before test image for battery 2. The label shows 'Fujitsu Low Self Discharge Rechargeable Battery' and 'HR-3UTC 1.2V Min. 1000mAh'. A date stamp '2021.1.6' is visible at the bottom.</p>	<p>After test image for battery 2. The label is identical to the 'Before test' image, but a yellow border highlights the central area of the label.</p>	Pass
3	<p>Before test image for battery 3. The label shows 'Fujitsu Low Self Discharge Rechargeable Battery' and 'HR-3UTC 1.2V Min. 1000mAh'. A date stamp '2021.1.6' is visible at the bottom.</p>	<p>After test image for battery 3. The label is identical to the 'Before test' image, but a yellow border highlights the central area of the label.</p>	Pass

Cell label test result with substituted ink ingredients

Test 4: Discoloration test

1) Purpose:

Check color stability.

2) Condition:

Storage the label near a window in direct sun light. (for at least 2 months).

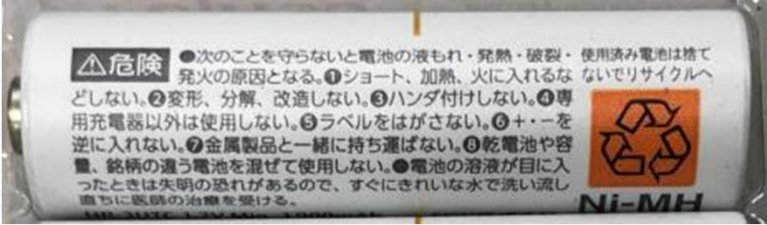
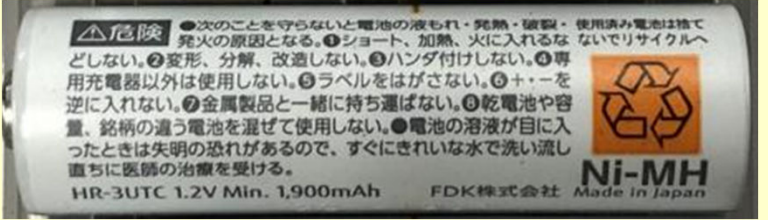
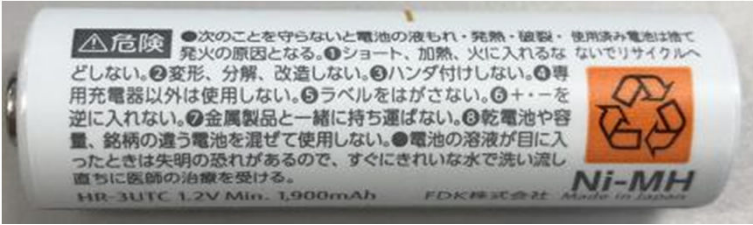
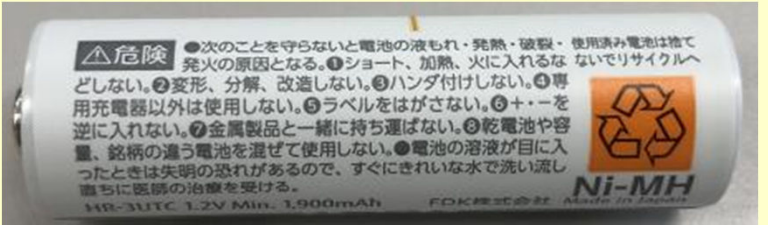
Criteria: Same color stability with current inks by visible check

3) Result:

No appearance degradation (Same color stability as current label).

Cell label test result with substituted ink ingredients

4) Reference pictures:

	Current	Substitute
Initial State		
After testing (3 months)		
Judgement	(Standard)	Passed

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