Change in Packaging

Jan.22st 2014

Kyocera Crystal Device

1. Details of Change

Change in Packaging Method (refer to Page. 3 onwards)

2. Reason of Change

Reduction of packaging material waste

3. Objective Item

Crystal Unit(AT, Tuning Fork, Crystal Unit with Thermistor):

※exclude Lead type Crystal Unit (HC49SFNB, HC49SFWA, HC-49/u-s, etc)
CX-49F, CX-49G, CX-49L, CX1255GB, CX1255CA
CX8045GB, CX8045GA, CX8045JA
CX5032GB, CX5032GA, CX5032SA, CX5032SB, KSX-35
CX3225GB, CX3225GA, CX3225CA, CX3225SA, CX3225SB, CX3225YB, KSX-23
CX2520DB. CX2520SB, CX2016DB, CX2016SB, CX1612DB, CX1612SB
CT2520DB, CT2016DB, CT1612DB（CT1612SB）
ST3215SA, ST3215SB, ST2012SB, ST1610SB

Oscillator (TCXO, Clock Oscillator, Industrial):

TCXO : KT3225, KT2520, KT2016, KT1612, High Precision TCXO（KT7050/KT5032）,
Real Time Clock Module（KR3225Y）
Clock : KC7050, KC5032, KC3225, KC3215A,KC2520, KC2016,
SAW oscillator: KC7050, KC5032

4. Time of Implementation

1/Mar/2014 (Factory shipment base)

5. Details of Change (Box)

(1) Summary of Change

Packaging is changed as follows

Φ180 reel

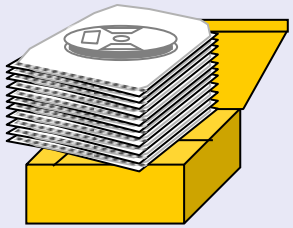
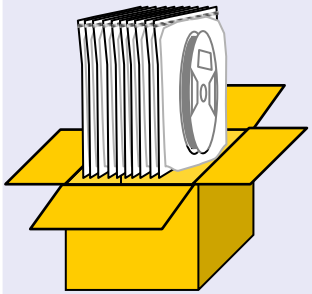
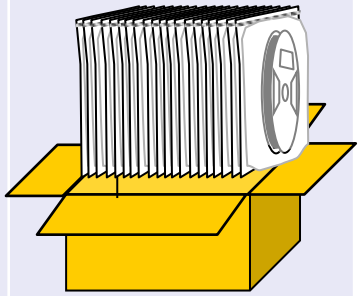
	Reel Quantity	Reel Box	Outer Box
Current	1reel (Crystal) 1 or 2 reel (TCXO) Differs by series (Clock)	Original Reel Box	Yes (No Change)
After Change	1～4 reel	Original Reel Box	Yes (No Change)
	5～10 reel	New Box	Yes (No Change)
	11～20 reel	New Box	No(Only Reel Box)
	21～40 reel	New Box	No(Only Reel Box)

Φ254, φ330 reel

	Reel Quantity	Reel Box	Outer Box
Current	1 or 5 reel (Crystal) 1 or 2 reel (TCXO) Differs by series (Clock)	Original Reel Box	Yes (No Change)
After Change	1～4 reel	Original Reel Box	Yes (No Change)
	5～10 reel	New Box	No(Only Reel Box)

(2) φ180 reel(Crystal Unit, Oscillator)

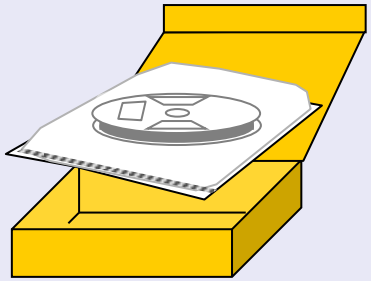
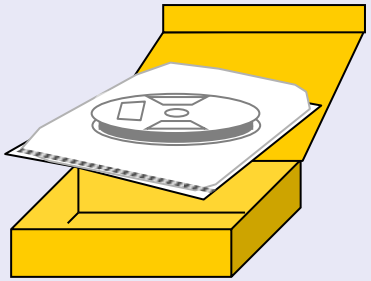
Plural reel shipment will be as follows.

Reel Qty.	Current	After Change			
		1～4	5～10	11～20	21～40
Reel Box	Crystal 1reel/box TCXO 1 or 2reel/box Clock differs by series  Horizontal	No change  Horizontal	5～10reel/box  Horizontal	11～20reel/box  Portrait	21～40reel/box  Portrait
Outer Box	Yes	Yes	Yes	No (Only Reel Box)	No (Only Reel Box)

No Changes to Reel and Reel Bag.

(3)φ254, φ330reel (Crystal Unit, Oscillator)

Plural reel shipment will be as follows.

Reel Qty.	Current	After Change	
		1～4	5～10
Reel Box	Crystal 1 or 5reel/box TCXO 1 or 2reel/box Clock differs by series  Horizontal	No change  Horizontal	5～10reel/box  Horizontal
Outer Box	Yes	Yes	No (Only Reel Box)

No Changes to Reel and Reel Bag.

(4) Packaging example after Change

■Φ180(20, 40reel max)

Current

After Change

※Current Packaging is kept for below 4reel

■Φ254, φ330(10reel max)

Current

After Change

※Current Packaging is kept for below 4reel

6. Details of Change (Label)

(1) Summary of Change

■Φ180reel

※A,B refers to type of label

	Reel Qty.	Reel	Reel	Reel	Outer Box
Curre	1 reel (Crystal) 1 or 2reel (TCXO) Clock differs by series	A	A	B	No Label
After Chang	1～4 reel	A	B	B	No Label
	5～10 reel	A	B	B	No Label
	11～20 reel	A	B	B	No Label
	21～40 reel	A	B	B	No Label

■Φ254, φ330reel

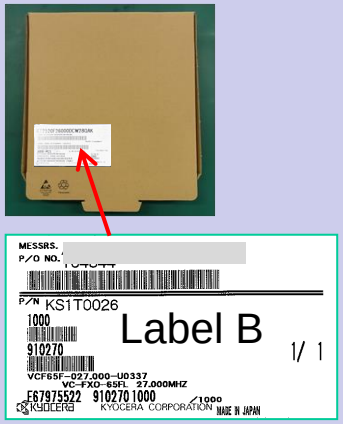
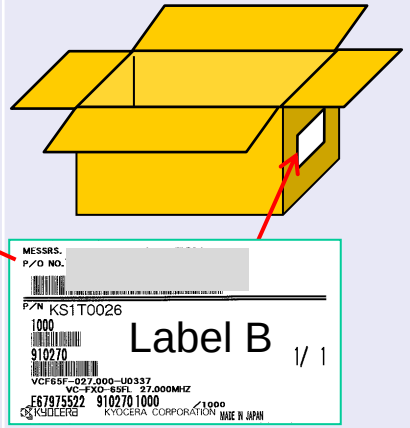
※A,B refers to type of label

	Reel Qty.	Reel	Reel	Reel	Outer Box
Curre	1 or 5reel (Crystal) 1 or 2reel (TCXO) Clock differs by series	A	A	B	No Label
After Chang	1～4 reel	A	B	B	No Label
	5～10 reel	A	B	B	No Label

(2) Label

Reel Label is changed as follows.

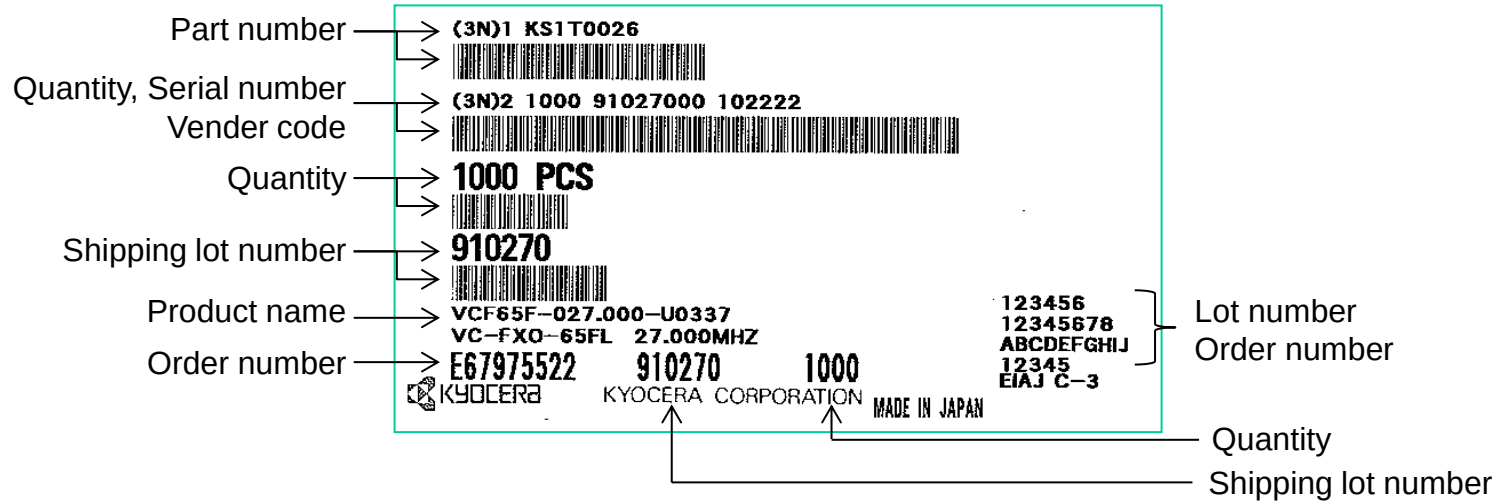
※A,B refers to type of label

	Reel Label	Reel Bag Label	Reel Box Label
Current			
After Change		 **Indicate the total number in the bag on the label**	 **Indicate the total number in the box on the label**

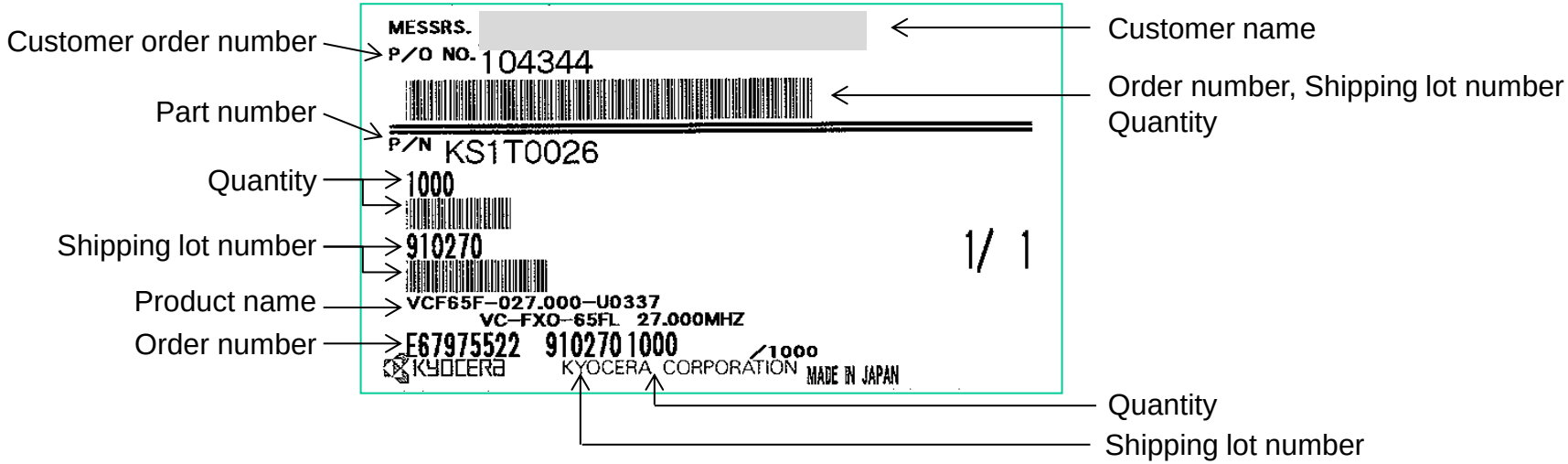
- As plural reel to be contained in a box, Reel box label would be attached to each Reel bag.
- Reel Box and Reel Bag to have common label but Reel Box label would have reel quantity.

(3) Label example after Change

Label A: Reel label



Label B: Reel bag label



Appendix
Transport Test

Test Packaging Form

Evaluation by the maximum Packaging case

Φ180×40reel
ITEM: Crystal Unit

Φ330×10reel
ITEM: Crystal Unit

Φ180×40reel
ITEM: Oscillator

Test Process Flow

①Appearance/Characterization	
Truck Transportation	Condition：Transportation by Truck (1600km×2)
②Appearance/Characterization	Check：Appearance, 30pcs Data, 1reel Characteristic Distribution Data
Drop test	Condition：150cm, Concrete, 6axis/10times each
③Appearance/Characterization	Check：Appearance, 30pcs Data
Oversea Shipment	Condition: Yamagata=Air=>Bangkok=Truck=>Chiangmai (return)
④Appearance/Characterization	Check：Appearance, 30pcs Data, 1reel Characteristic Distribution Data

Test Result

Crystal Unit(φ180×40reel)

Contents	Appearance	Characteristic	Judg
Truck Transport	No Damage (Pg.13)	No Problem (Pg.17,18)	OK
Drop Test	No Damage (Pg.14)	No Problem (Pg.18)	OK
Oversea Transport	No Damage (Pg.15)	No Problem (Pg.17,18)	OK

Oscillator(φ180×40reel)

Contents	Appearance	Characteristic	Judg
Truck Transport	No Damage (Pg.13)	No Problem (Pg.19,20)	OK
Drop Test	No Damage (Pg.14)	No Problem (Pg.20)	OK
Oversea Transport	No Damage (Pg.15)	No Problem (Pg.19,20)	OK

Crystal Unit(φ330×10reel)

Contents	Appearance	Characteristic	Judg
Truck Transport	No Damage (Pg.13)	No Problem (Pg.17,18)	OK
Drop Test	No Damage (Pg.14)	No Problem (Pg.18)	OK
Oversea Transport	No Damage (Pg.15)	No Problem (Pg.17,18)	OK

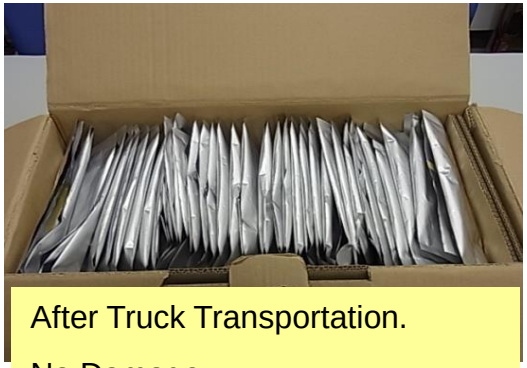
Result: No Problem for Crystal Unit and Oscillator

Appearance Test (Before Truck Transportation)

Shipment with New Packaging (Yamagata->Kagoshima by Truck)

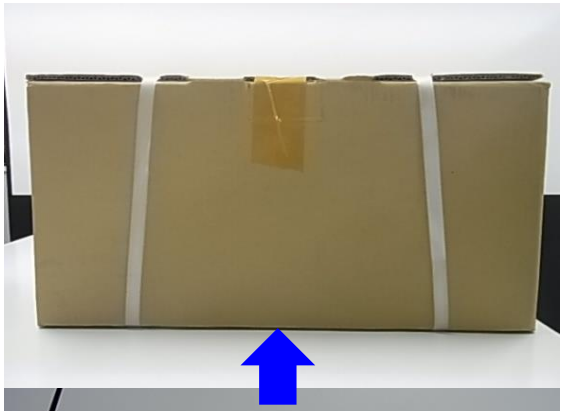
Appearance: No dent, No Scratch

Appearance Test (After Truck Transportation)



After Truck Transportation.

No Damage



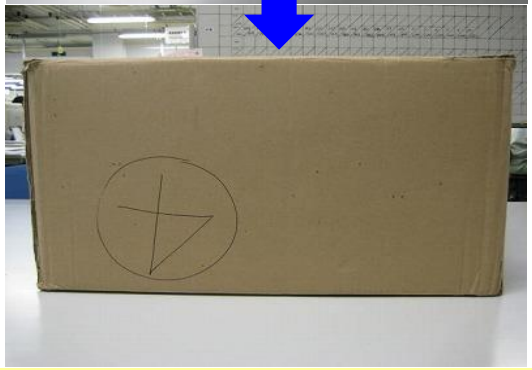
Appearance: No dent, No Scratch

Drop Test (After Drop Test)

Condition: Height150cm ±X,Y,Z 1cycle for each axis x 10times

After Drop test

No damage to internal goods



Outer Box condition: Damage to Outer Box from Drop stress. No internal damage.

Appearance Test (After Oversea Shipment)

Appearance after oversea shipment. No Damage to Internal goods.

Appearance: No dent, No Scratch

Mechanical Stress Data for each Test

①Appearance/Characterization

Truck Transportation — Truck (1600km×2)

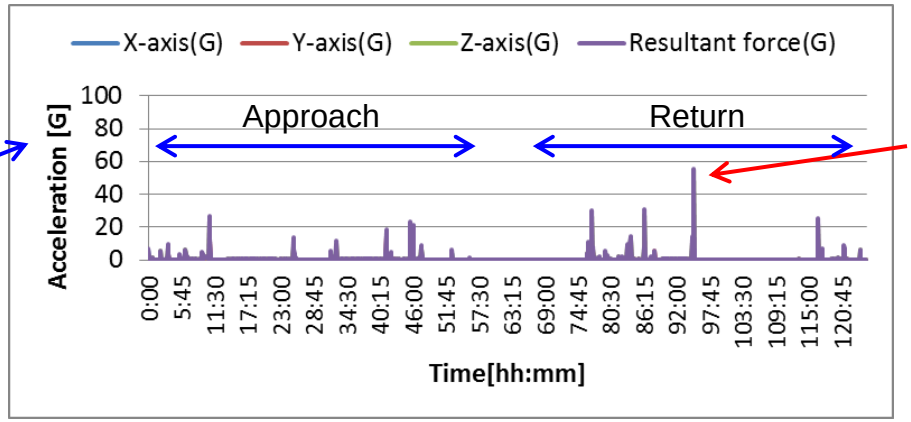
②Appearance/Characterization

Drop test — 150cm, Concrete, 6axis/10times each

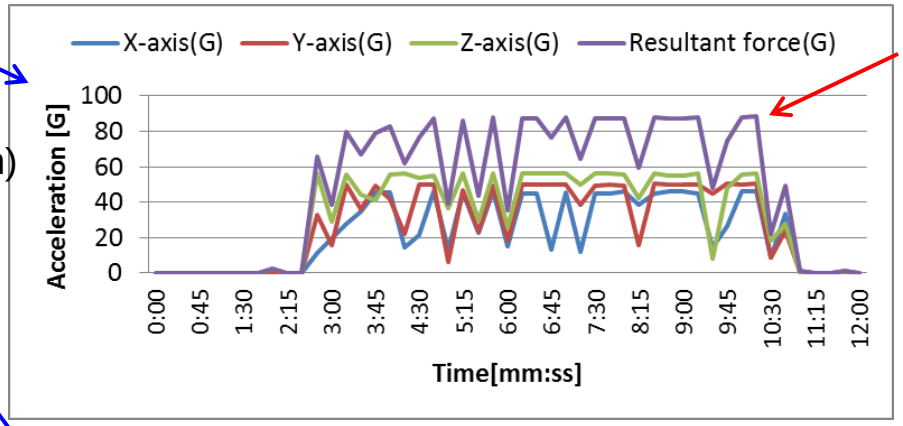
③Appearance/Characterization

Oversea Shipment — Yamagata=Air=>Bangkok =Truck=>Chiangmai (Return)

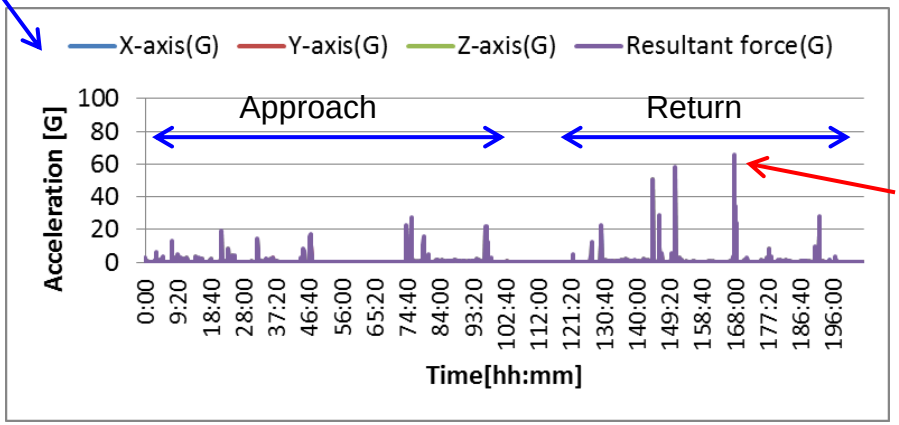
④Appearance/Characterization



Max. 55.4G



Max. 88.3G



Max. 65.9G

Characteristic Data (Xtal distribution)

①Appearance/Characterization

Truck Transportation

②Appearance/Characterization

Drop test

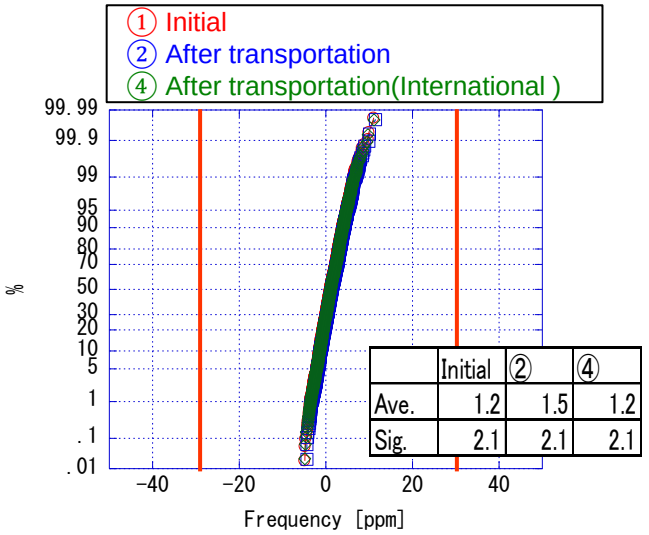
③Appearance/Characterization

Oversea Shipment

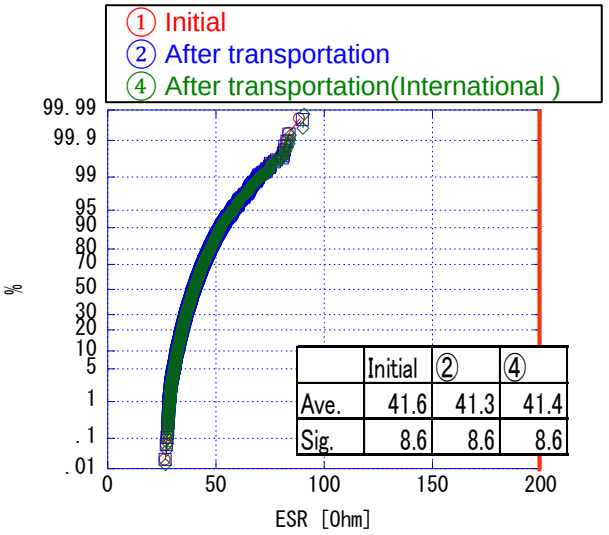
④Appearance/Characterization

Φ180×40Reel Packing test (n=3,000/Reel)

Frequency Distribution

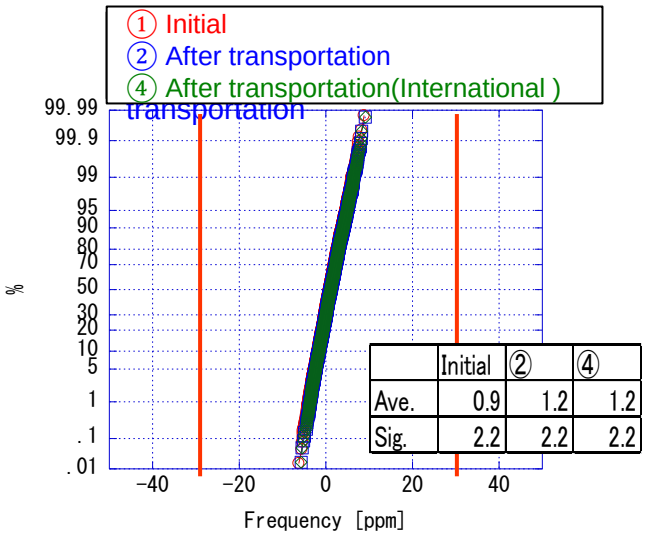


ESR Distribution

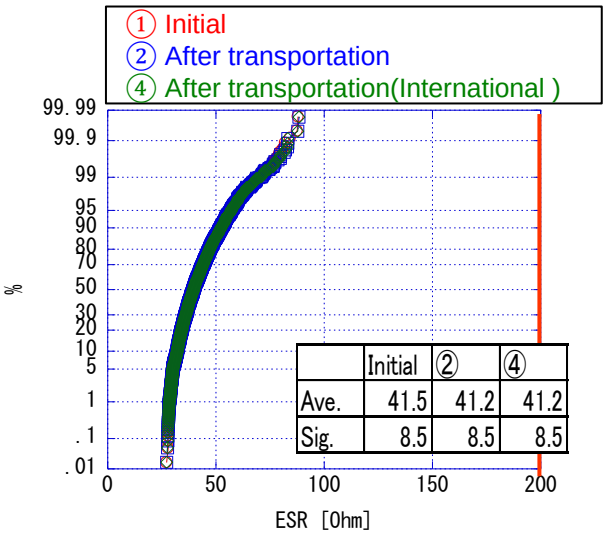


Φ330×10Reel Packing test

Frequency Distribution



ESR Distribution



Result: Same Performance

Characteristic Data (Xtal 30pcs)

①Appearance/Characterization

Truck Transportation

②Appearance/Characterization

Drop test

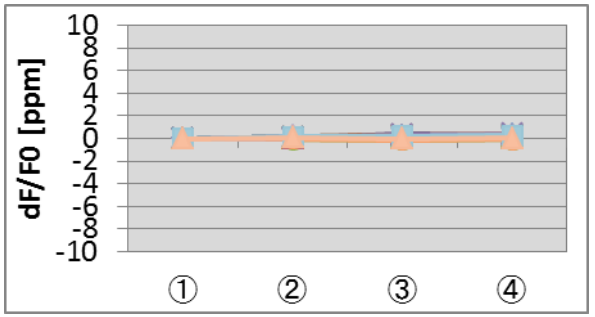
③Appearance/Characterization

Oversea Shipment

④Appearance/Characterization

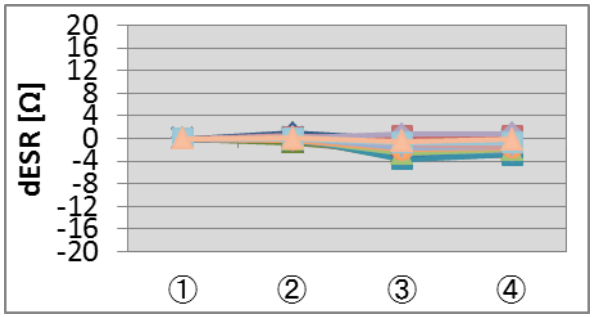
Φ180×40Reel Packing test

Frequency Change



	①Initial	②After Transport	③After Drop	④After Transport
N	30	30	30	30
Ave.	0.00	0.07	0.11	0.15
Std.	0.00	0.06	0.13	0.13

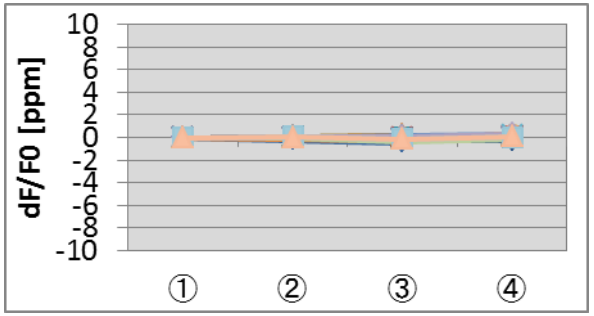
ESR Change



	①Initial	②After Transport	③After Drop	④After Transport
N	30	30	30	30
Ave.	0.00	−0.02	−1.44	−1.09
Std.	0.00	0.32	1.05	0.98

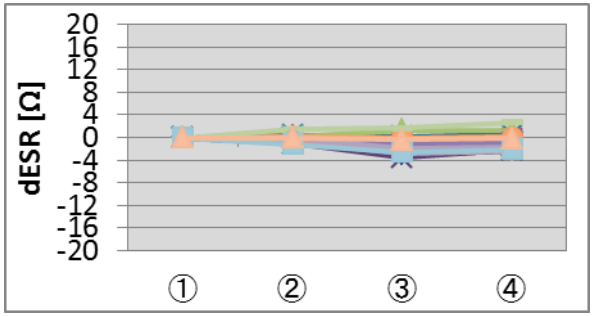
Φ330×10Reel Packing test

Frequency Change



	①Initial	②After Transport	③After Drop	④After Transport
N	30	30	30	30
Ave.	0.00	0.02	−0.08	0.09
Std.	0.00	0.07	0.14	0.12

ESR Change



	①Initial	②After Transport	③After Drop	④After Transport
N	30	30	30	30
Ave.	0.00	−0.17	−1.28	−0.91
Std.	0.00	0.49	1.21	1.12

ESR decreases by 1.5ohm after drop test. No Problem.

Characteristic Data (Oscillator distribution)

①Appearance/Characterization

Truck Transportation

②Appearance/Characterization

Drop test

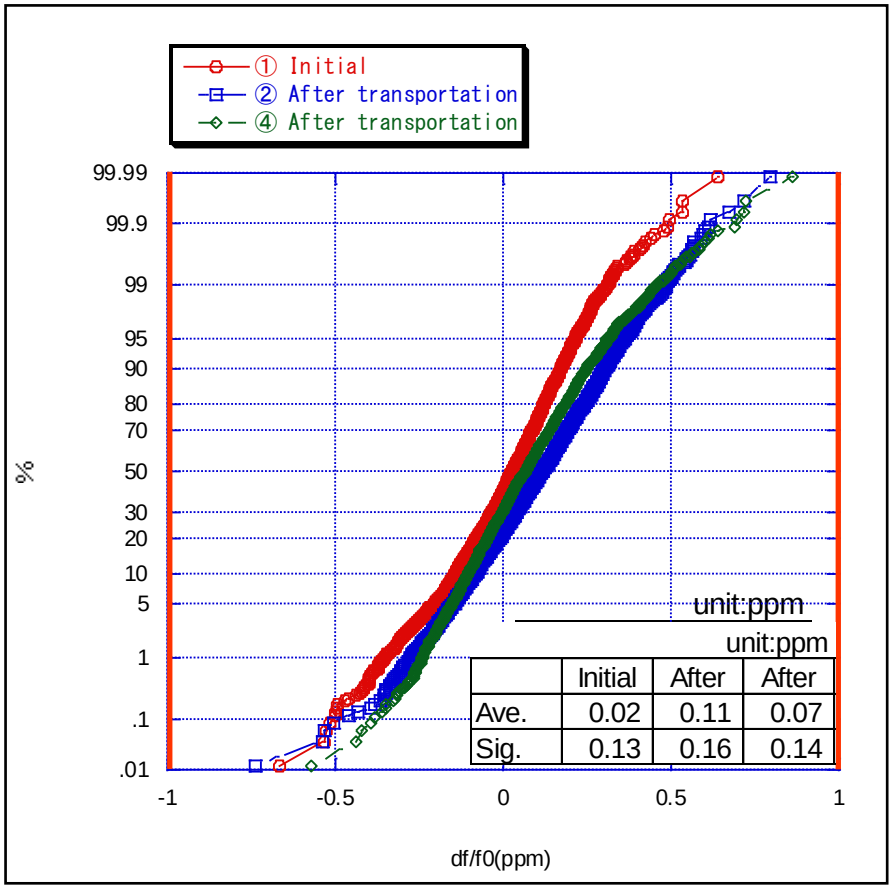
③Appearance/Characterization

Oversea Shipment

④Appearance/Characterization

Φ180×40Reel Packing test

Frequency Distribution(n=4,000/Reel)



Frequency is shifting to +side (+0.1ppm) including aging.

No Problem.

Characteristic Data (Oscillator 30pcs)

①Appearance/Characterization

Truck Transportation

②Appearance/Characterization

Drop test

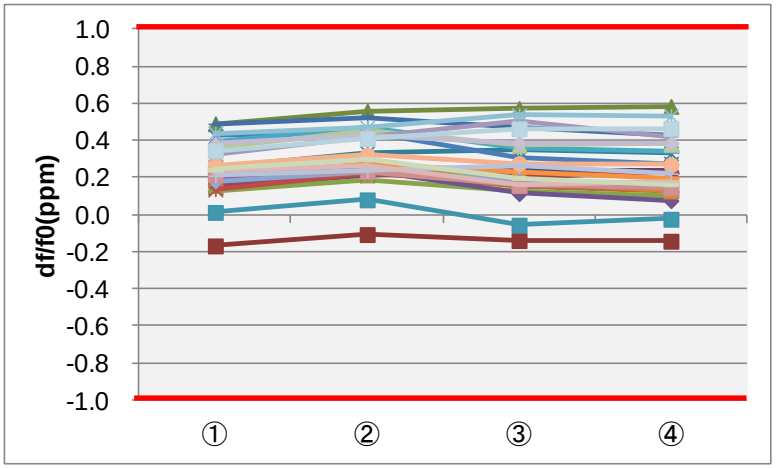
③Appearance/Characterization

Oversea Shipment

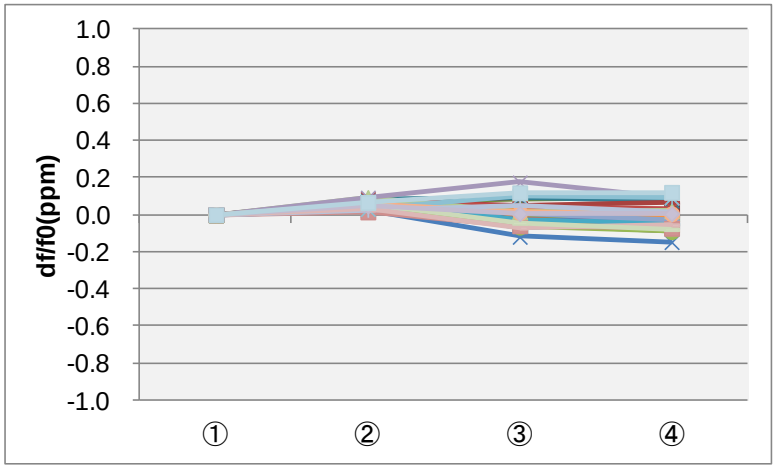
④Appearance/Characterization

Φ180×40Reel Packing test

Frequency Change
<Absolute value>



Frequency Change
<Change from the initial>



unit:ppm

	①Initial	②After transport	③After drop	④After transport
N	30	30	30	30
Ave.	0.24	0.30	0.25	0.24
Std.	0.14	0.14	0.16	0.16

unit:ppm

	①Initial	②After transport	③After drop	④After transport
N	30	30	30	30
Ave.	0.00	0.06	0.01	0.00
Std.	0.00	0.02	0.07	0.07

Frequency avg. decreases 0.5ppm after drop test. No Problem.