RELIABILITY TEST DATA

Safety Standard Certified Lead Type Disc Ceramic Capacitors for General Purpose

MURATA PN : DE1E3KX472M***N01F

New Small Type KX (series N)

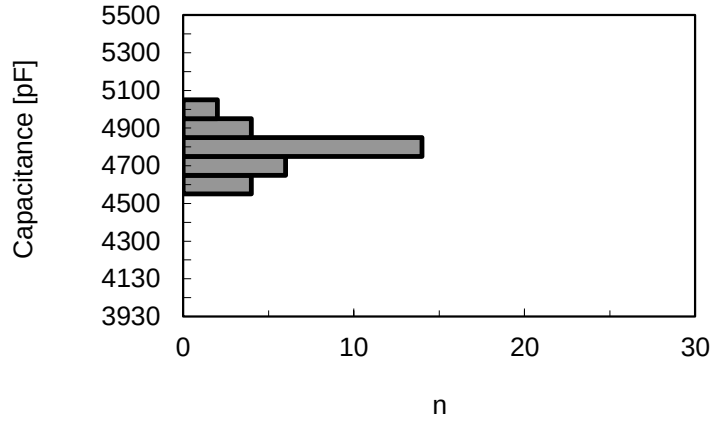
Rated Voltage(Y1) : AC250V(r.m.s.)

muRata
INNOVATOR IN ELECTRONICS

1. INITIAL (Cap., D.F., I.R.)

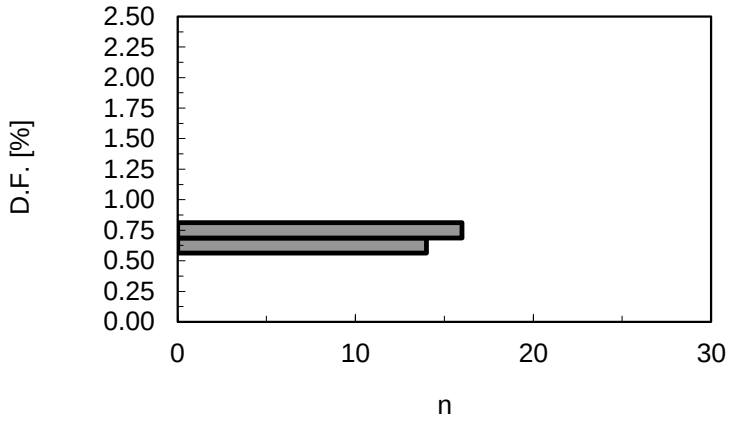
Condition : (Cap., D.F.) 1.0 kHz, 1.0 V(r.m.s.)
(I.R.) DC 500 V, 60 s
(Dielectric Strength) AC4kV(r.m.s.),60 s
(Temp.) 20 °C

Sample Qty. : 30 pcs.



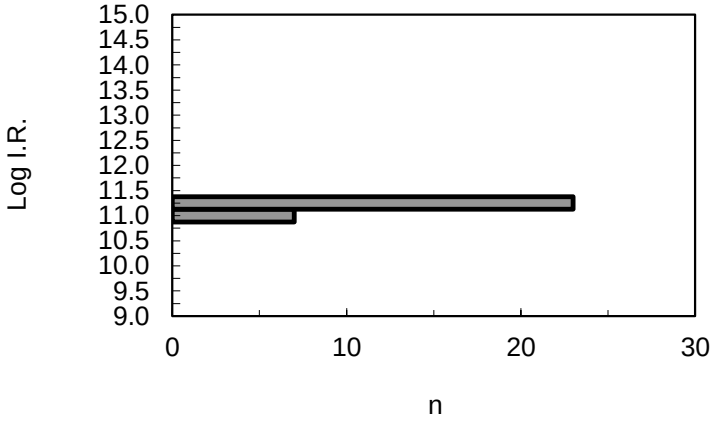
Spec.

Within
4700 pF ± 20%
(3760 to 5640 pF)



Spec.

2.5% max.



Spec.

10,000 MΩ min.
(Log I.R. : 10 min.)

Dielectric Strength (Between lead wires) : No failure
Dielectric Strength (Body Insulation) : No failure
Appearance : No visible defect

Room Condition

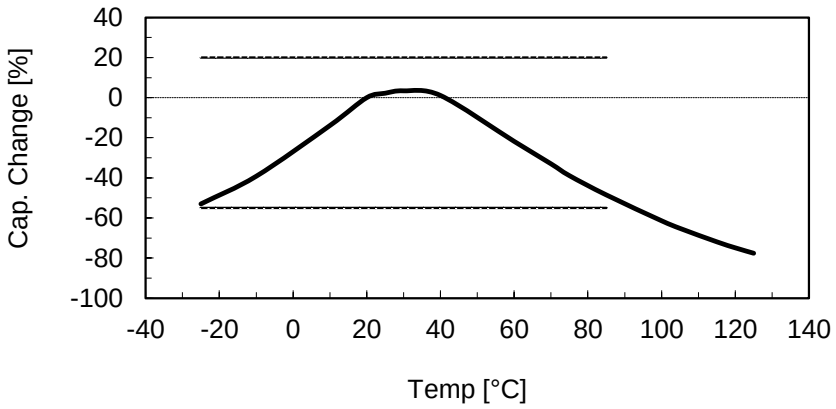
Temperature : between 15 to 35 ° C
Relative humidity : between 45 to 75 %
Atm. pressure : between 86 to 106 kPa

2. TEMPERATURE CHARACTERISTIC

Condition : 1.0 kHz, 1.0 V(r.m.s.)

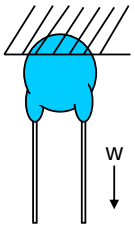
Specification : +20 / -55% (Temp. Range : -25 to 85 °C, Reference Temp. : 20 °C)

Sample Qty. : 5 pcs.



3. ROBUSTNESS of TERMINATIONS

Condition : < TENSILE >
Fix the body of capacitor,and apply a tensile weight gradually to each lead wire in the radial direction of capacitor up to 10 N and keep it for 10 s.



< BENDING >
Each lead wire shall be subjected to 5 N weight and then a 90° bend, at the point of egress,in one direction return to original position,and then a 90° bend in the opposite direction at the rate of one bend in 2 to 3 s.

Specification : Lead wire shall not cut off.
Capacitor shall not be broken.

Result :

No.	TENSILE	BENDING
1	OK	OK
2	OK	OK
3	OK	OK
4	OK	OK
5	OK	OK
6	OK	OK
7	OK	OK
8	OK	OK
9	OK	OK
10	OK	OK

4. SOLDERABILITY of LEADS

Condition : The lead wires of a capacitor shall be dipped into flux and then into molten solder (Sn-3Ag-0.5Cu) of 245 °C for 2 s.

Specification : Lead wires shall be soldered with uniformly coated on the axial direction over 75% of the circumferential direction.

Sample Qty. : 10 pcs.

No.	RESULT
1	OK
2	OK
3	OK
4	OK
5	OK
6	OK
7	OK
8	OK
9	OK
10	OK

Condition : The lead wires of a capacitor shall be dipped into flux and then into molten solder (H60A) of 235 °C for 2 s.

Specification : Lead wires shall be soldered with uniformly coated on the axial direction over 75% of the circumferential direction.

Sample Qty. : 10 pcs.

No.	RESULT
1	OK
2	OK
3	OK
4	OK
5	OK
6	OK
7	OK
8	OK
9	OK
10	OK

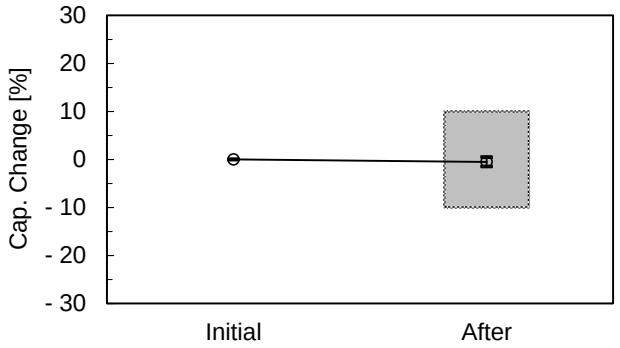
5. SOLDERING EFFECT

< Non-preheat >

Condition : Solder temp. ... 350 °C
Immersion time ... 3.5 s

Pre-treatment ... Store at 85°C for 1 h, and then, place at room condition for 24 h.
Post-treatment ... Place at room condition for 1 h.

Sample Qty. : 10 pcs.



Spec.

Within ± 10%

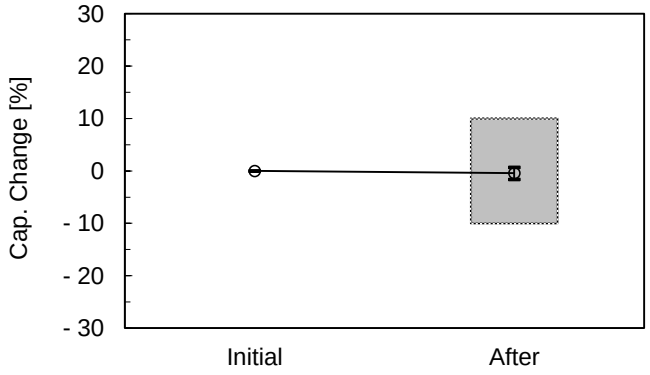
(Dielectric Strength) AC4kV(r.m.s.),60 s
Dielectric Strength (Between lead wires) : No failure
Dielectric Strength (Body Insulation) : No failure
Insulation Resistance (I.R.) : 1000MΩmin.
Appearance : No visible defect

<On-preheat >

Condition : Pre-heat ... 120 °C, 60 s
Solder temp. ... 260 °C
Immersion time ... 7.5 s

Pre-treatment ... Store at 85°C for 1 h, and then, place at room condition for 24 h.
Post-treatment ... Place at room condition for 1 h.

Sample Qty. : 10 pcs.



Spec.

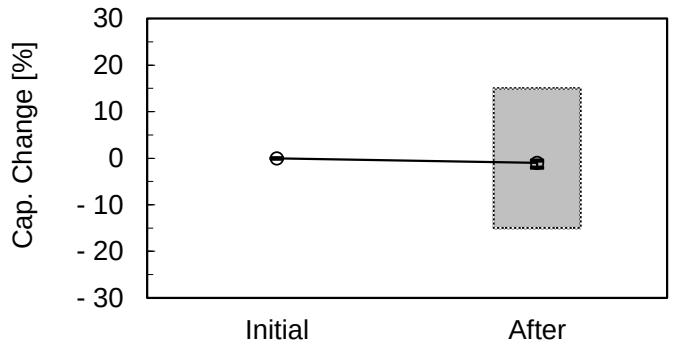
Within ± 10%

(Dielectric Strength) AC4kV(r.m.s.),60 s
Dielectric Strength (Between lead wires) : No failure
Dielectric Strength (Body Insulation) : No failure
Insulation Resistance (I.R.) : 1000MΩmin.
Appearance : No visible defect

6. HUMIDITY (UNDER STEADY STATE)

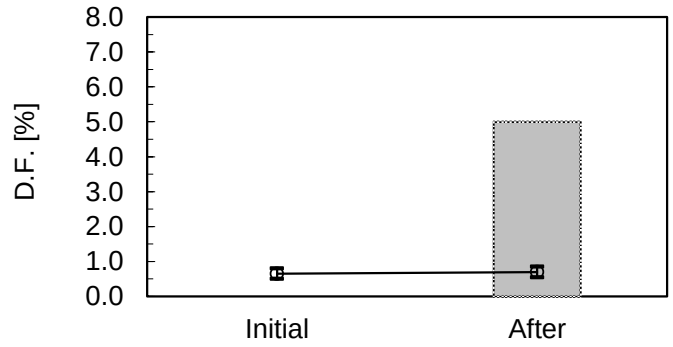
Condition : Temperature ... 40 °C
Relative humidity ... 95%
Duration ... 500 h

Sample Qty. : 10 pcs.



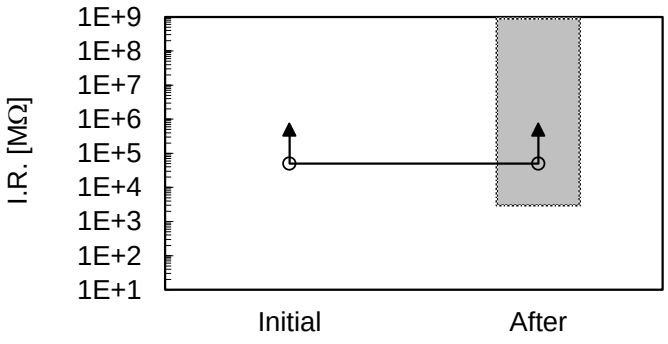
Spec.

Within ± 15%



Spec.

5 % max.



Spec.

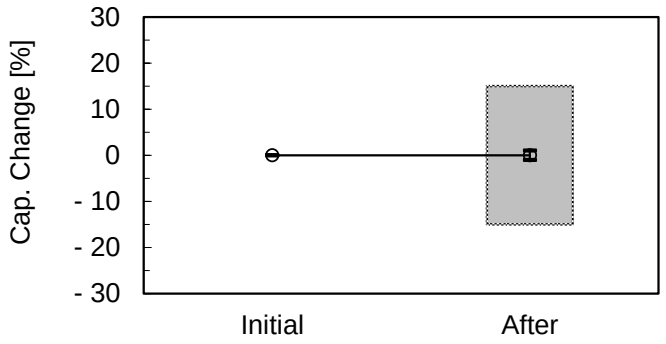
3,000 MΩ min.

(Dielectric Strength) AC4kV(r.m.s.),60 s
Dielectric Strength (Between lead wires) : No failure
Dielectric Strength (Body Insulation) : No failure
Appearance : No visible defect

7. HUMIDITY LOADING

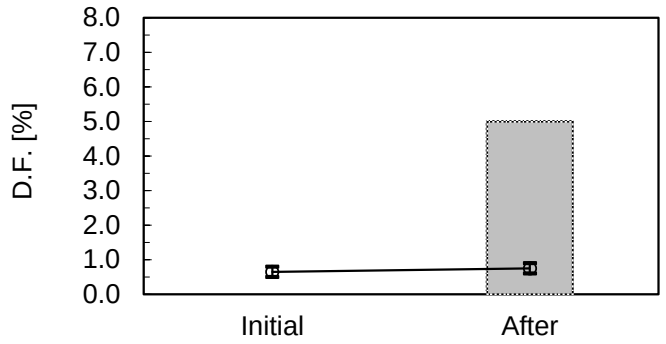
Condition : Temperature ... 40 °C
Relative humidity ... 95%
Voltage ... Rated Voltage
Duration ... 500 h

Sample Qty. : 10 pcs.



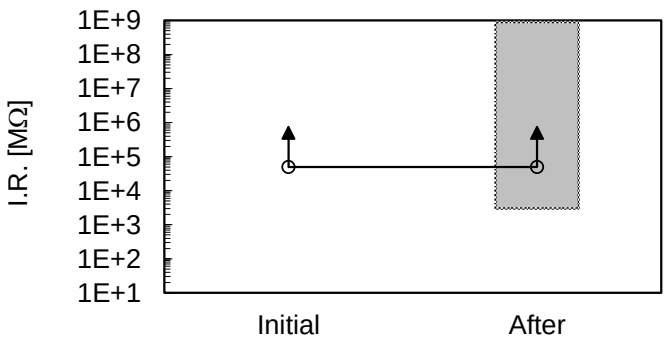
Spec.

Within ± 15%



Spec.

5 % max.



Spec.

3,000 MΩ min.

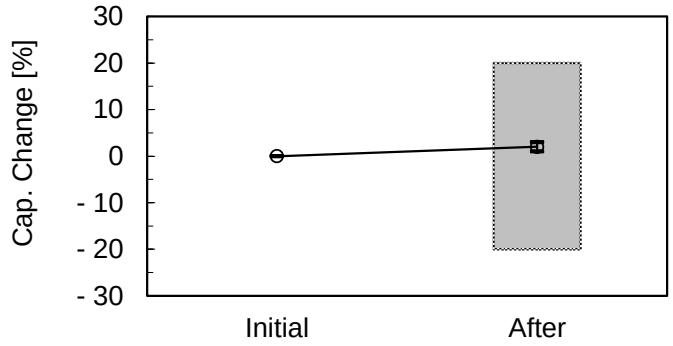
(Dielectric Strength) AC4kV(r.m.s.),60 s
Dielectric Strength (Between lead wires) : No failure
Dielectric Strength (Body Insulation) : No failure
Appearance : No visible defect

8. LIFE (HIGH TEMPERATURE LOADING)

Condition : Temperature ... 125°C
Voltage ... AC 425 V(r.m.s.) [Once each hour the voltage is increased to AC 1,000 V(r.m.s.) for 0.1 s.]
Duration ... 1,000 h

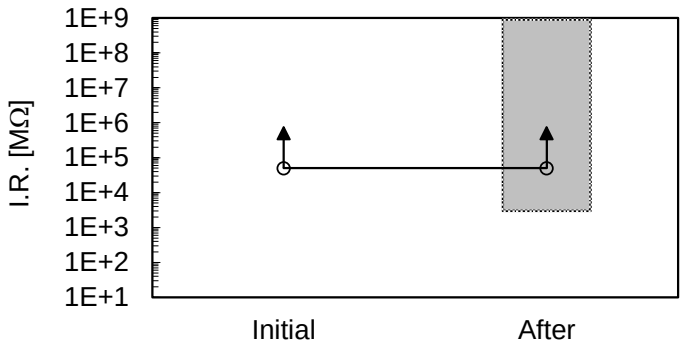
Pre-treatment ... Each individual capacitor shall be subjected to a 8 kV impulses.

Sample Qty. : 10 pcs.



Spec.

Within ± 20%



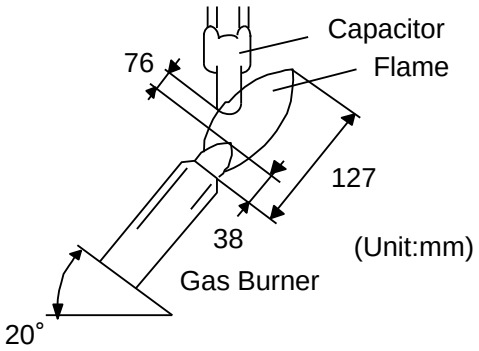
Spec.

3,000 MΩ min.

(Dielectric Strength) AC4kV(r.m.s.),60 s
Dielectric Strength (Between lead wires) : No failure
Dielectric Strength (Body Insulation) : No failure
Appearance : No visible defect

9. FLAME TEST

Condition : The capacitor shall be subjected to applied flame for 15 s, and then removed for 15 s until 5 cycles.



Sample Qty. : 10 pcs.

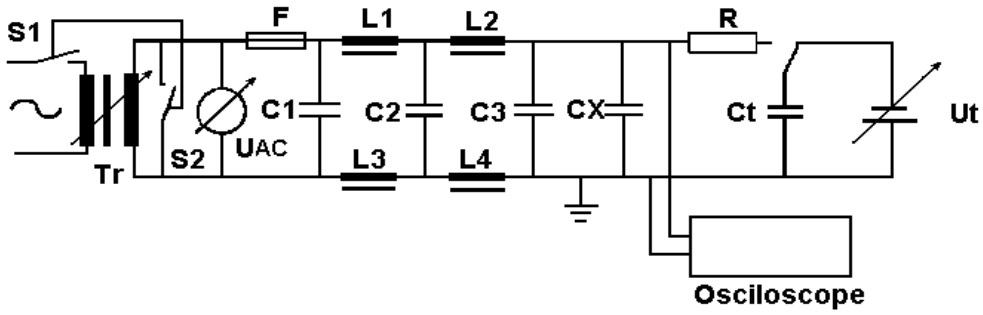
Specification : The capacitor flame discontinue as follows.

Cycle	Time
1 - 4	30 s max.
5	60 s max.

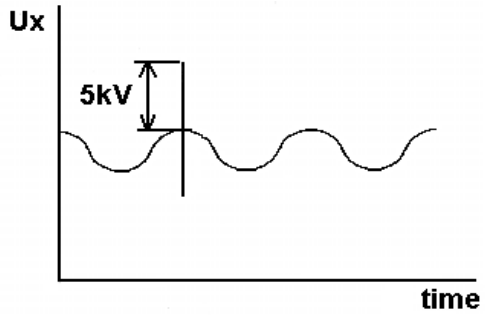
No.	**Result**
1	OK
2	OK
3	OK
4	OK
5	OK
6	OK
7	OK
8	OK
9	OK
10	OK

10. ACTIVE FLAMMABILITY

Condition : The capacitors shall be individually wrapped in at least one but more than two complete layers of cheese-cloth. The capacitor shall be subjected to 20 discharges. The interval between successive discharges shall be 5 s.
The U_{AC} shall be maintained for 2 min after the last discharge.



C1,C2	: 1 μF ± 10%	L1 to 4	: 1.5 mH ± 20% 16 A Rod core choke
C3	: 0.033 μF ± 5% 10 kV		
Ct	: 3 μF ± 5% 10 kV	R	: 100 Ω ± 2%
Cx	Capacitor under test	U_{AC}	: U_R ± 5%
F	Fuse, Rated 10 A	U_R	: Rated Voltage
		Ut	: Voltage applied to Ct



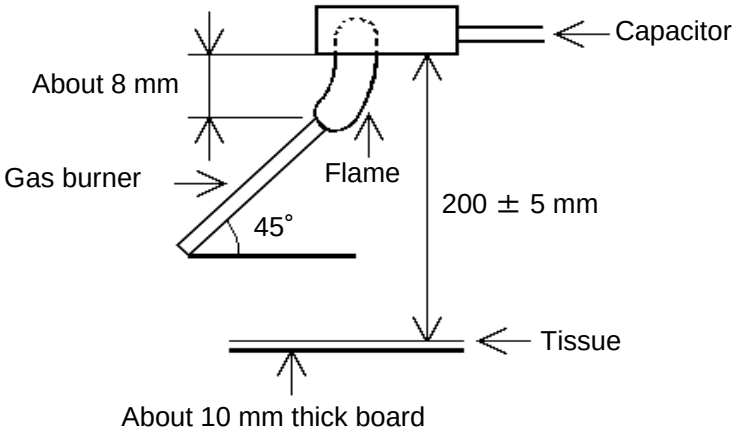
Sample Qty. : 10 pcs.

Specification : The cheese-cloth shall not be on fire.

No.	RESULT
1	OK
2	OK
3	OK
4	OK
5	OK
6	OK
7	OK
8	OK
9	OK
10	OK

11. PASSIVE FLAMMABILITY

Condition : The capacitor under test shall be held in the flame in the position which best promotes burning. Each Specimen shall only be exposed once to the flame.
Time of exposure to flame : 30 s.



Length of flame : 12 ± 1 mm
Gas burner : Length 35 mm min.
Inside Dia. : 0.5 ± 0.1 mm
Outside Dia. : 0.9 mm max.
Gas : Butane gas Purity 95% min.

Sample Qty. : 10 pcs.

Specification : The burning time shall not be exceeded the time 30 s.
The tissue paper shall not ignite.

No.	RESULT
1	OK
2	OK
3	OK
4	OK
5	OK
6	OK
7	OK
8	OK
9	OK
10	OK

12. TEMPERATURE & IMMERSION CYCLE

Condition : The capacitor shall be subjected to 5 temperature cycles, then consecutively to 2 immersion cycles.

< Temperature cycle / Cycle time : 5 cycles>

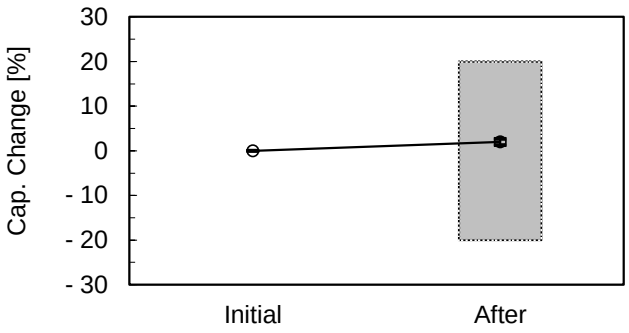
Step	1	2	3	4
Temp.[°C]	-40	Room Temp.	125	Room Temp.
Time[min]	30	2 to 3	30	2 to 3

< Immersion cycle / Cycle time : 2 cycles>

Step	Temp.[°C]	Time[min]	Immersion water
1	65	15	Clean water
2	0	15	Saturated salt water

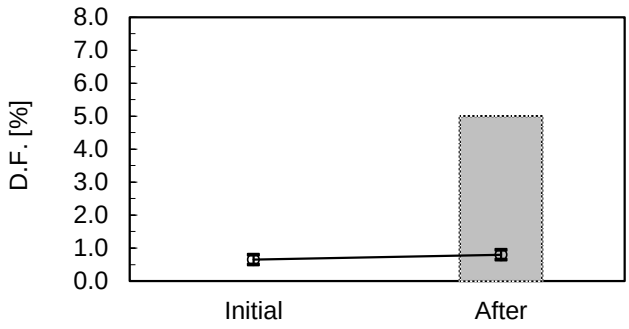
Pre-treatment ... Store at 85 °C for 1 h, and then, place at room condition for 24 h.
Post-treatment ... Place at room condition for 24 h.

Sample Qty. : 10 pcs.



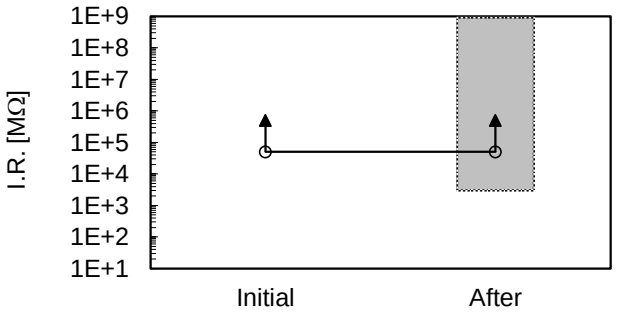
Spec.

Within ± 20%



Spec.

5 % max.



Spec.

3,000 MΩ min.

(Dielectric Strength) AC4kV(r.m.s.),60 s
Dielectric Strength (Between lead wires) : No failure
Dielectric Strength (Body Insulation) : No failure
Appearance : No visible defect