250 FASTON INSUL. BOOT/ BOOT INSULATOR FOR POSITIVE LOCK TERMINAL

1. INTRODUCTION

1.1 Purpose

Testing was performed on 250 FASTON insulation boot and boot insulator for Positive Lock terminal to determine its conformance to the requirements of product specification 108-20020, Rev D3. and 108-3027 ,Rev.O respectively.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of 250 FASTON insulation boot and boot insulator for Positive Lock terminal. Testing was performed at the Shanghai Electrical Components Test Laboratory between February 20, 2013 and March 07, 2013. The associated test number is SECT13-0041

1.3 Conclusion

Based on the test results, the material change had no adverse impact on product performance.

1.4 Test Specimens

Specimens with the following part numbers were used for test:

Group No	SERIES PART	P/N	Wire Size	Material
1,2,3,4	250 FASTON INSUL. BOOT	926539-1 Rev. K	crimped with 2.0 Sq.mm FLRK wire	PA 66
5,6,7	BOOT INSULATOR FOR POSLOK TERM	154719 Re. AS	crimped with 2.0 Sq.mm FLRK wire	PA 66

Fig. 1

Note:
Color of housings may range from clear to green or yellow due to hygroscopic nature of resin. However it doesn't affect the Form, Fit and Function of the product as guaranteed by resin supplier and endorsed by our validation.

1.5 Test Sequence

Test Items	Test Group (a)						
	1	2	3	4	5	6	7
	Test Sequence(b)						
Visual examination	1	1	1	1	1	1	1
Contact Retention Force	2						
Insulation Resistance		2					
Dielectric Withstanding Voltage		3					
Thermal Cycling			3				
Accelerated Aging				3			
Millivolt Drop			2,4	2,4			
Electrical Requirement							2,4
Mechanical requirement (Retention force)					2		
Durability						2	
Humidity							3

Fig. 2

Note: a). Test group defined per customer requirement.
b). Numbers indicate sequence in which tests are performed.
c). Group 1,2,3,4 performed on 250 FASTON INSUL. BOOT
Group 5,6,7 performed on BOOT INSULATOR FOR POSLOK TERM

1.6 Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

Temperature: 15℃ to 35℃
Relative Humidity: 25% to 75%

2. SUMMARY OF TESTING

2.1. Initial Examination of Product
All specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Contact Retention Force

Unit: N

Group	Number of data points	Condition	Contact Retention Force			
			Type	Max	Min	Ave
1	5	Final	250FASTON INSUL. BOOT	261.93	152.55	198.56

Fig 3

2.3 Insulation Resistance/ Dielectric Withstanding Voltage
Insulation resistance and dielectric withstanding voltage result are shown in Fig 4

Unit: $10^{13}\Omega$

Group	Number of data points	Condition	IR/DWV			
			Type	Max	Min	Ave
2	5	Initial	250FASTON INSUL. BOOT	3.26	0.09	1.69
		Initial	250FASTON INSUL. BOOT	No flashover, no breakdown		

Fig 4

2.4 Millivolt Drop
All millivolt drop measurements were taken at 100 milliamperes maximum. Data summaries are shown in Fig 5.

Unit: mΩ

Group	Number of data points	Condition	Millivolt Drop			
			Type	Max	Min	Ave
3	5	Initial	250FASTON INSUL. BOOT	0.55	0.52	0.53
		After Thermal Cycling	250FASTON INSUL. BOOT	0.70	0.62	0.64
4	5	Initial	250FASTON INSUL. BOOT	0.54	0.51	0.53
		After Accelerated Aging	250FASTON INSUL. BOOT	0.65	0.63	0.64

Fig 5

2.5. Thermal Cycling
No evidence of physical damage was visible as a result of exposure to thermal cycling.

2.6. Accelerated Aging
No evidence of physical damage was visible as a result of exposure to Accelerated Aging.

2.7 Mechanical requirement (Retention force)
Retention force on BOOT INSULATOR FOR POSLOK TERM is shown in Fig 6.

Unit: N

Group	Number of data points	Condition	Retention force			
			Type	Max	Min	Ave
5	5	Initial	BOOT INSULATOR FOR POSLOK TERM	81.37	68.46	75.05

Fig 6

2.8 Durability
1st and 10th Engaging/Separating Force are shown in Fig 7

Unit: N

Group	Number of data points	Condition	Engaging/Separating Force			
			Type	Max	Min	Ave
6	5	Initial	Engaging force (BOOT INSULATOR FOR POSLOK TERM)	22.97	16.00	18.55
		Final		21.95	18.92	19.93
		Initial	Separating Force (BOOT INSULATOR FOR POSLOK TERM)	22.39	14.69	17.78
		Final		19.71	17.35	18.63

Fig 7

2.9 Electrical Requirement
Electrical requirement on contact resistance evaluation are shown in Fig.8

Unit: mΩ

Group	Number of data points	Condition	Electrical Requirement			
			Type	Max	Min	Ave
7	5	Initial	BOOT INSULATOR FOR POSLOK TERM	0.69	0.63	0.66
		Final		0.85	0.81	0.83

Fig 8

2.10 Humidity
No evidence of physical damage was visible as a result of exposure to humidity.

3. TEST METHODS

3.1. Initial Examination of Product
All specimens were visually examined for evidence of physical damage detrimental to product performance

3.2 Measuring of Voltage Drop
Subject mated specimens to specified current measuring the voltage drop.

3.3 Durability
10 mating/unmating operations, record the initial and final engaging and separating force.
(Phos. Bronze)

3.4. Mechanical Requirement
Measure the contact retention force at the rate of 25mm/minute.

3.5. Contact Retention Force
Apply an axial load to contact at a rate of 25 mm / minute

3.6. Electrical Requirement
The millivolt drop, with the same set up when measured across the complete joint.

3.7. Accelerated Aging
Subject the test samples to 125℃ for 200h.

3.8. Thermal Cycling
Subject the samples to 5cycles. Each cycle consists of:

a). 2 hrs at 125℃
b). 2 hrs : (40 ±2)℃at 95% RH
c). 2 hrs : (-30 ±2)℃

3.9. Humidity
Subject the samples to the condition:

a). 3 hrs at (40+/-2)℃, relative humidity greater than 96%.
b). Followed by 3 hrs cooling to (20 ±5)°, relative humidity greater than 96% RH.
c). Followed finally by 3 hrs at (40 ±2)°, relative humidity greater than 96% RH.

4. CALIBRATION

4.1 Calibration Statement
All equipment containing a calibration number is calibrated and traceable through TE Connectivity (TE).