Glow Wire Evaluation of RAST 5 Positive Lock MKIII Housings

1. INTRODUCTION

1.1. Purpose

Testing was performed on the TE Connectivity Positive Lock MKIII housings molded in V0+GWT (TE RM: 2136700) resin to evaluate product line performance during Glow Wire Testing.

1.2. Scope

This report covers the glow wire performance of the Positive Lock MKIII housing product line. Testing was performed at the Harrisburg Electrical Components Test Laboratory between 28-June-2017 and 29-June-2017. See EA20170371T for the full report.

1.3. Conclusion

Test Set 1 and Test Set 2 specimens conformed to IEC 60335-1 when tested at 750°C with a maximum allowable flame duration of 2 seconds. The Test Sets 3 and Test Set 4 specimens conformed to IEC 60695-211 Edition 2.0 2014-02 when tested at 850°C with a maximum allowable flame duration of 30 seconds after removal from the glow wire.

1.4. Test Specimens

The specimens submitted for testing are identified in Table 1.

Table 1 – Test Specimens

Test Set ID	Quantity	Part Number	Description
1	2	521204 521210	521204 Housing with Natural V0+GWT Resin 521210 Housing with Natural V0+GWT Resin
2	2	521204 521210	521204 Housing with Natural V0+GWT Resin 521210 Housing with Natural V0+GWT Resin
3	2	521204 521210	521204 Housing with Natural V0+GWT Resin 521210 Housing with Natural V0+GWT Resin
4	2	521204 521210	521204 Housing with Natural V0+GWT Resin 521210 Housing with Natural V0+GWT Resin

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1.5. Test Sequence

The specimens listed in Table 1 were subjected to testing as outlined in Table 2.

Table 2 – Testing Sequence

Test or Examination	Test Set			
	1	2	3	4
	Test Sequence (a)			
Glow Wire at 750°C-Long Side	1			
Glow Wire at 750°C-Short Side		1		
Glow Wire at 850°C-Long Side			1	
Glow Wire at 850°C-Short Side				1

(a)The numbers indicate sequence in which tests were performed.

1.6. Environmental Conditions

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

Temperature: 15°C to 35°C

Relative Humidity: 20% to 80%

2. SUMMARY OF TESTING

2.1. Glow Wire at 750°C

All specimens in Test Sets 1 and 2 met the requirement of no flame persisting longer than 2 second and no burning or charring of the specified layer. No flames were present on any of the Test Set 1 and Test Set 2 specimens. Table 3 and Table 4 show the resulting observations recorded during testing.

Table 3 – Test Set 1 Results

750°C Long Side Test								
Test Set 1 Specimen #	**Location**	**Ti (Sec)**	**Te (Sec)**	**Te-Ti (sec)**	**Flame Height (cm)**	**Drops (yes/no)**	**Light Tissue Paper**	**Test Pass (yes/no)**
PN 521204								
1-1	Long Side	**NA**				**Yes**	**No**	**Yes**
1-2	Long Side	**NA**				**Yes**	**No**	**Yes**
PN 521210								
1-3	Long Side	**NA**				**Yes**	**No**	**Yes**
1-4	Long Side	**NA**				**Yes**	**No**	**Yes**

Note: Ti – Time Ignition, Te – Time Extinguish from test start. Time removed from heating element was 30 seconds for all specimens.

Table 4 – Test Set 2 Results

750°C Short Side Test								
Test Set 2 Specimen #	**Location**	**Ti (Sec)**	**Te (Sec)**	**Te-Ti (sec)**	**Flame Height (cm)**	**Drops (yes/no)**	**Light Tissue Paper**	**Test Pass (yes/no)**
PN 521204								
2-1	Short Side	**NA**				**Yes**	**No**	**Yes**
2-2	Short Side	**NA**				**Yes**	**No**	**Yes**
PN 521210								
2-3	Short Side	**NA**				**Yes**	**No**	**Yes**
2-4	Short Side	**NA**				**Yes**	**No**	**Yes**

Note: Ti – Time Ignition, Te – Time Extinguish from test start. Time removed from heating element was 30 seconds for all specimens.

2.2. Glow Wire at 850°C

All specimens in Test Sets 3 and 4 subjected to the glow wire test at 850°C for 30 seconds self-extinguished within 30 seconds of removing from the heated element (IEC 60695-2-11). Refer to Tables 5 and 6 for the detailed results.

Table 5 – Test Set 3 Results

850°C Long Side Test								
Test Set 3 Specimen #	**Location**	**Ti (Sec)**	**Te (Sec)**	**Te-Ti (sec)**	**Flame Height (cm)**	**Drops (yes/no)**	**Light Tissue Paper**	**Test Pass (yes/no)**
PN 521204								
3-1	Long Side	**Flash < 1 sec, 2cm Height**				**Yes**	**No**	**Yes**
3-2	Long Side	**17.73**	**22.3**	**4.57**	**8.00**	**Yes**	**No**	**Yes**
PN 521210								
3-3	Long Side	**Flash < 1 sec**				**Yes**	**No**	**Yes**
3-4	Long Side	**0.72**	**2.6**	**1.88**	**1.00**	**Yes**	**No**	**Yes**

Note: Ti – Time Ignition, Te – Time Extinguish from test start. Time removed from heating element was 30 seconds for all specimens.

Table 6 – Test Set 4 Results

850°C Short Side Test								
Test Set 4 Specimen #	**Location**	**Ti (Sec)**	**Te (Sec)**	**Te-Ti (sec)**	**Flame Height (cm)**	**Drops (yes/no)**	**Light Tissue Paper**	**Test Pass (yes/no)**
PN 521204								
4-1	Short Side	**NA**				**Yes**	**No**	**Yes**
4-2	Short Side	**5.22**	**12.07**	**6.85**	**8.50**	**Yes**	**No**	**Yes**
PN 521210								
4-3	Short Side	**0.50**	**1.50**	**1.00**	**2.50**	**Yes**	**No**	**Yes**
4-4	Short Side	**Flash < 1 sec, 2cm Height**				**Yes**	**No**	**Yes**

Note: Ti – Time Ignition, Te – Time Extinguish from test start. Time removed from heating element was 30 seconds for all specimens.

3. TEST METHODS

3.1. Glow Wire at 750°C

All parts were conditioned at lab temperature and humidity for 24 hours prior to testing by opening the bags they were supplied in to expose them to ambient conditions. Test sets 1 and 2 consisted of eight specimens each as identified in Table 1 and were subjected to the Glow Wire test per IEC 60335-1 and IEC 60695-2-11 for a duration of thirty seconds at 750°C ± 10°C with a glow wire penetration depth of 7 mm. The specimens were tested in two orientations as shown in Figure 1 and Figure 2. Test specimens were orientated whereas not to impede the material from burning up the test specimen or dripping down to the specified layer. The tester observed each test specimen for flame height, flame duration, and burning of the specified layer (wrapping tissue paper) beneath the specimen under test as specified in paragraph 5.3 in IEC60695-2-10 2nd Edition 2014-02.

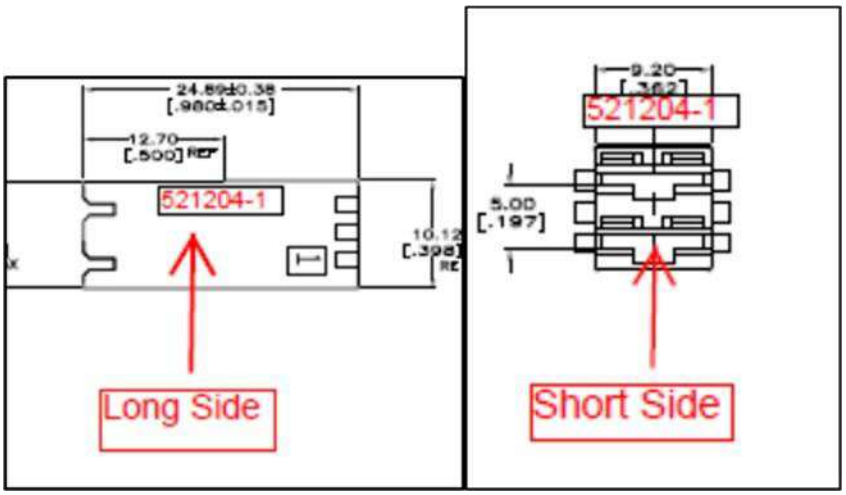

Figure 1 – 521204 Test Orientation

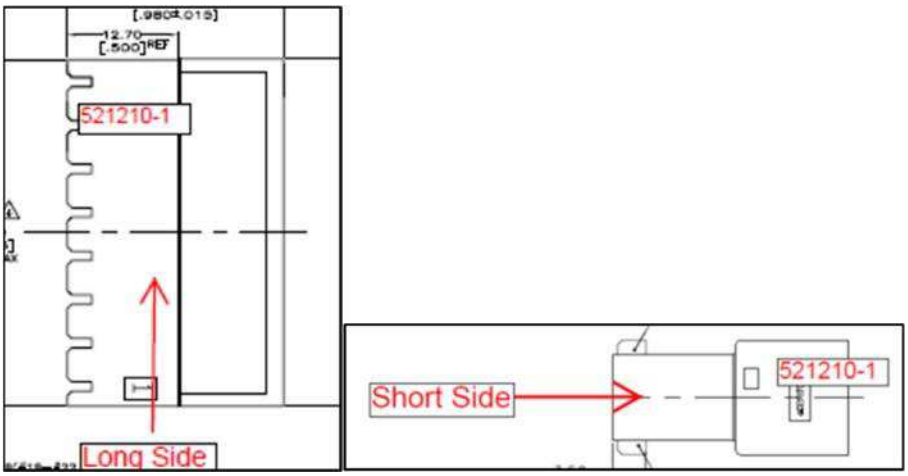

Figure 2 – 521210 Test Orientation

3.2. Glow Wire at 850°C

All parts were conditioned at lab temperature and humidity for 24 hours prior to testing by opening the bags they were supplied in to expose them to ambient conditions. Test Sets 3 and 4 consisted of eight specimens each as described in Table 1 and were subjected to the Glow Wire test per IEC60695-2-11 for a duration of 30 seconds at 850°C ± 10°C with a glow wire penetration depth of 7mm. Following removal from the glow wire specimens were observed for an additional 30 seconds. Test specimens were tested in two orientations as shown in Figure 1 and Figure 2. Test specimens were orientated whereas not to impede the material from burning up the test specimen or dripping down to the specified layer. The tester observed each test for flame height, flame duration, and burning of the specified layer (wrapping tissue paper) beneath the specimen under test as specified in paragraph 5.3 in IEC60695-2-10 2nd Edition 2014-02.