Burning analysis on Faston 250 series receptacle

1. INTRODUCTION

1.1 Purpose

Testing was performed on the TE Connectivity FASTON 250 SERIES RECEPTACLE to analysis the root-cause of burning issue.

1.2 Scope

This report covers the root-cause of burning issue on FASTON receptacle. Testing was performed at the Shanghai Electrical Components Test Laboratory during 09Jul2018 to 15Jul2018. The associated test number is TP-18-02035 and TP-18-02029.

1.3 Conclusion

After checking the crimping quality, 3D X-ray scanning, and component analysis, we found the bad crimping quality may be one of the factors to this burning issue, please find detail information in the summary report.

1.4 Test Specimens

The specimens submitted for testing are identified in Table 1, and refer to figure 1 for more info.

Table 1 specimen information

Test Group	Part No	Description	Qty.	Comments
1	280001-9	FAST 250 REC 0.3-0.8MM2 0.40X18.60 TPBR	1	Burned terminal (a)
2	280001-9	FAST 250 REC 0.3-0.8MM2 0.40X18.60 TPBR	1	Burned terminal (b)
3	280001-9	FAST 250 REC 0.3-0.8MM2 0.40X18.60 TPBR	1	Not burned terminal (c)

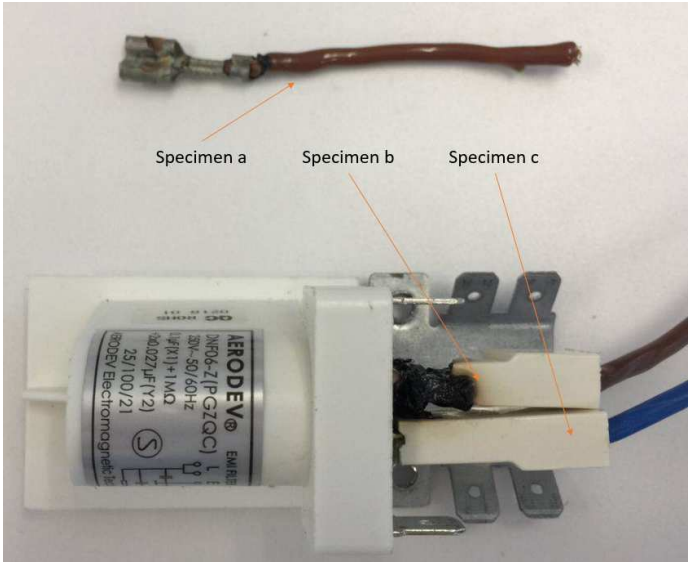

Figure 1. specimens picture

1.5 Test Sequence

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

Table 2-Test sequence

Test	Test Group		
	1	2	3
	Test Sequence		
Examination of Product	1	1	1
Contact Cross section	3	3	3
3D X-ray scanning		2	2
Component analysis	2		

(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℃ to 35℃
Relative Humidity: 25% to 75%

2. SUMMARY OF TESTING

2.1. Examination of product
Figures 2 through 4 shows the visual check of specimens.

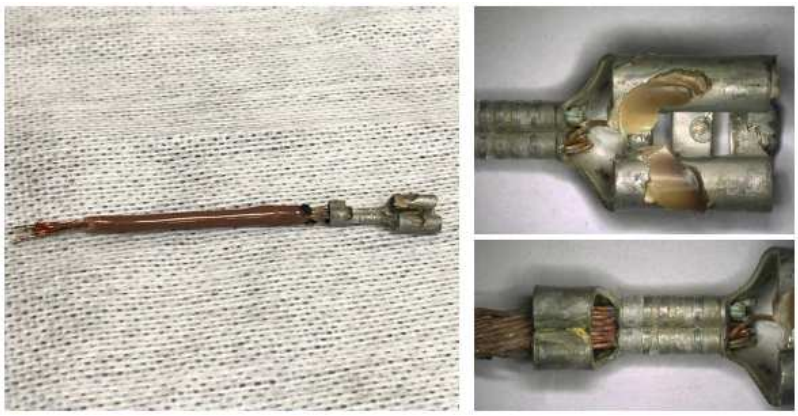

Figure 2 – visual check for specimen (a)

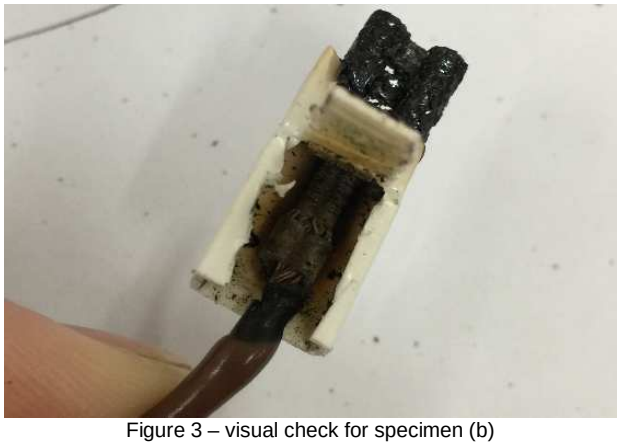

Figure 3 – visual check for specimen (b)

Figure 4 – visual check for specimen (c)

2.2 Component analysis

Refer to figure 5 through 6 for component analysis summary data of specimen a, all recorded values were only for reference due to specimen (a) is burned terminal.

Figure 5 – Strand wire, SEM&EDS analysis result

Per SEM&EDS analysis result, the green discoloration could be caused by copper oxidation and corrosion. The green material (area A) is mainly CuCl 2.

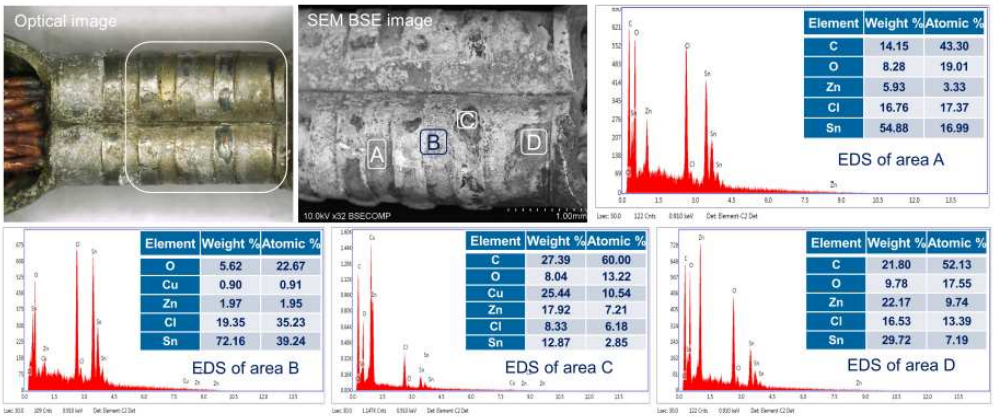

Figure 6 – Wire crimp area, SEM&EDS analysis result

Oxidation and corrosion of Cu/Zn/Sn are detected at contact wire crimp area surface, as well as some contamination (area A, area C/ D)

2.3 3D X-ray scanning

Refer to figure 7 through 8 for contact X-ray scanning summary data. Figure 7 is the data of contact area for both specimen (b) and (c), figure 8 is the data of wire crimping area for both specimen (b) and (c). according to the test result, we can found that contact area of both specimen (b) and (c) are OK, but wire crimping of specimen (b) is not good, and for crimping area of specimen (c) is OK.

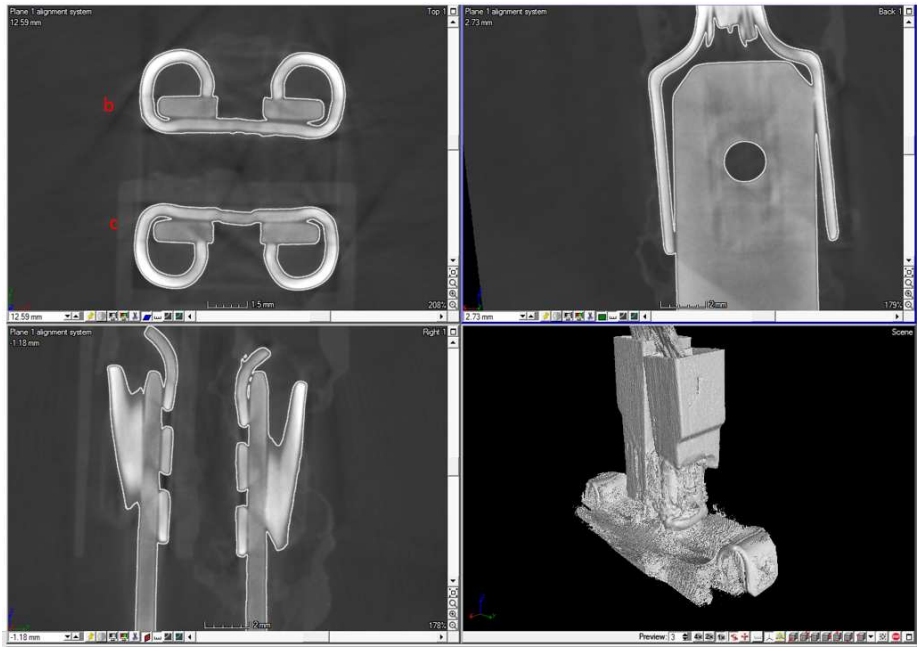

Figure 7 – data of contact area for both specimen (b) and (c)

Figure 8 – data of crimping area for both specimen (b) and (c)

2.4 cross section

Refer to figure 9 through 11 for cross section summary data and table 3 – 5 for test data for crimping data. Figure 9 is the cross-section of specimen(a), figure 10 is the cross section of specimen (b), and figure 11 is the cross section of specimen (c). according to the test result, we have found that both specimen(a) and (b) are lack of strands, standard wire strands are 28, but both specimen(b) and (c) are 21 strands, CMA less than standard lead to smaller compression.

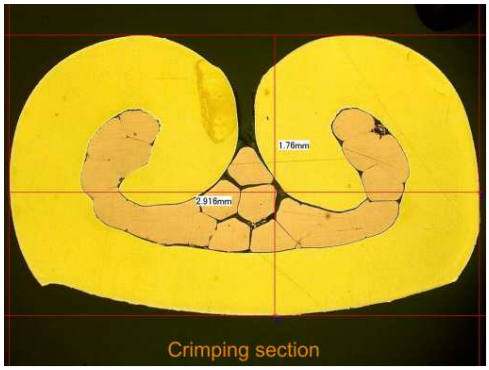

Figure 9 – cross section of specimen (a)

Table – 3 crimping data of specimen(a)

item	result	comments
Target Crimp Height :	1.7300 +/- 0.0300	
Actual Crimp Height :	1.760	CH is on the up line
Target Crimp Width :	2.8000 +/- 0.0000	
Actual Crimp Width :	2.916	
Area after crimping :	0.9436	
Crimp Compression :	0.56%	Compression low
Wire CMA:	1874	Only 21 strands, CMA less than standard leads to smaller compression.

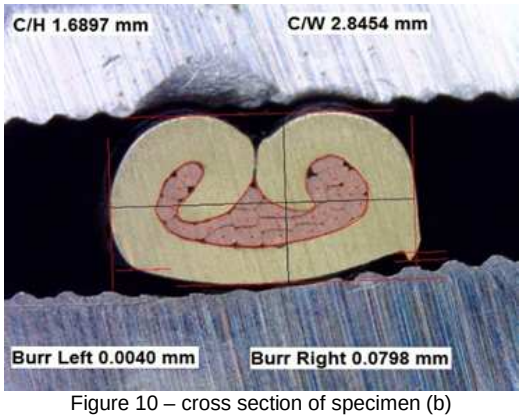

Figure 10 – cross section of specimen (b)

Table – 4 crimping data of specimen(b)

item	result	comments
Target Crimp Height :	1.7300 +/- 0.0300	
Actual Crimp Height :	1.6897	CH out of spec
Target Crimp Width :	2.8000 +/- 0.0000	
Actual Crimp Width :	2.8454	
Area after crimping :	0.94492	
Crimp Compression :	0.54%	Compression low
Wire CMA:	1874	Only 21 strands, CMA less than standard leads to smaller compression.

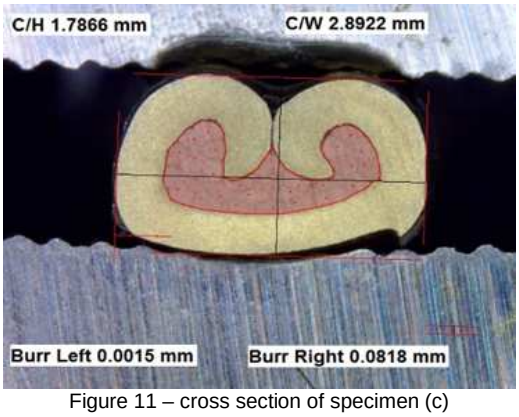

Figure 11 – cross section of specimen (c)

Table – 5 crimping data of specimen(c)

item	result	comments
Target Crimp Height :	1.7300 +/- 0.0300	
Actual Crimp Height :	1.7866	CH out of spec
Target Crimp Width :	2.8000 +/- 0.0000	
Actual Crimp Width :	2.8922	
Area after crimping :	1.12104	
Crimp Compression :	11.50%	
Wire CMA:	2545	