

DEUTSCH* Stamped and Formed (S&F) Contacts T-Rise Validation

1. INTRODUCTION

1.1. Purpose

Testing was performed on DEUTSCH Stamped and Formed Contacts to determine T-rise curves. Test procedures are given in USCAR-2 rev 6, Feb 2013.

1.2. Scope

This report covers the electrical performance of the stamped and formed contacts. Testing was performed at the Winston-Salem Electronic Components Test Laboratory in 2015 and 2018. The test file numbers for this testing are listed in Figure 1. This documentation is on file at, and available from Industrial Commercial Transportation business unit.

Test Group	Test Report
1	WE-20150331ACL WE-20181181ACL

Figure 1

1.3. Conclusion

Current temperature rise (T-Rise) curves were generated for the DEUTSCH Stamped and Formed contacts as tested per the sequences shown in Figure 3 of this document.

1.4. Test Specimens

Test specimens were representative of normal production lots. Specimens identified with the part numbers given in Figure 2 were used for testing.

DEUTSCH PART NUMBER	DESCRIPTION	TEST GROUP
1060-12-0166	Size 12 S&F Pin, Nickel, 12 AWG	1
1062-12-0166	Size 12 S&F Socket, Nickel, 12 AWG	
1060-12-0144	Size 12 S&F Pin, Gold, 12 AWG	
1062-12-0144	Size 12 S&F Socket, Gold, 12 AWG	
1060-12-0222	Size 12 S&F Pin, Nickel, 10 AWG	
1062-12-0222	Size 12 S&F Socket, Nickel, 10 AWG	
1060-16-0122	Size 16 S&F Pin, Nickel, 14-18 AWG	
1062-16-0122	Size 16 S&F Socket, Nickel, 14-18 AWG	
1060-16-0144	Size 16 S&F Pin, Gold, 14-18 AWG	
1062-16-0144	Size 16 S&F Socket, Gold, 14-18 AWG	
1060-16-0622	Size 16 S&F Pin, Nickel, 20 AWG	
1062-16-0622	Size 16 S&F Socket, Nickel, 20 AWG	
1060-16-0644	Size 16 S&F Pin, Gold, 20 AWG	
1062-16-0644	Size 16 S&F Socket, Gold, 20 AWG	

Figure 2

1.5. Environmental Conditions

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

Temperature: 15° to 35°C

Relative humidity: 25 to 75%

1.6. Qualification Test Sequences

TEST OR EXAMINATION	TEST GROUP (a)
	1
	TEST SEQUENCE (b)
Visual Examination	1,7
Voltage Drop	2,4
Terminal Cycling	3
Maximum Test Current Capability	5
Current Cycling	6

(a) Specimens were prepared in accordance production drawings and were selected at random from current production.

- Groups 1 specimens consisted of the following:
 - Size 12 (12-01) Nickel and Gold: 12 AWG
 - Size 12 (12-02) Nickel and Gold: 10 AWG
 - Size 16 (16-01) Nickel and Gold: 14 AWG, 16 AWG, 18 AWG
 - Size 16 (16-06) Nickel and Gold: 16 AWG, 18 AWG, 20 AWG

(b) Numbers indicate sequence that tests were performed.

Figure 3

2. SUMMARY OF TESTING

2.1. Visual Examination (Groups 1)

- A. Procedure: SAE/USCAR-2 Revision 6
- B. Method: Perform an examination of the samples with the naked eye under fluorescent lights. Each test sample to be visually examined for manufacturing or material defects, such as cracks, tarnishing, flash, etc.
- C. Requirement: No physical defects detrimental to product performance.
- D. Result: **PASSED**

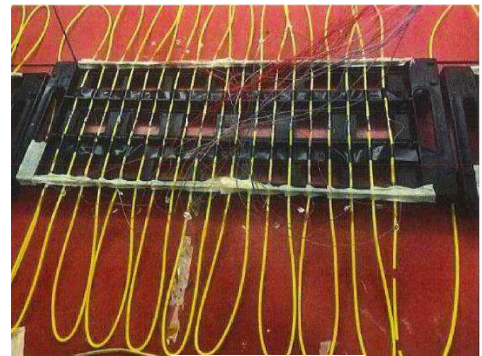
2.2. Voltage Drop (Groups 1)

- A. Procedure: SAE/USCAR-2 Revision 6
- B. Method: Each mated terminal pair was subjected to 25A and voltage was allowed to fluctuate to maintain constant current. Measurements were taken on the data acquisition system using voltage sense lead bundles. The overall resistance measurement included bulk wire, two crimps, bulk terminal material, and terminal interface. The bulk wire was subtracted out of all readings before reporting them.
- C. Requirement: Evaluation
- D. Result: **PERFORMED**

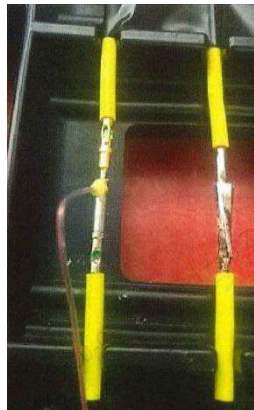
- 2.3. Terminal Cycling (Groups 1)
- A. Procedure: SAE/USCAR-2 Revision 6
 - B. Method: Each terminal pair was engaged and disengaged a total of 10 times by hand. Great care was taken to minimize terminal rotation and inserted to the proper depth.
 - C. Requirement: Conditioning
 - D. Result: **PERFORMED**
- 2.4. Maximum Current Carrying Capability (Groups 1)
- A. Procedure: SAE/USCAR-2 Revision 6
 - B. Method: Test samples were arranged in a draft-free enclosure in a horizontal attitude a minimum of 2 inches apart on the bottom of the enclosure. The ambient probe was placed 6 inches from the test samples and on the same horizontal attitude as the test samples. T-Rise measurements were made with the data acquisition system. Samples were energized at a current level and allowed to maintain thermal stability. Thermal stabilization was achieved when the temperature rise of 3 consecutive readings taken at 5-minute intervals differ at most 1°C (1.8°F). Once the test sample is considered stable at that current level, data is recorded, and the current is increased to the next level. This was repeated until a 55°C T-Rise was reached.
 - C. Requirement: Evaluation
 - D. Result: **PERFORMED**
- 2.5. Current Cycling (Groups 1)
- A. Procedure: SAE/USCAR-2 Revision 6
 - B. Method: Each terminal pair was cycled at the specified current for that group. Current was applied for 45 minute and then removed for 15 minutes. This was considered to me 1 cycle and repeated 1007 more times. A voltage drop, and t-rise measurement was recorded 30 minutes into the on portion of the cycle and then once per week.
 - C. Requirement: 55°C maximum T-rise during current cycling.
 - D. Result: **PASSED**



Test Group in Series



Test Setup



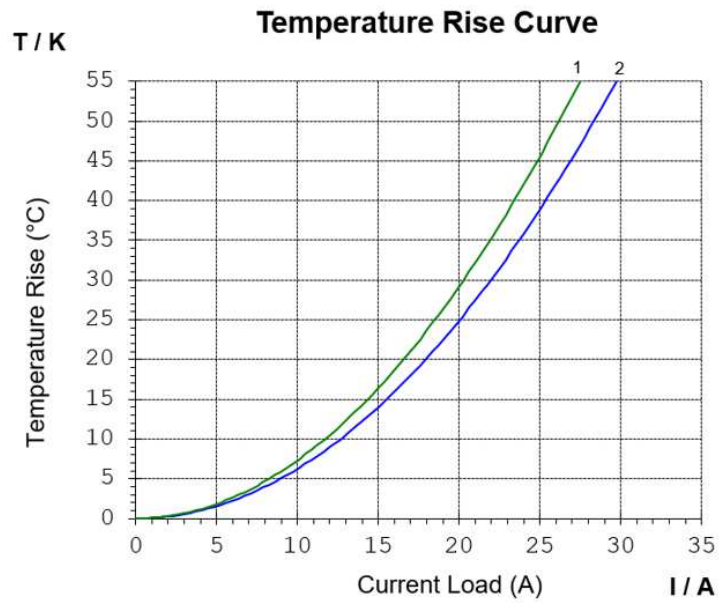
Thermocouple Placement

3.1. Appendix: Current Temperature Rise (T-Rise) Open Air Without Housing

Size 12 - Nickel			
Pin Part Number	Soc Part Number	Conductor	Curve
1060-12-0166	1062-12-0166	12 AWG	1
1060-12-0222	1062-12-0222	10 AWG	2



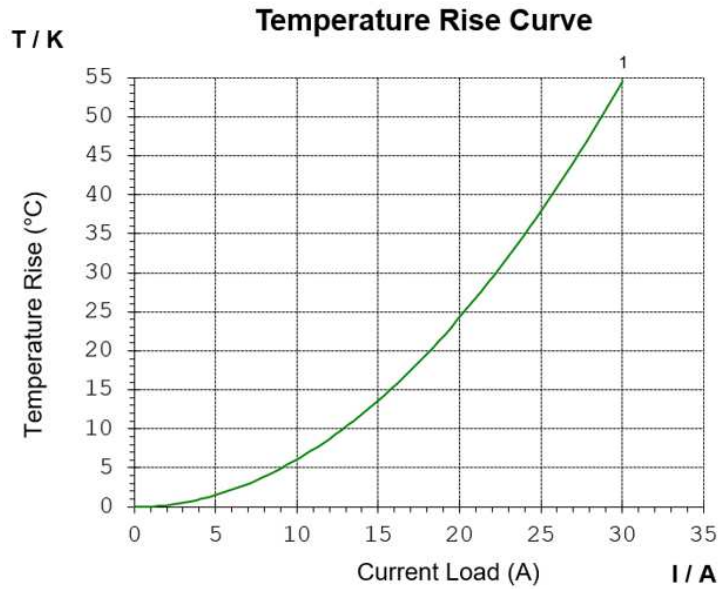
NOTE
T-rise curves indicate testing at 20% above rated current.



Size 12 - Gold			
Pin Part Number	Soc Part Number	Wire	Curve
1060-12-0144	1062-12-0144	12 AWG	1



NOTE
T-rise curves indicate testing at 20% above rated current.



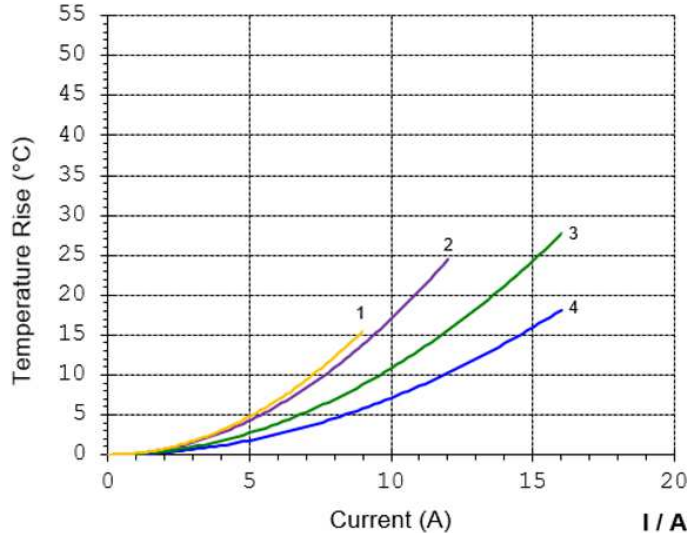
Size 16 - Nickel			
Pin Part Number	Soc Part Number	Wire	Curve
1060-16-0622	1062-16-0622	20 AWG	1
1060-16-0622	1062-16-0622	18 AWG	2
1060-14-0122	1062-14-0122		
1060-16-0122	1062-16-0122		
1060-16-0722	1062-16-0722	16 AWG	3
1060-16-0622	1062-16-0622		
1060-14-0122	1062-14-0122		
1060-16-0122	1062-16-0122	14 AWG	4
1060-16-0722	1062-16-0722		
1060-14-0122	1062-14-0122		
1060-16-0122	1062-16-0122		
1060-16-0722	1062-16-0722		



NOTE
T-rise curves indicate testing at 20% above rated current.

T / K

Temperature Rise Curve



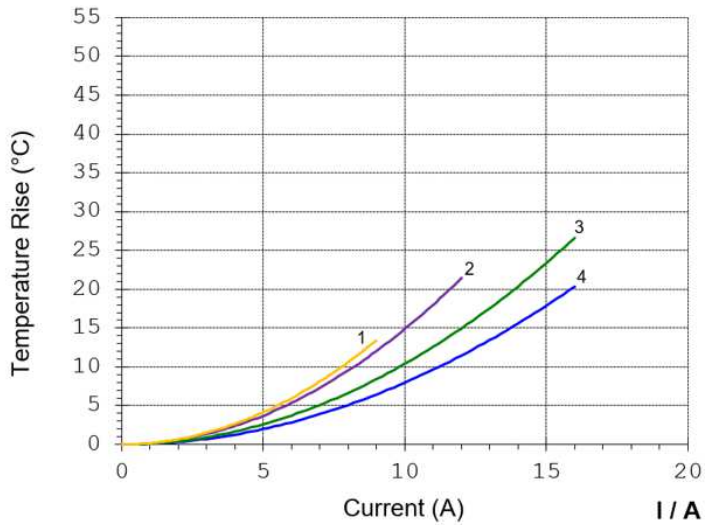
Size 16 - Gold			
Pin Part Number	Soc Part Number	Wire	Curve
1060-16-0644	1062-16-0644	20 AWG	1
1060-16-0644	1062-16-0644	18 AWG	2
1060-14-0144	1062-14-0144		
1060-16-0144	1062-16-0144		
1060-16-0744	1062-16-0744	16 AWG	3
1060-16-0644	1062-16-0644		
1060-14-0144	1062-14-0144		
1060-16-0144	1062-16-0144	14 AWG	4
1060-16-0744	1062-16-0744		
1060-14-0144	1062-14-0144		
1060-16-0144	1062-16-0144		
1060-16-0744	1062-16-0744		



NOTE
T-rise curves indicate testing at 20% above rated current.

T / K

Temperature Rise Curve



4.1. Revision History

Rev Ltr	Brief Description of Change	Date	Dwn	Apvd
A	Initial Release	28-Aug-2020	DM	IG