

Tyco Electronics Corporation 803-985-8500 tel
200 Interconnect Drive 803-985-8507 fax
Rock Hill, S.C. 29730

The Tyco Electronics manufacturing facility in Rock Hill, SC discovered a condition in our plating operation that resulted in a small amount of tin plating being deposited onto the tip of the gold plated area of certain contacts. The defect rate is 2 to 4 contact pins in succession out of every 1,360 contact pins plated during this event. The attached 8D Cause & Corrective Action report explains this event and the associated corrective action in detail. An analysis of our shipping records indicates that you received product as follows that may contain these contacts:

<u>TE Part #</u>	<u>Purchase Order #</u>	<u>Quantity Shipped</u>
1-5499922-0	5665PW1014412	1080
102160-6	5665PW0314402	1440
1-5499160-0	5665PW0165405	216
5102153-3	5665PW0287401	2730
5102154-8	5665PW0232201	1200
5102321-2	5665PW1007404	1152
5102321-3	5665PW0209201	2016
5102321-4	5665PW0321406	504
5102321-8	5665PW0319406	360
5499141-2	5665PW0256202	7056
	5665PW0244201	5040
	5665PW0237200	1512
5499141-7	5665PW0351400	1080
5499910-1	5665PW0118411	3240
5499910-3	5665PW1003100	2016
5102321-9	5665PW0320400	576
5499922-1	5665PW0180409	10206

The potential reliability issue for the affected connectors would be the formation of inter-metallic corrosion between the tin and gold surfaces if the tin is dragged into the mating area during the mating / un-mating process. If corrosion formed on the contact surface, contact resistance could increase. Although we believe the occurrence of this is very low, we recommend that you:

- 1- Return any un-used product by calling the TE Customer Service department @ 1-800-526-5136 and request a RMA number within 90 days. Our customer service associate will enter a replacement order at that time.
- 2- You may choose to inspect your product using the photo in the attached 8D as an example of the potential defect. Again, you may request a RMA for any defects you find.

It is the goal of Tyco Electronics to deliver quality products to our customers and we apologize for the inconvenience. If you have any questions regarding this issue, please don't hesitate to contact the Product Quality Engineer, Sherry McMillan @ 803-985-8531 or me at the number below.

Best Regards,
Don Pittman
Product Assurance Manager
200 Interconnect Drive
Rock Hill, SC 29730
Tyco Electronics

Phone: 803-985-8630

Tyco Electronics / Rock Hill – Root Cause & Corrective Action

D1 Problem Description

In Assembly, a Quality Auditor found "silvery plating" on the gold tips of Universal Header contacts. The first indication was seen on 24 January 2011. The traceability data for the affected orders was researched, revealing that the product was belt plated on Line 58 - beginning with Week 50 of 2010.

Multiple factory orders were affected because the belt is sized to fit all Universal Header product. An inspection of the retained samples from affected Plating orders did not show the problem because the inspection samples are small (8"). In Plating, the problem occurred every 11.4 feet (the belt circumference).

D2 Identify Team

Team Leader: Bill McMurry, Plating Team Manager
Team Members: Al Davis, Plating Manufacturing Engineer
Arthur Tolbert, Plating Supervisor
Shane Brittain, Electrical / Inspection Engineer
Bill Drennan, Plating Quality Engineer
Sherry McMillan, Assembly Quality Engineer

D3 Contain Suspect Material

A. A list of all belt plated product dating back to Week 50 was generated. This was reduced to sixteen Universal Header orders (plated part numbers 102129 and 102132). All product in inventory was returned to the factory, and audits confirmed that the problem did not exist in product plated prior to Week 50.

Completed: January 25, 2011

B. Using the list described in D3A (above), all affected Assembly orders were identified. A global Quality Alert was issued to fully contain all suspect connectors & components within the TE distribution system and to move forward with notification of all customers who may have received any of this product.

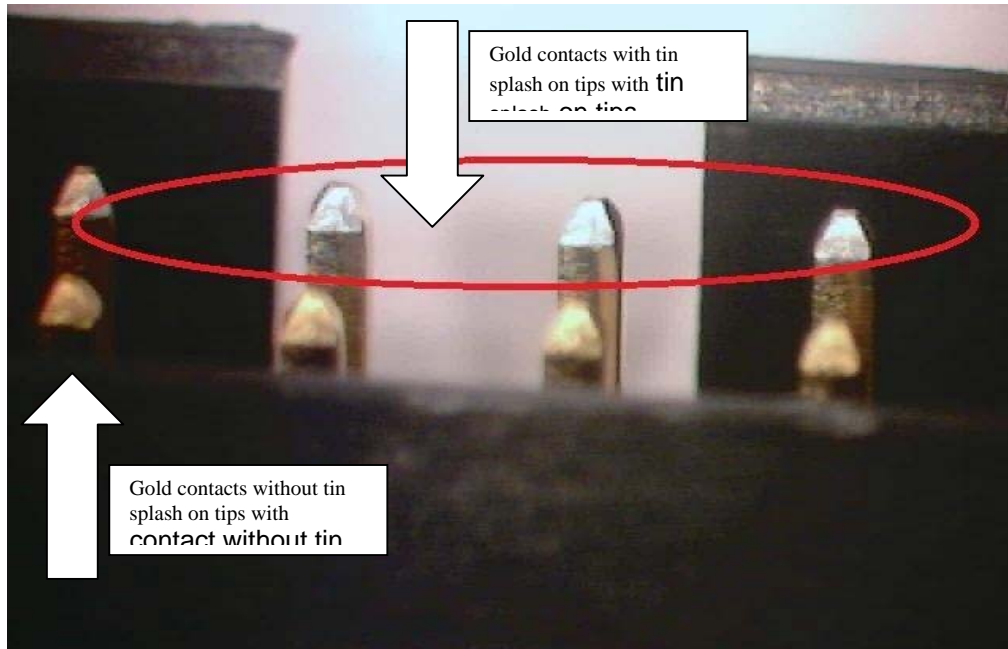
Completed: February 4, 2011

D4 Root Cause - Occurrence

Because the plating baths operate at elevated temperatures, the seams on the tin plating belts can expand over time and allow tin solution to leak through the belt each time the belt seam passes the plating spray nozzle. This allowed a small amount tin solution to plate onto the tips of the contacts already plated with gold.

Up to four contacts were affected every 11.4 feet (roughly 4 out of every 1360 contacts)

Because there were inadequate controls over the cleaning and inspection of belts, this belt was allowed to deteriorate through use.



D4 Root Cause - Escape

The Plating department relies on an automated vision system to 100% inspect the product, but the vision system employed on Line 58 was not capable of detecting the slight discoloration on the tips of the contacts. Another version of software has just been developed to improve the visual inspection.

D4 Root Cause - Systemic

When Universal Header product was assigned to the belt plating process, the possibility of belt degradation was not addressed as a possible root cause. The Process FMEA for Plating was not reviewed for changes or additional root causes.

D5 Identify Corrective Actions - Occurrence

A: Remove all plating belts with seams from the plating operation.

Assigned to: Al Davis **Completed:** 2/3/2011

B: Order seamless belts on all future purchase orders.

Assigned to: Al Davis **Completed:** 2/3/2011 & On-going

C: Implement a log sheet to record when plating belts are issued and returned. This record will reference the unique identification number which is displayed on the belt. The Plating Daily Production Record (DPR) will also be revised to record the belt ID # on every order.

Assigned to: Davis / Tolbert / Drennan **Estimated Completion Date:** 2/9/2011

D: Develop standard work instructions to clean, inspect, and issue plating belts:

- Used belts will be soaked on the line and then red tagged to the Cell Shop for cleaning
- Newly received belts will be given an ID #, inspected, and entered into the maintenance records
- Visual standards for acceptance will be developed and used to approve new and used belts
- Records will be kept on the return, cleaning, and inspection of belts and when they are re-issued

Assigned to: Davis / Tolbert / Drennan **Estimated Completion Date:** 2/9/2011

E: Provide a location near Line 58 to soak belts prior to their return to the Cell Shop

Assigned to: A. Davis / T. Tolbert **Estimated Completion Date:** 2/25/2011

D5 Identify Corrective Actions - Escape

Convert the Line 58 vision system to color cameras to improve the detection of tin overplating

Assigned to: Shane Brittain

Estimated Completion Date: 2/18/2011

D5 Identify Corrective Actions - Systemic

A. Revise the Process FMEA for Plating to include the belt plating process. Identify the potential root

causes and assign corrective action tasks as appropriate.

Assigned to: Drennan / Davis

Estimated Completion Date: 2/11/2011

B: Plating will follow the required change control checklist before implementing process changes.

Assigned to: Drennan / McMurry

Completed: 2/3/2011 & On-going

D6 Verification of Corrective Actions - Occurrence

A. Through 100% inspection and expanded audit checks, the effectiveness of removing the seamed

belts will be monitored to verify that seamless belts eliminate the problem.

Assigned to: B. Drennan / T. Tolbert

Estimated Completion Date: 2/14/2011

B. Using expanded audit checks and Assembly inspection data, the effectiveness of all actions will be verified.

Assigned to: B. Drennan

Estimated Completion Date: 3/24/2011

D6 Verification of Corrective Actions - Escape

Using expanded audit checks and Assembly inspection data, the effectiveness of the enhanced vision system will be verified.

Assigned to: B. Drennan

Estimated Completion Date: 3/24/2011

D6 Verification of Corrective Actions - Systemic

The minutes, revised Process FMEA, and list of assigned action items will verify that change control

activities were effective and successfully completed.

Assigned to: B. Drennan

Estimated Completion Date: 2/22/2011 & On-going

D7 Prevent Recurrence

Expand the use of color cameras to all lines to improve the detection of tin overplating.

Assigned to: Shane Brittain

Estimated Completion Date: 7/10/2011

D8 Communicate Success

The project team will be recognized upon the successful completion of all action items.