

Part Submission Warrant

Part Name	<u>2.8mm Receptacle, Seal, 14AWG</u>	Cust. Part Number	<u>1326032-5</u>
Shown on Drawing No.	<u>TE PRINT 1326032</u>	Org. Part Number	<u>1326032-5 FORD: IFIT-14474-JA</u>
Engineering Change Level	<u>E1</u>	Dated	<u>26-Apr-2011</u>
Additional Engineering Changes	<u>N/A</u>	Dated	<u>N/A</u>
Safety and/or Government Regulation	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Purchase Order No.	<u>N/A</u>
Weight (kg)	<u>0.0005</u>		
Checking Aid Number	<u>N/A</u>	Checking Aid Engineering Change Level	<u>N/A</u>
Dated	<u>N/A</u>		

ORGANIZATION MANUFACTURING INFORMATION

TE CONNECTIVITY

Supplier Name & Supplier/Vendor Code

233 Burgess Road

Street Address

<u>Greensboro</u>	<u>NC</u>	<u>27409</u>	<u>US</u>
City	Region	Postal Code	Country

MATERIALS REPORTING

Has customer-required Substances of Concern information been reported?

Submitted by IMDS or other customer format:

Are polymeric parts identified with appropriate ISO marking codes?

REASON FOR SUBMISSION

- ☒ Initial submission
- ☐ Engineering Change(s)
- ☐ Tooling: Transfer, Replacement, Refurbishment, or additional
- ☐ Correction of Discrepancy
- ☐ Tooling Inactive > than 1 year

- ☐ Change to Optional Construction or Material
- ☐ Sub-Supplier or Material Source Change
- ☐ Change in Part Processing
- ☐ Parts produced at Additional Location
- ☐ Other - please specify

REQUESTED SUBMISSION LEVEL (Check one)

- ☐ Level 1 - Warrant only (and for designated appearance items, an Appearance Approval Report) submitted to customer.
- ☒ Level 2 - Warrant with product samples and limited supporting data submitted to customer.
- ☐ Level 3 - Warrant with product samples and complete supporting data submitted to customer.
- ☐ Level 4 - Warrant and other requirements as defined by customer.
- ☐ Level 5 - Warrant with product samples and complete supporting data reviewed at supplier's manufacturing location.

SUBMISSION RESULTS

The results for ☒ dimensional measurements ☒ material and functional test ☐ appearance criteria ☐ statistical process packageThese results meet all design record requirements: ☒ YES ☐ NO (If "NO" - Explanation Required)

Mold / Cavity / Production Process

Stamping

DECLARATION

I affirm that the samples represented by this warrant are representative of our parts, which were made by a process that meets all Production Part

Approval Process Manual 4th Edition Requirements. I further affirm that these samples were produced at a production rate of

324,000 / 24 hours

I also certify that the documented evidence of such compliance is on file and available for review. I have noted any deviation from the declaration below.

EXPLANATION/COMMENTS:

Is each Customer Tool properly tagged and numbered?

☐ Yes ☐ No ☒ N/A

Organization Authorized Signature



Date

5-Dec-2012Print Name David WilsonPhone No. 336-665-4428Fax No. 336-665-4571Title Quality TechnicianE-mail dwwilson@tycoelectronics.com

FOR CUSTOMER USE ONLY (IF APPLICABLE)

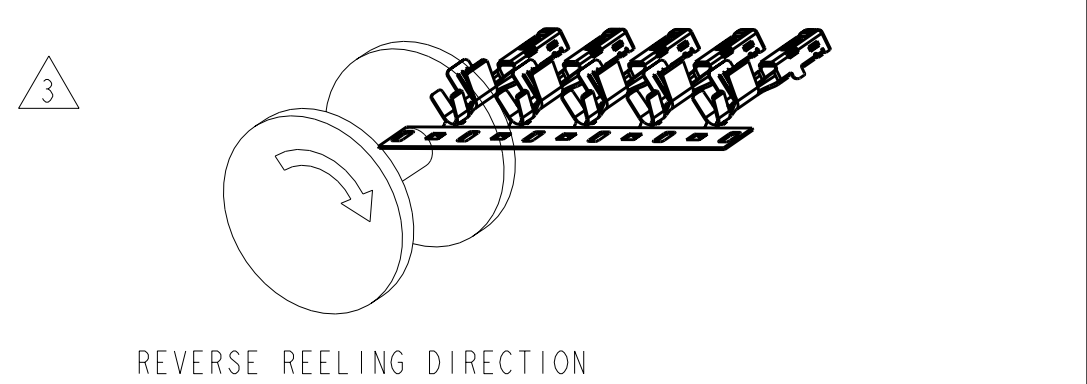
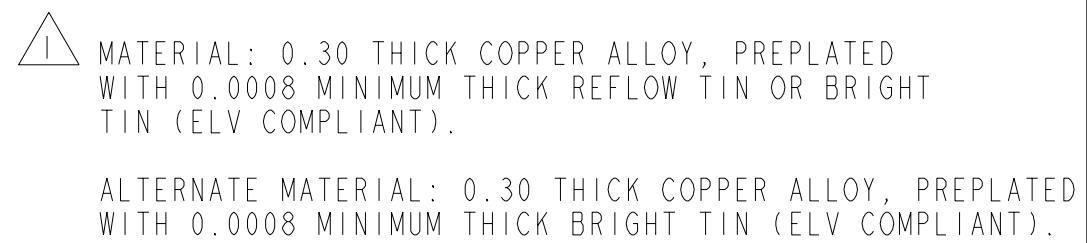
Part Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Customer Signature

Date

Print Name





Customer Tracking Number (optional)



4. QUALIFICATION OF THE CRIMP APPLICATION TOOLING SHALL BE CONTROLLED BY THE REQUIREMENTS ESTABLISHED UNDER USCAR 21.
5. LOOSE END SPLICING TO BE USED.



3	1326032-6 REELED FOR AMP APPLICATORS							12 AWG	1-1326032-2
	1326032-5 REELED FOR AMP APPLICATORS							14 AWG	1-1326032-1
	1326032-4 REELED FOR AMP APPLICATORS							16 AWG	1-1326032-0
	1326032-3 REELED FOR AMP APPLICATORS							18 AWG	1326032-8
	1326032-2 REELED FOR AMP APPLICATORS							20 AWG	1326032-8
	1326032-1 REELED FOR AMP APPLICATORS							22 AWG	1326032-7
2	1.35	6.8	4.30	6.09	4.7	2.70	5.25	12 AWG	1326032-6
	1.35	6.5	4.30	5.62	3.9	1.70	3.88	14 AWG	1326032-5
	1.10	5.6	3.80	4.54	3.9	1.70	3.88	16 AWG	1326032-4
	1.10	5.6	3.80	4.54	3.3	1.30	2.76	18 AWG	1326032-3
	0.90	5.0	3.40	4.11	3.3	1.30	2.76	20 AWG	1326032-2
	0.90	5.0	3.40	4.11	2.5	0.90	2.11	22 AWG	1326032-1
REELING	N	L	ØK	J	H	ØF	E	WIRE SIZE	PART NO.

THIS DRAWING IS A CONTROLLED DOCUMENT.		DWN D. STRAUSSER 28APR99 CHK D. BROWN 28APR99 APP'D D. BROWN 28APR99		 TE Connectivity	
DIMENSIONS: mm		TOLERANCES, UNLESS OTHERWISE SPECIFIED: 0 PLC \pm . 2 PLC \pm .02, .10 3 PLC \pm . 4 PLC \pm . ANGLES \pm $^{\circ}$ 45		NAME 2.8mm RECEPTACLE, SEALED	
		PRODUCT SPEC SAE/J1537-2 8/97 APPLICATION SPEC 114-13013		SIZE CAGE CODE DRAWING NO A1 00779 C=1326032	
MATERIAL 		FINISH 		RESTRICTED TO -	
CUSTOMER DRAWING					
SCALE				10: SHEET 1 OF 1 REV E	



PRODUCT / TOOLING APPROVAL LAB
WINSTON-SALEM N.C.

AUTHOR : Reggie McCraw
REQUEST : 201211.035
PART DESC. : 2.8MM RECEPTACLE SEALED
PART : 1326032-5
TOOL : S714149
CAVITY : 1 OUT DIE
PRINT REV. : E1
METHOD : Scope # T2993-0005
VENDOR : N/A / DAVID WILSON
DATE : 11/15/2012
FILENAME : 11035P00.xls

** ALL DIMENSIONS IN MILLIMETERS **

LABEL = MEASUREMENT LABEL
DESC = FEATURE DESCRIPTION
NOM.VAL = NOMINAL VALUE
UPPER = UPPER TOLERANCE OR UPPER LIMIT OF A RANGE
LOWER = LOWER TOLERANCE OR LOWER LIMIT OF A RANGE
HM = HOW MEASURED DEVICE
ACT.VAL = ACTUAL MEASURED VALUE
DEV>TOL = DEVIATION GREATER THAN UPPER OR LOWER TOLERANCE

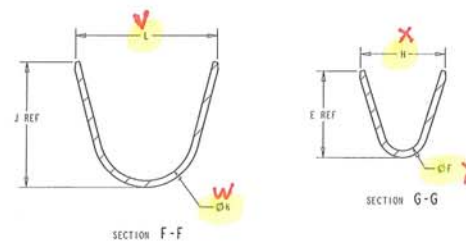
NOTES

PTA LAB

LABEL	DESC	NOMINAL	UPPER	LOWER	FN	HM	ACTUAL	DEV>TOL
A		5.200	0.100	0.100	LX0	SCOP	5.201	
A		5.200	0.100	0.100	LX0	SCOP	5.188	
B		1.600	0.100	0.100	LXX	SCOP	1.604	
B		1.600	0.100	0.100	LXX	SCOP	1.595	
C		0.400	0.100	0.100	MAE	SCOP	0.400	
C		0.400	0.100	0.100	MAE	SCOP	0.400	
C		0.400	0.100	0.100	MAE	SCOP	0.400	
C		0.400	0.100	0.100	MAE	SCOP	0.400	
D		RANGE	5.300	5.000	LXX	SCOP	5.164	
E		RANGE	2.900	2.600	LXX	SCOP	2.829	
F		RANGE	2.550	2.500	LYY	SCOP	2.525	
G		RANGE	2.550	2.500	LXX	SCOP	2.512	
H		4.050	0.050	0.050	LXX	SCOP	4.098	
J	left	3.900	0.000	0.100	LY0	SCOP	3.878	
J	right	3.900	0.000	0.100	LY0	SCOP	3.805	
K		3.300	0.100	0.100	LXX	SCOP	3.258	
L		3.050	0.050	0.050	LYY	SCOP	3.091	
M		8.650	0.000	0.100	LX0	SCOP	8.550	
N		21.500	0.200	0.200	LX0	SCOP	21.391	
P		3.750	0.100	0.100	LXX	SCOP	3.763	
P		3.750	0.100	0.100	LXX	SCOP	3.766	
Q		9.250	0.200	0.200	LX0	SCOP	9.100	
R		2.000	0.100	0.100	LXX	SCOP	1.941	
S		12.450	0.150	0.150	LXX	SCOP	12.300	
T		1.350	0.100	0.100	LYY	SCOP	1.320	
U		0.800	0.100	0.100	MAE	SCOP	0.800	
U		0.800	0.100	0.100	MAE	SCOP	0.800	
V		6.500	0.300	0.300	LXX	SCOP	6.590	

PTA LAB

LABEL	DESC	NOMINAL	UPPER	LOWER	FN	HM	ACTUAL	DEV>TOL
W		4.300	0.100	0.100	MAE	SCOP	4.300	
X		3.900	0.300	0.300	LXX	SCOP	3.893	
Y		1.700	0.100	0.100	MAE	SCOP	1.700	



LOC	UNIT	REVISIONS				
GE	00	REV	DESCRIPTION	DATE	BY	APP
		01	REVISED PER ECO-11-005030	28APR2013	BR	

⚠ MATERIAL: 0.30 THICK COPPER ALLOY, PREPLATED WITH 0.0008 MINIMUM THICK REFLOW TIN OR BRIGHT TIN (ELY COMPLIANT).

ALTERNATE MATERIAL: 0.30 THICK COPPER ALLOY, PREPLATED WITH 0.0008 MINIMUM THICK BRIGHT TIN (ELY COMPLIANT).



4. QUALIFICATION OF THE CRIMP APPLICATION TOOLING SHALL BE CONTROLLED BY THE REQUIREMENTS.

5. LOOSE END SPLICING TO BE USED

[illegible]

Report Date: 14 May 02

TYCO Electronics		Production Verification Plan and Report				PVP&R Number	014508002	Dept#	4508	Global Automotive, America's North	
						Plan Date	08-04-99	Plan Originator	Dale Brown – Tyco Electronics		
Component Tyco USCAR 2.8mm Terminal System		P/N 1326029-01...-04 : 2.8mm Blade, Unsealed 1326030-01...-04 : 2.8mm Receptacle, Unsealed 1326031-01...-05 : 2.8mm Blade, Sealed 1326032-01...-06 : 2.8mm Receptacle, Sealed			UPG Number	Concurrence		Manager Appv'l			
Model Year Various	Applications USCAR Terminal Strategy	Controlling Document USCAR Rev. A (August 1997)				Source Tyco Electronics		Report Date 5/14/02 (Updated) ¹		Reporting Engineer M.D. Brown	

TEST PLAN										TEST REPORT					NOTES
Item No.	Procedure Or Standard	Test Description	Acceptance Criteria	Target Require Ments	Test Respon- sibility	Test Stage	Sample		Timing		Samples Tested			Actual Results	
							Qty	Type	Start	Compl	Qty	Type	Phase		
THE FOLLOWING SEQUENCE IS TYCO ELECTRONICS' ELECTRICAL CONNECTOR SCREEN TEST															
1		Perform rapid temperature cycling with vibration and current cycling concurrently.	Evaluation	100%	AMP	PV	3*	D	09/01/99	09/03/99	4	D	PV	PASS 8P Sealed: Test Current: 9.9 Vib. Profile: Body & IP Temp: Class III ΔR _{Max} =0.75mΩ	Criteria: 20 milliohms maximum dry circuit resistance. Class III, Engine Compartment Profile, rated current (14 AWG Wire). (4 Connectors Fully loaded, 8 data points from each connector)

PROCEDURE	TEST DESCRIPTION	ACCEPTANCE CRITERIA	TARGET REQUIREMENTS	TEST STAGE	SAMPLE TYPE	SAMPLES TESTED	ACTUAL RESULTS	NOTES
Specify the governing Test Procedure or Standard.	Provide a brief description of each test.	Specify test targets and/or pass/fail criteria. e.g. cycles, miles, volts, minimum value, no. failure, etc.	Acceptance Level	ED = engineering development DV = design verification PV = Production validation CC = continuing conformance	A = prototype (hand made) B = prototype (tooled) C = program level D = initial production E = full volume production	List quantity tested, sample type, and design phase, e.g., I, II, etc.	Actual Test Results	Describe or elaborate on unique criteria, results, etc.

¹⁾ CHANGES HIGHLIGHTED IN GREEN REPRESENT DIFFERENCES BETWEEN SAE/USCAR-2, REVISION A (2001) AND SAE/USCAR-2, REVISION 3 (1997)

TEST PLAN										TEST REPORT					NOTES
Item No.	Procedure or Standard	Test Description	Acceptance Criteria	Target Require Ments	Test Respon- sibility	Test Stage	Sample		Timing		Samples Tested			Actual Results	
							Qty	Type	Start	Compl	Qty	Type	Phase		

START OF USCAR TERMINAL TESTING

2		USCAR Test Requirements													
2a	USCAR 5.2.1	Terminal-Terminal Engage Force	$F_M \leq 6.2 \text{ N}$ (Per engagement force analysis)	No Failures	AMP	PV	60*	D	09/07/99	09/20/99	30	D	PV	PASS Unsealed System $(F_M)_{Max}=4.42 \text{ N}$ Sealed System: $(F_M)_{Max}=5.49 \text{ N}$	*30 Sealed Terminal wire-wire pairs (any wire size) 30 Unsealed Terminal wire-wire pairs (any wire size)
2b	USCAR 5.2.1	Terminal-Terminal Disengage Force	$F_U \geq 2.5 \text{ N}$	No Failures	AMP	PV	*	D	09/07/99	09/20/99	30	D	PV	PASS Unsealed System $(F_U)_{Min}=3.52 \text{ N}$ Sealed System: $(F_U)_{Min}=3.73 \text{ N}$	*Use mated samples from test 3a.
2c	USCAR 5.2.2	Terminal Bend Resistance	$\leq 30^\circ$ Permanent Deform. Under 22 N Load. $\leq 30^\circ$ Permanent Deform. Under 10 N Load NOTE: Bend Strength changed to 10 N in Rev 3 of SAE/USCAR -2, dated April 2001	No Failures	AMP	PV	120*	D	09/07/99	09/20/99	60	D	PV	PASS Strength > 10N 1326032-1,-2,-3; 1326031-1,-2,-3; 1326030-1,-2; 1326029-1,-2 Strength > 22N 1326032-4,-5,-6; 1326031-4,-5; 1326030-3,-4; 1326029-3,-4	1) Load directed upward for 15 seconds on half of samples. 2) Load directed downward for 15 seconds on half of samples.

PROCEDURE	TEST DESCRIPTION	ACCEPTANCE CRITERIA	TARGET REQUIREMENTS	TEST STAGE	SAMPLE TYPE	SAMPLES TESTED	ACTUAL RESULTS	NOTES
Specify the governing Test Procedure or Standard.	Provide a brief description of each test.	Specify test targets and/or pass/fail criteria. e.g. cycles, miles, volts, minimum value, no. failure, etc.	Acceptance Level	ED = engineering development DV = design verification PV = Production validation CC = continuing conformance	A = prototype (hand made) B = prototype (tooled) C = program level D = initial production E = full volume production	List quantity tested, sample type, and design phase, e.g., I, II, etc.	Actual Test Results	Describe or elaborate on unique criteria, results, etc.

TEST PLAN										TEST REPORT					NOTES
Item No.	Procedure or Standard	Test Description	Acceptance Criteria	Target Require Ments	Test Respon-sibility	Test Stage	Sample		Timing		Samples Tested			Actual Results	
							Qty	Type	Start	Compl	Qty	Type	Phase		

2d	USCAR 5.2.4 <i>USCAR 5.3.2 (Rev 3)</i>	Voltage Drop	$MV_{Drop} \leq 4\text{ mV/A}$ $R_i \leq 5\text{ m}\Omega$ NOTE: Allowable resistance changed to 5 mΩ in Rev 3 of SAE/USCAR –2, dated April 2001	No Failures	AMP	PV	30	D	09/07/99	09/15/99	30	D	PV	PASS $MV_{Drop,Max} = 1.03\text{ mV/A}$	14 VDC, Rated Current; Resistance is measured across complete system (crimp to crimp).
2e	USCAR 5.2.5 <i>USCAR 5.3.1 (Rev 3)</i>	Dry Circuit Resistance	$R_i \leq 20\text{ m}\Omega$ for low energy $R_i \leq 5\text{ m}\Omega$ NOTE: Allowable resistance changed to 5 mΩ in Rev 3 of SAE/USCAR –2, dated April 2001	No Failures	AMP	PV	30	D	09/07/99	09/15/99	30	D	PV	PASS $R_{MAX} = 1.36\text{ m}\Omega$	100mA, 20mv; Resistance is measured across complete system (crimp to crimp).

PROCEDURE	TEST DESCRIPTION	ACCEPTANCE CRITERIA	TARGET REQUIREMENTS	TEST STAGE	SAMPLE TYPE	SAMPLES TESTED	ACTUAL RESULTS	NOTES
Specify the governing Test Procedure or Standard.	Provide a brief description of each test.	Specify test targets and/or pass/fail criteria. e.g. cycles, miles, volts, minimum value, no. failure, etc.	Acceptance Level	ED = engineering development DV = design verification PV = Production validation CC = continuing conformance	A = prototype (hand made) B = prototype (tooled) C = program level D = initial production E = full volume production	List quantity tested, sample type, and design phase, e.g., I, II, etc.	Actual Test Results	Describe or elaborate on unique criteria, results, etc.

TEST PLAN										TEST REPORT					NOTES
Item No.	Procedure or Standard	Test Description	Acceptance Criteria	Target Require Ments	Test Respon-sibility	Test Stage	Sample		Timing		Samples Tested			Actual Results	
							Qty	Type	Start	Compl	Qty	Type	Phase		
2f	USCAR 5.2.6 USCAR 5.3.3 (Rev 3)	Maximum Current Rating	Voltage drop ≤4mV/A (crimp to crimp) OR Change in temp. of interface ≤ 20° C NOTE: Criteria for this requirement changed to 55°C t-Rise or voltage drop change of 5 mV/A in Rev 3 of SAE/USCAR–2, dated April 2001	No Failures	AMP	PV	210*	D	09/07/99	10/30/99				PASS 10 AWG I = 25.1 Amps 12 AWG I = 21.2 Amps 14 AWG I = 17.3 Amps 16 AWG I = 14.2 Amps 18 AWG I = 12.4 Amps 20 AWG I = 10.4 Amps 22 AWG I = 8.3 Amps	*30 Unsealed Terminal Pairs (22 AWG). 30 Unsealed Terminal Pairs (20 AWG). 30 Unsealed Terminal Pairs (18 AWG). 30 Unsealed Terminal Pairs (16 AWG). 30 Unsealed Terminal Pairs (14 AWG). 30 Unsealed Terminal Pairs (12 AWG). 30 Unsealed Terminal Pairs (10 AWG).
END OF USCAR TERMINAL TESTING															

PROCEDURE	TEST DESCRIPTION	ACCEPTANCE CRITERIA	TARGET REQUIREMENTS	TEST STAGE	SAMPLE TYPE	SAMPLES TESTED	ACTUAL RESULTS	NOTES
Specify the governing Test Procedure or Standard.	Provide a brief description of each test.	Specify test targets and/or pass/fail criteria. e.g. cycles, miles, volts, minimum value, no. failure, etc.	Acceptance Level	ED = engineering development DV = design verification PV = Production validation CC = continuing conformance	A = prototype (hand made) B = prototype (tooled) C = program level D = initial production E = full volume production	List quantity tested, sample type, and design phase, e.g., I, II, etc.	Actual Test Results	Describe or elaborate on unique criteria, results, etc.

TEST PLAN										TEST REPORT					NOTES
Item No.	Procedure or Standard	Test Description	Acceptance Criteria	Target Require Ments	Test Respon- sibility	Test Stage	Sample		Timing		Samples Tested			Actual Results	
							Qty	Type	Start	Compl	Qty	Type	Phase		

START OF USCAR CONNECTOR TESTING

3		USCAR Test Requirements													
3a	USCAR 5.3.1 <i>USCAR 5.4.1 (Rev 3)</i>	Terminal Insertion	<p>≤ 15 N before full lock-up of terminal</p> <p>≥ 50N forward-stop push through force</p> <p>NOTE: 50 N forward-stop push through was added to Rev 3 of SAE/USCAR –2, dated April 2001</p>	No Failures	AMP	PV	7*	D	09/07/99	09/10/99	36	D	PV	<p><i>PASS</i></p> <p>Unsealed Recept.: <i>Insertion,Max = 5.19N</i> <i>Push Through> 75N</i></p> <p>Sealed Recept.: <i>Insertion,Max = 14.31N</i> <i>Push Through> 75N</i></p> <p>Unsealed Blade: <i>Insertion,Max = 5.80N</i> <i>Push Through> 75N</i></p> <p>Sealed Blade: <i>Insertion,Max = 14.51N</i> <i>Push Through> 75N</i></p>	<p>**A worst-case design analysis will be conducted with respect to the 0.25minimum overtravel requirement.</p> <p>*3 Unsealed 12 Position Connectors (36 data points male, 36 data points female)</p> <p>*4 Unsealed 8 Position Wire-Wire Connectors (32 data points male, 32 data points female)</p>

PROCEDURE	TEST DESCRIPTION	ACCEPTANCE CRITERIA	TARGET REQUIREMENTS	TEST STAGE	SAMPLE TYPE	SAMPLES TESTED	ACTUAL RESULTS	NOTES
Specify the governing Test Procedure or Standard.	Provide a brief description of each test.	Specify test targets and/or pass/fail criteria. e.g. cycles, miles, volts, minimum value, no. failure, etc.	Acceptance Level	ED = engineering development DV = design verification PV = Production validation CC = continuing conformance	A = prototype (hand made) B = prototype (tooled) C = program level D = initial production E = full volume production	List quantity tested, sample type, and design phase, e.g., I, II, etc.	Actual Test Results	Describe or elaborate on unique criteria, results, etc.

TEST PLAN										TEST REPORT					NOTES
Item No.	Procedure or Standard	Test Description	Acceptance Criteria	Target Require Ments	Test Respon-sibility	Test Stage	Sample		Timing		Samples Tested			Actual Results	
							Qty	Type	Start	Compl	Qty	Type	Phase		

3b	USCAR 5.3.1 USCAR 5.4.1 (Rev 3)	Terminal Disengage	<p>> 90 N with secondary locking feature</p> <p>> 40 N without secondary locking feature</p> <p>> 60 N without secondary locking feature</p> <p>> 48 N after environ. requirement</p> <p>NOTE: 48 N terminal retention force (after environment) was added to Rev 3 of SAE/USCAR -2, dated April 2001; 40 N extraction (primary lock only) was changed to 60 N.</p>	No Failures	AMP	PV	7*	D	09/01/99	10/30/99	36	D	PV	PASS Unsealed Recept.: <i>(Extraction with TPA)_{min}=161.5N</i>	*3 unsealed 12 positions / 4 sealed 8 positions for test with secondary locking feature. Samples used will be produced from test 2g. (36 data points male & female for unsealed, 32 data points male & female for sealed)
											36	D	PV	Unsealed Recept.: <i>(Extraction w/o TPA)_{min}=159.1N</i>	
											32	D	PV	Sealed Recept.: <i>(Extraction with TPA)_{min}=134.3N</i>	
											32	D	PV	Sealed Recept.: <i>(Extraction w/o TPA)_{min}=131.3N</i>	3 unsealed 12 positions / 4 sealed 8 positions for test without secondary locking feature. (36 data points male & female for unsealed, 32 data points male & female for sealed)
											36	D	PV	Unsealed Blade: <i>(Extraction with TPA)_{min}=101.7N</i>	
											36	D	PV	Unsealed Blade: <i>(Extraction w/o TPA)_{min}=112.7N</i>	Test 48 N pull-out Requirement after each of the four USCar Environmental tests Detailed in items 6-9.
											32	D	PV	Sealed Blade: <i>(Extraction with TPA)_{min}=92.61N</i>	
											32	D	PV	Sealed Blade: <i>(Extraction w/o TPA)_{min}=91.53N</i> *for after environment tests see items 6-9.	

PROCEDURE	TEST DESCRIPTION	ACCEPTANCE CRITERIA	TARGET REQUIREMENTS	TEST STAGE	SAMPLE TYPE	SAMPLES TESTED	ACTUAL RESULTS	NOTES
Specify the governing Test Procedure or Standard.	Provide a brief description of each test.	Specify test targets and/or pass/fail criteria. e.g. cycles, miles, volts, minimum value, no. failure, etc.	Acceptance Level	ED = engineering development DV = design verification PV = Production validation CC = continuing conformance	A = prototype (hand made) B = prototype (tooled) C = program level D = initial production E = full volume production	List quantity tested, sample type, and design phase, e.g., I, II, etc.	Actual Test Results	Describe or elaborate on unique criteria, results, etc.

TEST PLAN										TEST REPORT					NOTES
Item No.	Procedure or Standard	Test Description	Acceptance Criteria	Target Require Ments	Test Respon- sibility	Test Stage	Sample		Timing		Samples Tested			Actual Results	
							Qty	Type	Start	Compl	Qty	Type	Phase		
3c	USCAR 5.3.2 USCAR 5.4.2 (Rev 3)	Connector Mating & Unmating Force	≤ 90 N ≤ 75 N NOTE: Mating force requirement in Rev 3 of SAE/USCAR –2, dated April 2001, is 75 N.	No Failures	AMP	PV	60*	D	09/01/99	09/10/99	30	D	PV	PASS 10p Unsealed: (F _{mate}) _{max} = 63.57 N (F _{unmate}) _{max} = 57.50 N 10p Unsealed: (F _{mate}) _{max} = 65.70 N (F _{unmate}) _{max} = 52.44 N	1) 75 Newton maximum effort to mate fully loaded connector pair. 2) 75 Newton maximum effort to unmate fully loaded connector pair. *30 unsealed connector systems fully loaded with any wire size – 12 Position *30 sealed connector systems fully loaded with any wire size (including system seals) – 8 Position
3d	USCAR 5.3.7	Connector System Maximum Current Rating	Voltage drop ≤ 4mV/A (crimp to crimp) OR Change in temp. of interface ≤ 20° C	No Failures	AMP	PV	7*	D	08/31/99	08/31/99	3	D	PV	Evaluation Only 12p Unsealed Current _{Max} = 9.21 Amps 4 8p Sealed Current _{Max} = 9.90 Amps	*Connectors: 3 fully loaded unsealed 12 position (14 AWG wire); 4 fully loaded sealed 8 position (14 AWG wire)
END OF USCAR CONNECTOR TESTING															

PROCEDURE	TEST DESCRIPTION	ACCEPTANCE CRITERIA	TARGET REQUIREMENTS	TEST STAGE	SAMPLE TYPE	SAMPLES TESTED	ACTUAL RESULTS	NOTES
Specify the governing Test Procedure or Standard.	Provide a brief description of each test.	Specify test targets and/or pass/fail criteria. e.g. cycles, miles, volts, minimum value, no. failure, etc.	Acceptance Level	ED = engineering development DV = design verification PV = Production validation CC = continuing conformance	A = prototype (hand made) B = prototype (tooled) C = program level D = initial production E = full volume production	List quantity tested, sample type, and design phase, e.g., I, II, etc.	Actual Test Results	Describe or elaborate on unique criteria, results, etc.

TEST PLAN										TEST REPORT					NOTES
Item No.	Procedure or Standard	Test Description	Acceptance Criteria	Target Require Ments	Test Respon-sibility	Test Stage	Sample		Timing		Samples Tested			Actual Results	
							Qty	Type	Start	Compl	Qty	Type	Phase		

START OF USCAR CONNECTOR SYSTEM ENVIRONMENTAL (CLASS III)

4		Vibration / Mechanical													
4a	USCAR 5.2.4 USCAR 5.3.1 (Rev 3)	Dry Circuit	$R_T \leq 20 \text{ mOhms.}$ $R_T \leq 5 \text{ m}\Omega$ NOTE: Criteria changed to 5 mΩ in Rev 3 of SAE/USCAR-2	No Failures	AMP	PV	7*	D	09/01/99	09/01/99	3 4	D D	PV PV	PASS 12p Unsealed: $(R_{Ti})_{Max} = 0.85 \text{ m}\Omega$ 8p Sealed: $(R_{Ti})_{Max} = 0.82 \text{ m}\Omega$ *After 10 mate/unmate	*3 unsealed 12 positions, 4 sealed 8 positions (14 AWG wire). Resistance is measured across complete system (crimp to crimp).
4b	USCAR 5.3.4	Vibration/Mechanical Shock (Engine Compartment profile).	See Notes	No Failures	AMP	PV	*	D	09/02/99	09/07/99				PASS 12p Unsealed: Body & IP 8p Sealed: Engine Comp.	*Use samples generated in step 6a.
4c	USCAR 5.2.4 USCAR 5.3.1 (Rev 3)	Dry Circuit	$R_T \leq 20 \text{ mOhms.}$ $R_T \leq 5 \text{ m}\Omega$ NOTE: Criteria changed to 5 mΩ in Rev 3 of SAE/USCAR-2	No Failures	AMP	PV	*	D	09/07/99	09/07/99				PASS 12p Unsealed: $(R_{Tp})_{Max} = 1.64 \text{ m}\Omega$ 8p Sealed: $(R_{Tp})_{Max} = 1.36 \text{ m}\Omega$	*Use samples generated in step 6b. Resistance is measured across complete system (crimp to crimp).
4d	USCAR 5.2.4 USCAR 5.3.2 (Rev 3)	Voltage Drop	$MV_{Drop} \leq 4 \text{ mV/A}$ $R_T \leq 5 \text{ m}\Omega$ NOTE: Criteria changed to 5 mΩ in Rev 3 of SAE/USCAR-2	No Failures	AMP	PV	*	D	09/07/99	09/07/99				PASS 12p Unsealed: $(MV_{DROP})_{Max} = 1.91 \text{ mV/A}$ 8p Sealed: $(MV_{DROP})_{Max} = 1.58 \text{ mV/A}$	*Use samples generated in step 6c. Voltage drop is measured across complete system (crimp to crimp). Rating determined in 3d
3b	USCAR 5.4.1 (Rev. 3)	Terminal Retention	$> 48 \text{ N}$	No Failures	AMP	PV	*	D	09/09/99	09/09/99				PASS Pullout > 48 N	

PROCEDURE	TEST DESCRIPTION	ACCEPTANCE CRITERIA	TARGET REQUIREMENTS	TEST STAGE	SAMPLE TYPE	SAMPLES TESTED	ACTUAL RESULTS	NOTES
Specify the governing Test Procedure or Standard.	Provide a brief description of each test.	Specify test targets and/or pass/fail criteria. e.g. cycles, miles, volts, minimum value, no. failure, etc.	Acceptance Level	ED = engineering development DV = design verification PV = Production validation CC = continuing conformance	A = prototype (hand made) B = prototype (tooled) C = program level D = initial production E = full volume production	List quantity tested, sample type, and design phase, e.g., I, II, etc.	Actual Test Results	Describe or elaborate on unique criteria, results, etc.

TEST PLAN										TEST REPORT				NOTES	
Item No.	Procedure or Standard	Test Description	Acceptance Criteria	Target Requirements	Test Responsibility	Test Stage	Sample		Timing		Samples Tested				Actual Results
							Qty	Type	Start	Compl	Qty	Type	Phase		
5		Thermal Shock													
5a	USCAR 5.2.5 USCAR 5.3.1 (Rev 3)	Dry Circuit	$R_T \leq 20\text{ m}\Omega$ $R_T \leq 5\text{ m}\Omega$ NOTE: Criteria changed to 5 mΩ in Rev 3 of SAE/USCAR-2	No Failures	AMP	PV	7*	D	09/01/99	09/01/99	3	D	PV	PASS 12p Unsealed: $(R_{Ti})_{Max}=0.88\text{m}\Omega$ 8p Sealed: $(R_{Ti})_{Max}=0.76\text{m}\Omega$ *After 10 mate/unmate	*3 unsealed 12 positions, 4 sealed 8 positions (14 AWG wire). Resistance is measured across complete system (crimp to crimp).
5b	USCAR 5.3.9	Thermal Shock Test (Class III)	See Notes	No Failures	AMP	PV	*	D	09/02/99	09/20/99				PASS 12p Unsealed: -40 °C to +125 °C 8p Sealed: -40 °C to +125 °C	*Use samples generated in step 7a.
5c	USCAR 5.2.4 USCAR 5.3.1 (Rev 3)	Dry Circuit	$R_T \leq 20\text{ m}\Omega$ $R_T \leq 5\text{ m}\Omega$ NOTE: Criteria changed to 5 mΩ in Rev 3 of SAE/USCAR-2	No Failures	AMP	PV	*	D	09/20/99	09/21/99				PASS 12p Unsealed: $(R_{Ti})_{Max}=1.20\text{m}\Omega$ 8p Sealed: $(R_{Ti})_{Max}=1.57\text{m}\Omega$	*Use samples generated in step 7b.
5d	USCAR 5.2.4 USCAR 5.3.2 (Rev 3)	Voltage Drop	$MV_{Drop} \leq 4\text{ mV/A}$ $R_T \leq 5\text{ m}\Omega$ NOTE: Criteria changed to 5 mΩ in Rev 3 of SAE/USCAR-2	No Failures	AMP	PV	*	D	09/21/99	09/22/99				PASS 12p Unsealed: $(MV_{DROP})_{Max} = 1.59\text{ mV/A}$ 8p Sealed: $(MV_{DROP})_{Max} = 1.38\text{ mV/A}$	*Use samples generated in step 7c. Voltage drop is measured across complete system (crimp to crimp). Rating determined in 3d
3b	USCAR 5.4.1 (Rev. 3)	Terminal Retention	> 48 N	No Failures	AMP	PV	*	D	09/23/99	09/24/99				PASS Pullout > 48 N	

PROCEDURE	TEST DESCRIPTION	ACCEPTANCE CRITERIA	TARGET REQUIREMENTS	TEST STAGE	SAMPLE TYPE	SAMPLES TESTED	ACTUAL RESULTS	NOTES
Specify the governing Test Procedure or Standard.	Provide a brief description of each test.	Specify test targets and/or pass/fail criteria. e.g. cycles, miles, volts, minimum value, no. failure, etc.	Acceptance Level	ED = engineering development DV = design verification PV = Production validation CC = continuing conformance	A = prototype (hand made) B = prototype (tooled) C = program level D = initial production E = full volume production	List quantity tested, sample type, and design phase, e.g., I, II, etc.	Actual Test Results	Describe or elaborate on unique criteria, results, etc.

TEST PLAN										TEST REPORT					NOTES
Item No.	Procedure or Standard	Test Description	Acceptance Criteria	Target Require Ments	Test Respon- sibility	Test Stage	Sample		Timing		Samples Tested			Actual Results	
							Qty	Type	Start	Compl	Qty	Type	Phase		

6		Temperature / Humidity													
6a	USCAR 5.2.5 <i>USCAR 5.3.1 (Rev 3)</i>	Dry Circuit	$R_T \leq 20 \text{ m}\Omega$ $R_T \leq 5 \text{ m}\Omega$ NOTE: Criteria changed to 5 mΩ in Rev 3 of SAE/USCAR-2	No Failures	AMP	PV	7*	D	09/07/99	09/07/99	3	D	PV	PASS 12p Unsealed: $(R_{Ti})_{Max} = 0.85 \text{ m}\Omega$ 8p Sealed: $(R_{Ti})_{Max} = 0.93 \text{ m}\Omega$ *After 10 mate/unmate	*3 unsealed 12 positions, 4 sealed 8 positions (14 AWG wire). Resistance is measured across complete system (crimp to crimp).
6b	USCAR 5.3.10	Temperature/Humidity Cycling. (Class III)	See Notes	No Failures	AMP	PV	*	D	09/08/99	09/29/99				PASS 12p Unsealed: Class III 8p Sealed: Class III	*Use samples generated in step 8a.
6c	USCAR 5.2.4 <i>USCAR 5.3.1 (Rev 3)</i>	Dry Circuit	$R_T \leq 20 \text{ m}\Omega$ $R_T \leq 5 \text{ m}\Omega$ NOTE: Criteria changed to 5 mΩ in Rev 3 of SAE/USCAR-2	No Failures	AMP	PV	*	D	09/29/99	09/29/99				PASS 12p Unsealed: $(R_{Tf})_{Max} = 1.06 \text{ m}\Omega$ 8p Sealed: $(R_{Tf})_{Max} = 1.41 \text{ m}\Omega$	*Use samples generated in step 8b.
6d	USCAR 5.2.4 <i>USCAR 5.3.2 (Rev 3)</i>	Voltage Drop	$MV_{Drop} \leq 4 \text{ mV/A}$ $R_T \leq 5 \text{ m}\Omega$ NOTE: Criteria changed to 5 mΩ in Rev 3 of SAE/USCAR-2	No Failures	AMP	PV	*	D	09/30/99	09/30/99				PASS 12p Unsealed: $(MV_{DROP})_{Max} = 1.30 \text{ mV/A}$ 8p Sealed: $(MV_{DROP})_{Max} = 1.84 \text{ mV/A}$	*Use samples generated in step 8c. Voltage drop is measured across complete system (crimp to crimp). Rating determined in 3d
3b	<i>USCAR 5.4.1 (Rev. 3)</i>	Terminal Retention	> 48 N	No Failures	AMP	PV	*	D	10/01/99	10/04/99				PASS Pullout > 48 N	

PROCEDURE	TEST DESCRIPTION	ACCEPTANCE CRITERIA	TARGET REQUIREMENTS	TEST STAGE	SAMPLE TYPE	SAMPLES TESTED	ACTUAL RESULTS	NOTES
Specify the governing Test Procedure or Standard.	Provide a brief description of each test.	Specify test targets and/or pass/fail criteria. e.g. cycles, miles, volts, minimum value, no. failure, etc.	Acceptance Level	ED = engineering development DV = design verification PV = Production validation CC = continuing conformance	A = prototype (hand made) B = prototype (tooled) C = program level D = initial production E = full volume production	List quantity tested, sample type, and design phase, e.g., I, II, etc.	Actual Test Results	Describe or elaborate on unique criteria, results, etc.

TEST PLAN										TEST REPORT					NOTES
Item No.	Procedure or Standard	Test Description	Acceptance Criteria	Target Require Ments	Test Respon- sibility	Test Stage	Sample		Timing		Samples Tested			Actual Results	
							Qty	Type	Start	Compl	Qty	Type	Phase		

7		High Temp													
7a	USCAR 5.2.5 <i>USCAR 5.3.1 (Rev 3)</i>	Dry Circuit	$R_T \leq 20 \text{ m}\Omega$ $R_T \leq 5 \text{ m}\Omega$ NOTE: Criteria changed to 5 mΩ in Rev 3 of SAE/USCAR-2	No Failures	AMP	PV	7*	D	09/01/99	09/01/99	3	D	PV	PASS 12p Unsealed: $(R_{Ti})_{Max} = 0.86 \text{ m}\Omega$ 8p Sealed: $(R_{Ti})_{Max} = 0.72 \text{ m}\Omega$ *After 10 mate/unmate	*3 unsealed 12 positions, 4 sealed 8 positions (14 AWG wire). Resistance is measured across complete system (crimp to crimp).
7b	USCAR 5.3.11	High Temperature Exposure (Class III)	See Notes	No Failures	AMP	PV	*	D	09/02/99	10/15/99				PASS 12p Unsealed: <i>Class III</i> 8p Sealed: <i>Class III</i>	*Use samples generated in step 9a.
7c	USCAR 5.2.4 <i>USCAR 5.3.1 (Rev 3)</i>	Dry Circuit	$R_T \leq 20 \text{ m}\Omega$ $R_T \leq 5 \text{ m}\Omega$ NOTE: Criteria changed to 5 mΩ in Rev 3 of SAE/USCAR-2	No Failures	AMP	PV	*	D	10/15/99	10/18/99				PASS 12p Unsealed: $(R_{Tf})_{Max} = 1.10 \text{ m}\Omega$ 8p Sealed: $(R_{Tf})_{Max} = 0.71 \text{ m}\Omega$	*Use samples generated in step 9b.
7d	USCAR 5.2.4 <i>USCAR 5.3.2 (Rev 3)</i>	Voltage Drop	$MV_{Drop} \leq 4 \text{ mV/A}$ $R_T \leq 5 \text{ m}\Omega$ NOTE: Criteria changed to 5 mΩ in Rev 3 of SAE/USCAR-2	No Failures	AMP	PV	*	D	10/18/99	10/18/99				PASS 12p Unsealed: $(MV_{DROP})_{Max} = 2.17 \text{ mV/A}$ 8p Sealed: $(MV_{DROP})_{Max} = 1.27 \text{ mV/A}$	*Use samples generated in step 9c. Voltage drop is measured across complete system (crimp to crimp). Rating determined in 3d
3b	<i>USCAR 5.4.1 (Rev 3)</i>	Terminal Retention	> 48 N	No Failures	AMP	PV	*	D	10/19/99	10/19/99				PASS <i>Pullout > 48 N</i>	

END OF CONNECTOR SYSTEM ENVIRONMENTAL (SEALED AND UNSEALED)

PROCEDURE	TEST DESCRIPTION	ACCEPTANCE CRITERIA	TARGET REQUIREMENTS	TEST STAGE	SAMPLE TYPE	SAMPLES TESTED	ACTUAL RESULTS	NOTES
Specify the governing Test Procedure or Standard.	Provide a brief description of each test.	Specify test targets and/or pass/fail criteria. e.g. cycles, miles, volts, minimum value, no. failure, etc.	Acceptance Level	ED = engineering development DV = design verification PV = Production validation CC = continuing conformance	A = prototype (hand made) B = prototype (tooled) C = program level D = initial production E = full volume production	List quantity tested, sample type, and design phase, e.g., I, II, etc.	Actual Test Results	Describe or elaborate on unique criteria, results, etc.

CERTIFICATION REPORT



OLD TO TYCO ELECTRONICS ATTN: ACCOUNTS PAYABLE P.O. BOX 68355 HARRISBURG, PA 17106		SHIP TO TYCO ELECTRONICS 233 BURGESS RD., BLDG 20063 GREENSBORO, NC 27409		ENTRY - BOL 69823-373716
				ALLOY 6476
PRODUCT DESCRIPTION 1.2870 .01180 TM02 CAC60 CU/NI/SI STRIP *REFLOW* SPEC 100-1554 REV.F P/N 705485-2		QUANTITY ORDERED PCS. LBS. 288000	PCS. 4 LBS. 8380 DATE 7/11/2012 TIME 9:48:02 AM	CUSTOMER ORDER NO. 7000340970 513440 GOV'T CONTRACT NO.

COIL NUMBER	770072AA	768392AC	769290AC	768392AA	769288AC	
COMPOSITION - %						
Copper - includes Ag	96.4	96.2	96.3	96.2	96.4	
Zinc	1.14	1.23	1.14	1.23	1.13	
Lead	<.002	<.002	<.002	<.002	<.002	
Tin	.093	.135	.096	.135	.101	
Nickel	1.85	1.89	1.88	1.89	1.85	
Silicon	.386	.408	.4	.408	.388	
Manganese	.033	.033	.039	.033	.034	
Magnesium	.021	.021	.017	.021	.010	
PROPERTIES						
Tensile Str. (ksi)	101.8	100.1	99.1	100.1	100.1	
Yield Str. (ksi) @ .2 OFFSET	94.7	93.1	92.6	93.1	94.1	
Elongation (%) in 2 inches	7.4	7.6	7.3	7.6	11.2	
Grain Size (RTF) in mm	.010	.020	.010	.020	.005	
Vickers	191	206	208	206	210	
Bend Test (L)	OK	OK	OK	OK	OK	
Bend Test (T)	OK	OK	OK	OK	OK	
Elec. Cond. (%) IACS	47.6	46.9	47.0	46.9	41.3	
Coating Thickness (µin)	41.00	38.00	42.00	38.00	39.00	

Certification Report continues on the next page.



Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO/TS 16949:2009

This is to certify that:

**TE Connectivity
Global Automotive Division
Americas North
233 Burgess Road
Greensboro
North Carolina
27409
USA**

Holds Certificate No: **TS 514458-000**

and operates a Quality Management System which complies with the requirements of ISO/TS 16949:2009 for the following scope:

Design and manufacture of electrical interconnecting devices for the automotive industry.

For and on behalf of BSI:

VP Regulatory Affairs, BSI Group America Inc.

Originally Registered: 02/11/2010

Latest Issue: 03/29/2011

Expiry Date: 02/10/2013

IATF Number: 0097555



Page: 1 of 2

This certificate remains the property of BSI and shall be returned immediately upon request.
An electronic certificate can be authenticated online. Printed copies can be validated at www.bsigroup.com/ClientDirectory
To be read in conjunction with the scope above or the attached appendix.
Further clarifications regarding the scope of this certificate and the applicability of ISO/TS16949 requirements may be obtained by consulting the organization.

IATF Contracted Office: 12110 Sunset Hills Road, Suite 200, Reston, VA 20190, USA



Certificate No: TS 514458-000

Location	Registered Activities
TE Connectivity Global Automotive Division Americas North 233 Burgess Road Greensboro North Carolina 27409 USA	Stamping, molding and assembly. Including the following remote support functions: TE Connectivity Global Automotive Division Americas North Troy, MI Design and Development. TE Connectivity Global Automotive Division Americas North Middletown, PA Design and Development, Product Testing and Customer Service. TE Connectivity Global Automotive Division Americas North Winston-Salem, NC Design and Development, Product Testing and Calibration, Business Office (Quote Process) and Purchasing. TE Connectivity Global Automotive Division Americas North Markham, ON Canada Design and Development and product testing (optics lab). TE Connectivity Global Automotive Division Americas North Harrisburg, PA Provision of Product Testing to TE Connectivity Manufacturing Sites.

Originally Registered: 02/11/2010

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Page: 2 of 2

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requirements may be obtained by consulting the organization.

IATF Contracted Office: 12110 Sunset Hills Road, Suite 200, Reston, VA 20190, USA

TYCO ELECTRONICS GAD-AN

NORTH CAROLINA LABORATORIES SCOPE OVERVIEW

SERVICE	EQUIPMENT	TYPICAL PROCEDURES	
Product/Tooling Approval Laboratory 3800 Reidsville Road, Winston-Salem, NC 27101			
Layout Inspection	Leitz Toolmakers Microscopes Starrett Coordinate Meas. Machine Mycrona Vision/Contact CMM Mitutoyo Hand Measuring Devices Micro-Vu Vertex Vision/Contact Measuring Center	AAP129, AAP165, AWP127-LB	
Cross-Sectioning	Low speed saws Polishing/grinding equipment	ASTM E3	
SERVICE	EQUIPMENT	TYPICAL PROCEDURES	
Product Reliability Center 3800 Reidsville Road, Winston-Salem, NC 27101			
Electrical, High Current			
Current Cycling	Hewlett-Packard 6032A	System Power Supply	TIN 109-51, SAE/USCAR-2
Current Surge	Wavetek 395, Kepco ATE 15-50M	Current Pulsing Station	Customer/Product Specific
Maximum Current Rating	T System	Portable Data Acquisition System	SAE/USCAR-2
Millivolt Drop	READA System		SAE/USCAR-2, EIA 364-6B, IEC 60512-2-2
T-rise at Rated Current	READA System		SAE/USCAR-2, EIA 364-70A Method 1
T-rise vs. Current Curve	T System		SAE/USCAR-2, EIA 364-70A Method 2
Resistive Load Verification	Agilent 60502B and 6681A	Programmable loads & power supplies	Customer/Product Specific
Electrical, Low Current			
Termination Resistance, Dry Circuit	READA System, Buttons System, H-P Micro-Voltmeter	Portable Data Acquisition System Hand Probe	SAE/USCAR-2, -17 & 20, EIA 364-23A, IEC 60512-2-1
Electrical, Voltage			
Breakdown Voltage	Associated Research 4271m13, EDNA System, Quadtec	HiPot Dielectric Tester	EIA 364-20B, IEC 60512-4-1
Dielectric Withstanding Voltage			SAE/USCAR-2, -17 & -20, EIA 364-20B, IEC 60512-4-1
Insulation Resistance	GenRad 1644-A, Quadtech	Megohm Bridge, Dielectric Analyzer	SAE/USCAR-2, -17 & -20, EIA 364-21C, IEC 60512-3-1
Electrical, RF			
Insertion Loss	Agilent 8753ES	Network Analyzer	SAE/USCAR-17
VSWR	Agilent 8753ES	Network Analyzer	SAE/USCAR-17

Environmental			
Heat Age	Blue M Models Such as OV490A-2, POM966E, POM206EX, HS3802FG, POM336B-1, CW5512F-1, POM336EX, Despatch LEB1-76-4	Oven	SAE/USCAR-2 & -20, EIA 364-17B, IEC 60512-11-9
Humidity / Temp. Cycling	Thermotron F-52-CHMV ESPEC ETH37 4DW CSZ Models CTH-32-15-15-S/WC CTH-16-705-705-S/W ZH-16-2-2-H/AC CVH-16-3-3-H/WC Blue M Electric Models FR-256PB, FR-366PB LRM386E CSZ ZH-8	Temperature / Humidity Chamber	SAE/USCAR-2 & -20, EIA 364-31B, IEC 60512-11-3, IEC 60512-11-12
Immersion	Blue M Electric OV490A-2, GenRad 1644-A	Oven, Megohm Bridge	SAE/USCAR-2
Pressure / Vacuum Leak	Ashcroft 415P-20, Ashcroft 4116P	Precision Gauges	SAE/USCAR-2
Salt Spray	Harshaw 4100-000-003	Salt Fog Chamber	SAE/USCAR-2 (Aug 97) EAI 364-26B, ASTM B117
Submergible Air Leak	Ashcroft 415P-20, Ashcroft 4116P	Precision Gauges	SAE/USCAR-2
Temp. Cycling	Blue M Models VRC30-PS-6WE VRC12-PC-4WE GOP 1004-12-2TPE CSZ Models Z-16-2-2-H/AC Z-8-1-1-H/AC BAV-1.6-033-033-H/A	Temperature Cycling Chamber	Customer/Product Specific
Thermal Shock	-Ransco 7103-1 -ESPEC TSA-70H-W -Thermotron ATS-100-3-3-LN2 ATS-150-H-3-3-LN2 -CSZ VTS-2.6-705-705-S/W VTS-3.3-705-705-S/A -Envirotronics SV2-2-2-3	Thermal Shock Chamber	SAE/USCAR-2 & -20, EIA 364-32C, IEC 60512-11-4
High Pressure Washing (Hot & Ambient)	Landa Pressure Washer, Wika Pressure gage	Pressure washer set-up	Customer Specific
Dust Testing	Triton	Dust Chamber	PF-9688, Customer Specific
Air Leak Detector	Furness – Sovereign	Leak Detector	Customer Specific

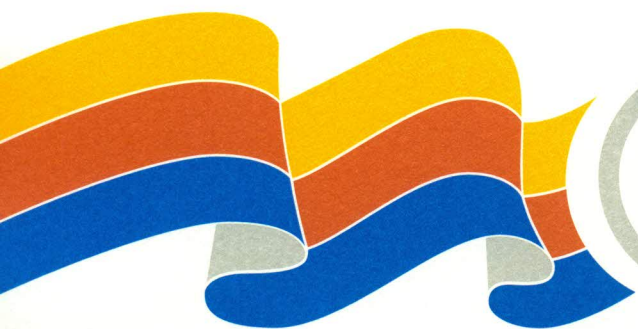
Mechanical			
Drop	n/a	n/a	Ford SDS #40
Durability	AMP Inc. 37517	Cycling Machine	SAE/USCAR-2, EIA 364-9C, IEC 60512-9-1
Mechanical Shock	AVCO SM105MP Vibration Machines	Mechanical Shock Tester High Frequency Vibration Machines	SAE/USCAR-2 EIA 364-27B IEC 60512-6-3
Torque	Snap-On TQJE1000	Torque Tester	TIN 109-183, Customer/Product Specific
Vibration – Low	LAB LVH18-100	Low-Frequency	Mil Std 202 Method 201A
Frequency		Vibration Machine	EIA 364-28A Test Cond. I
Vibration – High Frequency	Unholtz-Dickie Models SA30-560/ST MA250D-206 Ti000-14 206 LDS V850	High-Frequency Vibration Machine	SAE/USCAR-2 & -20 EIA 364-28D, IEC 60512-6-4
Miscellaneous			
Audible Feedback	Brueel & Kjaer 1561725	Sound Meter (db)	TIN 109-133, SDS #EL-0017, Customer Specific
Thermal Imaging	Nikon Laird 3AS	Infrared Camera	Application Specific
Tensile / Compression			
Axial Pull Test	Instron 4502	Tensile / Compression Machine	SAE/USCAR-2 & -17
Bend Force			SAE/USCAR-2
Bend, Crimp			SAE/USCAR-2
Connector - Connector Engage / Disengage			SAE/USCAR-2, EIA 364-13B IEC60512-13-1
Connector Lock Strength Integrity			SAE/USCAR-2 & -17
Connector Mechanical Integrity			SAE/USCAR-2
Contact Insertion			SAE/USCAR-2, TIN 109-41
Contact Retention			SAE/USCAR-2, TIN 109-41
Crimp Tensile			SAE/USCAR-2, EIA 364-8B, IEC 60512-16-4 & -20
Engaging Force			SAE/USCAR-2, TIN 109-35
Force vs. Deflection			TIN 109-98
Insulated Crimp			SAE/USCAR-2
Latch Depression			SAE/USCAR-2
Lock Insertion & Removal Forces			SAE/USCAR-2 & -17
Misc. Component Engage / Disengage			SAE/USCAR-2 & -17
Contact Normal Force			TIN 109-98
Panel Retention			TIN 109-41

Secondary Lock Strength			SAE/USCAR-2, TIN 109-35,
Separating Force			USCAR-2, TIN 109-98
Spring Rate			Ford SDS #32
Staging Latch Strength			SAE/USCAR-2, Ford SDS #32
Tensile			SAE/USCAR-2, EIA 364-8B, IEC 60512-16-4 & -20
Terminal Assurance Retention			SAE/USCAR-2, TIN 109-14
Terminal Insertion / No False Lock-up			SAE/USCAR-2, TIN 109-14
Terminal Push Thru			SAE/USCAR-2, TIN 109-14
Unmating Force			SAE/USCAR-2, EIA 364-13B, IEC 60512-13-1
SERVICE	EQUIPMENT		TYPICAL PROCEDURES
Electromechanical Components Laboratory 3920 Reidsville Road, Winston-Salem, NC 27101			
Electrical, APT			
Pull-in/Drop-out Voltage	Markenrich Tester	APT	VTEST-0001
Pull-in/Drop-out Current	Markenrich Tester	APT	VTEST-0001
Operate/Release time	Markenrich Tester	APT	VTEST-0001
Contact Voltage Drop	Markenrich Tester, CVD Tester	APT	VTEST-0001
Contact Resistance	Markenrich Tester, CVD Tester	APT	VTEST-0001
Contact Bounce	Markenrich Tester	APT	VTEST-0001
Coil Resistance	Markenrich Tester	APT	VTEST-0001
Electrical, Durability			
Overload and Endurance	Life Test Monitor	L.T.M.	Customer Specific
Current Cycling	Power Supplies	L.T.M.	Customer Specific
Flasher Testing	Power Supplies, Temp Chambers, Flasher Tester	Flasher Test Set-up	Customer Specific VTEST-0055 & 0056
Continuous Current Overload	Life Test Monitor	L.T.M.	Customer Specific
Millivolt Drop Testing	Power Supplies, Agilent 34970A, Millivolt LTMs	Millivolt Drop Testers	VTEST-0001, Customer Specific
Load Soak	Power Supplies Temp Chambers	Load Soak Set-up	VTEST-0003
Electrical, Coil			
Coil Over/Under Voltage	Power Supplies Multi-meters	Coil Over/Under Voltage Test Set-up	Customer Specific
Coil Temperature Rise	YEW Chart Recorder/ Power Supplies/Temp. Chambers, Agilent 34970A	Coil Temperature Rise Test Set-up	Customer Specific
Coil Input (power)	Power Supply/Multi-meter	Coil Power Test Set-up	Customer Specific

Electrical, Voltage			
Breakdown Voltage	Kikusui Tos 8650, Quadtech Guardian 2530, Quadtech Sentry 30	Hipot Tester	EIA 364-20B, IEC 60512-4-1
Dielectric Testing	Kikusui Tos 8650, Quadtech Guardian 2530, Quadtech Sentry 30	Hipot Tester	VTEST-0001
Insulation Resistance	Quadtech Guardian 2530, Quadtech Sentry 30	IR Tester	EIA 364-21C, IEC 60512-3-1, VTEST-0001
Circuit Breaker			
Short Circuit AC	Short Circuit Tester	Short Circuit Tester	Customer Specific
Calibration- Circuit Breakers	Model F-EDC12159	Circuit Breaker Calibration	Customer Specific
Current Cycling Endurance	Power Supplies/LTM/ pneumatic cycler.	Circuit Breaker Cycler Set-up	Customer Specific
Environmental			
Humidity / Temp. Cycling	Thermotron/Tenney Chambers/LTM	Humidity / Temp. Cycling Set-up	EIA 364-31B, IEC 60512-11-3, IEC 60512-11-12
Thermal Shock	Thermal Shock Chambers @ 3800RR	Thermal Shock Chambers	EIA 364-32C, IEC 60512-11-4
Dust	Dust Chamber	Dust Test Chamber	VTEST-0011
Salt Fog	Harshaw 4100-000-003	Salt Fog Chambers	EIA 364-26B, ASTM B117
Temp. Cycling	LTM/Power supplies/Temp Chamber	Temp. Cycling Set-up	Customer/Product Specific
Mechanical			
Drop	Drop Tester	Drop Test Set-up	VTEST-0008
Mechanical Shock	AVCO SM105MP Vibration Tables @ 3800RR	Mechanical Shock Tester High-Frequency Vibration Machines	EIA 364-27B IEC 60512-6-3
Vibration – Low Frequency	LAB LVH18-100 @ 3800 RR	Low-Frequency Vibration Machines	EIA 364-27B IEC 60512-6-3
Vibration – High Frequency	Vibration Tables at 3800RR	High-Frequency Vibration Machine	EIA 364-28D, BTEST-0010 IEC 60512-6-4
Mechanical Life Cycling	Power Supplies/ Counter	Mechanical Life Cycling Test Set-up	Customer Specific Technical Data Book
Mechanical, Miscellaneous			
Audible Sound	Sound Meter / Sound Chamber	Audible Sound Test Set- up	VTEST-0017
Tensile/Compression			
Panel Retention	Insertion 4502 @ 3800RR	Tensile / Compression Machine	TIN109-41
Tensile	Instron 4502 @ 3800RR	Tensile / Compression Machine	EIA 364-8B, IEC 60512-16-4 & -20
Cover Retention	Instron 4502 @ 3800RR	Tensile / Compression Machine	VTEST-0005
Thermal retention	Instron 4502 @ 3800RR	Tensile / Compression Machine	VTEST-0004

SERVICE	EQUIPMENT	TYPICAL PROCEDURES
Materials and Processes Laboratory 3800 Reidsville Road, Winston-Salem, NC 27101		
Metallographic Sample Preparation	Embedding Media, polishing compounds, LECO AP-200 polisher	ASTM E3
Optical Examination of Cross-Sectioned Materials	Nikon Epiphot Metallograph	TIN 109-52, Method 2 ASTM E112
Vickers Hardness	Micromet Microhardness Tester	ASTM E384, ASTM E92
Knoop Hardness	Micromet Microhardness Tester	ASTM B758, ASTM E384
Rockwell Hardness	Wilson Series 500 Hardness Tester	ASTM E18, ASTM 1842
Coercive Force	Forster Coercive Force Tester	ASTM A867, ASTM A848
Tensile Testing – Materials	United TM-10 Tensile Tester	TIN 109-79, ASTM E8
Differential Scanning Calorimetry (DSC)	Mettler DSC 20 Differential Scanning Calorimeter	TIN 109-172, ASTM D3417
Scanning Electron Microscopy (SEM) Surface Characterization	AMRAY 1830i Scanning Electron Microscope	Application Specific
Elemental Analysis – Qualitative and Quantitative Energy Dispersive Spectroscopy	EDAX International EDS Detector PV9700/43 with Phoenix Software	Application Specific, ASTM E1508
Fourier Transform Infrared (FTIR) Material Identification	Nicolet 5PC FTIR with IR-Plan analytical microscope	Application Specific, ASTM E1252, ASTM E334
Melt Viscosity	Kayeness (Dynisco) Capillary Rheometer	ASTM D3835, TIN 109-57, TIN 103-2915
Melt Flow Rate	Dynisco Melt Indexer	ASTM D1238, TIN 118-1952
Melt Volume Rate	Dynisco Melt Indexer	ISO 1133, TIN 118-4440
Moisture Content	Computrac Vapor Pro	TIN 118-1953
Solderability	Multicore Solder Must II	MIL-STD 883C, TIN 109-11

CERTIFICATE OF REGISTRATION



**Quality
System
Registrar**



Having been audited in accordance with requirements of

ISO/TS 16949:2009

SRI Quality System Registrar, Seven Fields, Pennsylvania, USA, hereby grants to:

Aurubis Buffalo, Inc.

Registration of the management system at its location:

**70 Sayre Street
Buffalo, New York, USA**

The conditions for maintaining this certificate of registration are set forth in the SRI registration agreements R20.3 and R20.4.

Scope of ISO/TS 16949:2009 registration: "Manufacture of copper and copper alloy, sheet, strip, cups, phosphor bronze, specialty alloys, and tinned strip for connectors."

Exclusions: Product Design and Development

Initial SRI registration date: December 29, 2003

Current registration period: October 3, 2011 through December 20, 2012

Signed for SRI:


Christopher H. Lake, President & COO

Certificate Date: October 3, 2011
Certificate Number: 010406
IATF Certificate Number: 0094280
Registration Number: 0276-01



Buffalo Manufacturing Unit

70 Sayre Street Buffalo, NY 14207

THIS DOCUMENT CONTAINS CONFIDENTIAL INFORMATION Its use is restricted to employees with a need to know and third parties with a need to know and who have signed a non-disclosure agreement.

 Work Instruction		
Title: Laboratories Scope Aurubis Buffalo Inc .		WI Number WI-0622 Revision: 14
Process: Process Product/Validation Verification Area: Chem/Sheet Mill Labs	Approved & Released Work Instruction	Implementation Date: 07/09/2009
Unit:		Review Period - 365 Days

Purpose:

To provide the Scope of the Buffalo Plant's Chemical and Sheet Mill Labs.

Responsibilities:

It is the responsibility of the Technical Director and all laboratory employees to comply and fully support this scope.

Procedure:

Scope:

The Laboratories at the Buffalo Plant are ISO/TS16949: latest revision, Certified (SRI Certificate No. 006259) captured labs and do not profit from any testing of customer product. The scope of our laboratories covers the type of inspection, calibration and tests performed.

Chemical/Metallurgical

Technology	Range, when necessary	Methods Used	Product Types	Remarks
Optical Emission Spectroscopy		ASTM E1251	Copper and Copper Alloys	
Microhardness		ASTM E384	Copper and Copper Alloys	Vickers Scale
Rockwell / Rockwell Superficial		ASTM E18	Copper and Copper Alloys	
Tension		ASTM E8	Copper and Copper Alloys	Flat Products
Grain Size		ASTM E112	Copper and Copper Alloys	Comparison Method
Conductivity		ASTM E1004	Copper and Copper Alloys	%IACS
Surface Roughness		ASME B46.1	Copper and Copper Alloys	
Tin Thickness		ASTM B568	Copper and Copper Alloys	Tin Coating over Copper and Copper Alloys
Hydrogen Embrittlement		ASTM B577	Copper and Copper Alloys	
Spring Limit		ASTM E855	Copper and Copper Alloys	
Bend Testing		ASTM E290	Copper and Copper Alloys	
% Oxygen/Hydrogen		Calibration	Copper and Copper Alloys	Eltra Oxygen/Hydrogen Determinator
Elemental analysis		Calibration	Copper and Copper Alloy Elements	Inductively Coupled Plasma Spectrometer
PH of solutions		Calibration	Solutions	Chemical laboratory
Conductivity of Solutions		Calibration	Solutions	Chemical laboratory

Inspection and Testing:

All inspection and testing will be performed in accordance with the Buffalo Plant ISO/TS16949: latest revision documentation and the Scope of Accreditation

This work instruction must be revised annually to show customers that this is the latest revision.



Scope 7-8-09.xls

7.0 Associated Documents: