PPAP SUBMISSION

LEONI : 300009515
FCI: 54001839/F8VB-14474-BA

DCL / PCL = AA2
Date: 6/24/08

2.80MM Apex Wire Snap On Female

FCI AUTOMOTIVE NORTH AMERICA
11823 Lenape Drive
Mount Union, Pennsylvania 17066

Part Submission Warrant

DaimlerChrysler

Part Submission Warrant

Part Name	2.80mm APEX WIRE SNAP ON FEMALE	Customer P/N	300009515
Shown on Drawing No.	F8VB-14474-AA	Org. P/N:	54001839/F8VB-14474-BA
Engineering Change Level:	AA2 (AA2)	Dated	6/24/2008
Additional Engineering Changes	NA	Dated	NA
Safety and Government Regulation: ☐ Yes ☑ No	Purchase Order No. NA	Weight (kg)	0.0007
Checking Aid No. NA	Checking Aid Engineering Change Level NA	Dated	NA

ORGANIZATION MANUFACTURING INFORMATION

FCI USA INC-MVL 793657490
Supplier Name & Supplier/Vendor Code

11823 LENAPE DRIVE
Street Address

MOUNT UNION PA 17066 USA
City Region Postal Code Country

CUSTOMER SUBMITTAL INFORMATION

LEONI
Customer Name/Division

Buyer/Buyer Code

VARIOUS
Application

MATERIALS REPORTING

Has Customer-required Substances of Concern Information been reported? ☑ Yes ☐ No ☐ N/A

Submitted by IMDS or other customer format: IMDS: 80347995 / 2

Are Polymeric parts identified with appropriate ISO marking codes: ☐ Yes ☐ No ☑ N/A

REASON FOR SUBMISSION (check at least one)

- ☐ 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: Annual Validation

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 tests ☐ appearance criteria ☑ statistical process pkg

These results meet all design record requirements: ☑ Yes ☐ NO (If "NO" - explanation required)

Mold/ Cavity/ Production Process D-471g 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 the production rate of _211.221____ / 8 hours. I also certify that documented evidence of such compliance is on file and available for review. I have noted any deviations from this declaration below

EXPLANATION/COMMENTS ANNUAL VALIDATION PRIOR TO TOOL MOVE TO BRAZIL

Is each Customer Tool properly tagged and numbered? ☑ Yes ☐ No ☐ N/A

Organization Authorized Signature: Judith Haskell Date: 2/11/02010

Print Name:	Judith Haskell	Phone:	(814) 542-5937	Fax. No.:	(814) 542-5885
Title:	Quality Specialist	E-mail:	jhaskell@fci.com		

FOR CUSTOMER USE ONLY (IF APPLICABLE)

Part Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Customer Signature: Date:

Print Name Customer Tracking Number (optional):

IMDS

FCI AUTOMOTIVE DIVISION

Quality Department

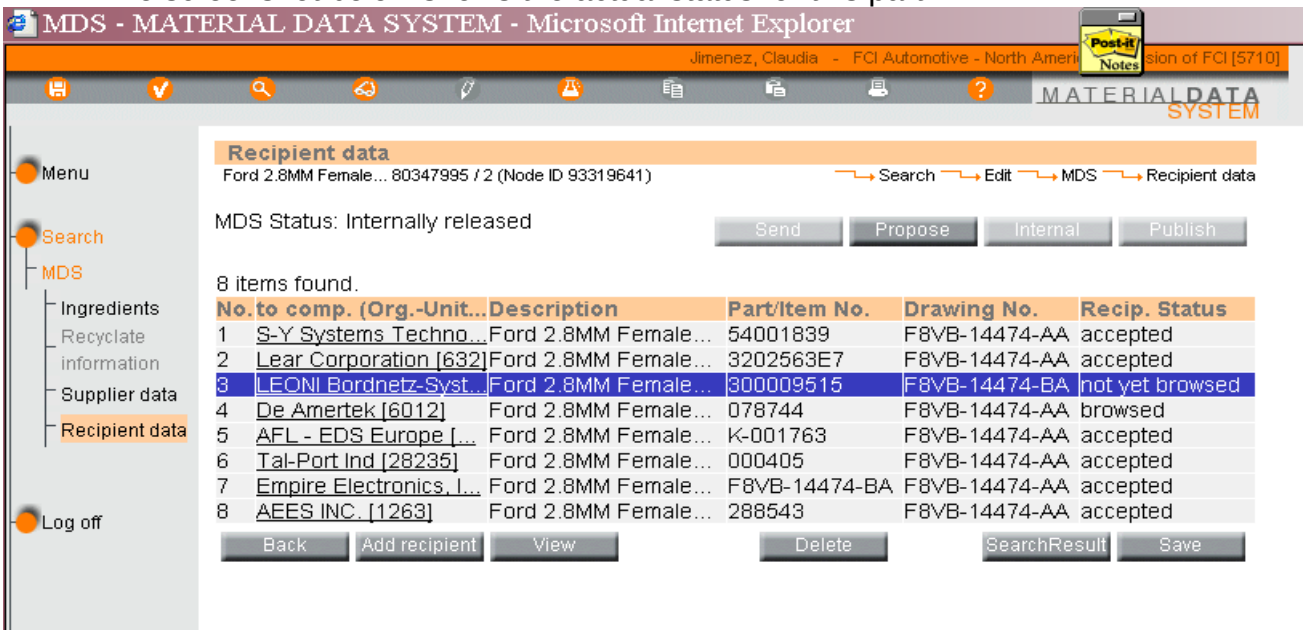
Date: January 29, 2010
To LEONI Bordnetz-Systeme GmbH
From: FCI Automotive Division

The IMDS submission has been submitted for part number:

Customer #	FCI #	IMDS ID	Description
300009515	54001839	80347995 / 2	Ford 2.8MM Female Terminal 18GA

Rev level or Drawing No.
F8VB-14474-BA

The screenshot below shows the actual status for this part.



**** This letter with the IMDS screen must be included in the PPAP submission.***

Best Regards,

Claudia A. Jiménez
FCI Automotive Division
IMDS Coordinator
Phone: (915) 356-1131
Fax: 011 52 (656) 692-5819
Email: claudia.jimenez@fci.com

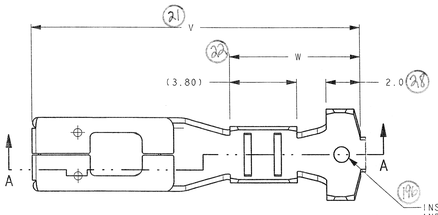
DESIGN RECORD

TABLE 1 - TERMINAL CRIMP DIMENSION (FOR REFERENCE ONLY)

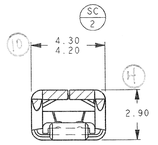
FORD PART NO.	SUPPLIER PART NO.	GRIP CODE	WIRE SIZE	WIRE SPEC.	COND CH (SECT Z-Z) (+/-0.05)	COND CW (SECT Z-Z) (+/-0.10)	INS CH (SECT Y-Y) (+/-0.10)	INS CW (SECT Y-Y) (+/-0.10)	INS CRIMP TYPE	INS GRIP TYPE	SERRATION TYPE	SERRATION NO.	DESIGNATED LETTER FOR CABLE SEAL	GREASE/ LUBRICANT	PLATING OPTIONS
XL3T-14474-DA	54001840	18	18	ESB-MIL-123-A/A2	1.35	2.05	4.00	3.30	OPTION 2	3	2	7	E/F	N/A	TIN
			20	ESB-MIL-123-A/A2	1.20	2.05	3.85	3.30	OPTION 2	3	2	7	F	N/A	
XL3T-14474-AA	54001432	14	14	ESB-MIL-123-A/A2	1.60	2.45	4.12	4.10	OPTION 2	3	2	9	D/C	N/A	TIN
			16	ESB-MIL-123-A/A2	1.50	2.45	4.06	4.10	OPTION 2	3	2	9	E/D	N/A	
XL3T-14474-CA	54001220	12	12	ESB-MIL-123-A/A2	1.95	3.45	4.50	4.35	OPTION 2	3	1	2	C/A	N/A	TIN
4L3T-14474-AA	54001439	14	14	ESB-MIL-123-A/A2	1.60	2.45	4.12	4.10	OPTION 2	3	2	9	D/C	NYE UNIFLOR 8917	TIN
			16	ESB-MIL-123-A/A2	1.50	2.45	4.06	4.10	OPTION 2	3	2	9	E/D	NYE UNIFLOR 8917	
4L3T-14474-CA	54001221	12	12	ESB-MIL-123-A/A2	1.95	3.45	4.50	4.35	OPTION 2	3	1	2	C/A	NYE UNIFLOR 8917	TIN
XF2T-14474-CA	54002231	22	22	ESB-MIL-123-A/A2	1.10	1.85	1.75	2.6	OPTION 2	1	2	5	N/A	N/A	TIN
F8VB-14474-BA	54001839	18	18	ESA-MIL-77-A	1.35	2.05	2.35	2.60	OPTION 2	1	2	7	N/A	N/A	TIN
				ESB-MIL-123-A/A2	1.35	2.05	2.35	2.60	OPTION 2	1	2	7	N/A	N/A	
			20	ESB-MIL-123-A/A2	1.20	2.05	2.18	2.60	OPTION 2	1	2	7	N/A	N/A	
8U5T-14474-GA	54001876	18AU	18	WSK-1A348-A4(THIN WALL) ESB-MIL-123-A/A2	1.35	2.05	2.35	2.60	OPTION 2	1	2	7	N/A	N/A	GOLD
			20		1.20	2.05	2.18	2.60	OPTION 2	1	2	7	N/A	N/A	
9U5T-14474-KA	54001879	18AU	18	WSK-1A348-A4(THIN WALL) ESB-MIL-123-A/A2	1.35	2.05	4.00	3.30	OPTION 2	3	2	7	M	N/A	GOLD
			20		1.20	2.05	3.85	3.30	OPTION 2	3	2	7		N/A	
F8VB-14474-AA	54001431	14	14	ESB-MIL-123-A/A2	1.60	2.45	2.72	3.20	OPTION 2	1	2	9	N/A	N/A	TIN
			16	ESB-MIL-123-A/A2	1.50	2.45	2.60	3.20	OPTION 2	1	2	9	N/A	N/A	
8U5T-14474-HA	54001446	14AU	14	WSK-1A348-A4(THIN WALL) ESB-MIL-123-A/A2	1.60	2.45	2.72	3.20	OPTION 2	1	2	9	N/A	N/A	GOLD
			16		1.50	2.45	2.60	3.20	OPTION 2	1	2	9	N/A	N/A	
9U5T-14474-JA	54001448	14AU	14	WSK-1A348-A4(THIN WALL) ESB-MIL-123-A/A2	1.60	2.45	4.12	4.10	OPTION 2	3	2	9	N	N/A	GOLD
			16		1.50	2.45	4.06	4.10	OPTION 2	3	2	9		N/A	
YF1T-14474-CA	54001311	13	VARIOUS	ESB-MIL-123-A/A2	VARIOUS	VARIOUS	VARIOUS	VARIOUS	OPTION 2	2	2	9	N/A	N/A	TIN
XF2T-14474-BA	54001018	10	10	ESB-MIL-123-A/A2	2.25	3.45	3.65	4.20	OPTION 1	1	1	2	N/A	N/A	TIN
			12	ESB-MIL-123-A/A2	1.95	3.45	3.40	4.15	OPTION 1	1	1	2	N/A	N/A	
7L7T-14474-EA	54001227	12	12	ESB-MIL-123-A/A2	1.95	3.45	3.40	4.15	OPTION 1	1	1	2	N/A	N/A	TIN

TABLE 3 - CABLE SEAL P/N'S

LETTER DESIGNATION	COLOR	FORD P/N
F	PINK	XL3T-14603-FA
E	YELLOW	XL3T-14603-EA
D	ORANGE	XL3T-14603-DA
C	LIGHT BLUE	XL3T-14603-CA
A	RED	XL3T-14603-AA
M	GREEN	8U5T-14603-MA
N	BLUE	8U5T-14603-NA

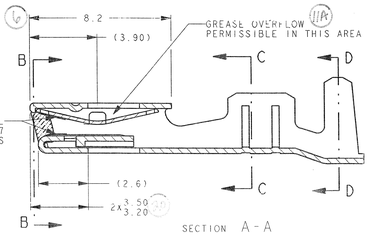


ACTUAL SIZE

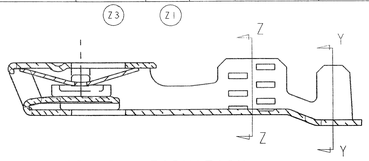


SECTION B-B

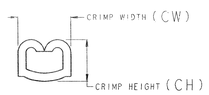
PRESSURE FILL NYE UNIFLOR 8917 FOR GREASED TERMS



SECTION A-A

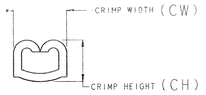


CRIMP INFORMATION



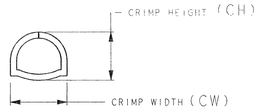
CONDUCTOR CRIMP

SECTION Z-Z



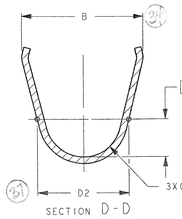
INSULATION CRIMP "B" STYLE OPTION 1

SECTION Y-Y

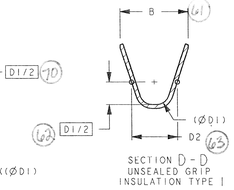


INSULATION CRIMP "D" STYLE OPTION 2

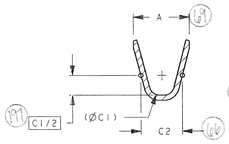
SECTION Y-Y



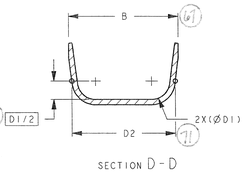
SECTION D-D CABLE SEAL GRIP INSULATION TYPE 3



SECTION D-D UNSEALED GRIP INSULATION TYPE 1



SECTION C-C CORE GRIP



SECTION D-D DOUBLE WIRE GRIP INSULATION TYPE 2

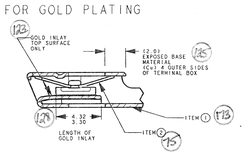
MATERIAL FOR GOLD PLATING

MATERIALS FOR GOLD PLATING OPTION

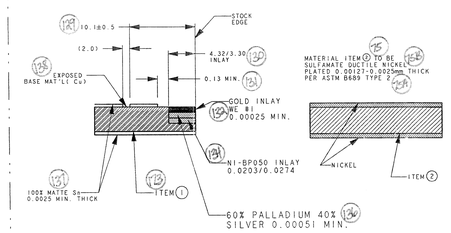
GOLD INLAY/PLATING NOTES

(120) MATERIAL FOR ITEM (1) TO BE ELECTRO MATTE TIN PLATED PER ASTM-B-545-97 EXCEPT IN AREA OF NICKEL, PALLADIUM, GOLD INLAY

(121) INLAY MATERIAL TO BE GOLD ALLOY PER ASTM B322 (69.8 Au, 25.4 Ag, 4.8 Pt) 0.00025mm MINIMUM AT THICKNESS SHALL BE PLATED OVER A PALLADIUM INTERLINER, OVER A NICKEL INTERLINER.

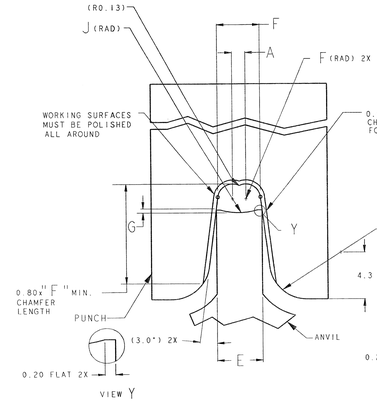


PARTIAL SECTION A-A

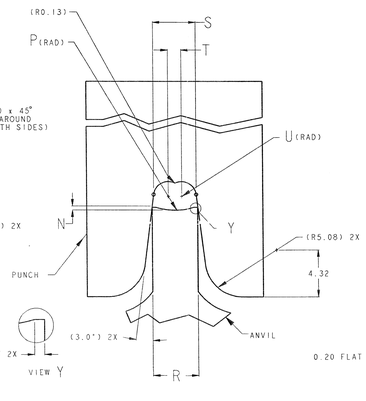


CRIMP TOOL INFORMATION (REF. ONLY)

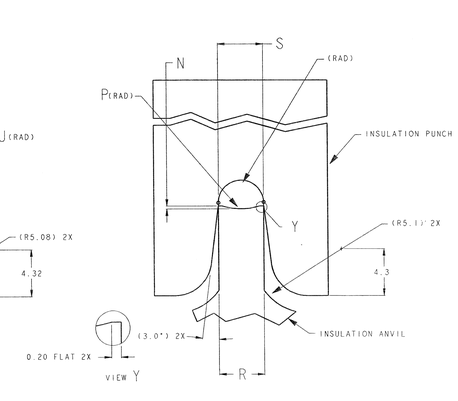
STANDARD "B" FORM TOOLING DESIGN CONDUCTOR CRIMP



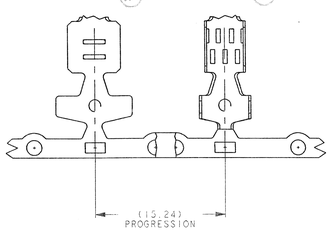
STANDARD "B" FORM TOOLING DESIGN INSULATION CRIMP OPTION 1



PUNCH AND ANVIL DESIGN STANDARD "D" FORM TOOLING INSULATION CRIMP OPTION 2



SERRATION TYPE 1



SERRATION TYPE 2

(15.24) PROGRESSION

NOTES:

1) CONFORMS TO ALL APPLICABLE SECTIONS OF:
SAE/USCAR-2 REV.3 EXCEPT TERMINAL BEND RESISTANCE SECTION 5.2.2
SAE/USCAR-12 REV 2
SAE/USCAR-21
FORD SDS VER 11

2) MATERIALS

ITEM (1) MATERIAL C14530 Cu THICKNESS 0.305 ± 0.008
PLATING : HOT TIN DIP : 0.50-2.50µm
SEE INSERT FOR GOLD PLATING MATERIAL ITEM (1) REQUIREMENTS
TENSILE STRENGTH : 312-442 MPa
MIN. ELONGATION : 2.5% IN 51.0 mm

GOLD PLATING OPTION R/W MATERIAL #47105
BASE MAT'L C14530 Cu FULL HARD
TENSILE STRENGTH : 324-394 MPa
MIN. ELONGATION : 2.0%
YIELD STRENGTH : (344-380 MPa)

ITEM (2) MATERIAL C17410 BeCu THICKNESS 0.203±0.008
PLATING : HOT TIN DIP : 0.50-2.5µm THICK
SEE INSERT FOR GOLD PLATING MATERIAL ITEM (2) REQUIREMENTS
TENSILE STRENGTH : 758-897 MPa
YIELD STRENGTH : 655-862 MPa
MIN. ELONGATION : 7% IN 50mm

3) THE APEX 2.80mm TERMINAL IS SYMMETRICAL ABOUT CENTERLINE AND CAN BE INSERTED 180°

4) DIMENSIONAL TOLERANCE.
1 PLACE ±0.25
2 PLACE ±0.10
ANGULAR ±3°

5) FOR CAVITY SPECIFICATION INFORMATION REFERENCE FCI DRAWING 15001 FOR UNSEALED CAVITY AND FCI DRAWING C15006 FOR SEALED CAVITY

6) TERMINALS THAT CONTAIN NYE UNIFLOR 8917 GREASE TO HAVE 4 MILLIGRAMS MINIMUM OF THE GREASE APPLIED TO THE CONTACT AREA

7) DRAWING CONFORMS TO AVP - (T401/T406)-001

8) SEE USCAR DRAWING EWCAP-001 FOR DIRECT CONNECT MATING BLADE INFORMATION

9) ANNUAL QUALITY REQUIREMENTS:
IT IS PERMISSIBLE TO PERFORM CONTINUOUS CONFORMANCE PER FCI SPECIFICATION #AQA-001 INSTEAD OF ANNUAL LAYOUT & ANNUAL PV REQUIREMENTS OF QS-9000 SECTION 2
- CURRENT PRODUCTION TOOLING
- POINT OF LAST RUN.

10) VENDOR, TOOL, GRIP & WEEK CODES MUST BE PRESENT & LEGIBLE

11) SC DESIGNATES SPC DIMENSION

12) CS DESIGNATES CABLE SEALED
U/S DESIGNATES UNSEALED

13) CAVITY SPECIFICATIONS, SEE SHEET # 2

FCI AUTOMOTIVE CONTROLLED COPY NO. DATE 28 Aug 08

FCI AUTOMOTIVE AMERICAS

TABLE - 2 - TERMINAL GRIP / CRIMP TOOL DIMENSION TABLE (CRIMP TOOL DIMENSIONS(E-U) FOR REFERENCE ONLY)

FORD PART NO.	SUPPLIER PART NO.	GRIP CODE	WIRE SPECIFICATION	A+/-0.30	B+/-0.30	(C1)	C2+/-0.30	(D1)	D2+/-0.30	E+/-0.005	F+/-0.005	G+/-0.005	J+/-0.005	K+/-0.005	M+/-0.005	N+/-0.005	P+/-0.005	R+/-0.005	S+/-0.005	T+/-0.005	U+/-0.005	V± 0.5 0.3	W±0.30	GRIP CODE
XL3T-14474-DA	54001840	18	ESB-MIL-123-A/A2	3.0	5.1	1.00	1.9	3.00	3.70	0.92	0.53	0.13	2.56	1.99	1.97	0.24	4.13	3.18	3.17	N/A	N/A	19.5	8.0	18(CS)
XL3T-14474-AA	54001432	14	ESB-MIL-123-A/A2	3.8	6.1	1.45	2.3	3.80	4.60	1.09	0.63	1.16	3.06	2.38	2.36	0.32	5.13	3.96	3.94	N/A	N/A	19.5	8.0	14(CS)
XL3T-14474-CA	54001220	12	ESB-MIL-123-A/A2	5.2	6.6	2.30	3.2	4.30	5.20	1.54	0.89	0.26	4.31	3.35	3.32	0.34	5.44	4.20	4.10	N/A	N/A	19.5	8.0	12(CS)
4L3T-14474-AA	54001439	14	ESB-MIL-123-A/A2	3.8	6.1	1.45	2.3	3.80	4.60	1.09	0.63	1.16	3.06	2.38	2.36	0.32	5.13	3.96	3.94	N/A	N/A	19.5	8.0	14(CS)
4L3T-14474-CA	54001221	12	ESB-MIL-123-A/A2	5.2	6.6	2.30	3.2	4.30	5.20	1.54	0.89	0.26	4.31	3.35	3.32	0.34	5.44	4.20	4.18	N/A	N/A	19.5	8.0	12(CS)
XF2T-14474-CA	54002231	22	ESB-MIL-123-A/A2	2.6	3.2	0.76	1.7	1.40	2.10	0.83	0.48	0.11	2.31	1.79	1.78	0.18	3.25	2.53	2.50	N/A	N/A	19.0	7.5	22(U/S)
F8VB-14474-BA	54001839	18	ESA-MIL-77-A	3.0	3.8	1.00	1.9	1.75	2.70	0.92	0.53	0.13	2.56	1.99	1.97	0.18	3.25	2.53	2.50	N/A	N/A	19.0	7.5	18(U/S)
			ESB-MIL-123-A/A2	3.0	3.8	1.00	1.9	1.75	2.70	0.92	0.53	0.13	2.56	1.99	1.97	0.18	3.25	2.53	2.50	N/A	N/A	19.0	7.5	18(U/S)
8U5T-14474-GA	54001876	18AU	WSK-1A348-A4(THIN WALL) ESB-MIL-123-A/A2	3.0	3.8	1.00	1.9	1.75	2.70	0.92	0.53	0.13	2.56	1.99	1.97	0.18	3.25	2.53	2.50	N/A	N/A	19.0	7.5	18(U/S)
				3.0	3.8	1.00	1.9	1.75	2.70	0.92	0.53	0.13	2.56	1.99	1.97	0.18	3.25	2.53	2.50	N/A	N/A	19.0	7.5	18(U/S)
9U5T-14474-KA	54001879	18AU	WSK-1A348-A4(THIN WALL) ESB-MIL-123-A/A2	3.0	5.1	1.00	1.9	3.00	3.70	0.92	0.53	0.13	2.56	1.99	1.97	0.24	4.13	3.18	3.17	N/A	N/A	19.5	8.0	18(CS)
F8VB-14474-AA	54001431	14	ESB-MIL-123-A/A2	3.8	4.7	1.45	2.3	2.25	3.20	1.09	0.63	1.16	3.06	2.38	2.36	0.24	4.00	3.11	3.08	N/A	N/A	19.0	7.5	14(U/S)
8U5T-14474-HA	54001446	14AU	WSK-1A348-A4(THIN WALL) ESB-MIL-123-A/A2	3.8	4.7	1.45	2.3	2.25	3.20	1.09	0.63	1.16	3.06	2.38	2.36	0.24	4.00	3.11	3.08	N/A	N/A	19.0	7.5	14(U/S)
9U5T-14474-JA	54001448	14AU	WSK-1A348-A4(THIN WALL) ESB-MIL-123-A/A2	3.8	6.1	1.45	2.3	3.80	4.60	1.09	0.63	1.16	3.06	2.38	2.36	0.32	5.13	3.96	3.94	N/A	N/A	19.5	8.0	14(CS)
YF1T-14474-CA	54001311	13	ESB-MIL-123-A/A2	4.6	6.6	1.50	3.7	2.55	6.00	1.92	1.11	0.34	5.38	4.17	4.13	0.34	5.36	4.17	4.13	2.58	1.92	19.0	7.5	13(U/S)
XF2T-14474-BA	54001018	10	ESB-MIL-123-A/A2	5.2	6.5	2.30	3.2	3.20	4.00	1.54	0.89	0.26	4.31	3.35	3.32	0.33	5.25	4.08	4.04	2.52	1.87	19.0	7.5	10(U/S)
7L7T-14474-EA	54001227	12	ESB-MIL-123-A/A2	5.2	5.2	2.30	3.2	3.00	3.80	1.54	0.89	0.26	4.31	3.35	3.32	0.34	5.44	4.20	4.18	N/A	N/A	19.0	7.5	12(U/S)

LTRS	REVISIONS			
ORIGINATOR	CHECKER	ENG APP	MATL APP	
Z1 GRIP CODE 18AU WAS 18 AND 14AU WAS 14				
Z2 ADDED CABLE SEAL TABLE				
Z3 P/N 54001208 CORRECTED TO 54001227				
Z4 UPDATED NOTE 3				
Z5 ADDED GOLD PLATING NOTE				
AELE-E-11786306-070 ARCHIVED DATE: ( )			CAD: YES	
VRB	VRB		MAT'L	
AA1 UPDATED GRIP CODE FOR GOLD PLATED PARTS				
AA2 UPDATED GOLD PLATING NOTES				
DATE: 20080624 AELE-E-11786306-078			CAD: YES	
VRB	VRB		MAT'L	

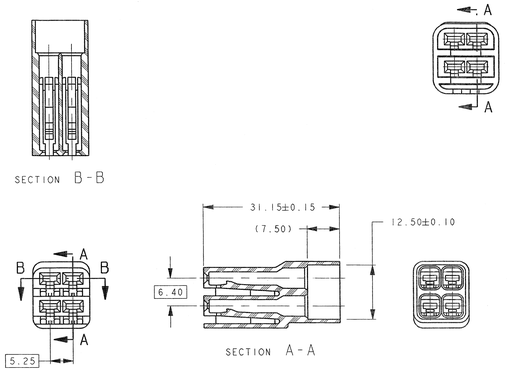
REFERENCE	FCI - AUTOMOTIVE (7362) FOR INFORMATION CONTACT: FCI - AUTOMOTIVE (7362)		
PART MUST COMPLY WITH MATERIAL SPECIFICATION WSS-M99P9999-AI TO HELP SAFEGUARD HEALTH, SAFETY AND THE ENVIRONMENT.			
DRAFTED IN ACCORDANCE WITH FAO ENGINEERING DRAFTING STANDARD CURRENT AT INITIAL RELEASE		3 RD ANGLE PROJ DIMENSIONS IN MILLIMETERS	
CAD TYPE	CAD LOC.	CAD FILE	DTM
X-PROE	N/A		IS MASTER
OPER. NO.	UNIT	DRAWING	F8VB-14474-AA
DESIGN JAB	DETAIL RS	TITLE	TERMINAL - (2.80MM) WIRE SNAP ON FEMALE
CHECKED JAB	SAFETY		SHT 1 OF 2
SCALE 4:1	DATE 20041215	DIVISION PLANT	

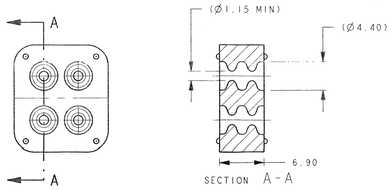
DRW SIZE A0/E

D471

E.C.N.#10474 Loc-R4A3
ESR #6243

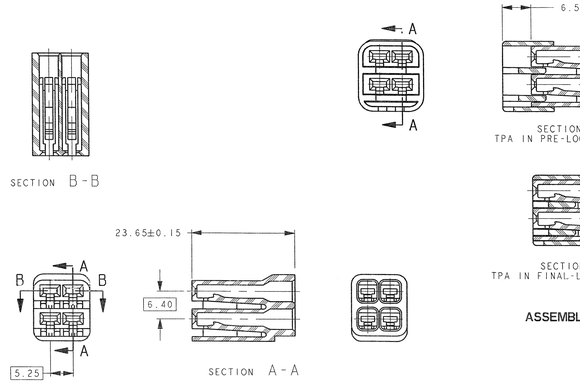
LTRS	REVISIONS			
ORIGINATOR	CHECKER	ENG APP	MATL APP	



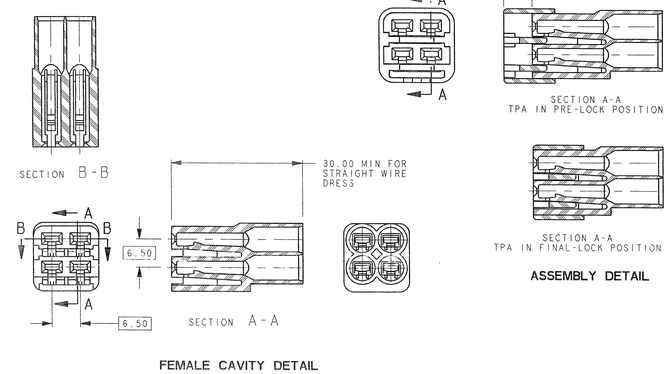


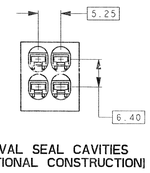
MATSEAL CROSS SECTIONAL VIEW
DIMENSION SHOWN FOR
20-12 AWG WIRE (SEE SHEET-1)
1.70-3.30MM INSULATION OD
SEAL MATERIAL: SILICON 13-22 DURO
WSB-M2D280-A5

MAT SEAL OPTION



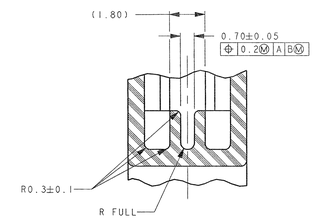
UNSEALED OPTION

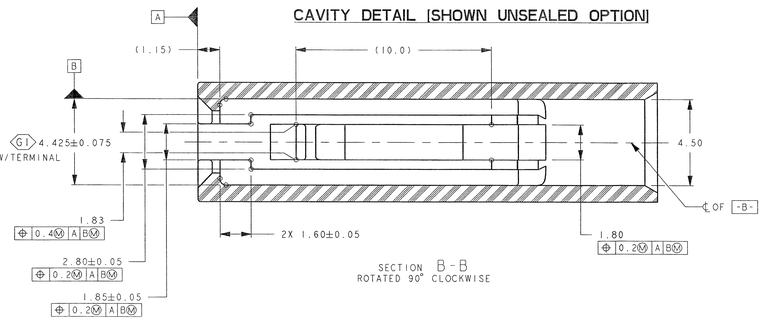


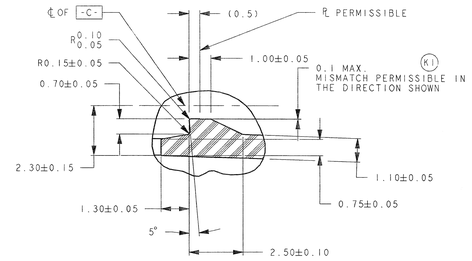


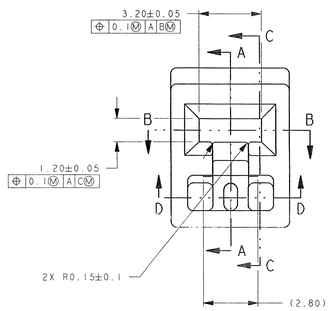
OVAL SEAL CAVITIES
[OPTIONAL CONSTRUCTION]

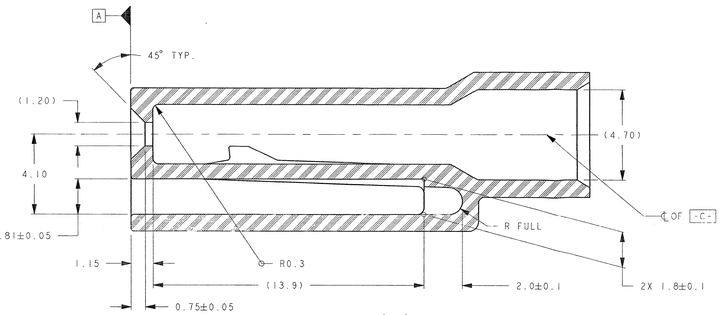
CABLE SEAL OPTIONS

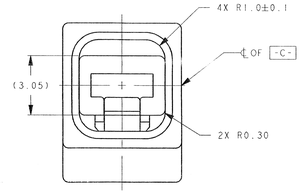


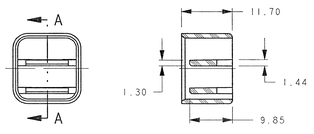




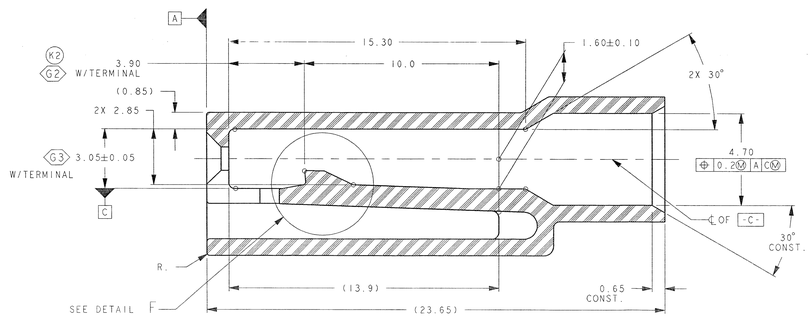








TPA DETAIL



CAVITY DETAIL NOTES:

1. CAVITY DESIGN SHOWN IS BASED ON UTILIZATION OF A SPECIFIC MATERIAL (NYLON 6/6 35% GLASS FILLED) USER OF THIS CAVITY DESIGN IS RESPONSIBLE FOR ANY NECESSARY MODIFICATIONS REQUIRED FOR A SPECIFIC APPLICATION OR MATERIAL.
2. UNLESS SPECIFIED ALL RADIUS TO BE 0.30MM GENERAL TOLERANCES ±0.10 ALL TWO PLACES DIM ±1.0° ON ANGULAR DIMS.
3. UNDIMENSIONED FEATURES ARE AT THE DISCRETION OF THE COMPONENT DESIGNER.
4. (K2) INDICATES IN-PROCESS INSPECTION FOR MANUFACTURING DIMENSION(S) OR SPECIFICATION (S).
5. (G3) DENOTES GAGE REQUIRMENTS FOR USER AND MANUFACTURER.
6. VENDOR MUST SUBMIT FOR ENGINEERING APPROVAL FOR LOCATION OF PARTING LINES PRIOR TO CONSTRUCTION OF DIE.
7. TO BE USED WITH 2.80mm APEX FEMALE TERMINAL SYSTEM SEE SHEET 1.
8. UNLESS OTHERWISE SPECIFIED ALL DRAFT TO BE WITHIN DIMENSIONAL TOLERANCE ONLY.
9. EXTERNAL CAVITY PROFILE FOR REFERENCE ONLY.

NOTES:

1. BY USING ANY INFORMATION CONTAINED IN THIS DRAWING (FCI AUTOMOTIVE), THE USER AGREES TO THE FOLLOWING:
   - A. USING FCI AUTOMOTIVE INFORMATION SHOWN IN THE DRAWING FOR ANY PURPOSE OTHER THAN CAVITY DESIGN IS PROHIBITED.
   - B. ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-FRINGMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY ARE EXPRESSLY DISCLAIMED AND EXCLUDED. THE ENTIRE RISK AS TO THE RESULT OBTAINED BY USING THE FCI AUTOMOTIVE INFORMATION IS ASSUMED BY THE USER.
   - C. FCI AUTOMOTIVE SHALL NOT BE LIABLE FOR ANY LOSS OR INJURY TO EARNINGS, PROFITS, GOODWILL, OR ANY PUNITIVE, EXEMPLARY, DIRECT CHAIN, SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DANGERS.
   - D. THE USER OF THE FCI AUTOMOTIVE INFORMATION AGREES TO DEFEND, IDENTIFY AND HOLD HARMLESS FCI AUTOMOTIVE AND ITS AFFILIATED ENTITIES, RESPECTIVE OFFICIERS, EMPLOYEES, AND AGENTS FROM ANY AND ALL CLAIMS, COSTS, EXPENSES, DAMAGES, JUDGEMENTS, OR OTHER LOSSES INCLUDING THE COST OF INVESTIGATION AND LITIGATION AND REASONABLE ATTORNEY'S FEES ARISING OUT OF THE USE OF THE FCI AUTOMOTIVE INFORMATION.
   - E. USER IS RESPONSIBLE FOR ANY SPECIFIC APPLICATION OF THE FCI AUTOMOTIVE INFORMATION.
2. MANUFACTURER RECOMMENDS USE OF FCI AUTOMOTIVE SUPPLIED TERMINALS WITH THE CAVITY DESIGN SHOWN IN DRAWING.
3. FCI AUTOMOTIVE INFORMATION CANNOT BE USED BY ANY PERSON OR ENTITY FOR ANY PURPOSE OTHER THAN FORD APPLICATION.
4. ANY USE OF THE INFORMATION SHOWN ON THE DRAWING REQUIRES THE PRIOR WRITTEN CONSENT OF FCI AUTOMOTIVE OR FORD MOTOR COMPANY.

FCI AUTOMOTIVE CONTROLLED COPY NO. 01 DATE 26Augos

FCI AUTOMOTIVE
AMERICAS

REFERENCE	FCI - AUTOMOTIVE (7362) FOR INFORMATION CONTACT: FCI - AUTOMOTIVE (7362)		
PART MUST COMPLY WITH MATERIAL SPECIFICATION WSS-M99P9999-A1 TO HELP SAFEGAURD HEALTH, SAFETY AND THE ENVIRONMENT.			
DRAFTED IN ACCORDANCE WITH FAO ENGINEERING DRAFTING STANDARD CURRENT AT INITIAL RELEASE	3 RD ANGLE PROJ DIMENSIONS IN MILLIMETERS		
CAD TYPE: X-PROE	CAD LOC.: N/A	CAD FILE	DTM IS MASTER
OPER. NO.	UNIT	DRAWING: F8VB-14474-AA	
DESIGN: JAB	DETAIL: TL	TITLE: TERMINAL - (2.8MM) WIRE SNAP ON FEMALE	SHT 2 OF 2
CHECKED: SSS	SAFETY		
SCALE: 6:1	DATE: 20070707	DIVISION / PLANT	Ford

DRW SIZE A1/A

D471 Rev AA2

E.C.N# 10474 Loc.: R4A3

DIMENSIONAL RESULTS

J O B H E A D E R

CUSTOMER.....	FORD
PART NUMBER.....	F8VB-14474-BA
B/P NUMBER.....	F8VB-14474-AA
PART NAME.....	TERM WIRE SNAP ON FEM
PO NUMBER.....	
LOG NUMBER.....	D471G F8VB14474BA
TOOL/MOLD NUMBER...	D471G
FIXTURE NUMBER.....	
LAYOUT TYPE.....	ANNUAL VALIDATION
JOB STATUS.....	Final Sign-Off
RESPONSIBILITY.....	PA
CHECK DATE.....	8-19-09
INSPECTED BY.....	AMH

GENERAL TOLERANCE	1 POS	2 POS	3 POS	4 POS	5 POS	ANGLE
	0.25000	0.10000	0.00000	0.00000	0.00000	3.00

PRECISION.....	3
UNIT OF MEASURE....	MM
JOB DATE.....	8-19-09
REV. LEVEL & DATE...	AA2 6-24-08
# PIECES.....	1
TOTAL FEATURES.....	75
MATERIAL.....	C14530 & C17410
SIGMA.....	3.0
TOLERANCE PERCENT..	80%
SHRINK FACTOR.....	0.0

COMMENTS: FULL LAYOUT TO FORD DRAWING DONE ON DELTRONIC #2 AT NOVI FOR PA
18 GAGE TIN PLATED
FCI #54001839

D471G F8VB14474BA/F8VB-14474-BA/TERM WIRE SNAP ON FEM/Final Sign-Off/FORD/AA2 6-24-08/8-19-09

ROW DETAIL

BAL# / DESC FEATURE	NOMINAL TOLERANCE +/-	G1 MEASURED OUT TOL
4 B	2.90 +/- 0.100	2.890
4 F	2.90 +/- 0.100	2.890
6 B	8.2 +/- 0.250	8.140
6 F	8.2 +/- 0.250	8.150
8	//TOOL STAMP ID--- G	PRESENT
10 B Min/Max	4.20/4.30	4.240
10 F Min/Max	4.20/4.30	4.260
11	//NYE UNIFLOR 8917 FOR GREASED TERMINALS	NOT APPL.
11 A	//GREASE OVERFLOW NOTE	NOT APPL.
20 BOT Min/Max	3.20/3.50 2X	3.290
20 TOP Min/Max	3.20/3.50 2X	3.310
21 B	19.0 +0.500/ -0.300	19.160
21 T	19.0 +0.500/ -0.300	19.170
22 B	7.5 +/- 0.300	7.490
22 T	7.5 +/- 0.300	7.490
28 B	2.0 +/- 0.250	1.940
28 T	2.0 +/- 0.250	1.980
34 NOTE	//"B" FOR CABLE SEAL GRIP INSULATION TYPE 3	NOT APPL.
37 NOTE	//"D2" FOR CABLE SEAL GRIP INSULATION TYPE 3	NOT APPL.
44	//WEEK STAMP ID- 27	PRESENT

D471G F8VB14474BA/F8VB-14474-BA/TERM WIRE SNAP ON FEM/Final Sign-Off/FORD/AA2 6-24-08/8-19-09

ROW DETAIL - (Continued)

BAL# / DESC		NOMINAL	G1 MEASURED
FEATURE		TOLERANCE +/-	OUT TOL
46		//GRIP STAMP ID- 18	
			PRESENT
47		//VENDOR STAMP ID- FCI	
			PRESENT
58	NOTE	//GREASE NOTE	
			NOT APPL.
61		3.8	3.652
		+/- 0.300	
		"B" FOR UNSEALED GRIP INSULATION TYPE 1----	
62		.875	0.875
Set On Size			
		(D1/2) FOR UNSEALED GRIP INSULATION TYPE 1	
63		2.70	2.633
		+/- 0.300	
		"D2" FOR UNSEALED GRIP INSULATION TYPE 1	
66		1.9	1.973
		+/- 0.300	
		"C2" FOR CORE GRIP	
67	NOTE	//"B" FOR DOUBLE WIRE GRIP INSULATION TYPE 2	
			NOT APPL.
68	NOTE	//"(D1/2)" FOR DOUBLE WIRE GRIP INSULATION TYPE 2	
			NOT APPL.
69		3.0	2.861
		+/- 0.300	
		"A" FOR CORE GRIP	
70	NOTE	//"(D1/2)" FOR CABLE SEAL GRIP INSULATION TYPE 3	
			NOT APPL.
71	NOTE	//"D2" FOR DOUBLE WIRE GRIP INSULATION TYPE 2	
			NOT APPL.
74		//1- BODY MATL --- C14530	
			CONFORMS
74	A	//PLATING - 100% HOT TIN DIP	
			CONFORMS
75		//2-SPRING MATL - C17410	
			CONFORMS
75	A-NOTE	//SULFAMATE DUCTILE NICKEL PER ASTM B689 TYPE 2- FOR GOLD PLATING OPTION	
			NOT APPL.
75	B	.00127/0.002	NOT APPL.
Min/Max			
		NICKEL PLATING THICKNESS- FOR GOLD PLATING OPTION	
75	NOTE	//MATL 2 C17410 Be Cu	
			CONFORMS
123		//GOLD INLAY TOP SURFACE ONLY- FOR GOLD PLATING OPTION	
			NOT APPL.

D471G F8VB14474BA/F8VB-14474-BA/TERM WIRE SNAP ON FEM/Final Sign-Off/FORD/AA2 6-24-08/8-19-09

ROW DETAIL - (Continued)

BAL# / DESC FEATURE	NOMINAL TOLERANCE +/-	G1 MEASURED OUT TOL
125 N	//GOLD PLATING OPTION-EXPOSED BASE MATL (Cu) 4 OUTER SIDES OF TERMINAL BOX- FOR GOLD PLATING OPTION	NOT APPL.
126 N	//GOLD PLATING OPT-ELECTRO MATTE TIN PLATED PER ASTM B 545-92--EXCEPT WHERE Ni, Pd, Au ARE. FOR GOLD	NOT APPL.
127 A NOTE	//GOLD PLATING OPTION-INLAY MATL GOLD ALLOY PER ASTM B522 (69% Au, 25% Ag, 6% Pt) FOR GOLD PLATING OPT	NOT APPL.
127 B MINIMUM	0.00025	NOT APPL.
	GOLD PLATING OPT-AT LOCATION INDICATED- SEE #132-	
128 Min/Max	3.30/4.32	NOT APPL.
	GOLD PLATING OPTION-LENGTH OF GOLD INLAY- SEE #130	
129	10.1 +/- 0.500	NOT APPL.
	GOLD PLATING OPTION- CHECKED IN FLAT BLANK. LENGTH OF EDGE TO BEGINNING OF EXPOSED MATERIAL	
130 Min/Max	3.30/4.32	NOT APPL.
	GOLD PLATING OPTION-INLAY---LENGTH OF GOLD INLAY- CHECKED IN FLAT BLANK	
131 MINIMUM	0.13	NOT APPL.
	GOLD PLATING OPTION- LENGTH OF OTHER EXPOSED MATERIAL- CHECKED IN FLAT BLANK	
132 A MINIMUM	.00025	NOT APPL.
	GOLD INLAY WE #1 PLATING OPTION	
134 A Min/Max	.02030/0.027	NOT APPL.
136 MINIMUM	0.00051	NOT APPL.
	60% Pd 40% SILVER PLATING THICKNESS- GOLD PLATING OPTION	
137 A MINIMUM	.00250	NOT APPL.
	GOLD PLATING OPTION-100% MATTE Sn PLATING THICKNESS- FOR GOLD PLATING OPTION	
138 NOTE	//GOLD PLATING OPTION---EXPOSED BASE MATL (Cu)	NOT APPL.
167 A	0.30500 +/- 0.008	0.304800
	MATERIAL THICKNESS	
168 B Min/Max	372./442.	401.964
	TENSILE STRENGTH - MPa	
170 MINIMUM	2.5	2.600
	ELONGATION	

D471G F8VB14474BA/F8VB-14474-BA/TERM WIRE SNAP ON FEM/Final Sign-Off/FORD/AA2 6-24-08/8-19-09

ROW DETAIL - (Continued)

BAL# / DESC FEATURE	NOMINAL TOLERANCE +/-	G1 MEASURED OUT TOL	
171 MAX Min/Max	.50000/2.500	0.914000	
	PLATING - 100% HOT TIN DIP		MICROMETERS
171 MIN Min/Max	.50000/2.500	0.813000	
	PLATING - 100% HOT TIN DIP		MICROMETERS
173 NOTE2	//GOLD PLATING OPTION-C14530 Cu FULL HARD		
		NOT APPL.	
174 MAX Min/Max	324./394.	NOT APPL.	
	GOLD PLATING OPTION-TENSILE Mpa		
174 MIN Min/Max	324./394.	NOT APPL.	
	GOLD PLATING OPTION-TENSILE Mpa		
175 MAX MINIMUM	2.00	NOT APPL.	
	GOLD PLATING OPTION---MIN ELONGATION		
175 MIN MINIMUM	2.00	NOT APPL.	
	GOLD PLATING OPTION---MIN ELONGATION		
177	0.20300 +/- 0.008	0.203000	
	MAT'L THICKNESS		
178 MAX Min/Max	.50000/2.500	2.032	
	PLATING - 100% HOT TIN DIP		MICROMETERS
178 MIN Min/Max	.50000/2.500	1.016	
	PLATING - 100% HOT TIN DIP		MICROMETERS
179 MAX Min/Max	758./897.	827.371	
	TENSILE STRENGTH - MPa		
179 MIN Min/Max	758./897.	806.687	
	TENSILE STRENGTH - MPa		
180 CMAX Min/Max	655./862.	761.871	
	YIELD STRENGTH - MPa		
180 CMIN Min/Max	655./862.	735.671	
	YIELD STRENGTH - MPa		
181 MINIMUM	7.	10.000	
	MIN. ELONGATION IN 50mm		

D471G F8VB14474BA/F8VB-14474-BA/TERM WIRE SNAP ON FEM/Final Sign-Off/FORD/AA2 6-24-08/8-19-09

ROW DETAIL - (Continued)

BAL# / DESC FEATURE	NOMINAL TOLERANCE +/-	G1 MEASURED OUT TOL
196 NOTE	//OPTIONAL INSULATION GRIP HOLE	NO HOLE PRESENT NOT APPL.
197 Set On Size	.50 "(C1/2)"	0.500 FOR CORE GRIP
201 NOTE	//SERRATION TYPE 1	NOT THIS TYPE NOT APPL.
202 NOTE	//SERRATION TYPE 2	PRESENT
203	//NUMBER OF SERRATIONS - 7	PRESENT

TOTAL # OF FEATURES	75	
LESS BASIC DIMENSIONS	2	
LESS EMPTY NOTES		0
LESS N/A DIMENSIONS		32
REPORTED DIMENSIONS		41
# DIMENSIONS IN TOLERANCE		41
# DIMENSIONS OUT OF TOLERANCE		0
% DIMENSIONS IN TOLERANCE		100.00%
% DIMENSIONS OUT OF TOLERANCE		0.00%
CUMULATIVE DIMENSIONS	41	
CUMULATIVE % (PIST) IN TOLERANCE	100.00%	

D471G F8VB14474BA/F8VB-14474-BA/TERM WIRE SNAP ON FEM/Final Sign-Off/FORD/AA2 6-24-08/8-19-09

OUT OF TOLERANCE SUMMARY

		G1
BAL# / DESC	NOMINAL	MEASURED
FEATURE	TOLERANCE +/-	OUT TOL

No Out Of Tolerance Features To Report For This Group.

Process Information

FBVB-14474-BA

DIE SAMPLE SUBMISSION FORM

DIE NUMBER: 4716 ☐ NEW TOOL ☑ CURRENT PRODUCTION TOOL ☐ PROTOTYPE TOOL

FCI PART NO.: 54001839 **CUSTOMER PART NUMBER:** FBVB-14474-BA

SINGLE STRIP: ✓ **MULTIPLE- OUT DIE:** **OTHER:**

SAMPLES WERE MANUFACTURED AT: MT. UNION **DATE:** 7-6-09 **MACHINE NUMBER:** S-3

FCI MATERIAL NUMBER(S): 47129-47221

MATERIAL LOT NO(S) OF BASE MAT'L: 4076-4051 **TRACKING NUMBER(S) OF PLATING CERT:**

GRIP GAGE SIZE: 18

REASON FOR SUBMISSION:

☐ FULL LAYOUT ☐ GRIP CHANGE ☒ ANNUAL ☐ PROCESS CHANGE ☐ ENGINEERING CHANGE

☐ FIRST RUN AFTER QUALIFICATION FROM TOOL SUPPLIER LOCATION ☐ CORRECTION OF DDD(S)

☐ MANUFACTURING LOCATION CHANGE NOW AT: WAS:

☐ MATERIAL TYPE CHANGE NEW MATERIAL: WAS:

☐ OTHER

THE FOLLOWING ITEMS MUST BE SUBMITTED WITH YOUR 300 PIECE SAMPLE AND TWO (2) DIE STRIPS (BLANKS): (1) THIS FORM (WQA302), (2) MATERIAL CERTS FOR EACH MATERIAL TYPE AND PLATING (S) IN YOUR SAMPLE (3) COPY OF FIRST PIECE INSPECTION RESULTS (4) DIE SET UP SHEETS AND CONTROL PLAN.

I HEREBY CERTIFY THAT THE SAMPLES I AM SUBMITTING ARE FROM A STABLE PROCESS, USING PRODUCTION EQUIPMENT, OPERATORS, AND MATERIAL PER AIAG REQUIREMENTS. ANY DEVIATIONS FROM THE PROCEDURE ARE LISTED BELOW:

WRITE DEVIATIONS IN SPACE PROVIDED:

SUBMITTED BY: Kenneth E. McGinn **DATE:** 7-6-09

BOTTOM SECTION FOR QA USE

PRINT NO.(S): FBVB-14474-AA

CURRENT PRINT LEVEL AND DATE: AA2 6/24/08

ENGINEERING SIGNATURE APPROVING SAMPLE FOR LAYOUT: **DATE:**

ENGINEERING SIGNATURE REJECTING SAMPLE FOR LAYOUT: **DATE:**

COMMENTS: Annual (Bumped Rev levels was @ V4 PPAP)

UNLESS OTHERWISE SPECIFIED, DIMENSIONAL LAYOUT WILL BE PERFORMED PER CURRENT DRAWING REQUIREMENTS.

MARKED PRINT SUPPLIED ? ○ YES ⊗ NO ○ N/A

LIST ADDITIONAL DIMENSIONAL INSPECTION BEYOND DDD'S ON FILE:

LIST DIMENSIONS TO BE CHECKED : All

LAYOUT OUTSOURCED TO: VISUALS / PAPERWORK TO BE COMPLETED BY FCI

SAMPLE LOGGED IN BY: J Haskell **DATE:** 7/8/09

☐ CHECK HERE IF PARTS ARE NOT FOR PPAP

AH 7-14-09

Framatome Connectors Interlock Inc.

Die Loading / Cleanout Information Sheet

Die No. 471		Ref. Procedure #	PRJ0003
General Information		Document Rev.	
		Revision Date	
		Approved By:	

Frequency: [X] Beginning of shift [ ] Every coil change

Coolant Line Placement

Station # 1
Station # 36

Comments

1) 1st HOLE IN FIRST STRIPPER
2) LAST HOLE IN 3RD STRIPPER FOR 10 GAGE PARTS
3) 1ST HOLE IN SPRING DIE STRIPPER

Coolant / Air Line Settings

	On	Off		On	Off
Coolant	X		Air	X	

Coil Set Direction

Up	X
Down	
No Preference	

Starting Location

1.) FIRST PILOT

Loading Speed

Run on:	X	Inch
		Continuous
		Other
Strokes per minute	100-150	

1.) SEE DIE LOADING INSTRUCTION SHEET FOR COMPLETE MAIN DIE & SPRING DIE LOADING INSTRUCTIONS.

Cleanout Instructions

Strippers to Remove: [X] All [ ] 1st [ ] 2nd [ ] 3rd

1.) BRUSH SOLVENT ON DIE & PUNCHES
2.) BLOW OFF EXCESS WITH AIR. WIPE OFF EXCESS WITH A RAG
3.) WIPE DOWN TRACK WITH RAG
4.) CHECK SLIDE FOR GREASE

Special Instructions

1.) SPRING ONLY GETS CLEANED WHEN DIE WRECKS
TO BE DONE BY AUTHORIZED PERSONEL ONLY!!!

Framatome Connectors International Inc.

Die Setup / Operator Information Sheet

Die No. 471		Ref. Procedure #	PRJ0003
General Information		Document Rev.	
		Revision Date	
		Approved By:	Jim Thomas

Spring Material Size:	.008 x .220 in.	Reel Size:	1 3/16 in.
Material Size:	0.012 x 1.160 in.	Reel Type:	Paper pancake
Progression:	0.600 in.	Interleaf Size:	1 in.
Press Speed:	700-750 s.p.m.	Box Size:	24 x 24 x 12 1/4
Press Speed Gold:	600-650 s.p.m.	Boxes per Skid:	8
Loading Speed:	100-150 s.p.m.	Grease Type:	Nyogel - 8917 / 760G
Press Stroke:	1 1/4 in.	Label Placement:	Carrier side

Packaging Quantities

Part Number	MAT'L TYPE	Quantity per Reel

SEE ADDITIONAL SHEET FOR
PARTS, MAT'L, ETC.

Take-up Information

Wicomat	
Coil Tech	
Either	X
Other	

Windup / Packaging Information

1.) Standard windup.
2.) Standard splice, use splice sticker
3.) M66" with (gold) must have a large blue X on both sides

Coolant Line Placement

1.) Station # 1 (1st cut)
2.) Station # 23
3.) Spring die (1st cut)

Air Line Placement

1.) Top shoe blow off
2.) Bottom shoe slug sucker
3.) Signature Track

Support Equipment

	Yes	No	COMMENTS
Special Take-up		X	
Paper Winder(Gold Mat'l)	X		
Additional Air Lines	X		SIGNATURE TRACK BLOW OFF & CUTTER
Additional Water Lines		X	
Special Ramp / Chute	X		SIGNATURE INSPECTION TRACK
Slug Sucker	X		

Special Instructions

1) PARTS MUST BE RUN SIGNATURE INSPECTION EQUIPMENT TURNED ON
2) REFER TO DIE LOADING INSTRUCTION SHEET IN DIE BOOK FOR MAIN DIE & SPRING DIE LOADING
3) REFER TO OPERATOR TRAINING MANUAL FOR S&S OPERATING PROCEDURES
4) BEFORE GREASE FILLED PARTS, MUST BE INSPECTED BY LASER SENSOR, REFER TO PROCEDURE ON LAMINATED SHEET AT PRESS
5) CHECK WICOMAT TO ENSURE THAT PARTS CHUTE IS NOT HITTING FINISHED PARTS ON REEL

MATERIAL TEST RESULTS

CERTIFICATION REPORT

LUVATA

SOLD TO	SHIP TO	ENTRY - BOL
FCI USA, INC ACCOUNTS PAYABLE DEPARTMENT 825 OLD TRAIL ROAD ETTERS, PA 17319	FCI AUTOMOTIVE AMERICAS 11823 LENAPE DRIVE MT. UNION, PA 17066	24983-349766
		ALLOY 1453

PRODUCT DESCRIPTION	QUANTITY ORDERED		CUSTOMER ORDER NO.
1.1600 .01200 H08 SN/TE COPPER STRIP *TINNED* EIB #47129	PCS. LBS. 288000	PCS. 5 LBS. 9257 DATE 6/22/2009 TIME 12:28:05 PM	PO69382 GOVT CONTRACT NO.

COIL NUMBER	521367B	521367C				
COMPOSITION - % Copper - Includes Ag Phosphorous Tin Tellerium	 99.94 .005 .015 .0106	 99.94 .005 .015 .0106				
PROPERTIES Tensile Str. (ksi) Elongation (%) in 2 inches Coating Thickness (µin)	 58.3 2.6 32.00	 58.3 2.6 36.00				

Lot #'s
4075
4076
4077
4078
4079

WE HEREBY CERTIFY that these test results were obtained from samples taken from coil(s), which were produced for the purchase order stated. These samples have been subjected to the tests called for by the customer and /or ASTM specification(s).
This product was manufactured in compliance with all applicable government and safety constraints on restricted, toxic, and hazardous materials and complies to the Restriction of Hazardous Substances Directive (RoHS) 2002/95/EC and the Consumer Product Safety Improvement Act of 2008.
Luvata Buffalo, Inc. product Material Safety Data Sheets (MSDS) provides component information for all hazardous materials in conformance with the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Thomas C. Pillington

Technical Department

BRUSHWELLMAN
ENGINEERED MATERIALS

606 Lamont Road, Elmhurst, IL US 60126

Material Certificate

Date
06/02/2009
Purchase order item/date
po69427 / 05/29/2009
Delivery item/date shipped
80415292 000010 / 06/02/2009
Order item/date
251121 000010 / 05/29/2009
Customer nbr Customer part nbr
14033 47121
Customer spec
ASTM-B-768
Rev Type Comp Class Grade

FCI Electronics
11823 Lenape Drive
Mount Union PA 17066-9733
US

Our Material: 620000859 STRIP 17410 HT .00800 X .2200
Your Material: 47121

Brush Wellman testing for chemistry composition, mechanical and physical properties were tested at our laboratory in Elmore Oh.
This material was inspected and tested and is conforming as required in accordance with the noted part, specification and revision number.
The test methods for these tests are available for review by the buyer.

Pure Hot Tin Dip Plated .00004" - .00008" per side.

Batch 0000714308 / Quantity 496 LBS

Lot# 405T

Characteristic	Unit	Value	Specification Limits Lower	Upper
CDA (UNS) Alloy	-	C17410		
ASTM Temper	-	TH04		
Dimensional Attributes				
Gauge	"	0.00800		
Gauge Plus	"	0.00025		
Gauge Minus	"	0.00025		
Width	"	0.2200		
Width Plus	"	0.00300		
Width Minus	"	0.00300		
Mechanical/Physical Properties				
Tensile	ksi	117.2 120.0	110.0	130.0
Yield @ 0.2% Offset	ksi	106.7 110.5	100.0	120.0
Elongation (4D or 2")	%	10	7	17
Hardness Scale	-	HV		
Hardness Value		254	230	280
Percent IACS	%	52.4	45.0	60.0
Bend 1 Direction	-	LONGITUDINAL		
Bend 2 Direction	-	TRANSVERSE		
Chemistry Composition				
Beryllium	%	0.34		
Fe+Si+Al	%	0.08		
Cobalt	%	0.54		

BRUSHWELLMAN
ENGINEERED MATERIALS

FCI Electronics
11823 Lenape Drive
Mount Union PA 17066-9733
US

Delivery item/date
80415292 000010 /
06/02/2009

Iron	%	0.04		
Silicon	%	0.02		
Aluminum	%	0.02		
Tin	%	0.01		
Zinc	%	< 0.01		
Chromium	%	0.01	0.01	
Alloy Balance	-	COPPER		

Lot Identification

Heat Number	-	73168
Coil Number	-	57
Prod Order/Pc/Lot Nbr.	-	100366319

Kevin Russell

Quality Representative - Kevin Russell

CERTIFICATE OF SPECIFICATION

Marjan, Inc.
44 Railroad Hill Street
Waterbury, CT 06708
PH: (203) 573-1742 – FX: (203) 755-9263

Marjan Hot Tinning, Inc.
1801 Albright Road
Montgomery, IL 60538
PH: (630) 906-0053 – FX: (630) 906-0058

DATE OF RECEIPT	ORDER NO.	MARJAN WORK ORDER NO.
12/02/08	CH4500213782	C10113

CUSTOMER Brush Wellman, Inc.

SPECIFICATION Material to be hot dip tin coated with 100% pure tin to a thickness of .00004/.00008"

CERTIFICATE OF ☐ TEST ☐ COMPLIANCE (1)

DESCRIPTION OF MATERIAL				SOLDERABILITY (2)		
Item	Material & Dimensions	Quantity (lbs.)	Coating Thickness (micro-inches)	Flux Used	Aging	Results
	.008 x 3.156"	2,943	40-80			
	AL 17410					

(1) This report is a certificate of compliance. The material furnished on this order complies with requirements of the specification shown.
(2) Only when required.

Number M3-1
Rev. No. 0

This is to certify that to the best of our knowledge and belief, the values shown are correct and true and that the material complies with the requirements of the specification shown.

Inspection Dept. CMG

Qualified Laboratory Documentation

THE AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

BRUSH WELLMAN INC.
Shoemakersville, PA

for technical competence in the field of

Mechanical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated January 2009*).

Presented this 30th day of January 2009.

President
For the Accreditation Council
Certificate Number 0339.02
Valid to December 31, 2010

For the tests or types of tests to which this accreditation applies, please refer to the laboratory's Mechanical Scope of Accreditation.

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

BRUSH WELLMAN INC.
READING METALLURGICAL LABORATORY
Shoemakersville Road
Shoemakersville, PA 19555
Darwin Evangelista Phone: 610 562 6612

MECHANICAL

Valid To: December 31, 2010 Certificate Number: 0339.02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests on metals and alloys, primarily beryllium alloys in strip, and rod and wire metal forms:

In-House Method	Test	Test Method
QCT-003	Tensile	ASTM E8, E345
QCT-036	Rockwell Hardness HRC, HRB, HR30N, HR15N, HR30T, HR15T	ASTM E18
	Microhardnesss	
QCT-033, 034	Vickers	ASTM E384
	Ductility	ASTM B820
QCT-012	90° Bend	----------
QCT-002	180° Bend	----------
QCT-035	Conductivity	----------
QCT-011	Solderability	----------
QCT-008	Scroll	----------
	Metallography	
QCT-009	Grain Size	ASTM E112, E930, E1181
QCT-009	Microetching	ASTM E407
QCT-009	Preparation	ASTM E3

BUREAU VERITAS
Certification

Certification

Awarded To

BRUSH WELLMAN, INC.

606 LAMONT ROAD
ELMHURST, ILLINOIS USA

Bureau Veritas Certification North America, Inc. certifies that the management system of the above organization has been audited and found to be in accordance with the requirements of the management system standards and scope of supply detailed below

STANDARDS

ISO 9001:2000

SCOPE OF SUPPLY

DISTRIBUTION OF STRIP, ROD, WIRE, BAR, PLATE, INGOT, AND TUBE PRODUCTS. PROCESSING TO INCLUDE SLITTING, CUTTING, TENSION LEVELING, RECOILING, AND TRAVERSE WINDING

Original Approval Date: 22 JULY 1994

Subject to the continued satisfactory operation of the Organization's Management System, this certificate will remain valid until: 8 SEPTEMBER 2009

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organization.

Certificate No: 191569
Issue Date: 15 SEPTEMBER 2006

For Bureau Veritas Certification North America, Inc.
515 West 5th Street, Jamestown, New York, USA
www.certification.us.bureauveritas.com

ANAB ACCREDITED

CERTIFICATE OF REGISTRATION

Having been audited in accordance with requirements of

ISO/TS 16949:2009

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

Luvata 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 R20.4TS.

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:	December 21, 2009 through December 20, 2012

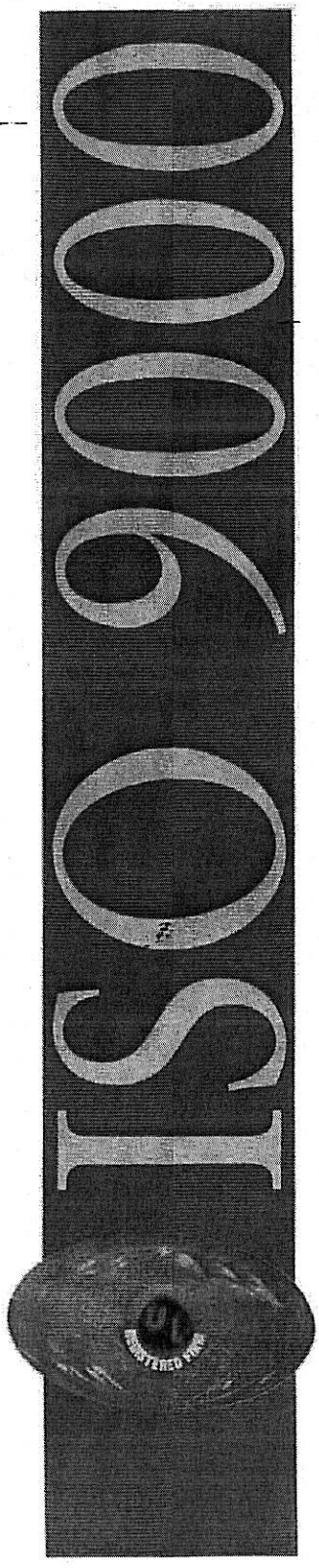
Signed for SRI: _____

Christopher H. Lake, President & COO

Certificate Date:	December 21, 2009
Certificate Number:	008646
IATF Certificate Number:	0094280
Registration Number:	0276-01

UNDERWRITERS LABORATORIES INC.

CERTIFICATE OF REGISTRATION



Marjan, Inc.
Fabor Fourslide
Nasco Inc.

44 Railroad Hill Street
Waterbury, CT 06722-2420

with an off-site facility located at:

Marjan Hot Tinning, Inc.
1801 Albright Drive
Montgomery, IL 60538

Underwriters Laboratories Inc.® (UL) issues this certificate to the Firm named above, after assessing the Firm's quality system and finding it in compliance with

ISO 9001:2000

EN ISO 9001:2000; BS EN ISO 9001:2000; ANSI/ASQ Q9001:2000

for the following scope of registration

3471 (US) : Electroplating, Plating, Polishing, Anodizing, and Coloring
3499 (US): Fabricated Metal Products, Not Elsewhere Classified
3469 (US): Metal Stampings, Not Elsewhere Classified
7389 (US): Business Services, Not Elsewhere Classified
Marjan, Inc. - The coating of hot tin, hot tin lead and hot tin silver on ferrous and non ferrous metal strip.
Fabor Fourslide - The fabrication of progressive fourslide metal stampings.
Nasco, Inc. -The slitting, edging, traverse winding and cutting to length of coiled metal strip.
The off-site facility located in Montgomery, IL performs the following functions: receiving/receiving inspection, hot coating, packing, shipping, purchasing, contract review, handling complaints, corrective/preventive action, training, calibration, customer supplied product.

Further clarifications regarding the scope of this certificate and the applicability of ISO 9001:2000 requirements may be obtained by consulting the organization

This quality system registration is included in UL's Directory of Registered Firms and applies to the provision of goods and/or services as specified in the scope of registration from the address(es) shown above. By issuance of this certificate the firm represents that it will maintain its registration in accordance with the applicable requirements. This certificate is not transferable and remains the property of Underwriters Laboratories Inc. ®.

File Number: A6711 Volume: 1
Original Certification Date: November 23, 1998
ISO 9001:2000 Issue Date: November 18, 2002
Revision Date: November 20, 2008
Renewal Date: November 22, 2011

John H. Schmidt
Vice President and Chief Development Officer

ANAB ACCREDITED

UL® REGISTERED FIRM

Buffalo Manufacturing Unit
70 Sayre Street Buffalo, NY 14207

Work Instruction

Title: Laboratories Scope		**WI Number** WI-0622 **Revision:** 7
Process: Process Product/Validation Verification **Area:** Chem/Sheet Mill Labs	***Approved & Released Work Instruction***	**Implementation Date:** 07/13/2006
Unit: **ISO/TS Book:**		**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.

Work Instructions:
Scope:

The Laboratories at the Buffalo Plant are ISO/TS16949:2002 Certified (SRI Certificate No. 005889) captured labs and do not profit from any testing of customer product. The scope of our laboratories covers the type of inspection and tests performed.

Chemistry / Metallurgical

Technology	Range, when necessary	Methods Used	Product Types	Remarks
Optical Emission Spectrometry		ASTM E 1251	Copper & Copper Alloys	
Micro Hardness		ASTM E 384	Copper & Copper Alloys	Vickers Scale
Rockwell / Rockwell Superficial		ASTM E18	Copper & Copper Alloys	
Tension		ASTM E8	Copper & Copper Alloys	Flat Products
Grain Size		ASTM E112	Copper & Copper Alloys	Comparison Method
Conductivity		ASTM E 1004	Copper & Copper Alloys	%IACS
Surface Roughness		ASME B.46.1	Copper & Copper Alloys	
Tin Thickness		ASTM B568	Copper & Copper Alloys	Tin coating over Copper
Hydrogen Embrittlement		ASTM B577	Copper & Copper Alloys	

Inspection and Testing:

All inspection and testing will be performed in accordance with the Buffalo Plant ISO/TS16949:2002 documentation and the Scope of Accreditation.

7.0 Associated Documents:

8.0 Document Revision History:

Revision: 7	**Date Created:** 09/15/2005 **Date of Last Revision:** 07/13/2006	**Last Approval Date:** 07/13/2006

Document Author: Thomas Pilkington	**Document Manager:** David Oldman

9.0 Reason for Change:

Revision:	Sec/Para Changed	Change Made:	Date
1	N/A	Initial Issue of Document	9/15/05
4	Work Instructions	Deleted the reference to the Lab Accredidation	3/24/06
5	W.I.	Add Scope chart	3/28/06
6	n/a	Remove O.A.B.	6/23/06
7	Work Instructions - Scope	Changed the Certificate Number	7/12/06

10.0 Notification List:

TS_ALL, TS_Chemical Lab, TS_Sheet Mill Lab

11.0 Approvals:

First Approver's Signature

Name: Parker Finney
Title: Director Technical

Jul 13, 2006 07:25:24 AM EDT - Approved by: Parker Finney/Copper/Buffalo/Outokumpu

Document History Section

marjan, inc

44 Railroad Hill Street
P.O. Box 2420
Waterbury, CT 06722-2420
PH: (203) 573-1742
FX: (203) 755-9263

A6711 ISO 9001

Midwest Location:
Marjan Hot Tinning, Inc.
1801 Albright Road
Montgomery, IL 60538
PH: (630) 906-0053
FX: (630) 906-0058

May 13, 2003

TO:

FROM: William Strobel

SUBJECT: Lab Equipment at Marjan, Inc. Waterbury Location

Equipment	Used For
* Solder pots	Solderability
* Micro Hardness Tester	To check material hardness
* Superficial Hardness Tester	To check material hardness
*AA Machine	To check elemental composition
* Binocular Microscope	Grain Structure examination
* Air oven	Age samples for testing
* Tensile Cut Machine	Prepare samples for tensile test
* Tensile Machine	Check tensile strength of material
* E Comet Grinder/Polisher	Prepare samples for examination of grain structure
* Spring Back Tester	Test spring back strength of materials

We are an ISO 9001:2000 certified company, our regristar being U.L. Equipment calibrated and/or verified internally and/or external service suppliers.

Sincerely,

William Strobel
Plant Manager

aqa INTERNATIONAL

ACCESSIBLE. UNDERSTANDABLE. REGISTRATION.

AQA Canada Inc.
2275 Upper Middle Rd. E., Suite 101
Oakville, ON L6H 0C3
www.aqacanada.com

905.363.2540 (T)
905.491-6815 (F)

May 5, 2009

Marty Wojtowicz
FCI MVL
11823 Lanape Dr.
Mount Union, PA 17066

Dear Marty:

I am pleased to advise you the FCI MVL has successfully completed the Stage 1 Documentation and Readiness Review for ISO/TS 16949:2002. Please contact our office to schedule the Stage 2 on-site Conformance Assessment.

Sincerely,

AQA Canada Inc.

Brad Kitchen
President

NA Automotive Group Quality Lab

FCI Automotive - North America, a division of FCI USA, Inc.
28100 Cabot Drive Suite 100
Novi, MI 48377
&
11823 Lenape Dr.
Mt. Union, PA 17066

1. Scope:

This Laboratory Scope is in accordance to the Quality System Requirements of ISO/TS 16949, and the ISO 17025 Standard. FCI performs inspection only on products produced by FCI Automotive. The scope of our Laboratory covers the type of inspection performed, the work instructions and specifications followed and the equipment used in performing the inspections. Additionally, this Laboratory performs calibration of equipment (company and privately owned) used in the measurement of FCI product. The scope covers the calibration of said equipment, the work instructions and specifications followed.

2. Responsibility:

It is the responsibility of the Quality Manager, Group Lab Supervisor, and all dimensional lab employees to comply and fully support this scope.

3. Inspection:

All inspection will be performed in accordance with print specification(s) and WQA304 (Dimensional Layout Inspection). Calibration will be performed per WTSP11 (Control of Inspection, Measuring and Test Equipment), WQA200 (Inspection, Measuring & Test Equipment) and WQA201 (Gage Calibration and Control Log).

4. Dimensional Measurement:

Equipment	Reference Standard	Procedure / Methods / Specifications
CNC Vision System	Outside Source NIST Traceable	Manufacturer's Instruction Manual
Omis / ROI Manual Vision System	1545-WQE Ram Optical 4" Glass Master	Manufacturer's Instruction Manual WQA322: Create a Program on the Deltronic WQA274: Deltronic Calibration Procedure
Profilometer	Outside Source NIST Traceable 1545-WQE Ram Optical 4" Glass Master	Manufacturer's Instruction Manual
.061-.750 Pin Gage Set .011 - .060 Plug Gage Set .0115 - .0605 Plug Gage Set	1562-WQE 125 Microinch Test Patch 1553-WQE 16.1 and 119.5 Microinch Test Patch	Manufacturer's Instruction Manual
Optical Comparator	1501-WQI Laser Scan Micrometer 1500-WQI Calibration Set for Laser Mic	Manufacturer's Instruction Manual WQA209: Master Disks and Plugs
Hardness Tester	Outside Source NIST Traceable	WQA215: Optical Comparators (Projectors)
Thickness Gages-Sheffield	Outside Source NIST Traceable	Manufacturer's Instruction Manual
0-12" Height Master	1516-WQE Master Gage Block Set	WQA285: Thickness Gages
Indicators: Dial (.00005 - .0005) and Test (Drop)	1516-WQE Master Gage Block Set	WQA214 Micrometer Height Gages
Surface Plate	1516-WQE Master Gage Block Set	WQA226 Indicators
0-6" Digital Caliper	Outside Source NIST Traceable	Print Specification
0-8" Height Gage	1516-WQE Master Gage Block Set	Print Specification

0-24" Height Gage	1516-WQE Master Gage Block Set	Print Specification
Gage Blocks	1516-WQE Master Gage Block Set	Print Specification
2" Ring Gages	1563-WQE Outside Source Nist Traceable	Print Specification
Weights – LB & Gram	1697-WQE & 1512-WQE Outside Source Nist Traceable	Print Specification
0-3" Digital Micrometer's	1508-WQE Outside Source Nist Traceable	Print Specification
	1516-WQE Master Gage Block Set	Print Specification

5. Analytical Analysis:

Equipment	Reference Standard	Procedure / Methods / Specifications
Analytical Balance Mettler PM400	1511-WQE Gram Weight Set	WQA210 Master Weight Set Gram

6. Calibration:

Micrometers: Outside and Inside Standard. Digital and Special Anvil Ect.	1516-WQE Master Gage Block Set Micrometer End Measuring Rods 1693-WRTE	WQA228: Standard Outside Micrometers WQA229: Inside Micrometers WQA233: V-Anvil Inside Micrometers (Tri-Anvil) WQA234: Tri-Anvil Inside Micrometers (Bore) WQA237: Digital O.D. Micrometers WQA238: LCD Electronic Digital O.D. Micrometers
Thickness Gages-Sheffield Feeler Gage Sets	1516-WQE Master Gage Block Set	WQA285: Thickness Gage WQA238: Thickness Gages Sets (Feeler Gages)
Calipers Dial and Digital	1516-WQE Master Gage Block Set 1517-WQE 2" Ringmaster	WQA230: Vernier and Digital Calipers
Video Vision System	1545-WQE Ram Optical 4" Glass Master	WQA274: Deltronic Calibration Procedure (Video)
Height Gages	1516-WQE Master Gage Block Set	WQA217: Height Gages (Vernier or Digital) WQA214: Micrometer Height Gages
Angle Plates	Surface Plate Layout	WQA218: Right Angle Plates
V-Blocks	Surface Plate Layout	WQA219: V-Blocks
Pin Gages	1501-WQI Laser Scan Micrometer	WQA220: Plain Plug Gages
Check Fixtures	1516-WQE Master Gage Block Set	WQA225: Check Fixtures and Functional Gages and Functional Gages
Indicators	1516-WQE Master Gage Block Set	WQA226: Indicators
Bore Gages	Ring Masters	WQA227: Dial Bore Gages
Depth Gages	1516-WQE Master Gage Block Set	WQA231: Micrometer Depth Gages
Beam Balances/Gram Scales	1511- WQE Gram Weight Set	WQA232: Beam Balances WQA210: Meter Weight Gram Set
Radius Gages	1562-WQE Optical Comparator	WQA235: Radius Gage Sets (Fillet Gages)
Compression / Force Gage	1508-WQA Master Weights and Hangers	WQA284: Chatillion Calibration
Thread Measuring Wires	1501-WQI Laser Scan Micrometer	WQA216: Thread Measuring Wires
Production Scales Up to 100 LBS.	9023-WQE Master Pound Weights	WQA250: Master Weights Pounds

Initial Process Studies

PROCESS CAPABILITY CERTIFICATION REPORT

PROCESS IS CAPABLE

Part Certification

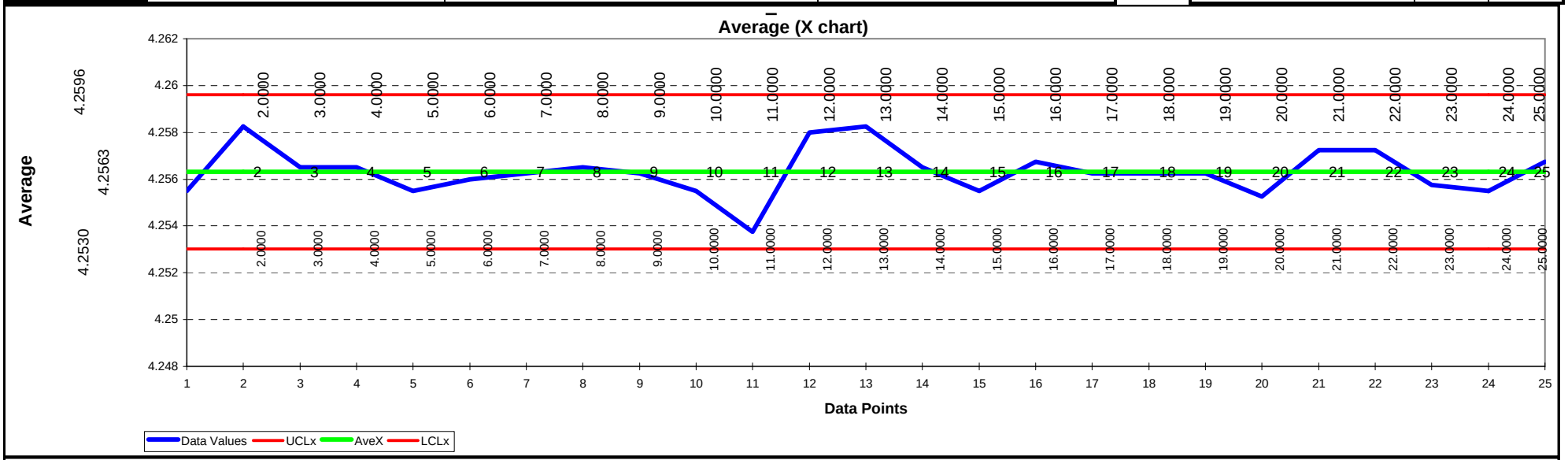
(●) Two sided spec (bilateral) ( ) One sided (MIN) ( ) One sided (MAX)

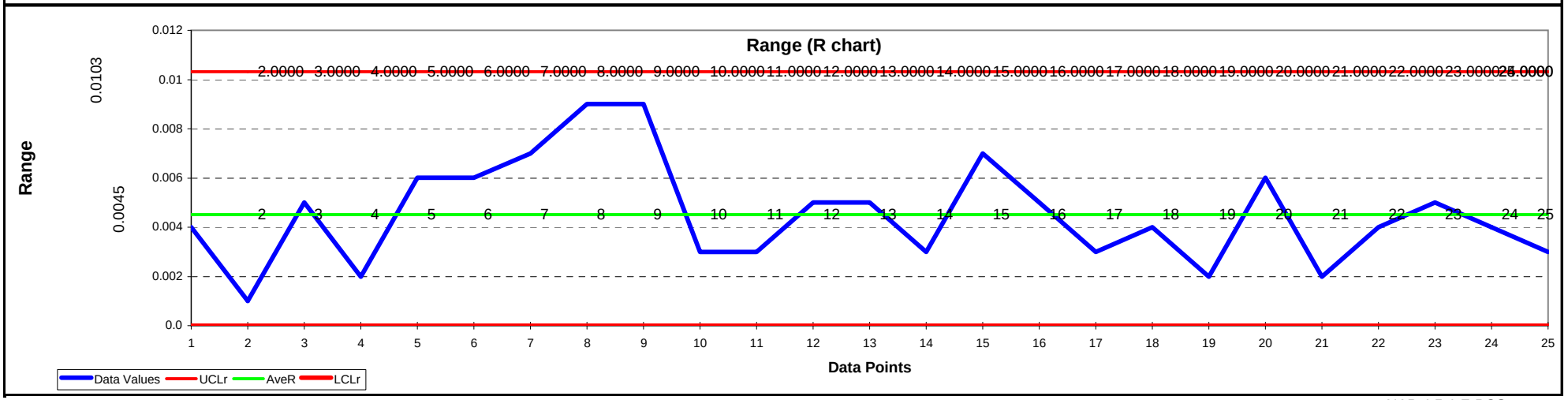
Number of readings per subgroup: 4

LOCATION / PART / TOOL / DIMENSION						
Plant	FCI Mt. Union			Dept:	Q.C.	Date: 9/1102009
Part number:	F8VB-14474-BA		Part description	2.8mm APEX Female Terminal		
Drawing number	F8VB-14474-AA		Eng. chg. level	AA6 Prel		
Tool number	D-471 G		# Cavities	N/A		
Description	Box Width			Units	mm	
Spec	4.250	Plus	0.005	Minus	0.005	
Lwr Spec	4.200	Nominal	4.25	Upr Spec	4.300	

PROCESS INFORMATION

Significant trends of data points:		X̄ Chart	R Chart
Increasing	RUN LENGTH	4	4
	HOW MANY RUNS	1	1
Decreasing	RUN LENGTH	4	3
	HOW MANY RUNS	1	2
Out of control limits		0	0
Consecutive data points above avg.		3	5
Consecutive data points below avg.		4	3





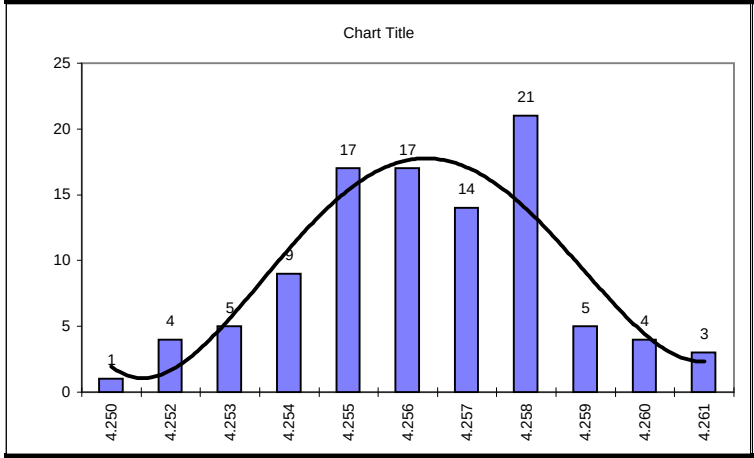
PROCESS CAPABILITY CERTIFICATION REPORT

PROCESS IS CAPABLE

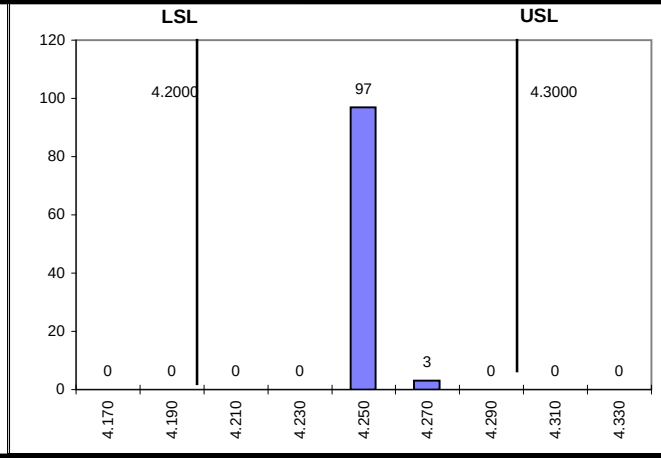
LOCATION	Plant	FCI Mt. Union		Dept:	Q.C.	Date: 9/10/2009
PART	Part number:	F8VB-14474-BA	Part description	2.8mm APEX Female Terminal		
	Drawing number	F8VB-14474-AA	Eng. chg. level	AA6 Prel		
TOOL	Tool number	D-471 G	# Cavities	N/A		
DIMENSION	Description	Box Width		Units	mm	
	Spec	4.250	Plus	0.005	Minus	0.005
	Lwr Spec	4.200	Nominal	4.25	Upr Spec	4.300

DESCRIPTIVE STATISTICS	VALUES
Number of readings	100
Lower spec limit (LSL)	4.2000
Nominal	0.0000
Upper spec limit (USL)	4.3000
Total sum	425.6320
Average readings ($\bar{x}$)	4.2563
Maximum	4.2620
Minimum	4.2510
Readings below LSL	0
Readings above USL	0
Average Range (R)	0.0045
D_2 Value n = 4	2.0590
Upper capability index (CPU)	6.6325
Lower capability index (CPL)	8.5518
Capability index (C_p)	7.5922
Process Capability (C_{pk})	**6.6325**
Capability ratio (CR)	0.1317
Std Deviation (n-1)	0.0022
Std Deviation (n)	0.0022
Variance (n-1)	0.0000
Variance (n)	0.0000
Performance index (P_P)	7.6512
Performance ratio (PR)	0.1307
Performance index (P_{pk})	**6.6841**

HISTOGRAM WITHOUT LIMITS



HISTOGRAM WITH LIMITS



SUBGROUPS

	n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
READINGS	1	**4.255**	**4.259**	**4.255**	**4.256**	**4.253**	**4.252**	**4.26**	**4.253**	**4.261**	**4.255**	**4.252**	**4.258**	**4.261**	**4.258**	**4.256**	**4.257**	**4.255**	**4.256**	**4.256**	**4.254**
	2	**4.254**	**4.258**	**4.26**	**4.256**	**4.259**	**4.256**	**4.256**	**4.256**	**4.252**	**4.256**	**4.255**	**4.259**	**4.259**	**4.256**	**4.258**	**4.26**	**4.258**	**4.258**	**4.255**	**4.252**
	3	**4.258**	**4.258**	**4.256**	**4.256**	**4.256**	**4.258**	**4.256**	**4.262**	**4.254**	**4.257**	**4.253**	**4.26**	**4.257**	**4.255**	**4.251**	**4.255**	**4.257**	**4.254**	**4.257**	**4.258**
	4	**4.255**	**4.258**	**4.255**	**4.258**	**4.254**	**4.258**	**4.253**	**4.255**	**4.258**	**4.254**	**4.255**	**4.255**	**4.256**	**4.257**	**4.257**	**4.255**	**4.255**	**4.257**	**4.257**	**4.257**
Average		4.2555	4.2583	4.2565	4.2565	4.2555	4.256	4.2563	4.2565	4.2563	4.2555	4.2538	4.258	4.2583	4.2565	4.2555	4.2568	4.2563	4.2563	4.2563	4.2553
Range		0.004	0.001	0.005	0.002	0.006	0.006	0.007	0.009	0.009	0.003	0.003	0.005	0.005	0.003	0.007	0.005	0.003	0.004	0.002	0.006

NOTES

	n	21	22	23	24	25
READINGS	1	**4.257**	**4.255**	**4.258**	**4.256**	**4.257**
	2	**4.258**	**4.258**	**4.254**	**4.254**	**4.258**
	3	**4.258**	**4.257**	**4.253**	**4.254**	**4.255**
	4	**4.256**	**4.259**	**4.258**	**4.258**	**4.257**
Average		4.2573	4.2573	4.2558	4.2555	4.2568
Range		0.002	0.004	0.005	0.004	0.003

MSA STUDIES
(Gage R & R's)

FCI AUTOMOTIVE NORTH AMERICA
11823 Lenape Drive
Mount Union, Pennsylvania 17066

To whom it may concern:

General gauging equipment, such as calipers, micrometers, OMIS and drop indicators are used to measure many different characteristics for the parts FCI manufacture.

The GR&R study submitted may be applicable to all parts measured with them, not necessarily a particular P/N for which paper work has been submitted for PPAP. The purpose of the GR&R is to determine how accurate and repeatable the gage is independently of what part number we are utilizing for the study.

FCI MVL Division – 28100 Cabot Drive – Suite 100 – Novi, MI 48377 – Tel : 248 592 2700 – Fax : 248 592 2701

FCI USA, Inc
Automotive Division
MSA Study

9/11/2009

Study Date: 9/11/2009
Gage ID: AU-005-CAL
Gage Desc: 4" Caliper
Appraisers: 3 Trials: 3
Study Type: Long-AIAG
☑ Approved

Company Part No.: 54001839
Part No.:
Part Desc: 2.8mm ApexFemale Terminal
Characteristic: Cond. Grip Width
Specification Limits: Min 2.8 Max 3.0
6 Sigma Process Variation: 0.2
Study Variation: 0.002521

	Appr A: Judy Haskell			Appr B: Debbie Yates			Appr C: Tiffani States			
1	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	
2	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	
3	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.9	2.89	*
4	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	
5	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	
6	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	
7	2.9	2.9	2.9	2.89	2.9	2.9 *	2.9	2.9	2.89	*
8	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	
9	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	
10	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	

		% Contribution	% TV	% Tol		
Repeatability (EV)	0.000591	0.03%	1.8%	1.8%	R bar	0.001000
Reproducibility (AV)	0.000137	0.00%	0.4%	0.4%	UCL-R	0.002580
Appraiser x Part (INT)						
GRR	0.000606	0.03%	1.8%	1.8%		
Part-to-Part (PV)	0.033328	99.97%	100.0%	100.0%		
Total Variation (TV)	0.033333			number of distinct categories		77.484012

* Limit of individual R's (range values). An (*) is used to identify those sets of measurements that have a Range value that exceeds the UCL-R limit value. Correct by repeating those readings using the same appraiser and part or discard the values and recalculate the study results and the value UCL-R.

Comments:

APPROVED BY: Haskell DATE: 9/11/09

FCI USA, Inc
Automotive Division
MSA Study

9/22/2009

Study Date: 9/22/2009
Gage ID: AU-020-MIC
Gage Desc: 0-1" Digital Micrometer
Appraisers: 3 **Trials:** 3
Study Type: Long-AIAG
☑ **Approved**

Company Part No.: AU-020-MIC
Part No.:
Part Desc: 2.8mm Male Terminal Blade
Characteristic: Blade Thickness
Specification Limits: Min 0.79 Max 0.84
6 Sigma Process Variation:
Study Variation: 0.000774

	Appr A:	Debbie Yates		Appr B:	Donna Zaorski		Appr C:	Angie Holmes	
1	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
2	0.81	0.811	0.811	0.81	0.811	0.811	0.811	0.81	0.811
3	0.811	0.811	0.812	0.81	0.811	0.81	0.81	0.811	0.811
4	0.812	0.812	0.81	0.811	0.812	0.81	0.81	0.811	0.811
5	0.811	0.812	0.811	0.812	0.81	0.811	0.811	0.81	0.81
6	0.812	0.811	0.811	0.81	0.81	0.811	0.811	0.81	0.81
7	0.812	0.812	0.812	0.811	0.811	0.811	0.811	0.812	0.812
8	0.81	0.811	0.812	0.812	0.812	0.812	0.812	0.811	0.81
9	0.812	0.812	0.811	0.812	0.811	0.812	0.812	0.811	0.811
10	0.81	0.81	0.811	0.811	0.81	0.811	0.811	0.81	0.81

		% Contribution	% TV	% Tol		
Repeatability (EV)	0.000571	54.49%	73.8%	6.9%	**R bar**	0.000967
Reproducibility (AV)	0.000181	5.50%	23.4%	2.2%	**UCL-R**	0.002494
Appraiser x Part (INT)						
GRR	**0.000599**	**59.99%**	**77.5%**	**7.2%**		
Part-to-Part (PV)	0.000489	40.01%	63.3%	5.9%		
Total Variation (TV)	0.000774			**number of distinct categories**		1.151528

* Limit of individual R's (range values). An (*) is used to identify those sets of measurements that have a Range value that exceeds the UCL-R limit value. Correct by repeating those readings using the same appraiser and part or discard the values and recalculate the study results and the value UCL-R.

Comments:

APPROVED BY: Debbie Yates **DATE:** 9/22/09

FCI USA, Inc
Automotive Division
MSA Study

Study Date: 8/19/2009
Gage ID: AU-2029-OMS
Gage Desc: OMIS
Appraisers: 3 **Trials:** 3
Study Type: Long-AIAG
Approved

Company Part No.: Master Gage Blocks
Part No.:
Part Desc: Optical Measuring System
Characteristic: Gage Block Width
Specification Limits: Min 6.30 Max 6.50
6 Sigma Process Variation:
Study Variation: 0.018607

	Appr A: Mary Hanes			**Appr B:** Tiffani States			**Appr C:** Debbie Yates		
1	6.403	6.402	6.404	6.404	6.405	6.406	6.408	6.407	6.405
2	6.432	6.439	6.431	6.434	6.435	6.435	6.439	6.435	6.437
3	6.4	6.409	6.404	6.406	6.402	6.403	6.407	6.403	6.404
4	6.4066	6.4	6.403	6.407	6.409	6.399	6.405	6.407	6.402
5	6.395	6.399	6.397	6.393	6.397	6.395	6.399	6.398	6.398
6	6.4	6.397	6.394	6.401	6.394	6.393	6.405	6.402	6.403
7	6.405	6.403	6.407	6.403	6.404	6.406	6.406	6.401	6.408
8	6.395	6.396	6.397	6.394	6.393	6.399	6.398	6.403	6.405
9	6.455	6.454	6.451	6.455	6.456	6.458	6.456	6.457	6.454
10	6.396	6.398	6.395	6.391	6.397	6.395	6.4	6.404	6.401

		% Contribution	**% TV**	**% Tol**		
Repeatability (EV)	0.002690	2.09%	14.5%	8.1%	**R bar**	0.004553
Reproducibility (AV)	0.001479	0.63%	8.0%	4.4%	**UCL-R**	0.011748
Appraiser x Part (INT)						
GRR	**0.003070**	**2.72%**	**16.5%**	**9.2%**		
Part-to-Part (PV)	0.018352	97.28%	98.6%	55.1%		
Total Variation (TV)	0.018607			**number of distinct categories**		8.428382

* Limit of individual R's (range values). An (*) is used to identify those sets of measurements that have a Range value that exceeds the UCL-R limit value. Correct by repeating those readings using the same appraiser and part or discard the values and recalculate the study results and the value UCL-R.

Comments:

APPROVED BY:_Debbie Yates_____ DATE:___8/19/2009_____

FCI USA, Inc
Automotive Division
Attribute Risk Analysis Study

12/10/2009

Study Date: 12/10/2009
Gage ID: AUD-471-B
Gage Desc: D471 Window Loc.
☑ Approved
Pass Value: 1
Fail Value: 0

Company Part No.: 54001208
Part No.:
Part Desc:
Upper Limit: 2
Lower Limit: 0
GRR:

Appraiser A: Judy H
Appraiser B: Debbie Y
Appraiser C: Angie

	A			B			C			Reference			Appraiser
	1	2	3	1	2	3	1	2	3	Decision	Value	Code	Signal
1	1	1	1	1	1	1	1	1	1	1	1	in	in
2	1	1	1	1	1	1	1	1	1	1	1	in	in
3	1	1	1	1	1	1	1	1	1	1	1	in	in
4	1	1	1	1	1	1	1	1	1	1	1	in	in
5	1	1	1	1	1	1	1	1	1	1	1	in	in
6	1	1	1	1	1	1	1	1	1	1	1	in	in
7	1	1	1	1	1	1	1	1	1	1	1	in	in
8	1	1	1	1	1	1	1	1	1	1	1	in	in
9	1	1	1	1	1	1	1	1	1	1	1	in	in
10	1	1	1	1	1	1	1	1	1	1	1	in	in
11	1	1	1	1	1	1	1	1	1	1	1	in	in
12	1	1	1	1	1	1	1	1	1	1	1	in	in
13	1	1	1	1	1	1	1	1	1	1	1	in	in
14	1	1	1	1	1	1	1	1	1	1	1	in	in
15	1	1	1	1	1	1	1	1	1	1	1	in	in
16	1	1	1	1	1	1	1	1	1	1	1	in	in
17	1	1	1	1	1	1	1	1	1	1	1	in	in
18	1	1	1	1	1	1	1	1	1	1	1	in	in
19	0	0	0	0	0	0	0	0	0	1	0	in	out
20	1	1	1	1	1	1	1	1	1	1	1	in	in
21	1	1	1	1	1	1	1	1	1	1	1	in	in

APPROVED BY: JHaskell DATE: 12/10/09

False positive (appraiser biased toward acceptance				0	0	0
Mixed				0	0	0
95% UCL				99.5%	99.5%	99.5%
Effectiveness	100.0%	100.0%	100.0%	96.0%	96.0%	96.0%
95% LCL	92.9%	92.9%	92.9%	86.3%	86.3%	86.3%

	System % Effective Score Appraiser vs. Each Other	System % Effective Score vs. Reference All Appraisers vs. Reference
Total Inspected	50	50
# Matched	50	48
95% UCL		99.5%
Effectiveness	100.0%	96.0%
95% LCL	92.9%	86.3%

Comments:

APPROVED BY:_____ DATE:_____

FCI USA, Inc
Automotive Division
Attribute Risk Analysis Study

9/18/2009

Study Date: 9/16/2009
Gage ID: AUD-471-C2
Gage Desc: D471 Box Gage "A-G" Go/NoGo
☑ Approved
Pass Value: 1
Fail Value: 0

Company Part No.: F8VB-14474-AA
Part No.:
Part Desc:
Upper Limit: 1
Lower Limit: 0
GRR:

Appraiser A: Debbie Yates **Appraiser B:** Donna Zaorski **Appraiser C:** Mary Hanes

	A			B			C			Reference			Appraiser
	1	2	3	1	2	3	1	2	3	Decision	Value	Code	Signal
1	1	1	1	1	1	1	1	1	1	1	1	in	in
2	1	1	1	1	1	1	1	1	1	1	1	in	in
3	1	1	1	1	1	1	1	1	1	1	1	in	in
4	1	1	1	1	1	1	1	1	1	1	1	in	in
5	1	1	1	1	1	1	1	1	1	1	1	in	in
6	1	1	1	1	1	1	1	1	1	1	1	in	in
7	1	1	1	1	1	1	1	1	1	1	1	in	in
8	1	1	1	1	1	1	1	1	1	1	1	in	in
9	1	1	1	1	1	1	1	1	1	1	1	in	in
10	1	1	1	1	1	1	1	1	1	1	1	in	in
11	1	1	1	1	1	1	1	1	1	1	1	in	in
12	1	1	1	1	1	1	1	1	1	1	1	in	in
13	1	1	1	1	1	1	1	1	1	1	1	in	in
14	1	1	1	1	1	1	1	1	1	1	1	in	in
15	1	1	1	1	1	1	1	1	1	1	1	in	in
16	1	1	1	1	1	1	1	1	1	1	1	in	in
17	1	1	1	1	1	1	1	1	1	1	1	in	in
18	0	0	0	0	0	0	0	0	0	1	0	in	out
19	1	1	1	1	1	1	1	1	1	1	1	in	in
20	1	1	1	1	1	1	1	1	1	1	1	in	in
21	1	1	1	1	1	1	1	1	1	1	1	in	in

APPROVED BY: Debbie Yates DATE: 9/16/09

22	1	1	1	1	1	1	1	1	1	1	1	in	in
23	1	1	1	1	1	1	1	1	1	1	1	in	in
24	1	1	1	1	1	1	1	1	1	1	1	in	in
25	1	1	1	1	1	1	1	1	1	1	1	in	in
26	1	1	1	1	1	1	1	1	1	1	1	in	in
27	1	1	1	1	1	1	1	1	1	1	1	in	in
28	1	1	1	1	1	1	1	1	1	1	1	in	in
29	1	1	1	1	1	1	1	1	1	1	1	in	in
30	1	1	1	1	1	1	1	1	1	1	1	in	in
31	1	1	1	1	1	1	1	1	1	1	1	in	in
32	1	1	1	1	1	1	1	1	1	1	1	in	in
33	0	0	0	0	0	0	0	0	0	1	0	in	out
34	1	1	1	1	1	1	1	1	1	1	1	in	in
35	1	1	1	1	1	1	1	1	1	1	1	in	in
36	1	1	1	1	1	1	1	1	1	1	1	in	in
37	1	1	1	1	1	1	1	1	1	1	1	in	in
38	1	1	1	1	1	1	1	1	1	1	1	in	in
39	1	1	1	1	1	1	1	1	1	1	1	in	in
40	1	1	1	1	1	1	1	1	1	1	1	in	in
41	1	1	1	1	1	1	1	1	1	1	1	in	in
42	1	1	1	1	1	1	1	1	1	1	1	in	in
43	1	1	1	1	1	1	1	1	1	1	1	in	in
44	1	1	1	1	1	1	1	1	1	1	1	in	in
45	1	1	1	1	1	1	1	1	1	1	1	in	in
46	1	1	1	1	1	1	1	1	1	1	1	in	in
47	1	1	1	1	1	1	1	1	1	1	1	in	in
48	1	1	1	1	1	1	1	1	1	1	1	in	in
49	1	1	1	1	1	1	1	1	1	1	1	in	in
50	1	1	1	1	1	1	1	1	1	1	1	in	in

Effectiveness

	% Appraiser Appraiser vs. Self			% Score vs. Attribute Appraiser vs. Reference		
Appraiser	A	B	C	A	B	C
Total Inspected	50	50	50	50	50	50
# Matched	50	50	50	48	48	48
False negative (appraiser biased toward rejection)				2	2	2

APPROVED BY:_____ DATE:_____

False positive (appraiser biased toward acceptance				0	0	0
Mixed				0	0	0
95% UCL				99.5%	99.5%	99.5%
Effectiveness	100.0%	100.0%	100.0%	96.0%	96.0%	96.0%
95% LCL	92.9%	92.9%	92.9%	86.3%	86.3%	86.3%

	System % Effective Score Appraiser vs. Each Other	System % Effective Score vs. Reference All Appraisers vs. Reference
Total Inspected	50	50
# Matched	50	48
95% UCL		99.5%
Effectiveness	100.0%	96.0%
95% LCL	92.9%	86.3%

Comments:

APPROVED BY: Debbie Yates DATE: 9/16/09

Insertion/Removal Force tester (Force Gage Tester) Gage R & R deemed Not Applicable due to Destructive Process. Calibration record provided in lieu of Gage R &R.

FCI USA, Inc
Automotive Division
11823 Lenape Drive

Mount Union,PA 17066

Certificate of Calibration

Print Date 7/14/2009 **Certificate Number: (None)**

Gage ID	AU-2076-FG	**Approved**	Yes
Gage S/N	143759	**As Found Condition**	In
Description	Force Gage - 11 lbs & Controller	**Uncertainty**	
Asset No.		**Coverage Factor k**	
Model No.	Imada Z2-11	**Deg. of Freedom (DF)**	
Unit of Meas.	Lbs/Newtons/oz/kg/g	**NIST No.**	
Manufacturer	IMADA	**Customer Info.**	
Cal. Date	7/14/2009		
Next Due	7/30/2010		
Cal. Freq.	12.00 EOM		
Location	Automotive Stamping Insp Area		

Certification Statement

It is hereby certified that the above described instrument conforms to the original manufacturer's specifications and has been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology within the limitations of the Institute Calibration Services or have been derived from accepted values of natural physical constants or have been derived by the ratio type of self calibration techniques. Our calibration system satisfies ISO-9000, QS-9000 and the ANSI Z-540 requirements.

Findings

Environmental Conditions

Temperature	
Humidity	
Pressure	
Other	

Standard ID / Gage ID of Standard	Minimum Uncertainty	Nominal Units	Maximum Type	Before / After	Accuracy / Accuracy	Fail Before / Fail After
2.00 lbs	1.98	2	2.02	1.99	-0.01	No
		.02 lbs	V	1.99	-0.01	No
4.00 lbs	3.96	4	4.04	3.98	-0.02	No
		.04 lbs	V	3.98	-0.02	No
7.00 lbs	6.93	7	7.07	7	0	No
		.07 lbs	V	6.97	-3.0000000000	No
9.00 lbs	8.91	9	9.09	9	0	No
		.09 lbs	V	8.97	-2.9999999999	No

Calibrated By Debbie Yates Date 7/14/09

Approved By _____ Date _____

FCI USA, Inc
Automotive Division
11823 Lenape Drive

Mount Union,PA 17066

Certificate of Calibration

Print Date 7/22/2009 **Certificate Number: (None)**

Gage ID	AUD-471-A2	**Approved**	Yes
Gage S/N	D-471	**As Found Condition**	In
Description	2.80 mm Terminal Blade	**Uncertainty**	
Asset No.		**Coverage Factor k**	
Model No.		**Deg. of Freedom (DF)**	
Unit of Meas.	IN/MM	**NIST No.**	
Manufacturer	FCI	**Customer Info.**	
Cal. Date	6/12/2009		
Next Due	6/14/2010		
Cal. Freq.	12.00 Months		
Location	Automotive Stamping Insp Area		

Certification Statement

It is hereby certified that the above described instrument conforms to the original manufacturer's specifications and has been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology within the limitations of the Institute Calibration Services or have been derived from accepted values of natural physical constants or have been derived by the ratio type of self calibration techniques. Our calibration system satisfies ISO-9000, QS-9000 and the ANSI Z-540 requirements.

Findings

Environmental Conditions

Temperature	
Humidity	
Pressure	
Other	

Standard ID / Gage ID of Standard	Minimum / Uncertainty	Nominal / Units	Maximum / Type	Before / After	Accuracy / Accuracy	Fail Before / Fail After
0.80 mm	0.775	0.8	0.825	0.8	0	No
			V	0.8	0	No
2.80 mm	2.775	2.8	2.825	2.76	-0.04	Yes
			V	2.76	-0.04	Yes

Calibrated By Debbie Yates (jh) **Date** 6/12/09

Approved By _____ **Date** _____

PROCESS FLOW DIAGRAMS

FCI AUTOMOTIVE NORTH AMERICA
11823 Lenape Drive
Mount Union, Pennsylvania 17066

F.C.I. AUTOMOTIVE - North America
PROCESS FLOW DIAGRAM

TOOL NUMBER	D471		
FCI PART NUMBER	SEE LISTING	**ORIGINATOR**	Steve Griffn
CUSTOMER PART NUMBER	SEE LISTING	**ISSUE DATE (ORG.)**	1/21/2004
PART CHANGE LEVEL		**REVISED BY**	Paul Smithmyer
PART DESCRIPTION	Terminal Wire Snap on Female (2.80mm Apex)	**REVISION DATE**	3/31/2008
DOCUMENT REV.	E	**MFG. ENG. MGR. APPROVAL**	Richard Lovett

ITEM #	EVENT	DESCRIPTION	CONTROL CHARACTERISTIC	# OF OPER.
10		Raw material is received at warehouse dock.	Receiving job instructions.	1
20		Shipper is verified against order in MFGPro.	Receiving job instructions.	1
30		Raw material is unloaded and moved to hold area.	Material handler job instructions.	1
40		Receiving Inspection - Raw material certifications are compared to Fci master material certifications.	Receiving job instructions.	1
50		Raw material is assigned a lot number.	Receiving job instructions.	1
60		Approved raw material is moved to warehouse storage racks.	Material handler job instructions.	1
70		Raw material is stored until needed.	Raw material tag.	1
80		Raw material and packaging is moved to stamping press when needed.	Material handler job instructions.	1
90		Setup and preparation of press, die, and necessary equipment per die book and associated documentation.	Operator and setup job instructions.	1
100		Setup personnel produce first piece samples .	Operator and setup job instructions.	1
110		First piece inspection - Setup personnel (and/or auditor) inspects product per control plan and attain proper labels once part meets control plan criteria.	Operator job instructions and Control Plan.	1
120		Parts are produced in strip form.	Operator job instructions.	1
125		Parts are Greased (See Print for P/N and specification)	Operator job instructions and Control Plan.	1

127	Inspection of Force, Box and Grip Width; Signature System (S&S System)	Operator job instructions and Control Plan.	1
130	Product is wound onto pancake reels.	Operator job instructions.	1
140	Press operator collects samples from each reel.	Operator job instructions and Control Plan.	1
150	In-process inspection - Press operator performs in-process inspection per control plan.	Operator job instructions and Control Plan.	1
160	Press operator labels each reel with bar code labels.	Operator job instructions.	1
170	Final inspection - Floor inspector performs final inspection per control plan.	Operator job instructions and Control Plan.	1
180	Reels are packed into cartons and sealed. Carton labels are applied. ID stamps are applied by operator and lead person	Operator job instructions.	1
190	Cartons are moved to staging area.	Material handler job instructions.	1
200	Product is registered as 'Finished Goods' in MFGPro.	Material handler job instructions.	1
210	Parts are moved to warehouse storage racks.	Material handler job instructions.	1
220	Product is stored until needed (ordered) by customer.	Box Labels, Warehouse Inventory Location	1
230	Package customer order / ship.	Customer Order, Shipper	1

GENERIC FLOW DIAGRAM

F.C.I. AUTOMOTIVE - North America

PROCESS FLOW DIAGRAM - STAMPING

TOOL NUMBER	**D-XXX (See Listing)**		
FCI PART NUMBER	**SEE LISTING**	**ORIGINATOR**	**Eriq Frommert**
CUSTOMER PART NUMBER	**SEE LISTING**	**ISSUE DATE (ORG.)**	**12/2/1997**
PART CHANGE LEVEL	**SEE LISTING**	**REVISED BY**	
PART DESCRIPTION	**Stamped Terminal**	**REVISION DATE**	
DOCUMENT REV.	**D-2**	**MFG. ENG. MGR. APPROVAL**	**Tim Luke**

Operation | Transportation | Inspection | Storage

ITEM #	EVENT	DESCRIPTION	CONTROL CHARACTERISTIC	# OF OPER.
10	Transportation	Receive raw material at warehouse dock.	Shipper / Invoice	1
20	Inspection	Shipper is verified against order in MFG Pro Database.	Shipper / Invoice	1
30	Transportation	Material is unloaded and moved to raw material receiving area.	Material Identification Code	1
40	Inspection	Receiving inspection - Material certifications are compared to master material specifications.	Inspection Instruction Sheets / Master Material Sheets	1
50	Operation	Raw material is assigned a lot number.	Material Identification Tag / Hold Tag	1
60	Transportation	Approved material is moved to warehouse storage racks.	Material Identification Tag / Hold Tag	1
70	Storage	Raw material is stored until needed.	Material Identification Tag / Hold Tag	1
80	Transportation	Raw material and packaging is moved to stamping press when needed.	Material Identification Tag / Hold Tag	1
90	Operation	Set up and preparation of press, dies and necessary equipment per die book and associated documentation.	Work Order, Set-up Sheet, Job Instructions	1
100	Operation	Set up personnel produce first piece samples.	Work Order, Set-up Sheet, Job Instructions	1
110	Inspection	First piece inspection - Set up personnel (and/or auditor) inspects product per control plan and attain proper labels once parts meet control plan criteria.	Control Plan, Inspections Log sheet, Job Instructions	1
120	Operation	Production parts are produced using high speed progressive die and press.	Work order, Set-up Sheet, Job Instructions	1
130	Operation	Product is placed into appropriate packaging.	Set-up Sheet, Job Instructions	1
140	Transportation	Press operator collects production samples.	Job Instructions	1
150	Inspection	In-Process inspection - Press operator performs in-process inspection per control plan.	Control Plan, Inspection Sheets	1

F.C.I. AUTOMOTIVE - North America

PROCESS FLOW DIAGRAM - STAMPING

TOOL NUMBER	**D-XXX (See Listing)**		
FCI PART NUMBER	**SEE LISTING**	**ORIGINATOR**	**Eriq Frommert**
CUSTOMER PART NUMBER	**SEE LISTING**	**ISSUE DATE (ORG.)**	**12/2/1997**
PART CHANGE LEVEL	**SEE LISTING**	**REVISED BY**	
PART DESCRIPTION	**Stamped Terminal**	**REVISION DATE**	
DOCUMENT REV.	**D-2**	**MFG. ENG. MGR. APPROVAL**	**Tim Luke**


Operation


Transportation


Inspection


Storage

ITEM #	EVENT	DESCRIPTION	CONTROL CHARACTERISTIC	# OF OPER.
160		Press operator labels each container with bar code labels.	Job Instructions	1
170		Final Inspection - Auditor performs final inspection per control plan.	Control Plan, Inspection Sheets	1
180		Each container is packed into exterior cartons and sealed. Carton labels are applied. ID stamps are applied.	Set-up Sheet	1
190		Cartons are moved to staging area.	Job Instructions, Carton Labels	1
200		Product is registered as finished goods in MFG Pro Database.	Job Instructions, Carton Labels	1
210		Parts are transferred to warehouse.	Job Instructions, Carton Labels	1
220		Product is stored until needed (ordered) by customer.	Job Instructions, Carton Labels	1
230		Package customer order and ship.	Job Instructions	1

MASTER LIST

MASTER LIST

Drawing Number: F8VB-14474-AA
Drawing Rev. Level: AA2

Originator: Steve Griffin
Org. date: 4/4/2005
Revised By: Jim Fagan
Revision Date: 2/10/2009

FCI Part Number	Customer Part Number
54001018	XF2T-14474-BA
54001220	XL3T-14474-CA
54001221	4L3T-14474-CA
54001318	YFIT-14474-CA
54001431	F8VB-14474AA
54001432	XL3T-14474-AA
54001439	4L3T-14474-AA
54001448	9U5T-14474-JA
54001839	F8VB-14474BA
54001840	XL3T-14474-DA
54002231	XF2T-14474-CA
54001227	7L7T-14474-EA
54001876	8U5T-14474-GA
54001879	9U5T-14474-KA

PFMEA Proprietary

Attention: Customer,

Legally, FCI is restricted from providing proprietary information to non-tool owner, or non-design owner third parties. FCI stands behind the quality of products supplied and, as an OEM recognized self certified supplier, have been rewarded for our quality achievements. Per AIAG requirements, all level 3 PPAP documentation is kept on file at FCI for customer review. Proprietary documents may be reviewed, but not submitted to third party customers.

Non-tool owner PPAP submission includes requirements indicated per the AIAG PPAP manual with the exception of the following proprietary documents: FMEA (including Design & Process) and Tooling drawing.

Thank you,

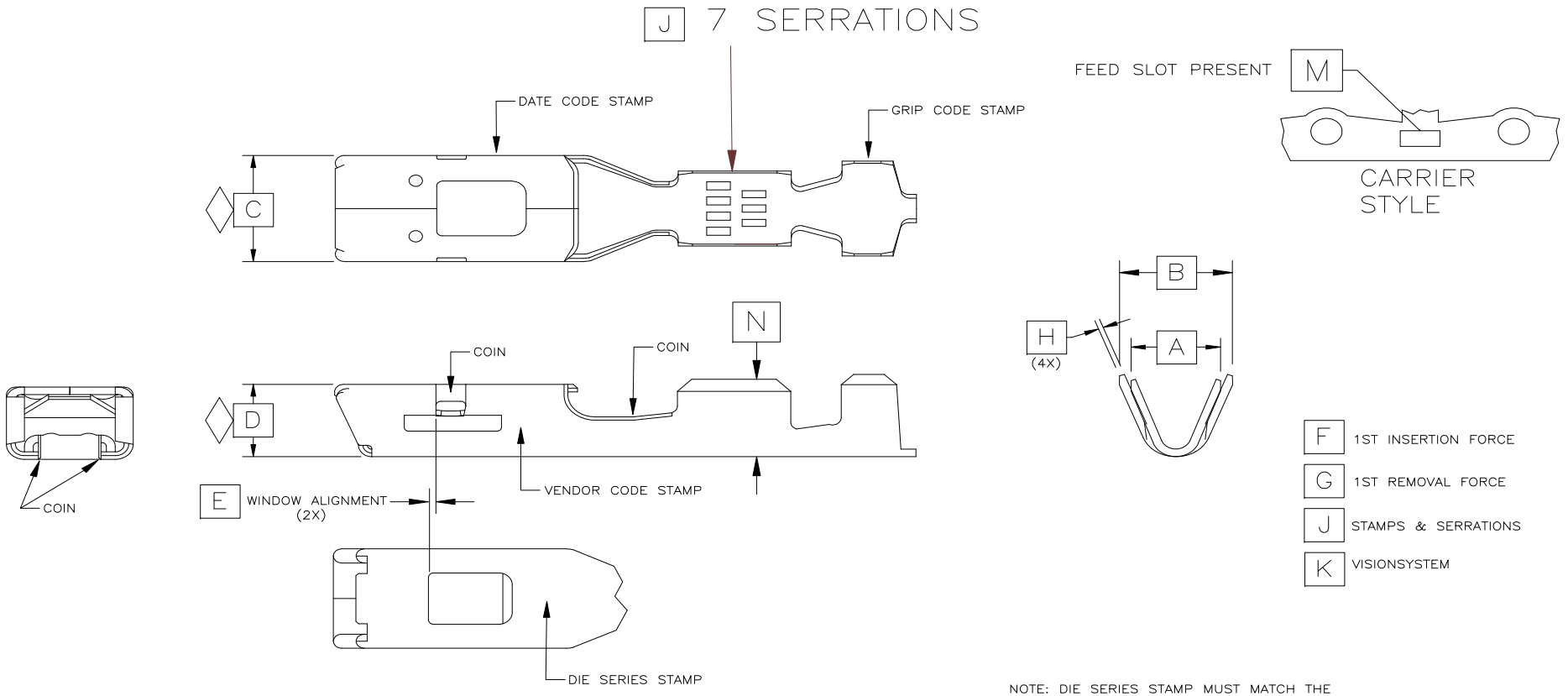
Kathy Sweeney

Kathy Sweeney
Group Lab Supervisor

FCI Automotive Division – 28100 Cabot Drive – Suite 100 – Novi, MI 48377 – Tel : 248 592 2700 – Fax : 248 592 2701

DFMEA Proprietary

PRODUCTION FLOOR INSPECTION DRAWING



NOTE: DIE SERIES STAMP MUST MATCH THE LETTER OF THE DIE PARTS ARE PRODUCED FROM

◇ INDICATES SPC DIMENSION

L– APPEARANCE; FREE OF VISUAL DEFECT & BURRS< 0.025mm

			This drawing / design and all other information contained thereon is proprietary and the property of FCI USA INC. and may not be copied, reproduced or disclosed to any party without the express written permission of FCI USA Inc.	**Description:** Terminal Wire Snap on Female (2.8mm APEX)	
				Drwn By: C. Tavera	**Part No.** **F8VB-14474-BA**
AA2	09/09	Updated to current revision.	This document is controlled electronicaly. When printed it becomes an uncontrolled copy.	**Date:** 9/29/05	
PCL:	**Date:**	**Revisions:**	**FCI Automotive Inc.** 1183 Lenape Dr. Mt. Union, PA 17066	**File Name:** 1211-INSP	**Assy. - A-XXX~X Die - D-471 Mold - M-xxx**

This drawing good for 2 weeks from effective date.

Effective date: 2/11/2010

PRODUCTION FLOOR INSPECTION

Stamping Inspection Sheet - Expires On:

FCI Part No. :	Customer Part No.:	Material Lot No.	MATERIAL:	47121/ 47129	Revised By:	Doc. Rev.:
54001839	F8VB-14474-BA		Qty:		J. Haskell	11

Part ID :	Manufacturing Lot No.	Press No.:	Die No.	Print Rev. Level	SPC Frequency	Rev. Date:
Terminal Wire Snap on Female (2.80mm APEX)			D - 471	AA2	Sample 3Pc 2X Shift	9/18/2009

Attribute & Variable Gages Needed	Significant Control Symbols
Caliper / Micrometer	(K) = Control Characteristic
Omis / Microscope	◇ = Critical Char. (SPC)
Force Gage / Gage AUD-471-A#	Gage AUD-471-C# / Gage AUD-471-B

MM	x	INCH	

Special Instructions

1.) Record all Process Changes on Inspection Sheet
2.) Record All Material Lot Changes on Inspection Sheet (Indicate Reel No. Change Occurred At)
3.) Reference Visual Inspection Drawing for Detailed Information for Visual Inspection N/A
4.) Reference Final Inspection Drawing for Detailed Information for Dim. Location
5.) Reference SPC Test Plan for Detailed Information for SPC Measurements
6.) Check 2 pcs. Min. (1 at 1st half of shift plus 1 at 2nd half of shift) and/or every 25th reel
7.) Complete Set-Up / Changeover Sheet, must submit to Supervision

Significant Characteristic	Appearance	Correct Labels	Cond. Grip Width	Ins. Grip Width	Box Width	Box Height	Window Location	1st Insertion Force	1st Removal Force	Cond & Ins Grip Coin Width (4x)	Serrations / Stamps	Vision System	Feed Slot	Cond. Grip Height			
Signif. Char.					SPC◆	SPC◆	(K)	(K)	(K)								
Instrument	Mantis / Microscope	Visual	Caliper	Caliper	Mics / Gage AUD-471-C#	Mics / Gage AUD-471-C#	Omis / Gage AUD-471-B	Force Gage & Gage AUD-471-A#	Force Gage & Gage AUD-471-A#	Omis	Visual	Visual	Visual	Caliper			
Insp. Letter	L	SA	A	B	C	D	E	F	G	H	J	K	M	N			
Specification / **Date / Reel**	**No Visual Defects / No Burrs greater than 0.025mm**	**Correct Box / Reel Labels**	**2.70 / 3.30**	**3.50 / 4.10**	**4.20 / 4.30**	**2.80 / 3.0**	**Inline within ± 0.20**	**2.85 / 4.50 N**	**2.20 N Min.**	**0.1 0 / 0.2**	**7 / FCI, Date, Die, 18**	**Working & In Use**	**Present**	**3.05 (REF.)**	**Overall Part Acceptance**		**Inspected By/Time:**
															Accept		
															Reject		
															Accept		
															Reject		
															Accept		
															Reject		
															Accept		
															Reject		
															Accept		
															Reject		
															Accept		
															Reject		
															Accept		
															Reject		
															Accept		
															Reject		

Control Plan

[ ] Prototype [ ] Pre-launch [X] Production		F.C. I. - Control Plan			Control Plan ID : F8VB-14474-BA D-471~Gb.xls		Tool #: D - 471	
FCI Part # : 54001839	Customer Part # : F8VB-14474-BA	Key Contact / Phone : Roger Schaeffer 814-542-5815	Originator: C. Tavera	Org. Date: 3/1/2005	Revised By: J. Haskell	Rev. Date: 9/18/2009	PCL AA2	Doc. Rev. 11
Part ID : Terminal Wire Snap on Female (2.80mm APEX)		Core Team : P Smithmyer (ME) J Kocinski(TE) J Moose (QE)			Customer Eng Approval / Date(if req'd)			
Supplier Plant : Mt. Union, PA	Code: I-785Q	Supplier / Plant Approval; Date:			Customer QA Approval / Date(if req'd)			
Print # F8VB-14474-AA	DCL AA2	Other Approval / Date (if req'd)			Other Approval / Date(if req'd)			

This Control Plan Expires on:

Part Process #	Process Name / Operation Description	Machine, Device Jig, Tools for MFG.	Characteristics #	Characteristics Product	Characteristics Process	Special Class Char.	Methods Product / Process Specification Tolerance	Methods Evaluation Measurement Technique	Methods Sample Size	Methods Sample Freq.	Methods Error-Proofing	Methods Control Method	Reaction Plans and Corrective Actions
110	First Piece Inspection by: Operator Inspector	Stamping Press	SZ		Die is in approved machine, running under approved process		Approved Process / Setup List	Visual		At Start-Up		Attribute and Variables Data per Designated Form, **WQAF0020**(First piece inspection sheet), or **WQAF0044** (Stamping inspection sheet)	Inform Production Supv., Mold Tech, Die Tech. & Quality Auditor. Adjuste and Reset , Isolate Production, per **WQCJ0003**(Containment), **WMEJ0191**(Rework & Sort), **WTSP12**(Disposition of nonconforming product), **WTSP13, WQAJ0045** (Corrective and Preventive Action).
			A to M	**See Part Process #150, 170**					1 Piece	At Start-Up	No		
			SA	Correct Labels			Correct Box / Reel Labels	Visual	All Labels	Every Order	No		
150,170	In-Process / Final Inspection by: Operator Inspector	Stamping Press	A	Cond. Grip Width			2.70 / 3.30	Caliper	1 pc	Every Four (4) Hours	No	Attribute and Variables Data per Designated Form, **WQAF0008**(In-process inspection sheet) , or **WQAF044**(Stamping inspection sheet) & **WTSP 11**(Statistical Techniques)	Inform Production Supv., Mold Tech, Die Tech. & Quality Auditor. Adjust and Reset, Isolate Production, per **WQCJ0003**(Containment), **WMEJ0191**(Rework & Sort), **WTSP12**(Disposition of nonconforming product), **WTSP13, WQAJ0045** (Corrective and Preventive Action).
			B	Ins. Grip Width			3.50 / 4.10	Caliper	1 Piece	Every Four (4) Hours	No		
			C	Box Width		◆	4.20 / 4.30	Mics / Gage AUD-471-C#	3 pcs	Every Four (4) Hours	No		
			D	Box Height		◆	2.80 / 3.0	Mics / Gage AUD-471-C#	3 pcs	Every Four (4) Hours	No		
			E	Window Location		Ⓖ	Inline within ± 0.20	Omis / Gage AUD-471-B	1 Piece	Every Four (4) Hours	No		
			F	1st Insertion Force		Ⓖ	2.85 / 4.50 N	Force Gage & Gage AUD-471-A#	1 Piece	Every 7 Reels (2x)	No	Data per Designated Form **HSF0002**	
			G	1st Removal Force		Ⓖ	2.20 N Min.	Force Gage & Gage AUD-471-A#	1 Piece	Every 7 Reels (2x)	No	Data per Designated Form **HSF0002**	
			H	Cond & Ins Grip Coin Width (4x)			0.1 0 / 0.2	Omis	1 Piece	Every Four (4) Hours	No		
			J	Serrations / Stamps			7 / FCI, Date, Die, 18	Visual	1 Piece	Every Reel Sample	No		
			K	Vision System			Working & In Use	Visual	1 Piece	Every Four (4) Hours	No		
			L	Appearance			No Visual Defects / No Burrs greater than 0.025mm	Mantis / Microscope	1 Piece	Every Reel Sample	No		
			M	Feed Slot			Present	Visual	Every Reel	Every Reel Sample	No		
			N	Cond. Grip Height			3.05 (REF.)	Caliper	1 Piece	Every Order At Start-Up	No		

FOR ALL PROCESSES NOT DETAILED ON THIS CONTROL PLAN SEE THE GENERIC STAMPING CONTROL PLAN WQCF0069

[ ] Prototype [ ] Pre-launch [X] Production	F.C. I. - Control Plan			Control Plan ID : F8VB-14474-BA D-471~Gb.xls		Tool # D - 471	
FCI Part # : 54001839	Customer Part # : F8VB-14474-BA	Key Contact / Phone : Roger Schaeffer 814-542-5815	Originator: C. Tavera	Org. Date: 3/1/2005	Revised By: J. Haskell	Rev. Date: 9/18/2009	PCL AA2 / Doc. Rev. 11
Part ID : Terminal Wire Snap on Female (2.80mm APEX)		Core Team : P Smithmyer (ME) J Kocinski(TE) J Moose (QE)			Customer Eng Approval / Date(if req'd)		
Supplier Plant : Mt. Union, PA	Code: I-785Q	Supplier / Plant Approval; Date:			Customer QA Approval / Date(if req'd)		
Print # F8VB-14474-AA	DCL AA2	Other Approval / Date (if req'd)			Other Approval / Date(if req'd)		

This Control Plan Expires on:

Part Process #	Process Name / Operation Description	Machine, Device Jig, Tools for MFG.	Characteristics			Methods						Reaction Plans and Corrective Actions
			#	Product	Process	Special Class Char.	Product / Process Specification Tolerance	Evaluation Measurement Technique	Sample Size	Sample Freq.	Error-Proofing	Control Method

PCL = Part Change Level/ DOC REV= Revision Number of Document

Generic
Control Plan

This Control Plan refers to the general process for all stamped parts. For details about the inspection process for a particular part number, refer to the Control Plan for that specific part number.

GENERIC Stamping Control Plan

[ ] Prototype [ ] Pre-launch [X] Production		F.C. I. - Control Plan			Control Plan ID : Generic Stamping Control Plan.xls		Tool #: REFER TO SPECIFIC PART #
FCI Part # : REFER TO SPECIFIC PART #	Customer Part # : REFER TO SPECIFIC PART #	Key Contact / Phone : Mt. Union QM (814) 542-5815	Originator: T. Currington	Org. Date: 5/9/2002	Revised By: J. Moose	Rev. Date: 4/15/2008	Document Rev.: 12
Part ID : Generic Stamping Control Plan		Core Team : S. Pritz, A. Ritter, B. Howlett, V. Bhat, S. Griffin, M. Finkle, Mt. Union QE&QM			Customer Eng Approval / Date(if req'd)		
Supplier Plant : Mount Union, PA	Code:	Supplier / Plant Approval; Date:			Customer QA Approval / Date(if req'd)		
Print # REFER TO SPECIFIC PART #	Drawing Change Level: REFER TO SPECIFIC PART #	Other Approval / Date (if req'd)			Other Approval / Date(if req'd)		

This Control Plan Expires on:

Part Process #	Process Name/ Operation Description	Machine, Device Jig, Tools for MFG.	Characteristics #	Characteristics Product	Characteristics Process	Special Class Char.	Methods Product/Process Specification Tolerance	Methods Evaluation Measurement Technique	Methods Sample Size	Methods Sample Freq.	Methods Error-Proofing	Methods Control Method	Reaction Plans and Corrective Actions
10	Receive Raw Material	Truck									No	ASN; Bill of Lading; P.O. **WTSP09**	Refuse Shipment
20	Inspect Raw material						Shipper / Invoice	Visual	Each Lot	100%	No	Shipper / Invoice, **WTSP09**	Quarentine, Notify Supervisor, purchasing
30	Move Material	Hi-Lo					ID Code	Move Ticket	Each Lot	100%	No	Move Ticket	Quarentine, Repack
40	RECEIVING INSPECTION			Chemical Comp.			FCI Master Material Specification Sheet	Comparison of Vendor Certification to Material Certification	All Certs	Each Shipment	No	Shipping / Receiving Inspection instructions, **WQCJ0006**	Inform Production Supervisor, Mold Tech, Die Tech and QC. Adjust and Reset, Isolate Production, **WQCJ0003, WMEJ0191, WTSP 12, WTSP13, WQAJ0045**
				Physical Properties			FCI Master Material Specification Sheet	Comparison of Vendor Certification to Material Certification	All Certs	Each Shipment	No		
50	LOT # ASSIGNMENT				Assignment of Lot Number		Label Printer / Mat'l Lot Log	Verify Sequential Lot Numbers via Received Material log	All Skids	Each Shipment / Every Skid	No		Contain Material / Reassign Lot Number
60	Material Handling	Hi-Lo					ID Code	Move Ticket			No	Location Ticket, ID Tag	Quarentine, Repack
70	Storage	Warehouse Rack					QC Tag				No	Bar Code Label	
80	MATERIAL HANDLING	Lift Truck			Placement of Material at Press		Material Certification / Material I.D. Tag	Verification of Correct Material	All Skids	Every Skid	No	Location Ticket, ID Tag	Quarentine, Repack
90	PRESS / DIE SETUP	Stamping Press			Proper Die Setup		Die Set According to Die Setup Sheet	Visual Inspection / Die Setup Sheet		Every Setup	No	Die Setup Sheet, Process sheet, Work Order WMEJ0332	Readjust Setup / Tooling
100	Produce First Piece	Stamping Press			Operator Instruction		Work Order, Setup Sheet, Process Sheets	Visual Inspection / Die Setup Sheet		Every Startup	No	Process Sheet, WMEJ0331	Readjust Setup / Tooling, Resample
110	FIRST PIECE INSPECTION	**See the Control Plan for information about the Specific Part**											

This Control Plan refers to the general process for all stamped parts. For details about the inspection process for a particular part number, refer to the Control Plan for that specific part number.

GENERIC Stamping Control Plan

[ ] Prototype [ ] Pre-launch [X] Production		F.C. I. - Control Plan			Control Plan ID : Generic Stamping Control Plan.xls		Tool #: REFER TO SPECIFIC PART #
FCI Part # : REFER TO SPECIFIC PART #	Customer Part # : REFER TO SPECIFIC PART #	Key Contact / Phone : Mt. Union QM (814) 542-5815	Originator: T. Currington	Org. Date: 5/9/2002	Revised By: J. Moose	Rev. Date: 4/15/2008	Document Rev.: 12
Part ID : Generic Stamping Control Plan		Core Team : S. Pritz, A. Ritter, B. Howlett, V. Bhat, S. Griffin, M. Finkle, Mt. Union QE&QM			Customer Eng Approval / Date(if req'd)		
Supplier Plant : Mount Union, PA	Code:	Supplier / Plant Approval; Date:			Customer QA Approval / Date(if req'd)		
Print # REFER TO SPECIFIC PART #	Drawing Change Level: REFER TO SPECIFIC PART #	Other Approval / Date (if req'd)			Other Approval / Date(if req'd)		

This Control Plan Expires on:

Part Process #	Process Name/ Operation Description	Machine, Device Jig, Tools for MFG.	Characteristics #	Characteristics Product	Characteristics Process	Special Class Char.	Methods Product/Process Specification Tolerance	Methods Evaluation Measurement Technique	Methods Sample Size	Methods Sample Freq.	Methods Error-Proofing	Methods Control Method	Reaction Plans and Corrective Actions
120	Produce Parts	Press / Die / In-Line Insp Equipment		Detection of spring & spring deflection (APEX PRODUCT LINE ONLY)			Visual presence of Terminal Spring	Detection with laser & strain Unit	All Parts	Every Part	Yes	Die Setup Instruction manual / Job Instr. WMEJ0332, WMEJ0333	
125	Grease Parts	Reese Pump		Grease fill	Optional		See Print for PN and Specification	Sensor and /or Visual Inspection	All Parts	Every Part	No	Operator Instruction, Specific Part Control Plan	Inform Production Supervisor, Mold Tech, Die Tech and QC. Adjust and Reset, Isolate Production, **WQCJ0003, WMEJ0191, WTSP 12, WTSP13, WQAJ0045**
127	Inspection of Force, Box and Grip Width	S&S System		Terminal Force, Box and Grip Width	Optional		Per Print Specification	Sensor	All Parts	Every Part	Yes	Automated Inspection By Machine, Operator Instruction, Specific Part Control Plan	
130	Packaging	CoilTech / Wicomat Take-up					Proper Windup & interleaf per Die Setup Sheet	Visual Inspection	All Reels	Every Reel	No	Process Sheet	Quarentine, Repack
130a	Packaging						Proper singulation per die setup Sheet	Visual Inspection	All coratons	Every Box	No	Process Sheet	Quarentine, Repack
140	Collect Samples	Operator			Operator Instruction		Inspection Requirements	Visual	5 pcs	Start up	No	Inspection Requirements	Readjust Setup / Tooling, Resample
150	IN-PROCESS INSPECTION	Microscope		Visually Acceptable Parts,			Free of Visual Defects & Burrs, Special Features Present, Gage Fit (If Applicable)	Visual Inspection with Microscope	15 pcs	Every Reel/Box	No	WQAF0008. WMEJ0331, WTSP20	Inform Production Supervisor, Mold Tech, Die Tech and QC. Adjust and Reset, Isolate Production, **WQCJ0003, WMEJ0191, WTSP 12, WTSP13, WQAJ0045**
160	Label	Boxes/ Reels/ Labels		Packaging			Correct Label / Label Placement / Cross-taping / Damage Free	Visual Inspection	All Reels	Every Reel/Box	No	Process Sheet / Work Order	
170	Final Inspection	**See the Control Plan for information about the Specific Part**											
180	Packaging						Carton Pack Reels	Visual Inspection	All Reels	Every Reel	No	Process Sheet	Quarentine, Repack

This Control Plan refers to the general process for all stamped parts. For details about the inspection process for a particular part number, refer to the Control Plan for that specific part number.

GENERIC Stamping Control Plan

[ ] Prototype [ ] Pre-launch [X] Production		F.C. I. - Control Plan			Control Plan ID :		Tool #:
					Generic Stamping Control Plan.xls		REFER TO SPECIFIC PART #
FCI Part # : REFER TO SPECIFIC PART #	Customer Part # : REFER TO SPECIFIC PART #	Key Contact / Phone : Mt. Union QM (814) 542-5815	Originator: T. Currington	Org. Date: 5/9/2002	Revised By: J. Moose	Rev. Date: 4/15/2008	Document Rev.: 12
Part ID : Generic Stamping Control Plan		Core Team : S. Pritz, A. Ritter, B. Howlett, V. Bhat, S. Griffin, M. Finkle, Mt. Union QE&QM			Customer Eng Approval / Date(if req'd)		
Supplier Plant : Mount Union, PA	Code:	Supplier / Plant Approval; Date:			Customer QA Approval / Date(if req'd)		
Print # REFER TO SPECIFIC PART #	Drawing Change Level: REFER TO SPECIFIC PART #	Other Approval / Date (if req'd)			Other Approval / Date(if req'd)		

This Control Plan Expires on:

Part Process #	Process Name/ Operation Description	Machine, Device Jig, Tools for MFG.	Characteristics #	Characteristics Product	Characteristics Process	Special Class Char.	Methods Product/Process Specification Tolerance	Methods Evaluation Measurement Technique	Methods Sample Size	Methods Sample Freq.	Methods Error-Proofing	Methods Control Method	Reaction Plans and Corrective Actions
190	Move Material	Hi-Lo					ID Code		100%	All Product	No	Location Ticket, ID Tag	
200	Move Material	Computer					MFG Pro		100%	All Product	No	Move Ticket	
210	Move Material	Hi-Lo					ID Code		100%	All Product	No	Location Ticket, ID Tag	Quarentine, Repack
220	Store Finished Product	Warehouse Racks					QC Tag				No	Bar Code Label	
230	Ship to customer	Truck		All Boxes shipped must be identified with two (2) customer specific bar code labels on adjacent corners								ASN; Bill of Lading; P.O.	Recall Shipment
	Annual Layout	Measuring Equipment		As Per Spectific Customer Requiremnts								Blueprint	Inform Engineering, Issue DDD's

APPEARANCE APPROVAL

Not Applicable