



ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES®

IPC-1710A

OEM Standard for Printed Board Manufacturers' Qualification Profile

Developed by the OEM council of the IPC, the MQP sets the standard for assessing PWB manufacturers capabilities and allows PWB manufacturers to more easily satisfy customer requirements.

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May 2004

A standard developed by IPC

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The material in this standard was developed by the OEM Council of the Institute for Interconnecting and Packaging Electronic Circuits.

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FOREWORD

It is not intended that this Manufacturers' Qualification Profile (MQP) satisfies all the requirements of the customer, however, conscientious maintenance of this document and or registration to ISO 9000 requirements should satisfy the major concerns. Thus, audits should be simpler, required less frequently, and facilitate less paper work as customers and suppliers work closer to meeting each others needs.

ACKNOWLEDGMENTS

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SECTION 1.1

COMPANY DESCRIPTION

DATE COMPLETED March 16, 2017

GENERAL INFORMATION

LEGAL NAME INTEGRATED TECHNOLOGY LTD (ITL CIRCUITS)			
CITY Markham		STATE	ZIP
PROVINCE Onatario		COUNTRY Canada	
TELEPHONE NUMBER 905 475-6658		FAX NUMBER 905-475-5097	TELEX NUMBER
E-MAIL ADDRESS sales@itlcircuits.com		MODEM NUMBER 905 475-9749	DATE FOUNDED <input type="checkbox"/> PUBLIC <input checked="" type="checkbox"/> PRIVATE
INTERNET URL www.itlcircuits.com		FTP SITE ftp.itlcircuits.com	

MANAGEMENT

PRESIDENT Michael Campbell (VP Finance)
CHIEF OPERATING OFFICER
VICE PRESIDENT OF MANUFACTURING Adolf Czudnochowsky
VICE PRESIDENT OF QUALITY
VICE PRESIDENT OF MARKETING/SALES
VICE PRESIDENT OF CUSTOMER SERVICE
WASTE TREATMENT MANAGER (POLLUTION PREVENTION)

CORPORATE DESCRIPTION	NUMBER OF EMPLOYEES		COMMENTS
	CORPORATE	SITE	
DESIGN AND DEVELOPMENT	0		N/A
ENGINEERING	11		
MANUFACTURING CONTROL	4		
MANUFACTURING	DIRECT	86	
	INDIRECT	12	
QUALITY CONTROL	QUALITY ENGINEERS	9	
	INTERNAL AUDITORS	2	
	GENERAL MANAGEMENT	2	
ADMINISTRATION	12		
TOTAL	138		

SECTION 1.2

DATE COMPLETED

March 16, 2017

SITE DESCRIPTION

(TO BE COMPLETED FOR EACH SITE)

ATTACH APPROPRIATE CHARTS (OPTIONAL)

MANUFACTURING FACILITY			
COMPANY NAME		ITL CIRCUITS	
PHYSICAL ADDRESS		90 Don Park Road	
CITY	Markham	STATE	ZIP
PROVINCE	Ontario	COUNTRY	Canada
TELEPHONE NUMBER	905 475-6658	FAX NUMBER	905 475-5097
E-MAIL ADDRESS	sales@itlcircuits.com	MODEM NUMBER	905 475-9749
		YEARS IN BUSINESS	34
INTERNET URL	www.itlcircuits.com	FTP	ftp.itlcircuits.com
PRINCIPLE PRODUCTS/SERVICES/SPECIALTIES	BUSINESS CHARACTERIZATION (HIGH VOLUME, QUICK TURN-AROUND, ETC.)		
Manufacturer of Printed Circuit Boards	Quick-turn, low and medium volume		

FACILITY MANAGEMENT	TITLE	REPORTS TO (Function/Job Title)
OVERALL OPERATION RESPONSIBILITY FOR THIS SITE Adolf Czudnochowsky	VP Operations	
MANUFACTURING Kurtis Johnson	Production Manager	VP Operations
TECHNICAL/ENGINEERING George Papas	Engineering Manager	VP Operations
MATERIALS/PRODUCTION CONTROL		
PURCHASING Scott Bullock	Purchasing Manager	VP Operations
QUALITY Randy Caldwell/Ian Hanna	QC Manager/QA Manger	VP Finance
SALES REPRESENTATIVE John Aman	Sales	VP Operations
WASTE MANAGEMENT Nicole Tolnai	Wet Process Supervisor	Operations Manager

BUILDINGS	SYSTEMS (INDICATE % COVERAGE)									
	AGE	AREA (Sq. Ft.)	Construction (Wood/Brick)	Power Conditioning	Heating	Ventilation	Air Conditioning	Sprinklers	Waste Treatment	Other
Office	42	5,000	Brick	100	100	100	100	100		
Manufacturing	42	40,000	Brick	100	100	100	75	100	100	
Storage	42	3,000	Brick	100	100	100	100	100		
Planned additions	34	20,000	Brick	100	100	100	75	100	100	

SAFETY AND REGULATORY AGENCY REQUIREMENTS			
Are fire extinguishers functional and accessible to employees?	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	What is the distance to the nearest fire station? (in minutes)
			5 Minutes
Do you conform to local/federal environment protection agency requirements?	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	Date of last OSHA visit Date of last EPA visit
			N/A N/A
Are you currently operating under a waiver or in violation of local government requirements?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	Other Agency Audits, UL, ISO 9000, NECQ, CSA Approval and Number
			<input checked="" type="checkbox"/> UL # E62927 <input type="checkbox"/> CSA # N/A
Do you have a safety program? Describe below.	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	Hazardous Waste Number Trade Waste Account Number
			ONO427700

PLANT PERSONNEL (TOTAL EMPLOYEES)										
Regular	Contract	Office	Technical/Engineering	Production	Full-Time QA	Part-Time QA	Union	Non-Union	Union Name	Contract Expires (Date)
138	N/A	12	11	86	12	N/A	N/A	138	N/A	N/A

COMMENTS

SECTION 2.1

PROCESS

DATE COMPLETED
March 16, 2017

This section is intended to provide overview information on the processes used to fabricate printed board products.

Site Capability Snapshot (Please Check all that apply)

Designators			Remarks
A	Conductor Forming Processes	<input checked="" type="checkbox"/> Subtractive <input checked="" type="checkbox"/> Thin Foil Subtractive less than .5 oz. <input type="checkbox"/> Semi-Additive <input checked="" type="checkbox"/> Additive (Electro-less) <input type="checkbox"/> Thick Film Paste and Fire <input type="checkbox"/> Thin Film Semi-conductor Sputtering <input type="checkbox"/> Other:	.25 oz
B	PTH Materials and Processes	<input checked="" type="checkbox"/> Acid Copper <input type="checkbox"/> Pyro-Phosphate Copper <input type="checkbox"/> Full Built Electro-Less <input type="checkbox"/> Gold Paste <input type="checkbox"/> Copper Paste <input type="checkbox"/> Gold Conductor Sputtering <input type="checkbox"/> Nickel Conductor Sputtering <input type="checkbox"/> Other:	
C	Permanent Over-plating	<input type="checkbox"/> Tin <input type="checkbox"/> Tin-Lead <input type="checkbox"/> Tin-Nickel Alloy <input checked="" type="checkbox"/> Nickel <input checked="" type="checkbox"/> Nickel Gold (Hard) <input checked="" type="checkbox"/> Nickel Gold (Soft) <input type="checkbox"/> Nickel Rhodium <input checked="" type="checkbox"/> Conductive Polymer <input type="checkbox"/> Other:	

D	Permanent Selective Plating	<input type="checkbox"/> Tin <input type="checkbox"/> Tin-Lead <input type="checkbox"/> Tin-Nickel Alloy <input type="checkbox"/> Nickel <input checked="" type="checkbox"/> Nickel Gold (Hard) <input checked="" type="checkbox"/> Nickel Gold (Soft) <input type="checkbox"/> Nickel Rhodium <input type="checkbox"/> Other:	
E	Permanent Mask or Coating	<input checked="" type="checkbox"/> Photo Dry Film <input checked="" type="checkbox"/> Photo Liquid <input checked="" type="checkbox"/> Image Transfer Screen Mask <input type="checkbox"/> Conformal Coating Solder Mask <input checked="" type="checkbox"/> Cover Coat <input type="checkbox"/> Other:	
F	Other Surface Finishes	<input type="checkbox"/> Tin-Lead Fused <input checked="" type="checkbox"/> Immersion Tin <input checked="" type="checkbox"/> Solder Leveled <input type="checkbox"/> Roll Soldered <input type="checkbox"/> Electro-less Solder Fused <input type="checkbox"/> Solder Bumped Lands <input type="checkbox"/> Solder Paste Fused <input type="checkbox"/> Azole Organic Protective Covering <input type="checkbox"/> Flux Protective Covering <input checked="" type="checkbox"/> Other: ENIG, IMMERSION SILVER	

SECTION 2.2

ELECTRICAL TEST EQUIPMENT

DATE COMPLETED

March 16, 2017

This section is intended to provide overview information on the test equipment and testing capability of the manufacturer.

Site Capability Snapshot (Please Check the column that applies furthest to the right.)

Designators			Remarks
A	Number of Nets	<input type="checkbox"/> <200 <input type="checkbox"/> 200 <input type="checkbox"/> 500 <input type="checkbox"/> 1000 <input type="checkbox"/> 2000 <input type="checkbox"/> 3000 <input type="checkbox"/> 4000 <input type="checkbox"/> 5000 <input checked="" type="checkbox"/> >5000 <input type="checkbox"/> Other:	
B	Number of Nodes	<input type="checkbox"/> <500 <input type="checkbox"/> 500 <input type="checkbox"/> 1000 <input type="checkbox"/> 2000 <input type="checkbox"/> 3000 <input type="checkbox"/> 4000 <input type="checkbox"/> 5000 <input type="checkbox"/> 6000 <input checked="" type="checkbox"/> >6000 <input type="checkbox"/> Other:	
C	Probe Point Pitch	<input type="checkbox"/> >1.0 [.040] <input type="checkbox"/> 1.0 [.040] <input type="checkbox"/> 0.8 [.032] <input type="checkbox"/> 0.65 [.025] <input type="checkbox"/> 0.50 [.020] <input type="checkbox"/> 0.40 [.016] <input type="checkbox"/> 0.30 [.012] <input type="checkbox"/> 0.20 [.008] <input checked="" type="checkbox"/> <0.20 [.008] <input type="checkbox"/> Other:	

D	Test % Single Pass	<input type="checkbox"/> None <input type="checkbox"/> <60% <input type="checkbox"/> 60% <input type="checkbox"/> 70% <input type="checkbox"/> 80% <input type="checkbox"/> 90% <input type="checkbox"/> 95% <input type="checkbox"/> 99% <input checked="" type="checkbox"/> 100% <input type="checkbox"/> Other:	
E	Probe Accuracy (DTP)	<input type="checkbox"/> >0.2 [.008] <input type="checkbox"/> 0.2 [.008] <input type="checkbox"/> 0.15 [.006] <input type="checkbox"/> 0.125 [.005] <input type="checkbox"/> 0.1 [.004] <input type="checkbox"/> 0.075 [.003] <input checked="" type="checkbox"/> <0.075 [.003] <input type="checkbox"/> Other:	
F	Grid Density	<input type="checkbox"/> Single Side Grid <input type="checkbox"/> Double Sided Grid <input type="checkbox"/> Double Density Grid <input checked="" type="checkbox"/> Double Density Double Sided <input type="checkbox"/> Quad Density <input type="checkbox"/> Double Sided Quad Density <input checked="" type="checkbox"/> Flying Probe <input type="checkbox"/> Other:	
G	Netlist Capability	<input type="checkbox"/> Golden Board <input checked="" type="checkbox"/> IPC-D-356 <input checked="" type="checkbox"/> Net List Extraction <input checked="" type="checkbox"/> CAD/CAM Net List Compare <input type="checkbox"/> Other:	

H	Test Voltage	<input type="checkbox"/> <20 VDC <input type="checkbox"/> 20 VDC <input type="checkbox"/> 40 VDC <input type="checkbox"/> 60 VDC <input type="checkbox"/> 80 VDC <input type="checkbox"/> 100 VDC <input checked="" type="checkbox"/> 500 VDC <input type="checkbox"/> 1000 VDC <input type="checkbox"/> >1000 VDC <input type="checkbox"/> Other:	
J	Impedance Meas	<input type="checkbox"/> Micro Section <input type="checkbox"/> Inboard Circuit <input checked="" type="checkbox"/> Coupon <input checked="" type="checkbox"/> Manual TDR <input type="checkbox"/> Automated TDR <input type="checkbox"/> Other:	
K	Impedance Tolerance	<input type="checkbox"/> None <input type="checkbox"/> >20% <input type="checkbox"/> 20% <input type="checkbox"/> 15% <input checked="" type="checkbox"/> 10% <input type="checkbox"/> 7% <input type="checkbox"/> 5% <input type="checkbox"/> 2% <input type="checkbox"/> <2% <input type="checkbox"/> Other:	

SECTION 2.3

PRODUCT TYPE

DATE COMPLETED

March 16, 2017

This section is intended to provide overview information on the printed board product types being fabricated by the manufacturer.

Site Capability Snapshot (Please Check all that apply.)

Designators			Remarks
A	Product Type	<input checked="" type="checkbox"/> Rigid Printed Board <input checked="" type="checkbox"/> Flex Printed Board <input checked="" type="checkbox"/> Rigid/Flex Board <input checked="" type="checkbox"/> Rigid Back Plane <input type="checkbox"/> Molded Product <input type="checkbox"/> Ceramic Printed Board <input type="checkbox"/> Multichip Module <input type="checkbox"/> Laminated Multichip Module <input type="checkbox"/> Deposited Dielectric Multichip Modules <input type="checkbox"/> Other:	
B	Circuit Mounting Type	<input checked="" type="checkbox"/> Single Sided <input checked="" type="checkbox"/> Double Sided <input checked="" type="checkbox"/> Multilayer <input checked="" type="checkbox"/> Single-sided Bonded to Substrate <input checked="" type="checkbox"/> Double-sided Bonded to Substrate <input checked="" type="checkbox"/> Multilayer Bonded to Substrate <input checked="" type="checkbox"/> Constrained Multilayer <input type="checkbox"/> Distributed Plane Multilayer <input type="checkbox"/> Other:	

C	Via Technology	<input type="checkbox"/> No-Vias <input checked="" type="checkbox"/> Thru Hole Vias <input checked="" type="checkbox"/> Buried Vias <input checked="" type="checkbox"/> Blind Vias <input checked="" type="checkbox"/> Thru Hole & Blind Vias <input checked="" type="checkbox"/> Thru Hole & Buried Vias <input checked="" type="checkbox"/> Thru Hole Buried & Blind Vias <input checked="" type="checkbox"/> Buried & Blind Vias <input checked="" type="checkbox"/> Other: *	<p>* Filled and Planarized Via's with "cap" plating as per IPC-4761 Type VII.</p> <p>* Laser Micro-Vias</p>
D	Laminate Material	<input type="checkbox"/> Phenolic <input type="checkbox"/> Epoxy Paper <input checked="" type="checkbox"/> Epoxy Glass <input checked="" type="checkbox"/> Modified Epoxy Composite <input checked="" type="checkbox"/> Polyimide Film & Reinforce <input type="checkbox"/> Cyanate Ester <input checked="" type="checkbox"/> Teflon <input checked="" type="checkbox"/> Ceramic Glass Types <input type="checkbox"/> Various Combinations <input checked="" type="checkbox"/> Other:	<p>High Temp/Lead-Free FR-4</p>
E	Core Material	<input type="checkbox"/> No Core <input type="checkbox"/> Polymer <input checked="" type="checkbox"/> Copper <input checked="" type="checkbox"/> Aluminum <input type="checkbox"/> Graphite <input type="checkbox"/> Copper Invar/Copper <input type="checkbox"/> Copper Moly/Copper <input type="checkbox"/> Other:	
F	Copper Thickness (Oz.)	<input type="checkbox"/> 1/8 Minimum <input checked="" type="checkbox"/> 1/4 Minimum <input checked="" type="checkbox"/> 3/8 Minimum <input checked="" type="checkbox"/> 1/2 Nominal <input checked="" type="checkbox"/> 1 Nominal <input checked="" type="checkbox"/> 2 Nominal <input checked="" type="checkbox"/> 3-5 Max <input type="checkbox"/> 6-9 Max <input type="checkbox"/> >10 <input type="checkbox"/> Other:	

G	Construction	<input type="checkbox"/> ≤4 Planes <input checked="" type="checkbox"/> >4 Planes <input checked="" type="checkbox"/> THK to TOL ≤0.2 mm <input type="checkbox"/> THK to TOL >0.2 mm <input checked="" type="checkbox"/> Bow/Twist ≤1% <input type="checkbox"/> Bow/Twist >1% <input checked="" type="checkbox"/> ≤0.3 mm Profile Tolerance <input type="checkbox"/> 0.3 mm Profile Tolerance <input type="checkbox"/> Other:	
H	Coatings and Markings	<input checked="" type="checkbox"/> ≤0.1 mm Mask Clearance <input type="checkbox"/> >0.1 mm Mask Clearance <input type="checkbox"/> One Side (Legend) <input checked="" type="checkbox"/> Two Side (Legend) <input type="checkbox"/> None (Legend) <input checked="" type="checkbox"/> UL Material Logo U.L. V ₀ Logo <input type="checkbox"/> U.L. V ₁ Logo <input type="checkbox"/> U.L. V ₂ Logo <input type="checkbox"/> Other:	

SECTION 2.4

PRODUCT COMPLEXITY

DATE COMPLETED
March 16, 2017

This section is intended to provide overview information on product complexity being fabricated by the manufacturer.

(Please check the column that applies farthest to the right)

Designators			Remarks
A	Board Size Diagonal	<input type="checkbox"/> <250 [10.00] <input type="checkbox"/> 250 [10.00] <input type="checkbox"/> 350 [14.00] <input type="checkbox"/> 450 [17.50] <input type="checkbox"/> 550 [21.50] <input type="checkbox"/> 650 [25.50] <input type="checkbox"/> 750 [29.50] <input checked="" type="checkbox"/> 850 [33.50] <input type="checkbox"/> >850 [33.50] <input type="checkbox"/> Other:	
B	Total Board Thickness	<input type="checkbox"/> 1,0 [.040] <input type="checkbox"/> 1,0 [.040] <input type="checkbox"/> 1,6 [.060] <input type="checkbox"/> 2,0 [.080] <input type="checkbox"/> 2,5 [.100] <input type="checkbox"/> 3,5 [.135] <input checked="" type="checkbox"/> 5,0 [.200] <input type="checkbox"/> 6,5 [.250] <input type="checkbox"/> >6,5 [.250] <input type="checkbox"/> Other:	
C	Number Conductive Layers	<input type="checkbox"/> 1-4 <input type="checkbox"/> 5-6 <input type="checkbox"/> 7-8 <input type="checkbox"/> 9-12 <input type="checkbox"/> 13-16 <input type="checkbox"/> 17-20 <input type="checkbox"/> 21-24 <input type="checkbox"/> 25-28 <input checked="" type="checkbox"/> >28 <input type="checkbox"/> Other:	

D	Dia Drilled Holes	<input type="checkbox"/> >0,5 [.020] <input type="checkbox"/> 0,5 [.020] <input type="checkbox"/> 0,4 [.016] <input type="checkbox"/> 0,35 [.014] <input type="checkbox"/> 0,30 [.012] <input type="checkbox"/> 0,25 [.010] <input type="checkbox"/> 0,20 [.008] <input type="checkbox"/> 0,15 [.006] <input checked="" type="checkbox"/> <0,15 [.006] <input type="checkbox"/> Other:	
E	Total PTH TOL (Max-Min)	<input type="checkbox"/> >0,250 [.010] <input type="checkbox"/> 0,250 [.010] <input type="checkbox"/> 0,200 [.008] <input type="checkbox"/> 0,150 [.006] <input type="checkbox"/> 0,125 [.005] <input type="checkbox"/> 0,100 [.004] <input type="checkbox"/> 0,075 [.003] <input checked="" type="checkbox"/> 0,050 [.002] <input type="checkbox"/> <0,050 [.002] <input type="checkbox"/> Other:	
F	Hole Location TOL DTP	<input type="checkbox"/> >0,50 [.020] <input type="checkbox"/> 0,50 [.020] <input type="checkbox"/> 0,40 [.016] <input type="checkbox"/> 0,30 [.012] <input type="checkbox"/> 0,25 [.010] <input type="checkbox"/> 0,20 [.008] <input type="checkbox"/> 0,15 [.006] <input checked="" type="checkbox"/> 0,10 [.004] <input type="checkbox"/> <0,10 [.004] <input type="checkbox"/> Other:	
G	Internal Layer Clearance (Min)	<input type="checkbox"/> >0,350 [.014] <input type="checkbox"/> 0,350 [.014] <input type="checkbox"/> 0,250 [.010] <input type="checkbox"/> 0,200 [.008] <input type="checkbox"/> 0,150 [.005] <input type="checkbox"/> 0,125 [.005] <input type="checkbox"/> 0,100 [.004] <input checked="" type="checkbox"/> 0,075 [.003] <input type="checkbox"/> <0,075 [.003] <input type="checkbox"/> Other:	

<p>H</p>	<p>Internal Layer Conductor Width (Min)</p>	<p><input type="checkbox"/> >0,250 [.010] <input type="checkbox"/> 0,250 [.010] <input type="checkbox"/> 0,200 [.008] <input type="checkbox"/> 0,150 [.006] <input type="checkbox"/> 0,125 [.005] <input type="checkbox"/> 0,100 [.004] <input checked="" type="checkbox"/> 0,075 [.003] <input type="checkbox"/> 0,050 [.002] <input type="checkbox"/> <0,050 [.002] <input type="checkbox"/> Other:</p>	
<p>J</p>	<p>Internal Layer Process Allowance</p>	<p><input type="checkbox"/> >0,100 [.004] <input type="checkbox"/> 0,100 [.004] <input type="checkbox"/> 0,075 [.003] <input type="checkbox"/> 0,050 [.002] <input type="checkbox"/> 0,040 [.0015] <input type="checkbox"/> 0,030 [.0012] <input checked="" type="checkbox"/> 0,025 [.001] <input type="checkbox"/> 0,020 [.0008] <input type="checkbox"/> <0,020 [.0008] <input type="checkbox"/> Other:</p>	<p>Based on H oz copper</p>
<p>K</p>	<p>External Layer Clearance (Min)</p>	<p><input type="checkbox"/> >0,350 [.014] <input type="checkbox"/> 0,350 [.014] <input type="checkbox"/> 0,250 [.010] <input type="checkbox"/> 0,200 [.008] <input type="checkbox"/> 0,150 [.006] <input type="checkbox"/> 0,125 [.005] <input type="checkbox"/> 0,100 [.004] <input checked="" type="checkbox"/> 0,075 [.003] <input type="checkbox"/> <0,075 [.003] <input type="checkbox"/> Other:</p>	

L	External Layer Conductor Width (Min)	<input type="checkbox"/> >0,250 [.010] <input type="checkbox"/> 0,250 [.010] <input type="checkbox"/> 0,200 [.008] <input type="checkbox"/> 0,150 [.006] <input type="checkbox"/> 0,125 [.005] <input type="checkbox"/> 0,100 [.004] <input checked="" type="checkbox"/> 0,075 [.003] <input type="checkbox"/> 0,050 [.002] <input type="checkbox"/> <0,050 [.002] <input type="checkbox"/> Other:	
M	External Layer Process Allowance	<input type="checkbox"/> >0,100 [.004] <input type="checkbox"/> 0,100 [.004] <input type="checkbox"/> 0,075 [.003] <input type="checkbox"/> 0,050 [.002] <input type="checkbox"/> 0,040 [.0015] <input type="checkbox"/> 0,030 [.0012] <input checked="" type="checkbox"/> 0,025 [.001] <input type="checkbox"/> 0,020 [.0008] <input type="checkbox"/> <0,020 [.0008] <input type="checkbox"/> Other:	Based on H oz copper
N	Feature Location DTP	<input type="checkbox"/> >0,50 [.020] <input type="checkbox"/> 0,50 [.020] <input type="checkbox"/> 0,40 [.016] <input type="checkbox"/> 0,30 [.012] <input type="checkbox"/> 0,25 [.010] <input type="checkbox"/> 0,20 [.008] <input checked="" type="checkbox"/> 0,15 [.006] <input type="checkbox"/> 0,10 [.004] <input type="checkbox"/> <0,10 [.004] <input type="checkbox"/> Other:	

All Dimensions are in millimeters [inches shown in brackets]

SECTION 2.5

QUALITY DEVELOPMENT

DATE COMPLETED
March 16, 2017

This section is intended to provide overview information on the quality systems in place in the manufacturing facility.

Site Capability Snapshot (Please Check all that apply.)

Designators			Remarks
A	Strategic Plan	<input checked="" type="checkbox"/> Functional Steering Committee Formed <input type="checkbox"/> TQM Plan & Philosophy Established & Published <input checked="" type="checkbox"/> Documented Quality Progress Review <input checked="" type="checkbox"/> Implementation & review of Project Team Recommendations <input checked="" type="checkbox"/> TQM Communicated throughout organization <input checked="" type="checkbox"/> Controlled New process Start-up <input type="checkbox"/> Management Participates in TQM Audits <input type="checkbox"/> Employee Recognition Program <input type="checkbox"/> Total TQM Plan/Involvement Customer Training <input type="checkbox"/> Other:	
B	Employee Involvement	<input checked="" type="checkbox"/> Certified Training Available <input checked="" type="checkbox"/> Training of Employee Base <input checked="" type="checkbox"/> TQM Team Trained <input checked="" type="checkbox"/> Design of Experiment Training and Use <input checked="" type="checkbox"/> New Process Implementation Training <input type="checkbox"/> Support Personnel Training <input type="checkbox"/> Advanced Statistical Training <input type="checkbox"/> Quality Functional Deployment <input type="checkbox"/> Ongoing Improvement Program for Employees <input type="checkbox"/> Other:	
C	Quality Manual	<input type="checkbox"/> Quality Manual Started <input type="checkbox"/> Generic Quality Manual for Facility <input type="checkbox"/> 10% of manufacturing depts. have process specifications <input type="checkbox"/> 25% of manufacturing depts. have process specifications <input type="checkbox"/> 50% of manufacturing depts. have process specifications <input type="checkbox"/> Non-manufacturing Manuals Developed <input type="checkbox"/> 25% of all departments have quality manuals <input type="checkbox"/> 50% of all departments have quality manuals <input checked="" type="checkbox"/> All Manufacturing and support depts. have controlled quality manual <input type="checkbox"/> Other:	

D	Instructions	<input type="checkbox"/> Work Instructions Started <input type="checkbox"/> Quality Instructions Started <input type="checkbox"/> 10% Work Instructions Completed <input type="checkbox"/> 10% Quality Instructions Completed <input type="checkbox"/> 25% Work Instructions Completed, Controlled <input type="checkbox"/> 25% Quality Instructions Completed, Controlled <input type="checkbox"/> 50% Work Instructions Completed, Controlled <input type="checkbox"/> 50% Quality Instructions Completed, Controlled <input checked="" type="checkbox"/> Quality and work Instruct. Completed, Controlled <input type="checkbox"/> Other:	
E	SPC Implementation IPC-PC-90	<input checked="" type="checkbox"/> Plan Exists <input checked="" type="checkbox"/> Training Started <input checked="" type="checkbox"/> Process Data Collected & Analyzed <input type="checkbox"/> All Employees Trained <input type="checkbox"/> First Process Stable & Capable <input checked="" type="checkbox"/> Several Major Processes Stable & Capable <input checked="" type="checkbox"/> Continued Improvement of Stable Processes <input checked="" type="checkbox"/> Additional Mfg Processes under Control <input type="checkbox"/> All Processes Under Control <input type="checkbox"/> Other:	
F	Supplier Programs/Controls	<input type="checkbox"/> Supplier Rating Program <input type="checkbox"/> Monthly Analysis Program <input checked="" type="checkbox"/> Key Problems Identified <input checked="" type="checkbox"/> Supplier Reviews Performance Data provided <input type="checkbox"/> TQM Acceptance by suppliers <input type="checkbox"/> 10% of Suppliers Using SPC <input type="checkbox"/> 25% of Suppliers Using SPC <input type="checkbox"/> 50% of Suppliers Using SPC <input type="checkbox"/> All Key Suppliers using Certified parts program <input type="checkbox"/> Other:	
G	Third Party IPC-QS-95	<input type="checkbox"/> Instrument Controls in Place <input type="checkbox"/> Measurement System in Control IPC-PC-90 <input type="checkbox"/> Document Controls in Place <input type="checkbox"/> Reduced Lot Sampling <input type="checkbox"/> 10% of Processes Under Audit Control <input type="checkbox"/> 50% or Greater of Processes Under Audit Control <input type="checkbox"/> ISO-9003 Certified <input type="checkbox"/> ISO-9002 Certified <input checked="" type="checkbox"/> ISO-9001 <input checked="" type="checkbox"/> Other: AS9100	ISO-9001:2000

SECTION 3

DATE COMPLETED
March 16, 2017

EQUIPMENT PROFILE (Pre-Site Audit)

* Examples of equipment limitations include:
min/max board size & min/max working area

3.1 PHOTOTOOL CAPABILITY	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) AOI of phototool	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
B) AOI CAD reference (CAM)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Orbotech Fusion 22 (2) and Dicovery 8	3	24 x 30
C) Photoplotting	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Orbotech LP-9008	1	24 x 30
D) Photo reductions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sub-contract		
E) Film scan and conversion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sub-contract		
F) Film processing <input type="checkbox"/> air-dried <input type="checkbox"/> force-dried <input checked="" type="checkbox"/> processed in automatic processor	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Carnfeldt EG-751		
G) Media types <input checked="" type="checkbox"/> silver halide film <input type="checkbox"/> glass <input checked="" type="checkbox"/> diazo	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Kodak		

3.2 DRILLING EQUIPMENT	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Manual	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
B) Optical (single spindle)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Pluritec Inspecta X-Ray drill;	1	
C) N.C. drill	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Excellon	See equipment list	

3.3 ROUTING EQUIPMENT	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Edge beveler	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lorr & Hermann	1	
B) Hand router (pin router)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Custom	2	
C) N.C. router	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Excellon	See equipment list	
D) N.C. driller/router	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Excellon	"	
E) Scoring (profile)	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
F) Scoring (straight line)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shoda	2	With "jump" scoring capability

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3.4 MECHANICAL EQUIPMENT	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Punch press	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Custom	1	40 ton
B) Shear	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Brown & Boggs	2	
C) Milling machine	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hartford	1	

3.5 HOLE PREPARATION (DESMEAR)	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Permagnate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	OMG	1	
B) Plasma	<input checked="" type="checkbox"/>	<input type="checkbox"/>	March Plasma	2	
C) Mechanical	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
D) Etchback	<input checked="" type="checkbox"/>	<input type="checkbox"/>	See Plasma		

3.6 PRIMARY IMAGE APPLICATION	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Dry film	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Dupont		
B) Hand screening	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
C) Machine screening	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
D) Wet film	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
E) Liquid photoimageable	<input type="checkbox"/>	<input checked="" type="checkbox"/>			

3.7 TYPE OF TREATMENT FOR MULTILAYER INNERLAYERS	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Black oxide	<input type="checkbox"/>	<input type="checkbox"/>			
B) Red oxide	<input type="checkbox"/>	<input type="checkbox"/>			
C) Copper scrub	<input checked="" type="checkbox"/>	<input type="checkbox"/>	I.S. Pumice scrubber	2	
D) Durabond	<input type="checkbox"/>	<input type="checkbox"/>			
E) Other	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MacDermid Multibond; Conveyorized system	1	

3.8 LAMINATION	YES	NO	MATERIAL	QTY	APPLICATION TECHNIQUE
A) High pressure	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Accudyne	2	24 x 24
B) High temperature	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
C) Vacuum	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
D) Vacuum assist	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lauffer; Hot-Oil Heated with Automated Transport; load & unload	4	26 x 30
E) Foil heat assist	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
F) Separate cool-down	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lauffer; Tempered Water	2	26 x 30

3.9 ELECTROLESS COPPER PLATING	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Fully additive application	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
B) Electroless deposition (semiadditive)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	OMG	1	
C) Through-hole and via	<input checked="" type="checkbox"/>	<input type="checkbox"/>			

3.10 COPPER ELECTROPLATING	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Copper sulfate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	OMG Reverse-Pulse	6 tanks	21x 24
B) Pyrophosphate	<input type="checkbox"/>	<input type="checkbox"/>			
C) Copper fluoborate	<input type="checkbox"/>	<input type="checkbox"/>			
D) Other	<input checked="" type="checkbox"/>	<input type="checkbox"/>	UYEMURA EVF Copper Plating for Micro-Vias	1	21 x 24

3.11 TIN/LEAD SURFACE PLATINGS/COATINGS	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Tin/lead electroplated	<input type="checkbox"/>	<input type="checkbox"/>			
B) Immersion tin or tin/lead (electroless)	<input type="checkbox"/>	<input type="checkbox"/>			
C) Hot air solder leveled (HASL)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Argus; Leaded and Lead-Free	2	21 x 24

3.12 FUSING PROCESSES	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) I.R. reflow	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
B) Hot oil reflow	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
C) Horizontal (hot air level)	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
D) Vertical (hot air level)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Argus HAL-5224; Leaded and Lead-Free	2	21 x 24

3.13 NICKEL SURFACE PLATING	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Electroless nickel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Uyemura	1	21x24
B) Electroplated nickel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Technic	1	21x24

3.14 GOLD SURFACE PLATING	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Electroless gold	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Uyemura	1	21x24
B) Electroplated gold	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Technic	1	21x24

3.15 PALLADIUM SURFACE PLATING	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Electroless palladium (immersion)	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
B) Electroplated palladium	<input type="checkbox"/>	<input checked="" type="checkbox"/>			

3.16 SOLDERMASK	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Screened deposited image	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
B) Dry film photoimageable	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
C) Liquid photoimageable	<input checked="" type="checkbox"/>	<input type="checkbox"/>	DP-1500 and DP-10	2	
D) Dry film/liquid combination	<input checked="" type="checkbox"/>	<input type="checkbox"/>			

3.17 ORGANIC SURFACE PROTECTION	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Benzotriazole	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
B) Imidazole	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
C) Benzimidazole	<input type="checkbox"/>	<input checked="" type="checkbox"/>			

3.18 MICROSECTION CAPABILITY	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Manual	<input type="checkbox"/>	<input type="checkbox"/>			
B) Single cavity automated	<input type="checkbox"/>	<input type="checkbox"/>			
C) Multiple cavity automated	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Bueller	2	
D) Plating thickness analysis	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Nikon Microscope	1	

3.19 CHEMICAL ANALYSIS	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Etching chemistry	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Ph, Titration and Specific Gravity		
B) Plating chemistry	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Titration, Hull Cell and Atomic Absorption and XRF		
C) Effluent (PPM) analysis	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Atomic Absorption, Ph methods		

3.20 ELECTRICAL TEST EQUIPMENT	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS
A) Continuity and shorts	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ATG A1200 and A2000 Parallel grid testers	3	
B) Fixture development	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Everett Charles "Majic Suite"	1	
C) Flying probe test	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ATG "A2", "A3", "A5 and "A7"	6	
D) Impedance control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Polar Instruments "CITS 5000S"	1	

MASTER EQUIPMENT LISTING

FORM MQP 10

DATE COMPLETED March 16, 2017

Please complete a Master Equipment List. You may use your own form or the MQP Form 10.

Shearing

Brown & Boggs Hydraulic Shear
 Edwards Electrical Shear
 Micrometer
 Copper Foil Thickness Tester
 Clean Machine Laminate Cleaner
 Reinhardt Oven
 Lohr & Herrmann LH-15 Automatic Edge Beveler

CAM/Photo

Orbotech (Valor) "Genesis 2000" CAM System (4 seats)
 Orbotech LP9008 - Laser Drum Photoplotter With Auto Film Load and Transport.
 Carnfeldt EG751 Film Processor
 36" Contact Exposure Frame
 X-Rite Film Densitometer
 OLEC 5 KW U.V. Exposure System
 James River Graphics Diazo Film Developer Mod 6000
 Light Tables
 Hartmann 40X Optical Comparators with Scales
 Mastercam CAD/CAM System
 Infinite Graphics EXT Net-list Extractor
 ATG TR-1000 Net-list Extractor, ET Fixture Design System
 Teknek Film Cleaner with Integral Protection Film Laminator
 C.A. Picard Automatic Film Punch
 Hewlett-Packard 4MV Laser Jet Printer
 U.S. Robotics "V-Everything" 33.6 Modem
 American Testing Corporation "Perfectest" Multilayer Registration System

Imaging

OLEC AP-30 - Exposing Units. (QTY 3)
 Morton 1600 D-Automatic Cut Sheet Laminator.
 HTE-102S Exposure Unit (2)
 ORC HMW-201 B Exposing Unit (2)
 Hartmann 40x Comparator with Measuring Scale

Dupont HL-24 Laminators
Dupont RF-100 Registration Fixture
Hennings Light Tables
Chemcut System 547XL-30 Dual Chamber Developing System
Dynachem U.V. Radiometer
Omega Model HH-71-K1 Surface/Roller Thermometer
Glass Phototool Frames
Omega Model CT485 Temperature/Humidity Chart Recorder
Teknek Pre-Lamination Cleaner
ORBOTECH PARAGON 9800 Laser Direct Imaging (LDI)
ORBOTECH NUVOGO 1000XL Laser Direct Imaging (LDI)

Multilayer Department

Lauffer Six Opening Vacuum Assist, Thermal Fluid Heated Presses With Auto Load/Unload Transport System. (QTY 4)
Lauffer Six Opening Cold Press With Programmable Cool Down. (QTY 2)
Accudyne 24.5"x26" Automated, Four Opening, Multilayer Laminating System consisting of (2) 150 ton Vacuum-Assist Hot Presses and (1) Cooldown Press complete with Load/Unload Product Transfer
Accudyne 30"x30" 200 ton Multilayer Press -3 Openings
Accudyne 30"x30" Cooling Press
Technical Products Prepreg Vacuum/Conditioning System
Canadian Cabinets Class 100 Laminar Flow Bench
March Plasma (APS) Model B-8 and B16 Plasma Etchback Systems
Refrigeration Unit for Pre-Preg storage
Ceco Overarm Digital Mircrometer
J & J Automatic Spotfacing Machine
Despatch VRC2-35 Baking Oven
Print Process Multilayer Registration Optimization Systems (QTY 2)
Somaca WB-62245 Deburrer/Plate Scrubber
DIS Optical Layer Alignment system complete with Optical Registration and Induction Welding

Drilling and Routing Department

Excellon Model 689 - (6) 180 K Spindles, Laser tool check
Excellon Century 2001 - Laser tool check CNC-7 System. (QTY 6)
Excellon - Uniline 200 - Drillers With CNC7 Controller, Air Bearing Spindles, Broken Bit Detector, Tool Management System And Auto Load/Unload. (QTY 4)
Kennard 422 - Router With Auto Table Load / Unload Option.
Wessel MLV 92 Multilayer Measuring/Drilling Machine with Integrated Optics for Optimum Layer Registration
Excellon Mark V (Qty 2) Driller with CNC 6 Controller
Excellon EX 200 Driller with CNC 65 Controller
Excellon EX 300 Driller with CNC 6 Controller
Excellon Mark VI (Qty 4) Driller with CNC 6 Controller, Airbearing Spindles, Broken Bit Detector & Tool Management System
Excellon EX 300 Router/Driller with CNC 6 Controller

Excellon XLC 3 Driller/Router with CNC 4 Controller
ATI 404 CNC Router
Excellon Scope Drills
Hawera HK4-2004 Drill Sharpener complete with Inspection Microscope
Glenbrook X-Ray Machine with printer
Lixi Model P5500 X-Ray
Spencer Vacuum Systems
Burnaby 802F Driller Pinner
Takeuchi Depinner
Excellon Ring Setters
Peak 25 & 50 Drill Microscopes
Numerous Vernier Calipers, Micrometers and Pin Gauge Sets
Wessel FSM Precision Tooling Hole Drilling and Pin Insertion Machine
Pluritec Inspecta X-Ray Drill
Excellon COBRA Hybrid LASER Drill

Wet Process Department

Hyoki - Deburring Machine With Auto Brush Adjustment And Ultrasonics.
MacDermid - Multibond Auto Conveyorized Inner Layer, Oxide Replacement System.
Semi-automated Electroless Copper Plating Line
Complete Reverse-Pulse, Dual Rectification Electrolytic Plating Line (6 Tanks, 500 gallons ea)
Micro-Via Plating Tank (1 tank at 400 gallons each)
Electrolytic Tin Plating Tank (200 gallons)
Chemcut 547 Conveyorized Inner Layer Line complete with Film Developer, Etcher and Film Stripper
Chemcut 547 Conveyorized Outer Layer Line complete with Film Stripper, Etcher, Neutralizer and Tin-Lead Stripper
I.S. Pumiflex Pumice Scrubber
Chemical Desmear Line
Hot Air Dryers
Vapour Degreasing Unit
Chemcut 547 Conveyorized HASL Pre-Clean Line
Total Waste Treatment System Complete with Metal Recovery
CMI Portable 1000 Hand-Held Through-Hole Copper Thickness Tester
I.S. High Pressure Post HASL Cleaning Machine
Schmid High Impingement Jet Pumice Scrub

Laboratory

Varian Cary 50 Conc - U.V. Visible Spectrophotometer
Fisher Accumet PH meter
Complete Apparatus for Wet Chemical Analysis
Mettler AJ150 Digital Analytical Scale
UPA MP-700-D Beta-Backscatter

Ceco Peel Strength Tester
Kenco Model 600 Omega Meter Ionic Contamination Tester
Unimet Unitron 8491 Microscope, complete with Polaroid Camera and Video Monitor
Micro Section Equipment Consisting of: Economet Eutomet 2 Gangmount System Isomet Low Speed Diamond Saw
Nikon SMZ 2B Microscope
Labconco Laboratory Fume/Work Benches
Thermotron Humidity/Temperature Cycling Chamber
Varian Spectr AA-10 Atomic Absorption Spectrophotometer
Spectronic 20D Spectrophotometer
Esico Triton Solder Pot
Criterion Dielectric Strength Tester
Beckman Megohm Meter
Kocour Centrifuge
Tektronix T.D.R. Controlled Impedance Tester
CMI XRX X-Ray Fluorescence Measuring System with Programmable Table

Photo-Imageable Soldermask

Bassi Top Cure 5.0 - Overhead Vertical Conveyorized Curing System With Auto Load/Unload
Olec, AP - 30 Exposing Units (QTY2)
HMW 680C 7 KW Exposing Unit
Pola & Massa Aluminum-oxide Scrubbing Machine with Ultrasonics
HMW 680GW 7 KW Exposing Unit
Mettler PM11 Digital Scale
Omega Infrared Thermometer
2-Despatch Pwc 3-21-1E Hot Air Oven complete with Chart Recorder
Circuit Automation DP10 Simultaneous Double-Sided Screening System
Circuit Automation DP-1500 Simultaneous Double-Sided Screening System
"EPIC" Model 110 Vertical Conveyorized Drying/Curing Oven
Amtech SRL-24 Automatic Unloading System
Chemcut 547 Conveyorized Aqueous Developing System
Dupont RF-100 Pinning System
Circuit Automation Vacuum drying system

Surface Finishes

Electroless Nickel and Immersion Gold Line (ENIG) (Uyemura)
Immersion Silver Line
Immersion Tin Line
Argus 5024 Lead-Free Hot-Air-Leveling unit
Complete Deep Tank Nickel/Gold Plating Line (Hard and Soft Gold)
Argus 5024 Hot Air Solder Leveling Unit with Surface Mount Option
International Supplies Conveyorized Post HASL Flux Washing System

Baker Brothers Microplate MP80 fully Automatic Gold Tab Line

Screening Department

Orbotech (New Systems) "Maxi" Inkjet Silkscreen Printer
Argus - Double Sided U.V. Curing Unit
Argon - Hydra II 2 Semi-Automatic Screening Machines
Screening Bases
Despatch VRC2-35 oven
Screen Wash Out Booth
Violux VM-611K Exposure System
Argus UV Curing Unit
Screen Tensionmeter
Squeegee Blade Sharpener
Light Table
Microscope
Tetko Vacutex Vacuum Frame
Harlacher Screen Stretching System
ITC Model THP35 Automated Via Filling System complete with Vacuum Heads
Pola and Massa Automated Via Planarizing machine

Machine Shop

Milling Machines
Ergoyen 12" Swing Lathe
Router Tables
Hand Shears
Barnaby Beveling Machine
Techtron Af-100 Automatic Beveller
Techtron NVC650PC Scoring Machine with Auto Load/Unload
Techtron NVC600 Scoring Machine
Slotting Machine
40 ton Punch Press
Stenhj Hydraulic Press
Miller TIG Welder
Miller MIG Welder
Sheet Metla Brake
Band Saw
Tow Motor
KBC MC-275 Metal Cut-Off Saw
Bostonmatic 3 Axis C.N.C. Milling Center
Kent Surface Grinder

Quality Control Department

ATG A2020 - Double/Sided Tester With Double-Density Grid (2); with Netlist
ECT (ATG) Flying Probe Testers; A2, A3 (2), A5 (2) A7; All Netlist driven
Polar Instruments, CITS500s Controlled Impedance Test System
ATG A-1200 Universal Double-Sided Bare Board Tester; with Netlist
Orbotech Discovery "8" AOI Systems (1); With CAD Reference
Orbotech Fusion 22 AOI System (2); With CAD Reference
Nikon SMZ 2B Microscope
Master Set Gauge Blocks
Dielectric Strength Tester
B & S C.M.M. Validator Co-ordinate Measuring System
Automatic Fixture Pin Inserter
CMI Model MR-4000 Thru Hole Copper Measuring System
Numerous Vernier Calipers, Micrometers and Pin Gauges
Qualipac SPM-5580A Automatic Packaging Machine
Elantech "ELSM" Shrink-Wrap Packaging Machine

SECTION 4

TECHNOLOGY PROFILE SPECIFICS

DATE COMPLETED
March 16, 2017

4.1 ADMINISTRATION

4.1.1 CAPACITY PROFILE	EST %	COMMENTS
A) Total annual capacity in square meters (surface area) per month	950,400 79,200	Based on 1200 18x24 panels per day max capacity
B) Presently running at ____ % of capacity	60	

4.1.2 PERCENTAGE OF DOLLAR VOLUME	EST %	COMMENTS
A) Single sided (rigid)	<1	
B) Double sided (rigid)	12	
C) Multilayer (rigid)	88	
D) Single side (unreinforced-flex)		
E) Double sided (unreinforced-flex)		
F) Multilayer (unreinforced-flex)		
G) Multilayer (rigid/flex)		

4.1.3 PANEL PRODUCTION PROFILE	UNITS PER MONTH
A) Size of a production lot in panels	
1) Normal	30-50
2) Smallest	3-5
B) Number of panels per month	
1) High Production	14,000
2) Medium Production	8,000
3) Low Production	1,000
3) Short run	800
4) Prototype	300

C) Average lead time (delivery) as defined in B)			
1) High Production		3 wks	
2) Medium Production		2 wks	
3) Low Production		1-2 wks	
3) Short run		10 days	
4) Prototype		3-5 days	
Quick turn - No. of days <u>3</u>			
D) Product delivered in full panel or array sub-panel format			
1) Total in panel or array format		10	
2) Scored format		50	
3) Tab breakaway format		40	
4) Other			
5) Total to customer layout			
6) Total to manufacturing layout			
E) Product delivered in board format			
1) Total in board format		30	
2) Extracted: scored to size		20	
3) Extracted: sheared to size			
4) Extracted: routed to size		50	
4.1.4 APPROVAL AND CERTIFICATION	YES	NO	COMMENTS
A) Company approvals			
1) UL approval	<input checked="" type="checkbox"/>	<input type="checkbox"/>	94V Level <u>V-0</u>
2) Canadian standards	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A
3) MIL-P-55110	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4) MIL-P-50884	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5) ISO-9002	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6) ISO-9001	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ISO-9001:9002 (AS9100)

7) ISO-14000	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8) BABT	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
9) EEC	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
10) Customer satisfaction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
B) Other certification information			
1)Laminate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	IPC-4101
2)Quality standards	<input checked="" type="checkbox"/>	<input type="checkbox"/>	AS9100
3)Equipment calibration	<input checked="" type="checkbox"/>	<input type="checkbox"/>	AS9100

4.1.5 CUSTOMER INTERFACE PROFILE	YES	NO	COMMENTS
A) Modem capability	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
B) Baud rate			36,600 bps
C) Data verification technique	<input checked="" type="checkbox"/>	<input type="checkbox"/>	DFM/DRC
D) Engineering change order process	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
E) Job status reporting to customers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

4.1.6 OTHER CAPABILITIES	YES	NO	COMMENTS
A) Facility research and development	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A
B) (Automated) On-line shop floor control/MRP system	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ITL WEB (Custom system)
C) Process control system	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ITL WEB
D) Operator training system	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

4.2 PROCESS ORIENTATION

4.2.1 LAMINATE MATERIAL	EST %	COMMENTS
A) Most commonly used laminates (G10, FR4, etc.)		Brand name ISOLA Type FR-4, HIGH TG, HIGH TD, POLYIMIDE, HIGH SPEED, Lead-Free Assembly Brand name Panasonic Type FR-4, HIGH TG, HIGH TD Brand name Ventec Type FR-4 Brand name ROGERS Type TEFLON, CERAMIC FILLED
B) Other laminate material		ARLON
1) Planar resistor layers		UL approved <input type="checkbox"/>
2) BT epoxy		UL approved <input type="checkbox"/>
3) Kevlar		UL approved <input type="checkbox"/>
4) Teflon		UL approved <input type="checkbox"/>
5) Polyimide		UL approved <input type="checkbox"/>
6) Cyanate ester		UL approved <input type="checkbox"/>
7) Other		UL approved <input type="checkbox"/>
C) Specification to which laminate is purchased (check all that apply) <input type="checkbox"/> MIL-P-13949 <input type="checkbox"/> IPC-4204 <input checked="" type="checkbox"/> IPC-4101 <input checked="" type="checkbox"/> UL Approved <input type="checkbox"/> IPC-4103 <input type="checkbox"/> Other <input type="checkbox"/> IPC-4202 <input type="checkbox"/> IPC-4203		
D) Laminate storage <input type="checkbox"/> Uncontrolled <input checked="" type="checkbox"/> Humidity controlled <input checked="" type="checkbox"/> Temperature controlled <input checked="" type="checkbox"/> Dry box <input checked="" type="checkbox"/> JIT inventory		
E) Panel size configurations in X, Y dimensions maximum X <u>533</u> Y <u>610</u> mm minimum X <u>230</u> Y <u>305</u> mm other X _____ Y _____mm		21x24 12x16 18x24 is the default size. Others are: 12x16, 12x18, 16x18,

4.2.2 PROCESS PRECISION SPECIFICS	YES	NO	VALUE	COMMENTS
A) Maximum printed board thickness built in volume				
1) Single sided			.200"	
2) Double sided			.200"	
3) Multilayer			.200"	
4) Rigid flex				
B) Printed board electrical performance capability				
1) Impedance control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	+/-10%	
2) Capacitance control	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
3) Microstrip boards	<input checked="" type="checkbox"/>	<input type="checkbox"/>	+/-10%	
C) Tooling system description				
1) Same holes in panels used for all processes	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Unique holes using Post-etch punch for layers and laminated panels
2) Optical registration	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Process: Artwork pre-registered to glass tools
3) Other	<input type="checkbox"/>	<input type="checkbox"/>		

4.2.3 OTHER PROCESS ORIENTATION SPECIFICS	YES	NO	SYSTEM	COMMENTS
A) Solder mask over bare copper	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
B) Plating/coating information				
1) Tin/lead reflow	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
2) Hot air leveling	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
3) Azole organic	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
4) Conductive	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Carbon Ink Keypads	
C) Hole formation				
1) Hole cleaning	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
2) Hole cleanliness verified	<input checked="" type="checkbox"/>	<input type="checkbox"/>		

4.3 PRODUCT DESCRIPTION

*CONSISTENCY IMPLIES YIELDS IN EXCESS OF 80%

4.3.1. THROUGH HOLE INSERTION	EST %	SIZE (MM) - +/- TOL	COMMENTS
A) Smallest conductor width and tolerance produced with consistency			
1) Outer layers (print and etch)		Size ____ mm Tol ± ____ .mm	NA
2) Inner layers (print and etch)		Size .089 mm Tol ± .013 .mm	
3) Outer layers (plated)		Size .089 mm Tol ± .013 .mm	
4) Inner layers (plated)		Size ____ mm Tol ± ____ .mm	NA
5) Outer layers (additive plating)		Size ____ mm Tol ± ____ .mm	NA
6) Inner layers (additive plating)		Size ____ mm Tol ± ____ .mm	NA
B) Smallest plated-through hole (PTH) and tolerance consistently produced in 1.5mm thickness material or multilayer board			
1) Minimum PTH diameter		Size .15 mm Tol ± .07 .mm	
2) Largest panel where this hole can be controlled (across diagonal)		Size 850 mm Tol ± ____ .mm	
C) Largest hole size that can be drilled and plated through in a 1.25mm diameter land while maintaining an annular ring of 0.125mm in large/small boards			
1) Largest board size (across diagonal)		Size 635 mm	
2) Largest hole diameter		Size .75 mm	
3) Smallest board size (across diagonal)		Size 60 mm	
4) Largest hole diameter		Size .75 mm	
D) Surface mount land pattern pitch (check all that apply)			
<input checked="" type="checkbox"/> 1.27mm [.050] <input checked="" type="checkbox"/> 0.63mm [.025]			
<input checked="" type="checkbox"/> 0.5mm [.020] <input checked="" type="checkbox"/> 0.4mm [.016]			
<input type="checkbox"/> 0.3mm [.012] <input type="checkbox"/> 0.25mm [.010]			
<input type="checkbox"/> Other ____ .			

E) Solder mask dam between lands (check all that apply) <input checked="" type="checkbox"/> 1.27mm [.050] <input checked="" type="checkbox"/> 0.63mm [.025] <input checked="" type="checkbox"/> 0.5mm [.020] <input checked="" type="checkbox"/> 0.4mm [.016] <input type="checkbox"/> 0.3mm [.012] <input type="checkbox"/> 0.25mm [.010] <input type="checkbox"/> Other ____ .			
F) Flatness tolerance (bow & twist) after reflow or solder coating <input type="checkbox"/> 1.5% <input type="checkbox"/> 1.0% <input checked="" type="checkbox"/> 0.5% <input type="checkbox"/> Other ____			

4.3.2 PRODUCT QUALITATIVE AND QUANTITATIVE INFORMATION	YES	NO	QUANTITY OF PANELS	NUMBER or DIMENSION	COMMENTS
A) Multilayer layer count					
1) Maximum layers fabricated in volume (Maximum Lot)			750	18X24	
2) Maximum layers fabricated in prototype (Minimum Lot)			10	18X24	
B) Buried vias produced consistently in volume	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
1) Size				.006	
2) Number of layers				10	
B) Blind vias produced consistently in volume	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
1) Size				.006	
2) Number of layers				14	
1) Controlled depth drilling	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
2) Total number of layers				8	

4.4. TESTING CAPABILITY

4.4.1 TEST AND TEST EQUIPMENT CAPABILITY	YES	NO	COMMENTS
A) SMT centerline pitch that can be electrically tested <input checked="" type="checkbox"/> 0.63mm [.025] <input checked="" type="checkbox"/> 0.5mm [.020] <input checked="" type="checkbox"/> 0.4mm [.016] <input checked="" type="checkbox"/> 0.3mm [.012] <input checked="" type="checkbox"/> 0.25mm [.010] <input type="checkbox"/> Other			
B) Double sided simultaneous electrical testing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
1) Equipment type	<input checked="" type="checkbox"/>	<input type="checkbox"/>	All Everett-Charles (ATG). Please see equipment list for details.
2) X-ray fluorescence inspection equipment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CMI
3) TDR equipment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Poar Instruments
4) Hi-pot test equipment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5) Four-wire kelvin tester	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

6) Capacitance meter	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7) Cleanliness testing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

4.4.2 AUTOMATED OPTICAL INSPECTION USAGE	EST %	COMMENTS
A) Before etching		
B) After etching	100	
C) Internal layers	100	
D) Final inspection		
E) Other	Outer Layers	Before soldermask
F) Conductor/clearance normally inspected by AOI equipment		
1) <input type="checkbox"/> 0.05mm [.002]		
2) <input checked="" type="checkbox"/> 0.05-.10mm [.002-.004]		
3) <input type="checkbox"/> >.10mm [.004]		
4) <input checked="" type="checkbox"/> Planes		
G) CAD download to AOI	100	All AOI is Cad reference

SECTION 5

QUALITY PROFILE

DATE COMPLETED March 16, 2017

GENERAL INFORMATION

COMPANY NAME

ITL Circuits

CONTACT

Randy Caldwell, QC Manager / Ian Hanna, QA Manager

TELEPHONE NUMBER

(905) 475-6658

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(905) 475-5097

This section of the Manufacturer's Qualification Profile is intended to describe the Total Quality Management (TQM) activity in place of being implemented at the manufacturing facility identified in the site description of this MQP.

To ease in the task of identifying the TQM program being planned or underway at the manufacturing site, the activities have been divided into twenty sections which when completed, provide the total picture of the posture toward managing quality issues. Each section contains a number of questions with regard to the topic under review.

It is not the intent to have the questions be all encompassing, nor is every question applicable to all manufacturers. However, identification of the status, related to each questions, when considered as a whole will convey an impression of the progress that the company has achieved in adopting the principles of total quality management.

The twenty sections, in order of the occurrence are:

- | | |
|---------------------------------------|--|
| 5.1 General Quality Programs | 5.11 Statistical Process Control |
| 5.2 New Products/Technical Services | 5.12 Problem Solving |
| 5.3 Customer Satisfaction | 5.13 In-Process Control |
| 5.4 Computer Integrated Manufacturing | 5.14 Receiving Inspection |
| 5.5 Process Documentation | 5.15 Material Handling |
| 5.6 Quality Records | 5.16 Non-Conforming Material Control |
| 5.7 Skill, Training & Certification | 5.17 Inspection and Test Plan |
| 5.8 Subcontractor Control | 5.18 Product Inspection/Final Audit |
| 5.9 Calibration Control | 5.19 Tooling Inspection, Handling, & Storage |
| 5.10 Internal Audits | 5.20 Corrective Action |

Each section provides a status report related to each question. The question may not be applicable, no activity has started as yet, or the company may have developed an approach to the issues raised by the questions. An (X) is indicated in the appropriate column. If deployment/implementation has started, the status is reported as percent deployment; this is indicated in column 4. The percentage number closely approximates the status of deployment. If deployment exists, the percentage results that have been achieved is indicated in column 5. Results are based on expected goals. Not providing percent information in either the deployment or results column implies a lack of activity in the particular area.

The quality descriptions requested are completed on the following pages by checking (X) the appropriate column to reflect the status of the manufacturing facility TQM program. Additional information may be provided as comments shown below, or on individual sections, or additional sheets as necessary.

COMMENTS

5.1 GENERAL QUALITY PROGRAMS		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Are quality objectives and responsibilities clearly stated, widely distributed and understood through the company?				100	100
2.	Is there a quality function or well defined organization which provides customer advocate guidance to the total organization and is this position fully supported by management?				100	100
3.	Does a quality measurement system exist with clearly defined metrics and is it utilized as a management tool?				100	100
4.	Are work instructions approved and controlled; and are they under revision control?				100	100
5.	Are the quality procedures and policies current and available at the point of application; and are they under revision control?				100	100
6.	Are benchmark and customer satisfaction studies done to determine best in class for all products, services, and administrative functions; and are quality goals set?				100	100
7.	Are Statistical Process Control (SPC) principles understood by all levels of management?				100	100
8.	Are there programs with sufficient resources assigned to support corrective actions and prevention?				100	100
9.	Does management solicit and accept feedback from the work force?				100	100
10.	Is there management support of ongoing training (including quality training), and is it documented by an organizational training plan?				100	100
11.	Are there regular management reviews of elements of the quality improvement process, including feedback for corrective action, and are the results acted upon?				100	100
12.	Are the quality and reliability goals aggressive relative to customer expectations and targeted at continuous improvement?				100	100
13.	Are the people who are responsible for administering the quality assurance function technically informed?				100	100
14.	Does Management have a "defect prevention" attitude to achieve continuous improvement?				100	100

5.2 NEW PRODUCTS/TECHNICAL SERVICES		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Do new product/technology/service development policies and procedures exist, and do they result in clearly defined project plans with appropriate measureables and approvals?				100	100
2.	Is quantitative benchmarking used to evaluate all new products/technologies/services in comparison to best-in-class offerings?				100	100
3.	Does a roadmap exist to ensure continued development of leading edge, best-in-class products/technology/services?				100	100
4.	Is the capability of each operation which controls critical-to-function characteristics for new products, fully certified?				100	100
5.	Are statistical tools used in the development of robust (high yield) new processes, products, and services?				100	100
6.	When new product/technology/service requires a new process, is it developed jointly and concurrently with the customer and/or suppliers?				100	100
7.	Are design reviews conducted on a scheduled basis which properly address the process capability indices of critical-to-function and product/service characteristics?				100	100
8.	Is the new product/technology/service, as produced by the process, verified to meet all customer satisfaction requirements?				100	100

COMMENTS

5.3 CUSTOMER SATISFACTION		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Is there a measurement system in place to assess the customer's perception of complete performance?				100	100
2.	Is an independent (unbiased) customer survey routinely conducted?				100	100
3.	Is there an internal measurement system within the organization which correlates to the level of customer satisfaction?				100	100
4.	Are there specific goals for achieving Total Customer Satisfaction, both internal and external?				100	100
5.	To what extent are customer satisfaction goals disseminated and understood by everyone in the organization?				100	100
6.	Does management regularly review and assess all operating systems to determine if barriers to customer satisfaction exist and are appropriate action plans then implemented?				100	100
7.	Is there a method in place to obtain future customer requirements?				100	100
8.	Are all findings of customer dissatisfaction reported back to the proper organization for analysis and corrective action?				100	100
9.	Are customer satisfaction requirements formally defined and documented, and are they based on customer input?				100	100
10.	Do all support organizations understand their role in achieving total customer satisfaction?				100	100

5.4 COMPUTER INTEGRATED MANUFACTURING		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Are systems integrated to allow electronic transfer of information between multiple systems to eliminate redundant data entry?				100	100
2.	Can customers electronically transfer CAD/CAM directly into manufacturing?				100	100
3.	Can customers electronically transfer order information directly into the business system?				100	100
4.	Is data electronically shared between shop floor control and process control systems (i.e., CNC, SPC, Electrical Test, AOI, etc.)?				100	100
5.	Are planning systems (MRP, forecasting, capacity planning, financial planning, etc.) electronically integrated with operation systems (order processing, purchasing, inventory management, shop floor control, financial/cost control, etc.)?				100	100
6.	Is information available from system processes in real time (vs. batch processing)?				100	100
7.	Are processes and procedures documented and available on-line?				100	100
8.	Do all functional departments have system access to key financial, manufacturing, sales, and operational data, as it relates to their functional objectives?				100	100
9.	Are computer simulation and design tools used to the maximum extent practicable in the design of new products/technologies/services				100	100

COMMENTS						

5.5 PROCESS DOCUMENTATION		STATUS				
DESCRIPTION OF PROGRAM		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are manufacturing product, process, and configuration documents under issue control?				100	100
2.	Are "preliminary" and "special product" specifications controlled?				100	100
3.	Does the system ensure that the most current customer specifications are available to the manufacturing personnel?				100	100
4.	Does the system ensure that the most current material specifications are available to the procurement function?				100	100
5.	Are incoming orders reviewed for revisions and issue changes?				100	100
6.	Is conformance to customer specifications assured before an order is accepted?				100	100
7.	Is customer feedback provided when designs do not meet manufacturability requirements?				100	100
8.	Are critical characteristics classified, relative to impact on product performance?				100	100
9.	Are customers informed of changes made to products controlled by customer drawings or specifications?				100	100
10.	Is there an effective internal deviation control procedure and, are customer requested deviations documented and followed?				100	100
11.	Do new product development procedures exist, and are they followed in the design development process?				100	100

5.6 QUALITY RECORDS		STATUS				
DESCRIPTION OF PROGRAM		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are records of inspection and process control maintained and available for review?				100	100
2.	Are records of equipment and equipment maintenance kept?				100	100
3.	Is the record and sample retention program defined?				100	100
4.	Are quality data used as a basis for corrective action?				100	100
5.	Are quality data used in reporting performance and trends to management?				100	100
6.	Are quality data used in supporting certifications of quality furnished to customers?				100	100
7.	Is field information used for corrective action?				100	100
8.	Does a cost of quality measurement system exist?				100	100
9.	Are customer reported quality problems responded to, and resolved in the time period requested?				100	100
10.	Is quality information on production material rejects provided to sub-suppliers with required corrective action?				100	100
11.	Are computers used to collect and analyze quality data?				100	100

COMMENTS

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5.7 SKILLS, TRAINING, & CERTIFICATION	STATUS
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DESCRIPTION OF PROGRAM		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Does management ensure that all personnel are trained in their role for achieving Total Customer Satisfaction?				100	100
2.	Do all personnel understand how their performance impacts internal and external customer satisfaction?				100	100
3.	Do all personnel who contact external customers reflect quality improvement programs?				100	100
4.	Do personnel participate in professional societies and growth programs?				100	100
5.	Are all personnel trained in sufficient detail to support key initiatives?				100	100
6.	Are the results of training evaluated and indicated program changes made?				100	100
7.	Does a policy exist which encourages the cross training and rotation of personnel, and is this policy used as the basis of job progression?				100	100
8.	Are performance standards participatively developed, and regularly applied for all personnel?				100	100
9.	Are Total Customer Satisfaction programs and resulting successes publicized to all personnel?				100	100
10.	Do goal setting and reward/incentive programs support the quality improvement process?		X			

5.8 SUBCONTRACTOR CONTROL		STATUS				
DESCRIPTION OF PROGRAM		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are requirements defined, communicated, and updated to ensure that the supplier understands expectations?				100	100
2.	Does a system exist which measures the performance of the supplier and communicates such information to the supplier? (i.e., supplier rating system)		X			
3.	Have the organization's processes been characterized to identify the critical requirements for the suppliers products?				100	100
4.	Have the capabilities of the supplier's processes been assessed and considered in the establishment of the requirements?				100	100
5.	Have partnerships been established with suppliers, and is assistance provided to ensure that each supplier has the capability to consistently supply conforming products?				100	100
6.	Have quality and cycle time metrics and improvement goals been established participatively with the supplier?		X			
7.	Has a system been established with the supplier for identification and verification of corrective action?				100	100
8.	Have the requirements for supplier materials been properly characterized and specified to ensure conformance of the product/service to the customer satisfaction requirements?				100	100
9.	Is there a supplier certification program or equivalent procured material/service continuous quality improvement program?		X			
10.	Can all personnel who contract suppliers properly reflect appropriate quality improvement programs and status to them?		X			

COMMENTS						

5.9 CALIBRATION CONTROL		STATUS				
DESCRIPTION OF PROGRAM		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results

1.	Are calibration and preventative maintenance programs in place and documented?				100	100
2.	Are calibration and maintenance personnel trained?				100	100
3.	Is traceability to NIST maintained?				100	100
4.	Is quality measurement and control equipment current, effective, and sufficiently integrated with production equipment?				100	100
5.	Is the history of quality measurement and control equipment documented?				100	100
6.	Has repeatability of measuring devices and inspection or testing processes been established and monitored; are gauge capability studies conducted and GR&R ratios acceptable(<10%)?				100	100
7.	Are calibration and preventative maintenance cycles on schedule?				100	100
8.	Is the use of non-calibrated equipment for design and production purposes prohibited?				100	100
9.	Are tools and fixtures used as criteria or acceptability of product/work fully qualified and identified?				100	100
10.	Are calibration intervals defined in accordance with industry standards or manufacturer's recommendations and the calibration history of the equipment?				100	100

5.10 INTERNAL AUDITS		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are regular reviews of the product/process conducted and are goals/plans established to continually improve?				100	100
2.	Are the processes/products properly documented and controlled? Do they include appropriate customer requirements and are they executed in conformance to the documentation?				100	100
3.	Are the required quality checks built into the operations within the manufacturing, field installation, and service process, and is the resulting data maintained and promptly acted upon?				100	100
4.	Are all pertinent methods of statistical quality control properly, effectively and efficiently used?				100	100
5.	Does a process change control system exist, and are customers informed of changes made to products and processes with customer approval prior to the change, when required?				100	100
6.	Are the operators within the process provided with written work instructions and are they trained?				100	100
7.	Is the receipt, handling, storage, packaging and release of all material, including customer provided items, at all stages, specified and controlled to prevent damage or deterioration, and to address obsolete material?				100	100
8.	Is there a first in/first out (FIFO) system in place, and is it followed?				100	100

COMMENTS

5.11 STATISTICAL PROCESS CONTROL		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Have the personnel who will be responsible for guiding the implementation of SPC been designated?				100	100
2.	Are statistical techniques used to reduce variation in the engineering process before the start of production?		X			
3.	Is the quality system dependent upon process rather than product controls?			X	40	40
4.	Is the capability of critical processes and machines measured and monitored with CPK's >1.5, and targeted with CP of 2.0?			X	20	20
5.	Are incapable processes or machines targeted for improvement or replacement?				100	100
6.	Is SPC implemented for all critical processes?				100	100
7.	Are procedures that control the reaction to out-of-control situations adequate and effective?				100	100
8.	Are operators trained in the use of appropriate statistical techniques, and are they properly applying them?			X	40	40
9.	Are advanced problem solving techniques used by engineers to solve problems? (Design of Experiments, planned experimentation, advanced diagnostic tools, etc.)			X	20	20
10.	Are control charts and other process controls properly implemented?				100	100
11.	Is statistical process control being practiced in work centers and are yields being recorded and plotted on a scheduled basis, with respect to upper and lower control limits?			X	40	40

5.12 PROBLEM SOLVING		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Are employees trained in problem solving techniques, in comparison to the needs of the organization?			X	20	20
2.	Does the organization utilize participative problem solving techniques to identify, measure and resolve internal and external problems?			X	20	20
3.	Are problem solving efforts timely and effective?			X	80	80
4.	Are applied resources sufficient to remove problem solving constraints?			X	80	80
5.	Are statistical techniques used for problem solving?			X	20	20
6.	Are quality data used to identify barriers, and to determine the priority of problems?				100	100
7.	Is there a policy/procedure that includes the use of problem solving techniques to systematically drive reduction in variability?			X	20	20

COMMENTS	

5.13 IN-PROCESS CONTROL		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Are process capabilities established and maintained on all major processes? (critical parameters)				100	100
2.	Are in-process inspections, test operations, and processes properly specified and performed?				100	100
3.	Are in-process inspection facilities and equipment adequate?				100	100
4.	Are the results of in-process inspections used in the promotion of effective preventative action and corrective action?				100	100
5.	Is preventative maintenance performed on the equipment and facilities?				100	100
6.	Are housekeeping procedures adequate and how well are they followed?				100	100
7.	Are process management plans established, and are critical parameters followed?				100	100
8.	Are work areas uncluttered and free of excess work-in-process, supplies, debris, etc? Is the environment conducive to producing quality work? Is proprietary information adequately protected?				100	100
9.	Are certifications and in-process inspection results used in making final acceptance decisions?				100	100
10.	Are methods and procedures for the control of metallurgical, chemical, and other special processes established and followed?				100	100

5.14 RECEIVING INSPECTION		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Are receiving inspection facilities and equipment adequately and properly maintained?				100	100
2.	Are receiving inspection procedures documented and followed?				100	100
3.	Are receiving inspection results used for corrective and preventive action?				100	100
4.	Are the procedures for storage and timely disposition of discrepant material in place and followed?				100	100

COMMENTS

5.15 MATERIAL HANDLING		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Are procured material releases from receiving inspection clearly identified, as to acceptance status?				100	100
2.	Are procedures to facilitate limited life materials, such as prepreg, in place, properly controlled, and monitored?				100	100
3.	Are procured items identified with some means of traceability (serial number, lot number, date code, etc.)?				100	100
4.	Are procedures and facilities adequate for storage, release and control of materials?				100	10
5.	Are in-store and in-process materials properly identified and controlled?				100	100
6.	Is in-process material protected from corrosion, deterioration, and damage?				100	100

5.16 NON-CONFORMING MATERIAL CONTROL		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Is non-conforming material identified, segregated from regular production material, and properly dispositioned?				100	100
2.	Are non-conforming materials properly identified and controlled to prevent inadvertent use?				100	100
3.	Is the review and disposition of non-conforming materials defined, and are provisions made for inclusion of the customer in disposition decision?				100	100
4.	Are procedures for controlling non-conforming materials, and for ensuing corrective action, in place and followed?				100	100
5.	Do procedures provide for material review by a committee consisting of Quality and Engineering (as a minimum), to determine the disposition of non-conforming materials? (deviating from drawings or specification)				100	100
6.	Do supplier's procedures and controls for corrective action prevent recurrence of non-conformances?				100	100
7.	Is there a system for coordinating necessary corrective action with purchasing personnel?				100	100
8.	Does the corrective action extend to all applicable causes of non-conformance (e.g., design, workmanship, procedures, equipment, etc.)?				100	100

COMMENTS

5.17 INSPECTION AND TEST PLAN		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Are statistical techniques used in determining the acceptability of finished goods to customer requirements?				100	100
2.	Are periodic tests conducted to audit reliability and environmental performance of the final product?				100	100
3.	Is CPK tracking performed for critical characteristics, with plans to achieve CPK = 1.5 with a target of CP of 2.0?			X	40	400
4.	Is root cause failure analysis performed for internal and external failures, and is appropriate corrective action implemented?				100	100
5.	Are test and inspection personnel trained in the procedures of their operations, and are those procedures being followed?				100	100
6.	Is the new product/technology/service, as produced by the processes, verified to meet all customer satisfaction requirements?				100	100

5.18 PRODUCT INSPECTION/FINAL AUDIT		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Are final product acceptance procedures documented and followed?				100	100
2.	Are all specific customer product audits conducted, as required?				100	100
3.	Are inspectors trained for the tasks performed?				100	100
4.	Are flow charts or milestones developed with checkpoints readily available?				100	100
5.	Is a system in place which denotes inspection performed; e.g., use of initials, stamps, labels, bar codes, etc., affixed to production documentation?				100	100
6.	Is a quality system established and maintained for control of product/production documentation?				100	100
7.	Is "accept/reject" criteria defined and available for use?				100	100
8.	Is a final audit performed to ensure that all required verifications and tests, from receipt of materials through point of product completion, have been accomplished?				100	100
9.	Are packing and order checking procedures documented and followed?				100	100

COMMENTS						

5.19 TOOLING INSPECTION, HANDLING, &		STATUS				
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STORAGE						
DESCRIPTION OF PROGRAM		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are temperature, humidity, laminar flow controls in place to prevent contamination, and to assure dimensional stability?				100	100
2.	Do operators use hairnets, gloves & lab coats in all photolab and photoexposure areas?				100	100
3.	Are work instructions and related forms in place to control all applicable tooling requirements, as stated in the customer's purchase order?				100	100
4.	Are customer provided artworks controlled with regard to handling, storage, revision control and relationship to converted production phototools (working films)?				100	100
5.	Are production phototools (working films) controlled with regard to handling, storage, use life, and relationship to customer purchase order?				100	100
6.	Are customer provided artworks and production phototools (working films) inspected, including dimensional checks?				100	100
7.	Are all tools, fixtures, and other devices, used for tooling inspection and control, maintained under the calibration control procedure?				100	100
8.	Are records showing initial acceptance, periodic checks, and any needs for rework and/or modification available?				100	100

5.20 CORRECTIVE ACTION		STATUS				
DESCRIPTION OF PROGRAM		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are final acceptance inspection results used for corrective and preventative action?				100	100
2.	Is root-cause analysis performed for non-conformances? This includes, but is not limited to, non-conformances (problems) caused by suppliers, found/caused "in-house" during processing, or those reported by the customer.				100	100
3.	Is positive action taken to prevent recurrence of problems, and are there documented reports/records of each occasion?				100	100
4.	Do procedures and systems provide for ensuring that replies are made to customer requests for correction action within the time limit specified?				100	100
5.	Is corrective action controlled and documented for all applicable work centers?				100	100
6.	When corrections are made, is their effectiveness subsequently reviewed and monitored?				100	100

COMMENTS	

SECTION 6 (CHECK ONE IN EACH LINE THAT APPLIES)

MANUFACTURING HISTORY (See Section 2 Site Capability)

DATE COMPLETED
March 16, 2017

Please complete as many history profiles so that the total descriptions of products you manufacture account for production orders that reflect 70% of your business. History profiles are for board or board family (board types may be grounded together if they are similar).

BOARD TYPE 20 Layer	DATE OF ORDER August 2016	MATERIAL ISOLA 408HR+3M ECM	HISTORY #
VIA TYPE MICRO-VIA	PRODUCTION QUANTITY 48	TOTAL YEARLY PRODUCTION % 576	

Dimensions in millimeters (inches in brackets)

BOARD			HOLES		
BOARD SIZE DIAGONAL	TOTAL BOARD THICKNESS	NUMBER CONDUCTIVE LAYERS	DIA DRILLED HOLES	TOTAL PTH TOL (MAX-MIN)	LOCATION TOL DTP
<input type="checkbox"/> <250 [<10.00]	<input type="checkbox"/> <1,0 [<.040]	<input type="checkbox"/> 1-4 [1-4]	<input type="checkbox"/> >0,5 [>.020]	<input type="checkbox"/> >0,250 [> .010]	<input type="checkbox"/> >0,50 [>.020]
<input type="checkbox"/> 250 [10.00]	<input type="checkbox"/> 1,0 [.040]	<input type="checkbox"/> 5-6 [5-6]	<input type="checkbox"/> 0,5 [.020]	<input type="checkbox"/> 0,250 [.010]	<input type="checkbox"/> 0,50 [.020]
<input checked="" type="checkbox"/> 350 [14.00]	<input checked="" type="checkbox"/> 1,6 [.060]	<input type="checkbox"/> 7-8 [7-8]	<input type="checkbox"/> 0,4 [.016]	<input type="checkbox"/> 0,200 [.008]	<input type="checkbox"/> 0,40 [.016]
<input type="checkbox"/> 450 [17.50]	<input type="checkbox"/> 2,0 [.080]	<input type="checkbox"/> 9-12 [9-12]	<input type="checkbox"/> 0,35 [.014]	<input type="checkbox"/> 0,150 [.006]	<input type="checkbox"/> 0,30 [.012]
<input type="checkbox"/> 550 [21.50]	<input type="checkbox"/> 2,5 [.100]	<input type="checkbox"/> 13-16 [13-16]	<input type="checkbox"/> 0,30 [.012]	<input type="checkbox"/> 0,125 [.005]	<input type="checkbox"/> 0,25 [.010]
<input type="checkbox"/> 650 [25.50]	<input type="checkbox"/> 3,5 [.135]	<input checked="" type="checkbox"/> 17-20 [17-20]	<input type="checkbox"/> 0,25 [.010]	<input type="checkbox"/> 0,100 [.004]	<input type="checkbox"/> 0,20 [.008]
<input type="checkbox"/> 750 [29.50]	<input type="checkbox"/> 5,0 [.200]	<input type="checkbox"/> 21-24 [21-24]	<input checked="" type="checkbox"/> 0,20 [.008]	<input checked="" type="checkbox"/> 0,075 [.003]	<input type="checkbox"/> 0,15 [.006]
<input type="checkbox"/> 850 [33.50]	<input type="checkbox"/> 6,5 [.250]	<input type="checkbox"/> 25-28 [25-28]	<input type="checkbox"/> 0,15 [.006]	<input type="checkbox"/> 0,050 [.002]	<input checked="" type="checkbox"/> 0,10 [.004]
<input type="checkbox"/> >850 [>33.50]	<input type="checkbox"/> >6,5 [>.250]	<input type="checkbox"/> >28 [>28]	<input type="checkbox"/> <0,15 [<.006]	<input type="checkbox"/> <0,050 [<.002]	<input type="checkbox"/> <0,10 [<.004]
<input type="checkbox"/> Other:	<input type="checkbox"/> Other:	<input type="checkbox"/> Other:	<input type="checkbox"/> Other:	<input type="checkbox"/> Other:	<input type="checkbox"/> Other:

CONDUCTORS

INTERNAL ELEC CLEARANCE (MIN)	INTERNAL COND WIDTH (MIN)	INTERNAL PROCESS ALLOWANCE	EXTERNAL ELEC CLEARANCE (MIN)	EXTERNAL COND WIDTH (MIN)	EXTERNAL PROCESS ALLOWANCE	FEATURE LOCATION DTP
<input type="checkbox"/> >0,350 [>.014]	<input type="checkbox"/> >0,250 [>.010]	<input type="checkbox"/> >0,100 [>.004]	<input type="checkbox"/> >0,350 [>.014]	<input type="checkbox"/> >0,250 [>.010]	<input type="checkbox"/> >0,100 [>.004]	<input type="checkbox"/> >0,50 [>.020]
<input type="checkbox"/> 0,350 [.014]	<input type="checkbox"/> 0,250 [.010]	<input type="checkbox"/> 0,100 [.004]	<input type="checkbox"/> 0,350 [.014]	<input type="checkbox"/> 0,250 [.010]	<input type="checkbox"/> 0,100 [.004]	<input type="checkbox"/> 0,50 [.020]
<input type="checkbox"/> 0,250 [.010]	<input type="checkbox"/> 0,200 [.008]	<input type="checkbox"/> 0,075 [.003]	<input type="checkbox"/> 0,250 [.010]	<input type="checkbox"/> 0,200 [.008]	<input type="checkbox"/> 0,075 [.003]	<input type="checkbox"/> 0,40 [.016]
<input type="checkbox"/> 0,200 [.008]	<input type="checkbox"/> 0,150 [.006]	<input type="checkbox"/> 0,050 [.002]	<input type="checkbox"/> 0,200 [.008]	<input type="checkbox"/> 0,150 [.006]	<input type="checkbox"/> 0,050 [.002]	<input type="checkbox"/> 0,30 [.012]
<input type="checkbox"/> 0,150 [.005]	<input type="checkbox"/> 0,125 [.005]	<input type="checkbox"/> 0,040 [.0015]	<input type="checkbox"/> 0,150 [.006]	<input type="checkbox"/> 0,125 [.005]	<input type="checkbox"/> 0,040 [.0015]	<input type="checkbox"/> 0,25 [.010]
<input type="checkbox"/> 0,125 [.005]	<input type="checkbox"/> 0,100 [.004]	<input type="checkbox"/> 0,030 [.0012]	<input type="checkbox"/> 0,125 [.005]	<input type="checkbox"/> 0,100 [.004]	<input type="checkbox"/> 0,030 [.0012]	<input type="checkbox"/> 0,20 [.008]
<input type="checkbox"/> 0,100 [.004]	<input checked="" type="checkbox"/> 0,075 [.003]	<input type="checkbox"/> 0,025 [.001]	<input checked="" type="checkbox"/> 0,100 [.004]	<input checked="" type="checkbox"/> 0,075 [.003]	<input type="checkbox"/> 0,025 [.001]	<input type="checkbox"/> 0,15 [.006]
<input checked="" type="checkbox"/> 0,075 [.003]	<input type="checkbox"/> 0,050 [.002]	<input type="checkbox"/> 0,020 [.0008]	<input type="checkbox"/> 0,075 [.003]	<input type="checkbox"/> 0,050 [.002]	<input type="checkbox"/> 0,020 [.0008]	<input checked="" type="checkbox"/> 0,10 [.004]
<input type="checkbox"/> <0,075 [<.003]	<input type="checkbox"/> <0,050 [<.002]	<input checked="" type="checkbox"/> <0,020 [<.0008]	<input type="checkbox"/> <0,075 [<.003]	<input type="checkbox"/> <0,050 [<.002]	<input checked="" type="checkbox"/> <0,020 [<.008]	<input type="checkbox"/> <0,10 [<.004]
<input type="checkbox"/> Other:	<input type="checkbox"/> Other:	<input checked="" type="checkbox"/> Other: .0005	<input type="checkbox"/> Other:	<input type="checkbox"/> Other:	<input checked="" type="checkbox"/> Other: .0005	<input type="checkbox"/> Other:

SECTION 7

DATE COMPLETED March 16, 2017

IDENTIFICATION OF PREVIOUS AUDITS (Optional)

*** TO PROVIDED UPON REQUEST**

Please complete as many forms as you feel reflect the intensity of your customer visits.

COMPANY AUDITORS	DATE OF AUDIT
AUDIT TEAM MEMBERS	AUDITOR REMARKS
	SPECIFICATIONS USED IN AUDIT
LENGHT OF AUDIT	
TEAM MEMBERS MAY BE CONTACTED AT	
COMPANY AUDITORS	DATE OF AUDIT
AUDIT TEAM MEMBERS	AUDITOR REMARKS
	SPECIFICATIONS USED IN AUDIT
LENGHT OF AUDIT	
TEAM MEMBERS MAY BE CONTACTED AT	
COMPANY AUDITORS	DATE OF AUDIT
AUDIT TEAM MEMBERS	AUDITOR REMARKS
	SPECIFICATIONS USED IN AUDIT
LENGHT OF AUDIT	
TEAM MEMBERS MAY BE CONTACT AT	

SECTION 8

FINANCIAL REVIEW (OPTIONAL)

DATE COMPLETED March 16, 2017

* TO BE PROVIDED ON-SITE

Please complete the following financial information that coincides with the company description and site information provided in section 1.

COMPANY FINANCIAL DESCRIPTION

LEGAL NAME		
TAXPAYER ID NUMBER	DUNS NUMBER	TRADING SYMBOL
ANNUAL SALES	PRIOR YEAR	YEAR-TO-DATE
FISCAL YEAR		
BANK	ACCOUNT NUMBER	
BANK ADDRESS	STATE	ZIP
PROVINCE	COUNTRY	
BANK TELEPHONE NUMBER	FAX NUMBER	
COMMENTS		

SITE FINANCIAL DESCRIPTION

SITE NAME		
TAXPAYER ID NUMBER	DUNS NUMBER	TRADING SYMBOL
ANNUAL SALES	PRIOR YEAR	YEAR-TO-DATE
FISCAL YEAR		
BANK	ACCOUNT NUMBER	
BANK ADDRESS	STATE	ZIP
PROVINCE	COUNTRY	
BANK TELEPHONE NUMBER	FAX NUMBER	
COMMENTS		

SECTION 9

MQP ELECTRONIC EDITING

This MS Word template comes with editable fields. IPC has made this electronic document available for ease of completing, updating, and filing the MQP, as well as to give the laminate manufacturer and customer a common interface. Using the template enables laminate manufacturers to maintain several customer specific files without the endless stream of paperwork.

Editable fields are highlighted in gray. To complete the fields in the template, use the TAB key to toggle from field to field, entering the information as instructed in the introductory text for each section.

The developers of this MQP strongly suggest the person at the laminate manufacturing facility responsible for creating and maintaining the MQP write protect the file to be sent.