



VERGENT
PRODUCTS

Continually Elevating Return

IPC-1720 Assembly Qualification Profile



ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES®

IPC-1720A

Assembly Qualification Profile

Developed by the OEM council of the IPC, IPC-1720A categorized an electronic assembly manufacturer's capabilities and supplies the OEM customer with detailed, substantive information.

IPC-1720A

July 2004

A standard developed by IPC

2215 Sanders Rd, Northbrook, IL 60062-6135
Tel. 847.509.9700 Fax 847.509.9798
www.ipc.org

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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 Assembly Qualification Profile (AQP) 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.

CONTENTS

<u>Sections:</u>	<u>Pages</u>
1.1 Company Description	1
1.2. Site Description	2
2.1 Product Type	3-5
2.2. Processes	6-8
2.3 Testing	9-10
2.4. Product Complexity	11-13
2.5. Product Volume	14-15
2.6 Quality Development	16-17
2.7 Services	18
3.0 Master Equipment Listing	19
4.0 Technology Profile Specifics	20-28
5.0 Quality Profile	29-39
6.0 Manufacturing History	40
7.0 Identification of Previous Audits	41
8.0 Financial Review	42
9.0 AQP Electronic Editing and Sample Form	43-50
10.0 Glossary of Terms	51
10.1 Product Type Description	52

HOW TO USE THE AQP

Although the AQP is for a single site or location, information about the overall company is helpful in establishing the relationship of the existing site to the total company and to other sites or divisions. The first page of section 1 is intended to convey the overall company description and is reflected in the optional financial review detailed in section 8. The remainder of the AQP is devoted to information about a single site (see section 9 for examples).

Although intended to be site specific, the AQP may be used to convey total corporate capability. When this practice is preferred, section 1.2 (intended for site description) is modified to reflect total corporate capability, as are all other sections of the AQP.

The Electronic Assembly Manufacturer should keep all sections current. In the initial contact between the manufacturer and a new customer, an abbreviated AQP will suffice (site description from Sections 1 and 2). Access to AQP in electronic media is suggested in order to facilitate the appropriate manufacturer/user information interchange. The remaining sections of the AQP provide details of the site assembly capability and the quality principles that have been incorporated into the systems used to manufacture products. The information is of use to the assembly company in assessing where the organization stands on implementing quality and technology; the same data helps the customer in determining how well the manufacturers' capability matches the customer need.

ACKNOWLEDGMENTS

The IPC is indebted to the members of the OEM council who participated in the development of this document. A note of thanks is also expressed to the members of the Electronic Manufacturing Services Industry (EMSI) for their review and critique and construction recommendations in finalizing the principles developed for the AQP.

Although the IPC is grateful for all the involvement and individual contributions made in completing the AQP, a special acknowledgment is extended to the following individuals. It was their dedication and foresight that made this publication possible.

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Wilcox Electric

Steve Pudles
Ronic Assoc. Inc.

Mario Suarez-Solis
Encore Computer Corp.

SECTION 1.1

DATE COMPLETED Updated August 15, 2016

COMPANY DESCRIPTION**GENERAL INFORMATION**

LEGAL NAME Vergent Products			
PHYSICAL ADDRESS 609 14 th Street SW			
CITY Loveland	STATE CO	ZIP 80537	
PROVINCE	COUNTRY USA		
TELEPHONE NUMBER (970) 667-8570	FAX NUMBER (970) 667-9332	TELEX NUMBER	
E-MAIL ADDRESS sales@vergentproducts.com	MODEM NUMBER	DATE FOUNDED July 1995 <input type="checkbox"/> PUBLIC <input checked="" type="checkbox"/> PRIVATE	
INTERNET URL http://www.vergentproducts.com/	FTP SITE		

MANAGEMENT

PRESIDENT and CHIEF EXECUTIVE OFFICER Terry Precht
VICE PRESIDENT OF MARKETING/SALES Diana Precht
VICE PRESIDENT OF OPERATIONS and CHIEF OPERATING OFFICER Tracy Ireland
VICE PRESIDENT OF FINANCE MANAGEMENT and CHIEF FINANCIAL OFFICER Terry Precht
VICE PRESIDENT OF ENGINEERING Terry Precht
DIRECTOR OF QUALITY John Beachman
DIRECTOR OF PROGRAM MANAGEMENT Diana Precht
DIRECTOR OF SUPPLY CHAIN Karla Lippincott

CORPORATE DESCRIPTION		NUMBER OF CORPORATE EMPLOYEES	NUMBER OF SITE EMPLOYEES	COMMENTS
DESIGN AND DEVELOPMENT		9	9	
MANUFACTURING ENGINEERING		2	2	
MANUFACTURING CONTROL		7	7	Supervisors and Expert Assemblers
MANUFACTURING	DIRECT	30	30	Does not include flexible contract workforce
	INDIRECT	17	17	
QUALITY CONTROL	QUALITY ENGINEERS	4	4	Includes QA Technicians
	INTERNAL AUDITORS	5	5	Includes QA Inspectors
	GENERAL MANAGEMENT	1	1	AdminSupport
ADMINISTRATION		13	13	Includes Client Engagement Managers, IT, Finance, HR & Sales
TOTAL		89	89	

SECTION 1.2

SITE DESCRIPTION

(TO BE COMPLETED FOR EACH SITE)

ATTACH APPROPRIATE CHARTS (OPTIONAL)

DATE COMPLETED
Updated August 15, 2016

MANUFACTURING FACILITY			
COMPANY NAME		Vergent Products	
PHYSICAL ADDRESS		609 14 th Street SW	
CITY	Loveland	STATE	CO ZIP 80537
PROVINCE		COUNTRY	USA
TELEPHONE NUMBER	(970) 667-8570	FAX NUMBER	(970) 667-9332 TELEX
E-MAIL NUMBER		MODEM NUMBER	YEARS IN BUSINESS 20 years
PRINCIPLE PRODUCTS/SERVICES/SPECIALTIE Product Commercialization Services for Consumer Products and Industrial/Medical Equipment.		BUSINESS CHARACTERIZATION (HIGH VOLUME, QUICK TURN-AROUND, ETC.) Product realization and improvement from concept through obsolescence, full turnkey, low to mid-volume high mix. Focus on elevating client return.	

FACILITY MANAGEMENT	TITLE	REPORTS TO (Function/Job Title)
OVERALL OPERATION RESPONSIBILITY FOR THIS SITE Terry Precht	President/Owner	
MANUFACTURING Tracy Ireland	Vice President of Operations/COO	President
TECHNICAL/ENGINEERING Terry Precht	Vice President of Engineering	President
MATERIALS/PRODUCTION CONTROL Karla Lippincott	Director of Supply Chain	Vice President of Operations
PURCHASING Karla Lippincott	Director of Supply Chain	Vice President of Operations
QUALITY John Beachman	Director of Quality	Vice President of Operations
SALES REPRESENTATIVE Diana Precht	Vice President of Sales/Owner	President
WASTE MANAGEMENT/FACILITIES/SAFETY Tracy Ireland	Director of Fiance	President

BUILDINGS				SYSTEMS (INDICATE % COVERAGE)						
	AGE	AREA (Sq. Ft.)	Construction (Wood/Brick)	Power Conditioning	Heating	Ventilation	Air Conditioning	Sprinklers	Waste Treatment	Other
Office	7 yrs	13840	Cement	25	100	100	100	100		
Manufacturing	7 yrs	23834	Cement	100	100	100	100	100		
Storage	7 yrs	30000*	Cement	0	100	100	100	100		
Planned additions										

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)	3 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	May 2005 none
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, CSA Approval and Number	<input checked="" type="checkbox"/> UL # E162464 <input checked="" type="checkbox"/> CSA # 4694618 <input checked="" type="checkbox"/> ISO 9001 Reg#A0001804-1 Reg Date 11-08
Do you have a safety program? Describe Comprehensive EHS	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	Hazardous Waste Number Trade Waste Account Number	COD040724551 Conditionally Exempt Small Waste Generator

PLANT PERSONNEL (TOTAL EMPLOYEES)										
Permanent	Contract	Office	Technical/Engineering	Production	Full-Time QA	Part-Time QA	Union	Non-Union	Union Name	Contract Expires (Date)
89	8	13	18	48 + 8	10	0	0	All	n/a	n/a

SECTION 2.1

PRODUCT TYPE

DATE COMPLETED
Updated August 15, 2016

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

Site Capability Snapshot (Please Check all that apply)

Designators			Remarks
A	Electronic Assembly Type	<input checked="" type="checkbox"/> 1A – Single-sided THT only <input checked="" type="checkbox"/> 1B – Single-sided SMT only <input checked="" type="checkbox"/> 1C - Single-sided simplistic mix of THT & SMT <input checked="" type="checkbox"/> 1X - Single-sided complex mix of THT & SMT with FP, BGA <input checked="" type="checkbox"/> 2B - Double-sided simplistic SMT only <input checked="" type="checkbox"/> 2C - Double-sided simplistic mix of THT & SMT <input checked="" type="checkbox"/> 2X - Double-sided complex mix of THT & SMT with FP, BGA <input type="checkbox"/> 2Y - Double-sided complex mix of THT & SMT with ultra-FP, chip scale <input type="checkbox"/> 2Z - Double-sided complex mix of THT & SMT with ultra-FP, COB, flip chip, TAB, chip scale <input type="checkbox"/> Other:	Have not demonstrated chip scale capability. Have not demonstrated COB, flip chip, TAB or chip scale capability.
B	Board Construction Type	<input checked="" type="checkbox"/> Rigid Printed Board <input type="checkbox"/> Flex Printed Board <input checked="" type="checkbox"/> Rigid Flex Board <input checked="" type="checkbox"/> Rigid Back Plane <input type="checkbox"/> Molded Board <input type="checkbox"/> MCM-C Ceramic Modules & Hybrids <input type="checkbox"/> MCM-L Laminated Modules <input type="checkbox"/> MCM-D Deposited Dielectric <input type="checkbox"/> Other:	
C	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"/> 350 [14.00] <input checked="" type="checkbox"/> 650 [25.50] <input type="checkbox"/> 750 [29.50] <input type="checkbox"/> 850 [33.50] <input type="checkbox"/> >850 [33.50] <input type="checkbox"/> Other:	SMT max board size = 17" x 19" 3070 test max board size = 30" x 18"

D	Maximum Thru Hole Work Area	<input type="checkbox"/> <300 CM ² <[50 IN ²] <input type="checkbox"/> 300 CM ² [50 IN ²] <input type="checkbox"/> 600 CM ² [100 IN ²] <input checked="" type="checkbox"/> 1000 CM ² [160 IN ²] <input type="checkbox"/> 1500 CM ² [230 IN ²] <input type="checkbox"/> 2100 CM ² [325 IN ²] <input type="checkbox"/> 2800 CM ² [430 IN ²] <input type="checkbox"/> 3600 CM ² [550 IN ²] <input type="checkbox"/> 3600 CM ² [550 IN ²] <input type="checkbox"/> Other:	12" x 14" max selective wave solder
E	Maximum SMT Work Area	<input type="checkbox"/> <300 CM ² <[150 IN ²] <input type="checkbox"/> 300 CM ² [50 IN ²] <input type="checkbox"/> 600 CM ² [100 IN ²] <input type="checkbox"/> 1000 CM ² [160 IN ²] <input type="checkbox"/> 1500 CM ² [230 IN ²] <input checked="" type="checkbox"/> 2100 CM ² [325 IN ²] <input type="checkbox"/> 2800 CM ² [430 IN ²] <input type="checkbox"/> 3600 CM ² [550 IN ²] <input type="checkbox"/> >3600 CM ² [550 IN ²] <input type="checkbox"/> Other:	SMT max board size = 17" x 19"
F	Distance Wiring Terminals & Connectors	<input checked="" type="checkbox"/> Solid Wire <input checked="" type="checkbox"/> Standard Wire <input checked="" type="checkbox"/> Shielded Wire <input checked="" type="checkbox"/> Coax Wire <input checked="" type="checkbox"/> Terminal Bifurcated & Turret <input checked="" type="checkbox"/> Clip & Pin Terminals <input checked="" type="checkbox"/> Crimped Terminals <input checked="" type="checkbox"/> Board Connectors <input checked="" type="checkbox"/> Backplane Connectors <input type="checkbox"/> Other:	
G	Cable & Harness (Multiple Wire)	<input checked="" type="checkbox"/> Hi Power Eq. or Lgr. 10 Gauge <input checked="" type="checkbox"/> Lower Power Thinner than 10 Gauge <input checked="" type="checkbox"/> Electrical Cable (Wire) <input type="checkbox"/> Optical Cable (Glass) <input checked="" type="checkbox"/> Electrical Harness <input type="checkbox"/> Optical Harness <input checked="" type="checkbox"/> Ribbon Cable Harness <input checked="" type="checkbox"/> Combination Harness <input type="checkbox"/> Other:	

H	Mechanical Assembly Operations	<input checked="" type="checkbox"/> Electronic Hardware <input checked="" type="checkbox"/> Mechanical Hardware <input checked="" type="checkbox"/> Shielding Hardware <input checked="" type="checkbox"/> Thermal Conductive Hardware <input checked="" type="checkbox"/> Front Panel Hardware <input checked="" type="checkbox"/> Jumper Wires <input type="checkbox"/> Molded Cable <input checked="" type="checkbox"/> Final System Assembly (Box Build) <input checked="" type="checkbox"/> Other: Small scale machine shop	
J	Completed End Product	<input checked="" type="checkbox"/> Consumer Products <input checked="" type="checkbox"/> General Purpose Computers <input checked="" type="checkbox"/> Telecommunications Products <input checked="" type="checkbox"/> Commercial Aircraft Products <input checked="" type="checkbox"/> Industrial & Automotive Products <input type="checkbox"/> High Performance Military <input type="checkbox"/> Outer Space (LEO & GEO) <input type="checkbox"/> Military Avionics <input checked="" type="checkbox"/> Automotive (Under the Hood) <input checked="" type="checkbox"/> Other: Class II Medical Devices	

*For product type description, see Glossary, Section 10.1

SECTION 2.2 PROCESSES

DATE COMPLETED
Updated August 15,
2016

This section is intended to provide overview information on the assembly processes used by the manufacturer.

Site Capability Snapshot (Please Check all that apply)

Designators			Remarks
A	Through Hole Insertion	<input checked="" type="checkbox"/> Two Leaded-Axial <input checked="" type="checkbox"/> Two Leaded Radial <input checked="" type="checkbox"/> Multiple Leaded ≤6-Radial <input checked="" type="checkbox"/> Single-In-Line Packages (SIPS) <input checked="" type="checkbox"/> Dual In-Line Pkgs. (DIPS) ≤24 PION <input checked="" type="checkbox"/> Dual In-Line Pkgs. >24 PION <input checked="" type="checkbox"/> Pin Grid Arrays (PGA's) <input checked="" type="checkbox"/> Component Sockets <input checked="" type="checkbox"/> Card Edge/Two Piece Connectors <input type="checkbox"/> Other:	
B	Surface Mount Placement	<input checked="" type="checkbox"/> Chip Resistors/Cap. (Reel) <input checked="" type="checkbox"/> Bulk Chip Resistors/Cap. <input checked="" type="checkbox"/> Tantalum Capacitor <input checked="" type="checkbox"/> Metal Faced Components (MELFS) <input checked="" type="checkbox"/> Sm. Outline Diodes (SODS) <input checked="" type="checkbox"/> Sm. Outline Transistors (SOTS) <input checked="" type="checkbox"/> Sm. Outline IC's (SOIC's) <input checked="" type="checkbox"/> Variable Resistor Trim Pots <input checked="" type="checkbox"/> Surface Mount Sockets/Test Pts. Connect <input type="checkbox"/> Other:	
C	High Pin Count	<input type="checkbox"/> Chip-on-Tape (Molded ring) >0.4 mm pitch <input type="checkbox"/> Chip-on-Tape (Molded ring) ≤0.3mm pitch <input checked="" type="checkbox"/> Quad Flat Pack (QFP) ≤0.4mm pitch <input checked="" type="checkbox"/> Quad Flat Pack (QFP) ≤0.3mm pitch <input checked="" type="checkbox"/> Shrink Quad Flat Pack (SQFP) <input checked="" type="checkbox"/> Thin Small Outline Pkg. (TSOP) <input checked="" type="checkbox"/> Ball/Post Grid Array >1.0mm pitch <input checked="" type="checkbox"/> Ball/Post Grid Array ≤1.0mm pitch <input checked="" type="checkbox"/> Land Grid Array Any Pitch <input type="checkbox"/> Other:	

D	Bare Chip Attachment	<input type="checkbox"/> Thermal Wire Bonding <input type="checkbox"/> Ball Bonding <input type="checkbox"/> Ultrasonic Wiring Bonding <input type="checkbox"/> Beam Lead Chip Bonding <input type="checkbox"/> Generic Tape Automated Bonding <input type="checkbox"/> Custom Tape Automated Bonding <input type="checkbox"/> Flip Chip on Ceramic or Glass Based <input type="checkbox"/> Flip Chip on Rigid Printed Boards <input type="checkbox"/> Flip Chip on Flex Circuit Boards <input type="checkbox"/> Other:	
E	Attachment Techniques	<input checked="" type="checkbox"/> Hand Soldering <input type="checkbox"/> Hot Bar Soldering <input checked="" type="checkbox"/> Focused Hot Air Soldering <input checked="" type="checkbox"/> Wave Soldering <input type="checkbox"/> IR Reflow Soldering <input type="checkbox"/> Vapor Phase Soldering <input checked="" type="checkbox"/> Hot Air Convection Soldering <input type="checkbox"/> Laser Soldering <input checked="" type="checkbox"/> Conductive Adhesive Attachment <input checked="" type="checkbox"/> Other: Automated selective wave solder	
F	Cleaning & Cleanliness Testing	<input checked="" type="checkbox"/> No Clean/Never Clean System <input type="checkbox"/> Aqueous Cleaning In-line Sys. <input type="checkbox"/> Aqueous Cleaning Static Soak <input type="checkbox"/> Modified Solvent Clean. In-line <input checked="" type="checkbox"/> Modified Solvent Clean. Static Soak <input checked="" type="checkbox"/> Ultrasonic Agitation Cleaning <input checked="" type="checkbox"/> Ionic Salt/Residue Test <input type="checkbox"/> Organic Contaminate Impreg. Test <input type="checkbox"/> Surface Insul. Resist. (SIR) Test <input checked="" type="checkbox"/> Other: Technical Devices Nu/Clean AquaBatch XL with DI Elite Plus	
G	Coating & Encapsulation	<input type="checkbox"/> Bare Die-Glob Top <input type="checkbox"/> Bare Die-Total Assembly <input type="checkbox"/> Assembly (1 or 2 sides) Epoxy Coating <input type="checkbox"/> Assembly (1 or 2 sides) Polyurethane Coating <input type="checkbox"/> Assembly (1 or 2 sides) Acrylic Coating <input type="checkbox"/> Assembly (1 or 2 sides) Vacuum Dep Coating <input type="checkbox"/> Encapsulation Exterior Access (Test) <input type="checkbox"/> Encap. Ex-access (Tuning) <input type="checkbox"/> Encap. Entire Assembly (Thin Coat) <input checked="" type="checkbox"/> Other: Silicone and acrylic conformal coat	
H	Inspection	<input checked="" type="checkbox"/> In-coming <input checked="" type="checkbox"/> In-Process <input checked="" type="checkbox"/> Final Inspection <input checked="" type="checkbox"/> 100% Inspection	

		<input checked="" type="checkbox"/> Audit Inspection <input checked="" type="checkbox"/> Manual <input type="checkbox"/> Semi-Automatic <input checked="" type="checkbox"/> Automatic <input type="checkbox"/> Other:	Automated Optical Inspection (AOI)
J	Testing & Repair	<input checked="" type="checkbox"/> Test Equipment Design <input checked="" type="checkbox"/> Test Equipment Fabrication <input checked="" type="checkbox"/> Test Development <input checked="" type="checkbox"/> Failure Analysis <input checked="" type="checkbox"/> Repair Depot <input checked="" type="checkbox"/> Rework Depot <input type="checkbox"/> Other:	

SECTION 2.3 TESTING

DATE COMPLETED
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This section is intended to provide detailed information on the test, equipment and testing capability of the manufacturer.

Site Capability Snapshot (Please Check all that apply)

Designators			Remarks
A	Test Type	<input checked="" type="checkbox"/> Automatic Test Generation <input checked="" type="checkbox"/> X-Ray Joint Evaluation <input checked="" type="checkbox"/> Cleanliness Testing <input checked="" type="checkbox"/> Auto in-circuit Electronic Assembly <input type="checkbox"/> Electro-magnetic Interference <input checked="" type="checkbox"/> Auto Function Electronic Assembly <input checked="" type="checkbox"/> System Level Test Electrical <input checked="" type="checkbox"/> System Level Test Function <input checked="" type="checkbox"/> System Level Test Environmental <input type="checkbox"/> Other:	Glenbrook on-site 2 & 3 pole SMD electrical verification @ Mydata Pick & Place Pick & Place
B	Test Fixture Type	<input checked="" type="checkbox"/> No Fixture <input checked="" type="checkbox"/> One-sided Probe Generic Electrical <input checked="" type="checkbox"/> Cam Shell Test-Generic Electrical <input checked="" type="checkbox"/> Custom Fixture Electrical <input checked="" type="checkbox"/> Dedicated Test Bed Electrical <input checked="" type="checkbox"/> Humidity Test <input checked="" type="checkbox"/> Temperature Test <input checked="" type="checkbox"/> Vibration Test <input checked="" type="checkbox"/> Shock Test <input checked="" type="checkbox"/> Other: Test engineering/development	20 - 98% RH in range +20° to +85°C -40°C to +200°C, 1kW load max. On site Controlled drop
C	Probe Point Pitch	<input checked="" type="checkbox"/> >1.0 [.040] <input checked="" type="checkbox"/> 1.0 [.040] <input checked="" type="checkbox"/> 0.8 [.032] <input checked="" type="checkbox"/> 0.65 [.025] <input checked="" type="checkbox"/> 0.50 [.020] <input type="checkbox"/> 0.40 [.016] <input type="checkbox"/> 0.30 [.012] <input type="checkbox"/> 0.20 [.008] <input type="checkbox"/> <.20 [.008] <input type="checkbox"/> Other:	Shaft diameter = 35 mil @ 100 mil spacing Shaft diameter = 25 mil @ 75 mil spacing Shaft diameter = 20 mil @ 50 mil spacing
D	No. of Probe Points	<input type="checkbox"/> <200 <input type="checkbox"/> 200 <input type="checkbox"/> 500 <input checked="" type="checkbox"/> 1000 <input type="checkbox"/> 1500 <input type="checkbox"/> 2000	3070 Configuration - 1300 nodes max.

		<input type="checkbox"/> 2500 <input type="checkbox"/> 3000 <input type="checkbox"/> >3000 <input type="checkbox"/> Other:	
E	No. of Test Vectors	<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:	3070 Configuration
F	Environmental Stress Screening	<input checked="" type="checkbox"/> Burn-in at Temperature <input checked="" type="checkbox"/> Burn-in with Temperature Cycling <input checked="" type="checkbox"/> Burn-in Hi Temperature Cycles <input checked="" type="checkbox"/> Burn-in with Temperature Cycles <input checked="" type="checkbox"/> Burn-in with Temperature Cycles Hi-humidity <input checked="" type="checkbox"/> Power Cycling On-Off <input checked="" type="checkbox"/> Vibrations Testing <input checked="" type="checkbox"/> Shock Test <input type="checkbox"/> Salt Spray Testing <input checked="" type="checkbox"/> Other: Water ingress custom test, vacuum custom test	Managed subcontract Managed subcontract

SECTION 2.4

PRODUCT COMPLEXITY

DATE COMPLETED
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This section is intended to provide overview information on the product complexity being fabricated by the manufacturer. Based on component density.

Site Capability Snapshot (Maximum Component Density*)

*PERCENT COMPONENT AND LAND AREA/AVAILABLE BOARD AREA

(Please Check all that apply)

Designators			Remarks
A	Type 1A Single-sided THT only	<input type="checkbox"/> <30 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 50 <input type="checkbox"/> 60 <input type="checkbox"/> 70 <input checked="" type="checkbox"/> 80 <input type="checkbox"/> 90 <input type="checkbox"/> >90 <input type="checkbox"/> Other:	
B	Type 1B Single-sided SMT only	<input type="checkbox"/> <30 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 50 <input type="checkbox"/> 60 <input type="checkbox"/> 70 <input checked="" type="checkbox"/> 80 <input type="checkbox"/> 90 <input type="checkbox"/> >90 <input type="checkbox"/> Other:	
C	Type 1C Single-sided simplistic mix of THT & SMT	<input type="checkbox"/> <30 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 50 <input type="checkbox"/> 60 <input type="checkbox"/> 70 <input checked="" type="checkbox"/> 80 <input type="checkbox"/> 90 <input type="checkbox"/> >90 <input type="checkbox"/> Other:	
D	Type 1X Single-sided complex mix of THT & SMT with FP, BGA	<input type="checkbox"/> <30 <input type="checkbox"/> 30 <input type="checkbox"/> 40	

		<input type="checkbox"/> 50 <input type="checkbox"/> 60 <input type="checkbox"/> 70 <input checked="" type="checkbox"/> 80 <input type="checkbox"/> 90 <input type="checkbox"/> >90 <input type="checkbox"/> Other:	
E	Type 2B Double-sided simplistic SMT only	<input type="checkbox"/> <30 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 50 <input type="checkbox"/> 60 <input type="checkbox"/> 70 <input checked="" type="checkbox"/> 80 <input type="checkbox"/> 90 <input type="checkbox"/> >90 <input type="checkbox"/> Other:	
F	Type 2C Double-sided simplistic mix of THT & SMT	<input type="checkbox"/> <30 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 50 <input type="checkbox"/> 60 <input type="checkbox"/> 70 <input checked="" type="checkbox"/> 80 <input type="checkbox"/> 90 <input type="checkbox"/> >90 <input type="checkbox"/> Other:	
G	Type 2X Double-sided complex mix of THT & SMT with FP, BGA	<input type="checkbox"/> <30 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 50 <input type="checkbox"/> 60 <input type="checkbox"/> 70 <input checked="" type="checkbox"/> 80 <input type="checkbox"/> 90 <input type="checkbox"/> >90 <input type="checkbox"/> Other:	

<p>H</p>	<p>Type 2Y Double-sided complex mix of THT & SMT with ultra-FP, chip scale</p>	<p><input checked="" type="checkbox"/> <30 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 50 <input type="checkbox"/> 60 <input type="checkbox"/> 70 <input checked="" type="checkbox"/> 80 <input type="checkbox"/> 90 <input type="checkbox"/> >90 <input checked="" type="checkbox"/> Other: Have not demonstrated capability.</p>	
<p>J</p>	<p>Type 2Z Double-sided complex mix of THT & SMT with ultra-FP, COB, flip chip, TAB, chip scale</p>	<p><input checked="" type="checkbox"/> <30 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 50 <input type="checkbox"/> 60 <input type="checkbox"/> 70 <input type="checkbox"/> 80 <input type="checkbox"/> 90 <input type="checkbox"/> >90 <input checked="" type="checkbox"/> Other: Have not demonstrated capability.</p>	

SECTION 2.5

PRODUCT VOLUME

DATE COMPLETED
Updated August 15, 2016

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

Site Capability Snapshot (Please Check all that apply)

Designators			Remarks
A	Volume of Electrical Assembly	<input checked="" type="checkbox"/> Prototype <input checked="" type="checkbox"/> Low (Under 100) <input checked="" type="checkbox"/> Low-Medium (To 1,000) <input checked="" type="checkbox"/> Medium (To 5,000) <input checked="" type="checkbox"/> Medium (To 10,000) <input type="checkbox"/> Medium-High (To 20,000) <input type="checkbox"/> High (To 50,000) <input type="checkbox"/> High To 500,000 <input type="checkbox"/> Other:	
B	Volume of Discrete Wiring	<input checked="" type="checkbox"/> Prototype <input checked="" type="checkbox"/> Low (Under 100) <input type="checkbox"/> Low-Medium (To 1,000) <input type="checkbox"/> Medium (To 5,000) <input type="checkbox"/> Medium (To 10,000) <input type="checkbox"/> Medium-High (To 20,000) <input type="checkbox"/> High (To 50,000) <input type="checkbox"/> High To 500,000 <input checked="" type="checkbox"/> Other: Managed Subcontract higher volumes	
C	Volume Cable/Harness	<input checked="" type="checkbox"/> Prototype <input checked="" type="checkbox"/> Low (Under 100) <input type="checkbox"/> Low-Medium (To 1,000) <input type="checkbox"/> Medium (To 5,000) <input type="checkbox"/> Medium (To 10,000) <input type="checkbox"/> Medium-High (To 20,000) <input type="checkbox"/> High (To 50,000) <input type="checkbox"/> High To 500,000 <input checked="" type="checkbox"/> Other: Managed Subcontract higher volumes	
D	Volume Mechanical	<input checked="" type="checkbox"/> Prototype <input checked="" type="checkbox"/> Low (Under 100) <input checked="" type="checkbox"/> Low-Medium (To 1,000) <input checked="" type="checkbox"/> Medium (To 5,000) <input checked="" type="checkbox"/> Medium (To 10,000) <input type="checkbox"/> Medium-High (To 20,000) <input type="checkbox"/> High (To 50,000) <input type="checkbox"/> High To 500,000 <input type="checkbox"/> Other:	

E	Volume Full System	<input checked="" type="checkbox"/> Prototype <input checked="" type="checkbox"/> Low (Under 100) <input checked="" type="checkbox"/> Low-Medium (To 1,000) <input checked="" type="checkbox"/> Medium (To 5,000) <input type="checkbox"/> Medium (To 10,000) <input type="checkbox"/> Medium-High (To 20,000) <input type="checkbox"/> High (To 50,000) <input type="checkbox"/> High (To 500,000) <input type="checkbox"/> Other:	
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SECTION 2.6

QUALITY DEVELOPMENT

DATE COMPLETED
Updated August 15, 2016

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 checked="" 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 checked="" type="checkbox"/> Management Participates in TQM Audits <input checked="" type="checkbox"/> Employee Recognition Program <input checked="" type="checkbox"/> Total TQM Plan/Involvement Customer Training <input checked="" type="checkbox"/> Other: Performance metrics dashboard	
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 checked="" type="checkbox"/> Support Personnel Training <input checked="" type="checkbox"/> Advanced Statistical Training <input checked="" type="checkbox"/> Quality Functional Deployment <input checked="" type="checkbox"/> Ongoing Improvement Program for Employees <input type="checkbox"/> Other:	On site IPC trainer Training lockout on shop floor All employees
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:	QMS documents on-line

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 Instructions Completed, Controlled <input type="checkbox"/> Other:	Work instructions on-line
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 checked="" 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:	Key employees trained Automated data collection
F	Supplier Programs/Controls	<input checked="" 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 checked="" type="checkbox"/> Instrument Controls in Place <input type="checkbox"/> Measurement System in Control IPC-PC-90 <input checked="" 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 Certified <input checked="" type="checkbox"/> Other: ISO-13485 certified	

SECTION 2.7 SERVICES

DATE COMPLETED
Updated August 15, 2016

This section is intended to provide overview information on the customer services offered by the manufacturer in addition to the assembly manufacturing services.

Site Capability Snapshot (Please Check all that apply)

	Designators		Remarks
A	Component Procurement	<input checked="" type="checkbox"/> Consignment <input checked="" type="checkbox"/> Passive Thru-Hole <input checked="" type="checkbox"/> Passive SMT <input checked="" type="checkbox"/> I/C SMT <input checked="" type="checkbox"/> I/C SMT <input checked="" type="checkbox"/> Hi-Pin Count (Peripheral) <input checked="" type="checkbox"/> Hi-Pin Count (Array) <input type="checkbox"/> Bare Die (CHIPS) <input checked="" type="checkbox"/> ASIC's <input type="checkbox"/> Other:	Subject to meeting requirements
B	Board Procurement	<input checked="" type="checkbox"/> Consignment <input checked="" type="checkbox"/> Single Sided <input checked="" type="checkbox"/> Double Sided <input checked="" type="checkbox"/> Multilayer (Rigid) <input checked="" type="checkbox"/> Multilayer (Rigid-Flex) <input checked="" type="checkbox"/> Metal Core Boards <input type="checkbox"/> CTE Boards <input type="checkbox"/> MCM's & Hybrids <input type="checkbox"/> PCMCIA's <input type="checkbox"/> Other:	Subject to meeting requirements
C	Design Services	<input type="checkbox"/> Outsource <input checked="" type="checkbox"/> Simulation <input checked="" type="checkbox"/> Circuit Analysis <input checked="" type="checkbox"/> Placement & Routing <input checked="" type="checkbox"/> Design Rule Implementation <input checked="" type="checkbox"/> Impedance Control <input checked="" type="checkbox"/> High Speed <input type="checkbox"/> MCM's (L) (C) or (D) <input type="checkbox"/> ASIC's <input checked="" type="checkbox"/> Other: Electrical, mechanical, thermal, industrial & optical	

SECTION 3.0

MASTER EQUIPMENT LISTING

FORM AQP 20

DATE COMPLETED Updated 8/15/2016

Please complete a Master Equipment List. You may use your own form or the AQP Form 20.

IDENTIFICATION	EQUIPMENT NAME/DESCRIPTION	MANUFACTURER TYPE/MODEL	EQUIPMENT LIMITS	ACCURACY	CALIBRATION FREQUENCY	REMARKS
DEK1	Screen printer	DEK Horizon			Annual	Grid-Lok support, auto locate, underside cleaner
DEK2	Screen printer	DEK 248			Annual	Magnet support, manual locate, Pro Plate frameless foil system
DEK3	Screen printer	DEK Horizon			Annual	Grid-Lok support, auto locate, underside cleaner
DEK4	Screen printer	DEK Horizon			Annual	Grid-Lok support, auto locate, underside cleaner
OVN	Oven	Blue M			Annual	MSD and PCB bake
MY1	SMT Pick & Place	Mydata MY9	Max bd size 17 x 19" Component min .020 x .010" (0201) Component max. 2.20 x 2.20 x .59" Component weight 8g	IPC-9850: X, Y & θ - Midas mount .25 μ m & .08° @3 σ , Hydra mount .69 μ m & 3.0° @ 3 σ	Annual	Hydra SpeedMount, two & three pole electrical verifier, Agilis feeders, networked
MY2	SMT Pick & Place	Mydata MY9	Max bd size 17 x 19" Component min .020 x .010" (0201) Component max. 2.20 x 2.20 x .59" Component weight 8g	IPC-9850: X, Y & θ - Midas mount .25 μ m & .08° @ 3 σ	Annual	Two & three pole electrical verifier, Agilis feeders, networked
MY3	SMT Pick & Place	Mydata MY15	Max bd size 17 x 19" Component min .020 x .010" (0201) Component max. 2.20 x 2.20 x .59" Component weight 8g	IPC-9850: X, Y & θ - Midas mount .25 μ m & .08° @3 σ , Hydra mount .69 μ m & 3.0° @ 3 σ	Annual	Hydra SpeedMount, two & three pole electrical verifier, Agilis feeders, networked
UNV1	SMT Pick & Place	Universal Advantis	Max Bd size 18" x 25" Min. component = 01005 Max component = 30mm x 30mm	45 μ m @ 3 σ	Annual	Chipshooter 22,600cph .159cps
UNV2	SMT Pick & Place	Universal Genesis	Max Bd. Size 18"x25" Min, Component = 0201 Max Component = 55mm x 55mm	45 μ m @ 3 σ	Annual	Flexshooter, 11,400 cph., 0.316cps
RF1	Convection Reflow Oven	Vitronics Soltec XPM1- 820			Annual	Heat zones = 8 Cool zones = 2 Lead-free process capable
RF2	Convection Reflow Oven	Vitronics Soltec XPM2			Annual	Heat zones = 8 Cool zones = 2 Lead-free process capable
RF3	Convection Reflow Oven	Vitronics Soltec XPM3			Annual	Heat zones = 8 Cool zones = 2 Lead-free process capable
KIC	Thermal Profile Manager	KIC Thermal Explorer			Annual	12 thermocouple capability, prediction software option
XRAY	2D Xray	Glenbrook RTX-113			Annual	x/y positioner 80kv , 35 um focal

						spot, Image processing software. Digital image and video capture
AVD	Hot Air Rework Station	Metcal Scorpion			Annual	Dual head precision placement pkg. Side view camera. 8zone profiling capability
SS1	Selective Solder (Lead-free)	ACE Production Technologies KISS-102	12 x 14" max board size		Annual	Spray fluxer, nitrogen environment
SS2	Selective Solder (Lead-free)	ACE Production Technologies KISS-102	12 x 14" max board size		Annual	Spray fluxer, nitrogen environment, Topside process heater

WAV	Wave Solder (Tin/lead)	Novastar 12D	12" wide waves		Annual	Foam fluxer, 24" bottom side IR pre-heater Dual wave configuration includes turbulent & laminar waves
SP3	Miniwave (Lead-free)	AirVac PCBRM-15			No cal required	
WS1	Automated aqueous cleaner	Technical Devices Nu/Clean AquaBatch XL with DI Elite Plus			No cal required	Closed loop, DI bed
WSH	Automated aqueous cleaner	Aqueous Technologies SMT-600			No cal required	Closed loop, DI bed
ION	Ionic Contamination Test	Alpha Metals OmegaMeter 600 SMD				ROSE method ionic contamination test
WST	Wire Stripper	Schleuniger EcoStrip 9300			No cal required	
	Semi-automated liquid dispense	Techcon			No cal required	
FP1	Flying Probe Test	Seica Pilot	Max bd size 16 x 23.75", max comp height tested side .9", non-tested side 3.9", Min bd width .8"		Annual	±10V @ .5A, ±100V @ .1A, Single touch F- node test
ICT1	In circuit Test	HP 3070			Annual	
EC1	Environmental Chamber	Tenney Engineering T64RS	20 - 98% RH in range +20° to +85°C, -40°C to +200°C, 1kW load max.		Annual	
	Vertical Mill	Chevalier FM3VK		.0001"		
	Coordinate Measurement Machine	Brown & Sharp, Reflex		.00001"		
DEP1	PCB Separator	cab MAESTRO 4M			No cal required	De-score saw
DEP2	v-score separator	Fancort VPD5			No cal required	shear
NIB1	PCB Separator	FKN Nibbler			No cal required	Tab Separator
NIB2		Fancort NTR2			No cal required	Hvy Tab Separator
	Surface Resistivity Meter - Megohmmeter	3M 701 Test Kit			Annual	
CP1	Lead Prep	Electrovert Electroprep			No cal required	
CF1	Axial Lead Former	GPD CF-7			No cal required	
CF2	Axial Lead Former	GPD CF-7			No cal required	
CF3	Radial Lead Prep	Hepco 1500-1	Diameter≤.040"		No cal required	
CF4	Radial Lead Prep	Hepco 1500-1	Diameter≤.040"		No cal required	
LT1	Lead Trimmer	GPD TF-5300			No cal required	Misc. Trim
LT2	Lead Trimmer	Streckfuss CO57	Diameter≤.032"		No cal required	Misc. Trim
LT3	Lead Trimmer	Streckfuss CO57	Diameter≤.032"		No cal required	Misc. Trim

SECTION 4

DATE COMPLETED Updated August 15, 2016

TECHNOLOGY PROFILE SPECIFICS**4.1 ADMINISTRATION**

4.1.1 CAPACITY PROFILE	EST %	COMMENTS
A) Total Capacity in units per month (based on best quarter)	65%	
B) Presently running at ____ % of total unit capacity.	30%	PCBA operating at 70% of 3 shifts Final Assembly is 1 shift only @ 50%
C) Revenue from manufacturing services. Revenue from non-manufacturing activities.	80% 20% Total 100%	
D) Work dedicated to consignment. Work dedicated to turnkey.	<5% 95% Total 100%	Consignment on exception basis

4.1.2 PERCENTAGE OF DOLLAR VOLUME	EST %	COMMENTS
* 1) Type 1A electronic assembly Single-sided THT only	2%	
2) Type 1B electronic assembly Single-sided SMT only	20%	
3) Type 1C electronic assembly Single-sided simplistic mix of THT & SMT	3%	
4) Type 1X electronic assembly Single-sided complex mix of THT & SMT with FP, BGA	10%	
5) Type 2B electronic assembly Double-sided simplistic SMT only	0%	
6) Type 2C electronic assembly Double-sided simplistic mix of THT & SMT	10%	
7) Type 2X electronic assembly Double-sided complex mix of THT & SMT with FP, BGA	10%	
8) Type 2Y electronic assembly Double-sided complex mix of THT & SMT with ultra-FP, chip scale	0%	Have not demonstrated chip scale capability.
9) Type 2Z electronic assembly Double-sided complex mix of THT & SMT with ultra-FP, COB, flip chip, TAB, chip scale	0%	Have not demonstrated COB, flip chip, TAB or chip scale capability.
10) Wire wrap assembly	N/A	
11) Cable/harness assembly	5%	
12) Mechanical assembly	30%	
13) Full system assembly	10%	

* For description of product types, see glossary, Section 10.1

4.1.3 UNIT PRODUCTION PROFILE	UNITS PER MONTH
A) What do you consider, in number of units per month the definition of the following (units=units per month)?	
1) High Production	10000+
2) Medium Production	2000 10000
3) Low Production	10 2000
4) Prototype Production	< 10
B) What is your average lead-time (delivery) as defined in (A)?	
1) High Production	10
2) Medium Production	8
3) Low Production	6
4) Prototype Production	For established clients only
Quick turn - No. of days 5	

4.1.4 MARKETS SERVED	YES	NO	COMMENTS
A) Consumer Products	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
B) General Purpose Computers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
C) Telecommunications Products	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
D) Commercial Aircraft	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
E) Industrial Products & Automotive	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
F) High Performance Military	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
G) Outer Space LEO & GEO	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
H) Military Avionics	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
J) Automotive (Under the Hood)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

4.1.5 APPROVAL & CERTIFICATION PROFILE	YES	NO	COMMENTS
What company approvals do you have?			
A) J-STD-001	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
B) IPC-A-610	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
C) MIL-STD-2000	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
D) UL Approval	<input checked="" type="checkbox"/>	<input type="checkbox"/>	As needed
E) UL Level 94V0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
F) UL Level 94V1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
G) UL Level 94V2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
H) Canadian Standards	<input checked="" type="checkbox"/>	<input type="checkbox"/>	As needed
J) MIL-P-55110	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
K) MIL-P-50884	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
L) ISO-9003	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
M) ISO-9002	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
N) ISO-9001	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
P) BABT	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Q) QC9000	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
R) EEC	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
S) Customer Evaluation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
T) Other	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ISO-13485

4.1.6 CUSTOMER INTERFACE PROFILE	YES	NO	EQUIPMENT	COMMENTS
A) Modem capability/BAUD rate	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
B) Ethernet capability	<input checked="" type="checkbox"/>	<input type="checkbox"/>		FTP of customer data Portal
C) Data verification	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Shared SQL databases
D) Manufacturing data requirements:	<input checked="" type="checkbox"/>	<input type="checkbox"/>		FTP, file share, portal, shared SQL
E) Engineering change order process:	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Omnify
F) Method for job status reporting to customers:	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Through Program Manager Portal

4.1.7 ADMINISTRATIVE PROFILE	YES	NO	QUANTITY	DEGREES	COMMENTS
A) Does the facility have a separate research and development dept.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	9		
B) Is there an (automated) on-line shop floor control/MRP system	<input checked="" type="checkbox"/>	<input type="checkbox"/>			SYSPRO Shop floor is paperless production
C) Quantity of engineers dedicated to supporting the following areas			5 (TOTAL)		
1) Materials	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1		1 SQE/Quality Engr
2) Manufacturing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3		2 Manufacturing Engr 1 Test Engr
3) Test	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1		1 Test Engineer Subcontract Test development

4.2 PROCESS ORIENTATION

4.2.1 PLANT LAYOUT CHARACTERISTICS	YES	NO	COMMENTS
A) In-line Assembly Process	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
B) Islands of Automation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Flexible demand low lines
C) Placement Equipment Technology			(TOTAL)
1) In-line	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2) Sequential	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3) Simultaneous	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

4.2.2 PROCESS PRECISION SPECIFICS	YES	NO	DIAMETER IN MM	COMMENTS
Please indicate the following standard tooling preferences for your mfg. eqpt.				
A) Vision alignment targets	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Three .040" finished copper fiducials with .100" keep out
1) Solder coated	<input checked="" type="checkbox"/>	<input type="checkbox"/>		HASL only
2) SMOBC	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
B) Protective coating	<input type="checkbox"/>	<input checked="" type="checkbox"/>		OSP is not a preferred PCB finish
C) Placement equipment alignment	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Three .040" finished copper fiducials with .100" keep out
1) Tooling holes required	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
D) Electrical test tooling alignment holes	<input checked="" type="checkbox"/>	<input type="checkbox"/>		

4.2.3 NEW PROCESS QUALIFICATION	YES	NO	RESPONSIBLE PERSONNEL	COMMENTS
A) Instruction manual for new process introduction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Focused NPI team	
B) New process qualification procedure	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
C) Responsible personnel:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	New Process Introduction team	

4.3 PRODUCT DESCRIPTION

*Include average percentage defects/ assembly for units which utilize the following device types.

4.3.1. THROUGH HOLE INSERTION	YES	NO	PERCENT	MAX./MIN PACKAGE SIZE	COMMENTS
A) Axial Leads	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
B) Radial Leads	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
C) DIP	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
D) Pin Grid Arrays	<input checked="" type="checkbox"/>	<input type="checkbox"/>			

4.3.2 SURFACE MOUNT COMPONENTS	YES	NO	PERCENT	MAX./MIN PACKAGE SIZE	MAX PIN COUNT	MIN. PITCH
A) Chip Capacitors/Resistors	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
B) Small Outline Diodes (SODs)	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
C) Small Outline Transistors (SOTs)	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
D) Small Outline IC's (SOICs)	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
E) Chip-on-tape (molded carrier ring)	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
F) Chip-on-board (COB)	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
G) Quad Flat Packs (QFPs)	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
H) Thin Small Outline Package (TSOP)	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
J) Ball/Post Grid Array (BGA/PGA)	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
K) Tape assisted Bond (TAB)	<input type="checkbox"/>	<input checked="" type="checkbox"/>				

4.3.3 PERCENTAGE OF UNITS PRODUCED IN YOUR MAIN BUSINESS CATEGORIES	YES	NO	PERCENT	PRODUCT DESCRIPTION	COMMENTS
A) Electronic assembly type	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
B) Board construction type	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
C) Board size, diagonal	<input type="checkbox"/>	<input type="checkbox"/>			
D) SMT working area	<input type="checkbox"/>	<input type="checkbox"/>			
E) THT working area	<input type="checkbox"/>	<input type="checkbox"/>			
F) Discrete wire	<input type="checkbox"/>	<input type="checkbox"/>			
G) Cable & Harness	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
H) Mechanical assemblies	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
J) Completed end product	<input checked="" type="checkbox"/>	<input type="checkbox"/>			

4.3.4 TOTAL BUSINESS DISTRIBUTION BY ASSEMBLY TYPES	YES	NO	PERCENT	COMMENTS
A) 1A Single-sided THT only	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
B) 1B Single-sided SMT only	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
C) 1C Single-sided simplistic mix of THT & SMT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
D) 1X Single-sided complex mix of THT & SMT with FP, BGA	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
E) 2B Double-sided simplistic SMT only	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
F) 2C Double-sided simplistic mix of THT & SMT	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
G) 2X Double-sided complex mix of THT & SMT with FP, BGA	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
H) 2Y Double-sided complex mix of THT & SMT with ultra-FP, chip scale	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Have not demonstrated chip scale capability.
J) 2Z Double-sided complex mix of THT & SMT with ultra-FP, COB, flip chip, TAB, chip scale	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Have not demonstrated COB, flip chip, TAB or chip scale capability.

4.3.5 TOTAL BUSINESS DISTRIBUTION BY BOARD ASSEMBLY TYPES	YES	NO	PERCENT	COMMENTS
A) Rigid	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
B) Flex	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
C) Rigid/Flex	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
D) Molded Board	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
E) Rigid Backplane	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
F) Ceramic MCM's	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
G) Laminated MCM	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
H) Deposited dielectric MCM	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
J) Discrete Wire Boards	<input type="checkbox"/>	<input checked="" type="checkbox"/>		

4.3.6 TOTAL BUSINESS DISTRIBUTION (REMAINING AREAS)	YES	NO	PERCENT	COMMENTS
A) Multi-wire Assemblies	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
B) Cables and Harness	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
C) Mechanical Assemblies	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
D) Full System Assembly	<input checked="" type="checkbox"/>	<input type="checkbox"/>		

4.4. TESTING CAPABILITY

4.4.1 ELECTRICAL TEST SMT CENTERLINE PITCH MINIMUM	YES	NO	COMMENTS
A) 0.63mm [.025]	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Seica flying probe
B) 0.5mm [.020]	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Seica flying probe
C) 0.4mm [.016]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
D) 0.3mm [.012]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
E) 0.25mm [.010]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
F) Other	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3070 - standard 49mil test pad spacing with 50mil probe size - premium 39mil test pad spacing with 40mil probe size

4.4.2 PERFORM DOUBLE SIDED SIMULTANEOUS ELECTRICAL TESTING	YES	NO	EQUIPMENT	EQUIPMENT LIMITS
A) Can you perform double sided simultaneous electrical testing?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		

4.4.3 BOUNDARY SCAN TESTING CAPABILITY	YES	NO	EQUIPMENT	EQUIPMENT LIMITS
A) Boundry scan testing capability?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3070, fixture, JTAG	

4.4.4 AUTOMATED OPTICAL INSPECTION USAGE?	YES	NO	EQUIPMENT	COMMENTS
A) Post paste application	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
B) Pre-placement	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
C) Post placement	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
D) Post reflow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	YES Tech F1	

4.4.5 FULL SYSTEM LEVEL TESTING	YES	NO	COMMENTS
A) Full system level testing?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
B) Can you develop these test systems in-house?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

4.4.6 DIRECT CAD DOWNLOAD TO TEST EQUIPMENT IN USE	YES	NO	COMMENTS
A) Direct CAD download to test equipment in use?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

4.4.7 RELIABILITY TESTING	YES	NO	EQUIPMENT	COMMENTS
A) Thermal (temperature/humidity)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Tenney T64RS	20 - 98% RH in range +20° to +85°C -40°C to +200°C, 1kW load max.
B) Vibration	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Outsourced
C) Shock	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
D) Salt spray	<input type="checkbox"/>	<input checked="" type="checkbox"/>		

4.5 MATERIALS MANAGEMENT

4.5.1 MATERIAL SYSTEMS	YES	NO	SYSTEM	COMMENTS
A) MRP System	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
B) Electronic data interface (EDI)	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Suppliers only
C) Kitting capability	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
D) Turn-key system	<input checked="" type="checkbox"/>	<input type="checkbox"/>		

SECTION 5

DATE COMPLETED
Updated August 15,
2016

QUALITY PROFILE

GENERAL INFORMATION

COMPANY NAME Technology Driven Products	
CONTACT John Beachman, Quality Manager	
TELEPHONE NUMBER 970-292-1132	FAX NUMBER 970-667-9332

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

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:

- | | |
|---|---|
| <ul style="list-style-type: none"> 5.1 General Quality Programs 5.2 Receiving Inspection 5.3 Customer Satisfaction 5.4 Computer Integrated Manufacturing 5.5 Process Documentation 5.6 Quality Records 5.7 Skill, Training & Certification 5.8 Subcontractor Control 5.9 New Products/Technical Services 5.10 Calibration Control | <ul style="list-style-type: none"> 5.11 Internal Audits 5.12 Statistical Process Control 5.13 Problem Solving 5.14 In-Process Control 5.15 Material Handling 5.16 Non-Conforming Material Control 5.17 Inspection and Test Plan 5.18 Product Inspection/Final Audit 5.19 Tooling Inspection, Handling, & Storage 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?			Y	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?			Y	100%	100%
3.	Does a quality measurement system exist with clearly defined metrics and is it utilized as a management tool?			Y	100%	100%
4.	Are work instructions approved and controlled; and are they under revision control?			Y	100%	100%
5.	Are the quality procedures and policies current and available at the point of application; and are they under revision control?			Y	100%	100%
6.	Are benchmark and customer satisfaction studies done to determine best in class for all products, services, and administrative functions; and are goals set so that quality is a competitive weapon?			Y	100%	100%
7.	Are Statistical Process Control (SPC) principles understood by all levels of management?			Y	100%	100%
8.	Are there programs with sufficient resources assigned to support corrective actions and prevention?			Y	100%	100%
9.	Does management solicit and accept feedback from the work force?			Y	100%	100%
10.	Is there management support of ongoing training (including quality training), and is it documented by an organizational training plan?			Y	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?			Y	100%	100%
12.	Are the quality and reliability goals aggressive relative to customer expectations and targeted at continuous improvement?			Y	100%	100%
13.	Are the people who are responsible for administering the quality assurance function technically informed?			Y	100%	100%
14.	Does Management have a "defect prevention" attitude to achieve continuous quality improvement?			Y	100%	100%

5.2 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?			Y	100%	100%
2.	Are receiving inspection procedures documented and followed?			Y	100%	100%
3.	Are receiving inspection results used for corrective and preventive action?			Y	100%	100%
4.	Are the procedures for storage and timely disposition of discrepant material in place and followed?			Y	100%	100%

COMMENTS
Dock to stock program in place

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?			Y	100%	100%
2.	Is an independent (unbiased) customer survey routinely conducted?			Y	100%	100%
3.	Is there an internal measurement system within the organization which correlates to the level of customer satisfaction?			Y	100%	90%
4.	Are there specific goals for achieving Total Customer Satisfaction, both internal and external?			Y	100%	90%
5.	To what extent are customer satisfaction goals disseminated and understood by everyone in the organization?			Y	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?			Y	100%	100%
7.	Is there a method in place to obtain future customer requirements?			Y	100%	90%
8.	Are all findings of customer dissatisfaction reported back to the proper organization for analysis and corrective action?			Y	100%	100%
9.	Are customer satisfaction requirements formally defined and documented, and are they based on customer input?			Y	100%	50%
10.	Do all support organizations understand their role in achieving total customer satisfaction?			Y	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?			Y	100%	75%
2.	Can customers electronically transfer CAD/CAM directly into manufacturing?			Y	100%	100%
3.	Can customers electronically transfer order information directly into the business system?			N		
4.	Is data electronically shared between shop floor control and process control systems (i.e., CNC, SPC, Electrical Test, AOI, etc.)?			Y	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.)?			Y	100%	100%
6.	Is information available from system processes in real time (vs. batch processing)?			Y	100%	100%
7.	Are processes and procedures documented and available on-line?			Y	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?			Y	100%	100%

COMMENTS

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

5.6 QUALITY RECORDS		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Are records of inspection and process control maintained and available for review?			Y	100%	100%
2.	Are records of equipment and equipment maintenance kept?			Y	100%	100%
3.	Is the record and sample retention program defined?			Y	100%	100%
4.	Are quality data used as a basis for corrective action?			Y	100%	100%
5.	Are quality data used in reporting performance and trends to management?			Y	100%	100%
6.	Are quality data used in supporting certifications of quality furnished to customers?			Y	100%	100%
7.	Is field information used for corrective action?			Y	100%	50%
8.	Does a cost of quality measurement system exist?			Y	50%	50%
9.	Are customer reported quality problems responded to, and resolved in the time period requested?			Y	100%	100%
10.	Is quality information on production material rejects provided to sub-suppliers with required corrective action?			Y	100%	100%
11.	Is quality data collected, summarized and analyzed using automated techniques?			Y	100%	100%

COMMENTS

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5.7 SKILLS, TRAINING, & CERTIFICATION		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Does management ensure that all personnel are trained in their role for achieving Total Customer Satisfaction?			Y	100%	95%
2.	Do all personnel understand how their performance impacts internal and external customer satisfaction?			Y	100%	95%
3.	Do all personnel who contact external customers reflect quality improvement programs?			Y	100%	100%
4.	Do personnel participate in professional societies and growth programs?			Y	50%	50%
5.	Are all personnel trained in sufficient detail to support key initiatives?			Y	100%	100%
6.	Are the results of training evaluated and indicated program changes made?			Y	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?			Y	100%	100%
8.	Are performance standards participatively developed, and regularly applied for all personnel?			Y	100%	100%
9.	Are Total Customer Satisfaction programs and resulting successes publicized to all personnel?			Y	100%	100%
10.	Do goal setting and reward/incentive programs support the quality improvement process?			Y	50%	50%

5.8 SUBCONTRACTOR CONTROL		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Are requirements defined, communicated, and updated to ensure that the supplier understands expectations?			Y	100%	95%
2.	Does a system exist which measures the performance of the supplier and communicates such information to the supplier? (i.e., supplier rating system)			Y	95%	95%
3.	Have the organization's processes been characterized to identify the critical requirements for the suppliers products?			Y	100%	95%
4.	Have the capabilities of the supplier's processes been assessed and considered in the establishment of the requirements?			Y	100%	95%
5.	Have partnerships been established with suppliers, and is assistance provided to ensure that each supplier has the capability to consistently supply conforming products?			Y	100%	95%
6.	Have quality and cycle time metrics and improvement goals been established participatively with the supplier?			Y	100%	95%
7.	Has a system been established with the supplier for identification and verification of corrective action?			Y	100%	90%
8.	Have the requirements for supplier materials been properly characterized and specified to ensure conformance of the product/service to the customer satisfaction requirements?			Y	100%	95%
9.	Is there a supplier certification program or equivalent procured material/service continuous quality improvement program?			Y	100%	95%
10.	Can all personnel who contract suppliers properly reflect appropriate quality improvement programs and status to them?			N	95%	95%

COMMENTS

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5.9 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?			Y	100%	95%
2.	Is quantitative benchmarking used to evaluate all new products/technologies/services in comparison to best-in-class offerings?			N		
3.	Does a roadmap exist to ensure continued development of leading edge, best-in-class products/technology/services?			N		
4.	Is the capability of each operation which controls critical-to-function characteristics for new products, fully validated?			Y	100%	80%
5.	Are statistical tools used in the development of robust (high yield) new processes, products, and services?			Y	50%	50%
6.	When new product/technology/service requires a new process, is it developed jointly and concurrently with the customer and/or suppliers?			Y	100%	80%
7.	Are computer simulation and design tools used to the maximum extent practicable in the design of new products/technologies/services?			Y	100%	100%
8.	Are design reviews conducted on a scheduled basis, and do they properly address the process capability indices of critical-to-function characteristics, and of the product/service characteristics?			Y	100%	100%
9.	Is the new product/technology/service, as produced by the process, verified to meet all customer satisfaction requirements?			Y	100%	100%

5.10 CALIBRATION CONTROL		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Are calibration and preventative maintenance programs in place and documented?			Y	100%	
2.	Are calibration and maintenance personnel trained?			Y	100%	
3.	Is traceability to NIST maintained?			Y	100%	
4.	Is quality measurement and control equipment current, effective, and sufficiently integrated with production equipment?			Y	100%	
5.	Is the history of quality measurement and control equipment documented?			Y	100%	
6.	Has repeatability of measuring devices and inspection or testing processes been established and monitored? Note: are gauge capability studies conducted and GR&R ratios acceptable (<10%)?			N		
7.	Are calibration and preventative maintenance cycles on schedule?			Y	99%	
8.	Is the use of non-calibrated equipment for design and production purposes prohibited?			Y	100%	
9.	Are tools and fixtures used as criteria or acceptability of product/work fully qualified and identified?			Y	100%	
10.	Are calibration intervals defined in accordance with industry standards or manufacturer's recommendations and the calibration history of the equipment?			Y	100%	

COMMENTS

5.11 INTERNAL AUDITS		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Are regular reviews of the product/process conducted and are goals/plans established to continually improve?			Y	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?			Y	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?			Y	100%	100%
4.	Are there specific goals for achieving Total Customer Satisfaction, both internal and external?			Y	100%	80%
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?			Y	100%	100%
6.	Are the operators within the process provided with written work instructions and are they trained?			Y	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?			Y	100%	100%
8.	Is there a first in/first out (FIFO) system in place, and is it followed?			Y	100%	100%

5.12 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?			Y	50%	50%.
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?			Y	90%	90%
4.	Is the capability of critical processes and machines measured and monitored with CPK's >1.5, and targeted with CP of 2.0?			N		
5.	Are incapable processes or machines targeted for improvement or replacement?			Y	90%	90%
6.	Is SPC implemented for all critical processes?			N		
7.	Are procedures that control the reaction to out-of-control situations adequate and effective?			Y	100%	80%
8.	Are operators trained in the use of appropriate statistical techniques, and are they properly applying them?			N		
9.	Are advanced problem solving techniques used by engineers to solve problems? (Design of Experiments, planned experimentation, advanced diagnostic tools, etc.)			Y	80%	80%
10.	Are control charts and other process controls properly implemented?			Y	100%	80%
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?			Y	75%	75%

COMMENTS

5.13 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?			Y	100%	100%
2.	Does the organization utilize participative problem solving techniques to identify, measure and resolve internal and external problems?			Y	100%	100%
3.	Are problem solving efforts timely and effective?			Y	100%	50%
4.	Are applied resources sufficient to remove problem solving constraints?			Y	50%	50%
5.	Are statistical techniques used for problem solving?			Y	50%	50%
6.	Are quality data used to identify barriers, and to determine the priority of problems?			Y	95%	95%
7.	Is there a policy/procedure that includes the use of problem solving techniques to systematically drive reduction in variability?			Y	95%	95%

5.14 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)			Y	100%	100%
2.	Are in-process inspections, test operations, and processes properly specified and performed?			Y	100%	100%
3.	Are in-process inspection facilities and equipment adequate?			Y	100%	95%
4.	Are the results of in-process inspections used in the promotion of effective preventative action and corrective action?			Y	100%	95%
5.	Is preventative maintenance performed on the equipment and facilities?			Y	100%	95%
6.	Are housekeeping procedures adequate and how well are they followed?			Y	90%	75%
7.	Are process management plans established, and are critical parameters followed?			Y	95%	95%
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?			Y	95%	95%
9.	Are certifications and in-process inspection results used in making final acceptance decisions?			Y	100%	95%
10.	Are methods and procedures for the control of metallurgical, chemical, and other special processes established and followed?			Y	95%	95%

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?			Y	100%	100%
2.	Are procedures to facilitate limited life materials, such as prepreg, in place, properly controlled, and monitored?			Y	100%	100%
3.	Are procured items identified with some means of traceability (serial number, lot number, date code, etc.)?			Y	100%	100%
4.	Are procedures and facilities adequate for storage, release and control of materials?			Y	100%	100%
5.	Are in-store and in-process materials properly identified and controlled?			Y	100%	100%
6.	Is in-process material protected from corrosion, deterioration, and damage?			Y	100%	100%
7.	Are ESD Policies and Procedures in place for handling electronic components?			Y	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?			Y	100%	100%
2.	Are non-conforming materials properly identified and controlled to prevent inadvertent use?			Y	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?			Y	100%	100%
4.	Are procedures for controlling non-conforming materials, and for ensuing corrective action, in place and followed?			Y	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)			Y	100%	100%
6.	Do supplier's procedures and controls for corrective action prevent recurrence of non-conformances?			Y	80%	80%
7.	Is there a system for coordinating necessary corrective action with purchasing personnel?			Y	100%	100%
8.	Does the corrective action extend to all applicable causes of non-conformance (e.g., design, workmanship, procedures, equipment, etc.)?			Y	100%	100%

COMMENTS

5.17 INSPECTION AND TEST PLAN	STATUS

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

5.18 PRODUCT INSPECTION/FINAL AUDIT		STATUS				
DESCRIPTION OF PROGRAM		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
1.	Are final product acceptance procedures documented and followed?			Y	100%	95%
2.	Are all specific customer product audits conducted, as required?			Y	100%	95%
3.	Are inspectors trained for the tasks performed?			Y	90%	95%
4.	Are flow charts or milestones developed with checkpoints readily available?			Y	95%	95%
5.	Is a system in place which denotes inspection performed; e.g., use of initials, stamps, labels, bar codes, etc., affixed to production documentation?			Y	90%	90%
6.	Is a quality system established and maintained for control of product/production documentation?			Y	100%	100%
7.	Is "accept/reject" criteria defined and available for use?			Y	95%	95%
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?			Y	90%	90%
9.	Are packing and order checking procedures documented and followed?			Y	100%	95%

COMMENTS	

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

5.20 CORRECTIVE ACTION		STATUS				
		Not Applicable	Not Started	Approach Developed	Percent Deployed	Percent Results
DESCRIPTION OF PROGRAM						
1.	Are final acceptance inspection results used for corrective and preventative action?			Y	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.			Y	100%	90%
3.	Is positive action taken to prevent recurrence of problems, and are there documented reports/records of each occasion?			Y	100%	90%
4.	Do procedures and systems provide for ensuring that replies are made to customer requests for correction action within the time limit specified?			Y	100%	90%
5.	Is corrective action controlled and documented for all applicable work centers?			Y	100%	100%
6.	When corrections are made, is their effectiveness subsequently reviewed and monitored?			Y	100%	100%

COMMENTS	

SECTION 6

DATE COMPLETED	HISTORY #
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MANUFACTURING HISTORY (See Section 2 Site Capability)(Should represent 70% of your business)

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 assembly type families (assembly types may be grouped together if they are similar).

ASSEMBLY TYPE	DATE OF ORDER	COMPONENT DENSITY
BOARD TYPE	PRODUCTION QUANTITY	TOTAL YEARLY PRODUCTION %

LEGEND	
A = BOARD/PANEL	C = ASSEMBLY
B = COMPONENTS	D = TEST

CHECK ALL THAT APPLY (Dimensions are in millimeters, inches are in brackets)

A	BOARD SIZE (ACROSS 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 [22.50]	<input type="checkbox"/> 750 [29.50]	<input type="checkbox"/> 850 [33.50]	<input type="checkbox"/> >850 [33.50]
	SURFACE MOUNT MAXIMUM WORKING AREA	<input type="checkbox"/> <300 CM ² [150 IN ²]	<input type="checkbox"/> 300 CM ² [50 IN ²]	<input type="checkbox"/> 600 CM ² [100 IN ²]	<input type="checkbox"/> 1000 CM ² [160 IN ²]	<input type="checkbox"/> 1500 CM ² [230 IN ²]	<input type="checkbox"/> 2100 CM ² [330 IN ²]	<input type="checkbox"/> 2800 CM ² [430 IN ²]	<input type="checkbox"/> 3600 CM ² [550 IN ²]	<input type="checkbox"/> >3600 CM ² [550 IN ²]
	MAXIMUM THROUGH-HOLE WORKING AREA	<input type="checkbox"/> <300 CM ² [150 IN ²]	<input type="checkbox"/> 300 CM ² [50 IN ²]	<input type="checkbox"/> 600 CM ² [100 IN ²]	<input type="checkbox"/> 1000 CM ² [160 IN ²]	<input type="checkbox"/> 1500 CM ² [230 IN ²]	<input type="checkbox"/> 2100 CM ² [330 IN ²]	<input type="checkbox"/> 2800 CM ² [430 IN ²]	<input type="checkbox"/> 3600 CM ² [550 IN ²]	<input type="checkbox"/> >3600 CM ² [550 IN ²]
B	THROUGH HOLE INSERTION	<input type="checkbox"/> Two Leaded-Axial	<input type="checkbox"/> Two Leaded-Radial	<input type="checkbox"/> Multiple Leaded ≤6 - Radial	<input type="checkbox"/> Single-In-Line Packages-SIPS	<input type="checkbox"/> Dual In-line pkgs (DIPS) ≤24 PION	<input type="checkbox"/> Dual In-line pkgs (DIPS) >24 PION	<input type="checkbox"/> Pin Grid Arrays (PGA's)	<input type="checkbox"/> Component Sockets	<input type="checkbox"/> Card Edge/Two Piece Connect.
	SURFACE MOUNT PLACEMENT	<input type="checkbox"/> Chip Resistors/ Cap. (Reel)	<input type="checkbox"/> Chip Resistors/ Cap. (Bulk)	<input type="checkbox"/> Tantalum Capacitor	<input type="checkbox"/> Metal Faced Comp. (MELFS)	<input type="checkbox"/> Sm. Outline Diodes (SODS)	<input type="checkbox"/> Sm. Outline Transistors-SOTS	<input type="checkbox"/> Sm. Outline IC's (SOIC's)	<input type="checkbox"/> Var. Resistor Trim Pots	<input type="checkbox"/> Surf. Mt. Sockets /Test Pts.Con.
	HIGH PIN COUNT	<input type="checkbox"/> Chip-on-Tape (Molded ring) >0.4mm pitch	<input type="checkbox"/> Chip-on-Tape (Molded ring) ≤0.3mm pitch	<input type="checkbox"/> Quad Flat Pack (QFP) ≤0.4mm pitch	<input type="checkbox"/> Quad Flat Pack (QFP) ≤0.3mm pitch	<input type="checkbox"/> Shrink Quad Flat Pack (SQFP)	<input type="checkbox"/> Thin Small Out-line Pkg. (TSOP)	<input type="checkbox"/> Ball/Post Grid Array >1.0mm pitch	<input type="checkbox"/> Ball/Post Grid Array ≤1.0mm pitch	<input type="checkbox"/> Land Grid Array Any Pitch
	BARE CHIP ATTACHMENT	<input type="checkbox"/> Thermal Wire Bonding	<input type="checkbox"/> Ball Bonding	<input type="checkbox"/> Ultrasonic Wire Bonding	<input type="checkbox"/> Beam Lead Chip Bonding	<input type="checkbox"/> Generic Tape Automated Bond.	<input type="checkbox"/> Custom Tape Automated Bond.	<input type="checkbox"/> Flip Chip Ceramic /Glass Based	<input type="checkbox"/> Flip Chip on Rigid Printed Boards	<input type="checkbox"/> Flip Chip on Flex Circuit Boards
C	ATTACHMENT TECHNIQUES	<input type="checkbox"/> Hand Soldering	<input type="checkbox"/> Hot Bar Soldering	<input type="checkbox"/> Focused Hot Air Soldering	<input type="checkbox"/> Wave Soldering	<input type="checkbox"/> IR Reflow Soldering	<input type="checkbox"/> Vapor Phase Soldering	<input type="checkbox"/> Hot Air Con-vection Soldering	<input type="checkbox"/> Laser Soldering	<input type="checkbox"/> Conductive Adhesive Attach.
	CLEANING AND CLEANLINESS TESTING	<input type="checkbox"/> No Clean/Never Clean System	<input type="checkbox"/> Aqueous Clean. In-line System	<input type="checkbox"/> Aqueous Clean. Static Soak	<input type="checkbox"/> Modified Solvent clean. In-line	<input type="checkbox"/> Modified Solvent clean. static soak	<input type="checkbox"/> Ultrasonic agitation cleaning	<input type="checkbox"/> Ionic Salt /ResidueTest	<input type="checkbox"/> Organic Contami-nate Impreg. test	<input type="checkbox"/> Surface Insul. Resist. (SIR) Test
	COATING AND ENCAPSULATION	<input type="checkbox"/> Bare Die-Glob Top	<input type="checkbox"/> Bare Die-Total Assembly	<input type="checkbox"/> Asbly (1-2 sides) Epoxy coat	<input type="checkbox"/> Asbly (1- 2 sides) Polyurethane coat	<input type="checkbox"/> Asbly (1-2 sides) Acrylic coating	<input type="checkbox"/> Asbly (1- 2sides) vacuum Dep coat	<input type="checkbox"/> Encap. Exterior Access (Test)	<input type="checkbox"/> Encap. Ex-access (Tuning)	<input type="checkbox"/> Encap. Entire asbly. (Thin Coat)
D	TEST TYPE	<input type="checkbox"/> Automatic Test Generation	<input type="checkbox"/> X-Ray Joint Evaluation	<input type="checkbox"/> Cleanliness Testing	<input type="checkbox"/> Auto in-circuit Electronic Asbly	<input type="checkbox"/> Electromagnetic Interference	<input type="checkbox"/> Auto function Electronic Asbly	<input type="checkbox"/> System Level Test Electrical	<input type="checkbox"/> System Level Test Function	<input type="checkbox"/> System Level test environmental
	NO. TEST VECTORS	<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 type="checkbox"/> >6000
	ENVIRONMENTAL STRESS SCREENING	<input type="checkbox"/> Burn-in at Temperature	<input type="checkbox"/> Burn-in with Temp. Cycling	<input type="checkbox"/> Burn-in Hi Temp. Cycles	<input type="checkbox"/> Burn-in w/temp. cycles hi-hum	<input type="checkbox"/> Power Cycling On-Off	<input type="checkbox"/> Vibrations Testing	<input type="checkbox"/> Shock Test	<input type="checkbox"/> Salt Spray Testing	

SECTION 7

DATE COMPLETED

IDENTIFICATION OF PREVIOUS AUDITS (Optional)

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	

*REPEAT THIS FORM AS NECESSARY

SECTION 8

FINANCIAL REVIEW (OPTIONAL)

DATE COMPLETED

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 Privately held - this information is available to clients but not public		

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 9.0

DATE COMPLETED August 16, 2016

AQP ELECTRONIC EDITING AND SAMPLE FORM

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.

SECTION 10

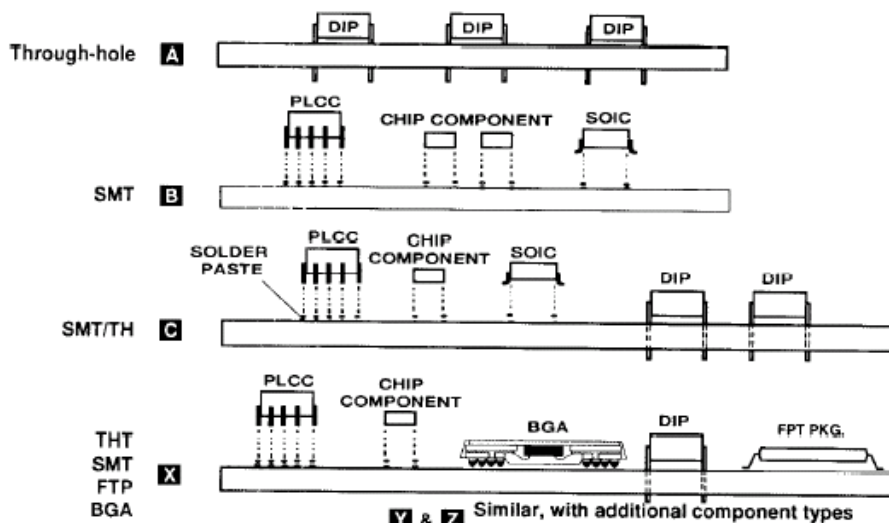
GLOSSARY OF TERMS

ATE	automatic test equipment
ATG	automatic test generation
BGA	ball grid array
CAD	computer aided design
CSP	chip-scale packaging
CTE	coefficient of thermal expansion
DCA	direct chip attachment
DFT	design for testability
DRC	design rule check
EMI	electromagnetic interference
ESD	electrostatic discharge
FPD	flat panel display
FR-4	epoxy-glass laminate
I/O	input/output
KGD	known-good die
MCM	multichip module
MIS	mounting and interconnection structure
MRC	manufacturing rules check
μBGA	micro ball grid array
PCB	printed circuit board
PGA	pin grid array
PWB	printed wiring board (see also PCB)
QFP	quad flat pack
SPC	statistical process control

SECTION 10.1

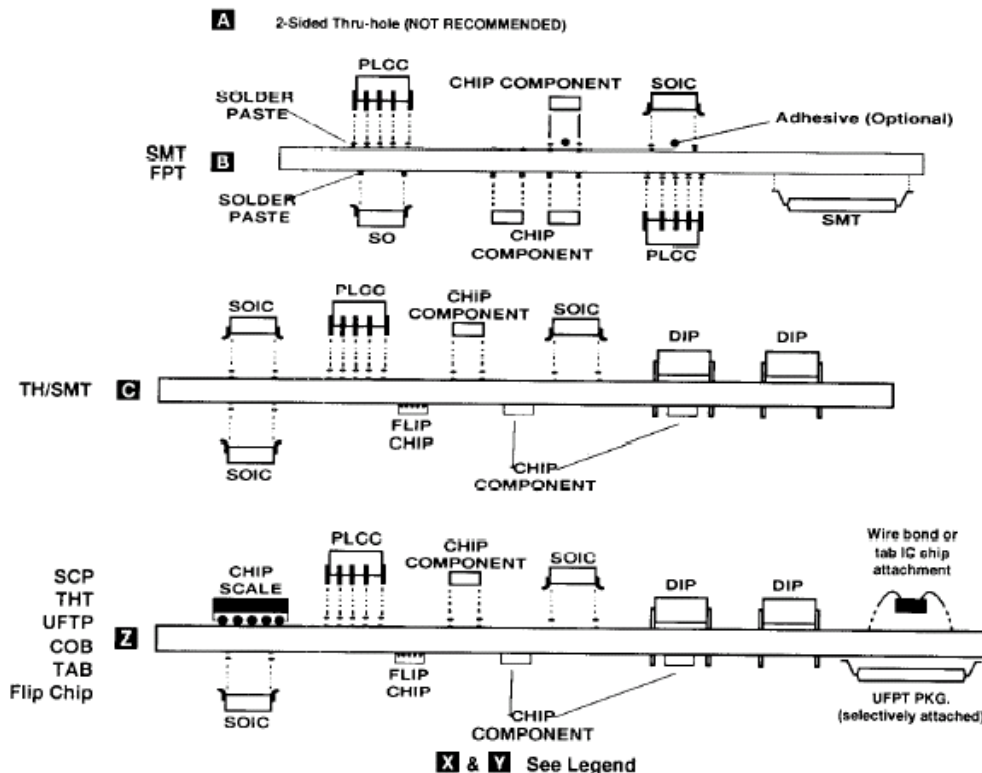
PRODUCT TYPE DESCRIPTION

Type 1 Components (mounted) on only one side of the board



Y & Z Similar, with additional component types (not shown) as described in the legend.

Type 2 Components (mounted) on both sides of the board



X & Y See Legend

Legend:

- Class A = Through-hole component mounting only
- Class B = Surface mounted components only
- Class C = Simplistic through-hole and surface mounting intermixed assembly
- Class X = Complex intermixed assembly, through-hole, surface mount, fine pitch BGA
- Class Y = Complex intermixed assembly, through-hole, surface mount, ultra fine pitch, chip scale
- Class Z = Complex intermixed assembly, through-hole, ultra fine pitch, COB, flip chip, TAB