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Printed Board Manufacturers' Qualification Profile (MQP)

PUBLICLY AVAILABLE SPECIFICATION

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

Reference number
IEC/PAS 62158

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PRINTED BOARD MANUFACTURERS' QUALIFICATION PROFILE (MQP)

FOREWORD

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IEC-PAS 62158 was submitted by the IPC (The Institute for Interconnecting and Packaging Electronic Circuits) and has been processed by IEC technical committee 52: Printed circuits.

The text of this PAS is based on the following document:	This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document:
Draft PAS	**Report on voting**
52/841/PAS	52/855/RVD

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

FOREWORD

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

Although the MQP 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 that information. The remainder of the MQP is devoted to information about the existing site.

The Printed Board Manufacturer should keep all sections current. In the initial contact between the manufacturer and a new customer, an abbreviated MQP will suffice (site description from Sections 1 and 2). Access to MQP in electronic media is suggested in order to facilitate the appropriate manufacturer/user information interchange. The remaining sections of the MQP provide details of the site manufacturing capability and the quality principles that have been incorporated into the systems used to fabricate printed boards. The information is also of use to the printed board manufacturer 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.

CONTENTS

This document is divided into ten sections. Each section is dated and maintained as a separate entity.

ACKNOWLEDGMENTS

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SECTION 1.1
COMPANY DESCRIPTION

DATE COMPLETED

GENERAL INFORMATION

LEGAL NAME			
PHYSICAL ADDRESS			
CITY		STATE	ZIP
PROVINCE		COUNTRY	
TELEPHONE NUMBER		FAX NUMBER	TELEX NUMBER
E-MAIL ADDRESS	MODEM NUMBER		DATE FOUNDED ☐ PUBLIC ☐ PRIVATE
INTERNET URL		FTP SITE	

MANAGEMENT

PRESIDENT
CHIEF OPERATING OFFICER
VICE PRESIDENT OF MANUFACTURING
VICE PRESIDENT OF QUALITY
VICE PRESIDENT OF MARKETING/SALES
VICE PRESIDENT OF CUSTOMER SERVICE
WASTE TREATMENT MANAGER (POLLUTION PREVENTION)

CORPORATE DESCRIPTION		NUMBER OF EMPLOYEES CORPORATE	SITE	COMMENTS
DESIGN AND DEVELOPMENT				
ENGINEERING				
MANUFACTURING CONTROL				
MANUFACTURING	DIRECT			
	INDIRECT			
QUALITY CONTROL	QUALITY ENGINEERS			
	INTERNAL AUDITORS			
	GENERAL MANAGEMENT			
ADMINISTRATION				
TOTAL				

SECTION 1.2
SITE DESCRIPTION

(TO BE COMPLETED FOR EACH SITE)

DATE COMPLETED

ATTACH APPROPRIATE CHARTS (OPTIONAL)

MANUFACTURING FACILITY

COMPANY NAME		
PHYSICAL ADDRESS		
CITY	STATE	ZIP
PROVINCE	COUNTRY	
TELEPHONE NUMBER	FAX NUMBER	TELEX
E-MAIL ADDRESS	MODEM NUMBER	YEARS IN BUSINESS
INTERNET URL	FTP	
PRINCIPLE PRODUCTS/SERVICES/SPECIALTIES	BUSINESS CHARACTERIZATION (HIGH VOLUME, QUICK TURN-AROUND, ETC.)	

FACILITY MANAGEMENT

FACILITY MANAGEMENT	TITLE	REPORTS TO (Function/Job Title)
OVERALL OPERATION RESPONSIBILITY FOR THIS SITE		
MANUFACTURING		
TECHNICAL/ENGINEERING		
MATERIALS/PRODUCTION CONTROL		
PURCHASING		
QUALITY		
SALES REPRESENTATIVE		
WASTE MANAGEMENT		

BUILDINGS

	AGE	AREA (Sq. Ft.)	Construction (Wood/Brick)
Office			
Manufacturing			
Storage			
Planned additions			

SYSTEMS (INDICATE % COVERAGE)

Power Conditioning	Heating	Ventilation	Air Conditioning	Sprinklers	Waste Treatment	Other

SAFETY AND REGULATORY AGENCY REQUIREMENTS

Are fire extinguishers functional and accessible to employees?	☐ YES	☐ NO	What is the distance to the nearest fire station? (in minutes)	Minutes
Do you conform to local/federal environment protection agency requirements?	☐ YES	☐ NO	Date of last OSHA visit Date of last EPA visit	
Are you currently operating under a waiver or in violation of local government requirements?	☐ YES	☐ NO	Other Agency Audits, UL, ISO 9000, NECQ, CSA Approval and Number	☐ UL # ☐ ISO 9000# ☐ CSA # ☐ Other
Do you have a safety program? Describe below.	☐ YES	☐ NO	Hazardous Waste Number Trade Waste Account Number	

PLANT PERSONNEL (TOTAL EMPLOYEES)

Regular	Contract	Office	Technical/ Engineering	Production	Full-Time QA	Part-Time QA	Union	Non-Union	Union Name	Contract Expires (Date)

COMMENTS

DATE COMPLETED

SECTION 2.1
PROCESSES

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

Site Capability Snapshot (Please Check all that apply)

DESIGNATORS		1	2	3	4	5	6	7	8	9	OTHER	REMARKS
A	Conductor Forming Process	☐ Sub-tractive	☐ Thin foil Sub-tractive less than .5 oz.	☐ Semi-Additive	☐ Additive (Electro-less)	☐ Black Hole	☐ Thick Film Paste and Fire	☐ Thin Film Semi-conductor Sputtering				
B	PTH Materials and Processes	☐ Acid Copper	☐ Pyro-Phosphate Copper	☐ Full Built Electro-Less	☐ Gold Paste	☐ Copper Paste	☐ Gold Conductor Sputtering	☐ Nickel Conductor Sputtering				
C	Permanent Over-plating	☐ Tin	☐ Tin-Lead	☐ Tin-Nickel Alloy	☐ Nickel	☐ Nickel Gold (Hard)	☐ Nickel Gold (Soft)	☐ Nickel Rhodium	☐ Conductive Polymer			
D	Permanent Selective Plating	☐ Tin	☐ Tin-Lead	☐ Tin-Nickel Alloy	☐ Nickel	☐ Nickel Gold (Hard)	☐ Nickel Gold (Soft)	☐ Nickel Rhodium				
E	Permanent Mask or Coating	☐ Photo Dry Film	☐ Photo Liquid	☐ Image Transfer Screen Mask	☐ Conformal Coating Solder Mask	☐ Cover Coat						
F	Other Surface Finishes	☐ Tin-Lead Fused	☐ Immersion Tin	☐ Solder Leveled	☐ Roll Soldered	☐ Electro-less Solder Fused	☐ Solder Bumped Lands	☐ Solder Paste Fused	☐ Azole Organic Protective Covering	☐ Flux Protective Covering		

SECTION 2.2

ELECTRICAL TEST EQUIPMENT

DATE COMPLETED

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

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

DESIGNATORS		1	2	3	4	5	6	7	8	9	OTHER	REMARKS
A	Number of Nets	☐ <200	☐ 200	☐ 500	☐ 1000	☐ 2000	☐ 3000	☐ 4000	☐ 5000	☐ >5000		
B	Number of Nodes	☐ <500	☐ 500	☐ 1000	☐ 2000	☐ 3000	☐ 4000	☐ 5000	☐ 6000	☐ >6000		
C	Probe Point Pitch	☐ >1.0 [.040]	☐ 1.0 [.040]	☐ 0.8 [.032]	☐ 0.65 [.025]	☐ 0.50 [.020]	☐ 0.40 [.016]	☐ 0.30 [.012]	☐ 0.20 [.008]	☐ <0.20 [.008]		
D	Test % Single Pass	☐ None	☐ <60%	☐ 60%	☐ 70%	☐ 80%	☐ 90%	☐ 95%	☐ 99%	☐ 100%		
E	Probe Accuracy (DTP)	☐ >0.2 [.008]	☐ 0.2 [.008]	☐ 0.15 [.006]	☐ 0.125 [.005]	☐ 0.1 [.004]	☐ 0.075 [.003]	☐ <0.075 [.003]				
F	Grid Density	☐ Single Side Grid	☐ Double Sided Grid	☐ Double Density Grid	☐ Double Density Double Sided	☐ Quad Density	☐ Double Sided Quad Density	☐ Flying Probe				
G	Netlist Capability	☐ Golden Board	☐ IPC-D-356	☐ Net List Extraction	☐ CAD/CAM Net List Compare							
H	Test Voltage	☐ <20 VDC	☐ 20 VDC	☐ 40 VDC	☐ 60 VDC	☐ 80 VDC	☐ 100 VDC	☐ 500 VDC	☐ 1000 VDC	☐ >1000 VDC		
J	Impedance Measure	☐ Micro Section	☐ Inboard Circuit	☐ Coupon	☐ Manual TDR	☐ Automated TDR						
K	Impedance Tolerance	☐ None	☐ >20%	☐ 20%	☐ 15%	☐ 10%	☐ 7%	☐ 5%	☐ 2%	☐ <2%		

DATE COMPLETED

SECTION 2.3
PRODUCT TYPE

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

Site Capability Snapshot (Please Check all that apply)

DESIGNATORS		1	2	3	4	5	6	7	8	9	OTHER	REMARKS
A	Product Type	☐ Rigid Printed Board	☐ Flex Printed Board	☐ Rigid/Flex Board	☐ Rigid Back Plane	☐ Molded Product	☐ Ceramic Printed Board	☐ Multichip Module	☐ Liminated Multichip Module	☐ Deposited Dielectric Multichip Modules		
B	Circuit Mounting Type	☐ Single Sided	☐ Double Sided	☐ Multi-layer	☐ Single-sided Bonded to Substrate	☐ Double-sided Bonded to Substrate	☐ Multi layer Bonded to Substrate	☐ Constrained Multi layer	☐ Distributed Plane Multi layer			
C	Via Technology	☐ No-Vias	☐ Thru Hole Vias	☐ Buried Vias	☐ Blind Vias	☐ Thru Hole & Blind Vias	☐ Thru Hole & Buried Vias	☐ Thru Hole Buried & Blind Vias	☐ Buried & Blind Vias			
D	Laminate Material	☐ Phenolic	☐ Epoxy Paper	☐ Epoxy Glass	☐ Modified Epoxy Composite	☐ Polyimide Film & Reinforce	☐ Cynanate Ester	☐ Teflon	☐ Ceramic Glass Types	☐ Various Combinations		
E	Core Material	☐ No Core	☐ Polymer	☐ Copper	☐ Aluminum	☐ Graphite	☐ Copper Invar/ Copper	☐ Copper Moly/ Copper				
F	Copper Thickness (Oz.)	☐ 1/8 Minimum	☐ 1/4 Minimum	☐ 3/8 Minimum	☐ 1/2 Nominal	☐ 1 Nominal	☐ 2 Nominal	☐ 3-5 Max	☐ 6-9 Max	☐ >10		
G	Construction	☐ ≤4 Planes	☐ >4 Planes	☐ THK to TOL ≤0.2 mm	☐ THK to TOL >0.2 mm	☐ Bow/Twist ≤1%	☐ Bow/Twist >1%	☐ ≤0.3 mm Profile Tolerance	☐ >0.3 mm Profile Tolerance			
H	Coatings and Markings	☐ ≤0.1 mm Mask Clearance	☐ >0.1 mm Mask Clearance	☐ One Side (Legend)	☐ Two Sided (Legend)	☐ None (Legend)	☐ U.L. Material Logo	☐ U.L. V_0 Logo	☐ U.L. V_1 Logo	☐ U.L. V_2 Logo		

SECTION 2.4

PRODUCT COMPLEXITY

DATE COMPLETED

This section is intended to provide overview information on the product complexity being fabricated by the manufacturer.
(Please check the column that applies furthest to the right)

DESIGNATORS		1	2	3	4	5	6	7	8	9	OTHER	REMARKS
A	Board Size Diagonal	☐ <250 [10.00]	☐ 250 [10.00]	☐ 350 [14.00]	☐ 450 [17.50]	☐ 550 [21.50]	☐ 650 [25.50]	☐ 750 [29.50]	☐ 850 [33.50]	☐ >850 [33.50]		
B	Total Board Thickness	☐ 1, 0 [.040]	☐ 1, 0 [.040]	☐ 1, 6 [.060]	☐ 2, 0 [.080]	☐ 2, 5 [.100]	☐ 3, 5 [.135]	☐ 5, 0 [.200]	☐ 6, 5 [.250]	☐ >6, 5 [.250]		
C	Number Conductive Layers	☐ 1 - 4	☐ 5 - 6	☐ 7 - 8	☐ 9 - 12	☐ 13 - 16	☐ 17 - 20	☐ 21 - 24	☐ 25 - 28	☐ >28		
D	Dia Drilled Holes	☐ >0, 5 [.020]	☐ 0, 5 [.020]	☐ 0, 4 [.016]	☐ 0, 35 [.014]	☐ 0, 30 [.012]	☐ 0, 25 [.010]	☐ 0, 20 [.008]	☐ 0, 15 [.006]	☐ <0, 15 [.006]		
E	Total PTH TOL (Max-Min)	☐ >0, 250 [.010]	☐ 0, 250 [.010]	☐ 0, 200 [.008]	☐ 0, 150 [.006]	☐ 0, 125 [.005]	☐ 0, 100 [.004]	☐ 0, 075 [.003]	☐ 0, 050 [.002]	☐ <0, 050 [.002]		
F	Hole Location TOL DTP	☐ >0, 50 [.020]	☐ 0, 50 [.020]	☐ 0, 40 [.016]	☐ 0, 30 [.012]	☐ 0, 25 [.010]	☐ 0, 20 [.008]	☐ 0, 15 [.006]	☐ 0, 10 [.004]	☐ <0, 10 [.004]		
G	Internal Layer Clearance (Min)	☐ >0, 350 [.014]	☐ 0, 350 [.014]	☐ 0, 250 [.010]	☐ 0, 200 [.008]	☐ 0, 150 [.006]	☐ 0, 125 [.005]	☐ 0, 100 [.004]	☐ 0, 075 [.003]	☐ <0, 075 [.003]		
H	Internal Layer Conductor Width (Min)	☐ >0, 250 [.010]	☐ 0, 250 [.010]	☐ 0, 200 [.008]	☐ 0, 150 [.006]	☐ 0, 125 [.005]	☐ 0, 100 [.004]	☐ 0, 075 [.003]	☐ 0, 050 [.002]	☐ <0, 050 [.002]		
J	Internal Layer Process Allowance	☐ >0, 100 [.004]	☐ 0, 100 [.004]	☐ 0, 075 [.003]	☐ 0, 050 [.002]	☐ 0, 040 [.0015]	☐ 0, 030 [.0012]	☐ 0, 025 [.001]	☐ 0, 020 [.0008]	☐ <0, 020 [.0008]		
K	External Layer Clearance (Min)	☐ >0, 350 [.014]	☐ 0, 350 [.014]	☐ 0, 250 [.010]	☐ 0, 200 [.008]	☐ 0, 150 [.006]	☐ 0, 125 [.005]	☐ 0, 100 [.004]	☐ 0, 075 [.003]	☐ <0, 075 [.003]		
L	External Layer Conductor Width (Min)	☐ >0, 250 [.010]	☐ 0, 250 [.010]	☐ 0, 200 [.008]	☐ 0, 150 [.006]	☐ 0, 125 [.005]	☐ 0, 100 [.004]	☐ 0, 075 [.003]	☐ 0, 050 [.002]	☐ <0, 050 [.002]		
M	External Layer Process Allowance	☐ >0, 100 [.004]	☐ 0, 100 [.004]	☐ 0, 075 [.003]	☐ 0, 050 [.002]	☐ 0, 040 [.0015]	☐ 0, 030 [.0012]	☐ 0, 025 [.001]	☐ 0, 020 [.0008]	☐ <0, 020 [.0008]		
N	Feature Location DTP	☐ >0, 50 [.020]	☐ 0, 50 [.020]	☐ 0, 40 [.016]	☐ 0, 30 [.012]	☐ 0, 25 [.010]	☐ 0, 20 [.008]	☐ 0, 15 [.006]	☐ 0, 10 [.004]	☐ <0, 10 [.004]		

All Dimensions are in millimeters [inches shown in brackets]

DATE COMPLETED

SECTION 2.5
QUALITY DEVELOPMENT

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		1	2	3	4	5	6	7	8	9	OTHER	REMARKS
A	Strategic Plan	☐ Functional Steering Committee Formed	☐ TQM Plan & Philosophy Established & Published	☐ Documented Quality Progress Review	☐ Implementation & review of Project Team Recommend-ations	☐ TQM Communi-cated throughout organization	☐ Controlled New process Start-up	☐ Management Participates in TQM Audits	☐ Employee Recognition Program	☐ Total TQM Plan/ Involvement Customer Training		
B	Employee Involvement	☐ Certified Training Available	☐ Training of Employee Base	☐ TQM Team Trained	☐ Design of Experiment Training and Use	☐ New Process Implementa-tion Training	☐ Support Personnel Training	☐ Advanced Statistical Training	☐ Quality Functional Deployment	☐ Ongoing Improvement Program for Employees		
C	Quality Manual	☐ Quality Manual Started	☐ Generic Quality Manual for Facility	☐ 10% of manu-facturing depts. have process specifications	☐ 25% of manu-facturing depts. have process specifications	☐ 50% of manu-facturing depts. have process specifications	☐ Non-manufac-turing Manuals Developed	☐ 25% of all departments have quality manuals	☐ 50% of all departments have quality manuals	☐ All Manufac-turing and support depts. have controlled quality manual		
D	Instructions	☐ Work Instructions Started	☐ Quality Instructions Started	☐ 10% Work Instructions Completed	☐ 10% Quality Instructions Completed	☐ 25% Work Instructions Completed, Controlled	☐ 25% Quality Instructions Completed, Controlled	☐ 50% Work Instructions Completed, Controlled	☐ 50% Quality Instructions Completed, Controlled	☐ Quality and work Instruct. Completed, Controlled		
E	SPC Implementation IPC-PC-90	☐ Plan Exists	☐ Training Started	☐ Process Data Collected & Analyzed	☐ All Employees Trained	☐ First Process Stable & Capable	☐ Several Major Processes Stable & Capable	☐ Continued Improvement of Stable Processes	☐ Additional Mfg Processes under control	☐ All Processes Under Control		
F	Supplier Programs/ Controls	☐ Supplier Rating Program	☐ Monthly Analysis Program	☐ Key Problems Identified	☐ Supplier Reviews Performance Data provided	☐ TQM Acceptance by suppliers	☐ 10% of Suppliers Using SPC	☐ 25% of Suppliers Using SPC	☐ 50% of Suppliers Using SPC	☐ All Key Suppliers using Certified parts program		
G	Third Party IPC-QS-95	☐ Instrument Controls in Place	☐ Measurement System in Control IPC-PC-90	☐ Document Controls in Place	☐ Reduced Lot Sampling	☐ 10% of Processes Under Audit Control	☐ 50% or Greater of Processes Under Audit Control	☐ ISO-9003 Certified	☐ ISO-9002 Certified	☐ ISO-9001 Certified		

SECTION 3

EQUIPMENT PROFILE (Pre-Site Audit)

DATE COMPLETED

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

3.1 PHOTOTOOL CAPABILITY	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS*
A) AOI of phototool	☐	☐			
B) AOI CAD reference (CAM)	☐	☐			
C) Photoplotting	☐	☐			
D) Photo reductions	☐	☐			
E) Film scan and conversion	☐	☐			
F) Film processing ☐ air-dried ☐ force-dried ☐ processed in automatic processor	☐	☐			
G) Media types ☐ silver halide film ☐ glass ☐ diazo	☐	☐			

3.2 DRILLING EQUIPMENT	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS*
A) Manual	☐	☐			
B) Optical (single spindle)	☐	☐			
C) N.C. drill	☐	☐			

3.3 ROUTING EQUIPMENT	YES	NO	EQUIPMENT	QTY	EQUIPMENT LIMITS*
A) Edge beveler	☐	☐			
B) Hand router (pin router)	☐	☐			
C) N.C. router	☐	☐			
D) N.C. driller/router	☐	☐			
E) Scoring (profile)	☐	☐			
F) Scoring (straight line)	☐	☐			