

QC Engineering drawing

Process	Key Management Projects	Management Standard	Testing frequency	Testing methods	Testing tools
IQC ↓	base material, solder mask, Chemicals, semi-finished products for outsourced processing	Meet incoming inspection guidelines	once/PO	Visual inspection, laboratory analysis and reliability test	Laboratory analysis instrument, needle gauge red film
Board Cut ↓	board thickness, copper thickness and dimensions	Meet process instructions and MI requirements	once/PO	Visual inspection and measurement	Vernier calipers, Copper measuring instrument, Steel
Baking board ↓	Temperature, time	Normal TG and middle TG: 155 ± 5 °C; high TG: 175 ± 5 °C Time: 4 hours	Full baking	Visual inspection and measurement	Thermometer Timer
↓ Inner layer imaging ↓	Ink viscosity	80-120PS	1 time/oil	measuring	Viscometer
	Baking sheet temperature	90 °C for the 1, 5 steps, 100 °C for the 2, 3, 4 steps	100%	Visual inspection	Thermometer
	Baking time	8-10min	100%	Visual inspection	Timer
	Exposure energy	5-7 cells	1 time/2H	Before production	21 grid exposure ruler
	Developing density	0.8-1.2% Na2CO3	1 time/shift	Laboratory analysis	Analytical Instruments
	Developing temperature	30 ± 2 °C	1 time/shift	Visual inspection	thermometer
	Developing speed	2.0-3.0m / min	1 time/shift	Visual inspection	Regulator
	Developing pressure	Wet film 1.5-2.5kg / cm2	1 time/shift	Visual inspection	Pressure gauge
↓ QC inspection ↓	Development is not clean	Not allowed	Full inspection	Visual inspection	Ten times magnifying glass
	open circuit	Not allowed	1PNL/batch	Visual inspection	AOI
	Short circuit	Not allowed			
	gap	$\leq 20\%$ of line width			
Line width / gap	$\pm 20\%$				
↓ Inner layer etching	Cu2 + content	140-190g / L	1 time/shift	Laboratory analysis	Analytical Instruments
	Acid equivalent	2.0-4.0N	1 time/shift		
	speed	1.5-5.0 (first confirmation)	1 time/shift	Visual inspection	Regulator
	proportion	1.26-1.32g / cm3	1 time/shift	measurement	Baum gauge

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↓	Etching temperature	50 ± 2 °C	1 time/shift	measurement	Thermometer
	Drop film concentration	4-8%	1 times/shift	Laboratory analysis	Analytical Instruments
AOI	Exterior	No notch, open and short circuit, poor etching, line width / small	Full inspection	Visual inspection	Visual inspection
↓ Brown oxidation ↓	H ₂ O ₂	20-30ml / l	2次/shift	Laboratory analysis	Analytical Instruments
	H ₂ SO ₄	45-55ml / l			
	MS-500	45-55ml / l			
	Cu ²⁺	≤35g / l			
	Micro-etch rate	1.0-1.5um			
QC Test	Exterior	No rubbing, Brown Oxide defect	100%	Visual inspection	10 times mirror
↓ Lamination ↓	temperature	according to lamination process	1 times/段	Visual inspection	thermostat
	time			Visual inspection	Computer display
	pressure			Visual inspection	Pressure gauge
IPQA Spot Check	Platen thickness	according toMI	AQL:10.0	Visual inspection	micrometer
	Exterior	null scratch, salient point, pit point, wrinkle	AQL:2.5	Visual inspection	Visual inspection
↓ Drilling	Drill bit diameter	according toMI	1 times/piece	Visual inspection	Visual inspection
	Rotating speed	Comply with drilling procedure			
	Feed speed	Comply with drilling procedure			
	Withdrawal speed	Comply with drilling procedure			
↓ IPQA Test	Aperture size	Consistent with MI	Full inspection	measurement	needle gauge
	Wrong number of holes	Not accept		red film	red film
	Hole offset	Meets ± 0.05mm		Visual inspection	red film
	Perforation	Not allowed			Visual inspection
↓	Degreasing concentration	0.15-0.25N	1 times/shift		

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<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Immersion Copper</div> <div style="text-align: center; margin: 10px 0;">↓</div>	Micro-etching concentration	SPS:80±20g/L H ₂ SO ₄ :3±1%	3 times/shift	chemical analysis	Chemical instrument
	Prepreg specific gravity	1.118-1.142	1 times/shift		
	Activation concentration	Specific gravity: 1.124-1.154 Palladium content: 60-90ppm	1 times/shift		
	Accelerated concentration	PH value: 8.75 ± 0.5 Concentration: 1 ± 0.2%	1 times/shift		
	Copper concentration	Cu ²⁺ :1.4-2.2g/L NaOH: 9±2g/L HCHO:5.5±2g/L EDTA:0.06-0.09N	3 times/shift		
<div style="border: 1px solid black; border-radius: 50%; padding: 5px; width: fit-content; margin: 0 auto;">IPQA Spot Check</div> <div style="text-align: center; margin: 10px 0;">↓</div>	Backlight check	≧Level 9	1 times/1H	Microsection test	40 times mirrors
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Panel Plating</div> <div style="text-align: center; margin: 10px 0;">↓</div>	Board electricity potion concentration	CUSO ₄ : 50-80 g/L H ₂ SO ₄ :220-250g/L CL-: 40-80PPM Matting agent: 0.2-1.5ml/l	1 times/week	chemical analysis	Chemical instrument
<div style="border: 1px solid black; border-radius: 50%; padding: 5px; width: fit-content; margin: 0 auto;">IPQA Spot Check</div> <div style="text-align: center; margin: 10px 0;">↓</div>	Exterior	Null board surface, copper particles, watermark, null copper in the hole, burr	AQL: 2.5	Visual inspection	Visual inspection
	Copper thickness in the hole	Refer to MI	AQL: 2.5	Visual inspection	CMI700
	Connection between hole wall and inner layer	null break	1PCS/batch	Visual inspection	microscope
<div style="text-align: center; margin: 10px 0;">↓</div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Outer</div>	Wear scar	8-15mm	1 times/shift	measurement	Film ruler
	Grinding speed	15-25dm/min	1 times/shift	Visual inspection	monitor
	Drying temperature	85±5℃	1 times/shift	Visual inspection	Thermometer
	Pickling	3-5%H ₂ SO ₄	1 times/shift	chemical analysis	Chemical instrument
	Film temperature	100-120℃	1 times/shift	Visual inspection	Infrared Thermometer
	Film speed	2.0-2.5m/min	1 times/shift	Visual inspection	meter
	Automatic machine film pressure	3-5kg/cm ²	1 times/shift	Visual inspection	Pressure gauge

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<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">layer imaging</div> <div style="text-align: center; margin: 5px 0;">↓</div> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; width: fit-content; margin: 0 auto;">IPQA Spot Check</div>	Exposure energy	Dry film: 5-7 energy	1 times/2H	Visual inspection	21-level exposure ruler
	Na2CO3 concentration	1±0.2%	1 times/shift	chemical analysis	Chemical instrument
	Developing pressure	1.2-1.8kg/cm2	1 times/shift	Visual inspection	Pressure gauge
	Developing speed	2.80-3.20m/min	1 times/shift	Visual inspection	Speedometer
<div style="border: 1px solid black; border-radius: 50%; padding: 5px; width: fit-content; margin: 0 auto;">QC Test</div> <div style="text-align: center; margin: 5px 0;">↓</div>	Exterior	null unclean development, open and short circuit, broken dry film, broken holes, wrinkles, notches	Full inspection	Visual inspection	Visual inspection 100×mirror
	Line width / gap	±20%	2PNL/batch (First board inspection)	measurement	100×mirror

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IPQA Spot Check	Exterior	Null unclear development, open and short circuit, broken dry film, broken holes, wrinkles, notches	AQL: 2.5	Visual inspection	Visual inspection
	Line width / gap	±20%	IPNL/batch		100×Magnifier
↓ Pattern plating	Degreasing concentration	ACP120:8±2g/L	1 times/shift	chemical analysis	Chemical instrument
	Micro-etching concentration	SPS:80±20g/L H ₂ SO ₄ :3±1%	1 times/shift		
	Copper plating potion concentration	CuSO ₄ 5H ₂ O: 50-80g/L H ₂ SO ₄ :220-250g/L CL ⁻ : 40-80PPM VP150B: 0.2-1.5ml/L	1 times/week		
	Tin plating solution concentration	SnSO ₄ : 30±5 g/L H ₂ SO ₄ :190±20g/L L Tin SP630:60±20ml/L	1 times/week		
IPQA spot check	Coating adhesion	The coating does not fall off	1 times/batch	Tape test / thermal shock test	3M Tape / Physical Room
	Copper thickness	Meet MI requirements	1 times/batch	Instrumentation / Development mirror observation	CMI700/Microscope/X-RAY
↓ Etching	Remove film concentration	Remove film: 10 ± 2%	1 times/shift	Laboratory analysis	Chemical instrument
	Etching fluid parameters	CU ²⁺ : 130-160g / L CL ⁻ : 170-200g / L PH: 8.0-8.8 Specific gravity: 23.5 ± 2.5Be0	1 times/shift	Laboratory analysis	Baum gauge、Acid-base reagent、Chemical instrument
	Etching pressure	Up pressure: 2.0 ± 1.5kg / cm ² Down pressure: 2.0 ± 1.5kg / cm ²	1 times/shift	Visual inspection	Pressure gauge
	Etching speed	Set with first item	1 times/shift	Visual inspection	Speedometer
	Stripping speed	Back to tin clean	1 times/shift	Visual inspection	Speedometer
AOI	Exterior	Null dents, scratches, open and short circuits, poor etching, rough, copper particles, holes, null copper, line width / young	Full inspection	Visual inspection	Visual inspection

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<p style="text-align: center;">↓</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Solder mask & Silkscreen</div> <p style="text-align: center;">↓</p>	Wear scar	8-15mm	1 times / shift	measurement	ruler
	Preview temperature	75±3℃	1 times / week	measurement	Thermometer
	Preview time	First side: 15min Second side: 25min Double side: 35-55min	1 times / furnace	Visual inspection	timer
	Exposure energy	9-12 cells	1 times / 2 hours	measurement	21 grid exposure ruler
	Developer concentration	0.8-1.2%	1 times / board	chemical analysis	Chemical instrument
	Baking temperature after soldering	Refer to the baking plate operation guide according to the plate	1 times / furnace	measurement	Thermometer
	Baking time after solder mask	Refer to the baking plate operation guide according to the plate	1 times / furnace	Visual inspection	timer
	High-temperature roasting temperature	155 ± 5 ℃	1 times / week	measurement	Thermometer
	High-temperature roasting time	60 minutes	1 times / furnace	Visual inspection	timer
<div style="border: 1px solid black; border-radius: 50%; padding: 5px; width: fit-content; margin: 0 auto;">QC Test</div>	Exterior	Null rub, PAD on green oil, poor development, misalignment, exposed copper, poor exposure, poor plugging, ink type, text offset, illegible text	Full inspection	Visual inspection	Magnifier
<p style="text-align: center;">↓</p> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; width: fit-content; margin: 0 auto;">IPQA Spot Check</div> <p style="text-align: center;">↓</p>	Exterior	Null rub, PAD on green oil, poor development, misalignment, exposed copper, poor exposure, poor plugging, ink type, text offset, illegible text	AQL: 2.5	Visual inspection	Visual inspection Magnifier
	Coating thickness	Take MI instructions	1PNL/batch	measurement	Microscope
	Coating adhesion	3M glue does not pull off	1PNL/batch	Testing	3M胶
	Coating hardness	6H pencil scribble surface	1PNL/batch	Testing	6H
	Solvent test	White cloth with alcohol wipe	1PNL/batch	Testing	White cloth / alcohol
	Slightly etched	SPS: 100 ± 20g / L	1 times/shift	Laboratory analysis	Chemical instrument
	Prepreg	H2SO4: 7-15ml / L	1 times/shift	Laboratory analysis	Chemical instrument

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Immersion gold ↓	Activation concentration	Palladium ion: 8-16PPM YC-42: 100 ± 20ml / L	Twice /week	Laboratory analysis	Chemical instrument
	After dipping	H2SO4: 20 ± 10ml / l	1 times/shift	Laboratory analysis	Chemical instrument
	Chemical nickel	Nickel ion: 4.3-5.2g / l Sodium dihydrogen sulfate: 24-35g / l	1 times/shift	Laboratory analysis	Chemical instrument
	Chemical gold	Gold ion: 0.4-0.6g / l	1 times/day	Laboratory analysis	Outbound product analysis
IPQA Spot Check ↓	Shen Jin	Not allowed	AQL	Visual inspection	Visual inspection
	Gold surface oxidation, heterochromatic	Not allowed	AQL	Visual inspection	Visual inspection
	Coating adhesion	3M glue does not pull off	1PNL/batch	Testing	3M glue
	Coating thickness	Meet MI requirements	every batch	measurement	X-RAY
Forming	Dimensions of gong board	Meet MI mechanical drawing instructions	Spot check	measurement	Calipers
	V-CUT depth dimension	Meet V-CUT drawing requirements	1 times/batch	measurement	V-CUT depth gauge
IPQA Spot Check ↓	V-CUT depth dimension	Meet customer drawing requirements	AQL:2.5	measurement	10 times mirror, Vernier calipers, depth gauges
	V bias	Offset in accordance with customer requirements			
Testing ↓	open circuit	null open	Full inspection	Testing	computer tester
	Short circuit	null short			
	Pin print	null pin print			
FQC	Visual inspection	Meets finished product inspection standards, customer inspection standards, and customer temporary requirements	Full inspection	Visual inspection	Visual inspection Magnifier
FQA Spot ↓	Visual inspection	Meet customer mechanical drawing requirements without open circuit and short circuit	AQL: 2.5	Visual inspection	Visual inspection, vernier caliper, 10 times mirror,
	Dimensional inspection			measurement	

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↓	function test	and short circuit		Testing	computer tester
<div style="border: 1px solid black; padding: 2px; display: inline-block;">Packing</div>	Packaging format	Meet customer requirements	Full inspection	Visual inspection	Visual inspection
	Package weight and quantity				
↓	Wrong number of packages	Not accept	AQL: 2.5	Visual inspection	Visual inspection
<div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;">FQA</div>	Wrong board				
	Wrong packaging specifications	Meet customer requirements			

Responsible person	Quality record	Exception Handling	Reference standard	Process equipment	Remarks
Incoming inspector	IQC testing report	1.Reject 2.Pick 3.Special procurement	IQC incoming inspection operation guide	Null	External quality inspector
Cutting worker	<Opening record>	Return to warehouse or supplier"	MI instructions	cutting machine	Self-check
Drilling supervisor	<Baking Sheet Record Form>	Rebake	MI instructions	oven	Full inspection
circuit supervisor	Coating machine inspection / maintenance record	Adjustment check	Inner circuit Operation Guidelines	Coating machine	Self-check
circuit supervisor	Records of exposure machine production and equipment inspection	Check adjustment	D/F Operation Guide	Exposure machine	Self-check
Laboratory technician	Laboratory Analysis Instructions	Analysis adjustment	Inner circuit Operation Guidelines	Developing machine	Self-check
circuit supervisor	Development machine production and equipment inspection records	Check adjustment			
QC	Process QC inspection record	Rework	circuit QCoperation instructions	null	Self-check
Laboratory	<Laboratory analysis 报告>	Adjustment analysis	Etching instructions	Etching machine	Self-check

Responsible person	Quality record	Exception Handling	Reference standard	Process equipment	Remarks
Laboratory	〈Laboratory analysis 报告〉	Adjustment analysis	Etching instructions	Etching machine	Self-check
AOI director	〈QC Inspection Day Report〉	Scrap and rework	AOI operation instructions	AOI machine	Inspector full inspection
Laboratory	〈Laboratory analysis report〉	Adjustment analysis	Brown Oxide operation instructions	Brown Oxide line	Self-check
QC inspector	〈Browning Quality Record Form〉	Rework	Browning QC Guidelines	null	Full inspection
Lamination director	Lamination press record sheet	Adjust operating parameters	压合operation instructions	Press machine	Self-check
QA Spot check	Lap daily spot check records	Returns / Full Test	QAoperation instructions	null	Spot check
drilling director	Automatic rig detection	Replace the drill bit	QA operation instructions	CNC drilling rig	Self-check
	Check rig display and operation instructions	Adjustment parameters			
QA Spot checker	Drilling daily spot check records	Adjustment parameters	drilling operation instructions	null	Spot check

Responsible person	Quality record	Exception Handling	Reference standard	Process equipment	Remarks
Laboratory	<chemical analysis report>	Analytical Additives	Immersion Copper line instructions	Immersion Copper line	Self-check
Immersion Copper QA	Backlight detection record sheet	Rework	Backlight level check operation instructions	hand presser	Spot check
Laboratory technician	Laboratory analysis notice	Analysis adjustment	Panel Plating operation instructions	Panel Plating machine	Self-check
Plating QA	<QA Inspection Day Report>	Rework	QA operation instructions	null	Spot check
circuit director	<Grinding plate inspection record>	Readjust	Grinding machine operation guide	Grinding machine	Self-check
		Replace			
	<Inspection records of film parameters>	Adjust normal range	Guidelines for the operation of automatic film laminating machine	Laminator	Self-check

Responsible person	Quality record	Exception Handling	Reference standard	Process equipment	Remarks
	<Exposure Machine Parameter Check Record>	Check adjustment	circuit exposure machine operation guide	Exposure machine, thermometer, hygrometer	Self-check
Laboratory	<Na2CO3 concentration analysis record>	Adjusted test	circuit Developing machine operation instructions	Developing machine	Self-check
circuit director	<Developer Parameter Inspection Record>	Check adjustment			
QC inspector	<QC inspection day report>	Rework	circuit QC operation instructions	null	Inspector full inspection
	<Line width and line spacing measurement records >				

Responsible person	Quality record	Exception Handling	Reference standard	Process equipment	Remarks
QA	⟨QA Inspection Day Report⟩	Withdrawal process	circuit QA operation instructions	null	Spot check
Laboratory	⟨chemical analysis report⟩	Analytical Additives	Pattern plating automatic line operation instructions	Pattern plating automatic line	Self-check
Physics laboratory	⟨Microsection report⟩ / Hole copper measurement record	Rework / Scrap	Plating IPQA operation instructions / Physics room operation instructions	Tin furnace / microscope	Spot check
Laboratory	⟨Laboratory analysis report⟩	Analytical Additives	Etching line operation instructions / Laboratory analysis instructions	Etching line	Self-check
plating director	Temperature measurement record	Check adjustment			
AOI director	⟨QC Inspection Day Report⟩	Scrap and Rework		AOI machine	Inspector Full inspection

Responsible person	Quality record	Exception Handling	Reference standard	Process equipment	Remarks
Green solder mask director	<Grinding Machine Inspection Record> <Oil record> <Exposure Energy Inspection Record> <Developer inspection record>	Rework	Green oil mill board operation guide, solder mask operation guide, baking sheet operation instructions, exposure operation instructions, alignment operation instructions, solder mask development operation instructions,	Grinding machine Exposure machine Silk printer	Solder mask process Self-check
Text director					
Inspector	<QC Inspection Day Report>	Rework	Soldering QC inspection operation instructions, MI instructions	null	Full inspection
IPQA	<QA Inspection Daily Report> Ink adhesion and hardness test report. Microslice recording	Return QC Rework	Solder mask, text IPQA inspection operation instructions physics room operation instructions MI instructions	null	
Physics laboratory					
IPQA					
IPQA					
IPQA					
Laboratory					
Laboratory					

Responsible person	Quality record	Exception Handling	Reference standard	Process equipment	Remarks
Laboratory	〈Laboratory analysis report〉	Analytical Additives	Immersion gold operation instructions	Immersion gold line	Self-check
Laboratory					
Laboratory					
Laboratory					
IQC	〈QA Inspection Day Report〉	Scrap and Rework	Immersion gold IPQA operation instructions	10 times mirror CMI900	Inspector Spot check
Suppliers					
Inspector	〈External Dimension Measurement Report〉	Scrap and Rework	Forming QA operation instructions, Customer drawing requirements	CNC machine tools	Inspector check
Inspector	〈V-CUT尺寸measurement record〉	Scrap and Rework	Forming QA operation instructions	null	Quality control inspection
Test supervisor	〈E-TEST Daily Statement〉	Scrap or Repair	E-TEST Top operation instructions	Test machine	Self-check
FQC director	〈FQC daily report〉	Scrap and Rework	FQC operation instructions MI instructions	null	Full inspection
FQA	〈QA daily report〉	return check or Rework	Operation instructions MI instructions Special customer	null	Quality control inspection

Responsible person	Quality record	Exception Handling	Reference standard	Process equipment	Remarks
			special customer requirements		
Packer	<Storage list>	Rework	packing operation instructions	Packing Machine	Package
FQA	<Pre-shipment inspection report>	Rework	Operation instructions MI instructions Special customer requirements	null	Quality control inspection