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PRINTED BOARD DESIGN, MANUFACTURE AND ASSEMBLY – TERMS AND DEFINITIONS

FOREWORD

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International Standard IEC 60194 has been prepared by IEC technical committee 91: Electronics assembly technology.

This fifth edition cancels and replaces the fourth edition (1999) and constitutes a technical revision.

The major change with regard to the previous edition concerns the addition of some four hundred new terms necessary to industry, added as a result of considerable development in assembly technology in recent years.

The text of this standard is based on the following documents:

FDIS	Report on voting
91/566/FDIS	91/578/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

IEC 60194 should be read in conjunction with IEC 60050(541) which provides for basic technical terms for board assembly technology not included in this standard.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this standard may be issued at a later date.

PRINTED BOARD DESIGN, MANUFACTURE AND ASSEMBLY – TERMS AND DEFINITIONS

1 Scope

This International Standard defines the terminology used in the field of printed circuit boards and printed circuit board assembly products.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050(541), *International Electrotechnical Vocabulary (IEV) – Chapter 541: Printed circuits*

3 General

The terms have been classified according to the decimal classification code (DCC) and this DCC number appears to the right of the defined term. The DCC numbering is explained fully in Annex A.

In order to avoid two ID numbers, the usual practice of numbering every paragraph (every term and definition) in front of the paragraph has not been followed in this standard. The official IEC number is the number which follows the DCC and the period (21.xxxx). Annex B provides a list of acronyms listed numerically according to the DCC number.

4 Terms and definitions

Abrasion Resistance **54.1821**
The ability of a material to withstand surface wear.

Abrasive Trimming **54.1318**
Adjusting the value of a film component by notching it with a finely- adjusted stream of an abrasive material against the resistor surface.

Absorption Coefficients **40.1727**
The degree to which various materials absorb heat or radiant energy when compared to each other.

Absorptivity, Infra-red **40.0087**
The ratio (or percentage) of the amount of energy absorbed by a substrate as compared with the total amount of incident energy.

Accelerated Aging **93.0001**
A test in which the parameters such as voltage and temperature are increased above normal operating values to obtain observable or measurable deterioration in a relatively short period of time.

Accelerated Life Test **93.0119**
See “Accelerated Aging”.

Accelerated Test **93.0216**
A test to check the life expectancy of an electronic component or electronic assembly in a short period of time by applying physically severe condition(s) to the unit under test.

Accelerator **53.0002**
See “Catalyst”.

Acceleration Factor (AF) **93.0260**
The ratio of stress in reliability testing to the normal operating condition.

Acceptance Quality Level (AQL) **90.0003**
The maximum number of defectives likely to exist within a population (lot) that can be considered to be contractually tolerable; normally associated with statistically derived sampling plans.

Acceptance Tests **92.0004**
Those tests deemed necessary to determine the acceptability of a product and as agreed to by both purchaser and vendor.

Acceptance Inspection (Criteria) **92.0288**
An inspection that determines conformance of a product to design specifications as the basis for acceptance.

Access Hole **60.1319**
A series of holes in successive layers of a multilayer board, each set having their centres on the same axis. These holes provide access to the surface of the land on one of the layers of the board. (See Figure A.1.)

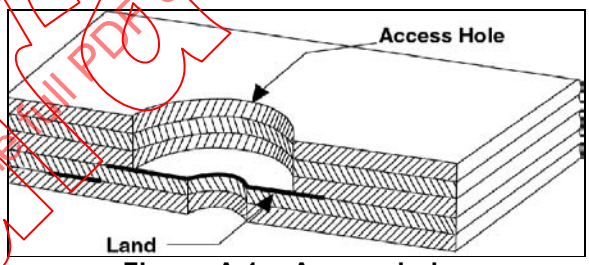


Figure A.1 – Access hole

Access Protocol **21.0005**
An agreed principle for establishing how nodes in a network communicate electronically.

Accordion Contact **36.0006**
A type of connector contact that consists of a flat spring formed into a "Z" shape in order to permit high deflection without overstress.

Accuracy **90.0007**
The deviation of the measured or observed value from the true value.

Acid Flux **46.0009**
A solution of an acid and an inorganic, organic, or water soluble organic flux. (See also “Inorganic Flux,” “Organic Flux,” and “Water Soluble Organic Flux”.)

Acid Number **54.0010**
The amount of potassium hydroxide in milligrams that is required to neutralize one gram of an acid medium.

Acid Value **54.1217**
See “Acid Number”

Acid-Core Solder **46.0008**
Wire solder with a self-contained acid flux.

Actinic Radiation **52.0011**
Light energy that reacts with a photosensitive material in order to produce an image.

Active Desiccant **30.0397**
Desiccant that is either fresh (new) or has been baked according to the manufacturer’s recommendations to renew desiccant to original specifications.

Activated Rosin Flux **46.0012**
A mixture of rosin and small amounts of organic-halide or organic-acid activators. (See also “Synthetic Activated Flux”.)

Activating **53.0013**
A treatment that renders nonconductive material receptive to electroless deposition.

Activating Layer **53.0014**
A layer of material that renders a nonconductive material receptive to electroless deposition.

Activator **46.0015**
A substance that improves the ability of a flux to remove surface oxides from the surfaces being joined.

Active Device **30.0016**
An electronic component whose basic character changes while operating on an applied signal. (This includes diodes, transistors, thyristors, and integrated circuits that are used for the rectification, amplification, switching, etc., of analog or digital circuits in either monolithic or hybrid form.)

Active Metal **36.0017**
A metal that has a very high electromotive force.

Active Trimming **54.1321**
Adjusting the value of a film circuit element in order to obtain a specified functional output from the circuit while it is electrically activated.

Actual Size **90.0018**
The measured size.

Additive Process **53.1322**
A Process for obtaining conductive patterns by the selective deposition of conductive material on clad or unclad base material. (See also “Semi-Additive Process” and “Fully-Additive Process”.)

Add-On Component **30.0019**
Discrete or integrated packaged or chip components that are attached to a film circuit in order to complete the circuit's function.

Adhesion
(Pressure Sensitive Tape) **46.2038**
The bond produced by contact between pressure-sensitive adhesive and a surface.

Adhesive **46.1728**
A substance such as glue or cement used to fasten objects together. In surface mounting, an epoxy adhesive is used to adhere SMDs to the substrate.

Adhesion Failure **96.0020**
The rupture of an adhesive bond such that the separation appears to be at the adhesive-adherent interface.

Adhesion Layer **74.0021**
The metal layer that adheres a barrier metal to a metal land on the surface of an integrated circuit.

Adhesion Promotion **53.0022**
The chemical process of preparing a surface to enhance its ability to be bonded to another surface or to accept an over-plate.

Adhesive Coated Substrate **41.0438**
A base material upon which an adhesive coating is applied, for the purpose of retaining the conductive material (either additively applied or attached as foil for subtractive processing), that becomes part of a metal-clad dielectric.

Adhesive-Coated Catalyzed Laminate **41.1320**
A base material with a thin polymer coating, that contains a plating catalyst, that is subsequently treated in order to obtain a microporous surface.

Adhesive-Coated Uncatalyzed Laminate **41.1323**
A base material with a thin polymer coating, that does not contain a plating catalyst, that is subsequently treated in order to obtain a microporous surface.

Adhesive Transfer (Pressure Sensitive Tape) **75.0558**
The transfer of adhesive from its normal position on the pressure sensitive tape to the surface to which the tape was attached, either during unwind or removal.

Adsorbed Contaminant **96.0023**
A contaminant attracted to the surface of a material that is held captive in the form of a gas, vapour or condensate.

Advanced Statistical Method **91.0024**
A statistical process analysis and control technique that is more- sophisticated and less widely-applicable than basic statistical methods.

Aging **90.0025**
The change of a property, e.g. solderability, with time. (See also “Accelerated Aging”.)

Air Contamination **14.0026**
See “Air Pollution”

Air Pollution **14.0027**
Contamination of the atmosphere with substances that are toxic or otherwise harmful.

Algorithm **11.0849**
A set of procedures for the solution of a problem in a series of steps.

Alignment Mark **22.0030**
A stylized pattern that is selectively positioned on a substrate material to assist in alignment. (See Figure A.2).

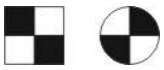


Figure A.2 – Alignment mark

Aliphatic Solvents **76.0031**
"Straight chain" solvents, derived from petroleum, of low solvent power.

Alkaline Cleaner **76.0032**
A material blended from alkali hydroxides and alkaline salts.

All Metal Package **33.0579**
A hybrid circuit package made solely of metal, without glass or ceramic.

Allowable Temperature **75.0609**
The temperature range that an electronic circuit or component can perform its intended functions.

Alloy, Tin Bismuth (Sn-Bi) **45.1947**
An alloy that is used as a lead free solder and consisting of tin and bismuth as the main constituents. Sn-Bi58 has a low melting point of 138 °C, but is not widely used because of its brittle properties.

Alloy, Tin Copper (Sn-Cu) **45.1948**
An alloy that is used as a lead free solder consisting of tin and copper considered to be applicable for wave or reflow soldering.

Alloy, Tin Silver (Sn-Ag) **45.1949**
An alloy that is used as a lead free solder and consisting of tin and silver as the main constituents used as a high temperature solder.

Alloy, Tin Silver Bismuth (Sn-Ag-Bi) **45.1950**
An alloy that is used as a lead free solder and consisting of tin, silver and bismuth as the main constituents. The Bi in Sn-Ag-Bi alloy reduces the melting temperature. The higher the Bi content is, higher the mechanical strength, but with poorer elongation capability. There is a limit to Bi content.

Alloy, Tin Silver Copper (Sn-Ag-Cu) **45.1951**
An alloy that is used as a lead free solder consisting of tin, silver and copper as the main constituents.

Alloy, Tin Zinc (Sn-Zn) **45.1952**
An alloy that is used as a lead free solder and consisting of tin and zinc as the main constituents. Zn09 alloy has the melting point of 199 °C, closest to the melting point of Sn-Pb alloy among lead free solders, which allows soldering work at present soldering temperatures, but tends to form a

stable oxide film, causing difficulty in securing a good solder wetting.

Alpha Error **91.0033**
The size of a Type I error or the probability of rejecting a hypothesis that is true.

Alphanumerical **25.1729**
Pertaining to data that contain the letters of an alphabet, the decimal digits, and may contain control characters, special characters and the space character.

Alpha Particle **35.0612**
A He^4 nucleus generated from a nuclear decay that is capable of generating hole-electron pairs in microelectronic devices and switching cells causing soft errors in some devices.

Alternating Current (ac) **21.1793**
A current that varies with time, commonly applied to a power source that switches polarity many times per second, in the shape of a sinusoidal, square, or triangular wave.

Alternative Hypothesis **93.1324**
The supposition that a significant difference exists between the desired results of two comparable populations. (See also "Null Hypothesis" and "Statistical Hypothesis".)

Alumina Substrate **43.1730**
Aluminum oxide used as a ceramic substrate material.

Ambient **29.0034**
The surrounding environment coming into contact with the system or component in question.

Amorphous Polymer **40.0035**
A polymer with a random and unstructured molecular configuration.

Amplitude, Voltage **21.0036**
The magnitude of a voltage as measured with respect to a reference, such as a ground plane.

Analog Circuit **21.0037**
An electrical circuit that provides a continuous relationship between its input and output.

Analysis of Variance (ANOVA) **91.0038**
The systematic method of statistically evaluating experimental results in order to separate the sources of variation.

Anchoring Spur **22.1325**
An extension of a land on a flexible printed board that extends beneath the coverlayer to assist in holding the land to the base material. (See Figure A.3.)

Figure A.3 – Lands with anchoring spurs

Angled Bond **74.0039**
The impression of the first and second bonds that are not in a straight line.

Anisotropic Conductive Contact **75.0675**
An electrical connection using an anisotropic conductive film or paste wherein conductive particles of gold, silver, nickel, solder, etc. are dispersed. When it is compressed, an electrical connection is attained only in the direction of compression.

Anisotropy **40.0685**
The condition for a substance having differing values for properties, such as permittivity, depending on the direction within the material.

Annotation **22.0040**
Text, notes, or other identification, constructed by a computer-aided system, intended to be inserted on a drawing, map or diagram.

Annular Ring
(Annular Width) **60.0041**
That portion of conductive material completely surrounding a hole. (See Figure A.4).

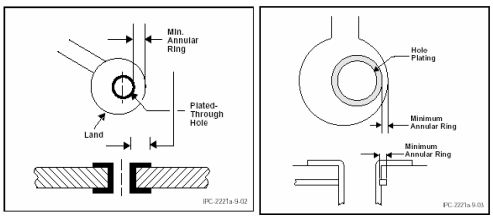


Figure A.4 – Annular ring (annular width)

Anode (BGA) **33.0689**
The electrode from which the forward current flows within the device.

Anodic Cleaning **57.0042**
Electrolytic cleaning in which the work is the anode.

Aperture (stencil) **73.0690**
An opening in the stencil-foil.

Apparent Field-of-View Angle **92.0043**
The angular subtense of the field-of-view in the image space of an optical system.

Application Specific Integrated Circuit (ASIC) **33.0692**
A semiconductor device intended to satisfy a unique complete circuit function.

Aqueous Flux **46.0044**
See “Water Soluble Organic Flux”

Aramid **44.0045**
See “Para-aramid”

Arc Resistance **92.0047**
The resistance of a material to the effects of a high voltage, low current arc (under prescribed conditions) passing across the surface of the material. (The resistance is stated as a measure of total elapsed time at that voltage required to form a conductive path on the surface - material carbonized by the arc).

Architecture **11.0046**
The structure of a computer's functional elements that makes it possess specific maximum and minimum capabilities.

Area Array **34.0751**
A bonding pattern in which edge and additional pads on the inner surface area of the chip are addressed in the bonding scheme. (See Figure A.5).

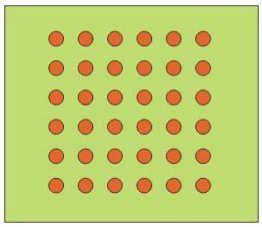


Figure A.5 – Area array

Area Array Tape Automated Bonding **74.0048**
Tape automated Bonding where some carrier tape terminations are made to lands within the perimeter of the die.

Area Ratio **73.0758**
The ratio of the area of aperture opening to the area of aperture walls.

Array **22.0049**
A group of elements or circuits arranged in rows and columns on a base material.

Artificial Intelligence **11.0050**
The capacity of a machine to perform functions that are normally associated with human intelligence, such as reasoning and learning.

Artwork **22.0051**
An accurately-scaled configuration that is used to produce the "Artwork Master" or "Production Master”. (See Figure A.6.)

Artwork Master **24.0052**
An accurately-scaled, usually 1:1, pattern that is used to produce the "Production Master”. (See Figure A.6.)

As-Fired **45.0054**
The condition (values) of thick-film components or the smoothness of ceramic base materials, after they have been processed in a firing furnace and prior to trimming or polishing.

Aspect Ratio (Film) **74.0055**
The ratio of the length of a film component to its width.

Aspect Ratio (Hole) **53.0056**
The ratio of the length or depth of a hole to its preplated diameter. (See Figure A.7.)

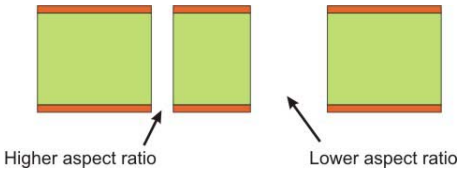


Figure A.7 – Aspect ratio (hole)

Aspect Ratio (stencil) **73.0808**
The ratio of the width of the aperture to the thickness of the stencil-foil.

Assembled Board **80.0057**
See “Assembly”.

Assembly **80.1327**
A number of parts, subassemblies or combinations thereof joined together. (Note: This term can be used in conjunction with other terms listed herein, e.g. "Printed Board Assembly”.)

Assembly Drawing **26.1328**
A document that depicts the physical relationship of two or more parts, a combination of parts and subordinate assemblies, or a group of assemblies required to form an assembly of a higher order.

Assembly Language **11.0058**
A computer language made up of brief expressions that an assembler program can translate into a machine language.

Assembly Manufacturer **70.1911**
The individual, organization, or company responsible for the assembly process and verification operations necessary to ensure full compliance of assemblies.

Assignable Cause **91.0059**
See “Special Cause”.

Asymmetric Stripline **21.0060**
A stripline signal conductor that is embedded, but not centreed, between two ground planes. (See Figure A.8).

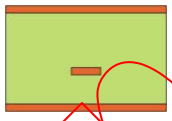
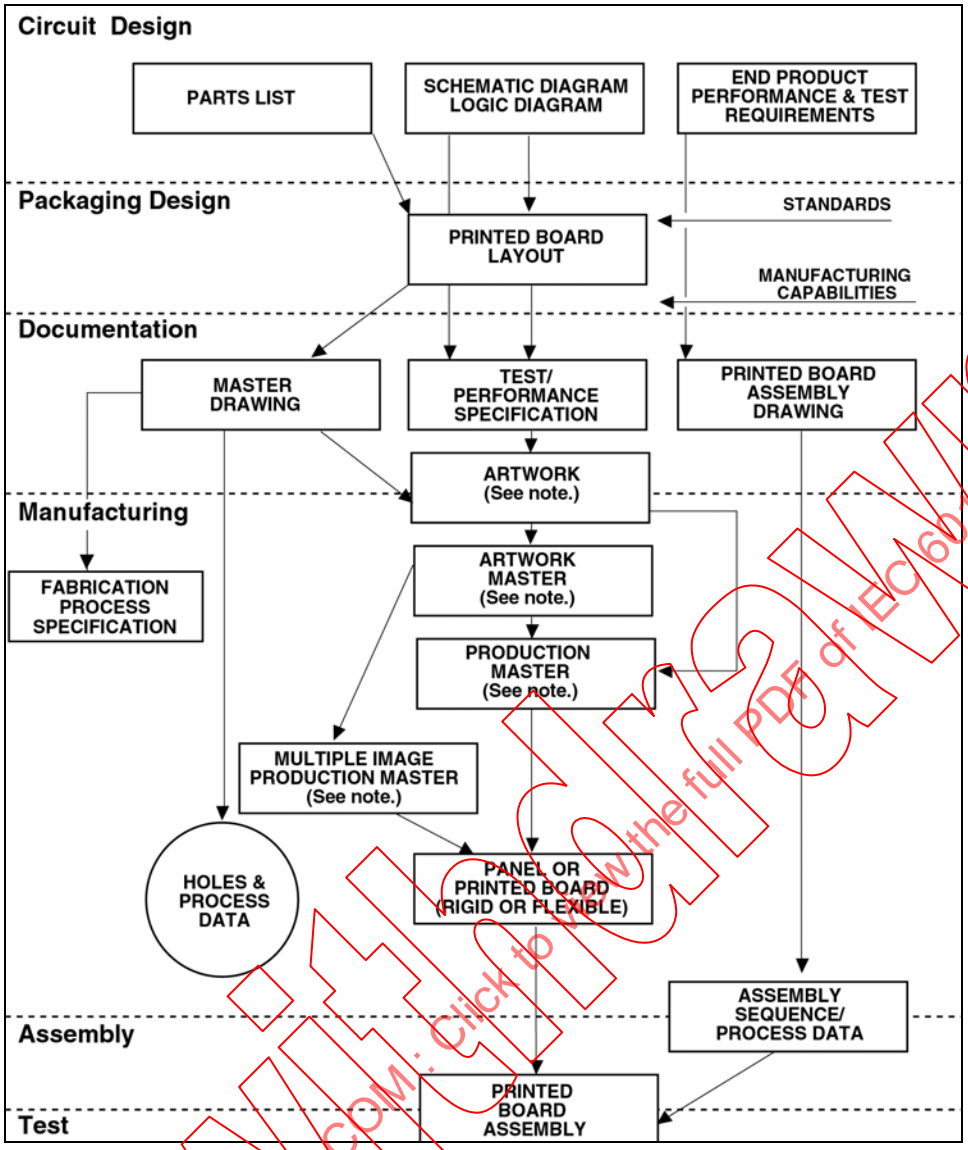


Figure A.8 – Asymmetric stripline

Attachment Density **22.1823**
The average number of surface mount or through hole solder joints, based on pitch and land size, that may be accommodated in a prescribed unit area e.g. cm^2, considering land size within the unit area to accommodate solder joint attachment.

Attenuation **21.0061**
The reduction in the amplitude of a signal due to losses in the media through which it is transmitted. The unit of measure is decibels (dB).



NOTE The term "original" may be used to preface any of the drafting and photographic-tooling terms used in this figure. The "original" is not usually used in manufacturing processes. In the event that a "copy" is made, the copy must be of sufficient accuracy to meet its intended purpose if it is to take on the name of any one of the terms used in this figure. Other adjectives may also be used to help describe the kind of copy, i.e. "nonstable", "first generation," "record," etc.

Figure A.6 – Simplified flow chart of printed board design/fabrication sequence

Attributes Data **94.0062**
Qualitative data that can be counted for recording and analysis purposes.

Automated Component Insertion **72.0063**
The act or operation of assembling discrete components to printed boards by means of electronically-controlled equipment.

Automatic Component Placement **22.0029**
Software that automatically optimizes the layout of components on a printed board.

Automatic Conductor Routing **22.0124**
Software that automatically determines the placement of interconnections on a printed board.

Automatic Dimensioning **25.1329**
A computer-aided drafting function that automatically generates dimensions, leaders, arrowheads, etc., that make up a complete set of documented dimensions.

Automatic Test Equipment **92.0064**
Equipment that automatically analyses functional or static parameters in order to evaluate performance.

Automatic Test Generation **92.0065**
Computer generation of a test program based solely on circuit topology with little or no manual programming effort.

Axial Lead **31.0067**
Lead wire extending from a component or module body along its longitudinal axis. (See Figure A.9).

Figure A.9 – Axial Lead

Azeotrope **49.0068**
See "Azeotropic Mixture"

Azeotropic Mixture (Azeotrope) **49.1330**
A liquid mixture of two or more substances that behaves like a single substance. The vapour produced by partial evaporization of the liquid has the same composition as the liquid.

B-Stage **41.1343**
An intermediate stage in the reaction of a thermosetting resin in which the material softens when heated and swells, but does not entirely fuse or dissolve when it is in contact with certain liquids. (See also "C- Staged Resin".)

B-Staged Material **41.0069**
See "Prepreg".

B-Staged Resin **41.0070**
A thermosetting resin that is in an intermediate state of cure. (See also "C-Staged Resin".)

Back Annotation **21.0072**
The process of extracting appropriate information from a completed printed board design and inserting it on the boards schematic diagram.

Back Bonding **74.0073**
Attaching a die to a base material with its circuitry facing away from the base material. (See Figure B.1).

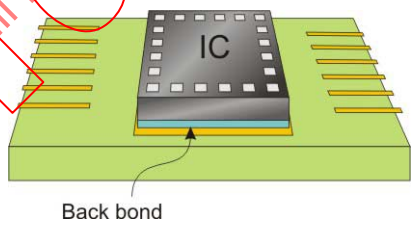


Figure B.1 – Back Bonding

Back Mounting **74.0079**
See "Back Bonding".

Back Taper(s) **51.0081**
The constant decrease in diameter along the length of the body of a drill.

Back-Bared Land **22.0071**
A land in flexible printed wiring that has a portion of the side normally bonded to the base dielectric material exposed by a clearance hole. (See Figure B.2).

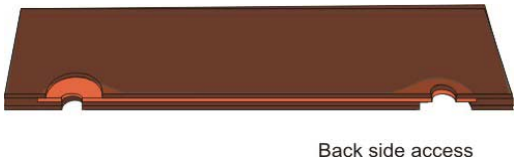


Figure B.2 – Back-bared land

Backdriving **92.0074**
An in-circuit testing technique that drives digital circuitry outputs to a given logic level, by supplying pulses of sufficient electrical current magnitude in parallel with the outputs, in order to overdrive the logic state conditions of the next digital device inputs.

Backfill **36.0075**
Filling a hybrid circuit package with a dry inert gas prior to hermetic sealing.

Background (Artwork) **22.0076**
The nonfunctional area of a phototool.

Background Variable **94.0077**
A parameter of no experimental interest that is not held at a constant value.

Backlighting **24.0078**
Viewing or photographing by placing an object between a light source and the eye or recording medium.

Backpanel **85.0080**
See "Backplane".

Backplane **85.1331**
An interconnection device used to provide point-to-point electrical interconnections. (It is usually a printed board that has discrete wiring terminals on one side and connector receptacles on the other side.) (See also "Mother Board".)

Backup Pin **70.0972**
A supporting pin that is located under a printed board to prevent deflection of the board during component mounting.

Backward Crosstalk **21.1332**
Noise induced into a quiet line, as seen at the end of the quiet line that is closest to the signal source, because the quiet line has been placed next to an active line. (See also "Forward Crosstalk".)

Bake Out **56.0082**
Subjecting a product to an elevated temperature in order to remove moisture and unwanted gasses prior to certain steps in the printed board manufacturing process or prior to final coating.

Balanced Transmission Line **21.1333**
A transmission line that has distributed inductance, capacitance, resistance, and conductance elements that are equally distributed between its conductors.

Ball **34.0976**
A raised metal, (or other conductive material) feature on a package substrate used to facilitate bonding to the next level of interconnect.

Ball Array **34.1086**
A group of balls arranged in rows and columns.

Ball Bond **74.0083**
The welded connection of a bond wire to the bond pad of an integrated circuit die. The bond wire is melted to form a ball and the ball is bonded by use of thermocompression or thermosonic techniques.

Ball Grid Array (BGA) **34.1096**
A surface mount package wherein the bumps for terminations are formed in a grid on the bottom of a package. (See Figure B.3).

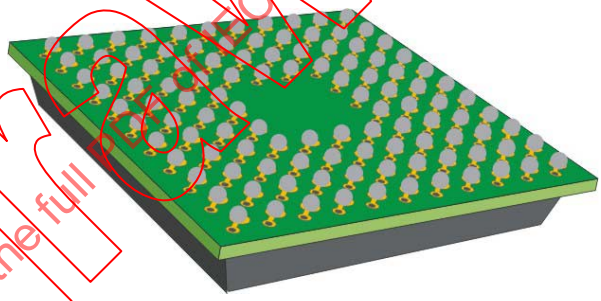


Figure B.3 – Ball grid array (BGA)

Ball Lift **74.2127**
A category of ball bond failure in which the ball lifts from the surface of the integrated circuit die bond pad metallization or lifts the metallization from the surface of the underlying oxide or silicon.

Bar **70.1238**
The dark element of a bar code.

Bar Code **70.1292**
A linear arrangement of bars and spaces in a predetermined pattern.

Bar Code Marking **70.1731**
An identification code consisting of a pattern of vertical bars whose width and spacing identifies the item marked.

Bar Code Printer **70.1353**
A printer with the ability to print bar coded labels and forms.

Bar Code Scanner/Reader **70.1354**
A device used for machine reading of a bar code. Readers may be hand held-wands, fixed optical beams, or moving optical beams.

Bar Code Symbol **70.1370**
A printed of photographically reproduced bar code composed of parallel bars and spaces of various widths. A bar code symbol contains a leading quiet zone, a start character, data characters, a stop character, and a trailing quiet zone. In some cases, a check character is included.

Bare Board **60.0084**
An unassembled (unpopulated) printed board.

Barrel Crack **96.1444**
A crack of the plated metal on the internal wall of a through-hole. (See also "Circumferential Crack".) (See Figure B.4).

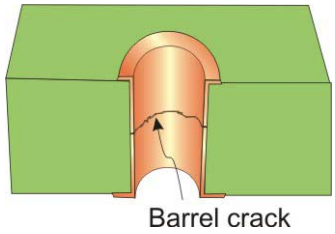


Figure B.4 – Barrel crack

Barrier Metal **74.0085**
A metal used to seal the semiconductor-die lands.

Base Film (relating to Flexible Circuits) **40.1471**
The film that is the base material for the flexible printed wiring board and on the surface of which the conductive pattern can be formed. When the heat resistance is required, polyimide film is mostly used, and polyester film is usually used when the heat resistance is not required.

Base Material **40.1334**
The insulating material upon which a conductive pattern may be formed. (The base material may be rigid or flexible, or both. It may be a dielectric or insulated metal sheet.)

Base Material Thickness **22.1604**
The thickness of the base material excluding conductive foil or material deposited on the surfaces.

Base Metal **45.0088**
See "Basis Metal".

Base Metal (Solder) **46.1491**
The underlying metal surface to be wetted by solder, also referred to as basis metal.

Base Plane **30.2011**
The plane that includes the lowest point of the mounting surface of the package, except for packages using stand-offs.

Base Solderability **92.0089**
The ease with which a metal or metal alloy surface can be wetted by molten solder under minimum realistic conditions.

Baseline Dimensioning **26.0086**
The maximum variation between two features that is equal to the sum of the tolerances on the two feature location dimensions taken from the same origin. (See Figure B.5.)

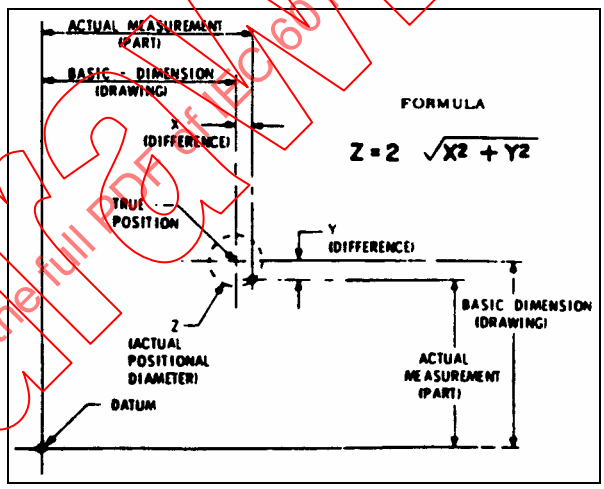


Figure B.5 – Example of feature location using baseline dimensions

Basic Dimension **26.1335**
A numerical value used to describe the theoretical exact location of a feature or hole. (It is the basis from which permissible variations are established by tolerance on other dimensions in notes or by feature control symbols.)

Basic Specification (BS) **26.1778**
A document that describes the common elements for a set, family or group of products, materials, or services.

Basic Statistical Method **91.1336**
The application of a theory of variation through the use of basic problem-solving techniques and statistical process control. (This includes control and capability analysis for both variables and attributes data.)

Basic Wettability **70.0090**
The ease with which a metal or metal alloy can be wetted by molten solder.

Basis Material **40.0091**
Material upon which coatings are deposited.

Basis Metal **45.0092**
A metal upon which coatings are deposited.

Batch Oven **56.0093**
A large temperature-controlled oven that is used to heat clean rolls of fabric.

Batch Processing **11.0094**
Executing a computer-aided program without human input.

Batch Size **17.0095**
See "Lot Size"

Bathtub Curve **93.0096**
A plot of failures versus time. (See Figure B.6).

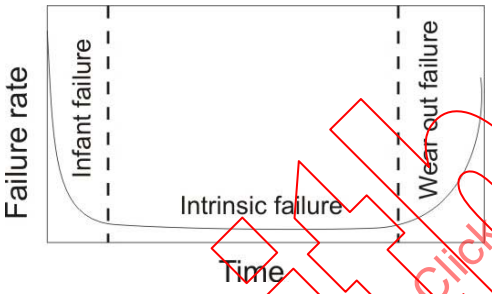


Figure B.6 – Bathtub curve

Baume **92.0097**
An arbitrary scale of specific gravities used in the gradation of hydrometers.

Bead (Discrete Wiring) **64.1555**
The external (surface) annular ring of copper plating around a plated-through hole on a fully additive circuit board which functions to conduct heat and promote solder wicking during the soldering of components.

Beam Lead **33.0100**
A component terminal in the form of a long metallic structural member that is not supported along its length.

Beaming **44.0099**
The operation in which yarn from several section beams is combined on the final warp beam.

Beam-Lead Device **33.0098**
An active or passive chip component with beam leads for interconnecting it to lands on a base material. (See Figure B.7).

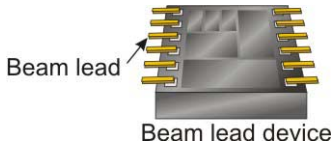


Figure B.7 – Beam-lead device

Bed-of-Nails Fixture **92.0101**
A test fixture consisting of a frame and a holder containing a field of spring-loaded pins that make electrical contact with a planar test object.

Bellows Contact **36.1337**
A type connector contact that consists of a flat spring that has been folded to provide a very uniform spring rate over the full tolerance range of the mating part.

Benchmark, Computer **11.0102**
A standard measure of the performance of computers relative to each other, including set-up time, program generation, and data processing capability.

Benchmark, Testing **92.0103**
A standard measure of the performance of testers relative to each other, including set-up time, test program generation, and fixturing.

Bending Resistance **92.1565**
The ability of a material to withstand repeated bending to specified parameters without producing cracks and breaks in excess of the specification allowance.

Beta Error **91.0104**
The size of a Type II error or the probability of accepting a hypothesis that is false.

Bias (Fabric) **44.0105**
Filling yarn that is off-square with the warp ends of a fabric.

Bifurcated Contact **36.1810**
A type of connector contact that usually consists of a flat spring that has been slotted length-wise in order to provide independent contact points with the mating part.

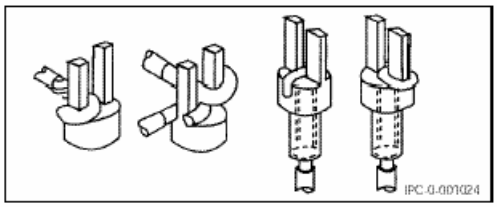


Figure B.8 – Bifurcated solder terminal

Bifurcated Solder Terminal **37.0106**
A solder terminal with a slot or slit opening through which one or more wires are placed prior to soldering. (See Figure B.8.)

Bilateral Tolerance **26.1572**
A tolerance in which variation is permitted in both directions from the specified dimension.

Binder **47.0107**
Material added to thick-film compositions and unfired base materials to give them additional strength for pre-fire handling. (See also "Glass Binder".)

Binomial Distribution **94.0108**
A discrete probability distribution that, with certain assumptions, describes the variation of an attribute (proportion).

Biochemical Oxygen Demand **92.0109**
A standardized measure used for estimating the degree of contamination of water.

Biocide **76.0110**
A general name for any substance that kills or inhibits the growth of micro-organisms.

Bipolar Device **33.1573**
A device in which both majority and minority carriers are present. Bi-polar and Metal-Oxide Semi-conductor (MOS) are the two most common device types.

Birdcage **37.1338**
Stranded wire whereby the strands in the stripped portion between the covering of an insulated wire and a soldered connection, or an end-tinned lead, have separated from the normal lay of the strands.

Bismaleimide **41.0111**
A resin that has the generic chemical structure of an aromatic chemical group that is attached to two (or "Bis") maleimide groups.

Bismaleimide Triazine **41.0112**
A resin that contains a mixture of bismaleimide and triazine resins.

Blank **41.1339**
An unprocessed or partially processed piece of base material or metal- clad base material, that has been cut from a sheet or panel, that has the rough dimensions of a printed board. (See also "Panel".)

Blanking **51.1574**
Cutting a sheet of material into pieces to the specified blank design.

Bleeding **52.0113**
A condition in which a plated hole discharges process material or solution from crevices or voids or a condition in which a resist migrates beyond the image area.

Blends **41.0114**
Mixtures of resins.

Blind Via **22.0115**
A via extending only to one surface of a printed board. (See Figure B.9.)

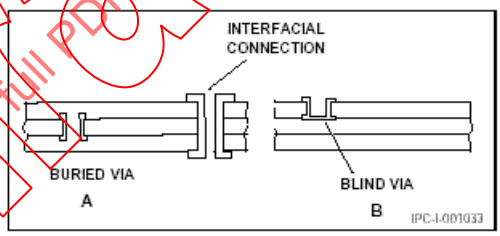


Figure B.9 – Blind and buried via

Blister **96.1340**
Delamination in the form of a localized swelling and separation between any of the layers of a lamination base material, or between base material and conductive foil or protective coating.

Blocking Variables **94.0116**
A relatively-homogeneous set of conditions within which different conditions of primary variables are compared.

Blow Hole **53.0117**
A void caused by outgassing.

Board **60.0118**
See "Printed Board," and "Multilayer Printed Board".

Board Fabricator **50.1912**
The individual, organization, or company responsible for the fabrication of the bare printed board, including all process and verification operations necessary to ensure full compliance with customer requirements.

Board Thickness **41.1583**
The thickness of the metal-clad base material or printed wiring board including the conductive layer.

Body Land Clearance **51.1341**
That portion of the land diameter of a drill that is decreased in order to provide clearance behind the margin.

Bond **74.0120**
An interconnection that performs a permanent electrical and/or mechanical function.

Bond Deformation **74.0123**
The plastic-flow change in the form of a lead caused by a bonding tool during a termination process.

Bond Enhancement Treatment **74.0125**
The improvement of the adhesion of a metal foil surface to an adjacent layer of material to which it is being attached.

Bond Envelope **74.0126**
The range of termination parameters within which acceptable bonds may be formed.

Bond Interface **74.0133**
The common area between a lead and a land to which it has been terminated.

Bond Land **74.0134**
See “Bonding Area”.

Bond Lift-Off **74.0135**
The failure mode whereby a bonded lead separates from the surface to which it has been joined.

Bond Schedule **74.0136**
The values of termination machine parameters.

Bond Separation **74.0137**
The distance between the termination points of the first bond and the second bond.

Bond Site **74.0138**
That portion of the bonding area where the actual termination takes place.

Bond Strength **60.0139**
The force perpendicular to a board's surface required to separate two adjacent layers of the board, expressed as force per unit area.

Bond Surface **74.0141**
See “Bonding Area”.

Bond-to-Bond Distance **74.0121**
The distance from the bonding site on a die to the corresponding bonding site on a lead frame, interconnecting base material, etc.

Bond-to-Die Distance **74.0122**
The distance from the heel of a beam lead to the die.

Bondability **74.1342**
Those surface characteristics and conditions of cleanliness of a bonding area that must exist in order to provide for the capability to achieve a successful termination.

Bonding Area **74.0128**
The area defined by the extent of a land or portion of a terminal to which a lead is to be bonded.

Bonding, Die **74.0127**
See “Die Bonding”.

Bonding Island **74.0129**
See “Bonding Area”.

Bonding Layer **55.0130**
An adhesive layer used in bonding together other discrete layers of a multilayer printed board during lamination.

Bonding Pad (IC) **33.1585**
An area of metallization on an integrated circuit die that permit connection of fine wires or circuit element to the die.

Bonding Time **70.1586**
The time duration from the commencement of thermo heat-up until the reflow profile is completed.

Bonding Tool **74.0131**
The instrument used to position leads or discrete wires over a land and to impart sufficient energy to complete the termination.

Bonding Wire **74.0132**
Fine gold or aluminum wire used for making electrical connections between lands, lead frames, and terminals.

Border Area **22.0142**
The region on a base material that is external to that of the end-product being fabricated within it.

Border Data **22.0143**
Patterns that appear in the border area, such as tooling features, test patterns, and registration marks.

Boss **22.0144**
See "Land".

Boss (Connector) **37.0145**
A raised section on a connector that fits into a specific slot in the positive polarization or keying feature of a mating connector.

Bounce Pad (Discrete Wiring) **64.1588**
An isolated area in a copper plane which acts solely as a stop for the laser drilling operation.

Bow (Fabric) **44.0146**
Filling yarn that lies in an arc across the width of a fabric.

Bow (Sheet, Panel, or Printed Board) **60.1218**
The deviation from flatness of a board characterized by a roughly cylindrical or spherical curvature such that, if the product is rectangular, its four corners are in the same plane. (See also "Twist".)

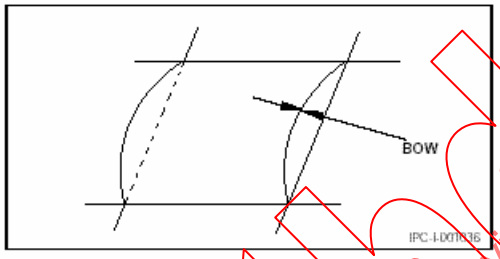


Figure B.10 – Bow

Brainstorming **94.0147**
The generation of an all-inclusive list of potential causal factors that are possible contributors to process problems.

Breakaway **54.1589**
The function of excising printed boards or printed board assemblies from their panel structure after all processing has been completed. (See Figure B.11.)

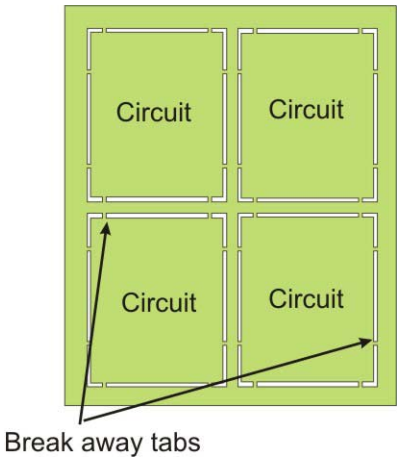


Figure B.11 – Breakaway

Breakout **60.0148**
See "Hole Breakout".

Bridging, Electrical **70.0149**
The unintentional formation of a conductive path between conductors. (See also "Solder Bridging".)

Brightness **24.0150**
See "Luminance".

Broken Pick **35.0151**
A filling yarn that is missing from a portion of the width of a fabric.

Brominated Epoxy **41.0152**
An epoxy resin containing chemically-bound bromine which is added to act as a flame retardant.

Brown Streak (Base Materials) **40.1590**
A thin vein or stain seen in the reinforcement that can range from light amber to nearly chocolate brown. It usually runs within a fibre bundle for 3 mm to 13 mm (0,13 in to 0,512 in). It is most commonly found in the warp yarns and may appear singly or in multiples, or in a pattern. It is due to the remnants of the glass binder agent, which the weaver did not remove.

Brown Thread (Base Materials) **40.1591**
See "Brown Streak"

Bubble Effect **76.0153**
The entrapment of air, solvent or moisture bubbles in a protective coating.

Buffer Material **76.0154**
A resilient material that is used to protect a crack-sensitive component from the stresses generated by a conformal coating.

Bugging Height **74.0155**
The distance between a land and the lower surface of a beam lead caused by the deformation of the lead during bonding.

Build-up Process **61.1593**
See "Sequential Lamination"

Bulge **60.0156**
A swelling of a printed board that is usually caused by internal delamination or separation of fibres.

Bulk Conductance **92.0157**
Conductance between two points of a homogeneous material.

Bulls-Eye **20.0158**
A stylized pattern that is located in the border area in order to aid in alignment.

Bulk Packaging **30.1596**
A method for packaging loose parts, into a bag or case.

Bulk Reflow **75.1597**
Reflow of multiple components, with simultaneous attachment, by an infrared (IR), convection/IR, convection, or vapour phase reflow (VPR) process.

Bump **34.1598**
A means of providing a (electrical) connection to the terminal area of a device. A small mound is formed on the device or substrate pads and is used as a contact for face-down loading.

Bump (Die) **74.0159**
A raised metal feature on a die land or tape carrier tape that facilitates inner-lead bonding.

Bump Array **34.1599**
A group of bumps arranged in rows and columns.

Bump Contact **34.1601**
A contacting pad that rises substantially above the surface level of the chip.

Bumped Die **74.0160**
A semiconductor die with raised metal features that facilitate inner-lead bonding. (See Figure B.12.)

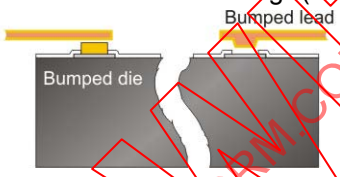


Figure B.12 – Bumped die

Bumped Tape **74.0161**
Carrier tape with raised metal features that facilitate inner-lead bonding.

Bumped Wafer **74.0162**
A semiconductor wafer with raised metal feature on its die lands that facilitate inner-lead bonding.

Buried Via **22.0163**
A via that does not extend to the surface of a printed board.

Burn-In **95.0164**
The process of electrically stressing a device at an elevated temperature, for a sufficient amount of time to cause the failure of marginal devices (Infant Mortality).

Burn-In, Dynamic **95.0165**
Burn-in at high temperatures that simulates the effects of actual or simulated operating conditions.

Burn-In, Static **95.0166**
Burn-in at high temperatures with unvarying voltage, either forward or reverse bias.

Burn-Off **74.0167**
See "Flame-Off".

Burnt Resin (Base Materials) **40.1602**
See "Treater Dirt"

Burr **92.1603**
Small lumps or masses with an irregular shape, convex to a surface, which a result of a machine process such as drilling or gouging.

Bus **21.0168**
One or more conductors used for transmitting data signals or power.

Bus Bar **37.0169**
A conduit, such as a component or conductor on a printed board, that is used for distributing electrical energy. (See also "Plating Bar".)

Butt Leads **36.1732**
A SMT lead form. Leads extending horizontally from about the centre of a component body, formed down at a 90 degree angle and ending immediately below the component body without additional bends.

Butter Coat **41.0170**
An increased amount of resin on the outer surface of a base material.

C

C-Staged Resin **41.0171**
A resin in its final state of cure. (See also "B-Staged Resin".)

Camber **92.0172**
The planar deflection of a flat cable or flexible laminate from a straight line.

Cap Lamination **55.0176**
A process for making multilayer printed boards with surface layers of metal-clad laminate bonded in a single operation. (See also "Foil Lamination".)

Capability Detail Specification (CapDS) 26.1780
A document that establishes the specific requirements, noted in a detailed specification, in order to establish the level of capability that a manufacturer possesses when he has demonstrated that he has met those requirements.

Capability Index (Cp) 91.0306
See "Capability Performance Index".

Capability Performance Index (Cp) 79.1806
The ratio of the measured performance of a process compared to specified limits.

Capability Performance, Lower (Cpkl) 91.1367
A measure of the relationship between the performance of a process and the lower specification limit. (See also "Capability Performance, Upper".)

Capability Performance, Upper (Cpku) 91.1344
A measure of the relationship between the performance of a process and the upper specification limit. (See also "Capability Performance, Lower".)

Capability Test Board (CTB) 94.1784
A printed board specifically designed to act as a capability qualifying component (CQC), or to be used by manufacturer to evaluate process variation, process control, or continuous improvement procedures.

Capability Test Segment (CTS) 94.1785
A segment or portion of a capability test board (CTB), containing a set or group of individual test patterns (ITP), intended to be used to demonstrate a specific level of printed board complexity or manufacturing capability.

Capacitance 21.1794
A measure of the ability of two adjacent conductors separated by an insulator to hold a charge when a voltage is impressed between them.

Capacitance Density 21.0173
The amount of capacitance available per unit area.

Capacitive Coupling 21.0174
The electrical interaction between two conductors that is caused by the capacitance between them.

Capillary 74.0175
A hollow bonding tool used to guide wire to the bonding site and to be used to apply pressure during the bonding cycle. (See also "Wedge Tool")

Capture Land 22.2116
A land where the microvia starts which varies in shape and size based on use (i.e. component mounting, via entrance, and conductor).

Card 60.0177
See "Printed Board".

Card-Edge Connector 22.0178
See "Edge-Board Connector".

Card-Insertion Connector 22.0179
See "Edge-Board Connector".

Carrier 30.1605
Container that directly holds components, such as a tray, tube, or tape and reel.

Carrier (Foil) 45.0180
A temporary support medium that facilitates the handling of thin and soft-metal foils.

Carrier Tape 36.1345
The carrier for conductors used in tape-automated bonding. (See also "Multilayer Carrier Tape," "Single-Layer Carrier Tape," "Two-Layer Carrier Tape" and "Three-Layer Carrier Tape")

Carry-Out 51.0181
The curved back portion of the flute of a drill.

Cartridge 30.1606
A container for components that facilitates the loading and unloading of them.

Castellation 33.0182
A recessed metalized feature on the edge of a leadless chip carrier that is used to interconnect conducting surface or planes within or on the chip carrier. (See Figure C.1.)

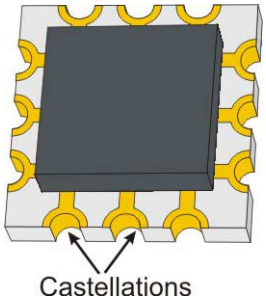


Figure C.1 – Castellation

Catalyst (Resin) 40.0183
A chemical that is used to initiate the reaction or increase the speed of the reaction between a resin and a curing agent.

Catalyzing **53.0184**
See “Activating”.

Cathodic Cleaning **57.0185**
Electrolytic cleaning in which the work is the cathode.

Cation Exchange **59.0186**
See “Ion Exchange”.

Cationic Reagent **59.0187**
Surface-active substances that have the active constituent in the positive ion.

Cause-and-Effect Diagram **94.0188**
A problem solving tool that uses a graphic description of various process elements in order to analyse potential sources of process variation.

Centre-to-Centre Spacing **22.1346**
The nominal distance between the centres of adjacent features on any single layer of a printed board. (See also “Pitch”.)

Centring Force **73.1733**
The force required by the pick-up tooling to center a surface mounting device in its proper location on a substrate.

Centrewire Break **74.0189**
A failure mode in a wire pull test whereby the wire fractures at approximately its midspan.

Central Line **91.0190**
The line on a control chart that depicts the average or median value of the items being plotted.

Ceramic Dual-in-line Package (CERDIP) **31.1611**
A dual in-line package that has a package body of ceramic material and hermetically sealed by a glass. (See also “Dual-in-line Package”.)

Ceramic Pin Grid Array **31.1612**
A pin grid array package (PGA) made of a ceramic material, hermetically sealed by metal, with leads formed on a grid extending from the bottom of the package.

Ceramic QUAD Flat Pack (CQFP) **33.1613**
A quad flat package (QPF) made of a ceramic material, hermetically sealed by metal, with leads extending from all four sides.

Certification **17.0191**
The verification that specified training or testing has been performed and that required proficiency or parameter values have been attained.

Chain Dimensioning **26.0192**
The maximum variation between two features that is equal to the sum of the tolerances on the intermediate distances.

Chamfer (Drill) **51.0193**
The angle at the end of a drill shank.

Character **70.1615**
A letter, digit, or other special form that is used to represent data in a bar code symbol. (See also “Bar Code Symbol”.)

Characteristic Curve **24.1347**
A plot of photographic product optical-density data versus the logarithm of the exposure used to characterize the response of the material to exposure and development.

Characteristic Impedance **21.0194**
The resistance of a parallel conductor structure to the flow of alternating current (AC), usually applied to high speed circuits, and normally consisting of a constant value over a wide range of frequencies.

Check List **94.1219**
A compilation of the specified criteria that may be evaluated during an audit or inspection.

Check Plot **94.0195**
An interim drawing used for graphical data verification.

Check Sheet **94.0196**
A form that is used for data collection.

Chelate Compound **76.0197**
A compound in which metal is contained as an integral part of a ring structure.

Chelating Agent **76.0198**
A compound capable of forming a chelate compound with a metal ion.

Chemical Conversion Coating **57.0199**
A protective coating produced by the chemical reaction of a metal with a chemical solution.

Chemical Resistance **40.1616**
The resistance of an insulating material to the degradation of surface characteristics, such as surface roughness, swelling, tackiness, blistering or colour change, beyond the specified allowance by exposure to chemicals such as acids, alkalis, salts, or solvents.

Chemical Vapour Deposition **45.0202**
The deposition of a film onto the surface of a substrate by the chemical reduction of a vapour on contact with the base material.

Chemical Wire Stripping **37.0203**
The process of removing insulation from wire using chemical compounds.

Chemically-Deposited Printed Circuit **50.0201**
See "Additive Process".

Chemically-Deposited Printed Wiring **50.0200**
See "Additive Process".

Chemisorption **74.1348**
The formation of bonds between the surface molecules of a metal, or other material of high surface energy, and another gas or liquid substance in contact with it.

Chessman **74.0204**
A disk, knob or lever used to manually control the position of a bonding tool with respect to land.

Chip **35.0205**
See "Die".

Chip Carrier **33.0208**
A low-profile, usually square, surface-mount component semiconductor package whose die cavity or die mounting area is a large fraction of the package size and whose external connections are usually on all four sides of the package. (It may be leaded or leadless.)

Chip-and-Wire **74.0206**
An assembly method that uses discrete wires to interconnect back-bonding die to lands, lead frames, etc.

Chip-in-Board (CIB) **74.1617**
An electronic component where a chip is inserted into an opening of a ceramic or glass-epoxy substrate and bonded by wire bonding or TAB techniques. The object of this technique is to reduce the thickness of the COB assembly. The chip may be covered by a resin after bonding.

Chip-on-Board (COB) **86.0207**
A printed board assembly technology that places unpackaged semiconductor dice and interconnects them by wire bonding or similar attachment techniques. Silicon area density is usually less than of the printed board. (See Figure C.2).

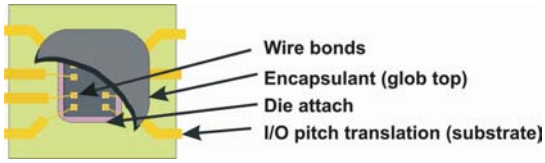


Figure C.2 – Chip-on-board (COB)

Chip-on-Board Assembly **74.1618**
A printed board assembly using a combination of uncased chips and other devices. The silicon area density is less than 30 %.

Chip-on-Flex (COF) **74.1619**
Semiconductor chip mounted directly onto flexible printed board.

Chip-on-Glass (COG) **74.1620**
An assembly technology that uses an unpackaged semiconductor die mounted directly on a glass substrate such as a glass plate for liquid crystal display (LCD).

Chipped Point **51.0209**
A condition whereby the amount of chips on the leading edge of a drill point exceeds an allowable value.

Chipping **51.0257**
A piece of a panel or board that has broken away.

Chisel **74.0210**
A tool used for wedge and ultrasonic bonding.

Chisel-Edge Angle **51.0211**
The angle between the leading cutting edge and the intersection of the primary and secondary relief facets of a drill point.

Chopped Bond **74.0212**
A bond with excessive deformation such that the strength of the bond is greatly reduced.

Circuit **21.0213**
A number of electrical elements and devices that have been interconnected to perform a desired electrical function.

Circuit Board **60.1625**
See "Printed Circuit".

Circuit Card **60.0214**
See "Printed Board".

Circuit Density **22.1824**
The average quantity of electronic components (prefabricated or part of the interconnecting structure) on a unit area of a printed board considering one or both sides for component mounting.

Circuitry Layer **22.0215**
A layer of a printed board containing conductors, including ground and voltage planes.

Circumferential Separation **96.1349**
A crack or void in the plating extending around the entire circumference of a plated through hole, a solder fillet around lead wire or eyelet, or the interface between a solder fillet and a land.

Circumferential Thermodes **74.1734**
A contact tool used for inner-lead and outer-lead gang bonding.

Clad (adj.) **55.1350**
A condition of the base material to which a relatively-thin layer or sheet of metal foil has been bonded to one or both of its sides, e.g. "a metal-clad base material".

Clearance Hole **22.1811**
A hole in a conductive pattern that is larger than, and coaxial with a hole in the base material of a printed board.

Clinched Lead **72.1351**
A component lead that is inserted through a hole in a printed board and is then formed in order to retain the component in place and in order to make metal-to-metal contact with a land prior to soldering. (See also "Partially-Clinched Lead".)

Clinched-Wire Interfacial Connection **72.0217**
See "Clinched-Wire Through Connection".

Clinched-Wire Through Connection **72.1352**
A connection made by a bare wire that has been passed through a hole in a printed board and subsequently formed (clinched) and soldered to the conductive pattern on each side of the board.

Closed-Entry Contact **37.0218**
A type of female connector contact that prevents the entry of an oversized mating part. (See also "Open-Entry Contact".)

Co-Firing **56.0219**
The simultaneous processing of thick-film circuit elements during one firing cycle.

Coaxial Cable **37.0220**
A cable in the form of a central wire surrounded by a conductor tubing or sheathing that serves as a shield and return.

Code 39 **70.1626**
A type of bar code named because it contains nine elements, bars and spaces, with three wide elements and six narrow elements.

Code Density **70.1627**
The number of characters per unit length in a bar code symbol.

Coefficient of Thermal Expansion (CTE) **40.0221**
The linear dimensional change of a material per unit change in temperature. (See also "Thermal Expansion Mismatch".)

Cohesion (Pressure Sensitive Tape) **75.1628**
The ability of a pressure sensitive adhesive to resist splitting.

Cohesion Failure **96.0222**
The rupture of an adhesive bond such that the separation appears to be within the adhesive.

Coined Lead **22.0223**
The end of a round lead that has been formed to have parallel surfaces that approximate the shape of a ribbon lead.

Cold Flow (Pressure Sensitive Tape) **75.1629**
The tendency of some pressure sensitive adhesives to act like a heavy viscous liquid and exhibit a limited amount of flow over a period of hours or days at room temperature.

Cold Hand Cleaning **76.0224**
Cleaning with a soft brush and rinsing in a small open tank of non-chlorinated solvent or isopropanol. (Propan-2-ol.)

Cold Machine Cleaning **76.0225**
Cleaning with a non-chlorinated solvent and an inline brush or wave cleaner.

Cold Solder Connection **97.0226**
A solder connection that exhibits poor wetting, and that is characterized by a grayish porous appearance. (This is due to excessive impurities in the solder, inadequate cleaning prior to soldering, and/or the insufficient application of heat during the soldering process.) (See also "Rosin Solder Connection".)

Colour Selectivity **24.1630**
The preferential absorption of thermal radiation in the visible band with wavelength of from 0,39 microns to 0,78 microns.

Colour Temperature **24.1355**
A measure of the energy distribution over the visible spectral range of a light source with a continuous spectrum, expressed in degrees Kelvin (K). (See also “Effective Colour Temperature”.)

Comb Pattern **22.0227**
A set of interdigitated comblike arrays of uniformly-spaced conductors. (See Figure C.3).

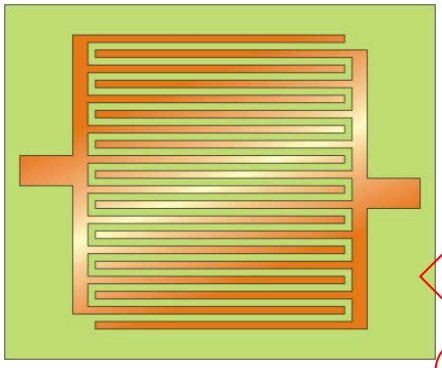


Figure C.3 – Comb pattern

Combination Mask **47.1631**
A type of screen mask that is composed of two areas wherein the one is located in the centre of the screen mask and is made by a metal screen mesh with a printing image, and the other is located in the periphery of the screen mask and is made by a thin elastic material.

Comment Record **25.0228**
A record that provides, or refers to, additional descriptive material that further clarifies the control of a data set.

Common Cause **91.0229**
A source of variation that affects all the individual values of the output of a process.

Compensated Artwork **24.0230**
Production master or artwork data that has been enlarged or reduced in order to meet the needs of subsequent processing requirements.

Compensation Circuit **21.0231**
An electrical circuit that alters the functioning of another circuit to which it is applied to achieve desired performance.

Compiler **11.0232**
A software module that analyses and converts programs from a high-level language to binary machine codes.

Complex Ion **76.0233**
An ion composed of two or more ions or radicals that are capable of an independent existence.

Compliant Bond **74.0235**
A bond that uses an elastically- and/or plastically-deformable member to impart the required energy to the lead.

Component **30.0236**
An individual part or combination of parts that, when together, perform a design function(s). (See also "Discrete Component”.)

Component Density **22.0237**
The quantity of components on a unit area of printed board.

Component Hole **20.0238**
A hole that is used for the attachment and/or electrical connection of component terminations, including pins and wires, to a printed board.

Component Lead **30.1356**
The solid or stranded wire or formed conductor that extends from a component to serve as a mechanical or electrical connector, or both. (See also “Component Pin”.)

Component Mounting **70.0239**
The act of attaching components to a printed board the manner in which they are attached, or both.

Component Mounting Orientation **22.1357**
The direction in which the components on a printed board or other assembly are lined up electrically with respect to the polarity of polarized components, with respect to one another, and/or with respect to the board outline.

Component Mounting Site **70.1632**
A location on a Packaging and Interconnecting structure (P&I) that consists of a land pattern and conductor fan-out to additional lands for testing or vias that are associated with the mounting of a single component.

Component Pin **30.0240**
A component lead that is not readily formable without being damaged. (See also “Component Lead”.)

Component Side **22.0241**
See “Primary Side”.

Component Thermal Masses **30.1735**
The ability of a part to absorb or retain heat energy, usually relative to its overall size and weight.

Composite (Phototool) **24.0242**
A photograph that consists of a combination two separate (aligned) images.

Composite Record **25.1358**
A collection of records that make up an electrical pattern that is used repeatedly in a design. (The definition and relationship of such records are covered and referred to as "subroutine definition" and "subroutine definition call”.)

Composite Test Pattern (CTP) **24.1792**
A grouping of individual test patterns into specific arrangements, to reflect control and precision capability of a manufacturer or manufacturing process.

Compound Die Set **51.1633**
A set consisting of a punch and matching die used to punch holes, details or the outlines of panels and/or printed wiring boards.

Compression Seal **36.0243**
A tight joint made between an component package and its leads that is formed as heated metal cools and shrinks around a glass insulator.

Computer Numerical Control (CNC) **11.0244**
A system that utilizes a computer and software as the primary numerical control technique. (See also “Numerical Control”.)

Computer-Aided Design (CAD) **22.1359**
The interactive use of computer systems, programs, and procedures in the design process wherein the decision-making activity rests with the human operator and a computer provides the data manipulation function.

Computer-Aided Engineering (CAE) **21.1360**
The interactive use of computer systems, programs, and procedures in an engineering process wherein the decision-making activity rests with the human operator and a computer provides the data manipulation function.

Computer-Aided Manufacturing (CAM) **25.1361**
The interactive use of computer systems, programs, and procedures in various phases of a manufacturing process wherein the decision-making activity rests with the human operator and a computer provides the data manipulation functions.

Concentration Polarization **54.0245**
That portion of polarization electrode produced by concentration changes at the metal-environment interface.

Condensation Soldering **75.1681**
See “Vapour Phase Soldering”.

Conditional End-of-Test **25.0246**
A command in a test program to stop the execution of the program when a particular condition, or set of conditions, is reached.

Conditioning **92.0247**
The time-related exposure of a test specimen to a specified environment(s) prior to or after testing and before evaluation.

Conductance **40.1635**
A measure of conductivity of a material, and the reciprocal of the electric resistance.

Conducting Salt **54.0248**
A salt added to a plating solution in order to increase its conductivity.

Conductive Foil **45.0249**
A thin sheet of metal that is intended for forming a conductive pattern on a base material.

Conductive Pattern **22.1362**
The configuration or design of the conductive material on a base material. (This includes conductors, lands, vias, heatsinks and passive components when these are integral part of the printed board manufacturing process.)

Conductive Paint **45.1636**
A paint with a suspended powder of an electrically conductive material.

Conductive Paste **45.1637**
A conductive material used to make conductive patterns and through holes on a base material consisting of silver, copper, nickel, carbon, etc. in a cream-like form.

Conductivity (Electrical) **40.0250**
The ability of a substance or material to conduct electricity.

Conductor **22.0251**
A single conductive path in a conductive pattern.

Conductor Base Spacing **60.0252**
The spacing between conductor at the plane of the surface of a base material. (See also "Design Spacing of Conductors".) (See Figure C.4.)

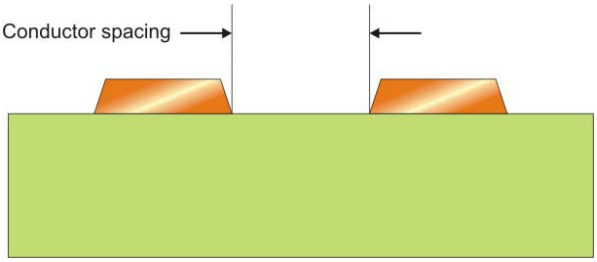


Figure C.4 – onductor base spacing

Conductor Base Width **60.0253**
The width of a conductor at the plane of the surface of a base material. (See also "Conductor Width" and "Design Width of Conductors".)

Conductor Layer No.1 **25.0254**
The first layer of a printed board that has a conductive pattern on or adjacent to its primary side.

Conductor Line **22.0256**
See "Conductor".

Conductor Layer **22.0848**
The total conductive pattern formed on one side of a single layer of a base material. (This may include all or a portion of ground and voltage planes.)

Conductor Nick **96.1932**
A reduction in a conductor cross-sectional area (internal or external) which may or may not expose the base material.

Conductor Path **22.0257**
See "Conductor".

Conductor Pattern **22.0258**
See "Conductive Pattern".

Conductor Pitch **22.1638**
The distance between the centres of adjacent conductors.

Conductor Protrusion **96.1640**
A random extension of conductor pattern that reduces the conductor spacing below the minimum requirement.

Conductor Side **22.0259**
The side of a single-sided printed board that contains the conductive pattern.

Conductor Spacing **60.1363**
The observable distance between adjacent edges (not centre-to-centre spacing) of isolated conductive patterns in a conductor layer. (See also "Centre-to-Centre Spacing".)

Conductor Thickness **22.1707**
Thickness of a conductor including additional metallic coatings but excluding non-conductive coatings.

Conductor Track **22.0261**
See "Conductor".

Conductor Width **60.1364**
The observable width of a conductor at any point chosen at random on a printed board as viewed from directly above unless otherwise specified. (See also "Design Width of Conductor" and "Conductor Base Width".)

Confidence Interval **94.1365**
The determination, with a specified degree of confidence, as to whether or not a particular characteristic is within ascertained limits of a population.

Confirmation Run **94.0262**
A test of the results that are obtained during an experimental design in order to prove if the results are reproducible in an actual application.

Conformal Coating **76.0263**
An insulating protective covering that conforms to the configuration of the objects coated (e.g. Printed Boards, Printed Board Assembly) providing a protective barrier against deleterious effects from environmental conditions.

Conformal Test Coupon Set **92.1641**
A complement of test coupons which are comprised of various coupon types, each of which is designed for a specific test or tests, but which were all made in the same manufacturing lot.

Conformal Via **22.1644**

A type of build-up via in which the conductor layer of a uniform thickness is formed conforming to the shape of a hole in the insulating layer.

Confounding **94.0264**
A situation whereby certain effects cannot be separated from other effects.

Connector **37.0265**
A device used to provide mechanical connect/ disconnect service for electrical terminations.

Connector Area **22.0269**
That portion of printed wiring used for the purpose of providing external connections.

Connector Contact **22.0270**
The conducting member of a connecting device that provides a separable connection.

Connector Housing **37.0271**
A plastic shell that holds electrical contacts in a specific field pattern that may also have polarization/keying bosses or slots.

Connector, One-Part **22.0266**
See "Edge-Board Connector.

Connector Tang **37.0272**
That portion of a printed board that mates with an edge-board connector.

Connector, Two-Part **22.0267**
A connector containing two sets of discretely-formed mating metal contacts.

Connector, Two-Part, Printed Board **37.0268**
A two-part connector wherein at least one set of contacts is mechanically and electrically attached to a printed board.

Constraining Core **44.0273**
A supporting plane that is internal to a packaging and interconnecting structure.

Consumer's Risk **94.0274**
See “Beta Error”.

Contact Angle (Bonding) **74.0275**
The angle between the bonding lead or wire and the bonding land.

Contact Angle (Soldering) **75.1326**
The angle of a solder fillet that is enclosed between a plane that is tangent to the solder/basis-metal surface and a plane that is tangent to the solder/air interface.

Contact Area **22.0276**
The common area between a conductor and a connector through which the flow of electricity takes place.

Contact Corrosion **96.0277**
See "Crevice Corrosion”.

Contact Length **96.0278**
The distance of travel made by a contact in touch with another during the insertion and removal of a connector.

Contact Plating **53.1647**
The plating applied to the parts of a printed wiring board that are used as the electrical contact to the circuit outside.

Contact Printing **24.1366**
A photographic light-exposure process that transfers an image from one base material to the photosensitive surface of another base material while both base materials are in mechanical contact with each other.

Contact Resistance **70.0279**
The electrical resistance of metallic surfaces, under specified conditions, at their interface in the contact area.

Contact Retention Force **96.0280**
The minimum axial load in either direction that a contact withstands while it is in its normal position in a connector insert.

Contact Spacing **22.0281**
See "Pitch”.

Contact Spring **37.0282**
The spring member of a socket-type contact that forces the engaging pin- type contact into a position of positive intimate contact.

Contained Paste Transfer Head **73.1648**
A stencil printer head that holds, in a single replaceable component, the squeegee blades and a pressurized chamber filled with solder paste.

Contamination Host Material **76.0283**
The material within which contamination is deposited or entrapped.

Continuity **92.0284**
An uninterrupted path for the flow of electrical current in a circuit.

Continuity Test **92.1649**
Resistance test to insure all the required points have electrical continuity.

Contract Services **17.0285**
Printed-board manufacturing processing operations that are performed for or by another vendor outside the manufacturer's facility.

Control Chart **91.1368**
A graphic representation of a characteristic of a process that shows plotted values of some statistic gathered from characteristic, a central line, and one or two statistically-derived control limits.

Control Console **11.0286**
A device terminal used to manipulate and maintain the operating system of a computer.

Control Drawing **22.0287**
See "Master Drawing".

Control Limits **91.0290**
The maximum allowable variation of a process characteristic due alone to common causes.

Controlled Collapse, Component Connection 75.0289
See "Controlled Collapse Soldering".

Controlled Collapse Bonding **74.1650**
A bonding technique that makes termination by reflowing the solder bump on a chip and connecting it to the land on the printed circuit board.

Controlled Collapse Soldering **75.1651**
A technique for soldering a component (i.e. flip chip, chip scale package, BGA) to a substrate, where the component connection surface tension forces of the liquid solder supports the weight of the component and controls the height of the joint.

Convected Energy **75.1736**
Heat transferred through circulation of fluid or gas.

Convection **21.1652**
Heat transfer that occurs at the interface of a solid and a fluid or gas that is due to their differences in temperature.

Convection Controlled **21.1653**
Thermal transfer in which the characteristics, such as flow rate, velocity, and temperature are precisely controlled.

Convection Forced **21.1654**
Transfer of heat energy by convention that is forced by moving fluid or gas.

Conveyor, Edge **70.0291**
A transporting mechanism that supports a product by the edges.

Conveyor, Mesh **70.0292**
A transporting mechanism that fully supports the product.

Conveyor, Secondary **70.0293**
A transporting mechanism used beneath the edge conveyor to catch a fallen product.

Cooldown **75.1655**
The period of time during which the solder joints go through a liquidus phase and become solid.

Coordinatograph **92.0294**
An X- and Y-coordinate plotting and measuring machine.

Coplanar Leads **33.0295**
The flat beam leads of a component package that have been formed so that they can simultaneously contact one plane of a base material.

Coplanarity **33.1656**
The distance in height between the lowest and highest leads when the component is in its seating plane.

Copolymerize **49.0847**
The creation of a polymer by the joining of two or more different monomers in repeating chain.

Copper Thickness **41.1657**
The thickness dimension of the copper cladding on a base material.

Copper Weight **41.1658**
The mass of copper per unit area for a foil expressed in g/m^2, often also expressed in ounces per square foot or micrometers (µm) in the industry.

Copper-Mirror Test **92.0296**
A test of the corrosivity of a flux on a copper film that is vacuum- deposited on a glass plate.

Corner Crack (Knee Crack) **96.1569**
A crack in the plated metal at the knee (the intersection of the hole barrel and the pad or land) of a plated through-hole.

Corner Marks **22.0297**
The marks at the corners of artwork whose inside edges establish, or help to establish, the borders and contour of a printed board.

Coronizing **44.0298**
Continuous heat cleaning and weave setting.

Corrosion (Chemical/Electrolytic) **76.0299**
The attack of chemicals, flux, and flux residues on base metals.

Corrosive Flux **75.0300**
Flux that contains levels of halides, amines, or organic acids that cause corrosion of copper.

Cosine Law (Illumination) **24.1369**
A law of illumination that states that the flux radiated or received in a given direction varies with the projected area of the receiver or emitter in a plane that is perpendicular to the direction of the flux.

Cost of Quality **94.0301**
The money spent in the creation, control, and evaluation of quality and the consequences of the failure to meet specified requirements.

Coupon **92.0302**
See "Test Coupon".

Coupon (Breakaway) **92.1220**
Coupons made as an integral part of the end product board and connected as one piece, except one edge of the coupon has perforations or a thin section connected to the board which can be easily broken off without damaging either the coupon or the board.

Coverfilm **42.2139**
A film of dielectric material with adhesive, usually identical with the base layer, which is bonded over the etched conductor runs to insulate them.

Cover Coat **42.0303**
See "Coverlayer".

Coverlayer (Flexible Circuit) **42.0304**
The layer of insulating material that is applied totally or partially over a conductive pattern on the outer surfaces of a printed board.

Cover Layer (Discrete Wiring) **64.1660**
A polymeric material which is applied to a circuit board over surface wired levels.

Cpk Index (Cpk) **91.0307**
A measure of the relationship between the scaled distance between the process mean value and the closest specification limit.

Crack, Foil **90.0308**
A break or separation that extends partially or completely through a layer of metallic foil.

Crack, Plating **90.0309**
A break or separation that extends partially or completely through a metallic coating(s), its overplate, or both.

Cracking **90.0310**
A condition that makes breaks or separations in coatings that extend through to an underlying surface.

Cratering **74.0311**
A defect in which a portion of a die under is torn loose by an excessive amount of ultrasonic wire-bonding energy.

Crazing (Base Material) **51.0312**
An internal condition that occurs in reinforced laminate base material whereby glass fibres are separated from the resin at the weave intersections. (This condition manifests itself in the form of connected white spots or crosses that are below the surface of the base material.) It is usually related to mechanically-induced stress. (See "Measling".)

Crazing (Conformal Coating) **76.0313**
A network of fine cracks on the surface of, or within, a conformal coating.

Crease **92.0314**
A ridge in a material that is caused by a fold or wrinkle being placed under pressure.

Creel **44.0315**
A device used as a yarn package rack to hold warp ends for a section beam.

Creep **40.0316**
Time-dependent strain occurring under stress.

Creep Endurance **40.1661**
Resistance against a time dependent strain occurring under stress on a material.

Crevice Corrosion **97.0317**
Localized corrosion that is the result of the formation of a crevice between a metal and a nonmetal, or between two metal surfaces.

Crimp Contact **37.0318**
A type of connector contact whose nonmating end is a hollow cylinder that can be crimped onto a wire inserted within it.

Critical Current Density **53.0319**
The current density above which a new and sometimes undesirable reaction occurs.

Critical Defect **94.0320**
Any anomaly specified as being unacceptable.

Critical Humidity **76.1371**
The relative humidity above which the atmospheric corrosion rate of a given metal increases sharply or above which the insulation decreases sharply.

Critical Operation **91.0321**
One procedure of a total process that has a significant impact on the characteristics of the completed product.

Critical Solution Temperature **76.0322**
The temperature above or below which two liquids are miscible in all proportions.

Crop Marks **22.0323**
See "Corner Marks".

Cross-Over (Discrete Wiring) **64.1662**
A point where tow or more discrete insulated wires intersect and cross each other.

Cross-Sectioning **92.0324**
See "Microsectioning"

Cross-Hatching **22.0325**
The breaking up of large conductive areas by the use of a pattern of voids in the conductive material. (See Figure C.5).

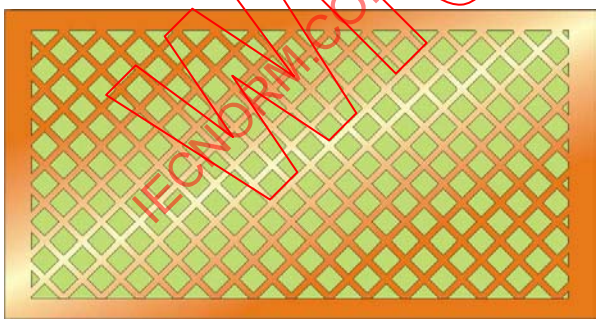


Figure C.5 – Cross-Hatching

Crossing Count **22.1372**
The unit for measuring optimum component placement characteristics that is based on the number of times there are crossovers of the signal conductor that are used to provide electrical interconnection between devices.

Crosslink **40.0326**
The formation of chemical bonds between molecules in a thermosetting resin.

Crosstalk **21.0327**
The undesirable interference caused by the coupling of energy between signal paths. (See also "Backward Crosstalk" and "Forward Crosstalk".)

Cratering (CHIP-OUT) **95.1663**
A category of ball bond failure in which the ball lifts from the surface of the integrated circuit die bond pad, taking with it a portion of the bond pad metallization and the underlying oxide or silicon.

Creep Resistant Holding Power (Pressure Sensitive Tape) **46.1869**
The ability of a pressure sensitive adhesive tape to resist static forces of shear applied to the same plane as the backing.

Crystalline Polymer **40.0328**
A polymer with a regular, structured molecular configuration.

Cubic Components **30.1737**
A part with a three-dimensional shape having the form of a cube.

Cumulative Tolerance **22.1373**
The summation of the tolerances that are permitted between functionally- related features. (See also "Baseline Dimensioning," "Basic Dimension," "Chain Dimensioning" and "Direct Dimensioning".)

Cup Solder Terminal **37.0329**
A cylindrical solder terminal with a hollow opening into which one or more wires are placed prior to soldering.

Cure **56.0330**
A chemical reaction that changes the physical properties of a substance, e.g. an adhesive.

Cure Time **56.0331**
The time at which ultimate physical properties of a curing thermosetting plastic composition are reached.

Curing Agent **56.0332**
A chemical substance that can react with a resin in order to physically harden the resin.

Current **21.1795**
The flow or movement of electrons in a conductor as the result of a voltage difference between the ends of the conductive path.

Current-Carrying Capacity **21.1374**
The maximum electrical current that can be carried continuously by a conductor, under specified conditions, without causing objectable degradation of electrical and mechanical properties of the product.

Customer Detail Specification (CDS) **26.1779**
A document that establishes the specific requirements, noted in a detailed specification, in order to tailor these to meet the needs of a custom product, material, or service.

Customer Test Data **92.1664**
Normal performance data generated at incoming inspection by the customer.

Cusum Chart **91.0333**
A diagram that depicts cumulative deviation from a target.

Cut-and-Peel **24.0334**
See "Cut-and-Strip".

Cut-and-Strip **24.0335**
The making of artwork by cutting a pattern in a resist and stripping away the unwanted areas or resist.

Cut-Off **74.0336**
The operation that follows the final bonding step that separates the bond from the source of the wire.

Cylindrical Components **30.1738**
A part having the shape of a cylinder.

D

D Curve **24.0347**
See "Characteristic Curve".

Damage **94.1665**
The result of an event that degrades a product, e.g. component, printed board, module, etc., beyond the form, fit and function limits of the governing document.

Dambar **36.1666**
A portion of the lead frame that prevents mold compound from flowing to end of the lead frame.

Data Capture **25.0340**
The automatic collection of information from a given machine or other information source.

Data File **11.0341**
A database organized in a specific manner for a specific application.

Data Layer **25.0342**
A specific group of related records that are within any individual data- information module.

Data Logging **11.0343**
The ability of a host computer or test analyser to store analysed data along with statistical data.

Data-Entry Device **25.0337**
A device terminal used to enter information into a computer system. (See also "Control Console).

Data-Information Module (DIM) **25.0338**
A group of records that contain related data that describe a specific function or task.

Database **11.0339**
A comprehensive collection of information that is so structured that some or all of its data may be used to create queries about related items contained within it.

Date Code **30.1739**
Marking of products to indicate their date of manufacture.

Datum **22.0344**
The theoretically-exact point, axis or plane that is the origin from which the location of geometric characteristics of features of a part are established.

Datum Axis **22.1667**
The theoretical axis derived from the true geometric counterpart of a specified feature (i.e. tooling hole, fiducial) as established by the extremities of contacting points of the actual datum feature.

Datum Feature **22.0345**
An actual feature of a part that is used to establish a datum.

Datum Reference **22.0346**
A defined point, line or plane that is used to locate a pattern or layer for manufacturing purposes, inspection purposes, or both.

Datum Target **22.1668**
A specified point or area on a printed board used to establish a datum.

Daughter Board **81.1669**
A printed board that is fastened to a mother board and electrically connected.

Decoupling **21.1375**
The absorbing of noise pulses in power supply lines, that was generated by switching logic devices, so as to prevent the lines from disturbing other logic devices in the same power-supply circuit.

Defect **90.0348**
A nonconformance or other risk factors as identified by the manufacturer. A process and/or material nonconformance that could result in a reduction of functional capability, design life or reliability.

Defect Identification **90.0349**
The provision for recording the location of a detected anomaly.

Definition **52.1701**
Degree of conformity of the pattern edges with the production master.

Definition (Phototool) **24.0350**
The clarity of detail in an optically-produced image.

Degradation **90.0351**
A decrease in the performance characteristics or service life of a product.

Degrees of Freedom (df) **94.0352**
The number of comparisons that are available in order to learn about an event.

Delamination **55.1376**
A separation between plies within a base material, between a base material and a conductive foil, or any other planar separation with a printed board. (See also "Blister".)

Delivered Panel (DP) **50.1788**
A production or prototype panel, or portion of either, intended to contain one or more printed boards in a specific arrangement or cluster, in order to facilitate economic assembly and testing in the next level of manufacturing.

Delivery Inspection **92.1670**
"See Final Inspection".

Dendritic Growth **90.0353**
Metallic filaments that grow between conductors in the presence of condensed moisture and an electric bias. (See also "Whiskers".)

Dendritic Migration **90.0354**
Migration that proceeds through an insulator in a "treeing" fashion.

Denier **44.0355**
The weight, in grams, of 9 000 m of fibre, filament or yarn.

Densitometer **24.0356**
An instrument that is used to measure the amount of light that has been absorbed by a photographic film.

Density (Material) **40.1675**
The mass of a substance per unit volume.

Density (Phototool) **24.0357**
The logarithm of the value of opacity.

Dent **45.0358**
A smooth depression in conductive foil that does not significantly reduce the foil's thickness.

Dentrices **90.0359**
See "Dendritic Migration".

Dependent of Feature Size **22.0360**
The concept that permits tolerances of form or position to vary in proportion to, and dependent on, a feature's size.

Depth of Field (Optical) **24.0361**
The range of distances along the axis of an optical instrument, usually a camera lens, through which an object will produce a relatively distinct image.

Desiccant **30.1679**
An absorbent material used to maintain a low relative humidity.

Design Automation **20.1377**
The use of computer systems, programs, and procedures in the design process wherein, the computer is responsible for the decision-making activity and data manipulation function.

Design Spacing of Conductors **22.0364**
The spacing between conductors as delineated or otherwise noted on the master drawing. (See also "Conductor Base Spacing".)

Design Width of Conductors **22.0365**
The width of conductors as delineated or otherwise noted on the master drawing. (See also "Conductor Base Width" and "Conductor Width".)

Design Rule **22.0363**
Guidelines that determine automatic conductor routing behavior with respect to specified design parameters.

Design-Rule Checking **22.0362**
The use of a computer-aided design program to perform continuity verification of all conductor routing in accordance with appropriate design rules.

Desmear **57.0366**
The removal of friction-melted resin and drilling debris from a hole wall.

Destructive Physical Analysis (DPA) **92.1680**
A process of determination of device construction or failure modes.

Detail Specification **26.1740**
A detailed written description of a part or a process.

Detailed Specification (DS) **26.1781**
A document that describes the exact requirements for a specific product, material, or service.

Detection **91.0367**
A strategy that attempts to identify and separate acceptable and unacceptable outputs from a process.

Developing (Phototool) **24.0368**
The chemical treatment of radiation-modified photosensitive material in order to produce an image.

Development (Resist) **52.1682**
The process of exposing a photoresist to a chemical solution which dissolves unwanted material and without affecting wanted material. The standard method of distinguishing between wanted and unwanted material is by polymerizing the resist so as to make it less soluble in the development solvent.

Device **30.0369**
An individual electrical circuit element that cannot be further reduced without destroying its stated function.

Dewetting **97.0370**
A condition that results when molten solder coats a surface and then recedes to leave irregularly-shaped mounds of solder that are separated by areas that are covered with a thin film of solder and with the basis metal not exposed. (See Figure D.1.)

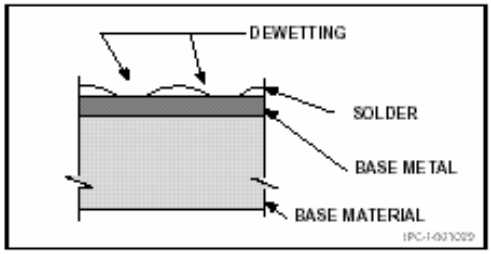


Figure D1 – Dewetting

Dewetting (Base Materials) **40.1684**
A loss or reduction of resin coverage from localized or large areas of reinforcement.

Diazo Material **24.0371**
A nonsilver, room-light hardening, ultraviolet-sensitive coating material.

Dibasic Acid **76.0372**
An acid containing two atoms of acidic hydrogen in a molecule.

Dice **35.0373**
Two or more die.

Dicing **35.1685**
The separating of semi-conductor wafers into individual die.

Dicyandiamide **41.0374**
A solid curing agent for epoxy resins.

Die **35.0375**
The uncased and normally leadless form of an electronic component that is either active or passive, discrete or integrated. (See also "Dice".)

Die Attached Pad **35.1688**
See "Die Pad"

Die Bonding **74.0376**
The attachment of a die to base material.

Die Mount Pad **35.1689**
See "Die Pad"

Die Pad **35.1687**
A land on which the integrated circuit die is mounted during the assembly process.

Die Paddle **35.1686**
The central portion of the lead frame on which the die and adhesive are placed during the attachment process.

Die Shrink **35.1690**
Method of reducing silicon area used for the same circuitry by reducing layout feature size by a common percentage for all levels.

Die Stamping (Conductor) **53.1691**
A process to make a conductive circuit in which the patterns are stamped out of a metal sheet.

Dielectric **40.0377**
A material with a high resistance to the flow of direct current, and which is capable of being polarized by an electrical field.

Dielectric Breakdown **21.1378**
The complete failure of a dielectric material that is characterized by a disruptive electrical discharge through the material that is due to deterioration of material or due to an excessive sudden increase in applied voltage.

Dielectric Constant **21.1379**
The ratio of the capacitance of a configuration of electrodes with a specific material as the dielectric between them to the capacitance of the same electrode configuration with a vacuum or air as the dielectric. See “Permittivity”.

Dielectric Fluid **21.0378**
A fluid that has excellent dielectric strength, excellent volume resistivity, a low dielectric constant, and a low dissipation factor.

Dielectric Strength **21.1380**
The maximum voltage that a dielectric can withstand under specified conditions without resulting in a voltage breakdown, usually expressed as volts per unit dimension.

Differential Etching **54.1692**
The process of removing copper from a conductive pattern that has been plated on a starting thin copper foil such that the portions of the thin starting foil are completely removed and the thicker plated portions are slightly reduced by the etchant.

Diffusion Bond **74.0379**
A bond formed in the absence of any liquid phase at any time prior to or during the joining process.

Digital Circuit **21.0380**
An electrical circuit that provides two (binary) or three distinct relationships (states) between its input and output.

Digitizing (CAD) **25.0381**
The converting of feature locations on a flat plane to its digital representation in X-Y coordinates.

Dilution Ratio **76.1221**
The maximum number of unit volumes of hydrocarbons that can be added per unit volume of active solvent in order to cause the first trace of gelation to occur when the concentration of nitrocellulose in the solution is 8 g (grams) per 100 ml (millilitres).

Dimensional Stability **21.1381**
A measure of the dimensional change of material that is caused by factors such as temperature changes, humidity changes, chemical treatment (aging), and stress exposure.

Dimensioned Hole **22.0382**
A hole in a printed board whose location is determined by physical dimensions or coordinate values that do not necessarily coincide with the stated grid.

Dimorphism **40.0383**
The existence of a substance in two different crystalline forms.

Dip Soldering **75.1382**
The making of soldered terminations simultaneously by bringing the solder side of a printed board with through-hole mounted components into contact with the surface of a static pool of molten solder. (See also "Drag Soldering”.)

Diphase Cleaning **76.0384**
Cleaning by means of solutions that contain a solvent layer and an aqueous layer.

Dipole (Electronic) **21.0385**
An assemblage of atoms or subatomic particles, separated by a finite distance, that have equal electric charges of opposite sign.

Dipole Moment **21.1383**
Molecules in which the atoms, their electrons, and their nuclei, that are so arranged that one part of the molecule has a positive electrical charge while the other part is negatively charged.

Direct Cleaning **76.0386**
See "Cathodic Cleaning”.

Direct Current (DC) **21.1796**
A current produced by a voltage source that does not vary with time and is normally provided by power

supplies, transformers or batteries to power electronic circuits.

Direct Current Cleaning **76.0387**
See "Cathodic Cleaning".

Direct Dimensioning **22.0388**
The maximum variation between two features that is controlled by the tolerance on the dimension between the features.

Discrepant Material **92.0389**
Material that does not conform to specification.

Discrete Component **30.0392**
A separate part of a printed board assembly that performs a circuit function, e.g. a resistor, a capacitor, a transistor, etc.

Discrete Wiring **64.1693**
A conductive pattern established by techniques other than printing, plating, and/or etching, that provides point-to-point connections in a predetermined arrangement on a common base.

Discrete Wiring Board **64.0390**
A base material upon which discrete wiring techniques are used to obtain electrical inter-connections.

Discrete Wiring Board Assembly **64.0391**
An assembly that uses a discrete wiring board for component mounting and interconnecting purposes.

Dispersant (Organosol) **41.0393**
A liquid chemical compound that has a solvating or peptizing action on a resin so as to aid in dispersing and spreading it.

Disperse Phase (Suspension) **41.0394**
The particles of solid material dispersed in a liquid medium.

Dispersing Agent **41.0395**
A surface-active agent added to a suspending medium to promote uniform separation of extremely-fine solid particles.

Disposition (Defects) **91.1694**
The determination of how defects should be treated. Dispositions include, but are not limited to, rework, use as is, scrap or repair.

Dissipation Factor **21.0396**
The ratio of loss current to charging current. The dissipation factor or loss tangent, tan∗, is given by εO/εN, where εN and εO are the real and imaginary parts of the permittivity (see permittivity). The loss tangent is a parameter used to express the tendency of insulators or dielectrics to absorb some of the energy in an ac signal.

Dissolution of Metallization **36.1741**
The process of dissolving metal, usually by introduction of chemicals. (See also "Leaching, Metallization".)

Dissolution of Termination Metallization (Leaching) **75.1695**
See "Leaching, Metallization".

Distance to Neutral Point (DNP) **35.1696**
The linear separation of a joint from the neutral point on a chip. This dimension controls the strain on the joint imposed by expansion mismatch between chip and substrate.

Distributed Numerical Control (DNC) **25.0398**
A network that links computer programs or computer-aided systems to numerically-controlled machine tools.

Disturbed Solder Connection **97.1384**
A solder connection that is characterized by the appearance that there was motion between the metals being joined when the solder was solidifying.

Don't Care Area **22.0399**
See "Exclusion Area".

Doping **35.0400**
The addition of an impurity to alter the conductivity of a semiconductor die.

Double-Sided Assembly **80.0401**
A packaging and interconnecting structure with components mounted on both the primary and secondary sides. (See also "Single-Sided Assembly".)

Double-Sided Printed Board **60.0402**
A printed board with a conductive pattern on both of its sides.

Double-Sided Flexible Printed Wiring Board **62.1697**
See Flexible Double-Sided Printed Board.

Double-Sided Printed Wiring Board **60.1698**
See Double-Sided Printed Board.

Doubled-Treated Foil (DTF) **45.1700**
Application of a chemical adhesion promoter treatment is placed on both surfaces of the copper (matte and drum sides).

Download, Computer **11.1385**
The transfer of computer programs or data from a computer to a lower- level computer. Software that applies human-like reasoning to solve a problem by the use of rules and heuristics.

Download, Tester **92.0403**
The ability of a test analyser to provide failure analysis and data logging information to a host computer.

Drafting Image **26.0404**
An image that is part of a master drawing or layout.

Drag Soldering **75.1386**
The making of soldered terminations by moving the solder side of a supported printed board with through-hole mounted components through the surface of a static pool of molten solder. (See also "Dip Soldering".)

Drain Wire **37.0405**
An uninsulated wire that is used for the electrical termination of a shield or ground plane.

Drawbridged Component **73.0406**
See "Tombstoned Component".

Drilling **51.1703**
A process for making holes using a drill bit or laser.

Drill Bit **51.1702**
A rod with spiral flutes (grooves) and an obtuse angled point with sharpened cutting edges used to make holes by rotary action.

Drill Body Length **51.0407**
The distance from the drill point to the intersection of the drill diameter and shoulder angle.

Drill Diameter **51.0408**
The actual size of the drill body.

Drill Point Concentricity **51.0409**
The total variation of the location of the chisel point of a rotated drill shank.

Dross **75.0410**
Oxide and other contaminants that form on the surface of molten solder.

Drying (Solder Paste) **75.1708**
Ambient or heating process to evaporate volatile components from solder paste which may or may not result in melting of rosin/resin.

Dry Film Resist **52.1705**
A composite material where a photosensitive emulsion that is sensitive to portions of the light spectrum and is either carried by or sandwiched between polymer release films and is used to expose imagery on printed boards.

Dry Glass (Clad Laminate) **41.1706**
A general reference to the appearance of a laminate where the reinforcement is highly visible, due to low/lost resin content or poor wetting/encapsulation of the resin to the reinforcement, although the resin coverage is acceptable.

Dual Fixture **92.0411**
A test fixture with two separate bed-of-nails units.

Dual-Inline Package (DIP) **31.1387**
A basically-rectangular component package that has a row of leads extending from each of the longer side of its body that are formed at right angles to a plane that is parallel to the base of its body.

Dual-Strip Line **21.1797**
A balanced stripline configuration (see Stripline and Balanced Transmission Line). This structure consists of two layers of signal lines located between two reference planes.

E

E Glass **44.0423**
A low alkali lime alumina borosilicate glass with good electrical properties.

Edge Definition **92.0415**
The reproduction fidelity of a pattern's edge relative to the production master.

Edge Detection **92.0416**
The ability to recognize (differentiate) the location of an edge.

Edge Rate **21.0417**
The rate of change in voltage with time of a logic signal transition.

Edge Short **74.0418**
An electrical short caused by carrier tape leads making contact with the edge of a semiconductor die.

Edge Spacing **22.0419**
The distance of a pattern or component body from the edges of a printed board. (See also "Margin".)

Edge-Board Connector **37.0412**
A connector that is used specifically for making nonpermanent interconnections with the edge-board contacts on a printed board.

Edge-Board Contact(s) **22.0413**
Printed contact(s) on or near any edge of a printed board, that are used specifically for mating with edge-board connectors.

Edge-to-Edge Spacing **22.0414**
See "Conductor Spacing Line".

Edge-Transmission Attenuation **21.1388**
The loss of a logic signal's switching-edge sharpness that has been caused by the absorption of the highest-frequency components by the transmission line.

Effective Colour Temperature **24.0420**
A colour temperature based on an approximation of an equivalent continuous spectrum resultant source, expressed in degrees Kelvin (K).

Effective Focal Length **24.0421**
A measure of the distance from the principal point of a magnification device's optical system to the corresponding focal point.

Effective Permittivity **21.0422**
The permittivity of a mixed media configuration, such as air and the solid dielectrics used in microstrip, that has the equivalent electromagnetic wave propagation characteristics of a single dielectric medium.

Effective Relative Dielectric Constant **21.1798**
The relative permittivity (see Dielectric Constant) of a mixed media configuration, such as air and the solid dielectrics used in microstrip, that has the equivalent electromagnetic wave propagation characteristics of a single dielectric medium.

Elastomeric Connector **36.0424**
A pliant strip of flexible material with insulating and conductive elements intended for providing electrical interconnections.

Electrical Characteristics **21.1742**
The distinguishing electrical traits or properties of a component or assembly.

Electrical Resistance **21.1712**
(See Resistance.)

Electrodeposited Foil **45.0425**
A metal foil that is produced by electrodeposition of the metal onto a material acting as a cathode.

Electrodeposition **53.0426**
The deposition of a conductive material from a plating solution by the application of electrical current.

Electroless Deposition **53.0427**
The deposition of conductive material from an autocatalytic plating solution without the application of electrical current.

Electroless Plating **53.0428**
See "Electroless Deposition".

Electrolytic Cleaning **76.0429**
Cleaning in which a current is passed through an alkaline solution with the part to be cleaned being one of the electrodes.

Electrolytic Corrosion **76.1713**
Corrosion caused by an electrochemical reaction.

Electrolytic Corrosion Factor (Pressure Sensitive Tape) **75.1714**
A measure of the pressure sensitive adhesive tape's corrosive effect on a copper conductor.

Electrolytic Deposition **53.0430**
See "Electrodeposition".

Electromagnetic Interference (EMI) **21.0431**
Unwanted electromagnetic energy that may couple into electrical circuits and adversely affect their performance.

Electromigration **96.1715**
An undesirable phenomenon in which metal ions migrate through a suitable medium under the influence of an electrical field.

Electron-Beam Bonding **74.0432**
Terminations made by heating with a stream of electrons in a vacuum.

Electroplating **53.0433**
See "Electrodeposition".

Electrostatic Discharge (ESD) **21.1716**
The rapid spontaneous transfer of electrostatic charge, induced by a high electrostatic field.

Element (Bar Code) **70.1717**
In a bar code, a generic term referring to a bar or space.

Elementary Diagram **26.0434**
A computer-generated schematic diagram with annotations.

Elongation **70.0435**
The increase in length of a material that is caused by a tensile load.

Embedded Component **30.0436**
A discrete component that is fabricated as an integral part of a printed board. (See Figure E.1 for an example.)

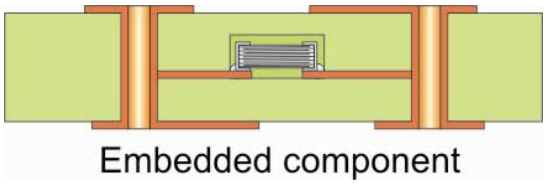


Figure E.1 – An example of embedded component

Embedded Copper (base material) **45.1718**
An inclusion which is composed of copper and sourced from the cladding, and may be particles from treatment transfer, broken away copper tooth, or spurious copper.

Embedded Fibre (Base Materials) **44.1825**
An inclusion which has an insignificant width or diameter but has significant length, usually but not always in a curly or twisted configuration, generally from organic sources such as clothing or packaging materials.

Embedded Passive **49.0096**
A sheet of resistive, capacitive or inductive material which is laminated onto a dielectric, and either etched or lased away to define individual resistors, capacitors or inductors.

Emulsifying Agent **76.0437**
A substance that increases the stability of an emulsion.

Emulsion **76.0439**
A stable mixture of two or more immiscible liquids held in suspension by small percentages of emulsifiers.

Encapsulant **76.0440**
See "Potting Compound".

End Item **20.0441**
See "End Product".

End Missing **44.0442**
A very small portion of the warp in a fabric that may have been broken in the pick-out of waste material.

End Product **20.0443**
An individual part or assembly in its final completed state.

End Mill **51.1719**
A rod with straight or spiral flutes (grooves) sharpened as a cutting surface(s) and a flat or shaped end with cutting teeth, used for surface or side milling by rotary action.

Engineering Drawing **26.0444**
A document that discloses the physical and functional end-product requirements of an item by means of pictorial and/or textual presentations.

Entry/Backup Material **51.1720**
A material which when placed on the top (entry) and/or bottom (backup) of a stack of printed boards being drilled or routed, supports the edges of drilled holes or routed profile such that the presence of burrs is minimized.

Epoxy Glass Substrate **41.1743**
A two-part epoxy resin that polymerizes spontaneously when the two components are mixed, combined with glass fibre to form a substrate.

Epoxy Novolac **41.0445**
A multifunctional resin having epoxy groups attached to a novolac group(s).

Epoxy Resin **40.1721**
A thermosetting resin containing at least two reactive oxirane rings that is made by the reaction of epichlorohydrine and bis-phenol A.

Epoxy Smear **51.0446**
See "Resin Smear".

Equilibrium Wetting **75.1722**
The degree of wetting in which the forces of wetting are in equilibrium with the forces of gravity. The visible indication of this is that the wetting balance curve describing the wetting action when the rate of change approaches zero.

Equivalent Series Resistance (ESR) **21.0447**
A loss parameter used to compare two capacitors of equal value in order to determine their relative effectiveness as filters.

Escape Rate **94.0448**
The ratio of the number of defective items not detected to the total number inspected, expressed as a percentage.

Escapes **94.0449**
Critical defects that are missed by an inspection system.

Etch Factor **54.0452**
The ratio of the depth of etch to the amount of lateral etch, i.e. the ratio of conductor thickness to the amount of undercut. (See Figure E.2.)

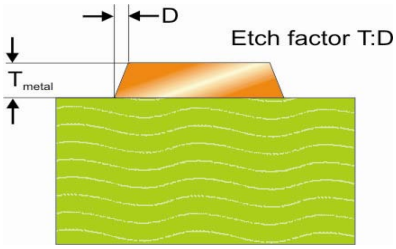


Figure E.2 – Etch factor

Etchant **54.0450**
A solution used to remove the unwanted portion of material from a printed board by a chemical reaction.

Etchback **54.1389**
The controlled removal by a chemical process, to a specific depth, of nonmetallic materials from the sidewalls of holes in order to remove resin smear and to expose additional internal conductor surfaces.

Etched Printed Boards **60.0451**
A board having a conductive pattern that was formed by the chemical removal of unwanted portions of a conductive foil.

Etching **54.0453**
The chemical, or chemical and electrolytic, removal of unwanted portions of conductive or resistive material.

Etching Indicator **54.1390**
A wedge-shaped or other specified pattern that is affixed to a conductive foil in order to indicate the quality of etching. (See Figure E.3.)

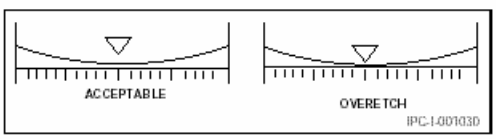


Figure E.3 – Etching Indicator

Etch Resist **54.1723**
An organic or metal plated material used to protect the conductive pattern image from the etching chemistry. The organic material may be photosensitive.

Ethanol **76.1744**
A solvent used in cleaning electrical assemblies (Ethylalcohol).

Eutectic (Solder) **75.1391**
The alloy composition at which a solder alloy melts/freezes completely without going through a pasty (partially solid) phase.

Eutectic **75.1392**
An isothermal reversible reaction in which on cooling a liquid solution is converted into two or more intimately-mixed solids, with the number of solids formed being the same as the number of components in the system.

Eutectic Die Attach **74.0454**
The mounting of a semiconductor die to a base material with a perform of a eutectic metal alloy that is brought to its eutectic melting temperature.

Eutrophication **76.0455**
The enrichment of either fresh or salt water by a chemical element or compound.

Excess Solder Connection **75.1393**
A solder connection that is characterized by the complete obscuring of the surfaces of the connected metals and/or by the presence of solder beyond the connection area.

Exchange Reaction **76.1317**
A chemical reaction in which atoms of the same element in two different molecules, or in two different positions in the same molecule, transfer places.

Excising **73.0457**
The cutting of the unterminated (outer) leads of an inner-lead bonded die in order to separate it from the carrier tape subsequent to further assembly processing.

Excitation Current **21.0458**
The root-mean-square (RMS) current flowing in a selected winding when the rated voltage and frequency is applied.

Exclusion Area **92.0459**
A predetermined region where inspection is excluded.

Exfoliation **76.0460**
Scaling from of a surface in flakes or layers as a result of corrosion.

Experimental Error **93.0461**
A variation that is due to a measurement error, a chance occurrence, and other factors.

Exposure **52.1724**
The process of generating a pattern within a photosensitive material through a chemical reaction using either laser direct imaging or conventional imaging with a working phototool.

Exposure Time (Component) **30.1914**
The compensation factor which accounts for the time after bake that the component manufacturer requires to process the components prior to bag seal.

External Layer **22.0462**
A conductive pattern on the surface of a printed board.

Extraction, Liquid-Liquid **76.0463**
See "Solvent Extraction".

Extraction Tool **77.0464**
A device used for removing a contact from a connector body or insert, a component from a socket, or a printed board from its enclosure.

Extraneous Copper (Base Materials) **92.2072**
A portion of the copper cladding which could not be etched off. Usually due to a contaminate stuck to the clad laminate which acts as a barrier to etching.

Extraneous Metal **92.0465**
Unwanted metal, usually copper, that remains on a base material after chemical processing.

Eyelet **37.0466**
A short metallic tube, the ends of which can be formed outward in order to fasten it within a hole in material such as a printed board.

F

F (Fisher) Test **94.0468**
A test that attempts to determine if two populations have the same variance.

F Ratio **93.0552**
The ratio of one variance value to another.

FCC System **37.0486**
A complete flat-conductor cabling system that is suitable for installation under carpet squares. (See "Flat Cable".)

Fabrication Allowance **26.1725**
A dimensional value added to a printed board feature or feature location intended to assure that manufacturing variations can maintain certain physical or performance characteristics of the end product.

Face Bonding **74.0469**
See "Face down bonding".

Face Down Bonding **74.1753**
A method of attaching a component or circuit chip to a substrate by inverting the chip and bonding chip contacts to the mirror-image contact points on the substrate.

Face up Bonding **74.1799**
A type of integrated circuit bonding wherein the back of the die is attached to a base material.

Factorial Experiment **94.0470**
An experimental design that evaluates every possible combination of events.

False Alarm **92.0471**
An anomaly identified by an inspection system that is not a critical defect.

False Alarm Rate **92.0472**
The ratio of the number of acceptable items detected to the total number inspected, expressed as a percentage.

Farad **21.1808**
A unit of electrical capacitance.

Far-End Crosstalk **21.0473**
See "Forward Crosstalk".

Fatigue Life **96.0474**
The number of cycles of stress that can be sustained prior to failure for a stated test condition.

Fatigue Limit **96.0475**
The maximum stress below which a material can presumably endure an infinite number of stress cycles.

Fatigue Strength **96.1394**
The maximum strength that can be sustained for a specific number of cycles without failure, with the stress being completely reversed within each cycle unless otherwise stated.

Fatigue-Strength Reduction Factor (Kf) **96.1395**
The ratio of the fatigue strength of a member or specimen with no stress concentration to the fatigue strength with stress concentration.

Fatty Acid **76.0476**
A carboxylic acid derived from, or contained in, an animal or vegetable fat or oil.

Fatty Ester **76.0477**
A fatty acid with the active hydrogen replaced by the alkyl group of a monohydric alcohol.

Fault **90.0478**
Any condition that causes a device or circuit to fail to operate in a proper manner.

Fault Dictionary **90.0479**
A list of elements in which each element consists of a fault signature that can be used to detect a fault.

Fault Isolation **92.0480**
The identification process used to determine the location of a fault to within a small number of replaceable components.

Fault Localization **91.0481**
The identification process used to determine the location of a fault to within a general area of a circuit.

Fault Masking **92.0482**
A condition that occurs when one fault conceals the existence of another.

Fault Modes **92.0483**
The various ways faults may occur.

Fault Resolution **92.0484**
A measure of the capability of a test process to perform failure isolation.

Fault Signature
The characteristic, unique erroneous response produced by a specific fault.

Fault Simulation **92.1396**
A process that allows for the prediction or observation of a system's behavior in the presence of a specific fault without actually having that fault occur.

Feather Length **44.0487**
The distance from the last warp end of a fabric to the end of the pick.

Feature **22.0488**
The general term that is applied to a physical portion of a part, such as a surface, hole or slot.

Feature Window **74.0491**
An opening in the insulation material of a carrier tape that allows for the creation and bonding of separated leads.

Feature-Based Modeling **21.0489**
A computer-based modeling method that is based on the use of part features instead of geometric entities.

Feature-Location Record **25.0490**
A type of record that defines lines, points, and annotations.

Fibre Exposure **91.0492**
The exposure of reinforcing fibres that are within machined, abraded, or chemical-attacked areas of a base material. (See also "Weave Exposure".)

Fiducial (Mark) **22.0493**
A printed board feature (or features) that is (are) created in the same process as the conductive pattern and that provides a common measurable point for component mounting with respect to a land pattern or land patterns.

Field Trimming **77.0494**
The adjusting of the value of a resistor in order to modify a circuit output voltage or current.

Filiform Corrosion **76.0495**
Corrosion that develops under organic coatings on metals in the form of randomly distributed fine hairlines that are usually curved, wavy, or coiled.

Fill **44.0496**
Yarns that are woven in a crosswise direction of a fabric.

Filler **44.0497**
A substance that is added to a material to improve its solidity, bulk, or other properties.

Fillet, Adhesive **75.0498**
The portion of an adhesive that fills the corner, or the angle formed, where two adherends are joined. (See Figure F.1.)

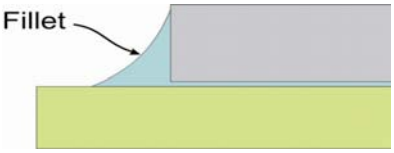


Figure F.1 – Fillet, Adhesive

Fillet, Solder **75.0499**
See "Solder Fillet".

Film **45.0500**
Single or multiple layers of material used to form hybrid circuit elements, interconnections, and crossovers. (See also "Thin Film" and "Thick Film".)

Film Conductor **45.0501**
A conductor formed in place on a base material by depositing a conductive material using screening, plating or evaporating techniques.

Film Network **53.0502**
An electrical network composed of thin-film and/or thick-film components on a base material.

Final Inspection **92.1671**
An evaluation of quality characteristics relating to a standard, specification, or design drawing prior to shipping to the customer.

Final Seal **76.1397**
The manufacturing process that completes the enclosure of a microcircuit so that further internal processing cannot be performed without removing a lid or otherwise disassembling the package.

Fine Leak **95.0504**
A leak in a sealed package that is less than 0.00001 cubic centimeters per second at one atmosphere of differential air pressure.

Fine Pitch QFP **33.1837**
A quad flat pack (QFP) package with the lead pitch at or less than 0,635 mm centres.

Fine-Pitch BGA/Chip Scale Package (CSP) **33.1838**
Ball grid array with less than 1 mm pitch. This is also known as Chip Scale Package (CSP).

Fine-Pitch Technology (FPT) **80.0503**
A surface-mount assembly technology with component terminations on less than 0,635 mm centres.

Fingers **22.0505**
See "Edge-Board Contacts".

Finished Fabric **44.0506**
A fabric that has been treated in order to aid its compatibility with resins.

Finite-Element Analysis (FEA) **21.1398**
A computer-based analysis method that subdivides geometric entities into successively smaller elements and links a series of equations to each element so that they can then be analysed simultaneously.

Finite-Element Modeling (FEM) **21.0507**
The use of a model to represent a problem that can be evaluated by finite-element analysis.

Fire (v.) **56.0508**
To heat a circuit so that its thick-film components are transformed into their final form.

Firing Sensitivity **56.0509**
The percentage change of film component characteristics caused by a change in peak firing temperature, expressed as percent per degree centigrade.

First Article **91.0511**
A part or assembly that has been manufactured prior to the start of a production run for the purpose of ascertaining whether or not the manufacturing processes used to fabricate it are capable of making items that will meet all applicable end-product requirements.

First Bond **74.0512**
The initial termination in a sequence of bonds made to form a conductive path. (See also "Second Bond".)

First Radius **74.0513**
The radius of the front edge of a bonding-tool foot.

First Search **74.0514**
The moment at which the final adjustment is made in the location of the bonding area under the bonding tool prior to making the first bond.

First-Pass Yield **91.0510**
The statistical average of the number of finished units in a group that pass all tests without any rework, expressed in per cent.

Fish Eye **44.0516**
A small area of a fabric that resists resin wetting that can be caused by the resin system, fabric and treating.

Fish Eye (Adhesive) **46.1839**
Relatively small deformations (pock marks) in the adhesive coating.

Fishbone Diagram **91.0515**
See "Cause-and-Effect Diagram".

Fisheye (Prepreg) **44.1840**
A localized area of the reinforcement where the resin coverage is significantly diminished although intact, forming a circular depression, much like a shallow volcano.

Fisheyes (Pressure Sensitive Tape) **46.1841**
In pressure sensitive tape, relatively small deformations or pockmarks within the adhesive coating.

Fissuring **56.0517**
The cracking of a conductor or dielectric material caused by stresses occurring during firing.

Fixed Contact **37.0518**
A type of connector contact that is permanently retained within the connector body or insert.

Fixed-Effect Model **91.1399**
A specific experimental treatment whereby the conclusions reached apply only to the factor levels considered in the analysis and the interferences are restricted to the experimental levels. (See also "Random-Effects Model".)

Fixture, Test **92.0519**
A device that interfaces between test equipment and the unit under test.

Flag **74.0520**
The support area on a die or lead frame.

Flame-Off **74.0521**
The use of a flame to sever a wire and to form a ball for the next ball-bonding termination.

Flame Resistance **40.1842**
The degree to which a given substance will resist being ignited when exposed to a flame.

Flame Retardance **40.1843**
The tendency of the material, when burning, to self-extinguish once the source of ignition is removed.

Flammability **40.1844**
The tendency of the material to ignite and burn when subjected to an ignition source.

Flare **51.1400**
The undesirable enlarged and tapered area around a punched hole that is on the side of the material through which the punch exited during hole formation. (See Figure F.2.)

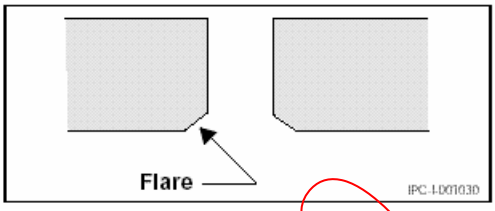


Figure F.2 – Flare

Flash Distillation **76.1401**
Distillation in which an appreciable proportion of liquid is quickly converted to a vapour in such a way that the final vapour is in equilibrium with the final liquid.

Flashover **21.1845**
An electric discharge that takes place around or on the surface of an insulator between conductors with different potentials when a path becomes sufficiently ionized to sustain an electric arc.

Flat Cable **37.0522**
Two or more parallel, round or flat, conductors that are contained in the same plane of a flat insulating base material.

Flat Conductor **40.1800**
A rectangular conductor that is wider than it is high.

Flat Pack **33.0523**
A rectangular component package that has a row of leads extending from each of the longer sides of its body that are parallel to the base of its body.

Flex-Rigid Double-Sided Printed Board **63.1570**
See "Rigid-flex Double-sided Printed Board"

Flex-Rigid Printed Board **63.0524**
See "Rigid-Flex Printed Board".

Flex-Rigid Printed Wiring Board
See "Rigid-Flex Printed Board". **63.1847**

Flexible Double-Sided Printed Board **62.1581**
Double-sided printed board, either printed circuit or printed wiring, using a flexible base material only.

Flexible Material Interconnect construction (FMIC) **70.1846**
The integration of passive and active components with mechanical components (including switches and connectors) on a flexible or thin base material, i.e. flexible printed board, in order to produce an electronic assembly.

Flexible Multilayer Printed Board **62.1582**
Multilayer printed board, either printed circuit or printed wiring, using flexible base materials only. Different areas of the flexible multilayer printed board may have different number of layers and thicknesses.

Flexible Printed Board **62.1579**
A printed board using a flexible base material only. May be partially provided with electrically non-functional stiffeners and/or coverlayer.

Flexible Printed Circuit **62.0525**
A patterned arrangement of printed circuitry and components that utilizes flexible base material with or without flexible coverlayer.

Flexible Printed Wiring **62.0526**
A patterned arrangement of printed wiring that utilizes flexible base material with or without flexible coverlayer.

Flexible Single-Sided Printed Board **62.1580**
Single-sided printed board, either printed circuit or printed wiring, using flexible base materials only.

Flexural Failure **91.0527**
A failure that is caused by the repeated flexing of a material.

Flexural Strength **44.0528**
The tensile strength of the outermost fibre of a material that is being bent.

Flip Chip **74.0530**
A leadless monolithic, circuit element structure that electrically and mechanically interconnects to a base material through the use of conductive bumps.

Flip-Chip Mounting **74.0529**
The mounting and interconnecting of a flip chip component to a base material.

Float **44.0531**
A warp or fill yarn that does not interlace with the next designated yarn, but passes over or under two or more adjacent yarns.

Floating Bushing **37.0533**
A connector mounting device that allows for connector body movement in order to facilitate its alignment with a mating part or mating assembly.

Floating-Annulus Tape-Automated Bonding **74.0532**
A carrier tape format that uses a free-floating annulus ring to separate suspended leads.

Flocculant **76.0534**
A substance that induces flocculation.

Flocculation **76.0535**
The combination or aggregation of suspended solid particles in such a way that they form small clumps or tufts that resemble wool.

Floor Life **30.1848**
The allowable time period for a moisture-sensitive device to be exposed to normal room environment after removal from a moisture barrier bag and before a solder reflow process.

Flow Soldering **75.0536**
A wave, drag or dip soldering process where the product is brought into contact with molten solder in order to attach electronic components to the interconnecting surface.

Flow Soldering (Nitrogen Process) **75.1934**
A flow soldering process, carried out in a nitrogen atmosphere, intended to retard oxidation of solder and board conductive surfaces and improve solder wetting.

Flush Conductor **22.0537**
A conductor whose outer surface is in the same plane as is the surface of the insulating material adjacent to the conductor.

Flux **75.0538**
A chemically- and physically active compound that, when heated, promotes the wetting of a base metal surface by molten solder by removing minor surface oxidation and other surface films and by protecting the surfaces from reoxidation during a soldering operation.

Flux Activation Temperature **75.0540**
The temperature at which flux becomes active enough to remove oxides from the metals being joined.

Flux Activity **75.0541**
The degree or efficiency with which a flux promotes wetting of a surface with molten solder. (See also "Solder-Spread Test," "Wetting Balance".)

Flux Characterization **76.0542**
A series of tests that determines the basic corrosive and conductive properties of fluxes and flux residues.

Flux Residue **76.0543**
A flux-related contaminant that is present on or near the surface of a solder connection.

Flux-Cored Solder **46.0539**
A wire or ribbon of solder that contains one or more continuous flux-filled cavities along its length.

Flux-Spatter Test **76.1402**
A semiquantitive test that characterizes the ability of flux and flux residues, upon rapid heating of the flux, to remain in one area rather than form a dispersion of fine droplets.

Fluxing **75.1745**
The efficiency with which a flux promotes wetting of a surface with molten solder.

Foil Burr **51.0544**
A rough edge or area that remains on the surface of a foil after it has been cut, pierced, or drilled.

Foil Lamination **55.0545**
A process for making multilayer printed boards with surface layer(s) of metal foil bonded in a single operation. (See also "Cap Lamination".)

Foil Profile **45.0546**
The roughness of a foil surface that results from the manufacture of the foil and/or from a bond-enhancement treatment.

Foot Length **74.0547**
The longer dimension of the bonding surface of a wedge-type bonding tool.

Footprint **22.0548**
See "Land Pattern".

Forced Gas Convection Soldering **75.1746**
Reflow soldering using forced hot air or nitrogen gas as the primary source of heat.

Forced-Field Analysis **93.1403**
A technique that is used to help solve a problem by identifying those forces that are preventing improvement (restraints) and those forces that affect improvement (drives).

Foreign Material **90.1854**
See "Inclusion"

Foreign Material (Soldering) **75.1404**
A lumpy, irregular coating that has covered, or partially covered, particles of material that are located on, but are different than, the material or coating of the items to be soldered.

Fork Contact **37.1405**
A type of female connector contact that consists of flat spring metal that has been formed into a two tine "fork-like" shape so that it mates with a spade contact.

Form **22.0549**
The shape of a feature.

Forward Crosstalk **21.1406**
Noise induced into a quiet line, as seen at the end of the quiet line that is the farthest from the signal source, because the quiet line has been placed next to an active line. (See also "Backward Crosstalk".)

Fractional-Factorial Experiment **91.0550**
An experiment whereby only a portion of the complete factorial is run.

Frame Pitch **74.0551**
The distance from the centreline of one tape-automated bonding frame to the centreline on the next frame site on a reel of carrier tape.

Frequency, Electrical Current **21.1856**
The number of cycles (hertz) or completed alterations per s.

Frit (Semiconductor) **35.1857**
A glass composition with a relatively low softening point.

From-To List **21.0553**
Written instructions in the form of a list that indicates the locations of wiring terminations.

Fully Additive Process **53.1407**
An additive process wherein the entire thickness of electrically- isolated conductors is obtained by the use of electroless deposition. (See also "Semi-Additive Process".)

Fully-Electroless Process **53.0554**
See "Fully-Additive Process".

Functional Tester **92.0556**
Equipment that analyses the unit under test as a complete functional entity by applying inputs and sensing outputs.

Functionality, Resin or Curing Agent **41.0555**

The number of reactive groups per molecule.

Fused Coating **56.0557**
A metallic coating, usually a tin or solder alloy, that has been melted and solidified to form a metallurgical bond to a basis metal.

Fusing **56.1676**
Melting of a metallic coating (usually electro-deposited tin or tin-lead) on a conductive pattern, followed by solidification .

Fusing Fluid **56.0467**
The heat-transfer medium used to attain a fused coating.

Fusing Flux **56.1408**
An activated organic fluid that is used in the fusing of a tin-lead plating on a basis metal. (The application of these predominantly water- soluble fluids is usually followed by the use of a fusing oil.)

Fusing Oil **56.1409**
An thermally-stable, nonactivated, fluid that is used in the fusing of tin lead plating on a basis metal. (The application of these predominantly water-soluble fluids is usually preceded by the use of a fusing flux.)

G

Galvanic Corrosion **76.1410**
Corrosion associated with the current of a galvanic cell consisting of two dissimilar conductors in an electrolyte or two similar conductors in dissimilar electrolytes.

Galvanic Deposition **53.0560**
See "Electrodeposition".

Galvanic Displacement **53.0561**
See "Immersion Plating".

Gang Bonding **74.0562**
The making of several terminations simultaneously. (See also "Single- Point Bonding".)

Gas Blanket **75.0564**
A flowing inert gas atmosphere used to keep metallization from oxidizing.

Gas-Tight Area **97.0563**
The common area between mated-metal surfaces from which gas vapours and impurities are excluded.

Gauge Precision **22.0559**
The absolute precision achieved in measuring feature size or feature location.

Gaussian Distribution **94.1807**
See "Normal Distribution"

Gel Time **55.0566**
The time in seconds required for prepreg to change its physical state from that of a solid material to a liquid, and then back to a solid material.

Gelation Particle **44.0565**
Microparticles of precured, usually translucent, resin in a laminate system.

Generative Process Planning **91.0567**
A computer-based method whereby new process plans are created that are based on part or product information and manufacturing capabilities.

Generic Specification (GS) **26.1782**
A document that describes as many general requirements as possible, pertaining to a set, family or group of products, materials, or service.

Geometric Tolerance **22.0568**
A tolerance that is used to control form, profile, orientation, location and runout.

Gerber Data **25.1411**
A type of data that consists of aperture selection and operation commands and dimensions in X- and Y-coordinates. (The data is generally used to direct a photoplotter in generating photoplotted artwork.)

Glass Binder **44.0569**
Glass powder added to a thick-film resistive or conductive ink in order to bind together the metallic particles after firing.

Glass Cloth **44.1858**
A pliable material made by weaving glass fibre bundles into a fabric layer.

Glass Fabric **44.1859**
Fabric woven with glass yarns.

Glass Distortion (Base Materials) **44.1860**
A localized variance in the linearity of the yarns of the reinforcement.

Glass Transition Temperature **55.1412**
The temperature at which an amorphous polymer, or the amorphous regions in a partially-crystalline polymer, changes from being in a hard and

relatively-brittle condition to being in a viscious or rubbery condition.

Glass Yarn **44.1861**
A generic term for a continuous strand (collection) of twisted glass filaments (fibres) in a form suitable for weaving.

Globule Method **97.1862**
A test method that evaluates the solderability of a surface using a small ball of solder.

Go/No-Go Test **92.0570**
A testing process that yields only a pass or a fail condition.

Golden Assembly **92.0571**
See "Know Good Assembly".

Golden Board **92.0572**
See "Known Good Board".

Gouge **92.0573**
A form of wear that consists of a wide groove deformation, accompanied by material removal, that penetrates a considerable distance below a surface.

Graded Wedge **54.0574**
See "Etching Indicator".

Grading Frame **44.0575**
Equipment used to continuously inspect fabric by the use of backlighting.

Green Strength **56.0577**
The strength of substance, joint, or assembly before it has been cured (set).

Greige **44.0578**
Fabric in a loom state that has no finish.

Grey-Scale Processing **92.0576**
The utilizing of more than one level of signal strength, intensity or amplitude to perform an inspection operation.

Grid **22.1812**
An orthogonal network of two sets of parallel equidistant lines that is used for locating points on a printed board.

Gross Leak **95.0580**
A leak in a sealed package that is greater than 0.00001 cubic centimeters per second at one atmosphere of differential air pressure.

Ground **20.0581**
A common reference point for electrical circuit returns, shielding, or heat sinking.

Ground Plane **20.1413**
A conductor layer, or portion thereof, that serves as a common reference for electrical circuit returns, shielding, or heat sinking. (See also "Signal Plane" and "Voltage Plane".)

Ground Plane Clearance **22.1414**
Removed portions of a ground plane that isolate it from a hole in the base material to which the plane is attached. (See Figure G.1. See also "Signal Plane" and "Voltage Plane".)

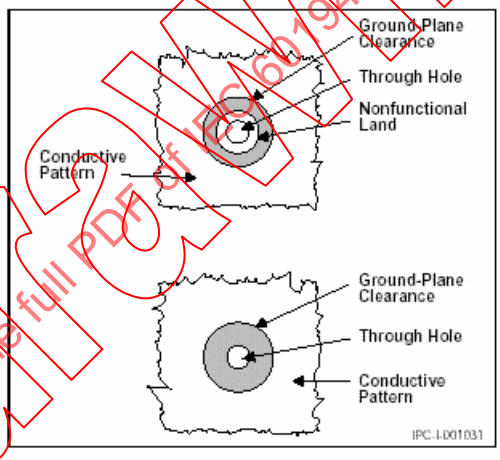


Figure G.1 – Ground plane clearance

Guarding **92.0582**
The in-circuit testing process of ensuring that a shunt path does not interfere with the testing of a device.

Guide Pin **37.0583**
A connector interfacing device that allows for connector body movement in order to facilitate contact alignment prior to contact engagement.

Gull Wing Leads **36.1747**
An SMT lead form. Leads extending horizontally from the component body centreline, bent downward immediately past the body and then bent outward just below the bottom of the body, thus forming the shape of a gull's wing.

H

Halide Content **76.0584**
The ratio of the mass of free halides to the mass of solids in a flux, expressed in mass percent of free chloride ion.

Haloing **51.1415**
Mechanically-induced fracturing or delamination, on or below the surface of a base material, that is usually exhibited by a light area around holes or other machined features.

Hand Soldering **75.0585**
Soldering using a soldering iron or other hand-held, operator- controllable apparatus.

Hard Wiring **75.0587**
Electrical wiring that is inseparable from an assembly without the use of special tools and processes.

Hardeners **56.0586**
See "Curing Agent".

Header (Connector) **37.0589**
A pin field that is positioned in a 3- or 4-sided plastic housing that mounts directly onto a printed board.

Header (Module) **36.0590**
The base of an electronic component package that contains leads.

Heat Absorption Coefficient **21.1863**
The degree to which various materials absorb heat or radiant energy when compared to each other.

Heat Cleaning **44.0591**
A process in which organic yarn binder (size) is removed from a fabric. (See also "Sizing".)

Heat Column **75.0592**
The heating element in a eutectic die bonder or wire bonder that is used to bring the base material up to its bonding temperature.

Heat of Fusion **56.0593**
The quantity of heat required to convert a unit weight of solid material to its liquid state.

Heat Resistance **21.1864**
The degree to which a material resists changes in its physical properties when subjected to changes in temperature.

Heatsink **30.0594**
A mechanical device that is made of a high thermal-conductivity and low specific-heat material that dissipates heat generated by a component or assembly.

Heatsink Plane **22.0595**
A continuous sheet of metal on or in a printed board that functions to dissipate heat away from heat generating components.

Heatsink Tool **75.1416**
A heatsink that is temporarily attached to a heat-sensitive component in order to minimize the transfer of heat from the component lead to the component body during a soldering operation.

Heavy Mark (Fabric) **44.0596**
A filling defect that extends across the width of a fabric containing in excess of two picks per inch from nominal.

Heel, Bonding **74.0598**
The part of a lead adjacent to a termination that has been deformed by the edge of the bonding tool.

Heel Break **97.0599**
The rupture of a lead at the heel of a bond.

Heel Crack **97.0600**
A crack across the width of a lead at the heel of a bond.

Heel (Drill) **51.0597**
The trailing edge of a drill land.

Heel Fillet **73.1866**
The solder fillet formed in the land area behind the lead. (See Figure H-.).

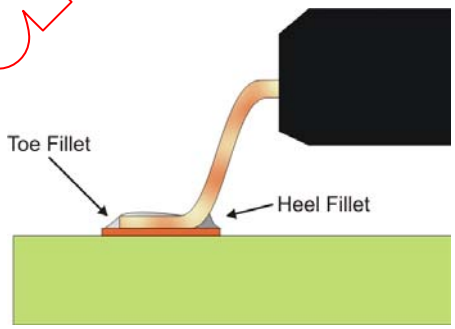


Figure H.1 – Heel fillet

Helix Angle **51.0601**
The angle of the spiral generated by the flute of a drill with respect to the axis of the drill.

Hermaphroditic Contact **37.0602**
A type of connector contact that mates with a contact that is identical to itself.

Hermetic (Sealed) **30.1867**
The condition of sealing a component from incoming gases to a specific of inward diffusion normally less than 1 x 10^{-6} cm^3/s (cubic cm per second).

Heterocyclic **76.0603**
A cyclic or ring structure, often in the shape of a pentagon, in which one or more of the atoms in the ring is an element other than carbon.

Hierarchical Database **11.0604**
A database that is arranged in a tree-like structure of logic.

High Density Plastic Quad Flat Pack **33.1868**
A QFP with greater than 196 leads at a pitch of 0,4 mm.

High-Impedance State **21.0605**
See "Tri-State".

High-Voltage Wire **37.0606**
Insulated wire, with an insulation thickness that is determined by corona-related factors, that is used for voltages over 240 V a.c. RMS or over 340 V d.c.

Hipot Test **92.0607**
A method in which the unit under test is subjected to a high alternating current (a.c.) voltage.

Histogram **91.0608**
A graph that depicts values that were obtained by dividing the range of a data set into equal intervals and that plots the number of data points in each interval. (See Figure H.2.)

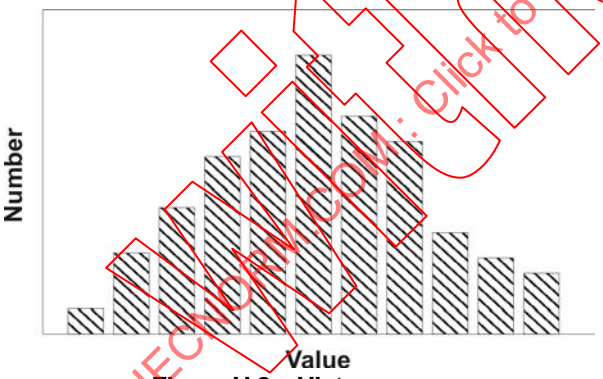


Figure H.2 – Histogram

Hole, Knee **53.1711**
The intersection of the wall of a hole at the outermost surface of the PWB. (See Figure H.3.)

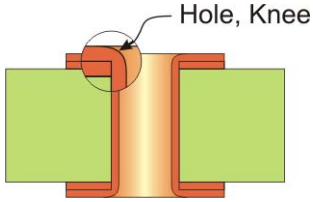


Figure H.3 – Hole, knee

Hole Base Positioning **51.1870**
The positioning of a printed board/panel or board assembly/array using tooling holes on the board to facilitate further manufacturing.

Hole Breakout **60.1699**
A condition in which a hole is not completely surrounded by the land. (See Figure H.4.)

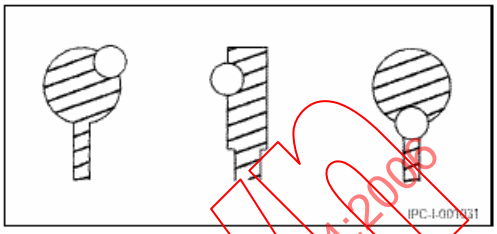


Figure H.4 – Hole breakout

Hole Density **22.0610**
The quantity of holes in a unit area of printed board.

Hole Edge Roughness **51.1709**
Unevenness of the edge of a hole formed by drilling or punching.

Hole Filling Process **52.1979**
A process of adding a conductive or non-conductive fill material to a plated through-hole, followed by adding an etch resist that covers the hole and its land. The process also includes etching away of the unwanted copper and subsequent stripping of the etch resist.

Hole Plugging Process **52.1980**
A process of plugging a plated through-hole with liquid solder mask material after the circuit configuration has been completed in order to prevent chemistry from entering the hole during the assembly process.

Hole Location **22.0611**
The dimensional position of the centre of a hole.

Hole Pattern **22.1621**
The arrangement of all the holes in a printed board or production board.

Hole Pull Strength **53.0613**
The load or pull force along the axis of a plated-through hole that will rupture the hole.

Hole Roughness **52.1710**
The coarseness of a hole (at the knee of the hole) or the on the wall (barrel) of the hole caused by drilling or punching.

Hole Void **53.0614**
A void in the metallic deposit of a plated-through hole that exposes the base material. (See Figure H.5.)

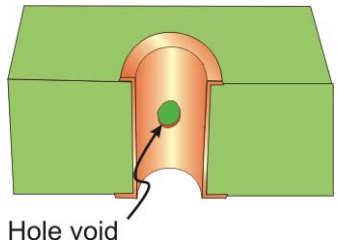


Figure H.5 – Hole void

Homocyclic **76.0615**
A ring compound containing only one kind of atom in its ring structure.

Homologous Series **76.0616**
A series of organic compounds in which each successive member has one more CH2 group in its molecule than the preceding member.

Homopolymer **76.0617**
A polymer derived from a single monomer with the aid of initiators that act in the manner of catalysts.

Hook **51.0618**
The rake condition in the flute face of a drill. (See Figure H.6.)

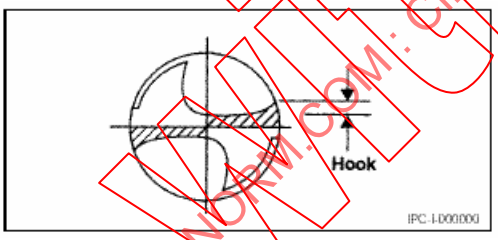


Figure H.6 – Hook

Hook Solder Terminal **37.0619**
A solder terminal with a curved feature around which one or more wires are wrapped prior to soldering. (See Figure H.7.)

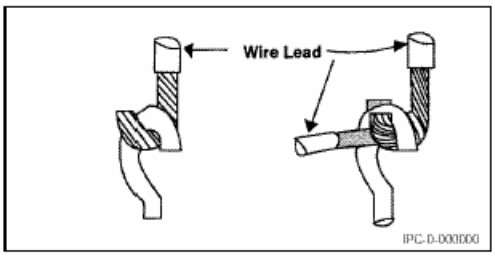


Figure H.7 – Hook Solder Terminal

Horn **74.0620**
A cone-shaped object that transmits ultrasonic energy from a transducer to a bonding tool.

Hot Air (Solder) Leveling **53.1871**
A physical deposition process using a solder bath into which the printed board is dipped into a molten solder bath and withdrawn across a set of hot air knives (forced hot air flow) used to remove excess solder.

Hot Air Reflow Soldering **75.1872**
A method of reflow soldering where heated air is circulated in a reflow chamber.

Hot Bar **75.1873**
A bonding tool for soldering leads of TAB of QFP to substrate using local heat and pressure.

Hot Plate Reflow Soldering **75.1748**
Reflow soldering using direct contact or close proximity to a hot plate as the primary source of heat.

Humidity Aging **92.1874**
The exposure to a humid environment as a preconditioning before a test for component reliability.

Humidity Indicator Card (HIC) **92.1875**
A card on which a moisture sensitive chemical is printed such that it will change colour from blue to pink when the indicated relative humidity is exceeded.

Hybrid Circuit **83.1417**
A circuit comprising insulating base material with various combinations of interconnected film conductors, film components, semiconductor dice, passive components and bonding wire.

Hybrid Integrated Circuit **83.1418**
A circuit comprising insulating base material with various combinations of interconnected film conductors, film components, semiconductor dice, passive components and bonding wire that perform the same function as a monolithic semiconductor integrated circuit.

Hybrid Microcircuit **83.1419**
A circuit comprising insulating base material with various combinations of interconnected film conductors, film components, semiconductor dice, passive components and bonding wire.

Hydrocarbon Tolerance **76.0621**
See "Dilution Ratio".

Hydrolytic Stability **76.0622**
The degree of resistance of a polymer to permanent property changes from hydrolytical effects.

Hydrophilic Matter **76.0623**
See "Polar Matter".

Hydrophilic Solvent **76.0624**
See "Polar Solvent".

Hydrophobic Matter **76.0625**
See "Nonpolar Matter".

Hydrophobic Solvent **76.0626**
See "Nonpolar Solvent".

Hydrotrope **76.0627**
A chemical that can increase the aqueous solubility of slightly-soluble organic chemicals.

Hydrotrophe **76.0628**
See "Hydrotrope".

Hypersorption **76.0629**
The process by which activated carbon selectively adsorbs less-volatile components from a gaseous mixture while the more-volatile components are unaffected.

Hypotheses Test **91.0630**
An objective method to determine and quantify, within known levels of risk, whether or not a hypothesis is either accepted or rejected.

I

Icicle **75.0631**
See "Solder Projection".

Identical Processing **91.0632**
Fabrication that is conducted under conditions that have demonstrated the capability to produce measurable attributes within a narrow band of variability.

Illuminance **24.0633**
Luminous flux striking a surface.

Illumination **24.0634**
See "Illuminance".

Image Blur **52.1575**
The state that a part of an image of the original film is not reproduced on the resist or in the pattern transfer.

Immersion Attitude **75.1749**
The positioning of an object when immersed in a solder bath.

Immersion Conditions **95.1750**
Test conditions resulting when a surface mounting device package leads are immersed into a solder bath to check resistance to soldering temperatures.

Immersion Plating **53.0635**
The chemical deposition of a thin metallic coating over certain basis metals that is achieved by a partial displacement of the basis metal.

Impedance **21.1801**
The resistance to the flow of current, represented by an electrical network of combined resistance, capacitance and inductance, in a conductor as seen by an AC source of varying time voltage. The unit of measure is ohms (Ω).

Impulse Current Soldering **75.1876**
See "Parallel-Gap Soldering".

In-Circuit Testing **92.0636**
The application of test signals directly to a device's input terminals and sensing the results directly from the device's output terminals.

In-Process Inspection **91.1879**
An evaluation of quality characteristics relating to a standard, specification, or design drawing during the manufacturing cycle and prior to completion of all manufacturing processes.

Inclusions **90.0637**
Foreign particles, metallic or nonmetallic, that may be entrapped in an insulating material, conductive layer, plating, base material, or solder connection.

Indentation **45.0638**
See "Dent".

Independent of Size **22.0639**
The concept that requires the tolerance of form or position to vary independent of, and without regard to, feature size.

Index Edge **22.0640**
See "Locating Edge".

Index Edge Marker **22.0641**
See "Locating Edge Marker".

Indexing Hole **22.0642**
See "Tooling Hole".

Indexing Notch **22.0643**
See "Locating Notch".

Indexing Slot **22.0644**
See "Locating Slot".

Individual Test Pattern (ITP) **24.1791**
A single test pattern designed and intended to serve a specific evaluation technique for determining a particular aspect(s) of a manufacturer or manufacturing process capability.

Individual Test Specimen (ITS) **92.1790**
A single test specimen that contains an individual test pattern (ITP) and is used to determine a particular aspect(s) of a manufacturer or manufacturing process capability.

Inductance **21.1802**
The property of a conductor that allows it to store energy in a magnetic field induced by a current flowing through it. The unit of measure is henry (H).

Infrared Reflow (IR) **75.1751**
Remelting of solder using infrared heating as the primary source of energy.

Infrared Soldering **75.1877**
A reflow soldering using infrared energy as the source of heat. (See infrared reflow).

Initiating **53.0645**
See "Activating".

Inner Layer **22.1878**
See "Internal Layer".

Inner-Lead Bond (ILB) **74.0646**
The connection between a conductor on a bonding tape and a bare die. (See also "Outer-Lead Bond".)

Innerlayer Connection **22.1427**
A conductor that connects conductive patterns on internal layers of a multilayer printed board, e.g. a plated-through hole. (See also "Interfacial Connection".)

Inorganic Flux **75.0647**
An aqueous flux solution of inorganic acids and halides. (See also "Acid Flux".)

Input Vector **92.0648**
A set of logic values to be applied to the complete set of input test points at any one point in time.

Insert (Connector) **37.1420**
The element that holds connector contacts in their proper arrangement and electrically insulates the contacts from one another and from the connector shell.

Insertion Loss **21.1880**
The ratio of transmitted electromagnetic power to incident power, usually expressed in decibel (dB) units. This loss of power includes losses by conversion to heat in the dielectric and in the conductors.

Inspection Facility **92.1421**
The combination of equipment, personnel, and procedure resources that perform inspection measurements and evaluations for the purpose of ascertaining the conformance of a product to applicable specifications.

Inspection Lot **92.1422**
A collection of units of product that are identified and treated as a unique entity from which a sample is drawn and inspected in order to determine conformance with acceptability criteria.

Inspection Overlay **91.0649**
A positive or negative transparency that is made from the production master and that is used as an inspection aid.

Inspection Personnel **92.0650**
Those individuals that inspect products for the purpose of ascertaining the conformance of a product to applicable specifications.

Inspection Rate **92.0651**
The number of features per unit of time that can be evaluated at specified false-alarm and escape-rate settings.

Instrument Bus **21.1423**
Four common lines or channels to which any analog test instrument can be connected via a multiplexer and any unit under test circuit mode that can be connected via a scanner.

Insufficient Solder Connection **97.1424**
A solder connection that is characterized by the incomplete coverage of one or more of the surfaces of the connected metals and/or by the presence of incomplete solder fillets.

Insulation **40.1813**
A material with a high resistance to the flow of electrical current. (See also "Dielectric".)

Insulation Resistance **21.1425**
The electrical resistance of an insulating material that is determined under specific conditions between any pair of contacts, conductors, or grounding devices in various combinations.

Integrated Circuit **30.1426**
A combination of inseparable associated circuit elements that are formed in place and inter-connected on or within a single base material to perform a particular electrical function.

Inter-Test Time (ITT) **92.0652**
The duration between two successive driver strobes.

Interconnection Density **22.1822**
The average number of conductors, based on conductor width and clearance, that may be routed in a prescribed unit area, e.g. cm^2, considering that there is no restriction within the area to the routing condition and that the conductor length is equal to the unit length of the prescribed area.

Interface Resistance **37.0653**
See "Contact Resistance".

Interfacial Connection **22.0654**
A conductor that connects conductive patterns on both sides of a printed board, e.g. a plated-through hole. (See also "Interlayer Connection".)

Intergranular Corrosion **76.0655**
Corrosion that occurs preferentially at grain boundaries.

Interlaminar Metallization **53.0656**
Metal through-migration that is the result of metal deposition or migration along delaminated areas of the interior of a laminate.

Interlayer Connection **22.1614**
An electrical connection between two or more layers of conductive patterns on or in a printed board.

Intermetallic Compound, Solder **75.1428**
An intermediate layer in a wetted solder connection between the wetted surface and the solder, consisting of the solution of at least one constituent of the wetted surface and at least one constituent of the solder.

Intermittent Fault **97.0657**
A fault whose effect on a circuit appears and disappears at irregular intervals.

Internal Capability Assessment **91.1881**
Periodic supplier verification of data captured through process control and analysed for variation that exceeds the performance limits desired by the manufacturing processes.

Internal Layer **22.0658**
A conductive pattern that is contained entirely within a multilayer printed board.

Interstitial Via **22.0659**
See "Blind Via" and "Buried Via".

Intrusive Soldering **75.1882**
A process in which the solder paste for the through-hole components is applied using a stencil or syringe to accommodate through-hole components that are inserted and reflow-soldered together with the surface-mount components.

Intumescence **56.0660**
The foaming or swelling of a material when it is exposed to high surface temperatures or flames.

Ion Exchange **76.0661**
A reversible chemical reaction between a solid and a fluid by means of which ions are interchanged from one substance to another.

Ionic Cleanliness **76.0663**
The degree of surface cleanliness with respect to the number of ions or weight of ionic matter per unit square of surface.

Ionizable (Ionic) Contamination **76.1222**
A polar (ionic) compound, usually a processing residue, that dissolves in water as free ions. (This includes flux activators, finger prints, etching or plating salts, etc., that decrease the resistivity of water when they are dissolved in it.).

Isotropy **40.1885**
The condition for a substance having a value for a property that is the same in all directions.

J

J-Leads **36.1752**
The preferred surface mount lead form used on PLCCs, so named because the lead departs the package body near its Z axis centreline, is formed down then rolled under the package. Leads so formed are shaped like the letter "J".

Jet Wave Soldering **75.1886**
A type of wave soldering that uses a pump to force solder up through a narrow slit to form a solder jet.

Job Set **25.0664**
A group of one or more data-information modules.

Jumper Wire **37.0665**
A discrete electrical connection that is part of the original design and is used to bridge portions of the basic conductive pattern formed on a printed board.

Junction Temperature **35.0666**
The temperature of the region of a transition between the p-type and n-type semiconductor material in a transistor or diode element.

Just-in-Time (JIT) **17.1429**
Production control techniques that minimize inventory by delivering parts and material to a manufacturing facility just before they are incorporated into a product.

K

Kerf **77.0667**
A laser-beam or abrasive-jet cut (slit) in a film component as a part of the trimming operation.

Key **37.0668**
A device that assures that the coupling of two components can occur in only one position.

Keying (n.) **37.1430**
A device that is used in addition to, or in lieu of, a polarization feature to assure that the coupling of identical mating components can occur in only one position.

Keying **37.1431**
The use of a device in addition to, or in lieu of, a polarizing feature to assure that the coupling of identical mating components can occur in only one direction.

Keying Slot **22.1432**
A slot in a printed board that permits the printed board assembly to be plugged into its mating connector and prevents the board from being plugged into any other connector. (See also "Polarizing Slot".)

Keyway **37.0669**
A general term that encompasses both keying slots and polarizing slots.

Knot (Base Materials) **44.1887**
A clump of reinforcement material formed either by the yarn within the web of the fabric or which was deposited onto the web during the treating process.

Known Good Board (KGB) **92.0671**
A correctly fabricated printed board that serves as a standard unit by which others can be compared.

Known Good Assembly (KGA) **92.0670**
A correctly operating printed board assembly that serves as a standard unit by which others can be compared.

Known Good Die (KGD) **35.0846**
A die-form semiconductor product that provides assurance of equivalent quality and reliability as its conventionally packaged counterparts.

Kovar **45.1888**
An alloy of 53 % iron, 17 % cobalt, 29 % nickel and trace elements, with a thermal expansion approximately matching that of alumina ceramics and sealing glasses.

L

L Cut **77.1433**
A trim notch in a film component that is created by a cut that starts perpendicular to the component's major axis and then turns ninety degrees to complete the trimming operation.

Laminate (n.) **55.0672**
A product made by bonding together two or more layers of material.

Laminate Thickness **41.0673**
The thickness of single- or double-sided metal-clad base material prior to any subsequent processing. (See also "Board Thickness".)

Laminate Void **91.0674**
The absence of resin or adhesive in an area that normally contains them.

Lamination (Dry Film) **52.1889**
The process of adhering a dry film photo resist or solder mask to a substrate utilizing heat and pressure.

Lamination (Multilayer) **55.1890**
The process of bonding one or more innerlayers together with an adhesive layer or layers (such as pre-preg) utilizing a combination of heat and pressure.

Land **22.1622**
A portion of a conductive pattern usually used for the connection and/or attachment of components.

Land (Drill) **51.0676**
The peripheral portion of the drill body that is between adjacent drill flutes.

Land Grid Array (LGA) **33.1891**
A square package with termination lands located in a grid pattern on the bottom of the package.

Land Pattern **22.0678**
A combination of lands that is used for the mounting, interconnection and testing of a particular component.

Land Tearing **96.1892**
The tearing of a land from a base material during a test of land adhesion robustness.

Land Width Angle (Drill) **51.1223**
The angle between the leading edge and the heel of a drill land as measured at the drill axis.

Land Width (Drill) **51.0679**
The perpendicular distance from the leading edge to the heel of a drill land.

Landless Hole **22.0677**
A plated-through hole without land(s).

Landless Via **22.1893**
A via in which the land diameter is designed to be less than or equal to the via diameter.

Lap Shear Strength **74.0680**
The shearing pressure at which an adhesive-bonded (and cured) lap joint fails. (See also "Shear Strength" and "Torsional Strength".)

Large-Scale Integration (LSI) **30.0681**
An integrated circuit with over 100 gates.

Larger-the-Better Characteristic **91.1434**
A parameter of quality that improves performance as its value increases. (See also "Nominal-Is-Best Characteristic" and "Smaller-the-Better Characteristic".)

Laser Bonding **53.1894**
A process effecting a metal-to-metal bond of two conductors by welding them together with a laser beam as a heat source.

Laser Direct Imaging (LDI) Method **52.1895**
The selective exposure of patterns onto a photosensitive material (such as dry film or liquid) without using a working phototool (artwork master).

Laser Scanner (Bar Code) **70.1896**
A bar code scanner that uses laser technology to read bar codes; has the ability to read from distances and on curved surfaces.

Laser Soldering **75.1897**
Method to reflow solder by optically concentrating and applying a laser beam to the part to be soldered or its individual leads.

Laser Trimming **77.0682**
The modification of a film component's value by the removal of film by applying heat from a focused laser source.

Laser Via **22.1898**
See "Microvia (Build-Up Via)".

Latch (Connector) **37.0683**
A device at both ends of a connector header that is used to hold in place and eject a mating receptacle connector.

Layback **51.0684**
The negative rake angle or rolled condition in the face of a drill flute. (See Figure L.1. See also "Hook" and "Overlap, Drill".)

Lay-up **55.1900**
The process of combining one or more innerlayers, and pre-preg or adhesive layer(s) into a lamination package. The package may consist of innerlayers, outerlayers and copper foil.

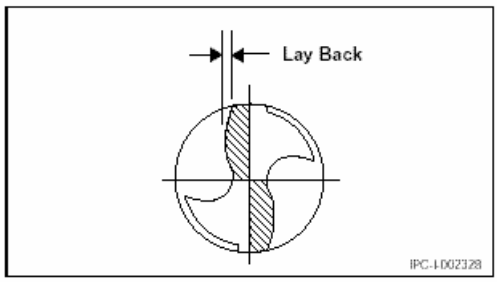


Figure L.1 – Layback

Layer **22.1624**
Stratum of a Printed Board. Layers are differentiated according to their function (conductor layer, insulating layer) and their location.

Layer-to Layer-Registration **55.1899**
The process of aligning circuit features (lands) on individual layers of a printed board through the use of tooling image location features (fiducials) or tooling holes.

Layer-to-Layer Spacing **22.0686**
The thickness of dielectric material between adjacent layers of conductive patterns in a printed board. (See Figure L.2.)

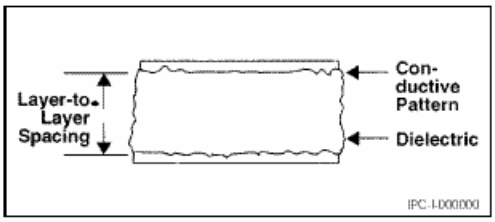


Figure L.2 – Layer-to-layer spacing

Leaching, Metallization **75.0687**
The loss or removal of a basis metal or coating during a soldering operation.

Lead **36.0688**
A length of insulated or uninsulated metallic conductor that is used for electrical interconnections.

Lead Extension **75.0691**
That part of a lead or wire that extends beyond a solder connection.

Lead Fingers **36.1901**
The interior ends of the lead frame leads to which the bond wires are connected to complete the circuit from the integrated circuit die bond lands.

Lead Frame **36.1902**
The metallic portion of the device package on which the integrated circuit die is mounted and connected from the die or dice bonding sites to the structure that becomes the outer leads of the package.

Lead-Free Plating **45.1903**
A metallic plating with an alloy containing no more than 0,1% of lead.

Lead-Free Solder **75.1904**
An alloy that does not contain more than 0,1 % lead (Pb) by weight as its constituent and is used for joining components to substrates or for coating surfaces.

Lead Mounting Hole **22.0695**
See "Component Hole".

Lead Pin **36.0696**
See "Component Pin".

Lead Projection **73.0697**
The distance that a component lead protrudes through the side of a printed board that is opposite from the one upon which the component is mounted.

Lead Wire **36.0698**
See "Component Lead".

Leaded Chip Carrier **31.1224**
A chip carrier whose external connections consist of leads that are around and down the side of the package. (See also "Leadless Chip Carrier".)

Leaded Surface-Mount Component **33.1435**
A surface-mount component for which external connections consist of leads that are around and down the side of the package. (See Figure L.3. See also "Leadless Surface-Mount Component".)

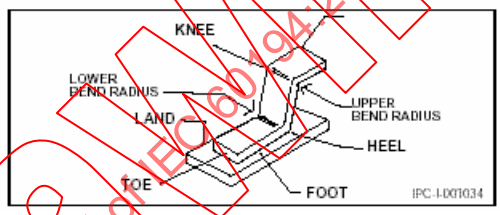


Figure L.3 – Leaded surface-mount component gull-wing shaped lead

Leadless Chip Carrier
A chip carrier whose external connections consist of metallized terminations that are an integral part of the component body. (See also "Leaded Chip Carrier".)

Leadless Component **30.1754**
See "Leadless Surface Mount Component".

Leadless Device **33.0694**
See Die and Leadless Surface Mount Component .

Leadless Inverted Device **33.1437**
A shaped metallized-ceramic form used as an intermediate carrier for diode or transistor die that has been especially adapted for leadless surface mounting.

Leadless Surface-Mount Component **33.1438**
A surface-mount component whose external connections consist of metallized terminations that are integral part of the component body. (See also "Leaded Surface-Mount Component".)

Leakage Current **21.0699**
The undesired flow of electrical current over or through an insulator.

Learn Time **92.0700**
The time it takes to do initial programming (teaching) to store feature coordinate locations and other data in an inspection/test machines memory.

Least Material Condition (LMC) **22.0701**
The condition in which a feature of size contains the least amount of material within the stated limits of size.

Legend **22.1439**
A format of letters, numbers, symbols and patterns that are used primarily to identify component locations and orientations for convenience of assembly and maintenance operations.

Leno End Out **44.0702**
Warp-end wrapper that is missing from the end of a fabric.

Leveling **56.0703**
See "Fusing and HASL/HAL".

Leveling Flux **56.0704**
See "Fusing Flux".

Leveling Oil **56.0705**
See "Fusing Oil".

Library **20.0706**
A catalogue of related items that contains all of the information about the items that is necessary for processing by a computer program.

Lifted Land **60.0707**
A land that has fully or partially separated (lifted) from the base material, whether or not any resin is lifted with the land.

Lift-off **97.1905**
See "Solder Fillet Lifting".

Light Mark (Fabric) **44.0708**
A filling defect that extends across the width of a fabric containing less than one pick per 25 mm from nominal.

Limits of Size **20.0709**
The specified maximum and minimum sizes.

Line **20.0710**
See "Conductor".

Line Coupling **21.0711**
The interaction between two transmission lines that is caused by their mutual inductance and the capacitance between them.

Lip Height **51.0712**
The perpendicular distance from one primary cutting edge to another.

Liquidus, Solder **75.1906**
The temperature at which a solder alloy is completely melted.

Load Capacitance **21.0713**
The capacitance seen by the output of a logic circuit or other signal source.

Load Time **92.0714**
The time it takes to load a unit in an inspection/test machine and to perform any necessary programming or machine alignment.

Loading Direction **70.1907**
The direction of board passing through an assembly line viewed from the operator side.

Local Fiducial **20.0715**
A fiducial mark (or marks) used to locate the position of a land pattern for an individual component on a printed board.

Local Intelligence **25.0716**
The capability of a work station to independently process data without the use of a host or central processing unit.

Local Reflow Soldering **75.1908**
The process of reflow soldering using the heat that is directly supplied to the local area to be reflowed by an energy beam (laser), soldering iron or hot air reflow tool.

Locating Accuracy (Component) **73.1909**
The accuracy in positioning of a component described by the amount of displacement from the desired position.

Locating Edge **20.0028**
A tooling feature in the form of the edge of a printed board.

Locating Edge Marker **20.0717**
A symbol that is used to identify which edge of a printed board is the index edge.

Locating Hole **20.0718**
See "Tooling Hole".

Locating Notch **20.0719**
A tooling feature in the form of a notch in a printed board.

Locating Slot **20.0720**
A tooling feature in the form of a slot in a printed board.

Location Hole **20.1726**
A hole or notch in the panel or printed board to enable either to be positioned accurately.

Logic Circuit **21.0721**
The functional digital circuits used to perform computational functions.

Logic Diagram **21.1440**
A drawing that depicts the multistate device implementation of logic functions with logic symbols and supplementary notations that show the details of signal flow and control, but not necessarily the point-to- point wiring.

Logic Family **21.1441**
A collection of logic functions using the same form of electronic circuit, e.g. emitter-coupled logic (ECL), transistor-transistor logic (TTL), complementary metal-oxide semiconductor logic (CMOS).

Long-Term Capability **91.0722**
The capability of a process that exhibits statistical control over an extended period of time.

Loom Beam **44.0723**
A large flanged cylinder onto which all warp yarns are wound and from which the yarns enter the loom.

Loop Height **76.0725**
The magnitude of deviation of a wire from a straight path between its end attachment points.

Loop, Wire **76.0724**
The curve (arc) in a bonding wire between its end attachment points.

Loss Tangent **21.0726**
See "Dissipation Factor".

Lot Size **91.1442**
A collection of units produced in one continuous, uninterrupted fabrication run.

Low Residue Solder Paste **75.1910**
A solder paste wherein the ionic, non-ionic, and carrier residues after soldering are controlled to low level.

Luminance **24.0727**
A measure of light flux reflected or emitted from a surface.

Luminous Energy **24.0728**
A measure of light flux flow rate, usually in units of lumen-seconds.

Luminous Flux **24.0729**
A measure of flow of visible light energy past any given point in space.

Lyophilic **76.1225**
A characterization of material that readily goes into colloidal suspension in a liquid.

Lyophobic **76.0730**
A characterization of material that exists in a colloidal state with a tendency to repel liquids.

M

Machine Language **11.0732**
The actual language, usually a binary code, that is used by a computer when it performs operations.

Machined Contact **37.0731**
A type of connector contact that consists of solid spring metal that has been formed by machining. (See also "Sheet-Metal Contact".)

Magnification Power **92.0733**
The ratio of the tangent of one-half of the angle (beta) subtended by the image of an object (H), as seen through and centreed in the field of view of the magnification device, to the tangent of one-half of the angle (alpha) subtended by the object (H) as seen at 250 mm by the unaided eye. (See Figure M.1.)

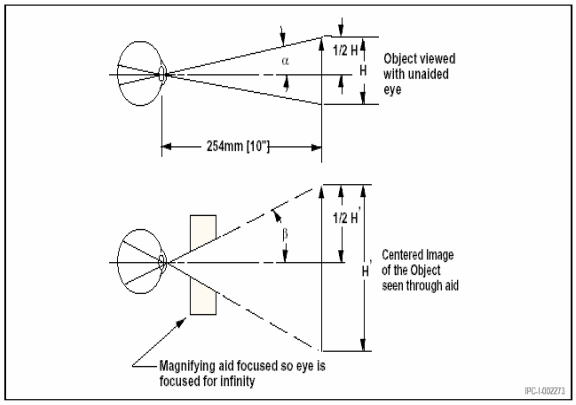


Figure M.1 – Magnification power parameters

Major Defect **94.0734**
A defect that is likely to result in a failure of a unit or product or that materially reduces its usability for its intended purpose.

Manhattan Distance **25.0735**
The orthogonal distance between two points.

Manual Data Input **25.0736**
Computer data that is manually generated with or without the aid of a data-entry device, such as a keyboard, lightpen, mouse, etc.

Manual Soldering **75.0737**
See "Hand Soldering".

Manufacturing Drawing **26.1634**
See "Master Drawing".

Mass Soldering **75.1678**
Methods of soldering in which many joints are made in the same operation.

Manufacturing Hole **20.0738**
See "Tooling Hole".

Margin (Flat Cable) **37.0739**
The distance between the reference edge of a flat cable and the nearest edge of the first conductor. (See also "Edge Spacing".)

Margin Width (Drill) **51.0740**
The thickness of the cylindrical portion of a drill land that is perpendicular to the leading edge.

Mark (Fabric) **44.0741**
A heavy or light area in a fabric that is due to excessive or insufficient filling yarns.

Mask **47.0742**
See "Resist".

Mass Lamination **55.1443**
The simultaneous lamination of a number of pre-etched, multiple-image, C-staged resin panels or sheets that are sandwiched between layers of B-staged resin and copper foil. (See also "Cap Lamination" and "Foil Lamination".)

Master Dot Pattern **26.0743**
See "Hole Pattern".

Master Drawing **26.0744**
A working document that shows the dimensional limits or grid locations that are applicable to any and all parts of a product to be fabricated, including the arrangement of conductors and nonconductive patterns or elements.

Master Line **22.0745**
See "Design Width of Conductor".

Master Pattern **24.0746**
See "Production Master".

Maximum Material Condition (MMC) **22.0747**
A drawing defining certain characteristics of the printed board, such material within the stated limits of size.

Mealing **76.1814**
A condition in the form of discrete spots or patches that reveals a separation at the interface between a conformal coating and a base material on the surface of a printed board, on the surface of an attached component, or both.

Measling **55.0748**
A condition that occurs in laminated base material in which internal glass fibres are separated from the resin at the weave intersection. (This condition manifests itself in the form of discrete white spots or "crosses" that are below the surface of the base material. It is usually related to thermally-induced stress.) (See also "Crazing, Base Material".)

Mechanical Stress **95.1755**
To subject a mechanical component to a process of physical stress.

Mechanical Wrap **75.0749**
The physical securing of a wire lead or component lead around a solder terminal.

Meniscus **92.0750**
The contour of a shape that is the result of the surface-tension forces that take place during wetting. (See Figure M.2).

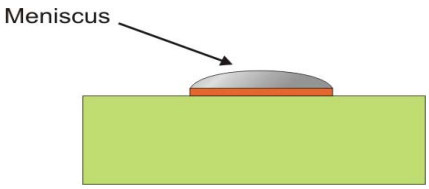


Figure M.2 – Meniscus

Message (Bar Code) **70.1915**
A string of characters encoded into a bar code symbol of a specific length.

Metal-Clad Base Material **41.1609**
Base material covered with conductive foil on one or both sides.

Metal-Clad Laminate **41.0752**
See "Metal-Clad base Material".

Metal Core Printed Board **61.1587**
A printed board having a metal core as the support for the printed board structure, usually used as a heat sink or power supply grounding layer.

Metal Migration **96.1445**
The electrolytic transfer of metal ions along an electrically conductive path from one metal surface to another when an electrical potential is applied to the two metal surfaces.

Metal Migrativity **96.0754**
The comparative rate of the velocity of metal migration under the same conditions.

Metal Surface Migration **96.1226**
The migration of metal on the surface of an electrical insulator.

Metal Through Migration **96.0662**
The migration of metal through an electrical insulator.

Metallized Land Areas **22.1756**
A pattern of conductive material used on a substrate to interconnect electronic components. Widened conductor areas used as attachment point for wire bonding or other devices.

Metallization (n.) **53.0753**
A deposited or plated thin metallic film that is used for its protective and/or electrical properties.

Microbond **74.0756**
A termination made with a small diameter wire, i.e. 0,025 mm or less.

Microcircuit **30.0757**
A relatively high density combination of equivalent circuit elements that are interconnected so as to perform as an indivisible electronic circuit component.

Microcircuit Module **86.1446**
A combination of microcircuits and discrete components that are interconnected so as to perform as an indivisible circuit assembly.

Microelectronics **30.0759**
The area of electronic technology with, or applied to, the realization of electronic systems from extremely-small electronic elements, devices or parts.

Microprobe **92.0760**
A small sharp-pointed object with a positional handle that is used to make temporary electrical contact to a land on a semiconductor for testing purposes.

Microsectioning **92.1447**
The preparation of a specimen of a material, or materials, that is to be used in a metallographic examination. (This usually consists of cutting out a cross-section, followed by encapsulation, polishing, etching, staining, etc.).

Microstrip **21.0761**
A transmission line (see Transmission Line) structure that consists of a signal conductor that runs parallel to and is separated from a much wider reference plane. (See Figure M.3.)

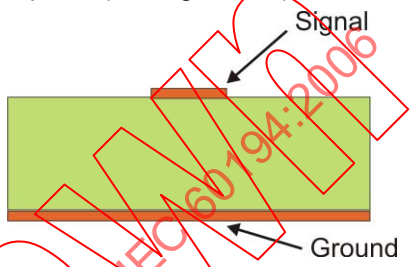


Figure M.3 – Microstrip

Microvia (Build-Up Via) **22.1595**
A blind or subsequently buried hole that is ≤0,15 m in diameter and formed either through laser or mechanical drilling, wet/dry etching, photo imaging, or conductive ink-formation followed by a plating operation.

Microwave Integrated Circuit **21.0762**
An integrated circuit that performs at microwave frequencies.

Microwave Laminate **40.1917**
A laminate of metal cladding on dielectric substrate of composition selected to be suitable for circuit boards intended for operation at microwave frequencies.

Microwaves **21.1918**
A term generally applied to radio waves in the frequency range of 1GHz to 100 GHz. It generally refers to the frequency range where circuits and device interconnects are described as distributed elements instead of lumped elements.

Migration (Pressure Sensitive Tape) **75.1919**
The movement between tape components or between the tape and the surface to which it is applied, over a long period of time.

Migration Rate **96.0763**
The distance over which metal migration proceeds in a given unit of time.

Migration Resistance **96.1920**
That property of a printed wiring board that resists insulation degradation by electromigration of metal atoms of a conductor under the influence of a difference in electrical potential.

Migration Velocity **96.0764**
See "Migration Rate".

Minimum Annular Ring **22.0766**
See "Minimum Annular Width".

Minimum Annular Width **22.0765**
The minimum width of metal(s) at the narrowest point between the edge of a hole and the outer edge of a circumscribing land. (This determination is made to the drilled hole on internal layers of multilayer printed boards and to the edge of the plating on external layers of multilayer and double-sided printed board.)

Minimum Bump Pitch **36.1921**
Minimum pitch between the centre of any two perfectly aligned bumps.

Minimum Electrical Spacing **21.1451**
The minimum allowable distance between adjacent conductors, or between conductors and non-common conductors such as mounting hardware, ground, etc., at a given voltage and altitude, that is sufficient to prevent dielectric breakdown, corona, or both, from occurring between the conductors.

Minor Defect **91.0767**
A defect that is not likely to result in a failure of a unit or product or that does not materially reduce its usability for its intended purpose.

Mirrored Pattern **24.0768**
A pattern whose orientation denotes a transposition from right reading. (See Figure M.4.)

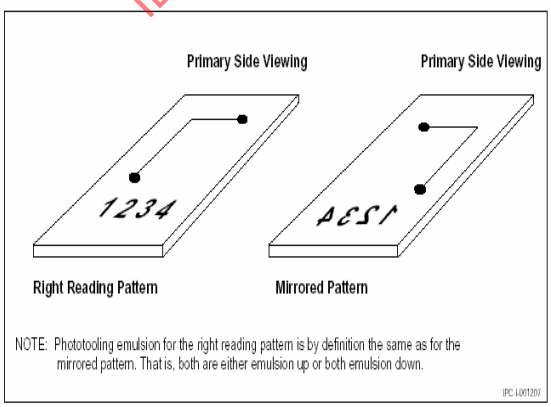


Figure M.4 – Mirrored pattern

Mis-Pick **44.0769**
A break in the pattern of cloth from selvage to selvage that is caused by a missing filling yarn.

Mislocated Bond **74.0770**
See "Off Bond".

Misregistration **50.0771**
Imperfect registration.

Mixed Component-Mounting Technology **70.1452**
A component mounting technology that uses both through-hole and surface- mounting technologies on the same packaging and interconnecting structure.

Mixed-Effects Model **91.0772**
An experimental treatment that contains elements of both deterministic effects and random-effects models.

Mixed Technology **70.1757**
In surface mounting, refers to mixing through hole component and surface mounting components on the same side of a printed circuit board.

Modal Form **25.0773**
The technique whereby a data description or other pertinent command is given only once at the beginning of a related set of data.

Modification **77.0774**
The revision of the functional capability of a product in order to satisfy new acceptance criteria.

Module **80.0775**
A separable unit in a packaging scheme.

Module Board **67.1922**
A substrate on which bare die and surface-mount components are attached and interconnected intended to be further assembled to a product planar board.

Moisture Absorption **40.1923**
Under specified test conditions, the weight percentage of moisture absorbed by a material.

Moisture Barrier Bag (MBB) **30.1924**
A bag that is electrostatic discharge (ESD) safe and is designed to restrict the ingress of water vapour used to package moisture-sensitive devices.

Moisture Resistance **40.1925**
The measure of how well the insulation characteristics of a material are maintained when exposed to temperature and humidity.

Molded Interconnection Device **67.1926**
A combination of molded plastic substrate and conductive patterns that provide both the mechanical and electrical functions of an electronic interconnection package.

Molecular Dye-Imaging Material **24.0776**
See "Diazo Material"

Monolithic Integrated Circuit **30.0777**
An integrated circuit in the form of a monolithic structure.

Montreal Protocol **76.1758**
An agreement by industrialized nations, at a meeting held in Montreal, Canada, to eliminate chlorofluorocarbons from all processes by 1995.

Mother Board **85.0778**
A printed board assembly that is used for interconnecting arrays of plug-in electronic modules. (See also "Backplane".)

Mounting Hole **20.0779**
A hole that is used for the mechanical support of a printed board or for the mechanical attachment of components to a printed board.

Mounting Tack Time **73.1927**
The interval of time required for mounting one component or all components on one printed board.

Muffle **75.0780**
An enclosure with a rectangular or oval cross-section that is located between the heating elements and the parts being processed that contains the atmosphere required for the reflow soldering process.

Multi-Vari **91.0781**
A nonmathematical method for determining the sources of variation.

Multichip Integrated Circuit **86.0782**
See "Multichip Module".

Multichip Microcircuit **86.0783**
See "Multichip Module".

Multichip Module (MCM) **86.0784**
A microchip module consisting primarily of closely-spaced integrated circuit dice that have a silicon area density of 30 % or more.

Multichip Module-Ceramic (MCM-C) **86.1928**
Multichip module primarily using hybrid processing technology where materials of the mounting structure are ceramic or glass-ceramic alternatives.

Multichip Module Deposited (MCM-D) **86.1929**
Mutlichip module where unreinforced dielectric and conductive materials are added sequentially to form an interconnecting structure on a substrate.

Multichip Module Laminate (MCM-L) **86.1930**
Multichip modules built primarily using printed board manufacturing processes and materials.

Multilayer Carrier Tape **36.0785**
Carrier tape with two or more conductor layers.

Multilayer Printed Board **60.1227**
The general term for a printed board that consists of rigid or flexible insulation materials and three or more alternate printed wiring and/or printed circuit layers that have been bonded together and electrically interconnected.

Multilayer Printed Circuit Board **60.0786**
A multilayer printed board with three or more printed circuit layers.

Multilayer Printed Circuit Board Assembly **80.0787**
An assembly that uses a multilayer printed circuit board for component mounting and interconnecting purposes.

Multilayer Printed Wiring Board **60.0788**
A multilayer printed board with only printed wiring for its conductive layers.

Multilayer Printed Wiring Board Assembly **80.0789**
An assembly that uses a multilayer printed wiring board for component mounting and interconnecting purposes.

Multilevel Experiment **91.0790**
The evaluation of a small number of factors at a large number of levels.

Multiple Image Production Master **24.1643**
A production master having at least two 1:1 scale patterns.

Multiple Indications **91.0791**
An anomaly that is detected and reported more than once.

Multiple Pattern **24.1645**
The arrangement of two or more 1:1 scale patterns contained within the size of one panel.

Multiple Printed Board **50.1646**
A printed panel in which one or more patterns occur two or more times, processed as a single unit and subsequently divided.

N

Nail Heading **51.0794**
The flared condition of copper on an inner conductive layer of a multilayer printed board that is caused by hole-drilling. (See Figure N.1.)

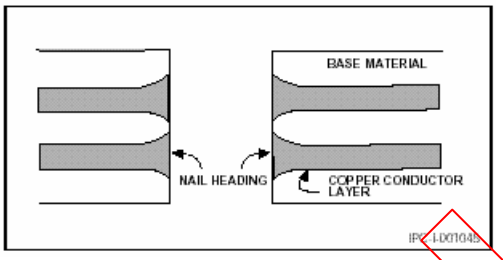


Figure N.1 – Nail heading

Nail **92.0792**
See "Probe, Test".

Nailhead Bond **74.0793**
See "Ball Bond".

Near-End Crosstalk **21.0795**
See "Backward Crosstalk".

Neckbreak **74.0796**
A break in a bond immediately above a ball bond.

Negative **24.0797**
An artwork, artwork master, or production master in which the pattern being fabricated is transparent to light and the other areas are opaque.

Negative Etchback **54.0798**
Etchback in which the inner conductor layer material is recessed relative to the surrounding base material. (See Figure N.2.)

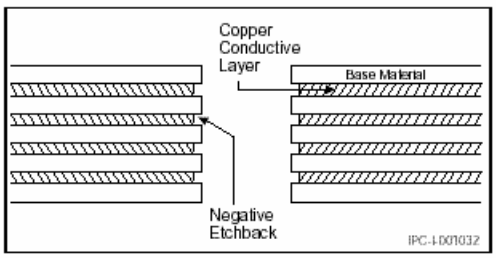


Figure N.2 – Negative etchback

Negative Pattern **24.1639**
An artwork, artwork master, or production master in which the pattern being fabricated is transparent to light and the other areas as opaque.

Negative-Acting Resist **52.1448**
A resist that is polymerized by light and which, after exposure and development, remains on a surface in those areas that were under the transparent areas of a production master.

Neighbourhood Processing **92.0799**
The determination of information about a location of pixel by the use of information obtained about its neighbours.

Nesting **25.1176**
Embedding data in levels of other data so that certain routines may be executed or accessed continuously in loops.

Net **21.1177**
An entire string of electrical connections from the first source point to the last target point, including lands and vias.

Net List **21.1178**
A list of alphanumeric representations, each of which is used to describe a group of two or more points that are electrically common.

Neutral Point **35.1931**
The neutral point is usually the geometric centre which defines the point at which there is no relative motion of the chip during thermal cycling.

Nick **60.1179**
A cut or notch in a wire on the surface or in the edge of a conductor.

Node **21.1180**
The endpoint of an electrical network branch or the junction of two or more branches.

Nodule **60.1181**
A mass or small lump with an irregular shape that is convex to a surface.

Noise (Process Control) **91.1182**
Factors in a manufacturing process that are uncontrollable or too costly to control.

Nominal **26.1935**
The design target dimension for a physical characteristic of a product or a feature to which a tolerance may be applied that establishes the limits of variation from the target that are acceptable.

Nominal Cured Thickness **55.1449**
The thickness of a multilayer printed board, or the distance between two adjacent layers of a multilayer printed board, after the prepreg has been cured at the temperature and pressure specified for that particular class of resin flow.

Nominal Value **26.1936**
The centre value between a minimum and maximum allowance.

Nominal-Is-Best Characteristic **91.1450**
A parameter of quality that optimizes performance at its nominal value. (See also "Larger-the-Better Characteristic" and "Smaller-the-Better Characteristic".)

Nonactivated Flux **75.1183**
A natural or synthetic-resin flux without activators.

Nonconductive Pattern **22.1184**
A configuration that is formed by the functional nonconductive material of a printed circuit, e.g. dielectric, resist, etc.

Nonfunctional Interfacial Connection **22.1453**
A plated through hole in a double-sided printed board that electrically connects a printed conductor on one side of the board to a nonfunctional land on the other side of the board. (See Figure N.3.)

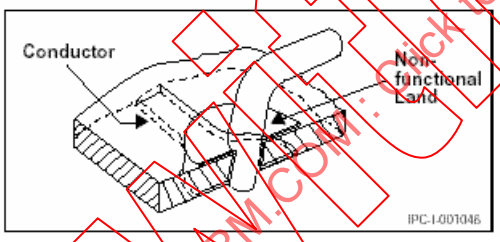


Figure N.3 – Nonfunctional Interfacial connection

Nonfunctional Land **22.1185**
A land that is not connected electrically to the conductive pattern on its layer.

Nonfunctional Terminal Area **22.1186**
See "Nonfunctional Land".

Nonionic Contaminant **76.1187**
A residue that does not readily ionize in water.

Nonpolar Matter **76.1188**
A substance that cannot be dissolved in water that is soluble in hydrophobic solvents.

Nonpolar Solvent **76.1454**
A liquid that is not ionized to the extent that it is electrically conductive, that can dissolve nonpolar compounds (such as hydrocarbons and resins), and cannot dissolve polar compounds (such as inorganic salts.)

Nonwetting (Solder) **75.1189**
The inability of molten solder to form a metallic bond with the basis metal. (See Figure N.4.)

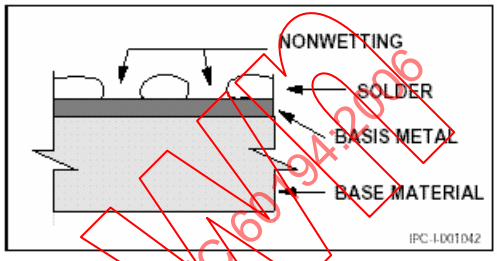


Figure N.4 – Nonwetting

Nonwoven Glass Mat **44.1937**
Glass fibres chopped into defined lengths (typically less than 50 mm) and uniformly distributed in random orientation into a horizontal plane and bound together with suitable chemical means.

Normal Distribution **94.1191**
A mathematically-defined continuous distribution of values that has a bell shape that is perfectly symmetrical about a mean value. (See Figure N.5.)

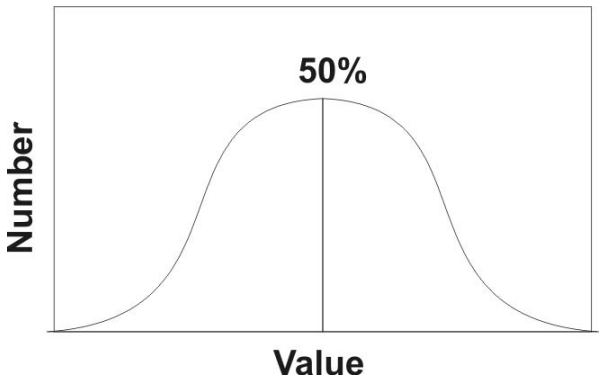


Figure N.5 – Normal distribution

Normal-Mode Rejection (NMR) **21.1190**
The amount of noise superimposed on the input signal of a direct-current (d.c.) digital voltmeter that the instrument is capable of rejecting.

Null Hypothesis **91.1455**
The supposition that no significant difference exists between the desired results of two comparable populations. (See also "Alternative Hypothesis" and "Statistical Hypothesis".)

Numerical Control (NC) (machining) **25.1193**
The automatic control of electromechanical devices by means of a digital input to an electronic controller.

Numerical Control (NC) (computer-aided design) **20.1192**
The use of mathematics to define, design or test geometric quantities that are used in a computer-aided technology.

O

Object Code **25.0801**
The output from a computer compiler or assembler that is, or is suitable for, processing into executable machine codes.

Objective Evidence **26.000X**
Documentation in the form of hard copy, computer data, video, or other media.

Object-Oriented Database **11.0800**
A database that combines graphics and text to describe objects.

Occluded Contaminant **76.0802**
A contaminant that is totally contained in an insulating material.

Occlusion **76.0803**
Uniform molecular adhesion between a precipitate and a soluble substance, or between a gas and a metal.

Odd-shape Chip Type Component **30.1704**
Parts with rectangular or cylindrical shapes, i.e. semi-fixed resistor or trimmer.

Off Bond **74.0804**
A termination that has some portion of the bonding area extending off the bonding land.

Off-contact Printing **52.1789**
A printing method wherein the image or mask is not in continuous contact with the material to be printed.

Offset Land **22.0805**
A land that is intentionally not in physical contact with its associated component hole.

Offset Terminal Area **22.0806**
See "Offset Land".

Omnibus Ring **36.0807**
See "Support Ring".

On-contact Printing **52.1940**
A printing method wherein the imaged mask is in continuous contact with the material to be printed.

One-Piece Connector **37.0809**
See "Edge-Board Connector".

One-Sided Board **60.0810**
See "Single-Sided Printed Board".

Oozing (Pressure Sensitive Tape) **75.1941**
In pressure sensitive tape technology, a squeezing out of the adhesive from under the backing.

Opacity (Photographic) **24.0811**
The reciprocal of the transmittance ratio for a photographic image.

Opaquer **24.1456**
A material that, when added to a resin system, renders laminate sufficiently opaque, so that the yarn or weave of the reinforcing material cannot be seen with the unaided eye using either reflected or transmitting light.

Open Circuit Potential **21.0814**
The potential of a cell from which no current flows in the external circuit.

Open, Electrical **92.0812**
A fault that causes two electrically-connected points to become separated.

Open-Entry Contact **37.0813**
A type of female connector contact that does not prevent the entry of an oversized mating part. (See also "Closed-Entry Contact".)

Open Point **51.1457**
The amount of misalignment between the trailing edge of the junction line between the primary and secondary drill-point clearance angles when they are ahead of the drill centreline. (See Figure O.1.)

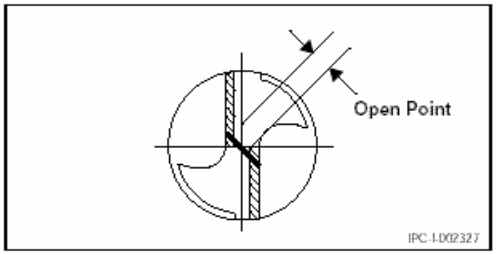


Figure O.1 – Open point

Open Time **75.1194**
The maximum duration of the interval from the application of an adhesive to the formation of a satisfactory bond. (See also "Working Time".)

Optical Image **24.1195**
An image that is projected onto a viewing screen.

Organic Contamination **76.1196**
A type of contamination derived from an organic substance.

Organic Flux **75.1942**
Flux primarily composed of organic materials other than rosin or resin.

Original Production Master **24.1943**
The original artwork or computer data file used to produce the production master that serves as the phototool in the manufacturing image transfer process.

Orthochromatic Emulsion **24.1197**
A photographic emulsion that is spectrally sensitive to the violet, blue, and green portions of the visible light spectrum.

Orthogonal-Array Experiment **91.1458**
A balanced evaluation whereby the average effect of a factor is determined while the levels of all other factors in the design are systematically changed.

Outer-Lead Bond (OLB) **74.1198**
The connection between a conductor on a bonding tape and the base material. (See also "Inner-Lead Bond".)

Outgassing **53.1199**
The gaseous emission from a laminate printed board or component when the board or the printed board assembly is exposed to heat or reduced air pressure, or both.

Outgrowth **45.1459**
The increase in size of one side of a conductor that is caused by plating that is in excess of that delineated on the production master. (See Figure O.2 and O.3.)

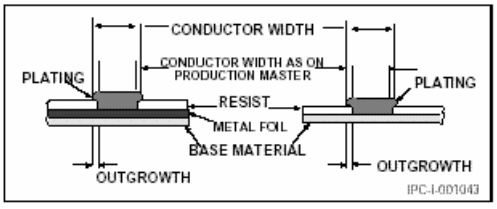


Figure O.2 – Outgrowth, overhang and undercut

Output Vector **91.1228**
The set of logic values, either expected or measured, for all output points at a particular test step of a unit under test.

Overall Length **51.1200**
The distance from the end of a drill shank to the cutting end of the tool, including the point.

Overcoat **76.0815**
A thin film of insulating material that is applied over a semiconductor die for the purposes of mechanical and contamination protection.

Overhang **60.0816**
The sum of outgrowth and undercut. (If undercut does not occur, the overhang is the same as the outgrowth.)

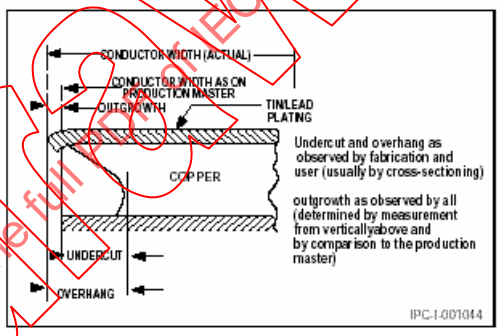


Figure O.3 – Outgrowth, overhang and undercut

Overheated Solder Connection **75.0817**
A solder connection that is characterized by solder surfaces that are dull, chalky, grainy, and porous or pitted.

Overlap (Film) **67.0818**
The contact area between a film component and a film conductor.

Overlap (Drill) **51.1229**
The amount of misalignment between the trailing edge of the junction line between the primary and secondary drill-point clearance angles when they are behind the drill centreline. (See also "Layback".) (See Figure O.4.)

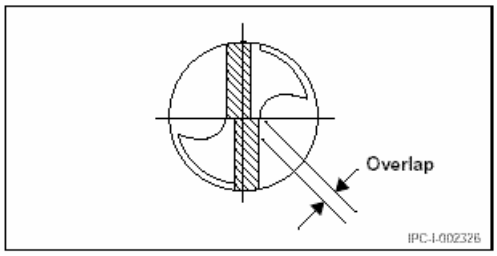


Figure O.4 – Overlap (Drill)

Overplate **53.1673**
Conformal metallic deposition on a previously formed conductive pattern or part thereof.

Overprinting **75.1944**
The use of stencils with apertures larger than the pads or annular rings on the board.

Oxide Transfer **41.0819**
See "Treatment Transfer".

Oxygen Concentration Cell **76.0820**
A galvanic cell resulting primarily from differences in oxygen concentration.

P

Package **30.1460**
The container for a circuit component, or components, that is used to protect its contents and to provide terminals for making connections to the rest of the circuit.

Package Cap **30.0821**
A cuplike package cover.

Package Cover **30.0053**
The cover that encloses the contents in the cavity of a package in the final sealing operation.

Package Lid **30.0822**
A flat package cover.

Packaging and Interconnecting Assembly 60.0823
The general term for an assembly that has components mounted on either or both sides of a packaging and interconnecting structure.

Packaging and Interconnection Structure 60.1461
The general term for a completely processed combination of base materials, supporting planes or constraining cores, and interconnection wiring that are used for the purpose of mounting and interconnecting components.

Package Cracking **95.1945**
Cracks in a plastic integrated circuit package caused by stress that results from exposure to reflow solder temperature. These cracks may propagate from the die or die pad to the surface of the package, or only extend part way to the surface of lead fingers.

Packaging Density **20.1462**
The relative quantity of functions (components, interconnection devices, mechanical devices, etc.) per unit volume. (This is usually expressed by qualitative terms such as high, medium, and low.)

Pad **20.0824**
See "Land".

Paddle **35.1946**
See “Die Pad”.

Panchromatic Emulsion **24.0825**
A photographic emulsion that is spectrally sensitive to all portions of the visible light spectrum.

Panel **41.1463**
A rectangular sheet of base material or metal-clad material of predetermined size that is used for the processing of one or more printed boards and, when required, one or more test coupons. (See also "Blank”.)

Panel Drawing **26.0826**
A document that shows the production master with related manufacturing patterns and artifacts that relate to the fabrication of printed boards.

Panel Plating **53.0827**
The plating of an entire surface of a panel including holes.

Para-aramid **44.1464**
The generic term that describes fibres that are made from wholly- aromatic polyamide, amide polymers in which at least 85 % of the amide linkages are directly attached to two benzene rings at the para position in the polymer chain.

Parallel Pair **22.0828**
Two conductors that are side-by-side at a controlled spacing.

Parallel-Gap Soldering **75.1465**
The passing of an electrical current through a high-resistance space between two parallel electrodes in order to provide the energy required to make a soldered termination.

Parallel-Gap Welding **75.1466**
The passing of an electrical current through a high-resistance space between two parallel electrodes in order to provide the energy required to make a welded termination.

Parameter Record **25.0829**
A record that defines the characteristics of a subsequent set of records such as job identification, electrical description, tolerances, etc.

Pareto Analysis **94.0830**
A problem-solving technique whereby all potential problem areas or sources of variation are ranked according to their contribution to the end result.

Partial Lift **74.0831**
A bonded lead that has been partial removed from the bonding area.

Partially-Clinched Lead **72.1467**
A component lead that is inserted through a hole in a printed board and is then formed in order to retain the component in place and but not necessarily in order to make metal-to-metal contact with a land prior to soldering. (See also "Clinched Lead".)

Passivation **57.0832**
The formation of an insulating layer to protect a surface from contaminants, moisture and particulate matter.

Passive Base Material **44.0834**
Base material, that does not exhibit transistance, that serves as the physical support and thermal sink for film circuits.

Passive Component (Element) **30.1468**
A discrete electronic device whose basic character does not change while it processes an applied signal. (This includes components such as resistors, capacitors, and inductors.)

Passive-Active Cell **76.0833**
A cell whose electromotive force is due to the potential difference between a metal in an active state and the same metal in a passive state.

Paste Flux **75.0836**
A flux formulated in the form of a paste to facilitate its application. (See also "Solder Paste" and "Solder-Paste Flux".)

Paste, Soldering **75.0835**
A soldering method that uses a solder paste applied to the land, device termination, or both.

Paste-in-Hole **75.1883**
See "Intrusive Soldering".

Path (Electrical) **20.0837**
See "Conductor".

Pattern **20.0838**
The configuration of conductive and nonconductive materials on a base material, and the circuit configuration on related tools, drawings and masters.

Pattern Area **20.0839**
The section of a designated configuration that includes the pattern and background.

Pattern Plating **53.0840**
The selective plating of a conductive pattern and associated holes.

Peel Adhesion (Pressure Sensitive Tape) **75.1958**
The force required to break the bond between pressure sensitive tape and the surface to which it is applied.

Peel Strength **92.0841**
The force per unit width that is required to peel a conductor foil from a laminate perpendicular to the surface of the substrate.

Percent Contribution **91.0842**
The amount that a single factor contributes to a total variation, expressed as a per cent.

Percent of the Field of View **92.0843**
The specific part of interest of the minimum required field of view of a magnification device.

Perforated (Pierced) Solder Terminal **37.1469**
A flat-metal solder terminal with an opening through which one or more wires are placed prior to soldering. (See Figure P.1.)

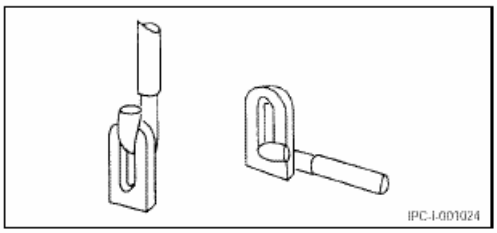


Figure P.1 – Perforated (pierced) solder terminal

Perforation **54.1959**
A mechanical method that removes a portion of the material outlining the board, in order to facilitate ease of breakout (removal) from the manufacturing/ assembly panel. See "Breakaway".

Perimeter Sealing Area **30.0844**
The surface on the perimeter of the cavity of a package that is used for attachment to the package cover.

Permanent Resist **52.0845**
A resist that is not removed after processing, e.g. plating resist that is used in a fully-additive process.

Permeability **21.1803**
A general term used to express various relationships between magnetic induction and magnetizing force.

Permittivity **21.1961**
The square root of the ratio of the electromagnetic wave propagation characteristics of free space to that of the dielectric medium. The permittivity, ε, of a material is, in general, a complex-valued (has real and imaginary parts) parameter. The real and imaginary parts of ε are given by εN and εO. See "Dielectric Constant".

Personality Plate **92.0234**
A translator fixture plate drilled to match the product under test.

Phenolic Resin **41.1962**
A thermosetting phenol and aldehyde compound resin used in printed board applications that are environmentally benign in terms of moisture, temperature and cycling exposures.

Photographic Fog **24.1470**
Any unwanted increase in density on a negative-working photographic product or a loss of density on a positive-working product that appears on exposed and processed glass film or paper that is not the result of image exposure.

Photographic Image **24.0456**
An image in a photomask or in an emulsion that is on a film or plate.

Photographic Layer **52.0850**
A light-sensitive layer of material that is capable of being exposed and processed so that it yields a visible image.

Photographic Operation **24.0851**
A procedure or technique that prepares a phototool for subsequent processing.

Photographic Plate **24.0852**
A "soda-lime-silica" sheet of glass with a photographic layer.

Photographic-Reduction Dimension **53.0255**
The dimensions on an artwork master, such as the distance between lines or between two specified points, that indicate the extent to which the artwork master is to be photographically reduced. (The value of the dimension refers to the 1-to-1 scale and must be specified.)

Photomaster **24.0853**
See "Artwork Master".

Photometry **24.0854**
The measurement of the effect of the intensity and energy of visible light on the human eye.

Photoplotting **24.0855**
A photographic process whereby an image is generated by a controlled- light beam that directly exposes a light-sensitive material.

Photoprint **52.0856**
The process of forming a circuit pattern image by exposing photo-sensitive material to light energy.

Photoresist **52.1472**
A photo-chemically reactive material, which polymerizes upon exposure to ultraviolet energy at a given wavelength customarily used to define an etching, plating, or selective stripping pattern on a substrate.

Photoresist Image **52.0857**
An exposed and developed image in a coating on a base material.

Phototool **24.0858**
A photographic product that is used to produce a pattern on a material. (see also "Artwork," "Artwork Master," "Production Master," "Working Master".)

Phototooling **24.0859**
The entire group of photographic products that are used to produce a pattern on a base material.

Phototooling Aid **24.0860**
A photographic product that is used to assist in the inspection of, but not the transfer of, imaged patterns.

Physical Vapour Deposition **45.1964**
The deposition of a film onto the surface of a substrate by the physical transfer of vapour from the source to the substrate. (See also "Chemical Vapour Deposition").

Pick **44.0861**
Filling yarn that runs crosswise to the entire width of a fabric.

Pick-Up Force **73.1760**
The force required to pick up a surface mounting component from its packaging medium for placement on a substrate.

Pick-Up Tool **73.1759**
A tool used to pick up surface mount components from a packaging medium for placement on a substrate and which may be hand activated or a part of a pick-and-place machine.

Pilot Hole **22.0862**
See "Tooling Hole".

Pin Grid Array (PGA) **31.1965**
A square or rectangular component package with pins protruding from the bottom surface with a pitch perpendicular to the plane of the package. (See Figure P.2.).

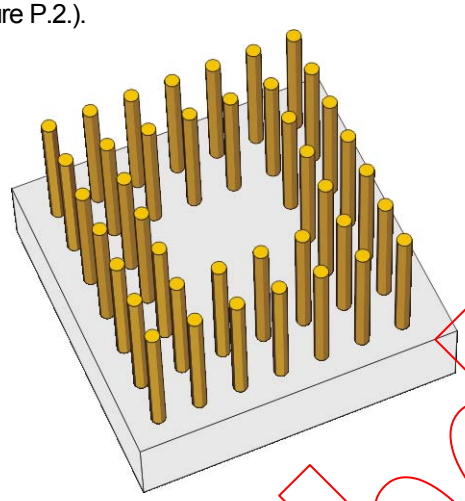


Figure P.2 – Pin grid array

Pin Lamination **55.1966**
A manufacturing technique utilizing pins to align various innerlayers and prepreg (adhesive layers) during the multiplayer lay-up and lamination process.

Pin-hole (Base Materials) **41.1967**
An open point in the resin coverage of the reinforcement, usually within the window formed by adjacent yarns in x and y directions.

Pinhole (Material) **92.0863**
An imperfection in the form of a small hole that penetrates entirely through a layer of material. (See also "Pit" and "Solder Connection Pinhole".)

Pinhole (Phototool) **24.0864**
A clear defect that is completely within a black pattern or in the black background of a clear pattern.

Pin-In-Hole **75.1884**
See "Intrusive Soldering".

Pink Ring **55.0865**
A zone around a through-hole/inner-layer interface from which a copper oxide coating has been chemically removed.

Pit **92.0866**
An imperfection in the form of a small hole that does not penetrate entirely through a layer of foil. (See also "Pinhole, Material".)

Pitch **22.1473**
The nominal centre-to-centre distance between adjacent features. (When the features are of equal size and their spacing is uniform, the pitch is usually measured from the reference edge of the adjacent features.)

Pixel **25.0867**
The smallest definable picture element area capable of being displayed.

Placement Force **73.1761**
The force required to deposit a surface mount component onto the surface of a substrate.

Plain Hole (See Unsupported Hole) **22.1968**

Plain Weave **44.0868**
A fabric configuration whereby each warp end goes over one pick and under the next, and whereby each pick goes over one warp end and under the next.

Planar Resistor **45.1969**
An etched or deposited resistive element incorporated within or on the surface of the printed board.

Planar-Mount Device **33.0869**
See "Surface-Mount Component (SMC)".

Planar Board **60.1970**
A substrate on which bare chips and surface- and insertion-mount components are mounted. After being mounted with these components, the substrate is no longer heated for mounting on other planar boards. It generally includes motherboards, daughter cards, etc.

Plastic **40.0870**
Any of a group of synthetic or natural organic materials that may be shaped when softened and then hardened.

Plastic QFP (PQFP) **33.1973**
See "Quad Flat Pack".

Plastic Ball Grid Array (PBGA) **33.1971**
A polymer based package with interconnects formed of tin-lead solder spheres. The solder interconnects are located in an array area in board side of package.

Plastic Deformation **40.0871**
Deformation that does, or will, remain permanent after removal of the load that caused it.

Plastic Device **30.0872**
A semiconductor component wherein the package or encapsulant is plastic.

Plastic Leaded Chip Carrier (PLCC) **33.1972**
A surface mount family of integrated circuit packages with leads exiting from all four sides of the package, generally with a 1,27 mm lead-to-lead pitch.

Plastic QUAD Flat Pack (PQFP) **33.1974**
A surface mount family of integrated circuit packages, bounded on all four sides by bumpers, with leads exiting from all four sides of the package and formed into a “gullwing” lead format.

Plate Finish, Laminating **55.1474**
The surface finish, without modification by subsequent processing, of the metal on metal-clad base material that results from direct contact with laminating-press plates.

Plated-Through Hole (PTH) **22.1475**
A hole with plating on its walls that makes an electrical connection between conductive patterns on internal layers, external layer, or both, of a printed board. (See Figure P.3.)

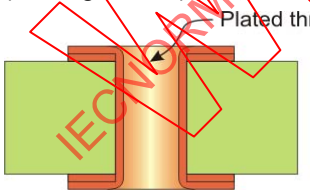


Figure P.3 – Plated-through hole (PTH)

Plated-Through Hole Structure Test **92.1476**
The visual examination of the metallic conductors and plated-through holes of a printed board after the dielectric material has been dissolved away.

Plating **53.0874**
Chemical or electrochemical deposition of metal on an entire surface (See panel plate) or on a conductive pattern (See pattern plate).

Plating Bar **53.0876**
The conductive path that temporarily interconnects areas of a conductive pattern that are to be electroplated. (See also "Bus Bar”.)

Plating, Burned **53.0875**
A rough, dull electrodeposit that was caused by excessive plating current density.

Plating Resist **52.1975**
An organic material intended to prevent the deposition of metallic plating on specific portions of copper planes that are on the surface of copper-clad laminate or printed board outer-layers.

Plating Solution **45.1976**
A chemical solution containing metal ions used in plating a metal-film on a substrate. Also may be referred to as an electrolyte.

Plating Thief **53.1477**
A racking device, or nonfunctional pattern on a panel, that is used to help achieve a more uniform current density on plated parts during an electroplating process.

Plating, Palladium **53.1953**
One of the lead-free plating using palladium. The basis metal should be Cu or Ni, but not Fe-Ni because of corrosion.

Plating, Tin (Sn) **53.1954**
One of the lead-free plating using tin only and employed mainly for passive chip components. When using Tin (Sn) plating, the occurrence of whiskers is a possibility and should be avoided.

Plating, Tin Bismuth (Sn-Bi) **53.1955**
One of the lead-free plating using tin with bismuth added no more than about 3 %.

Plating, Tin Copper (Sn-Cu) **53.1956**
One of the lead-free plating using tin with copper added no more than about 2,5 %.

Plating, Tin Silver (Sn-Ag) **53.1957**
One of the lead-free plating using tin with silver added to about 3 %.

Plating Up **53.0877**
The electrochemical deposition of a conductive material on a base material that takes place after the base material has been made conductive.

Plating Void **53.1977**
See “Void”.

Plenum **54.1978**
A chamber that is used to uniformly distribute a fluid, e.g. air, nitrogen, or other gas, into a processing chamber.

Plied Yarn **44.0878**
Yarn with two or more twisted yarns.

Plotting **24.0879**
The mechanical converting of X-Y position information into a visual pattern, such as artwork.

Plug Connector **37.0880**
The unmounted half of a two-piece connector pair that mates with a receptacle connector.

Point Angle **51.0881**
The included angle between the two primary cutting edges of a drill.

Poisson Distribution **91.1478**
A discrete probability distribution for attributes data that is particularly applicable when there are many opportunities for the occurrence of an event but a low probability on each trial.

Polar Matter **76.0883**
A substance that can dissolve in water and hydrophilic solvents.

Polar Solvent **76.1815**
A liquid that is ionized to the extent that it is electrically conductive, that can dissolve polar compounds (such as hydrocarbons and resins), but cannot dissolve non-polar compounds (such as inorganic salts).

Polarized Component **30.1981**
A component wherein the terminations are assigned as positive or negative electrical polarity.

Polarizing Slot **22.0882**
A slot in the edge of a printed board that is used to assure the proper insertion and location of the board in a mating connector. (See also "Keying Slot”.)

Polyester **42.1982**
The synthetic polymer that has more than two ester radicals in the main chain.

Polyimide **42.1983**
The synthetic polymer that has more than two imide radicals in the main chain.

Polymer **40.1479**
A compound of high molecular weight that is derived from either the joining together of many small similar or dissimilar molecules or by the condensation of many small molecules by the elimination of water, alcohol, or some other solvent.

Polymer Reversion **76.1480**
The irreversible softening or liquifaction of a polymer as the result of hydrolysis due to the bombardment of the polymer with vapour molecules that contain an active hydroxyl group.

Polymerize **40.0884**
To form a polymer or polymeric compound.

Polymerized Rosin **76.0885**
Rosin that has reacted with itself during the course of a soldering operation.

Porosity (Solder) **75.0886**
A solder coating with an uneven surface and a spongy appearance that may contain a concentration of small pinholes and pits.

Positional Tolerance **22.0887**
The amount that a feature is permitted to vary from its true-position location.

Positive Pattern **24.0888**
An artwork, artwork master, or production master in which the pattern being fabricated is opaque to light and the other areas are transparent.

Positive-Acting Resist **52.1481**
A resist that is decomposed (softened) by light and which, after exposure and development, is removed from those areas of surface that were under the transparent areas of a production master.

Post **37.0889**
See "Terminal”.

Post Curing **56.0890**
Heat aging in order to stabilize material through stress relieving.

Postprocessing **25.0891**
Manipulating data after it has been generated or run through a batch process.

Postprocessor **25.1482**
A software procedure or program that interprets data and formats it into data that is readable by a numerically-controlled machine or by other computer programs.

Potting Compound **47.0892**
A material, usually organic, that is used for the encapsulation of components and wires.

Power Dissipation **21.0893**
The energy used by an electronic device in the performance of its function.

Power Factor **21.0894**
The cosine of the angle of phase difference between current and the voltage applied.

Power of Experiment **91.0895**
The probability of rejecting the results of the null hypothesis when it is false and of accepting the alternative hypothesis when it is true.

Power of Source **24.0896**
See "Radiant Intensity".

Power Plane **22.0897**
See "Voltage Plane".

Power Plane Inductance **21.1804**
The inductance in response to a.c. noise, seen on a d.c. backplane system.

Preconditioning **71.1762**
Preparation of a component or assembly for processing or testing.

Preferred Solder Connection **75.0899**
A solder connection that is smooth, bright, and feathered-out to a thin edge in order to indicate proper solder flow and wetting action. Also no bare metal is exposed within the solder connection and there are no sharp protrusions of solder or the evidence of contamination, e.g. embedded foreign material.

Pre-finish (n.) **55.0898**
A coupling agent that is applied on a fibre in order to improve compatibility with resins.

Pre-setting **73.1986**
The fixing of component(s) to prescribed position using adhesive to prevent the movement of components during soldering.

Preflow **55.0900**
See "Stabilization Period".

Pregelation Particle **92.0901**
See “Prepreg”.

Preheat (n.) **56.0902**
A preliminary phase of a process during which the product is heated at a predetermined rate from ambient temperature to a desired elevated temperature.

Preheat Force **75.1984**
In hot-bar conductive soldering, that portion of the force profile where light contact pressure is made during preheat between a thermode and the component leads being terminated to allow for wetting of the metals being joined prior the application of the full bonding force.

Preheating (v.) **56.1483**
The raising of the temperature of a material(s) above the ambient temperature in order to reduce the thermal shock and to influence the dwell time during subsequent elevated-temperature processing.

Preimpregnated Bonding Sheet **41.0903**
See "Prepreg".

Prepreg **41.0904**
A sheet of material that has been impregnated with a resin cured to an intermediate stage, i.e. B-staged resin.

Pressfit Contact **37.0905**
An electrical contact that can be pressed into a hole in an insulator or printed board with or without plated-through holes.

Pretinning **53.0906**
See "Tinning" .

Primary Flare **51.0907**
A condition whereby the drill's primary relief is wider at its periphery than it is at its centre. (see Figure P.4.)

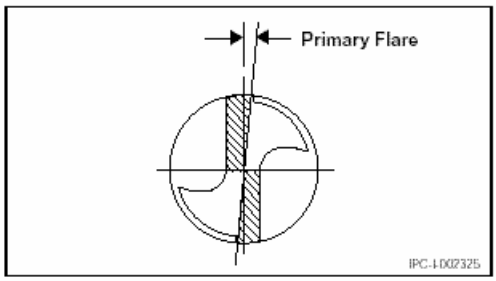


Figure P.4 – Primary flare

Primary Relief **51.0908**
The clearance angle at the outer corner of the cutting edge of the cutting edge of a drill point.

Primary Side **22.1484**
The side of a packaging and interconnecting structure that is so defined on the master drawing. (It is usually the side that contains the most complex or the most number of components.)

Primary Stage of Manufacture **92.0909**
That time during the manufacturing of a product when it is ready for inspection prior to shipment.

Primary Taper **51.0910**
A condition whereby the primary relief is wider at the centre of a drill than it is at the periphery. (See Figure P.5.)

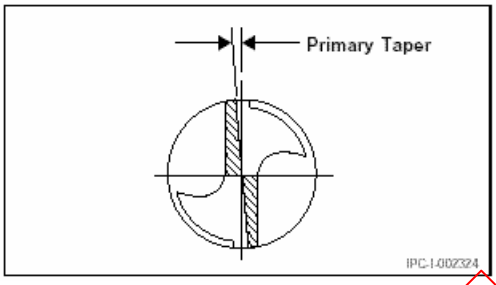


Figure P.5 – Primary taper

Print Contrast Signal **70.1987**
In bar code symbols, a comparison between the reflectance of the bars and spaces.

Printed Board (PB) **60.1485**
The general term for completely processed printed circuit and printed wiring configurations. (This includes single-sided, double-sided and multilayer boards with rigid, flexible, and rigid-flex base materials.)

Printed Board Assembly **80.0911**
The generic term for an assembly that uses a printed board for component mounting and interconnecting purposes.

Printed Board Assembly Drawing **26.1486**
The document that shows a printed board, separately manufactured components, and any information necessary to describe the joining of them together in order to perform a specific function.

Printed Circuit **60.0912**
A conductive pattern that is composed of printed components, printed wiring, discrete wiring, or a combination there of, that is formed in a predetermined arrangement on a common base. (This is also a generic term that is used to describe a printed board that is produced by any of a number of techniques.)

Printed Circuit Board **60.1487**
Printed board that provides both point-to-point connections and printed components in a predetermined arrangement on a common base. (See also "Printed Wiring Board".)

Printed Circuit Board Assembly **80.0913**
An assembly that uses a printed circuit board for component mounting and interconnecting purposes.

Printed Component **52.0914**
A part (such as an inductor, resistor, capacitor, or transmission line) that is formed as part of the conductive pattern of a printed board.

Printed Components, Conductive Inks **52.1600**
Component (e.g. printed inductor, resistor, capacitor or transmission line) forming part of the pattern of a printed circuit.

Printed Contact **22.0915**
A portion of a conductive pattern that serves as one part of a contact system.

Printed Edge-Board Contact **22.0916**
See "Edge-Board Contact".

Printed Wiring **60.1488**
A conductive pattern that provides point-to-point connections but not printed components in a predetermined arrangement on a common base. (See also "Printed Circuit".)

Printed Wiring Board **60.1489**
A printed board that provides point-to-point connections but not printed components in a predetermined arrangement on a common base. (See also "Printed Circuit Board".)

Printed Wiring Board Assembly **80.0917**
An assembly that uses a printed wiring board for component mounting and interconnecting purposes.

Printing **52.1592**
Act of reproducing a pattern on a surface by any process.

Probe Point **92.0919**
The predetermined location on a printed board where electrical contact can be made to exposed circuitry for electrical diagnostic purposes.

Probe, Test **92.0918**
A spring-loaded metal device used to make electrical contact between a test equipment and the unit under test.

Process Average **91.0920**
The location of the distribution of measured values of a particular process characteristic.

Process Indicator **91.0921**
A detectable anomaly, other than a defect, that is reflective of material, equipment, personnel, process and/or workmanship variation.

Process Spread **91.0922**
The extent to which the individual values of a process may vary.

Processability **70.1763**
Suitable and capable of being processed.

Producer's Risk **93.0923**
See "Alpha Error".

Production Board **60.1490**
A printed board or discrete-wiring board that has been manufactured in accordance with the applicable detailed drawings, specifications, and procurement requirements.

Production Data **94.1988**
Normal performance data from manufacturing runs generated as a quality assurance function. This data can be compiled, analysed, and reported as support for product compliance to a standard by the manufacturer.

Production Master **24.1642**
A 1:1 scale pattern that is used to produce rigid or flexible printed boards within the accuracy specified on the master drawing. (See also "Multiple-image Production Master" and "Single Image Production Master".)

Production Panel (PP) **50.1787**
An arrangement of printed boards fabricated from laminate or base materials as a group in a specific cluster to facilitate economic fabrication techniques using controlled and documented chemical, mechanical and electrical processes.

Production Printed Board (PPB) **50.1786**
A printed board fabricated from laminate or base materials in an environment that consists of controlled and documented chemical, mechanical and electrical processes used in combination to produce the features and characteristics of the final printed board product.

Proficiency **91.1989**
The capability to perform tasks in accordance with requirements and verification procedures.

Profile Factor **92.1492**
The amount by which the overall average thickness of a metal exceeds the thickness that is calculated from the established density of the metal and the area of the sample.

Propagation Delay **21.1493**
The time from output to input required for a signal to travel along a transmission line, or the time required for a logic device to receive an input stimulus, perform its function, and present a signal at its output.

Proportional Dimensions **92.0924**
The distortion of an optical system used in a magnification device.

Protrusion of Conductor **96.1990**
See "Conductor Protrusion".

Pull Strength **92.0925**
See "Bond Strength".

Pull-off Strength (SMD) **97.1991**
The force required to remove a surface mount device (SMD) mounted on a printed board by the application of a force that is perpendicular and away from the surface upon which it is mounted.

Pull-Out Strength **97.1816**
The force, normal to the printed board, required to separate the metallic wall of a plated-through hole from the base material.

Pulse, Digital **21.1494**
A logic signal that switches from one digital state to the other and back again in a short period of time, and that remains in the original state for most of the time.

Pulse Soldering **75.0926**
Soldering by the heat generated by pulsing an electrical current through a high resistance point of the joint area and the solder.

Punching **51.1992**
Formation of a hole, a slot, or a finished board by use of a female die and a male punch.

Push Back **51.1993**
The process of returning the printed board or printed board assembly that has been remove from the panel, back into its original position.

Push-Off Strength **97.0928**
The force required to dislodge a leadless component by the application of a force that is parallel to the surface upon which it is mounted.

Q

QFP with Bumper (BQFP) **33.1835**
A QFP package with a guarding bumper.

Quad Flat Pack (QFP) **33.1836**
A generic square or rectangular component package, containing semiconductor die, with leads on all four sides that are formed in a “gullwing” shape.

Qualification Agency **94.1212**
The organization that is used to perform documentation reviews and audits of an inspection or testing facility.

Qualification Testing **94.1213**
The demonstration of the ability to meet all of the requirements specified for a product.

Qualitative Analysis **92.1214**
The subdivision of chemistry concerned with the identification of materials.

Quality Conformance Testing **94.1496**
Qualification testing that is performed on a regularly-scheduled basis in order to demonstrate the continued ability of a product to meet all of the quality requirements specified.

Quality-Conformance Test Circuitry **92.1495**
A portion of a printed board panel that contains a complete set of test coupons that are used to determine the acceptability of the board(s) on the panel.

Quality System **90.1913**
A set of interrelated or interacting quality elements within an organization’s operations.

Quality Management System
A management system with which an organization will be directed with regards to product quality.

Quantitative Analysis **92.1215**
Chemical determination of the composition of mixtures or the constituents of a pure compound without regard to quantity.

Quartz Fibre (Electrical Grade) **44.1994**
Quartz yarn or fibre, which is to be used to develop the reinforcement for printed board applications.

Quasi-Interfacial Connection **22.1216**
See "Interfacial Connection”.

Quasi-Interfacial Plated-Through Hole **22.1201**
See "Nonfunctional Interfacial Connection”.

Quiet Zone (Bar code) **70.1996**
In a bar code symbol, the area that contains no markings, immediately preceding the start character and following the stop character.

Quill **44.1202**
A bobbin onto which filling yarns are wound.

R

Radial Lead Component **31.1997**
A component where the leads are located on the bottom, radially and parallel to the central axis.

Radiant Flux **56.1304**
The energy emitted per second from a radiant source in form of radiation, expressed in watts.

Radiant Intensity **56.1305**
The amount of power from a point source that is generated through a solid angle, measured in watts per steradian.

Radiation, Infrared **21.1998**
Thermal radiation emitted in the infrared region of the electromagnetic spectrum.

Radiation, Long Wave, Infrared **21.1999**
Infrared energy that is radiated at a wavelength that is between 5 microns and 100 microns.

Radiation, Medium Wave Infrared **21.2000**
Infrared energy that is radiated at a wavelength that is between 2,5 microns and 5 microns.

Radiation, Near Infrared **21.2001**
See “Radiation, shortwave infrared”.

Radiation, Re-emitted Infrared **21.2003**
That portion of thermal energy absorbed by a media that is in turn emitted in the infrared portion of the electromagnetic spectrum.

Radiation, Short Wave Infrared **21.2004**
Infrared energy that is radiated at a wave length that is between 0,78 microns and 2,5 microns.

Radiator, Focused **56.1306**
A reflector that is incorporated in the back of an emitter for the purpose of concentrating energy to produce a point or line of heat.

Radiator, Nonfocused **56.1307**
A diffusing reflector that is incorporated in the back of an emitter for the purpose of scattering energy over an area.

Radiometry **24.1308**
The measurement of radiation in the optical spectrum. (This includes infrared (IR), ultraviolet (UV), and visible.)

Random Sample **91.1311**
A set of individuals that is taken from a population in such a way that each possible individual in the population has an equal chance of being selected.

Random-Effects Model **91.1497**
A specific experimental treatment whereby a random sample is taken from a large population of treatments in such a manner that the conclusions reached can be extended to the entire population and the inferences are not restricted to the experimental levels.

Randomization **91.1309**
The random selection of experimental runs in order to minimize biases that are due to unknown or uncontrollable factors in an experimental design.

Randomness **91.1310**
A situation in which any individual event has the same mathematical probability of occurring as does all of the other events within the set of events.

Rebond **74.1312**
A termination made at, on top of, or adjacent to, the location of a prior bond.

Receptacle Connector **37.1313**
The fixed or stationary half of a two-piece connector pair that mates with a plug connector.

Reciprocity Failure **91.1314**
The deviation from the Reciprocity Law.

Reciprocity Law **91.1498**
A general law that pertains to photo-chemical reactions that states the mass of photoproduct from such a reaction is determined simply by the total exposure involved.

Rectangular Leads **36.1764**
A lead form or leg shape whose cross section is rectangular in shape.

Reduction Marks **22.1316**
A set of stylized patterns in the border area of an artwork between which the photographic-reduction dimension is defined.

Reed **44.1230**
A thin comb made of pressed steel wires between which warp ends are drawn after passing through the needle eyes.

Reference Dimension **26.1231**
A dimension without a tolerance that is used only for informational purposes that does not govern inspection or other manufacturing operations.

Reference Edge **22.1232**
The edge of a cable or conductor from which measurements are made.

Reference Hole **22.1233**
See "Tooling Hole".

Reference Master **24.1234**
Artwork that is free of defects.

Reflection, Signal Propagation **21.1499**
The fraction of a propagating signal that is reflected back toward its source after the signal has encountered a discontinuity in the electrical impedance of the transmission line on which it is traveling.

Reflection Coefficient **21.2005**
The ratio of the power or voltage of a microwave signal reflected from a load resistance that is attached to a circuit or transmission line to the power of the incoming signal.

Reflectivity **21.2006**
The ratio of the radiation power reflected from a surface to the incident radiation power. In the range of photometry it is the appropriate ratio of the luminous fluxes.

Reflow Soldering **75.1500**
The joining of surfaces that have been tinned and/or have solder between them, placing them together, heating them until the solder flows, and allowing the surface and the solder to cool in the joined position.

Reflow Soldering (Nitrogen Process) **75.1933**
A reflow soldering process, carried out in a nitrogen atmosphere, intended to retard oxidation of solder and board conductive surfaces and improve solder wetting.

Reflow Spike **75.1235**
The portion of the reflow soldering process during which the temperature of the solder is raised to a value that is sufficient to cause the solder to melt.

Reflow Temperature **75.2007**
The temperature range of a reflow soldering process during which the solder is in its liquidus phase.

Regardless of Feature Size **22.1236**
A geometric tolerance or datum reference that applies at any increment of size of a feature that is within its size tolerance.

Registered Production Master **24.1237**
A production master that incorporates physical registration features.

Registration **50.1240**
The degree of conformity of the position of a pattern (or portion thereof), a hole, or other feature to its intended position on a product.

Registration Mark **22.1315**
A stylized pattern (symbol) that is used as a reference point for registration.

Regression Analysis **91.1241**
The use of statistics to investigate and model the relationships between parameters and results.

Relative Permittivity (ϵ_r) **21.2008**
The relative permittivity, ϵ_r, is the ratio of the permittivity of a material to that of free space.

Release Liner (Pressure Sensitive Tape) **75.2009**
A web or sheet of material covering the adhesive side of a pressure sensitive tape.

Reliability **90.1501**
The probability that a component, device, or assembly will function properly for a definite period of time under the influence of specific environmental and operational conditions.

Re-melting Separation **75.2010**
The phenomenon in which solder on the previously soldered surface is re-melted by the heat being applied for soldering on the opposite side, causing separation of the solder and a component termination, or between the solder and a land (pad).

Removable Contact **37.1242**
A type of connector contact that is not permanently retained within the connector body or insert.

Render True Colour **24.1243**
The colour aberrations of an optical system that have been sufficiently corrected so as to allow a magnification device to resolve the required details.

Repair(ing) **77.1502**
The act of restoring the functional capability of a defective article in a manner that precludes compliance of the article with applicable drawings or specifications.

Repeat Set-Up Time **92.1244**
The set-up time for a unit that is identical to one previously evaluated.

Repeatability (Accept/Reject) Decisions **91.1503**
The percentage of features that show the same acceptance or rejection status on a minimum of three consecutive tests using identical operating modes and conditions in a statistically-significant random sampling of three units.

Residue **76.1245**
Any visual or measurable form of process-related contamination.

Resin **40.1246**
A natural or synthetic resinous material. (See also "Rosin" and "Synthetic Resin".)

Resin Flux **75.1247**
A resin and small amounts of organic activators in an organic solvent.

Resin Particle (Base Material) **44.1985**
An inclusion that is normally amber to brown and slightly translucent, composed of a particle of non-indigenous and previously dried or cured resin that may appear similar to "treater dirt" which tends to be less translucent, darker and chunkier.

Resin Recession **60.1504**
The presence of voids between the plating of a plated-through hole and the wall of the hole as seen in microsections of plated-through holes that have been exposed to high temperatures. (See Figure R.1.)

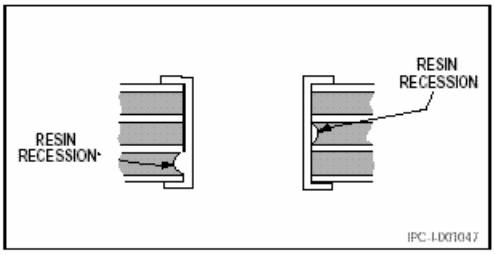


Figure R.1 – Resin recession

Resin Smear **51.1506**
Base material resin that covers the exposed edge of conductive material in the wall of a drilled hole. (This resin transfer is usually caused by the drilling operation).

Resin-Rich Area **41.1505**
The location in a printed board of a significant thickness of unreinforced surface-layer resin that is of the same composition as the resin within the base material.

Resin-Starved Area **41.1507**
The location in a printed board that does not have a sufficient amount of resin to completely wet out the reinforcing material. (Evidence of this condition is often in the form of low-gloss dry spots or exposed fibres.)

Resist (Mask) **52.1508**
A coating material, in a specific pattern, that is used to mask or protect selected areas of conductive circuitry during manufacturing or testing from the action of an etchant, plating, solder, etc.

Resistance **21.1805**
The nature to oppose the flow of electrons in a metallic lead, determined by Ohms law; in a circuit the resistance is the quotient of the applied voltage and the resulting electrical current.

Resistance Soldering **75.1248**
Soldering by a combination of pressure and heat generated by passing a high current through two mechanically-joined conductors.

Resistance to Solvents **76.2012**
The ability of the base laminate and other materials to resist damage to the material when exposed to solvents.

Resistance Welding **75.1249**
Welding by a combination of pressure and heat generated by passing a high current through two mechanically-joined conductors.

Resistive Clad Laminate **45.2013**
A clad laminate containing resistive material that is used in making planar resistors.

Resistor Drift **92.1250**
The change in resistance of a resistor caused by aging, usually expressed a percent change per 1,000 h.

Resolving Power **24.1509**
The ability of a photographic system to maintain the separate identity of parallel lines and spaces in a developed image when their relative displacement is small.

Response Variable **91.1251**
The dependent variable being studied.

Return Loss **21.2014**
Level of the reflected signal which is a result of a mismatch between a load and a source. It is usually expressed as the ratio of reflected power to incident power in dB units.

Reversal Development **24.1252**
The reversing of the tone of an image on a photographic emulsion from that which can be accomplished with conventional developing.

Reverse Current Cleaning **76.1253**
See "Anodic Cleaning".

Reverse Etchback
(See "Negative Etchback".) **54.2015**
The state that the inside conductor in a through in a multilayer board is etched off further inside of the cutting plane of the insulting layer.

Reverse-Treated Core (RTF) **41.2016**
A core (innerlayer) whereby the copper foil is laminated to the base material with the drum side down.

Reverse-Treated Foil **45.2017**
Metal foil on which the drum or smooth side has been chemically treated to make the surface rougher for increased adhesion to bonded surfaces

Reverse Image **52.1254**
The pattern of resist on a printed board that is used to allow for the exposure of conductive areas for subsequent plating.

Reversion **96.1510**
A chemical reaction in which a polymerized material partially or completely degenerates to a lower polymeric state or to the original monomer. (This is usually accompanied by significant changes in physical and mechanical properties.)

Rework **77.1511**
The act of reprocessing noncomplying articles, through the use of original or alternate equivalent processing, in a manner that assures compliance of the article with applicable drawings or specifications.

Rheology **40.2018**
The study of the change in form and flow of matter, generally characterized by elasticity, viscosity, and plasticity.

Ribbon Cable **37.1255**
A flat cable with round conductors.

Ribbon Interconnect **37.1256**
A flat narrow ribbon of metal used to make interconnections to lands, lead frames, etc.

Right Reading **24.1257**
A phototool pattern-orientation that is the same as the artwork master when it is viewed from the primary side of a product. (See Figures M.4 and R.2.)

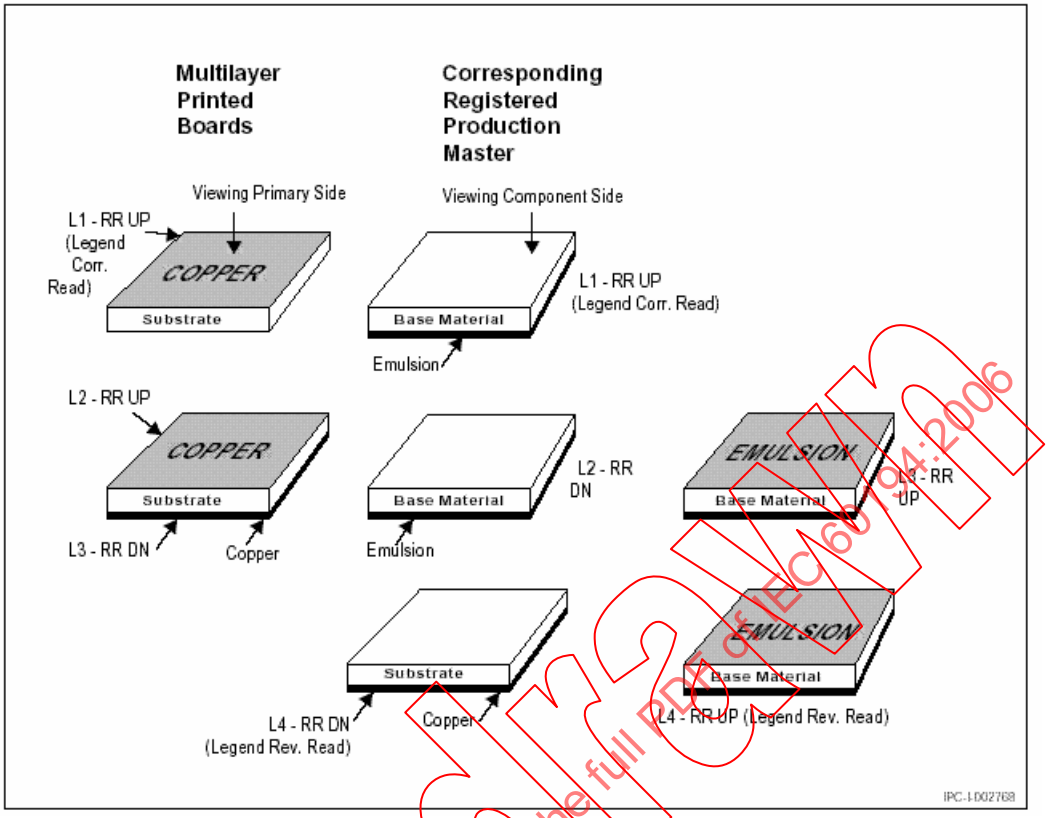
Right Reading Down **24.1512**
An orientation of a phototool in which the pattern is right and the emulsion is on the surface that is away from the viewing surface. (See Figures M.2 and R.2.)

Right Reading Up **24.1513**
An orientation of a phototool in which the pattern is right reading and the emulsion is on the surface that is toward the viewing surface. (See Figures M.4 and R.2.)

Rigid Double-sided Printed Board **61.1577**
Double-sided printed board, either printed circuit or printed wiring, using rigid base materials only.

Rigid Multilayer Printed Board **61.1578**
Multilayer printed board, either printed circuit or printed wiring, using rigid base materials only.

Rigid Printed Board **61.1571**
A printed board using rigid base materials only.



NOTE 1 A precise definition of image tone and orientation necessitates that the orientation of the pattern and the legend by separately identified. For example: Layer 1-Pos RR DN (Legend Corr. Read) or Layer 2-Pos RR UP (Legend Rev. Read) (There is no such thing as wrong reading.)

NOTE 2 By definition, all layer patterns are viewed from the same direction. (This view defines RR for the pattern appearance of all layers; this is not the same as viewing the final board copper head on.)

NOTE 3 Legend is usually correct reading when viewing the copper; therefore, on occasion alphanumerics must be reversed reading when the pattern is right reading by definition.

NOTE 4 Production master emulsion must be presented against the board copper in the stack up. Therefore, production master emulsion orientation is opposite to individual copper layer orientation, i.e.

NOTE 5 When specifying artwork tone and orientation, remember the board layup and the purpose of the artwork, i.e. file copy, artwork master, or production master, etc.

Single-sided printed board, either printed circuit or printed wiring, using rigid base materials only. if copper is RR UP by definition, corresponding production master must be RR DN.

NOTE 6 In manual designs the artwork is usually prepared at an enlarged scale with tapes and other drafting aids. The artwork master is produced from the artwork by photographic reduction.

NOTE 7 In semi-automated designs, there may be no artwork by definition. Typically, an enlarged colour-coded printed wiring layout on a gridded format is prepared for subsequent digitizing and photoplotting. This procedure may yield intermediate phototools which can be photographically processed into an artwork master or it may directly yield an artwork master, working master, or production master.

NOTE 8 In fully automated systems, there is usually no artwork or printed wiring layout prepared. A computerized procedure from a form of the electrical schematic by total computerization or a combination of computer and interactive design procedures. This procedure may yield intermediate phototools or the artwork master, working master, or production master directly

Figure R.2 – Printed board viewing orientations

Rigid-Flex Printed Board **63.1258**
A printed board with both rigid and flexible base materials.

Rise Time (Transition Duration) **21.1259**
The time required for a logic-signal voltage to switch from 10 % to 90 % of the difference between logic states.

Risk Management Factor (RMF) **94.1777**
The maximum tolerable percentage of possible defects within a lot (group) of units, based on approximately 95 % confidence level.

Roadmap **26.1260**
A printed nonconductive pattern that delineates the components and circuitry on a printed board in order to aid in servicing and repairing the final assembly.

Robber **53.1261**
See "Plating Thief".

Roll-to-Roll Process **42.2019**
A method of manufacturing flexible printed circuits using a continuous roll process, rather than individual panels

Rosin **46.1514**
A hard, natural resin, consisting of abietic and primaric acids and their isomers, some fatty acids and terpene hydrocarbons, that is extracted from pine trees and subsequently refined.

Rosin Flux **46.1262**
Rosin in an organic solvent or rosin as a paste with activators.

Rosin Solder Connection **75.1515**
A solder connection that has practically the same appearance as does a cold solder connection, but that also shows evidence of entrapped rosin separating the surfaces to be joined. (See also "Cold Solder Connection").

Rotational Error **25.1263**
The angular misalignment of a functional pattern with respect to the X and Y axes.

Router (CAD) **22.1264**
A computer program that automatically determines paths between points to be interconnected.

Router Bit **51.2020**
A straight or shaped rotary cutting tool used in a power router to cut, trim or shape materials by rotary action.

Routing **54.2021**
A mechanical method that removes a portion of the material outlining a printed board, using a cutting bit, in order to facilitate ease of breakout (removal) from the manufacturing/assembly panel.

Routing Mark **25.1265**
An artwork feature that is used to define the periphery of a printed board.

Roving **44.1266**
A collection of parallel strands of filaments assembled with or without an intentional twist.

Rubber Banding **22.1267**
A technique for displaying a straight line with one endpoint fixed and the other end following the commands of a manual data input device.

Run **91.1268**
A consecutive number of points that consistently increase or decrease, or that are consistently above or below the central line of an SPC control chart.

Run Chart **91.1269**
A graphic representation of plotted values of some statistic gathered from a process characteristic and a central line that can be analysed for runs.

Run Time **92.1271**
The time elapsed while a unit is in an inspection or testing machine.

Runout **24.1270**
The sum of the cumulative-pitch error across a number of functional patterns on a step-and-repeat phototool.

Runtime System **11.1272**
The collection of software programs required to perform the actual testing and diagnosis of a unit under test.

S

Sacrificial Protection **45.1274**
The preferential corrosion of a metal coating in order to protect the substrate metal.

Sacrificial-Foil Laminate **31.1273**
A base material with a treated-metal foil which is subsequently removed, for the purpose of impressing a microporous topography on the surface of the base material.

Sagging **74.1275**
See “Wire Sag”.

Sample Qualification **90.2022**
Producing a product with a given set of parameters intended for evaluation as a sample of manufacturing capability.

Saponifier **76.1276**
An aqueous organic- or inorganic-base solution with additives that promote the removal of rosin and/or water-soluble flux.

Satin Weave **44.1516**
A fabric configuration where the surface is almost entirely made up of warp filling adjacent yarns, thereby producing a smooth surface. (The intersection points do not fall in a straight diagonal, or twill, but in a patterned formation.)

Scalar Processing **11.1277**
The use of a computer architecture in which single operations are performed on data elements.

Scan Rate **92.0755**
The rate at which a machine scans the surface of the unit being evaluated, expressed in surface area per unit of time or time per unit area of surface.

Scan-Dead Time **92.1278**
The time during a scanning process when data is not being collected from the unit being evaluated.

Scanner, Test **92.0693**
A program controlled relay matrix used for connecting any unit-under-test circuit node to the analog instrument bus.

Scanning Electron Microscope (SEM) **92.2023**
A microscope that makes use of a scanning beam of electrons to display details smaller than 100 angstroms in size (surface only).

Scatter Diagram **94.0991**
A graph that depicts the relationships between an independent variable and a dependent response variable.

Scavenged Air **14.2024**
Vapours and aerosols removed from a processing area to help ensure that there is no process fluid in the workplace.

Schematic Diagram **26.1107**
A drawing that shows, by means of graphic symbols, the electrical connections, components and functions of a specific circuit arrangement.

Scoop-Proof Connectors **37.1239**
Connectors that incorporate features that prevent contact damage during mating and unmating.

Screen Printing **52.1204**
The transferring of an image to a surface by forcing a suitable media with a squeegee through an imaged-screen mesh.

Scribe Coat **24.1205**
A stable base material, such as glass or film, with an opaque coating.

Scribing **24.1279**
The cutting of the opaque coating, but not the base material, on a scribe-coat material.

Scrubbing **74.1280**
The rubbing of the lead wire and bonding land in order to break up oxide layers and to improve bondability.

Scum **52.2025**
A resist residue remaining on the substrates surface following development.

Search Height **74.1281**
The height of a bonding tool above the bonding area prior to it being lowered to make the termination.

Seating Plane **30.2026**
The surface on which a component rests.

Second Bond **74.1283**
The second termination in a sequence of bonds made to form a conductive path. (See also "First Bond".)

Secondary Relief **51.1282**
The clearance angle that is behind the primary relief of a drill point.

Secondary Side **22.1517**
That side of a packaging and interconnecting structure that is opposite the primary side. (It is the same as the "solder side" on through-hole mounting technology.)

Section Beam **44.1284**
A flanged cylinder onto which yarn is drawn and accumulated from the yarn bobbins or packages.

Sectional Specification (SS) **26.1783**
A document that describes the specific requirements pertaining to a portion of a set, family, or group of products, materials or, services.

Seed Layer **53.1286**
See "Activating Layer".

Seeding **53.1285**
See "Activating".

Self Declaration **94.2027**
The manufacturer's view of its products and process capabilities in order to meet the customer's requirements, the requirements of a standard, and/or the applicable associated specification sheet(s).

Self Test **92.1287**
The ability of an analyser to appraise itself prior to performing a test procedure.

Self-Alignment Effect **73.2028**
An effect that pulls an SMD to the centre of the land by the surface tension of the solder during reflow soldering.

Selvage **44.1288**
The edge of the fabric where the body of the fabric ends as defined by the last warp yarn.

Semi-Additive Process **53.1518**
An additive process wherein the entire thickness of electrically- isolated conductors is obtained by the combined use of electroless metal deposition and electroplating, etching, or both. (See also "Fully-Additive Process".)

Semi-Rigid Cable **37.2029**
A coaxial cable that has a solid outer conductor.

Semiconductor **30.1289**
A solid material, such as silicon, that has a resistivity that is midway between that of a conductor and of a resistor.

Semiconductor Carrier **74.1290**
A package for semiconductor die.

Sensitivity Control **91.1519**
The provisions that allow a machine to be set to acceptance and rejection thresholds that correspond to the end-use requirements for the units being evaluated.

Sensitizing **53.1291**
See "Activating".

Separable Component Part **30.1520**
A replaceable component part with a body that is not chemically bonded, excluding protective coatings, solder, and potting compounds, to the base material.

Sequential Lamination **61.1594**
The process of manufacturing multilayer printed boards in which multiple double-sided printed boards with interconnecting holes between conductive patterns on both sides are laminated or combined, after which additional layers (usually single-sided) are attached to the partially completed board stackup.

Sequentially-Laminated Multilayer Printed Board **61.1521**
A multilayer printed board that is formed by laminating together through-hole plated double-sided or multilayer boards. (Thus, some of its conductive layers are interconnected with blind or buried vias.)

Serpentine Cut **77.1293**
A trimming cut in a film component in the shape of a wavy (serpentine) pattern.

Service Temperature (Flexible Circuits) **42.2137**
The maximum, continuous temperature exposure that a flexible printed wiring material may withstand without degradation beyond 50 % of both initial peel strength and dielectric breakdown for a 100,000 h lifetime.

Set-Up Time **92.1522**
The time required to change hardware and software, to set-up necessary windows, and to run calibration and verification tests in order to ensure that a system is ready for operation.

Shadowing, Etchback **54.1294**
A condition that occurs during an etchback process in which the dielectric material immediately next to the foil is not removed completely. (See Figure S.1. This can occur even though an acceptable amount of etchback may have been achieved elsewhere.)

Shadowless Illumination **24.1523**
The illumination of the area of interest by the light source of a magnifying device so that no shadows fall on the area of interest from objects in the field of view that are not of prime interest.

Shank **51.1295**
The cylindrical part of a drill that is held in the spindle of a drilling machine.

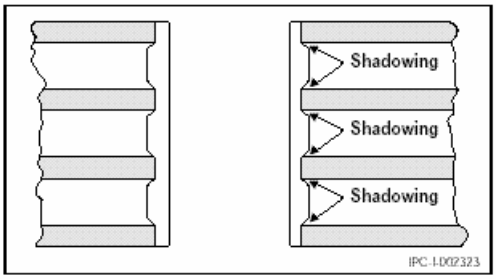


Figure S.1 – Shadowing

Shank Diameter **51.1297**
The actual size of a drill shank.

Shank-to-Drill Body Concentricity **51.1296**
The total variation of the location of the outside diameter of a rotating drill shank.

Shear Strength **92.1298**
The force required to shear apart adhesive-bonded (and cured) materials and/or components. (See also "Lap Shear Strength" and "Torsional Strength".)

Shear Test **92.1765**
The maximum stress a material can withstand in shear; the value of the force achieved when shearing stress is applied to a solder joint or wire bond to determine the breaking load.

Sheet Capacitance **92.1524**
The electrical capacitance of a material as measured from one electrode to another, expressed in a unit of capacitance (e.g. farads or microfarads) per unit area.

Sheet Resistance **92.1525**
The electrical resistance of a planar film of a resistive material with uniform thickness as measured across opposite sides of a unit square pattern, expressed in ohms per square.

Sheet-Metal Contact **37.1299**
A type of connector contact that consists of flat spring metal that has been formed by either stamping or bending. (See also "Machined Contact".)

Shelf Life **90.1526**
The length of time a material, substance, or product can be stored, under specific environmental conditions, while it meets all applicable specification requirements and remains suitable for its intended use.

Shield **21.1300**
The material around a conductor or group of conductors that limits electromagnetic and/or electrostatic interference.

Shielding, Electronic **21.1527**
A physical barrier, usually electrically conductive, that reduces the interaction of electric or magnetic fields upon devices, circuits, or portions of circuits.

Short, Electrical **92.1301**
A fault that connects two or more points that are normally electrically separated.

Short-Term Capability **91.1302**
The capability of a process that exhibits statistical control over a brief period of time.

Shoulder Angle **51.0929**
The angle of the blended transition from the drill shank diameter to the drill body diameter.

Shrinkage Cavity **97.2031**
A cavity or crack occurring around the surface of a soldered area after solidification of the solder joint that does not penetrate into the inside of the soldered area.

Shrink SOP (SSOP) **33.2030**
A family of component packages with four sizes, each having the ability to provide lead pitches between 0,625 mm (0,0025 in) and 0,3 mm (0,012 in).

Shuttle **44.0930**
The device that holds the quill of the filling yarn and carries it back and forth across the width of the fabric.

Sigma (σ) **94.0931**
The lowercase Greek letter that is used to designate a standard deviation of a population.

Signal **21.0932**
An electrical impulse of a predetermined voltage, current, polarity and pulse width.

Signal Conductor **22.0934**
An individual conductor that is used to transmit an impressed electrical signal.

Signal Line **22.0935**
A conductor used to transmit a logic signal from one part of a circuit to another.

Signal Plane **22.0936**
A conductor layer that carries electrical signals. (See also "Ground Plane" and "Voltage Plane".)

Signal-to-Noise Ratio (Process Control) **91.0933**
A response variable that takes into consideration both parameter mean and parameter variation values.

Silkscreening **52.0937**
See "Screen Printing".

Silver Migration **92.0938**
The ionic removal of silver and its redeposition in an adjacent area under the influence of migration-inducing conditions.

Silver Streak (Base Materials) **96.2033**
See "Tunnel Void".

Simulated Aging **92.0939**
The artificial exposure of material to conditions of both high and low temperature and humidity in an attempt to produce changes that occur during its extended exposure to normal environmental conditions.

Simulated Datum **92.0940**
The surface or feature(s) on a fixture, used as a machine reference, which is correlated to the original board or assembly datum.

Single Chip Package (SCP) **33.2034**
An integrated circuit package containing only one semiconductor die.

Single-Image Production Master **24.0941**
A production master that is used in the process of making only one printed board. (See also "Multiple-Image Production Master".)

Single-Inline Package (SIP) **31.0942**
A component package with one straight row of pins or wire leads.

Single-Layer Carrier Tape **36.1528**
The carrier for conductors used in tape-automated bonding that consists only of a metal foil. (See also "Multilayer Carrier Tape," "Two-Layer Carrier Tape," and "Three-Layer Carrier Tape".)

Single-Point Bonding **74.0943**
The making of terminations one at a time. (See also "Gang Bonding".)

Single-Sided Assembly **80.0944**
A packaging and interconnecting structure with components mounted only on one side. (See also "Double-Sided Assembly".)

Single-Sided Printed Board **60.0945**
A printed board with a conductive pattern on only one side. (Do the same with double-sided)

Sizing **44.0948**
The method of applying size i.e. starch to a group (width) of warp yarns on a continuous basis.

Skin Depth **21.2035**
The depth into a conductor for which the reciprocal of the current associated with a propagating electromagnetic signal is flowing. The depth becomes less as frequency increase.

Skin Effect **21.0946**
The increase in resistance of a conductor at microwave frequencies that is caused by the tendency of electric current to concentrate at the conductor's surface.

Skip Via **22.2036**
A via that directly connects conductive layers of build-up/HDI layers that are not adjacent with each other.

Skipping **52.0947**
When a coating or resist does not cover the spaces between adjacent conductors.

Slice **35.0949**
See "Wafer".

Sliver **96.0950**
A slender portion of plating overhang that is partially or completely separated from a conductor edge.

Slump **73.0951**
The distance that a substance, e.g. adhesive, moves after it has been applied.

Smaller-the-Better Characteristic **91.1817**
A parameter of quality that improves performance as its value decreases. (See also "Larger-the-Better Characteristic" and "Nominal-is-Best Characteristic").

Smear Removal **54.0953**
See "Desmear".

Smeared Bond **74.0952**
A bond impression that has been distorted or enlarged by excess lateral movement of the bonding tool or holding device fixture.

Socket Contact **37.0954**
A female connector contact.

Soft Error **35.2037**
A temporary electrical state error in a circuit caused by a transient event.

Solarization **24.0955**
A decrease in density with increased exposure.

Solder **46.0956**
A metal alloy with a melting temperature that is below 427 °C .

Solder Ball **75.0959**
A small sphere of solder adhering to a laminate, resist, or conductor surface. (This generally occurs after wave solder or reflow soldering.)

Solder Bath **75.1767**
A container or vessel of molten solder into which component parts or assemblies are immersed.

Solder Bridging **75.0960**
The unwanted formation of a conductive path of solder between conductors.

Solder Bump **74.0961**
A round ball of solder used to make interconnections between a flip-chip component and a base material during controlled-collapse soldering.

Solder Coat **53.0962**
A layer of solder that is applied directly from a molten solder bath to a conductive pattern.

Solder Connection **75.0963**
A metallurgical connection serving electrical/ mechanical/thermal functions that employs solder for the joining of two or more metal surfaces. (See also, “Cold Solder Connection”, “Disturbed Solder Connection”, “Excess Solder Connection”, “Insufficient Solder Connection”, “Overheated Solder Connection”, “Preferred Solder Connection”, and “Solder Connection Pinhole”.)

Solder Connection Pinhole **75.0964**
A small hole that penetrates from the surface of a solder connection to a void of indeterminate size within the solder connection.

Solder Contact **37.2039**
A type of connector contact whose non-mating end is in the form of a hollow cylinder, cup, eyelet, or hook that can be soldered to a wire in contact with it.

Solder Cream **46.0965**
See "Solder Paste”.

Solder Destination Side **73.2040**
The side of the printed board or mounting structure that the solder flows toward.

Solder Dissolution **70.2041**
A phenomenon whereby metals (i.e. Ag, Pcl. Co) are dissolved in the solder.

Solder Embrittlement **75.0966**
The reduction in mechanical properties of a metal as a result of local penetration of solder along grain boundaries.

Solder Fillet **75.0967**
Solder, with a normally concave surface, that is at the intersection of the metal surfaces of the solder connection.

Solder Fillet Lifting **97.1833**
The phenomenon in which a solder fillet is lifted off from a land on a board mainly during the flow soldering process. Usually, the phenomenon is more likely to occur on the primary side rather than on the secondary side which is exposed to flow soldering.

Solder Fillet Tearing **97.1834**
The tearing of a solder fillet from a land (pad). The term often refers to a re-melting separation that happens in mixed component-mounting in lead-free soldering process.

Solder Flow-up **70.2042**
The phenomenon in which molten solder flows from the solder contact side, through a plated-through hole, and wets the non-solder contact periphery, spreading to the component terminations.

Solder Joint **75.2043**
See “Solder Connection”.

Solder Levelling **53.1677**
A solder coating process that causes redistribution and/or partial removal of excess molted solder from a printed board by applying sufficient heat and mechanical force.

Solder Luster **75.2044**
A state in which the surface of a solder fillet is smooth and lustrous.

Solder Mask **47.0973**
See "Solder Resist".

Solder Meniscus **75.1766**
The contour of a solder shape that is the result of the surface-tension forces that take place during wetting.

Solder Paste **46.1818**
Finely divided particles of solder, with additives to promote wetting and to control viscosity, tackiness, slumping, drying rate, etc, that are suspended in a cream flux.

Solder-Paste Flux **75.0957**
Solder paste without the solder particles.

Solder Paste Printing Bleed **75.2045**
A spread of solder paste beyond the opening of screen mask.

Solder Plug **75.0974**
A core of solder in a plated-through hole.

Solder Powder **46.2046**
A small particle of solder having a spherical or irregular shape.

Solder Projection **75.0975**
An undesirable protrusion of solder from a solidified solder joint or coating.

Solder Reflow **75.2047**
See "Reflow Soldering".

Solder Resist **47.1674**
A heat-resisting coating material applied to selected areas to prevent the deposition of solder upon those areas during subsequent soldering.

Solder Resist Aperture **22.0977**
An opening in a solder resist.

Solder Side **22.0978**
The secondary side of a single-sided assembly.

Solder, Silver-Tin **46.2049**
Lead-tin solder with a percent of silver added to prevent the silver dissolution phenomenon, thus increasing the melting point according to the silver content.

Solder Spread Test **92.1819**
The determination of a relative measure of solder flux efficiency that is obtained by determining the area of spread of a specified weight of solder that has been placed on a specially prepared and fluxed metallic surface.

Solder Source Side **73.2048**
The side of the printed board or mounting structure to which solder is applied

Solder Sputter **75.0979**
Extraneous fragments of solder with an irregular-shape.

Solder Terminal **37.0980**
An electrical/mechanical connection device that is used to terminate a discrete wire or wires by soldering. (See also "Bifurcated Solder Terminal," "Cup Solder Terminal," "Hook Solder Terminal," "Perforated (Pierced) Solder Terminal," and "Turret Solder Terminal".)

Solder Webbing **75.0981**
A continuous film or curtain of solder that is parallel to, but not necessarily adhering to, a surface that should be free of solder.

Solder Wicking **75.0982**
The capillary movement of solder between metal surfaces, such as strands of wire.

Solderability **75.0958**
The ability of a metal to be wetted by molten solder.

Soldering **75.0968**
The joining of metallic surfaces with solder and without the melting of the base material.

Soldering Ability **75.0969**
The ability of a specific combination of components to facilitate the formation of a proper solder joint.

Soldering Flux **75.0970**
See "Flux".

Soldering Iron **75.1768**
Common name for a tool which is used to heat components and to reflow solder.

Soldering Iron Tip **75.0971**
The portion of a soldering iron that is used for the application of the heat that melts the solder.

Soldering Oil (Blanket) **75.1529**
Liquid formulations that are used in intermix wave soldering and as coverings on static and wave soldering pots in order to eliminate dross and to reduce surface tension during the soldering operation.

Soldering Temperature Resistance **75.1865**
The ability of the material to withstand the exposure of being subjected to molten or reflow solder temperatures without changing the physical properties of the material in excess of an acceptance criteria.

Solderless Wrap **75.1530**
The connecting of a solid wire to a square, rectangular, or V-shaped terminal by tightly wrapping a solid-conductor wire around the terminal with a special tool.

Solid-State Bond **74.0983**
See "Diffusion Bond".

Solid-Tantalum Chip Component **32.0984**
A capacitor in a leadless package whose dielectric material is solid tantalum.

Solidus (Soldering) **75.2050**
The temperature at which a solder alloy begins to melt.

Solvent **76.0985**
A non-reactive liquid substance that is capable of dissolving another substance.

Solvent Cleaning **76.0986**
The removal of organic and inorganic soils using a blend of polar and nonpolar organic solvents.

Solvent Extraction **76.1531**
The removal of one or more components from a liquid mixture by intimate contact with a second liquid that is nearly insoluble in the first liquid and which dissolves the impurities and not the substance that is to be purified.

Solvent Pop **76.0987**
Blistering caused by entrapped solvent.

Solvent Release **76.0988**
The physical transfer of molecules of a solvent from the liquid phase to the gas phase.

Solvent Wash **76.0989**
See "Solvent Cleaning".

Space (Bar code) **70.2051**
The light element of a bar code.

Spacing **22.0990**
See "Centre-to-Centre Spacing," "Conductor Spacing," "Edge Spacing," and "Pitch".

Spade Contact **37.0992**
A type of male connector contact that consists of flat metal that mates with a fork contact.

Spalling **97.0993**
The chipping, fragmenting or separation of a surface coating, or the cracking, breaking or splintering of materials, due to heat.

Span **22.0994**
The distance from the reference edge of the first conductor in a group of parallel conductors to the reference edge of the last conductor in the group.

Special Cause **91.0995**
A source of variation that is intermittent, unpredictable, or unstable that affects only some of the individual values of process output.

Special Characters **70.2052**
Non-alphabetic or numeric characters in a bar code symbol.

Specific Gravity **40.2053**
The ratio of the weight of a given volume of a substance to the weight of an equal volume of water.

Specific Solderability **75.0997**
The ease with which a metal or alloy can be wetted under specific conditions.

Specification Drawings **26.1532**
A document that shows the dimensional limits that are applicable to any or all parts of a component and any other information that is necessary to describe the product to be fabricated.

Specification Limits **91.0996**
The requirements for judging acceptability of a particular characteristic.

Specimens **92.1769**
Samples of a material, device or circuit, representative of the production lot, which are selected for testing.

Specks **70.2054**
Ink splatter not part of a bar code pattern.

Splay **51.0998**
The tendency of a rotating drill bit to make off-centre, out-of-round, holes that are not perpendicular to the drilling surface.

Split (Fabric) **44.0999**
An opening in a fabric that results from having either the pick or end breaking in two.

Spot Size **70.2055**
The diameter of the focused image of the emitter in bar code.

Spotting Out **96.1000**
The delayed appearance of spots and blemishes on plated or finished surfaces.

Spread **73.1001**
The distance of a substance, e.g. adhesive, moves after it has been applied at ambient conditions.

Spread (Values) **91.1002**
A general concept for the extent by which values in a distribution differ from one another.

Sprocket **74.1003**
A perforation along the edge of a carrier tape that is used to move and align the tape during the tape fabrication, assembly, and testing operations.

Spur **24.1004**
An undesirable clear projection from a clear photographic pattern or a dark projection from a dark pattern photographic.

Spurious Signal **21.1006**
See "Crosstalk".

Sputtering **53.1007**
The ejection of atoms caused by ion bombardment of a target material in a plasma environment and the subsequent deposition of ejected atoms onto the surface of the substrate".

Squeegee **75.2056**
A metal or rubber blade used to wipe a material (ink or solder paste) across a stencil or silk screen to force the material through the openings in the screen or stencil, onto the surface of a printed board or mounting structure.

Stability **91.1008**
The absence of special causes of variation.

Stabilization Period **57.1009**
The period of time in the reflow profile after preheat and before the reflow spike occurs where the temperature of the metals being joined are allowed to equalize.

Stable Process **91.1010**
A process that is in statistical control.

Stack Pin **51.2057**
The metal pin used for fastening and positioning of a panel(s) in hole drilling or peripheral cutting.

Stacked Via/Microvia **61.2058**
A via/microvia structure formed by stacking one or more build-up vias/microvias in a build-up multilayer providing an interlayer connection between three or more conductive layers.

Stain Proofing **76.1011**
The retardation of the oxidation of a metal surface.

Staking, Adhesive **73.1012**
The bonding or attaching of components, or component elements, to a surface or together by the application of small quantities of adhesive material.

Staking, Mechanical **75.1533**
The attaching of metallic devices, such as solder terminals and eyelets, by the upsetting of the portion of the device that protrudes through a hole in a base material.

Stamped Printed Wiring **60.1013**
Wiring that is produced by die stamping and bonding a metal foil to a base material.

Stand-Off **70.1770**
A post or protrusion used to facilitate raising a surface mounting device above the surface of the substrate.

Standard Deviation of a Population **91.1534**
A measure of the distribution of a population about a mean value that is equal to the square root of the variance of a process output. (See also "Sigma".)

Standard (Electrode) Potential **76.1535**
The reversible potential from an electrode process when all products and reactants are at unit activity on a scale in which the potential for a standard hydrogen half-cell is zero.

Standoff Solder Terminal **37.1014**
See "Turret Solder Terminal".

Start/Stop Characters **70.2059**
Distinct characters at the beginning and end of each bar code symbol that provide directional information for the decoding logic.

Static Electricity **21.2060**
An electrical charge (potential) at rest.

Static Electricity Control **21.2061**
A technique where materials and systems are employed to eliminate/discharge static electricity buildup by providing continuous discharge paths.

Static Relative Permittivity **21.2062**
The ratio of the capacitance (C_x) of a given configuration of electrodes with a specified dielectric, filling all the region of the static electrical field, to the capacitance (C_v) of the same electrode configuration with a vacuum (or air) as the dielectric.

Statistical Control **91.1015**
The condition of describing a process from which all special causes of variation have been eliminated and, thereby, only common causes remain.

Statistical Hypothesis **91.1016**
An assumption that is made about a population being sampled. (See also "Alternative Hypothesis" and "Null Hypothesis".)

Statistical Process Control (SPC) **91.1536**
The use of statistical techniques to analyse a process or its output so as to be able to take appropriate action in order to achieve and maintain a state of statistical control and to improve process capability.

Statistical Quality Control (SQC) **91.1017**
The use of statistical techniques to document and assure end product compliance with requirements.

Steam Aging **92.2063**
The exposure of a finish to an environment humidified by steam to precondition the finish for reliability.

Stencil (Solder Paste/Adhesive) **75.1849**
A thin sheet of material containing openings to reflect a specific pattern, designed to transfer a paste-like material to a substrate for the purpose of component attachment.

Stencil Border **75.1850**
Peripheral tensioned mesh, either polyester or stainless steel, which keeps the stencil foil flat and taut, connecting the foil to the frame.

Stencil Foil **75.1851**
The metal area of the stencil, which contains the print pattern.

Stencil Frame **75.1855**
A device onto which the stencil-foil is mounted. This may be tubular or cast aluminum with the border permanently mounted using an adhesive Cast frame sizes are referenced from the inside. Tubular frame sizes are referenced from the outside.

Stencil (Solder Mask) **52.1852**
A thin sheet of material containing openings designed to transfer paste-like solder mask material to a substrate to form the protective pattern.

Stencil Step **75.1853**
A stencil with more than one stencil-foil thickness.

Step Plating **43.2064**
A plating phenomena wherein the plating does not plate to the edge (sidewall) of the plating resist.

Step Scale **24.1537**
A series of regularly-spaced tones that range from black, through intermediate shades of gray, to white that is used as a reference scale for exposure control in a photo-fabrication process.

Step Soldering **75.1019**
The making of solder connections by sequentially using solder alloys with successively-lower melting temperatures.

Step Wedge **24.1020**
See "Step Scale".

Step-and-Repeat **24.1018**
The successive exposure of a single image in order to produce a multiple-image production master.

Stiffener Board **60.2065**
A material fastened to the surface of a printed board to increase its mechanical strength.

Stitch Bond **74.1021**
A bond made with a capillary-type bonding tool whereby the wire is not formed into a ball prior to bonding.

Straight-Through Lead **72.1022**
A component lead that extends through a hole and is terminated without subsequent forming.

Strain Relief (Connector) **37.1023**
A receptacle connector device that prevents the disturbance of the contact and cable terminations.

Stress Corrosion Cracking **95.1024**
Spontaneous cracking produced by the combined action of corrosion and residual or applied static stress.

Stress Relief **36.1025**
The portion of a component lead or wire lead that is formed in such a way as to minimize mechanical stresses after the lead is terminated.

Stress Relief (Clad Laminate) **41.2066**
The process used to reduce tension between the copper foil and the core material of a clad laminate.

Strike Plating **53.2067**
A thin plating used as a base for subsequent plating.

Stringing **73.1026**
The forming of a "tail" of adhesive as the dispensing tool pin or needle is withdrawn from the deposited adhesive.

Strip (Resist Stripping) **52.2069**
The process of removing unneeded masking material, such as a photoresist or metallic etch resist, after a processing step is completed.

Stripback **44.1027**
Broken filaments along a yarn strand that are pushed back and protrude above the fibre plane.

Stripline **21.1028**
A transmission line structure that consists of a signal line that runs parallel to and is sandwiched between and separated by a dielectric from two reference planes.

Structurally-Similar Construction **90.1029**
Material combinations and materials whose construction details will not affect test results at the primary stage of manufacture.

Stub **21.1030**
A branch of the main signal line of a signal net that is usually used to reach a load that is not on the direct signal path.

Stud Via **22.2070**
A via formed with a conductive stud, or pin.

Stud-Mount Termination **30.1031**
See "Straight-Through Lead".

Subgroup **91.0140**
A subset of a population that is analysed dependently in order to eliminate assignable causes of variation.

Subnet **21.1206**
A single source and a single target point that, together with associated vias, lands, and preplaced items, are completely connected by route segments within one net.

Substrate **41.1207**
See "Base Material".

Substrate Bending Test **92.1771**
A test applied to a substrate to determine its resistance to bending and the effects of bending to the substrate and any components mounted on the substrate.

Subsurface Corrosion **96.1208**
Formation of isolated particles of corrosion products beneath a metal surface.

Subtractive Process **50.1209**
The fabricating of a conductive pattern by the selective removal of unwanted portions of a conductive foil.

Support Ring **36.1033**
Dielectric material that is used to hold beam leads in place relative to one another outside of a packaged device.

Supported Hole **22.1211**
A hole in a printed board that has its inside surfaces plated or otherwise reinforced.

Supporting Plane **44.1032**
A planar structure that is a part of a packaging and interconnecting structure in order to provide mechanical support, thermo-mechanical constraint, thermal conduction and/or electrical characteristics. (It may be either internal or external to the packaging and interconnecting structure.) (See also "Constraining Core".)

Surface Insulation Resistance (SIR) **92.1538**
The electrical resistance of an insulating material between a pair of contacts, conductors or grounding devices in various combinations, that is determined under specified environmental and electrical conditions.

Surface Mount Device (SMD) **30.1772**
See "Surface Mount Component (SMC)".“

Surface Mounting Technology (SMT) **73.1035**
The electrical connection of components to the surface of a conductive pattern that does not utilize component holes.

Surface Resistance **21.2073**
The ratio of DC voltage to the current flowing between two electrodes of specified configuration that contacts the same side of a material. Expressed in ohms.

Surface Tension **75.1036**
The specific force tangential to the surface of a liquid to minimize its surface area for the specific condition.

Surface-Mount Component (SMC) **30.1034**
A leaded or leadless device (part) that is capable of being attached to a printed board by surface mounting.

Surge **21.1037**
A transient variation in the current and/or potential at a point in a circuit.

Swaged Lead **72.1539**
A component lead wire that extends through a hole in a printed board and its lead extension is flattened (swaged) to secure the component to the board during manufacturing operations.

Swell-and-Etch Process **53.1540**
The surface treatment of a base material in order to promote the adhesion of an electroless metal deposit by softening the surface with a solvent and then exposing the surface to an oxidizing solution in order to create a microporous surface.

Symbology (Bar Code) **70.2075**
The structural characteristics of bar code symbols.

Synthetic Activated Flux **75.1038**
A highly-activated organic flux whose post-soldering residues are soluble in allowed appropriate solvents.

Synthetic Resin **75.1039**
A synthetic organic polymer or a chemically-treated natural resin.

System Effective Colour Temperature **24.1040**
The effective colour temperature measured using an optical system's light source to illuminate the target area.

T

Tab **22.1042**
See "Printed Contact".

TAB **75.1041**
See "Tape Automated Bonding".

Tackiness **73.2076**
The adhesion between solder paste applied on a land and a SMD component.

Tail, Bonding **75.1043**
The free end of wire extending beyond the bond impression of a wire bond from the heel.

Tail Pull **75.1044**
The removal of excess wire after a wedge or ultrasonic bond is made.

Tape **75.1045**
See "Carrier Tape".

Tape Automated Bonding **75.1046**
A fine-pitch technology that provides interconnections between die and base materials with conductors that are on a carrier tape. (See Figure T.1).

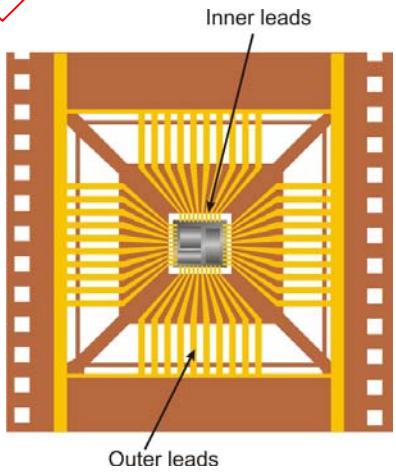


Figure T.1 – Tape Automated bonding

Tape Carrier Package (TCP) **33.2077**
A semiconductor package that has the TAB connection and is coated by a resin.

Taped Component **71.1541**
A component that is attached to a continuous tape in order to facilitate the use of automatic component incoming inspection, lead forming, assembling and testing.

Target Land **22.2117**
A land on which a microvia ends and makes a connection.

Tear (Base Materials) **96.2078**
A rip or split in either direction of the resin-coated reinforcement fabric in a base material dielectric structure.

Tear (Fabric) **44.1047**
A large rip in a fabric that is usually caused by excessive tension being applied during processing or caused by a weakness in the fabric.

Temperature Range (ΔT) **75.1672**
The range between upper and lower temperature limits as measured on a product (component, board or assembly) in a reflow heating process or end use environment.

Temperature Leveling **75.2079**
A process to make the temperature difference across a board as uniform as possible by preheating the board, or through the heating and melting of solder used in component attachment.

Temperature Profile **75.1048**
The depiction of the temperature that a selected point traverses as it passes through the reflow process.

Temperature, Reflow, Maximum **70.2080**
The maximum temperature that any portion of a product will reach during the reflow soldering process.

Tenter Frame **44.1049**
A machine test maintains fabric width during drying by means of clips running on two parallel endless chains.

Tenting **52.1050**
The covering of holes in a printed board and the surrounding conductive pattern with a resist.

Terminal **37.1051**
A metallic device that is used for making electrical connections. (See also "Solder Terminal".)

Terminal Area **22.1052**
See "Land".

Terminal Clearance Hole **22.1053**
See "Access Hole".

Terminal Hole **22.1054**
See "Component Hole".

Terminal Pad **22.1055**
See "Land".

Terminations **22.1773**
To connect a line to a terminal, distributing frame, switch or matrix.

Terpenes **76.1774**
(Turpentine).
A solvent used in cleaning electrical assemblies.

Test Board **92.1683**
A printed board or discrete-wiring board that is deemed to be suitable for determining the acceptability of a group of boards that were, or will be, produced with the same fabrication processes. (See also "Capability Test Board".)

Test Coupon **92.1820**
A portion of quality conformance test circuitry that is used for a specific test, or group of related tests, in order to determine the acceptability of a product.

Test Coupon Set **92.2081**
A complement of test coupons that are comprised of various test coupon types, each of which is designed for a specific test, that are all made in the same manufacturing lot.

Test Language **92.1057**
A high-level language used to write a test program.

Test Master **92.1058**
Artwork that contains specified anomalies or degrees of defect that an inspection or testing system should be capable of detecting.

Test Pattern **92.1059**
A pattern that is used for inspection or testing purposes.

Test Point **92.1060**
A special point of access to an electrical circuit that is used for electrical testing purposes.

Test Program **92.1061**
The set of instructions to a tester that controls the unit under test.

Test Set **92.1062**
The unique combination of test programs and test fixtures that control the unit under test.

Test Step **92.1063**
The application of a single input vector.

Testing Personnel **92.1056**
Those individuals that test products for the purpose of ascertaining the conformance of a product to applicable specifications.

Tetrafunctional Resins **75.1064**
Materials that have four reactive groups per molecule.

Thermal Coefficient of Expansion (TCE) **21.1065**
See "Coefficient of Thermal Expansion (CTE)".

Thermal Conductivity **20.1066**
The property of a material that describes the rate at which heat will be conducted through a unit area of the material for a given driving force.

Thermal Cure **40.2082**
A chemical reaction using heat energy that hardens organic substances such as adhesives and coating materials.

Thermal Expansion **21.2083**
Expansion of the material when subjected to a temperature increase.

Thermal Mismatch (Expansion) **20.1067**
The difference between the thermal expansion of two materials that are bonded together. (See also "Coefficient of Thermal Expansion (CTE)".)

Thermal Plane **22.2085**
See "Heatsink Plane".

Thermal Relief **22.1068**
The crosshatching of a ground or voltage plane that minimizes blistering or warping during soldering operations.

Thermal Resistance **21.2086**
The resistance of a material to the passage of thermal energy usually measure in K/W.

Thermal Shock Resistance **21.2087**
A measure of how well a material stands up to rapid changes in temperature.

Thermal Shock Test **92.2088**
One of the environmental tests to check the property changes of a product or material caused by rapid heating and cooling.

Thermal Shunt **30.1069**
See "Heatsink".

Thermal Ultrasonic Bonding **74.2089**
The bonding of wires to metal pads on an integrated circuit by means of heat and ultrasonic scrubbing of wire into the pad to create a metallurgic bond.

Thermal Zone **50.1542**
The evaluation zone of the plated metal in a microsection of the vertical portion of a plated-through-hole extending a specified distance beyond the ends of the lands. (Unless otherwise specified, this distance is 0,08 mm.)

Thermocompression Bonding **74.1543**
The joining together of two materials without an intermediate material by the application of pressure and heat in the absence of electrical current.

Thermode **75.1070**
A contact heating element that is used to generate reflow soldering heat.

Thermode Temperature Gradient **75.2090**
The temperature difference between one end of a thermode and the other after some time that the temperatures at both ends are in steady state.

Thermode Temperature Variation **75.2091**
The maximum difference of temperatures of a point on a controlled-temperature thermode over a period of time.

Thermoplastic **40.1071**
A plastic that can be repeatedly softened and reshaped, without any significant change in inherent properties, by exposure to heat and hardened by cooling.

Thermoset **40.1544**
A plastic that undergoes a chemical reaction when exposed to elevated temperatures that leads to it having a relatively infusible or crosslinked stated that cannot be softened or reshaped by subsequent heating.

Thermosonic Bonding **74.1072**
Terminations made by combining thermo-compression and ultrasonic bonding principles.

Thick Film **45.1545**
A film, greater than 0,1 mm thick, deposited by screen printing and subsequently fired at high temperatures in order to fuse it into its final functional form.