

DeltaQualifikationsMatrix

Allgemeines

Kurze Produkt- und Technologiezyklen elektronischer Bauelemente sowie neue Umweltauflagen (Bleiverbot, Flammschutzmittel, ...) führen häufig zu prozeß- und werkstofftechnischen Änderungen an Bauelementen, Leiterplatten, Verbindungstechnik und Schaltung, welche evaluiert werden müssen. Eine geeignete Methodik zur Handhabung von Änderungen an elektronischen Bauelementen beschreibt die ZVEI "Guideline for Customer Notifications of Product and /or Process Changes (PCN) of Electronic Components specified for Automotive Applications". Ein wesentlicher Teil dieser Guideline sind die hier vorliegenden Matrizen, welche sich als Empfehlungen für die Evaluierung von typischen Änderungen an elektronischen Bauelementen verstehen. Dies sollte Teil des offenen und risikobewussten Dialoges zwischen Lieferant und Kunden sein.

Diese DeltaQualifikationsMatrizen wurden durch den Industriearbeitskreis "PCN DeltaQualifikationsMatrix" und den Bauteilexperten des ZVEI Arbeitskreis "PCN-Methodik" erarbeitet. Der Inhalt wurde basierend auf dem aktuellen Stand der Technik erstellt und erhebt keinen Anspruch auf Vollständigkeit. Im Einzelfall ist ggf. ein abweichendes Vorgehen abzustimmen, da kundenspezifische Vereinbarungen zur Qualifikation zu berücksichtigen sind.

Anwendung der DeltaQualifikationsMatrix (auszufüllen durch den Bauelementehersteller)

- a) Diese Tabelle ist **nur** bei Änderungen anzuwenden. Neuqualifikationen und Sonderqualifikation (z.B. Verguß von Modulen) sowie Information Notes bleiben von diesen Matrizen unberührt.
- b) Ist eine Änderung in dieser Tabelle nicht aufgeführt, so ist der Qualifikationsumfang zwischen Kunde und Lieferant abzustimmen.
- c) Die Matrix der Aktiven Bauelemente ist so aufgebaut, dass zwischen integrierten Halbleitern (AEC-Q100 Rev.H) und diskreten Halbleitern (AEC-Q101 Rev. D1) auszuwählen ist (Zelle D4). Für Passive Bauelemente gilt die AEC-Q200. Für LED's gilt die IEC 60810.
- d) **Alle** Änderungen in der PCN sind in der Spalte B durch ein Kreuz (x) zu markieren und werden dadurch farblich hervorgehoben. Sofern dies geschehen ist, werden im Feld "*Tests, which should be considered for the appropriate process change*" (Zeile 83 für Aktive Bauelemente, Zeile 466 für Passive Bauelemente oder in Zeile 77 für LED's) alle in Betracht zu ziehenden Zuverlässigkeitstests angezeigt.
- e) In "*Tests, which should be considered for the appropriate process change after selection of condition table*" (Zeile 85 für Aktive Bauelemente, Zeile 468 für Passive Bauelemente oder Zeile 79 für LED's) wird die Anpassung der in Betracht zu ziehenden Tests in Folge der Relevanz bezüglich der Änderung berücksichtigt.
Dazu ist die Tabelle "Conditions" entsprechend der Auswahl (A/B/C) mit einem (x) zu bewerten.
- f) In "*Suppliers performed tests*" (Zeile 87 für Aktive Bauelemente, Zeile 470 für Passive Bauelemente oder Zeile 81 für LED's) dokumentiert der Bauelementehersteller die durchgeführten bzw. geplanten Tests.
- g) Falls von der Testempfehlung abgewichen wird, so sollten diese Abweichungen vom Bauelementehersteller angezeigt und kommentiert werden. Hierzu ist der Bereich "*Reason for exception of tests*" (Zeile 89 für Aktive Bauelemente, Zeile 472 für Passive Bauelemente oder Zeile 83 für LED's) zu verwenden.
Werden die in Betracht zu ziehenden Tests durch generische Daten (**G**) belegt, ist dies ebenfalls hier anzuzeigen und zu begründen.

Die Einstufung des Untersuchungslevel erfolgt in folgende Kategorien

- "**C: Component level**": Die Evaluierung der Änderung am Bauelement ist durch Untersuchungen **ausschließlich** am Bauelement beim Bauelementehersteller durchführbar. Zur Evaluierung der Änderung dürfen Ergebnisse aus bereits durchgeführten Untersuchungen herangezogen werden, wenn diese zu einem ähnlichen Bauelement bereits vorliegen (**Generische Daten**).
- "**B: Board level**": Die beschriebene Änderung hat möglicherweise Einfluss auf die Verarbeitbarkeit des Bauelementes im Steuergerät. Die Evaluierung der Änderung wird wie unter C beim Bauelementehersteller durchgeführt. Zusätzlich ist durch den Kunden/Steuergerätehersteller die Verarbeitbarkeit zu prüfen, die z.B. abhängig von der Änderung, Zuverlässigkeitsuntersuchungen auf applikationsrelevanten Testboards erfordert.
- "**A: Application level**": Die beschriebene Änderung hat möglicherweise Einfluss auf die Applikation/ das Steuergerät. Die Evaluierung der Änderung wird wie unter C oder B durchgeführt. Zusätzlich ist vom Kunden/Steuergerätehersteller der Einfluss der Änderung im Steuergerät durch geeignete Untersuchungen zu bewerten. Dieses Vorgehen ist mit dem OEM abzustimmen. Hierbei ist zu berücksichtigen, ob die Steuergeräte- / Baugruppenanforderungen durch andere Qualifikationen bereits hinreichend abgesichert sind (**applikationsspezifische Risikobetrachtung**).
- "*****: **Not relevant for qualification matrix**": Änderung(en), die nicht in A, B oder C eingestuft werden können und somit nicht relevant für die DeQuMA sind.

Information Notes

Änderungen die nur eine Information Note benötigen (bei der Bewertung Risk on Supply Chain als "I" gekennzeichnet), dürfen nicht in der DeQuMa angekreuzt werden, da Sie ansonsten den erforderlichen Evaluierungslevel verfälschen. Für als "I" bewertete Änderungen ist das Information Note Formblatt zu verwenden.

Wichtige Hinweise

- Zur formgerechten Anwendung der DeltaQualifikationsMatrizen steht auf der Homepage des ZVEI AK ein Tutorial bereit (ZVEI-Tutorial).
- ID Nummer: ist eine eindeutige Identifikationsnummer für jede angegebene Änderung, die in den ZVEI PCN DeltaQualifikationsMatrizen identifiziert ist. Die gleiche ID Nummer wird zur Identifizierung der Änderung im PCN Form Sheet verwendet.
- Die mittels Matrix identifizierten Tests sind **in Betracht zu ziehen**, d.h. es ist zu prüfen, ob der jeweilige Test für die spezifische Änderung in dieser Form notwendig ist. Abweichungen oder generische Daten sind im Detail zu begründen.
- Die Spalte "Further applicable conditions", Bemerkungen und Fußnoten sind unbedingt zu beachten, da sie wichtige Hinweise und Einschränkungen enthalten.
- Zur Nutzung aller Funktionen muss in Excel die Anwendung von Makros freigegeben sein.

Form provided by ZVEI - Revision 3.1 - December 2016

DeltaQualificationMatrix

General

Short product and technology cycles as well as new environmental regulations („Pb-free“, flame retardants, ...) frequently result in process and material changes of components, printed circuit boards, assembly techniques and circuit layout which have to be evaluated. The ZVEI "Guideline for Customer Notifications of Product and /or Process Changes (PCN) of Electronic Components specified for Automotive Applications" describes an appropriate methodology for dealing with changed electronic components. The qualification matrices in this guideline are recommendations for how to assess typical changes of electronic components. These recommendations promote an open risk-based discussion between supplier and customer regarding qualifications.

The DeltaQualificationMatrices were developed by the Industry Task Force Team "PCN DeltaQualificationMatrix" together with component experts from the ZVEI Working Group "PCN-Methodology". Actual content represents state-of-the-art technology and does not claim to be comprehensive. Deviation from proposed guideline should be mutually agreed as customer specific requirements have to be considered.

DeltaQualificationMatrix Application (completion by component manufacturer)

- a) This table has to be used for changes **only**. The matrices are not applicable for new product, special qualifications (for instance for encapsulation of module) or Information Notes.
- b) If a change is not listed in this table, the qualification plan has to be defined and agreed between customer and supplier.
- c) The matrix for Active Components requires the user to chose between integrated circuits (AEC-Q100 Rev. H) and discret semiconductors (AEC-Q101 Rev.D1) (cell D4).
For Passive Components AEC-Q200 is used. For LED'S the IEC 60810 is used.
- d) **All** changes as listed in the PCN have to be marked by a cross (x) in column B and will appear colored. The relevant reliability tests are then shown in "*Tests, which should be considered for the appropriate process change*" (row 83 for Active Components, row 466 for Passive Components, respectively in row 77 for LED's).
- e) In "*Tests, which should be considered for the appropriate process change after selection of condition table*" (see row 85 for Active Components, row 468 for Passive Components, or row 79 for LED's) is for modification of the found relevant tests under consideration of the weight of change. Related table "Conditions" has to be assessed per proposed letters with an (x).
- f) In "*Suppliers performed tests*" (here_row 87 for Active Components, row 470 for Passive Components, or row 81 for LED's) the component manufacturer documents the planned and performed tests.
- g) In case of deviations from tests, which should be considered this should be notified and commented by the component manufacturer in the area "*Reason for exception of tests*" (see row 89 for Active Components, row 472 for Passive Components, or row 83 for LED's).
Test results in form of generic data (**G**) are allowed when notified and justified.

Evaluation Levels are categorized as follows

"**C: Component level**": The evaluation of a change at component level by the component manufacturer is sufficient. Generic data from other relevant evaluations can be used.

"**B: Board level**": The intended change described in the PCN may influence processability / manufacturability of the component at board level. Therefore additional evaluation by customer may be necessary, for example reliability tests on application relevant testboards, depending on change.

"**A: Application level**": The intended change described in the PCN may influence the properties of the application (e.g. Electronic Control Unit).
In addition to the evaluation under C or B the influence of the change in the application is evaluated by suitable investigations by the customer. The scope of the evaluation has to be aligned with the OEM. It has to be considered whether the application / assembly requirements are already sufficiently safeguarded by other qualifications (**application specific risk assessment**).

" *": **Not relevant for qualification matrix**": Changes which fulfill neither A,B nor C definitions

Information Notes

Changes indicated as "I" shall not be marked in the DeQuMa. For those changes the InformationNote sheet shall be used. As the DeQuMa is desired for PCN only, a marking of "I"-changes would automatically influence evaluation level and test effort.

Important Notes

- To use the matrices in the right form the ZVEI working group provides a Tutorial on its homepage (ZVEI-Tutorial)
- ID number: is a unique identification number for each indicated change defined in the ZVEI PCN DeltaQualificationMatrices. The same ID number is used in the PCN Form sheet to identify the change.
- Tests identified by the matrix have **to be considered** and checked if they are necessary to assess the specific change. Test modifications or generic data have to be justified in detail.
- "Further applicable conditions", comments and notes need attention, as they provide important hints and limitations.
- In order to use all functions in EXCEL, macros have to be allowed.

History of DeQuMa

| Version | Remarks |
|---------|---|
| 2.0 | Revised by ZVEI PCN Methodology Workgroup in March 2015 |
| 2.1 | Released March 2015 |
| 2.1.1 | Active Components - delete write protection in comments |
| 2.2 | Solved problems with some ActiveX configurations |
| 2.2.2 | Solved Problems in Active Components |
| 2.2.3 | Solved Problems ActiveX, Active Components SEM-DE-02 (Design changes in routing) error fixed |
| 2.2.4 | Minor fixes |
| 3.0 | General Revision by ZVEI PCN Methodology Workgroup in June 2016 Changes are indicated by underlining in the read only version named Changes_DeQuMa_rev3_vs_rev2.xlsx |
| 3.0.4 | Expert Release |
| 3.0.5 | Fixing of macro bugs |
| 3.1 | Final Release (orthographic and punctuation corrections) |

| Category | Code | Description | Impact | Priority | Material | Process | Design | Test | Reliability | Cost | Lead Time | Supply Chain | Environment | Health & Safety | Other | Notes | |
|---|--|--|--------|---|--|---|--------|------|-------------|------|-----------|--------------|-------------|-----------------|-------|--|--|
| CERAMIC / TANTALUM | PAS-CER-MA-01 | Change of supplier of material | - | P | Change to a new or additional material supplier or component manufacturer | g.g. for 2nd source supplier | C | | | | | | | | | Assumption material specification remains unchanged. Otherwise see change of material. | |
| | DESIGN | | | | | | | | | | | | | | | | |
| | PAS-CER-DE-01 | Change of termination, surface finish, shape, color, appearance or dimension structure - Lead Diameter | I | P | Lead diameter | e.g. change from 0.8mm into 0.6mm | B | | | | | | | | | | |
| | PAS-CER-DE-02 | Change of termination, surface finish, shape, color, appearance or dimension structure - Termination Area | I | P | Termination area | e.g. change to width of termination from 0.1 - 0.3mm to 0.2 - 0.4mm | B | | | | | | | | | | |
| | PAS-CER-DE-03 | Change of termination, surface finish, shape, color, appearance or dimension structure - Termination Profile | I | P | Termination profile | e.g. additional layer in termination | B | | | | | | | | | | |
| | PAS-CER-DE-04 | Change of inner construction - Layer Thickness | I | P | Layer thickness (electronic thickness) | e.g. change from 0.2µm into 0.3µm | C | | | | | | | | | | |
| | PAS-CER-DE-05 | Change of inner construction - Layer Thickness | I | P | Layer thickness (electronic thickness) | Layer thickness (mechanical thickness) | C | | | | | | | | | | |
| | PAS-CER-DE-06 | Change of inner construction - Number of Layers | I | P | Number of layers (electronic) / Also in combination with PAS-CER-DE-05 | Also see layer thickness | C | | | | | | | | | | |
| | PROCESS | | | | | | | | | | | | | | | | |
| | PAS-CER-PR-01 | Change in process technology or manufacturing methods - Clong | - | P | Change of clong | e.g. change from cutting to stamping | C | | | | | | | | | | |
| PAS-CER-PR-02 | Change in process technology or manufacturing methods - Electrode apply | - | P | Electrode apply (electronic) layer process | e.g. change from wet to dry process | C | | | | | | | | | | | |
| PAS-CER-PR-03 | Change in process technology or manufacturing methods - Firing | - | P | Change of firing profile | e.g. separation of decarbonization and firing profile | C | | | | | | | | | | | |
| PAS-CER-PR-04 | Change in process technology or manufacturing methods - Firing technique | - | P | Change of firing technique / firing technique | e.g. standard passing to dry firing | C | | | | | | | | | | | |
| PAS-CER-PR-05 | Change in process technology or manufacturing methods - Particle Size | - | P | Change of particle size (electronic) / Also in combination with PAS-CER-MA-03 | e.g. change D50 from 0.5µm into 0.4µm | C | | | | | | | | | | | |
| PAS-CER-PR-06 | Change in process technology or manufacturing methods - Screening/printing | - | P | Change of screening / printing | e.g. change from screen printing into offset printing | C | | | | | | | | | | | |
| PAS-CER-PR-07 | Change in process technology or manufacturing methods - Termination | - | P | Change for termination preparation (the process in 90% of termination finish step) | e.g. change from dry to paste in printing (apply) | B | | | | | | | | | | | |
| PAS-CER-PR-08 | Process regularly being within specification | - | P | Verify with process specification | e.g. process control | C | | | | | | | | | | | |
| PACKING / SHIPPING - NEW MATERIAL, CRITICAL DIMENSIONS | | | | | | | | | | | | | | | | | |
| PAS-CER-PA-01 | Packing / shipping specification change (dimension of tolerance) | P | P | Change of packing specification | e.g. number of pieces on reel | B | | | | | | | | | | | |
| PAS-CER-PA-02 | Dry pack requirements change | P | P | Change of dry pack requirements | e.g. change of MSL e.g. change to dry pack assurance (DSC, L850) | B | | | | | | | | | | | |
| PAS-CER-PA-03 | Change of carrier (size, type) | P | P | Change of carrier | e.g. change by material e.g. change by geometry | B | | | | | | | | | | | |
| PACKING / SHIPPING - VISUAL INSPECTION | | | | | | | | | | | | | | | | | |
| PAS-CER-PI-01 | Change of labeling, also on reel | I | P | Change of labeling, also on reel | e.g. additional information (that is stored) e.g. change of customer specific information | B | | | | | | | | | | | |
| PAS-CER-PI-02 | Change of product marking | I | P | Marking on device | e.g. change of content of marking e.g. change of method of marking e.g. change of appearance of marking | B | | | | | | | | | | | |
| PAS-CER-PI-03 | Change of packing/shipping specification which does not describe a change of dimension or material of the packing | P | P | Change in packing specification which does not describe a change of dimension or material of the packing | e.g. change of documentation in packing specification | - | | | | | | | | | | | |
| LOGISTICS / CAPACITY / TESTING - EQUIPMENT | | | | | | | | | | | | | | | | | |
| PAS-CER-EQ-01 | Production from a new equipment which uses a different technology or which due to its unique form or function can be expected to influence the integrity of the final product | P | P | Change in process technique which is not already covered by test. Note: Change affecting the process is covered by the table requires also a PCH | e.g. change from wet to dry technology | C | | | | | | | | | | Test effort depends on final risk assessment. | |
| PAS-CER-EQ-02 | Production from a new equipment which uses the same basic technology (equipment equipment or extension of existing equipment) | - | P | PCH required for dedicated equipment for sensitive component production | e.g. elimination of manual handling processes | C | | | | | | | | | | Test effort depends on final risk assessment. | |
| PAS-CER-EQ-03 | Change in final test equipment type that uses a different technology | P | P | Change of final test equipment which uses different technology PCH required for dedicated equipment for sensitive parameters | e.g. change of water platform | C | | | | | | | | | | Page 168 / 169: table continuation | |
| LOGISTICS / CAPACITY / TESTING - PROCESS FLOW | | | | | | | | | | | | | | | | | |
| PAS-CER-PT-01 | Manufacturing site transfer or movement of a part of production process to a different location/site | P | P | Change of manufacturing site. Note: Reorganization transfer into new plant is not affected | Movement or transfer of manufacturing site or process steps to a different location/site | B | | | | | | | | | | | |
| PAS-CER-PT-02 | Elimination or addition of a manufacturing process step | - | P | Change of manufacturing process sequence | e.g. wetting / cleaning process e.g. change of order of processes | C | | | | | | | | | | Characterization depends on impact of production flow | |
| LOGISTICS / CAPACITY / TESTING - QUOTE | | | | | | | | | | | | | | | | | |
| PAS-CER-QU-01 | Change of test coverage used by the supplier to ensure data sheet compliance (e.g. introduction/abolition of electrical measurement test steps, introduction/abolition of testing procedure or sampling) | - | P | Change of test coverage | e.g. change from 100% to sample inspection e.g. test flow reduction from three to two e.g. change in burn-in to process | C | | | | | | | | | | if (table: Table) test coverage, if (table: Table) only for change in burn-in process | |
| FILE OPERATIONS | | | | | | | | | | | | | | | | | |
| FILE OPERATIONS - FILE | | | | | | | | | | | | | | | | | |
| PAS-FLM-MA-01 | Any change with impact on special customer characteristics/critical parameters | P | P | File change | Not relevant for technical evaluation | - | | | | | | | | | | | |
| PAS-FLM-MA-02 | Any change with impact on (pre)availability/reliability (as customer, which is not covered in the data sheet) | P | P | File change | Technical matters means component details | B | | | | | | | | | | | |
| FILE OPERATIONS - SUBSTANCE | | | | | | | | | | | | | | | | | |
| PAS-FLM-DS-01 | Change of substance (parameter/electrical specification (resistance, voltage and/or ACDC specification) | P | P | Change of application-relevant substance. Note: Editorial changes | e.g. system of electrical parameter distribution | A | | | | | | | | | | Risk assessment depending on change for each application | |
| PAS-FLM-DS-02 | Correction of data sheet | I | P | No technical change of the product, only correction to description (wording). Note: If loss of editorial changes, (B) or loss of impact on product (e.g. typo) | e.g. also editorial correction of technical data sheet (e.g. change of component tolerance) | A | | | | | | | | | | | |
| PAS-FLM-DS-03 | Specification of additional parameters | I | P | Specification of new not previously mentioned parameter of the product. Note: In addition. Note: Risk assessment depending on change for each application to provide evidence of additional parameters (see evaluation) | e.g. adding new (tested) parameter | A | | | | | | | | | | | |
| MATERIAL | | | | | | | | | | | | | | | | | |
| PAS-FLM-MA-01 | Change of material composition - Sealing Compound | P | P | Typical change within alloy or PU which refers only to mechanical properties. Note: Change from epoxy resin to PU resin (both devices) will lead to generate new products | e.g. change of epoxy / PU composition | C | | | | | | | | | | Consider relaxation in application | |
| PAS-FLM-MA-02 | Change of material composition - Package | P | P | Change material of package | Change material of package. e.g. change from 99.9 to 99.99 e.g. change of gas flow rate | B | | | | | | | | | | Consider AIG and processability | |
| PAS-FLM-MA-03 | Change of material composition - Lead/Termination | P | P | Change of lead termination. Note: If change of lead frame material leads to ESD change, then change of data sheet (PAS-FLM-DS-01) has to be introduced. | e.g. change of basis material from Cu to Fe e.g. change of finishing from Sn/Pb to Sn | B | | | | | | | | | | Change of base material: Consider ESD, high frequency parameter | |
| PAS-FLM-MA-04 | Change of material composition - Metal Spray (Diecast) | P | P | Change of Metal Spray Diecast. Use alloy material to meet dry process for bonded and related type | e.g. from Zn to Al | C | | | | | | | | | | Consider ESD, conductivity. Test for related SMD components. | |
| PAS-FLM-MA-05 | Change of material composition - Film | P | P | Change of film material for bonded and related SMD | e.g. change of additives (4% of film composition) (e.g. 2000 to 20000) | C | | | | | | | | | | | |
| PAS-FLM-MA-06 | Change of material composition - Metal Pad | P | P | Change of metal pad for inner electrode | e.g. change from Al to Al2O3 alloy | C | | | | | | | | | | | |
| PAS-FLM-MA-07 | Change of supplier of material | P | P | Change to a new or additional material supplier or component manufacturer which are described above | e.g. for 2nd source supplier | C | | | | | | | | | | Assumption material specification remains unchanged. Otherwise see change of material. | |
| FILE OPERATIONS - FILE | | | | | | | | | | | | | | | | | |
| PAS-FLM-DE-01 | Change of termination, surface finish, shape, color, appearance or dimension structure - Lead Diameter / Thickness | I | P | Change of lead diameter thickness | e.g. change lead diameter from 0.5 to 0.4 mm e.g. change of thickness of terminal | B | | | | | | | | | | | |
| PAS-FLM-DE-02 | Change of termination, surface finish, shape, color, appearance or dimension structure - Termination Area | I | P | Change of termination area and change which are affecting the area for connection of component and PCB | e.g. change in termination dimension / change in termination area | B | | | | | | | | | | | |
| PAS-FLM-DE-03 | Change of inner construction - Inner Connection | I | P | Change of inner connection | e.g. change from soldered connection to welded connection | C | | | | | | | | | | | |
| PAS-FLM-DE-04 | Change of termination, surface finish, shape, color, appearance or dimension structure - Appearance | I | P | Change of appearance. Note: Risk assessment depending on effect on product integrity. Note: Marking on device is defined as separate change (PAS-FLM-PI-02). | e.g. change or adding of color on component | B | | | | | | | | | | Check if MATERIAL is affected. | |
| PAS-FLM-DE-05 | Change of inner construction - Pinhead | P | P | Change of inner construction | e.g. change to a different lead supplier | C | | | | | | | | | | | |
| PAS-FLM-DE-06 | Change of inner construction - Insulation System | - | P | Change of inner insulation to protect sensitive element against housing | e.g. change of dielectric material (characteristics of insulating material thickness) | C | | | | | | | | | | | |
| PAS-FLM-DE-07 | Change of termination, surface finish, shape, color, appearance or dimension structure - Package | I | P | Change of packaging | e.g. change of dimension or shape | B | | | | | | | | | | | |
| PROCESS | | | | | | | | | | | | | | | | | |
| PAS-FLM-PR-01 | Change in process technology or manufacturing methods - Packaging | - | P | Change of main firing or handling process (related to final type only) | e.g. change in main firing process (printing, ultrasonic, jetting, ...) e.g. change in handling process (transportation, ...) | C | | | | | | | | | | | |
| PAS-FLM-PR-02 | Change in process technology or manufacturing methods - Terminal Attach | - | P | Change Terminal Attach Process to attaching element for bonded and related type | e.g. wetting and / or galvanic process e.g. wetting / soldering | C | | | | | | | | | | Consider ESD | |
| PAS-FLM-PR-03 | Change in process technology or manufacturing methods - Wetting | - | P | Change of wetting, heating or temperature control | e.g. change of wetting temperature | C | | | | | | | | | | Subsidiarity Test for related SMD components. | |

