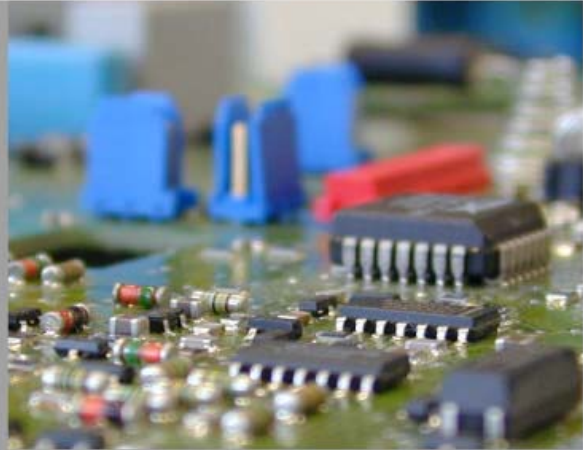


# Newsletter

July 2007

## Component Management



We are pleased to present to you the second edition of our Component Management Newsletter.

### What has happened in the meantime ?

The roll-out of the PDM system has begun and the first training sessions have taken place at Landis+Gyr in Zug, UK and Enermet in Finland. Thus, the roll-out of the Component Management Data Base is imminent. After completing the first tests with the migration of capacitors and the emergence of still some questions regarding the migration, the existing data for every component in the current Team Centre Data Base will be prepared. In principle, the components from R&D France and partially from R&D UK will also be included; provide their data agrees with the information in the Team Centre. Technical clarifications will be necessary for certain parts.

### Some of our Data Base Statistics

(interim report only)

Sources	Part Numbers
<b>1</b>	<b>3079</b>
2	1449
3	866
4	420
5	64
6	53
<b>Grand Total</b>	<b>5931</b>

It is quite obvious that dealing with the subject of second sources has a high priority, because 50% of all components have a single source: this is TOO high in today's world.

Parts	Manufacturers
<b>1</b>	<b>170</b>
1-5	159
5-20	97
20-100	52
100-1000	24
1000-2000	1
<b>Grand Total</b>	<b>503</b>

On the one hand, it is immediately apparent and very probable that this gives us a good start point for future negotiation with manufacturers. It is to be noted that previously key electronic components were negotiated by L+G ourselves. Standard components were dealt with by the corresponding EMS, i.e. SBT or Jabil.

On the other hand, it is clear that a reduction must be made in the very high number of manufacturers from who we obtain a single component.

### Introduction of New Components

In future, a catalogue of criteria should be used when introducing new components. This should ensure that innovation, technical security, commercial security and, of course, the best price are correspondingly observed or kept in a reasonable balance.

We want to develop this catalogue of criteria together and adapt it later to suit possible changes in requirements.

A first draft could read as follows:

- Standard Component or customized only for the Landis+Gyr Group
- Life Cycle Status: prelim or new or active, NOT mature (over zenith)
- No similar or „nearly“ similar comp. already in DB
- Confirmed that we will get selective PCN
- Second Source available (1:1 replacement)
- Rating of the manufacturer on green level (technical + financial)
- Lead time in acceptable range
- No allocation past 12 months
- AQL-Level in acceptable range
- MTBF / FIT on right level for standard applications
- Validation: “NON-Standard” or “Standard” or “not for new design”

If Single Source:

- Justification for single source request
- Description of alternative technical solution
- Estimated total cost to implement the alternative solution
- Statement of responsible product manager
- Statement of purchasing engineer or strategic buyer
- Safety stock at manufacturer or EMS
- Risk analysis

### Qualification of new Components

A check of the qualification of new components is applicable or even required,

- A) If they are specially customized for the Landis+Gyr-Group.
- B) If the manufacturer's specifications insufficiently conform to the characteristics required by us or are not precisely stated.
- C) If functions related to safety are involved.
- D) If a requested quality certificate supplied by the manufacturer does not correspond to our requirements.
- E) If special reliability is necessary.
- F) If we are dealing with a new manufacturer, with whom we have no experience (if need be settled by references).
- G) If we are dealing with a new technology.

A corresponding qualification would be carried out, for example, if an optocoupler input is operated with a current substantially under the value in the specification.

Or a corresponding test certificate would be needed, if an input resistor must sustain excessive impulse voltages.

In previous years, this task was performed by an internal department, which separated from Landis+Gyr after a Management Buyout and became known as QUINEL (Quality in Electronics). In the meantime, their activities have shifted towards EMV testing and calibration. For this reason, we have decided that we will in future collaborate intensively with Microtec. This company presents itself in the following article as our guest.

### Why qualification of electronic devices ?

microtec, testlab for opto+microelectronics  
([www.microtec.de](http://www.microtec.de))

*microtec* is involved as a first source supplier for Landis+Gyr in terms of semiconductor production test and ASIC-supply chain service (Lafta-3, MMI-3, CTS-3). But the independent test lab also performs qualification which is important regarding quality within storage and operating time of a component.

#### Rising customer's warranty claims

Component qualifications are an absolute necessity in all applications where warranty claims can occur. Behaviour and function of electronic devices are checked under operating and environmental conditions related to the relevant application. Thus potential failures are detected and can be eliminated prior to volume production.

Since warranty claims of customers and goodwill costs increase, qualifications are strongly recommended to avoid highly subsequent costs due to component and pcb failures.



Installing of electronic devices for vibration test.

Knowledge of the application and experience in the field of failure mechanisms and technical test alternatives are necessary in creating a suitable qualification flow.

#### Environmental tests and accelerated aging

Besides electrical testing, *microtec* is equipped with environmental test facilities. Mechanical stability of components can be checked by shock and vibration tests.

Furthermore thermal shock and storage under extreme temperature and humidity conditions accelerate aging of the components and lead to a life time estimation for the devices.



Chambers for thermal shock and temperature storage.

Components can be stored biased (Burn-In, Run-In), that means the intended operating conditions for each component are simulated (see table "abbreviations")

Failure analyses is also performed prior to the manufacturing process, to assess correct workmanship and material quality.

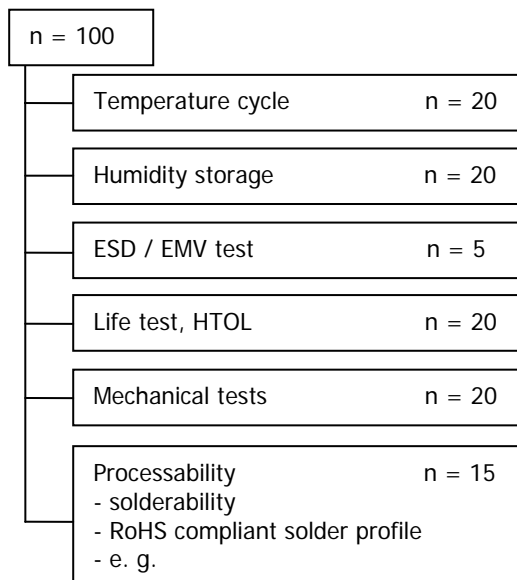


Measuring of electronic parameters of a packaged ASIC.

### Life time estimation of electronic devices

Reliability inspection takes a step further than qualification. Life cycle estimation is calculated on the basis of a probability calculation, e.g. Meantime Between Failure (MTBF) (detailed topic in the coming issue).

### Example for a typical qualification program



## Detailed aspects of qualification on different types of electronic devices

### ASICs and ICs

Components qualified at microtec with specific requirements are among others **ASICs + ICs**. Qualification includes electrical measurements as a check of the data sheet. Often Burn-In, especially HTOL, HTSL, THB or PTC (see table "abbreviations") are performed on top.

Leakage test or solderability tests are just a few more examinations in a qualification flow.

### Abbreviations of environmental tests

abbr.	name of examination
HTOL	High Temperature Operating Lifetime
HTSL	High Temperature Storage Lifetime
THB	Temperature Humidity Biased
PTC	Pressure Temperature Cycle



Laser life test and Burn-In Test



Precise measuring of single LEDs, e.g. for LED-selection

### Passive devices

Besides electrical measurements passive devices (R, C, I) are often examined additionally by a bending test. This mechanical stress test checks mechanical stability, material and workmanship of coils, capacitors and resistors.

### Light emitting diodes (LEDs)

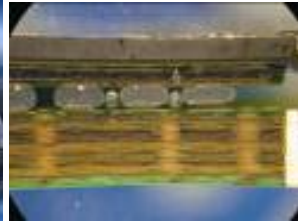
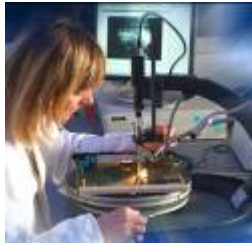
Measurements are performed to check degradation of the diodes under several climatic conditions. We found that specifically temperature cycling, and operation by high junction temperature combined with high temperature/ humidity is critical. Also measurements regarding eye safety are performed, especially on High Power LEDs.

### Displays

The relevant technologies for **displays** like LCD, LED, plasma, vacuum fluorescence and electro luminescence can be characterized according optical and electrical parameters, e.g. viewing angle or brightness. Further tests, like life test and environmental test on the outdoor temperature range are recommended. LCDs often are critical against humidity and temperature cycling, for outdoor application an UV test is necessary.

### Printed board assemblies (PBAs)

With qualifications for **printed board assemblies (PBAs)**, sub-components and interconnection technology are taken in account, too. On component level, solderability tests and classifying into different moisture sensitivity levels (MSL) are performed. Solder profile qualification regarding RoHS-compliant conditions help to check whether the devices stand increased heat.



Cross section of PBA shows lift-off of solder joint (right hand image) and therefore no interconnection; only visible by a high resolution microscope.

Qualification of **printed circuit boards (PCBs)** means to check compliance of the physical board parameters with the specification as well as to control workmanship. The assessment is done by visual inspection of microsections with high resolution microscopes, taken after the board was exposed to soldering stress

**Cable assemblies** are mainly manufactured by a semiautomatic process or completely by manual work. The quality of electrical connection of cable and connector differs significantly depending on the manufacturer. Regarding long time durability, the quality of a cable assembly can be assessed by cross sections on the connection area.

### Resumee

Qualifications prior to serial production can avoid highly subsequent costs due to component failures. However, for certain applications qualification to international standards is crucial to get into the market.

### About microtec

Qualification, failure analysis and testing are available from one source: microtec GmbH supplies worldwide customers with professional one-stop quality service and acts as a certified expert.  
([www.microtec.de](http://www.microtec.de))



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### Share Point

As already mentioned in the last Newsletter, in future we would like to use the share point <https://lea.mycema.com/ECOMP> not only for communication with all R&D colleagues but also as platform for discussions, for FAQs and so on. If you have not got yet a password for login, please send a short email to [Richard.FREI@landisgyr.com](mailto:Richard.FREI@landisgyr.com). We will overwork and adapt this share point soon.

### Topics in the coming Newsletter

microtec's Reliability Engineering for electronic devices.

### Feedback

We would be happy to get feedback from your side.

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