



**RoodMicrotec**  
powerful solutions



Zwolle



Dresden




Nördlingen



Stuttgart

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## History



- **1969:** Foundation of German Signetics GmbH, test and assembly location, in Nördlingen (Germany)
- **1974:** Takeover by Philips Semiconductors
- **1983:** Management buyout and re-naming into SES Electronics GmbH offering independent test services for ICs
- **1991:** Merger with Rood Testhouse International N.V. in Zwolle (Netherlands)
- **1996:** Change of legal structure to `Rood Technology Deutschland GmbH + Co`
- **2001:** Clean room installation for wafer probing and bare die handling
- **2005:** Foundation of Dresden location
- **2008: Merger with microtec, testlab for opto+microelectronics in Stuttgart (Germany)**
  - established in 1982 nearby Stuttgart
  - focus on test and supply chain service for ASICs and ASSPs
  - focus on examinations for PBAs, PCBs, mounting technology
  - focus on failure and technology analysis
  - focus on optoelectronics: LEDs, fiberoptics, laser diodes, image sensors

● RoodMicrotec Introduction

● Engineering Test Supply Chain Qualification

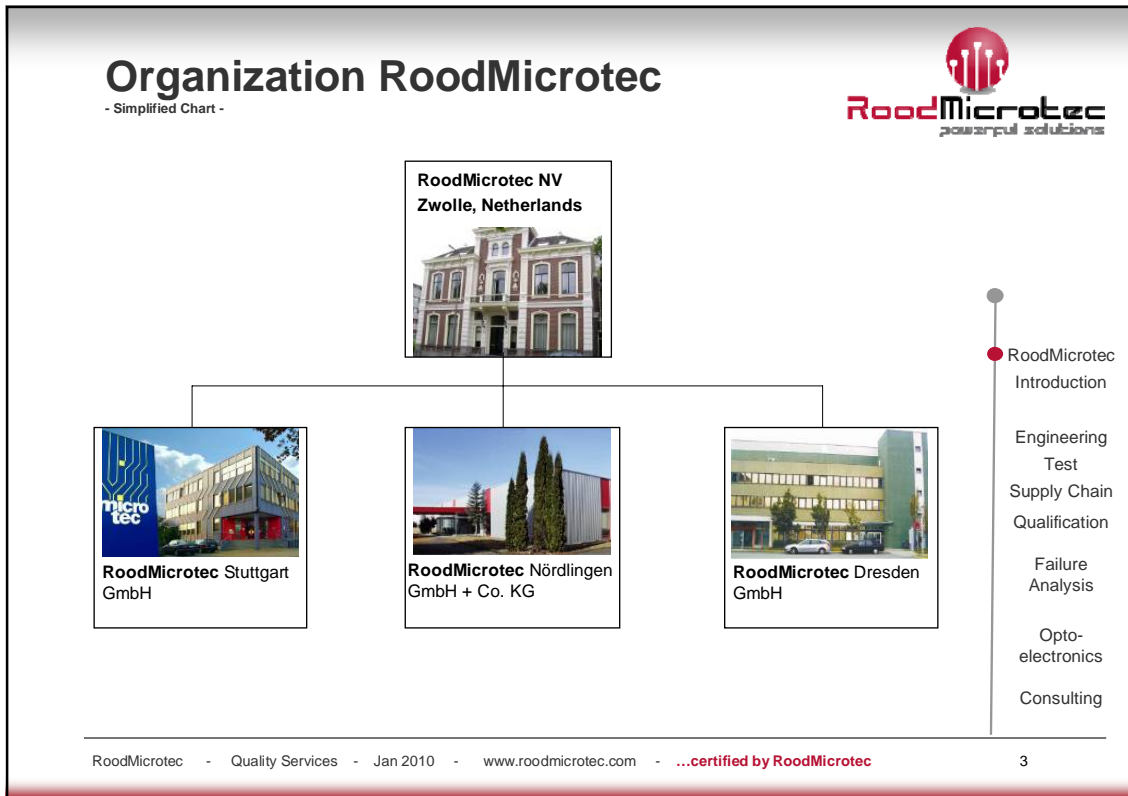
● Failure Analysis

● Opto-electronics


● Consulting

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## RoodMicrotec - Some Facts





- 162 employees, 16.7 M€ turnover (2008)
- Largest independent test house in Europe
- “One-stop-shopping” for semiconductor services
- Outstanding position due to optoelectronics services
- Located in the heart of Europe

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## Quality Management





### Stuttgart:

- ISO TS 16949
- ISO 17025
- ISO 9001
- ISO 14001 scheduled 2010

### Nördlingen / Dresden

- ISO TS 16949
- ISO 17025
- ISO 9001
- ISO 14001




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## Fields of Activity

- **Market Segments:**
  - Automotive
  - Industrial
  - Aerospace
  - Communications
  - Medical
- **Customers:**
  - Fabless design companies
  - Component manufacturers and -users
  - System manufacturers and -users
  - Distributors






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## Services



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- Engineering
- Test + Programming
- Supply Chain Management
- Qualification
- Failure Analysis
- Consulting

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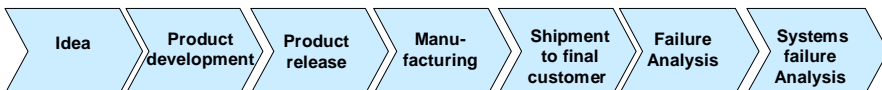
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## Service Chain



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<p>Design for test</p> <p>Specification</p> <p>Test strategy</p>	<p>Specification</p> <p>Chip Design</p> <p>Test software</p> <p>Test hardware</p>	<p>Electrical characterization</p> <p>Environmental &amp; endurance testing</p> <p>Qualification acc. Standards</p>	<p>Wafer Test/ Sort</p> <p>Assembly</p> <p>Sawing &amp; chip Packaging</p> <p>Screening/ Burn-In</p> <p>Scanning</p> <p>Tape &amp; Reel</p> <p>Dry- pack</p> <p>Outgoing inspection</p>	<p>Direct shipment worldwide</p> <p>Incoming Inspection</p>	<p>Components</p> <p>Printed Board Assemblies</p> <p>Material Mounting technologies</p>	<p>Printed Board Assemblies (PBA's) and systems</p>
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## Engineering



### Test Engineering

- Design for Test, Design for Manufacturing
- Test software & hardware development
- Platforms LTX Credence, Teradyne, Verigy

### Product Engineering

- Test time optimization & reduction
- Definition of yield roadmap
- Off-load & test-site transfers



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## Production Test and Programming



### Functional, parametric & optoelectronic test of wafers and packaged devices

- From characterization to high volume test
- Automatic, multi-site, tri-temp handling
- Clean room class 1000
- RF-test up

### Device Programming

- Multi-site equipment


### End of line – service

- Tape & Reel Service
- Ship to line

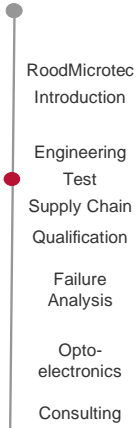


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## Test: Equipment




- **Various test systems and handling/ probing systems**
  - Credence                    D10, Duo
  - Teradyne                    μFlex
  - SZ                            M3650/ 3610/ 3000
  - Verigy                        V93,000 (at Verigy site)
  
- **Maximum safety by 2 test locations**
  - “ 2nd Source“
  
- **High volume test**



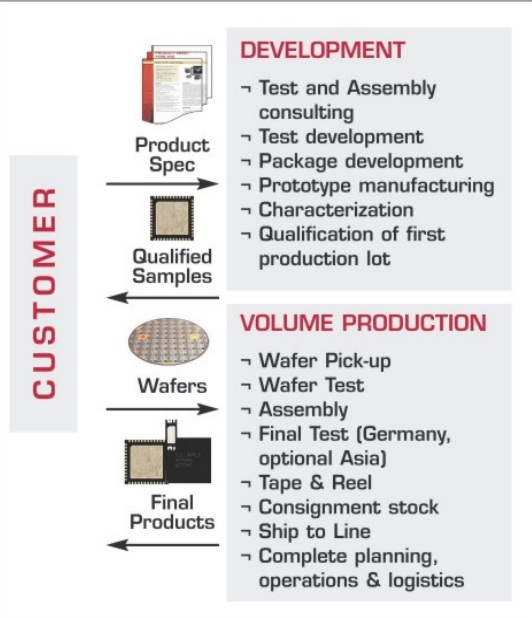
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## Supply Chain Management



CUSTOMER



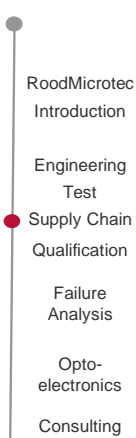
**DEVELOPMENT**

- Test and Assembly consulting
- Test development
- Package development
- Prototype manufacturing
- Characterization
- Qualification of first production lot

**VOLUME PRODUCTION**

- Wafer Pick-up
- Wafer Test
- Assembly
- Final Test (Germany, optional Asia)
- Tape & Reel
- Consignment stock
- Ship to Line
- Complete planning, operations & logistics

- Support from idea to realization
- Permanent quality monitoring
- Root cause analysis with in-house FA/QA lab
- Co-operation with wafer fabs and certified assembly subcontractors in Europe and Asia
- Optimal procurement by combining production volumes



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## Qualification and Burn-In



- Qualifications acc. to international standards like AEC-Q, ESCC, Telcordia, MIL, JEDEC, IEC
- Component to board
- Optoelectronic devices
  
- Operating life test for ICs, LEDs, Laser Diodes, VCSELs
- Real-time monitoring Burn-In
- Climatic stress testing
- Mechanical stress testing
- ESD testing
- Solderability tests
- MSL classification



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## Failure- & Technology Analysis



### Service from chip to assembled boards

- Internal physical inspection (IPI / DPA)
- First silicon debug and chip repair
- Focused Ion Beam (FIB) Services
- Customer return management
- Identity check
  
- Metallographic X-sectioning
- Material characterization
- Extensive microscopy: Light optical, SEM with EDX, SAM, X-ray



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## Service for optoelectronics



- **Characterisation (Incoming inspection)**
- **Environmental tests**
- **Reliability / risk / failure analysis**

on

- Fiberoptics board-to-board and Ultra Long Haul
- Single components and modules
- POF components
- LD, VCSEL, IRED and LED
- Signal lamps, displays
- CMOS and CCD image sensors



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## Evaluation & Consulting

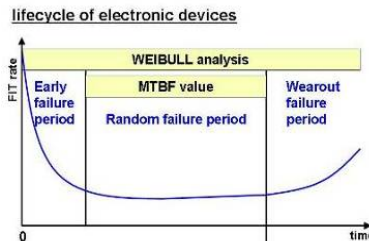


- **Competence center for packages, interconnection technology, printed circuit boards and printed board assembly**

- Interconnection technology evaluation
- Process, product & supplier audits

- **Life time prediction**

- MTBF (Meantime Between Failure) calculation
- FIT (Failure In Time) rate calculation acc. WEIBULL



- **ESD Services**

- ESD Evaluation
- ESDFOS (ESD from outside to surface) evaluation

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## ESD & ESDFOS Evaluation



(ESDFOS = ESD From Outside to Surface)

- Risk identification
  - of production & production process
  - of equipment
 depending on product sensitivity or customer requirements
  
- Guidance for equipment release
- Acceptance for production
- Equipment construction & maintenance
- Certification of equipment for suppliers
- ESD training



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## ESD + Reliability Evaluation/Consulting



- **Team of Experts for**
  - ESD- Evaluation
  - Printed Board Assemblies
  - Interconnection an Process technology
  - Optoelectronic Components and Modules
  - Audits for ISO TS 16949, ISO 9001, installation of QM system
  - MTBF Calculation
  
- **Expert Knowledge for Solutions**

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