



INDUCTIVE COMPONENTS  
EMI SUPPRESSION  
EMC



[www.nkl-emv.de](http://www.nkl-emv.de)

## COMPANY PROFILE

NKL® is one of the largest manufacturers of inductive components for the electronics industry in Germany. We mainly produce toroid chokes and EMI filters. We are well known as a competent partner concerning EMC and inductive components.

We are committed to satisfying our customers by supplying them with high quality inductive components. Our emphasis is placed on competent consultation, on-time delivery and competitive pricing. It is important for us to keep our quality management system up to date.

NKL® is located in Wolpertshausen near Schwäbisch Hall, located between Nuremberg and Stuttgart. We are 5 min off the Autobahn A6/E50. Our facilities include administration, development/application, a small production area and the EMC test laboratory. Large volumes of our parts are produced by our partner companies abroad.

The technical competence of our staff regarding EMC and inductive components is constantly updated, i.e. by attending technical seminars. We are involved and in cooperation with VDE committees on standardization and ZVEI. The high standard of our quality management system is certified according to the ISO 9001:2008 standard.

The vast majority of our products are customized, with more than 7,000 different parts specified in datasheets. This shows that we are capable of finding solutions for our customers, even in difficult cases.





## N K L H I S T O R Y

Since the mid-sixties, Klaus Lorenzen, the founder of the company, has been involved in EMI suppression and EMC. He was the head of an EMC test laboratory in Stuttgart and afterwards became CEO of a manufacturing company of inductive components. During that time he gained considerable know-how in developing EMC compatible solutions. He continuously improved construction and production of inductive components. Some of it was patented.

In 1979, Klaus Lorenzen established NKL<sup>®</sup> GmbH in Gaildorf near Stuttgart. The company grew rapidly and the facilities that accommodated the more than 40 employees soon became too small. Due to increasing business the facilities in Gaildorf became too small. Therefore a new location for the company was chosen: Wolpertshausen ([www.wolpertshausen.de](http://www.wolpertshausen.de)). Close to the Autobahn A6/E50 between Heilbronn and Nuremberg NKL<sup>®</sup> GmbH is much easier accessible for the customers. This way several problems were solved regarding space and traffic.

In May 2000 relocation to the new facilities took place, with a production space of 16,000 square feet and an office space of 4,000 square feet. The headquarters in Wolpertshausen include:

- administration
- development/application
- production area
- EMC test laboratory

In 1998 the quality management system of NKL<sup>®</sup> GmbH was certified according to ISO 9001. At the end of the very same year the founder Klaus Lorenzen retired. His son, Dipl.-Ing. (FH) Uwe Lorenzen, assumed the position of CEO and Dipl.-Ing. (FH) Bernd Spatscheck became COO.



Increasing business of NKL<sup>®</sup> GmbH required us to also concentrate on marketing and sales aspects. Since the end of 1997 NKL<sup>®</sup> GmbH has appointed a sales representative responsible for Northern and Eastern Germany. A sales agent has been employed for Southern Germany and Austria since 1999.

- In Switzerland, NKL<sup>®</sup> GmbH is represented by Sibalco AG/Basle ([www.sibalco.ch](http://www.sibalco.ch)).
- The Benelux representative is EEMC-Coimex in Da Lelystad/Netherlands ([www.eemc.nl](http://www.eemc.nl))

Other regions and customers from other countries are directly taken care of from the corporate headquarters in Wolpertshausen.

Currently, NKL<sup>®</sup> GmbH in Wolpertshausen employs approx. 40 people and the production companies abroad about 100 people. The volume of sales has increased to over € 5 million per annum.

## OUR COMPETENCE

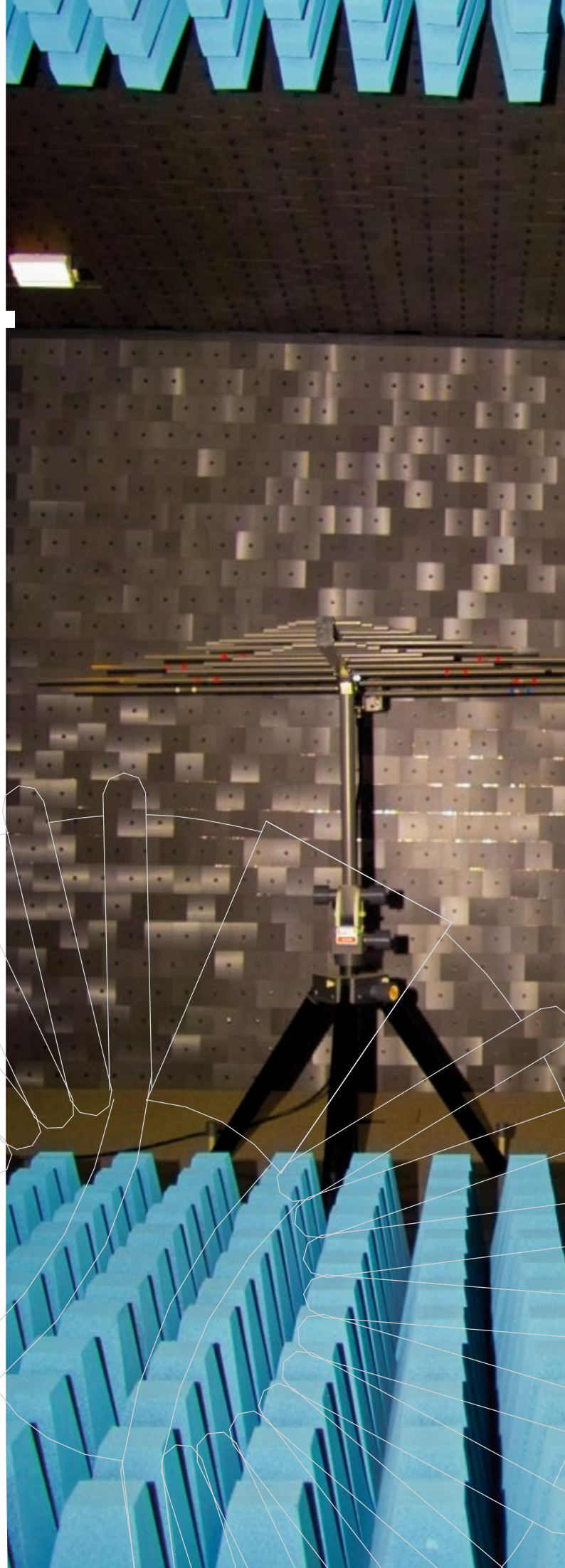
One main reason for our enduring success has been and still is our technical competence in the area of inductive components and EMC. Collaboration between our EMC test lab with a well equipped test bay and our R&D department with production area is dependable and unbureaucratic.

This empowers us to help customers in finding a solution in our lab within the shortest possible time (it sometimes takes as little as 15 min). The experience gained in our EMC test lab is directly incorporated into R&D.

Our EMC test lab is specialized in measurements and consulting services regarding appliances and components for industry, medicine, IT, railway, aviation, marine, automotive, domestic applications etc. This service is available for our customers at a moderate charge. Our strength is to accompany our customers during their entire development process.

We operate an S+M anechoic RF chamber (measuring distance of 3 m), an open area test site (measuring distance of 10 m) and, of course, measuring stations for conducted emission for appliances up to  $3 \times 400 \text{ V}_{AC} / 32 \text{ A}_{AC}$ . RF measurement tests are performed from 9 kHz to 6 GHz. The lab is furthermore equipped with a water and shop air supply.

In addition to the test lab equipment we possess a comprehensive range of LCR analyzers ranging from 1 Hz to 3 MHz, precision magnetic analyzers with a DC bias source up to 50 A, attenuation measurement equipment from 10 kHz up to 3.3 GHz, an adjustable AC source up to  $300 \text{ V}_{AC} / 16 \text{ A}$  from 45 Hz to 800 Hz, an adjustable AC calibrator up to  $20 \text{ A}_{AC}$  from 50 Hz to 50 kHz, a measuring system for evaluating current transformers up to  $200 \text{ A}_{AC}$  at line frequency, a thermographic camera, heating cabinets, devices for optical inspection and many more.

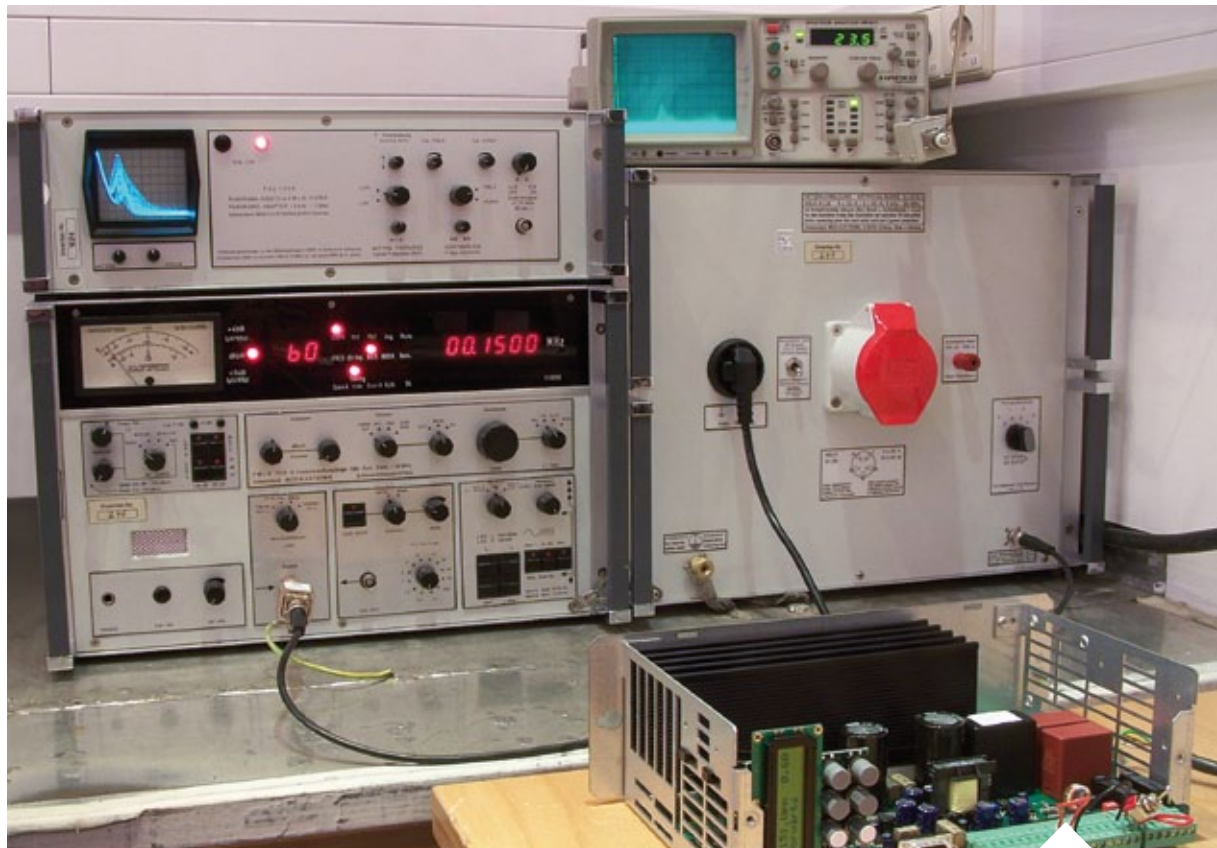


## OUR COMPETENCE FOR YOUR SUCCESS

The technical qualification of our staff is continuously ensured by our involvement in various committees dealing with engineering standards like VDE / DKE as well as ZVEI. We are thus able to share our expertise and are always up to date when it comes to upcoming standards even before others know about them.

In order to ensure the quality of our products and services we have been employing a comprehensive quality management system in accordance with ISO 9001 since 1998.

In matters of environment we have developed a broad knowledge basis by early cooperation in research projects for eco balance of components (Life Cycle Assessment). We are thus able to also support our customers in such matters.



CURRENT COMPENSATED  
 CHOKES  
 SINGLE CHOKES  
 ▶ EMI FILTERS  
 STORAGE CHOKES  
 PFC CHOKES  
 CURRENT TRANSFORMERS  
 SIGNAL TRANSFORMERS  
 SPECIAL DESIGNS



**Filters** for EMI suppression with integrated LCR circuits, one or multiple stages either suppression of common or differential mode interference

- Nominal currents up to 50 A, line voltage up to 500 V<sub>AC</sub>  
Higher values on request
- Application: power line AC (single or multiple phase) or DC  
Assembly in cabinets (if applicable with clamp), on housings, ground plates, mounting angles, etc.
- Variety of housings made of plastic or metal. Customized circuitry and connections.
- EMC lab service: Test of customer appliances in order to engineer optimal filter configurations

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 SPECIAL DESIGNS



**Storage chokes** for short-term energy storage like in SMPS's

- Nominal currents up to 150 A, toroid diameters from 10 mm up to 240 mm
- Applications: SMPS, DC-DC converters
- Toroid chokes with different core materials and properties, regarding core loss and saturation: iron powder or alloys
- Different designs (case, socket, etc.) as well as SMD, customized designs

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**PFC chokes** for limitation of harmonics of nonlinear loads connected to the AC mains

- Nominal currents up to 50 A, toroid diameters from 13 mm up to 100 mm
- Applications: primary SMPS, frequency converters
- Toroid chokes with different core materials and properties, regarding core loss and saturation: different alloys
- Different designs (case, socket, etc.), customized designs

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**Current transformers** for electrically isolated detection and measurement of alternating currents

- Nominal currents up to 300 A, isolation voltage up to 1 kV<sub>AC</sub>, toroid diameters from 14 mm up to ca. 40 mm, larger cores possible
- Applications: detection, measurement, short circuit detection, load-shedding circuits
- Toroid chokes with different core materials and properties, regarding saturation and linearity: ferrite, tape wound cores, nano-crystalline
- Different designs (connecting cable, print and open), customized designs

- CURRENT COMPENSATED CHOKES
- SINGLE CHOKES
- EMI FILTERS
- STORAGE CHOKES
- PFC CHOKES
- CURRENT TRANSFORMERS
- ▶ **SIGNAL TRANSFORMERS**
- SPECIAL DESIGNS



**Transformers** for electrically isolated transfer of signals, pulses, data or power

- Nominal voltages up to 500 V<sub>AC</sub> - power up to 100 W, isolation voltage up to 1 kV<sub>AC</sub>, toroid diameters from 14 mm up to ca. 40 mm, higher values on request
- Applications: SMPS, any application of triggering power devices
- Toroid chokes with different core materials and properties, regarding saturation, linearity and frequency response: ferrite, tape wound cores, nano-crystalline
- Different designs (case, socket, etc.), customized designs

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- ▶ **SPECIAL DESIGNS**

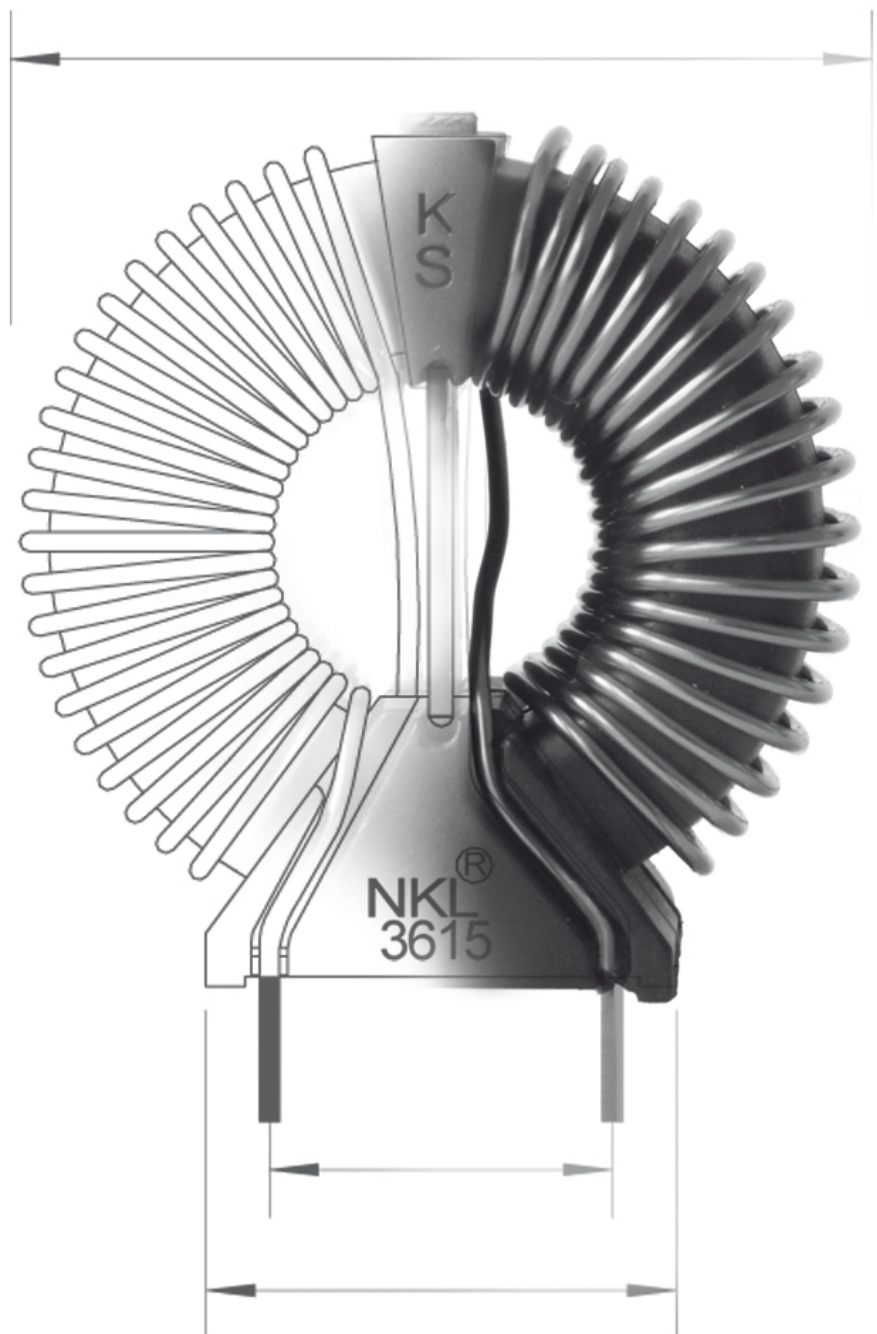


**Special designs and EMI-suppression products - Designs other than toroid chokes**

- **Special designs** with gapped ferrite toroids, rods, E-cores and their relatives (ETD, EC, EFD, PD, PH, RM, etc.), chokes with cord set or assembled feed line
- **EMI-suppression** products like standard cores, cable shields (tubular or split), capacitors (X2, Y2)



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