

Laboratory Fact Sheet

1 Institution

Name:



KEMA
Utrechtseweg 310
6812 AR Arnhem
The Netherlands
www.kema.com

Date of Fact Sheet: 2007-05-20

2 Classification

- independent
- accreditation according to IEC 17025
- long-time DG experience (more than 3 years)
- active in standardisation committees

3 Brief historical background

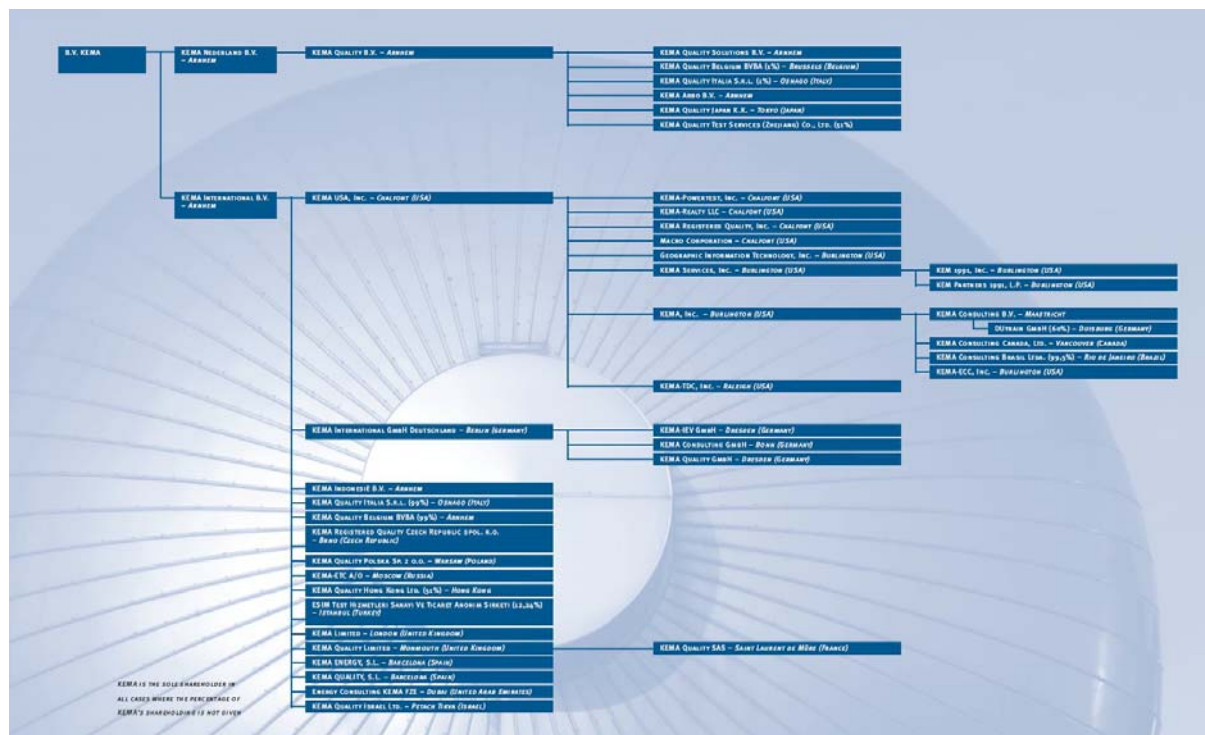
KEMA started life in 1927 as the Dutch electricity industry's Arnhem-based test house. Originally just an abbreviation of the company's full Dutch name, the letters K-E-M-A have since come to stand for much more than the testing of electrical equipment. While electrical safety testing and certification are still among KEMA's core activities, today's globally active company provides a host of independent applied research and consultancy services via an international network of subsidiaries and agencies. The consistent theme that unites these diverse activities is risk reduction. Almost all KEMA's services involve the minimization of risk. Through the reduction of data communication errors and leaks, for example, or through the supervision of energy infrastructure restructuring projects in countries all over the globe. But equally through the testing of high-voltage equipment and the performance of short-circuit tests in the world's largest short-circuit lab. Similarly, research into the quality of mobile telephone networks, testing equipment in environments with a raised explosion risk, and determining the residual service life of high-voltage lines, pylons and the like all demonstrate KEMA's commitment to the reduction of risk.

4 Mission statement

KEMA provides confidence in the performance of products, processes and equipment for the production, distribution and use of electricity.

5 Institution in brief

See annual report at the website



- Accreditations:

All laboratories are designed and equipped to test in accordance to the latest international standards.. The KEMA High-Voltage laboratory, High Power laboratory and EMC laboratory are accredited according to ISO/IEC 17025 and is a member of STL, IEC and CIGRE. The measuring systems are of high accuracy and KEMA is accredited by the Dutch Accreditation Council for calibration of measuring systems.

- Number of staff:

Employees worldwide 1453 (2006)

- Main source of funding:

Commercial activities.

- Any potential conflicts of interest with respect to the cooperation under the NetDERlab e.g. due to source of funding:

NONE

6 Brief summary of competences

Competences of KEMA cover a broad package of services: business and technical consultancy, operational support, measurement, inspection, auditing, testing and certification in the areas of generation, transmission & distribution and end use of electricity. KEMA is an independent and innovative partner that provides reliable solutions throughout the world for all parties in the complete energy chain.

Template for matrix of competences

Institution: KEMA	
Description of competence	Yes/no / list
Involvement in standardisation groups/committees	Yes – e.g. CIGRE, IEC, ANSI, DIN, IEE, IEEE, NEN, STL
Certification expertise	Yes -
Area of Scientific expertise	<ul style="list-style-type: none"> - MV & HV research and testing - DG integration in grids - Intermittency and storage - Active management of distribution systems - Power system analysis and economics - Reliability and Power Quality - Standardisation and certification - Quality assurance
Involvement in consultancy (e.g. for industry and government)	Yes
DG reference project list	<p>Numerous projects throughout Europe and the USA concerning integration of windturbines and (offshore) wind parcs, CHP for industrial and greenhouse applications, PV, heatpumps, microCHP and the use of advanced power electronics and control applications (e.g. FACTS and FACDS)</p> <p>Projects on intelligent distribution substations, fault current limiter, storage applications, energy management and future network architectures including operation of virtual power plants</p>
List of recent publications (say last 3 - 5 years)	<p>Publications at Cigré, CIRED, IEEE and relevant conferences and symposia</p> <p>Selected references can be obtained through contact persons</p>

7 Laboratory facilities

Provide a description of facility and summarise in a table as shown below.

High Power Lab

The KEMA High-Power Laboratory is a well-known independent laboratory for testing and certification of medium and high voltage components used in the electrical infrastructure. Our customers are manufacturers and utilities worldwide, in particular Europe, Asia, America and the Middle East.

The KEMA High-Power Laboratory issues Type Test Certificates and Test Reports for tests on cables, cable accessories, insulators, power transformers, instrument transformers, GIS, switchgear, panels and other components. We have several flexible test bays available and can work for clients in parallel. Our test engineers and technicians are highly qualified and experienced in (type) testing of medium and high voltage components. We provide very efficient and cost effective testing of your components. Maximum flexibility is offered for meeting your requirements.

The roots of the laboratories go back to 1937 when the first KEMA Laboratory was commissioned to perform short-circuit tests for the founders of KEMA: the electrical utility companies in the Netherlands.

Not long after the first controlled short-circuit tests were performed, the circuit breaker manufacturers requested that KEMA be authorized to act on behalf of the utilities and conduct research and development tests without the presence of the utility company representatives. This initiated the process of development that led to the independent status that characterizes KEMA today, and to the expansion of KEMA's 500 MVA station to 1000 MVA after World War II.

To meet increasing demands, a second laboratory was commissioned in 1958. Two short-circuit generators made it possible to perform three-phase tests at power levels up to 3000 MVA. The ever-increasing power of the Dutch grid necessitated the creation of a new laboratory. Commissioned in 1973, this station is now the world's most powerful laboratory, utilizing short-circuit generators with a power level up to 10000 MVA at 60 Hz.

A highly sophisticated and reliable installation for the synthetic testing of (ultra) high-voltage circuit breakers is available as well. This installation is designed for single phase and three-phase synthetic tests. Recently KEMA added a medium-voltage test station with state-of-the-art controls and instrumentation to more fully utilize the existing capacity and provide increased flexibility.

In 1990, KEMA acquired Powertest, Inc., which with its 3250 MVA of short-circuit power is the largest High-Power Laboratory in the United States. The purchase of the laboratory by KEMA made it independent of any manufacturer and allowed it to operate as a commercial third-party laboratory.

Located in Chalfont, Pennsylvania (near Philadelphia), this laboratory was designed and built in the early 1970s, and underwent major expansions and improvements in the late 1970's and in 2002.

Committed to providing superior testing services, this highly flexible and efficient laboratory maintains state-of-the-art testing equipment and instrumentation and recently expanded the short -circuit and load-switching testing capabilities to voltages up to 72 kV.

High Voltage Lab

The KEMA High-Voltage Laboratory is a well-known independent laboratory for testing and certification of medium and high voltage components used in the

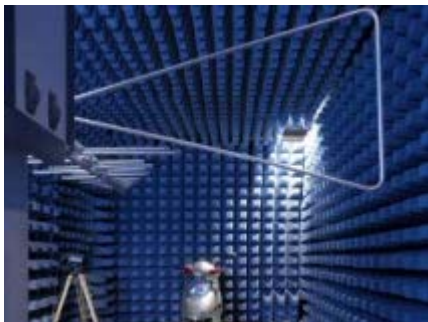
electrical infrastructure. Our customers are manufacturers and utilities world-wide, in particular Europe, Asia, America and the Middle East.

The KEMA High-Voltage Laboratory issues Type Test Certificates and Test Reports for tests on cables, cable accessories, insulators, power transformers, instrument transformers, GIS, switchgear, panels and other components. We have several flexible test bays available and can work for clients in parallel.

For on-site testing we operate several transportable test facilities for commissioning and maintenance, tests on medium and high voltage cables and overhead lines, complete substations, power transformers and generators. For example: a series resonant voltage source for commissioning tests of cables up to 250 kV/80 A with partial discharge measurements. And 0,1 Hz test vans to detect weak spots in medium voltage cable systems.

The KEMA High-Voltage laboratory is accredited according to IEC 17025 and is a member of STL, IEC and CIGRE. Our measuring systems are of high accuracy and we are accredited by the Dutch Accreditation Council for calibration of measuring systems.

EMC laboratory



KEMA determines in its laboratories whether products conform to the EMC Directive. If your product does not cause too much interference and is sufficiently unaffected by its environment, then you'll be issued a KEMA EMC Certificate. This certificate and the affiliated report enable you to prove that your products are in compliance with the EMC Directive. As soon as you comply with all the prevailing directives, you may equip your product with CE and formulate the required Statement of Conformance. Your product is then freely marketable within the European Union.

- KEMA's EMC lab is the largest in the Netherlands
- The expertise is so comprehensive that government agencies and institutions trust KEMA's conclusions implicitly
- EMC tests can be logically combined with other tests such as those for KEMA-KEUR, the Low Voltage Directive (LVD), the Machine Directive, the Medical Directive, and the ATEX Directive

- A KEMA report has unmistakable added value for your customers, government agencies, and in cases of interpretation and acceptance disputes
- KEMA easily performs EMC tests on site
- Huge machines and installations are not a problem for KEMA

EMVT laboratory:

The electrical capabilities of the lab are:

- Nominal power 1 MVA in four quadrant operation
- Nominal output voltage 3.3 kVrms, 3 phases
- Overload capabilities: 1.25 pu/10s and 3pu/1s
- Power frequency adjustable between DC and 75 Hz
- Harmonic voltage distortion up to 2.4 kHz

The system is capable of delivering a fully controllable “bad grid” or load with controllable harmonic distortion, voltage unbalance, (rapid) dynamic system voltage variations, power frequency variations, balanced and unbalanced dips and short interruptions.

Loads (500 kW resistors, 1 MVAR inductors, 1 MVAR capacitors) are available in the voltage range from 0.6 to 4 kV in multiple possible combinations.

The purpose of this laboratory is to:

- Acquire knowledge about electromagnetic power technology
- Perform research into electrical energy in the broadest sense of the word
- Develop and facilitate power electronics and electromagnetic power technology
- Test components and systems containing power electronics
- Develop test procedures for the application of power electronics.

The research will be specifically focused on proofs of concept, proofs of principle, prototypes and new control and regulation algorithms. In addition, new products will be developed and tested with an emphasis on expansion of the applications and complete testing, including related controllers and IT infrastructure. The development of new test procedures, as well as competence development for the management of lab facilities, will have a high priority. The lab will also be particularly well suited to the development of technical expertise based on experience gained from projects that can later be applied to consultancy services. Additionally, the lab will be used to support schooling and training programs. And lastly, the laboratory will also support participation in the development of standards. Distributed Energy Resources (DER) tests will be carried out upon requests from clients and in accordance with standards such as IEEE 1547.

8 Standardisation activities

Product certification: sometimes obligatory, but possibly a distinguishing factor if adeptly employed. KEMA can provide the safety certification marks you need for your market. Regardless of whether it pertains to end products or components, for the consumer market or the industrial market. KEMA knows everything about electrical safety. So it goes without saying that we have extensive knowledge of

national and international standards and specifications. And correctly interpreting these for you is our forte

European legislation means liberalisation of the market; resulting in competition. These factors have a major influence on the railway industry. Products and processes have to meet ever-higher requirements. KEMA participates for many years in the area of traction, offering many services including the notified body of KEMA Railway Transport Certification (KEMA RTC). KEMA RTC fulfils all mandatory as well as voluntary inspections requested by the railway section. This independent organization is a notified body within the scope of the European Guidelines 98/48/EC and 2001/16/EC for the interoperability of the Trans-European railway network.

To be completed

9 Testing activities

Transmission & Distribution Testing & Certification (High and Medium Voltage)

T&D Testing & Certification is active globally, wherever there are T&D equipment manufacturers interested in shipping their products for testing and certification. The High-Power Laboratory (HPL) in Arnhem remains the market leader. The KEMA Power Test (KPT) laboratory in Chalfont (USA) and the High-Voltage Laboratory (HVL) in the Netherlands operate in distinct but growing markets. While KPT primarily serves its domestic market, HVL's client portfolio is evenly spread across the various main regions. Asia is a very promising market. The Middle East continues to be a priority market for all high and medium voltage services. China is quickly becoming a very large player in the field of HV/MV equipment, much of which is exported. The Indian market is also growing rapidly and has great potential. Naturally, we are focusing on establishing a strong presence in both markets.

Products & Processes Testing & Certification (Low Voltage)

Globalization plays an important role in almost all markets where KEMA is active. Global customers seek global support and global solutions. National approval systems and protected markets are disappearing. The trend towards internationalisation is strongly visible, among both manufacturers and retailers of electrical equipment. There is a clear trend towards global testing and certification standards. In both Western Europe and North America, demand for KEMA's services is tending to shift towards the high end of the market, whilst production is increasingly shifting to Asia and to a lesser extent Eastern Europe. Society is becoming more risk-averse, which results in a growing demand from manufacturers, retailers and governmental bodies for qualified and independent inspection, testing and certification services.

At the high-risk end of the scale we typically find sophisticated (high-end) products, both consumer and industrial, and customers/manufacturers with a high level of technical expertise. Design typically remains in Europe and the USA, while production is moved to low-cost Asian plants. Typical products include medical implants and explosion-proof devices.

At the low-risk end of the scale we typically find lowend products and clients, again both consumer and industrial, with a lower level of technical expertise, such as retailers. In this sector, it is common for both design and production to

have been moved to Asia. Volumes are usually high and typical products include MP3 players and Christmas lights. In terms of the number of certificates issued, the strongest growth figures are for China.