



Ferrites and accessories

Quality and environment

Date: February 2023

Corporate goals

Our aim is to play a leading role among the world's most competitive companies in the sector of electronic components. This aim is shared by the TDK Electronics quality and environment management system:

1 TDK Electronics quality system

1.1 Extract from TDK Electronics quality policy

- The quality of our products and services represents a key constituent of our corporate strategy, whose principal aim is customer satisfaction.
- Our quality management system is continuously oriented to the international standards that stipulate the highest requirements.

1.2 Quality management system

The quality management system to IATF 16949 is applied throughout the company and is used to implement the TDK Electronics quality policy. The implications include:

- As a rule, product and process developments follow the rules of APQP¹⁾,
- Quality tools such as FMEA²⁾, DoE³⁾ and SPC⁴⁾ minimize risks and ensure continuous improvements in conjunction with regular internal audits and QM reviews.

1.3 Certification

The TDK Electronics quality management system forms the basis for the certification to IATF 16949 that includes all TDK Electronics plants and sales organizations. The company certificates are posted on the TDK Electronics Internet (www.tdk-electronics.tdk.com/quality).

1.4 Production sequence and quality assurance

The business units implement the corporate specifications for quality management in procedural and work instructions referred to products and processes.

1) APQP = Advanced Product Quality Planning

2) DoE = Design of Experiments

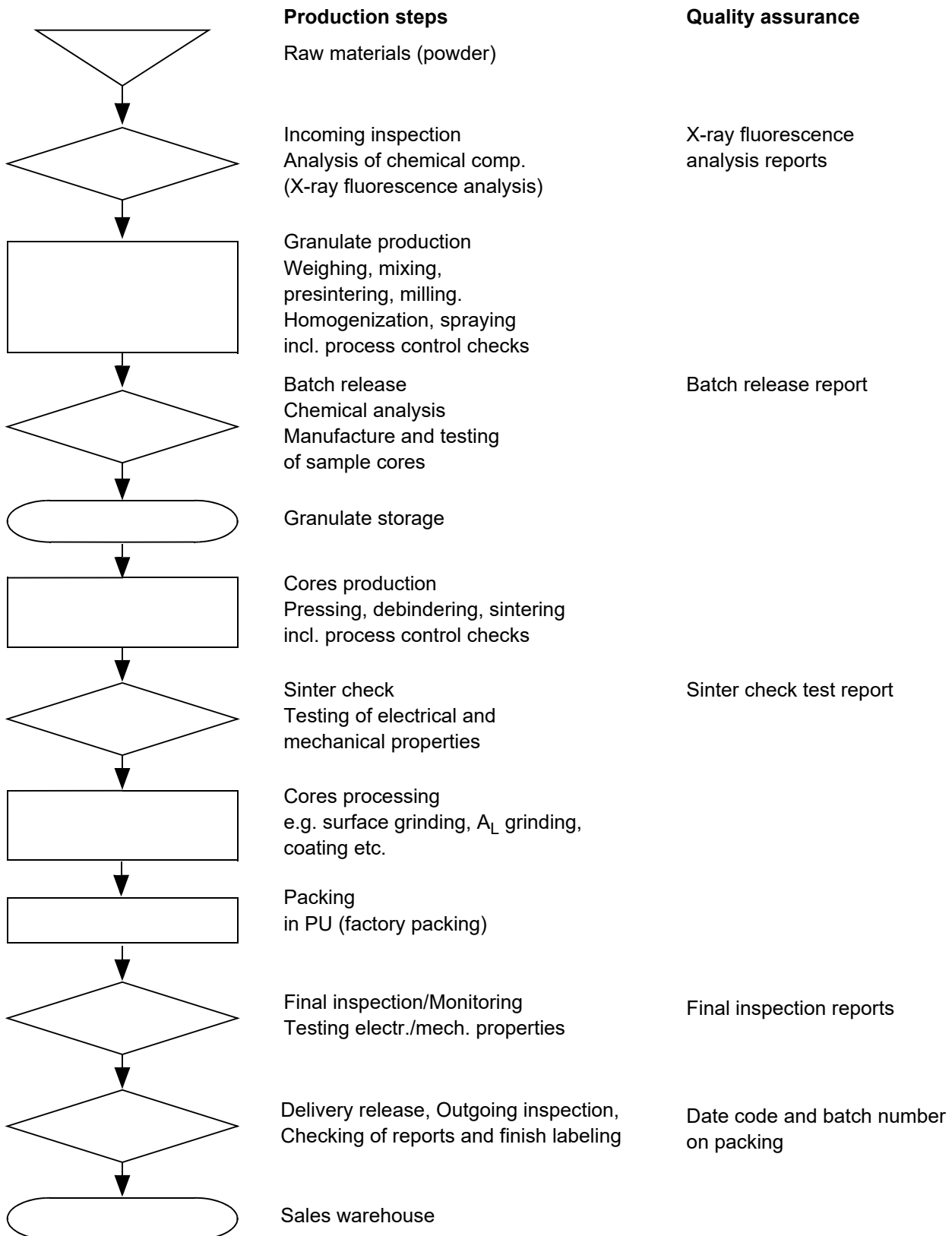
3) FMEA = Failure Modes and Effects Analysis

4) SPC = Statistical Process Control

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Production sequence and quality assurance during ferrite manufacture (schematic)

The following example shows quality assurance applied to the production sequence of ferrites.



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1.5 Delivery quality

“Delivery quality” means compliance with the agreed data at the time of delivery.

1.6 Failure criteria

A component is defective if one of its features does not correspond to the specification of the data sheet or an agreed delivery specification.

1.7 Incoming goods inspection at the customer

For the incoming inspection, we recommend the use of a random sampling plan to DIN ISO 2859 Part 1 (contents compliant with MIL STD 105 D or IEC 60410).

The test methods used and the AQL must be agreed between the customer and supplier.

1.8 Final inspection/approval for shipment

Final inspection verifies the major properties of the end products batch by batch, usually by means of fully automated selection tests.

Approval for shipment helps certify that products shipped comply with specifications. It includes:

- testing of principal parameters,
- identification check and visual assessment,
- examination of papers accompanying the batch.

1.9 Reliability

A variety of endurance tests and environmental tests are conducted to assure the product reliability. These tests are derived from the extremes of expected application conditions, with test conditions intensified to obtain authoritative results within a reasonable period.

The reliability testing programs of TDK Electronics are based on the test plans of international standards and customer requirements.

TDK Electronics performs reliability tests to qualify new component families and for periodic requalification.

1.10 Traceability

By recording the lot or batch numbers on the documentation accompanying the process, complete traceability is maintained in the production sequence.

After delivery, traceability to the internal release inspections (“quality control gates”) is ensured by the batch number which is printed on the label.

1.11 Electrical properties

The measuring conditions can be found in the chapter “General – Definitions”. The product data and relevant tolerance limits are defined in the respective data sheets. The material data given in the chapter “SIFERRIT materials” are to be understood as typical values.

Measuring conditions deviations from the data book require an agreement between the customer and TDK Electronics.

1.12 Dimensions

The dimensional drawings in the individual data sheets are definitive for the dimensions.

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1.13 Finish

Assessment of the finish of ferrite cores is performed in accordance with TDK Electronics finish specifications. These are based on IEC 63093. Detailed drawings, which are available on request, specify the maximum permissible limit values for damage which can never be totally excluded with ceramic components. Assessment of the solderability of terminal pins for coil formers and clamps is carried out for PTH types to IEC 60068-2-20, test Ta, method 1 (aging 3) and for SMD types to IEC 60068-2-58.

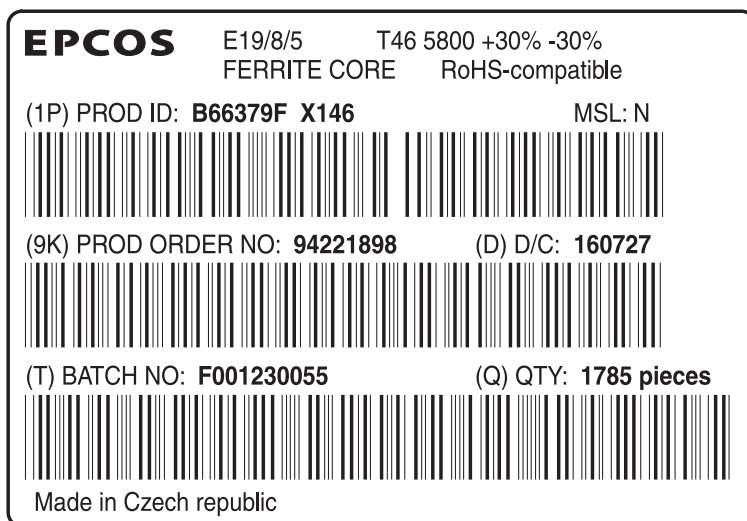
1.14 AQL values

Within the framework of our quality goals, we are gradually tightening the AQL values which are intended for use in the customer's incoming goods inspection, currently the value AQL 0.25 is applicable, if not otherwise specified.

1.15 Barcode label

The packing of all TDK Electronics components bears a barcode label stating the type, production ID (1P), production order number (9K), data code (D), batch number (T), and quantity (Q). This enables a component to be traced back through the production process, together with its batch and test report.

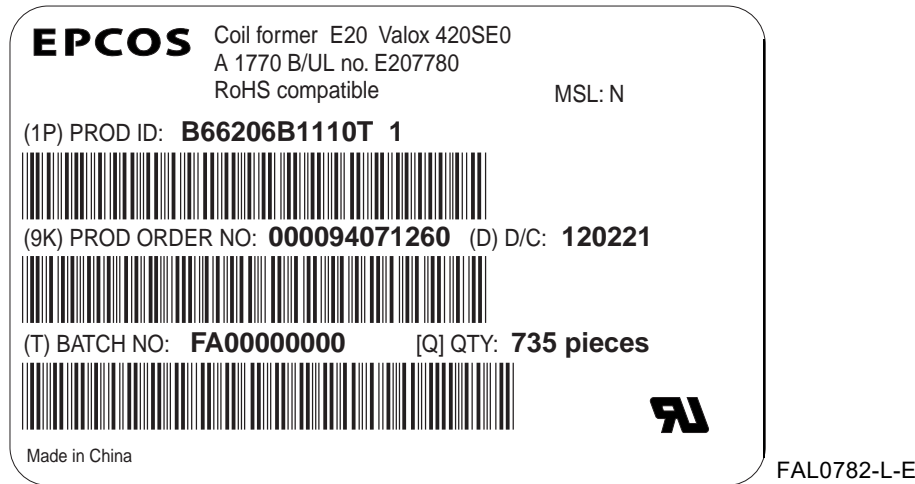
Example for core label



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Example for accessories label



1.16 Conditions of use

TDK Electronics products may only be used in line with the technical specifications and installation instructions and must comply with the state of the art. Non-observance of limits, operating conditions or handling guidelines can lead to disturbances in the circuit and other undesirable consequences such as a higher failure rate.

Please note the “Important notes”.

Should you have any application-referred questions, please contact our experts, who will be pleased to advise you.

1.17 Storage conditions

For all components the following storage conditions apply:

- storage takes place in original packages in non aggressive atmosphere,
- storage temperature should not be less than $-25\text{ }^{\circ}\text{C}$ ($-13\text{ }^{\circ}\text{F}$) and not exceed $+40\text{ }^{\circ}\text{C}$ ($+104\text{ }^{\circ}\text{F}$),
- relative humidity should be $\leq 75\%$ as an annual average and $\leq 95\%$ on max. 30 days per annum, condensation is not allowed.

1.18 Shelf life

Shelf life of electronic components is limited by material characteristics or decreasing solderability of the terminations.

The default shelf life of following electronic components:

- Ferrites cores: 5 years
- Ferrite accessories – solderable parts: 6 months
- Ferrite accessories – FPC foils (self-adhesive): 6 months
- Ferrite accessories – other parts: 2 years

Internal quality check is performed in terms of above mentioned periods The items which become out of shelf life are checked by the quality control procedures and if quality parameters fit the required values, then the shelf life can be prolonged accordingly.

1.19 Customer complaints

If a fault occurs in a product despite careful manufacture and testing, please contact your local sales organization. They will register your complaint as an RMA¹⁾ process and forward it to the relevant technical departments for rapid handling.

TDK Electronics treats technical complaints according to the 8D methodology; i.e. with the use of interdisciplinary teams who aim to implement rapid countermeasures and sustained corrections and answer all complaints with an 8D report (8D = 8 disciplines).

In order to be able to deal quickly and smoothly with complaints, the following data are helpful:

- Number of components subject to complaint or returned
- Fault description
- How and when was the fault detected?
- Logistics data (date code, delivery note no.)
- Operating conditions
- Operating duration up to occurrence of the fault
- Measurement parameters in the case of divergent technical data

In the event of transport damage, we would ask you to describe this in more detail and if required to mark it so that it can be distinguished from any further damage sustained during the return shipment. The original package should also be checked and any damage to be described. In order to avoid further damage, the original packaging should also be used for the return shipment.

1) RMA = Return of Material Authorization

2 Environmental management system

2.1 Environmental policy

Our fundamental commitment to environmental protection is laid down in the TDK Electronics environmental policy:

1. We work continuously toward reducing the burden on the environment, toward minimizing associated risks and toward lowering the use of energy and resources, above and beyond the legal requirements.
2. We take appropriate precautions to avoid environmental hazards and to prevent damage to the environment.
3. Potential impact on the environment is assessed and incorporated in process and product planning at the earliest possible stage.
4. By applying environmental, energy and occupational safety management, we ensure that this policy is implemented effectively. The technical and organizational procedures required to do this are monitored regularly and constantly further developed.
5. Each employee is required to act in an environmentally conscious manner. It is the constant duty of management to increase and encourage awareness of responsibility for environment, energy consumption and occupational safety at all levels.
6. We work with our business partners to promote conformity with similar objectives. We supply our customers with information on ways to minimize any potentially adverse environmental impacts of our products.
7. We work in a spirit of cooperation with the relevant authorities.
8. We inform the public of the impact on the environment caused by the company and our activities related to the environment and occupational health and safety.
9. We consider ensuring a safe, healthy and comfortable work environment as first priority. To regard the rules of labor safety is the task of each employee. We comply with all applicable legal requirements and with all requirements that relate to OH&S hazards.
10. We take preventive measures to avoid work-related injury and ill health and strive for continual improvement of our OH&S management system and the OH&S performance.
11. We support purchase of energy efficient products, machines and services, which will improve our energy related performance.

2.2 Environmental management system

The TDK Electronics ISO 14001 based environmental management system is applied company wide for implementing the TDK Electronics environmental policy. It is posted on the TDK Electronics Intranet and is thus accessible to all employees.

2.3 Certification

The TDK Electronics AG operates an environmental management system that conforms to the requirements of ISO 14001 and is mandatory for all plants.

The company certificate is posted on the TDK Electronics internet:
(<https://product.tdk.com/en/environment/index.html>).

2.4 RoHS

The term "RoHS-compatible" shall mean the following:

Components defined as “RoHS-compatible” are compatible with the requirements of Art. 4 of Directive 2011/65/EU (“RoHS II”) of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment of 8 June 2011 and with the requirements of the provisions which will result from transposition of RoHS II into national law to the extent such provisions reflect the directive.

“RoHS-compatible” components do not contain any of the following substances at a content exceeding the maximum concentration limits of 0.1% for lead, mercury, hexavalent chromium, PBB, PBDE, and 0.01% for cadmium at a homogeneous material level, except the application is exempted by Annex III of “RoHS II”.

2.5 REACH

According to Art. 33 we are obliged to inform our customers immediately or on request a consumer within 45 days if we get knowledge that a Substance of Very High Concern (SVHC) is contained in a product or its packaging with more than 0.1% w/w. Provided this substance is published by the European Chemical Agency via the candidates list. Respective information is provided via <https://product.tdk.com/en/environment/reach/index.html> (Link: REACH Candidates List and Information according REACH Art. 33, concerning TDK Electronics Products).

2.6 Banned and hazardous substances in components

As a manufacturer of passive components, we develop our products on the basis of sustainability. In order to establish a standardized procedure for TDK Electronics worldwide, a material compliance management and a mandatory list of banned and declarable substances and substances of special interest (EPCOS BAD-SL) are part of our quality management system. The planning and development instructions include regulations and guidelines that aim to identify environmental aspects and to optimize products and processes with respect to material use and environmental compliance, to design them with sparing use of resources and to substitute hazardous substances as far as possible.

Consideration of the environmental aspects is checked and recorded in the design reviews: the environmental officer provides support in the assessment of the environmental impacts of a development project.

2.7 Material data sheets for product families

TDK Electronics posts material data sheets on the Internet (<https://product.tdk.com/en/environment/index.html>) that show typical compositions of product groups by selected representatives. The materials are listed with their percentage weight distribution referred to the respective component.

As per IEC/PAS 61906, all materials with a weight percentage exceeding 0.1% are listed. All specifications are typical data and may vary slightly within a product group or production lot.

The material data sheets do not represent guaranteed properties, but are merely given for purposes of information.

Please note in this connection the “Important notes”.

2.8 Disposal

All ferrite cores and accessories can be disposed of, reused or recycled. However as disposal is regulated by national law, the respective national provisions have to be observed.

Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule, we are either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether a product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous)**. Useful information on this will be found in our Material Data Sheets on the Internet (www.tdk-electronics.tdk.com/material). Should you have any more detailed questions, please contact our sales offices.
5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order.
We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available. The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.
6. Unless otherwise agreed in individual contracts, **all orders are subject to our General Terms and Conditions of Supply**.

7. **Our manufacturing sites serving the automotive business apply the IATF 16949 standard.**
The IATF certifications confirm our compliance with requirements regarding the quality management system in the automotive industry. Referring to customer requirements and customer specific requirements (“CSR”) TDK always has and will continue to have the policy of respecting individual agreements. Even if IATF 16949 may appear to support the acceptance of unilateral requirements, we hereby like to emphasize that **only requirements mutually agreed upon can and will be implemented in our Quality Management System.** For clarification purposes we like to point out that obligations from IATF 16949 shall only become legally binding if individually agreed upon.
8. The trade names EPCOS, CarXield, CeraCharge, CeraDiode, CeraLink, CeraPad, CeraPlas, CSMP, CTVS, DeltaCap, DigiSiMic, ExoCore, FilterCap, FormFit, InsuGate, LeaXield, MiniBlue, MiniCell, MKD, MKK, ModCap, MotorCap, PCC, PhaseCap, PhaseCube, PhaseMod, PhiCap, PowerHap, PQSine, PQvar, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMDAD, SiMic, SIMID, SineFormer, SIOV, ThermoFuse, WindCap, XieldCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at www.tdk-electronics.tdk.com/trademarks.

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