

Quality and Inspection Requirements for Electrical Equipment

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General Quality and Inspection requirements

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1 Requirements Levels

Depending on physical location and other plant specific aspects KBE 100 is divided into 3 requirement levels. These levels are not directly related to the specific classification principals applied for each power plant concerning electrical function classes therefore an assessment on applicable requirement level has to be done for each specific case.

The requirement levels are KBE 100-1, KBE 100-2 and KBE 100-3 where level -1 is the top level.

For 1E- and category A-equipment according to IEC 61226 KBE 100-1 shall apply.

2 Quality Assurance System

2.1 QA Requirements on the Manufacturer/Supplier

The Manufacturer/Supplier shall have implemented a quality management system which meets the requirements in appropriate standard in the ISO 9000 series or other equivalent standard.

The requirements shall be applied on all activities with impact on quality regarding development, design, manufacturing, final inspection, shipping, installation and service to the extent which they are performed by the Manufacturer/Supplier or his subcontractors.

For software applications ISO/IEC 90003 shall be applied. Other well-known standards may be accepted after the Purchasers approval.

The Manufacturer/Supplier shall possess and follow an IT-security program for programmable electronics, implemented in the QA management system. The IT-security program shall meet the requirements in ISO 27001 or other equivalent standards. The quality system shall be documented in a quality manual which is authorized by the Manufacturers/Suppliers management. A registered copy of the Manufacturers/Suppliers quality manual shall be provided upon Purchasers request.

The Manufacturer/Supplier shall describe in what manner he intends to apply his quality system to the actual delivery.

The Purchaser shall be given the opportunity to assess the manufactures quality system by conducting on site audit at the Manufacturer/Supplier and subsuppliers.

3 Definitions

FAT, Factory Acceptance Test

A functionally targeted test program for electrical equipment.

The Manufacturer/Supplier shall perform the test in the presence of the Purchaser, before delivery release. The test is normally also performed as a SAT following installation in the plant.

SAT, Site Acceptance Test

A functionally targeted test program for electrical equipment performed in conjunction with the installation in the plant..

OAT, Operational Acceptance Test

A functionally targeted operational test for electrical equipment after installation and start-up

4 Quality and Inspection Requirements

4.1 General requirements

The Manufacturer/Supplier shall take full responsibility for the products quality and pay for all expenses for the required inspections and tests. The Manufacturer/Supplier shall also pay for the expenses which may arise from deviation, nonconformities or delays due to re-inspections caused by Manufacturer/Supplier.

This document describes the quality requirements for electrical and instrumentation equipment. However many components such as venturis, thermowells, condensation pots etc. may also be regarded as mechanical equipment. For these, requirements according to TBM (Technical Requirements for Mechanical Equipment) are valid. Inspections are specified in a separate Inspection Plan according to KBM (Quality Requirements for Mechanical Equipment).

4.2 Regulations and standards

The Manufacturer/Supplier is responsible for the compliance to regulations and standards valid at the time of quotation. This applies in addition to what the Purchaser have specified in the inquiry or purchase documents.

Primarily Swedish regulations and IEC standards shall be applied. Other international or national regulations and standards may be applied after approval from the Purchaser.

From the quotation it should be clear by which regulations and standards the product is designed. The Manufacturer/Supplier shall provide copies of these documents upon Purchasers request.

4.3 Product verification

4.3.1 General inspection requirements

The Manufacturer/Supplier is requested to show how the products performance, environmental endurances and other attributes are verified.

The Purchaser defines in the inquiry basis for the inspection extent to be performed by the Manufacturer/Supplier. This is done in the following documents:

- Technical Specification
- Quality- and inspection requirements (this document)
- Inspection Plan with corresponding inspection procedures (KBE IP and KBE EP)

This information is the Purchasers opinion about the minimal required scope of inspection and tests and how they should be documented. The Manufacturer/Supplier may add those inspections and tests which he regards as necessary. The Manufacturer/Supplier may also use his own inspection plan and inspection and test procedures. In such a case the Manufacturer/Supplier has

to identify deviations from the Purchasers Inspection Plan and add his own routines for the actual purchase order.

The Manufacturer/Supplier shall continuously list all approved and issued manufacturing, inspection and test documents. This record shall contain the identities of the documents and actual revision notes. Documentation on this should be provided upon Purchasers request.

The Purchaser or his representatives shall have the right to, if requested, be present in discussions concerning quality issues which may take place between the Manufacturer/Supplier and by him engaged inspection agencies or subcontractors.

4.3.2 Type inspection

The Manufacturer/Supplier shall in the quotation specify those type tests which have been performed on the product as well as applied standards and acceptance criteria.

If the Purchaser in the Inspection Plan has specified a certain type test not performed for the product, the Manufacturer/Supplier shall have the test performed and the cost shall be included in the quotation.

Specimens which have undergone a type test may not be included in the delivery without the Purchasers approval.

4.3.3 Routine inspection

The Manufacturer/Supplier shall specify all routine inspections and tests performed on the product during and after manufacturing, with reference to inspection and test procedures. The procedures shall be available for the Purchaser to review.

The Purchaser or his representative shall have the right to be present at the Manufacturers/Suppliers inspections and tests. At such occasions the Purchaser shall be allowed to perform inspections and tests of his own without any extra costs..The Manufacturer/Supplier shall be prepared to perform extra inspections and tests, optional to the original agreement, at the Purchasers expense.

4.3.4 Delivery inspection

Delivery inspection shall be performed, upon Purchasers request, at Manufacturers or alternatively at Suppliers premises prior to despatch.

At the delivery inspection the inspection and test documentation shall be available and clearly arranged for the Purchasers review.

Delivery inspection is performed in accordance with KBE EP-191.

The delivery inspection normally includes an acceptance test (Factory Acceptance test, FAT) according to KBE EP-192 which if in case is specified in the inspection plan. Shipping may not occur until delivery permission has been issued bythe Purchaser.

4.3.5 Commissioning

If specified in the Inspection Plan, the Manufacturer/Supplier shall produce a commissioning programme, defined as Site Acceptance Test, SAT and in some cases also Operating Acceptance Test, OAT. (KBE EP-193 and KBE EP-194)

Participation from the Manufacturer/Supplier at the site for other activities shall be specified in the purchase order.

4.3.6 Deviations

The Manufacturer/Supplier shall continuously document and correct all deviations and non-conformances. The Purchaser shall be informed concerning this and possible corrections.

4.3.7 Inspection and Test Documentation

Certificates shall be identifiable to the Inspection Plan and to the actual component.

The inspection documentation shall be delivered in the extent defined in the inspection plan and in the number defined in the contract. Additionally the Manufacturer/Supplier shall confirm that the product is approved and fulfils all contractual requirements.

The delivery is not regarded as complete until all documentation including inspection documents are delivered and approved by the Purchaser.

5 Other Requirements

For standard type products the Manufacturer/Supplier shall have a system for fault reporting, statistics, and experience feedback valid for all users of the product. Experiences regarding product faults shall be communicated to the Purchaser, as soon they are known by the Manufacturer/Supplier.