## 1.0 Purpose

Product Control Specifications (PCS) specify the requirements for routine inspections, tests, Product Verification Tests and sample selection for products certified under an Intertek EU Type 5 certification scheme (including GS, S, BEAB, ASTA, ENEC, BAUART and TICK MARK). They are for use by manufacturers and by factory inspectors.

## 2.0 Scope

Products: Contactors, relays, motor starters and zero voltage relays etc.
Standards: IEC/EN 60947
Marks: S, BG, TICK, ASTA

## 3.0 Routine inspections and tests

### 3.1 General

The following requirements apply to most products.
Variations may be permitted by prior, written agreement from the certification body.
The factory should have a quality plan defining all inspections and tests on materials, components and completed products as appropriate.
Completed products shall be marked to confirm satisfactory completion of all required testing.
Any products which fail inspection or testing shall be segregated and not allowed to continue through the process until rectified and re-inspected or retested.
Products shall not be released until the testing equipment has been checked again following a production batch.
Records of inspections and test should be maintained and held for at least two years.
Records shall include:

- Type of product
- Date of test
- Place of manufacture
- Quantity tested
- Number of failures and actions taken

### 3.2 Required inspections and tests

| Inspection/test | Test parameters | Sampling plan |
|---|---|---|
| IEC/EN 60947-1:<br>Dielectric tests acc. to 8.3.3.4.2 item 2) | 2) Power-frequency withstand voltage<br><br>**a) Test voltage**<br>The test apparatus shall be the same as that stated in item 3) b) of 8.3.3.4.1 except that the overcurrent trip should be set at 25 mA.<br>However, at the discretion of the manufacturer for safety reasons, test apparatus of a lower power or trip setting may be used, but the short-circuit current of the test apparatus shall be at least eight times the nominal trip setting of the overcurrent relay, for example for a transformer with a short-circuit current of 40 mA, the maximum trip setting of the overcurrent relay shall be 5 mA ± 1 mA.<br><br>NOTE 1 The capacitance of the equipment may be taken into account.<br>The value of the test voltage shall be 2 *Ue* with a minimum of 1 000 V r.m.s.<br>NOTE 2 In the case of multiple values, *Ue* refers to the highest value marked on the equipment or given in the manufacturer's documentation.<br><br>**b) Application of test voltage**<br>The requirements of item 3) c) of 8.3.3.4.1 shall apply, except that the duration of the test voltage shall be 1 s only.<br>However, as an alternative, a simplified test procedure may be used if it is considered to subject the insulation to an equivalent dielectric stress.<br><br>**c) Acceptance criteria**<br>The overcurrent relay shall not trip. | 100% |
| IEC/EN 60947-2:<br>For the definition of routine tests, see 2.6.2 and 8.1.3 of IEC 60947-1. | The following tests apply:<br>- mechanical operation (8.4.1);<br>- verification of the calibration of overcurrent releases (8.4.2);<br>- verification of the operation of under voltage and shunt releases (8.4.3);<br>- additional tests for CBRs to Annex B (8.4.4);<br>- dielectric tests (see note) (8.4.5);<br>- verification of clearances (8.4.6). | 100% |

| | | |
|---|---|---|
| IEC/EN 60947-3:<br>8.1.3 Routine tests<br>Subclause 8.1.3 of IEC 60947-1 applies with the following additions. | **8.1.3.1 General**<br><br>The following tests apply:<br>- mechanical operation test (see 8.1.3.2) operation of the switch, disconnector, switch-disconnector or fuse-combination unit during manufacture and/or other routine test may take the place of the tests listed above, provided the same conditions apply and the number of operations is not less than that specified;<br>- dielectric test (see 8.1.3.3) if, by the control of materials and manufacturing processes, the integrity of the dielectric properties has been proven, these tests may be replaced by sampling tests according to a recognized sampling plan (see IEC 60410).<br><br>**8.1.3.2 Mechanical operation test**<br>A test shall be made to verify the correct mechanical operation of the equipment by 5 closing and opening operations.<br><br>**8.1.3.3 Dielectric test**<br>The test conditions shall be in accordance with 8.3.3.4.2 of IEC 60947-1. As an alternative, the combined test according to 8.3.3.4.2, item 3), of IEC 60947-1 is allowed. The value of the test voltage shall be in accordance with that given in Table 12A of IEC 60947-1. The duration of the test shall not be less than 1 s and the test voltage shall be applied as follows:<br><br>- with the equipment in the open position, between each pair of terminals which are electrically connected together when the equipment is closed;<br>- with the equipment in the closed position, between each pole and the adjacent pole(s) and between each pole and the frame;<br>- for equipment incorporating electronic circuits connected to the main poles, with the equipment in the open position, between each pole and the adjacent pole(s) and between each pole and the frame, either on the incoming side or the outgoing side depending on the position of the electronic components. | 100% |

| | | |
|---|---|---|
| IEC/EN 60947-4:<br>**9.1.3 Routine tests**<br>Subclause 8.1.3 of IEC 60947-1 applies where sampling tests (see 9.1.4) are not made. | Routine tests for contactors and starters comprise:<br>- operation and operating limits (see 9.3.6.2);<br>- dielectric tests (see 9.3.6.3).<br><br>**9.1.4 Sampling tests (IEC 60947-4-1)**<br>Sampling tests for contactors and starters comprise:<br>- operation and operating limits (see 9.3.6.2)<br>- dielectric tests (see 9.3.6.3).<br><br>Subclause 8.1.4 of IEC 60947-1 applies with the following additions.<br>A manufacturer may use sampling tests instead of routine tests at his own discretion.<br>Sampling shall meet or exceed the following requirements as specified in IEC 60410 (see Table II-A: Single sampling plans for normal inspection):<br>- sampling based on AQL ≤ 1;<br>- acceptance number Ac = 0 (no defect accepted);<br>- rejection number Re = 1 (if 1 defect, the entire lot shall be tested).<br><br>Sampling shall be made at regular intervals for each specific lot.<br>Alternative statistical methods that ensure compliance with the above IEC 60410 requirements can be used, e.g. statistical methods controlling continuous manufacturing or process control with capability index.<br>Sampling tests for clearance verification shall be performed according to 8.3.3.4.3 of IEC 60947-1.<br><br>**9.1.4 Sampling tests (IEC 60947-4-2)**<br>Sampling tests for controllers and starters comprise<br>- operation and operating limits (9.3.6.2);<br>- dielectric tests (9.3.6.3).<br><br>Subclause 8.1.4 of IEC 60947-1:2007 applies, with the following amplification:<br>A manufacturer may use sampling tests instead of routine tests at his own discretion.<br>Sampling shall meet or exceed the following requirements, as specified in IEC 60410<br>(see Table II-A of IEC 60410:1973).<br><br>Sampling is based on AQL 1:<br>- acceptance number Ac = 0 (no defect accepted);<br>- rejection number Re = 1 (if 1 defect, the entire lot shall be tested).<br><br>Sampling shall be made at regular intervals for each specific lot.<br>Alternative statistical methods that ensure compliance with the above IEC 60410 requirements can be used, for example statistical methods controlling continuous | 100% |

| | | |
|---|---|---|
| IEC/EN 60947-5-1: | **8.1.3 Routine tests**<br>Routine tests are the responsibility of the manufacturer and are usually limited to a mechanical inspection and a verification of the mechanical operation.<br>In certain cases specified in Annexes J and K, the inspection is supplemented by a dielectric test. When performed, the dielectric test is carried out according to 8.3.3.4 with the following amendments: the required minimum duration of voltage application is reduced to about 1 s and the metal foil and external terminal connections are unnecessary.<br>Additional routine tests for the control switch or the control circuit device may be specified as appropriate.<br>A sampling plan may be accepted. | 100% |
| IEC/EN 60947-5-2: | **8.1.3 Routine tests**<br>Routine tests are the responsibility of the manufacturer and are usually limited to the mechanical inspection and verification of electrical operation.<br>The inspection may be supplemented by a dielectric test. When performed, the dielectric test is carried out according to 8.3.3.4, the test duration may be reduced to 1 s. | 100% |
| IEC/EN 60947-6-1:<br>9.1.3 Routine tests<br>Sub-clause 8.1.3 of IEC 60947-1 applies. Routine tests are stated in 9.4. | **9.4 Routine tests**<br>Routine tests shall be made on new and clean TSE and shall consist of:<br>a) Verification of the operating mechanism as stated in 9.3.3.1.<br>b) Verification of controls, sequence and limits as stated in 9.3.3.2.4, 9.3.3.2.5 and 9.3.3.2.6.<br>c) Verification of dielectric withstand according to 8.3.3.4.2 of IEC 60947-1.<br><br>NOTE The combined test of 8.3.3.4.2 of IEC 60947-1 is permitted | 100% |
| IEC/EN 60947-6-2:<br>9.1.3 Routine tests | Subclause 8.1.3 of Part 1 applies.<br><br>Routine tests comprise:<br>- operation and operating limits (9.5.2);<br>- dielectric tests (9.5.3).<br><br>NOTE The combined test of 8.3.3.4.2 of IEC 60947-1 is permitted. | 100% |

## 4.0 Product Verification Tests/Periodic testing (refer to CIG 021 clause 4.8)

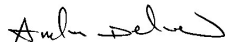
Product verification tests are in addition to the production line inspection and routine tests and are performed on samples taken randomly from the production line.
The manufacturer is responsible for conducting or arranging for the following periodic testing to be completed. Records shall be available for review during factory inspection visits.

| Certification Mark | Frequency | PVT/periodic testing required |
|---|---|---|
| SEMKO<br>BG<br>TICK<br>ASTA | Annual | For each basic type certified the following tests according to the product standard.<br>Testing must be conducted in a laboratory which is subjected to external audits by an appropriate party to ISO 17025.<br>• Marking, correct assembly<br>• Terminals<br>• Protection against electric shock<br>• Overload trip characteristic against the calibration requirement<br>• Short-circuit trip characteristic<br>• Temperature rise<br>• Mechanical endurance |

**5.0 Surveillance testing by the Certification Body**

If required, samples are selected during the factory inspection and the manufacturer should send these to the address provided. If samples are required but not available at the time of the inspection, the manufacturer should send these as soon as they become available. If there is no stock or production, the manufacturer should advise the certification body that samples will not be provided due to no production.
The certification body will arrange for the required testing to be completed. This will be charged to the manufacturer or Licence holder. A report of the testing will be provided.

| Certification Mark | Surveillance testing requirements |
|---|---|
| SEMKO, BG, TICK, ASTA | Regular selection and testing of surveillance samples is not required.<br>Records of the above PVT should be readily available to the certification body for review if requested.<br>Samples may be required if any deviations to the type tested or non-compliance with the product standard are suspected |

| Document History | | | | |
|---|---|---|---|---|
| **Revision No.** | **Date** | **Changes** | **Name & Title** | |
| | | | **Author** | **Approving Official** |
| 1 | 11/02/2015 | Original issue | Hans-Georg Andersson / R W Hayward |  |
| | | | | |
| | | | | |

End of Document