

## **Wires, Cables and Cords**

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TÜV Rheinland do Brasil

### **1 – PURPOSE**

This document describes the complementary criteria of the “Product Certification Rule” – RC 002 for certification and maintenance of the license to the use of the conformity mark of TÜV Rheinland do Brasil Ltda.

### **2 – APPLICATION FIELD**

Applicable to all companies in the segment of:

- NBR 7286:2001 – Power cables with insulation extruded of ethylenepropylene rubber (EPR) for rated voltages of 1 kV to 35 kV – Performance requirements;
- NBR 13248:2000 – Power and control cables and insulated conductors without sheath, with insulation extruded and with low emission of smoke up to and including 1kV – Performance requirements;
- IEC 60227-5:2003 – Polyvinyl chloride insulated cables of rated voltage up to and including 450/750 V - Part 5: Flexible cables (cords);
- IEC 60245-4:2004 – Rubber insulated cables – rated voltages up to and including 450/750 V - Part 4: Cords and flexible cables;
- IEC 60245-8:2004 - Rubber insulated cables – rated voltage up to and including 450/750 V - Part 8: Cords for applications requiring high flexibility;
- NM 247-5:2002 - Polyvinyl chloride insulated cables (PVC) – rated voltages up to and including 450/750V Part 5: Flexible cables (cords) (IEC 60227-5, MOD);
- NBR NM-274:2002 – Non-sheathed single-core and sheathed multicore flexible cables insulated with heat resistant silicone of rated voltages up to and including 450/750V.

### **3 – COMPLIMENTARY DOCUMENTS**

ABNT ISO/IEC Guide 2:1998 - Standards and related activities - General vocabulary;

NBR ISO 9001:2000 - Quality management systems - Requirements;

ABNT ISO/IEC 17030:2005 – Conformity assessment – General requirements for third-party marks of conformity;

ABNT ISO/IEC 17025:2005 – General requirements for the competence of testing and calibration laboratories;

ABNT ISO/IEC 17000:2005 – Conformity assessment – Vocabulary and general principles;

ABNT ISO/IEC Guide 67:1998 – Conformity assessment – Fundamentals of product certification;

ABNT ISO/IEC Guide 28:1998 – Conformity assessment – Guidance on a third-party certification system for products;

ABNT ISO/IEC Guide 65:1997 – General requirements for bodies whose operates products certification systems.

Law nº 8.078/1990 – Consumer Protection and Defense Code, section IV – On Abusive Practices.

### **4 - LICENSE TO USE THE CONFORMITY MARKING**

Complements RC 002;

The license to use the Conformity Marking for Wires, Cables and cords will have validation for 2 years, and must contain:

Number of the certificate issued;

Certificate validity term;

Product description;

Applicant (Corporate Name / Address);

Manufacturer (Corporate Name / Address);

Technical standards applicable to the certified product;

Granting for conformity marking use (license to use SBAC conformity marking); and

Issue date of the certificate.

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## **Wires, Cables and Cords**

### **5 – WIRES, CABLES AND CORDS TESTS AND SAMPLES**

The tests described in this CRC are defined in the specific standards and any errata, amendment or update in the versions of these standards may only be used with TÜV Rheinland do Brasil authorization.

#### **5.1 – INITIAL TESTS**

The initial tests are specified in the specific standards as follows:

##### **5.1.1 - NBR 7286 ( Multicore cable Cu / EPR or HEPR / ST2 0,6/1kV )**

- ✓ Product marking;
- ✓ Construction requirements verification (dimensional);
- ✓ Electrical resistance at 20°C;
- ✓ Voltage test;
- ✓ Insulation resistance at 20° C;
- ✓ Voltage test at long term;
- ✓ Insulation resistance at 90°C;
- ✓ Heat shock (sheath);
- ✓ Pressure at high temperature (sheath);
- ✓ Mechanical characteristics before and after ageing (insulation and sheath);
- ✓ Loss of mass (sheath);
- ✓ Impact test at low temperature.
- ✓ Test of non-contamination
- ✓ Flame resistance;
- ✓ Hot set test (insulation);
- ✓ Bending/elongation at low temperature (sheath);
- ✓ Tensile test after ageing in an air bomb (insulation);
- ✓ Ozone resistance (insulation);
- ✓ Water absorption (insulation – gravimetric);

##### **5.1.2 - NBR 13248 ( Multicore cable Cu / EPR or HEPR / Polyolefin )**

- ✓ Product marking;
- ✓ Construction requirements verification (dimensional);
- ✓ Electrical resistance at 20°C;
- ✓ Voltage test;
- ✓ Insulation resistance at room temperature;
- ✓ Mechanical characteristics (insulation and sheath);
- ✓ Voltage test at long term;
- ✓ Test of non-contamination;
- ✓ Determination of the presence of halogen, nitrogen and sulphur;
- ✓ Determination of the level of acidity;
- ✓ Water absorption, method gravimetric (insulation);
- ✓ Bending/elongation at low temperature (sheath);
- ✓ Determination of the quantity of the acid gas;
- ✓ Determination of the toxicity index;
- ✓ Loss of mass (sheath);
- ✓ Density of smoke;
- ✓ Tensile test after ageing in an air oven (insulation);
- ✓ Ozone resistance test (insulation);
- ✓ Vertical flame test;
- ✓ Pressure at high temperature (sheath);

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- ✓ Impact test at low temperature;
- ✓ Hot set test (insulation);
- ✓ Insulation resistance at maximum temperature of operation.

### **5.1.3 - IEC 60227-5**

- ✓ Product marking;
- ✓ Conductor construction;
- ✓ Dimensional check, including ovality;
- ✓ Voltage test;
- ✓ Electrical resistance at 20°C;
- ✓ Insulation resistance at maximum temperature of operation;
- ✓ Pressure at high temperature (insulation and sheath);
- ✓ Loss of mass (insulation and sheath);
- ✓ Mechanical characteristics, before and after ageing (insulation and sheath);
- ✓ Cold bend (insulation and sheath) and cold bend/elongation at low temperature, only applicable to 60227 IEC 57 (insulation and sheath);
- ✓ Heat shock (insulation and sheath);
- ✓ Flame resistance;
- ✓ Voltage test on cores;
- ✓ Impact test at low temperature;
- ✓ Flexing test followed by voltage test;
- ✓ Test of non-contamination (only applicable to cable type 60227 IEC 53);
- ✓ Thermal stability, only applicable for cables type 60227 IEC 56 or 57 – (insulation and sheath); and
- ✓ Compatibility test (only applicable for cables type 60227 IEC 57);

### **5.1.4 – IEC 60245-4**

- ✓ Product marking;
- ✓ Conductor construction;
- ✓ Dimensional verification, including ovality;
- ✓ Voltage test;
- ✓ Electrical resistance at 20°C;
- ✓ Flexing test followed by voltage test;
- ✓ Mechanical characteristics, before and after ageing (insulation and sheath);
- ✓ Voltage test on cores;
- ✓ Hot set test (insulation and sheath);
- ✓ Ozone resistance (insulation);
- ✓ Tensile test after ageing in an air bomb (insulation and sheath for 60245 IEC 53) - (insulation for 60245 IEC 57 ou 66);
- ✓ Bending test at low temperature (covered for 60245 IEC 57);
- ✓ Immersion in oil (sheath for 60245 IEC 57 or 66);
- ✓ Bending/elongation at low temperature (covered for 60245 IEC 66);

### **5.1.5 – IEC 60245-8**

- ✓ Product marking;
- ✓ Conductor construction;
- ✓ Dimensional check, including ovality and coverage by textile braid;
- ✓ Voltage test;
- ✓ Electrical resistance at 20°C;
- ✓ Three pulleys flexing test;

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- ✓ Kink test;
- ✓ Solderability test (plain conductors);
- ✓ Mechanical characteristics, before and after ageing;
- ✓ Wear resistance test;
- ✓ Voltage test on cores ;
- ✓ Hot set test;
- ✓ Resistance to heat of textile braid;
- ✓ Ozone resistance test (method A); and
- ✓ Tensile test after ageing in an air bomb.

### **5.1.6 – NM 247-5**

- ✓ Product marking;
- ✓ Construction requirements verification (dimensional and ovality);
- ✓ Electrical resistance at 20°C;
- ✓ Voltage test;
- ✓ Insulation resistance at 20° C;
- ✓ Separation of the cores (applicable only to the parallel cord);
- ✓ Copper resistivity;
- ✓ Pressure at high temperature (insulation for 247 NM 42 and insulation and sheath for 247 NM 52 and 53);
- ✓ Flexing test followed by voltage test;
- ✓ Copper elongation at break;
- ✓ Mechanical characteristics (insulation for 247 NM 42 and insulation and sheath for 247 NM 52 and 53);
- ✓ Bending test at low temperature (insulation for 247 NM 42 and insulation and sheath for 247 NM 52 and 53);
- ✓ Impact test at low temperature;
- ✓ Voltage test on cores;
- ✓ Heat shock (insulation for 247 NM 42 and insulation and sheath for 247 NM 52 and 53);
- ✓ Flame resistance;
- ✓ Insulation resistance at 70°C;
- ✓ Loss of mass (insulation for 247 NM 42 and insulation and sheath for 247 NM 52 and 53);

### **5.1.7 NBR NM-274:2002**

- ✓ Product marking;
- ✓ Construction requirements verification (dimensional and ovality);
- ✓ Electrical resistance at 20°C;
- ✓ Voltage test;
- ✓ Mechanical characteristics (insulation for single core, and insulation and sheath for multicore cable);
- ✓ Voltage test on cores (only applicable for multicore cable); and
- ✓ Hot set test (insulation for single core and insulation and sheath for multicore).

### **5.2 – SAMPLE QUANTITY:**

The sample collection for the surveillance is performed by TÜV Rheinland do Brasil.

**Note:** In case of prototypes, the manufacturer can collect and send the samples required to TÜV Laboratory/TÜV Rheinland do Brasil, through an agreement among them and under the responsibility of TÜV Rheinland do Brasil. The approval of the prototype on the initial tests do not exonerate TÜV Rheinland do Brasil from the validation of the products after the start of the production line operation.

**5.2.1 - NBR 7286**

The quantity of samples required for the test is prescribed in the NBR 7286 and correspond to those indicated in the table:

Cable type	Strand classes	Initial tests	
		Type	Additional
Single core or Multiplexed	1, 2, 4, 5	On the lowest section of the highest strand class and on the highest section of the lowest strand class produced.	On the lowest section class 1 or 2
Multicore	1, 2, 4, 5	On the lowest section of the highest strand class and on the highest section of the lowest strand class produced.	On the lowest section class 1 or 2

The maximum section of the cable is of 120mm<sup>2</sup> to perform the initial tests.

**5.2.2 - NBR 13248**

The quantity of samples required to the test is prescribed by the NBR 13248 and correspond to those indicated in the table:

Cable type	Strand classes	Initial tests	
		Type	Additional
Single core or Multiplexed	1, 2, 4, 5	On the lowest section of the highest strand class and on the highest section of the lowest strand class produced.	On the lowest section class 1 or 2
Multicore	1, 2, 4, 5	On the lowest section of the highest strand class and on the highest section of the lowest strand class produced.	On the lowest section class 1 or 2

**5.2.3 – IEC 60227-5**

The quantity of samples required to the tests, correspond to those indicated in the table below:

Product	Nº of cores	Strand classes	Voltage (V)	Type tests	Flexing test
<b>Circular Flexible Cable</b>	2 to 3	5	300/300	2 x 0,75	3 x 0,75
<b>Flat Flexible Cable</b>	2	5	300/300	2 x 0,75	-----
<b>Circular Flexible Cable</b>	2 to 5	5	300/500	3 x 2,5	2 x 0,75
<b>Flat Flexible Cable</b>	2	5	300/500	2 x 2,5	-----

**Notes:**

- (1) If the manufacturer does not produce any of the listed cables, must be used a cable as close as possible.
- (2) Table 1 applies to the lowest strand class among those requested by the manufacturer. In other strand classes are performed all tests determined by the standard as routine and flexing test followed by voltage test, on the sections and constructions established in the table above. These tests serve to complement the scope range.
- (3) In case of manufacturer whose produces flexible cable 300V and of 750V, the tests of the table 1 are performed on the highest voltage while the additional routine and flexing tests are performed on the lowest voltage.

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**5.2.4 – IEC 60245-4**

The quantity of samples required to the test are those indicated in the table below:

Product	N° of cores	Strand classes	Voltage (V)	Type tests	Flexing test
<b>Circular Flexible Cable</b>	2 to 5	5	300/500	3 x 2,5	2 x 0,75
<b>Circular Flexible Cable</b>	1 to 5	5	450/750	2 x 2,5	3 x 0,75

**Notes:**

- (1) If the manufacturer does not produce any of the listed cables, must be used a cable as close as possible.
- (2) Table 1 applies to the lowest strand class among those requested by the manufacturer. In other strand classes are performed all tests determined by the standard as routine and flexing test followed by voltage test, determined by the standard as type (T), in the sections and constructions established in the table above. These tests serve to complement the scope range.
- (3) In case of manufacturer whose produces flexible cable 300V and of 750V, the tests of the table 1 are performed on the highest voltage while the additional routine and flexing tests are performed on the lowest voltage.

**5.2.5 – IEC 60245-8**

Product	N° of cores	Strand classes	Voltage (V)	Type tests	Flexing test
<b>Braided cord for applications requiring high flexibility</b>	2 and 3	6	300/300	2 x 1,5	3 x 0,75

**Notes:**

- (1) If the manufacturer does not produce any of the listed cables, must be used a cable as close as possible.
- (2) Table 1 applies to the lowest strand class among those requested by the manufacturer. In other strand classes are performed all tests determined by the standard as routine and flexing test followed by voltage test, determined by the standard as type (T), in the sections and constructions established in the table above. These tests serve to complement the scope range.

**5.2.6 – NM 247-5**

Product	N° of cores	Strand classes	Voltage (V)	Type tests	Flexing test
<b>Parallel Flexible Cord</b>	2	4, 5 ou 6	300	2 x 2,5	2 x 0,5
<b>Circular Flexible Cable</b>	2 a 5	4, 5 ou 6	300	2 x 0,75	3 x 0,75
			750	3 x 2,5	2 x 0,75
<b>Flat Flexible Cable</b>	2 a 3	4, 5 ou 6	300	2 x 0,75	3 x 0,75
			750	2 x 2,5	3 x 2,5

**Notes:**

- (1) If the manufacturer does not produce any of the listed cables, must be used a cable as close as possible.
- (2) Table 1 applies to the lowest strand class among those requested by the manufacturer. In other strand classes are performed all tests determined by the standard as routine and flexing test followed by voltage test, determined by the standard as type (T), in the sections and constructions established in the table above. These tests serve to complement the scope range.
- (3) In case of manufacturer whose produces flexible cable 300V and of 750V, the tests of the table 1 are performed on the highest voltage while the additional routine and flexing tests are performed on the lowest voltage.

**5.3 – Surveillance tests**

The surveillance tests will be performed at each 6 months, after the granting of the license to use the conformity marking, in one section of each strand class produced. At each sample, the section will be alternated.

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The surveillance tests and the sample collection will be performed by TÜV Rheinland do Brasil, being taken from the market and from manufacturer logistic department, alternately.

The surveillance tests will be performed as follow:

### **5.3.1 - NBR 7286**

At each six months will be always checked the correct functioning of the spark test equipment, regarding its calibration in the electric voltage range used by the manufacturer, according to the conditions specified by the NM 244.

Furthermore, it will be always performed the type tests on each one of the samples collected as follow:

- ✓ Product marking;
- ✓ Construction requirements verification (dimensional);
- ✓ Electrical resistance at 20°C;
- ✓ Voltage test; and
- ✓ Insulation resistance at 20° C.

**5.3.1.1** – Beyond the tests mentioned in the previous section, the tests listed below will be performed according to the periodicity established, based on the granting of the license to the use of the conformity marking.

- ✓ 1<sup>st</sup> Semester: Insulation resistance at 90°C, heat shock (sheath) and pressure at high temperature (sheath);
- ✓ 2<sup>nd</sup> Semester: Mechanical characteristics (insulation and sheath), loss of mass (sheath) and impact test at low temperature;
- ✓ 3<sup>rd</sup> Semester: Test of non-contamination, flame resistance, hot set test (insulation) and bending/elongation at low temperature (sheath).
- ✓ 4<sup>th</sup> Semester: Tensile test after ageing in an air bomb (insulation), ozone resistance (insulation), water absorption (insulation -gravimetric) and voltage test at long term.

### **5.3.2 - NBR 13248**

At each six months will be always checked the correct functioning of the spark, regarding its calibration in the electric voltage range used by the manufacturer, according to the conditions specified by the NM 244.

Furthermore, it will be always performed the type tests on each one of the samples collected as follow:

- ✓ Product marking;
- ✓ Construction requirements verification (dimensional);
- ✓ Electrical resistance at 20°C;
- ✓ Voltage test; and
- ✓ Insulation resistance at 20° C.

**5.3.2.1** – Beyond the tests mentioned in the previous section, the tests listed below will be performed according to the established periodicity.

- ✓ 1<sup>st</sup> Semester: Voltage test at long term; Mechanical characteristics (insulation and sheath); test of non-contamination; determination of the presence of halogen, nitrogen and sulphur; determination of the level of acidity;
- ✓ 2<sup>nd</sup> Semester: Water absorption, method gravimetric (insulation), cold bend/elongation at break at low temperature (sheath); determination of the quantity of the acid gas; determination of the toxicity index;
- ✓ 3<sup>rd</sup> Semester: Loss of mass (sheath), density of smoke, tensile test after ageing in an air bomb (insulation); ozone resistance (insulation); vertical flame test;
- ✓ 4<sup>th</sup> Semester: Pressure at high temperature (sheath); impact test at low temperature; hot set test (insulation); insulation resistance at maximum temperature of operation;

### **5.3.3 – IEC 60227-5**

**A.2.1** The surveillance tests will be performed after the granting of the license to use the conformity marking, in one section of each strand class made. At each sampling, the section will be alternated.

**A.2.21** At each six months will be always checked the correct functioning of the spark test equipment, regarding its calibration in the electric voltage range used by the manufacturer, according to the conditions specified by the IEC 60227-5.

Furthermore, it will be always performed the type tests on each one of the samples collected as follow:

- ✓ Product marking;
- ✓ Construction requirements and dimensional verification (ovality, if applicable);
- ✓ Voltage test;
- ✓ Electrical resistance at 20°C; and
- ✓ Insulation resistance at the maximum temperature of operation;

**A.2.32** Beyond the tests mentioned in the previous section, the tests listed below will be performed according to the established periodicity, based on the license granting to the use of the conformity marking.

#### **For insulation in PVC/D and sheath in PVC ST5**

- ✓ 1<sup>st</sup> Semester: Pressure at high temperature (insulation and sheath) and loss of mass (insulation and sheath);
- ✓ 2<sup>nd</sup> Semester: Mechanical characteristics (insulation and sheath) and bending at low temperature (insulation and sheath);
- ✓ 3<sup>rd</sup> Semester: Flame resistance, voltage test on cores and heat shock (insulation and sheath);
- ✓ 4<sup>th</sup> Semester: Impact test at low temperature (only applicable to the 60227 IEC 52, 53 and 57); flexing test followed by voltage test; test of non-contamination (only applicable to the 60227 IEC 53); thermal stability (insulation and sheath, only applicable to the 60227 IEC 56 and 57); compatibility (only applicable to the 60227 IEC 57);

**A.2.43** At the end of the cycle of 4 (four) semesters, a new sequence of tests will be initiated, as described on item A.2.32.

#### **5.3.4 – IEC 60245-4**

The surveillance tests will be performed at each 6 months, after the granting of the license to use the conformity marking, in one section of each strand class made. At each sampling, the section will be alternated.

At each six months will be always checked the correct functioning of the spark test equipment, regarding its calibration in the electric voltage range used by the manufacturer, according to the conditions specified by the IEC 60245-4.

Furthermore, it will be always performed the type tests on each one of the samples collected as follow:

- ✓ Product marking;
- ✓ Conductor construction;
- ✓ Dimensional verification (ovality);
- ✓ Voltage test; and
- ✓ Electrical resistance at 20°C;

**5.3.4.1** – Beyond the tests mentioned in the previous section, the tests listed below will be performed according to the established periodicity, based on the license granting to the use of the conformity marking.

##### **For rubber insulation/sheath:**

- ✓ 1<sup>st</sup> Semester: Flexing test followed by voltage test; bending at low temperature (only applicable to the 60245 IEC 57), bending/elongation at low temperature (only applicable to the 60245 IEC 66);
- ✓ 2<sup>nd</sup> Semester: Mechanical characteristics (insulation and sheath); immersion in oil (insulation and sheath, only applicable to the 60245 IEC 57 and 66);
- ✓ 3<sup>rd</sup> Semester: Voltage test on cores and hot set test (insulation/sheath)
- ✓ 4<sup>th</sup> Semester: Ozone resistance (insulation), Tensile test after ageing in an air bomb (insulation) and for sheath only to the 60245 IEC 53);

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### **5.3.5 – IEC 60245-8**

The surveillance tests will be performed at each 6 months, after the granting of the license to use the conformity marking, in one section of each strand class made. At each sampling, the section will be alternated.

At each six months will be always checked the correct functioning of the spark test equipment, regarding its calibration in the electric voltage range used by the manufacturer, according to the conditions specified by the IEC 60245-8.

Furthermore, it will be always performed the type tests on each one of the samples collected as follow:

- ✓ Product marking;
- ✓ Construction requirements verification;
- ✓ Dimensional verification (ovality and coverage of the textile braid);
- ✓ Voltage test; and
- ✓ Electrical resistance at 20°C;

**5.3.5.1 –** Beyond the tests mentioned in the previous section, the tests listed below will be performed according to the established periodicity, based on the license granting to the use of the conformity marking.

#### **For rubber insulation:**

- ✓ 1<sup>st</sup> Semester: Three pulleys flexing test, kink test, solderability test (only applicable to plain conductors);
- ✓ 2<sup>nd</sup> Semester: Mechanical characteristics and wear resistance test;
- ✓ 3<sup>rd</sup> Semester: Voltage test on cores, hot set test and resistance to heat of textile braid; and
- ✓ 4<sup>th</sup> Semester: Ozone resistance test (method A), tensile test after ageing in an air bomb;

### **5.3.6 – NM 247-5**

The surveillance tests will be performed at each 6 months, after the granting of the license to use the conformity marking, in one section of each strand class produced. At each sampling, the section will be alternated.

At each six months will be always checked the correct functioning of the spark test equipment, regarding its calibration in the electric voltage range used by the manufacturer, according to the conditions specified by the NM 247-5. Furthermore, it will be always performed the type tests on each one of the samples collected as follow:

- ✓ Product marking;
- ✓ Construction requirements verification/dimensional (ovality, if applicable);
- ✓ Voltage test;
- ✓ Electrical resistance at 20°C;
- ✓ Separation of cores (only applicable to the 247 NM 42); and
- ✓ Insulation resistance at 20° C.

**5.3.6.1 –** Beyond the tests mentioned in the previous section, the tests listed below will be performed according to the established periodicity, based on the license granting to the use of the conformity marking. Insulation/sheath in PVC

- ✓ 1<sup>st</sup> Semester: Electrical resistivity of copper, pressure at high temperature (insulation for 247 NM 42 and insulation and sheath for 247 NM 52 and 53), flexing test followed by voltage test;
- ✓ 2<sup>nd</sup> Semester: Elongation at break of the copper; mechanical characteristics (insulation for 247 NM 42 and insulation and sheath for 247 NM 52 and 53), bending test at low temperature (insulation for 247 NM 42 and insulation and sheath for 247 NM 52 and 53) and impact test at low temperature;
- ✓ 3<sup>rd</sup> Semester: Voltage test on cores, heat shock (insulation for 247 NM 42 and insulation and sheath for 247 NM 52 and 53), flame resistance; and
- ✓ 4<sup>th</sup> Semester: Insulation resistance at 70°C, mechanical characteristics (insulation for 247 NM 42 and insulation and sheath for 247 NM 52 and 53), loss of mass (insulation for 247 NM 42 and insulation and sheath for 247 NM 52 and 53); test of non-contamination (only applicable to the 247 NM 53)

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### **6 – ACTIONS REGARDING THE NON-CONFORMITIES**

**6.1** - The initial tests shall not have non-conformities.

**6.2** – Whenever a non-conformity is observed in any surveillance test, the same test must be repeated in two new samples, counterproof and witness for the non-conformity attribute, not admitting any non-conformity.

**Note 1:** If TÜV Rheinland do Brasil decides appropriate, and in agreement with the manufacturer, the non-conformity might be confirmed without the realization of the counterproof and witness tests.

**6.3** – When the non-conformity confirmation, TÜV Rheinland do Brasil will immediately suspend the license to use the conformity marking, requesting to the manufacturer the pertinent treatment with establishment of corrective actions and implementation deadlines.

**Note:** If the non-conformity found does not put at risk the safety of the user, under TÜV Rheinland do Brasil's analysis and responsibility, the manufacturer can not have its license to use the conformity marking suspended, since it ensures to TÜV Rheinland do Brasil through corrective actions, the correction of the non-conformity on the existing products in the market and the implementation of these actions in the production line.

### **7 – EVALUATION OF THE MANUFACTURING QUALITY CONTROL SYSTEM**

**7.1** – The initial and periodical evaluation of the manufacturing quality control system will be performed by TÜV RHEINLAND DO BRASIL.

**7.2** – The initial and periodical evaluation of the manufacturing quality control system must check the compliance with the requirements listed below, when applicable, in the Manufacturer's Quality Management System Scope:

1. Control of records - (\*) complying with section 4.2.4 of the standard
2. Control of Production - (\*) complying with section 7.5.1 and 7.5.2
3. Identification and traceability - (\*) complying with section 7.5.3 of the standard
4. Preservation of the product - (\*) complying with section 7.5.5 of the standard
5. Control of the measuring and monitoring devices - (\*) complying with section 7.6 of the standard
6. Monitoring and measurement of product - (\*) complying with section 8.2.4 of the standard
7. Control of non-conforming product - (\*) complying with section 8.3 of the standard
8. Corrective action - (\*) complying with section 8.5.2 of the standard
9. Preventive action - (\*) complying with section 8.5.3 of the standard

**Note:** For this evaluation will be used as reference the content presented in NBR ISO 9001:2000 Quality Management Systems – Requirements.

**7.3** – In the initial and periodical evaluation of the manufacturing quality control will be checked the correct functioning of the spark test equipment regarding its efficacy and its calibration in the electric voltage range used by the manufacturer according the conditions specified by the respective standards.

**7.4** – In the initial and periodical evaluation of the manufacturing quality control will be checked the performance by the manufacturer of the routine tests prescribed in the respective standards and its results.

**7.5** – If the manufacturer has a quality system certified by an CB (Certification Body) accredited by Inmetro according to the standard NBR ISO 9001:2000, TÜV RHEINLAND DO BRASIL must analyze the documentation related to the quality system certification, ensuring that the requirements described above have been assessed focusing the product to be certified. Otherwise TÜV RHEINLAND DO BRASIL must check the compliance with the requirements described in items B.2, B.3 and B.4.

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**7.6** – The periodical evaluation of the manufacturing quality control must be performed at least at each 6 (six) months after the granting of the license to use the conformity marking.

### 8 – CONFORMITY LOGO

#### 8.1 – On the product / packaging



**LOGO UC:** To be used only for clients who still uses it on its products and packaging.

In case of cables and flexible cords, on which, due to its dimensions, make it impossible to have a clear printing of the TÜV Rheinland marking, it will be allowed, as an alternative, the use of the full fantasy name of the TÜV Rheinland, followed by its identification number (OCP-0004).

#### Notes:

On products smaller than or equal to 2,5mm<sup>2</sup>, the Conformity Identification Seal, on which, due to its dimensions, make it impossible to have a clear printing of the TÜV Rheinland marking, it will be allowed, as an alternative, the use of the full fantasy name of the TÜV Rheinland, followed by its identification number (TÜV RHEINLAND DO BRASIL- OCP 0004).

For the sections smaller than or equal to 1mm<sup>2</sup>, the conformity identification seal is optional. However, it is obligatory on packaging / labels;

### 9 – REVISION STATUS

Initial version.