

**RESULTS OBTAINED IN THE TEST:**

***WATER RESISTANCE TESTS FOR H07RN8-F FLEXIBLE CABLES.  
ELECTRICAL TEST.***

***WATER RESISTANCE TESTS FOR H07RN8-F FLEXIBLE CABLES.  
MECHANICAL PROPERTIES OF SHEATH AFTER WATER  
INMMERSION***

**SAMPLE: CABLE TYPE H07RN-F 5G2,5 0,6/1kV**

**MANUFACTURED BY: TOP CABLE (AKAN CABLES)**

This Tests Report includes tests carried out in the ELECTRIC LABORATORY of ceis

Our Client: TOP CABLE - AKAN CABLES, S.L.. - (BARCELONA) - SALIENT - PI PLANS DE LA SALA

This report includes partial tests demanded by our client.

The results of the test refer only to the tested samples and not to the product in general.

Samples have been selected and sent by the manufacturer to the laboratory.

Reception date of the tested samples: 2014/03/26

Performance date of tests: from 2014/04/24 at 2014/08/25

The report shall not be reproduced except in full without the written approval of the testing laboratory.

Laboratory of test accredited by ENAC with accreditation N° 1/LE149

Móstoles-Madrid, 2014/09/15

Mariano PARDO LUMBRERAS  
*Customer Manager – Electrical Area*

**TESTED SAMPLE**

CABLE TYPE: **H07RN-F 5G2,5**

MANUFACTURED BY: **TOP CABLE (AKAN CABLES)**

MARKING:

**TOP CABLE Xtrem H07RN-F 5G2,5 AENOR (HAR) IEC 60245/DN-F 0,6/1 KV 5G2,5  
UNE 21150 / IEC 60092-353 IEC 60332-1 E-022-14-3029 CE MADE IN SPAIN 140131**

**APPLICABLE STANDARD**

The following standards have been applied for the performance of the tests:

**UNE EN 50525-2-21:2014, Annex D y E.**

REMARKS:

Test case verdicts
Test case does not apply to the test object : N/A
Test item does meet the requirement ..... : PASS
Test item does not meet the requirement . : FAIL

**OBSERVATIONS**

The norm UNE EN 50525-2-21 applies to the cables type H07RN8-F, nevertheless, by request of TOP CABLE has been applied for the cable H07RN-F which results of test do the object of this report.

**TESTS RESULTS**

**1.-WATER RESISTANCE TESTS FOR H07RN8-F FLEXIBLE CABLES.  
ELECTRICAL TEST.**

1.1.-Voltage pre-test on complete cable

Minimum length of the sample : 20 m  
Temperature of the water : 20 °C±5 °C  
Minimum period of immersion in water : 1 h  
Voltage applied : 2.500 V  
Duration of each application of voltage : 15 min  
Points of application : A voltage shall be applied between every conductor and linked to each other all the rest and to the water.

**No breakdown**

**RESULT: PASS**

1.2.-Voltage test on completed cable at 50°C

(The sample comes from the tested one in the paragraph 1.1)

Minimum length of the sample : 5 m  
Temperature of the water : 50±2 °C  
Voltage applied : 1 kV  
Minimum period of immersion in water : 100 days  
Duration of each application of voltage : 100 days  
Points of application : Between one conductor connected to the water and all others connected together.

**No breakdown**

**RESULT: PASS**

1.3.-Insulations resistance test after pre-voltaje test.

(The sample comes from the tested one in the paragraph 1.1)

Test carried out on 3 samples of isolated conductor.

1.3.1. Voltage test on cores

Minimum length of the sample : 5 m  
 Temperature of the water : 50±2 °C  
 Minimum period of immersion in water : 24 h  
 Voltage applied : 2.500 V  
 Duration of each application of voltage : 5 min  
 Points of application : Between every conductor and the water

**No breakdown**

**RESULT: PASS**

Insulations resistance:

Minimum length of the sample : 5 m  
 Temperature of the water : 50±2 °C  
 Voltage applied : 500 V c.c.

Sample nº 1	Volume resistivity (Ω.cm)
Brown	11,5x10 <sup>13</sup>
Blue	10,9 x10 <sup>13</sup>
Green - yellow	12,0 x10 <sup>13</sup>
Sample nº 2	
Brown	13,8x10 <sup>13</sup>
Blue	10,9 x10 <sup>13</sup>
Green - yellow	12,0 x10 <sup>13</sup>
Sample nº 3	
Brown	11,5x10 <sup>13</sup>
Blue	12,3 x10 <sup>13</sup>
Green - yellow	12,0 x10 <sup>13</sup>

Prescribed: The value of volume resistivity, shall be  $\geq 10^{12}$  Ω.cm

**RESULT: PASS**

1.3.2 Voltage test on cores at 50 °C

Minimum length of the sample : 5 m  
 Temperature of the water : 50±2 °C  
 Minimum period of immersion in water : 14 days  
 Voltage applied : 1 kV  
 Duration of each application of voltage : 14 days  
 Points of application : Between every conductor and the water

No breakdown

**RESULT: PASS**

Insulations resistance:

Minimum length of the sample : 5 m  
 Temperature of the water : 50±2 °C  
 Voltage applied : 500 V c.c.

<b>Sample n° 1</b>	Volume resistivity ( $\Omega$ .cm)
Brown	11,5x10 <sup>13</sup>
Blue	10,9 x10 <sup>13</sup>
Green - yellow	12,0 x10 <sup>13</sup>
<b>Sample n° 2</b>	
Brown	11,5x10 <sup>13</sup>
Blue	11,6 x10 <sup>13</sup>
Green - yellow	12,0 x10 <sup>13</sup>
<b>Sample n° 3</b>	
Brown	15,4x10 <sup>13</sup>
Blue	14,6 x10 <sup>13</sup>
Green - yellow	16,0 x10 <sup>13</sup>

Prescribed: The value of volume resistivity, shall be  $\geq 10^{11}$   $\Omega$ .cm

**RESULT: PASS**

**2.- WATER RESISTANCE TESTS FOR H07RN8-F FLEXIBLE CABLES.  
MECHANICAL PROPERTIES OF SHEATH AFTER WATER IMMERSION**

Samples: Dumb bell

Conditioned for seven days: 20±5°C - 50±5% Hr

**2.1 Determination of tensile strength and elongation at break:**

2.1.1 Without immersion.

Tensile strength: 13,4 N/mm<sup>2</sup>  
Elongation at break: 412 %

2.1.2 After immersion in potable tap water at 50°C±2°C for 28 days.

Tensile strength: 12,5N/mm<sup>2</sup>  
Elongation at break: 381 %

2.1.3 After immersion in potable tap water at 50°C±2°C for 100 days.

Tensile strength: 11,4 N/mm<sup>2</sup>  
Elongation at break: 329 %

Requirements for tensile strength and elongation at break (Single layer):

After immersion 100 days:

Tensile strength: 7 N/mm<sup>2</sup>  
Elongation at break: 200 %

Variation between 28 days immersion and 100 days immersion:

Tensile strength: -0,9  
Elongation at break: -0,14

Variation prescribed between 28 days immersion and 100 days immersion:

Tensile strength: ±0,15  
Elongation at break: ±0,20

**RESULT: PASS**

2.2 Increase in mass

Samples: Dumb bell

Conditioned for seven days:  $20\pm 5^{\circ}\text{C}$  -  $50\pm 5\%$  Hr

Temperature of aging:  $50\pm 2^{\circ}\text{C}$   
Duration of aging: 100 days

Increase of mass after immersion for 100 days: 30 %

Prescribed: The increase of mass after immersion for 100 days shall not be greater than 40 % of the mass before immersion.

**RESULT: PASS**