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Zertifikat: 01 100 020214



LABORATORIES OF EXTRA HIGH  
VOLTAGE RESEARCH CENTER SECTOR  
km 27 Cairo- Alex. Desert Road  
Report No. (557/2019)  
Page 1 of 4

## TEST REPORT

REPORT No. ( 557 /2019)

▪ **CLIENT : ELSEWEDY CABLES**

▪ **Report Date:** 17 / 11 /2019

**Expire Date :** 12/5/2021

▪ **Place:**

- Laboratories of Extra High Voltage Research Center.
- Internal code:TO-AC-18-04 -14 -02.

▪ **Requirements:**

- Type tests according to Specifications Standard

▪ **Standard Specifications:**

- IEC 61089 (1991) , IEC60 888 (1987) . IEC 60889(1987).

▪ **Description of the Specimen :**

- Aluminum Conductor Steel Reinforced (ACSR) 150/25 mm<sup>2</sup>.

▪ **Description of the Test Equipment:**

- Digital Low Resistances Ohmmeter (DLRO) Type: (Biddle) - Serial No. (42109).
- Universal testing machine 100 kN – LLOYED – Model: LR100K PLUS - Serial No. 108322.

▪ **Test Sample:**

- Test sample was choosing under the responsibility of the client.

▪ **Tests:**

1. Conductor construction and dimension measurement.
2. Determination of direction lay.
3. Determination of lay ratio.
4. Resistivity test.
5. Mass per unit length
6. Tensile test for wires



## ■ Test Method and Results:

### 1- Conductor construction and dimension measurement :

- Dimensions have been measured according to **IEC 61089** The measured values is shown in the following table:

Item	Unit	Requirement	Measured / determined
- Overall conductor diameter	mm	17.25	17.23
- Diameter Aluminum wire	mm	2.7	2.7
- No of Aluminum wires	---	26	26
- Diameter steel wire	mm	2.15	2.14
- No of steel wires	---	7	7

- Tolerance of. Wires and conductor diameter:  $\pm 1\%$

- **The conductor met the requirements.**

### 2- Determination of direction lay :

- The direction of lay of the conductor was measured in accordance with clause ( 5.4.4) of **IEC60889** The measured value is shown in the following table:

Item	Lay direction	
	Requirement	Determined
- Direction of lay for conductor outer surface	Right-hand	Right-hand

- **The conductor met the requirements.**

### 3- Determination of lay ratio:

- The lay ratio of the conductor was measured in accordance with clause ( 5.4.4) of **IEC60889** The measured value is shown in the following table:

Item	Lay ratio (%)	
	Requirement	Measured
- Lay ratio for conductor outer surface	10-14	13

- **The conductor met the requirements.**

### 4- Resistivity test:

- The electrical resistivity was measured for aluminum wire in accordance with clause 5 of **IEC 60889** and The measured value is shown in the following table :

Test	Requirement	Measured
Electrical resistivity for Al. wires at 20 °C ( $\Omega \cdot \text{mm}^2/\text{m}$ )	$\leq 0.028264$	0.028262

- **The conductor met the requirements.**



#### 5- Mass per unit length:

- The Mass per unit length was measured for aluminum in accordance with clause 5.6 of *IEC 61089* and The measured value is shown in the following table :

Test	Requirement	Measured
Mass per unit length (kg/km)	626±2%	633

- **The conductor met the requirements.**

#### 6- Tensile test:

- The mechanical tensile strength was measured on wires in accordance with clause (11.3) of *IEC 889* , clause (11.3) of *IEC 888* and clause ( 6.4.8.9) of *IEC 61089* The measured value is shown in the following table:

No.	Type of wire	Overall diameter (mm)	Cross section area (mm <sup>2</sup> )	breaking load(N)	Tensile strength (M.Pa)		Minimum elongation at break on 250 mm(%)	
				Measured	Requirement	Result	Requirement	Result
1	AL	2.7	5.726	1020.54	161.5≤	178.23	---	2.4
2	AL	2.7	5.726	998.10		174.31		1.3
3	AL	2.7	5.726	1061.71		185.42		1.7
4	AL	2.7	5.726	981.44		171.40		2.1
5	AL	2.7	5.726	1056.45		184.50		1.9
6	AL	2.7	5.726	1089.72		190.31		2.2
7	AL	2.7	5.726	1060.05		185.13		2.1
8	AL	2.7	5.726	1046.43		182.75		1.8
9	AL	2.7	5.726	994.89		173.75		2.3
10	AL	2.7	5.726	1045.05		182.51		2.0
11	AL	2.7	5.726	1078.32		188.32		2.4
12	AL	2.7	5.726	993.46		173.50		2.1
13	AL	2.7	5.726	1143.77		199.75		2.4
14	AL	2.7	5.726	1060.23		185.16		2.0
15	AL	2.7	5.726	1089.26		190.23		2.2
16	AL	2.7	5.726	1085.94		189.65		2.0
17	AL	2.7	5.726	1071.85		187.19		2.3
18	AL	2.7	5.726	1054.96		184.24		3.0
19	AL	2.7	5.726	1062.12		185.49		3.4
20	AL	2.7	5.726	1031.25		180.10		3.1
21	AL	2.7	5.726	1033.37		180.47		3.4
22	AL	2.7	5.726	1013.90		177.07		3.2
23	AL	2.7	5.726	1053.47		183.98		3.5
24	AL	2.7	5.726	1059.08		184.96		3.0
25	AL	2.7	5.726	1017.51		177.70		2.8
26	AL	2.7	5.726	1084.62		189.12		3.0
27	ST	2.15	3.631	5598.28	1320	1541.80	3.5≤	4.6







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Report No. (557/2019)

Page 4 of 4

28	ST	2.15	3.631	5698.67		1569.45		4.8
29	ST	2.15	3.631	5651.29		1556.40		3.8
30	ST	2.15	3.631	5604.67		1543.56		4.1
31	ST	2.15	3.631	5626.34		1549.53		5.2
32	ST	2.15	3.631	5702.74		1570.57		3.7
33	ST	2.15	3.631	5545.34		1527.22		4.2

- The conductor met the requirements.

#### Conclusion:

- The ACSR 150/25 mm<sup>2</sup> manufactured by Elsewedy Cables . fulfilled the requirements of tests mentioned in this report according to standard specifications and The user must be making sure of performing the remaining tests which have not been mentioned in this report such as :

1. Wrapping test.
2. Welding of aluminum wires.
3. Tensile test for conductor.

#### Notes:

- Tests were carried out on the above specimen only without any responsibility concerning other untested specimens.
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