



DIN EN ISO 9001:2000
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LABORATORIES OF EXTRA HIGH
VOLTAGE RESEARCH CENTER SECTOR
km 27 Cairo- Alex. Desert Road

Report No. (583/2019)

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TEST REPORT

REPORT No. (583 /2019)

▪ **CLIENT** : **ELSEWEDY CABLES.**

▪ **Report Date** : 27 / 11 /2019

Expire Date : 12/5/2021

▪ **Place**:

- **Laboratories of Extra High Voltage Research Center.**

- **Internal code:TO-AC-18-04 -14 -01.**

▪ **Requirements**:

- **Type tests according to Specifications Standard**

▪ **Standard Specifications**:

- **IEC 61089 (1991) , IEC60888 (1987) . IEC 60889 (1987).**

▪ **Description of the Specimen** :

- **Aluminum Conductor Steel Reinforced (ACSR) 70/12 mm².**

▪ **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	11.55	11.53
- Diameter Aluminum wire	mm	1.80	1.80
- No of Aluminum wires	---	26	26
- Diameter steel wire	mm	1.45	1.45
- 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 **IEC 60889** 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 **IEC 60889** The measured value is shown in the following table:

Item	Lay ratio (%)	
	Requirement	Measured
- Lay ratio for conductor outer surface	10-14	12.8

- ***The conductor met the requirements.***

4- Resistivity test:

- The electrical resistivity was measured for aluminum wire in accordance with clause 5 of **IEC60889** and The measured value is shown in the following table :

Test	Requirement	Measured
Electrical resistivity for Al. wires at 20 °C ($\Omega \cdot \text{mm}^2/\text{m}$)	≤ 0.028264	0.028263

- ***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)	279±2%	282

- **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 (6.6.4) of *IEC 61089* The measured value is shown in the following tables:

No.	Type of wire	Overall diameter (mm)	Cross section area (mm ²)	breaking load(N)	Tensile strength (M.Pa)		Minimum elongation at break on 250 mm(%))	
				Measured	Requirement	Result	Requirement	Result
1	AL	1.83	2.63	493.8177	175.5	187.7634	---	1.4
2	AL	1.83	2.63	570.7026		216.9972		1.9
3	AL	1.83	2.63	566.3166		215.3295		2.1
4	AL	1.83	2.63	546.373		207.7464		1.6
5	AL	1.83	2.63	539.7423		205.2252		1.6
6	AL	1.83	2.63	530.4542		201.6936		2.6
7	AL	1.83	2.63	548.5144		208.5606		1.8
8	AL	1.83	2.63	557.0285		211.7979		1.9
9	AL	1.83	2.63	531.4862		202.086		1.3
10	AL	1.83	2.63	542.5029		206.2749		1.5
11	AL	1.83	2.63	482.2076		183.3489		1.5
12	AL	1.83	2.63	574.3147		218.3706		2.5
13	AL	1.83	2.63	516.522		196.3962		2.0
14	AL	1.83	2.63	499.4938		189.9216		2.1
15	AL	1.83	2.63	530.7122		201.7917		2.5
16	AL	1.83	2.63	498.7198		189.6273		2.0
17	AL	1.83	2.63	491.7537		186.9786		2.1
18	AL	1.83	2.63	519.6438		197.5832		2.0
19	AL	1.83	2.63	483.2396		183.7413		2.1
20	AL	1.83	2.63	560.8985		213.2694		2.6
21	AL	1.83	2.63	523.4881		199.0449		2.1
22	AL	1.83	2.63	526.0681		200.0259		1.8
23	AL	1.83	2.63	477.0475		181.3869		2.0
24	AL	1.83	2.63	506.4599		192.5703		2.2
25	AL	1.83	2.63	523.7461		199.143		2.1
26	AL	1.83	2.63	559.6085		212.7789		2.0



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27	ST	1.485	1.697	2756.081	≥1320	1624.09	≥3.5	4.2
28	ST	1.47	1.732	2941.56		1698.36		4.4
29	ST	1.44	1.697	2924.949		1723.6		4.8
30	ST	1.44	1.64	2969.22		1810.5		4.4
31	ST	1.46	1.595	2284.2		1432.1		3.6
32	ST	1.46	1.629	2216.694		1360.77		3.8
33	ST	1.456	1.674	493.8177		1490.04		4.9

- The conductor met the requirements.

Conclusion:

- The ACSR 70/12 mm² 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 complete conductor

Notes:

- Tests were carried out on the above specimen only without any responsibility concerning other untested specimens.
- The tests were carried out without any obligation on Egyptian Electricity Holding Company regarding the rights of others.
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