



الموضوع : اختبار موصل الومنيوم مقوى بالصلب
مقاس (٢٥/١٥٠) مم ٢

السيد المهندس / رئيس مجلس الادارة
شركة انيرجيا لكابلات الطاقة

تحية طيبة وبعد ،،،

ايها إلى خطابكم بتاريخ ٢٠١٧/٩/١٢ والمرفق صورته بخصوص الموضوع عاليه .

نتشرف بالاحاطه بأنه قد تم إجراء الاختبارات المطلوبة وتم إعداد التقرير الفني رقم (٢٠١٧/٤١٧) المتضمن نتائج الاختبارات . علما بان قيمة تكاليف إجراء الاختبارات هى مبلغ وقدره ٩١٢٠ جنيه (فقط وقدره تسعة الاف ومائة وعشرون جنيها مصريا لاغير) شاملة ١٤ % ضريبة القيمة المضافة تسدد بشيك باسم الشركة القابضة لكهرباء مصر- مركز أبحاث الجهد الفائق- فى مقابل استلام التقرير بموقع مركز أبحاث الجهد الفائق .

وتفضلوا بقبول فائق الاحترام ،،،

رئيس قطاع
العامل والبحوث والاختبارات
م/ محمد سليم سالم

عضو مجلس الادارة المتفرغ
لشئون شركات التوزيع

م/ الحسينى الحسينى الفار

مرفقات :

عدد

(١) التقرير الفني الكون من عدد (٤) صفحة .



DIN EN ISO 9001:2000
Zertifikat: 01 101020214



LABORATORIES OF EXTRA HIGH
VOLTAGE RESEARCH CENTER SECTOR
km 27 Cairo- Alex. Desert Road
Report No. (417/2017)
Page 1 of 4

TEST REPORT

REPORT No. (417/2017)

- **CLIENT** : *Energya Power Cables CO. El Sewedy-Helal*
- **Report Date:** 10/12/2017
- **Place:**
- *Laboratories of Extra High Voltage Research Center.*
- **Requirements:**
- *Type tests according to Specifications Standard*
- **Standard Specifications:**
- *IEC 61089, IEC 60888. IEC 60889.*
- **Description of the Specimen :**
- *Aluminum Conductor Type (ASCR) 150/25 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

M. Rabe



▪ **Test Method and Results:**

1- **Conductor construction and dimension measurement :**

- Dimensions have been measured according to table IEC61089 The measured values is shown in the following table:

Item	Unit	Requirement Value	Measured Value
- Overall conductor diameter	mm	17.1	17.18
- Diameter Aluminum wire	mm	2.7	2.7
- No of Aluminum wires	---	26	26
- Diameter steel wire	mm	2.13	2.13
- 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 (6.6.6) of **IEC(61089)** 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

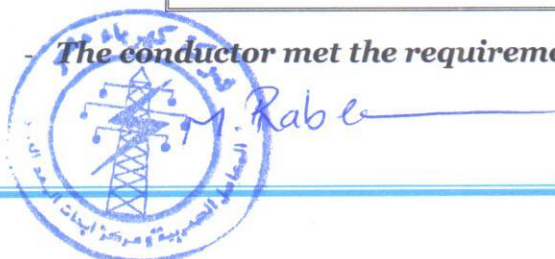
- ***The conductor met the requirements.***

3- **Determination of lay ratio:**

- The lay ratio of the conductor was measured in accordance with clause (6.6.6) of **IEC(61089)** 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 alloy wire Type AL4 in accordance with clause 2 of *IEC (60889)* and The measured value is shown in the following table :

Test	Requirement	Measured
Electrical resistivity for Al. wires at 20 °C ($\Omega \cdot \text{mm}^2/\text{m}$)	≤ 0.028264	0.028260

- **The conductor met the requirements.**

5- Mass per unit length:

- The Mass per unit length was measured for aluminum alloy wire Type AL4 in accordance with clause 5.6 of *IEC(61089)* and The measured value is shown in the following table :

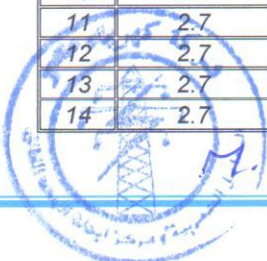
Test	Requirement	Measured
Mass per unit length (kg/km)	$606 \pm 2\%$	610

- **The conductor met the requirements.**

6- Tensile test:

- The mechanical tensile strength was measured on wires in accordance with clause (10.2) of *IEC (6888)* and clause (6.6.6) of *IEC (61089)* The measured value is shown in the following table:

No.	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	2.7	5.73	962.27	≥ 161.5	168.07	---	2.1
2	2.7	5.73	961.22		167.88		2.3
3	2.7	5.73	994.60		173.71		2.4
4	2.7	5.73	948.77		165.71		2.5
5	2.7	5.73	971.96		169.76		2.6
6	2.7	5.73	997.06		174.14		2.1
7	2.7	5.73	982.00		171.51		2
8	2.7	5.73	935.30		163.36		2.4
9	2.7	5.73	988.57		172.66		1.95
10	2.7	5.73	990.95		173.07		2.36
11	2.7	5.73	1009.18		176.26		2.54
12	2.7	5.73	945.17		165.08		2.14
13	2.7	5.73	949.54		165.84		2.36
14	2.7	5.73	1011.44		176.65		2.69





DIN EN ISO 9001:2000
Zertifiziert: 01.10.026214



LABORATORIES OF EXTRA HIGH
VOLTAGE RESEARCH CENTER SECTOR
KM 27 Cairo- Alex. Desert Road

Report No. (417/2017)

Page 4 of 4

15	2.7	5.73	975.81	≥ 161.5	170.43	≥ 3.5	2.1
16	2.7	5.73	936.41		163.55		2.7
17	2.6	5.31	1066.91		200.95		2.1
18	2.6	5.31	1039.01		195.70		2.3
19	2.6	5.31	1103.33		207.81		2.4
20	2.6	5.31	982.77		185.10		2
21	2.6	5.31	949.54		178.85		2.8
22	2.6	5.31	1031.61		194.30		2.6
23	2.6	5.31	944.40		177.88		2.5
24	2.6	5.31	1031.65		194.31		2.3
25	2.6	5.31	996.33		187.66		2.84
26	2.6	5.31	1016.09		191.38		3.5
27	2.13	3.56	6785.41	≥ 1340	1405.23	≥ 3.5	3.6
28	2.14	3.59	5537.40		1540.45		3.9
29	2.13	3.56	5879.52		1650.87		3.5
30	2.13	3.56	5307.76		1440.33		3.7
31	2.13	3.56	4982.42		1398.98		3.9
32	2.13	3.56	5556.32		1560.12		3.5
33	2.13	3.56	6372.35		1789.25		3.8

- The conductor met the requirements.

Conclusion:

- The ACSR 150/25 mm² manufactured by energya CABLES CO. El Sewedy-Helal 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.

Notes:

- Tests were carried out on the above specimens only without any responsibility concerning other untested specimens.
- The tests were carried out without any obligation on Egyptian Electricity Holding Company.
- This test report shall not be reproduced except in full, without written approval of EHVR.
- This report is valid unless any change occurs either in sample design or in document of specifications.
- Verify the compliance with the mentioned specification in this report every three years for renewing use.

Test Engineers:

- Eng. Mohamed Rabiaa M. Rabiaa 10/12/2017

General Manager

M. Abd ElAziz 10/12/2017
Eng. M. Abd ElAziz

Managing Director

Eng. Mohamed Selim Salman
ehvr@eehc.gov.eg

Dec. 10, 2017



تحرر في : 2017/11/9

السيد المهندس / رئيس قطاع معامل أبحاث الجهد الفائق

تحية طيبة وبعد ...

برجاء التكرم بالموافقة على اختبار عينة كابل ACSR 150/25 اختبار

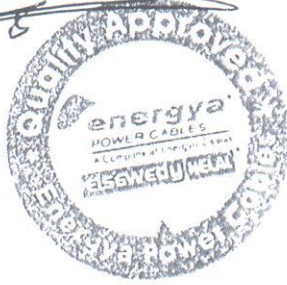
Type Test عليها ونحن على إستعداد تحمل كافة التكلفة المطلوبة

وتفضلوا بقبول وافر الاحترام ...

يعتمد

م / محمد كمال

مدير الجودة



مركز أبحاث الجهد الفائق
مرفق رقم / ١١١٠
لتوريد الفني رقم ١٧٤١٧٠٠٠

قطاع المعامل والبحوث والاختبارات
مركز أبحاث الجهد الفائق
وارد رقم: ١٤٩
تاريخ: ١٤ / ١١ / ٢٠١٧