

العنوان : العباسية - القاهرة رقم بريدى ١٥١٧
تليفون : ٢٦٨٥٥٤٩٧
فاكس : ٢٤٠٢٧٨٦٣ (٢٠٢)
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وزارة الكهرباء والطاقة
الشركة القابضة لكهرباء مصر
عضو مجلس الادارة المتفرغ
لشئون شركات التوزيع

الموضوع : اختبار موصل سبيكة المونيوم قطاع
١٥٠ مم ٢

السيد المهندس / رئيس مجلس الادارة
انرجيا لكابلات الطاقة

تحية طيبة وبعد ،،،

إيماء إلى خطابكم بتاريخ ٢٠١٨/٣/٢ والمرفق صورته بخصوص الموضوع عاليه .

نتشرف بالاحاطه بأنه قد تم إجراء الاختبارات المطلوبة وتم إعداد التقرير الفني رقم (٢٠١٨/١٥٨) المتضمن نتائج الاختبارات . علما بان قيمة تكاليف إجراء الاختبارات هى مبلغ وقدره ٩١٢٠ جنييه (فقط وقدره تسعة الالف ومائه 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 ،،،

مدير عام البحوث الكهربائية
مهندس/ ضياء الدين العروسى

مدير عام الجودة
مهندس/ محمد عبدالعزيز

رئيس قطاع
المعامل والبحوث والاختبارات
م/ محمد سليم سامان

عضو مجلس الادارة المتفرغ
لشئون شركات التوزيع
م/ الحسينى الحسينى الفار

مرفقات :
عدد

(١) التقرير الفني المكون من عدد (٥) صفحة .

شريف



DIN EN ISO 9001:2000
Zertifikat: 01 110 020214



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KM 27 Cairo- Alex. Desert Road

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TEST REPORT

REPORT No. (158 /2018)

- **CLIENT** : *energya CABLES Co.(ElSewedy- Helal).*
- **Report Date:** *10/4/2018*
- **Place:**
 - *Laboratories of Extra High Voltage Research Center.*
 - *Internal code:TO-AC-18-03-02-01.*
- **Requirements:**
 - *Type tests according to Specifications Standard*
- **Standard Specifications:**
 - *IEC 60104 (1987) , IEC 61089.*
- **Description of the Specimen :**
 - *Aluminum Alloy Conductor Type B (AAAC) 150 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





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■ 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	15.8	15.78
- Diameter wire	mm	2.25	2.24
- No of wires	---	37	37

- 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 60104** 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 60104** The measured value is shown in the following table:

Item	Lay ratio (%)	
	Requirement	Measured
- Lay ratio for conductor outer surface	10-14	12.87

- **The conductor met the requirements.**

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4- Resistivity test:

- The electrical resistivity was measured for aluminum alloy wire in accordance with clause 5 of *IEC 60104* and The measured value is shown in the following table :

Test	Requirement	Measured
Electrical resistivity for Al. wires at 20 °C ($\Omega \cdot \text{mm}^2/\text{m}$)	≤ 0.032530	0.032529

- **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 6.4.6 of *IEC 61089* and The measured value is shown in the following table :

Test	Requirement	Measured
Mass per unit length (kg/km)	405.±1%	668

- **The conductor met the requirements.**

6- Tensile test:

- The mechanical tensile strength was measured on wires in accordance with clause (11.3) of *IEC 61089* and clause (6.4.8.9) of *IEC 60104* 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	2.25	3.98	1370.05	≥ 295	344.57	≥ 3.5	3.65
2	2.25	3.98	1405.54		353.50		6.62
3	2.21	3.84	1376.74		358.90		5.69
4	2.21	3.84	1369.00		356.89		5.09
5	2.21	3.84	1302.15		339.46		4.07
6	2.21	3.84	1332.01		347.24		6.25
7	2.21	3.84	1397.16		364.23		6.14
8	2.21	3.84	1338.96		349.06		5.31
9	2.21	3.84	1360.01		354.54		4.48

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10	2.21	3.84	1369.17		356.93		7.94
11	2.21	3.84	1351.89		352.42		3.20
12	2.21	3.84	1322.53		344.77		6.26
13	2.21	3.84	1367.33		356.45		4.50
14	2.21	3.84	1381.20		360.07		5.86
15	2.21	3.84	1282.28		334.28		5.88
16	2.21	3.84	1343.15		350.15		9.04
17	2.21	3.84	1393.09		363.17		8.19
18	2.21	3.84	1380.69		359.93		6.69
19	2.21	3.84	1370.29		357.22		4.60
20	2.21	3.84	1380.05		359.77		5.39
21	2.21	3.84	1379.25		359.56		4.13
22	2.21	3.84	1282.69		334.38		8.14
23	2.21	3.84	1343.11		350.14		6.34
24	2.21	3.84	1324.10		345.18		7.10
25	2.21	3.84	1363.56		355.47		4.17
26	2.21	3.84	1486.62		387.55		5.22
27	2.21	3.84	1351.57		352.34		4.05
28	2.21	3.84	1482.58		386.49		8.12
29	2.21	3.84	1352.20		352.51		3.56
30	2.21	3.84	1404.68		366.19		4.53
31	2.21	3.84	1371.66		357.58		3.98
32	2.21	3.84	1335.99		348.28		3.61
33	2.21	3.84	1420.14		370.22		6.62
34	2.21	3.84	1418.55		369.80		5.66
35	2.21	3.84	1405.40		366.38		4.36
36	2.21	3.84	1369.09		356.91		3.34
37	2.21	3.84	1325.55		345.56		3.65

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■ Conclusion:

- **The AAAC 150 mm² manufactured by energya CABLES Co.(ElSewedy- 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

■ TEST ENGINEERS:

- **Eng. Mohamed Rabea**

M. Rabea 10/4/2018

General Manger

M. Abd ElAziz
10/4/2018
Eng. M. Abd ElAziz



Managing Director

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