

**KEMA TYPE TEST CERTIFICATE OF COMPLETE TYPE TESTS**

**Object** 4-core power cable **1598-16**

**Type** 0,6/1 kV - 4x25 mm<sup>2</sup>  
Al/XLPE/PVC/SWA/PVC

|  |                      |                     |      |
|--|----------------------|---------------------|------|
| Rated voltage, U <sub>0</sub> /U (U <sub>m</sub> ) | 0,6/1 (1,2) kV       | Conductor material  | AL   |
| Conductor cross-section                            | 4x25 mm <sup>2</sup> | Insulation material | XLPE |

**Manufacturer** El Sewedy Cables,  
10 of Ramadan City, Egypt

**Client** El Sewedy Cables,  
10 of Ramadan City, Egypt

**Tested by** DNV GL Netherlands B.V.,  
Arnhem, the Netherlands

**Date of tests** 25 November to 15 December 2016

The object, constructed in accordance with the description, drawings and photographs incorporated in this Certificate, has been subjected to the series of proving tests in accordance with the complete type test requirements of

**IEC 60502-1 (2009)** subclauses 17 & 18

This Certificate has been issued by DNV GL following exclusively the STL Guides.

The results are shown in the record of proving Tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the above standard(s) and to justify the ratings assigned by the manufacturer as listed on page 5.

This Certificate applies only to the object tested. The responsibility for conformity of any object having the same type references as that tested rests with the Manufacturer.

\*) as declared by the manufacturer

This Certificate consists of 25 pages in total.

DNV GL Netherlands B.V.



J.P. Fonteijne  
Executive Vice President  
KEMA Laboratories



**Laboratories**

Arnhem, 14 February 2017

## INFORMATION SHEET

### 1 KEMA Type Test Certificate

A KEMA Type Test Certificate contains a record of a series of (type) tests carried out in accordance with a recognized standard. The equipment tested has fulfilled the requirements of this standard and the relevant ratings assigned by the manufacturer are endorsed by DNV GL. In addition, the test object's technical drawings have been verified and the condition of the test object after the tests is assessed and recorded. The Certificate contains the essential drawings and a description of the equipment tested. A KEMA Type Test Certificate signifies that the object meets all the requirements of the named subclauses of the standard. It can be identified by gold-embossed lettering on the cover and a gold seal on its front sheet.

The Certificate is applicable to the equipment tested only. DNV GL is responsible for the validity and the contents of the Certificate. The responsibility for conformity of any object having the same type references as the one tested rests with the manufacturer.

Detailed rules on types of certification are given in DNV GL's Certification procedure applicable to KEMA Laboratories.

### 2 KEMA Report of Performance

A KEMA Report of Performance is issued when an object has successfully completed and passed a subset (but not all) of test programmes in accordance with a recognized standard. In addition, the test object's technical drawings have been verified and the condition of the test object after the tests is assessed and recorded. The report is applicable to the equipment tested only. A KEMA Report of Performance signifies that the object meets the requirements of the named subclauses of the standard. It can be identified by silver-embossed lettering on the cover and a silver seal on its front sheet.

The sentence on the front page of a KEMA Report of Performance will state that the tests have been carried out in accordance with ..... The object has complied with the relevant requirements.

### 3 KEMA Test Report

A KEMA Test Report is issued in all other cases. Reasons for issuing a KEMA Test Report could be:

- Tests were performed according to the client's instructions.
- Tests were performed only partially according to the standard.
- No technical drawings were submitted for verification and/or no assessment of the condition of the test object after the tests was performed.
- The object failed one or more of the performed tests.

The KEMA Test Report can be identified by the grey-embossed lettering on the cover and grey seal on its front sheet.

In case the number of tests, the test procedure and the test parameters are based on a recognized standard and related to the ratings assigned by the manufacturer, the following sentence will appear on the front sheet. The tests have been carried out in accordance with the client's instructions. Test procedure and test parameters were based on ..... If the object does not pass the tests such behaviour will be mentioned on the front sheet. Verification of the drawings (if submitted) and assessment of the condition after the tests is only done on client's request.

When the tests, test procedure and/or test parameters are not in accordance with a recognized standard, the front sheet will state the tests have been carried out in accordance with client's instructions.

### 4 Official and uncontrolled test documents

The official test documents of DNV GL are issued in bound form. Uncontrolled copies may be provided as loose sheets or as a digital file for convenience of reproduction by the client. The copyright has to be respected at all times.

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|                   |                                |         |
|-------------------|--------------------------------|---------|
| KEMA Laboratories | -4-                            | 1598-16 |
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## 1 IDENTIFICATION OF THE TEST OBJECT

### 1.1 Ratings/characteristics of the object tested

|   |                    |
|---|--------------------|
| Rated voltage, $U_0/U$ ( $U_m$ )                        | 0,6/1 (1,2) kV     |
| Rated maximum conductor temperature in normal operation | 90 °C              |
| Rated conductor cross-section                           | 25 mm <sup>2</sup> |

### 1.2 Description of the test object

|  |  |
|--|--|
| Manufacturer (as stated by the client) | El Sewedy Cables,<br>10 <sup>th</sup> of Ramadan City, Egypt   |
| Type                                   | $U_0 = 0,6$ kV 4 x 25 mm <sup>2</sup> XLPE CABLE   |
| Manufacturing year                     | 2016   |
| Quantity submitted                     | 37 m   |
| Rated voltage, $U_0/U$ ( $U_m$ )       | 0,6/1 (1,2) kV   |
| Overall diameter (D)                   | 25,6 mm  |
| Number of cores                        | 4  |
| Marking on the oversheath              | DEWA Electric Cable 600/1000 V 4x25 SQMM<br>Al/XLPE/PVC/SWA/PVC IEC 60502-1 El Sewedy<br>Cables EGYPT PO 3411600082} |

#### Conductor

- material Al
- cross-section 25 mm<sup>2</sup>
- nominal diameter (d) 7,2 x 5,5 mm (width x height )
- type sector shaped  
(i.e. round compacted, sector shaped)
- class 2
- number and nominal diameter of wires 7 wires and  $\varnothing$  2,2 mm
- maximum conductor temperature in normal operation 90 °C

#### Insulation

- material XLPE
- nominal thickness 0,9 mm
- manufacturer of the material known in KEMA Laboratories' files
- Core identification Red, Yellow, Blue, Black

#### Filler

- material Polypropylene filler
- type (i.e. extruded, yarn) yarn

**Binder(s)**

- material Polypropylene tape
- type (i.e. tape, extruded) tape

**Inner covering(s)**

- material (incl. ST-code) PVC, ST<sub>2</sub>
- type (i.e. tape, extruded) extruded
- approximate thickness 1,0 mm

**Metal armour**

- material galvanized steel wires
- number of wires 39
- nominal diameter of wires 1,6 mm
- cross-sectional area 78,4 mm<sup>2</sup>
- manufacturer of the material known in KEMA Laboratories' files

**Oversheath**

- material PVC, ST<sub>2</sub>
- nominal thickness 1,8 mm
- nominal overall diameter of the cable (D) 25,6 mm
- material designation known in KEMA Laboratories' files
- manufacturer of the material known in KEMA Laboratories' files
- colour black
- graphite coating applied no

**Fire retardant**

- (acc. IEC 60332-1) yes

**Manufacturing details insulation system**

- location of manufacturing 10<sup>th</sup> of Ramadan City, Egypt
- type of extrusion line low voltage horizontal extrusion line
- type of extrusion single extrusion head
- factory identification of extrusion line EX20
- manufacturer of the extrusion line known in KEMA Laboratories' files
- identification of production batch batch 3
- curing means air
- cooling means water
- length markings on cable sample sent to KEMA Laboratories begin: 13 m, end: 50 m

### 1.3 List of documents

The manufacturer has guaranteed that the object submitted for tests has been manufactured in accordance with the following drawings and/or documents. KEMA Laboratories has verified that these drawings and/or documents adequately represent the object tested. The manufacturer is responsible for the correctness of these drawings and/or documents and the technical data presented.

The following drawings and/or documents have been included in this Certificate:

| Drawing no./document no. | Revision |
|--------------------------|----------|
| G-1-b                    | 0        |

## 2 GENERAL INFORMATION

### 2.1 The tests were witnessed by

| <b>Name</b>  | <b>Company</b>  |
|--|---|
| Humaid Al Shamsi<br>(28 November to 2 December 2016) | Dubai Electricity & Water Authority,<br>Dubai, U.A.E. |
| Mazin Aziz<br>(5 to 9 December 2016)                 |   |

### 2.2 The tests were carried out by

| <b>Name</b>     | <b>Company</b>           |
|-----------------|--------------------------|
| Eelke Rijpstra  | DNV GL Netherlands B.V., |
| Henk van Zuilen | Arnhem, the Netherlands  |
| Frank Rasing    |                          |

### 2.3 Subcontracting

All tests were subcontracted to DNV GL – New Energy Technology, Arnhem, the Netherlands.

### 2.4 Purpose of test

Purpose of the test was to verify whether the material complies with the specified requirements.

### 2.5 Measurement uncertainty

A table with measurement uncertainties is enclosed in this Certificate. Unless otherwise stated, the measurement uncertainties of the results presented in this Certificate are as indicated in that table.



### 3 CONDUCTOR

#### Standard and date

Standard IEC 60502-1 clause 5

Test date 29 November 2016

#### 3.1 Measurement of the resistance of the conductor

| Item       | Unit               | Requirement | Measured/determined |        |      |       |
|------------|--------------------|-------------|---------------------|--------|------|-------|
|            |                    |             | Red                 | Yellow | Blue | Black |
| Resistance | $\Omega/\text{km}$ | $\leq 1,2$  | 1,13                | 1,13   | 1,14 | 1,14  |

#### Result

The object passed the test.

#### 3.2 Measurement of the number of wires of the conductor

| Item            | Unit | Requirement | Measured/determined |        |      |       |
|-----------------|------|-------------|---------------------|--------|------|-------|
|                 |      |             | Red                 | Yellow | Blue | Black |
| Number of wires | -    | $\geq 6$    | 7                   | 7      | 7    | 7     |

#### Result

The object passed the test.

#### 3.3 Measurement of the diameter of the conductor

| Item     | Unit | Requirement | Measured/determined |                |                |                |
|----------|------|-------------|---------------------|----------------|----------------|----------------|
|          |      |             | Red                 | Yellow         | Blue           | Black          |
| Diameter | mm   | -           | 6,78 x<br>5,69      | 6,77 x<br>5,67 | 6,69 x<br>5,66 | 6,71 x<br>5,90 |

#### Result

The result is for information only.

## 4 ELECTRICAL TYPE TESTS

### 4.1 Measurement of insulation resistance at max. conductor temperature

#### Standard and date

Standard IEC 60502-1, clause 17.2

Test date 30 November 2016

| Item  | Unit                             | Requirement    | Measured/determined |                    |                    |                    |
|---|----------------------------------|----------------|---------------------|--------------------|--------------------|--------------------|
|   |                                  |                | Red                 | Yellow             | Blue               | Black              |
| <b>Volume resistivity, <math>\rho</math></b>            |                                  |                |                     |                    |                    |                    |
| at 90 °C  | $\Omega \cdot \text{cm}$         | $\geq 10^{12}$ | 1,12*<br>$10^{15}$  | 5,00*<br>$10^{15}$ | 1,33*<br>$10^{16}$ | 1,31*<br>$10^{16}$ |
| <b>Insulation resistance constant, <math>K_i</math></b> |                                  |                |                     |                    |                    |                    |
| at 90 °C  | $\text{M}\Omega \cdot \text{km}$ | $\geq 3,67$    | 4106                | 18331              | 48799              | 47997              |

#### Result

The object passed the test

## 4.2 Voltage test for 4 h

### Standard and date

Standard IEC 60502-1, clause 17.3

Test date 2 December 2016

### Environmental conditions

Temperature  $20 \pm 15$  °C

Temperature of test object 23 °C

| Applied voltage<br>kV | Frequency<br>Hz | Duration<br>h | Measured/determined |
|-----------------------|-----------------|---------------|---------------------|
| 2,4                   | 50              | 4             | no breakdown        |

### Requirement

No breakdown of the insulation shall occur.

### Result

The object passed the test.

## 5 NON-ELECTRICAL TYPE TESTS

### 5.1 Measurement of thickness of insulation

#### Standard and date

Standard IEC 60502-1, clause 18.1

Test date 2 December 2016

| Thickness         | Unit | Requirement | Specified | Measured/determined |        |      |       |
|-------------------|------|-------------|-----------|---------------------|--------|------|-------|
|                   |      |             |           | Red                 | Yellow | Blue | Black |
| Nominal           | mm   | 0,9         | 0,9       | -                   | -      | -    | -     |
| Average           | mm   | -           | -         | 1,61                | 1,60   | 1,64 | 1,45  |
| Minimum ( $t_m$ ) | mm   | $\geq 0,71$ | -         | 1,52                | 1,46   | 1,42 | 1,32  |

#### Result

The object passed the test.

### 5.2 Measurement of thickness of non-metallic sheaths

#### Standard and date

Standard IEC 60502-1, clause 18.2

Test date 2 December 2016

#### Oversheath

| Thickness         | Unit | Requirement | Specified | Measured/determined |
|-------------------|------|-------------|-----------|---------------------|
| Nominal           | mm   | $\geq 1,8$  | 1,8       | -                   |
| Average           | mm   | -           | -         | 1,85                |
| Minimum ( $t_m$ ) | mm   | $\geq 1,24$ | -         | 1,83                |

#### Result

The object passed the test.

## 5.3 Tests for determining the mechanical properties of insulation before and after ageing

### Standard and date

Standard IEC 60502-1, clause 18.3

Test date 8 December 2016

### Characteristic test data

Temperature during ageing  $135 \pm 3$  °C

Duration 7 days (30 November to 7 December 2016)

| Item                                  | Unit              | Requirement   | Measured/determined |        |      |       |
|---------------------------------------|-------------------|---------------|---------------------|--------|------|-------|
|                                       |                   |               | Red                 | Yellow | Blue | Black |
| <b>Without ageing</b>                 |                   |               |                     |        |      |       |
| Tensile strength                      | N/mm <sup>2</sup> | $\geq 12,5$   | 19,2                | 19,4   | 16,9 | 20,5  |
| Elongation                            | %                 | $\geq 200$    | 500                 | 480    | 439  | 534   |
| <b>After ageing</b>                   |                   |               |                     |        |      |       |
| Tensile strength                      | N/mm <sup>2</sup> | -             | 22,9                | 20,6   | 19,8 | 15,8  |
| Variation with samples without ageing | %                 | $\pm 25$ max. | 19                  | 6      | 17   | -23   |
| Elongation                            | %                 | -             | 392                 | 358    | 372  | 440   |
| Variation with samples without ageing | %                 | $\pm 25$ max. | -22                 | -25    | -15  | -18   |

### Result

The object passed the test.

## 5.4 Tests for determining the mechanical properties of non-metallic sheaths before and after ageing

### Standard and date

Standard IEC 60502-1, clause 18.4  
 Test date 13 December 2016

### Characteristic test data (oversheath)

Temperature during ageing  $100 \pm 2$  °C  
 Duration 7 days (5 to 12 December 2016)

### Oversheath

| Item                                  | Unit              | Requirement | Measured/determined |
|---------------------------------------|-------------------|-------------|---------------------|
| <b>Without ageing</b>                 |                   |             |                     |
| Tensile strength                      | N/mm <sup>2</sup> | ≥ 12,5      | 15,6                |
| Elongation                            | %                 | ≥ 150       | 211                 |
| <b>After ageing</b>                   |                   |             |                     |
| Tensile strength                      | N/mm <sup>2</sup> | ≥ 12,5      | 15,6                |
| Variation with samples without ageing | %                 | ± 25 max.   | 0                   |
| Elongation                            | %                 | ≥ 150       | 208                 |
| Variation with samples without ageing | %                 | ± 25 max.   | -1                  |

### Result

The object passed the test.

## 5.5 Additional ageing test on pieces of completed cables

### Standard and date

Standard IEC 60502-1, clause 18.5

Test date 7 December 2016

### Characteristic test data

Temperature during ageing  $100 \pm 2$  °C

Duration 7 days (29 November to 6 December 2016)

### Insulation

| Item                                  | Unit              | Requirement | Measured/determined |        |      |       |
|---------------------------------------|-------------------|-------------|---------------------|--------|------|-------|
|                                       |                   |             | Red                 | Yellow | Blue | Black |
| Tensile strength                      | N/mm <sup>2</sup> | -           | 20,5                | 18,4   | 19,6 | 20,3  |
| Variation with samples without ageing | %                 | ± 25 max.   | 7                   | -5     | 16   | -1    |
| Elongation                            | %                 | -           | 462                 | 438    | 467  | 440   |
| Variation with samples without ageing | %                 | ± 25 max.   | -8                  | -9     | 6    | -18   |

### Oversheath

| Item                                  | Unit              | Requirement | Measured/determined |  |
|---------------------------------------|-------------------|-------------|---------------------|--|
|                                       |                   |             |                     |  |
| Tensile strength                      | N/mm <sup>2</sup> | -           | 15,7                |  |
| Variation with samples without ageing | %                 | ± 25 max.   | 1                   |  |
| Elongation                            | %                 | -           | 215                 |  |
| Variation with samples without ageing | %                 | ± 25 max.   | 2                   |  |

### Result

The object passed the test.

## 5.6 Loss of mass test on PVC sheaths of type ST<sub>2</sub>

### Standard and date

Standard IEC 60502-1, clause 18.6  
Test date 13 December 2016

### Characteristic test data

Temperature during ageing 100 ± 2 °C  
Duration 7 days (5 to 12 December 2016)

### Oversheath

| Item         | Unit               | Requirement | Measured/Determined |
|--------------|--------------------|-------------|---------------------|
| Loss of mass | mg/cm <sup>2</sup> | ≤ 1,5       | 0,44                |

### Result

The object passed the test.



## 5.7 Pressure test at high temperature on non-metallic sheaths

### Standard and date

Standard IEC 60502-1, clause 18.7  
Test date 7 December 2016

### Characteristic test data

Temperature during ageing  $90 \pm 2$  °C  
Duration 6 h  
Load 5 N

### Oversheath

| Item                 | Unit | Requirement | Measured/Determined |
|----------------------|------|-------------|---------------------|
| Depth of indentation | %    | $\leq 50$   | 24                  |

### Result

The object passed the test.

## 5.8 Test on PVC insulation and sheaths and halogen free sheaths at low temperatures

### Standard and date

Standard IEC 60502-1, clause 18.8  
Test date 29 November and 1 December 2016

### Characteristic test data

Temperature  $-15 \pm 2$  °C  
Period of application > 16 h  
Mass of hammer 750 g

### Oversheath

| Item             | Unit | Requirement | Measured/Determined |
|------------------|------|-------------|---------------------|
| Cold elongation  | %    | $\geq 20$   | 60                  |
| Cold impact test | -    | no cracks   | no cracks           |

### Result

The object passed the test.

## 5.9 Test for resistance of PVC insulation and sheaths to cracking (heat shock test)

### Standard and date

Standard IEC 60502-1, clause 18.9  
Test date 5 December 2016

### Characteristic test data

Temperature  $150 \pm 3 \text{ }^\circ\text{C}$   
Period of application 1 h  
Diameter of mandrel 4 mm  
Number of turns 6

### Oversheath

| Item      | Unit | Requirement | Measured/Determined |
|-----------|------|-------------|---------------------|
| Soundness | -    | no cracks   | no cracks           |

### Result

The object passed the test.

## 5.10 Hot set test for XLPE insulation

### Standard and date

Standard IEC 60502-1, clause 18.11

Test date 2 December 2016

### Characteristic test data

Temperature  $200 \pm 3 \text{ }^\circ\text{C}$

Time under load 15 min

Mechanical stress  $20 \text{ N/cm}^2$

| Item                  | Unit | Requirement | Measured/determined |        |      |       |
|-----------------------|------|-------------|---------------------|--------|------|-------|
|                       |      |             | Red                 | Yellow | Blue | Black |
| Elongation under load | %    | $\leq 175$  | 47                  | 43     | 51   | 48    |
| Permanent elongation  | %    | $\leq 15$   | 5                   | 4      | 6    | 7     |

### Result

The object passed the test.

## 5.11 Water absorption test on insulation

### Standard and date

Standard IEC 60502-1, clause 18.13  
Test date 25 November to 15 December 2016

### Characteristic test data

Temperature  $85 \pm 2 \text{ }^\circ\text{C}$   
Duration 14 days (28 November to 12 December 2016)

| Item              | Unit               | Requirement | Measured/determined |        |      |       |
|-------------------|--------------------|-------------|---------------------|--------|------|-------|
|                   |                    |             | Red                 | Yellow | Blue | Black |
| Variation of mass | mg/cm <sup>2</sup> | $\leq 1$    | 0,04                | 0,04   | 0,02 | 0,12  |

### Result

The object passed the test.

## 5.12 Fire tests

### 5.12.1 Flame spread test on single cables

#### Standard and date

Standard IEC 60502-1, clause 18.14.1

Test date 30 November 2016

#### Characteristic test data

Overall diameter of test piece 25,6 mm

Duration 120 s

Flame type 1 kW pre-mixed flame

| Item                           | Unit | Requirement | Measured/determined |
|--------------------------------|------|-------------|---------------------|
| Length free of charring        | mm   | > 50        | 326                 |
| Downward limit charred surface | mm   | < 540       | 498                 |

#### Result

The object passed the test

## 5.13 Shrinkage test for XLPE insulation

#### Standard and date

Standard IEC 60502-1, clause 18.16

Test date 5 December 2016

#### Characteristic test data

Temperature  $130 \pm 3$  °C

Duration 1 h

| Item      | Unit | Requirement | Measured/determined |        |      |       |
|-----------|------|-------------|---------------------|--------|------|-------|
|           |      |             | Red                 | Yellow | Blue | Black |
| Shrinkage | %    | $\leq 4$    | 0,2                 | 1      | 0,7  | 0,5   |

#### Result

The object passed the test.

## 6 VERIFICATION OF CABLE CONSTRUCTION

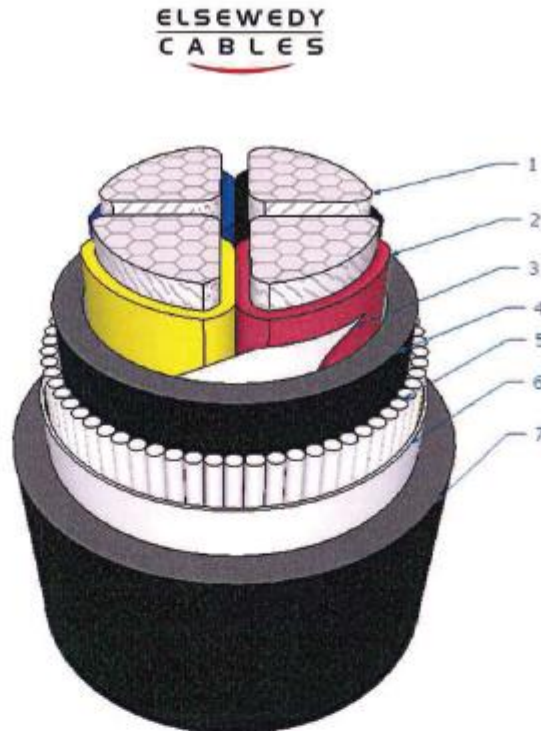
Verification of cable construction was carried out in accordance with clauses 5-13 of IEC 60502-1. The results are presented below.

|   | Observed/determined   |
|---|---|
| Marking on the cable                    | DEWA Electric Cable 600/1000 V 4x25 SQMM<br>Al/XLPE/PVC/SWA/PVC IEC 60502-1 El Sewedy Cables<br>EGYPT PO 3411600082 |
| Construction                            | Aluminium Conductor   |
|   | XLPE insulation   |
|   | Filler and binder   |
|   | Inner covering  |
|   | Steel wire armour   |
|   | Binder  |
|   | Oversheath  |
| Outer diameter of the cable,<br>average | 25,6 mm   |
| Outer diameter of the cores,<br>average | Red: 10,11 x 9,26 mm<br>Yellow: 9,65 x 8,40 mm<br>Blue: 10,06 x 8,88 mm<br>Black: 9,84 x 8,69 mm                    |

### Result

No significant deviations from the specified requirements are found.

## 7 DRAWINGS



| Drawing No. G - 1 - b |                                  |                                 |
|-----------------------|----------------------------------|---------------------------------|
| Size :                | 4 x 25 mm <sup>2</sup>           | Type : AL/XLPE/SWA/PVC          |
| Voltage:              | 0.6 / 1 kV                       | Standard: IEC 60502-1:2004      |
| Code :                | AX1-T104-W12-00-00               | <b>EL-SEWEDY CABLES</b>         |
| Sr.                   | Description                      | Approx. Diameter (mm)           |
| 1.                    | Aluminum Conductor (Compact)     | Shaped                          |
| 2.                    | XLPE Insulation                  | Shaped                          |
| 3.                    | Polypropylene Filler             |                                 |
| 4.                    | Polypropylene Tape               | 17.8                            |
| 5.                    | PVC Bedding                      | 19.8                            |
| 6.                    | Galvanized Steel Wire Armoured   | 23.7                            |
| 7.                    | Polypropylene Tape (if required) |                                 |
| 8.                    | PVC Sheath                       | 26.7                            |
| Not to Scale          | Drawn by<br>Mr. Nabil Abdallah   | Approved by<br>Eng. Ahmed FARAG |

Monday, 13 April, 2015

Rev. No. ( 0 )Tech. Offer No.: /AX1-T104-W12-00-00-D(sector).docx



El Sewedy Cables is the winner of the 2005  
"National Award for Excellence in Export"





## 8 MEASUREMENT UNCERTAINTIES

The measurement uncertainties in the results presented are as specified below unless otherwise indicated.

| <b>Measurement</b>                  | <b>Measurement uncertainty</b>  |
|-------------------------------------|---|
| Tensile strength test               | 1%  |
| Measurement of dimensions           | 5 $\mu\text{m}$   |
| Measurement loss of mass            | 0,11 mg : 8,0 gr  |
| Measurement of conductor resistance | 0,03% of measured value   |
| Measurement at low temperature      | 0,1 $^{\circ}\text{C}$  |
| Measurement in heating cabinets     | 0,1 $^{\circ}\text{C}$  |
| Voltage test                        | $2 \cdot 10^{-3} \cdot u + 20\text{v}$<br>$2 \cdot 10^{-3} \cdot i + 0,2\%$ |