Saudi Electricity Company	الشركة السعودية للكهرباء

SEC DISTRIBUTION MATERIALS SPECIFICATION	10-SDMS-01
	DATE: January - 2002

10-SDMS-01

SPECIFICATIONS

FOR

13.8 & 33 KV OVERHEAD LINE CONDUCTORS (ACSR / AW TYPE)

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1.0 SCOPE

This SEC Distribution Materials Specification (10-SDMS-01) covers the minimum technical requirement for design, materials, manufacturing, inspection, testing, performance and supply of bare concentric-lay stranded aluminium conductor, Aluminium-Clad Steel Reinforced (ACSR / AW) intended to be used for the 13.8 & 33 KV overhead line system of Saudi Electricity Company (SEC), Saudi Arabia.

2.0 CROSS REFERENCES

This specification shall always be read in conjunction with SEC General Specification No: 01-SDMS-01 latest revision titled (General Requirement for all Equipment/Materials), which shall be considered as an integral part of this SDMS.

This SDMS shall also be read in conjunction with SEC Purchase Order or Contract Schedules and the Scope of Work and Technical Specifications for project, as applicable.

3.0 APPLICABLE CODES AND STANDARDS

The latest revision of the following Codes and Standards shall be applicable for the equipment/material covered in this SDMS. In case of conflict, the vendor/manufacturer may propose equipment/material conforming to one group of Codes and Standards quoted hereunder without jeopardizing the requirements of this SDMS

3.1 IEC 207 Aluminium Stranded Conductors.

3.2 IEC 209 Aluminium Conductors Steel Reinforced.

3.3 ASTM B502 Aluminium-Clad Steel Core Wire for Aluminium Conductors, Aluminium-Clad Steel Reinforced.

3.4 ASTM B549 Concentric Lay Stranded Aluminium Conductors, Aluminium-Clad Steel Reinforced (ACSR/AW)

4.0 DESIGN AND CONSTRUCTION REQUIREMENTS

4.1 General

4.1.1 The ACSR/AW conductor shall meet or exceed the requirements of this specification in all respects.

4.1.2 Manufacturer's drawings, as required by 01-SDMS-01, shall show the cross-section of the bare overhead line conductor, together with all pertinent dimensions.

4.2 Design Criteria

4.2.1 Unless otherwise specified, the conductor shall be manufactured and tested in accordance with the relevant standards mentioned in clause 3

4.2.2 The conductor shall be designed for service conditions specified in 01-SDMS-01

4.2.3 The size and continuous current carrying capacity of the conductor shall be based on a maximum permissible continuous temperature of 90°C taking into account the solar radiation and wind effects.

4.2.4 The ACSR/AW conductor rating and dimensions shall be as indicated in Data Schedule.

4.2.5 The rated strength of a composite conductor shall be taken as the sum of the strengths of the aluminium and aluminium-clad steel components.

4.2.6 The breaking strength of the composite conductor shall not be less than 95% of the rated strength.

4.3 Materials

4.3.1 The bare overhead line conductors shall consist of concentric-lay stranded conductors made from round aluminium wires and round aluminium-clad steel core wire(s).

4.3.2 The aluminium used for cladding shall have a purity and quantity to meet the required thickness of not less than 10% of the nominal wire radius.

4.3.3 Application of neutral grease is not acceptable between layers of aluminium and aluminium-clad steel wires.

4.4 Construction

4.4.1 The bare overhead line conductor shall be constructed in conventional concentric-lay conductor type. The direction of lay of the outer layer shall be right hand and shall be reversed in successive layers.

4.4.2 No joints of any kind shall be made in the finished aluminium-clad steel wires. Joints may be made in the rods or semi-finished wires prior to drawing to final size, provided that the supplier can guarantee that the joint will have at least 90% of the tensile strength of the un-jointed rod.

4.4.3 Welded joints in the aluminium wires shall be not closer than 15m to another or to either end of the wire. No more than two such joints shall be present in any reel length of the conductor.

4.4.4 The surface of the wire shall be smooth and free from imperfections not consistent with good manufacturing practice.

4.5 Mass and Electrical Resistance

The appropriate mass and electrical DC resistance at 20˚C shall be determined by using the standard increments shown in table 4 of ASTM B549 for ACSR/AW conductors.

4.6 Area and Diameter

4.6.1 The area of cross section of the aluminium wires of ACSR/AW conductor shall not be less than 98% of the area specified in Data Schedule.

4.6.2 The area and diameter of bare overhead line conductors covered by this specification are as follows:

Type of Conductor	Area (mm2)	Overall Diameter (mm)	Strand Diameter	
			Al (mm)	Al-Clad (mm)
MERLIN/AW *	170.5	17.35	3.472	3.472
QUAIL/AW *	67.44	11.34	3.782	3.782

5.0 TESTS:

5.1 General

5.1.1 Conductor shall be tested in accordance with the latest standards and as specified herein. Supplier shall provide all test results for review and acceptance by SEC.

5.1.2 The full range of routine, special and type tests specified in the relevant standard shall be carried out as applicable.

5.1.3 Routine and/or special tests shall be carried out in the supplier's factory. Type test report/certificate from an independent testing laboratory shall be submitted to SEC.

5.2 Tests for mechanical and electrical properties of component wires shall be made before stranding.

5.3 Torsion tests shall be made on aluminium-clad steel wires. The wire shall withstand without fracture not less than 20 twists in a length equivalent to 100 times the nominal diameter of the wire.

5.4 Records for all joints made in the conductor wires shall be submitted to SEC.

6.0 PACKING AND SHIPPING

In addition to the applicable items per 01-SDMS-01, packing and shipping of the overhead line conductor shall conform to the following:

6.1 The conductor shall be delivered on standard sized wooden or steel reels of sturdy construction properly packed and lagged externally to prevent possible damage to the conductor during transportation. Wood lagging shall also be secured with steel straps to provide physical protection for the conductor during transit and during customary storage and handling operations.

6.2 Conductors shall be supplied in lengths as specified in purchase orders. The allowable tolerance on the specified length shall be ± 5%

6.5 Reel Markings

6.5.1 Conductor reels/drums shall be marked in legible and indelible letters giving the following particulars:

a. Conductor voltage and material
b. Type of conductor
c. Length and weight of conductor on reel
d. Stranding
e. Cross-section of conductor
f. Gross weight
g. Size of reel
h. Manufacturer's name and country of origin
i. Year of manufacture
j. SEC stock number in 10cm high bold numerals
k. SEC address and purchase order number
l. Serial number of reel
m. Direction of rolling of reel
n. Spec number 10-SDMS-01

6.5.2 All markings shall appear on both sides of the reel.

6.5.3 Conductor reel identification shall include any additional information as required by SEC shipping instructions.

7.0 GUARANTEE

The supplier shall guarantee the conductor against all defects arising out of faulty design or workmanship, or of defective material for a period of two years from date of delivery.

8.0 SUBMITTALS

8.1 Submittals required with tender:

8.1.1 The supplier shall complete and return one copy of the attached Data Schedule for each size of conductor offered.

8.1.2 Guaranteed Ex-Works delivery date.

8.1.3 Type test certificates.

8.1.4 Dimensional cross-sectional drawings of conductor and drum along with Technical Data and Catalogues shall be submitted by the supplier to facilitate evaluation of the offer.

8.2 Submittals required following award of contract:

8.2.1 Details of manufacturing and test programs.

8.2.2 Factory test reports.

8.2.3 Erection Sag-Tension tables based on

- Spans of 70-100m in 10m steps.
- Design maximum tension on 1/3 rated breaking load at 600 N/m2, 0˚C (no ice).
- Erection temperature range 10-35˚C in steps of 5˚C.

9.1 SCHEDULE OF PARTICULARS

TECHNICAL DATA of OHL CONDUCTOR ACSR/AW
(Sheet 1/3)

SEC Inquiry No:_____ Item No:_____

No.	DESCRIPTION	UNIT	SEC SPECIFIED VALUES*	VENDOR PROPOSED VALUES**
4.0	DESIGN AND CONSTRUCTION REQUIREMENTS			
1	The standard to which cable or wire manufactured		As per clause 3.0	
2	Type of cable		ACSR/AW	
3	Rated voltage	KV	Up to 33 KV	
4	Number and diameter of aluminium strands	No./mm		
5	Aluminium area	mm2		
6	Diameter of steel strand	mm		
7	Steel area	mm2		
8	Minimum Aluminium coating on steel strand	g/m2		
9	Total cross-sectional area of conductor	mm2		
10	Overall diameter of bare conductor (apprx.)	mm		
11	Ultimate breaking load of conductor	kg		
12	Rated tensile strength	kg		
13	Equivalent modulus of elasticity	Kg/mm2		
14	Maximum stress	Kg/mm2		
15	Equivalent coefficient of linear expansion per °C			
16	Resistance of conductor per km at reference temperature 75ºC	Ohm/km		
17	Max. continuous current carrying capacity of conductor at ambient temperature 45ºC	Amps		
18	Conductor temperature for condition at item 17	º C		
19	The short time overload current capacity of conductor at ambient 45ºC - 1 hour duration - 3 hour duration	 Amps Amps		
20	Conductor temperature for condition at item 19	º C		
21	Max DC resistance per Km at 20°C	Ω/km		
22	Max AC resistance per Km at 80°C	Ω/km		
23	Reactance per Km	Ω/km		
24	Weight of conductor per km	Kg/km		

9.1 SCHEDULE OF PARTICULARS

TECHNICAL DATA of OHL CONDUCTOR ACSR/AW
(Sheet 2/3)

SEC Inquiry No:_____ Item No:_____

6.0	PACKING AND SHIPPING

1	Drum type		
2	Length of conductor (M)		
3	Dimensions (M)		
4	Gross weight (kg)		
5	Net weight (kg)		
6	Marking as per the specification		

8.0	SUBMITTALS

1	All submitted as per the specification

(*) - Values to be provided / proposed by the vendor.
(**) - Please provide explanations for deviations if any.

9.1 SCHEDULE OF PARTICULARS

TECHNICAL DATA of OHL CONDUCTOR ACSR/AW
(Sheet 3/3)

SEC Inquiry No:_____ Item No:_____

A. ADDITIONAL TECHNICAL INFORMATION OR FEATURES SPECIFIED BY SEC:

B. ADDITIONAL SUPPLEMENTARY DATA OR FEATURES PROPOSED BY BIDDER / VENDOR / SUPPLIER:

C. OTHER PARTICULARS TO BE FILLED UP BY BIDDER / VENDOR / SUPPLIER:

D. LIST OF DEVIATIONS & CLAUSES TO WHICH EXCEPTION IS TAKEN BY THE BIDDER / VENDOR / SUPPLIER: (USE SEPARATE SHEET IF NECESSARY).

	MANUFACTURER OF MATERIALS / EQUIPMENT	VENDOR / SUPPLIER
Name of Country		
Location and Office Address		
Name & Signature of Authorized Representative and Date		
Official Seal / Stamp		