

**SPECIFICATION FOR UNDERGROUND
WARNING TAPES**

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Rev.01

**SPECIFICATION FOR UNDERGROUND
WARNING TAPES**

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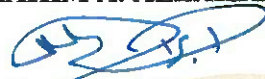
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Revision History

#	Date	Revision No.	Major Revision Description

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1. Scope

This SEC Distribution Materials Specification (SDMS) specifies the minimum technical requirements of underground warning tapes to identify and give early warning to excavators that a power and telecom cables are buried underneath.

This standard is subject to revision as new materials and methods of construction are developed. The latest revision of this standard shall be applicable. The date and version/revision of the latest issue of each sheet is printed at the top corner above the standard number.

2. Cross References to Other SEC Standards

This specification shall always be read in conjunction with SEC General Specification No. 01-SDMS-01 (latest revision) titled "General Requirements for all Equipment/Materials," which shall be considered as an integral part of this specification. It shall also be read in conjunction with SEC purchase order and/or contract schedules, and scope of work/technical specifications for projects, as applicable.

2.1 Intended Use

- 2.1.1 Warning Tape (WT) is used as a part of the civil work in the implementation of MV power & telecommunications outside plant network. The WT will be installed in duct underground trenches as per the technical specification set in the design and implementation guidelines.
- 2.1.2 Warning Tape will be installed at the top of the ducts in open trench as per the technical specification set in the OSP infrastructure implementation guidelines.
- 2.1.3 Detectable warning tape has an aluminum backing facilitating the search for underground assets using a non-ferrous metal locator tool, which locates the presence of MV power & telecom cables within the drilling range and prevent their damage.
- 2.1.4 The specifications cover the design and technical specifications for the following type of Warning Tape:
- 2.1.5 There are two types of structures:
 - a) **TSCxxx Warning Tape Type 1 (for MV Power)**
 - b) **TSCxxx Warning Tape Type 2 (for Telecom)**

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2.2 Long Term Performance Requirements

2.2.1 The warning tape shall be designed, manufactured by high quality materials only and “packaged” so that the storing, installation, operation and maintenance, characteristics shall not degrade when exposed to the environmental conditions of Saudi Arabia.

2.3 Associated Specifications

2.3.1 The following standards shall be applied, and deemed to be an integral part of this specification:

Table 1: List of Applicable Codes and Standards

Standard #	Title
ASTM D792	Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D882	Test Method for Tensile Properties of Thin Plastic Films
ASTM D2103	Specification for Polyethylene Film and Sheeting
ASTM D2578	Test Method for Wetting Tension of Polyethylene and Polypropylene Films

3 Technical Requirements

3.1 General.

- 3.1.1 All material used for the manufacturing of detectable warning tape, shall be of high grade virgin raw materials. Recycled materials shall NOT be accepted.
- 3.1.2 Warning tapes shall be manufactured from high-grade virgin materials of low density polyethylene polymers.
- 3.1.3 Warning tape shall be resistant to most soil types including alkaline and acidic soils.
- 3.1.4 All material used in the Warning Tape shall be non-toxic and dermatologically safe.
- 3.1.5 Any violation to the technical specification set in this document may result in putting the product of the manufacturer suspending or cancelling the type approval.
- 3.1.6 The manufacture shall maintain and share with Distribution/Dawiyat the material delivered to its contractors including but not limited to the serial number, the manufacturing details and the delivery date to the contractor.
- 3.1.7 The manufacturer shall not deliver any item to the contractors once the type approval is suspended or cancelled.

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- 3.1.8 The manufacturing of the Warning Tape shall take place in a production environment which is ISO certified in accordance with the ISO 9001:2015 for quality management system.
- 3.1.9 The manufacturer shall submit compliance statement as per Annex 1 of this document. Contractor shall support the compliance statement with supporting document such as data sheets. The compliance shall be either, “Comply”, “Partially Comply” or “Not Comply”.

4 Design Requirements.

4.1 Warning Tape Type 1

- 4.1.1 Warning tapes shall have a minimum thickness of 200 μm with allowable tolerance of +50 μm .
- 4.1.2 Warning tapes shall have width of 150mm and roll size of 500m.
- 4.1.3 The imprints in the warning tapes shall be indelible, lead-free, black color and shall be overcoated to protect the imprints from acids, alkalis, and other soil substances.
- 4.1.4 It is applicable in MV Power Cables implementation and has the following specifications.

Warning Tape Type 1 design



Roll Size: 500 m

Width: 150 mm

Thickness: 200 μm

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Table 2: Warning Tape Type 1 Specifications

No	Description	SEC Specified Values (*)	Vendor Proposed Values (**)
1	Warning Tape		
1.1	Material (Virgin Grade)	Low Density Polyethylene Film	
1.2	Resistant to most soil types including alkaline and acidic soils	Yes	
1.3	Thickness + Tolerance	200 μ m + 50 μ m	
1.4	Width	150mm	
1.5	Roll size	500m	
1.6	Color	Traffic Yellow (RAL 1023)	
2	Imprints		
2.1	Color	Black	
2.2	Material	Indelible Lead-Free	
2.3	Design	As specified	
2.4	Overlay Clear coating	Yes	
2.5	Manufacturer	**	
2.6	Manufacturer Catalogue Number	**	
2.7	Country of Origin	**	
2.8	Submittals required with tender /Inquiry included or not	**	

4.2 Warning Tape Type 2

4.2.1 WT type 1 should have an aluminum backing, detectable when searching for underground assets using a non-ferrous metal locator tool, which locates the presence of telecom cables within the drilling range and prevent their damage.

4.2.2 It is applicable in Telecom OSP Network implementation and has the following specifications.

Warning Tape Type 2 design



Roll Size: 500 m
Width: 50 mm
Thickness: 50 μ m

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Table 3: Warning Tape Type 2 Specifications

Properties	Specification	Tolerance	TestMethod	Unit
PHYSICAL PROPERTIES				
Width	50 mm		CFP-1	mm
Repeat	Continues		CFP-1	mm
Thickness	150		ASTM D-2103/CFP-1	Microns
GSM (Grams per Square Meter)	135		CFP-1	G/m ²
Density (Pet)	1.41		CFP-2	G/cm ³
Density (Foil)	2.7	Std	ASTM D-792-66	G/cm ³
Density (HDPE)	0.94	Std	ASTM D-792-66	G/cm ³
Color (Back ground)	Orange		(RAL 2004)	NA
Printability	Black ≥ 45 Dynes	Std	ASTM D-2578-08	
MEHANIACL PROPERTIES				
Tensile Strength MD/TD	343	Not Lower	ASTM - 882 - 97	Kg/cm ²
Bond Strength	150	Not Lower	CFP - 4	g/15 mm
THERMAL PROPERTIES				
Heat Resistance	Pass	Ink Heat Resistance	CFP - 11	0 C
CHEMICAL PROPRETIES				
Sulphate 5 %	-	No Effect	-	-
Chlorate 5 %	-	No Effect	-	-
Alkali 10 %	-	No Effect	-	-
Soap 10 %	-	No Effect	-	-
OTHER PROPERTIES				
Roll WT / OD	500	NA	NA	Meters
Core ID	76	Standard	NA	mm

5 Testing and Inspection

All underground warning tapes shall be tested in conformance with the applicable clauses of the standards mentioned in this specification.

6 Submittals

6.1. Submittals Required with Tender/Inquiry

6.1.1 Clause-by-clause compliance with the latest revision of SEC specification 12-SDMS-03 Rev.01.

6.1.2 Manufacture's Catalogue

6.1.3 Certificate stating that the raw material has been sampled, tested and

Inspected in accordance with relevant standard specifications.

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6.1.4 Filled-up technical data schedule of the item offered.

6.1.5 Proof that the product offered is already been supplied and used in utility companies.

6.1.6 USB Flash Drive containing e-copy of all documents mention above.

6.1. Submittals Required following award of contract

6.2.1 Samples

6.2.2 Quality assurance tests

6.2.3 Manufacturing and routine test schedules

7 Distribution Unit Code**Material Unit Code**

Unit Code	Description	Unit of Measure
TSC xxx	Warning Tape Type 1	Meter
TSC xxx	Warning Tape Type 2	Meter

Warning Tape**SEC Inquiry No.:****Item No.:**

- Additional Technical Information or Features Specified by SEC
- Additional Supplementary Data o Features Proposed by Bidders/Vendor/Supplier
- Other Particular to be filled-up by the Bidder/Vendor/Supplier
- List of Deviation and Clauses to which exception is taken by the Bidder/Vendor/Supplier. (Use separate sheet, if necessary)

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Description	Manufacturer of Material/Equipment	Vendor/Supplier
Name of Company		
Location and Office Address		
Name and signature of Authorized Representative with Date		
Official Seal / Stamp		

ANNEXE-1 COMPLIANCE SHEET

Section	Compliance	Remarks
3	TECHNICAL REQUIREMENTS	
3.1	General	
3.1.1	All material used for the manufacturing of detectable warning tape, shall be of high grade virgin raw materials. Recycled materials shall NOT be accepted.	
3.1.2	Warning tapes shall be manufactured from high-grade virgin materials of low density polyethylene polymers.	
3.1.3	Warning tape shall be resistant to most soil types including alkaline and acidic soils.	
3.1.4	All material used in the Warning Tape shall be non-toxic and dermatologically safe.	
3.1.5	Any violation to the technical specification set in this document may result in putting the product of the manufacturer suspending or cancelling the type approval.	
3.1.6	The manufacture shall maintain and share with Dawiyat the material delivered to its contractors including but not limited to the serial number, the manufacturing details and the delivery date to the contractor.	
3.1.7	The manufacturer shall not deliver any item to the contractors once the type approval is suspended or cancelled.	

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3.1.8	The manufacturing of the Warning Tape shall take place in a production environment which is ISO certified in accordance with the ISO 9001:2015 for quality management system.		
3.1.9	The manufacturer shall submit compliance statement as per Annex 1 of this document. Contractor shall support the compliance statement with supporting document such as data sheets. The compliance shall be either, "Comply", "Partially Comply" or "Not Comply".		
4	Design Requirement		
4.1	Warning Tape Type 1		
4.1.1	Warning tapes shall be manufactured from high-grade virgin materials of low density polyethylene polymers.		
4.1.2	It is applicable in MV Power Cables implementation and has the following specifications.		
4.1.3	Roll Size: 500 m		
4.1.4	Width: 150 mm		
4.1.5	Thickness: 200 μ m		
4.1.6	Warning Tape Type 1 design		
4.1.7	Table 2: Warning Tape Type 1 Specifications		
4.2	Warning Tape Type 2		
4.2.1	WT type 1 should have an aluminum backing, detectable when searching for underground assets using a non-ferrous metal locator tool, which locates the presence of telecom cables within the drilling range and prevent their damage.		
4.2.2	It is applicable in Telecom OSP Network implementation and has the following specifications.		
4.2.3	Roll Size: 500 m		
4.2.4	Width: 50 mm		
4.2.5	Thickness: 50 μ m		
4.2.6	Warning Tape Type 2 design		

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4.2.7	Table 3: Warning Tape Type 2 Specifications		
5	Testing & Inspection		
5.1	All underground warning tapes shall be tested in conformance with the applicable clauses of the standards mentioned in this specification.		