



a world class African city



**TITLE** **SPECIFICATION FOR 40 MM  
DIRECT BURIAL PROTECTIVE  
SLEEVE FOR FIBRE OPTIC  
CABLES**

**REFERENCE** **CP\_TSSPEC\_150** **REV 1**  
**DATE:** **JULY 2021**  
**PAGE:** **1 OF 14**  
**REVISION DATE:** **AUGUST 2021**

COMPILED BY

FUNCTIONAL RESP

APPROVED BY

APPROVED BY

  
**M.M NTSIYENE**  
TECHNICIAN  
TECHNOLOGY SERVICES

  
**Z NGQWALA**  
UNDERGROUND SYSTEMS  
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GENERAL MANAGER  
(ACTING)  
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**L. MAGIDA**  
GROUP EXECUTIVE:  
ENGINEERING SERVICES  
(ACTING)

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## FOREWORD

This specification was prepared by the following Work Group members:

M Ntsiyene

## Technology Services

The Work Group was appointed by the Distribution Study Committee, which, at the time of approval, comprised of the following members:

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Arsenio Cossa	Metering
Masape Mokgadi Kahumba	Secondary Plant (Metering)
Katlego Mogale	Maintenance (Engineering Operations)
Gavin Jardine	Infrastructure Planning
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Recommendations for corrections, additions or deletions should be addressed to the:

Technology Services Manager  
City Power Johannesburg (Pty) Ltd  
P O Box 38766  
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## **INTRODUCTION**

The protective sleeve will be used to provide a ready means of drawing fibre optic cables under streets and pavements, and to afford protection to the fibre optic cables that will be subject to loads due to heavy transport passing on the road above.

## **1 SCOPE**

This specification covers City Power's requirements for flexible protective HDPE sleeve for fibre optic cables.

## **2 NORMATIVE REFERENCES**

The following documents contain provisions that, through reference in the text, constitute requirements of this specification. At the time of publication, the editions indicated were valid. All standards and specifications are subject to revision, and parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent editions of the documents listed below.

SANS 791 :	Unplasticised polyvinyl chloride (uPVC) sewer and drain pipes and pipe fittings
SANS 1222:	Classification of degrees of protection provided by enclosures
SANS 1601:	Structured wall pipes and fittings of uPVC for buried drainage and sewerage systems.
EN 500861-2-4:	Particular requirements for conduit systems buried underground.

## **3 REQUIREMENTS**

### **3.1 Type**

The protective sleeve shall:

- a) Be constructed from high density polyethylene (HDPE);
- b) Be yellow in colour;
- c) Be supplied with pre-installed pilot rope;
- d) Be in a coil of 300m in length;
- e) Have a nominal outside diameter of 40 mm, with a tolerance of -0 / +0.3 mm;
- f) Have an internal diameter of 33 mm;
- g) Be supplied with a knock on end caps at either end of the sleeve; and
- h) Be suitable for normal duty use (direct burial).

### **3.2 Construction**

The protective sleeve shall:

- a) Contain the highest quality virgin polymer;
- b) Have a bore that is true and smooth;
- c) Contain no recycled or poor quality polymer material;
- d) Have an ultra slippery silicon co-extruded bore; and
- e) The length shall be continuous with no welds or joints.

### **3.3 Flexibility**

The protective sleeve shall be flexible to facilitate the installation of the sleeve around immovable objects.

### **3.4 Friction**

The protective sleeve shall have a low co-efficient of friction of less than 0,1 to accommodate the easy draw of fibre optic cables through the sleeve.

### **3.5 Jointing**

Jointing of the protective sleeve shall be done by means of standard compression couplings which shall have an IP 66 rating as per SANS 1222 and shall have a pressure rating of 10 bar.

### **3.6 Bending Radius**

The minimum bending radius shall be 10 times the outside diameter of the sleeve.

## **4 PHYSICAL PROPERTIES**

### **4.1 Impact**

The protective sleeve shall exhibit no signs of splits and cracks when conditioned at -5 °C for 2 hours and subject to an impact of 5 kg falling from 1 m drop height.

### **4.2 Pressure rating**

The direct buried sleeves shall have a pressure rating of 10 bar.

### **4.3 Ultra violet**

The protective sleeve, although intended to be buried underground, shall be UV resistant for up to one year for storage purposes.

## **5 END CAPS**

End caps for sealing the open ends of sleeves already laid in the ground, but not yet installed with fibre optic cable, shall be provided for both ends of the sleeve. The end caps shall fit securely into the sleeve ends and hold the pilot rope captive.

## **6 PILOT ROPE**

- 6.1 The polypropylene pilot rope shall be pre-installed in the sleeve.
- 6.2 The pilot rope shall have a breaking strain of 100 kg.

## **7 MARKING**

### **7.1 Information**

- 7.1.1 All protective sleeves shall be clearly printed at 1 metre intervals with the following:
  - a) The manufacturer's trademark or name,
  - b) Outer and inner diameter, and
  - c) The name "City Power".

### **7.2 Print**

- 7.2.1 The protective sleeve shall be marked with black lettering.
- 7.2.2 The numbers and characters shall be 4 mm in height.

## **8 PACKAGING**

- 8.1 All flexible protective sleeves shall be securely supplied in coils of 300m.
- 8.2 The ends of the protective sleeve shall be sealed to prevent ingress of water.
- 8.3 Each coil shall have a waterproof label attached with the following information:
  - a) product code;
  - b) length of the sleeve in metres;
  - c) total mass; and
  - d) City Power's SAP number.

## **9 DOCUMENTATION**

- 9.1 Documentation shall be submitted in a technical catalogue format.
- 9.2 The catalogue shall specify the protective sleeve sizes, dimensions, reference number, and other products and accessories.

## **10 QUALITY MANAGEMENT**

- 10.1 The supplier (deemed to be an organization that undertakes any manufacturing or assembly operation) shall have a formally documented and implemented quality management system (QMS) that, as a minimum meets with the requirements of the international code of practice for quality systems ISO 9002. City Power reserves the right to audit quality management systems for suitability and effectiveness, and to verify all goods for conformance prior to delivery.
- 10.2 Foreign and third party manufacturers, shall, in addition, hold valid certification of their quality management system. Such certification shall be from a national quality systems certification body (Registrar), duly accredited by a QMS accreditation body, which is signatory to a mutual recognition agreement with South Africa.

## **11 HEALTH AND SAFETY**

A health and safety plan shall be set up in order to ensure proper management and compliance of the flexible protective PVC sleeves for underground drilling. Guidance on the requirements of a health and safety plan may be found in OHSAS 18001:2007 standards. This is to ensure that the services provided conforms to standard operating procedures and City Power SHERQ Policy. The details shall be subject to agreement between City Power and the Supplier.

## **12 ENVIRONMENTAL MANAGEMENT**

An environmental management plan shall be set up in order to ensure the proper environmental management and compliance of the flexible protective PVC sleeves for underground drilling for the entire life cycle (i.e. during design, development). Guidance on the requirements for an environmental management TPVS may be found in ISO 14001:2015 standards. The details shall be subject to agreement between City Power and the Supplier. This is to ensure that the asset created conforms to environmental standards and City Power SHERQ Policy.

**ANNEX A - Bibliography**

None

**ANNEX B - Revision information**

**DATE      REV. NO.      NOTES**

April 2005      0      First issue

June 2021      1      General Editing

10. HEALTH AND SAFETY

11. ENVIRONMENTAL MANAGEMENT

New study committee

**ANNEX C – Item 1 –SLEEVE FIBRE OPTIC 40 MM – SAP NO. 1172****Schedule A: Purchaser's specific requirements****Schedule B: Guarantees and technical particulars of equipment offered**

Item	Subclause of CP_TSSPEC_150	Description	Schedule A	Schedule B
1		Manufacturer	Required	
2	3.1(a)	Material of flexible sleeve	HDPE	
3	3.1(b)	Colour	Yellow	
4	3.1(c)	Pilot string or draw-wire supplied	Yes/ No	Yes
5	3.1(e)	Outside diameter	40 mm	40 mm
6	3.1(g)	End caps on both ends	Yes/No	Yes
7	3.2(a)	Constructed of high quality polymer	Yes/ No	Yes
8	3.2(d)	Does the sleeve contain an ultra slippery silicon bore	Yes/ No	Yes
9	3.6	Minimum bending radius of sleeve	10d	10d
10	4.1	Is the sleeve impact resistant?	Yes/ No	Yes
11	4.2	Pressure rating of the sleeve	bar	10 bar
12	4.3	Is the sleeve UV protected?	Yes/ No	Yes
13	5	Are end caps supplied?	Yes/ No	Yes
14	6	Breaking strain of the pilot rope	kg	100
15	7	Does the markings on the sleeve comply?	Yes/ No	Yes
16	8	Does the packaging comply?	Yes/ No	Yes
17	8.2	Are the ends sealed?	Yes/ No	Yes

**Note: Ticks, Cross [√, X], Astrick [\*], Word [Noted] or TBA ["To Be Advice"] will not be accepted**

Tender Number: \_\_\_\_\_

Tenderer's Authorised Signatory: \_\_\_\_\_  
Name in block letters \_\_\_\_\_ Signature \_\_\_\_\_

Full name of company: \_\_\_\_\_

**Item 1 –SLEEVE FIBRE OPTIC 40 MM – SAP NO. 1172**

**Deviation schedule**

**Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.**

<b>Item</b>	<b>Subclause of CP_TSSPEC_150</b>	<b>Proposed deviation</b>

**Note: Ticks, Cross [√, X], Astrick [\*], Word [Noted] or TBA [“To Be Advice”] will not be accepted**

Tender Number: \_\_\_\_\_

Tenderer's Authorised Signatory: \_\_\_\_\_  
Name in block letters \_\_\_\_\_ Signature \_\_\_\_\_

Full name of company: \_\_\_\_\_

**ANNEX C – Item 2 –COUPLING COMPRESSION FIBRE OPTIC 40 MM –  
SAP NO. 1173**

**Schedule A: Purchaser's specific requirements**

**Schedule B: Guarantees and technical particulars of equipment offered**

<b>Item</b>	<b>Subclause of CP_TSSPEC_150</b>	<b>Description</b>	<b>Schedule A</b>	<b>Schedule B</b>
1		Manufacturer	Required	
2		Material of compression coupling	Required	
3	3.5	IP rating of compression coupling	IP	66
4	3.5	Pressure rating	bar	10

**Note: Ticks, Cross [✓], X, Astrick [\*], Word [Noted] or TBA ["To Be Advice"] will not be accepted**

Tender Number: \_\_\_\_\_

Tenderer's Authorised Signatory: \_\_\_\_\_  
Name in block letters \_\_\_\_\_ Signature \_\_\_\_\_

Full name of company: \_\_\_\_\_

**Item 2 –COUPLING COMPRESSION FIBRE OPTIC 40 MM – SAP NO. 1173**

**Deviation schedule**

**Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.**

<b>Item</b>	<b>Subclause of CP_TSSPEC_150</b>	<b>Proposed deviation</b>

**Note: Ticks, Cross [√, X], Astrick [\*], Word [Noted] or TBA ["To Be Advice"] will not be accepted**

Tender Number: \_\_\_\_\_

Tenderer's Authorised Signatory: \_\_\_\_\_  
Name in block letters \_\_\_\_\_ Signature \_\_\_\_\_

Full name of company: \_\_\_\_\_

**ANNEX D – Stock Items**

**Material Group : PIPE-DST**

<b>Item</b>	<b>SAP No</b>	<b>SAP Short Description</b>	<b>SAP Long Description</b>
1	1172	SLEEVE FIBRE OPTIC 40MM YELLOW	SLEEVE. PROTECTIVE. FLEXIBLE, YELLOW. HIGH DENSITY POLYETHYLENE, FOR DRAWING FIBRE OPTIC CABLE. SUPPLIED AS COILS OF 300M IN LENGTH WITH AN OUTER DIAMETER OF 40MM. WITH PILOT STRING. FITTED WITH END CAPS. ITEM SPECIFICATION NO. CP_TSSPEC_150
2	1173	COUPLING FIBRE OPTIC 40MM	COUPLING. COMPRESSION. 40MM FOR YELLOW HIGH DENSITY POLYETHYLENE FIBRE OPTIC SLEEVE. ITEM SPECIFICATION NO. CP_TSSPEC_150