



RFQ / TENDER

Tender No: VEG-15732

Vendor No: 11001386

BOARD LIST
BOARD LIST
TRANSNET FREIGHT RAIL
PROCUREMENT DEPARTMENT
2000

Purchaser : Mohale Rapetswa
Telephone : 011
Fax Number:

Please quote reference:
DL7/6000607703

Deliver to:
TFR Head Office
Supply Chain Services
2000 Johannesburg

Closing Date :09.10.2014
Validity Date :30.01.2015
RFQ No :6000607703
End of Validity :28.11.2014

Ihr Zeichen VEG-15732

SUPPLY OF 3 X DRUMS (500M PER DRUM), 0.9MM CONDUCTOR, 20 PAIR CABLE (STEEL ARMOUR TELECOMS CABLE) FOR VEREENIGING DEPOT.

THE RFQ DOCUMENTS ARE OBTAINABLE FROM THE OFFICE OF TRANSNET FREIGHT RAIL, TENDER ADVISE CENTRE, GROUND FLOOR, INYANDA HOUSE 1, WELLINGTON ROAD, PARKTOWN, DURING OFFICE HOURS 08:00 TO 15:00 AND RFQ DOCUMENT IS FOR FREE.

RFQ CLOSING DATE: 09 OCTOBER 2014

QUOTATIONS MAY BE E-MAILED TO: thuli.mathebula@transnet.net

FOR ANY TECHNICAL ENQUIRIES WITH REGARD TO THIS RFQ YOU MAY CONTACT THABO LANDE TEL NO: 016 420 6262 OR 073 512 7275

1. RETURN OF QUOTATION/S:

1.1 QUOTATION/S MUST BE SUBMITTED PUNCTUALLY AT 10:00 ON THE CLOSING DATE (09 SEPTEMBER 2014) AND LATE QUOTATIONS WILL NOT BE CONSIDERED.

1.2 IF POSTED:

21 WELLINGTON ROAD
INYANDA HOUSE 1
PARKTOWN
,2193

1.3 IF DELIVERED BY HAND:

TRANSNET FREIGHT RAIL

DATE: SIGNATURE OF TENDERER(S):
CONTACT PERSON: TEL No:

RFQ / TENDER

Tender No: VEG-15732 Page
Date : 01.10.2014 2

BOARD LIST
TRANSNET FREIGHT RAIL
PROCUREMENT DEPARTMENT

21 WELLINGTON ROAD
INYANDA HOUSE 1
PARKTOWN

2. CONDITIONS:

- 2.2 ANY PURCHASE ORDER PLACED AS A RESULT OF YOUR QUOTATION WILL BE SUBJECT TO THE STANDARD TERMS AND CONDITIONS OF CONTRACT, FORM US7 (Latest) GENERAL TENDER CONDITIONS FORM CSS5, (Latest)
- 2.3 TENDERERS MAY OFFER AN EARLIER VALIDITY DATE, BUT THEIR QUOTATION MAY, IN THAT EVENT, BE DISREGARDED FOR THIS REASON.
- 2.4 TENDERERS ARE REQUIRED TO OFFER ONLY FIRM PRICES. PRICES SUBJECT TO REVIEW IN TERMS OF CLAUSE 32(1) OF FORM US7 WILL ONLY BE CONSIDERED SHOULD THE DELIVERY PERIOD REQUIRED EXCEED 6 MONTHS.
- 2.5 BEST DELIVERY TIME MUST BE OFFERED.
- 2.6 DISCOUNT (TRADE DISCOUNT)/CASH DISCOUNT (CONDITIONAL DISCOUNT)/ VALUE ADDED TAX (VAT) MUST BE SHOWN SEPARATELY.
- 2.7 TRANSNET RESERVES THE RIGHT TO NEGOTIATE PRICES AND COMMERCIAL ASPECTS AFTER THE CLOSING DATE OF THE QUOTATION.

"PREVIEW COPY ONLY"

DATE:

SIGNATURE OF TENDERER(S):

RFQ / TENDER

Tender No: VEG-15732 Page
Date : 01.10.2014 3

BOARD LIST
TRANSNET FREIGHT RAIL
PROCUREMENT DEPARTMENT

2.8 DIRECT DELIVERY INTIMATES DELIVERY BEING EFFECTED INTO THE WAREHOUSE OR THE ACTUAL POINT OF SUPPLY AND SHOULD THEREFORE INCLUDE ANY TRANSPORTATION MODE DEEMED NECESSARY IN EXECUTING THIS METHOD OF DELIVERY BASIS IN ORDER TO MEET THE REQUIRED DELIVERY DATE.

SCHEDULE OF REQUIREMENTS

TENDERERS SHOULD INSERT THEIR PRICE/S UNDER THE APPROPRIATE HEADINGS HEREUNDER.

IN THIS REGARD THE TENDERER'S ATTENTION IS DIRECTED TO PARAGRAPH 16 OF FORM CSS5 (REVISED October 2005).

NB. TENDERERS OFFERING GOODS FROM IMPORTED SUPPLIES MUST SUBMIT THEIR PRICES ON THE DELIVERY BASIS APPEARING UNDER COLUMN (C) OF THIS SCHEDULE OF REQUIREMENTS.

TAX CLEARANCE CERTIFICATES:

The Regulations in terms of the Public Finance Management Act, 1999: Framework for Supply Chain Management as published in Government Gazette No. 25767 dated 5 December 2003, Clause 9 (1) (d), stipulates that the accounting officer or accounting authority of an institution to which these regulations apply must reject any bid from a supplier who fails to provide written proof from the South African Revenue that the supplier either has no outstanding tax obligations or has made arrangements to meet outstanding tax obligations. Tenderers will be disqualified if a valid tax clearance certificate or written proof from the South African Revenue Service that supplier has made arrangements to meet outstanding tax obligations is not submitted with the tender.

EVALUATION CRITERIA: COMPETITIVE PRICING AND B-BBEE

COMPANY DETAILS:

NAME OF COMPANY: _____
E-MAIL ADDRESS: _____

CONTACT PERSON: _____

TEL NO: _____ FAX NO: _____
REG NO: _____

BROAD BASED BLACK ECONOMIC EMPOWERMENT (BBBEE)

Transnet fully endorses and supports the Government's Broad-based Black Economic Empowerment Programme and it is strongly of the opinion that all South African Business Enterprises have an equal obligation to redress the imbalances of the past.

Transnet will therefore prefer to do business with local business enterprises who share these same values. Transnet will endeavour to do business with local business enterprises that possess a BBBEE "recognition level" of at least a level 5. Transnet urges Tenderers (large enterprises and QSE's - see below) to have themselves accredited by any one of the various Accreditation Agencies available, who do their BBBEE ratings in accordance with the latest Codes (i.e. those promulgated on 9 February 2007) and whose names appear on the present ABVA (Association of BEE Verification Agencies) - "List of Full Members" as displayed on the ABVA website (www.abva.co.za).

Although no agencies have, as yet, been accredited by SANAS (SA National Accreditation System), Transnet will, in the interim, accept rating certificates of tenderers who have been verified by any of the listed agencies.

Enterprises will be rated by such agency based on the following:

1. Large Enterprises (i.e. annual turnover >R35million:
" Rating level based on all seven elements of the BBBEE scorecard.

DATE: SIGNATURE OF TENDERER(S):

RFQ / TENDER

Tender No: VEG-15732
Date : 01.10.2014

Page
4

BOARD LIST TRANSNET FREIGHT RAIL PROCUREMENT DEPARTMENT

2. Qualifying Small Enterprises - (QSE) (i.e. annual turnover >R5million but <R35million:
" Rating based on any four elements of the BBBEE scorecard.

NB:

3. Emerging Micro Enterprises - (EME) (i.e. annual turnover <R5m) are exempted from being rated/verified:
" Automatic rating of Level 4 BBBEE irrespective of race of ownership, i.e. 100% BBBEE recognition
" Black ownership >50% or Black Women ownership >30% automatically qualifies as Level 3 BBBEE, i.e. 110% BBBEE recognition
" EME's should provide certified documentary proof of annual turnover (i.e. audited financials) plus proof of Black ownership if Black ownership >50% or Black Women ownership >30% from the EME's Auditor/Accounting Officer.

4. In addition to the above, Tenderers who wish to enter into a Joint Venture or subcontract portions of the contract to BBBEE companies, must state in their tenders the percentage of the total contract value that will be allocated to such BBBEE companies, should they be successful in being awarded any business. A rating certificate in respect of such BBBEE JV-partners and / or sub-contractor/s, as well as a breakdown of the distribution of the aforementioned percentage must also be furnished

In view of the high emphasis which Transnet places on Broad-based Black Economic Empowerment, Transnet will allow certain preference points for BBBEE in the evaluation of all responses. Depending upon the value of the ensuing business award (i.e. below or in excess of R2m), the 80/20 or 90/10 point preference systems will be utilized where BBBEE will count out of 20 or 10 respectively in the evaluation process.

EACH RESPONDENT IS REQUIRED TO FURNISH PROOF OF THE ABOVE TO TRANSNET. FAILURE TO DO SO WILL RESULT IN A SCORE OF ZERO BEING ALLOCATED FOR BBBEE.

Turnover: Kindly indicate your company's annual turnover for the past year R_____

- " If annual turnover <R5m, please attach certified confirmation from your Auditor/Accounting Officer
" If annual turnover >R5m please attach original or certified copy of accreditation certificate and detailed scorecard by an ABVA accreditation agency (registered as a "Full Member")

PAYMENT TERMS

The following payment terms will apply as from 1 October 2008.

- " All suppliers will be paid 30 days from receipt of month end statement, i.e. payment term F055.
" All CIDB suppliers will be paid 21 days from date of invoice, i.e. payment term F057.

Item	Qty	Material	Description
------	-----	----------	-------------

00010	1	Copper Cable	
-------	---	--------------	--

R.....
Each

Delivery Date: 28.11.2014

DATE:

SIGNATURE OF TENDERER(S):

RFQ / TENDER

Tender No: VEG-15732
Date : 01.10.2014

Page
5

BOARD LIST
TRANSNET FREIGHT RAIL
PROCUREMENT DEPARTMENT

Item	Qty	Material	Description
------	-----	----------	-------------

FULL DETAILS OF DESCRIPTION

"PREVIEW COPY ONLY"

DATE:

SIGNATURE OF TENDERER(S):

RFQ / TENDER

Tender No: VEG-15732
Date : 01.10.2014

Page
6

BOARD LIST
TRANSNET FREIGHT RAIL
PROCUREMENT DEPARTMENT

3. ADDITIONAL INFORMATION REQUIRED: (WHERE APPLICABLE)

3.1 THE FOLLOWING ADDITIONAL INFORMATION IS REQUIRED:

(A) Precedence would be given to affirmative companies in the adjudication of this tender. Documentary proof of the companies black ownership is to be returned with the tender documents, please.

- (A) DISCOUNT:
- (B) SETTLEMENT DISCOUNT:.....
- (C) PRICE/S FIRM:
- (D) PRICE/S FIRM UNTIL THEREAFTER SUBJECT TO REVIEW.
- (E) PRICE/S NOT FIRM:
- (F) SABS MARK:
- (G) SABS PERMIT NO:
- (H) BRAND/MAKE/TYPE:
- (I) FULL NAME AND ADDRESS OF MANUFACTURER:

(J) FULL NAME AND ADDRESS OF INSPECTION POINT:

(K) COUNTRY OF ORIGIN:

(L) SURPLUS MATERIAL:

TENDERERS MUST INDICATE IF THEY WILL BE PREPARED TO PURCHASE BACK FROM TRANSNET ANY SURPLUS MATERIAL WHICH MAY BECOME AVAILABLE FROM ANY RESULTING PURCHASE ORDER/CONTRACT ORIGINATED FROM THE QUOTATION SUBMITTED:

(M) PAYMENT OVERSEAS:

ONLY IF TRANSNET LIMITED IS REQUESTED BY THE TENDERER TO EFFECT PAYMENT OVERSEAS DIRECT TO THE TENDERER'S PRINCIPAL/SUPPLIER THE FOLLOWING INFORMATION IS REQUIRED:

* EXCHANGE RATE ON WHICH THE QUOTATION PRICE IS BASED: R1,00 (S.A. CURRENCY) BEING EQUAL TO (FOREIGN CURRENCY)

* PERCENTAGE IN RELATION TO THE QUOTATION PRICE TO BE REMITTED OVERSEAS:

* NAME OF COUNTRY TO WHICH PAYMENT IS TO BE MADE:

* APPLICABLE DATE OF EXCHANGE RATE:

* BENEFICIARY'S NAME AND FULL ADDRESS:

DATE:

SIGNATURE OF TENDERER(S):

RFQ / TENDER

Tender No: VEG-15732
Date : 01.10.2014

Page
7

BOARD LIST
TRANSNET FREIGHT RAIL
PROCUREMENT DEPARTMENT

* BENEFICIARY'S BANKERS AND FULL ADDRESS:

.....
.....
.....

* APPLICABLE ACCOUNT NUMBER:

.....

(N) DELIVERY DATE:

TENDERERS MUST FURNISH THEIR ACTUAL DELIVERY AND MANUFACTURING PERIOD HEREUNDER NOTWITHSTANDING THE DELIVERY DATES SPECIFIED BY TRANSNET.

THE FOLLOWING MUST ALSO BE FURNISHED IN REGARD TO THE ABOVE:

1. PERIOD REQUIRED TO OBTAIN RAW MATERIAL.(DAYS)
2. MANUFACTURING PERIOD.(DAYS)
3. PERIOD TO TRANSPORT MATERIAL TO DESTINATION.(DAYS)

MATERIAL NO.	1.(PERIOD)	2.(PERIOD)	3.(PERIOD)
.....
.....
.....
.....
.....
.....
.....

DRAWINGS

Drawings applicable to this tender may be obtained free of charge at the office of the Executive Manager, Transnet Freight Rail, 33rd Floor, Carlton Centre, 150 Commissioner Street, Johannesburg

DATE:

SIGNATURE OF TENDERER(S):

TRANSNET

TRANSTEL

A Business Unit of Transnet Limited

SPECIFICATION NO. SCCA-4

AUGUST 1995

**SPECIFICATION FOR ALUMINIUM/POLYETHYLENE
LAMINATED SHEATH FOR UNDERGROUND
POLYETHYLENE INSULATED TRUNK TYPE CABLE
WITH OR WITHOUT STEEL-WIRE ARMOUR**

"PRELIMINARY COPY ONLY"

INDEX

1. GENERAL
2. INSPECTION
3. BASIC CORE
4. INNER SHEATH
5. OUTER SHEATH WITH ARMOURING
6. OUTER SHEATH WITHOUT ARMOURING
7. MARKING OF CABLE
8. TESTS
9. CABLE DRUMS
10. COLOUR SCHEME
11. SIZE AND MAKE-UP OF CABLE
12. STANDARD LENGTHS

AUGUST 1995

SPECIFICATION FOR ALUMINIUM / LAMINATED SHEATH FOR UNDERGROUND POLYETHYLENE INSULATED TRUNK TYPE CABLE WITH OR WITHOUT STEEL-WIRE ARMOUR

1. GENERAL

- 1.1 This specification covers underground polyethylene cable for VF trunk circuits.
- 1.2 The following are referred to in this specification :
- a) BRITISH STANDARD SPECIFICATIONS —
443, 6746, 7 and 6234 (latest issues).
 - b) AMERICAN SOCIETY FOR TESTING MATERIALS —
D1693 (latest issue).
 - c) TELKOM SPECIFICATION —
267 for colour schemes (latest issue).
- 1.3 The Tenderer must indicate clause by clause whether or not the cable offered complies in every respect with this specification. If alternative specifications are submitted all divergences from this specification must be clearly stated.

2. INSPECTION

- 2.1 Transnet reserves to itself the right to arrange for the inspection of all goods forming the subject of any contract or order, at any stage before final acceptance and by any means it may think fit, and when such inspection is to be carried out, the relevant contracts, orders and suborders must be endorsed accordingly.
- 2.2 When inspection at the Contractor's works or warehouse is specified the authorised inspector of Transnet must have free access to the premises of the Contractor at all times during working hours, must have the liberty to inspect work which is the subject of the contract or order, at any stage of manufacture, and may reject any goods which are found to be incomplete, defective or in any way not in conformity with the terms of the contract or order; and the Contractor must afford all reasonable facilities for access and inspection.
- 2.3 The Contractor must supply without charge to Transnet all tools, gauges, templates and other equipment which may be required for checking the accuracy of the work, must provide the labour necessary for inspecting the work in accordance with the requirements specified in the contract or order and must render all reasonable assistance in carrying out this checking and inspection.

AUGUST 1995

- 2.4 The Contractor must prepare and supply without charge to Transnet all test pieces, samples and specimens, must provide all labour and apparatus for carrying out tests and analyses in accordance with the terms of the contract or order, and render all reasonable assistance in making such tests and analyses.
- 2.5 The successful tenderer must notify Transnet at least 2 weeks (14 days) prior to the cable being ready for delivery, so that arrangements can be made to test the cable before delivery.

3. BASIC CORE

3.1 Conductors

- a) Each conductor must consist of a solid wire of annealed electrolytic copper, smoothly drawn, circular in section, uniform in quality, free from all defects and having the properties specified in, Table 1.
- b) To determine compliance with the resistance requirement, ten pairs of conductors, distributed throughout the cable and selected at random, must be connected in series. The resistance of the ten conductors connected in series, must be measured and an average conductor resistance obtained. The average, so obtained, must not exceed the maximum average value specified in, Table 1.

TABLE 1

DIAMETER AND RESISTANCE OF CONDUCTORS AT 20 °C

DIAMETER mm			MAXIMUM AVERAGE RESISTANCE OF CONDUCTORS (ohms per 1 000 m) (NOTE 1)
NOMINAL	MINIMUM	MAXIMUM	
0,5	0,49	0,51	90,31
0,63	0,62	0,64	56,94
0,9	0,89	0,91	27,91
1,25	1,25	1,27	14,43

NOTE 1

The maximum resistance values specified, include allowance for twinning, stranding and laying up.

AUGUST 1995

- c) The physical properties of annealed copper wire must be those defined by the International Electro-technical Commission.
- d) Samples of the conductor, 255 mm long, taken from the completed cable must, when slowly and steadily stretched at a speed of $127 \text{ mm} \pm 50 \text{ mm}$ per minute, give an elongation of not less than 15 % before fracture.
- e) Joints must be kept to a minimum and must be made in a workmanlike manner by brazing, silver soldering, electric welding or other approved method.
- f) The diameter of the conductor must not be increased by a joint, nor must the tensile strength of a joint be less than 90 % of that for a similar sample of conductor not containing a joint.
- g) The Inspecting Officer may, at his discretion, cut out and test a length of approximately 305 mm of conductor containing a joint. If it should appear to the Inspecting Officer that an undue number of joints have been made in any length of cable, such length must be rejected.
- h) The difference in resistance of the two conductors of a pair, expressed as a percentage of the loop resistance of that pair must not be greater than two percent.

3.2 Insulation

3.2.1 Material

Each conductor must be uniformly covered with coloured polyethylene compound Type 03 in accordance with BSS 6234. Reclaimed polyethylene must not be used. The polyethylene must satisfy the following additional requirements :

a) Shrinkback Test

200 mm specimens must be cut from the centre of a 1,5 metre length and then reduced to 150 mm by trimming each end of the specimen. The 150 mm specimens must be placed in a convection type circulating-air oven operating at a temperature of $100 \text{ }^\circ\text{C} \pm 1 \text{ }^\circ\text{C}$ for a 24 hour period. At the end of this period, the total shrinkage, as measured from both ends of the conductor must be 3 mm average and 6 mm maximum.

b) Cold Bend Test

The polyethylene insulation must not show cracks when a sample of insulated conductors, which has been subjected to a temperature not warmer than $-76 \text{ }^\circ\text{C}$ for one hour, is bent 180° at that temperature around a mandrel, the diameter of which is three times the diameter of the insulated conductor. The bend must be made at a uniform rate and the time required must not exceed one minute.

AUGUST 1995

c) Environmental Stress Cracking Test

A certificate from the suppliers of the polyethylene to the effect that their compound meets the environmental stress cracking test of ASTM D-1693, is acceptable but Transnet reserves the right to request the authorised Inspector of Transnet to carry out sporadic tests with compound provided by the cable manufacturer.

d) Colouring

The manufacturer must make every effort to comply with the standard colours referred to in BSS 6234 but in cases of dispute, compliance may be checked by removing the conductor from the insulation.

Pre-mixed coloured polyethylene is preferred, but colouring by the addition of approved colour concentrates to the polyethylene during extrusion is acceptable. In the latter case, a certificate must be submitted to Transtel stating that the pigments and their amounts used in the colour concentrates, will produce compounds meeting the intent of the requirements for the electrical properties specified. Dry power blending is not acceptable.

3.2.2 The insulation must be smooth and as concentric as is consistent with the good commercial practice. It must be free from pinholes, splits, blisters and other defects, other than those covered by subclause 3.2.4.

3.2.3 The radial thickness of the insulation must be as necessitated by the electrical requirements of clause 8 of this specification, but must be not less than 0,254 mm. The thickness of the insulation must be measured at three or more sections along the length of a representative sample of the insulated conductor, 305 mm long, and taken not less than 305 mm from the end of a factory length.

This measurement must be made by taking two measurements on each of two diameters at right angles to one another through the centre of the conductor, i.e. 12 individual measurements. A method of measurement capable of reading accurately to 0,025 mm must be used. No reading must fall below the specified minimum.

3.2.4 Repairs to the conductor insulation during manufacture are permissible. The repairs must be made by heat moulding, using polyethylene compound of the same grade as the insulation. Repairs may be made to the conductor insulation after stranding by means of suitable tapes which will not unravel during subsequent manufacturing operations. The repaired, insulated conductor must be capable of meeting the electrical requirements, spark test, specified in clause 8.

AUGUST 1995

3.3 Twinning

3.3.1 Two conductors, insulated as described in clause 3.2, must be uniformly twisted together to form a pair.

3.3.2 In order that crosstalk be minimised, the pair twists must be designed to enable the cable to meet the following capacitance unbalance limits :

- a) Pair-to-pair capacitance unbalance measurements must be made with 800 hertz alternating current on each manufacturing length of cable. All conductors, other than those under test, must be connected to earth.
- b) The corrected capacitance unbalance measurements between any two pairs in the cable, must not exceed 360 pF with a maximum average of 120 pF . (Average capacitance unbalance is the numerical average of the unbalance readings without regard to signs).
- c) The measurements must be corrected as follows :

Lengths less than 100 metres being considered as 100 metres.

The measured values must be divided by $0,5 \left(\frac{L}{500} + \sqrt{\frac{L}{500}} \right)$ where L is the length in metres of the cable under test.

3.3.3 To avoid danger of loss of identity of the A and B conductors of given pairs, maximum lengths of pair twists must not exceed those given in Table 2.

TABLE 2

CONDUCTOR DIAMETER	MAXIMUM LENGTH OF PAIR TWIST
mm	mm
0,5 and 0,63	150
0,9 and 1,25	175

3.4 Stranding

The pairs must be stranded into a compact and symmetrical cable. The direction of stranding must alternate in successive layers.

3.5 Inter Layer Lapping

A tape or thread of sufficient strength must be applied over the centre and each layer, except the outer.

AUGUST 1995

3.6 Heat Barrier or Core Covering

Lappings of a suitable non-hygroscopic material to provide at least two thicknesses at any point must be used as a core covering. There must be no adhesion between the core covering and the conductor insulation or the inner sheath, and no softening of the insulation on the conductors.

4. INNER SHEATH

4.1 Moisture Barrier

- 4.1.1 The cable core must be completely covered with Polyethylene Coated Aluminium Foil applied longitudinally and with an overlap of not less than 6 mm . The polyethylene coating must be outside.
- 4.1.2 The nominal thickness of the aluminium foil and polyethylene film must be 0,15 mm and 0,04 mm respectively.
- 4.1.3 The peel strength of the polyethylene from the aluminium must be not less than 0,25 N per 1 mm width of foil when tested in accordance with Appendix 1.
- 4.1.4 The moisture barrier must be electrically continuous throughout the cable length.
- 4.1.5 The overlap on the moisture barrier must be smooth and free of corrugations throughout the cable length. Where corrugations extend beyond the overlap. The water permeability test (Appendix 2) will be carried out.
- 4.1.6 The APL Sheath must be capable of withstanding a pressure of 100 kPa for 3 hours after equalization of the pressure throughout a 500 metre length. The APL sheath must withstand a continuous working pressure of not less than 80 kPa.

4.1.6.1 Pressure Testing

- (a) One end of the cable must be sealed with end-caps with a valve built-in. The cable will be pumped up to 100 kPa . with dry air (see # 4.1.7). The cable must remain in this condition for three hours. (i.e. 100 kPa pressure, no air flow).
- (b) The air to be removed from the cable. The pressure must not drop below 80 kPa and must remain there for at least 24 hours after settling down (1 hour).

AUGUST 1995

4.1.6.2 Delivery

After the pressure test as above and before shipping, the cable must be repumped to a equalized pressure of 100 kPa .

4.1.7 The air to be used for the pressure testing must be dry, having a maximum moisture content of 0,02 grams/litre at N.T.P.

4.1.8 Tenderers must state what gas flow in litres/hour is guaranteed to flow through a 500 metre length of cable with a 3 kPa pressure difference between the ends.

5. **OUTER SHEATH WITH ARMOURING**5.1 Material

The longitudinally covered core must be sheathed with polyethylene compound 03C in accordance with BS 6234. Reclaimed polyethylene must not be used. The polyethylene must satisfy the following requirements:

5.2 Thickness

The minimum spot thickness of the polyethylene outer sheathing must be in accordance with Table 3 below.

TABLE -3

THICKNESS OF OUTER SHEATHING

CALCULATED DIAMETER OVER ARMOUR WIRES		MINIMUM SPOT THICKNESS OF POLYETHYLEN E OUTER SHEATHING	SPARK TEST VOLTAGE
FROM	TO		
mm	mm	mm	kV
—	12,70	1,14	6
12,71	19,05	1,40	7
19,06	25,40	1,65	8
25,41	31,75	1,91	9
31,76	35,10	2,16	10
35,11	44,45	2,41	10
44,46	50,80	2,67	10
50,81	and larger	2.92	10

AUGUST 1995

The thickness must be determined by the same method as in subclause 3.2.3, except that the measurements must be taken at those points of a section where the sheath thickness is at its geometrical minimum.

- 5.3 The polyethylene sheath must be smooth, reasonably circular, free from pinholes, joints and other defects.
- 5.4 The outer sheath must be spark-tested to the shield in accordance with BSS 7 or approved alternative method at the test voltages given in Table 3.
- 5.5 Armouring

One layer of galvanised steel wire armour must be applied over the cable, sheathed in accordance with clause 4 above. The armouring must comply with the requirements detailed below.

5.5.1 Quality

The wire must have an ultimate tensile strength of 345 to 420 MN/m², and the galvanising must be capable of passing the tests laid down in British Standard Specification No. 443.

5.5.2 Diameter

The nominal diameter of armour wires will be in accordance with Table 4 below. A tolerance of $\pm 2,5\%$ will be allowed on the nominal diameter.

TABLE 4
DIAMETER OF ARMOURING WIRES

CALCULATED DIAMETER UNDER ARMOUR WIRES		NOMINAL DIAMETER OF ARMOUR WIRES
FROM	TO	
mm	mm	mm
—	12,70	0,90
12,71	19,05	1,25
19,06	25,40	1,60
25,41	35,10	2,00
35,11	50,80	2,50
50,81	and larger	3,15 and 3,55

AUGUST 1995

6. OUTER SHEATH WITHOUT ARMOURING

6.1 Material

The longitudinally covered core must be sheathed with polyethylene compound 03C in accordance with BS 6234. Reclaimed polyethylene must not be used. The polyethylene must satisfy the following requirements:

6.2 The minimum sheath thickness must be in accordance with table 5:

TABLE 5 :
THICKNESS OF OUTER SHEATHING

Calculated overall diameter of cable in mm		Minimum thickness of polyethylene sheath	Spark test voltage in kV
Above	Up to and including		
—	19,1	1,65	8
19,1	25,4	1,78	8
25,4	31,8	1,91	9
31,8	38,1	2,03	9
38,1	44,5	2,16	10
44,5	50,8	2,29	10
50,8	57,2	2,41	10
57,2	63,5	2,4	10
63,5	69,9	2,67	10
69,9	76,2	2,79	10

6.3 Diameter Cross-section

The sheath must be reasonably circular, free from pinholes, joints, mended places and other defects. Ovality must not exceed 8 %. The ovality must be the difference between the maximum and minimum diameters at the same cross section expressed as a percentage of the minimum diameter.

6.4 Impact test

A specimen of the sheathed cable, approximately 400 mm in length, is secured at the bottom of a 1 M tube, 30 mm in diameter. This assembly is placed in a cold chamber at a temperature of -20 degrees Celsius for four hours after which a mass of 0,45 kg is released at the top of the tube. The cable must show no cracks.

AUGUST 1995

6.5 Environmental Stress Cracking Test

A certificate from the suppliers of the polyethylene to the effect that their compound meets with the environmental stress cracking test of A.S.T.M.D. -1693 is acceptable, but Transtel reserves the right to authorize sporadic tests with compound provided by the cable manufacturer.

6.6 Shrink-back Test

Slab specimens must be cut from the cable sheath, 50 mm long, 13 mm wide, and the same thickness as the sheath. The slab specimens must be placed in a convection type air circulating oven operating at a temperature of 100 (± 1 degree) degrees Celsius for a 24 hour period. At the end of the period, the shrinkage as measured in the lengthwise direction must not exceed 5 %.

7. MARKING OF SHEATH

The following details must be clearly printed or indelibly embossed on the sheath of the cable at intervals of not more than 1,0 metre throughout the whole length of the cable.

- a) Manufacturer's name.
- b) Year of manufacture.
- c) Transtel
- d) The number of pairs and conductor size of the cable.
- e) The length of cable must be indicated in metres, at one metre (1 metre) intervals.

The length indicated on the cable must not deviate from the true and actual length by more than 1 %.

If all the required information cannot be printed or embossed on the sheath, a tape, bearing the manufacturers name and year of manufacture, must be run in under the sheath, at intervals of not more than 1,0 metres throughout the whole length of the cable.

8. TESTS

8.1 High Voltage Tests

- 8.1.1 Each conductor in the cable must be subjected to a DC voltage of 10 kV, applied gradually between it and all the remaining conductors connected to earth. A high resistance protector must be included in the voltage lead so that breakdown does not result in damage to the conductor insulation.

To pass this test, the conductor must withstand the applied voltage for 2 seconds without breakdown.

AUGUST 1995

- 8.1.2 A number of conductors, which fail to pass the test at the required voltage, will be permitted within the limits given in Table 6. These conductors must withstand 2 kV for 2 seconds without breakdown.
- 8.1.3 The 2 kV test must be applied only to conductors which have previously failed to withstand the higher voltage.

8.2 Insulation Resistance

The insulation resistance measurements must be made with not less than 500 volt DC after steady electrification for one minute.

8.2.1 Insulated Conductor

All insulated conductor must be individually spark tested in accordance with BS 6007 at a voltage at least 4 kV or 3 kV AC with spark test equipment calibrated in accordance with BS 5099. Failures detected must be recorded. Insulated conductors with failures due to bare sections of wire must be repaired. Insulated conductors with failures that exceed the limit agreed to between manufacturer and Transtel due to pinholes, must be repaired. Faults must be repaired in accordance with subclause 3.2.4 or cut out. Spark testing to verify conformance must also be conducted at other stages of protection. Results of these test must be recorded.

8.2.2 Completed Cable

The insulation resistance between each conductor in the cable and all the other conductors connected together, must be not less than 44 000 megohm-km .

8.3 Mutual Capacitance

The average mutual capacitance of the pairs in a manufactured length of cable, measured with 800 hertz alternating current, must be $0,041 \pm 5\%$ microfarads/km .

8.4 Routine Tests

- 8.4.1 Spark testing on the insulated conductor and insulation resistance testing in accordance with subclause 8.2.1, must be carried out on all wires or pairs of wires used in making up cables.
- 8.4.2 Pressure testing of the inner sheath by either of the alternative methods detailed in subclause 4.1.6 and spark testing of the outer sheath in accordance with subclauses 5.4 and 6.2 must be carried out on each and every cable length.
- 8.4.3 Testing to guarantee freedom from defective pairs, (such as crosses, short circuits and open circuits) must be carried out on each and every cable length.

AUGUST 1995

8.4.4 The mutual capacitance, capacity unbalance and resistance unbalance must be measured on all pairs in each factory length of cable, and if called for, the manufacturer must supply 2 certified copies of summaries of such tests. Transnet reserves the right to call for complete test results for any length or lengths, and to check test any such length or lengths.

8.5 Capability Tests

All other tests not under 8.4 are considered to be capability tests, and must be carried out as frequently as is required to determine and maintain the quality of the product produced to meet the intent of this specification.

8.6 Sealing of Ends

Immediately after completion of the electrical tests, the ends of the cable must be sealed by an approved method to prevent the ingress of moisture. Schrader valve must remain open.

9. CABLE DRUMS

9.1 Unless otherwise specified, all cables must be supplied on non-returnable, strong, new wooden or steel drums of approved design.

9.2 Each end of the cable must be sealed and firmly secured. Where the inner end of the cable protrudes through the flange, it must be completely protected by a metal cover, which must be firmly secured to the flange. The inner end of the cable must be at least 0,5 m long to allow for testing before installation.

Drums must be manufactured throughout from seasoned Industrial Grade SA pine or Saligna which must have a moisture content of not more than 20 % at assembly.

9.3 Each drum must bear one length of 500 m of cable only, unless otherwise specified.

9.4 A round spindle hole not less than 50 mm nor more than 80 mm diameter must be cut through the centre of the centre board of each ply of each flange. Care must be taken to see that the holes in the drum barrel supports coincide.

9.5 The maximum overall dimensions of cable drums complete with battens, must not exceed 2,1 m diameter by 1,15 m in width.

9.6 The barrel of the drum on which the first turns of the cable are coiled, must have a diameter not less than 18 times nor more than 21 times the overall diameter of the cable, with an absolute minimum of 0,3 m .

9.7 The distance between the outside of the last cable layer and the inside of the battens must be not greater than 75 mm nor less than 50 mm for all cables.

9.8 In order to prevent sharp edges or wood splinters or any other irregularity causing damage to the Polyethylene cable during rolling on or unrolling off the drum, the inside faces of the flanges and the barrel of each drum must be smooth and free from splinters. These surfaces must also be lined with a strong paper covering.

AUGUST 1995

- 9.9 After the cable, so coiled, has been tested and approved by the Inspecting Officer of Transnet, the cable must be covered by a wrapping of 0,15 mm paper. Overseas manufactured cable must be covered by a thick canvas or hessian wrapper or alternatively, the cable may be covered by 3 mm thick compressed tempered hardboard strapped around the cable by at least two steel straps. The hardboard must be neat fit between the flanges of the drum. After the cable has been covered, the drums must be lagged with battens of adequate thickness to prevent damage to the cable during storage and transit. The battens must be butted and must enclose the cable space completely.
- 9.10 When the cable contains defects, either permitted by the specification or conceded by the Inspecting Officer, a water-proofed label indelibly printed with full details of the defect(s), must be securely attached to the inside of the flange, adjacent to the point where the running end of the cable is secured.
- 9.11 After the circumference battens have been nailed into position, a continuous band of 25,4 mm wide hoop iron, not less than 0,75 mm thick, must be fitted to the circumference battens and must be positioned immediately over the centre of each flange, and secured by nails.
- 9.12 Each drum must bear a distinguishing number of 50 mm figures either branded or neatly gouged on the outside of one flange.
- 9.13 An arrow must be painted on each drum to show the direction of rolling, i.e. the opposite direction to that in which the outer end of the cable points.
- 9.14 Each drum must be plainly marked to show the following unless otherwise specified in subsidiary specification :
- (a) TRANSNET
 - (b) Contract or Order Number
 - (c) Type of cable
 - (d) Length in metres
 - (e) Gross mass of the drum and cable in kilograms
 - (f) "Stow away from boilers"
 - (h) "Sling only with bar through centre of drum"
 - (i) The name of the manufacturer
 - (j) Executive Manager (Promat) catalogue number as specified in the order.

10. COLOUR SCHEME

The colour scheme must be in accordance with Telkom specification 267.

11. SIZE AND MAKE-UP OF CABLE

The sizes of the cable pairs and the make-up of the cable must be in accordance with Table 6

AUGUST 1995

TABLE 6 — MAKE-UP OF CABLES
VOLTAGE TEST — NUMBER OF CONDUCTORS
PERMITTED AT REDUCED TEST VOLTAGE OF 2 kV

CABLE SIZE	NUMBER OF PAIRS IN CENTRE	NUMBER OF PAIRS IN LAYER							NUMBER OF CONDUCTORS PERMITTED AT TEST VOLTAGE OF 2 kV
		1ST	2ND	3RD	4TH	5TH	6TH	7TH	
4 Pairs	4	—							None
10 Pairs	2	8	—						2
15 Pairs	4	11	—						2
20 Pairs	2	6	12	—					2
25 Pairs	3	8	14	—					3
30 Pairs	4	10	16	—					4
50 Pairs	4	10	15	21	—				6
75 Pairs	3	9	15	21	27	—			8
100 Pairs	2	8	14	20	25	31	—		10
150 Pairs	3	9	15	21	27	34	41	—	15
200 Pairs	4	10	16	22	28	34	40	46	20

12. STANDARD LENGTHS

12.1 Standard Lengths

A standard length will be 500 metres, unless otherwise specified in the tender.

12.2 Short Lengths

Short lengths of cable not ordered in specific lengths are acceptable at the discretion of Transnet provided that they must comprise not more than 5 % of each item on the order. Individual short lengths must be not less than 200 m. Not more than 2 short lengths must be supplied on one drum and each drum must be clearly marked on the flange showing the lengths and their position on the drum. All short lengths will be paid for on a pro-rata basis and will be subject to a 5 % discount.

END OF SPECIFICATION