Eskom	Standard	Technology

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1. Introduction

High Security mesh fencing is another fencing option. This type of fence can be used where higher deterrent and delay requirements exist. It is an improvement on standard welded mesh fencing (smaller aperture and more difficult to cut) and an alternative to palisade fencing, specifically where theft of palisade steel is a concern.

The following fencing systems are available:

- Boundary fence (animal fence)
- Diamond mesh fence
- Welded mesh fence
- Palisade fence
- High security mesh fence
- Concrete wall

The purpose of fences are to restrict movement due to the inherent deter and delay value. Fences can also be combined with detection devices (vibration sensors, cameras, etc.). Detection devices do not form part of the scope of this document.

2. Supporting clauses

2.1 Scope

The document specifies a high security mesh fencing system. Most of these systems are unique to a specific supplier. This standard is compiled to allow some freedom of design, while still meeting minimum criteria as specified.

2.1.1 Purpose

The document states the minimum requirements for High Security mesh fencing. It can be used to evaluate possible suppliers or audit design, manufacturing, installation, maintenance and warrantees.

2.1.2 Applicability

This document shall apply throughout Eskom Holdings Limited Divisions.

2.2 Normative/informative references

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

[1] BS EN 10025-2: Hot rolled products of structural steels. Technical delivery conditions for non-alloy structural steels

[2] SANS 23-4: Steel wire and wire products for fences Part 4: Steel wire welded mesh fencing

[3] SANS 121: Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods

[4] SANS 1700-5-8: Fasteners Part 5: General requirements and mechanical properties Section 8: Mechanical properties of corrosion- resistant stainless-steel fasteners - Bolts, screws and studs

[5] SANS 4628- Sections addressing cracking, blistering etc.

[6] QM-58: Supplier Contract Quality

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2.2.1 Informative

None

2.3 Definitions

2.3.1 General

Definition	Description
High Security fencing	A fencing system with a higher level of security than a welded mesh fence. It is still possible to breach the fence by cutting or grinding methods, but it is more difficult. (un-official definition)

2.3.2 Disclosure classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 Abbreviations

Abbreviation	Description
PVC	Polyvinyl chloride
SANS	South African National Standard

2.5 Roles and responsibilities

The document will follow the Eskom documentation process. This process will identify relevant responsibilities

2.6 Process for monitoring

Eskom standard processes will address monitoring

2.7 Related/supporting documents

Not applicable

3. Categories of High Security Mesh Fencing

3.1 Security Classification

The difference between the categories is based on the design of the mesh and ease of bridging the barrier. Two categories of high security fences shall be catered for as per table 1.

Table 1: Security Classification

Category	Description	Notes
One	Steel wire (4mm) fence with 76.2mm x 12.7mm aperture.	A mild steel fence with a small aperture that makes cutting the fence challenging.
Two	A design based on Category One proposals, but offering alternative designs that will make the bridging of the fence more difficult	This option allows suppliers to offer unique designs that will offer higher levels of resistance to bridging compared to Category One.

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3.2 Environmental Classification

Table 2: Environmental Classification

Eskom Pollution level	Corrosively categories ISO 9223	Description of environment	Coating proposal
Low	C1 to C3 Very low to Medium pollution	Inland and low environmental pollution	Non-ferrous metallic coating (e.g. Zn or Zn95Al5)
High	C4 to C5 High to Very High pollution	Industrial inland to Coastal and/or corrosive environment	Duplex coating. (Non-ferrous metallic coating with organic moisture ingress inhibitor coating)

4. Product Specific Requirements

4.1 Steelwork

4.1.1 Mesh

4.1.1.1 Wire

The minimum requirements for the steel grade wire:

- Ultimate tensile strength : 500 MPa (prior to welding)
- Wire diameter : 4 mm (± 0.06 mm)

Note: The chemical composition of the wire is not specified because it might influence the welding process as preferred by the manufacturer. The end product shall however meet performance requirements as stipulated in this document.

4.1.1.2 Panel

The mesh shall be produced by electrical resistance welding at every line wire/cross wire intersection.

The welded mesh panel shall have the following features:

4.1.1.3 Dimensions

- Panel height : Mesh height above ground level: 2.4m (± 1%)
- Panel width : 3.0 to 3.5m (Standard panels)
- Shorter lengths will be allowed for stepping purposes.

4.1.1.4 Aperture

- Category 1 : 76.2mm (± 2mm) x 12.7mm (± 1mm).
- Category 2 : Any combination or alternative designs that will make bridging of the system more difficult than Category 1 products.

4.1.1.5 Welding shear strength

Test to be conducted in accordance with SANS 23-4. The shear strength for any welded section shall not be less than 75% of the ultimate tensile strength of the wire diameter under testing.

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4.1.1.6 Coatings:

- Non-ferrous metallic coatings
  - Zinc or Zinc alloy coating
  - Coating to be used for corrosively categories C1 to C3 e.g Zn (Hot dip galvanizing) or Zn95Al5 (Galfan).
  - Minimum mass of Zink alloy coating = 275 g/m^2 (SANS 10244 Part 2)
  - Minimum mass of Zink coating = 505 g/m^2 (SANS 121)
- Organic coating
  - Polyvinyl chloride (PVC) and fusion-bond epoxy powder coating
  - Organic coating to be applied over non-ferrous coating.
  - To be used in corrosively categories C4 to C5.
  - Minimum coating thickness = 400 – 600 µm

4.1.2 Posts

- Post to be manufactured from either S275JR or S355JR grade steel according to BS EN 10025-2 depending on the design requirements. The use of alternative steel grades must be accepted by Eskom.
- All metal parts to be hot dip galvanized in accordance with SANS 121. Minimum coating thickness required for C1 to C3 environments is 75 µm and 115 µm for C4-C5 environments.
- All manufacturing processes to be completed prior to hot dip galvanizing.
- All openings that will result in water entrapment to be closed.
- Posts to include footplates or alternative.
- Earthing connection points to be available on all posts.
  - Flat bar of 65 x 65 x 6mm with 18mm diameter hole placed in the center for earth connection, to form part of the post 75mm below ground level.
  - All earthing connections to be inspected and sign off by Eskom representative before closing with concrete.

4.1.3 Gates

- Gates to be manufactured from either S275JR or S355JR grade steel according to BS EN 10025-2 depending on the design requirements. The use of alternative steel grades must be accepted by Eskom.
- All metal parts to be hot dip galvanized in accordance with SANS 121. Minimum coating thickness required for C1 to C3 environments is 75 µm and 115 µm for C4-C5 environments.
- All manufacturing processes to be completed prior to hot dip galvanizing.
- All openings that will result in water entrapment to be closed.
- The layout plan will indicate the position of the gates
- Gate options
  - Option 1: 5m motorized gate (sliding)
  - Option 2: 2 x 2.5m swing gates

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- Option 3: 7m sliding gate comprising of two sections with a removable pillar between the gates. Section one to be 4m and motorized and section two to be 3m and not motorized. One of the two sections will include a personnel gate.
- Option 4: 1.5m pedestrian gate.

- In the case where motorization of sliding gates is not required as part of the project, all sliding gate installations must still be motorization ready.
- The runner and wheels should allow for easy operation (Minimum wheel size of 100mm is proposed)
- Sweepers to be included on sliding gates.
- All Earthing connection points to form part of the pillar. Motorized gates are to be earthed in the open and closed position

4.1.4 Overhang and Razor Wire

- Material
  - All fencing wire to comply with SANS 675.
  - Binding wire: 2mm Class ‘A’ heavy galvanised wire or Hogg Rings
  - Strain wire: 4mm class 'A' heavy galvanised wire.
  - Eye bolts to be either stainless steel or hot dip galvanized in accordance with SANS 121 with a minimum coating thickness required for C1 to C3 environments of 75 µm and 115 µm for C4-C5 environments
- Installation requirements
  - Fence shall have double overhang and razor coil installed as standard.
  - The gate and fence overlap should have a single overhang and Flatwrap
  - Bolted overhangs can be used as long as it is locked in its overhang position and not dependant on the bolts to lock the overhang position.
  - Height of fence above natural ground level: 2.4m
  - Height of fence and double overhang: 3m
  - Height of fence, double overhang and razor coil 3.5m
  - Binding of strain wire to have a 5 wrap finish
  - Strain wires to be strained with eye bolts from the gate, corner and strain / tee posts

4.1.5 Attachments

4.1.5.1 Mesh Attachment to post

- Material
  - Stainless steel or hot dip galvanized in accordance with SANS 121 with a minimum coating thickness required for C1 to C3 environments of 75 µm and 115 µm for C4 to C5 environments
- Installation requirements
  - No fasteners shall protrude beyond the surface on the exterior of the fencing system.
  - Nylon washers to be used between products where bi-metallic corrosion is a possibility.
  - The installation of fasteners shall not cause damage to protective coatings (during the installation process)

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- The mesh should be adequately supported on the sides as well as the top and bottom (see wind loading requirements in paragraph 5.2).

4.1.5.2 Mesh Attachment to anti-tunneling system

- The mesh must be anchored into/onto the center of the anti-tunneling and the bottom rail of the panels must be flush with the anti-tunneling and maximum 70mm from ground level if anti-tunneling is not required.

4.1.5.3 Fasteners

- Corrosion-resistant stainless-steel fasteners shall be used.
- Stainless steel fasteners shall be of a grade, condition and design which will not enhance stress corrosion cracking.
- Fasteners shall meet SANS 1700-5-8 2003, Part 5, Section 8
- No hexogen head type bolts shall be used.
- No self-tapping screws shall be used
- Where alley head type bolts are used the holes to be filled with non-removable filler e.g. Pratley steel.

4.2 Civil Work

4.2.1 Site Conditions

Designs must be applicable to meet specific site conditions. These include:

- Site layout
- soil condition
- drainage
- piping
- etc.

The requirements shall be stipulated during the clarification meeting for the specific site. Some requirements might be excluded from the suppliers' scope of work for a specific site and will become the responsibility of Eskom.

4.2.2 Concrete

- Designs to align with soil conditions
- Concrete work to be in accordance with SANS 1200
- Concrete strength to be 25MPa except for anti-tunneling
- Compaction of the bottom of the fence post shall be 93% of mod. Aashto
- No concrete to be poured where the air temperature will drop below 4˚C in 8 hours after pouring of concrete unless a suitable approved additive is added to the concrete mix

4.2.3 Stepping

- Maximum of 150mm per panel
- Tops of panels to be horizontal. (Sloping panels will be allowed in unique circumstances and must be agreed to with the client)

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4.2.4 Anti-tunnelling systems

- 100mm (wide) x 600mm (deep) concrete (15MPa) between posts.
- The mesh must be anchored into/onto the center of the anti-tunneling (see attachments section)

5. Product Life Cycle Requirements

5.1 Design

Although standardized design components will be used, design requirements are unique to a specific site. A site survey with all relevant stakeholders must take place to ensure that the supplier familiarize himself with specific site conditions and customer requirements.

The following supplier specific standardized design components and drawings must be accepted by Eskom:

- Mesh design parameters and drawings (Critical and overall dimensions to be included)
- Posts design parameters and drawings
- Overhang and razor coil design parameters and drawings
- Gate design parameters and drawings
- Gate locking mechanism detail (high security and vandal proof. Protect lock from being cut with bolt cutter etc.).
- Mesh to post attachment method and products
- Design parameters, drawings and work procedures for civil construction

Calculations must be provided to proof the specified parameters

Other Design parameters

- Colour of the fence and posts to be in accordance with the client specification for the specific site. (Colours should be as specified in SANS 1091:2012 e.g. G35 – grey etc.)
- The classification of the pollution level for the specific site shall be agreed on by both the customer and supplier and should be verified by the Eskom specialist.
- Earthing interfaces should form part of the designs.
- Wind loading:
    - The wind loading for the fencing system must be designed in accordance with SANS 10162-2005
    - The fencing system must be able to withstand a wind of 50m/s. Proof of conformance must be provided and accepted by Eskom.

5.2 Manufacture

Suppliers must have a certified Quality Management System for manufacturing (ISO 9001:2008). The Quality Management System is accepted by Eskom for a specific manufacturing facility. If the manufacturing facility changes, the Quality Management System for the new manufacturing facility must be evaluated before manufacturing can take place. The system must clearly stipulate;

- The quality checking and hold points during the manufacturing process. Procedures must clearly indicate sample size, and “pass/fail” criteria.
- Sample testing of the tensile strength of receiving raw material at the manufacturing premises.
- If raw material is pre-coated, coating mass sample testing must also be performed.

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- The chemical composition of raw material must be closely monitored as part of the receiving process. It is also advisable that an independent chemical composition analysis be conducted on a random basis
- Suppliers that supply critical material that might have a major impact on the quality of the final product should have documented quality control processes in place. Typical examples are,
  - Supplier of wire products
  - Galvanizing etc.
- Inspection prior to release shall be specified in the Quality manual. (Dimension, weld strength, etc.)
- The manufacturing premises can be visited by Eskom

5.3 Transport and Storage

- The procedures should form part of the Quality Management System.
- It should include stacking, loading, transport and inspection (final inspection after off-loading).

5.4 Installation and inspection

5.4.1 Installation

- Procedures should be covered in the Quality Management System.
- Detailed installation and training documentation should be available.
- Installers must be declared competent and be accredited by the supplier. Relevant detail of installers must be available. This includes, training received, level of expertise and project involvement.
- Hold and inspection points must be clearly specified.

5.4.2 Inspection

- Final inspection must be done by both the Customer and Supplier. Standardized check sheets shall be documented in the suppliers Quality Management system
- A final certificate of compliance (indicating the warrantee) shall be issued to the customer by the supplier.

5.5 Maintenance and Repair

5.5.1 Maintenance

- Maintenance philosophies must be documented by the supplier and indicate nature of inspection, interval, treatment and repair.

5.5.2 Repair

- Procedures and products to repair secondary coatings must be specified by the supplier
- Repair proposals for galvanized products should be in line with the proposals of the Galvanizing Association of South Africa.
- All methods of repair must be accepted by Eskom. The following minimum requirements are proposed

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- The area to be repaired is lightly blasted using a small blasting nozzle so as not to damage the surrounding hot dip galvanized coating. Alternatively, the defective area shall be cleaned with abrasive paper (80 grit) or thoroughly cleaned preferably using a stainless steel brush. All dust and debris must be completely removed. In the event of moisture being present, all surfaces are to be thoroughly dried prior to the application of the repair material.
- A zinc rich epoxy or a suitable zinc rich paint, containing approximately 90% metallic zinc particles (by volume) in the dry film, should be applied to a thickness of 100 micro. In addition "Galvpatch" can be used to repair smaller areas or edges

- Repairs to hot dip galvanized steel shall conform to SANS 121 (ISO 1461).
- Life expectancy tests should be provided to prove that repair methods are adequate and meet the warrantee

6. Quality Management System and Guarantee

6.1 Quality Management System

- The supplier shall have a documented and maintained Quality Management System.
- Eskom will audit the suppliers Quality management system in accordance with the Supplier Contract Quality document QM-58.
- The manufacturing part of the system must be certified (ISO 9001:2008)
- The supplier shall submit the quality control plans to Eskom, indicating all inspection and hold points, sample size, and "pass/fail" criteria. The plans must be accepted by Eskom.
- The scope must encompass all activities that the supplier will be involved with, from manufacture to installation. The following activities must be covered in detail.
  - Design – See section 5.1
  - Manufacture – See section 5.2
  - Transport and Storage - See section 5.3
  - Installation and Inspection - See section 5.4
  - Maintenance and Repair - See section 5.5

6.2 Guarantee

- The supplier shall guarantee the fencing and coating system
- The supplier shall state the minimum Guarantee duration
- The supplier shall in detail document what constitutes a "failure".

6.2.1 Coating system

Eskom requires performance guarantees for the applied coating system/s. Such guarantees shall be provided by the supplier representing the manufacturer and installer (product and workmanship guarantees) at the time of tender. The minimum guarantee period shall be 15 years.

The criteria for failure of the coating system will not exceed Ri3 of SANS 4628-3. Although, visible coating defects such as blistering, cracking, flacking and peeling are not always associated with visible rusting, they indicate defects that could either lead to substrate corrosion or are shielding substrate corrosion that has already taken place beneath the coating. Any such defects noted during the guarantee period shall be repaired.

Independent arbitrators shall be consulted in the case of a dispute. Nationally recognized associations will be used.

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7. Authorization

This document has been seen and accepted by:

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8. Revisions

Date	Rev.	Compiler	Remarks
April 2014	1	AJ Le Roux	Required by Security Technologies Care Group

9. Development team

The following people were involved in the development of this document:

- Abre Le Roux
- Jacques Calitz

10. Acknowledgements

Jacques provided the metallurgical input for this document. He also accompanied the author to suppliers to obtain first-hand information regarding the manufacturing processes. Special thanks to Jacques for his dedication and the fact that he is always prepared to assist. Your help is highly appreciated.

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Annex A – Technical Schedules A and B for High Security Mesh Fences

Schedule A: Purchasers specific requirements

Schedule B: Guarantees and technical particulars of equipment offered by the supplier

Item	Description	Schedule A	Schedule B
3	**CATEGORIES OF HIGH SECURITY FENCING**		
3.1	Category One	Do you offer a fencing system with a 4 mm Steel wire and 76.2mm x 12.7mm aperture	
3.1	Category Two	Do you offer alternative higher security fencing systems that is based on the requirements as per category one. Provide a detailed description.	
3.2	Environmental Classification	Do you offer a Zn coating	
		Do you offer a Zn95Al5 coating	
		Do you offer a Duplex coating	

Item	Description
4	**PRODUCT SPECIFIC REQUIREMENTS**
4.1	**Steelwork**

Item	Description		Schedule A	Schedule B
4.1.1	**Mesh**			
4.1.1.1	Wire		Minimum ultimate tensile strength : 500MPa (prior to welding)	
			Wire diameter : 4 mm (± 0.06 mm)	
4.1.1.2	Panel	General	The mesh shall be produced by electrical resistance welding at every line wire/cross wire intersection.	
4.1.1.3		Dimensions	Panel height: Mesh height above ground level: 2.4m (± 1%)	
			Panel width: 3.0 to 3.5m (Standard panels)	
			Shorter lengths will be allowed for stepping purposes.	
4.1.1.4		Aperture	Category 1: 76.2mm (± 2mm) x 12.7mm (± 1mm).	
			Category 2: Any combination or alternative designs that will make bridging of the system more difficult than Category 1 products. Please elaborate.	
4.1.1.5		Welding shear strength	Test to be conducted in accordance with SANS 23-4. The shear strength for any welded section shall not be less than 70% of the ultimate tensile strength of the wire diameter under testing.	

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4.1.1.6	Coatings	Non-ferrous metallic coatings	Do you offer a Zinc coating (Hot dip galvanizing)	
			Do you offer a Zinc alloy coating - Zn95Al5 (Galfan).	
			Minimum mass of Zink alloy coating = 275 g/m^2 (SANS 10244 Part 2)	
			Minimum mass of Zink coating = 505 g/m^2 (SANS 121)	
		Organic coating	Do you offer Polyvinyl chloride (PVC) and fusion-bond epoxy powder coating	
			Minimum coating thickness = 400 – 600 µm	

Item	Description	Schedule A	Schedule B
4.1.2	**Posts**		
		Post to be manufactured from either S275JR or S355JR grade steel according to BS EN 10025-2 depending on the design requirements. The use of alternative steel grades must be accepted by Eskom.	
		All metal parts to be hot dip galvanized in accordance with SANS 121. Minimum coating thickness required for C1 to C3 environments is 75 µm and 115 µm for C4-C5 environments.	
		All manufacturing processes to be completed prior to hot dip galvanizing.	
		All openings that will result in water entrapment to be closed.	
		Posts to include footplates or alternative.	
	Earthing connection points to be available on all posts.	Flat bar of 65 x 65 x 6mm with 18mm diameter hole placed in the center for earth connection, to form part of the post 75mm below ground level.	

Item	Description	Schedule A	Schedule B
4.1.3	**Gates**		
		Gates to be manufactured from either S275JR or S355JR grade steel according to BS EN 10025-2 depending on the design requirements. The use of alternative steel grades must be accepted by Eskom.	
		All metal parts to be hot dip galvanized in accordance with SANS 121. Minimum coating thickness required for C1 to C3 environments is 75 µm and 115 µm for C4-C5 environments.	
		All manufacturing processes to be completed prior to hot dip galvanizing.	

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		All openings that will result in water entrapment to be closed.	
	Gate options	Option 1: 5m motorized gate (sliding)	
		Option 2: 2 x 2.5m swing gates	
		Option 3: 7m sliding gate comprising of two sections with a removable pillar between the gates. Section one to be 4m and motorized and section two to be 3m and not motorized. One of the two sections will include a personnel gate.	
		Option 4: 1.5m pedestrian gate.	
		All motorization of sliding gates to be motorization ready	
		Sweepers to be included on sliding gates	
		All earthing connection points to form part of the pillar. Motorized gates are to be earthed in the open and closed position	

Item	Description	Schedule A	Schedule B
4.1.4	**Overhang and Razor Wire**		
	Material	All fencing wire to comply with SANS 675.	
		Binding wire: 2mm Class ‘A’ heavy galvanised wire or Hogg Rings	
		Strain wire: 4mm class 'A' heavy galvanised wire.	
		Eye bolts to be either stainless steel or hot dip galvanized in accordance with SANS 121 with a minimum coating thickness required for C1 to C3 environments of 75 µm and 115 µm for C4-C5 environments	
	Installation requirements	Fence will have double overhang and razor coil installed as standard	
		The gate and fence overlap should have a single overhang and Flatwrap	
		Bolted overhangs can be used as long as it is locked in its overhang position and not dependant on the bolts to lock the overhang position	
		Height of fence: 2.4m	
		Height of fence and double overhang: 3m	
		Height of fence, double overhang and razor coil 3.5m	
		Binding of strain wire to have a 5 wrap finish	
		Strain wires to be strained with eye bolts from the gate, corner and strain / tee posts	

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Item	Description		Schedule A	Schedule B
4.1.5	**Attachments**			
4.1.5.1	Mesh Attachment to post	Material	Stainless steel or hot dip galvanized in accordance with SANS 121 with a minimum coating thickness required for C1 to C3 environments of 75 µm and 115 µm for C4-C5 environments	
		Installation requirements	No fasteners shall protrude beyond the surface on the exterior of the fencing system.	
			Nylon washers to be used between products where bi-metallic corrosion is a possibility.	
			The installation of fasteners shall not damage protective coatings (during the installation process)	
			The mesh should be adequately supported on the sides as well as the top (see wind loading requirements in paragraph 5.2).	
4.1.5.2	Mesh Attachment to anti-tunneling system		The mesh must be anchored into/onto the center of the anti-tunneling and the bottom rail of the panels must be flush with the anti-tunneling and maximum 70mm from ground level if anti-tunneling is not required	
4.1.5.3	Fasteners		Corrosion-resistant stainless-steel fasteners shall be used.	
			The stainless steel fasteners shall be of a grade, condition and design which will not enhance stress corrosion cracking.	
			Fasteners shall meet SANS 1700-5-8 2003, Part 5, Section 8	
			No hexogen head type bolts shall be used.	
			No self-tapping screws shall be used	
			Where alley head type bolts are used the holes to be filled with non-removable filler e.g. Pratley steel.	

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Item	Description	Schedule A	Schedule B
4.2	**Civil Work**		
4.2.1	Site Conditions	Did you attend a clarification meeting and are you familiar with the site conditions.	
4.2.2	Concrete	Does the designs align with soil conditions	
		Concrete work to be in accordance with SANS 1200	
		Concrete strength to be 25MPa except for anti-tunneling	
		Compaction of the bottom of the fence post shall be 93% of mod. Aashto	
		No concrete to be poured where the air temperature will drop below 4˚C in 8 hours after pouring of concrete unless a suitable approved additive is added to the concrete mix	
4.2.3	Stepping	Maximum of 150mm per panel	
		Tops of panels to be horizontal. (Sloping panels will be allowed in unique circumstances and must be agreed to with the client)	
4.2.4	Anti-tunnelling systems	100mm (wide) x 600mm (deep) concrete (15MPa) between posts	
		The mesh must be anchored into/onto the anti-tunneling (see attachments section)	

Item	Description
5	**PRODUCT LIFE CYCLE REQUIREMENTS**

Item	Description	Schedule A	Schedule B
5.1	**Design**		
	Drawings to be accepted by Eskom	Are you familiar with the specific site conditions and customer requirements and has it formally been agreed on.	
		Provide Mesh design parameters and drawings (Critical and overall dimensions to be included)	

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	Drawings to be accepted by Eskom	Provide Posts design parameters and drawings	
		Provide Overhang and razor coil design parameters and drawings	
		Provide Gate design parameters and drawings	
		Gate locking mechanism detail (high security and vandal proof. Protect lock from being cut with bolt cutter etc.)	
		Provide Mesh to post attachment method and products	
		Provide Design parameters, drawings and work procedures for civil construction	
		Provide Calculations to proof that design parameters are met	
	Other	Do you conform to the customer color requirement for the fence and posts	
		Was there agreement between the customer and supplier on the classification of the pollution level and was the Eskom specialist consulted	
		Do Earthing interfaces form part of the designs	
	Wind loading	The wind loading for the fencing system must be designed in accordance with SANS 10162-2005	
		The fencing system must be able to withstand a wind pressure of 1040 Pa. Proof of conformance must be provided and accepted by Eskom.	

Item	Description	Schedule A	Schedule B
5.2	**Manufacture**		
		Do you have a certified Quality Management System for manufacturing	
	Does the Quality Management System include the following	The quality checking and hold points during the manufacturing process. Procedures must clearly indicate sample size, and “pass/fail” criteria	
		Sample testing of the tensile strength of received raw material at the manufacturing premises.	
		If raw material is pre-coated, coating mass sample testing must also be performed.	

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		The chemical composition of raw material must be closely monitored as part of the receiving process. It is also advisable that an independent chemical composition analysis be conducted on a random basis	
		Suppliers that supply critical material that might have a major impact on the quality of the final product should have documented quality control processes in place. Typical examples are, • Supplier of wire products • Galvanizing etc.	
		Inspection prior to release shall be specified in the Quality manual. (Dimension, weld strength, etc.)	

Item	Description	Schedule A	Schedule B
5.3	**Transport and Storage**		
		Does Transport and Storage form part of the Quality Management System?	
		Does the Quality Management System include stacking, loading, transport and inspection (final inspection after off-loading)?	

Item	Description	Schedule A	Schedule B
5.4	**Installation and inspection**		
5.4.1	Installation	Does Installation form part of the Quality Management System?	
		Is detailed installation and training documentation available	
		Installers must be declared competent and be accredited by the supplier. Relevant detail of installers must be available. This includes, training received, level of expertise and project involvement.	
		Hold and inspection points must be clearly specified	
5.4.2	Inspection	Standardized check sheets shall be documented in the suppliers Quality Management system	
		A final certificate of compliance (indicating the warrantee) shall be issued to the customer	

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Item	Description	Schedule A	Schedule B
5.5	**Maintenance and Repair**		
5.5.1	Maintenance	Maintenance philosophies must be documented by the supplier and indicate interval, nature of inspection, treatment and repair.	
5.5.2	Repair	Procedures and products to repair secondary coatings must be specified by the supplier	
		Repair proposals for galvanized products should be in line with the proposals by the Galvanizing Association of South Africa.	
		Do you meet the minimum requirements as stipulated in 5.5.2?	
		Repairs to hot dip galvanized steel shall conform to SANS 121 (ISO 1461).	
		Life expectancy tests should be provided to prove that repair methods are adequate and meet the warrantee	

Item	Description	Schedule A	Schedule B
6	**Quality Management System and Guarantee**		
6.1	Quality Management System	The supplier shall have a documented and maintained Quality Management System.	
		Eskom will audit the suppliers Quality management system in accordance with the Supplier Contract Quality document QM-58. Do you comply with this document?	
		The manufacturing part of the system must be certified (ISO 9001:2008)	
		The supplier shall submit the quality control plans to Eskom, indicating all inspection and hold points sample size, and “pass/fail” criteria. The plans must be accepted by Eskom.	
		The scope must encompass all activities that the supplier will be involved with, from manufacture to installation. The following activities must be covered in detail • Design – See section 5.1 • Manufacture – See section 5.2 • Transport and Storage - See section 5.3 • Installation and Inspection - See	

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		section 5.4 • Maintenance and Repair - See section 5.5	
6.2	Guarantee	The supplier shall guarantee the fencing and coating system. Eskom requires performance guarantees for the applied coating and fencing system/s.	
		The supplier shall state the minimum Guarantee duration (The minimum guarantee period required by Eskom is15 years).	
		Stipulate the guarantee for corrosively categories C1 toC3 according to ISO 9223	
		Stipulate the guarantee for corrosively categories C4 to C5 according to ISO 9223	
6.2.1		The supplier shall in detail document what is covered by of the guarantee as well as the terms and conditions.	
		The supplier shall in detail document what constitutes a “failure”.	
		Does your guarantee meet the requirements as per 6.2.1	
		Detail of supplier that will honor the warrantee	

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