water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF WATER AND SANITATION
REBPUBLIC OF SOUTH AFRICA

DUE AT	11:00
CLOSING DATE	17 November 2015
BID NUMBER	W1054WTE
DESCRIPTION: SUPPLY, INSTALLATION AND MAINTENANCE OF ADDITIONAL SMART	
WATER FLOW METERING TECHNOLOGIES FOR THE DEPARTMENT OF WATER AND SANITATION	
FOR A TERM CONTRACT PERIOD OF THREE (3) YEARS	
SUBMIT TENDER DOCUMENT TO	
POSTAL ADDRESS: Director-General Water and Sanitation Private Bag X313 PRETORIA, 0001	**TO BE DEPOSIT IN:** The Tender Box at the entrance of Zwamadaka Building 157 Francis Baard Street (Formerly Schoeman Street) PRETORIA, 0002

TENDERER: (Company address and stamp)

COMPILED BY: DEPARTMENT OF WATER AND SANITATION

COMPULSORY BRIEFING SESSIONS

Compulsory briefing sessions will be held in only four (4) major Provinces. It is mandatory for all prospective bidders to attend at least one (1) of these sessions in the venues nearest to them and in dates and times provided below. Failure to do so shall invalidate your bid.

Western Cape Province:
Venue: Department of Water and Sanitation, 3 Blackenberg Street Sigma Building. 2nd Floor Boardroom Spectrum Building, BELLVILLE.
Date: 28 October 2015
Time: 11:00am

Gauteng Province:
Venue: Department of Water and Sanitation, Roodeplaat Construction Training Centre, KAMEELDRIFT
Date: 29 October 2015
Time: 11:00am

KwaZulu Natal Province:
Venue: Department of Water and Sanitation, Southern Life Building, 9th Floor, 88 Joe Slovo Street,
DURBAN
Date: 04 November 2015
Time: 11:00am

Free State Province:
Venue: Department of Water and Sanitation, Bloem Plaza 2nd Floor c/o Charlotte Maxeke & East Burger Street. Spruite Boardroom,
BLOEMFONTEIN
Date: 05 November 2015
Time: 11:00am

SBD 1

INVITATION TO BID

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF THE (NAME OF DEPARTMENT/PUBLIC ENTITY)

BID NUMBER: ..... CLOSING DATE: ..... CLOSING TIME: 11:00

DESCRIPTION.....

The successful bidder will be required to fill in and sign a written Contract Form (SBD 7).

BID DOCUMENTS MAY BE POSTED TO:
POSTAL ADDRESS: DIRECTOR-GENERAL: WATER AND SANITATION
PRIVATE BAG X 313
PRETORIA,0001

OR

DEPOSITED IN THE BID BOX SITUATED AT *(STREET ADDRESS)*
THE TENDER BOX AT THE ENTRANCE
OF ZWAMADAKA BUILDING
157 SCHOEMAN STREET
PRETORIA,0002

Bidders should ensure that bids are delivered timeously to the correct address. If the bid is late, it will not be accepted for consideration.

The bid box is generally open 24 hours a day, 7 days a week.

ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS – (NOT TO BE RE-TYPED)

THIS BID IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT AND THE PREFERENTIAL PROCUREMENT REGULATIONS, 2011, THE GENERAL CONDITIONS OF CONTRACT (GCC) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT

THE FOLLOWING PARTICULARS MUST BE FURNISHED
(FAILURE TO DO SO MAY RESULT IN YOUR BID BEING DISQUALIFIED)

NAME OF BIDDER .....

POSTAL ADDRESS .....

STREET ADDRESS .....

TELEPHONE NUMBER CODE.....NUMBER.....

CELLPHONE NUMBER .....

FACSIMILE NUMBER CODE ..... .NUMBER.....

E-MAIL ADDRESS .....

VAT REGISTRATION NUMBER .....

HAS AN ORIGINAL AND VALID TAX CLEARANCE CERTIFICATE BEEN SUBMITTED? (SBD 2) YES or NO

HAS A B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE BEEN SUBMITTED? (SBD 6.1) YES or NO

IF YES, WHO WAS THE CERTIFICATE ISSUED BY?

AN ACCOUNTING OFICER AS CONTEMPLATED IN THE CLOSE CORPORATION ACT (CCA)..... .....
A VERIFICATION AGENCY ACCREDITED BY THE SOUTH AFRICAN ACCREDITATION SYSTEM (SANAS); OR.....
A REGISTERED AUDITOR .....
[TICK APPLICABLE BOX]

(A B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE MUST BE SUBMITTED IN ORDER TO QUALIFY FOR PREFERENCE POINTS FOR B-BBEE)

ARE YOU THE ACCREDITED REPRESENTATIVE
IN SOUTH AFRICA FOR THE GOODS / SERVICES / WORKS OFFERED? YES or
NO

[IF YES ENCLOSE PROOF]

SIGNATURE OF BIDDER .....

DATE .....

CAPACITY UNDER WHICH THIS BID IS SIGNED .....

TOTAL BID PRICE..... TOTAL NUMBER OF ITEMS OFFERED .....

ANY ENQUIRIES REGARDING THE BIDDING PROCEDURE MAY BE DIRECTED TO:

Department:	Water and Sanitation
Contact Person:	**Julia Dirane / Anele Ndamase / Thandie Plaatjie / Thembeka Hlazo / Mogoma Sekgothe**
Tel:	012 – 336 7780 / 012 – 336 7432 / 012 – 336 8364 / 012 – 336 7066 / 012 – 336 7418
Fax:	012 – 336 6963
E-mail address:	bidenquirieswte@dws.gov.za

ANY ENQUIRIES REGARDING TECHNICAL INFORMATION MAY BE DIRECTED TO:

Contact Person:	**Mr LAV Manus**
Tel:	012 – 336 8092
Fax:	012 – 336 7031
E-mail address:	manusl@dws.gov.za and cc dlaminit2@dws.gov.za

TAX CLEARANCE CERTIFICATE REQUIREMENTS

It is a condition of bid that the taxes of the successful bidder must be in order, or that satisfactory arrangements have been made with South African Revenue Service (SARS) to meet the bidder's tax obligations.

1 In order to meet this requirement bidders are required to complete in full the attached form TCC 001 "Application for a Tax Clearance Certificate" and submit it to any SARS branch office nationally. The Tax Clearance Certificate Requirements are also applicable to foreign bidders / individuals who wish to submit bids.

2 SARS will then furnish the bidder with a Tax Clearance Certificate that will be valid for a period of 1 (one) year from the date of approval.

3 The original Tax Clearance Certificate must be submitted together with the bid. Failure to submit the original and valid Tax Clearance Certificate will result in the invalidation of the bid. Certified copies of the Tax Clearance Certificate will not be acceptable.

4 In bids where Consortia / Joint Ventures / Sub-contractors are involved, each party must submit a separate Tax Clearance Certificate.

5 Copies of the TCC 001 "Application for a Tax Clearance Certificate" form are available from any SARS branch office nationally or on the website www.sars.gov.za.

6 Applications for the Tax Clearance Certificates may also be made via eFiling. In order to use this provision, taxpayers will need to register with SARS as eFilers through the website www.sars.gov.za.

TAX CLEARANCE

TCC 001

Application for a Tax Clearance Certificate

Purpose

Select the applicable option ..... Tenders | | Good standing | |

If "Good standing", please state the purpose of this application

Particulars of applicant

Name/Legal name (Initials & Surname or registered name)

Trading name (If applicable)

ID/Passport no

Company/Close Corp. registered no

Income Tax ref no

PAYE ref no 7

VAT registration no 4

SDL ref no L

Customs code

UIF ref no U

Telephone no

Fax no

E-mail address

Physical address

Postal address

Particulars of representative (Public Officer/Trustee/Partner)

Surname

First names

ID/Passport no

Income Tax ref no

Telephone no

Fax no

E-mail address

Physical address

Particulars of tender (If applicable)

Tender number

Estimated Tender amount R

Expected duration of the tender year(s)

Particulars of the 3 largest contracts previously awarded

Date started	Date finalised	Principal	Contact person	Telephone number	Amount

Audit

Are you currently aware of any Audit investigation against you/the company? YES | NO

If "YES" provide details

Appointment of representative/agent (Power of Attorney)

I the undersigned confirm that I require a Tax Clearance Certificate in respect of Tenders or Goodstanding.

I hereby authorise and instruct _____ to apply to and receive from SARS the applicable Tax Clearance Certificate on my/our behalf.

Signature of representative/agent

Date (CCYY-MM-DD)

Name of representative/ agent

Declaration

I declare that the information furnished in this application as well as any supporting documents is true and correct in every respect.

Signature of applicant/Public Officer

Date (CCYY-MM-DD)

Name of applicant/ Public Officer

Notes:

1. It is a serious offence to make a false declaration.
2. Section 75 of the Income Tax Act, 1962, states: Any person who
   (a) fails or neglects to furnish, file or submit any return or document as and when required by or under this Act; or
   (b) without just cause shown by him, refuses or neglects to-
      (i) furnish, produce or make available any information, documents or things;
      (ii) reply to or answer truly and fully, any questions put to him ...

   As and when required in terms of this Act .. shall be guilty of an offence ...
3. **SARS will, under no circumstances, issue a Tax Clearance Certificate unless this form is completed in full.**
4. Your Tax Clearance Certificate will only be issued on presentation of your South African Identity Document or Passport (Foreigners only) as applicable.

PRICING SCHEDULE – NON-FIRM PRICES (PURCHASES)

NOTE: **PRICE ADJUSTMENTS WILL BE ALLOWED AT THE PERIODS AND TIMES SPECIFIED IN THE BIDDING DOCUMENTS.**

IN CASES WHERE DIFFERENT DELIVERY POINTS INFLUENCE THE PRICING, A SEPARATE PRICING SCHEDULE MUST BE SUBMITTED FOR EACH DELIVERY POINT

Name of Bidder……Bid number…W1054WTE…

Closing Time 11:00 …… Closing date……

OFFER TO BE VALID FOR…90…DAYS FROM THE CLOSING DATE OF BID.

ITEM NO.	QUANTITY	DESCRIPTION	BID PRICE IN RSA CURRENCY **(ALL APPLICABLE TAXES INCLUDED) UNIT PRICE
1.	1	MECHANICAL WATER FLOW METER (20mm)	
2.	1	MECHANICAL WATER FLOW METER (25mm)	
3.	1	MECHANICAL WATER FLOW METER (50mm)	
4.	1	MECHANICAL WATER FLOW METER (65mm)	
5.	1	MECHANICAL WATER FLOW METER (75mm)	
6.	1	MECHANICAL WATER FLOW METER (80mm)	
7.	1	MECHANICAL WATER FLOW METER (100mm)	
8.	1	MECHANICAL WATER FLOW METER (125mm)	
9.	1	MECHANICAL WATER FLOW METER (150mm)	
10.	1	MECHANICAL WATER FLOW METER (175mm)	
11.	1	MECHANICAL WATER FLOW METER (200mm)	
12.	1	UTRASONIC WATER FLOW METER	
13.	1	AREA VELOCITY WATER FLOW METER	
14.	1	DRIVE-BY HANDHELD DATA COLLECTORS	

- Required by: ……
- At: ……

- Brand and model ……
-
- Country of origin ……

- Does the offer comply with the specification(s)? *YES/NO
- If not to specification, indicate deviation(s) ……

- Period required for delivery .....
- Delivery: *Firm/not firm

** "all applicable taxes" includes value- added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies.

*Delete if not applicable

PRICE ADJUSTMENTS

A NON-FIRM PRICES SUBJECT TO ESCALATION

1. IN CASES OF PERIOD CONTRACTS, NON FIRM PRICES WILL BE ADJUSTED (LOADED) WITH THE ASSESSED CONTRACT PRICE ADJUSTMENTS IMPLICIT IN NON FIRM PRICES WHEN CALCULATING THE COMPARATIVE PRICES

2. IN THIS CATEGORY PRICE ESCALATIONS WILL ONLY BE CONSIDERED IN TERMS OF THE FOLLOWING FORMULA:

$$Pa = (1-V)Pt\left(D1\frac{R1t}{R1o} + D2\frac{R2t}{R2o} + D3\frac{R3t}{R3o} + D4\frac{R4t}{R4o}\right) + VPt$$

Where:

Pa	=	The new escalated price to be calculated.
(1-V)Pt	=	85% of the original bid price. **Note that Pt must always be the original bid price and not an escalated price.**
D1, D2..	=	Each factor of the bid price eg. labour, transport, clothing, footwear, etc. The total of the various factors D1, D2...etc. must add up to 100%.
R1t, R2t.....	=	Index figure obtained from new index (depends on the number of factors used).
R1o, R2o	=	Index figure at time of bidding.
VPt	=	15% of the original bid price. This portion of the bid price remains firm i.e. it is not subject to any price escalations.

3. The following index/indices must be used to calculate your bid price:

Index..... Dated..... Index..... Dated..... Index..... Dated.....

Index..... Dated..... Index..... Dated..... Index..... Dated.....

4. FURNISH A BREAKDOWN OF YOUR PRICE IN TERMS OF ABOVE-MENTIONED FORMULA. THE TOTAL OF THE VARIOUS FACTORS MUST ADD UP TO 100%.

FACTOR (D1, D2 etc. eg. Labour, transport etc.)	PERCENTAGE OF BID PRICE

B PRICES SUBJECT TO RATE OF EXCHANGE VARIATIONS

1. Please furnish full particulars of your financial institution, state the currencies used in the conversion of the prices of the items to South African currency, which portion of the price is subject to rate of exchange variations and the amounts remitted abroad.

PARTICULARS OF FINANCIAL INSTITUTION	ITEM NO	PRICE	CURRENCY	RATE	PORTION OF PRICE SUBJECT TO ROE	AMOUNT IN FOREIGN CURRENCY REMITTED ABROAD
				ZAR=		
				ZAR=		
				ZAR=		
				ZAR=		
				ZAR=		
				ZAR=		

2. Adjustments for rate of exchange variations during the contract period will be calculated by using the average monthly exchange rates as issued by your commercial bank for the periods indicated hereunder: (Proof from bank required)

AVERAGE MONTHLY EXCHANGE RATES FOR THE PERIOD:	DATE DOCUMENTATION MUST BE SUBMITTED TO THIS OFFICE	DATE FROM WHICH NEW CALCULATED PRICES WILL BECOME EFFECTIVE	DATE UNTIL WHICH NEW CALCULATED PRICE WILL BE EFFECTIVE

ANNEXURE 8

PRICING SCHEDULE (CONTINUATION OF SBD 3.2)
(Maintenance Charges)

NOTE: PRICE ADJUSTMENTS WILL BE ALLOWED AT THE PERIODS AND TIMES SPECIFIED IN THE BIDDING DOCUMENTS.

IN CASES WHERE DIFFERENT DELIVERY POINTS INFLUENCE THE PRICING, A SEPARATE PRICING SCHEDULE MUST BE SUBMITTED FOR EACH DELIVERY POINT.

CLOSING TIME 11:00 ON..... BID NO. W1054WTE

NAME OF BIDDER: .....

OFFER TO BE VALID FOR 90 DAYS FROM DATE OF BID

ITEM NO	QUANTITY	DESCRIPTION	BID PRICE IN RSA CURRENCY, INCLUSIVE OF VALUE ADDED TAX
		SUPPLY, INSTALLATION AND MAINTENANCE OF ADDITIONAL SMART WATER FLOW METERING TECHNOLOGIES FOR THE DEPARTMENT OF WATER AND SANITATION FOR A TERM CONTRACT PERIOD OF THREE (3) YEARS	

- Required by .....
- At (Place of maintenance) .....
- Total price for outright sale (inclusive of importation charges, delivery and installation costs, etc.) for the equipment as specified R..... (Total price)
  - (a) Price of all material, equipment, etc. R.....
  - (b) Price of delivery to site R.....
  - (c) Price of installation/erection, etc. R.....
- Total maintenance and servicing charges, payable monthly in arrears, in order to ensure that the equipment is maintained in good working order R..... per month
- Are maintenance and servicing charges payable during guarantee period? *YES/NO
- If not, indicate commencement date .....
- For what period, calculated from the commencement date of the maintenance agreement, will the maintenance charges remain firm? .....
- Brand and model .....
- Country of manufacture .....

ANNEXURE 8

-	Delivery basis: Delivered and installed	.....
-	Period required for delivery after receipt of order	.....
-	Delivery period	*** FIRM / NOT FIRM**
-	Is offer strictly to specification?	*** YES/NO**
	If <u>not</u> to specification, state deviation	.....

<u>NOTE</u>: **All delivery and/or railage costs must be included in the bid price.**

Any enquiries regarding bidding procedures may be directed to the -

Department of Water and Sanitation Supply Chain Management Office
Private Bag X313, Pretoria, 0001.
Tel: (012) 336-7696/7418/8988

<u>Or</u>

for technical information -

Department of Water and Sanitation Mr LAV Manus
Tel: (012) 336 8092

* **Delete whichever is not applicable.**

ANNEXURE B

SBD 4
DECLARATION OF INTEREST

1 Any legal person, including persons employed by the state[1], or persons having a kinship with persons employed by the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid (includes an advertised competitive bid, a limited bid, a proposal or written price quotation). In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons employed by the state, or to persons connected with or related to them, it is required that the bidder or his/her authorised representative declare his/her position in relation to the evaluating/adjudicating authority where-

- the bidder is employed by the state; and/or
- the legal person on whose behalf the bidding document is signed, has a relationship with persons/a person who are/is involved in the evaluation and or adjudication of the bid(s), or where it is known that such a relationship exists between the person or persons for or on whose behalf the declarant acts and persons who are involved with the evaluation and or adjudication of the bid.

2 **In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.**

2.1 Full Name of bidder or his or her representative _____

_____

1.2 Identity Number: | | | | | | | | | | | | | |

1.3 Position occupied in the Company (director, trustee, shareholder[2], member):

_____

1.4 Registration number of company, enterprise, close corporation, partnership agreement or trust:

_____

1.5 Tax Reference Number: | | | | | | | | | | | | | |

1.6 VAT Registration Number: | | | | | | | | | | | | | |

1.6.1 The names of all directors/trustees/shareholders/members, their individual identity numbers, tax reference numbers and, if applicable, employee/PERSAL numbers must be indicated in paragraph 3 below.

[1]"State" means –

(a) any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No. 1 of 1999);
(b) any municipality or municipal entity;
(c) provincial legislature;
(d) national Assembly or the national Council of provinces; or
(e) Parliament.

[2]"Shareholder" means a person who owns shares in the company and is actively involved in the management of the enterprise or business and exercises control over the enterprise.

2.7 Are you or any person connected with the bidder presently employed by the state? YES NO

2.7.1 If so, furnish the following particulars:

Name of person/director/trustee shareholder/ member: _____

Name of state institution at which you or the person connected to the bidder is employed: _____

Position occupied in the state institution: _____

Any other particulars: _____

_____

_____

2.7.2 If you are presently employed by the state, did you obtain the appropriate authority to undertake remunerative work outside employment in the public sector? YES NO

2.7.2.1 If yes, did you attach proof of such authority to the bid document? YES NO

(Note: Failure to submit proof of such authority, where applicable, may result in the disqualification of the bid.)

2.7.2.2 If no, furnish reasons for non-submission of such proof: _____

_____

_____

_____

2.8 Did you or your spouse, or any of the company's directors/trustees/shareholders/members or their spouses conduct business with the state in the previous twelve months? YES NO

2.8.1 If so, furnish particulars:

2.9 Do you, or any person connected with the bidder, have any relationship (family, friend, other) with a person employed by the state and who may be involved with the evaluation and or adjudication of this bid? YES NO

2.9.1 If so, furnish particulars

2.10 Are you, or any person connected with the bidder, aware of any relationship (family, friend, other) between any other bidder and any person employed by the state who may be involved with the evaluation and or adjudication of this bid? YES NO

2.10.1 If so, furnish particulars.

2.11 Do you or any of the directors/trustees/ shareholders/members of the company have any interest in any other related companies whether or not they are bidding for this contract? YES NO

2.11.1 If so, furnish particulars:

3 Full details of directors/trustees/members/shareholders

Full Name	Identity Number	Personal Income Tax Reference Number	State Employee Number/Persal Number

4 DECLARATION

I, THE UNDERSIGNED (NAME) _____

CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 2 and 3 ABOVE IS CORRECT. I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

_____ _____

Signature Date

_____ _____

Position Name of bidder

This document must be signed and submitted together with your bid

THE NATIONAL INDUSTRIAL PARTICIPATION PROGRAMME

INTRODUCTION

The National Industrial Participation (NIP) Programme, which is applicable to all government procurement contracts that have an imported content, became effective on the 1 September 1996. The NIP policy and guidelines were fully endorsed by Cabinet on 30 April 1997. In terms of the Cabinet decision, all state and parastatal purchases / lease contracts (for goods, works and services) entered into after this date, are subject to the NIP requirements. NIP is obligatory and therefore must be complied with. The Industrial Participation Secretariat (IPS) of the Department of Trade and Industry (DTI) is charged with the responsibility of administering the programme.

1 PILLARS OF THE PROGRAMME

1.1 The NIP obligation is benchmarked on the imported content of the contract. Any contract having an imported content equal to or exceeding US$ 10 million or other currency equivalent to US$ 10 million will have a NIP obligation. This threshold of US$ 10 million can be reached as follows:

(a) Any single contract with imported content exceeding US$10 million.

or

(b) Multiple contracts for the same goods, works or services each with imported content exceeding US$3 million awarded to one seller over a 2 year period which in total exceeds US$10 million.

or

(c) A contract with a renewable option clause, where should the option be exercised the total value of the imported content will exceed US$10 million.

or

(d) Multiple suppliers of the same goods, works or services under the same contract, where the value of the imported content of each allocation is equal to or exceeds US$ 3 million worth of goods, works or services to the same government institution, which in total over a two (2) year period exceeds US$10 million.

1.2 The NIP obligation applicable to suppliers in respect of sub-paragraphs 1.1 (a) to 1.1 (c) above will amount to 30 % of the imported content whilst suppliers in respect of paragraph 1.1 (d) shall incur 30% of the total NIP obligation on a *pro-rata* basis.

1.3 To satisfy the NIP obligation, the DTI would negotiate and conclude agreements such as investments, joint ventures, sub-contracting, licensee production, export promotion, sourcing arrangements and research and development (R&D) with partners or suppliers.

1.4 A period of seven years has been identified as the time frame within which to discharge the obligation.

2 REQUIREMENTS OF THE DEPARTMENT OF TRADE AND INDUSTRY

2.1 In order to ensure effective implementation of the programme, successful bidders (contractors) are required to, immediately after the award of a contract that is in excess of **R10 million** (ten million Rands), submit details of such a contract to the DTI for reporting purposes.

2.2 The purpose for reporting details of contracts in excess of the amount of R10 million (ten million Rands) is to cater for multiple contracts for the same goods, works or services; renewable contracts and multiple suppliers for the same goods, works or services under the same contract as provided for in paragraphs 1.1.(b) to 1.1. (d) above.

3 BID SUBMISSION AND CONTRACT REPORTING REQUIREMENTS OF BIDDERS AND SUCCESSFUL BIDDERS (CONTRACTORS)

3.1 Bidders are required to sign and submit this Standard Bidding Document (SBD 5) together with the bid on the closing date and time.

3.2 In order to accommodate multiple contracts for the same goods, works or services; renewable contracts and multiple suppliers for the same goods, works or services under the same contract as indicated in sub-paragraphs 1.1 (b) to 1.1 (d) above and to enable the DTI in determining the NIP obligation, successful bidders (contractors) are required, immediately after being officially notified about any successful bid with a value in excess of R10 million (ten million Rands), to contact and furnish the DTI with the following information:

- Bid / contract number.
- Description of the goods, works or services.
- Date on which the contract was accepted.
- Name, address and contact details of the government institution.
- Value of the contract.
- Imported content of the contract, if possible.

3.3 The information required in paragraph 3.2 above must be sent to the Department of Trade and Industry, Private Bag X 84, Pretoria, 0001 for the attention of Mr Elias Malapane within five (5) working days after award of the contract. Mr Malapane may be contacted on telephone (012) 394 1401, facsimile (012) 394 2401 or e-mail at Elias@thedti.gov.za for further details about the programme.

4 PROCESS TO SATISFY THE NIP OBLIGATION

4.1 Once the successful bidder (contractor) has made contact with and furnished the DTI with the information required, the following steps will be followed:

a. the contractor and the DTI will determine the NIP obligation;
b. the contractor and the DTI will sign the NIP obligation agreement;

c. the contractor will submit a performance guarantee to the DTI;
d. the contractor will submit a business concept for consideration and approval by the DTI;
e. upon approval of the business concept by the DTI, the contractor will submit detailed business plans outlining the business concepts;
f. the contractor will implement the business plans; and
g. the contractor will submit bi-annual progress reports on approved plans to the DTI.

4.2 The NIP obligation agreement is between the DTI and the successful bidder (contractor) and, therefore, does not involve the purchasing institution.

Bid number ..... Closing date:.....

Name of bidder.....

Postal address .....

.....

Signature..... Name (in print).....

Date.....

SBD 6.1

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2011

This preference form must form part of all bids invited. It contains general information and serves as a claim form for preference points for Broad-Based Black Economic Empowerment (B-BBEE) Status Level of Contribution

NB: BEFORE COMPLETING THIS FORM, BIDDERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF B-BBEE, AS PRESCRIBED IN THE PREFERENTIAL PROCUREMENT REGULATIONS, 2011.

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1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to all bids:

- the 90/10 system for requirements with a Rand value above R1 000 000 (all applicable taxes included).

1.2 The value of this bid is estimated to exceed R1 000 000 (all applicable taxes included) and therefore the **90\10** system shall be applicable.

1.3 Preference points for this bid shall be awarded for:

(a) Price; and
(b) B-BBEE Status Level of Contribution.

1.3.1 The maximum points for this bid are allocated as follows:

		POINTS
1.3.1.1	**PRICE**	90
1.3.1.2	**B-BBEE STATUS LEVEL OF CONTRIBUTION**	10
	Total points for Price and B-BBEE must not exceed	**100**

1.4 Failure on the part of a bidder to fill in and/or to sign this form and submit a B-BBEE Verification Certificate from a Verification Agency accredited by the South African Accreditation System (SANAS) or a Registered Auditor approved by the Independent Regulatory Board of Auditors (IRBA) or an Accounting Officer as contemplated in the Close Corporation Act (CCA) together with the bid, will be interpreted to mean that preference points for B-BBEE status level of contribution are not claimed.

1.5. The purchaser reserves the right to require of a bidder, either before a bid is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the purchaser.

2. DEFINITIONS

2..1 **"all applicable taxes"** includes value-added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies;

2.2 **"B-BBEE"** means broad-based black economic empowerment as defined in section 1 of the Broad -Based Black Economic Empowerment Act;

2.3 **"B-BBEE status level of contributor"** means the B-BBEE status received by a measured entity based on its overall performance using the relevant scorecard contained in the Codes of Good Practice on Black Economic Empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;

2.4 **"bid"** means a written offer in a prescribed or stipulated form in response to an invitation by an organ of state for the provision of services, works or goods, through price quotations, advertised competitive bidding processes or proposals;

2.5 **"Broad-Based Black Economic Empowerment Act"** means the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);

2.6 **"comparative price"** means the price after the factors of a non-firm price and all unconditional discounts that can be utilized have been taken into consideration;

2.7 **"consortium or joint venture"** means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract;

2.8 **"contract"** means the agreement that results from the acceptance of a bid by an organ of state;

2.9 **"EME"** means any enterprise with an annual total revenue of R5 million or less .

2.10 **"Firm price"** means the price that is only subject to adjustments in accordance with the actual increase or decrease resulting from the change, imposition, or abolition of customs or excise duty and any other duty, levy, or tax, which, in terms of the law or regulation, is binding on the contractor and demonstrably has an influence on the price of any supplies, or the rendering costs of any service, for the execution of the contract;

2.11 **"functionality"** means the measurement according to predetermined norms, as set out in the bid documents, of a service or commodity that is designed to be practical and useful, working or operating, taking into account, among other factors, the quality, reliability, viability and durability of a service and the technical capacity and ability of a bidder;

2.12 **"non-firm prices"** means all prices other than "firm" prices;

2.13 **"person"** includes a juristic person;

2.14 **"rand value"** means the total estimated value of a contract in South African currency, calculated at the time of bid invitations, and includes all applicable taxes and excise duties;

2.15 **"sub-contract"** means the primary contractor's assigning, leasing, making out work to, or employing, another person to support such primary contractor in the execution of part of a project in terms of the contract;

2.16 **"total revenue"** bears the same meaning assigned to this expression in the Codes of Good Practice on Black Economic Empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act and promulgated in the *Government Gazette* on 9 February 2007;

2.17 **"trust"** means the arrangement through which the property of one person is made over or

bequeathed to a trustee to administer such property for the benefit of another person; and

2.18 **"trustee"** means any person, including the founder of a trust, to whom property is bequeathed in order for such property to be administered for the benefit of another person.

3. ADJUDICATION USING A POINT SYSTEM

3.1 The bidder obtaining the highest number of total points will be awarded the contract.

3.2 Preference points shall be calculated after prices have been brought to a comparative basis taking into account all factors of non-firm prices and all unconditional discounts;.

3.3 Points scored must be rounded off to the nearest 2 decimal places.

3.4 In the event that two or more bids have scored equal total points, the successful bid must be the one scoring the highest number of preference points for B-BBEE.

3.5 However, when functionality is part of the evaluation process and two or more bids have scored equal points including equal preference points for B-BBEE, the successful bid must be the one scoring the highest score for functionality.

3.6 Should two or more bids be equal in all respects, the award shall be decided by the drawing of lots.

4. POINTS AWARDED FOR PRICE

4.1 THE 80/20 OR 90/10 PREFERENCE POINT SYSTEMS

A maximum of 80 or 90 points is allocated for price on the following basis:

90/10

$$Ps = 90\left(1 - \frac{Pt - P\min}{P\min}\right)$$

Where

Ps = Points scored for comparative price of bid under consideration

Pt = Comparative price of bid under consideration

Pmin = Comparative price of lowest acceptable bid

5. Points awarded for B-BBEE Status Level of Contribution

5.1 In terms of Regulation 5 (2) and 6 (2) of the Preferential Procurement Regulations, preference points must be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table below:

B-BBEE Status Level of Contributor	Number of points (90/10 system)	Number of points (80/20 system)
1	10	20
2	9	18
3	8	16
4	5	12
5	4	8
6	3	6
7	2	4
8	1	2
Non-compliant contributor	0	0

5.2 Bidders who qualify as EMEs in terms of the B-BBEE Act must submit a certificate issued by an Accounting Officer as contemplated in the CCA or a Verification Agency accredited by SANAS or a Registered Auditor. Registered auditors do not need to meet the prerequisite for IRBA's approval for the purpose of conducting verification and issuing EMEs with B-BBEE Status Level Certificates.

5.3 Bidders other than EMEs must submit their original and valid B-BBEE status level verification certificate or a certified copy thereof, substantiating their B-BBEE rating issued by a Registered Auditor approved by IRBA or a Verification Agency accredited by SANAS.

5.4 A trust, consortium or joint venture, will qualify for points for their B-BBEE status level as a legal entity, provided that the entity submits their B-BBEE status level certificate.

5.5 A trust, consortium or joint venture will qualify for points for their B-BBEE status level as an unincorporated entity, provided that the entity submits their consolidated B-BBEE scorecard as if they were a group structure and that such a consolidated B-BBEE scorecard is prepared for every separate bid.

5.6 Tertiary institutions and public entities will be required to submit their B-BBEE status level certificates in terms of the specialized scorecard contained in the B-BBEE Codes of Good Practice.

5.7 A person will not be awarded points for B-BBEE status level if it is indicated in the bid documents that such a bidder intends sub-contracting more than 25% of the value of the contract to any other enterprise that does not qualify for at least the points that such a bidder qualifies for, unless the intended sub-contractor is an EME that has the capability and ability to execute the sub-contract.

5.8 A person awarded a contract may not sub-contract more than 25% of the value of the contract to any other enterprise that does not have an equal or higher B-BBEE status level than the person concerned, unless the contract is sub-contracted to an EME that has the capability and ability to execute the sub-contract.

6. BID DECLARATION

6.1 Bidders who claim points in respect of B-BBEE Status Level of Contribution must complete the following:

7. B-BBEE STATUS LEVEL OF CONTRIBUTION CLAIMED IN TERMS OF PARAGRAPHS 1.3.1.2 AND 5.1

7.1 B-BBEE Status Level of Contribution: ..... = ...(maximum of 10 or 20 points)

(Points claimed in respect of paragraph 7.1 must be in accordance with the table reflected in paragraph 5.1 and must be substantiated by means of a B-BBEE certificate issued by a Verification Agency accredited by SANAS or a Registered Auditor approved by IRBA or an Accounting Officer as contemplated in the CCA).

8 SUB-CONTRACTING

8.1 Will any portion of the contract be sub-contracted? YES / NO (delete which is not applicable)

8.1.1 If yes, indicate:

(i) what percentage of the contract will be subcontracted? .....%
(ii) the name of the sub-contractor? .....
(iii) the B-BBEE status level of the sub-contractor? .....
(iv) whether the sub-contractor is an EME? YES / NO (delete which is not applicable)

9 DECLARATION WITH REGARD TO COMPANY/FIRM

9.1 Name of company/firm ..... :

9.2 VAT registration number :.....

9.3 Company registration number .....

:

9.4 TYPE OF COMPANY/ FIRM

Partnership/Joint Venture / Consortium
One person business/sole propriety
Close corporation
Company
(Pty) Limited
[TICK APPLICABLE BOX]

9.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

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

9.6 COMPANY CLASSIFICATION

Manufacturer
Supplier
Professional service provider
Other service providers, e.g. transporter, etc.

[TICK APPLICABLE BOX]

9.7 Total number of years the company/firm has been in business? .....

9.8 I/we, the undersigned, who is / are duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the B-BBE status level of contribution indicated in paragraph 7 of the foregoing certificate, qualifies the company/ firm for the preference(s) shown and I / we acknowledge that:

(i) The information furnished is true and correct;

(ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form.

(iii) In the event of a contract being awarded as a result of points claimed as shown in paragraph 7, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;

(iv) If the B-BBEE status level of contribution has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have –

(a) disqualify the person from the bidding process;

(b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;

(c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;

(d) restrict the bidder or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, from obtaining business from any organ of state for a period not exceeding 10 years, after the audi alteram partem (hear the other side) rule has been applied; and

(e) forward the matter for criminal prosecution

WITNESSES:

1. .....

2. .....

.....
SIGNATURE(S) OF BIDDER(S)

DATE:.....
ADDRESS:.....
.....

.....

SBD 8

DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

This Standard Bidding Document must form part of all bids invited.

It serves as a declaration to be used by institutions in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.

The bid of any bidder may be disregarded if that bidder, or any of its directors have-

abused the institution's supply chain management system;
committed fraud or any other improper conduct in relation to such system; or
failed to perform on any previous contract.

In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

Item	Question		
4.1	Is the bidder or any of its directors listed on the National Treasury's Database of Restricted Suppliers as companies or persons prohibited from doing business with the public sector? (Companies or persons who are listed on this Database were informed in writing of this restriction by the Accounting Officer/Authority of the institution that imposed the restriction after the audi alteram partem rule was applied). The Database of Restricted Suppliers now resides on the National Treasury's website(www.treasury.gov.za) and can be accessed by clicking on its link at the bottom of the home page.	Yes ☐	No ☐
4.1.1	If so, furnish particulars: _____ _____		
4.2	Is the bidder or any of its directors listed on the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)? The Register for Tender Defaulters can be accessed on the National Treasury's website (www.treasury.gov.za) by clicking on its link at the bottom of the home page.	Yes ☐	No ☐

4.2.1	If so, furnish particulars: _____ _____		
4.3	Was the bidder or any of its directors convicted by a court of law (including a court outside of the Republic of South Africa) for fraud or corruption during the past five years?	Yes ☐	No ☐
4.3.1	If so, furnish particulars: _____ _____		
4.4	Was any contract between the bidder and any organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes ☐	No ☐
4.4.1	If so, furnish particulars: _____ _____		

CERTIFICATION

I, THE UNDERSIGNED (FULL NAME) _____

CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS TRUE AND CORRECT.

I ACCEPT THAT, IN ADDITION TO CANCELLATION OF A CONTRACT, ACTION MAY BE TAKEN AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

_____ _____

Signature Date

_____ _____

Position Name of Bidder

SBD 9

CERTIFICATE OF INDEPENDENT BID DETERMINATION

1 This Standard Bidding Document (SBD) must form part of all bids[1] invited.

2 Section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive bidding (or bid rigging).[2] Collusive bidding is a *pe se* prohibition meaning that it cannot be justified under any grounds.

3 Treasury Regulation 16A9 prescribes that accounting officers and accounting authorities must take all reasonable steps to prevent abuse of the supply chain management system and authorizes accounting officers and accounting authorities to:

a) disregard the bid of any bidder if that bidder, or any of its directors have abused the institution's supply chain management system and or committed fraud or any other improper conduct in relation to such system.

b) cancel a contract awarded to a supplier of goods and services if the supplier committed any corrupt or fraudulent act during the bidding process or the execution of that contract.

4 This SBD serves as a certificate of declaration that would be used by institutions to ensure that, when bids are considered, reasonable steps are taken to prevent any form of bid-rigging.

5 In order to give effect to the above, the attached Certificate of Bid Determination (SBD 9) must be completed and submitted with the bid:

[1] Includes price quotations, advertised competitive bids, limited bids and proposals.

[2] Bid rigging (or collusive bidding) occurs when businesses, that would otherwise be expected to compete, secretly conspire to raise prices or lower the quality of goods and / or services for purchasers who wish to acquire goods and / or services through a bidding process. Bid rigging is, therefore, an agreement between competitors not to compete.

CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting the accompanying bid:

_____

(Bid Number and Description)

in response to the invitation for the bid made by:

_____

(Name of Institution)

do hereby make the following statements that I certify to be true and complete in every respect:

I certify, on behalf of: _____ that:

(Name of Bidder)

1 I have read and I understand the contents of this Certificate;

2 I understand that the accompanying bid will be disqualified if this Certificate is found not to be true and complete in every respect;

3 I am authorized by the bidder to sign this Certificate, and to submit the accompanying bid, on behalf of the bidder;

4 Each person whose signature appears on the accompanying bid has been authorized by the bidder to determine the terms of, and to sign the bid, on behalf of the bidder;

5 For the purposes of this Certificate and the accompanying bid, I understand that the word "competitor" shall include any individual or organization, other than the bidder, whether or not affiliated with the bidder, who:

(a) has been requested to submit a bid in response to this bid invitation;
(b) could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience; and
(c) provides the same goods and services as the bidder and/or is in the same line of business as the bidder

6 The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However communication between partners in a joint venture or consortium[3] will not be construed as collusive bidding.

7 In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:

(a) prices;
(b) geographical area where product or service will be rendered (market allocation)
(c) methods, factors or formulas used to calculate prices;
(d) the intention or decision to submit or not to submit, a bid;
(e) the submission of a bid which does not meet the specifications and conditions of the bid; or
(f) bidding with the intention not to win the bid.

8 In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or services to which this bid invitation relates.

9 The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.

[3] **Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.**

10 I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

Signature	Date
Position	Name of Bidder

DEPARTMENT OF WATER AFFAIRS

INSTRUCTIONS TO BIDDERS: PURCHASES

1. The standard bidding forms should not be retyped or redrafted but photocopies may be prepared and used. Additional offers may be made of any item but only on a photocopy of the page in question or on other forms obtainable from the Head of Procurement: Department of Water Affairs, Private Bag X313, Pretoria, 0001, Attention: Supply Chain Management Office. Additional offers made in any other manner may be disregarded.

2. Should standard bid forms not be filled in by means of mechanical devices, for example typewriters, ink, preferably black, must be used to fill in bids.

3. Bidders shall check the numbers of the pages and satisfy themselves that none are missing or duplicated. No liability shall be accepted in regard to claims arising from the fact that pages are missing or duplicated.

4. Where items are specified in detail, the specifications form an integral part of the bid document and bidders shall indicate in the space provided whether the items offered are to specification or not.

5. In respect of the paragraphs where the items offered are strictly to specification, bidders shall insert the words "as specified".

6. In cases where the items are not to specification, the deviations from the specifications shall be indicated.

7. The bid prices shall be given in the units shown.

8. With the exception of basic prices, where required, all prices shall be quoted in South African currency.

9. Delivery basis:

   (a) Supplies which are held in stock or are in transit or on order from South African manufacturers at the date of bid, shall be offered on a basis of delivery into consignee's store or on his site within the free delivery area of the bidder's centre, or carriage paid consignee's station if the goods are required elsewhere.

   (b) Notwithstanding the provisions of paragraph 9(a), bid prices for supplies in respect of which installation/erection/assembly is a requirement, shall include ALL costs on a basis of delivered on site as specified.

10. Unless specifically provided for in the bid document, no bids transmitted by telegram, telex, facsimile, e-mail or similar apparatus shall be considered.

2/...

ANNEXURE 7

11. Bids received after the closing date and time are late and will as a rule not be accepted for consideration.

12. Bids will be opened in public, that is, bidders or their representatives may be present. If requested by any bidder, the names of bidders and if practical the total amount of each bid and of any alternative bids, will be read aloud.

13. The period for which offers are to remain valid and binding is indicated in the bid documents and is calculated from the closing date on the understanding that offers are to remain in force and binding until the close of business on the last day of the period calculated and if this day falls on a Saturday, Sunday or public holiday, the bid is to remain valid and binding until the close of business on the following working day.

14. These conditions (Annexure 7) form part of the bid and failure to comply therewith may invalidate a bid.

15. Bidders are requested to promote local content optimally. Bidders who use locally manufactured components, products, equipment and systems, may claim preferences as set out in the Preference Points Claim Form, if attached.

16. After public opening of bids, information relating to the examination, clarification and evaluation of bids and recommendations concerning awards will not be disclosed to bidders or other persons not officially concerned with the process, until the successful bidder is notified of the award. The bid documentation of bidders is considered to be confidential and will under no circumstances be made available to other bidders or other persons.

17. If you are a supplier but not the actual manufacturer and will be sourcing the product(s) from another company, a letter from that company(ies)/supplier(s) confirming firm supply arrangement(s) in this regard, has to accompany your bid and failure to submit the document may invalidate your bid.

17.1 The said company/supplier must confirm that it has familiarised itself with the item description, specifications and bid conditions and if the bid consist of more than one item it should be clearly indicated in respect of which item(s) the supportive letter has been issued.

18. The financial standing of bidders and their ability to manufacture or to supply goods or to render a service may be examined before their bids are considered for acceptance.

19. The Department may, where a bid relates to more than one item, accept such bid in respect of any specific item or items and also accept part of the specified quantity of any specific item or items.

20. The Department is not obliged to accept any bid. The evaluation of a bid will be done in accordance with the Preferential Procurement Policy Framework Act, 2000 (Act no. 5 of 2000) and its regulations.

3/...

ANNEXURE 7

21. After approval of the bid, both parties must sign a written contract. The Contract Form must be filled in duplicate by both the successful bidder and the purchaser. Both Contract Forms must be signed in the original so that the successful bidder and the purchaser would be in possession of originally signed contracts for their respective records.

21.1 Failure of the successful bidder to sign the Contract Form in ink may result in the invalidation of their bid.

W1054WTE

SUPPLY, INSTALLATION AND MAINTENANCE OF ADDITIONAL SMART WATER FLOW METERING TECHNOLOGIES FOR THE DEPARTMENT OF WATER AND SANITATION FOR A TERM CONTRACT PERIOD OF THREE (3) YEARS

TERMS OF REFERENCE

1. INSTRUCTIONS TO BIDDERS

1.1 INTRODUCTION TO PROJECT

1.1.1 The Department of Water and Sanitation ("the Department") is the custodian of South Africa's water resources. The Department is primarily responsible for the formulation and implementation of water policy as well as overseeing water services provided by local government. The ambit of the Department scope is governed, inter alia by the National Water Act (NO. 36 of 1998) ("the National Water Act") which empowers the Department to recover its costs of fulfilling the obligations placed on the Ministry of Water and Sanitation from water users through raw water tariffs/charges.

1.1.2 The National Water Resources Infrastructure (NWRI) is responsible for the Development, Operations, Maintenance and Rehabilitation of National Water Resources Infrastructure Assets for the Department. It distributes bulk raw (untreated) water in terms of the National Water Act (NO. 36 of 1998) to authorised users. The NWRI's responsibility is to design, develop, construct and maintain infrastructure assets comprising of dams, tunnels, pipelines, canals, pump stations, Waste Water Treatment Plants (WWTP's), Water Treatment Plants (WTP's), Buildings and associated infrastructure that is positioned across Southern Africa. The NWRI Branch is endeavouring to become a Bulk Raw Water Management business unit. It is paramount that the costing of managing the supply of the water resource is based upon actual (verifiable) water use measurement.

1.1.3 Credible information and proper assets management is critical for an effective business management, regulation and all other elements of the sector which requires financial viability. This would be the reason why measurement is such an important element of the water management business which also bears mutual benefits to related aspects such as regulation (as part of the water resource management functions).

1.1.4 The Department has an existing contract Bid W0815WTE for the supply, installation and maintenance of "smart" Electro-magnetic water flow meters, for pipe diameters between 75mm to 600mm, which includes a suitable WEB-BASED software for monitoring and billing purposes. Therefore no offers for "smart" Electro-magnetic water flow meters shall be accepted. No provision for a WEB-BASED software shall be accepted as well.

2. INVITATION FOR BIDS

2.1 In accordance with the notice to all Bidders, each Bidder is required to submit the following copies before the closing date and time:

- 1 × Original Bid document
- 3 × Copies of original Bid document

All four (4) documents should be in one (1) or more than one (1)sealed envelope(s).

2.2 Bids are to be securely sealed andappropriately labelled "*W1054WTE - Supply, installation and maintenance of additional water flow metering technologies*"

2.3 No Bid(s) will be received if detached from the package in which it is bound; nor must any ofthe accompanying papers be detached therefrom, but the entire package must

be unbroken and unaltered, in good order, and enclosed in sealed envelope(s) when the Bid isdeposited.

3. SCOPE OF WORK

The scope of work to:

3.1 Supply an array of additional "smart" water flow meters to address volumetric usage and verification of existing water abstraction conditions.

3.2 Install, repair and maintain existing and/or new "smart" water flow meters and "smart" bulk water flow measuring devices.

3.3 Supply, install and maintain wireless communication (monitoring system)devices for both "smart" water flow meters and bulk water flow measuring devices, feeding volumetric data to an existing WEB-BASED software.

3.4 Construction of suitable reinforced concrete chambers or any other recommended structure, to prevent unauthorized access.

3.5 Supply field water flow measuring or field verification devices to verify the accuracy of water meters for pipeline application.

3.6 Make provision for high-level training of Departmental staff.

4. REQUIREMENTS

4.1 The successful Bidder shall be required to provide the following services and/or technologies:

REQUIRED **WATER FLOW METER TECHNOLOGIES**:

CATEGORY	PARAMETERS	TYPE OF WATER METER TO BE USED	OFFER NEEDED
1	For pipe diameters less than 75mm or Annual water sales less than R100 000.00	Mechanical water flow meter	**Yes**
2	For pipe diameters 600mm and above or Insufficient space to properly install an Electro-magnetic water flow meter	Ultrasonic water flow meter	**Yes**

3	Gravity fed pipelines that are half full and Open channel	Area velocity water flow meter	**Yes**

REQUIRED WATER FLOW METER **MONITORING TECHNOLOGIES**:

CATEGORY	TYPE OF METER	MONITORING DEVICE	OFFER NEEDED
1	Mechanical water flow meter	A suitable hand-held drive-by device for those areas where cellular phone coverage is dodgy and A suitable sensor with digital display unit and wireless communication to an existing WEB-BASED software	**Yes**
2	Area velocity water flow meter	A suitable hand-held drive-by device for those areas where cellular phone coverage is dodgy and A suitable sensor with digital display unit and wireless communication to an existing WEB-BASED software	**Yes**

4.2 The service provider must indicate the following:

4.2.1 Submit technical details of how the meter offered Operates, Maintained, On-field and Off-field verification of accuracy.

4.2.2 The prices for supply, installation and putting in operation the meters including the construction of meter chambers as required in unit cost.

4.2.3 Annual maintenance costs of each meter type offered.

4.2.4 Annual on-field and off-field verification costs of each meter type offered.

4.2.5 Demonstrate compliance with the necessary standards of meters to be supplied.

4.2.6 A compulsory 12 month Guarantee of meter functionality, workmanship and that of repairs.

5. ADDITIONAL INFORMATION ON EXISITNG BID W0815WTE

5.1 The Department of Water and Sanitation has an existing Bid W0815TWE, for the Supply, Installation and Maintenance of Electro-magnetic flow meters, for pipe diameters between 75mm – 600mm.

5.2 Also included in the above-mentioned Bid W0815WTE, isa suitable WEB-BASED software that receives these volumetric water flow data. The Department of Water and Sanitation uses this software to compile water efficiency reports and produce a file to be uploaded to SAP (version ECC6) for billing purposes.

5.3 All new metering technologies that are additional to the existing Bid shall be monitored using the existing WEB-BASED software. This software is specially configured for our needs and is called Water Meter Management System.

6. PRICING

6.1 PRICING FOR THE FOLLOWING:

ASSESSING OF WATER METERS AND BULK WATER MEASURMENT DEVICES, SUPPLYING, INSTALLATION OF WATER METER/BULK WATER DEVICES AND APPURTENANT WORKS IN SEVERAL LOCATIONS IN TERMS OF DEPTH AND REGION.

6.1.1 The Department expect the service providers to offer unit prices for each type of water flow meter. This price should be in line with the service provider solution. In the event when price is compared to the actual service provider proposal and it is found to be inaccurate and with various assumptions the Department reserves the right to disqualify the Bidder.

6.2 PRICING FOR THE FOLLOWING: SUPPLY AND INSTALLATION OF WATER FLOW METERS AND BULK WATER MEASURING DEVICES

6.2.1 Supply unit costs for each meter including supply, installation, annual maintenance, on-field verification, calibration costs and Operations & Maintenance manuals.

6.2.2 To furnishing of a detailed operations and maintenance manual for each of the supplied goods/ services;

6.2.3 The required water flow metering technologies are supposed to be installed at different localities as desired by the Department in the premises of domestic, industrial and agricultural consumers;

6.2.4 Water meters shall comply to the requirements of the Trade Metrology Act (Act 77 of 1973) and its Regulations and also SANS 1529-1; 2006 and ISO 4064-1;

6.2.5 Attach copy of proof indicating that water flow meter conforms to any of these three (3) standards JASWIC / SANS / SABS. *JASWIC–Joint Acceptance Scheme for Water Installations; SANS-South African National Standards; SABS-South African Bureau of Standards.*

6.2.6 Bidders shall submit full details of the required additional water flow metering technologies whose technical specifications shall comply with the following:

7. HOUSING

The housing shall be such as permit the unit to be installed in an underground chamber and shall meet the requirements for IP68 protection against environmental conditions.

7.1 TRANSMITTING UNIT

The transmitting unit shall be contained in a case and shall meet the requirements for IP68 protection against environmental conditions. This unit must at least be ready to be connected to remote reading technology or preferably be technologically equipped to communicate with remote meter reading systems.

7.2 RECEIVING UNIT

The receiving unit shall be digital, and shall display the rate of flow as a continuous line on a seven display calibrated in m^3 or m^3/hr as appropriate, and an integrating totalizer calibrated in m^3, also as appropriate. The totalizer shall not be re-settable.

The unit shall be contained in a case suitable for wall /panel mounting or as a combined item and shall meet the requirements for IP65 protection against environmental conditions.

7.3 CHAMBERS

All meters, valves and bypasses within the chamber must be supported, with adjustable pipe stands or concrete casts. Wood blocking are not acceptable means of support.

Vaults and chambers require drain connection to a storm drainage system. Where a gravity connection to the storm system is not available, the Department may approve one of the following options:

- Installation of a electric sump pump
- Installation of a rock pit.

The dimensions of the chamber will vary with the size of the meter installed, but the supply must ensure that on both sides of the pipe/meter installation there is a standing/working area for maintenance purposes.

The concrete reinforced concrete chambers shall be designed and constructed such that:

- 500mm clearance between the bottom-most edge of the pipe and the chamber floor
- 500mm on either side of the pipeline
- length of the chamber not less than 1800mm
- heightfrom chamber floor to chamber roof, to be at least 2000mm.

7.4 APPURTENANT WORKS.

Strainers must be installed immediately upstream of the meter using a flanged connection, to avoid any blockages that could impact readings – these should be easily unblocked so as to allow free flow of water. Strainers shall be of the same manufacture and size as the meter.

Isolation valves must be provided upstream and downstream of the meter to allow removal of meter and strainer cases. One valve must be installed on bypasses. A lock wing must be provided on the operating nut of bypass valves 50mm and smaller.

For all meter installations provide a straight section of horizontal pipe, five pipe diameters in length, between the strainer and the upstream isolating valve.

A test point must be provided for all meters 75mm in diameter and greater. In the absence of a test plug on the meter case, install a testing tee with a 50mm diameter threaded nipple and cap between the meter and the downstream isolating valve.

For meters 75mm in diameter and larger a mechanical flange adapter must be provided on the downstream side of the meter to provide flexibility for meter and strainer case removal.

7.5 COMMISIONNING

Unless otherwise specified in the Schedule of Quantities, the supplier will be required to provide the signal cables between the units and to commission the meters after installation.

8. COMPATIBILITY WITH EXISTING WEB-BASED SOFTWARE

The meter and installation process shall be compatible with the Department's existing billingsoftware application and be capable of transitioning to new versions of the software as upgradesare made. The Contractor shall work with the existing Contractors information systems provider/manager in order to link the new water flow measuring technologies with the existing WEB-BASED software.

9. PROGRESS MEETINGS

Progress meetings will be held on as required by the Department. The Department will establish the dates, timesand place(s) of the meetings, and conduct the meetings. The meetings will be conducted once amonth or more often if deemed necessary by the Department. The meetings shall be attended by theDepartments and Contractors personnel as well as any other individual pertinent to the agenda.

10. DISPOSAL OF OLD METERS

All meters removed and replaced will be the property of the Department and will be returned unlessa suitable disposal program is approved by the Department. The Contractor shall be held accountable for the returnof all old meters.

11. CIDB GRADING

Only Contractors who have a valid and active CIDB grading of 7 either in civil (CE) or mechanical (ME) designations shall be considered.

12. MULTIPLE CONTRACTORS

The Department shall appoint multiple contractors to execute this assignment i.e. more than one Contractor. Depending upon the number and geographical spread of qualifying contractors, thisassignment shall be allocated according to Provincial boundaries, OperationalCluster or even Operational Area.

13 BID ENQUIRIES

FURTHER TECHNICAL INFORMATION: queries and questions of clarity can be addressed to Mr LAV Manus contactable as follows: Tel: 012 336 8092 email: manusl@dws.gov.za and cc dlaminit2@dws.gov.za. The **Bid number and the subject name** of this Bid should be clearly identified on the subject line when an enquiry is made.

W1054WTE

SUPPLY, INSTALLATION AND MAINTENANCE OF ADDITIONAL SMART WATER FLOW METERING TECHNOLOGIES FOR THE DEPARTMENT OF WATER AND SANITATION FOR A TERM CONTRACT PERIOD OF THREE (3) YEARS

GENERAL SPECIFICATIONS

1. GENERAL TECHNICAL SPECIFICATIONS

1.1 MECHANICAL WATER FLOW METER

1.1.1 OPERATION

The turbine type water meter shall be able to measure raw water flowing through the meter. The mechanical drive should be able to convert/translatethe rotations into volume totalization displayed on the register dial face. Shall have provision to be read remotely and/or by a suitable drive-by hand held unit.

1.1.2 CONSTRUCTION

Meters shall consist of three basic components: Cast Iron EpoxyCoated main case, measuring element, and sealed register. The measuring element assembly includes the rotorassembly, vertical shaft and a calibration vane which eliminates the need for calibration change gears.

1.1.3 MAINTENANCE

Water metershall be engineered and manufactured to provide long-termservice and operate virtually maintenance free. If necessary the measuring element must be removable from the main body case for maintenance or replacement, without removing the entire body from the line.

1.1.4 STRAINERS

All meters shall contain a removable polypropylene plastic strainer screen. The strainer shall be located near the main case inlet port, before the measuring chamber. The strainer shall also function as the device that holds the measuring chamber in place within the main case. Straps or other types of fasteners shall not be accepted.

1.1.5 CONNECTIONS

The meter shall come with companion flanges for installation of meters on various pipe types and sizes in bronze or cast iron

1.2 BROCHURE

All Bidders should attach product brochure that shows the full technical specifications of the meter being offered.

1.2 UTRASONIC WATER FLOW METER

1.2.1 GENERAL

Type of flow meter required	**ULTRA SONIC**
Mode of operation	**TRANSIT TIME/TIME OF FLIGHT**
Pipe material	**CARBON STEEL, PVC, FIBRE CEMENT, DUCTILE IRON, FRPM, GRP, ETC**
Pipe outer diameter	**25mm to 8000mm**
Pipe wall thickness	**1 TO 100mm**
Pipe internal lining	**PAINTED, BITUMEN, EPOXY, ZINC.**
Average thickness of internal lining	**LESS THAN 1 MM TO 50 MM**
Pipe outer cover	**PAINTED, BITUMEN, EPOXY OR NONE**
Distance between transducers and signal converter	**UP TO 300 m**
Fluid to be measured	**RAW WATER**

1.2.2 FLOW METERS

The flow meter/s and other equipment shall be installed in an instrument panel that complies with the minimum requirements for IP 65 rating as per Part 3, Item 3.3.11. All cable entries shall be fitted with the appropriate size and type of cable gland. All cable glands shall comply with an **IP 68** rating. Only 230 V single phase, AC power is available and any other power requirements are to be provided for by the Bidder.

1.2.2.1 Each complete flow meter shall incorporate and or comply with the following

Dual path instruments shall use **FOUR** sensing units (transducers) per pipeline that are connected via transducer cable to the signal conversion unit. The instantaneous flow for each pipeline shall be continuously displayed by means of a separate and free standing digital indicator. The accumulated flow for each pipeline shall be continuously displayed by means of a non-resettable electro-mechanical counter. The sensing (transducers) units shall be electrically isolated from the pipeline. It shall have a facility to adjust for the various pipe diameters. It shall give a quantifiable indication of a fault condition and/or signal loss occurs.

1.2.3 TRANSDUCERS

Transducers to be used shall be of the non-wetted type and shall be externally mounted on the pipeline. No welding of any kind shall be allowed for the mounting of the transducers. All transducers shall only be attached to the pipeline with stainless SS306 or SS316 steel brackets. TRANSDUCERS SHALL COMPLY WITH AN IP 68 RATING. Transducer cables to be installed in 32 mm galvanized steel conduit. No more than four (4) transducer cables in any 32mm conduit. Secured at intervals of no more than 500 mm. All bends shall have inspection covers or covered draw boxes shall be installed.

1.2.4 FLOW ACCURACY FACTORY

Pipe Diameter 25mm to 8000mm
Velocity: ± **30** to **0,8m/s**: **0.2** % of reading.
Velocity: ± **0,8m/s** to **1,0 mm/s**: **1.0** % of reading.
Flow velocity range: **+ and – 30 m/s**
Repeatability: **Less than 0,5** % of full scale

1.2.5 POWER REQUIREMENTS

230 V, Single phase, AC power is available on some site.

1.2.6 OUTPUTS REQUIRED

DIGITAL DISPLAY (incorporated in signal conversion unit)
Liquidcrystaldisplay with LED back light.

ANALOGUE OUTPUTS
Isolated outputs: 0 to 20 or 4 to 20 milli amp, Load capability of isolated output at least 750 Ohm, 2 off Totaliser/pulse/frequency type of output [3 amp, 100 VDC, 1 Watt, 0.1 to 10 kHz], Totaliser/pulse/frequency output to be optically isolated

DIGITAL OUTPUTS
Output to be galvanically isolated,Protocol to be used on serial port: MODBUS, Variables to be date and time stamped, Access speed allowed on variables max 1 Sec

VOLUMETRIC FLOW DISPLAY [User selectable] Cubic meters/second, Liter/second

TOTALISER [Forward and reverse] selectable from **10000 TO 0,00001** m^3

1.2.7 DIGITAL INDICATOR

One indicator is to be supplied for each flow meter. The digital display shall be a 6-digit, 0.56" (14.2 mm) High Red L E D, giving a maximum display of 999999. The decimal point shall be selectable. A flashing display shall indicate totaliser overflow. Programmable to display the instantaneous flow and by means of a selector button the accumulated quantity of water. Front bezel shall meet NEMA 4/IP65 requirements. Shall have a lock-out facility to limit operator entry to the programmable settings and totaliser. Time base with a scale factor of 0.001 to 100.0 and a low-end cut-out. Shall be able to reset the integrator on totaliser overflow. The digital indicatorto be fitted into IP 66 enclosures in such a way that the reading is clearly visible with space available for the labeling and surge protection as specified.

1.2.8 TOTALISING COUNTER

One totalising counter is to be supplied for each flow meter. Mode of operation: **Electro/ mechanical,** Number of digits at least 8, Height of digits not less than 4mm, Non – resettable, Shock-stability to IEC 068-2-27: 600 M/s^2 ,Vibro-stability to IEC 068-2-6: 50 M/s^2, Minimum Pulse length DC counter: 20 ms
AC counter: 50 ms, The totalising countersto be fitted into IP 66 enclosures in such a way that the reading is clearly visible with space available for the labeling and surge protection as specified.

1.2.9 TYPE TESTING AND CALIBRATION

Type test certificates to be submitted with bid documents. Calibration certificate to be supplied for each instrument as supplied under this contract

1.2.10 INSTRUMENT CABINET

Flow meter,Digital indicator, Totalising Counter, Power supply, Batteries, Electrical surge protection and related equipment to be installed in the instrument panel. Minimum dimensions 800 (H) x 600(W) x 300 (D) Rated minimum degree of ingress protection: **IP 66,** Instrument panel and all doors to be constructed from glass fiber reinforced/impregnated polyester. Shall be wall mountable with 4 stainless steel wall mounting lugs giving a space of at least 10 mm between the enclosure and the wall. Shall be fitted with a painted metal chassis of at least 2,5 mm thick. The instrument panel to be fitted with a glazed door that allows sights of the indicator/s and integrator/s. The window to be at least 50% of the front area. Resistance of the enclosure with the glazed door to comply with IK 08 (5 Joules) to EN 50 102. The external door shall be removable and have concealed hinges and captive, stainless steel hinge pins. The external door shall have an in situ moulded polyurethane sealing gasket fitted to a groove. Only two closure points that are situated outside the sealed area. At least one of the closure points shall be lockable with a cylindrical barrel type lock and two keys shall be supplied for this lock. Fitted with an internal door for mounting of the totalisers and integrators. Each enclosure to be fitted with an M10 brass bolt, two brass nuts and two rubber washers of two mm thick that will act as an equipotential bar. All surge protection in the enclosure to be grounded onto this bolt. The earth mat connection shall terminate on this bolt on the outside of the cabinet.

1.2.11 SURGE PROTECTION

Irrespective of the surge protection as specified the successful Bidder shall fully guarantee all the equipment as supplied under this bid for the full guarantee period of at least 24 months.
APART FROM ANY SURGE PROTECTION AS MAY BE DEEMED NECESSARY BY THE BIDDER THE BIDDER SHALL MAKE PROVISION IN HIS BID FOR THE SUPPLY, INSTALLATION AND COMMISSIONING GUARANTEE OF THE FOLLOWING SURGE PROTECTION:

1.2.11.1 Single pole, Class II arrester in accordance with IEC 60364-7-712:2002-05, fitted with zinc oxide varistor, Dehn Guard, Rated voltage 275V AC, Max Discharge current (8/20): 40 kA, Response time<25 ns, 35 mm Din rail mounting.

1.2.11.2 Single pole surge arrester for Zone 0_B – 1, arrester in accordance with IEC 61643-1. Dehn gap, Rated voltage 255V/ 50 Hz, Nominal discharge current

(8/20) : 20 kA., Response time<100 ns, Voltage protection level, 1200 V, 35 mm Din rail mounting.

1.2.11.3 Two pole surge protection device with supervisory and disconnection with base and plug in module. In accordance with IEC 61643-1, Dehn rail, Nominal voltage 230V AC, Nominal Current 25 A, Nominal Discharge current (8/20): 5 kA, Response time<25 ns, Protection level <1200V, 35 mm Din rail mounting.

1.2.11.4 Two pole surge protection device with plug in module. Device in accordance with IEC 61643-21, Blitzductor, Nominal voltage up to 110V AC, Nominal Current 1A, Nominal Discharge current (8/20) : 20 kA., 35 mm Din rail mounting.

1.2.11.5 Transducer cable surge protection to be installed on all transducer cables, One unit for each transducer

1.2.11.6 Stranded Copper cable for connection of the pipeline spark gap to the earthmat and instrument cabinet equipotential earth point to earth mat. Cross sectional area not less than 35 mm^2. Complete with appropriately sized, crimped lugs. Installed in 25 mm^2 PVC ducting that is secured at intervals of no more than 500 mm apart.

1.2.12 GUARANTEE PERIOD/WARRANTY

ALL EQUIPMENT SUPPLIED UNDER THIS BID SHALL BE UNCONDITIONALLY AND FULLY GUARANTEED FOR A MINIMUM PERIOD OF 24 MONTHS FROM DATE OF COMMISSIONING.

1.2.13 OPERATION AND MAINTENANCE MANUALS

6 Operation and maintenance manuals to be supplied for EACH SITE. 3 Hard copies in suitable Arch-lever files and 3 CD's

1.2.14 CERTIFICATES

During the contract period at least four possibly five types of certificates are to be issued for each flow meter system. The five certificates are:

1.2.15 FACTORY ACCEPTANCE TESTING/INSPECTION

All equipment supplied under this Bid shall be fully factory tested and inspected to ensure its Bid compliance. All factory acceptance tests shall be witnessed by the Engineer on a mutually agreeable date before delivery to site. No equipment shall be accepted on site before a successful factory acceptance test.

It shall be proven with a wet test in a pipe of length at least 20 times the internal diameter and a diameter of not less than 100 mm that the equipment functions at a) no flow , b)with a flow velocity of at least 0.5m/s and c) at a velocity of more than 1.5 m/s.

1.2.16 PORTABLE UNIT AND TRAINING

All Bidders should provide unit costs for a portable unit that will be used for on-field verification of meters in service, which will be used by our staff. Make

provision for training DWS staff on the use of such a unit. Training may be per person and should include certification thereof.

1.2.17 BROCHURE

All Bidders should attach product brochure that shows the full technical specifications of the meter being offered.

1.3 AREA VELOCITY WATER FLOW METER

1.3.1 SCOPE

This specification covers an ultrasonic, area-velocity flow monitor. The instrument shall provide for indicating, transmitting, totalizing of the flow rate through partially filled or surcharged round pipes and rectangular, trapezoidal, egg or irregular shaped open channels.

1.3.2 GENERAL

1.3.2.1 Flow monitor to consist of a submersible ultrasonic sensor, connecting cable and remote enclosure with indicting, transmitting and controlling electronics. Entire systems shall have no moving parts.

1.3.2.2 Level measurement accuracy shall be ±0.25% of Range. Velocity measurement accuracy shall be ±2% of reading.

1.3.3 SENSING ELEMENT

A. Ultrasonic sensor shall be rated IP68 for continuous submersion in raw water.
B. Using the Doppler principle, the sensor shall measure fluid velocities from 0.03 to 6.2 m/sec and reverse flow to -1.5 m/sec.
C. Using ultrasonic echo-ranging principle, the submerged sensor shall measure liquid level from 25mm to 5000mm.
D. Level sensing circuitry shall include a temperature sensor for automatic temperature compensation.
E. Sensor shall be constructed of PVC and epoxy resin or any other material that are resistant to any fouling, corrosion and abrasion.
F. Sensor operating temperature shall be -20°C to 60°C).
G. Shall include manufacturer's recommended stainless steel sensor mounting bracket.

1.3.4 SENSING ELEMENT

A. Provide minimum length 8m tri-coaxial cable with potted bond to the Sensor head. Sensor cable shall be waterproof and electrically shielded. Exposed material shall be polyurethane only.
B. Extended sensor cable shall be shielded tri-coaxial to a maximum length of 150m. Cable shall be spliced with screw terminal connections in manufacturer's recommended steel Junction Box.

1.3.5 TRANSMITTER

A. The transmitter shall provide for field calibration to round pipes and open channels of any shape.
B. Calibration shall be via built-in 5-key calibration system with menu selection of parameters. Systems requiring calibration by Parameter codes, BCD switches or external calibrators shall not be accepted.

C. Calibration data shall be password protected and permanently stored through power interruptions for a minimum of 12 months.
D. Field calibration shall allow selection and automatic conversion of measurement units, measurement span, high/low flow alarm relay and flow proportional relay pulse rates.
E. Transmitter shall permit field programmable damping to smooth output in turbulent flow conditions.
F. Transmitter operating temperature shall be from -20° to 60°C. Transmitter shall contain a thermostat-controlled enclosure heater for condensation protection below -1°C.
G. Transmitter shall have three isolated 4-20mA outputs rated for 1000 ohm maximum load with menu-selectable 0-5VDC alternative. Outputs shall be configured to transmit level, velocity and flow.
H. Provide two relay contacts rated 5 amp SPDT programmable for flow proportionate pulse to a remote totalizer or sampler, high-low flow, velocity and/or level alarm, echo loss alarm.
I. Provide a white, backlit matrix LCD display indicating flow rate, level, velocity, relay states and 14-digit totalizer in user-selected engineering units.
J. Transmitter display indicating flow rate, units of calibration, totalizer and relay states shall be visible without opening cover.
K. Transmitter shall be housed in a wall-mount, watertight IP66 enclosure with hinged, clear cover. Mounting hardware shall be included.
L. Transmitter electronics shall be surge protected on AC power input, sensor and 4-20mA outputs.
M. Transmitter power input shall be 100-240VAC 50-60Hz with power consumption of 5.28 Watts or less.
N. The transmitter shall permit plug-in field installation and auto-detection of optional accessories including data logger and additional control relays.

1.4 PORTABLE UNIT AND TRAINING

All Bidders should provide unit costs for a portable unit that will be used for on-field verification of meters in service, which will be used by our staff. Make provision for training DWS staff on the use of such a unit. Training may be per person and should include certification thereof.

1.5 BROCHURE

All Bidders should attach product brochure that shows the full technical specifications of the meter being offered.

1.4 DRIVE-BY HANDHELD DATA COLLECTORS

To meet current meter reading requirements, suitable drive-by handheld data collectors must be capable ofreading all water flow meters throughout the Department. Data collectors must have the capability to collectand store meter readings at any time or the meter reading route through the use of analphanumeric keypad and probing of water meters equipped with absolute encoders. The datacollectors shall be able to obtain all types of readings on any particular route without requiringreprogramming of the handheld computer, physical change of software in the unit while in thefield, or access through special software menus contained within a given route/program. Inaddition, the data collectors shall include communication cradles for charging and loading thehandheld and probes for interrogating Sensor and other absolute encoder meters.

1.4.1 BROCHURE

All Bidders should attach product brochure that shows the full technical specifications of the drive-by handheld data collector being offered.

DWS reserves the right to test, assess and inspect this unit whether by own staff or by a private Consultant/Professional Service Provider.

2. STAFF

List the numbers (quantity) of staff in the following categories presently available within your own organisation:

Civil Engineering	:
Mechanical Engineering	:
Chartered accountant	:
GIS specialists	:
Project Management	:
Technicians	:
Foreman	:
Artisans	:
Skilled	:
Driver (EHMV - Extra Heavy Motor Vehicle)	:
Driver Operator (Extra Heavy Motor Vehicle with crane):	
Semi Skilled	:
General Workers	:
Administrators	:

Other:

_____	:
_____	:
_____	:
_____	:
_____	:

It is an expressed condition that the Contractor shall execute the contract under the supervision of a person appointed under General Machinery Regulations 2(1).

Who is the person appointed under the Act? _____

Is the certified copy of the letter of appointment herewith attached? (Y/N) _____

3. LABOUR COSTS

The following labour costs per appropriate skill level is required (per hour, unless otherwise specified). All prices given must **exclude** VAT.The labour costs herewith will be used during the Contract period to evaluate quotations submitted by the Contractor.

LEVEL	NORMAL TIME	OVERTIME	TRAVELLING TIME	DAILY LIVING OUT ALLOWANCE
Civil Engineering				
Mechanical Engineering				
Chartered accountant				
GIS specialists				
Project Manager				
Technicians				
Foreman				
Artisans				
Skilled				
Driver (EHMV)				
Driver Operator				
Semi Skilled				
General Worker				
Administration				

Working Hours:
The contractor shall work 8 hours per day. Time shall be in accordance with DWS regulations or as agreed between the Contractor and DWS

Overtime:
The Contractor shall request to the Department in writing approval prior to working overtime. The contractor shall indicate the benefit of the overtime to the Department, before this approval is granted. Emergency repairs will be exempted from the above prior approval process. Overtime shall be in accordance with the Basic Conditions of the Employment Act.

Travelling time:
The travelling time shall be the rates charged for personnel while travelling to and from site in order to execute the required tasks. Only 70% of the labour rate may be claimed for travelling.

Living Out Allowance:
The living out allowance shall include all food costs as well as any other costs that might arise when staying out, excluding accommodation.

Accommodation:
The Cost containment circular as updated from National Treasury shall apply.

1. Contractors Mobile Accommodation*(furnish full rates and/or unit costs for these)*. Failure to do so shall render this option none-available for the duration of contract.
2. Approved Establishments (Hotel, Guesthouses etc.) A maximum of **R1300.00** per person per night including dinner, bed, breakfast and parking shall be claimed.

4. TRANSPORT COSTS

Tariff is in cents per kilometre (exclusive of VAT) as from the dates below: No back charge of tariffs will be made before the under-mentioned dates for invoices already processed.

These rates are updated on a monthly basis by the Department of Transport.

Petrol

Engine swept volume CC	Sedan/station wagon	Light delivery vehicle (LDV) 4x2	Light delivery vehicle (LDV) 4x4	Mini bus/MPV
	A	B	C	D
	From Sept 2015	From Sept 2015	From Sept 2015	From Sept 2015
Up to 1250	243.0	215.0	352.7	328.3
1251 to 1550	304.6	273.9		
1551 to 1750	**334.0**	282.0		**328.3**
1751 to 1950	392.4	336.8		
1951 to 2150	403.6	373.2	**401.2**	410.5
2151 to 2500	478.3	**388.0**		481.3
2501 to 3500	591.8	405.2	461.7	602.2
Over 3500	673.6	472.5	527.2	673.7

Diesel

Engine swept volume CC	Sedan/station wagon	Light delivery vehicle (LDV) 4x2	Light delivery vehicle (LDV) 4x4	Mini bus/MPV
	A	B	C	D
	From Sept 2015	From Sept 2015	From Sept 2015	From Sept 2015
Up to 1250	223.4	238.7	352.3	**433.4**
1251 to 1550	289.4	294.3		
1551 to 1750	**310.9**	299.6		
1751 to 1950	325.5	339.9		
1951 to 2150	370.8	344.0	**421.5**	
2151 to 2500	434.6	**377.8**		542.5
2501 to 3500	559.3	387.2	471.1	578.9
Over 3500		517.9	533.1	660.7

The maximum permissible vehicle rates to be claimed during the execution of this assignment are written in **bolded** above, hence they are:

SEDAN/SUV/MPV : 1600cc (petrol or diesel)
LDV4×2/4×4 : 2500cc (petrol or diesel)

4.1 GREATER CAPACITY VEHICLES

The utilization of vehicles with greater engine capacity than above shall be requested in writing, where again, the Contractor shall indicate the benefit for to the Department for consideration.

4.2 HEAVY & EXTRA HEAVY MOTOR VEHICLES

Heavy and Extra Heavy Motor Vehicles (Diesel)

Load Capacity in (Tonne)	Rate per Kilometre (Rand/km)
5 to 8 Tonne (drop-side)	
5 to 8 Tonne (with crane)	
10 to 14 Tonne (drop-side)	
10 to 14 Tonne (with crane)	
20 to 30 Tonne (flat-deck)	

RATE PER KILOMETRE (Rand/km) = this rate does not include the driver/operator and is expressed in rand/km.

NOTE:

- Rates for all vehicles not listed above must be supplied by the bidder for approval.
- There is no provision for an additional rate for towing a trailer.
- Bidders are encouraged to furnish hourly rates or kilometre rates of plant applicable to the execution of this contract.

W1054WTE

SUPPLY, INSTALLATION AND MAINTENANCE OF ADDITIONAL SMART WATER METERING TECHNOLOGIES FOR THE DEPARTMENT OF WATER AND SANITATION FOR A TERM CONTRACT PERIOD OF THREE (3) YEARS

QUESTIONNAIRES

Clause	Description
F.1.1	**The Employer is: DEPARTMENT OF WATER AND SANITATION** Address: **Sedibeng Building, 157 Francis Baard (Schoeman) Street, Pretoria, 0001**
F1.2	**Interpretation** The tender data and additional requirements contained in the tender schedules that are included in the returnable documents are deemed to be part of these tender conditions.
F.1.3	**The Employer's Agent for Technical Information is:** Name: Mr LAV Manus Tel: 012 336 8092 E-mail: manusl@dws.gov.za & cc dlaminit2@dws.gov.za
F.1.4	**Reject or accept** The Employer may accept or reject any variation, deviation, tender offer, or alternative tender offer, and may cancel the tender process and reject all tender offers at any time before the formation of a contract. The employer shall not accept or incur any liability to a Tenderer for such a cancellation and rejection, but will give written reasons for such action upon written request to do so.
F.1.5	**Eligibility** Only those Tenderers who have in their management and employment suitably registered Professional Persons in accordance with the relevant South African legislature for Professionally Registered Persons and in terms of the relevant professional bodies, are eligible to submit tenders
F.1.6	**Support Resources** The Tenderer must indicate resources they intend allocating to this project when requested to do by the employer at any time
F.1.7	**Acknowledge Addenda** The Tenderer shall acknowledge receipt of addenda to the tender documents, which the employer may issue, and if necessary apply for an extension of the closing time stated in the tender data, in order to take the addenda into account.
F.1.8	**Alterations to documents;** The Tenderer must take note of the following; a) "No alterations, additions and reductions must be made to the tender document issued by the employer. b) No document must be unbounded or unbundled and other documents which were not part of the document added. c) All additional documents not requested by the employer and the Tenderer feels that they might be important, they must be placed in a separate enveloped and be clearly

Clause	Description
	marked **"Optional Additional Documents"** d) All signatories to the tender offer shall initial all such alterations. e) Erasures and the use of masking fluid are prohibited.
F.1.9	**Alternative tender offers** No alternative tender offers will be accepted.
F.1.10.	**Submitting tender offer:** **A two-envelope procedure will not be followed** a) Return all relevant documents binded together with a rubber band after completing them entirely in a sealed envelope with the requested attachments b) All attachments requested must be binded together and submitted as such together with the tender document clearly marked. c) Tenders must be signed by a person duly authorised to do so d) Tenders submitted by Joint Ventures or Consortiums / Partnerships shall be accompanied by the document of formation of such entities e) All tender documents shall be completed in **black ink** and in case of a mistake or an error, a line must be drawn through the error and authorised full signature and date must be attached.
F.1.11	The Tenderer must Accept that tender offers, which do not provide all the data or information requested completely and in the form required, may be regarded by the employer as non-responsive.
F.1.12	**Closing date and time:** Closing date: **17 November 2015** Closing Time: **11h00** **Location of Tender box: Ground Floor, ZwaMadaka Building** **Physical address: 157 Francis Baard street, Pretoria, 0001**
F.1.13	All late tenders will immediately be disqualified

BID NO: W1054WTE

FORM A COMPULSORY ENTERPRISE QUESTIONNAIRE

1.1 Name of firm : .....

1.2 VAT registration number:.....

1.3 Company registration number :.....

1.4 **TYPE OF FIRM**[TICK APPLICABLE BOX]

Partnership
One person business/sole trader
Close corporation
Company
(Pty) Limited

1.5 **DESCRIBE PRINCIPAL BUSINESS ACTIVITIES**

1.6 **COMPANY CLASSIFICATION** [TICK APPLICABLE BOX]

Manufacturer
Supplier
Professional service provider
Other service providers, e.g. transporter, etc.

1.7 **TOTAL NUMBER OF YEARS THIS FIRM HAS BEEN IN BUSINESS? .....**

1.7.1 **TOTAL ANNUAL TURNOVER? .....**

1.8 Particulars of Ownership of Bidding Entity. In the event of a consortia / joint venture each company must indicated separately

Name	Date/Position occupied in Enterprise	ID Number	Date RSA Citizenship obtained	* HDI Status			%of business / enterprise owned
				No franchise prior to elections	Women	Disabled	

**Indicate YES or NO*

1.9 I / We, the undersigned, who warrants that he / she is duly authorised to do so and I / we acknowledge that:

(i) The information furnished is true and correct.

(ii) If the claims are found to be incorrect, the purchaser may, in addition to any other remedy it may have -

(a) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;

(b) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;

Name of Bidder:.....

Date: .....

Signature :..... Position: .....

Full name of signatory: .....

Witness 1 .....

Witness 2 .....

The following Documents must be attached:

For Closed Corporations
CK1 or CK2 as applicable (Founding Statement)

For Companies
Shareholders register

For Joint Venture Agreement
Copy of Joint Venture Agreement between all parties, as well as the documents in (1) or (2) of each Joint Venture Member

Certified ID copies for members of the Bidding Entity
Attached ID copies of all shareholders in Bidding Entity

FORM B SCHEDULE OF PREVIOUS EXPERIENCE

Provide proof of 5 similar assignments and projects (Water, Sanitation) completed within the last 5 years by completing the table

No	Assignment / Project	Value in Rands	Date Assigned	Date Completed	Employer	Contact Person	Tel No
1.							
2.							
3.							
4.							
5.							

Name of Bidder :.....

Date: .....

Signature :..... Position: .....

Full name of signatory: .....

FORM C FINANCIAL REFERENCE

1. Banking Information

I/we hereby authorises the Client (Department of Water and Sanitation) to approach the following bank for the purposes of obtaining a financial reference. (Bank letter confirming details to be attached)

Bank Name	
Account Name	
Account Type	
Account Number	
Branch Code	
Address of Bank	
Contact Person	
Telephone Number	
How long has this Account been in existence	

2. Authorised Bank Account Information

I/we hereby authorises the Client (Department of Water and Sanitation) to process all payments due to us through EFT direct to the bank details provided.

Name of Bidder :.....

Date: .....

Signature:..... Position: .....

Full name of signatory: .....

DEPARTMENT OF WATER AND SANITATION

SUPPLY, INSTALLATION AND MAINTENANCE OF ADDITIONAL SMART WATER METERING TECHNOLOGIES FOR THE DEPARTMENT OF WATER AND SANITATION FOR A TERM CONTRACT PERIOD OF THREE (3) YEARS

BID W1054WTE

SCHEDULE OF PROPOSED SUBCONTRACTORS

We notify you that it is our intention to employ the following Subcontractors to work on this contract.
If we are awarded the contract we agree that this notification does not change the requirement for us to submit the names of proposed Subcontractors in accordance with requirements in the contract for such appointments. If there are no such requirements in the contract, then your written acceptance of this list shall be binding between us

[We confirm that all subcontractors who are contracted to clean and equip boreholes are registered as home builders with the National Home Builder Registration Council.]

No.	Name and Address of Proposed Subcontractor	Nature and Extent of Work	B-BBEE Level	Previous Experience with Subcontractor
1.				
2.				
3.				
4.				
5.				
6.				
7.				

Signed ..... Date

Name ..... Position

Bidder .....

INTRODUCTION

In terms of Regulation 4(4) of the Construction Regulations of July 2003, a Contractor may only be appointed to perform construction work if the Client is satisfied that the Contractor has the necessary competencies and resources to carry out the work safely in accordance with the Occupational Health and Safety Act, Act 85 of 1993 and the Construction Regulations of July 2003. In line with this requirement the Contractor is required to read through this document carefully, sign it and submit it with his/her Tender.

DECLARATION

1. I, the undersigned hereby declare and confirm that I am fully conversant with the Occupational Health and Safety Act, Act 85 of 1993 and the Construction Regulations of July 2003 and the Generic Construction Safety, Health and Environmental Specifications.
2. I hereby declare that my company and its employees has the necessary competency and resources to safely carry out the construction works under this contract in compliance with the Occupational Health and Safety Act, Act 85 of 1993, the Construction Regulations of July 2003 and the Generic Construction Safety, Health and Environmental Specifications.
3. I hereby confirm that adequate provisions has been made in my tender to cover the cost of all Safety, Health and Environmental duties and responsibilities imposed on me by the Occupational Health and Safety Act, Act 85 of 1993, the Construction Regulations of July 2003 and the Generic Construction Safety, Health and Environmental Specifications.
4. I hereby undertake that if my tender is accepted, to provide before commencement of the Works under the contract or as required by the Conditions of the Contract, a suitable and sufficiently documented Construction Safety, Health and Environmental Management Plan in accordance with Regulation 5(1) of the Construction Regulations of July 2003, which shall be subject to approval by the Client.
5. I confirm that I may not commence with any part of construction work under the contract until my Construction Safety Health and Environmental Management Plan has been approved in writing by the Client.
6. I hereby confirm that copies of the following documentation will be kept on site for viewing and inspection purposes for the duration of the construction work:
   a) Client's Construction Safety, Health and Environmental Specification.
   b) Approved Construction Safety, Health and Environmental Plan.
   c) Occupational Health and Safety Act, Act 85 of 1993.
   d) Construction Regulations of July 2003.

7. I agree that my failure to complete and execute this declaration to the satisfaction of the Client will mean that I am unable to comply with the requirements of the Occupational Health and Safety Act, Act 85 of 1993 and the Construction Regulations of July 2003, and accept that my tender will be rejected.

Duly signed at.....on this the..... day of..... 201.....

Full Name of Signatory

Name of Enterprise

Capacity of Signatory

Signature authorised representative Bidder

W1054WTE

SUPPLY, INSTALLATION AND MAINTENANCE OF ADDITIONAL SMART WATER FLOW METERING TECHNOLOGIES FOR THE DEPARTMENT OF WATER AND SANITATION FOR A TERM CONTRACT PERIOD OF THREE (3) YEARS

STANDARD SPECIFICATION

DWS 9900

SECTION C3

CORROSION PROTECTION OF VALVES, FLOWMETERS AND OUTLET PIPES

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1. SCOPE

This specification covers the corrosion protection of valves, flowmeters, steel pipes, plant and equipment subjected to environments with variable corrosive tendencies.

2. INTERPRETATIONS

2.1 PROJECT SPECIFICATION

Valves, flowmeters, outlet pipes, plant and equipment shall be manufactured and corrosion protected in accordance with the requirements specified in the Project Specification. No deviation from specification will be allowed without the written consent of the Project Engineer. In the case of there being conflict between specifications, the Project Specification will take preference.

2.2 APPLICATION

This specification contains clauses that are generally applicable to the corrosion protection of valves, flowmeters, outlet pipes, plant and equipment.

2.3 DEFINITIONS

LINING

Refers to the internal coating of valves and pipes.

COATING

Refers to the external coating of valves and pipes.

DIS-BONDED AREA

An area of lining or coating that initially did adhere to the steel substrate after application, but which subsequently became loose from the substrate as a result of mechanical, chemical or other action.

UN-BONDED AREA

An area of lining or coating which at no stage adhered to the steel substrate.

3. APPROVAL PROCEDURE

3.1 APPROVALS BEFORE AWARD OF CONTRACT

(a) The Corrosion Protection System specified in the Project Specification, shall be agreed upon between the Corrosion and Project Engineers.

(b) Approval by the Corrosion Engineer of the corrosion protection system, procedures and specific materials offered in the Tender. Manufacturer's data sheets or legible copies thereof shall be submitted for each product.

(c) Acceptance of the Departmental Quality Control Plan for Corrosion Protection - refer to DWS 2020 QCC1.

3.2 APPLICATION APPROVALS

(a) Qualification of personnel

(b) Quality of equipment

(c) Pre-preparation

(d) Surface preparation

(e) Application

(f) Final acceptance

4. GENERAL REQUIREMENTS

4.1 QUALITY ASSURANCE AND PROCEDURES

Quality procedures as specified in DWS 2020 shall be adhered to.

The production and application shall be in accordance with SABS ISO 9000, Quality System.

The Contractor shall be responsible for ensuring that he is fully conversant with the requirements of this specification and the relevant coating systems.

4.1.1 QUALITY PLAN

A detailed quality plan shall be submitted for approval and completion by the Corrosion Engineer before manufacture/coating is initiated – refer to DWS 2020 QCC1 section 1.

4.2 QUALIFIED STAFF

4.2.1 APPLICATION

A high standard of workmanship is required. Only experienced personnel shall be used to carry out corrosion protection work.

All work shall be carried out under the constant supervision of a qualified supervisor.

4.2.2 REPAIR WORK AT SITE

All repair work shall be done by competent personnel of the approved applicator under the supervision of a qualified supervisor.

4.3 COMPATIBILITY OF MATERIALS

The Contractor shall ensure that metals or alloys are compatible or are adequately protected if, in the galvanic series, there is more than 0,3 volt difference in the galvanic potential.

4.3.1 DESIGN PRECAUTIONS

All equipment shall be designed to suppress corrosion in an exposed environment.

4.3.1.1 ACCESSIBILITY

Easy access for protection and maintenance shall be provided. The use of back to back angles, partially open box sections or inaccessible stiffeners shall be avoided.

Corrosion protection of areas that are unavoidably inaccessible shall be specifically specified or approved by the Corrosion Engineer.

4.3.1.2 WATER RETENTION AREAS

Pockets, recesses and crevices in which water and dirt may collect shall be avoided. Water retention areas shall be properly drained by holes as large as possible i.e. 150 mm diameter – minimum 50 mm diameter.

Surfaces of corrodible metals, such as the insides of tanks or hollow sections that cannot be protected by any method (e.g. painting or dipping), shall be avoided, or where not possible, be fully sealed against ingress of air and moisture.

4.3.1.3 PERMANENT INSTALLATIONS

Permanent installations in concrete shall be manufactured from stainless steel as specified in Section 5.

4.3.2 CORROSION PREVENTION

The Contractor shall ensure that the following steps are taken to minimise corrosion:

(a) If dissimilar metals are used:

Coat all surfaces of the whole assembly including the more noble member of the galvanic series.

(b) If the noble member of the assembly cannot be entirely covered:

(i) Keep the anode/cathode ratio as large as possible in the particular component.

(ii) Use electrical insulators between two metals. Insulation must be complete, a bolt requires a sleeve as well as washers of an insulating material.

(c) Joints and crevices between metals shall be sealed.

(d) Where fastening is unavoidable, the fasteners shall be more noble (cathodic) than the base material. Fasteners shall be coated where possible and/or adequately electrically insulated between fasteners and the base material.

4.4 EQUIPMENT

4.4.1 MEASURING EQUIPMENT

The Contractor shall have the following measuring equipment at his shop or site at all times:

Ambient temperature gauge
Blast profile gauge
Dew point instrument
Dry film thickness gauge
Electric insulation defect detector
Surface temperature gauge
Relative humidity instrument
Wet film comb

All test equipment shall have current calibration certification.

All instruments shall be calibrated daily, except where otherwise specified by manufacturers, to achieve the required accuracy.

Dry film thickness gauges shall be calibrated on a flat surface, provided that the surface profile is in accordance with the specification.

4.4.2 SPRAY EQUIPMENT

Spray equipment shall be suitable for the production of high quality work, capable of properly atomising the material and equipped with suitable pressure regulators and gauges. Air caps, needles and nozzles shall be of the type recommended by the coating manufacturer.

All spray equipment shall be fitted with suitable oil and moisture traps.

4.4.3 MIXER

A low speed mixer, which does not introduce air into the coating material being mixed, shall be utilised.

4.5 INSTALLATION REQUIREMENTS

4.5.1 SUPPORTS

When pipes and valves without integrally cast supporting feet are installed or mounted on concrete supports, rubber insertion shall be used to insulate the pipe from the support. The thickness of the rubber insertion shall not be less than 10 mm and protrude not less than 20 mm all round.

4.5.2 ANCHORS IN CONCRETE

All permanent anchors in concrete shall be stainless steel to ASTM A240 grade 316.

Special care shall be taken to ensure that anchors be installed to the correct level and depth. Anchors shall not be cut after installation without prior inspection and approval of the Engineer.

To avoid a galvanic reaction (stainless steel/galvanizing) under wet conditions, the nut and washer shall be FBE coated. Where necessary caps shall be specified by the Corrosion Engineer.

4.5.3 SEALING

Where pipes enter or exit concrete, they shall be sealed on their circumference with a continuous polyurethane or polysulphide flexible sealer in a 25 mm square recess, to be approved by the Corrosion Engineer.

4.5.4 ARMOURING

Armoured or special protection shall be applied to the pipe surfaces at all road and rail crossings, through sleeves and culverts, and as requested by the Engineer.

4.6 HANDLING AND TRANSPORT

4.6.1 PHYSICAL PROTECTION

Adequate provision shall be made for the protection of the valve and pipe coating, between the completion of manufacture and installation.

The coated items shall not be handled within the drying time recommended by the coating manufacturer, relevant to the ambient temperature.

4.6.2 END COVERS

After inspection, testing and final acceptance, all ends (including branch ends), shall be sealed as follows:

All plain ends shall be sealed with plastic or other approved sheeting secured to the pipe circumference with double flat steel binding strips and all flanged ends shall be closed off with sturdy timber flanges.

All plastic covers and timber flanges to be clearly marked:

"NOT TO BE REMOVED BEFORE INSTALLATION"

Plastic covers and timber flanges shall remain in place during, handling, transport, storage and laying.

4.6.3 LIFTING

All coated items shall only be lifted by means of broad band slings that will not damage the coating. Slings shall not be less than 500 mm wide for pipes up to 500 mm nominal bore, 1 000 mm wide for larger pipes and 50 mm wide for other items, or as approved by the Engineer.

4.6.4 MARKING OF VALVES, PIPES, CRATES AND BAGS

(a) Each valve, pipe and special shall be legibly, indelibly and durably marked, (in such a manner that the coating is not damaged), with the following information:

- Contract number,
- Scheme name,
- Serial number of the pipe or special,
- Nominal diameter,
- Grade and thickness of steel,
- Hydrostatic test pressure,
- Item number.

(b) The bags and crates shall be tagged using metallic tags and shall indicate the following information:

- Contract number,
- Scheme name,
- Part numbers,
- Description,
- Sizes,
- Quantities.

Each bag or crate shall have the delivery address listed on a separate metallic tag.

4.6.5 TRANSPORT

Coated items shall be handled with due regard to the relatively soft nature of organic coatings and appropriate precautions shall be taken.

The Contractor is responsible for the safe delivery of all the items and small parts to site without damage. All items shall be securely packed to prevent damage while in transit.

If transported by a third party , the Contractor is responsible for ensuring protection of items as specified.

Precaution shall be taken to support and chock pipes on padded cradles or saw-dust filled bags to prevent movement when loading onto vehicles.

Where items are transported, the packing shall be of a thickness and positioned to ensure that they do not touch when they flex.

Items shall be firmly lashed or chained with padded lashing. The area of padded surfaces shall be adequate to prevent damage to coatings.

Bolts in strong hessian bags and other small components shall be labelled and crated. The bags and crates shall be tagged using metallic tags and shall be marked in accordance with paragraph 4.6.4 (b).

Each bag or crate shall have the delivery address listed on a separate metallic tag.

The Site Engineer shall be notified of the delivery date and of any requirements regarding off-loading and storage at site.

4.6.6 OFF-LOADING AT SITE

The supplier shall be responsible for the transportation and supervision during off-loading of the equipment and other small components at the delivery site.

Under no circumstances shall coated equipment be allowed to rest directly on the ground.

The final delivery inspection and acceptance of equipment supplied shall be undertaken on site after off-loading has been completed.

4.6.7 STACKING AND STORAGE

The Contractor shall provide all the necessary balks of timber and saw-dust filled bags used to support the items on soil, concrete or other hard surface and to separate them from each other both at his works and on site.

Grass or other vegetation shall not be allowed to grow in the storage area within three metres of the equipment.

4.6.8 DAMAGE

Any damage that occurs during the handling and storage of items at the Manufacturer/Contractor's works, including transportation to site, shall be repaired by the Manufacturer/Contractor at his own cost, in accordance with the specification and to the approval of the Engineer.

4.6.9 REJECTION

The Engineer has the right to reject any damaged items and materials which have been delivered and off-loaded at site.

5. RECOMMENDED COATING SYSTEMS

5.1 TOXICITY OF LINING MATERIAL

Materials used for the lining of valves and pipes shall be non-toxic and shall not impart any odour, taste, or colour to the water. Certification shall be submitted to the Corrosion Engineer for his approval.

5.2 PROPRIETARY ITEMS

Components that are supplied painted or protected e.g. gearboxes, actuators etc. **shall only be accepted** provided that they meet the corrosion protection requirements of this specification. If this specification cannot be adhered to the Contractor **shall submit full details of the equivalent paint systems** at tendering stage for approval by the Corrosion Engineer.

5.3 COATING SYSTEMS FOR VALVES, FLOWMETERS AND OUTLET PIPES

Selection of all corrosion protection systems shall be cleared with the Corrosion Engineer before finalisation of the Project Specification.

The following tables are abbreviated guidelines and the systems are not listed in order of preference.

See **NOTES** under paragraph 5.11.

5.4 OUTLET PIPES AND SPECIALS

5.4.1 ABOVE GROUND

ENVIRONMENT	MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
Above ground **For wet conditions see paragraph 5.8.5**	MS	Lining	1. Two pack Epoxy	400
			2. FBE	300
			3. Elastoplastic Polyurethane	1-3 mm
			4. HDG – See note 1	105
		Coating	1. Two pack Epoxy plus top coat of Re-coatable Polyurethane	250 40
			2. Multi-purpose Epoxy plus top coat of Re-coatable Polyurethane if required	250 40
			3. FBE plus top coat of Re-coatable Polyurethane	200 40
			4. HDG – See note 1 If required: Epoxy primer for galvanised surfaces plus top coat of Re-coatable Polyurethane	105 40-80 40

5.4.2 ENCASED IN CONCRETE

ENVIRONMENT	MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
Encased in concrete	3CR12 (See note 9) MS (See note 10)	Lining	1. Two pack Epoxy	400
			2. FBE	300
			3. Elastoplastic Polyurethane	2 mm
	3CR12	Coating	1. Two pack Epoxy	250
			2. FBE	200
	MS	Coating	1. Two pack Epoxy	300
			2. FBE	250
	SS 304 or SS 316 See note 6	Lining	1. Two pack Epoxy	250
			2. FBE	175
			3. Elastoplastic Polyurethane	1 mm
		Coating	1. Two pack Epoxy plus sealant of Polyurethane or Polysulphide – See note 2	150
			2. FBE plus sealant of Polyurethane or Polysulphide - See note 2	100
			3. Pickle and passivate – See note 3	
Buried in soil - chamber to coupling	All materials	Coating	Petrolatum wrapping system – refer Section 12	

5.4.3 BURIED IN SOIL

ENVIRONMENT	MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
Buried in soil	MS	Lining	1. Two pack Epoxy	400
			2. FBE	300
			3. Elastoplastic Polyurethane	1-3 mm
		Coating Depth < 4 m	1. Reinforced bitumen – refer paragraph 11.3.4	
			2. FBPE	2-3 mm
			3. Tape wrapping – refer paragraph 12.3.4	
			4. Two pack Epoxy plus tape wrapping – refer paragraph 12.3.5	300
			5. FBE plus tape wrapping – refer paragraph 12.3.5	200
		Coating Depth > 4 m and proximity of other services	1. Reinforced bitumen – armour wrapping – refer paragraph 11.3.4	
			2. FBPE	2-3 mm
			3. Armoured tape wrapping – refer paragraph 12.3.4	See par. 12.3.5
			4. Two pack Epoxy plus tape wrapping – refer paragraph 12.3.5	400
			5. FBE plus tape wrapping – refer paragraph 14.4	300

5.4.4 IN CHAMBER WALLS

ENVIRONMENT	MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
In chamber walls	3CR12 MS	Lining	1. Two pack Epoxy	400
			2. FBE	300
			3. Elastoplastic Polyurethane	1-3 mm
			4. HDG plus Epoxy primer plus Two pack Epoxy	105 40-80 300
			5. HDG plus FBE	105 250
		Coating See note 2	1. Two pack Epoxy plus top coat of pure Aliphatic Polyurethane plus sealant of Polyurethane or Polysulphide - See note 2	400 25
			2. FBE plus top coat of pure Aliphatic Polyurethane plus sealant of Polyurethane or Polysulphide - See note 2	300 25
			3. HDG plus Epoxy primer plus Two pack Epoxy plus top coat of pure Aliphatic Polyurethane	105 40-80 300 25
			4. HDG plus FBE plus top coat of pure Aliphatic Polyurethane	105 275 25
	SS 304 or SS 316	Lining	1. Two pack Epoxy	250
			2. FBE	175
			3. Elastoplastic Polyurethane	1 mm
		Coating	1. Two pack Epoxy plus top coat of pure Aliphatic Polyurethane plus sealant of Polyurethane or Polysulphide – See note 2	150 25
			2. FBE plus top coat of pure Aliphatic Polyurethane plus sealant of Polyurethane or Polysulphide - See note 2	100 25
Buried in soil - chamber to coupling	All materials	Coating	Petrolatum wrapping system - refer Section 12	

5.4.5 IN WATER

ENVIRONMENT	MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
In water and severe corrosion conditions	3CR12 MS	Lining	1. Two pack Epoxy	400
			2. FBE	300
			3. Elastoplastic Polyurethane	1-3 mm
		Coating	1. Two pack Epoxy plus pure Aliphatic Polyurethane	400 25
			2. FBE	300
			3. Elastoplastic Polyurethane	1-3 mm
			4. FBPE	2-3 mm
	SS 304 See note 6	Lining	1. Two pack Epoxy	250
			2. FBE	150
			3. Elastoplastic Polyurethane	1 mm
		Coating	1. Two pack Epoxy	250
			2. FBE	150

5.5 COUPLINGS AND FLANGE ADAPTORS (SEE PARAGRAPH 5.6)

MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
MS	Lining and Coating	1. Two pack Epoxy	400
		2. FBE	300
		3. HDG plus Epoxy primer plus Two pack Epoxy	105 40-80 250
		4. HDG plus FBE	105 250
SS 304	Lining and coating	Pickle and passivate – See note 3	
SS 304 buried	Lining and coating	1. Two pack Epoxy	150
		2. FBE	125

5.6 JOINTS

ENVIRONMENT	MATERIAL	SYSTEM	MINIMUM DFT (µm)
Plain Ended Pipes where couplings or flange adaptors are to be fitted	MS	Same as lining material for 300 mm from end	400
		Two pack Epoxy for cement mortar lining with 100 mm overlap inside and outside	400
Flanges of Bitumen wrapped pipes	MS	Same as lining material on top and back of flange with an overlap of 100 mm from the flange	400
		Two pack Epoxy for cement mortar lining with 100 mm overlap inside and outside	400
Flange faces	MS	Two pack Epoxy or FBE	60 - 90
Coupling or Flanged Joints Buried in Soil or in Wet Chambers	MS SS 304 SS 316	Coating system plus Petrolatum wrapping system - refer Section 13	
Welded Joints Buried in Soil and encased in concrete	MS SS 304 SS 316	As specified for lining and coating	

5.7 VALVES AND FLOWMETERS

5.7.1 VALVES AND FLOWMETERS (INCLUDING HANDWHEELS)

ENVIRONMENT	MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
	MS SG	Lining	1. Two pack Epoxy plus top coat of pure Aliphatic Polyurethane – where specified	400 25
			2. FBE plus top coat of pure Aliphatic Polyurethane – where specified	250 25
	SS 316	Lining	1. Two pack Epoxy plus top coat of pure Aliphatic Polyurethane – where specified	150 25
			2. FBE plus top coat of pure Aliphatic Polyurethane – where specified	125 25
			3. Pickle and passivate – See note 3	
Dry	MS SG	Coating	1. Two pack Epoxy plus top coat of Re-coatable Polyurethane	250 40
			2. Multi-purpose Epoxy plus top coat of Re-coatable Polyurethane if required	250 40
			3. FBE plus top coat of Re-coatable Polyurethane	200 40
Wet	MS SG	Coating	1. Two pack Epoxy plus top coat of pure Aliphatic Polyurethane – where specified	400 25
			2. FBE plus top coat of pure Aliphatic Polyurethane	250 25
	SS 316	Coating	1. Two pack Epoxy plus top coat of pure Aliphatic Polyurethane – where specified	150 25
			2. FBE plus top coat of pure Aliphatic Polyurethane – where specified	125 25
			3. Pickle and passivate – See note 3	

5.7.2 GEARBOXES

ENVIRONMENT	MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
Dry/Wet	CI SG	Lining	1. Two pack Epoxy	150
			2. FBE	125
		Coating	As per the valve specification – refer paragraph 5.7.1	

5.7.3 HYDRAULIC EQUIPMENT

5.7.3.1 HYDRAULIC CYLINDERS

ENVIRONMENT	MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
Dry/Wet	MS SS 304 SS 316	Coating	As per the valve specification – refer paragraph 5.7.1	

5.7.3.2 PIPES

ENVIRONMENT	MATERIAL	SYSTEM
Dry/Wet	SS 316	Pickle and passivate (avoid MS contact and contamination)

5.7.3.3 POWER PACKS

ENVIRONMENT	MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
Dry	MS	Lining	Two pack Epoxy	200
			FBE	125
		Coating	1. Two pack Epoxy plus top coat of Re-coatable Polyurethane	250 40
			2. Multi-purpose Epoxy plus top coat of Re-coatable Polyurethane if required	250 40
			3. FBE plus top coat of Re-coatable Polyurethane	200 40
Wet	MS	Coating	1. Two pack Epoxy plus top coat of pure Aliphatic Polyurethane	400 25
			2. FBE plus top coat of pure Aliphatic Polyurethane	250 25
	3CR12	Lining	Two pack Epoxy	150
			FBE	125
		Coating	1. Two pack Epoxy plus top coat of pure Aliphatic Polyurethane	250 25
			2. FBE plus top coat of pure Aliphatic Polyurethane	125 25
	SS 304	Coating	Pickle and passivate - See note 3	

5.7.4 ELECTRICAL EQUIPMENT

5.7.4.1 ACTUATORS

ENVIRONMENT	MATERIAL	SURFACE	SYSTEM	MINIMUM DFT (µm)
Dry/Wet	SG CI	Coating	1. Two pack Epoxy plus top coat of Re-coatable Polyurethane – where specified	250 40
			2. FBE plus top coat of Re-coatable Polyurethane – where specified	200 40
	DCA	Coating	1. Two pack Epoxy plus top coat of Re-coatable Polyurethane – where specified	200 40
			2. FBE plus top coat of Re-coatable Polyurethane – where specified	150 40
	SG/CI gearbox	Lining	1. Two pack Epoxy	125
			2. FBE	100

5.8 CONTROL CABINETS/PANELS

5.8.1 ELECTRICAL PANELS AND ENCLOSURES

ENVIRONMENT	MATERIAL	SYSTEM	MINIMUM DFT (µm)
Indoor – Dry	MS	1. Multi-purpose Epoxy plus Re-coatable Polyurethane if required	250 40
		2. Two pack Epoxy plus Re-coatable Polyurethane	250 40
		3. FBE	125
	PC ABS DCA	Un-coated	
	GRP	Polyester gelcoat	250
	3Cr12	1. Multi-purpose Epoxy plus Re-coatable Polyurethane if required	125 40
		2. Two pack Epoxy plus Re-coatable Polyurethane	125 40
		3. FBE	100
Indoor – Wet	3Cr12 or SS 304	1. Two pack Epoxy plus Re-coatable Polyurethane	250 40
		2. FBE	125
	DCA	FBE	75
	PC ABS	Un-coated	
	GRP	Polyester gelcoat	250
Outdoor	3Cr12 or SS 304	1. FBP	150
		2. Multi-purpose Epoxy plus Re-coatable Polyurethane if required	250 40

5.8.2 CABLE SUPPORT SYSTEMS

ENVIRONMENT	MATERIAL	SYSTEM	MINIMUM DFT (µm)
Dry Not exposed to UV	MS	1. Two pack Epoxy	250
		2. Multi-purpose Epoxy	250
		3. FBE	150
		4. HDG	85
	3Cr12	Pickle and passivate – See note 4	
Dry Exposed to UV	MS	1. Two pack Epoxy plus Re-coatable Polyurethane	250 40
		2. Multi-purpose Epoxy	300
		3. FBP	150
		4. HDG	85
	3Cr12	Pickle and passivate – See note 4	
Wet	3Cr12	FBE	100
	SS 304 or SS 316	Pickle and passivate – See notes 3 and 4	

5.8.3 CONDUIT

ENVIRONMENT	MATERIAL	SYSTEM	MINIMUM DFT (µm)
Indoor - Dry	MS	HDG	65
	PVC	Un-coated	
Indoor - Wet	SS 304	Pickle and passivate – See notes 3 and 4	
	PVC	Un-coated	
Outdoor	MS	HDG	65
	SS 304	Pickle and passivate – See notes 3 and 4	
Underground	HDPE PVC	Un-coated	
	SS 304	Pickle and passivate – See notes 3 and 4	

5.8.4 JUNCTION BOXES

ENVIRONMENT	MATERIAL	SYSTEM	MINIMUM DFT (µm)
Indoor – Dry	DCA	FBE	50
	PVC	Un-coated	
	GRP	Polyester gelcoat	250
Indoor - Wet	DCA	FBE	75
	PVC	Un-coated	
	GRP	Polyester gelcoat	250
Outdoor	DCA	FBP	75

5.8.5 CABLE MOUNTING STRAPS AND CLAMPS

ENVIRONMENT	MATERIAL	SYSTEM	MINIMUM DFT (µm)
Indoor	MS	HDG	45
	PVC	Un-coated	
	SS 304	Un-coated	
Outdoor	SS 304	Un-coated	

5.9 FASTENERS AND ANCHORS

5.9.1 FASTENERS

ENVIRONMENT	MATERIAL	SYSTEM	MINIMUM DFT (µm)
Fasteners and washers - Dry	MS	HDG plus threads coated with Molybdenum Disulphide lubricant or wax	45
	SS 304	Threads coated with Molybdenum Disulphide lubricant or Nickel Anti-seize compound	Uniform cover
Fasteners and washers - Wet/Submerged	SS 316	1. Pickle and passivate - See note 3 plus threads coated with Molybdenum Disulphide lubricant or Nickel Anti-seize compound	Uniform cover
		2. FBE coated (thread surfaces excluded) plus threads coated with Molybdenum Disulphide lubricant or Nickel Anti-seize compound	50
Fasteners and washers – Buried in soil	MS	1. HDG plus threads coated with Molybdenum Disulphide lubricant or wax plus Bitumen or Tape wrapping	45
	SS 304	1. Threads coated with Molybdenum Disulphide lubricant or Nickel Anti-seize compound plus Bitumen or Tape wrapping	Uniform cover
Fasteners for flange adaptors – Drilled and tapped	MS	HDG plus wet assembly with Epoxy or threads coated with Molybdenum Disulphide lubricant	45
	SS 304	Pickle and passivate - See note 3 plus wet assembly with Epoxy	Uniform cover
Fasteners for flange adaptors – Welded	SS 304	Pickle and passivate - See note 3	

5.9.2 ANCHORS

ENVIRONMENT	MATERIAL	SYSTEM	
Anchors in concrete - Dry See paragraph 4.5.1	SS 316	Threads coated with Molybdenum Disulphide Lubricant or Nickel Anti-seize compound	Uniform cover
Anchors in concrete – Wet See paragraph 4.5.1	SS 316	Threads coated with Molybdenum Disulphide Lubricant or Nickel Anti-seize compound plus nut and washer FBE coated	Uniform cover 50

5.10 STAINLESS STEEL ITEMS

SURFACES	COATING	MINIMUM DFT (µm)
Stainless steel components (Dissimilar materials in submerged conditions)	Two pack Epoxy or FBE to a smooth, glossy and uniform finish	125
3CR12 steel components (All submerged conditions)	Two pack Epoxy or FBE	400 250
Stainless steel components (Dry or compatible metal conditions)	Pickle and passivate – See note 4	
3CR12 steel components (Dry conditions only)	Pickle and passivate – See note 4	

5.11 ABBREVIATIONS AND NOTES

ABBREVIATIONS

ABS : Acrylnitrile-butadiene-styrene
Al : Aluminium
CI : Cast iron - grade 220
CS : Cast steel
DCA : Die cast aluminium
DFT : Dry film thickness
FBE : Fusion-bonded Epoxy
FBP : Fusion-bonded Polyester
FBPE : Fusion-bonded Polyethylene
GRP : Glass fibre reinforced Polyester
HDG : Hot-dip galvanized
HDPE: High Density Polyethylene
PC : Polycarbonate
PVC : Polyvinylchloride
MS : Mild steel – grade 300WA
SG : Spheroidal graphite cast iron – grade 420
SS : Stainless steel – grades 304, 304L, 316 and 316L
UV : Ultra Violet
3Cr12: Corrosion resistant steel
µm : Micrometer

NOTES

The following items shall be approved by the Corrosion Engineer

1.	Hot-dip galvanizing	- Only for pipes up to 200 mm diameter maximum and flow less than 2 m/s. - Pipes shall not be embedded in concrete. - Water analysis shall be provided. - Pipes over 200 mm diameter to be coated with a duplex system
2.	Sealant	- Interfaces of different environments shall be sealed with a Polyurethane or Polysulphide flexible sealant to be applied in accordance with the manufacturers data sheets.
3.	Un-coated stainless steel	- Only to be used if no galvanic reaction and anaerobic conditions are found.
4.	Pickle and passivate	- If not in contact with less noble material. - If exposed to anaerobic conditions seal-coat all crevices with Elastoplastic Epoxy. - Shall be done by the dipping process.
5.	Galvanic cells	- Where a galvanic cell is situated within a water path <150 mm and concrete cover <75 mm, both the MS, 3Cr12 or SS shall be coated.
6.	Anaerobic conditions	- SS grade 316L shall be used under anaerobic and aggressive water conditions.
7.	Polyurethane for colour coding	- Re-coatable or pure Aliphatic Polyurethane where required for colour coding. Only UV resistant Polyurethane shall be used.
8.	Primers	- Primers shall only be used in special cases i.e. over-coating of galvanized surfaces.
9.	3CR12	- In view of superior corrosion resistance, coated 3CR12 material is preferred
10.	Mild steel	- Mild steel may only be used where the pipe lining can be refurbished in situ
11.	Items subjected to high temperatures	- Items to be manufactured out of stainless steel or coated with heat resistant paint.
12.	Epoxy primer	- Epoxy primer may not be required if appropriate two pack Epoxy/ Re-coatable or pure Aliphatic Polyurethane is being used.

6 MANUFACTURE AND PRE-PREPARATION

6.1 RESPONSIBILITY

6.1.1 PRE-PREPARATION

The Manufacturer or Refurbisher shall be responsible for all the pre-preparation of equipment prior to surface preparation. Pre-preparation shall be carried out to the approval of the Corrosion Engineer and the Corrosion Protection Contractor.

6.1.2 PERSONNEL

Pre-preparation shall be carried out by competent personnel, under the supervision of an experienced supervisor.

6.1.3 MARKING

All items shall be permanently and indelibly marked to identify each individual item as specified by the Engineer.

6.2 FABRICATION REQUIREMENTS

6.2.1 SURFACE DEFECTS

All extrusions, rolled steel and castings shall be clean and free of score marks, pits, protrusions, blisters, porosity, blowholes, cracks or any other flaws which may be detrimental.

Laminations, scabs or occluded scale shall be ground out. If such grinding penetrates deeper than 7% of the metal thickness, the area shall be repaired by welding or the metal shall be rejected at the discretion of the Engineer.

6.2.2 UNDERCUTS, CAVITIES AND PITS

Weld undercuts and cavities as well as pits in metal surfaces are not permitted.

All undercuts, cavities and pits shall be ground out, re-welded and ground to a smooth contour.

6.2.3 WELDS

All welds shall be continuous and shall have a smooth contour.

Staggered welds, where specified, shall only be permitted with prior approval of the Corrosion Engineer on submission of appropriate remedial corrosion protection procedures.

Welding processes used shall limit heat input to a minimum to restrict the heat affected zone.

6.2.4 LIFTING LUGS

Where required, lugs shall be fitted by the manufacturer to the requirements of the Corrosion Contractor and the approval of the Engineer.

6.2.4.1 LUGS TO BE REMOVED

After removal the damaged coating area shall be repaired in accordance with the original Specification.

6.2.4.2 PERMANENT LUGS

Lugs, not intended to be removed, shall be manufactured of equal or more noble grade than the base material in accordance with the Specification.

6.3 REFURBISHMENT

6.3.1 INSPECTION PROCEDURE

Corrosion damage must be exposed by manual, mechanical or abrasive blast-cleaning for inspection. The refurbishment procedures shall then be specified by the Engineer.

6.3.2 PREPARATION METHODS

(a) Smooth out all shallow pits with a pencil grinder.

(b) Weld up and grind to a smooth finish where:

- More than 25% of the material has been lost by pitting corrosion.
- Material loss detrimentally affects the strength of the item.

(c) Replace damaged section.

6.4 PRE-PREPARATION

6.4.1 GENERAL REQUIREMENTS

6.4.1.1 PROTRUSIONS

Protrusions shall be removed by grinding and dressing to a smooth contour.

6.4.1.2 SHARP EDGES

Burrs and rough faces caused by guillotining, flame cutting, drilling, machining or punching shall be removed by grinding.

All sharp edges shall be radiused to a minimum of 2 mm.

6.4.1.3 WELDS

Welds shall be free from slag, slag inclusions, cracks, surface cavities and under-cuts.

Irregular projections shall be ground to a smooth contour.

Areas adjacent to welds shall be free from weld spatter. Such spatter shall be removed by grinding or scraping.

6.4.2 MATERIALS

6.4.2.1 CASTINGS

Castings with defects exceeding the restrictions given in the table below shall be rejected.

In the case of blowholes occurring opposite each other, the combined depth shall be taken into account.

Blowholes and cavities not exceeding 2 mm depth shall be smoothed out by grinding.

Acceptance criteria for the repair of blowholes and cavities.

SURFACE	DEPTH OF BLOWHOLES	DIAMETER OF BLOWHOLES	REPAIR
Internal	Maximum 20% of material thickness	40% maximum of material thickness	Welding only
External	Maximum 10% of material thickness	20% maximum of material thickness	Solvent free Epoxy or welding
External	10 to 20% maximum of material thickness	40% maximum of material thickness	Welding only

Castings shall, after inspection by the Engineer, be ground smooth.

Small and repaired blowholes shall be ground level and smooth.

6.4.2.2 HOT-DIP GALVANIZED ITEMS

The design and manufacture of all items to be hot-dip galvanized shall conform to SABS Code of Practice 0214.

Vent holes shall be drilled by the manufacturer, in accordance with the above Code of Practice, to the approval of the Engineer and Galvanizer.

The Silicon and Phosphorus contents of materials to be galvanized shall comply with the standard below. If no material certificates are available, samples of the materials shall be analysed for their Silicon and Phosphorus contents.

The following materials shall be used:

(a) For aesthetic appearance

- Aluminium-killed steel or
- Silicon-killed steel with a Silicon content not exceeding 0,04% and a Phosphorus content not exceeding 0,02%.

NOTE: Material certification shall be supplied.

b) For general corrosion protection

- Aluminium killed steel or
- Silicon killed steel with a Silicon content not exceeding 0,25% and a Phosphorus content not exceeding 0,02%.

6.4.2.3 CORROSION RESISTANT STEELS

Fabrication shall take place in dedicated areas separated from carbon steel.

All equipment used in the forming and manipulation of stainless steel items during fabrication shall be clean and free of materials that may contaminate the metal with carbon steel.

The manufacture of items from corrosion resistant steels shall be in accordance with the SASSDA's Information Series and the guidelines of the material supplier.

Discoloration caused by welding or cutting shall be mechanically cleaned by buffing followed by pickling and passivation in accordance with the SASSDA's Information Series and the guidelines of the material supplier.

Organic contamination shall be removed by degreasing.

Iron contamination shall be removed by pickling and passivation, by the dipping process after degreasing.

All surfaces shall be tested for free iron contamination by the water or the ferroxyl test method.

6.5 PRIMARY CLEANING

The Manufacturer or Refurbisher shall remove excessive oil, grease or other surface contaminants with a water soluble solvent degreaser followed by rinsing with clean soft water before the items are despatched to the Corrosion Protection Contractor.

7 SURFACE PREPARATION

7.1 STANDARDS

SABS	1344	Medium duty solvent detergent.
SABS	064	The preparation of surfaces for coating.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after overall removal of previous coatings.
SABS ISO	8504-2	Preparation of steel substrates before application of paints and related products – Surface preparation methods – Part 2: Abrasive blast cleaning.
SABS ISO	8503	Preparation of steel substrates before application of paints and related products – Surface roughness characteristics of blast-cleaned steel substrates.
SABS Method	770	Cleanliness of blast-cleaned steel surfaces for painting (freedom of soluble salts).
SABS Method	772	Profile of blast-cleaned steel surfaces for painting (profile gauge).
SABS Method	769	Cleanliness of blast-cleaned steel surfaces for painting (freedom from dust and debris).
ISO	11125	Preparation of steel substrates before application of paints – Metallic blast-cleaning abrasives.
ISO	11127	Preparation of steel substrates before application of paints – Non-metallic blast–cleaning abrasives.

7.2 RESPONSIBILITY

7.2.1 SURFACE PREPARATION

The corrosion protection Contractor shall be responsible for preparation of all surfaces to be coated.

On completion of the Contract, all plant, equipment, temporary structures and materials shall be removed from the site.

7.2.2 PERSONNEL

The Contractor carrying out the surface preparation shall have competent personnel with the necessary technical knowledge of the processes involved.

All work shall be carried out under the supervision of an experienced supervisor.

7.2.3 EQUIPMENT

Plant and equipment shall, to achieve the specified surface preparation, comply with the following:

(a) Equipment and air supply free of oil and moisture.
(b) Compressors shall have a capacity and pressure output to achieve the required nozzle pressures.
(c) Worn nozzles shall be replaced.

If the correct surface preparation is not achieved due to inadequate plant and equipment, the Engineer may order the Contractor to obtain such plant and equipment as may be necessary to achieve the specified results.

All plant, equipment and temporary structures shall at all times be maintained in good and safe working order.

7.2.4 WORKING CONDITIONS

Surface preparation shall not take place when conditions are likely to affect the corrosion protection processes adversely.

The Contractor shall provide screens, covers, trestles or any other equipment necessary to avoid contamination of surfaces and to minimise time delays caused by inclement weather.

7.2.5 HEALTH AND SAFETY

The Contractor shall at all times enforce health and safety measures necessary to comply with the Occupational Health and Safety Act No. 85 of 1993 and the manufacturer's requirements.

7.3 PROCEDURE

7.3.1 APPROVAL OF WORKS AND PROGRAMME

The Contractor's programme, plant and equipment and works shall be approved by the Corrosion Engineer prior to commencement of surface preparation.

7.3.2 INITIAL INSPECTION

Before accepting items from the Fabricator, the corrosion protection Contractor shall check the initial condition of the surface for:

(a) Visible surface defects
(b) Corrosion or contamination
(c) Any required metal dressing
(d) Elimination of burrs and radiusing of edges
(e) Removing of weld spatter and weld imperfections such as blowholes
(f) Suitable lifting lugs

7.3.3 DEGREASING

All surfaces to be coated shall be tested for oil and grease contamination by the water break free test.

Oil and grease contamination shall be removed by:

- Steam-cleaning
- An emulsifiable or aqueous detergent applied in accordance with SABS 1344.
- An alkaline cleaning solution.

Allow to react, then rinse off with clean, potable water to remove all residues prior to surface preparation, all in accordance with clauses 3.3 and 3.4 of SABS 064.

The surfaces shall be tested after degreasing and show no oil, grease and chemical contamination after degreasing.

Care shall be taken to avoid entrapment of cleaning agents in recesses or other retention areas.

7.3.4 ROUGH-BLAST

All rust, millscale, old coating or marking paint shall be removed by rough-blasting.

The Engineer shall be advised when blast-cleaning of the appropriate section will be completed so that an inspection can be carried out to determine if repairs are required.

Blast-cleaning shall be done in accordance with the code of practice SABS 064 to achieve a cleanliness of Sa 2. (SABS ISO 8501-1)

7.3.5 WATER SOLUBLE SALTS

The surfaces to be coated shall be tested for water soluble salts after blast cleaning. The maximum level of salts allowable on the surfaces shall not exceed the values given in paragraph 7.4.3.
Should these values be exceeded, the surfaces shall be cleaned by:

(a) A liquid soluble salt remover approved by the Corrosion Engineer or
(b) Washing with a high pressure jet of clean potable water or
(c) Water injected blast-cleaning or
(d) Flash-blasting until the soluble salts are within the specified limits.

7.3.6 FINAL-BLAST

7.3.6.1 FINAL-BLAST

7.3.6.1.1 Humidity and Temperature

All blast-cleaned surfaces shall be coated within:

Four (4) hours when humidity is less than 70% or

Two (2) hours when humidity is 70% and 85%.

Final-blasting shall not be carried out if the steel temperature is less than 3°C above dew point.

7.3.6.1.2 Blasting Material

Final blast-cleaning shall be carried out using clean, uncontaminated blast-medium in accordance with paragraph 7.4.2.

7.3.6.1.3 Cleanliness

All surfaces for "wet/submerged conditions" and for "dry conditions" shall be blast-cleaned to Sa 3 and Sa 2½ respectively.

7.3.6.1.4 Profile

The required surface profile specified in paragraph 7.4.1 shall be achieved by final-blasting in accordance with SABS 064 and SABS ISO 8504-2.

7.3.6.1.5 Residual Dust and Debris

Prior to coating, dust and debris shall be removed by vacuum-cleaning in accordance with SABS 769 and paragraph 7.4.1. Dust and debris may only be removed by blowing with clean uncontaminated compressed air, with prior approval of the Corrosion Engineer.

7.3.6.1.6 Contamination

After final-blasting un-coated steel shall not be touched with bare hands. All applicators shall wear white gloves and shoe covers where applicable.

7.3.6.2 FLASH-BLAST

Flash blast-cleaning shall be carried out to reinstate the surfaces as specified in paragraph 7.4.1; in accordance with paragraph 7.3.6.1.

7.3.6.3 SWEEP-BLASTING

Sweep blast-cleaning is used to create a fine, even profile on soft materials and to remove portions of a coating.

The parameters for sweep blast-cleaning are as follows:

Equipment and air supply	Free of oil and moisture
Nozzle pressure	Not greater than 300 kPa
Nozzle angle to the surface being cleaned	30 to 60°
Sweeping distance	450 to 600 mm
Abrasive – ultra fine non-metallic grit	Minimum 0,2 mm – maximum 0,8 mm
Grit	Only new grit shall be used

7.4 REQUIREMENTS

7.4.1 SURFACE CONDITIONS

Prepared surfaces shall be in accordance with the table below.

PROPERTY	FOR DRY CONDITIONS	FOR WET/SUBMERGED CONDITIONS	TAPE WRAPPING
Cleanliness to ISO 8501-1 (min) (SIS 055900)	Sa 2½	Sa 3	St 2
Residual dust and debris (SABS Method 769)	0,5%	0,3%	0,5%
Oil, grease and perspiration	Nil	Nil	Nil
Surface Profile (min) Coats up to 200 µm (max)	30 µm 50 µm	30 µm 50 µm	- -
Surface Profile (min) Coats up to 300 µm (max)	50 µm 80 µm	50 µm 80 µm	- -
Surface Profile (min) Coats up to 500 µm (max)	60 µm 100 µm	60 µm 100 µm	- -
Water soluble salts: Maximum at any point. Average of any 250 cm.	 500 mg/m^2 100 mg/m^2	 100 mg/m^2 100 mg/m^2	 500 mg/m^2 100 mg/m^2

Note: Surface profile shall be about ↓ of the coating thickness.

7.4.2 ABRASIVE MATERIAL

7.4.2.1 MATERIAL

The blast-cleaning abrasive shall be composed of clean, sound hard particles free from foreign substances such as dirt, oil, grease, toxic substances, organic matter, water soluble salts and foreign metals.

7.4.2.2 CERTIFICATION

The abrasive material supplier shall certify that all products supplied conform to all the requirements specified.

7.4.2.3 SHAPE AND SIZE

The individual abrasive particles shall be angular in shape and within the following sizes:

Non-metallic material	0,2 to 0,8 mm or 0,4 to 1,4 mm
Metallic material	0,3 to 0,9 mm

7.4.2.4 HARDNESS

The minimum hardness of abrasive material shall be as follows:

For non-metallic material	–	6 on the Moh's scale
For metallic material	–	390 HV

7.4.2.5 pH

The pH of the prepared slurry mixture shall not be below 6,2.

7.4.2.6 WATER SOLUBLE SALTS

The conductivity of slurry shall be less than 25 mS/m in accordance with ISO 11127.

7.4.2.7 MOISTURE CONTENT

The moisture content for abrasive material shall not exceed 0,2 percent.

7.4.2.8 RE-CYCLING

Re-cycled blasting-material shall only be used if:

(a) Blasting-materials were only used on degreased surfaces
(b) Dust and debris is removed from the blasting-material
(c) Particles are kept angular and within specified sizes

7.4.3 AIR SUPPLY

The air pressure at the nozzle shall be a minimum of 600 to 700 kPa.

Air supply equipment shall be fitted with efficient oil and water traps to avoid contamination of the surface.

7.5 SURFACE PREPARATION OF OTHER MATERIALS

7.5.1 GALVANIZED SURFACES TO BE COATED

7.5.1.1 PASSIVATION

Surfaces to be coated shall not be passivated.

7.5.1.2 DEGREASING

Galvanized steel surfaces shall be degreased prior to coating, using either a water soluble solvent degreaser in accordance with SABS 1344 and the manufacturer's instructions, or a mild acid-detergent degreasing solution to be approved by the Corrosion Engineer.

7.5.1.3 PROFILE

7.5.1.3.1 Sweep-blasting

Large areas shall be prepared by sweep-blasting with non-metallic abrasive in accordance with paragraph 7.3.6.3. Cracking, flaking, or any form of delamination of the zinc coating due to excessive blast-cleaning shall not be permitted. Removal of zinc by blast-cleaning shall not exceed 10 µm.

7.5.1.3.2 Mechanical

Surfaces that can not be sweep-blasted shall be abraded manually or mechanically with abrasive paper grade 220 or by using non-metallic abrasive pads.

7.5.1.4 DUST AND DEBRIS

Finally, all dust and debris shall be removed by vacuum-cleaning.

7.5.1.5 PRIMER

Primer for galvanised surfaces shall be applied immediately after surface preparation, not exceeding the time limits specified in paragraph 7.3.6.1.1.

7.5.2 ALUMINIUM SURFACES TO BE COATED

Aluminium surfaces to be coated shall be treated as follows:

7.5.2.1 DEGREASING

Surfaces shall be degreased in accordance with paragraph 7.3.3.

7.5.2.2 PROFILE

Sweep-blast with non-metallic abrasive in accordance with paragraph 7.3.6.3.

7.5.2.3 DUST AND DEBRIS

All dust and debris shall be removed by vacuum-cleaning.

7.5.2.4 PRIMER

Primer for aluminium surfaces shall be applied immediately after surface cleaning, not exceeding the time limits specified in paragraph 7.3.6.1.1.

7.5.3 CORROSION RESISTANT AND STAINLESS STEEL

Components fabricated from stainless steel shall not be contaminated with iron or mild steel.

7.5.3.1 UN-COATED SURFACES

Stainless steel surfaces shall not be contaminated with carbon steel, scratched or stressed.

The following areas shall be pickled and passivated:

(a) All un-coated areas.

(b) Ground and sheared edges.

(c) Heat affected zones caused by welding or cutting.

7.5.3.2 SURFACES TO BE COATED

7.5.3.2.1 Degreasing

Surfaces shall be degreased in accordance with paragraph 7.3.3.

7.5.3.2.2 Profile

Corrosion resistant steel surfaces shall be blast-cleaned with stainless steel grit or non-metallic abrasive to create a profile in accordance with table 7.4.1. The use of steel shot and steel or cast iron grit is strictly prohibited.

Where blasting is impractical, the surface shall be roughened manually with abrasive paper grade 220, disc grinders or flapper wheel abrasive pads. In all instances, clean, uncontaminated equipment must be used.

Surface profile shall be in the range of 30 to 50 µm.

7.5.3.2.3 Dust and Debris

Dust and debris shall be removed by vacuum-cleaning.

7.5.4 SYNTHETIC MATERIALS TO BE COATED

7.5.4.1 DEGREASING

Surfaces shall be degreased in accordance with paragraph 7.3.3.

7.5.4.2 PROFILE

Abrade the surface with abrasive paper grade 220 to achieve a uniform matt finish.

7.5.4.3 DUST AND DEBRIS

Dust and debris shall be removed by vacuum-cleaning.

7.5.5 COATED SURFACES

7.5.5.1 PRIMED SURFACES TO BE OVER-COATED

7.5.5.1.1 Degreasing

Surfaces shall be degreased in accordance with paragraph 7.3.3.

7.5.5.1.2 Profile

Primers to be over coated outside the over-coating period shall be abraded with abrasive paper grade 220 to a uniform matt finish.

All un-coated areas and all areas with micro rust shall be re-blasted to the original surface finish as specified.

7.5.5.1.3 Dust and Debris

Dust and debris shall be removed by vacuum cleaning.

7.5.5.2 COATED SURFACES TO BE REPAIRED

Spot repairs shall be carried out in accordance with the original specification or as specified by the Corrosion Engineer. Repairs shall overlap the undamaged area by a minimum of 25 mm. Repairs shall be built up to the original undamaged coating thickness.

7.5.5.2.1 Preparation of Bare Areas.

Bare areas shall be prepared by spot-blasting to Sa 3 in accordance with paragraph 7.3.6. If spot-blasting is not possible, clean with abrasive paper grade 220 to a bright metal surface.

7.5.5.2.2 Soluble Salts

The surfaces shall be tested for water soluble salts in accordance with paragraph 7.3.5.

7.5.5.2.3 Feathering of Coated Surfaces

The surrounding paint, which must be intact, shall be feathered for a minimum distance of 25 mm beyond the damaged areas.

7.5.5.2.4 Dust and Debris

Dust and debris shall be removed by vacuum-cleaning.

7.5.5.3 COATED SURFACES TO BE OVER COATED

7.5.5.3.1 Degreasing

Surfaces shall be cleared of all contamination and degreased in accordance with paragraph 7.3.3.

7.5.5.3.2 Profile

Coated surfaces to be over-coated outside the over-coating period shall be abraded with abrasive paper grade 220 to a uniform matt finish.

7.5.5.3.3 Dust and Debris

Dust and debris shall be removed by vacuum-cleaning.

7.5.5.3.4 Solvent-wiping

The surfaces to be coated shall be wiped with the solvent specified by the coating manufacturer and approved by the Corrosion Engineer.

Further coats shall then be applied as specified in the Project Specification.

7.6 TEST METHODS

Tests, instruments, methods and criteria shall be as specified below or in the Project Specification.

7.6.1 FREE OF OIL AND GREASE

7.6.1.1 WETTING WITH WATER

All surfaces cleaned of oil and grease shall be tested using the "water-break-free" method. The surface shall be wetted with water and the entire surface shall be covered by an unbroken film.

7.6.1.2 SOLVENT-WIPING

Where water soluble lubricants may be present the surface shall be further tested by wiping with a clean cotton wool swab soaked in solvent. No stain shall be evident on the swab after solvent-wiping.

7.6.2 WATER SOLUBLE SALT CONTAMINANTS

Substrate surfaces shall be tested for the presence of water soluble salt contaminants in accordance with SABS Method 770 or by means Weber Reilly Test.

7.6.3 STANDARD OF MECHANICAL SURFACE PREPARATION

Mechanical surface preparation shall be visually compared to the standard shown in SABS ISO 8501-1.

7.6.4 BLAST PROFILE

The blast profile of the substrate surfaces shall be determined in accordance with SABS Method 772.

7.6.5 RESIDUAL DUST AND DEBRIS

Substrate surfaces shall be tested for the presence of residual dust and debris in accordance with SABS Method 769.

7.6.6 BLASTING-MATERIAL

All blasting-materials shall be approved by the Corrosion Engineer.

7.6.6.1 METALLIC ABRASIVE

Abrasive shall be tested in accordance with ISO 11125 for particle size, hardness, density, foreign matter and moisture.

7.6.6.2 NON-METALLIC ABRASIVE

Abrasive shall be tested in accordance with ISO 11127 for particle size, hardness, density, moisture and water soluble contaminants.

8 EPOXY COATING SYSTEM

8.1 STANDARDS

Equipment, materials and operational methods shall comply with the relevant SABS, ISO, BS, DIN or equivalent American Standard.

The Contractor shall ensure that he is in possession of the latest editions of all the relevant National Specifications, Codes of Practice or Standards referred to in this specification.

Reference is made to the latest issues of the following Standard Specifications:

SABS	1091	National colour standards for paint.
SABS	1217	The production of painted and powder coated steel pipes.
SABS Method	769	Cleanliness of blast-cleaned steel surfaces for painting (dust and debris).
SABS Method	772	Profile of blast-cleaned steel surfaces for painting.
SABS ISO	2808	Determination of film thickness.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
BSS	5493	Protective coating of iron and steel structures against corrosion.
SABS ISO	9000	Model for quality assurance in production and installation.

8.2 MATERIAL

(a) The Contractor shall have the latest editions of all the relevant National Specifications and Codes of Practice and the manufacturer's data sheets of materials to be used available.

(b) Two pack Epoxies shall be in accordance with SABS 1217. Preference will be given to Contractor's utilising solvent free Epoxies in confined spaces.

Two pack Epoxies offered shall be either polyamide or polyamine cured.

(c) Multi-purpose Epoxy shall be of the high build, modified aluminium Epoxy mastic type, containing at least 90% solids.

(d) Materials and procedures shall comply with the relevant SABS Specifications and Codes of Practice.

(e) All materials in a coating system shall be purchased from the same manufacturer unless approved by the Corrosion Engineer.

(f) Details of coating materials to be supplied and approved – refer to paragraph 3.1.
The Contractor shall only proceed with the purchase of coating materials upon receipt of written approval from the Corrosion Engineer.

(g) Materials offered and subsequently approved shall not be changed without written approval of the Corrosion Engineer.

Coating material selection shall also be approved by the material manufacturer/supplier. The Contractor shall receive a written assurance from the material suppliers that the materials comply with the specified requirements.

(h) All coating materials shall be delivered in the manufacturer's original containers, clearly marked with the following:

- Manufacturer's name
- Product Brand and Reference Number
- Batch Number which may incorporate the date of manufacture
- Abbreviated instructions for storage and use of material, which shall include mixing ratios of the components of multi-component materials, minimum and maximum temperature of application and the method of application
- The SABS mark where applicable

(i) All coating materials shall be kept in an approved dry and enclosed store. The temperature shall not drop below 0°C nor exceed 40°C.

(j) Usage of materials shall be on a first in, first out basis and no materials shall be used that have exceeded the shelf life recommended by the manufacturer.

8.3 SPECIAL COATING AREAS

(a) Areas that are inaccessible after assembly shall be prepared and fully coated with the specified system to the specified requirements before assembly. The coating shall be fully cured before assembly.

(b) Mating surfaces of joints shall be coated with primer (where specified) or first coat only. The coating shall be uniform in thickness and shall not interfere with the mechanical tolerances. After assembly the outside surface of the joints shall be fully coated.

(c) Steel edges to be welded after coating shall not be coated for a distance of 50 mm from the welding edge. The unlined strip of grit blasted surface shall be temporarily protected with a coat of (red or a different colour to the lining/coating) weldable primer between coating application and installation.

(d) Friction grip areas shall be left un-coated unless otherwise specified.

8.4 APPLICATION

8.4.1 ACCEPTABILITY OF ITEMS TO BE COATED

Shall conform to sub-clause 4.1.1 of SABS 1217, with the proviso that pipes shall read items to be coated.

8.4.2 SURFACE PREPARATION

The Contractor shall satisfy himself that the condition of each item to be coated is such that it is fit for coating or lining, or both, as relevant. Immediately after surface preparation each item or special shall be examined, including the inside surface, where possible, for compliance with the relevant requirements of this sub-clause.

Pre- and surface preparation shall conform to Sections 6 and 7 respectively.

For pipes and specials intended for butt welding the prepared surfaces shall extend to the pipe ends.

8.4.3 COATING THICKNESSES

Coating thicknesses shall conform to Section 5 or as specified in the Project Specification.

8.4.4 MANUFACTURER'S INSTRUCTIONS

Recommendations supplied by the manufacturer in the form of the latest edition of printed data sheets, or given in writing on the manufacturer's letterhead, shall be followed.

The following details shall be made available to the applicator:

(a) Brand and type of epoxy resin
(b) Mixing and thinning instructions
(c) Recommended type and quantity of solvent required for thinning during application
(d) Pot life of mixed product
(e) Minimum and maximum recommended dry film thickness per coat
(f) Recommended time intervals between coats
(g) Recommended minimum and maximum steel surface temperatures during application
(h) Time for complete drying and curing on steel surfaces
(i) All relevant information the Supplier wishes to submit on his product
(k) Recommended method of coating application

Verbal information by the manufacturer's representative will not be accepted unless confirmed in writing by the Company.

8.4.5 COATING APPLICATION

8.4.5.1 ENVIRONMENTAL CONDITIONS

8.4.5.1.1 Dusty Conditions

Coatings shall not be applied in dusty or contaminated conditions.

8.4.5.1.2 Surface Temperature

Coatings shall not be applied if the surface temperature of the steelwork is less than 3°C above dew point or outside the range 5-40°C, unless otherwise specified by the coating manufacturer.

8.4.5.1.3 Relative Humidity and Time of Application

The first coat shall be applied as soon as possible after blast cleaning, but not exceeding four (4) hours if the relative humidity (RH) is below 70% or two (2) hours if the RH is between 70% and 85%. Refer to paragraph 7.3.6.1.

8.4.5.1.4 Ambient Temperature

Coatings shall not be applied when the ambient temperature is less than the minimum or greater than the maximum specified by the manufacturer of the coating material.

8.4.5.2 MIXING

The Contractor shall ensure that all paints are mixed in accordance with the requirements of Specification BS 5493.

All coating components, particularly two- or multi-component materials, shall be thoroughly mixed until a homogeneous mixture is achieved.

In the case of two-pack materials, each component containing pigments shall be thoroughly mixed. The two components shall then be mixed together in the proportions supplied by the Manufacturer until the mixture is completely homogeneous. For two pack materials, the use of part of the contents (split packs) is strictly forbidden.

In the case of solvent based Epoxy materials, it is recommended that the mixed material be allowed to stand for an induction period, as recommended by the manufacturer, before use.

During application, coating materials shall be agitated regularly to keep the solids in suspension. The preparation time, induction time and pot life of these materials shall be closely adhered to.

8.4.5.3 APPLICATION REQUIREMENTS

8.4.5.3.1 Equipment

Application equipment shall be maintained in a clean condition and in good working order.

The use of equipment not maintained in good condition may lead to rejection of the coating.

8.4.5.3.2 Compatibility of Coats

All primer, intermediate and finishing coats shall be mutually compatible.

8.4.5.3.3 Surface Restoration

Should immediate lining/coating not be possible, or should any atmospheric oxidisation take place between the completion of blast cleaning and commencement of lining/coating, such oxidisation shall be removed by flash blasting to restore the specified surface finish. Removal of dust and debris shall be in accordance with paragraph 7.3.6.1.5.

8.4.5.3.4 Supports

During coating application, the items shall be so supported to prevent damage to the wet coatings until the coatings have hardened adequately. Items shall remain supported during curing, storing and handling.

8.4.5.4 METHOD OF APPLICATION

8.4.5.4.1 Application

Epoxy coatings shall be applied by any appropriate method recommended by the manufacturer thereof, and approved by the Corrosion Engineer.

8.4.5.4.2 First Coat

The first coat shall be applied to a minimum dry film thickness of 40 µm above the peaks of the blast profile.

8.4.5.4.3 Cleanliness

During application and curing of the layers, the items shall be protected against contamination by dust or other foreign matter and shall be kept dry and shaded from direct sunlight.

All coats shall be clean and free from dust, oil, moisture and perspiration before over-coating.

Operators handling blast-cleaned or partially painted surfaces shall wear clean gloves to avoid contamination of the surface.

8.4.5.4.4 Stripe Coat and Crevices

All metal edges, up stands, welds, bolts and nuts shall be adequately coated. Additional stripe coatings shall be applied after initial priming, if ordered by the Engineer.

Special attention shall be given to crevices and edges to ensure complete coverage and uniform paint thickness.

8.4.5.4.5 Second and Subsequent Coats

The second and subsequent layers shall then be applied within the recommended over-coating periods.

8.4.5.4.6 Coat Colours

The colour of each subsequent coat shall be different to that of the previous coat except where two finishing coats of the same colour are necessary to achieve colour uniformity.

8.4.5.4.7 Over-coating Times

Over-coating times shall be not less than the minimum nor greater than the maximum specified by the manufacturer relevant to the ambient temperature.

Strict adherence to over-coating times is particularly important for coatings which are subsequently immersed.

8.4.5.5 PIPE ENDS

(a) Extension of Lining

For flanged pipes or specials and pipes or specials intended for joining with flexible couplings or for site welding by means of double sleeve weld-on couplings, the lining shall extend to the ends of pipes and specials including edges and shall overlap by at least 300 mm on the outside of the pipe. Coatings shall overlap epoxy surfaces on the outside by at least 25 mm.

(b) Butt Weld Edges

For pipes and specials intended for site butt welding, lining and coating shall extend up to a distance of 50 mm from the pipe ends.

The unlined circumferential strip of grit blasted surface shall be temporarily protected between the works and the site with a coat of (red or a different colour to the lining/coating) weldable primer.

8.4.5.6 IN-SITU APPLIED EPOXY LINING

In-situ application shall only be used to make good defects. No welding whatsoever shall be performed on any pipe or special on which the lining or coating has been completed, without the approval in writing of the Engineer. The temporary protected surfaces shall be blast cleaned before coating with the specified system. The approval shall only be considered by the Corrosion Engineer after submission by the Contractor of acceptable proposals for making good un-coated and damaged areas.

8.4.5.7 PROTECTION WITH TAPE WRAP

Pipes to be tape wrapped (when buried in soil) shall be wrapped in accordance with paragraph 12.3.4.

8.4.5.8 OVER-COATING WITH POLYURETHANE

8.4.5.8.1 Wet, Submerged or High Humidity Conditions

Pure Aliphatic Polyurethane

(a) The area to be over-coated shall be abraded with abrasive paper grade 220 to a uniform matt finish.

(b) The surface shall be vacuum-cleaned to remove dust and debris – refer paragraph 7.3.6.1.5.

(c) Contaminants shall be removed and surfaces prepared by wiping with an organic solvent.

(d) Over-coat with a 25 to 35 µm layer of pure Aliphatic Polyurethane in accordance with the Departmental colour code.

8.4.5.8.2 Dry or UV Conditions

Re-coatable Polyurethane

(a) The area to be over-coated shall be abraded with abrasive paper grade 220 to a uniform matt finish.

(b) The surface shall be vacuum-cleaned to remove dust and debris – refer paragraph 7.3.6.1.5.

(c) Over-coat with a 40 µm minimum layer of Re-coatable Polyurethane in accordance with the Departmental colour code.

8.4.5.9 QUALITY OF COATING

8.4.5.9.1 Finish

The fully cured coating shall have a uniform, smooth, gloss finish with proper adhesion.

8.4.5.9.2 Dry Film Thickness (DFT)

The Epoxy coating shall be evenly applied to the minimum final film thickness as specified in section 5 and shall be tested in accordance with paragraph 8.5.4.

8.4.5.9.3 Electrical Insulation Defects

All coated surfaces intended for water immersion or where likely to be frequently wetted under normal service conditions shall show no electrical insulation defects when tested in accordance with paragraph 8.5.3.

8.4.5.9.4 Finishing Coat Colours

The finishing coat colours shall be as specified in the Project Specification in accordance with the Departmental Colour Code.

Colours shall be in accordance with SABS 1091 as follows:

Valves and outlet pipes for raw water	Brilliant green to SABS 1091 code - H10
Valves and outlet pipes for chlorinated filtered water	Arctic blue to SABS 1091 code – F28
Handwheels	Golden yellow to SABS 1091 code – B49

Where not specified, the selection of final colours shall be approved by the Engineer.

8.4.5.9.5 Solvent Entrapment

Coatings showing evidence of entrapped solvents after full cure will be rejected. No inter-coat de-lamination shall be allowed.

The Contractor shall be held responsible for blistering of coatings, when shown to be caused by solvent retention.

8.5 TESTING

To be read in conjunction with paragraph 4.1, Quality Assurance.

8.5.1 CONTRACTOR'S AND ENGINEER'S INSPECTIONS

Paragraphs 1.4 and 3.1 of DWS 2020 shall apply.

8.5.2 VISUAL INSPECTION

All surfaces shall be inspected visually and shall be free from tears, runs, sags, wrinkles, blisters, change in colour or gloss, orange peel, dirt, visible pinholes, dust or fluff occlusions or any other visible defects.

8.5.3 HOLIDAY INSPECTION (ELECTRICAL INSULATION DEFECTS INSPECTION)

100a% of the lining and coating of all pipes shall be tested and there shall be no electrical insulation defects on any area inspected.

Except for coating containing conductive pigment (Zn, Al), low-voltage wet sponge electrical insulation defects inspection shall be carried out in accordance with SABS 1217 for coatings and linings of thickness not exceeding 500 µm.

For films exceeding 500 µm thickness, the high voltage, sparking electrical insulation defects detector is used in accordance with SABS 1217.

Inspection procedure shall ensure that sufficient moisture is present at all times i.e. only measure the bottom section of pipes.

8.5.4 DRY FILM THICKNESS (DFT)

(a) Measurements shall be taken in accordance with SABS ISO 2808, unless the frequency of readings is specified in the Project Specification.

(b) 100% of all coating thicknesses measured shall comply with the minimum requirements of the Project Specification.

(c) In the case of coats applied after the erection of steel work on Site, the frequency at which measurements of the DFT are taken shall be at the discretion of the Engineer's Inspector or the Engineers Representatives, and may be dictated by accessibility.

(d) DFT in excess of the prescribed maxima shall not necessarily constitute reason for rejection if the paint film is demonstrated to be sound in all respects.

(e) Owing to delayed solvent release, solvent-borne coatings shrink over a period of time resulting in a lower film thickness and therefore it is important that DFT measurements be taken within seven days.

DFT measurements taken at times beyond seven days after application, shall not constitute a valid claim against the original satisfactory and documented execution of the work.

(f) The method used to measure DFT, and the significance of the readings for each particular project, shall be agreed upon by all parties prior to commencement of the work.

8.5.4.1 AUTOMATED SHOP APPLIED LINING AND COATING

The film thickness on the first pipe and thereafter on at least one pipe selected at random from every day's production, but not less than one pipe out of every ten pipes, shall be measured non-destructively by an approved eddy current instrument. At least four readings at equally spaced intervals around the circumference, approximately 300 mm from each end of the pipe, shall be taken. The first reading shall be over the weld bead. When practicable an additional four readings at equally spaced intervals around the circumference in the centre of the pipe shall be taken. The thickness shall not be less than the minimum specified over 100% of the area including weld beads. The Inspectorate may at their discretion supplement the above test by checking wet film thickness on any or all pipes during application of the epoxy resin.

8.5.4.2 HAND AND IN-SITU APPLIED LINING AND COATING

All the applied lining and coating thicknesses shall be tested by means of an approved eddy current or magnetic instrument. At least four readings shall be taken at equally spaced intervals around the pipe circumference at any test point. The first reading shall be over the weld bead. The thickness shall not be less than the minimum specified over 100% of the area including weld beads.

8.5.5 DEGREE OF CURE OF TWO-COMPONENT MATERIALS

The degree of cure of a two-component material will vary with time, temperature and ventilation and shall be assessed by solvent wiping in accordance with the method given in SABS 1217 (methyl ethyl ketone resistance test)

8.6 DAMAGED COATINGS

(a) All repairs and procedures shall be approved by the Corrosion Engineer and subject to inspection procedures as set out in paragraph 8.5.1.

Where the damage is extensive the remedial procedures shall be agreed with the Corrosion Engineer in writing

(b) All repairs shall comply with the requirements of the repair-product manufacturer's data sheet. The Engineer may at his discretion request that repaired coating areas undergo adhesion tests.

(c) Any damage occurring during transit from the Contractor's premises to the site, shall be the responsibility of the Contractor. The Contractor responsible for installation of equipment at site shall repair and damage occurring on site during handling, assembly, storage, transport and erection.

(d) The repaired area shall be tested in accordance with sub-clauses 8.4 and 8.12 of SABS 1217 for compliance with the relevant requirements for thickness and electrical insulation defects respectively.

(e) Any item showing electrical insulation defects exceeding an average of five per square metre (a cluster of pinholes within a radius of 25 mm being regarded as a single defective area), or flaking or other signs of loss of adhesion, shall not be repaired. The item shall be blast cleaned and re-coated in accordance with the relevant requirements of the specification

8.7 REPAIR METHODS FOR MINOR DEFECTS

The repair of areas showing electrical insulation defects or low film thickness shall, if approved by the Corrosion Engineer, be carried out as follows:

(a) Degrease in accordance with paragraph 7.3.3.

(b) Thoroughly abrade the damaged area, including an adjacent surrounding area of at least 25 mm wide, with a medium grade 220 abrasive paper.

(c) Vacuum-clean the surface to remove dust and debris in accordance with SABS method 769 and paragraph 7.4.1.

(d) Wipe the abraded paint surface with methyl ethyl ketone and allow to dry

(e) Apply as many coats of repair material as necessary to achieve the specified thickness and finish.

NOTE: 1. When solvent borne materials are used, curing time between coats, as specified by the coating material manufacturer, shall be adhered to.

2. Apply a final top coat over the repaired area to achieve a pleasing, uniform finish of the item.

8.8 REPAIR METHODS FOR MAJOR DEFECTS

The repair of areas showing damage down to the steel surface shall, if approved by the Corrosion Engineer, be carried out as follows:

(a) Degrease in accordance with paragraph 7.3.3.

(b) Blast-clean all damaged areas to Sa 3 (SABS ISO 8501-1).

(c) Feather the surrounding paint for a distance of 25 mm beyond the damaged areas with a medium grade 220 abrasive paper.

(d) Vacuum-clean the surface to remove dust and debris in accordance with SABS method 769 and paragraph 7.4.1.

(e) Wipe only the abraded paint surface with methyl ethyl ketone and allow to dry.

(f) Apply as many coats of repair material as necessary to achieve the specified thickness and finish.

NOTE: 1. When solvent borne materials are used, curing time between coats, as specified by the coating material manufacturer, shall be adhered to.

2. Apply a final top coat over the repaired area to achieve a pleasing, uniform finish of the item.

9 FUSION BONDED EPOXY COATING SYSTEMS

9.1 FUSION-BONDED EPOXY COATING (HEAVY DUTY)

9.1.1 STANDARDS

Equipment, materials and operational methods shall comply with the relevant SABS, ISO, BS, DIN or equivalent American Standard.

The Contractor shall ensure that he is in possession of the latest editions of all the relevant National Specifications, Codes of Practice or Standards referred to in this specification.

Reference is made to the latest issues of the following Standard Specifications:

SABS	1217	The production of painted and powder coated steel pipes.
SABS Method	769	Cleanliness of blast-cleaned steel surfaces for painting (dust and debris).
SABS Method	772	Profile of blast-cleaned steel surfaces for painting.
SABS ISO	2808	Determination of film thickness.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
BSS	5493	Protective coating of iron and steel structures against corrosion.
SABS ISO	9000	Model for quality assurance in production and installation.

9.1.2 MATERIAL

Shall conform to SABS 1217, Type 2, powder coating.

9.1.3 APPLICATION

9.1.3.1 SURFACE PREPARATION

Pre- and surface preparation shall conform to Sections 6 and 7 respectively.

9.1.3.2 COATING THICKNESSES

Coating thicknesses shall conform to Section 5 or as specified in the Project Specification.

9.1.3.3 COATING APPLICATION

Items shall be heated to a temperature of 200°C (only applicable to heavy items) and coated with Fusion-bonded Epoxy by means of an electrostatic powder gun.

The normal procedures pertaining to powder application shall apply.

On completion of the coating, items shall be cured for 60 minutes at 200°C (mean temperature).

9.1.3.4 QUALITY OF COATING

9.1.3.4.1 Finish

The fully cured coating shall have a uniform, smooth, gloss finish with proper adhesion.

9.1.3.4.2 Film Thickness

The Epoxy coating shall be evenly applied to the minimum final film thickness as specified in section 5 and shall be tested in accordance with paragraph 9.1.4.4.

9.1.3.4.3 Electrical Insulation Defects

All coated surfaces intended for water immersion or where likely to be frequently wetted under normal service conditions shall show no electrical insulation defects when tested in accordance with paragraph 9.1.4.3

9.1.3.4.4 Finishing Coat Colours

The finishing coat colours shall be as specified in the Project Specification in accordance with the Departmental Colour Code.

Colours shall be in accordance with SABS 1091.

Where not specified, the selection of final colours shall be approved by the Engineer.

9.1.4 TESTING

To be read in conjunction with paragraph 4.1, Quality Assurance and SABS 1217.

9.1.4.1 CONTRACTOR'S AND ENGINEER'S INSPECTIONS

Paragraphs 1.4 and 3.1 of DWS 2020 shall apply.

9.1.4.2 VISUAL INSPECTION

All surfaces shall be inspected visually and shall be free from tears, runs, sags, wrinkles, blisters, change in colour or gloss, orange peel, dirt, visible pinholes, dust or fluff occlusions or any other visible defects.

9.1.4.3 HOLIDAY INSPECTION (ELECTRICAL INSULATION DEFECTS INSPECTION)

100% of all coated surfaces shall be tested and there shall be no electrical insulation defects on any area inspected.

Inspection procedure shall ensure that sufficient moisture is present at all times.

For films exceeding 500 µm thickness, a high voltage, electrical insulation defects detector shall be used in accordance with SABS 1217.

9.1.4.4 FILM THICKNESS

(a) Measurements shall be taken in accordance with SABS ISO 2808.

(b) 100% of all coating thicknesses measured shall comply with the minimum requirements of the Project Specification.

(c) Film thickness in excess of the prescribed maxima shall not necessarily constitute reason for rejection if the coating is demonstrated to be sound in all respects.

(d) The method used to measure film thickness, and the significance of the readings for each particular project, shall be agreed upon by all parties prior to commencement of the work.

9.1.4.5 DEGREE OF CURE OF FUSION-BONDED MATERIALS

The degree of cure of fusion-bonded material shall be assessed by solvent wiping in accordance with the method given in SABS 1217 (methyl ethyl ketone resistance test)

9.1.5 DAMAGED COATINGS

(a) All repairs and procedures shall be approved by the Corrosion Engineer and subject to inspection procedures as set out in paragraph 8.5.1.

Where the damage is extensive the remedial procedures shall be agreed in writing with the Corrosion Engineer.

(b) All repairs shall comply with the requirements of the repair-product manufacturer's data sheet. The Engineer may at his discretion request that repaired coating areas undergo adhesion tests.

(c) Any damage occurring during transit from the Contractor's premises to site, shall be the responsibility of the Contractor. The Contractor responsible for installation of equipment on site shall repair any damage occurring on site during handling, assembly, storage, transport and erection.

(d) The repaired area shall be tested in accordance with sub-clauses 8.4 and 8.12 of SABS 1217 for compliance with the relevant requirements for thickness and electrical insulation defects respectively.

(e) Any item showing electrical insulation defects exceeding an average of five per square metre (a cluster of pinholes within a radius of 25 mm being regarded as a single defective area), or flaking or other signs of loss of adhesion, shall not be repaired. The item shall be blast cleaned and re-coated in accordance with the relevant requirements of the specification

9.1.6 REPAIR METHODS FOR MINOR DEFECTS

The repair of areas showing electrical insulation defects or low film thickness shall, if approved by the Corrosion Engineer, be carried out as follows:

(a) Degrease in accordance with paragraph 7.3.3.

(b) Thoroughly abrade the damaged area, including an adjacent surrounding area of at least 25 mm wide, with a medium grade 220 abrasive paper.

(c) Vacuum-clean the surface to remove dust and debris in accordance with paragraph 7.4.1.

(d) Wipe the abraded paint surface with methyl ethyl ketone and allow to dry

(e) Apply as many coats of the following repair material as necessary to achieve the specified thickness and finish.

(i) Solvent free Epoxy or

(ii) Fusion-bonded Epoxy powder repair kit.

NOTE: 1. Apply a final top coat over the repaired area to achieve a pleasing, uniform finish of the item.

9.1.7 REPAIR METHODS FOR MAJOR DEFECTS

The total un-coated areas for renovation by the applicator shall not exceed 0,5 percent of the total surface area of a component. Each un-coated area for renovation shall not exceed 2 500 mm². If damaged areas are larger, the items containing such areas shall be re-coated.

The repair of areas showing damage down to the steel surface shall, if approved by the Corrosion Engineer, be carried out as follows:

(a) Degrease in accordance with paragraph 7.3.3.

(b) Blast-clean all damaged areas to Sa 3 (SABS ISO 8501-1).

(c) Feather the surrounding paint for a distance of 25 mm beyond the damaged areas with a medium grade 220 abrasive paper.

(d) Vacuum-clean the surface to remove dust and debris in accordance with SABS method 769 and paragraph 7.4.1.

(e) Wipe only the abraded paint surface with methyl ethyl ketone and allow to dry.

(f) Apply as many coats of the following repair material as necessary to achieve the specified thickness and finish.

  (i) Solvent free Epoxy or

  (ii) Fusion-bonded Epoxy powder repair kit.

NOTE: 1. Apply a final top coat over the repaired area to achieve a pleasing, uniform finish of the item.

9.2 POWDER COATING AS SPECIFIED IN SABS 1274

9.2.1 STANDARDS

Equipment, materials and operational methods shall comply with the relevant SABS, ISO, BS, DIN or equivalent American Standard.

The Contractor shall ensure that he is in possession of the latest editions of all the relevant National Specifications, Codes of Practice or Standards referred to in this specification.

Reference is made to the latest issues of the following Standard Specifications:

SABS	064	The preparation of steel surfaces for coating
SABS	1217	The production of painted and powder coated steel pipes.
SABS	1274	Coatings applied by the powder-coating process.
SABS Method	769	Cleanliness of blast-cleaned steel surfaces for painting (dust and debris).
SABS Method	772	Profile of blast-cleaned steel surfaces for painting.
SABS ISO	2808	Determination of film thickness.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
BSS	5493	Protective coating of iron and steel structures against corrosion.
SABS ISO	9000	Model for quality assurance in production and installation.

9.2.2 MATERIAL

Shall conform to SABS 1274, Type as specified in the Project Specification.

9.2.3 APPLICATION

9.2.3.1 SURFACE PREPARATION

Pre- and surface preparation shall conform to Sections 6 and 7 respectively.

If abrasive blast-cleaning is not practical, a surface conversion hot applied coating in accordance with SABS 064, Section 5 shall be applied.

9.2.3.2 COATING THICKNESSES

Coating thicknesses shall conform to Section 5 or as specified in the Project Specification.

9.2.3.3 COATING APPLICATION

The coating shall be applied by means of an electrostatic powder gun and the application of heat treatment to initiate fusion of the powder.

9.2.3.4 QUALITY OF COATING

9.2.3.4.1 Finish

The fully cured coating shall have a uniform, smooth, gloss finish with proper adhesion.

9.2.3.4.2 Film Thickness

The Epoxy coating shall be evenly applied to the minimum final film thickness as specified in Tables 1 to 6 of SABS 1274 and shall be tested in accordance with paragraph 9.2.4.4.

9.2.3.4.3 Electrical Insulation Defects

All coated surfaces likely to be frequently wetted under normal service conditions shall show no electrical insulation defects when tested in accordance with paragraph 9.2.4.3.

9.2.3.4.4 Finishing Coat Colours

The finishing coat colours shall be as specified in the Project Specification in accordance with the Departmental Colour Code.

Colours shall be in accordance with SABS 1091.

Where not specified, the selection of final colours shall be approved by the Engineer.

9.2.4 TESTING

To be read in conjunction with paragraph 4.1, Quality Assurance.

Testing shall be done in accordance with SABS 1274, Section 6 to comply with the requirements of Tables 1 to 6, Section 3.

9.2.4.1 CONTRACTOR'S AND ENGINEER'S INSPECTIONS

Paragraphs 1.4 and 3.1 of DWS 2020 shall apply.

9.2.4.2 VISUAL INSPECTION

All surfaces shall be inspected visually and shall be free from tears, runs, sags, wrinkles, blisters, change in colour or gloss, orange peel, dirt, visible pinholes, dust or fluff occlusions or any other visible defects.

9.2.4.3 HOLIDAY INSPECTION (ELECTRICAL INSULATION DEFECTS INSPECTION)

100% of all coated surfaces shall be tested and there shall be no electrical insulation defects on any area inspected.

Inspection procedure shall ensure that sufficient moisture is present at all times.

For films exceeding 500 µm thickness, a high voltage, electrical insulation defects detector shall be used in accordance with SABS 1217.

9.2.4.4 FILM THICKNESS

(a) Measurements shall be taken in accordance with SABS ISO 2808.

(b) 100% of all coating thicknesses measured shall comply with the minimum requirements of the Project Specification.

(c) DFT in excess of the prescribed maxima shall not necessarily constitute reason for rejection if the paint film is demonstrated to be sound in all respects.

(f) The method used to measure DFT, and the significance of the readings for each particular project, shall be agreed upon by all parties prior to commencement of the work.

9.2.4.5 DEGREE OF CURE OF FUSION-BONDED MATERIALS

The degree of cure of fusion-bonded material shall be assessed by solvent wiping in accordance with the method given in SABS 1217 (methyl ethyl ketone resistance test for epoxy materials).

9.2.5 DAMAGED COATINGS

No repairs of damaged coatings shall be accepted.

10 GALVANIZING

10.1 STANDARDS

Reference is made to the latest issues of the following Standard Specifications:

SABS ISO	14713	Protection against corrosion of iron and steel in structures - guidelines.
SABS EN	10240	Internal/external protective coatings for steel tubes.
SABS ISO	1461	Hot-dip galvanized coatings on fabricated iron and steel articles.
SABS Method	772	Profile of blast-cleaned steel surfaces for painting.
SABS ISO	2063	Metallic and other inorganic coatings – Thermal spraying.
SABS ISO	2808	Determination of film thickness.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
SABS	0374-1	The suitability of hot-dip galvanized steel piping for the transportation of water.
SABS	1344	Medium duty solvent detergent.
ISO	752	Zinc ingots.
EN	1179	Zinc and zinc alloys – primary zinc
SABS ISO	9000	Model for quality assurance in production and installation.

10.2 MATERIAL

(a) The impurities in the molten zinc, as defined in ISO 752 and EN 1179, shall not exceed a total of 1,5%.

(b) Steel to be hot-dip galvanized shall be:

(i) For aesthetic appearance

- Aluminium-killed steel or
- Silicon-killed steel with a Silicon content not exceeding 0,04% and a Phosphorus content not exceeding 0,02%.

NOTE: Material certification shall be supplied.

(ii) For general corrosion protection

- Aluminium killed steel or
- Silicon killed steel with a Silicon content not exceeding 0,25% and a Phosphorus content not exceeding 0,02%.

(c) The condition of articles to be hot-dip galvanized shall comply with "Annexure C" of SABS ISO 1461.

(d) The condition of tubes to be hot-dip galvanized on a continuous line shall comply with "Annexure A" of SABS EN 10240.

10.3 APPLICATION

(a) Shall only be done by members of the Hot Dip Galvanizers Association of Southern Africa (HDGASA) in accordance with SABS ISO 9000.

(b) Shall be in accordance with SABS ISO 1461 and SABS EN 10240 for tubes.

10.4 TOLERANCES

10.4.1 STEEL SPECIALS

Shall be in accordance with clause 6 of SABS ISO 1461.

10.4.1.1 SURFACE

The surfaces shall be free from nodules, blisters, roughness and sharp points. Un-coated areas, flux residues, lumps and zinc ash shall not be permitted.

Notwithstanding Clause 6.1 of SABS ISO 1461, in the case of handrails etc. a high quality surface finish is required and a bright smooth surface shall be achieved. Only materials specified under paragraph 10.2 (b) (i) shall be utilised. Double dipping shall not be allowed.

10.4.1.2 THICKNESS

The thickness of hot-dip galvanizing shall comply with the requirements of the table below.

Minimum coating thicknesses on items that are not centrifuged.

ARTICLES AND ITS THICKNESS	HEAVY DUTY COATING	LIGHT DUTY COATING	
	Coating thickness µm (min)	Local coating thickness µm (min)	Mean coating thickness µm (min)
≥ 6 mm ≤ Steel	105	70	85
3,0 mm ≤ Steel < 6,0 mm	80	55	70
1,5 mm ≤ Steel < 3,0 mm	65	45	55
Steel < 1,5 mm	55	35	45
Castings ≥ 6,0 mm	105	70	80
Castings < 6,0 mm	-	60	70

Heavy duty coatings are required except in the following cases:

(a) Where a high surface finish is required.

(b) Where otherwise specified in the Project Specification.

10.4.2 STEEL TUBES

Shall be in accordance with clause 7 of SABS EN 10240.

10.4.2.1 SURFACE

The surface of the coating shall be continuous, smooth and free from flux residues.

10.4.2.2 THICKNESS

The thickness shall comply with the requirements of the coating quality A1, in accordance with clause 8, Table 1 of SABS EN 10240, as specified below.

Minimum local coating thickness requirements for coating quality A1

Requirements	Coating quality A1
Minimum local coating thickness on the inside surface except at the weld bead	55 µm
Minimum local coating thickness on the inside surface at the weld bead	28 µm
Minimum local coating thickness on the outside	55 µm

surface	

10.4.2.3 ADHESION

The coating shall show no evidence of flaking or cracking when tested in accordance with clause 11.4 of SABS EN 10240.

10.4.2.4 COATING QUALITIES

(a) Coating qualities shall be A1 for water installations – see sub-clause 8.2 of SABS EN 10240.

(b) The surface of the coating on the inside shall be as smooth as can be achieved by steam blowing.

10.5 TESTING

10.5.1 STEEL ITEMS

To be read in conjunction with paragraph 4.1, Quality Assurance.

10.5.1.1 VISUAL EXAMINATION

Where a superior aesthetic appearance of hot-dip galvanizing is requested, a bright mirror surface finish shall be achieved by the galvanizer.

10.5.1.2 THICKNESS

Thicknesses shall be in accordance with paragraph 10.4.1.2 and shall be tested in accordance with sub-clause 6.2 of SABS ISO 1461.

10.5.2 STEEL TUBES

To be read in conjunction with paragraph 4.1, Quality Assurance.

10.5.2.1 VISUAL EXAMINATION

Where a superior aesthetic appearance of hot-dip galvanizing is requested, a bright mirror surface finish shall be achieved by the galvanizer.

10.5.2.2 THICKNESS

Shall be tested in accordance with sub-clause 11.3 of SABS EN 10240.

10.5.2.3 ADHESION

Shall be tested in accordance with sub-clause 11.4 of SABS EN 10240.

10.5.2.4 CHEMICAL ANALYSIS

Shall be tested in accordance with sub-clause 11.5 of SABS EN 10240.

10.6 REPAIR METHODS

10.6.1 STEEL ITEMS

The total un-coated areas for renovation by the galvanizer shall not exceed 0,5% of the total surface area of a component. Each un-coated area for renovation shall not exceed 400 mm². If un-coated areas are larger, the item containing such areas shall be re-galvanized.

The repair method shall be approved by the Corrosion Engineer before repairs are initiated.

Repairs shall be by zinc thermal spray in accordance with SABS ISO 2063 or three component zinc solvent free Epoxy repair system. The repair shall include removal of any scale, cleaning and any necessary pre-treatment to ensure adhesion – refer surface preparation Section 7.

The coating thickness on the renovated areas shall be a minimum of 30 µm more than the local coating thickness specified in paragraph 10.4.1.2 for the relevant hot-dip galvanized coating unless otherwise specified by the Corrosion Engineer. The coating on the renovated areas shall be capable of giving sacrificial protection to the steel to which it is applied.

10.6.2 STEEL TUBES

- Repairs shall not be allowed on internal surfaces of tubes. Tubes shall be re-galvanized.
- Repairs on external surfaces shall be in accordance with paragraph 10.6.1.

10.7 DUPLEX SYSTEM (HOT-DIP GALVANIZING + ORGANIC COATING)

10.7.1 SURFACE PREPARATION

10.7.1.1 SURFACE PASSIVATION

Items to be over-coated shall not be passivated.

10.7.1.2 CONTAMINANTS AND PHYSICAL FACTORS

The following contaminants shall be removed:

(a) Galvanizing residues and passivation products.

(b) Oil and grease.

(c) Perspiration and oil contamination from contact with hands.

(d) Dust and chemical contamination.

10.7.1.3 DEGREASING

Galvanized steel surfaces shall be degreased prior to coating, using either a water soluble solvent degreaser in accordance with SABS 1344 and the manufacturer's instructions, or a mild acid-detergent degreasing solution to be approved by the Corrosion Engineer.

10.7.1.4 SWEEP BLAST-CLEANING

Large areas shall be prepared by sweep-blasting with non-metallic abrasive in accordance with paragraph 7.3.6.3. Cracking, flaking, or any form of de-lamination of the zinc coating due to excessive blast-cleaning shall not be permitted. Removal of zinc by blast-cleaning shall not exceed 10 µm.

10.7.1.5 MECHANICAL CLEANING

Surfaces that can not be sweep-blasted shall be abraded manually or mechanically with abrasive paper grade 220 or non-metallic abrasive pads.

10.7.2. APPLICATION

Coatings shall be applied immediately after surface preparation in accordance with paragraph 8.4.5. All coating materials shall be applied strictly in accordance with the manufacturer's instructions.

In the case of nuts, bolts and other fasteners, care shall be taken to ensure that all edges are over-coated to the minimum specified thickness.

Only coatings approved by the Corrosion Engineer for application on hot-dip galvanized surfaces shall be used.

For additional protection under high humidity conditions and for colour coding Epoxy and Polyurethane coatings shall be applied to thicknesses specified in paragraph 5.

Epoxy primer may not be required if appropriate two pack Epoxy/ Re-coatable or pure Aliphatic Polyurethane is being used.

10.7.3. REPAIRS OF DUPLEX SYSTEM

To repair coatings damaged during transportation, handling or erection, the following procedures shall be followed:

10.7.3.1 DAMAGE DOWN TO BARE STEEL

(a) Degrease in accordance with paragraph 7.3.3.

(b) Thoroughly abrade the damaged area, including an adjacent surrounding area of at least 25 mm wide, with grade 80 abrasive paper.

(c) Vacuum-clean the surface to remove dust and debris in accordance with SABS method 769 and paragraph 7.4.1.

(d) Where originally over-coated with two component Epoxies, wipe the surface with methyl ethyl ketone and allow to dry.

(e) Apply sufficient coats of three component zinc solvent free Epoxy to a dry film thickness of 30 µm more than the original thickness of the zinc.

(f) When dry, apply the same system as originally applied so as to cover the damaged area extending for 25 mm over the surrounding area.

NOTE: 1. When solvent borne materials are used, curing time between coats, as specified by the coating material manufacturer, shall be adhered to.

2. Apply a final top coat over the repaired area to achieve a pleasing, uniform finish of the item.

10.7.3.2 DAMAGE DOWN TO ZINC SURFACE

(a) Prepare the surface as described in paragraph 10.7.3.1 - (a), (b) (c) and (d).

(b) Apply coating as described in paragraph 10.7.3.1 – (e) and (f).

NOTE: 1. When solvent borne materials are used, curing time between coats, as specified by the coating material manufacturer, shall be adhered to.

2. Apply a final top coat over the repaired area to achieve a pleasing, uniform finish of the item.

11. BITUMEN COATING SYSTEMS

11.1 STANDARDS

Reference is made to the latest issues of the following Standard Specifications:

DWS	9900	Standard corrosion specification.
DWS	9900	Section C – Manufacture, Pre and Surface Preparation.
SABS	1130	Glass fibre reinforcing material for pipe wrapping.
SABS	1136	Cold-applied bitumen primer for steel pipeline protection.
SABS	1137	Hot-applied bitumen for steel pipeline protection.
SABS	1178	The production of lined and coated steel pipes using bitumen or coal tar enamel.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
SABS ISO	9000	Model for quality assurance in production and installation.

11.2 MATERIAL

11.2.1 HOT APPLIED BITUMEN AND PRIMER

Shall conform to SABS 1137 & 1178. In all cases where bitumen or primer is to be stored in open tanks at elevated temperatures, or the storage temperature of the bitumen in enclosed tanks exceeds 180°C, the supplier shall be consulted and certificates obtained from him indicating recommended maximum temperatures and temperature/time relationships for storage. These certificates shall be made available to the Engineer or the Inspectorate on request.

NOTE: Bitumen that has been heated to a temperature in excess of 230°C shall be discarded.

11.2.2 COLD APPLIED BITUMEN PRIMER

Shall conform to SABS 1136

11.2.3 GLASS FIBRE TISSUE AND WOVEN WRAP

Shall conform to SABS 1130.

11.3 APPLICATION

11.3.1 ACCEPTABILITY OF PIPES

Shall conform to sub-clause 3.3.1 of SABS 1178.

11.3.2 SURFACE PREPARATION

Surfaces shall be prepared in accordance with Section 7 and shall conform to sub-clause 3.3.2 of SABS 1178 with preparation grade Sa 2½ of ISO 8501-1 and surface profile amplitude 75 micrometers (µm)

11.3.3 LINING

(a) Primers shall be applied in accordance with clause 3.5 of SABS 1178. The lining shall then be applied in accordance with clause 3.6 of SABS 1178, except that the maximum lining thickness shall be 5 mm.

(b) Where pipe ends are intended for jointing by butt welding, the lining shall be cut back 100 mm from each end of the pipe. The primer shall however extend over the full length of the pipe.

11.3.4 COATING

11.3.4.1 COATING PROCEDURE

The coating procedure shall conform to sub-clauses 3.5.2, 3.7.2 and 3.7.3 of SABS 1178 and as specified here.

11.3.4.2 RE-INFORCED COATING

The re-inforced wrapping shall be of glass fibre tissue and shall have a fifty (50) percent overlap from one end of the pipe to the other. On completion of the first wrap a further coat of hot bitumen of temperature not exceeding 230°C shall be applied, whilst a second wrap shall be applied in the same manner as the first, but in the reverse direction. On no account shall the bitumen layer between two wraps be less than 1 mm thick.

The minimum cover of bitumen over the second glass fibre tissue wrap shall not be less than 1 mm. The nominal thickness of the completed coating shall be 5,5 mm. The coating surface shall be free of surface craters, crazing, laminations, and pinholes and shall have an acceptable smooth surface.

11.3.4.3 ARMOURED COATING

Armoured coated pipes shall, where specified in the Schedule of Quantities and in the documents, be "armoured" against mechanical damage as follows:

Immediately after completion of the second glass fibre tissue (to SABS 1130, Type 1) wrap, a further coat of hot bitumen, not exceeding 230°C, shall be applied with bitumen impregnated woven glass fibre reinforcement, (to SABS 1130, Type 2 or Type 3) as in the above paragraphs (a) and (b).

It shall be helically wound around the pipe as a single wrap from end to end, applied under tension with a minimum overlap of 35 mm.

On no account shall the minimum thickness of the bitumen layer between the outer wrap and the second tissue wrap be less than 1,5 mm.

The minimum cover of bitumen over the woven glass fibre outer wrap shall not be less than 1,0 mm.

The nominal thickness of "armoured" coatings shall be 7 mm.

11.3.4.4 PIPE ENDS

Treatment of pipe ends shall conform to sub-clause 3.7.11 of SABS 1178.

Where pipe ends are intended for jointing by slip couplings, the coating shall be cut back 250 mm from the end of the pipe.

11.3.4.5 REFLECTIVE FINISH

Reflective finishes shall conform to paragraph 11.3.7 and sub-clause 3.7.10 of SABS 1178.

11.3.5 BITUMEN COATING OF PIPES WITH LININGS OTHER THAN BITUMEN

Bitumen and glass fibre reinforcement shall comply with paragraphs 11.2.1 and 11.2.3 respectively. Cold applied bitumen primer shall conform to SABS 1136.

11.3.5.1 APPLICATION OF COATING

(a) Within four (4) hours of having been grit blasted, and provided the pipes and specials are kept dry and free of dust, cold applied bitumen primer shall be applied by brush, spray, roller or mechanical equipment. The pipe or special shall be supported on skids or in any other suitable manner to avoid damage to and contamination of the primed surface. Primer shall be applied in a uniform manner and at the coverage rate specified or as recommended by the manufacturer, but at a rate of not less than 0,8 litres per square metre of pipe surface. Particular care is required to ensure complete penetration and coverage of welds and sharp edges. All defects in priming shall be immediately touched up by brush, care being taken to overlap the joint with the correctly primed area. Care shall be taken not to contaminate the inside of the pipes or specials with the primer.

All equipment used for priming shall be maintained in a clean condition. Primer shall be stored in sealed containers and before material is drawn from containers, the contents shall be agitated or stirred to ensure uniformity. After sufficient material for application is withdrawn, containers shall be sealed immediately to prevent contamination or loss of solvent. Material shall not be kept in open containers overnight, nor shall it be exposed to the sun. Primer which has become fouled with foreign substances shall be discarded. Primer shall be maintained at the correct consistency by mechanical agitation during application. Thinners may be used as recommended by the manufacturer, provided the thinners are uniformly mixed with the primer before use.

(b) As soon as the primer is dry to the touch, but not later than three (3) days after application of the primer and provided primed surfaces are kept clean, dry, free from dust and shaded from sunlight, the primed pipes shall be transferred to a lathe-like coating machine. Coating shall further proceed strictly in accordance with paragraph 11.3.5.

Reflective finishes shall only be applied and the specified inspections and non-destructive tests shall only be carried out after the lining, if applicable, has been completed and fully cured.

11.3.6 LINING AND COATING OF SPECIALS

In the case of specials, where length and/or shape preclude the application of lining and coating by the mechanical processes as described for pipes, the lining and coating shall be applied by hand. The lining and coating shall not be inferior to that applied by machine. The standards of pre-cleaning of specials and linings and coatings applied to specials shall comply with all the requirements of this specification.

11.3.7 REFLECTIVE FINISH

Bitumen coated pipes shall be given a temporary reflective finish of white wash to minimise heat absorption in transit and prior to laying and back filling on site.

11.4 TOLERANCES

The minimum acceptable lining thickness shall be 2,5 mm and the maximum acceptable thickness 5 mm.

The nominal coating thickness shall be 5,5 mm with a tolerance of -0,5 mm and +0,5 mm.

The nominal thickness of "armoured" coatings shall be 7,0 mm with a tolerance of –0,5 mm and +0,5 mm.

11.5 SPARE PIPES

Spare pipes shall be lined and coated in accordance with paragraph 4.7.

11.6 TESTING

To be read in conjunction with paragraph 4.1, Quality Assurance.

11.6.1 VISUAL INSPECTION

(a) Linings shall have a smooth glossy finish and shall be free from ripples, runs, pinholes, craters, bubbles, laminations and visible impurities.

(b) Coatings shall be free of surface craters, crazing lamination, dis-bonding, un-bonded areas, pinholes and shall have an acceptable smooth surface. No hollow sounds shall be detected when the coating is tapped. The glass fibre reinforcement of the fibre pattern thereof shall not be discernible on the bitumen surface.

11.6.2 NON-DESTRUCTIVE TESTS

11.6.2.1 HOLIDAY TESTING

Shall conform to sub-clause 7.2.2 of SABS 1178.

11.6.2.2 THICKNESS TESTING

On each pipe in the sample, taken in accordance with paragraph 11.6.4.2 (b), the thickness of lining and coating shall be measured by means of a suitable magnetic or eddy current instrument. The instrument must be designed for non-destructive measurement of the thickness of non-metallic films on a magnetic base and be suitable for use on curve surfaces. Set zero and calibrate the instrument on steel similar to that used in the manufacture of the pipe, using a suitable shim of which the thickness is approximately equivalent to the thickness of the coating/lining under test. Take readings as specified in sub-clause 7.2.1 (a) and (b) of SABS 1178.

11.6.3 DESTRUCTIVE TESTS

11.6.3.1 PEEL TEST ON LINING

Shall conform to sub-clause 7.3.2 of SABS 1178. Three tests shall be carried out, one of which shall be over the longitudinal or spiral weld seam, the test areas being approximately 120° apart. The lining shall not be accepted as having passed the test if the average of the three peel length readings is greater than 3 mm.

11.6.3.2 CONDITION OF BITUMEN

Shall conform to sub-clause 7.3.3 (a) and (b) of SABS 1178, to the following standards:

(a) Fraas breaking point : no failure to +10°C
(b) Softening point : 100 - 125°C
(c) Penetration : 1,0 - 2,2 mm
(d) Resistance to cracking : no cracking down to –10°C

In the event of the condition of bitumen test results not satisfying all these requirements, a series of three (3) other tests shall be carried out by the Contractor, and witnessed by the Inspectorate. The average of the three (3) results for each test shall be determined. If the average does not

comply with the requirements, then the day's production, from which lining and coating samples were obtained, shall be rejected.

11.6.4 TEST SAMPLES

11.6.4.1 VISUAL

All pipes to be inspected.

11.6.4.2 NON-DESTRUCTIVE TESTING

(a) Holiday testing

All pipes to be inspected.

(b) Thickness

On the first pipe and thereafter on at least 10 percent of the number of pipes and specials in each day's production.

11.6.4.3 DESTRUCTIVE TESTING

Sufficient lining and coating material shall be removed from the ends of at least one pipe selected at random from that day's production for the purpose of carrying out the tests; the peel test shall be carried out the next day on the same pipe.

11.7 REPAIR METHODS

11.7.1 DAMAGE TO SUBSTRATE

Areas dis-bonded or damaged through to the substrate shall be repaired as follows:

(i) The problem areas shall be stripped back to the substrate and the edges feathered back for 100 mm minimum to achieve St2 of ISO 8501.

(ii) The repair shall be effected by firstly applying a coat of primer

(iii) (a) Using liquid bitumen and cut pieces of glass fibre tissue or a blanket, rebuild the coating to the original specification. Gas heated repair irons shall be used to blend in the various layers or

(b) Apply a layer of the "torch on" bitumen tape with 50 mm overlap by heating the side of the tape with a gas torch until the compound is glossy and just molten. Then smooth firmly onto the surface to eliminate air pockets and voids.

Overlaps and seams shall be smoothed and sealed by tooling with a heated bullnose trowel

11.7.2 PARTIALLY DAMAGED

Areas partially de-laminated or damaged through the thickness shall be repaired as follows:

The de-laminated or damaged areas shall be stripped back to the lamination or bottom of the damage and using liquid bitumen and cut pieces of glass fibre tissue, the coating shall be rebuilt to the original specification. Gas heated repair irons shall be used to blend in the various layers.

11.7.3 ELECTRICAL INSULATION DEFECTS

Electrical insulation defects (holidays) shall be repaired by hot ironing.

11.7.4 TOP COAT

Completed repairs shall be protected as per paragraph 11.3.7.

12 TAPE WRAPPING SYSTEM

12.1 STANDARDS

Reference is made to the latest issues of the following Standard Specifications:

DWS	9900	Standard corrosion specification.
SABS	1117	Plastic wrappings for the protection of steel pipelines.
SABS	0129	Plastics tape wrapping of steel pipelines.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
SABS ISO	9000	Model for quality assurance in production and installation.

12.2 MATERIAL

Tapes shall conform to SABS 1117, types A, B or C.

12.3 APPLICATION

12.3.1 GENERAL

Steel pipes, fittings and specials, protected by means of polyethylene pressure-sensitive or polyethylene laminated to an elastomeric layer of butyl rubber tapes, shall be wrapped in accordance with SABS 0129 as amended and extended by this Specification. All pipes shall be wrapped outside the trench in accordance with acceptable factory applications. Tape wrapping may be carried out in an "over the trench" operation for pipe diameters up to 450 mm.

If in the opinion of the Engineer adverse weather conditions are such as to interfere with the successful application of an efficient corrosion protective wrapping, he shall order a stoppage of work. It shall be regarded that the Contractor has accepted this risk and made provision for it in his tender.

The production and application of the tapes shall be controlled by SABS ISO 9000, Quality System.

12.3.2 SURFACE PREPARATION

Shall conform to clause 3.2 of SABS 0129.

12.3.3 PRIMING

Immediately after cleaning but not later than 4 hours after cleaning, provided the pipe surfaces are kept dry and free from dust, a primer shall be applied according to sub-clause 4.2.1 of SABS 0129.

12.3.4 WRAPPING

Tape wrapping shall be applied with sufficient pre-tensioning immediately after priming, in accordance with sub-clause 4.2.2 of SABS 0129, and shall ensure a smooth wrap free from wrinkles, blisters, frayed or torn edges, cracks or other defects even at temperatures up to 65°C. For normal wrap, tape shall be applied in two layers with a minimum overlap of 50 mm on both the inner and outer wraps.

Tape joints and repairs shall be done in accordance with sub-clause 4.2.3 of SABS 0129.

Hand wrapping shall only be allowed for short lengths that are inaccessible to a wrapping machine, specials, joints. small diameter pipes and small repairs – refer paragraph 12.6.

12.3.5 ARMOURING

Where required the wrapping shall be armoured by the application of a third layer of pressure-sensitive polyethylene tape, with a carrier thickness of 750 micrometers (µm) as follows:

Inner wrap shall overlap by half the tape width plus 25 mm and the outer wrap shall overlap by not less than 50 mm.

Armoured wrappings shall generally be applied at the following positions:

(a) all road crossings through sleeves and culverts;
(b) all railway crossings through sleeves or culverts; and
(c) wherever the Engineer may consider that special conditions warrant such measures.

12.3.6 WRAPPING OF SPECIALS

In the case of specials or pipe lengths where length and/or shape preclude the application of a protective wrapping system by any means, the protection shall be carried out either by bitumen-fibre glass or epoxy coating in accordance with paragraphs 11.3 or 8.4.5 respectively. In the case of access, scour, air valve and farmers off-take tees the special shall be deemed to incorporate at least two (2) diameter lengths either side of the main tee barrel.

12.4 TOLERANCES

12.4.1 PRESSURE SENSITIVE TAPE WRAPPING

The minimum thickness of the inner low-density polyethylene tape carrier component shall be 300 µm and the maximum thickness of the outer high-density tape carrier shall be 1000 µm. Total minimum polyethylene thickness of 1450 µm.

The adhesive part of the inner layer shall be a minimum thickness of 1.5 times the polyethylene tape carrier thickness. For the outer layer the adhesive layer shall be at least equal to the thickness of the polyethylene tape carrier thickness.

12.4.2 BUTYL RUBBER LAMINATES

The minimum thickness of the completed wrapping shall be 750 µm. The inner layer shall be a butyl rubber laminate of 450 µm minimum thickness of which the butyl rubber film shall not be less than 200 µm thick and the polyethylene film shall not be less than 200 µm thick.

The outer layer shall be high density pressure tape of 300 µm minimum thickness.

12.5 TESTING

To be read in conjunction with paragraph 4.1, Quality Assurance.

12.5.1 VISUAL INSPECTION

The wrapping shall have a smooth appearance, free from wrinkles, blisters, bridging across weld beads, frayed edges, cracks, dis-bonding and any signs of physical damage.

12.5.2 NON-DESTRUCTIVE TESTING

(a) Electrical Insulation Defect (Holiday) Testing

The entire wrapping of the pipeline shall be tested with an approved holiday detector equipped with a rolling ring detector around the pipe by the Contractor to the Engineer's satisfaction. The ring shall be in close contact with the surface of the wrapping along the pipe circumference. The test shall be carried out immediately prior to lowering the pipe into the trench. The wrapping on specials or short pipe lengths shall be tested with an approved holiday detector fitted with a copper bristle brush detector of suitable form. The wrapping shall exhibit no holidays when tested with an effective voltage of 12 kV at a nominal pulse frequency of not less than 30 Hz.

The Engineer may instruct any length of pipe or any number of specials to be re-tested using a holiday detector with a copper bristle brush detector.

(b) Coating Insulation Test

The Engineer shall carry out a conductance test on the wrapping over any section of pipeline between valves when the pipeline has been wrapped and installed in the trench with padding and back filling completed. The test shall be conducted with the valves temporarily removed from the line, at the Contractor's expense, to ensure complete isolation of the pipeline section under test or between gaps left for tie-ins.

The length of the section of pipeline under test shall be carefully measured and the conductance over the section tested shall not exceed 180 micro-Siemens per square metre of pipe surface under all conditions of test. If the results of the test for the section of pipeline tested are not satisfactory, two sections immediately adjacent to the testing section will be tested. If the results on one or both of these sections tested are not satisfactory, all sections of wrapped pipeline shall be tested.

12.5.3 DESTRUCTIVE TESTING

The Engineer may from time to time collect samples of 10 metres of each type of tape and one litre of primer for testing, for compliance with the specification, by any independent laboratory appointed by the Engineer. The supply of samples shall be for the Contractor's account. The Engineer reserves the right to reject the whole batch of materials from which unsatisfactory samples were obtained.

12.5.4 REPAIRS

The Contractor shall be required to locate areas of faulty protection on all sections on which unsatisfactory results are obtained and to affect the necessary repairs. The cost of this work and all additional materials provided or supplied, including the reinstatement of the trench and the retest shall be for the Contractor's account.

12.6 REPAIR METHODS

Where damage to the wrapping on a pipeline has occurred and where there are creases, wrinkles and folds in the wrapping, proceed as follows:

12.6.1 SMALL DAMAGED AREAS

If the width of the tape being used exceeds by at least 100 mm the length of the section affected, cut the area of damaged wrapping away to bare metal leaving no raised edges or protrusions.

Clean and prime the exposed area in accordance with paragraphs 12.3.2 and 12.3.3 and apply a patch of tape, ensuring an overlap of not less than 50 mm on all sides onto the surrounding wrap.

Apply by hand-wrapping with a fifty five (55) percent over-lap, a further layer of tape commencing two turns before and continuing for two turns beyond the patch.

12.6.2 LARGE DAMAGED AREAS

Where the extent of damaged or faulty wrapping is such that the tape cannot span the affected area and provide a 50 mm overlap on all sides it must be completely remove from the pipe over the affected section. The area must be cleaned and primed in accordance with paragraphs 12.3.2 and 12.3.3. The pipe must be re-wrapped with a fifty five (55) percent overlap, commencing two turns before and finishing two turns beyond the bared section.

12.6.3 DAMAGE ON DOUBLE WRAP

Where damage or a defect has occurred in a section that has been double wrapped and in the case of small holidays, the outer wrap shall be removed for a distance equal to three (3) times the width of the inner wrap tape on each side of the damaged area.

The appropriate procedure given in paragraphs 12.6.1 or 12.6.2 shall be used to effect the repair of the inner wrap.

The outer wrap shall be re-instated in accordance with paragraph 12.3.5.

12.6.4 OUTER WRAP DAMAGE

Where damage extends through an outer wrap/rockshield (see Section 6 of SABS 0129), this should be carefully removed for a distance equal to three (3) times the width of the inner wrap tape on each side of the damaged area without damaging the inner wrapping.

The repair shall be carried out by the appropriate method given in paragraphs 12.6.1 or 12.6.2 and the outer wrap/rockshield re-instated in accordance with paragraph 12.3.5.

13 PETROLATUM WRAPPING SYSTEM

Profiling mastic and mastic blankets are used for corrosion protection of couplings and flanges in chambers with high humidity and buried in soil.

13.1 STANDARDS

Reference is made to the latest issues of the following Standard Specifications:

DWS	9900	Standard corrosion specification.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
SABS	0129	Plastics tape wrapping of steel pipelines.
SABS ISO	9000	Model for quality assurance in production and installation.

13.2 SURFACE PREPARATION

Mechanically clean and wire brush the joint to remove all loose rust, scale, old coating and foreign matter to St 2 (ISO 8501-1).

Areas subjected to chemical attack, salt spray, fungus or bacteria shall be neutralised, rinsed with clean potable water and mechanically cleaned as specified above.

13.3 PRIMING

Brush priming solution well over the entire joint area, leaving a thin film (at a nominal coverage rate of 0,8 m²/litre). Apply a liberal amount around the bolt threads, narrow cavities and crevices.

Paste shall be used where excessive surface corrosion has occurred and under high humidity or submerged conditions.

13.4 APPLICATION OF MASTIC AND TAPE

(a) Use profiling mastic and/or strips to fill all voids, crevices and sharp or irregular contours.

(b) Apply mastic tape circumferentially over the area to be coated with a 25 mm overlap on either side of the mastic with a 75 mm end overlap.

(c) Pre-formed petrolatum mastic blanket system (10 mm thick), supported by a coated tape backing, is available to provide a quick and easy method to apply this system.

(d) Eliminate all air pockets, wrinkles and creases.

13.5 TOP COAT

13.5.1 BURIED CONDITIONS

Two complete turns of the polyethylene sheeting shall be applied circumferentially. The ends are secured to the pipe barrels with 48 mm wide bands of PVC adhesive tape, which is also applied to the outside diameter of the bolted joint.

13.5.2 HIGH HUMIDITY CONDITIONS

Overcoat with a synthetic coating mixed with a cementitious filler to give a tough, flexible coating. The base coat may be over coated with water based Acrylics or Epoxies.

NOTE: Detail of application shall be in accordance with the manufacturer's data sheets and approved by the Corrosion Engineer.

14 POLYOLEFIN-BITUMEN WRAPPING SYSTEM

This system shall be used for corrosion protection of galvanised pipes up to 200 mm diameter.

The system comprises an inner layer and outer coating whereby the inner layer is made up of a self-adhesive rubber bitumen compound reinforced with a fully impregnated heat set polyester mat. The outer layer is a tough medium density cross-linked Polyolifin heat shrinkable sleeve.

14.1 STANDARDS

Reference is made to the latest issues of the following Standard Specifications:

SABS ISO	1461	Hot-dip galvanized coatings on fabricated iron and steel articles.
SABS ISO	8501-1	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of un-coated steel substrates and of steel substrates after removal of previous coatings.
SABS	1117	Plastic wrappings for the protection of steel pipelines.
SABS	0129	Plastics tape wrapping of steel pipelines.
SABS ISO	9000	Model for quality assurance in production and installation.

14.2 MATERIAL

Tapes shall conform to SABS 1117, type C.

14.3 APPLICATION

14.3.1 SURFACE PREPARATION

Surfaces, hot dip galvanised in accordance with SABS ISO 1461, shall be degreased as per Sections 6 and 7.

14.3.2 APPLICATION

(a) Apply an adhesive bitumen layer at 130°C.

(b) Allow the compound to cure for thirty (30) minutes and cool to room temperature.

(c) Fit the oversized sleeve onto the pipe protruding 75 mm beyond the pipe ends.

(d) Shrink the sleeve with a yellow LPG or propane flame.

(e) Trim the sleeve edges.

14.4 TOLERANCES

Prime coat	20 µm DFT
Inner layer	900 µm nominal
Outer layer	600 µm nominal
Overall thickness	1,5 mm nominal
Colour	Black

14.5 TESTING

To be read in conjunction with paragraph 4.1, Quality Assurance.

14.5.1 VISUAL INSPECTION

The wrapping shall have a smooth appearance, free from wrinkles, blisters, bridging across weld beads, frayed edges, cracks, dis-bonding and any signs of physical damage.

14.5.2 ELECTRICAL INSULATION DEFECT (HOLIDAY) TESTING

The entire wrapping of the pipeline shall be tested with an approved holiday detector equipped with a rolling ring detector around the pipe by the Contractor to the Engineer's satisfaction. The ring shall be in close contact with the surface of the wrapping along the pipe circumference. The test shall be carried out immediately prior to lowering the pipe into the trench. The wrapping on specials or short pipe lengths shall be tested with an approved holiday detector fitted with a copper bristle brush detector of suitable form. The wrapping shall exhibit no holidays when tested with an effective voltage of 12 kV at a nominal pulse frequency of not less than 30 Hz.

The Engineer may instruct any length of pipe or any number of specials to be re-tested using a holiday detector with a copper bristle brush detector.

14.5.3 ADHESION

Shall be tested in accordance with SABS 1117 (Type C).

14.6 REPAIRS

14.6.1 SMALL REPAIRS (LESS THAN 10 MM)

(a) Remove any contaminants from the damaged area.

(b) Cut away any protrusions.

(c) Use a weld stick and seal the damaged area by gently heating the point of the weld stick until it begins to flow. Press the weld stick firmly over the damaged area.

14.6.2 LARGE REPAIRS

(a) Remove any contaminants from the damaged area.

(b) Cut away any protrusions.

(c) Using a 100 mm wide bitumen tape and beginning 100 mm from the affected area, spirally wrap the tape utilising a 55 percent overlap. Continue to apply the tape until the repair is 100 mm beyond the affected area.

(d) Alternatively, if the pipe has not yet been installed, a section of sleeve may be placed over the defect and shrunk to at least 100 mm beyond each side of the defect.

15. COMPULSORY BRIEFING SESSIONS

15.1 Compulsory briefing sessions will be held in only four (4) major Provinces. It is mandatory for all prospective bidders to attend at least one (1) of these sessions in the venues nearest to them and in dates and times provided below. Failure to do so shall invalidate your bid.

15.2 See attached schedule

ANNEXURE C3

REQUIREMENTS TO BE SPECIFIED

A: INFORMATION TO BE SUPPLIED IN TENDER SPECIFICATION		
ITEM	**INSTRUCTION**	**PARAGRAPH**
Corrosion protection system	Agreement and approval	3.1a
	Dry film thickness	8.4.3
Finishing coat colours	Departmental colour code	8.4.5.6.4 9.1.3.4.4 9.2.3.4.4
Repair kit	Required or not	9.1.6
Material type	Type of powder	9.2.2
Medium duty hot-dip galvanised coating	Medium duty	10.4.1.2

B: INFORMATION TO BE SUPPLIED BEFORE ORDER IS PLACED		
ITEM	**INSTRUCTION**	**PARAGRAPH**
Approval of specific corrosion systems	Approval	3.1 (b) 3.1 (c)
Proprietary items	Corrosion protection	5.1.5.2
Lifting lugs	Design	6.2.4
Blasting-material with data sheets	Blasting-material	7.6.6
Method of application	Epoxy	8.4.5.4.1
Coating for duplex system	Application of duplex system	10.7.2

C: INFORMATION TO BE SUPPLIED AFTER ORDER IS PLACED		
ITEM	**INSTRUCTION**	**PARAGRAPH**
Quality plan	Approval	4.1.1
Suitability of design	Hot-dip galvanising	6.4.2.2
Programme	Approval	7.3.1

ANNEXURE C3

DEPARTMENTAL COLOUR CODE

MECHANICAL AND GENERAL

ITEMS	COLOUR	SABS 1091 CODE
Structural steel, Gates	Light grey	G29
Hydraulic power pack	Strong blue	F11
Hydraulic oil	Salmon pink	A40
Hazardous objects/areas (restricted headroom, crane hook etc)	Golden yellow with black chevron	B49*
Handwheels and levers	Golden yellow	B49
Handrails: - vertical - horizontal	Black Golden yellow	 G49
Handrails on dam walls - Aluminium - Stainless steel - Galvanized	Un-coated Un-coated Light grey	 G29
Floors: - safe and walking areas - restricted areas - open flooring (gratings) – MS galvanized 3CR12 Stainless steel	Emerald green Golden yellow Un-coated Un-coated Un-coated	E14 B49*
Fire protection equipment	Signal red	A11*
Control panels	Eau de nil	H43

PUMP STATION

ITEMS	COLOUR	SABS 1091 CODE
Electric motors	Light beige	C57
Pumps/control valves: for raw water for chem-treated water	Apple green Middle blue	H29 F07
Fan and coupling guards	Signal red	A11*
Base plates	Black	
Overhead travelling cranes	Golden yellow	B49
Isolating valves: for raw water for chem-treated water	Brilliant green Arctic blue	H10 F28

ELECTRICAL

ITEMS	COLOUR	SABS 1091 CODE
Low voltage panels: indoor outdoor	Light orange Light orange	B26* B26
Medium voltage panels: indoor outdoor	Admiral grey Admiral grey	G12 G12
Panel accessories (gland plates, back plates, interior)	White	
UPS equipment	Light orange	B26
Transformers	Light stone	C37
LV distribution kiosks, mini subs	Light stone	C37
Standby electrical equipment (Permanently powered)	Signal red	A11*
General outdoor	Light grey green	H40
All equipment – interior	White	

WATER TREATMENT PLANT

ITEMS	COLOUR	SABS 1091 CODE
Equipment	Same colour of respective pipe work	
Handwheels (remote valves)	Same colour of respective pipe work	
PIPE WORK		
Raw water	Brilliant green	H10
Chemical treated raw water	Verdigris green	E22
Clarified raw water	Eau de nil	H43
Filtered water	Pale blue	E39
Chlorinated filtered water	Arctic blue	F28
Backwash water	Cornflower blue	F29
Air saturated water	Turquoise blue	E18
Wash water recovery	Middle buff	B33

SEWAGE PIPE WORK

ITEMS	COLOUR	SABS 1091 CODE
Raw sewage	Dark earth	B11
Settled sewage effluent	Brilliant green	H10
Biologically treated sewage effluent	Verdigris green	E22
Final/chlorinated effluent	Eau de nil	H43
Digested sewage sludge	Middle brown	B07
Raw sewage sludge	Dark brown	B03
Humus sludge	Golden brown	B13
Return activated sludge	Golden brown	B13
Waste activated sludge	Middle brown	B15
Supernatants/underflows returning to head of works	Middle buff	B33

DOSING/CONTROL PIPE WORK

ITEMS	COLOUR	SABS 1091 CODE
Poly-electrolite	Pinotage	A08
Alum/Ferric chloride	Jacaranda	F18
Chlorine solution	Primrose	C67
Chlorine gas	Lemon	C54
Chlorine liquid	Light orange	B26
Lime slurry	Biscuit	B64
Lime hydrated	Biscuit	B64
Lime saturated water	Biscuit	B64
Air/compressed air	White	
Steam	Pastel grey	G54

NOTE: Colours marked thus * are restricted for specified equipment only.

W1054WTE

SUPPLY, INSTALLATION AND MAINTENANCE OF ADDITIONAL SMART WATER FLOW METERING TECHNOLOGIES FOR THE DEPARTMENT OF WATER AND SANITATION FOR A TERM CONTRACT PERIOD OF THREE (3) YEARS

EVALUATION CRITERIA

1. EVALUATION CRITERIA

PHASE 1: ADMINISTRATION

The following documents are required with your response

(FAILURE TO SUBMIT ANYONE ONE OF THEM IN THE PRESCRIBED FORMAT AND MANNER SHALL RENDER YOUR BID NONE-RESPONSIVE AND DISQUALIFIED, THIS EXCLUDES SUBMISSION OR NONE-SUBMISSION OF A B-BBEE CERTIFICATE):

NO	COMPULSORY RETURNABLE DOCUMENTS	YES (√)	NO (√)
1	Certified copies of Company registration with Companies and Intellectual Property Commission (CIPC)- formerly CIPRO, issued in terms of the Companies Act of 2008		
2	Certified copies of ID copy/copies for all Directors and Shareholders		
3	Authority of Signatory, attach certified ID copy thereof		
4	Original and Valid Tax Clearance Certificate (Refer to SBD 2)		
5	Notary Joint Venture Agreement / Association Agreement (if applicable)		
6	The service provider (and in the case of a consortium or joint venture – at least one member of such consortium or joint venture) should submit a notary agreement between the parties and clearly identify the lead partner		
7	The service provider (and in the case of a consortium or joint venture – at least one member of such consortium or joint venture) should be registered with the ECSA (as a Professional Engineer/Technologist)		
8	Latest Annual Financial Statement (AFS) – at least for the past two (2) years, in terms of the Companies Act of 2008		
9	Proof that meters will comply with SANS 1529-1:2006		
10	Company Profile		
10.1	Project Team CV's and Qualifications (lead project team and technical staff only).		
10.2	Track Record & Experience (schedule of similar work and value), with contactable references. In addition, reference letter from at least three (3) previous clients of major projects should be attached.		
10.3	Original or certified and valid Letter of "Good standing" issued by the		

NO	COMPULSORY RETURNABLE DOCUMENTS	YES (√)	NO (√)
	Compensation Commissioner		
11	Proof/Evidence that the Bidder's company has a minimum CIDB grading of 7 CE / ME		
12	Provide technical brochures with full technical specifications of all metering technologies offered under this Bid		
13	Completion and inclusion of standard bidding documents (SBD) (SBD 1, SBD 3.2, SBD 4,SBD 5, SBD 6.1, SBD 8, SBD 9)		
14	**COMPULSORY BRIEFING SESSION:** Did you attend the compulsory briefing session and have you attached at least a copy of the Compulsory Briefing Certificate		

1.1 DWS may conduct a due diligence on any Bidder, which may include interviewing customers references or other activities to verify a Bidders or other information and capabilities (Including visiting the Bidders various premises and/or sites to verify certain stated information or assumptions) and in this instances the Bidders will be obliged to provide DWS with all necessary access, assistance and/or information which DWS may reasonable request and to respond within the given time frame set by DWS. DWS may enforce whatever measures it considers necessary to ensure the confidentially and integrity of the contents of the Bidder.

1.2 DWS will evaluate the Bidders with reference to DWS set and approved evaluation criteria. DWS reserve the right to appoint a specialist/consultant to assist in performing such evaluations.

1.3 DWS has defined minimum mandatory criteria (Phase 1) listed in the table below that must be met by the Bidder in order for DWS to accept a Bid for further evaluation.

1.4 DWS will validate the claims made in the proposals and submitted to DWS for the purposes of this bid. This will include verification with the Bidders previous clients and applicable regulatory bodies.

1.5 The mandatory requirements evaluation will be carried out by the appointed committee of DWS to determine which Bidders responses are compliant or non-compliant with the Bid Terms of Reference and/or Specifications issued by DWS as part of the Bid process.

1.6 Where there is failure to comply with the mandatory requirements criteria or DWS is for any reason unable to verify whether the mandatory requirements are fully complied with, DWS shall disqualify the Bid offer.

1.7 The following preference point systems are applicable to all bids: the 90/10 system

for requirements with a Rand value above R1 000 000 (all applicable taxes included).

1.8 Evaluation **Method 4,** which entails the balance between **Functionality, Financial offer and preferences** and **90/10** points system, will be adopted as follows:

1.8.1 Functionality points = maximum 100 points *(minimum of 72 points required to qualify for next stage of evaluation)*

1.8.2 Price = 90 points

1.8.3 Preference /B-BBEE = 10 points

1.9 The following criteria would be applicable to evaluate qualifying proposals:

PHASE 2: FUNCTIONALITY

Proposals will be evaluated according to the criteria listed below:

Criteria		**Guideline Weighing Points**	
		Bidder score	**Maximum weight** *(minimum score)*
Functionality	**Compliance to technical specifications** Full compliance to all aspects of the technical specifications contained in this Bid document - Technical brochure for each meter type being offered with full technical specifications		**15** *(12)*
	Approach paper – Method statement 2-3 pages of a method statement must be completed and submitted with Bid		**15** *(12)*
	Bidder's Experience Schedule of similar work with at least 3 contactable references		**15** *(12)*

Functionality	**Contractor's Resources – Personnel and Plant** • Submission of organization and staffing proposals and CV's. A schedule should be attached indicating full-time or part-time employees • Plant and equipment (owned or hired). Proof of ownership should be attached and confirmation by lessee in case of hired plant and/or equipment		**15** *(12)*
	Quality Control Procedures • Standard operating procedures • Monitoring and control • Management of none-conformance • Management reports • Affiliations and accreditations (e.g. ISO; SABS; etc)		**10** *(6)*
	Safety, Health and Environmental procedures proposed by the Contractor Submission of Safety, Health and Environmental procedures in compliance with the applicable legislation, with detailed safe working procedures.		**10** *(6)*
	Risk Management Process Submission of proposed Risk Management processes, procedures, practices and monitoring specifically the risks that are identified for this project.		**10** *(6)*
	Financial Capability Submission of the most recent Annual Financial Statements of the last 2 financial years, produced in accordance with the Company Act of 2008		**10** *(6)*
Total			**100 points** *(72)*

Note to Bidders:

The bidder is expected to achieve a ***minimum threshold score for functionality of 72 to qualify for further evaluation.***

RATINGS	Points allocation for 10 Maximum Weight	Points allocation for 15 Maximum Weight
Very poor	2	3
Poor	4	6
Average	6	9
Good	8	12
Excellent	10	15

PHASE 3: PRICE and B-BBEE

Further evaluation is based on Price and Preference (90/10) after the minimum score has been achieved by the bidder.

B-BBEE points

Bidders should note that points may be claimed for B-BBEE in terms of the Preferential Procurement Regulations, 2011. Such claim should be accompanied by either an original or certified copy of a B-BBEE Contribution Level certificate issued by a SANAS-accredited agency or Auditors or a letter from a company Accountant is case of an Exempted Micro Enterprise (EME).

	Procurement Preferencing (B-BBEE Level Certification)	Point Allocation
	B-BBEE Level 1 Certifications	10
	B-BBEE Level 2 Certifications	9
	B-BBEE Level 3 Certifications	8
	B-BBEE Level 4 Certifications	5
	B-BBEE Level 5 Certifications	4
	B-BBEE Level 6 Certifications	3
	B-BBEE Level 7 Certifications	2
	B-BBEE Level 8 Certifications	1
	Non-Compliant Contributor	*0*
	Total	**10**

Financial offer
The financial proposal should be detailed and broken down into specific fee categories and be VAT inclusive.

W1054WTE

SUPPLY, INSTALLATION AND MAINTENANCE OF ADDITIONAL SMART WATER METERING TECHNOLOGIES FOR THE DEPARTMENT OF WATER AND SANITATION FOR A TERM CONTRACT PERIOD OF THREE (3) YEARS

GENERAL CONDITIONS OF CONTRACT

THIS BID IS GOVERNED BY THE GENERAL CONDITION OF CONTRACT FOR CONSTRUCTION WORKS 2nd EDITION 2010, AS PUBLISHED BY THE SOUTH AFRICAN INSTITUTE OF CIVIL ENGINEERING (SAICE)