SEALED QUOTATION DOCUMENT

Procurement of Goods
Sealed Quotation

Invitation for Sealed Quotation : Procurement and Supply of PE-100 Series HDPE Pipes for different Water Supply Projects at Panchthar district

Issued by:
Federal Water Supply and Sewerage Management Project, Ilam
Ilam Municipality Illam Municipality Ilam

Sealed Quotation Number	FWSSMPILAM/15/081/082/SQ
Issued On	05-05-2025

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Abbreviations

BD ... Bidding Document

BDF ... Bidding Forms

BDS ... Bid Data Sheet

BOQ ... Bill of Quantities

COF ... Contract Forms

DP ... Development Partners

DoLIDAR ... Department of Local Infrastructure Development and Agricultural Roads

ELI ... Eligibility

EQC ... Evaluation and Qualification Criteria

EXP ... Experience

FIN ... Financial

FWSSMP……Federal Water Supply and Sewerage Management Project

GCC ... General Conditions of Contract

GoN ... Government of Nepal

ICC ... International Chamber of Commerce

IFB ……. Invitation for Bids

ITB ... Instructions to Bidders

JV ... Joint Venture

LIT ... Litigation

NCB ... National Competitive Bidding

PAN ... Permanent Account Number

PPA ... Public Procurement Act

PPMO ... Public Procurement Monitoring Office

PPR ... Public Procurement Regulations

PL ... Profit & Loss

SBD ... Standard Bidding Document

SCC ... Special Conditions of Contract

SQG……..Seal Quotation of Goods

TS ... Technical Specifications

VAT ... Value Added Tax

WRQ ... Works Requirements

Section - I
Invitation for Sealed Quotation

Invitation for Sealed Quotation

Name of the Office: Federal Water Supply and Sewerage Management Project, Ilam

Address of the Office: Ilam Municipality Illam Municipality Ilam

Invitation for Sealed Quotation for the procurement of Invitation for Sealed Quotation : Procurement and Supply of PE-100 Series HDPE Pipes for different Water Supply Projects at Panchthar district

Sealed Quotation No: FWSSMPILAM/15/081/082/SQ

Date of second Publication : 05-05-2025

1. The Federal Water Supply and Sewerage Management Project, Ilam invites sealed quotations from registered Suppliers for the Invitation for Sealed Quotation : Procurement and Supply of PE-100 Series HDPE Pipes for different Water Supply Projects at Panchthar district
   .
2. Eligible eligible Suppliers may obtain further information and inspect the Sealed quotation Forms at the office of Ilam Municipality Illam Municipality Ilam , 027520026, , fwssmp.ilam@gmail.com.
   OR
   [may visit PPMO website www.bolpatra.gov.np.]
3. If hard copy is allowed then a complete then a complete set of Bidding Documents may be purchased from the office Federal Water Supply and Sewerage Management Project, Ilam Ilam Municipality Illam Municipality Ilam and the officeFederal Water Supply and Sewerage Management Project, Ilam Ilam Municipality Illam Municipality Ilam by eligible Bidders on the submission of a written application, along with the copy of company/firm registration certificate, and upon payment of a non-refundable fee of NRs.1000.0 till 20-05-2025 10:00 during office hours.
4. Bidder who chooses to submit their bid electronically may download the bidding documents for e-submission from PPMO's e-GP i.e www.bopatra.gov.np/egp. Bidders, submitting their bid electronically, should deposit the cost of bidding document in the following account
   i. Name of the Bank :Nepal Bank Ltd. ii. Name of Office :Federal Water Supply and Sewerage Management Project, Ilam
   iii. Office Code no :313010301 iv. Office Account No :00101000000001001001
   v. Rajaswa (revenue) Shirshak No :14229
5. Sealed bids must be submitted to the office Federal Water Supply and Sewerage Management Project, Ilam Ilam Municipality Illam Municipality Ilam by hand or through e-GP system i.e www.bopatra.gov.np/egp on or before 20-05-2025 10:00. Bids received after this deadline will be rejected.
6. The bids will be opened in the presence of Bidders' representatives who choose to attend at 20-05-2025 12:00 at the office of Federal Water Supply and Sewerage Management Project, Ilam
   Illam Municipality, Ilam
   Koshi Pradesh
   Nepal.
   Bids must be valid for a period of 45 days after bid opening and must be accompanied by a bid security amounting to a minimum of 50000 , which shall be valid for 30 days beyond the validity period of the bid (i.e. [Refer Clause ITB 20.1]). If bidder wishes to submit the Cash Security, the cash should be deposited in Deposit Account No.[04001000002003000001] at [Nepal Bank Ltd. , Ilam Municipality, Ilam, Koshi Pradesh] and submit the receipt of the deposited amount of cash along with the Sealed Quotation.
7. If the last date of purchasing and /or submission falls on a government holiday, then the next working day shall be considered as the last date. In such case the validity period of the bid security shall remain the same as specified for the original last date of bid submission
8. The Purchaser reserves the right to accept or reject, wholly or partly any or all the Sealed Quotations without assigning any reason, whatsoever.

Section - II

Instructions to Bidders

Notes on the Instructions to Bidders

This section of the bidding documents should provide the information necessary for Interested Suppliers to prepare responsive bids, in accordance with the requirements of the Purchaser. It should also give information on bid submission, opening and evaluation, and award of Contract.These Instructions to Bidders shall not be part of the Contract and shall cease to have effect once the Contract is signed.

Section II Instructions to Bidder

1. Scope of Works

1.1 The Purchaser stated in the BDS for the procurement of Goods as detailed in attached specifications, drawings and the bill of quantities provided herein. The name of Purchaser, name of project and contract identification number of Contracts are provided in the BDS.

2. Eligible Bidder

2.1 This Invitation for Bids is open to all registered Suppliers with eligibility criteria specified below.

Sl. No.	Criteria Title
1	Up to date Firm/Company Registration Certificate
2	VAT and PAN Registration Certificates
3	Tax Clearance Certificate:2080/081
4	Other documents as needed

2.2 A bidder declared blacklisted and ineligible by the GoN, Public Procurement Monitoring Office (PPMO) and/or the DP in case of DP funded project, shall be ineligible to bid for a contract during the period of time determined by the GoN, PPMO and/or the DP.

3. One Quotation per Bidder

3.1 Each Bidder shall submit only one quotation, A Bidder who submits more than one quotation shall cause all the quotations with the Bidder's participation to be disqualified.

4. Cost of Bidding

4.1 The Bidder shall bear all costs associated with the preparation and submission of his Quotation and the Purchaser shall in no case be liable for those costs.

5. Site Visit

5.1 The Bidder at his own cost, responsibility and risk may visit the site of the supply, delivery or installation of Goods and acquire all necessary information for preparing the bid and entering into a contract for the procurement of Goods.

6. Content of Quotation Form

6.1 The Quotation Form comprise the documents listed below:

1. Section I: Invitation for Sealed Quotation (SQ)
2. Section II: Instructions to Bidders
3. Section III: Bid Data Sheet
4. Section IV Quotation Forms and Price Schedule
5. Section V: Schedule of Requirements
6. Section VI: General Conditions of Contract (GCC)
7. Section VII: Special Conditions of Contract
8. Section VIII: Contract Form

7. Clarification

7.1 A prospective Supplier/Bidder may obtain clarification on the Quotation Form from the the Purchaser on or before 5 days prior to the deadline for submission of Quotation.

8. Language of Quotation

8.1 All documents relating to the Quotation shall be in English or in Nepali.

9. Documents Comprising Quotation

9.1 The Quotation by the Bidder shall comprise the following:

a. Quotation Form and Price Schedules
b. Bid Security
c. Schedule of Requirements

10. Quotation Prices

10.1 The Bidder shall indicate on the appropriate Price Schedule the unit prices (where applicable) and total price in Nepali Rupees. for all items of the goods to be supplied under the contract.
10.2 All duties, taxes and other levies payable by the Bidder under the contract shall be included in the rates, prices and total Bid Price submitted by the Bidder.
10.3 Price quoted by the Bidder shall remain fixed and valid until completion of the Contract Performance and will not be subject to variation in any account.

11. Quotation Validity

11.1 The Sealed Quotation shall remain valid for the period of 45 days after opening of the quotation. A bid valid for a shorter period shall be rejected by the Purchaser as nonresponsive.

12.	Quotation/Bid Security	12.1 The Bidder shall furnish as part of its Sealed Quotation, in original form, a bid security as specified in the BDS. In case of e-submission of Quotation, the Bidder shall upload scanned copy of Bid security letter at the time of electronic submission of the Sealed Quotation. The Bidder accepts that the scanned copy of the Bid security shall, for all purposes, be equal to the original. The details of original Bid Security and the scanned copy submitted with e-Sealed Quotation should be the same otherwise the Sealed Quotation shall be non-responsive. 12.2 The Bid Security shall be, at the Bidder's option, in any of the following forms: (a) an unconditional bank guarantee from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law or; (b) a cash deposit voucher in the Purchaser's Account as specified in the BDS In the case of a bank guarantee, the Bid Security shall be submitted either using the Bid Security Form included in Section III (Bidding Forms) or in another Form acceptable to the Purchaser. The form must include the complete name of the Bidder. The Bid security shall be valid for minimum thirty (30) days beyond the original validity period of the bid 12.3 Any Sealed Quotation not accompanied by an enforceable and substantially compliant bid security, shall be rejected by the Purchaser as nonresponsive. In case of e-Submission, if the scanned copy of an acceptable Bid Security letter is not uploaded with the electronic Bid then Bid shall be rejected. 12.4 The Bid security shall be forfeited if: (a) a Bidder requests for withdrawal or modification during the period of Quotation validity specified by the Bidder on the Letter of Bid, after Sealed Quotation submission deadline. (b) a Bidder changes the prices or substance of the Sealed Quotation while providing information; (c) a Bidder involves in fraud and corruption pursuant to clause 26; (d) the successful Bidder fails to: (i) furnish a performance security in accordance with clause 25; (ii) sign the Contract in accordance within the period stipulated in Letter of Award.; or (iii) accept the correction of arithmetical errors pursuant to clause 19.1 (iv) fails to provide the clarification of its Quotation by the date and time set in the Purchaser's
13.	Format and Signing of Quotations	13.1 The Quotation shall be typed or written in indelible ink and shall be signed by an authorized person. Any entries or amendments including alternations, additions or corrections made shall be initialled by the same authorized person.
14.	Sealing and Marking of Quotations	14.1 Bidders may submit their bids by manually or by electronically. When so specified in the BDS. Procedures for submission, sealing and marking are as follows: Bidders submitting bids by manually. The Bidder shall submit his bid in sealed envelopes. The envelope shall be addressed to the Purchaser as specified in the BDS and shall bear the name and identification number of the Sealed quotation. 14.2 Bidders submitting Bids electronically shall follow the electronic bid submission procedure specified in the BDS
15.	Deadline for Submission of Quotations	15.1 Quotations shall be delivered to the Purchaser at the address no later than the time and date specified in the BDS.
16.	Late Quotation	16.1 Any Quotation received by the Purchaser after the deadline shall not be accepted and shall be returned unopened to the Bidder upon request.
17.	Modification And Withdrawal	17.1 Sealed Quotations once submitted shall not be withdrawn or modified.
18.	Bid Opening	18.1 The Purchaser shall open the Quotations in the presence of the Bidders' representatives who choose to attend at the time and in the place as specified in the BDS 18.2 The Purchaser shall prepare and provide minutes of the opening including the information disclosed to those present.
19.	Process to be Confidential	19.1 Information relating to the examination, evaluation and comparison of Quotations and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process until the award to the successful Bidder has been announced. Any efforts by the Bidder to influence the Purchaser in the Quotation evaluation, comparison or contract award decisions may result in rejection of Bidder's quotation.
20.	Examination of Quotations	20.1 Prior to the detailed evaluation of Quotations, the Purchaser shall determine whether each Quotation (a) meets the eligibility criteria defined in Clause 2; (b) has been properly signed by the authorized person; (c) is accompanied by the required securities; and (d) is substantially responsive to the requirements of the Bidding documents.

21.	Evaluation and Comparison of Quotations	21.1 In evaluating the Quotations, the Purchaser shall determine for each Sealed Quotation the evaluated Quotation Price by adjusting any corrections for errors. Quotations shall be checked by the Purchaser for any arithmetic errors. Errors shall be corrected by the Purchaser as follows: (a) only for unit price Contracts, if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected; (b) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and (c) If there is a discrepancy between the Quotation price in the Summary of Price Schedule and the Quotation amount in item (c) of the Letter of Quotation, the price in the Summary of Price Schedule will prevail and the Quotation amount in item (c) of the Letter of Quotation will be corrected. (d) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) ,(b) and (c) above. 21.2 In case of e-submission of bid, upon notification from the Purchaser, the bidder shall also submit the original of documents comprising the Sealed Quotation as per ITB 9 for verification of submitted documents for acceptance of the e-submitted bid. If a Bidder does not provide original of document of its Sealed Quotation by the date and time set in the Purchaser's request for clarification, its bid may be rejected. 21.3 If the Bidder that submitted the lowest evaluated bid does not accept the correction of errors, its bid shall be disqualified and its Quotation security shall be forfeited. 21.4 In Case, a corruption case is being filed to Court against the Natural Person or Board of Director of the firm/institution /company or any partner of JV, such Natural Person or Board of Director of the firm/institution /company or any partner of JV such bidder's bid shall be excluded from the evaluation, if public entity receives instruction from Government of Nepal.
22.	Award of Contract	22.1 The Purchaser shall decide the award of the contract to the Bidder whose Quotation is within the approved estimate and who has offered the lowest evaluated Price within Quotation validity period provided that such Bidder has been determined to be eligible in accordance with the provisions of Clauses 2. 22.2 In Case, a corruption case is being filed to Court against the Natural Person or Board of Director of the firm/institution /company or any partner of JV, such Natural Person or Board of Director of the firm/institution /company or any partner of JV such bidder's bid shall be excluded from the evaluation, if public entity receives instruction from Government of Nepal.
23.	Purchaser's Right to Accept or Reject	23.1 The Purchaser reserves the right to accept or reject any Quotation or to cancel the bidding process and reject all Quotations, at any time prior to the award of the contract, without assigning any reasons whatsoever and without thereby incurring any liability to the affected Bidder or Bidders.
24.	Notification of Award and Signing of Agreement	24.1The Bidder whose bid is accepted and all other participating bidders shall be notified of the award by the Purchaser. 24.2 The notification (hereafter called the "Letter of Acceptance") to the successful Bidder shall state the sum that the Purchaser shall pay the Bidder in the execution and completion of the contract. Within 7 days of receipt of the Letter of Acceptance, the successful Bidder shall deliver the Performance Security pursuant Clause 25 and sign the Agreement. 24.3 Inability of the Bidder to make an Agreement within the above stated period shall result in the forfeiture of the Bidder's Quotation Security and , upon which the Contract shall then be awarded to the next successive successful Bidder.
25.	Performance Security	25.1 Within seven (7) days of the receipt of Letter of Acceptance from the Purchaser, the successful Bidder shall furnish the performance security as stated below from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law in accordance with the conditions of Contract using Sample Form for the Performance Security included in Section VIII (Contract Forms), or another form acceptable to the Purchaser. i) If bid price of the bidder selected for acceptance is up to 15 (fifteen) percent below the approved cost estimate, the performance security amount shall be 5 (five) percent of the bid price. ii) For the bid price of the bidder selected for acceptance is more than 15 (fifteen) percent below of the cost estimate, the performance security amount shall be determined as follows: Performance Security Amount = [(0.85 x Cost Estimate – Bid Price) x 0.5] + 5% of Bid Price. The Bid Price and Cost Estimate shall be inclusive of Value Added Tax.

26. Corrupt or Fraudulent Practices

26.1 The Purchaser shall reject a bid for award if it determines that the Bidder recommended for award of contract has engaged in corrupt or fraudulent practices in competing for the contract in question.
26.2 In Case, a corruption case is being filed to Court against the Natural Person or Board of Director of the firm/institution /company or any partner of JV, such Natural Person or Board of Director of the firm/institution /company or any partner of JV such bidder's bid shall be excluded from the evaluation, if public entity receives instruction from Government of Nepal.

27. Conduct of Bidders

27.1 The Bidder shall be responsible to fulfil his obligations as per the requirement of the Contract Agreement, Bidding documents, GoN's Procurement Act and Regulations.
27.2 The Bidder shall not carry out or cause to carry out the following acts with an intention to influence the implementation of the procurement process or the procurement agreement :

a) give or propose improper inducement directly or indirectly,
b) distortion or misrepresentation of facts
c) engaging or being involved in corrupt or fraudulent practice
d) interference in participation of other prospective bidders.
e) coercion or threatening directly or indirectly to cause harm to the person or the property of any person to be involved in the procurement proceedings,
f) collusive practice among bidders before or after submission of bids for distribution of works among bidders or fixing artificial/uncompetitive bid price with an intention to deprive the Purchaser the benefit of open competitive bid price..

27.3 contacting the Purchaser with an intention to influence the Purchaser with regards to the bid or interference of any kind in examination and evaluation of the bids during the period after opening of bids up to the notification of award of contract

28. Blacklisting Bidder

28.1 Without prejudice to any other right of the Purchaser under this Contract, GoN, Public Procurement Monitoring Office may blacklist a bidder for his conduct up to three years on the following grounds and seriousness of the act committed by the bidder:

a) if it is proved that the bidder committed acts pursuant to the Sub-Clause 27.2,
b) if it is proved later that the bidder/Supplier had committed substantial defect in implementation of the contract or had not substantially fulfilled his obligations under the contract or the completed work is not of the specified quality as per the contract ,
c) if convicted by a court of law in a criminal offence which disqualifies the bidder from participating in the contract.
d) if it is proved that the contract agreement signed by the bidder was based on false or misrepresentation of bidder's qualification information,
e) Inability of the bidder signing the contract agreement, once the letter of acceptance to the successful bidder has been provided by the Purchaser.,

28.2 A firm declared blacklisted and ineligible by the GON shall be ineligible to bid for a contract during the period of time determined by the PPMO.

29. Publication of contract award notice

29.1 Within three days of contract signing, the Public Entity shall publish a notice on the contract award with following information: in its notice board as well as shall manage to publish the notice on the notice board of District Coordination Committee, District Administration Office, Provincial Treasury and Controller Office and District Treasury and Controller Office, Such notice shall also be posted in its website and PPMO's website.

a. Name of the procurement,
b. IFB number,
c. date and name of newspaper published the IFB notice,
d. name of the successful Bidder, and the contract price.

29.2 The Purchaser shall promptly respond in writing to any unsuccessful Bidder who, within thirty days from the date of publication of contract award notice in accordance with ITB 29.1, requests in writing the grounds on which its bid was not selected.

30. Provision of PPA and PPR

30.1 If any provision of this document are inconsistent with Public Procurement Act (PPA), 2063 or Public Procurement Regulations (PPR), 2064, the provision of this documents shall be void to the extent of such inconsistency and the provision of PPA and PPR shall prevail.

Section III Bid Data Sheet

ITB 1	The scope of Supply is : The number of the Invitation for Sealed Quotation (SQ) is :FWSSMPILAM/15/081/082/SQThe Purchaser is: Federal Water Supply and Sewerage Management Project, Ilam The Name of the Project is :Invitation for Sealed Quotation : Procurement and Supply of PE-100 Series HDPE Pipes for different Water Supply Projects at Panchthar district
ITB 10	The Bidder shall furnish a bid security, from Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law with a minimum of NRs.50000, which shall be valid for 30 days beyond the validity period of the bid.
ITB 10(a)	Cash Deposit Account for Bid Security: Bank Name:Nepal Bank Ltd. Bank Address:Ilam Municipality, Ilam, Koshi Pradesh Account holder's Name:Kosh Tatha Lekha Niyantraka Karyalaya Account Number:04001000002003000001
ITB 14.1	Bidders shall have the option of submitting their bids electronically. Bidders shall follow the electronic bid submission procedures specified below: i. The bidder is required to register in the e-GP system https://www.bolpatra.gov.np/egp following the procedure specified in e-GP guideline. ii. Interested bidders may either purchase the bidding document from the Purchaser's office as specified in the BDS or may download the from e-GP system. iii. The registered bidders need to maintain their profile data required during preparation of bids. iv. In order to submit their bids electronically the cost of the bidding document shall be deposited in the account specified in IFQ. In addition, electronic scanned copy (.pdf format) of the bank deposit voucher/cash receipt should also be submitted along with the bid. v. The bidder can prepare the their bids using data and documents maintained in bidder’s profile and forms/format provided in Sealed Quotation Document by Purchaser. The bidder may submit bids as a single entity or as a joint venture. The bidder submitting bid in joint venture shall have to upload joint venture agreement along with partner(s) Bolpatra ID provided during bidder’s registration. vi. Bidders (all partners in case of JV) should update their profile data and documents required during preparation and submission of their bids. vii. In case of bid submission in JV, the consent of the partners shall be obtained through the confirmation link sent to the registered email address and the partners shall have to acknowledge their confirmation.The required forms and documents shall be part of technical bids: 1. Letter of Quotation (Mandatory) 2.Quotation Security /Bank Guarantee (Mandatory) 3. Company registration (Mandatory) 4. VAT registration (Mandatory) 5. Tax clearances certificate or evidence of tax return submission for the F/Y (Mandatory) 6. Power of Attorney of Bid signatory (Mandatory) 7. Completed Price Schedule (Mandatory) 8. Bank Voucher for cost of bid document (Mandatory) 9. Joint venture agreement (Mandatory in case of JV Bid) 10. Additional documents specified in Bidding Document (any other required documents, which is not against the provision of Procurement Act/Regulation/Directives and Standard Bidding Document issued by PPMO) Note: The documents specified as “Mandatory” should be included in e-submission. viii. After providing all the details and documents, bid response documents will be generated from the system. Bidders are advised to download and verify the response documents prior to bid submission. ix. For verifying the authentic user, the system will send one time password in the registered email address of the bidder. System will validate the OTP and allow bidder to submit their bid. x. Once Quotation is submitted, bidders won’t able to modify/withdrawal their bid. xi. The Bidder/Quotation shall meet the following requirements and conditions for e-submission of bids: a) The e-submitted Quotations must be readable through PDF reader.The facility for submission of Quotation electronically through e-submission is to promote transparency, non-discrimination, equality of access, and open competition in the bidding process. The Bidders are fully responsible to use the e- submission facility properly in e-GP system as per specified procedures and in no case the Purchaser shall be held liable for Bidder's inability to use this facility.b) When a bidder submits electronic bid through the PPMO e-GP portal, it is assumed that the bidder has prepared the bid by studying and examining the complete set of the Bidding documents including specifications, drawings and conditions of contract.
ITB 15	The deadline for Sealed Quotation submission is:20-05-2025 10:00 Address:Ilam Municipality Illam Municipality Ilam

ITB 18	The Sealed Quotation opening shall take place at : Address :Federal Water Supply and Sewerage Management Project, Ilam Illam Municipality, Ilam Koshi Pradesh Nepal Date and Time:20-05-2025 12:00 a) e-GP system allows to download the Sealed Quotation response document only after bid opening date and time are met. Simultaneous login of two members of the opening committee is required for bid opening. b)The Purchaser shall conduct the opening of bid at the address on the same date and time as specified in bidding document in the presence of Bidders' representatives who choose to attend

Section - IV
Sample Forms

1. Quotation and Price Schedules

Date:

To: *[name and address of the Purchaser]*

Gentlemen and/or Ladies:

Having examined the Sealed Quotation (SQ) documents, we the undersigned, offer to supply and deliver ***[description of goods and services]*** in conformity with the said SQ documents for the sum of ***[total SQ amount in words and figures]*** or such other sums as may be ascertained in accordance with the Schedule of Prices attached herewith and made part of this SQ.

We undertake, if our SQ is accepted, to deliver the goods in accordance with the delivery schedule specified in the Schedule of Requirements.

If our SQ is accepted, we will obtain the guarantee of a bank in a sum equivalent to Five (5) percent of the Contract Price for the due performance of the Contract, in the form prescribed by the Purchaser.

We agree to abide by this SQ for a Period of ***45*** days from the date fixed for SQ opening it shall remain binding upon us and may be accepted at any time before the expiration of that period.

Until a formal Contract is prepared and executed, this SQ, together with your written acceptance thereof and your notification of award, shall constitute a binding Contract between us.

We understand that you are not bound to accept the lowest or any SQ you may receive.

Dated this _____ day of _____ 20_____.

_____ _____

[signature] *[in the capacity of]*

Duly authorized to sign SQ for and on behalf of _____

2. Bidder's Information Form

[The Bidder shall fill in this Form. No alterations to its format shall be permitted and no substitutions shall be accepted. In case of joint venture, each partner shall fill the information in separate form.]

1.	Bidder's Legal Name	
2	Bidder's Address:	
3	Bidder's Country of Registration:	
4.	Bidder's Year of Registration:	
5.	Bidder's Legal Address in Country of Registration	
6.	Bidder's Authorized Representative Information:Name: Address: Telephone/Fax numbers: Email Address:	
7	Bidder's Telephone/Fax numbers:	
8	Bidder's Email Address:	
	Attached are copies of the following original documents. ❑ 1. Firm Registration Certificate ❑ 2. Authorization to represent the firm	

3. Price Schedule for Goods

Name of Bidder _____ Contract Identification Number _____

Item	Description	Country of Origin	Quantity	Unit Price[1] EXW (in NRs)		Total Price (in NRs) (cols. 4x5)
				In Figure	In Words	
1	2	3	4	5		4x5=6
Total						
VAT						
Grand Total						

Note: Unit price shall include all custom duties and taxes, transportation cost to the final destination and insurance cost.

[If there are more than one lot/slice/package, prepare Price Schedule form for each lot/slice/package]

Name _____

In the capacity of _____

Signed _____

Duly authorized to sign the Sealed Quotation for and on behalf of _____

Date: _____

[1] The price shall include all customs duties and sales and other taxes already paid or payable on the components and raw material used in the manufacture or assembly of the item or the customs duties and sales and other taxes paid on the previously imported item offered ex warehouse, ex showroom, or off-the-shelf. These factors should not be entered separately.

4. Bid Security

Bank's Name, and Address of Issuing Branch or Office
(On Letter head of the Commercial Bank or Financial Institution eligible to issue Bank Guarantee as per prevailing Law)

Beneficiary: ..... name and address of Employer…….

Date:…….

Bid Security No.: .....

We have been informed that . …… .[***insert name of the Bidder***] (hereinafter called "the Bidder") intends to submit its bid (hereinafter called "the Bid") to you for the execution of …….. name of Contract …… under Invitation for Bids No. …… ("the IFB").

Furthermore, we understand that, according to your conditions, bids must be supported by a bid guarantee.

At the request of the Bidder, we……. . name of Bank. ……hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of. . ……amount in figures …… (. ……. .amount in words ……..) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the bid conditions, because the Bidder:

(a) has withdrawn or modifies its Bid during the period of bid validity specified by the Bidder in the Form of Bid; or

(b) does not accept the correction of errors in accordance with the Instructions to Bidders (hereinafter "the ITB"); or

(c) having been notified of the acceptance of its Bid by the Employer during the period of bid validity, (i) fails or refuses to execute the Contract Agreement, or (ii) fails or refuses to furnish the performance security, in accordance with the ITB.

(d) is involved in fraud and corruption in accordance with the ITB

This guarantee will remain in force up to and including the date ……number……days after the deadline for submission of Bids as such deadline is stated in the instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this guarantee should reach the Bank not letter than the above date.

This Bank guarantee shall not be withdrawn or released merely upon return of the original guarantee by the Bidder unless notified by you for the release of the guarantee.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.

Bank's seal and authorized signature(s) . . .

Note:

The bid security of …… has been counter guaranteed by the Bank ……on

……. ……. (Applicable for Bid Security of Foreign Banks).

Schedule of Requirement

1. List of Goods and Related Services

1 Procurement Supply and Delivery of PE-100 series pipes (Confirming to NS-40/PE 100 or equivalent) of			
1.1 PE-100 Series			
1.1.1 Office of FWSSMP Ilam or Chature Bazar Panchthar			
Procument Item Details			
SL. No	**Item Description**	**Unit of Measurement**	**Quantity**
1	Procurement and supply of PE-100 series HP16-20 mm diameter HDPE PIPES (Confirming to NS-40/PE 100 or equivalent) as per Clause 3, 3.3.2.8 and other related clause of the Specification,	mtr	34135.0
2	Procurement and supply of PE-100 series HP12.5-32 mm diameter HDPE PIPES (Confirming to NS-40/PE 100 or equivalent) as per Clause 3, 3.3.2.8 and other related clause of the Specification,	mtr	1500.0
3	Procurement and supply of PE-100 series HP16-32 mm diameter HDPE PIPES (Confirming to NS-40/PE 100 or equivalent) as per Clause 3, 3.3.2.8 and other related clause of the Specification,	mtr	1000.0
4	Procurement and supply of PE-100 series HP12.5-40 mm diameter HDPE PIPES (Confirming to NS-40/PE 100 or equivalent) as per Clause 3, 3.3.2.8 and other related clause of the Specification,	mtr	1300.0
5	Procurement and supply of PE-100 series HP16-40 mm diameter HDPE PIPES (Confirming to NS-40/PE 100 or equivalent) as per Clause 3, 3.3.2.8 and other related clause of the Specification,	mtr	500.0

2. Delivery and Completion Schedule

1 Procurement Supply and Delivery of PE-100 series pipes (Confirming to NS-40/PE 100 or equivalent) of					
1.1 PE-100 Series					
1.1.1 Office of FWSSMP Ilam or Chature Bazar Panchthar					
SL. No	Description of Goods	Final Destination	Earliest Delivery Date	Acceptable Delivery Date	Bidder's offered Delivery date
1	Procurement and supply of PE-100 series HP16-20 mm diameter HDPE PIPES (Confirming to NS-40/PE 100 or equivalent) as per Clause 3, 3.3.2.8 and other related clause of the Specification,	Office of FWSSMP, Ilam or Chature Bazar, Panchthar	within the 1 day after the agreement	20 days after the agreement	
2	Procurement and supply of PE-100 series HP12.5-32 mm diameter HDPE PIPES (Confirming to NS-40/PE 100 or equivalent) as per Clause 3, 3.3.2.8 and other related clause of the Specification,	Office of FWSSMP, Ilam or Chature Bazar, Panchthar	within the 1 day after the agreement	20 days after the agreement	
3	Procurement and supply of PE-100 series HP16-32 mm diameter HDPE PIPES (Confirming to NS-40/PE 100 or equivalent) as per Clause 3, 3.3.2.8 and other related clause of the Specification,	Office of FWSSMP, Ilam or Chature Bazar, Panchthar	within the 1 day after the agreement	20 days after the agreement	
4	Procurement and supply of PE-100 series HP12.5-40 mm diameter HDPE PIPES (Confirming to NS-40/PE 100 or equivalent) as per Clause 3, 3.3.2.8 and other related clause of the Specification,	Office of FWSSMP, Ilam or Chature Bazar, Panchthar	within the 1 day after the agreement	20 days after the agreement	
5	Procurement and supply of PE-100 series HP16-40 mm diameter HDPE PIPES (Confirming to NS-40/PE 100 or equivalent) as per Clause 3, 3.3.2.8 and other related clause of the Specification,	Office of FWSSMP, Ilam or Chature Bazar, Panchthar	within the 1 day after the agreement	20 days after the agreement	

Technical Specifications

1 Procurement Supply and Delivery of PE-100 series pipes (Confirming to NS-40/PE 100 or equivalent) of				
1.1 PE-100 Series				
1.1.1 Office of FWSSMP Ilam or Chature Bazar Panchthar				
Sl. No.	**Description of Goods**	**Particulars**	**Requirements**	**Bidder's Offer**
1	Procurement and supply of PE-100 series HP16-20 mm diameter HDPE PIPES (Confirming to NS-40/PE 100 or equivalent) as per Clause 3, 3.3.2.8 and other related clause of the Specification,	as specified in the technical specification.	as specified in the technical specification.	
2	Procurement and supply of PE-100 series HP12.5-32 mm diameter HDPE PIPES (Confirming to NS-40/PE 100 or equivalent) as per Clause 3, 3.3.2.8 and other related clause of the Specification,	as specified in the technical specification.	as specified in the technical specification.	
3	Procurement and supply of PE-100 series HP16-32 mm diameter HDPE PIPES (Confirming to NS-40/PE 100 or equivalent) as per Clause 3, 3.3.2.8 and other related clause of the Specification,	NS 40	PE-100 series	
4	Procurement and supply of PE-100 series HP12.5-40 mm diameter HDPE PIPES (Confirming to NS-40/PE 100 or equivalent) as per Clause 3, 3.3.2.8 and other related clause of the Specification,	NS 40	PE-100 series	
5	Procurement and supply of PE-100 series HP16-40 mm diameter HDPE PIPES (Confirming to NS-40/PE 100 or equivalent) as per Clause 3, 3.3.2.8 and other related clause of the Specification,	NS 40	PE-100 series	

Conditions of Contract

Section VI. General Conditions of Contract

1. Definitions	1.1 In this contract, the following terms shall be interpreted as indicated: a. "The Contract" means the agreement entered into between the Purchaser and the Supplier, as recorded in the Contract Form Signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein; b. "The Contract Price" means the price payable to the Supplier under the contract for the full and proper performance of its contractual obligation; c. "The Goods" means Equipment and related Accessories and spare-parts or any other materials which the Supplier is required to supply to the Purchaser under the contract; d. "Services" means services ancillary to the supply of the goods such as transportation and insurance including the installation, commissioning and the operational and maintenance training of the supplied equipment. e. "The Purchaser" means the procuring entity purchasing the goods; f. "The Supplier" means the organization supplying the goods and services under this contract.
2. Technical Specification	2.1 The goods supplied under this contract shall confirm to the standards mentioned in the Technical Specification.
3. Patent Right	3.1 The Supplier shall indemnify the Purchaser against all third-party claims of infringement of patent, trademark or industrial design rights arising from use of goods or any part thereof in the Purchaser's country.

4. Performance Security	4.1 Within seven days (7) of receipt of award of contract from the Purchaser, the successful Bidder shall furnish the performance security in the Performance Security Form provided in the Bidding Documentsfor the due performance of the Contract in the amounts specified in the SCC. 4.2 Failure of the successful Supplier to comply with the requirement of Sub - clause 4.1 shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security, in which event the Purchaser may make the award to the next lowest Supplier or call for new sealed quotations. 4.3 The proceeds of the Performance Security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract. 4.4 The validity of Performance Security shall be the sum of delivery period, warranty period from the date of the issue of final acceptance certificate to the Supplier and additional one month. 4.5 The performance security shall be released within 28 days of completion of warranty period and upon submission of claim by the Supplier.
5. Inspection and Tests	5.1 The Purchaser or its Representative shall have the right to inspect and/or test the goods to confirm their conformity to the Technical Specification and the quality of performance after the supply and delivery of good to the Purchaser's premises 5.2 The Purchaser may reject any Goods or any part thereof that fail to pass any test and/or inspection or do not conform to the specifications. The Supplier shall either rectify or replace such rejected Goods or parts thereof or make alterations necessary to meet the specifications at no cost to the Purchaser.
6. Packing	6.1 The Supplier shall provide such packing of the goods as is required to prevent their damage or deterioration during transmit to their final destination as indicated in the contract. 6.2 The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit and open storage. 6.3 The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided in accordance with international standard and practice.
7. Delivery of Goods	7.1 Delivery of the goods shall be made by the Supplier in accordance with the terms specified by the Purchaser in its Schedule of Requirements.
8. Insurance	8.1 The goods supplied under the contract shall be fully insured in the currency of the Sealed Quotation price against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the manner specified.

9. Warranty	9.1 The Supplier warrants that all the goods supplied under the contract shall fully comply with the specification laid down in the contract. 9.2 Unless otherwise specified in the SCC, the warranty shall remain valid for one year after the goods have been delivered to the final destination indicated in the contract, and accepted by the Purchaser after installation and commissioning of equipment by the Supplier. 9.3 The Purchaser shall promptly notify the Supplier in writing of any claims arising under this warranty. 9.4 Upon receipt of such notice, the Supplier shall, with all reasonable speed, replace the defective goods without cost to the Purchaser. The Supplier will be entitled to remove, at its own risk and cost, the defective goods.
10. Payment	10.1 Payment shall be made in the Nepalese currency as specified in the SCC 10.2 Payment of the goods shall be made after the delivery and installation and commissioning of goods (if applicable) to the satisfaction of the Purchaser.
11. Prices	11.1 Prices charged by the Supplier for goods delivered under the contract shall not vary from the prices quoted by the Supplier in its sealed quotation.
12. Changed Order	12.1 Where the Purchaser desires to make changes in **Schedule of Requirement**, it shall not exceed more than 15 percent.
13. Liquidated Damages	13.1 If the Supplier fails to deliver any or all of the goods within the time period specified in the contract, the Purchaser shall, without prejudice to its other remedies under the contract, deduct from the contract price, as liquidated damages, a sum equivalent to 0.05 percent of the contract price of delayed goods for each day of delay until actual delivery, up to a maximum deduction of 10 percent of the delayed goods' contract price. Once the maximum is reached, the Purchaser may consider termination of the contract.
14. Resolution of Disputes	14.1 If any dispute or difference of any kind whatsoever shall arise between the Purchaser and the Supplier in connection with or arising out of the Contract, the parties shall make every effort to resolve amicably such dispute or difference by mutual consultation. 14.2 If, after thirty (30) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the Purchaser or Supplier may give notice to the other party of it's intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given. 14.2.1 Any dispute or difference in respect of such a notice of intention to commence arbitration has been given in accordance with this Clause shall be finally settled by arbitration.Arbitration may be

	commenced prior to or after delivary of the Goods under the Contract. 14.2.2 Arbitration proceedings shall be conducted in accordance with in accordance with the rules of Nepal Council of Arbitration (NEPCA). 14.3 Notwithstanding any reference to arbitration herein, a. the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree; and b. the Purchaser shall pay the Supplier any monies due the Supplier.
15. Governing Language	15.1 The Governing Language shall be: Nepali or English
16. Applicable Law	16.1 The applicable law shall be Laws of Nepal.
17. Notices	17.1 Any Notice given by one party to the other pursuant to the Contract shall be in writing to the address specified in the SCC. The term "in writing" means communicated in written form with proof of receipt 17.2 A Notice shall be effective when delivered or on the Notice's effective date, whichever is later.
18. Taxes and Duties	18.1 The Supplier shall be entirely responsible for all taxes, duties, licence fees and other such levies imposed by the GON.
19. Operation, Maintenance and Spare-parts Manuals	19.1 The successful Supplier shall supply manufacturer's operation, maintenance and spare-part manuals of the goods (Equipment) as specified in SCC..
20. Conduct of Suppliers	20.1 The Supplier shall be responsible to fulfil his obligations as per the requirement of the Contract Agreement, Quotation documents, GoN's Procurement Act and Regulations. 20.2 The Supplier shall not carry out or cause to carryout the following acts with an intention to influence the implementation of the procurement process or the procurement agreement : a. give or propose improper inducement directly or indirectly, b. distortion or misrepresentation of facts c. engaging or being involved in corrupt or fraudulent practice d. interference in participation of other prospective bidders. e. coercion or threatening directly or indirectly to impair or harm, any party or the property of the party involved in the procurement proceedings,

	f. collusive practice among bidders before or after submission of bids for distribution of works among bidders or fixing artificial/uncompetitive bid price with an intention to deprive the Purchaser the benefit of open competitive bid price.. g. contacting the Purchaser with an intention to influence the Purchaser with regards to the bid or interference of any kind in examination and evaluation of the bids during the period after opening of bids up to the notification of award of contract
21. Blacklisting Supplier	21.1 Without prejudice to any right of the Purchaser under this Contract, the GoN, Public Procurement and Monitoring Office (PPMO) may blacklist a Supplier for his conduct up to three years on the following grounds and seriousness of the act committed by the supplier: a. if it is proved that the supplier committed acts pursuant to the Sub - clause 20.2, b. if the supplier fails to sign an agreement pursuant to ITB Clause 24, c. if it is proved later that the supplier had committed substantial defect in implementation of the contract or had not substantially fulfilled his obligations under the contract or the completed work is not of the specified quality as per the contract , d. if convicted by a court of law in a criminal offence which disqualifies the supplier from participating in the contract. 21.2 A Supplier declared blacklisted and ineligible by the GON shall be ineligible to bid for a contract during the period of time determined by PPMO and credit information bureau of Nepal.

Section VII - Special Conditions of Contract (SCC)

This SCC forms part of the Agreement
[Note: with the exception of the items for which the Purchaser's requirements have been inserted, the Bidder shall complete the following information before submitting his Sealed Quotation.]

GCC 1.1.1 (e)	The Purchaser shall be: Federal Water Supply and Sewerage Management Project, Ilam
GCC 4.1	The Currency of of the performance Security shall be in Nepalese Rupees.The amount of the performance security shall be as follows: (i) if bid price of the bidder selected for acceptance is up to 15 (fifteen) percent below the approved cost estimate, the performance security amount shall be 5 (five) percent of the bid price. (ii) For the bid price of the bidder selected for acceptance is more than 15 (fifteen) percent below of the cost estimate, the performance security amount shall be determined as follows: (iii) Performance Security Amount =[(0.85 x Cost Estimate – Bid Price) x 0.5] + 5% of Bid Price. The Bid Price and Cost Estimate shall be inclusive of Value Added Tax.
GCC 9.1	The warranty period shall be : 6
GCC 10	The terms of payment to be made to the Supplier under the contract shall be as follows: Through accounts division/unit of the Purchaser Payments shall be made in Nepalese Rupees in the following manner: Upon delivery and acceptance, the Client shall pay the full Contract Price (100%) for the delivered Goods and related services within thirty (30) days of receipt. Payment will be made upon the Client's satisfaction with the Goods and related services, and upon submission of a Tax Invoice and claim supported by an acceptance certificate issued by the Client or its authorized representative. Advance Payment is not applicable for this contract. Payments shall be made in Nepalese Rupees in the following manner:.

SL No	Milestone Name	Payment Percentage
1	Advance payment	0
2	The payment for the goods will be made after successful delivery to the site.	100.0

GCC 17.1	For notices, the Purchaser’s address shall be: Attention: Federal Water Supply and Sewerage Management Project, Ilam Address: Ilam Municipality Illam Municipality Ilam Designation: Telephone: 027520026 Facsimile Number: Electronic Mail Address:
GCC 17.1	For notices, the Suppliers’s address shall be: Attention: Address: Designation: Telephone: Facsimile Number: Electronic Mail Address:
GCC 19.1	The Supplier shall supply [[[1]]]number of copies manufacturer's operation, maintenance and spare-part manuals of the goods (Equipment) in English or Nepali language as specified in SCC.

Section VIII. Contract Form

1. Letter of Acceptance

[on letterhead paper of the Purchaser]

Date……..

To: (*name and address of the Contractor*)

Subject: . . . . . *Notification of Award*

This is to notify that your Sealed Quotation dated . . . . for execution of the . . . . . .*name of the contract and identification number, as given in the Contract Data/SCC* . . . . . for the Contract price of Nepalese Rupees *[insert amount in figures and words in Nepalese Rupees]*, as corrected in accordance with the Instructions to Bidders is hereby accepted in accordance with the Instruction to Bidders.

You are hereby instructed to contract this office to sign the formal contract agreement within 7 days. As per the Conditions of Contract, you are also required to submit Performance Security, as specified in SCC, consisting of a Bank Guarantee in the format included in Section VIII (Contract Forms) of the Bidding Document.

The Purchaser shall forfeit the bid security, in case you fail to furnish the Performance Security and to sign the contract within specified period.

Authorized Signature: .....

Name and Title of Signatory:

2. Contract Agreement

THIS AGREEMENT made the _____ day of _____ 20_____ between *[name of Purchaser]* (hereinafter called "the Purchaser") of the one part and *[name of Supplier]* of *[city and country of Supplier]* (hereinafter called "the Supplier") of the other part:

WHEREAS the Purchaser invited Sealed Quotation for certain goods and ancillary services, viz., *[brief description of goods and services]* and has accepted a SQ by the Supplier for the supply of those goods and services in the sum of ……. *[contract price in words and figures]* (hereinafter called "the Contract Price").

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz.:
   a. Form of Agreement
   b. The Purchaser's Notification of Award
   c. The General Conditions of Contract;
   d. Special Conditions of Contract
   e. Quotation Form and the Price Schedule submitted by the Supplier;
   f. The Schedule of Requirements;

   .
3. In consideration of the payments to be made by the Purchaser to the Supplier as hereinafter mentioned, the Supplier hereby covenants with the Purchaser to provide the goods and services and to remedy defects therein in conformity in all respects with the provisions of the Contract.
4. The Purchaser hereby covenants to pay the Supplier in consideration of the provision of the goods and services and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the contract at the times and in the manner prescribed by the Contract.

   IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with their respective laws the day and year first above written.

On behalf of the Purchaser	On behalf of the Supplier
Name:	Name:
Designation:	Designation:
Sign:	Sign:
Seal:	Seal:

3. Performance Security

Date :

To: ***[name and address of the Purchaser]***

WHEREAS [**insert complete name of Supplier**] (hereinafter "the Supplier") has received the notification of award for the execution of **[insert identification number and name of contract]** (hereinafter "the Contract").

AND WHEREAS it has been stipulated by you in the aforementioned Contract that the Supplier shall furnish you with a security [**insert type of security**] issued by a reputable guarantor for the sum specified therein as security for compliance with the Supplier's performance obligations in accordance with the Contract.

AND WHEREAS the undersigned [**insert complete name of Guarantor**], legally domiciled in [**insert complete address of Guarantor**], (hereinafter the "Guarantor"), have agreed to give the Supplier a security:

THEREFORE WE hereby affirm that we are Guarantors and responsible to you, on behalf of the Supplier, up to a total of [**insert currency and amount of guarantee in words and figures**] and we undertake to pay you, upon your first written demand declaring the Supplier to be in default under the Contract, without cavil or argument, any sum or sums within the limits of [**insert currency and amount of guarantee in words and figures**] as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This security is valid until the [**insert day, month, year**].

Name: [**insert complete name of person signing the Security**]

In the capacity of: [**insert legal capacity of person signing the Security**]

Signed: [**insert signature of person whose name and capacity are shown above**]

Duly authorized to sign the security for and on behalf of: **[insert seal and complete name of Guarantor]**

Date: [**insert date of signing**]

4. Bank Guarantee for Advance Payment

To: ***[name of the Purchaser]***

[name of Contract]

Gentlemen and/or Ladies:

In accordance with the payment provision included in the Contract, which amends Clause 10 of the General Conditions of Contract to provide for advance payment, ***[name and address of Supplier]*** (hereinafter called "the Supplier") shall deposit with the Purchaser a bank guarantee to guarantee its proper and faithful performance under the said Clause of the Contract in an amount of ***[amount of guarantee in figures and words]***.

We, the ***[bank or financial institution]***, as instructed by the Supplier, agree unconditionally and irrevocably to guarantee as primary obligator and not as surety merely, the payment to the Purchaser on its first demand without whatsoever right of objection on our part and without its first claim to the Supplier, in the amount not exceeding ***[amount of guarantee in figures and words]***.

We further agree that no change or addition to or other modification of the terms of the Contract to be performed there under or of any of the Contract documents which may be made between the Purchaser and the Supplier, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition, or modification.

The validity period of the guarantee shall be 30 days beyond the period scheduled for repayment of the advance payment and the guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until the Purchaser receives full repayment of the same amount from the Supplier.

Yours truly,

Signature and seal of the Guarantors

_____

[name of bank or financial institution]

_____

[address]

_____

[date]

Table 4 Standard Dimension Ratio (SDR) and Corresponding Wall Thicknesses (e) of Pipes
(Clauses 7.4 and E-4.3)

SDR	SDR 41		SDR 33		SDR 26		SDR 21		SDR 17		SDR 13.6		SDR 11		SDR 9		SDR 7.4		SDR 6	
	Nominal Pressure (PN) Bar																			
PE 63 PE 80 PE 100	PN 2 PN 2.5 PN 3.2		PN 2.5 PN 3.2 PN 4		PN 3.2 PN 4 PN 5		PN 4 PN 5 PN 6		PN 5 PN 6 PN 8		PN 6 PN 8 PN 10		PN 8 PN 10 PN 12.5		- PN 12.5 PN 16		- PN 16 PN 20		- - PN 20	
	Wall Thickness																			
Nominal OD dn, mm	e min mm	e max mm	e min mm	e max mm	e min mm	e max mm	e min mm	e max mm	e min mm	e max mm	e min mm	e max mm	e min mm	e max mm	e min mm	e max mm	e min mm	e max mm	e min mm	e max mm
16															1.8	2.1	2.2	2.5	2.7	3.1
20													1.9	2.2	2.3	2.6	2.7	3.1	3.4	3.8
25											1.9	2.2	2.3	2.6	2.8	3.2	3.4	3.8	4.2	4.7
32									1.9	2.2	2.4	2.7	3.0	3.4	3.6	4.1	4.4	4.9	5.4	6.0
40							1.9	2.2	2.4	2.7	3.0	3.4	3.7	4.2	4.5	5.1	5.4	6.0	6.7	7.5
50					2.0	2.3	2.4	2.7	3.0	3.4	3.7	4.2	4.6	5.2	5.6	6.3	6.8	7.6	8.4	9.3
63					2.5	2.9	3.0	3.4	3.7	4.2	4.7	5.3	5.8	6.5	7.0	7.8	8.6	9.6	10.5	11.7
75	1.9	2.2	2.3	2.6	2.9	3.3	3.6	4.1	4.5	5.1	5.6	6.3	6.8	7.6	8.4	9.3	10.2	11.3	12.5	13.9
90	2.2	2.5	2.8	3.2	3.5	4.0	4.3	4.8	5.3	5.9	6.7	7.5	8.2	9.1	10.0	11.1	12.2	13.5	15.0	16.6
110	2.7	3.1	3.4	3.8	4.3	4.8	5.3	5.9	6.6	7.4	8.1	9.0	10.0	11.1	12.3	13.6	14.9	16.5	18.4	20.3
125	3.1	3.5	3.8	4.3	4.9	5.5	6.0	6.7	7.4	8.2	9.2	10.2	11.4	12.6	13.9	15.4	16.9	18.7	20.9	23.1
140	3.5	4.0	4.3	4.8	5.4	6.0	6.7	7.5	8.3	9.2	10.3	11.4	12.7	14.1	15.6	17.3	19.0	21.0	23.4	25.8
160	3.9	4.4	4.9	5.5	6.2	6.9	7.7	8.6	9.5	10.6	11.8	13.1	14.6	16.2	17.8	19.7	21.7	24.0	26.7	29.5
180	4.4	4.9	5.5	6.1	7.0	7.8	8.6	9.6	10.6	11.8	13.3	14.7	16.4	18.1	20.0	22.1	24.4	26.9	30.0	33.1
200	4.9	5.5	6.1	6.8	7.7	8.6	9.6	10.7	11.8	13.1	14.7	16.3	18.2	20.1	22.3	24.6	27.1	29.9	33.4	36.8
225	5.5	6.2	6.9	7.7	8.7	9.7	10.8	12.0	13.3	14.7	16.6	18.4	20.5	22.7	25.0	27.6	30.5	33.7	37.5	41.4
250	6.1	6.8	7.6	8.4	9.7	10.8	12.0	13.3	14.7	16.3	18.4	20.3	22.7	25.1	27.8	30.7	33.9	37.4	41.7	46.0
280	6.9	7.7	8.5	9.5	10.8	12.0	13.4	14.8	16.6	18.4	20.6	22.8	25.4	28.0	31.2	34.4	37.9	41.8	46.7	51.5
315	7.7	8.6	9.6	10.7	12.2	13.5	15.0	16.6	18.6	20.6	23.2	25.6	28.6	31.6	35.0	38.6	42.6	47.0	52.5	57.9
355	8.7	9.7	10.8	12.0	13.7	15.2	16.9	18.7	20.9	23.1	26.1	28.8	32.3	35.6	39.5	43.6	48.0	52.9	59.2	65.2
400	9.8	10.9	12.2	13.5	15.4	17.0	19.1	21.1	23.5	26.0	29.4	32.4	36.4	40.1	44.5	49.1	54.1	59.6	66.7	73.5
450	11.0	12.2	13.7	15.2	17.3	19.1	21.5	23.8	26.5	29.3	33.1	36.5	40.9	45.1	50.0	55.1	60.9	67.1	75.0	82.6
500	12.2	13.6	15.2	16.8	19.3	21.3	23.9	26.4	29.4	32.4	36.8	40.6	45.5	50.2	55.6	61.3	67.6	74.5	83.4	91.8
560	13.7	15.2	17.0	18.8	21.6	23.9	26.7	29.5	33.0	36.4	41.2	45.4	50.9	56.1	62.3	68.6	75.7	83.4	93.4	102.8
630	15.4	17.0	19.1	21.1	24.3	26.8	30.0	33.1	37.1	40.9	46.3	51.0	57.3	63.1	70.0	77.1	85.2	93.8	105.0	115.6
710	17.3	19.1	21.6	23.9	27.3	30.1	33.9	37.4	41.8	46.1	52.2	57.5	64.5	71.1	78.9	86.9	96.0	105.7	118.4	130.3
800	19.6	21.6	24.3	26.8	30.8	34.0	38.1	42.0	47.1	51.9	58.8	64.8	72.7	80.1	88.9	97.9	108.2	119.1		
900	22.0	24.3	27.3	30.1	34.7	38.3	42.9	47.3	53.0	58.4	66.2	72.9	81.8	90.1	100.0	110.1	121.7	134.0		
1 000	24.4	26.9	30.3	33.4	38.5	42.5	47.7	52.6	58.9	64.9	73.5	81.1	90.9	100.1	111.2	122.4				
1 200	29.3	32.3	36.4	40.1	46.2	50.9	57.2	63.0	70.6	77.8	88.2	97.2	109.1	120.1						
1 400	34.1	37.6	42.4	46.7	53.9	59.4	66.7	73.5	82.4	90.7	102.9	113.4								
1 600	39.0	43.0	48.5	53.4	61.6	67.9	76.2	83.9	94.2	103.7	117.6	129.5								
1 800	43.9	48.4	54.6	60.2	69.3	76.3	85.8	94.5	106.0	116.7										
2 000	48.8	53.8	60.6	66.8	77.0	84.8	95.3	104.9	117.7	129.6										

NOTES
1 Tolerances calculated from (0.1 e_{min} + 0.1) mm rounded up to the next 0.1 mm.
2 All pressure ratings are calculated at 27°C and rounded up to nearest pressure class.
3 Considering operational problems, maximum wall thickness of pipes are considered around 130 mm.

Table 5 Hydraulic Characteristic Requirements of Pipes

(Clauses 8.1.1 and E-4.3)

Sl No.	Test Temp °C	Test Duration h	Induced Hoop Stress MPa		
			PE 63	PE 80	PE 100
(1)	(2)	(3)	(4)	(5)	(6)
i)	27	100	6.9	8.6	10.7
ii)	80	48	3.8	4.9	5.7
iii)	80	165	3.5	4.5	5.4
iv)	80	1000	3.2	4.0	5.0

8.1.2 Internal Pressure Creep Rupture Test of Pipe Joints

The pipe joints shall also be tested for the hydraulic characteristic requirement by subjecting the butt fusion joint or electro fusion joint of a pipe to internal pressure creep rupture test at 80°C for 48 h as per Table 5 and in accordance with the method given in Annex E. The pipe joints under test shall show no signs of localized swelling, leakage or weeping and shall not burst during the prescribed test period.

8.2 Longitudinal Reversion Test

When tested in accordance with the method given in Annex F, the value of the longitudinal reversion shall not be greater than 3 percent.

8.3 Carbon Black Content and Dispersion

When tested from a composite sample of minimum three pipes, in accordance with NS 97 the carbon black content shall be within 2.5 ± 0.5 percent, and the dispersion of carbon black shall be satisfactory.

8.4 Melt Flow Rate

When tested from a composite sample of minimum three pipes as per NS 97 at 190° C with nominal load of 5 kgf, MFR shall not deviate from the MFR of the resin by more than 30 percent.

8.5 Oxidation Induction Time

The minimum oxidation induction time of the pipe when tested in accordance with the method given in Annex B shall be not less than 20 min.

8.6 Overall Migration

When tested from a sample of minimum 3 pipes as per NS…, the overall migration of constituents shall be within the limits stipulated in NS… .

8.7 Density

When tested from a composite sample of minimum of 3 pipes as per NS 110, the base density of the pipe shall be between 930 to 965 kg/m^3.

8.8 Tensile Strength for Butt-fusion

When tested according to Annex G, the test specimens prepared by punching /machining from pipe butt fusion sample preferably 110 mm Dia/SDR 11 shall show ductile failure. If the sample shows brittle fail the test may be considered as a failure.

NOTE — If 110 mm/SDR 11 pipes are not being manufactured, test shall be carried out on the nearest, preferably higher size/ SDR ratio being manufactured.

8.9 Elongation at Break

When tested according to Annex H, the test specimens punched/machined from pipe samples, shall meet requirement as per Table 6.

Table 6 Elongation at Break Requirements of Pipes

(Clause 8.9)

S. No. (1)	Characteristics (2)	Requirements (3)	Test Parameters Parameter (4)	Value (5)	Test Method Ref to (6)
i	Elongation at break for $e \leq 5$ mm	≥ 350 Percent	Test piece shape Test speed	Type 2 100 mm/min	Annex H
ii	Elongation at break for 5 mm $< e \leq 12$ mm	≥ 350 Percent	Test piece shape Test speed	Type 1* 50 mm/min	Annex H
iii	Elongation at break for $e > 12$ mm	≥ 350 Percent	Test piece shape Test speed	Type 1* 25 mm/min	Annex H
			OR		
			Test piece shape Test speed	Type 3* 10 mm/min	

* Where practical, machined type 2 test pieces may be used for pipe wall thickness ≤ 25 mm. The test may be terminated when the requirement is met, without continuing until the rupture of the test piece.

8.10 Slow Crack Growth Rate

When subjected to test parameters as given below and tested in accordance with the procedure given in Annex E, the notched test specimens prepared from pipe size of preferably 110 mm and SDR 11 in accordance with Annex J shall show no signs of localized swelling, leakage or weeping and shall not burst during the prescribed test period.

Test Temperature	Test Duration	Internal Test Pressure, MPa		
°C	H	PE 63	PE 80	PE 100
80±1	500 h	0.64	0.8	0.92

NOTE — If 110 mm / SDR 11 pipes are not being manufactured, test shall be carried out on the nearest, preferable higher size/ SDR ratio being manufactured.

9. SAMPLING, FREQUENCY OF TESTS AND CRITERIA FOR CONFORMITY

9.1 Type Tests

9.1.1 Type tests are intended to prove the suitability and performance of a new composition, a new technique or a new size of a pipe. Such tests, therefore, need be applied only when a change is made in polymer composition or method of manufacture, or when a new size of pipe is to be introduced. Even if no change is envisaged, type test shall be done at least once in two years on each pressure rating and grade of pipe of the highest size manufactured during the period.

9.1.2 Three samples of the same grade, same size and same SDR selected at random shall be tested for compliance with the requirements of the type tests as given in Table 7.

9.1.3 If all the samples pass the requirements of the type test, the type of the pipe under consideration shall be considered eligible for type approval.

9.1.4 In case of any of the samples fails in the type test, the testing authority, at its discretion, may call for fresh samples not exceeding the original number and subject them to the type test again. If in repeat test, no single failure occurs, the type of pipe under consideration shall be considered eligible for type approval. If any of the samples fails in the repeat tests, the type of pipe shall not be approved. The manufacturer or the supplier may be asked to improve the design and resubmit the product for type approval.

9.1.5 At the end of the validity period (normally one year for internal pressure creep rupture test at 27°C for 100 h and internal pressure creep rupture test for joints at 80°C for 48 h and two years for all other type tests) or earlier as may be necessary, the testing authority may call for fresh samples for type-test for the purpose of type approval.

Table 7 Type Tests

(Clause 9.1.2)

Sl No.	Description of Test	Sample Requirement Size	Clause
(1)	(2)	(3)	(4)
i)	Tensile strength for butt-fusion	3	8.8
ii)	Overall migration	3	8.6
iii)	Internal pressure creep rupture test (hydrostatic resistance test) at 27°C for 100 h	3	8.11
iv)	Internal pressure creep rupture test (hydrostatic resistance test) at 80°C for 165 h	3	8.11
v)	Internal pressure creep rupture test (hydrostatic resistance test) at 80°C for 1 000 h test	3	8.11
vi)	Slow crack growth rate test	3	8.10
vii)	Internal Pressure Creep Rupture Test (Hydrostatic Creep Rupture Test) for Joints at 80°C for 48 h	3	8.12

9.2 Acceptance Test

9.2.1 Acceptance tests are carried out on sample selected from a lot for the purpose of acceptance of the lot.

9.2.2 **Lot**

All pipes of the same grade, same size, same SDR and also manufactured essentially under similar conditions of manufacture shall constitute a lot. For ascertaining conformity of the lot to the requirements of this standard, samples for acceptance tests (see Table 8) shall be selected and prepared after conditioning at 27±2°C and tested for compliance as per Table 8.

Table 8 Acceptance Tests

(Clause 9.2.2)

Sl No.	Description of Test	Sample Size	Requirement Clause
(i)	Visual appearance and dimensions	Table 9	7.1 and 7.4
(ii)	Melt flow rate	Table 10	8.4
(iii)	Density	Table 10	8.5
(iv)	Reversion test	Table 10	8.7
(v)	Elongation at break	Table 10	8.2
(vi)	Carbon black content	Table 10	8.9
(vii)	Carbon black dispersion	Table 10	8.3
(viii)	Oxidation induction	Table 10	8.8
(ix)	Internal pressure creep rupture test (hydrostatic resistance test at 80°C for 48 h	Table 10	8.11.1

9.2.3 Conformity to Dimensional and Visual Characteristics

9.2.3.1 The number of test samples shall be in accordance with Table 9.

9.2.3.2 These pipes shall be selected at random from the lot and in order to ensure the randomness of selection, a random number table shall be used. For guidance and use of random number tables, NS 145 may be referred. For the above purpose, each length of the coil of a given size, grade and SDR shall be considered as one pipe. In the absence of a random number table, the following procedure may be adopted.

Starting from any pipe in the lot, count them as 1, 2, 3, 4 etc, up to r and so on where r is the integral part of N/n, N being the number of pipes in the lot and n is the number of pipes in the samples. Every r^{th} pipe so counted shall be drawn so as to constitute the required sample size.

9.2.3.3 The number of pipes given for the first sample in col 4 of Table 9 shall be examined for visual and dimensional requirements as given in 7.1 and 7.4 respectively. A pipe failing to satisfy any of these requirements shall be considered as defective. The lot shall be deemed to have satisfied these requirements, if the number of detectives found in the first sample are less than or equal to the corresponding acceptance number given in col 6 of Table 9. The lot shall be deemed not to have met these requirements if the number of detectives found in the first sample is greater than or equal to the corresponding rejection numbers given in col 7 of Table 9. If, however, the number of detectives found in the first sample lies between the corresponding acceptance and rejection numbers given in col 6 and 7 of Table 9, the second sample of the size given in col 4 of Table 9 shall be taken and examined for these requirements. The lot shall be considered to have satisfied these, requirements, if the number of detectives found in the cumulative sample is less than or equal to the corresponding acceptance number given in col 6 of Table 9 otherwise not. In case, the sample size is equal to or less than the lot size, 100 percent inspection shall be done for these tests and all the samples from the lot which pass these tests shall be tested for other acceptance tests.

9.2.4 Conformity to Acceptance Tests Other Than Dimensional and Visual Characteristics

The lot having satisfied dimensional and visual requirements shall be tested for other acceptance tests as given in Table 8. The number of test samples selected from the lot for subjecting to these tests shall be in accordance with Table 10. For the above purpose, each length of the coil of a given size, grade and SDR shall be considered as one pipe. The lot shall be considered to have met the requirements of these tests, if none of samples tested fails.

Table 9 Scale of Sampling for Dimensional Requirements
(Clauses 9.2.3.1 and 9.2.3.3)

Sl No.	No. of Pipes in the Lot	Sample No.	Sample Size	Cumulative Sample Size	Acceptance No.	Rejection No.
i)	Up to 150	First	13	13	0	2
		Second	13	26	1	2
ii)	151 to 280	First	20	20	0	3
		Second	20	40	3	4
iii)	281 to 500	First	32	32	3	4
		Second	32	64	4	5
iv)	501 to 1200	First	50	50	2	5
		Second	50	100	6	7
v)	1201 to 3200	First	80	80	3	7
		Second	80	160	8	9
vi)	3201 to 10000	First	125	125	5	9
		Second	125	250	12	13
vii)	10001 to 35000	First	200	200	7	11
		Second	200	400	18	19

Table 10 Scale of Sampling for Acceptance Tests Other Than Dimensional Requirements
(Clauses 9.2.2 and 9.2.4)

Sl No.	No. of Pipes in the Lot	Sample Size
a) For Pipe Sizes Upto 500 mm		
i)	Up to 150	3
ii)	151 to 1200	5
iii)	1201 to 35000	8
b) For Pipe Sizes Above 500 mm		
iv)	Up to 500	3
v)	501 to 1 200	5
vi)	1201 to 35000	5

10. MARKING

10.1 Each straight length/coil of pipe shall be clearly and indelibly marked in white/yellow colour using ink/ paint or inkjet print or hot embossed on white base, at every 1 m throughout the length of pipe/coil with the information given in 10.1.1.

10.1.1 The marking on the pipe shall carry the following minimum information:

a) Manufacturer's name/trade-mark;
b) Material designation, PE... (see 6.1);
c) Pressure rating;
d) Standard dimension ratio (SDR);
e) Nominal Size; and
f) Lot Number/Batch Number, containing information of date of manufacture shall include the details of production in the following manner

Year	Month	Day	Machine No.	Shift
Xxxx	Xx	Xx	xx	xx

10.2 NS Certification Marking

Each pipe/coil may also be marked with the Standard Mark.

10.2.1 The use of the Standard Mark is governed by the provisions of the Nepal Standards (Certification Mark) Act, 2037 and the Rules and Regulations made there under. The details of conditions under which a license for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Nepal Bureau of Standards and Metrology.

ANNEX A

(Clause 3.17)

THE RELATIONSHIP BETWEEN MINIMUM REQUIRED STRENGTH, NOMINAL PRESSURE AND STANDARD DIMENSION RATIO

A-1 The relation between nominal pressure (at 27°C) (PN), design stress at 20°C (σ), and the standard dimension ratio (SDR) is given by the following equation:

$$PN = \frac{20\sigma}{SDR - 1} \times f_1$$

Where, σ = MRS/C

PN = nominal pressure at 27°C, in bar

MRS = minimum required strength of the material class (see Table 1),

C = overall service design co-efficient = 1.25,

f_1 = pressure reduction co-efficient = 0.85 for 27°C (from Fig. 1), and

SDR = standard dimension ratio.

The Nominal Pressure (PN) for various material class and different SDRs has been calculated using the above equation and is given in the informal Table below

However, if a higher value for C is required, the PN values will have to be recalculated using the above equation considering the calculated design stress, σ for each class. A higher value for C can also be obtained by choosing a higher PN class.

Sl. No.	SDR	Standard Dimension Ratio (SDR) Used in Wall Thickness Chart (Table 5) at 27°C		
		Nominal Pressure for Material Class in Bar		
		PE 63	PE 80	PE 100
(1)	(2)	(3)	(4)	(5)
i)	41	2.0	2.5	3.0
ii)	33	2.5	3.2	4.0
iii)	26	3.2	4.0	5.0
iv)	21	4.0	5.0	6.0
v)	17	5.0	6.0	8.0
vi)	13.6	6.0	8.0	10.0
vii)	11	8.0	10.0	12.5
viii)	9	—	12.5	16.0
ix)	7.4	—	16.0	20.0
x)	6	—	20.0	—

ANNEX B

[Table 2 Sl No. (iii)]

METHOD FOR DETERMINATION OF OXIDATION INDUCTION TIME (THERMAL STABILITY)

B-1 APPARATUS AND EQUIPMENT

B-1.1 A differential thermal analyzer (DTA)/differential scanning calorimeter (DSC), calibrated using pure indium and pure tin to give values which lie within 156.6 ± 0.5°C and 231.9 ± 0.5 °C respectively. The test cell shall allow the cell to be purged within 1 min by use of successive gases at the specified flow rate.

B-1.2 Aluminium pans, large enough to accommodate a test piece in solid or molten form.

B-2 TEST PIECES

A sample from the pipe shall be taken by use of a core drill directed radically though the pipe wall. The diameter of the core shall be just less than the inner diameter of the sample pan of the thermal analyzer, and care should be taken not to overheat the sample during the coring operation. Using a scalpel, cut the test pieces that weigh 15 ± 0.5 mg in the form of discs from the core sample, selecting the inner surface.
Outer surface and mid-wall as the minimum sample points which are to be tested individually.

B-3 PROCEDURE

Establish a nitrogen flow of 50 cm^3/min ±10 percent through the differential thermal analyzer or differential scanning calorimeter cell. Check that when a switchover to oxygen is made the gas flow will continue at the rate of 50 cm^3/min ±10 percent and then revert to a nitrogen flow of 50 cm^3/min ±10 percent.
Place a 15 mg ± 0.5 mg cylindrical polyethylene specimen in an open aluminium pan an empty aluminium reference pan into the cell. Set the instrument to run isothermally at 200°C ±0.1°C raising the temperature at a rate of 20°C /min and allowing the temperature to stabilize. Make any corrections to the heater voltage to bring the specimen temperature to 200°C ± 0.1°C. Start to record the thermo graph.
When stable conditions exist under the nitrogen flow, which should be the case after 5 min switch over to oxygen and mark this point on the thermo graph. The cell should be purged within 1 min of atmosphere changeover. Continue to run the thermo graph until the oxidation exotherm has occurred, and has reached its maximum.

B-4 INTERPRETATION OF RESULTS

The thermal stability of the specimen is the time taken in minutes from the introduction of oxygen to the intercept of the extended baseline and the tangent drawn to the exotherm at the point of maximum slope.

ANNEX C

[Table 2 Sl No. (iv)]

METHOD FOR DETERMINATION OF VOLATILE CONTENT IN POLYETHYLENE PIPING MATERIALS AND COMPONENTS

C-1 PRINCPLE

The method consists of determining the loss of mass of a test piece which has been put in a drying oven at a given temperature. The method is used for determining the content of material which volatiles at 105°C in polyethylene (PE) piping materials. This method is also applicable to moulding and extrusion materials. It can be also applicable to components in PE piping systems.

C-2 APPARATUS

C-2.1 Drying Oven or Equivalent Device, capable of maintaining the temperature at (105 ± 2)°C at the position for the cup(s) (see C-3.2 and C-5.4).

C-2.2 A Cylindrical Glass Weighing Cup, with a diameter of 35 mm capable of containing a test piece (see C-4.1), a minimum volume of 50 ml and a corresponding lid.

C-2.3 A Desiccators

C-2.4 An Analytical Balance or Equivalent, capable of weighing to the nearest 0.1 mg.

C-3 TEST PIECE

C-3.1 Each test piece shall comprise an approximately 25 g portion of a sample representative of the material before molding or extrusion, as applicable, or cut in accordance with the referring standard from a cross section of a pipe or fitting.

NOTE — If test sample utilize different sampling weights or are taken from different sources, for example raw material granulate or finished product, then there may be a difference in test results obtained. This may depend on, for example, the surface area/mass ratio or the maximum thickness of material. To demonstrate correlation with results for granulate sample determined in accordance with this method, the preparation of samples from finished products may have to be modified.

C-3.2 The number of test pieces shall be as specified in Table 2.

C-4 PROCEDURE

C-4.1 Clean and dry a weighing cup and its lid until constant weight is achieved and store them in the desiccators for at least 0.5 h at room temperature.

C-4.2 Take the weighing cup and its lid out of the desiccator and determine their combined mass, m_0 to the nearest 0.1 mg.

C-4.3 Fill the cup with about 25 g portion of the sample and determine the mass, m_1, of the cup, lid and the test portion to the nearest 0.1 mg.

C-4.4 Put the weighing cup in the drying oven zone which is kept at (105 ± 2) °C (see C-3.1).

C-4.5 After a period of 65 ± 5 min, take the weighing cup out of the drying oven and put the cup in the desiccator for at least 1h at room temperature.

C-4.6 Cover the cup with the lid. Weigh the cup, lid and residual material to the nearest 0.1 mg, as mass m_2.

C-5 CALCULATION

Calculate the volatile material content, m_v, of the test portion using the following equation:

$$m_v = \frac{m1 - m2}{m1 - m0} \times 10^6$$

Where,

m_v = volatile material content in milligrams per kilogram (mg/kg) at (105 ± 2)°C;

m_0 = mass in grams of the empty weighing cup and its lid;

m_1 = mass in grams of the weighing cup and its lid plus the test portion; and

m_2 = mass in grams of the weighing cup and its lid plus the residual material after 1 h at (105 ± 2) °C.

ANNEX D

[Table 2 Sl No. (v)]

METHOD FOR DETERMINATION OF WATER CONTENT IN POLYETHYLENE PIPING MATERIALS AND COMPONENTS

D-1 PRINCIPLE

This method of determining water content of plastics is an extraction method, in which a test portion is extracted with anhydrous methanol and the extracted water determined by titration using the Karl Fischer method. It can be used for all plastics and is applicable to granules having a maximum size of 4 mm × 4 mm × 3 mm. The method do not test for water absorption (kinetics and equilibrium) of plastics. It is suitable for the determination of water content as low as of 0.1 percent or above.

D-2 REAGENT

During the analysis, reagents of recognized analytical grade should only be used.

a) Methanol, anhydrous, having water content less than 0.1 percent by mass.

b) Karl Fischer Reagent, with an equivalent factor of approximately 3 mg/ml to 5 mg/ml of water, if the reagent is prepared; check its equivalent factor.

D-3 APPARATUS

Ordinary laboratory apparatus and the following:

a) Glass Flasks, 250 ml capacity provided with ground-glass or rubber stoppers.

b) Conical Titration Flasks, 150 ml capacity, with standard ground necks and provided with ground-glass stoppers.

c) Reflux Condensers, with ground neck capable of being fitted on to the flasks [D-3 (b)] and on to the tubes [D-3 (d)].

d) Water Absorption Tubes with ground joints, containing calcium chloride or other drying agent.

e) Electrical or Hot-air Heaters, for the flasks [D-3 (b)].

f) Pipettes, 50 ml capacity (automatic filling Pipettes are acceptable).

g) Woulfe Bottles, with two tubes.

h) Curved or U-shaped Water Absorption Tubes, filled with calcium chloride.

j) Rubber Pipette Filler

k) Pipette, 10 ml capacity

m) Desiccator, containing calcium chloride

n) Analytical Balance, accurate to 0.2 mg

p) Karl Fischer Apparatus, for determining water content.

D-4 PREPARATION OF TEST SAMPLE

D-4.1 Granules

Take a representative sample of approximately 100 g. Put the sample into a pre-dried glass flask [see D-3 (a)] and immediately close it with a stopper.

NOTE — It is desirable pre-dry the container in an oven, and then cools it over a suitable water absorbent, for instance silica gel.

D-4.2 Finished Articles

Cut or saw the sample into pieces of approximate size, that is, having a maximum size of 4 mm × 4 mm × 3 mm.

D-5 PROCEDURE

D-5.1 Precautions

Due to the low quantities of water measured, maximum care shall be taken exercised at all times to avoid contaminating the sample with water from the sample container, the atmosphere or transfer equipment. Hygroscopic resin samples shall be shall be protected from the atmosphere.

D-5.2 Preparation of Test Portions

Conduct the test on two test portions from the same sample. Use test portions containing 10 mg to 20 mg of water based on the estimated water content of the sample.

D-5.3 Determination

a) Carefully dry the apparatus.

b) Weigh each test portion the nearest 1 mg into a conical titration flask [D-3 (b)] fitted with a ground-glass stopper. Pipette 50 ml [D-3 (f)] of anhydrous methanol [D-2 (a)] into the conical flask containing the test portion. At the same time, add 50 ml of anhydrous methanol to another conical flask for a blank test. Stopper the flask. Keep the stoppered flasks in the desiccator [D-3 (n)] pending continuation of the test.

c) Unstopper the flask and quickly attach them to reflux condensers [D-3 (e)] fitted with calcium chloride tube [D-3 (d)]. Reflux the contents of the conical flasks for 3h, then leave them for 45 min to cool to room temperature.

Separate the flask from the condenser, quickly stopper them and place them in the desiccator.

d) Use the Karl Fischer apparatus [D-3 (p)] to titrate the contents of each flask with Karl Fischer reagent [D-2 (b)].

D-6 EXPRESSION OF RESULTS

The water content w, expressed as a percentage by mass, for each of the two determinations is determined by the following formula:

$$w = \frac{(V_1 - V_2)T}{m \times 100}$$

where

V_1 is the volume, expressed in millilitres, of Karl Fischer reagent used for the determination;

V_2 is the volume, expressed in millilitres, of Karl Fischer reagent used for the blank test;

T is the water equivalent, expressed in the grams of water per millilitre of reagent, of Karl Fischer reagent, and

m is the mass, in gram of the test portion.

The two values for the water content shall not defer by more than 10 percent relative or 0.02 percent absolute, whichever is the greater. If the difference is greater, repeat the measurement until acceptable consecutive values are obtained and discard all unacceptable results.

The result is expressed as the average of these two determinations, rounded to the nearest 0.01 percent by mass.

ANNEX E

(Clauses 8.1.1, 8.1.2 and 8.10)

INTERNAL PRESSURE CREEP RUPTURE TEST

E-1 GENERAL

The test shall be carried out not earlier than 24 h after the pipes have been manufactured.

E-2 TEST SPECIMENS

A sample of pipe having free length between the end fittings equal to ten times the outside diameter but not less than 250 mm and not greater than 750 mm shall be taken for testing from each pipe to be tested.

E-3 APPRATUS

Equipment permitting the application of a controlled internal hydraulic pressure to the specimen which are immersed in a thermostatically controlled water-bath.

E-4 PROCEDURE

E-4.1 The pipes shall be fitted with the locking plugs at both ends in such a way that the axial force coming from the internal pressure are transmitted to the pipe. The pipe shall remain free to move in longitudinal direction.

E-4.2 Through a closable operating in one of the locking plugs, the pipe shall be filled with water at ambient temperature. It shall be put in a water bath at the applicable test temperature (permissible deviation of ±1°C) and kept in the bath for minimum 1 h to adjust the temperature.

E-4.3 The pressure in the pipe shall then be increased to the test pressure (p) gradually and without shock, preferably within 10 to 30 s in the bath whose temperature has been adjusted in accordance with E-4.2. The pressure with a permissible deviation of ± 2.5 percent shall be maintained for the applicable test duration.

The test pressure (p) shall be calculated as follows from the minimum dimension given in Table 4 as the case may be and corresponding induced stress value given in Table 5.

$$p = \frac{2\sigma_i S}{d - s}$$

Where

p = test pressure, in MPa;

S = minimum wall thickness, in mm;

σ_i = induced stress, in MPa; and

d = outside diameter of pipe, in mm.

E-5 The sample shall not show sign of localized swelling or leakage and shall not burst during the prescribed test duration. The test showing failure within a distance equivalent to the length of end cap from the end shall be disregarded and the test be repeated.

ANNEX F

(Clause 8.2)

LONGITUDINAL REVERSION TEST

F-1 APPARATUS

F-1.1 Air Oven — Thermostatically controlled at 110±2°C and is capable of re-establishing this temperature within 15 minutes after the introduction of test specimen in the oven.

F-1.2 Thermometer — Graduated to 0.5°C.

F-1.3 Test Specimens — Either 3 complete sections of pipe, approximately 200 mm long shall be taken as test pieces, or where the pipe diameter is greater than 200 mm, pieces of pipe about 200 mm axial length and with an approximate circumferential arc length of 200mm shall be prepared by cutting. In such cases, the entire circumference of approximately 200 mm long section of pipe shall be divided into pieces measuring approximately 200 mm square. The direction of the pipe axis shall be marked on the pieces. All pieces are required to be tested. A mark shall be scribed on the external surface approximately 50 mm for each end of the test pieces in the axial direction of pipe,(in the case of complete section of pipe, the mark shall be scribed around the whole circumference) . The distance between the marks, l_0 (reference length), shall be approximately 100 mm and shall be measured to the nearest 0.25 mm at ambient temperature.

F-2 PROCEDURE

F-2.1 Place the test pieces concave side up on a glass plate previously dusted with talcum, to ensure that changes in length take unimpeded. The pieces shall not touch each other.

F-2.2 Set the oven temperature at 110 ± 2°C. The glass plate with the test pieces shall then be placed in the oven heated to test temperature and capable of maintaining continuous forced air circulation. The test pieces shall be kept in the oven at the temperature and for the periods specified below:

Wall Thickness, e mm	Test Temperature °C	Period of Stressing min
Up to 8	110±2	60±1
Over 8 and up to 16	110±2	120±2
Over 16	110±2	240±5

F-2.3 Remove the test pieces from the oven and allow to cool in air, without being moved, at the ambient temperature. Measure the minimum distance between the two marks.

F-3 EXPRESSION OF RESULTS

F-3.1 For each test pieces calculate the longitudinal reversion, T, as a percentage, as follows:

$$T = \frac{l_0 - l_1}{l_0} \times 100$$

Where
l_0 and l_1 are the distance (reference length) in mm before and after the test.

F-3.2 The average value (arithmetic mean) of all the test pieces shall be obtained and reported.

ANNEX G

(Clause 8.8)

DETERMINATION OF FAILURE MODE OF TEST PIECES FROM A BUTT-FUSED JOINT

G-1 PRINCIPLE OF THE METHOD

A test piece machined from a butt-fused PE pipe joint to give a waisted section is subjected to a tensile stress at constant speed. When loading the test piece in a tensile-testing machine, the stress is concentrated through the jointed region and ultimate failure is in the vicinity of the joint.
The failure mode is used as criteria for the evaluation of the butt-fused joint. The test is carried out at a temperature of 27 ±2°C.

G-2 APPARATUS

a) Room, which can be controlled at a temperature of 27 ± 2°C.

b) Tensile-testing machine, capable of sustaining between its clamping jaws a constant speed of 5 ± 1 mm/min, and equipped with means for recording the consequent applied force and a device to detect test piece failure.

c) Clamping device, equipped with bars fitting into traction holes machined in the test piece.

d) Measuring devices, capable of determining the width and thickness of the test piece to within 0.05 mm.

e) Template with the geometry of the test piece (see Fig. 5 and Fig. 6), to mark the shape of the test piece to be machined.

G-3 TEST PIECES

G-3.1 Preparation

G-3.1.1 General

The butt-fused PE pipe joints shall be prepared in accordance with the manufacturer's instructions or the instructions specified in the IS 7634 (Part 2).
For each test piece required, a strip shall be machined out along the longitudinal direction of the pipe, across the joint. The strip shall be further machined to prepare a test piece with dimensions conforming to following using a template to ensure that the joint interface will be aligned with the cross-section of the centre of the waist of the test piece of type A or type B, as applicable:

a) Table 11 and Fig. 2 for pipes with wall thickness $e < 25$ mm (Type A);

b) Table 11 and Fig. 3 for pipes with wall thickness $e \geq 25$ mm (Type B);

The fusion beads may be removed.

G-3.1.2 Type A Test Piece

The dimension and shape of the Type A test piece shall conform to Fig. 2 and Table 11.

The "waist" of the test piece shall be formed by drilling or machining holes with their centres 35 mm

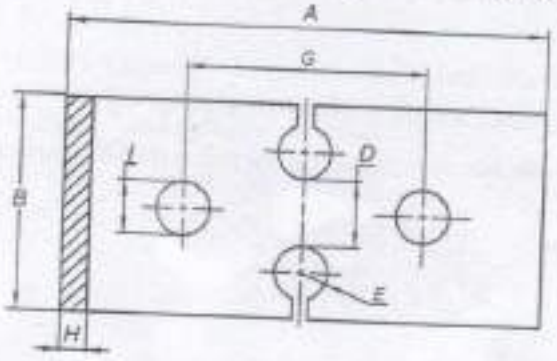

FIG. 2 MACHINED TYPE A TENSILE TEST PIECE
(FOR E < 25 mm)

or 45 mm apart, as applicable, so that the centre lines of the holes lie in the same plane as the joint interface, and then cutting towards the holes from the corresponding edge of the strip. The faces of the test piece waist shall be smooth. The finish of the remaining edges is not critical.

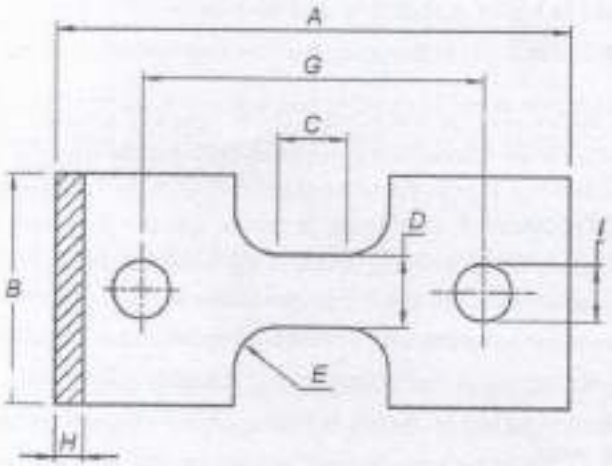

FIG. 3 MACHINE TYPE B TENSILE TEST PIECE (FOR E ≥ 25 mm)

Table 11 Dimensions of Type A and B Test Pieces

(Clause G-3.1.2)

All dimensions in millimetres

Sl No.	Symbol	Description	Dimension of Type A Test Piece		Dimensions of Type B Test Piece
			$d_n \leq 160$ mm	$d_n > 160$ mm	
(1)	(2)	(3)	(4)	(5)	(6)
i)	A	Overall length, Min	180	180	250
ii)	B	Width at ends	60±3	80 ± 2	100±3
iii)	C	Length of narrow parallel-sided portion	Not Applicable	Not Applicable	25±1
iv)	D	Width of narrow portion	25±1	25 ± 1	25±1
v)	E	Radius	5±0.5	10 ± 0.5	25 ± 0.5
vi)	G	Initial distance between grip	90±5	90 ± 5	150±5
vii)	E	Thickness	Full wall thickness	Full wall thickness	Full wall thickness
viii)	I	Diameter of marker holes	20±5	20 ± 5	20±5

G-3.1.3 Type B Test Piece

The dimension and shape of the Type B test piece shall conform to Fig. 3 and Table 11.

G-3.2 Number of Test Pieces

The number of test pieces shall depend upon he nominal outside diameter d_n of the pipe as given in Table 12.

Table 12 Number of Test Pieces

(Clause G-3.2)

Sl No.	Nominal Outside Diameter, d_n mm	Number of Test Pieces
i)	$90 \leq d_n < 110$	3
ii)	$110 \leq d_n < 180$	4
iii)	$180 \leq d_n < 315$	6
iv)	$d_n \geq 315$	7

One test piece shall be taken at the position of maximum misalignment. The other test pieces shall be taken uniformly around the circumference of the joint.

G-4 CONDITIONING

Immediately prior to testing in accordance with G-5, condition each test piece in air for a minimum of 6 h at a temperature of 27 ± 2°C, starting the period of conditioning at a time such that testing will not be carried out less than 24 h after the butt fusion of the joint.

G-5 PROCEDURE

a) Measure the thickness of the test piece as the thickness of the pipe wall and the width of the test piece as the distance between the two holes drilled at the joint (D) for test pieces of type A (see Table 11 and Fig. 2) or as the width of the narrow portion (D) for test pieces of type B (see Table 11 and Fig. 3).

b) Place the test piece in the clamping device of the tensile-testing machine, so that the direction of the force applied to the test piece is perpendicular to the butt-fusion joint.

c) Apply tension to the test piece with a cross-head speed of 5 ± 1 mm/min.

d) Record the force applied during extension until complete failure of the test piece.

e) Record the type of failure as ductile or brittle. Only failures at the butt-fusion joint shall be taken into account.

G-6 EXPRESSION OF RESULTS

The sample shall not show brittle failure during the prescribed test. The results of all the test pieces shall be obtained and reported.

ANNEX H

(Clause 8.9 and Table 6)

DETERMINATION OF ELONGATION AT BREAK

H-1 APPARATUS

H-1.1 Tensile-testing machine meeting the specifications given in H-1.2 to H-1.4, as follows:

H-1.2 Grips, for holding the test piece and attached to the machine so that the major axis of the test piece coincides with the direction of pull through the centre line of the assembly. This can be achieved, for example, by using centring pins in the grips.

The test piece shall be held such that slip relative to the grips is prevented as far as possible and this shall be effected with the type of grip that maintains or increases pressure on the test piece as the force applied to the test piece increases.

The clamping system shall not cause premature fracture at the grips.

H-1.3 Load indicator, incorporating a mechanism capable of showing the total tensile load carried by the test piece when held by the grips. The mechanism shall be essentially free from inertia lag at the specified rate of testing, and shall indicate the load with an accuracy of within 1 percent of the actual value.

H-1.4 Extensometer, suitable for determining the gauge length of the test piece at any moment during the test.

The instrument shall be essentially free from inertia lag at the specified test speeds and shall be capable of measuring deformation to an accuracy of within 1 percent. Where a mechanical extensometer is used, this shall be fixed to the test piece in such a way that the test piece undergoes the minimum damage and distortion and no slip occurs between it and the extensometer.

The measurement of elongation of the test piece on the basis of the movement of the grips lacks accuracy and shall be avoided whenever possible.

NOTE — It is desirable, but not essential, for this instrument to record this length, or any variation in it, automatically as a function of the stress in the test piece.

H-1.5 Micrometer or equivalent, capable of reading to 0.01 mm or less and suitable for measuring the thickness and width of the test piece.

H-1.6 Cutting die, conforming to the relevant profile in this standard, as applicable.

H-1.7 Milling machine and cutter, capable of producing the test piece specified in this standard, as applicable.

H-2 TEST PIECES

H-2.1 Nature of Test Pieces

H-2.1.1 General

Where the thickness of the pipe is less than or equal to 12 mm, the test pieces shall be cut using a die or obtained by machining. Where the thickness of the pipes is greater than 12 mm the test pieces shall be machined.

H-2.1.2 Dimensions of Test Pieces

Test pieces shall be either of Type 1, the shape and dimensions of which are given in Fig. 4 and Table 13, Type 2, the shape and dimensions of which are given in Fig. 5 and Table 14 or Type 3, the shape and dimensions of which are given in Fig. 6 and Table 15. The choice of test piece is dependent on the wall thickness of the pipe from which it is taken (see H-2).

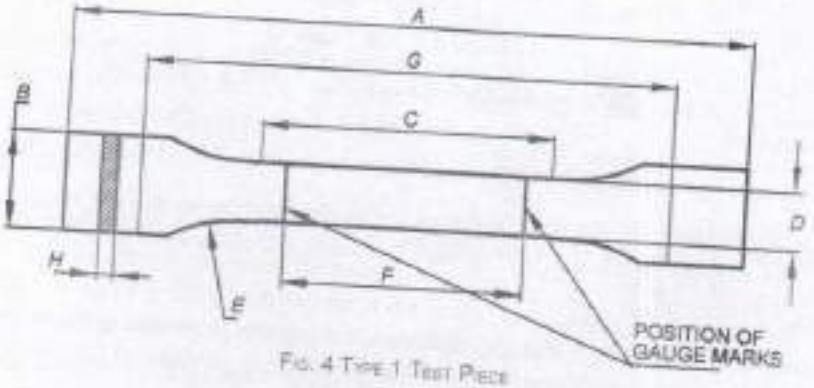

FIG. 4 TYPE 1 TEST PIECE

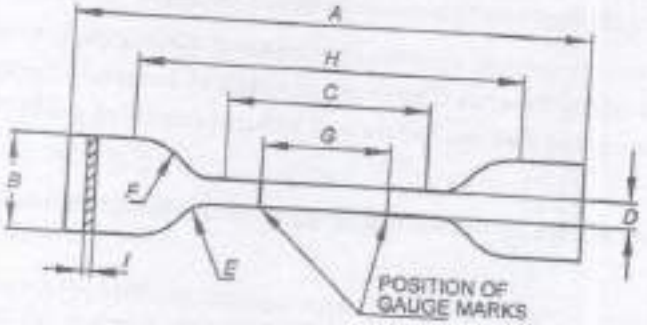

FIG. 5 TYPE 2 TEST PIECE

Table 13 Dimension of Type 1 Test Pieces
(Clause H-2.1.2)

Sl No. (1)	Symbol (2)	Description (3)	Dimension Mm (4)
i)	A	Overall length, Min.	150
ii)	B	Width of ends	20 ± 0.2
iii)	C	Length of narrow, parallel-sided portion	60 ± 0.5
iv)	D	Width of narrow, parallel-sided portion	10 ± 0.2
v)	E	Radius	60
vi)	F	Gauge length	50 ± 0.5
vii)	G	Initial distance between grips	115 ± 0.5
viii)	H	Thickness	That of the Pipe

Table 14 Dimension of Type 2 Test Pieces
(Clause H-2.1.2)

Sl No. (1)	Symbol (2)	Description (3)	Dimension Mm (4)
i)	A	Overall length, Min	115
ii)	B	Width of ends	25±1
iii)	C	Length of narrow, parallel-sided portion	33±2
iv)	D	Width of narrow, parallel-sided portion	6 + 0-0.4
v)	E	Small radius	14±1
vi)	F	Large radius	25±2
vii)	G	Gauge length	25±1
viii)	H	Initial distance between grips	80±5
ix)	I	Thickness	That of the Pipe

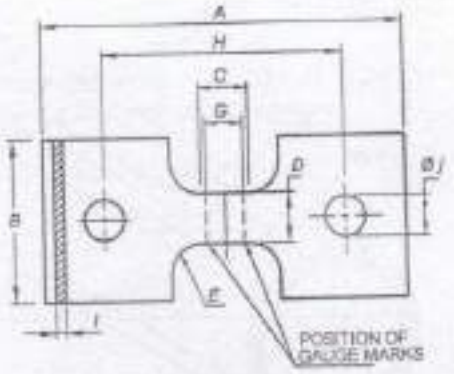

FIG. 6 TYPE 3 TEST PIECE

Table 15 Dimension of Type 3 Test Pieces
(Clause H-2.1.2)

Sl No	Symbol	Description	Dimension mm
(1)	(2)	(3)	(4)
i)	A	Overall length (min.)	250
ii)	B	Width of ends	100±3
iii)	C	Length of narrow, parallel-sided portion	25±1
iv)	D	Width of narrow, parallel-sided portion	25±1
v)	E	Radius	25±1
vi)	G	Gauge length	20±1
vii)	H	Initial distance between centres of loading pins	165±5
viii)	I	Thickness	That of the pipe
ix)	J	Diameter of hole	30±5

H-2.2 Preparation of Test Pieces

Cut strips from the pipe as supplied, that is which has not been heated or flattened, so that their axis is parallel to the axis of the pipe and the positions from which the strips are taken conform to item (a) or item (b) below, as applicable:

a) Pipes of nominal outside diameter less than or equal to 63 mm

Use lengths of pipe of approximately 150 mm.
Cut strips from these various lengths, distributing them around the circumference from a generating line taken as the reference line.
Unless otherwise specified, cut at least three strips from each sample so as to be able to take three test pieces (see Table 16).

Table 16 Recommended Number of Test Pieces [Clause H-2.2 (a)]

Sl No.	Nominal Outside Diameter, d_n mm	Number of Sectors or Strips
(1)	(2)	(3)
i)	$15 \leq d_n < 75$	3
ii)	$75 \leq d_n < 280$	5
iii)	$280 \leq d_n < 450$	6
iv)	$d_n \geq 450$	8