

30002/DTK/19 TF/ENQ-49/E3ES

12 Feb 2022

FOR ATTENTION OF ALL BIDDERS

There is an important instruction regarding place of submission of Bid due to lockdown and restricted movement of goods and services across the border, in view of Covid-19 on page No 4 of this RFP, amending the clause 2 of this RFP to that Extent.

INVITATION OF QUOTATION FOR SUPPLY OF CONSTRUCTIONAL STORES

Dear Sir/Madam,

INVITATION OF QUOTATION

1. This Project requires stores as per Appendix 'A' accordingly invites OTE for the purpose. The RFP can be downloaded from CPP Website : <https://eprocure.gov.in/eprocure/app>. The consignor can submit their offer by downloading the enquiries and sending it by Speed Post/Courier/Hand

2. Quotations are invited in physical form containing 'T'-Bid (Technical bid) as per Appx 'B' and 'Q'-Bid (Price Bid) as per Appx 'C' for the above items. Please note that quotation will be received by the Headquarters Chief Engineer (P) Dantak, C/o 99 APO upto 1700 Hrs (BST) on 05 Mar 2022. 'T'-Bid will be opened on 07 Mar 2022 at 1200 Hrs (BST). After opening of 'T'-Bid and its evaluation 'Q'-Bid will be opened for the successful bidders on 09 Mar 2022.

3. Firms or their duly authorized representative who have submitted their quotation and who wish to be present at the time of opening of quotation may visit the office of Headquarters Chief Engineer (P) Dantak, C/o 99 APO at the above mentioned time and date for viewing the quotation opening process.

4. Bidding procedure shall be single stage-two bid system and bid documents are to be prepared in two parts as under:-

- Part-I (Technical Bid : 'T' Bid) at Appendix 'B'
Part-II (Price Bid : 'Q' Bid) at Appendix 'C'.

5. Part-I Technical Bid ('T' Bid) : Appendix 'B'

5.1. The technical bid comprising of the following details shall be forwarded in a separate envelope by the Manufacture/Authorized consignor duly mentioning the Name of the firm, Enquiry reference and date of opening etc on top of the envelope.

(a) Details such as Name of firm, Address Contact number GSTIN number, Email, PAN No and other Registration details with HQ DGBR / Project Dantak / Any other BRO Project / Ministry of Defence Govt of India / Govt of Bhutan as per format enclosed at Appendix 'B' to the enquiry be provided. Original Manufacturers, PSUs and consignor enlisted with Central Purchase Organization and National Small Industries Corporation also to provide details of their registration in Appendix 'B'

(b) In case if the firm is not enlisted / Registered with HQ DGBR or Project Dantak as a registered contractor/consignor or with Ministry of Defence Govt of India or Govt of Bhutan or CPO or NSIC, details of EMD alongwith original copy of EMD be provided as per Ser No 9 of Appx 'B'. PSUs, Original Manufacturers, Original Manufacturers of Bhutan registered with Dantak/ HQ DGBR/ RGoB are exempted from submission of EMD on producing of necessary document/certificates, in this regard.

(c) Firm/ Consignor should have completed minimum one supply order of similar items to any Govt agency/BRO projects in last three years w.e.f the date of this enquiry are eligible. Copy of such supply order to be mandatorily enclosed with 'T' Bid failing which the firm will not be considered for opening of 'Q' Bid.

5.2 Eligibility Criteria for Technical Evaluation

5.2.1 The manufacturers/ consignor who have submitted the following documents in their 'T' Bid will only be eligible technically and for opening of their 'Q' Bid:-

- (a) Fulfillment of criteria & submission of documents as laid down at Para 5.1
(b) Complete details as per Appendix 'B' of enquiry.
(c) Enlistment / Registration details with HQ DGBR / Project Dantak / Ministry of Defence, Govt of India/Govt of Bhutan/CPO/NSIC be clearly mentioned or EMD be submitted by non enlisted/non registered firms. EMD shall be deposited in case if the consignor is registered with any other Project of BRO.
(d) Original manufacturers of Bhutan will have to submit EMD in case if they are not enlisted/ registered with HQ DGBR/Project Dantak or Government of Bhutan.

5.3. The bidder should meet all the technical evaluation criteria in order that the bid is considered to be technically responsive and the bidder qualifying to have its commercial bid opened

6. Part-II Price Bid ('Q' Bid): Appendix 'C'

6.1 The price bid ('Q' Bid) shall be forwarded in a separate envelope by the Manufacturer/Authorised Dealer/ Consignor duly mentioning the name of the firm, Enquiry reference and date of opening on top of the envelope.

6.2 Part-II Price Bids ('Q' Bid). Price Bid shall be quoted by bidder as per the format attached as Appendix 'C'.

6.3 'Q'-Bid evaluation. Price Bid of non qualified bidders, based on evaluation of 'T' Bid, will not be opened.

6.4 Price Bids shall only be furnished in attached format forming part of the bid documents.

7. 'T' Bid and 'Q' Bid be submitted in two separate envelopes duly superscribed and both these sealed covers are to be put in a bigger cover which should be sealed and duly superscribed. Consignor/ bidders who offer the Enquiry documents of 'T' Bid and 'Q' Bid in a single envelope will be rejected. On top of both 'T' Bid and 'Q' Bid, details such as Name of Manufacturer/ Consignor of the items, Enquiry Reference and date of opening etc will be mentioned clearly.

8. No conditional offer other than conditions mentioned above will be entertained.

9. The complete expenses on preparation and submission of quotation shall be borne by the firms and it shall have no claim on this account.

Earnest money and security deposit.

10. Manufacturer/Firms who are NOT enlisted as per Para 5.1 (b) of this RFP will have to submit Earnest Money of Amount in Rs 1,47,500/- (Rupees One Lakh Forty Seven Thousand Five Hundred Only) in the form of fixed Deposit receipt, or Bank guarantee from any of the commercial banks drawn in favour of Chief Engineer, Project Dantak payable at SBI Hasimara having validity/ maturity period of Six Months and will be enclosed with Technical Bid. Earnest Money of un-successful firms/ Consignor shall be returned to them immediately on placing of Supply Order. The EMD will be forfeited if the bidder withdraws or amends, impairs or derogates from the tender in any respect within the validity period of their tender.

11. Performance Security Deposit. Performance Security deposit in the form of Bank Garrantee or Demand Draft should be submitted by your firm @ 3% of the value of Supply Order amount within 30 days of receipt of the Supply Order, to HQ 19 BRTF, Phuentsholing. The Fixed Deposit Receipt or Bank Guarantee Bond be prepared having validity/maturity period of six months in favour of HQ 19 BRTF Payable at SBI, Hasimara. On receipt of Performance Security, the EMD will be returned to the firm. The performance Security will be released after one month of release of completed payment against the supply order. If required, the extension of validity of performance Security Deposit will be sought accordingly. Original Manufacturers/PSUs/Approved Producers and the firms who are enlisted with HQ Project Dantak or HQ DGBR are exempted from deposition of Performance Security Deposit.

(a) Clause for Evaluation of L1. To determine the L1, the quoted rates of Consignor who have been found technically "Substantially Responsive". 'Q' Bid shall be evaluated as under -

(i) Ranking of the commercial bid will be based on the lowest cost of each items which will comprise of Basic Cost of item, Freight insurance, except levies, Taxes and Duties levied by Central/State Local Govts such as Octroi/Entry Tax, etc as quoted by the Bidder in his 'Q' Bid. All these elements shall mandatorily be indicated separately.

(ii) Any Taxes and Duties not mentioned clearly in 'Q'-Bid will not be counted and the Bidder shall not have any claim on account of such omissions on his part.

(iii) GST/Sales Tax are not applicable for Project Dantak. Sales tax exemption certificate will be issued to consignor. For any query regarding exemption of GST on import of goods and services from India to Bhutan, kindly refer to the following websites for detail information.

(aa) www.cbec.gov.in/htdocs-cbec/gst/index

(ab) www.cbec.gov.in/resources/htdocs-cbec/gst/notfctn-42-igst-rate-english.pdf

(ac) www.cbec.gov.in/resources/htdocs-cbec/gst/notfctn-300CGST-rate-english.pdf

(iv) For Indian Consignor only. As supply to Project Dantak located outside India, no GST is applicable. Indian Consignor / Bidder shall attach undertaking certificate as per the following format mandatorily :-

UNDERTAKING CERTIFICATE

"It is certified that the goods / materials given in the Enquiry No 30002/DTK/19TF/ENQ- / E3ES dt 12Feb Jan 2022 of HQ CE (P) Dantak will be supplied by me / our firm as export and for use in Bhutan. It is declared that no GST cost has been included by me in the rates quoted in above mentioned enquiry".

Signature with date :
Name of the bidder :
Name of firm with address :

(v) Certificate on account of GST as per Rule No 16 (1) of IGST Act 2017 will be issued on receipt of stores as format of certificate is as given under:-

GST : ZERO RATED SUPPLY CERTIFICATE

1. It is certified that the goods supplied by your firm against SO No 30003/DTK/19TF/SO-_____/E3ES dated _____ 2022 for the cost of Rs _____/- (Rupees _____ only) is a zero rated supply as per **GST Rule No 16 (1) of IGST Act 2017** as the goods were supplied as an export and to be used in Bhutan by this Project.

2. It is further certified that no amount was paid to your firm by this Project on account of GST

Consignee Unit

(b) **Force Majeure Clause**. Should any force majeure circumstance arise, each of the contracting party shall be excused for the non fulfillment or for the delayed fulfillment of any of its contractual obligations, if the affected party within 10 days of its occurrence informs in a written form the other party Force majeure shall mean fires, floods, natural disasters or other acts such as war, turmoil, strikes, sabotage explosions, and quarantine restriction beyond the control of either party

Consignee, Delivery & Delivery Period

12. Supply will have to be completed within 45 days from the date of effect of supply order. The stores are required to be delivered as per Appendix 'A' attached to this enquiry to the consignee Dett 'A' 504 SS&TC Samdrup Jongkhar, Bhutan. The responsibility for loading and unloading of stores including transit loss shall rest with the consignor. The firm who are unable to supply the desired items within original delivery period due to any reason and are contemplating/seeking extension of original delivery period must send their request by email giving detailed reason for seeking original delivery period extension and the request should reach seven clear working days before expiring of original delivery period failing which the supply order will be considered to be terminated and firm will be responsible for the same.

Discount

13. Discount, if any, offered thereon shall be clearly specified.

Price Adjustment

14. No adjustment in the rates after the date of opening of the quotation on account of any increase/decrease in the cost of input or on account of any statutory increase in any taxes or duty is admissible.

Manufacturer/Authorized Dealer/Distributor

15. In case your firm is an original manufacturer of the product or an authorized dealer/ consignor, a certificate to this effect shall be enclosed alongwith product catalogue and company price list. Discount, if any offered thereon shall be specified clearly. If the product is proprietary in nature, certificate to this effect that the firm is sole manufacturer/ consignor/ distributor of the product shall be enclosed with the offer.

Freight/ Warranty

16. **Freight**. Packaging and freight will be complete responsibility of the consignor. Damages/ losses in transit shall be the responsibility of the consignor upto the delivery location specified by the respective consignees. No Defence vehicles will be provided to transport the stores. Stores will be securely packed without any additional cost to the Govt to avoid losses or damages during transit so as to reach this consignee, in perfect serviceable and fit for use condition. The consignor shall remain responsible for adequacy of packages during transit. The packages shall be marked with the Supply order and other necessary details for easy identification at the consignee's end. The consignor will be responsible for unloading at FOR and to ensure that the stores are delivered in sound condition without any damage.

17. **Warranty/Guarantee**. The stores supplied against the supply order shall bear a warranty against defective materials for a period of Two years or as specified by the company/ consignor/ firm (whichever is higher) from the date of completion of the supply order. In case of manufacturing failure or defect in any component within the warranty period, the consignee shall inform the consignor for joint inspection. Within a period of one week of the receipt of such information, the rejected material shall be removed and replaced by the consignor at the site at his own expense and no extra payment shall be made on this account. All stores to be supplied should be free from all defects and faults in material workmanship and manufacture. They should be of the highest grade and consistent with the established and generally accepted standards for material of the type used and in full conformity with the specifications, drawings or samples and shall, if operable, operate properly. The Consignor shall be bound to furnish a clear written warranty regarding the same. In the event of the ultimate consignee in Bhutan not finding the stores in accordance with the order, the Consignor will be required to replace them free of cost inclusive of all freight and handling charges. Such replacement will be done within ninety days to the claim report raised by the consignee. These standard conditions will also apply in respect of replaced stores.

Contact Address

18. For any further information/clarification on the subject the following Officer may be contacted during the office hours (i.e. 0830 Hrs to 1700 Hrs BST except Sunday/Holidays):-

SO-1 (Res)
Headquarters
Chief Engineer
Project Dantak
Tele No .009752351082/86/88
FAX No . 009752351285

19. The accepting officer does not bind himself to accept the lowest quotation or any other quotation and reserves the right to accept or reject any of the quotation either in part or in full without assigning any reasons what so ever thereto.

20. No purchase against this enquiry is guaranteed.

21. The quantities of stores given is/are guidelines and may be enhanced or decreased upto +/- 25% according to our requirement at the time of placing of supply order.

22. Quotation received after the expiry of time and date specified in **Para 02** above will not be entertained.

23. **Payment will be made on receipt of stores in full as there is no provision for making advance payment.**

24. **Repeat Order Clause.** The Consignee may order upto 50% qty of SO within six months from the date of successful completion of the supply against this contract and at the same cost, terms and conditions of the contract. The consignor is bound to supply the material, if found fulfilling all conditions as mentioned in Para 9.7.22 of DPM 2009.

25. **Sample Approval** The firm shall produce one sample of the item for approval to the consignee within 20 days of this Supply Order only the approved samples will be supplied in bulk as per the quantity given in Supply Order. Samples may be approved by producing actual samples or through a catalogue of desired make as per SO.

26. **Inspection** The stores supplied may be inspected by the BOO detailed by the CFA or his authorized rep at time of delivery and should be strictly according to the specifications provided in the supply order. In case the items are found not according to specifications/satisfaction of the Inspecting Officer, the stores are liable to be rejected and will have to be replaced **within 30 days** without any additional cost by the consignor/firms.

27. **LD** The consignor shall be liable to pay liquidated damages and not as a penalty, a sum equivalent to ½% (Half Percent) of the contract/supply order price per week of delay or part thereof. The consignor's liability of liquidated damages shall not exceed maximum of 10% (Ten percent) of the contract price. If the delivery is delayed beyond 10 weeks, the consignee may at his own option, terminate the contract / supply order.

28. **Validity** The rates should be valid for 120 days wef the date of submission of the offer.

29. Items should be of same Make/Brand as mentioned in the appendix attached.

30. Mentioning of GSTIN Nos and quoting rates in words is compulsory, without which enquiry will not be considered for placing supply order. Clear description/specification of items is also mandatory.

31. Rates be quoted for items as per specification in enquiry only.

32. **Risk & Expense Clause** Risk & Cost clause will be applicable as per DPM 2009 on failure of supply of stores by due date/extended time.

33. In addition to the existing facility/provision of receiving bids at HQ CE (P) Dantak and as mentioned in clause 2 of this RFP, a facility has been created on Indian side border town of Jaigaon to facilitate submission of bids by Indian Bidders due to lockdown and restricted movement of goods and services across the Indo-Bhutan borders. The bidders can exercise following option and address:-

(a) **Existing facility at HQ CE (P) Dantak Thimphu:-**

(i) **If sending bids by post:-**

HQ CE (P) Dantak
PIN - 931 708
C/o 99 APO

(ii) **Manual Submission** - Dropping of bids in tender Box kept in HQ CE (P) Dantak premises

(b) **Additional facility at Jaigaon:-**

(i) **If sending bids by post:-**

OIC Liaison Cell
Supervisor Mess, HQ 19 BRTF (GREF)
Jaigaon (W.B.)
PIN - 736 182
Contact details/ Phone No - 9970889254

(ii) **Manual submission:-**

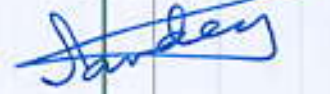
Submit the bid documents to the OIC liaison Cell at Jaigaon.
Address:-

OIC Liaison Cell
Supervisor Mess, HQ 19 BRTF (GREF)
Jaigaon (W.B.)
PIN - 736 182
Contact details/ Phone No - 9970889254

Please take acknowledgement from OIC Liaison Cell in case of manual submission at Jaigaon

Note:- Last date and time for submission of bids will be same for both the location and bids from both the places will be collected and opened on fixed date by the nominated BOO at HQ CE (P) Dantak.

Your's faithfully,



(Sandeep Saxena)
Lt Col
SO-1 (Res)
for Chief Engineer

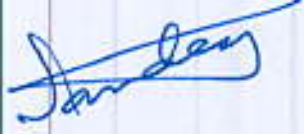
Contd 6/-

Appendix 'A'LIST OF STORES

HQ CE (P) Dantak ENQ No 30002/ DTK/ 19TF/ENQ-42/E3ES dt 12 Feb 2022

Ser No	Nomenclature	A/U	Qty
Stores to be supplied to Dett 'A' 504 SS&TC, Samdrup Jongkhar, Bhutan			
Category of Stores :- Constructional Stores (Specification as per Annx I att with this RFP)			
1	Geo textile 280 GSM NON-WOVEN (specification as per Annexure-I attached)	Sqm	14654.80
2	Geo grids of Tult 90 KN/Mtr (specification as per Annexure-I attached)	Sqm	18200.00
3	Geo grids of Tult 60 KN/Mtr (specification as per Annexure-I attached)	Sqm	18516.00
4	Geo web wall sections width 0.80m length 2.64M and 150mm depth including all accessories like TRA keys and ATRA clips (specification as per Annexure-I attached)	Sqm	4887.60
5	Drainage system with 160mm dia perforated PVC Pipe (specification as per Annexure-I attached)	Mtr	3804.50

Registration No. of Firm
TIN No. of Firm
Firm Seal
Fax & Tele No.


(Sandeep Saxena)
Lt Col
SO -1 (Res)
for Chief Engineer

Contd 7/-

TECHNICAL BID ('T' BID)

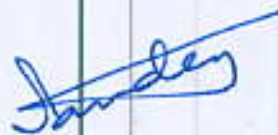
HQ CE (P) Dantak ENQ No 30002/DTK/ 19 TF/ /ENQ-49 /E3ES dt 12 Feb 2022
(As per Clause Para 5)

PARTICULAR OF FIRM		
SER NO	ITEMS	DETAILS
1.	Name of firms	
2.	Legal Status of the firm	Individual company (Incorporated un-incorporated)/ Partnership firm / public limited
3.	Address	
4.	Contact Telephone, Mobile & Fax No	
5.	E-mail address	
6.	GSTIN No	
7.	PAN No	
8.	Registration details :-	
	(a) Registration/Enlistment No.	
	(b) With whom registered /enlisted	
	(c) Letter ref under which registered/enlisted. (Enclose copy)	
9.	EMD (For unregistered consignor/ firm only) EMD in the form of cheque is not acceptable. EMD be submitted in the form of Fixed Deposit Receipt or Bank Guarantee only	Amount Rs 1,47,500/- Fixed Deposit Receipt or Bank Guarantee Number _____ Dated : _____
Date		(Signature of authorized rep of firm with seal)

Note:

1. Firm enlisted with HQ CE (Project) Dantak need not enclose photocopy of GSTIN No. PAN No and copy of letters reference under which registered. Rest all firms should enclose relevant photocopies.
2. Firms should enclose all relevant documents as mentioned under Para 5 of this Enquiry in addition to the above details, failing which the firm will be rejected during 'T' Bid evaluation.

(Signature of Consignor)



(Sandeep Saxena)
Lt Col
SO-1 (Res)
for Chief Engineer

Contd... 8/-

PRICE BID ('Q' BID)PRICE BID HQ CE (P) Dantak ENQ No 30002/ DTK/ 19TF/ENQ-19 /E3ES dt 12 Feb 2022

Ser No	Nomenclature	A/U	Qty	Basic Price (Unit price)	Freight Charges	Total Amount
Stores to be supplied to Dett 'A' 504 SS&TC, Samdrup Jongkhar, Bhutan						
Category of Stores :- Constructional Stores (Specification as per Annx I att with this RFP)						
1	Geo textile 280 GSM NON-WOVEN (specification as per Annexure-I attached)	Sqm	14654.80			
2	Geo grids of Tult 90 KN/Mtr (specification as per Annexure-I attached)	Sqm	18200.00			
3	Geo grids of Tult 60 KN/Mtr (specification as per Annexure-I attached)	Sqm	18516.00			
4	Geo web wall sections width 0.80m length 2.64M and 150mm depth including all accessories like TRA keys and ATRA clips (specification as per Annexure-I attached)	Sqm	4887.60			
5	Drainage system with 160mm dia perforated PVC Pipe (specification as per Annexure-I attached)	Mtr	3804.50			

Registration No. of Firm
TIN No. of Firm
Firm Seal
Fax & Tele No.


(Sandeep Saxena)
Lt Col
SO-1 (Res)
for Chief Engineer

Annexure-I

(HQ CE (P) Dantak ENQ 30002/DTK/19TF/ENQ/E3ES
dated Feb 2022)

Tech specification of stores

Ser No	Nomenclature	A/U	QTY	Remarks																			
1	Geo-textile 280 Gsm Non-Woven Brand: NOWOFILL GSM: 280 Usage/Application: Construction Type: Geotextiles Material: PP, PET Polyster Thickness: 15mm Application: Water proofing, construction Packaging type: Roll Is It Woven: Non-Woven Width: 120 Inches Pattern: Plain	SQM	14654.8																				
2	Geo Grids of Tult 90 Kn/Mtr Tensile Properties Ultimate Strength: ASM D 6637 Kn/m 89.1 Tension At 5% strain: ASM D 6637 Kn/m 22 Strain at ultimate: ASM D 6637 % 13.7 Design properties Creep reduced Strength: ASM D 5262 Kn/m 56.39 Longterm design strength in the md: GR1- GG4b Kn/m 48.82 Co efficient of direct sliding- cds: ASM D 5321 0.85 Co efficient of interaction- ci: ASM D 6706 0.9 Physical Properties Roll length: MINIMUM M 50 Roll width: MINIMUM M 2.5	SQM	18200.00																				
3	Geo Grids of Tult 60 Kn/Mtr Tensile Properties Ultimate Strength: ASM D 6637 Kn/m 59.8 Tension At 5% strain: ASM D 6637 Kn/m 13.4 Strain at ultimate: ASM D 6637 % 15.3 Design properties Creep reduced Strength: ASM D 5262 Kn/m 37.84 Longterm design strength in the md: GR1- GG4b Kn/m 32.76 Co efficient of direct sliding- cds: ASM D 5321 0.85 Co efficient of interaction- ci: ASM D 6706 0.9 Physical Properties Roll length: MINIMUM M 50 Roll width: MINIMUM M 2.5	SQM	18516																				
4	Geo Web wall section 0.80m length x 2.64 m and 150 mm depth incl all accessories like TRA keys and ATRA clips DIMENSIONS <table border="1"> <thead> <tr> <th>Parameter</th> <th>Units</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Cell Depth</td> <td>Inchess (mm)</td> <td>6(150)</td> </tr> <tr> <td>Cell size (Length xWidth+/- 10%)</td> <td>Inchess (mm)</td> <td>10.5x13.0(267x330)</td> </tr> <tr> <td rowspan="2">Expanded section width</td> <td>No. cell</td> <td>8</td> </tr> <tr> <td>Feet (mm)</td> <td>Fixed 8.67 (2.64)</td> </tr> <tr> <td rowspan="2">Expanded section Length</td> <td>No. cell</td> <td>3,4,5,6,7</td> </tr> <tr> <td>Feet (mm)</td> <td>varies 2.63 to 6 13 (0.80 to 1.87)</td> </tr> </tbody> </table>	Parameter	Units	Value	Cell Depth	Inchess (mm)	6(150)	Cell size (Length xWidth+/- 10%)	Inchess (mm)	10.5x13.0(267x330)	Expanded section width	No. cell	8	Feet (mm)	Fixed 8.67 (2.64)	Expanded section Length	No. cell	3,4,5,6,7	Feet (mm)	varies 2.63 to 6 13 (0.80 to 1.87)	SQM	4887.60	
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Expanded section Length	No. cell	3,4,5,6,7																					
	Feet (mm)	varies 2.63 to 6 13 (0.80 to 1.87)																					

Contd

2/
Handley

STRUCTURAL INTEGRITY AND SYSTEM		Specification of ATRA Keys	
Parameter	Units	Value	
Minimum short Term Seam Peel Strength	ib/in (N/cm)	>80 (142)	
Long-Term Seam Peel Strength (standard 4 inch sample width)	ib (N)	160(710)	
Internal Junction Efficiency ²	%	>100	
Mechanical Junction efficiency (Connection type: ATRA Key)	%	≥100	
Peak Friction Angle Ratio (δ/ϕ) ³	Unitless	0.95	
MATERIAL PROPERTIES			
Parameter	Test method	Units	Value
Polymer density	ASTM D1505 or D792	g/cm ³	0.935-0.965
Carbon black content ⁴	ASTM D1603	%	1.5-2.0
Sheet thickness prior to Texture	ASTM D5199	mm(mil)	1.27(50), -5%+10%
Sheet thickness After Texture	ASTM D5199	mm(mil)	1.52 (60), -5%+10%
Texture Type/Shape	-	-	Rhomboidal
Texture Density	-	indentations/c m ²	22-31
DURABILITY			
Parameter	Test method	Units	Value
Environmental Stress Crack Resistance	ASTM D1693	hrs	>5,000
Resistance to Oxidation	EN ISO 13438	yrs	≥50
Resistance to Weathering	EN12224	%	100
5	DRAINAGE SYSTEM. The drainage system shall be of PVC 160 mm dia and 6m length pipe half perforated with all elbows and end caps complete. Perforation shall be as per standard engineering practices. The specifications are as under -		
Material	Recycled Poly Propylene		
Void Ratio	0.956		
Shape & Size	Rectangular in shape wrapped in Geotextile sandwich per m ² with 3 cm in width to allow more water to flow through		

Signature of consigner



SO 1 (Res)