

TENDER DOCUMENT

For purchase of Testing Equipment/Machines & Accessories Under the National Technical Textile Mission (NTTM)

Total No. of Equipment : 8 (Eight)

Tender No. Nitra/Pur/PT-1/2023-24/ 788

Sale of Tender Document & Downloading up to	: 30-05-2023 (up to 05.30 pm)
Last date & time for acceptance of Tender	: 31-05-2023 (up to 12.00 pm)
Tender opens on (Technical Bids only)	: 31-05-2023 (at 03.00 pm)
Financial Bids Opening	: Will be intimated later to eligible bidders

**NORTHERN INDIA TEXTILE RESEARCH ASSOCIATION
(Linked to Ministry of Textiles, Govt. of India)
SECTOR-23, RAJ NAGAR, GHAZIABAD-201 002 (U.P.), INDIA**

Phone No: 0120-2807390/91/92/93/94/95

Fax No: 0120-2783596, e-mail: mail@nitratextile.org

Website : www.nitratextile.org

VOLUME - I
(Part – 1)
INSTRUCTION TO TENDERER

INSTRUCTION TO TENDERER

1.0 GENERAL

- 1.1. Tender form may be downloaded from NITRA's website www.nitratextile.org up to 30-05-2023 till 05.30 PM. Alternatively printed copies can be obtained from NITRA's office at free of cost.
- 1.2. Modifications if any of the above documents will be made by addenda / corrigenda, copies of which will be sent in duplicate to each tenderer before the due date of the tender. One copy shall be signed, sealed and submitted packed along with the tender documents. Tender documents to be submitted, are as detailed hereafter.

The tenderer shall not make any additions / deletions to or amend the text of the documents except in so far as may be necessary to comply with any addenda / corrigenda issued. The tenderer shall use only tender documents as issued for submitting his quote and shall comply to various terms and conditions.

- 1.3 E-mail, Fax, Telex or Telegraphic tenders shall not be entertained.
- 1.4 The tender shall be filled in & submitted in English only. All accompanying literature and correspondence shall also be in English.
- 1.5 No claim for costs, charges, expenses incurred by the tenderer in connection with preparation of tender submission and for subsequent clarifications of their tender shall be accepted.
- 1.6 Bidders are required to submit Earnest Money Deposit through a Demand Draft favoring 'Northern India Textile Research Association' payable at Ghaziabad. Disqualified bidder/bidders will get back their EMD within 30 days from the date of opening of financial bid/bids. Demand Draft submitted towards EMD shall be returned after receipt of performance Bank Guarantee from successful bidder.
- 1.7 Nitra reserves it right to alter, change, cancel partially or fully, rescind or modify the terms and conditions of tender without assigning any reason thereof.

2.0 TENDERER TO STUDY DOCUMENTS

- 2.1 Submission of the tender by the tenderer implies that he has read tender documents and has made himself aware of the specifications of machinery and the terms and conditions.
- 2.2 The tenderer shall be deemed to have full knowledge of documents and no extra charges consequent on any misunderstanding or otherwise shall be allowed.
- 2.3 Any question regarding the tender document and discrepancies shall be directed to the Tender Issuing Authority in writing minimum 10 days prior to the due date of submission of tender. The Tender Issuing Authority shall issue all clarifications, interpretations, meanings and specific directions if any in duplicate in writing to all the tenderers. **One copy of these shall be returned duly signed and seal affixed along with tender submission.**

3.0 SUFFICIENCY OF THE TENDERER

- 3.1 The tenderer shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender and about the rates quoted by him and cover all his obligations under the tender.

4.0 METHOD OF TENDERING

Each and every paper of tender documents shall be signed by the authorized person(s) and seal affixed.

4.1.0 Authority of signing

- 4.1.1 If the tender is submitted by an individual, it shall be signed by him.
- 4.1.2 If the tender is submitted by a proprietary firm, it shall be signed by the proprietor.
- 4.1.3 If the tender is submitted by a partnership firm, it shall be signed by all the partners of the firm or by a partner holding the power of attorney for the firm for signing the tender, in which case, a certified copy of power of attorney shall accompany the tender.
- 4.1.4 If the tender is submitted by a limited company or a corporation, it shall be signed by a duly authorized person or the person holding the power of attorney for signing the tender, in which case a certified copy of the power of attorney shall accompany the tender.

4.1.5 All witnesses and sureties shall be persons of respectable status and probity and their full name, occupations and addresses shall be stated below their signatures.

4.2.0 Stating of Rates

4.2.1 The tender shall be filled in English with a neat hand / type and all the figures and words shall be legible.

4.2.2 The rates shall be written both in words and in figures. The tenderer shall also show the amount for each item, the total of each section and the grand total of the whole tender.

4.2.3 Correction if any shall make Correction, initialing, dating and rewriting.

4.2.4 In case of conflict between the figures and words in the rates, the latter shall prevail.

4.2.5 The tenders will be verified for accuracy in the arithmetical calculations.

4.3.0 Packing and Submission

4.3.1 The tender shall be submitted on or before and at the address given in Appendix-TF given in Tender Form. Any tender received after this date and time shall not be accepted. Tenders shall be packed, marked and sealed and submitted in original with documents listed below. **Tender shall be submitted in Two separate sealed cover, “Technical Bid” & “Financial Bid”.**

4.3.2 Sealed cover “**Technical Bid**” shall contain

- a) EMD - DD of not less than 2% of tender value or Rs.10,000/- (Rupees Ten Thousand only) whichever is lower is to be submitted from any Scheduled Bank. The applicant without EMD will be out rightly disqualified.
- b) SSI Certificate if the Manufacturer/supplier, are registered as small industries with the Government. The SSI Manufacturer/supplier are exempted to deposit EMD. (Self attested copy of the Registration Certificate is to be submitted).
- c) Profile of bidder's organization along with copy of PAN and GST Registration Certificate.
- d) If the bidder does not manufacture the equipment, authorization of the manufacturer to the bidder for marketing and servicing the equipments in India should be enclosed along with the tender. In the absence of such authorization, the tender will not be considered.
- e) Tender documents, which shall be signed by the authorized person(s) and seal affixed.
- f) Volume II, - Technical Specifications in details of equipment /machine for which bid has been submitted.

- g) List of items including spare parts with quantities for which the financial bid has been submitted.
- h) The machine/equipment for which bid has been submitted should contain Cliental List of internationally reputed institutes/ companies located in India and other countries.

4.3.4 Sealed cover “**Financial Bid**” shall contain financial Specification

- a) Bill of Quantities duly completed with price.
- b) The undertaking that Tender Form is duly completed signed and sealed for entering into agreement with terms and conditions for this contract.
- c) Covering letter in duplicate bringing out the tenderer’s reservations, if any, regarding compliance with the tender document and his own specific assumption, if any.
- d) Bills/Schedule of Quantities duly completed with price which will be inclusive of all taxes (GST and any other taxes), duties (Excise Duty, Custom Duty etc.) any other Govt. levies & all other charges (packing, forwarding, loading-unloading, erection and commissioning, insurance and any other incidental charges by whatever name called).
- e) It is necessary to fill the Tender Value precisely. In case, all individuals’ items are not quoted, it will be deemed that that Tender Value is inclusive of quotes of all the individual items as per the tender document.
- f) Validity of bid/bids (technical & financial) should be 180 days.
- g) Volume I (Part -1) Instruction to Tenderer, Volume I (Part-2) - Tender Form, Appendix – TF , Volume-1 (Part-3) Terms & Conditions and addenda / corrigenda /clarification issued before due date of tender duly signed and sealed (in token of acceptance of documents).
- h) In case of Imported Items, Please quote Free On Board (FOB) value (at nearest foreign Airport/ Sea port) & Also quote separately CIP charges up to IGI Airport, New Delhi or ICD Patparganj / Tughlakabad, Delhi (whatever applicable). Also specify compulsorily the packing dimension, Nos. of Box / Cartoon & gross weight of each Box/Cartoon (Packing list). Please specify the name of the port &Country, from where the goods will be dispatched.

4.3.5. Separate bid for each of the items should be submitted in an envelope super scribed **with the name of the item at the top, last date of submission, name and address of the bidder.**

4.3.6. In the case of nonwoven machines and preparatory machines the supplier can bid for individual machines also. In that case of title of the machine need to be mentioned on the cover positively.

4.3.7. The sealed envelope containing covers ‘**Technical Bid**’ & ‘**Financial Bid**’ as above shall be marked in the name of **The Chairman, Purchase Committee, NITRA, Ghaziabad clearly indicating the name of the item for which the bid is submitted.**

5.0 TENDER TO BE VALID FOR

Rates quoted by the tenderer shall be valid for a period as given in Appendix-TF from the date of submission or till an extended date mutually as agreed on expiry of the said period.

The Tenderer shall not withdraw or revise or alter any conditions, rate(s) quoted within a stated period, unless he is called upon to do so in mutual agreement / negotiations. NITRA reserves the right to cancel the bid if the tenderer revokes or withdraws the tender within a stated period.

5.1 OPENING OF TENDER

- 5.1.1 The tender shall be opened by the Purchase Committee NITRA on the designated date and time in the confidence on event of any change in the date and time of tender opening, the same would be informed to the tenderer through public notice or individual correspondence or through our website.

6.0 AGREEMENT

- 6.1 The successful tenderer shall be bound to implement the contract on receipt of intimation of acceptance from the Purchase Committee, NITRA.
- 6.2 The successful tenderer shall bear stamp duty and other expenses pertaining to preparation and execution of contract document / agreement.

7.0 PROCEDURE FOR REJECTION

- 7.1 The Purchase Committee, NITRA Ghaziabad reserves the right to accept or reject any tender or reject all tenders without giving any reasons for their decision.
- 7.2 Tenders are liable to be rejected in which any of the particulars / prescribed information is either missing or incomplete in any respect and or if the prescribed conditions are not fulfilled.
- 7.3 Canvassing in connection with tender is strictly prohibited and tender submitted by tenderers who resort to canvassing will be liable to rejection.
- 7.4 Tenders containing uncalled remarks or any additional conditions are liable to be rejected. Tenderer can bring out in his / their covering letter along with submission of tender cover "Financial Bid", his / their's any reservations, additions, omissions, and assumptions they might have made while pricing the tender. Tender Issuing Authority reserves the right to ignore such additions, deletion other than brought out in covering letter packed in cover "Financial Bid", by the tenderer. Decision of the Purchase Committee NITRA, Ghaziabad, in this regard shall be final and any non-compliance shall reject the bid.

VOLUME – 1
(Part – 2)

TENDER FORM

To,
The Chairman
Purchase Committee
NITRA
Sector-23, Raj Nagar
Ghaziabad – 201 002 (U.P.).

**Sub : Supply of testing equipment/ machinery to NITRA, Ghaziabad
as per the specifications and Quantities mentioned in the tender.**

Dear Sir,

- a. Having examined the conditions of Tenders / Specifications of the machinery / equipments, we, the undersigned, offer to supply equipment/machines as mentioned in the Annexure as per the quantity and specifications given in the tender.
- b. We agree to abide by this tender for the period given in Appendix TF from the opening date fixed for receiving the same and it shall remain binding upon us for a mutually extended period agreed in writing by us.
- c. If our tender is accepted, we undertake to supply the Equipment/machinery and install the same in NITRA, Ghaziabad mentioned in the tender within the specified periods in Appendix-TF on receipt of written order from the Purchase Committee, NITRA.
- d. If our tender is accepted we will, obtain and arrange:
 1. Transit insurances
 2. Any other statutory obligation, if any, prior of commencement of supply of machinery.
- e. We agree to your right to cancel the order or stop payment without prejudice to any other right or remedy for the following failures on our part.
 1. Changes to tender are made within Validity Period as specified in Appendix-TF.
 2. Supply and installation of equipment/machineries is not commenced within specified period as given in Appendix-TF.
 3. Obligations under (e) above are not fulfilled.

- f. Unless and until a formal agreement/purchase order is prepared and executed, this tender together with your written acceptance thereof, shall constitute a binding contract between us.
- g. We understand that you are not bound to accept the lowest or any tender you may receive.
- h. We agree to make a presentation of the products to be supplied by us, before the Purchase Sub-Committee on the date specified by it.
- i. Fluctuation in foreign exchange rates in respect of the imported equipment/machinery shall be borne by the equipment/machinery suppliers / authorized Agents.
- j. We hereby declare that the rates quoted by us are the lowest rates.
- k. In case of Imported Items, We have quoted Free On Board value (at nearest foreign Airport/ Sea port) & Also quoted separately CIP charges up to IGI Airport, New Delhi or ICD Patparganj / Tughlakabad, Delhi (whatever applicable). Also specified the packing dimension, Nos. of Box / Cartoon & gross weight of each Box/Cartoon (Packing list).

Authorized Signatory
to tenderer

Signature dated
Designation / Capacity
Name
Address

WITNESS 1

Signature

ADDRESS

Name

DATE

WITNESS 2

Signature

ADDRESS

Name

DATE

APPENDIX - TF

Sr. No.	Particulars	Remarks
1	Validity of Tender	180 days
2	Address, date and time of submission of the Tender Documents.	The Chairman, Purchase Committee, NITRA, Sector-23, Raj Nagar, Ghaziabad, U.P.-201002, India. Up to 12.00 PM 31-05-2023
3	Supply, installation and commissioning of the machinery etc.	Within 3 months from the date of placement of order or advance paid failing which order may be cancelled.
4	Period of warranty / performance guarantee of machines.	3 Years
5	Submission of the Programme for delivery.	Within 21 days from the date of the acceptance of the order placed.

SEAL AND SIGNATURE OF TENDERER

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VOLUME – I

(Part – 3)

TERMS AND CONDITIONS

1. Before submissions of the tender, the prospective bidders are expected to examine Technical Specifications of the equipment/machineries allied items required, terms and conditions, etc., given in the Tender Documents. Failure to furnish all information required by the Tender documents may result in the rejection of the bid. Detailed specifications of the items tendered and other accessories should be given, in the bid.
2. The descriptive leaflet giving the technical details of the equipment/machineries allied items should be supplied along with the quotation.
3. All accessories required for using the main equipment/machinery to make it fully operational for production are to be specified.
4. The suppliers of the machinery / equipment should provide both theoretical and practical training after commissioning the machinery or at an appropriate stage.
5. The price quoted should be exclusive of duty, Taxes, installation etc., which should be shown separately in the bid, if applicable. Freight and Insurance charges are to be indicated separately and the same will be paid at actual against supporting documents produced. Packing, forwarding and other charges as applicable are to be indicated separately in the tender.
6. The terms of payment in case of indigenous equipment/ machinery & accessories shall be as under :
 - a) 20% of the machinery cost ex-factory will be paid as advance against confirmation of orders.
 - b) 70% payment will be made against successful installation, commissioning and demonstration of satisfactory performance of the machinery / equipments at site.
 - c) Balance 10% payment will be made within one month from the date of installation & submission of Performance Guarantee for 12 months. If performance guarantee is not being submitted, then remaining payment will be released after 12 months from the date of installation. Format of Bank Guarantee will be provided in due course.
7. In case of Imported Items, 100% Payment will be made through Irrevocable Letter of Credit.

8. Delivery of the equipment/machineries should be as per the commitment from the date of receipt of initial payment against acceptance of order in case of Indigenous machinery and should not be extended.
9. **The pre-installation requirements including space, nature of civil work, power point, power requirement etc. are to be mentioned clearly in the technical bid.**
10. Separate bid for each of the items should be submitted in an envelope super scribed with the name of the item at the top, **“LAST DATE OF SUBMISSION: 31-05-2023 (12.00 PM), NAME AND ADDRESS OF THE BIDDER.** The sealed envelopes shall be marked in the name of **“The Chairman, Purchase Committee, NITRA, Ghaziabad”.**
11. The list of organizations (with full addresses, telephone / fax no., e-mail addresses etc.) in India and abroad to which the equipment/machinery were supplied is to be provided in the bid for our reference. Preference will be given if the supplies are made to internationally reputed test houses both in India and other countries particularly for the bided equipment.
12. Validity of the tender should be available up to 180 days. The tender may be rejected if the validity is not given up to 180 days.
13. The supplier should take responsibility for delivering, installing and commissioning of the machinery inside the premises of NITRA, Ghaziabad or at the address as specified in the Purchase Order.
14. Late / delayed tender offers will not be considered at all.
15. Any non-fulfillment of the stipulation given above will make the bid invalid.
16. If the tenders received are not sealed properly, they will not be considered at all.
17. Purchase Committee, NITRA reserves the right to accept or reject any or all the bids either in full or part without assigning any reason thereof.
18. The local supplier shall be entirely responsible for all taxes duties, license fees etc., incurred until delivery of the contracted goods (to the purchaser) up to place of delivery.
19. The delivery installation & commissioning period of the equipment/machinery as agreed to should not be extended under normal conditions. Suitable penalty for non-execution of the order may be enforced to the extent of 1% of the cost of machinery for every week extended. In case of the delay beyond scheduled period due to some unforeseen reason, written permission is required from the Chairman, Purchase Committee, NITRA, with proper justification to avoid penalty.

20. The equipment/machinery & accessories should be delivered, installed and commissioned at the address specified in the order. Service / operation / instruction / calibration manuals (in English) tool kit and gauges must also be supplied along with the machinery and accessories.
21. During the guarantee / warrantee period, servicing / maintenance should be undertaken regularly, subsequently Servicing/maintenance should be undertaken by the manufacturer or authorised agency of the manufacturer.
- 22. Warranty / performance guarantee period of three years should be given in respect of all the machinery and accessories supplied. Terms for service contract after the expiry of said warranty period are to be quoted separately.**
23. The manufacturer / supplier may indicate the Status of the Manufactured Product / or of the performed services as regards to ISO 9000 quality system..
24. List of servicing centres in India is to be indicated with detailed address, telephone no. / fax no. / e-mail address etc.
25. All pre-installation requisites such as Cables, Plugs, Compressor, Stabilizer etc. should be provided by the supplier along with the equipment/ machinery. NITRA, Ghaziabad concerned will provide adequate space, electricity & water, as the case may be, for the successful installation and commissioning of the equipment/ machinery.
26. The Capacity statement of equipment, plant and past performance details should be provided.

NOTE: The bidder has to specifically state that the clauses one to all as above have been read and understood and agree to comply all the above mentioned clauses individually.

TECHNICAL SPECIFICATIONS
(Volume-II)
List of Equipment / Machines

Sl.No.	Name of the Equipment/ Machine	Qty.	Location
1	Pilot Scale Melt Spinning Machine	1 Set.	Ghaziabad
2	Computerized Flat Knitting Machine	1 No.	Ghaziabad
3	Pilot Scale Nonwoven & Preparatory Machine (Fine Fibres)	1 Set.	Ghaziabad
4	Pilot Scale Nonwoven & Preparatory Machine (Coarse Fibres)	1 Set.	Ghaziabad
5	Single Fibre Fineness & Tensile Tester	1 Set	Ghaziabad
6	Manikin Flame Engulfment Tester	1 Set	Ghaziabad
7	Fibre Hollowness Analyzer (Digital Microscope System)	1 No.	Ghaziabad
8	Banana Fibre Extractor & Combing Machine	1 Set.	Ghaziabad

1. SPECIFICATION FOR PILOT MELT SPINNING M/C

Extruder Single screw

Single screw extruder with AC constant speed drive suitable for PP, nylon 66 with variable output of 150-300 cc/hour or 150-300 g/h for PP. Throughput of 600 cc/hr at 70 rpm of screw. Maximum processing temperature of 300 °C (extruder materials Suitable for max. Hold temp of 350° C inside the barrel). 3 zones extruder with independent PID temperature control with +/- 1.0° C accuracy. Pressure transducer at extruder output with electronic pressure display. Screw should be designed for shear mixing with Suitable mixing (spike) head profile. Barrel split open with easy opening and cleaning of barrel and screw using metal brush. Embedded heaters in barrel body and easy removal of insulation to allow easy opening of barrel for cleaning. Cooling zone at chip feeding with water circulation along with low temperature water circulator . Safety shear pin between screw and drive. Screw Diameter 25mm and Length 610mm .

Spin head

~6”by 6” alloy metal block suitable for continuous operation at 350° C. To be directly attached to the output of the extruder. Inclusive Of metering pump cavity, polymers melt path and spinneret assembly. Spinneret assembly for one position spinning with provision

for 2 layer metal wire mesh filter, distributor and spinneret plates. Easy opening and cleaning and assembly of all parts. Spinneret with suitable L/D ratio of 2-4; monofilament, 4 filament, and 3 mm strand die spinneret plates.

Metering Pump

Gear type with AC constant speed drive (with safety shear pin). Flow rates of 1.5 cc/min to 3.0 cc/min with metering accuracy of +/- 3%.

Godet

Single godet to be provided with mirror finish with diameter of 15 cm. One idler rollers of 3 cm diameter frictionless bearing to be placed at an angle to the main godet. Godet is electrically heated by Mica heater and the temperature is controlled by PID Temperature controller Programable Module . The godet driven by constant speed AC drive motors with +/-1% surface speed accuracy in the surface speed range of 50 m/min to 75 m/min. Or to be specified at the time of order.

Hopper

Small 1 lt. SS hopper with N2 purging at the base and an easy to use gate valve.

Cooling Zone

Laminar flow constant air profile across the width using rectangular honeycomb attached to air blower motor and air filter. Mechanism to alter air flow profile along the length. Chiller Unit provided for chilled air

The Winder speeds for easy variation of spinning speed of the machine after threading.

Take Up Unit

0.25 HP AC Motor,

Speed Control by AC Drive

Bobbin Push Pull Assembly Cam Unit to give uniform movement to fibers

Maximum Speed 220 mt /minute min speed 35 mt/min

Basic specifications

The total power required for the machine is 5KW app.

Machine Operating Supply AC 3 Phase

Physical Space required for the Machine 6 Meters X 4 Meter.

Spares Required

Bobbin for Take up Unit 20 Nos

Spinnerets 3nos (0.3 , 0.5 & 0.7 Dia) Mono and Multifilament up to 16 holes to be Specified at the time of Order

Muffle Furnace 9X4X4" (600 Degree)

Vacuum Drawing Oven With Mini Pump 12" X 12"

Chiller Unit For Circulation Of Water

Control Panel

Control Panel is provided to control the above mentioned parameters of Pilot Melt Spinning Machine to display on HMI

Technical Specifications For Draw Frame

General Description Two Stage Filament Drawing Machine should be noise free, Vibration free and Light weight.

Heated Draw Rollers Heated Draw rollers up to a temperature of 300 0 Centigrade . Mirror polished chrome plated with diameter 80/90 mm and length 90 mm. Temperature accuracy + 2 o C

Draw Ratio Any combination of Draw ratio should be achievable by simple adjustment of Speed of all the three set of rollers from the control Panel.

Roller Drive All three sets of 2 rollers should be driven by AC Motor and Drive . 6 Motors with 3 drives. Every roller provide the individual motor and each set of roller to have one drive each .

Draw Rollers Speed 1st Set of Roller From 30 – 200 RPM

2nd Set of Roller From 40 – 400 RPM

3rd Set Of Roller From 60 -600 RPM

Display Touch screen to show actual Speed and Temperature of heaters and controls of all the Three set of rollers

Drawing Machine Design Details Sketch /Picture of the quoted drawing machine should be provided along with the quotation.

General Requirements

1. Vendor shall be responsible for the installation & commissioning of the complete system at the NITRA site.
2. Comprehensive training of NITRA personnel shall be provided along with operation, and maintenance of the complete system.
3. Detailed checklists and operation manual/s shall be provided for regular operation, operation, and maintenance of the complete system.
4. Necessary Tools and Spares for the operation and maintenance of the complete system shall be provided.
5. Full system drawings, part lists, etc shall be provided.
6. Details of authorized resellers/agents/representatives in India, along with their address and contact information shall be provided.
7. Indian Agent Commission and copy of the agreement with Indian Agent.
8. Bidder should agree in writing to provide technical support and spares for a period of at least ten years after completion of the standard warranty term of one year (only willingness to be indicated not the associated cost).
9. Extended Warranty/CMC costing to be provided 3 Years (post standard warrant terms of one year)
10. Infrastructure/facilities required from NITRA for successful installation & Commissioning.
11. A list of preferably 5 satisfactory buyers of the same instrument/apparatus shall be provided by the tenderer. A letter from the buyer about the satisfactory running of the machine should be provided.

2. Specification of Computerised Flat knitting Machine Capable to produce 3D Spacer Fabrics

Machine Details:-

Computerized Flat knitting Machine with following specifications:

- Machine gauge and width: 14 gauge and 36 inch
- Knitting with Full Jacquard selection via special solenoid actuators, electronically controlled stitch density arrangement.
- Machine should be capable of producing design, especially inlay patterns and i-plating possibility.
- Possibility of racking within 2 inches, also ½ and ¼ pitch from any position.
- Must have Inverse plating capability within the same course in each needle combined with inlay patterns as well as sinker patterns.
- Facility of simultaneous transfer of loops, front or back along with independent of carriage direction, Split stitch by exchanging yarn carriers.
- Machine should have Digital Stitch Control System for control stitch length digitally along with dynamic variable stitch facility.
- Facility of loop presser with individual selection possibility.
- Knitting system – Single carriage, Triple knitting system
- Sinker system- Spring type moveable full- sinker system
- At least 16 yarn feed roller and side tensioner with brake dish with multi-step adjustable dials.
- Yarn carriers: 16 yarn carriers with 2 in-lay carriers. Stitch presser with specialized Motor Drive along with On/off Adjustment and amount set up facility.
- Machine should have system to detect yarn breaking, knots, floating yarn, rewind, end of knitting, fail of racking needle, needle collision, program error, self-locking protection system etc. Full safety cover for noise suppression and dust-proofing with stop motion sensor and interlock mechanism.
- Facility of Needle hook conversion between LL-size and MM size possible without exchanging cams.
- Control System: LCD Panel, touch screen and finger interface, transmitted by USB, storage of different design files, monitoring and operational parameter adjustment at any time when the machine is running, support English language, stored program and easy to upgrade etc. Ethernet 10/100 BASE-T network interface.
- Back-up power: Power supply for resuming knitting after power failure.
- Design solution software & other accessories to perform designing of spacer knitted fabrics, patterning making, texture, product mapping, color management, drawing, designing, 3D modeling/ simulation of garment, simulation of yarn and reverse side of the fabric on computer system etc.

General Requirements

1. Vendor shall be responsible for the installation & commissioning of the complete system at the NITRA site.

2. Comprehensive training of NITRA personnel shall be provided along with operation, and maintenance of the complete system.
3. Detailed checklists and operation manual/s shall be provided for regular operation, operation, and maintenance of the complete system.
4. Necessary Tools and Spares for the operation and maintenance of the complete system shall be provided.
5. Full system drawings, part lists, etc shall be provided.
6. Details of authorized resellers/agents/representatives in India, along with their address and contact information shall be provided.
7. Indian Agent Commission and copy of the agreement with Indian Agent.
8. Bidder should agree in writing to provide technical support and spares for a period of at least ten years after completion of the standard warranty term of one year (only willingness to be indicated not the associated cost).
9. Extended Warranty/CMC costing to be provided 3 Years (post standard warrant terms of one year)
10. Infrastructure/facilities required from NITRA for successful installation & Commissioning.
11. A list of preferably 5 satisfactory buyers of the same instrument/apparatus shall be provided by the tenderer. A letter from the buyer about the satisfactory running of the machine should be provided.

3. SPECIFICATION FOR PILOT SCALE NONWOVEN FABRIC- MAKING MACHINE (NEEDLE PUNCHING) & PREPARATORY MACHINES (Fine fibres)

1. Opener cum lap forming machine

- Working width – Up to 250 mm or more
- Suitable for – Fibre fineness 2.0 to 4.5 Micronaire
- Machines supply – ready to run condition with all required accessories
Spares & accessories

2. Lab Model Carding Machine

- Working width – 450-500mm
- Suitable for – Fibre fineness 2.0 to 4.5 Micronaire
- Machines supply – ready to run condition with all required accessories
- Spares & accessories
- Suitable for processing of synthetic and natural fibres

3. Lab Model Cross Lapper Machine

- Working width – 250 mm to 450 mm
- Capable of – laying carded web into folds across the machine conveyor
- Provision for – Varying delivery rate to control web thickness
- Machines supply – Ready to run condition with all required accessories
- Spares & accessories

4. NON-WOVEN NEEDLE PUNCHING MACHINE

- Computer controlled Lab model
- Working width - 450mm-500mm
- Stroke length of Needle Punching machine -60mm
- Needle density – Suitable for handling the fibre of fineness 2.0 to 4.5 Micronaire
- Punches per minute up to 100
- Machines supply – ready to run condition with all required accessories
- Suitable for processing of synthetic and natural fibres
- Computer with proper specification to run the machine

General Requirements

1. Vendor shall be responsible for the installation & commissioning of the complete system at the NITRA site.
2. Comprehensive training of NITRA personnel shall be provided along with operation, and maintenance of the complete system.
3. Detailed checklists and operation manual/s shall be provided for regular operation, operation, and maintenance of the complete system.

4. Necessary Tools and Spares for the operation and maintenance of the complete system shall be provided.
5. Full system drawings, part lists, etc shall be provided.
6. Details of authorized resellers/agents/representatives in India, along with their address and contact information shall be provided.
7. Indian Agent Commission and copy of the agreement with Indian Agent.
8. Bidder should agree in writing to provide technical support and spares for a period of at least ten years after completion of the standard warranty term of one year (only willingness to be indicated not the associated cost).
9. Extended Warranty/CMC costing to be provided 3 Years (post standard warrant terms of one year)
10. Infrastructure/facilities required from NITRA for successful installation & Commissioning.
11. A list of preferably 5 satisfactory buyers of the same instrument/apparatus shall be provided by the tenderer. A letter from the buyer about the satisfactory running of the machine should be provided.

4. SPECIFICATION FOR PILOT SCALE NEEDLE PUNCHING NON-WOVEN FABRIC MAKING MACHINE & PREPARATORY MACHINES (Coarse fibres)

1. Lab Model Carding Machine

- Working width – 450-500mm
- Suitable for – Fibre fineness 84 to 280 Micronaire
- Machines supply – ready to run condition with all required accessories
- Spares & accessories
- Suitable for processing of synthetic and natural fibres

2. Lab Model Cross Lapper Machine

- Working width – 250 mm to 450 mm
- Capable of – laying carded web into folds across the machine conveyor
- Provision for – Varying delivery rate to control web thickness
- Machines supply – Ready to run condition with all required accessories

3. NON-WOVEN NEEDLE PUNCHING MACHINE:

- Computer controlled Lab model
- Working width - 450mm-500mm
- Stroke length of Needle Punching machine -60mm
- Needle density – Suitable for handling fibres of fineness 80-280 micronaire
- Punches per minute up to 100
- Machines supply – ready to run condition with all required accessories
- Suitable for processing of synthetic and natural fibres
- Spares & accessories
- Computer with proper specifications to run the machine

General Requirements

1. Vendor shall be responsible for the installation & commissioning of the complete system at the NITRA site.
2. Comprehensive training of NITRA personnel shall be provided along with operation, and maintenance of the complete system.
3. Detailed checklists and operation manual/s shall be provided for regular operation, operation, and maintenance of the complete system.
4. Necessary Tools and Spares for the operation and maintenance of the complete system shall be provided.
5. Full system drawings, part lists, etc shall be provided.
6. Details of authorized resellers/agents/representatives in India, along with their address and contact information shall be provided.
7. Indian Agent Commission and copy of the agreement with Indian Agent.

- 8.** Bidder should agree in writing to provide technical support and spares for a period of at least ten years after completion of the standard warranty term of one year (only willingness to be indicated not the associated cost).
- 9.** Extended Warranty/CMC costing to be provided 3 Years (post standard warranty terms of one year)
- 10.** Infrastructure/facilities required from NITRA for successful installation & Commissioning.
- 11.** A list of at preferably 5 satisfactory buyers of the same instrument/apparatus shall be provided by the tenderer. A letter from the buyer about the satisfactory running of the machine should also be provided.

5. Specification for Single fibre fineness and tensile properties testers

Single fibre fineness tester

- Should be capable of fineness and tensile properties of fibres of minimum fibre length 28mm
- Pre-tensioning clips for different fineness fibres
- Accuracy of $\pm 1\%$ and can be used for specs of ASTM, BISFA and DIN
- With a repeatability of better than or equal to 1.0%
- Evaluation software to provide linear density values in denier, dtex in combination with tensile properties

Single fibre tensile tester

- Gauge length 5 – 50mm
- Suitable for Wet BISFA testing principle
- Testing speed 0.5 to 50mm
- Suitable vibroclips for particular denier
- Force value accuracy $\pm 1\%$
- Elongation value accuracy $\pm 0.005\text{mm}$
- Evaluation software to provide display of linear density, tenacity, elongation, force etc.

It is preferable that both equipments should be able to run without instrument air and by electro mechanical means.

Preferably both equipment should be able to run individually without computer in case of emergency

General Requirements

1. Vendor shall be responsible for the installation & commissioning of the complete system at the NITRA site.
2. Comprehensive training of NITRA personnel shall be provided along with operation, and maintenance of the complete system.
3. Detailed checklists and operation manual/s shall be provided for regular operation, operation, and maintenance of the complete system.
4. Necessary Tools and Spares for the operation and maintenance of the complete system shall be provided.
5. Full system drawings, part lists, etc shall be provided.
6. Details of authorized resellers/agents/representatives in India, along with their address and contact information shall be provided.
7. Indian Agent Commission and copy of the agreement with Indian Agent.
8. Bidder should agree in writing to provide technical support and spares for a period of at least ten years after completion of the standard warranty term of one year (only willingness to be indicated not the associated cost).
9. Extended Warranty/CMC costing to be provided 3 Years (post standard warrant terms of one year)

- 10.** Infrastructure/facilities required from NITRA for successful installation & Commissioning.
- 11.** A list of preferably 5 satisfactory buyers of the same instrument/apparatus shall be provided by the tenderer. A letter from the buyer about the satisfactory running of the machine should be provided.

6. Technical Specifications of Manikin flame engulfment test apparatus

The apparatus shall fulfill the requirements of the latest version of IS 17881 (Part 1), IS 17881 (Part 2), ISO 13506-1, ISO 13506-2, ASTM F 1930, and NFPA 2112 standards.

The details of the technical specification of the Manikin system and burn evaluation chamber are given below. If there is any variation between the required specification and those proposed by the supplier, a proper justification for the variation needs to be provided. The final decision for the acceptance or not acceptance of the justification given by the supplier will be of the technical committee.

1. Instrumented Manikin

i) Formation of Manikin:

- a) The manikin shall be of Adult Male type.
- b) It shall have a head, neck, chest/back, abdomen, buttocks, arms, hands, legs, and feet.
- c) The primary body dimensions of the manikin shall conform to the dimensions as mentioned in the ASTM F 1930. The overall manikin form shall meet the 50th percentile human dimensions as mentioned in ASTM F 6240.
- d) The construction materials of manikin shall be non-metallic, fire-resistant, and thermally stable. It shall not interfere with or help in the combustion process.
- e) Vendor shall specify the material used for the construction of the manikin along with all the required properties like durability (mechanical & other properties), flame resistance, and thermal stability.
- f) The minimum life or number of test cycle exposure of the manikin body when subjected to the specified test conditions of ASTM F 1930 shall be specified.
- g) The manikin body shall have joints at ankles, hips, knees, elbows, and shoulders to enable full articulation and adjustable settings to allow posing in fixed positions. The parts of the body especially the hands shall disassemble for easy dressing and understanding.
- h) The manikin shall have internal space for fitting the Data acquisition system.

ii) Manikin Sensor system:

- a) Thermal energy sensors should be distributed as uniformly as possible all over the manikin body form. The distribution of sensors as uniform or non-uniform shall be clearly specified.
- b) At least 134 thermal energy sensors should be provided including two on each hand and foot.
- c) The percentage distribution shall meet the requirement of ASTM F1930.
- d) Sensor shall have the capacity to measure the incident heat flux over a range from 0.0 to 167 kW/m² (0.0 to 4.0 cal/sec.cm²).
- e) The sensors shall be constructed of a material with known thermal and physical characteristics that shall be used to indicate the time-varying heat flux received by the sensors.
- f) Sensors shall have long-term stability for repeated use and optimal matching to human skin.
- g) The minimum response time for the sensors shall be ≤ 0.1 Sec. The sensor surface shall have a minimum absorptivity of 0.9.
- h) The type of sensor shall be copper disc flux sensor or equivalent. The detailed technical specifications of the sensor shall be provided.
- i) Additional sensors amounting to a minimum of 15 Nos for manikin body form.
- j) Heat flux measuring device, traceable to NIST or a similar standards body, shall be provided to calibrate the heat/energy sources used to calibrate the thermal energy sensors.
- k) A hand-held heat flux gun with NIST traceable reference sensor shall be provided for in-situ calibration of the manikin's sensors.
- l) Calibration certificate shall be provided for Heat Flux Sensors as per the requirement of ISO 15025.
- m) Calibration process of heat flux skin simulate sensors and calibration facility at NITRA may be provided with proper training.

iii) Manikin Data Acquisition and Instrumentation.

- a. Data acquisition components shall be fitted inside the manikin body form to ensure high-accuracy measurement through digitization of signals close to the source.
- b. Leads from each sensor should connect to microprocessor control boards mounted inside the manikin.
- c. A water-cooling system shall be provided for the protection for sensitive internal components, to provide a uniform operating temperature, and to prevent temperature drift from affecting processor accuracy.
- d. A system shall be provided with the capability of acquiring and storing the results of the measurement from each sensor at least four times per second for the data acquisition period.
- e. Single cable shall be provided to supply power and communication to the manikin. This cable shall have proper shielding from flame exposure and include a connection from manikin handling convenience.
- f. Sensor data shall be collected at high speed, digitized, and transmitted to a PC/Laptop user interface running the software for Burn injury assessment.
- g. External electronics for the manikin and burn chamber shall be housed in another enclosure along with necessary cabling to provide power and to communicate with the manikin.
- h. One Workstation with the below-mentioned specifications shall be provided for the operation and control of Data Acquisition and instrumentation. The burn Assessment program shall also be loaded on this workstation for data analysis, burn injury prediction, visualization, and report generation.

Workstation Specifications (Minimum): It should be compatible with the software. The following is the requirement:

Intel 12th Gen i7,16 GB RAM, 500GB SSD, WiFi, Keyboard, Mouse, 27” Monitor, Win 11 Pro (64 bit)

iv) Burn Assessment Software Program

- a. Computer Software program shall be provided having the capacity to receive the output of sensors
- b. It shall calculate time-dependent heat flux.

- c. It shall calculate temperature within skin and subcutaneous layers as a function of depth and time
- d. It shall predict second or third-degree burn injury for each sensor utilizing a skin burn injury model as per IS 17881 (Part 1 & Part 2), ASTM F1930, ISO 13506 (Part 1 & Part 2), NFPA 2112.
- e. It shall predict total burn injury and the percentage of predicted burn injury.
- d. It shall generate a diagram of the manikin showing location and burn injury levels as second and third-degree areas along with sensor distribution in a color-coded form.
- e. It shall report the results as per the reporting format mentioned in IS 17881 (Part 1 & Part 2), ASTM F1930, ISO 13506 (Part 1 & Part 2), and NFPA 2112.
- f. Report of burn injury prediction shall be generated immediately after the completion of the test.

v) **Flame Test Chamber**

- a) The exposure chamber shall be ventilated, fire-resistant enclosure with viewing windows and access door (s) to enclose the manikin and exposure apparatus.
- b) Exposure chamber shall be a self-contained, enclosed space built from fire-proof materials. Interior walls shall be galvanized and power-coated sheet steel (white), while the exterior wall material shall meet site requirements for housing the flame test chamber.
- c) The exposure chamber size shall be sufficient to provide uniform flame engulfment of the manikin and shall have sufficient spaces to allow safe movement around the manikin.
 - i) The minimum size of the chamber shall be 4.5 m X 4.2m X 3.0m.
 - ii) Large viewing windows in the wall and safety windows in access door/s shall be provided.
 - iii) Chamber shall include mounting provisions for manikin and cable routing as necessary to protect from heat exposure.

- d) System shall be supplied with a pre-engineered ventilation system having a forced exhaust ventilation system (complying with NFPA 86(2015) Section 5.4) to supply oxygen for combustion, and to vent the heated chamber space after a burn. Openings to the exterior of the test chamber shall be provided for a passive supply of adequate amounts of air for the safe combustion of fuel during exposure.
- e) Exposure chamber shall be equipped with sufficient safety devices, detectors, and suppression systems.
 - a. These may include devices like propane gas detectors, motion detectors, door closure detectors, hand-held fire extinguishers, and other necessary safety devices.
 - b. A system like a water deluge system with an interlocked “LEL/Exhaust system” or equivalent shall be provided.
 - c. These devices shall be built-in into the burn chamber system to protect operators and equipment.
- vi) **Fuel and Delivery system:** The chamber shall be equipped with fuel supply, delivery, and burner systems to provide reproducible flash fire exposures.
 - a. A system of propane/LPG gas piping, pressure regulators valves, and pressure sensors including a double block and bleed burner management system or equivalent shall be provided to safely deliver gaseous fuel to the ignition system and exposure torches.
 - b. This delivery system shall be sufficient to provide a uniform heat flux of at least 2.0 cal/sec/cm² (84kW/m²) for an exposure time of at least 20 seconds.
- vii) **Ignition and Burner system:**

The burner system shall consist of one ignition pilot flame for each exposure burner, and sufficient burners (at least twelve) to provide the required range of heat fluxed with flam distribution uniformity to meet the requirement of IS 17881 (Part 1 & Part 2), ASTM F1930, ISO 13506 (Part 1 & Part 2), and NFPA 2112.

- a. Each exposure burner shall be equipped with an ignition system positioned near the exit of the burner, but not in the direct path of the flames so as not to interfere with the exposure flame pattern.
- b. The ignition system shall be interlocked to the burner gas supply valves to prevent the premature or erroneous opening of these valves.
- c. The flame exposure burners shall be large, induced combustion air, industrial style propane/LPG burners positioned around the manikin to produce a uniform laboratory simulation of a flash fire.
- d. At least Twelve (12) burners shall be used and positioned to yield the required exposure level and uniformity.
- e. Each burner must be individually controlled to create a user-customized burn profile.
- f. The complete Fuel delivery and burner arrangement shall be PLC controlled.
- g. Video monitoring system (VMS) available for safe viewing of test and video recording of flame and garment response before, during, and after the flame exposure shall be provided.
- h. The system shall have minimum specifications of recording at 30 FPS, at a resolution of 1280/720 pixels with storage of 1 TB. The operation of V.M.S. shall be directly controlled and integrated with the overall system operation and control software for recording, storing & accessing the video monitoring system output.
- i. Safety provisioning before, during, and after the test, through a safety checklist, Automatic test sequencing, integrated chamber, and gas safety functions and operating interlocks shall be provisional.
- j. This shall be integrated with the overall 'system operation and control software' comprising of data monitoring, operational control of fire, data acquisition system, skin burn injury calculations, report, preparation, and supporting functions (For guidance Appendix X2 of ASTM F 1930 may be referred).

viii) **General Requirements**

1. The supplied system shall comprehensively meet the requirement of IS 17881 (Part 1 & Part 2) ASTM F1930, ISO 13506 (Part 1 & Part 2), and NFPA 2112 standards.
2. System shall be suitable for installation within an interior laboratory space.
3. Vendor shall be responsible for the installation & commissioning of the complete system at the NITRA site. The vendor shall demonstrate the performance of the system to meet the requirements of IS 17881 (Part 1 & Part 2) ASTM F1930, ISO 13506 (Part 1 & Part 2), and NFPA 2112 standards.
4. Comprehensive training of NITRA personnel shall be provided for regular operation, fail-safe control operation, and maintenance of the complete system for a period of at least 5 days.
5. System, sub-system, and component level Bill of material (BOM) shall be provided.
6. Safety Provisions shall be inbuilt into the complete system and interlocked with the overall system operation and control software.
7. Automatic Report operation shall be provisioned as per requirements of IS 17881 (Part 1 & Part 2) ASTM F1930, ISO 13506 (Part 1 & Part 2), and NFPA 2112.
8. **Calibration and Setup requirements:** It shall be possible to set up the test apparatus and undertake calibration as per ASTM F 1930 specified requirements Calibration shall be possible for
 - a. Individual sensors against suitable NIST traceable reference.
 - b. 'Sensor-Data acquisition- Burn model as a unit.
 - c. Exposure flame for the stated exposure levels.
9. **Checklists and Operation manuals:** Detailed checklists and operation manual/s shall be provided for regular operation, fail-safe control operation, and maintenance of the complete system.
10. Software validation report for Burn injury Assessment and skin temperature calculations [meeting IS 17881 (Part 1 & Part 2), ASTM F1930, ISO 13506 (Part 1 & Part 2), and NFPA 2112 requirements for calculations of those parameters] shall be provided.
11. Necessary Tools and Spares for the operation and maintenance of the complete system shall be provided.

- 12.** Full system drawings, part lists, etc shall be provided.
- 13.** System packaging shall be adequate to ensure the safe transport of all sub-systems and components.
- 14.** Details of authorized resellers/agents/representatives in India, along with their address and contact information shall be provided.
- 15.** Indian Agent Commission and copy of the agreement with Indian Agent.
- 16.** Bidder should agree in writing to provide technical support and spares for a period of at least ten years after completion of the standard warranty term of one year (only willingness to be indicated not the associated cost).
- 17.** Extended Warranty/CMC costing to be provided 3 Years (post standard warrant terms of one year)
- 18.** Activity chart with Timelines for installation commission & training for the complete system.
- 19.** Infrastructure/facilities required from NITRA for successful installation & Commissioning.
- 20.** A list of preferably 5 satisfactory buyers of same instrument/apparatus shall be provided by the tenderer. Letter from buyer about the satisfactorily running of instrument should be provided.

7. Specification for Fibre Hollowness Analyser (Digital Microscope System)

Objective: To analyze fibre hollowness characteristic

Scope of analysis: Fiber hollowness characteristic, Measurement of fiber micron and diameter, Longitudinal/cross-sectional view of fiber, Surface characterization of fiber, yarn, and fabric.

Instrument Details:

Fibre hollowness analyzer (High magnification microscope) to provide clear and high-contrast sharp images of the specimen with polarizer devices. Available with Software loaded with a digital library of images of Longitudinal and cross-sectional views of all fibers. Capable of interfacing with laptop/computer and printer for widescreen view and prints.

Specification of the Digital Microscope:

1. Eyepieces: Wide Field 10×(standard) & 15× (optional)
2. Magnification Power: 40×, 100×, 400× & 1000× (standard), up to 1200× (optional)
3. Objective: 4×, 10×, 40× & 100×
4. Observation head with an inclination of 30° rotatable at 360°
5. Illumination systems with ultra-high brightness LED and Brightness control knob
6. Light Control: Invariably controlled Light Intensity Meter.
7. Coarse Focus Adjustment: With a Knob (Bigger Knob).
8. Fine Focus Adjustment: With a Knob (Smaller Knob).
9. Light Condenser Movement: Up/ Down with a knob
10. Stage Micrometer: 1 mm Scale with 0.1 mm Accuracy (for calibrating the graduated screen)
11. Standard Accessories: Cover Glasses, Pointing Needle, Spare LED Bulb, Spare Fuse, Cotton Cloth, Yarn Holder, Dust Cover, Laptop with software (digital library), Digital Camera.

Specifications of the Digital Camera:

- USB Digital Camera 5.0 Megapixels with progressive scanning
- Standard C-Mount Camera USB 2.0 Interface
- Rapid image download and ease of Operation Support Still Image Capture (JPG, BMP)
- Resolution 2592 × 1944 pixels

Image Displays on computers should be supported with image analysis software to provide support for Image demonstration and analysis, including the following:

- Take Photo and Save Picture into the Computer/ Laptop system
- Take Video and Save Video into the Computer/ Laptop system
- Do measurements of certain cells, like size, and diameter.
- Coordinate the measurement result and can be printed

Specifications of the Laptop: The minimum requirement of the Laptop:

- 1) 12th Gen Intel Core i5 Processor, 15/15.5 inches HD Laptop, 8 GB RAM/512GB SSD/Windows 11/MS Office Brand- HP/Lenovo
- 2) Printer

Specifications of the Software:

- Software to provide simple, accurate and user-friendly platform for all Images and Geometrical Measurements.
- Ease Create customized reports with images, date and text in MS. Word and MS. Excel format.

General Requirements

1. Vendor shall be responsible for the installation & commissioning of the complete system at the NITRA site.
2. Comprehensive training of NITRA personnel shall be provided along with operation, and maintenance of the complete system.
3. Detailed checklists and operation manual/s shall be provided for regular operation, operation, and maintenance of the complete system.
4. Necessary Tools and Spares for the operation and maintenance of the complete system shall be provided.
5. Full system drawings, part lists, etc shall be provided.
6. Details of authorized resellers/agents/representatives in India, along with their address and contact information shall be provided.
7. Indian Agent Commission and copy of the agreement with Indian Agent.

8. Bidder should agree in writing to provide technical support and spares for a period of at least ten years after completion of the standard warranty term of one year (only willingness to be indicated not the associated cost).
9. Extended Warranty/CMC costing to be provided 3 Years (post standard warrant terms of one year)
10. Infrastructure/facilities required from NITRA for successful installation & Commissioning.
11. A list of preferably 5 satisfactory buyers of the same instrument/apparatus shall be provided by the tenderer. A letter from buyer about the satisfactorily running of instrument should be provided.

8. SPECIFICATION FOR BANANA FIBRE EXTRACTOR & COMBING MACHINE

BANANA STEM CUTTER MACHINE:

- Cutter dia – 16” to 20”
- Power supply (Motor) – single phase 50Hz, 230 V
- Machines supply – ready to run condition with all required accessories

BANANA FIBRE EXTRACTOR / DECORTICATOR MACHINE

- Capacity – 15 to 20 kg per day or more
- Roller blades – MS / SS
- Guide / Safety Roller – MS / SS
- Fluted feed rollers – MS / SS
- Pulp and water separation system
- Power supply (Motor) – single phase 50Hz, 230 V
- Machines supply – ready to run condition with all required accessories

BANANA FIBRE COMBING MACHINE

- Drum dia – 400 to 500 mm
- Combing needles – SS
- Power supply (Motor) – single phase 50Hz, 230 V
- Machines supply – ready to run condition with all required accessories
- Spares & accessories – for 5 years

General Requirements

1. Vendor shall be responsible for the installation & commissioning of the complete system at the NITRA site.
2. Comprehensive training of NITRA personnel shall be provided along with operation, and maintenance of the complete system.
3. Detailed checklists and operation manual/s shall be provided for regular operation, operation, and maintenance of the complete system.
4. Necessary Tools and Spares for the operation and maintenance of the complete system shall be provided.
5. Full system drawings, part lists, etc shall be provided.
6. Details of authorized resellers/agents/representatives in India, along with their address and contact information shall be provided.
7. Indian Agent Commission and copy of the agreement with Indian Agent.
8. Bidder should agree in writing to provide technical support and spares for a period of at least ten years after completion of the standard warranty term of one year (only willingness to be indicated not the associated cost).
9. Extended Warranty/CMC costing to be provided 3 Years (post standard warrant terms of one year)

- 10.** Infrastructure/facilities required from NITRA for successful installation & Commissioning.
- 11.** A list of preferably 5 satisfactory buyers of the same instrument/apparatus shall be provided by the tenderer. A letter from the buyer about the satisfactory running of the machine should be provided.