



NATIONAL AUTOMOTIVE TEST TRACKS

SHORT TERM TENDER NOTICE INVITING TENDER

FOR

EXECUTION OF WET GRIP SURFACE FOR WET GRIP
MEASUREMENT, INDEXING AND TYRE LABELLING AS PER ISO
AT BRAKING TRACK FACILITY

AT

NATRAX
PITHAMPUR, DIST. DHAR (Madhya Pradesh)

Tender No. - NATRAX/C&I/TT/Misc/20/95/R

National Automotive Test Tracks (NATRAX)

NH-52, Old Agra- Mumbai Highway, Near to Pithampur Flyover, Post Khandwa (Near
Pithampur)

Dhar District, Madhya Pradesh-454774

Phone: +919893892310, Fax – 07292-256101

Email: tulika.banerjee@natrip.in;





Tender No. - NATRAX/C&I/TT/Misc/20/95/R

1. General Instructions:

NATRiP Implementation Society (NATIS), an autonomous body constituted by Ministry of Heavy Industries & Public Enterprises, Government of India for execution of National Automotive Testing and R&D Infrastructure Project (NATRiP), the largest and one of the most significant initiatives in Automotive sector so far which represents a unique joining of hands between the Government of India, a number of State Governments and Indian Automotive Industry to create a state-of-the-art Testing, Validation and R&D infrastructure in the Country.

The Project aims at creating core global competencies in Automotive sector in India and facilitate seamless integration of Indian Automotive industry with the world as also to position the Country prominently on the global automotive map.

The National Automotive Test Tracks (NATRAX) is an Automotive Testing & Certification Centre under NATRIP. NATRAX is being set up on approx. 3000 acres for comprehensive testing and evaluation of all types of automobiles, near Pithampur, Dist. DHAR, (Madhya Pradesh, India). NATRAX invites sealed tenders from the Bidders in the prescribed proforma for performing, executing and implementing the Works on the terms and conditions contained in this Tender Document and in the Contract. Brief description of Works and the timelines for tenders are summarised in the table below:

The details of the Tender are mentioned below: -

Description of Work	Time for completion	Date of start of floating of tender	Last date for submission of Bid	Date & Time of Bid opening	Estimated Cost
Execution of Wet Grip Surface for Wet Grip Measurement, Indexing and Tyre Labelling as per ISO at Braking Track Facility at NATRAX site, Pithampur-Dhar (MP)	45 Days from the date of issue of NTP	5 th Aug 2020	17 th Aug 2020, 3:00pm	17 th Aug 2020, 3:30pm	Rs 10.00 Lakh

Those who meet the minimum eligibility criteria as mentioned in the Instruction to bidder (ITB) (and also in NIT) may be eligible to become successful in the bidding process. The bidder in the form of JV/Consortium is not permitted.

2. Bid Submission details:

Sealed bids are to be submitted at the following address not later than the aforesaid





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time & date or as next convenient date & time on pre-intimation.

NATRAX HUB office,
NH-52, Old Agra- Mumbai Highway,
Near to Pithampur Flyover, Post Khandwa (Near Pithampur)
Dhar District, Madhya Pradesh-454774

No Bids will be accepted after the aforesaid date and time. However, on exceptional cases, NATRAX reserves the right to extend the time/last date of submission of Bid to a next convenient date/time before opening of the Bids.

Bids sent telegraphically or through other means of transmission (telefax, email etc.) which cannot be delivered in a sealed envelope shall be treated as defective, invalid and shall stand rejected.

NATRAX shall not be responsible for any postal/courier delays for non-receipt /non-delivery of bids or due to wrong addressee.

3. Disclaimer:

NATRAX reserves all rights to accept/ reject/modify/split any or all proposals without assigning any reasons. Bidders shall not have any cause of action or claim against NATRAX for any of its decisions.

For NATRAX

Procurement Incharge





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ANNEXURE I
INSTRUCTION TO BIDDERS

1. Bidders are required to submit their Bids in two parts in a sealed envelope, superscribed **“Bid for Tender No. NATRAX/C&I/TT/Misc/20/95/R” on the top of envelop, containing** two separate sealed envelopes, as given below. The sealed bids shall be submitted at the NATRAX, Pithampur before the closure of bid submission date/time.

- a) The first sealed envelope marked as **“Technical Bid for Tender No. NATRAX/C&I/TT/Misc/20/95/R”** shall consist of all the technical details eligibility, commercial terms and conditions and documents sought in the NIQ/Tender along with the signed copy the NIQ/Tender document. **Further, the Technical Bid must include a copy of the unfilled Financial Bid of the Bidder without any information on the prices**
- b) The second sealed envelope marked as **“Financial Bid for Tender No. NATRAX/C&I/TT/Misc/20/95/R”** should consist of the Financial Bid duly filled and signed by an authorised person from the Bidder’s.

Both the envelopes are to be submitted together in a sealed outer envelope.

The technical bids are opened at the first instance and evaluated. At the second stage, financial bids of only these technically acceptable offers are to be opened with prior intimation on the date and time for further scrutiny, evaluation, ranking & placement of order.

2. The bidders are expected to meet the minimum eligibility criteria as given in the “Short-Term Notice Inviting Tender”. NATRAX will reject the bids that do not meet the minimum eligibility criteria as laid down, based on their submission along with the Tender documents even after the bid opening process is concluded.

3. The Contract shall be governed by NATRAX’s Special Conditions for Contract (SCC) and all other relevant specification applicable.

4. All Bidders are hereby explicitly informed that “CONDITIONAL OFFERS” or “OFFERS WITH DEVIATIONS” from the conditions of Contract, the quotation not meeting the minimum eligibility criteria, Technical specifications, or any other requirements as stipulated in the Tender documents are liable to be “REJECTED”.

5. Bidders should give details of their technical soundness and provide list of customers/client of previous works of similar nature in Government Departments/ Undertakings/ Public / Private sectors/Autonomous etc.,

6. **Minimum Eligibility Criteria: -**

Documents to be submitted along with the bid:

The bidders whose bid meet the following criteria would only be considered as responsive and evaluated by NATRAX.



i. **MEC 1: -**

Legal Valid Entity:

The Bidder shall necessary be a legal valid entity either in the form of Proprietary/Private Partnership/Private/Govt./ Public/Autonomous. In form of JV/Consortium not permitted.

List of acceptable documents: -

- a) License certificate/Gumasta of the firm
- b) Details of Owner/partners of the firm
- c) Copies of Income Tax Registration/PAN Card, GST registration, PF registration and any other statutory requirements, etc.,

ii. **MEC – 2: Financial Capabilities**

The minimum **Average Annual Financial** turnover of the bidder during the last three years, ending on 31st March of the previous financial year, should be as Rs 15 Lakh. Documentary evidence in the form of certified Audited Balance Sheets of relevant periods or a certificate from the Chartered Accountant / Cost Accountant indicating the turnover details for the relevant period shall be uploaded with the bid.

In case the date of constitution / incorporation of the bidder is less than 3-year-old, the average turnover in respect of the completed financial years after the date of constitution shall be taken into account for this criterion.

iii. **MEC- 3: Experience**

The Bidder should have successfully completed or substantially completed similar works during last three (3) years ending last day of month previous to the one in which applications are invited should be either of the following: -

- a. Three similar completed works costing not less than the amount equal to 40(forty) percent of the estimated cost; or
- b. Two similar completed works costing not less than the amount equal to 50 (fifty) percent of the estimated cost; or
- c. One similar completed work costing not less than the amount equal to 80 (eighty) percent of the estimated cost;

***Similar works means Execution of Wet Grip Surface for Test Track/Proving Ground or any Civil work-related to fixing & mirror polishing of Kota/Granite/Stone, Civil work related to Industrial floor/ Building/Commercial complex Concrete floor and Polishing work or Laying of concrete for the road work and there polishing/finishing etc.**

List of accepted documents:

- a) Completion certificate/supply of PO, value of works, etc.,



- b) Incase completion certificate/PO does not clearly mention the value of work executed, then the bidder shall submit the fresh summary & proof as TDS, CA certificate, Excise, GST etc.,
7. **Tender Fee & EMD Exemption: -**
- a) This tender is free of cost.
- b) If registered under “Micro & Small Enterprises” (MSEs), supporting documents need to be submitted to avail exemption from Earnest Money, subject to verification of certificate.
- c) For MSME, price benefit shall be given as per the guideline, at the discretion of NATRAX.
8. The Bidders are expected to carefully examine all the contents of the Tender documents including instructions, conditions, terms, specifications, drawings (if any), shall inspect the Site with prior notice to NATRAX and at Bidders own cost, acquaint himself with all local conditions, means of access to the work, nature of the work and all matters pertaining thereto & take them fully into account before submitting their offer. Failure to comply with the requirements as detailed in these documents shall be at the Bidder’s own risk. Bids which are not responsive to the requirements of the Tender will be rejected.
9. While all efforts have been made to avoid errors in drafting of the Tender documents, the Bidder is advised to check the same carefully. No claim on account of any errors detected in the Tender documents shall be entertained.
10. The Bidder shall carry out all the work strictly in accordance with Specification, Standard Practices and instructions of NATRAX or NATRAX’s representative and deviation on any account will not be permitted. If in the opinion of NATRAX, changes have to be made in the design and it desires the Bidder to carry out the same. The decision of NATRAX in such cases shall be final and shall not be open to arbitration.
11. The successful Bidder is bound to carry out associated work necessary for the completion of the job even though such items are not included in the quantities and drawings to achieve end results and deemed to be priced in the other items. No claim on this account shall be entertained.
12. The successful Bidder should make his own arrangement to obtain all materials required for the work.
13. Addendum / Corrigendum (if required) to the Tender may be issued prior to the date of opening of the Bid to clarify or to intimate any changes/modifications etc. All such addendum / corrigendum shall be treated as an integral part of the Tender.
14. Any effort by a Bidder to influence NATRAX or any of its functionaries in the process of examination, clarification, evaluation and comparison of tenders and in decisions concerning award of contract, may result in rejection of the Bid.
15. In order to afford prospective bidders, reasonable time for preparing their Quotes after taking into account such amendments, NATRAX may, at its discretion, extend the deadline





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for submission of bids.

16. Information relating to the examination, clarification, evaluation and comparison of bids and recommendations concerning the award of Contract shall not be disclosed to Bidders or other persons not officially concerned with such process.

17. NATRAX reserves the right to accept / reject or modify any bids, and to annul the Tender process and reject all quotations, at any time prior to award of Contract, or to divide the Contract between/amongst Bidders without thereby incurring any liability to the affected Bidder or Bidders or any obligations to inform the affected Bidder or Bidders of the grounds for NATRAX's action. Any bidder not following ITB stands rejected.

18. Bid Opening Details:

- a) The Bids will be opened at NATRAX HUB office at the date and time mentioned in Tender / corrigendum in the presence of Bidders or their duly authorized representatives, who choose to remain present at the time of opening the Bids.
- b) A letter of authorization shall be submitted to NATRAX, by the Bidder's representative before the opening of Bids.
- c) Absence of bidders or their duly authorized representatives shall not impair the legality of the bid opening process.
- d) All bidders or their duly authorized representatives shall be required to sign the main bid envelopes by way of confirmation of sealed bid status at the time of opening of bids. After identification signing, the Procurement Committee representative shall open the bid envelope.
- e) This will not give any right to the bidder to claim that he is successful in the bidding process.
- f) Bid envelopes shall be required to sign by all the authorized representatives and the same will be kept under the custody of NATRAX.
- g) Refusal to sign on any of the bid envelopes by any of the bidder or his duly authorized representative may disqualify him from the process at the discretion of members of the Tender opening Committee present at the time of opening of the Bids.

19. The rate should be quoted both in words and figures on our prescribed format duly signed & stamped by the bidder, incase any discrepancy, word will be preferred. All statutory deductions shall be applicable while releasing payments. All corrections and overwriting should be initialed by the Bidder.

20. TECHNICAL BID EVALUATION

- a) **NATRAX** shall follow the **Segregated bid evaluation** system (No bearing of technical score in the financial bid evaluation and L-1 in the financial bid shall be deemed as successful bidder) to determine the successful bidder. (Bidders may also refer the SCC)





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- b) The bidder should qualify the all three MEC.
- c) The Bidder is requested to specify what particular value he is offering for each particular requirement, rather than just stating he is fulfilling the Minimum Requirement. Unless specifically required ("Specify yes/no"), cells filled with terms like "compliant" or "yes" will not be evaluated. Even when a "Specify yes/no" answer is required a small sentence explaining the requirement is required.
- d) During the technical bid evaluation process, NATIS may ask clarifications to the bidder through E-mail/ Fax, for confirming and consolidating their technical offers.
- e) All such clarifications are required to be answered by the bidder by E-mail/Fax, within the time specified by NATRAX.
- f) Only the technically qualified bidders shall be intimated for financial bid opening in writing.

21. FINANCIAL BID EVALUATION

- a) For the evaluation of the Financial Bids, the eventual Bid prices shall be ascertained after considering all the terms and conditions associated with the Bid price specified in the Financial Bid document and after detailed scrutiny of the financial bid.
- b) No Bidder shall be allowed to propose/carry out any revision / correction / modification in his Price Bid offer.
- c) If there is a discrepancy between the sub total/s and the total price that is obtained by multiplying the unit price and quantity/adding the sub total/s, the sub total/s shall prevail and the total price shall be corrected, unless in the opinion of the Employer that there is an obvious misplacement of the decimal point in the sub total price, in which case the total price as quoted shall govern and the sub total/s shall be corrected;
- d) If there is an error in a total, corresponding to the addition or subtraction of sub totals, the subtotals shall prevail and the total shall be corrected; and
- e) The bidder needs to fill the rates against each item in word as well as in figures as mentioned in BOQ (Financial bid). In case of any discrepancy, the rate provided in word shall prevail and correct the amount against the item. All the prices should be inclusive of all taxes and GST.
- f) The amount stated in the Letter to Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and, shall be considered as binding upon the bidder. If the bidder does not accept the corrected amount of bid, the bid will be rejected.
- g) Contract negotiations, if any, will be held before the issuance of Letter of Acceptance/ Notification of Award. The negotiation shall conclude with a revised offer letter from the successful bidder, affecting the discounts if any and accepted by NATRAX.

22. Award of Work:

- a) Prior to the expiry of the period of Bid validity prescribed, NATIS will issue to the Successful Bidder, the Work Order. The Successful Bidder shall return one copy of the Work Order to NATRAX duly acknowledged and signed by the authorized signatory, within two [2] days of receipt of the same by him.





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- b) NATRAX shall notify all the unsuccessful Bidders and discharge/ return their Earnest Money Deposit. No correspondence will be entertained by NATRAX from the unsuccessful Bidders.

23. Validity of bids:

The rate quoted should be valid for a **minimum period of 60 days** from the last date of Submission of Quotation. No claim for escalation of rate will be considered at any point of time.

24. Prospective bidders requiring any clarification of the Tender may write to tulika.banerjee@natrip.in.

25. The Bids / related correspondences shall be made in English language only.

26. Special Conditions:

a.	Scope of work	Execution of Wet Grip Surface for Wet Grip Meaurment, Indexing and Tyre Labelling as per ISO at Braking Track Facility at NATRAX site, Pithampur-Dhar (MP)
b.	Completion Schedule	45 (Forty-five) days from the date of issue of NTP
c.	Liquidated Damages	0.1% of the Contract Price per day to a maximum of 10% of the Contract Price.
d.	Payment & Mode	• In In dian National Rupees (INR) & through RTGS against submission of invoice on monthly basis with all supporting documents for actual works executed. • Payment shall be processed only after due certification by Engineer-in-Charge. • No Advance payments.
e.	Retention	5% (Five) of the Contract Price.
f.	Release of Retention Amount	On completion of warranty period.
g.	Warranty Period	6 (Six) months from the date of issue of work completion certificate.
h.	Project Facility / Place of Installation/delivery	NATRAX Site NH-52, Old Agra- Mumbai Highway, Near to Pithampur Flyover, Post Khandwa (Near Pithampur) Dhar District, Madhya Pradesh-454774
j.	Tender Document Fee	Free of Cost
k.	Bid Security/EMD	Rs 20,000/- be submitted as Bid Security/EMD along with the Technical bid in the form of A/C Payee Demand Draft/Fixed Deposit Receipt/Banker's Cheque or Bank Guarantee from any of the Commercial Banks favouring "National Automotive Test Tracks" & payable at





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		Pithampur. Bid Security/EMD should remain valid for a period of forty-five days beyond the final bid validity period. Bids received without EMD will be summarily rejected.
L.	Performance Security	5% (Five) of the Contract value should be submitted as Performance Security by the Successful Bidder on award of Contract. Performance Security may be furnished in the form of an A/C Payee Demand Draft, Fixed Deposit Receipt or Bank Guarantee from a Commercial Bank favouring "National Automotive Test Tracks" & payable at Pithampur and should remain valid for a period of Sixty days beyond the date of completion of all Contractual Obligations. Bid Security/EMD will be returned to the successful bidder on receipt of Performance Security.
m.	List of Mandatory Tests to be carried out	Calibration of BPN measuring equipments required from NABL Lab. Any other tests as per the discretion of Engineer-In-Charge.
n.	Approved brands for Materials	Batti (Pad) for Polishing – ISI marked brand or any equivalent brand approved by Engineer-In-Charge Glass Beads –ISI Brand or any equivalent brand approved by Engineer-in-Charge BPN equipment shall be calibrated and certificate to be submitted to NATRAX before start of work
K.	Detailed scope of Work	As per Annexure A

27. The bidder should give the following, duly signed and sealed, failing to which the bids will be summarily rejected:

a. DECLARATION
(To be executed on Bidder's letter head)

I/We having acquainted with the content & requirement of this Tender, do hereby accept to furnish the same in compliance with all terms & conditions. I/we have not tampered/modified the tender in any manner and breach of any such, will result in rejection of Tender and / or prosecuted.

I / We hereby declare that the firm/company has not been blacklisted or debarred in the past by any other Government organization from taking part in Government tenders.

In case the above information found false or in case of breach of any of terms and conditions at any stage of Tender or Contract, I/We are fully aware that the Tender/ Contract will be rejected / cancelled by NATRAX and Payments (for completed/partially completed), Retention, Bid Security (EMD), Performance Security, etc., shall be forfeited.

Signature of the Bidder:





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Name and Designation:

Address:

Contact details:

Place:

Date:

Seal of the Bidder's Firm

- b. The completed tender documents.





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Form for the submission of Financial Bid

Financial Proposal Submission Form

(To be Executed on Letterhead of the Bidder)

FINANCIAL PROPOSAL SUBMISSION FORM

[Location, Date]

To:
The Procurement Officer
NH-52, Old Agra- Mumbai Highway,
Near to Pithampur Flyover,
Post Khandwa (Near Pithampur)
Dhar District, Madhya Pradesh-454774

Dear Sir,

We, the undersigned, offer to provide the equipment & services in accordance with your Tender No. _____, dated _____ and our Technical Bid. Our attached Financial Bid includes the price in the format for financial bid provide as part of tender documents. The total price of our offer is _____ (in figures and words) and includes all the deliverables under this tender as per our Technical Bid.

We hereby declare that all the information and statements made in this Bid is true and complete in all respects and is as per the guidelines and terms & conditions laid down in the tender document. We further understand that any information which is found false or is not as per the guidelines and terms & conditions of the tender document may lead to our disqualification.

Our Financial Bid shall be binding upon us subject to the modifications resulting from Contract negotiations, up to expiration of the validity period of the Bid.

We understand NATRAX has right to accept or reject our Bid as per its discretion.

Yours sincerely,

Authorized Signature [In full]: _____

Authorized Signature [In initials]: _____

Name and Title of Signatory: _____

Name of Firm: _____

Address: _____

[Note : To be signed in blue ink]



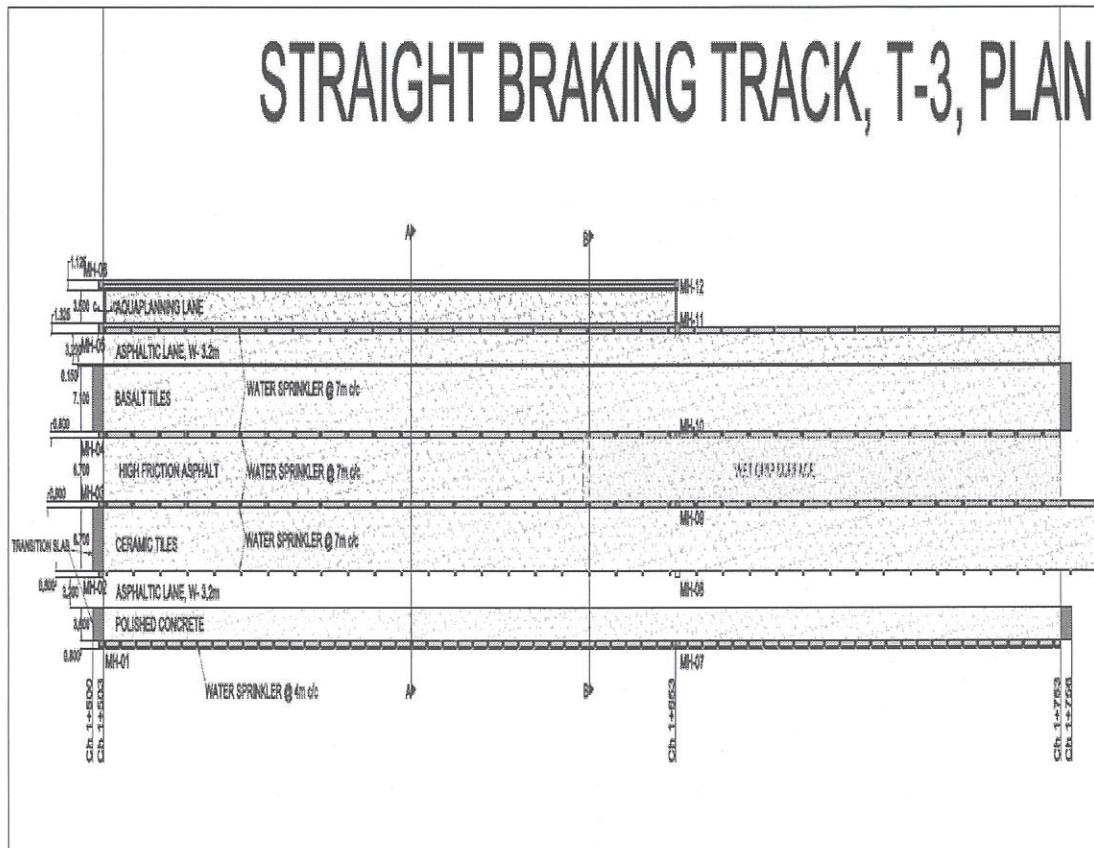


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Bill of Quantity for Execution of Wet Grip Surface for Wet Grip Measurement, Indexing and Tyre Labelling as per ISO at Braking Track Facility AT NATRAX SITE PITHAMPUR, DISTT. DHAR (M.P)							
Sr. No	Ref.	Item Specification	Unit	Qty	Rate in Rs	Amount in Rs	Remark
1		Wet Grip Surface- Polishing of High Friction Asphalt (HFA) Surface in Grids of 3.75mX 5.0m as per ECE R-117 standard this is including rubbing with scrubber batti, initial polishing with diamond batti and final polishing with Granite batti to match the BPN of surface between 48-55 No. when measured with BPN measuring equipments, polishing shall be homogeneous and uniform along and the length and width. this operation includes cost of Machine, Batti of different Nos., labour, fuel, cleaning polishing etc. complete as per direction of Engineer-In-Charge & Technical Specification of quotation and without damaging the HFA surface (if damaged the cost of re-laying will be borne by contractor).	Sqm	900			
2	MR	Measurement of BPN by Measuring equipments as per ASTM E 303-93 (Reapproved in 2008) & ASTM E 501-08 or any other latest standard applicable and the reading shall be between 48-55 when measured, BPN measurement shall be taken after each and every polishing operation as specified in the technical specification and Data shall be filled in the format as per direction of Engineer-In-Charge etc. complete.	Sqm	900			
3		Measurement of Texture depth (TDM) to ascertain the criteria set forth for the Wet grip surface with glass beads of 60-80-micron as per ASTM in each and every grid and no. of reading may vary in each grid and its value shall be within 0.70 +/- 0.30 mm and record in the prescribed format as per direction of Engineer-In-Charge	Sqm	900			
4		Cleaning and washing of surface after polishing, BPN and TDM process completion and soaked the surface with smooth cloth this operation includes cleaning of drain and covering of adjacent surface of Braking Track etc. all complete. Contractor to take all safety and precautionary measures during the polishing operation as per direction of Engineer-In-charge.	Sqm	900			
		Total Amount Rs.					
		Grand total Amounts in Rs					



Layout Plan of Wet Surface





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Checklist Tender No. NATRAX/C&I/TT/Misc/20/95/R

S.No	Particulars	Document Attached
1	Have you submitted bids in 2 parts in sealed envelopes with the necessary headings? Have you submitted both the envelopes together in a sealed outer envelope?	Yes ☐ No ☐
2	Have you enclosed the EMD for Rs 20,000/- in the technical Bid?	Yes ☐ No ☐
3	Have you submitted the details of your technical soundness	Yes ☐ No ☐
4	Legal Valid Entity: Have the documents mentioned in the NIQ have been submitted?	Yes ☐ No ☐
5	Is your firm a legal entity for the last 3 years. If yes, please provide Certificate of Incorporation,	Yes ☐ No ☐
6	ITR Returns for last three Assessment years including Audited Balance sheet (2017-18, 2018-19 & 2019-20) should be provided.	Yes ☐ No ☐
7	It should have the average turnover of Rs. 15 Lac, in the last 3 financial years (2017-18, 2018-19 & 2019-20), please provide details	Yes ☐ No ☐
8	Details of Technical Capabilities (similar experience) in last 3 years with reference of clients (Name & Contact numbers) should be attached.	Yes ☐ No ☐
9	If registered under "Micro, Small & Medium Enterprises" (MSME), supporting documents need to be submitted to avail exemption from Bid Security / Earnest Money.	Yes ☐ No ☐





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10	Have your technical bid been prepared for packing as per Tender?	Yes ☐ No ☐
11	Duly Stamped and signed on all pages of the Tender/Quotation documents, as issued by NATRAX (in Original)	Yes ☐ No ☐
12	Have your financial Bid proposal is duly filled, sealed and signed on all pages?	Yes ☐ No ☐
13	Have you filled your quotes against all items?	Yes ☐ No ☐
14	Have you verified the calculation of prices ?	Yes ☐ No ☐
15	Have your financial bid been properly packed as per Tender?	Yes ☐ No ☐
16	Total no of pages submitted by the bidder as a part of the bid	Total no. of pages: _____ pgs



Annexure-A**TECHNICAL SPECIFICATION & CONSTRUCTION METHODOLOGY****For****POLISHING OF HIGH FRICION ASPHALT FOR WET GRIP SURFACE****Introduction**

All tyres should have to carry a label displaying information about two performance criteria such as rolling resistance and wet grip. The rolling resistance of tyres determines their fuel efficiency grading and the wet grip of tyres determines their braking safety grading. Measurement of rolling resistance and wet grip must be reproducible; tests on the same tyres in different Test Track/laboratories must produce the same results in order to ensure a fair comparison between tyres from different suppliers. In addition, a good reproducibility of testing results prevents market surveillance authorities from obtaining different results from those of the suppliers when testing the same tyres

WET GRIP SURFACE

This course consists of 125 m X 7.0 m on back side of Polished High Friction Asphalt (HFA) Surface at Braking Track from Ch. 1+678 to Ch. 1+853.

Detail of POLISHED Wet Grip Track: (T3 Str. Braking Track Back side of HFA)

Length: 125 m

Width : 7.0 m

Composition: (T3 Str. Braking Track)

CUT PORTION (As per Doc.)

1. Drainage Layer: 300 mm thk
2. GSB: 300 mm thk
3. Wet Mix Macadam- 250mm
4. DBM- 100mm Thk.
5. SDBC- 60mm Thk.
6. BC (HFA)- 40mm Thk.

Sequence of Construction:

Step 1: Polishing operation of Bituminous top surface with different Grinding/Polishing Batti from diamond to granite.

Step 2: Checking of top surface Coefficient of Adhesion (k). Also, we can check same using British Pendulum Number method and do polishing up to desired values (if required).



Materials:

The High Friction asphalt surface is already executed and completed at Braking Track. As the name suggests the surface is a Special bituminous concrete surface with friction coefficient more than 0.90 and BPN value between 68-75 and after polishing the BPN shall be within range of 42-60 wet grip surface.

Wearing Course. High Friction Asphalt Surface – This layer includes BDM and SDBC in its lower part to guarantee the base course to flexion and BC layer of special characteristics at Top.

Inspection during construction :

During construction, daily regular inspection should be carried out by the client, with indications of the Engineer in Charge based on the standard local regulations for roads and highways construction.

Composition and Sequence of Operation:

- a. High Friction Asphalt Layer of 125m length divided in Grid of 3.5Mx 10M with chaulking or Paints on the RCC kerb along the surface.
- b. Mark Centre point of each grid and take the Texture depth measurements (TDM) with glass beads of 60-80-micron as per ASTM and it shall be within 0.70 +/- 0.30 mm and record in the prescribed format.
- c. Take the BPN of each center point of grid and at least 10-12 times, so that it will be consistent after some time and note the reading in the format prescribed, if the reading is more than 60 BPN, then next operation of polishing shall be finalized. The method of polishing of surface and measurement of BPN during the polishing are as follows;

A. Polishing Methods to measure the wetted frictional properties of the surface;

British Pendulum Number (BPN) measurement method and temperature correction

The British Pendulum Number method shall be as defined in ASTM E 303-93 (Reapproved in 2008) Pad rubber component formulation and physical properties shall be as specified in ASTM E 501-08.

The averaged British Pendulum Number (BPN) shall be between 42 and 60 BPN after temperature correction as follows.

BPN shall be corrected by the wetted road surface temperature. Unless temperature correction recommendations are indicated by the British pendulum manufacturer, the following formula is used:

$$BPN = BPN \text{ (measured value)} + \text{temperature correction}$$

$$\text{temperature correction} = -0.0018 t^2 + 0.34 t - 6.1$$

where t is the wetted road surface temperature in degrees Celsius.

Effects of slider pad wear: the pad shall be removed for maximum wear when the wear on the striking edge of the slider reaches 3.2 mm in the plane of the slider or 1.6 mm vertical to it in accordance with section



5.2.2. and Figure 3 of ASTM E 303-93 (Reapproved 2008).

For the purpose of checking track surface BPN consistency for the measurement of wet grip on an instrumented passenger car: the BPN values of the test track should not vary over the entire stopping distance so as to decrease the dispersion of test results. The wetted frictional properties of the surface shall be measured five times at each point of the BPN measurement every 10 meters and the coefficient of variation of the averaged BPN shall not exceed 10 per cent.

Polishing Operation if the BPN criteria is not fulfilled:

Bituminous concrete, surface has been cleaned with water and all dust has been removed and left for 24 Hours. The surface is polished with a suitable rotary polishing machine (Mosaic/Granite Polishing Machine) with different size Pad to produce the desired BPN. Depending on the aggregates used, this operation may need abrasive pads or only buffing pads.

Construction methodology used to provide the wearing course with the right smoothness is compliant to the techniques used for finishing industrial pavements:

1. Bituminous surface shall be cleaned by broomer and watering before start of operation and aggregate if any shall be removed.
2. Bituminous surface shall be watered and grinded using Mosaic/Granite polishing machine with wheels and varying grit sizes in successions as: first with Rough Batti
3. If the roughness of surface has been removed than Diamond Batti shall be used to reduce the BPN.
4. Granite Batti No. 01 & 02 shall be used to further reduce the BPN without damaging the surface with watering on the surface.
5. After granite batti, final polishing with smooth batti shall be used with watering arrangement.
6. During Each grinding operation, BPN of surface shall be checked and recorded against each grinding batti
7. Only one Grid shall select for grinding operation and finishing shall be homogenous all-around grid. The exact time for which grinding would be done with a specific grit size will be decided on preliminary trials. After each succession, top surface will be checked for wearing course adhesion.
8. If required final polishing would be done using buffing pads.
9. After completion of Polishing and measurement of BPN at final surface. Texture depth measurements (TDM) shall be checked to ascertain the criteria set forth for the Wet grip surface with glass beads of 60-80-micron as per ASTM and it shall be within 0.70 +/- 0.30 mm and record in the prescribed format.
10. Polishing shall always be done in grids as stated above and after completion of one grid other shall be taken over.
11. After polishing surface shall be washed and cleaned with broomer/sweeper arrangements.

B. Acceptance criteria of the wearing course adherence by Standard Tyre Method:

The BPN is to be checked in wet conditions after application of temperature correction factor. And it should around 42-62 when measured using an calibrated BPN measurement machine as per method sated above following methods may also be used;



ASTM E 1136 Standard Reference Test Tyre method (b)

By derogation with paragraph 2.4., this method uses the reference tyre that has the characteristics indicated in the ASTM E 1136-93 (Reapproved 2003) and referred to as SRTT14. The average peak braking force coefficient (μ peak ave) of the SRTT14 shall be 0.7 ± 0.1 at 65 km/h. The average peak braking force coefficient (μ peak, ave) of the SRTT14 shall be corrected for the wetted road surface temperature as follows:

Peak braking force coefficient (μ peak, ave) = peak braking force coefficient (measured) + temperature correction

Temperature correction = $0.0035 \times (t - 20)$

Where t is the wetted road surface temperature in degrees Celsius.

Atmospheric conditions

The wind conditions shall not interfere with wetting of the surface (windshields are allowed). Both the wetted surface temperature and the ambient temperature shall be between 2 °C and 20 °C for snow tyres and 5 °C and 35 °C for normal tyres. The wetted surface temperature shall not vary during the test by more than 10 °C. The ambient temperature must remain close to the wetted surface temperature; the difference between the ambient and the wetted surface temperatures must be less than 10 °C.

4. Testing methods for measuring wet grip

For the calculation of the wet grip index (G) of a candidate tyre, the wet grip braking performance of the candidate tyre is compared to the wet grip braking performance of the reference tyre on a vehicle travelling straight ahead on a wet, paved surface. It is measured with one of the following methods:

- (a) Vehicle method consisting of testing a set of tyres mounted on an instrumented passenger car;
- (b) Testing method using a trailer towed by a vehicle or a tyre test vehicle, equipped with the test tyre(s).

Testing method (a) using an instrumented passenger car**Principle**

The testing method covers a procedure for measuring the deceleration performance of C1 tyres during braking, using an instrumented passenger car equipped with an Antilock Braking System (ABS), where "instrumented passenger car" means a passenger car that is fitted with the measuring equipment, for the purpose of this testing method. Starting with a defined initial speed, the brakes are applied hard enough on four wheels at the same time to activate the ABS. The average deceleration is calculated between two pre-defined speeds.

Equipment**Vehicle**

Permitted modifications on the passenger car are as follows:

- (a) Those allowing the number of tyre sizes that can be mounted on the vehicle to be increased;
- (b) Those permitting automatic activation of the braking device to be installed;



(c) Any other modification of the braking system is prohibited.

Measuring equipment

The vehicle shall be fitted with a sensor suitable for measuring speed on a wet surface and distance covered between two speeds. To measure vehicle speed, a fifth wheel or non-contact speed-measuring system shall be used.

Conditioning of the test track and wetting condition

The test track surface shall be watered at least half an hour prior to testing in order to equalize the surface temperature and water temperature. External watering should be supplied continuously throughout testing. For the whole testing area, the water depth shall be 1.0 ± 0.5 mm, measured from the peak of the pavement. The test track should then be conditioned by conducting at least ten test runs with tyres not involved in the test programme at 90 km/h.

Tyres and rims

Tyre preparation and break-in The test tyres shall be trimmed to remove all protuberances on the tread surface caused by mould air vents or flashes at mould junctions. The test tyres shall be mounted on the test rim declared by the tyre manufacturer. A proper bead seat should be achieved by the use of a suitable lubricant. Excessive use of lubricant should be avoided to prevent slipping of the tyre on the wheel rim. The test tyres/rim assemblies shall be stored in a location for a minimum of two hours such that they all have the same ambient temperature prior to testing. They should be shielded from the sun to avoid excessive heating by solar radiation.

For tyre break-in, two braking runs shall be performed.

Tyre load

The static load on each axle tyre shall lie between 60 per cent and 90 per cent of the tested tyre load capacity. Tyre loads on the same axle should not differ by more than 10 per cent.

Tyre inflation pressure-On the front and rear axles, the inflation pressures shall be 220 kPa (for standard- and extra-load tyres). The tyre pressure should be checked just prior to testing at ambient temperature and adjusted if required.

1. After completion of Tyre adherence method at final surface. Texture depth measurements (TDM) shall be checked to ascertain the criteria set forth for the Wet grip surface with glass beads of 60-80-micron as per ASTM and it shall be within 0.70 ± 0.30 mm and record in the prescribed format.
2. Polishing shall always be done in grids as stated above and after completion of one grid other shall be taken over.
3. After polishing surface shall be washed and cleaned with broomer/sweeper arrangements.

Inspection and acceptance criteria of the surface level:

Level of all the layers will be checked in the grid of W/4x5.0m (where W is total width of surface)- in order to check two longitudinal axes. Levels obtained to be compared with the theoretical levels. Equipment required for this activity is standard topographical high precision equipment. (Validated with a calibration certificate).





Tender No. - NATRAX/C&I/TT/Misc/20/95/R

Acceptance criteria are the maximum distance in absolute level between the theoretical and the real surface:	ACCEPTANCE CRITERIA
Wearing course –	1-2 mm

Inspection and acceptance criteria of the layer's regularity

Regularity of the surface layers will be measured by means of the travelling beam of 3.0 m in longitudinal and transverse direction making a grid of maximum 1 m x 1 m.

This travelling beam is an adaptation of the standard "Irregularity measurement of pavement courses: the straightedge test" according to the EN 13036-7:2003.

Maximum tolerances of acceptance for the regularity are as follows: LAYER	ACCEPTANCE CRITERIA
Wearing course –	+/- 2 mm

Applicable Codes and Standards

1. ASTM E 303-93 (Reapproved in 2008)
2. ASTM E 501-08
3. ECE R-117
4. EN 13036-7:2003
5. ASTM E 965-15 (2019)
6. Relevant/modified IS/ASTM codes and best Engineering Practice shall be adopted during execution of works.

