Standard Bidding Document

Tender No. 211-S-1535-TSO
(Goods)

National

Single Stage-Two Envelope

November 12, 2026

TSO (TSO),TSO
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REQUEST FOR BIDS

PROCUREMENT OF GOODS

1. The **TSO (TSO)** has reserved Funds for the procurement planned for FY **2026-27**. The **TSO (TSO)** intends to apply part of the proceeds of this Fund to cover eligible payments under the contract for the "**Tender No. 211-S-1535-TSO**" with the reference of **"P196872"**

2. The **TSO (TSO)** invites sealed Bids from eligible Bidders for procurement of goods described in the bidding documents on **EPADS v2.0**.

3. **Single Stage-Two Envelope** will be used by adopting **Least Cost Based Selection (LCBS)** Technique for the subject procurement, in line with the Public Procurement Rules, 2026 and any Regulations, Regulatory Guides, Procurement Guidelines or Instructions issued by the Authority from time to time.

4. All Bids must be accompanied by a Bid Security amount described in Bid Security Section in Bidding Document in the form of **Pay Order, Banker's Cheque, Call at Deposit, Demand Draft** or all bids must be accompanied by bid securing declaration in the format specified in the Bidding documents

5. E-Bidding documents, containing detailed terms & conditions, specifications and requirements etc. are available on **e-Pak Acquisition and Disposal System (EPADS)** at **https://epads.gov.pk/opportunities/federal/procurements/196872** for all the interested bidders registered on **EPADS v2.0**. Bidders are required to get themselves registered on **EPADS v2.0** to participate in Bidding process.

6. The e-bids, prepared in accordance with the instructions in the e-Bidding Documents, must be submitted through **EPADS v2.0** on or before **Tuesday, November 24, 2026 10:30 AM**. E-bids will be opened using **EPADS v2.0** on the same day at **Tuesday, November 24, 2026 11:00 AM**. Manual submission of Bids shall not be entertained. Those vendors who have not yet registered on the new version of **EPADS v2.0,** may register themselves on **https://vendors.epads.gov.pk/**. A tutorial to explain the registration process is available at **https://www.youtube.com/watch?v=MNW6T38v7tc**

In terms of Rule 65 of Public Procurement Rules, 2026 Grievance Redressal Committee (GRC) is notified for the subject procurement and notification copy is available on the procuring agency's website and on Authority's website at (**www.ppra.gov.pk**).

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Instructions to Bidders

A. Introduction

1.Scope of Bids

1.1 The Procuring Agency (PA), as indicated in the **Bids Data Sheet (BDS)** invites Bids **through EPADS v2.0** for the provision of Goods as specified in the BDS and **in Section V – Evaluation Criteria, Specifications & Schedule of Requirements**. The name, identification, and number of items/deliverables are provided in the **BDS**. The successful Bidders will be expected to provide the goods within the specified period and timeline(s) as stated in the **BDS**.

2. Source of Funds

2.1 Source of funds is referred in Clause-2 I of Invitation for Bids.

3. Eligible Bidders

3.1 A Bidder may be natural person, company or firm or public or semi-public agency of Pakistan or any foreign country**,** or any combination of them with a formal existing agreement (on Judicial Papers) in the form of a joint venture, consortium, or association. In the case of a joint venture, consortium, or association, all members shall be jointly and severally liable for the execution of the Contract in accordance with the terms and conditions of the Contract. The joint venture, consortium, or association shall nominate a Lead Member as nominated in the BDS, who shall have the authority to conduct all business for and on behalf of any and all the members of the joint venture, consortium, or association during the Bidding process, and in case of award of contract, during the execution of the contract.

Verifiable copy of the agreement that forms a joint venture, consortium or association shall be required to be submitted as part of the Bid.

The appointment of Lead Member in the joint venture, consortium, or association shall be confirmed by submission of a valid Power of Attorney to the Procuring Agency.

Any bid submitted by the joint venture, consortium or association shall indicate the part of proposed contract to be performed by each party and each party shall be evaluated (or post qualified if required) with respect to its contribution only, and the responsibilities of each party shall not be substantially altered without prior written approval of the Procuring Agency and in line with any

instructions issued by the Authority.

(The limit on the number of members of JV or Consortium or Association may be prescribed in BDS, in accordance with the guidelines issued by the PPRA).

3.2 The invitation for Bids is open to all prospective suppliers, manufacturers, or authorized agents / dealers subject to any provisions of incorporation or licensing by the respective national incorporating agency or statutory body established for that particular trade or business. Procuring agencies shall specify the registration/licensing requirements for the foreign bidders keeping in view the requirement of that business.

3.3 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest with one or more parties in this Bidding process, if they:

1. are associated or have been associated in the past, directly or indirectly with a firm or any of its affiliates which have been engaged by the Procuring Agency to provide consulting services for the preparation of the design, specifications and other documents to be used for the procurement of the Goods to be purchased under this Invitation for Bids.

2. have controlling shareholders in common; or

3. receive or have received any direct or indirect subsidy from any of them; or

4. have the same legal representative for purposes of this Bid; or

5. have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Bids of another Bidder, or influence the decisions of the Procuring Agency regarding this Bidding process; or

6. Submit more than one Bid in this Bidding process.

3.4 A Bidder may be ineligible if –

1. he is declared bankrupt or, in the case of company or firm, insolvent;

2. payments in favor of the Bidder is suspended in accordance with the judgment of a court of law other than a judgment declaring bankruptcy and resulting (in accordance with the national laws) in the total or partial loss of the right to administer and dispose of its property;

3. the Bidder is convicted, by a final judgment, of any offence involving professional conduct;

4. the Bidder is blacklisted locally or by international organizations and hence debarred due to involvement in corrupt and fraudulent practices, or submission of false or misleading information or performance failure or involved in disrupting procurement process or due to breach of bid Securing Declaration.

3.5 As and when required, bidders shall provide to the Procuring Agency evidence of their eligibility, proof of compliance with the necessary legal requirements to carry out the contract effectively.

3.6 Bidders shall submit Bids relating to the nature, conditions and modalities of sub-contracting wherever the sub-contracting of any elements of the contract amounting to more than ten (10) percent of the Bid price is envisaged.

4. Eligible Goods and Related Services

4.1 All goods and related services to be supplied under the contract shall have their origin in eligible source countries, and all expenditures made under the contract will be limited to such goods and services. For purpose of this Bid, ineligible countries are the countries declared ineligible by the Federal Government.

5. One Bid per Bidder

5.1 A bidder shall submit only one Bid, in the same bidding process, either individually as a Bidder or as a member in a joint venture or any similar arrangement.

5.2 **The Bidder shall not engage a subcontractor for any portion of the contract if the value of such subcontracting exceeds thirty percent (30%) of the total contract amount.**

6. Cost of Bidding

6.1 Any cost incurred by the bidder relating to the preparation and submission of its Bid shall be borne by the bidder, and the Procuring Agency shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

B. Bidding Documents

7. Contents of Bidding Document

7.1 The Goods required, Bidding procedures, and terms and conditions of the contract are prescribed in the Bidding Documents. In addition to the Invitation for Bids, the Bidding documents which should be read in conjunction with any addenda issued in accordance with **ITB 10.1** include:

Section I -Invitation to Bids

Section II Instructions to Bidders (ITB)

Section III Bid Data Sheet (BDS)

Section IV Evaluation Criteria, Specifications, Schedule of Requirements

Section V Bid Forms

Section VI General Conditions of Contract (GCC)

Section VII Special Conditions of Contract (SCC)

Section VIII Contract Forms

Section IX Integrity Pact

Section X Declaration of Beneficial Ownership Information.

7.2 The Bidder is expected to examine all instructions, forms, terms and specifications in the Bidding documents. Failure to furnish all the information required in the Bidding documents through EPADS v2.0 will be at the Bidder’s risk and may result in the rejection of its Bids.

8. Clarification of Bidding documents

8.1 A prospective Bidder requiring any clarification of the Bidding documents may notify the Procuring Agency through EPADS v2.0**.**

8.2 The Procuring Agency will within two (02) working days after receiving the request for clarification, respond to any request for clarification through EPADS v2.0 provided that such request is received not later than three (03) days, prior to the deadline for the submission of Bids as prescribed in **ITB 22**

8.3 The Procuring Agency's response will be forwarded to all identified Prospective Bidders through EPADS v2.0, including a description of the inquiry,

but without identifying its source.

8.4 Should the Procuring Agency deem it necessary to amend the Bidding document as a result of a clarification, it shall do so following the procedure under **ITB 9.**

8.5 If indicated **in the BDS**, the Bidder's designated representative is invited at the Bidder's cost to attend a pre-Bid meeting at the place, date and time mentioned **in the BDS**. During this pre-Bid meeting, prospective Bidders may request clarification of the schedule of requirement, the Evaluation Criteria or any other aspects of the Bidding document.

8.6 Minutes of the pre-Bid meeting, if applicable, including the text of the questions asked by Bidders, including those during the meeting (without identifying the source) and the responses given, together with any responses prepared after the meeting will be uploaded on EPADS v2.0. Any modification to the Bidding documents that may become necessary as a result of the pre-Bid meeting shall be made by the Procuring Agency exclusively through the use of an Addendum pursuant to ITB 9. Non-attendance at the pre-Bid meeting will not be a cause for disqualification of a Bidder.

9. Amendment of Bidding documents

9.1 Before the deadline for submission of Bids, the Procuring Agency for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder or Pre-Bid meeting may modify the Bidding documents by issuing addenda through EPADS v2.0.

9.2 The Procuring Agency shall promptly publish the addendum through EPADS v2.0.

Any addendum issued including the notice of any extension of the deadline shall also be communicated through EPADS v2.0 to all the bidders who have already submitted their bids. Such bidders shall have the right to withdraw their already submitted bid and re-submit the revised bid prior to the original or extended bid submission deadline.

9.3 To give prospective Bidders reasonable time in which to take an addendum/corrigendum into account in preparing their Bids, the Procuring Agency may, at its discretion, extend the deadline for the submission of Bids through EPADS v2.0:

Provided that the Procuring Agency shall extend the deadline for submission of Bids, if such an addendum is issued within last three (03) days of the Bids submission deadline.

C. Preparation of Bids

10. Language of Bid

10.1 The Bid prepared by the bidder, as well as all correspondence and documents relating to the Bids exchanged by the Bidder and the Procuring Agency shall be written in the English language unless otherwise specified in the BDS**.** Supporting documents and printed literature furnished by the Bidder may be in another language provided they are accompanied by an accurate translation of the relevant pages in the English language unless otherwise specified in the **BDS**, in which case, for purposes of interpretation of the Bidder, the translation shall govern.

11. Documents and samples Constituting the Bid

11.1 The Bid prepared by the Bidder shall constitute the documents required in the **BDS**.

Details of sample(s) where applicable and requested in the BDS.

Documentary evidence established in accordance with ITB 13 that the Bidder is eligible and/or qualified for the subject bidding process;

Documentary evidence established in accordance with **ITB 03** that the Bidder has been authorized by the manufacturer to deliver the goods into Pakistan, where required and where the supplier is not the manufacturer of those goods;

Documentary evidence established in accordance with ITB 12 that the goods and related services to be supplied by the Bidder are eligible goods and services, and conform to the Bidding Documents;

Bid security or Bid Securing Declaration furnished in accordance with **ITB ---.**

12. Documents Establishing Eligibility of the Goods and Conformity to Bidding documents

12.1 To establish the conformity of the bidder to the Bidding document, the Bidder shall furnish as part of its Bids the documentary evidence that Goods

provided conform to the technical specifications and standards.

13. Documents Establishing Eligibility and Qualification of the Bidder

13.1 Pursuant to **ITB 10,** the Bidder shall furnish, as part of its Bid, all those documents establishing the Bidder's eligibility to participate in the Bidding process and/or its qualification to perform the contract if its Bid is accepted.

14. Form of Bid

14.1 The Bidder shall fill the Form of Bid furnished in the Bidding document. The Bid Form must be completed without any alterations to its format and no substitute shall be accepted.

15. Bid Prices

15.1 The Bid Prices quoted by the Bidder in the Form of Bid and in the Price Schedules shall conform to the requirements specified below or exclusively mentioned hereafter in the Bidding documents.

15.2 **All items in the Schedule of Requirement must be listed and priced separately in the Price Schedule(s). If a Price Schedule shows items listed but not priced and neither explicitly denied, their prices shall be construed to be included in the prices of other items.**

15.3 In the event that any item(s) in the Price Schedule are not quoted, and such omission is determined by the Procuring Agency not to materially affect the responsiveness of the Bid, the Procuring Agency may, for the sole purpose of bid evaluation and comparison, assign a price to the unquoted item(s) in accordance with the following methodology:

(a) The assigned price shall be the average of the prices quoted for the same item(s) by all substantially responsive bidders; or

(b) In cases where no comparable quotations are available, the Procuring Agency shall apply the corresponding item price from its duly approved cost estimate for evaluation purposes.

The prices so assigned shall be utilized exclusively for bid evaluation and comparison, and shall not, under any circumstances, be incorporated into or form part of the Contract Price.

15.4 The Bid price to be quoted in the Form of Bid in accordance with **ITB 13.1** shall be the total price of the Bid.

15.5 The Bidder shall indicate on the appropriate Price Schedule, the unit prices (where applicable) and total Bid price of the Goods it proposes to provide under the contract.

15.6 Prices quoted by the Bidder shall be fixed during the Bidder's performance of the contract and not subject to variation on any account. A Bid submitted with an adjustable price will be treated as non-responsive and shall be rejected.

16. Bids Currencies

16.1 Prices shall be quoted in Pakistani Rupees unless otherwise specified in the BDS in accordance with Rule 42 (2) of the Public Procurement Rules, 2026.

17. Bids Validity Period

17.1 Such extensions may be more than one time but the total period of such extension shall not exceed the original bid validity period.

17.2 Bids shall remain valid for the period specified in the **BDS** after the Bid submission deadline prescribed by the Procuring Agency. A Bid valid for a shorter period shall be rejected by the Procuring Agency as non-responsive**.** The period of Bid validity will be determined from the complementary Bid securing instrument, i.e. the expiry period of Bid Security or Bids Securing Declaration as the case may be.

The procuring agency shall ordinarily be under an obligation to process and evaluate the bid and to issue letter of award within the stipulated bid validity period.

17.3 Under exceptional circumstances, prior to the expiration of the initial Bid validity period, the Procuring Agency may request the Bidders' consent to an extension of the period of validity of their Bids through EPADS v2.0,. The Bid Security provided under **ITB 17** shall also be suitably extended. A Bidder may refuse the request without forfeiting its Bid security or causing to be executed its Bid Securing Declaration. A Bidder agreeing to the request will not be required nor permitted to modify its Bid, but will be required to extend the validity of its Bid Security or Bid Securing Declaration for the period of the extension.

18. Bid Security or Bid Securing Declaration

18.1 The Bidder shall furnish as part of its Bid, a Bid Security in accordance with Rule 36 of the Public Procurement Rules, 2026.

18.2 The original Bid Security shall be enclosed within the sealed envelope and to be submitted physically before closing time for submission of bids. Whereas, scanned copy of bid security shall be uploaded electronically through EPADS v2.0 before closing hours for submission of bids.

18.3 The Bidder who failed to submit the original Bids security before the submission deadline shall be disqualified straightaway.

18.4 The Bid Security or Bid Securing Declaration is required to protect the Procuring Agency against the risk of Bidder’s conduct which would warrant the security’s forfeiture, pursuant to **ITB 18.7.**

18.5 The Bid Security shall be denominated in the local currency or in another freely convertible currency, and it shall be in the form specified in the BDS which shall be in any of the following:

a) a bank guarantee, a bank draft, an irrevocable letter of credit issued by a Scheduled bank in the form provided in the Bidding Documents or another form acceptable to the Procuring Agency;

b) a cashier’s or certified cheque; or

c) another security if indicated in the BDS.

The Bid Security shall be valid for twenty-eight (28) days beyond the end of the validity of the Bid. This shall also apply if the period for Bid Validity is extended. In either case, the form must include the complete name of the Bidder.

18.6 The Bid Security shall be payable promptly upon written demand by the Procuring Agency in case any of the conditions listed in **ITB 18.7** are invoked.

18.7 Unsuccessful Bidders' Bid Security will be discharged or returned as promptly as possible, however in no case later than thirty (30) days after the expiration of the period of Bid Validity prescribed by the procuring agency pursuant to **ITB 17.** The Procuring Agency shall make no claim to the amount of the Bid Security, and shall promptly return the Bid Security documents, after whichever of the following that occurs earliest:

a. the expiry of the Bid Security;

b. the entry into force of a procurement contract and the provision of a Performance Guarantee, for the performance of the contract if such a guarantee, is required by the Bid documents;

c. the rejection by the Procuring Agency of all Bids;

d. cancellation of procurement proceedings.

e. the withdrawal of the Bid prior to the deadline for the submission of Bids, unless the Bid document stipulates that no such withdrawal is permitted.

18.8 The successful Bidder's Bid Security will be discharged upon the Bidder signing the contract**,** or furnishing the Performance Guarantee.

18.9 The Bid Security may be forfeited or the Bid Securing Declaration executed:

a. if a Bidder:

b. withdraws its Bid during the period of Bid Validity as specified by the Procuring Agency, and referred by the Bidder on the Form of Bids except as provided for in **ITB 16.2**; or

c. does not accept the correction of errors**;** or

d. in the case of a successful Bidder, if the Bidder fails:

e. to sign the contract; or

f. to furnish Performance Guarantee**.**

19. Withdrawal, Substitution, and Modification of Bid

19.1 Before Bid submission deadline, any Bidder may withdraw, substitute, or modify its Bid after it has been submitted through EPADS v2.0.

20. Format and Signing of Bid

20.1 The Bidder shall prepare and submit Bids with due diligence after carefully reading all the terms and condition before bid submission deadline through EPADS v2.0.

D. Submission of Bids

21. Submission of Bids through EPADS v2.0 before bid submission deadline.

21.1 The Technical and Financial Bids, shall be submitted electronically through EPADS, before bid submission deadline. The bid submission option shall be automatically disabled once the deadline is over.

22. Deadline for Submission of Bids

22.1 Bids shall be received by the Procuring Agency through EPADS v2.0 before bid submission deadline.

22.2 The Procuring Agency may, under exceptional circumstances, extend the deadline for the submission of Bids, after recording reasons in writing and in an equal opportunity manner.

In such case, all rights and obligations of the Procuring Agency and the Bidders that were previously governed by the original deadline shall thereafter be subject to the revised deadline.

E. Opening and Evaluation of Bids

23. Opening of Bids

23.1 The respective Bid Evaluation Committee of the Procuring Agency shall open all Bids through the EPADS v2.0, on the date and time specified in the Bid Data Sheet (BDS).

23.2 The respective Bid Evaluation Committee **shall generate minutes through EPADS v2.0 containing brief details of bid opening process.** The record of the Bid opening shall include, as a minimum: the name of the Bidder, the Bid price if applicable, and the presence or absence of a Bid Security or Bid Securing Declaration.

23.3 The procuring agency shall live broadcast the opening of bids on national media or on their website or digital channels, if the volume of procurement exceeds five hundred million rupees in case of goods and services and one thousand million rupees in case of works.

23.4 In case the date of opening of bid has been declared as public holiday or the procuring agency fails to open bid due to any EPADS v2.0 related issues, the submission and opening of bids shall be shifted to the next working day at the same time.

23.5 In case of Single Stage One Envelope Procedure, the Bidders names, the Bid prices, the total amount of each Bid and, the presence or absence of Bid Security, Bid Securing Declaration and such other details as the Procuring Agency may consider appropriate, will be announced by the Bid respective Evaluation Committee.

23.6 No bid will be rejected at the time of bid openning except for bids whose original bid security has not been provided to the procuring agency before bid submission deadline.

24. Clarification of Bids

24.1 To assist in the examination, evaluation and comparison of Bids of the Bidders, the respective Bid Evaluation Committee may, ask any Bidder for a clarification of its Bid including breakdown of prices.

24.2 The request for clarification and the response shall be sought through EPADS v2.0 before **three days prior to the deadline for submission of bids.** No change in the prices or substance of the Bids shall be sought, offered, or permitted.

24.3 The alteration or modification in the bids which in any way affect the following parameters will be considered as a change in the substance of a Bid:

1. evaluation & qualification criteria;
2. required scope of work or specifications;
3. all securities requirements;
4. tax requirements;
5. terms and conditions of Bidding documents.
6. change in the ranking of the Bidder

24.4 From the time of bid(s) opening to the time of Contract award if any Bidder wishes to contact the Procuring Agency on any matter related to the Bids it should do so through **EPADS v2.0**.

25. Preliminary Examination of Bids

25.1 Prior to the detailed evaluation of Bids, the respective Bid Evaluation Committee will determine whether each Bid:

1. meets the eligibility criteria defined in **ITB 3**;

2. has been prepared as per the format and contents defined by the Procuring Agency in the Bidding documents;

3. is accompanied by the required securities; and

4. is substantially responsive to the requirements of the Bidding documents.

25.2 The respective Bid Evaluation Committee's determination of a Bid's responsiveness will be based on the contents of the Bid itself.

25.3 A substantially responsive Bid is one which conforms to all the terms, conditions, and specifications of the Bidding documents, without material deviation or reservation. A material deviation or reservation is one that: -

1. affects in any substantial way the scope, quality, or performance of the Goods;

2. limits in any substantial way, inconsistent with the Bidding documents, the Procuring Agency's rights or the Bidders obligations under the Contract; or

3. if rectified, would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.

25.4 If a Bid is not substantially responsive, it will be rejected by the respective Bid Evaluation Committee and may not subsequently be evaluated for complete technical responsiveness.

26. Examination of Terms and Conditions; Technical Evaluation

26.1 The respective Bid Evaluation Committee shall examine the Bids to confirm that all terms and conditions specified in the **GCC** and the **SCC** have been accepted by the Bidder without any material deviation or reservation.

26.2 The respective Bid Evaluation Committee shall evaluate the technical aspects of the Bids submitted, to confirm that all requirements specified in Schedule of Requirements and Technical Specifications of the Bidding documents have been met without material deviation or reservation.

26.3 If after the examination of the terms and conditions and the technical evaluation, the respective Bid Evaluation Committee determines that the Bid is not substantially responsive in accordance with **ITB,** it shall reject the Bid.

27. Correction of Errors

27.1 Bids determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows: -

1. if there is a discrepancy between unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail, and the total price shall be corrected, unless in the opinion of the respective Evaluation Committee there is an obvious misplacement of the decimal point in the unit price, in which the total price as quoted shall govern and the unit price shall be corrected;

2. if there is an error in a total corresponding to the addition or subtraction of sub-totals, the sub-totals shall prevail and the total shall be corrected; and

3. where there is a discrepancy between the amounts in figures and in words, the amount in words will govern.

4. Where there is discrepancy between grand total of price schedule and amount mentioned on the Form of Bid, the amount referred in Price Schedule shall be treated as correct subject to elimination of other errors.

27.2 The amount stated in the Bid will be adjusted by the respective Bid Evaluation Committee in accordance with the above procedure for the correction of errors and, with the concurrence of the Bidder, shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected amount, its Bid will then be rejected, and the Bid Security may be forfeited or the Bids Securing Declaration may be executed.

28. Conversion to Single Currency

28.1 For the purposes of comparison of bids quoted in different currencies, the price shall be converted into a single currency in accordance with Rule 42(2) of Public Procurement Rules,2026.

29. Evaluation of Bids

29.1 The Bids, quotations, or proposals shall be evaluated by the respective evaluation committees as per evaluation criteria prescribed in the Bidding Documents in accordance with Rule 11, 12 and 13 of the Public Procurement Rules, 2026.

29.2 While evaluating the bids, the procuring agency shall consider the following:

i. Bids will be evaluated on lump sum bid basis or items wise or Lot wise (contracts), as specified in the BDS; and the Bid Price;

ii. correction of arithmetic errors in accordance with ITB 27;

30. Domestic Preference

30.1 The respective Bid Evaluation Committee shall evaluate and compare bids, allow for preference to domestic bidders, while competing with the international bidders in accordance with the policies of the Federal Government.

The percentage of preference, to be accorded shall be clearly mentioned in the bidding documents under the bid evaluation criteria.

31. Determination of Successful Bid

31.1 **Selection technique will be adopted for determining the Successful Bid in accordance with the criteria referred in the BDS or prescribed in the separate section titled as Evaluation Criteria.**

31.2 **Least Cost Based Selection (LCBS)**
After meeting the requirements of eligibility, qualification and substantial responsiveness, the bid in compliance with all the mandatory (technical) specifications/requirements and/or requisite quality threshold (if any), and having lowest evaluated cost (or financial proposal) shall be considered Successful Bid.

31.3 **Quality and Cost Based Selection (QCBS)**
In such combination, there shall be some specific weightage of both the technical features and financial aspects of the proposal. The financial marks shall be awarded on the basis of inverse proportion calculations. The successful bid shall be declared, on the basis of combined evaluation.

31.4 **Quality Based Selection (QBS)**
After meeting the requirements of eligibility, qualification and substantial responsiveness the bid in compliance with all the mandatory (technical) specifications/requirements and attaining highest marks in the Technical Evaluation considering all other qualitative and/or quantitative parameters (or point rated criteria) for technical proposal(s) such as working methodology, implementation plan, resource allocation, additional functionalities, risk

management approach, knowledge transfer techniques, post implementation methodology etc. shall be treated as highest ranked bid. Later on, the financial proposal of highest ranked bidder shall be opened, however, in case of failure to proceed further with such a bidder, the procuring agency may resort to second highest bidder and so on.

31.5 The Procuring Agency may adopt the Quality & Cost Based Selection Technique due to the following two reasons:

1. Where the Procuring Agency knows about the main features, usage and output of the products; however not clear about the complete features, technical specifications and functionalities of the goods to be procured and requires the bidders to submit their proposals defining those features, specifications and functionalities; or

2. Where the Procuring Agency, in addition to the mandatory requirements and mandatory technical specifications, requires parameters specified in Evaluation Criteria to be evaluated while determining the quality of the goods.

31.6 In such cases, the Procuring Agency may allocate certain weightage to these factors as a part of Evaluation Criteria, and may determine the ranking of the bidders on the basis of combined evaluation in accordance with provisions of Rule 2(1)(xxviii) of the Public Procurement Rules, 2026.

32. Abnormally Low Financial Bids

32.1 An abnormally low bid is a bid that, in light of the Procuring Agency's cost estimate, market conditions, or other received bids, appears to be unrealistically low and may not be sustainable for successfull contract execution.

32.2 **Where the Bid price is considered to be abnormally low, the Procuring Agency shall perform price analysis either during determination of Successful Bids or as a part of the post-qualification process.**

32.3 The Procuring Agency may reject an Abnormally low financial bid in accordance with Rule 43 of the Public Procurement Rules, 2026.

32.4 In order to identify the Abnormally Low Bids (ALB) following approaches can be considered to minimize the scope of subjectivity:

1. Comparing the Bid price with the cost estimate;

2. Comparing the Bid price with the Bid(s) offered by other Bidders submitting substantially responsive Bids; and

3. Comparing the Bids price with prices paid in similar contracts in the recent past either government- or development partner-funded.

32.5 The respective Bid Evaluation Committee will determine to its satisfaction whether the Bidder that is selected as having submitted the successful bid is qualified to perform the contract satisfactorily.

32.6 The determination will take into account the Bidder's financial, technical, and production capabilities. It will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, as well as such other information as the Procuring Agency deems necessary and appropriate. Factors not included in these Bidding documents shall not be used in the evaluation of the Bidders' qualifications.

32.7 Respective Bid Evaluation Committee may seek "Certificate for Independent Price Determination" from the Bidder and the results of reference checks may be used in determining an award of contract.

Explanation: The Certificate shall be furnished by the Bidder. The Bidder shall certify that the price is determined keeping in view of all the essential aspects such as raw material, its processing, value addition, optimization of resources due to economy of scale, transportation, insurance and margin of profit etc.

32.8 An affirmative determination will be a prerequisite for award of the contract to the Bidder. A negative determination will result in rejection of the Bidder's Bid, in which event the respective Bid Evaluation Committee will proceed to the next ranked Bidder to make a similar determination of that Bidder's capabilities to perform satisfactorily.

F. Award of Contract

33. Criteria of Award

33.1 The Procuring Agency will award the Contract to the Bidder whose Bids has been determined to be substantially responsive to the Bidding documents and who has been declared as Successful Bidder.

34. Negotiations

34.1 In accordance with Rule 52A of Public Procurement Rules, 2026, without changing the cost and scope of work or services, the procuring agency may

negotiate with the successful bidder (with a view to streamline the work or task execution, at the time of contract finalization) on methodology, work plan, staffing and special conditions of the contract.

There shall be no limitation on the successful bidder offering voluntary reduction in bid price without affecting the quality or scope of the procurement.

35. Procuring Agency's Right to reject all bids

35.1 The Procuring Agency reserves the right to reject all bids or proposals at any time prior to the issuance of the Letter of Award, without incurring any liability, in accordance with Rule 45 of the Public Procurement Rules, 2026.

36. Cancellation of Procurement

36.1 The procuring agency reserves the right to cancel the procurement proceedings in accordance with Rule 46 of the Public Procurement Rules, 2026.

37. Procuring Agency’s Right to Vary Quantities at the Time of Award

37.1 The Procuring Agency reserves the right at the time of contract award to increase or decrease the **quantity of** Goods originally specified in these Bidding documents provided this does not exceed **by** 15%, without any change in unit price or other terms and conditions of the Bids and Bidding documents.

38. Notification of Award

38.1 Prior to the award of contract, the procuring agency shall announce and publish the result of bid evaluation on EPADS v2.0 in accordance with Rule 48 of the Public Procurement Rules, 2026.

The Bidder whose Bids has been accepted will be notified of the award by the Procuring Agency prior to expiration of the Bids/Bid Validity period. The Letter of Award will state the sum that the Procuring Agency will pay the successful Bidder in consideration for the delivery of Goods as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price).

38.2 The Letter of award will constitute the formation of the Contract, subject to the Bidder furnishing the Performance Guarantee and signing of the contract.

39. Signing of Contract

39.1 Promptly after issuance of Letter of award, Procuring Agency shall send the successful Bidder the draft Contract, incorporating all terms and conditions as agreed by the parties to the contract.

39.2 Immediately after the Redressal of grievance by the GRC (if any), and **after fulfillment of all conditions precedent** of the Contract Form, the successful Bidder and the Procuring Agency shall sign the Contract.

40. Corrupt & Fraudulent Practices

40.1 Procuring Agencies (including beneficiaries of Government funded projects and procurement) as well as Bidders/Contractors under Government financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts, and will avoid engaging in any corrupt and fraudulent practices.

F. Grievance Redressal & Complaint Review Mechanism

41. Constitution of Grievance Redressal Committee

41.1 The Grievance Redressal Committee shall address the grievance, if any submitted by any party, including the bidder, in accordance with Rule 65 of the Public Procurement Rules, 2026 read with Redressal of Grievances Regulations, 2021.

In case if any party or the bidder is not satisfied with the decision of the GRC or if it fails to decide within ten days, the bidder or the party may file an appeal before the Appellate Committee of the Authority in accordance with Rule 65(7) of the Public Procurement Rules, 2026 to be read with Redressal of Grievances Regulations, 2021.

G. Mechanism of Blacklisting

42. Mechanism of Blacklisting

42.1 The Procuring Agency shall initiate blacklisting proceedings against any bidder, supplier, or contractor in accordance with the Rule 25 of the Public Procurement Rules, 2026.

42.2 The blacklisted/debarred bidder may file the review petition before the Authority in accordance with Rule 25 (6) of the Public Procurement Rules, 2026 to be read with Procedure of filing and disposal of Review Petitions Regulations, 2021.

43. Contract Management

43.1 For each procurement, the Procuring Agency shall designate a Contract Manager, who shall be duly responsible for the efficient management and administration of the contract in strict compliance with the provisions set forth under Rules 58, 59, and 60 of the Public Procurement Rules, 2026.

44. Inspection of goods and evaluation of services.

44.1 The Inspection Committee or the Firm shall have the right to conduct inspections of the goods in accordance with Rule 61 of the Public Procurement Rules, 2026.

45. Socio-economic development.

45.1 In accordance with Rule 63 of the Public Procurement Rules, 2026, preference may be granted to small and medium enterprises and marginalized groups in accordance with the policies notified by the Federal Government.

46. Environmental objectives

46.1 As per Rule 64 of the Public Procurement Rules, 2026, the procuring agency may seek to procure goods with a reduced environmental impact throughout their life cycle when compared to goods services with the same primary function that may otherwise be procured.

Bid Data Sheet

Bids Data Sheet (BDS)

The following specific data for the procurement of Goods to be procured shall complement, supplement, or amend the provisions in the Instructions to Bidders (ITB). Whenever there is a conflict, the provisions herein shall prevail over those in ITB.

BDS Clause Number
ITB Number
Amendments of, and Supplements to, Clauses in the Instruction to Bidders

A. Introduction

BDS Clause Number 1
ITB Number 1.1

Name of Procuring Agency: **TSO (TSO)**

The subject of procurement is: **Tender No. 211-S-1535-TSO**

Period for Provision of Goods:

Extension Period (if applicable):

Expected commencement date: **Friday, January 1, 2027**

BDS Clause Number 2
ITB Number 2.1

Source of funds [Enter source of funds]

Financial year for the operations of the Procuring Agency: **2026-27**

Name and identification number of the Contract: **P196872**

Identification Number:

BDS Clause Number 3
ITB Clause Number 3.1

Eligible Bidder [Enter eligibility of bidder]

JV/Consortium or Association Allowed: **No**
Number of JV/Consortium Members: **Nil**

see section of eligibility criteria.

B. Bidding Documents

BDS Clause Number 4

ITB Clause Number 4.1

Eligible goods and related services [Enter requirements for eligible goods and related services, if any]

ITB Number 8.1

The Bidders may seek clarifications through **EPADS v2.0** : Clarification Date: Saturday, November 21, 2026

ITB Number 8.2

The Bidders may seek clarifications through **EPADS v2.0** : Clarification Date: Saturday, November 21, 2026

ITB Number 8.3

The Bidders may seek clarifications through **EPADS v2.0** : Clarification Date: Saturday, November 21, 2026

ITB Number 8.5

Pre-bid meeting will be/will not be held [Tick the appropriate] If yes write down the time, and date of the pre-Bid meeting:
[The meeting should take place not later than one weeks before the deadline for Bid submission.]

C. Preparation of Bids

BDS Clause Number 5
ITB Number 10.1

The Language of all correspondences and documents related to the Bids shall be in: **English**

List of documents required along with the bid: No

BDS Clause Number 6
ITB Number 11.1

Documents required / not required with bid submission [enter list of documents] Samples required / not required with the bid [Enter the names and number of samples]

Items/Lots and their related documents:

See section items and Lots

BDS Clause Number 7
ITB Number 12.1

Items / Lots Specifications:

see section of items specifications.

BDS Clause Number 8
ITB Number 15.6

The price shall be **Fixed**.

BDS Clause Number 9
ITB Number 16.1

Currency of the Bids shall be : **PKR**

BDS Clause Number 10
ITB Number 17.1

The Bids/Bid Validity period shall be: **120 Days**

BDS Clause Number 11
ITB Number 18.1

The amount of Bid Security shall be as defined in Bid Security Section for items and lots given in **BDS 6**
Instrument of Bid Security shall be in the Name of : **TSO**
The Bid Security shall be in the form of: **Pay Order, Banker's Cheque, Call at Deposit, Demand Draft**

ITB Number 18.2

The address for submission of original bid security is [Insert the address for bid security submission]

D. Submission of Bids

BDS Clause Number 12
ITB Number 20.1

Bid shall be submitted online on EPADS v2.0 whereas hard copy of the bid security should be submitted to the following;

Track Supply office, Pakistan Railways, Lahore before bid submission deadline.

Bids that are not submitted on EPADS v2.0 shall be disqualified.

The deadline for Bids submission is: **Tuesday, November 24, 2026 10:30 AM**

Day *:* ***Tuesday***

Date: ***Tuesday, November 24, 2026***

Time *:* ***11:00 AM***

E. Opening and Evaluation of Bids

BDS Clause Number 13
ITB Number 23.1

The Bids opening shall take place on **EPADS v2.0**.

Day *:* ***Tuesday***

Date: ***Tuesday, November 24, 2026***

Time *:* ***11:00 AM***

ITB Number 29.2

The procuring agency shall consider the following:
lump sum bid basis; or
items wise; or
Lot wise (contracts),

ITB Number 30.1

BDS Clause Number 14
ITB Number 31.1

Domestic Preference [applicable / not applicable]

ITB Number 31.2

Selection technique adopted will be:
The Procuring Agency shall use any of the following evaluation techniques for determination of successful bid.

Least Cost Base Selection (LCBS)
Quality and Cost Based Selection (QCBS)
Quality Based Selection (QBS)
[Insert the Evaluation Technique]

Selection technique adopted will be: **Least Cost Based Selection (LCBS)**
see Evaluation Criteria

F. Review of Procurement Decisions

BDS Clause Number 15
ITB Number 41.1

Grievence against this procurement shall be submitted online on EPADS v2.0.

Arbitrator shall be appointed by mutual consent of the both parties.

ITB Number 42.2

The Address of PPRA Grievance Redressal Appellate Committee to submit a copy of grievance:

Grievance Redressal Appellate Committee,
Public Procurement Regulatory Authority
1st Floor, G-5/2, Islamabad, Pakistan
Tel: +92-51-9202254

Eligibility Criteria

All Active Taxpayers shall be eligible to participate in the procurement process, unless expressly excluded or otherwise restricted under the Eligibility Criteria specified by the Procuring Agency.

Required Registration
NADRA CITIZENSHIP (CNIC/NICOP)
FBR (NTN)
FBR (GSTN)

Evaluation Criteria

Eligibile bidder(s) with substantially responsive bid(s) offering **Least Cost Based Selection (LCBS)** shall be consider for the award of contract(s).

Least Cost Based Selection (LCBS)

Weightage

Technical Evaluation %
100

Technical Marks	190
Passing Marks	**190**
Technical Evaluation Criteria	
The firm will intimate to Track Supply Officer (AEN/Sleeper Inspection) Lahore and DCP/Inspection (concerned) (Mughalpura or Karachi Cantt) in writing about the readiness of raw material for testing. The inspection of the raw material will be carried out at firm’s premises. Samples of raw material will jointly be taken by AEN/Sleeper Inspection & DCP/Inspection concerned, and will be approved jointly by AEN/Sleeper Inspection, Lahore and DCP/ Inspection (concerned) (Mughalpura or Karachi Cantt) who will pick up samples from every lot for tests as per specification. After satisfactory result, bulk production will be allowed. The delay in this process will not entitle the supplier for any extension in delivery period (Qualitative)(Doc Required)	10

The inspection of the item will be carried out jointly by Assistant Engineer, Inspection, Lahore and DCP/ Inspection, (concerned) (Mughalpura or Karachi Cantt), after delivery at Storepura Mughalpura or Karachi Cant (Qualitative)(Doc Required)	10
The rejected material will have to be lifted by the supplier with his own arrangements and expenses. (Qualitative)(Doc Required)	10
Pakistan Railways reserves the right to get the material tested from any institution at the supplier cost. (Qualitative)(Doc Required)	10
Following warranty clauses are applicable: i. The seller warrants that the stores will be in accordance with the particulars mentioned in the purchase order. ii. The seller warrants that the stores will be free from defects in material and workmanship. iii. The seller obligations under the warranties expressed in sub-paragraphs (i) & (ii) above shall be limited to replacement free delivery to Storepura Moghalpura, at his own cost, Stores which at the time of maintenance prove defective in material or fail to comply with the required performance in the normal course of service. The warranty shall be valid for a period of 12 months from the date of supply of the material against purchase order. Security shall be released after issuance of satisfactory working report by WKP/HPD and AEN/ Sleeper Inspection. iv. The Purchaser would be entitled to retain entire security deposit against the Purchase Order till the expiry of warranty period. v. This warranty shall be in addition to the rejections/replacements under normal inspection. (Qualitative)(Doc Required)	10
Has the bidder submitted the bid security in original in tender box? (Mandatory) (Qualitative)(Doc Required)	10
Has the bidder uploaded bid security with the “TECHNICAL PROPOSAL on EPADS FINANCIAL PROPOSAL” is to be submitted uploaded Separately (correct in all respects) on EPADS as stipulated in this tender and in a manner of single stage two envelope basis as per PPRA? (Qualitative)(Doc Required)	10
Has the bidder confirmed Railway Specifications / Requirements/ Descriptions as stipulated in this tender? (Qualitative) (Doc Required)	10
Is the bid validity according to the tender clause i.e One Hundred Twenty days (120) days from the date of opening of tender? (i.e from the date of opening of technical proposal). (Qualitative)(Doc Required)	10

Has the bidder confirmed delivery period / schedule and delivery terms as stipulated in this tender? (Qualitative)(Doc Required)	10
Has the bidder confirmed single place of delivery as stipulated in this tender? (Qualitative)(Doc Required)	10
Is the offer un-conditional? (Qualitative)(Doc Required)	10
Is the bid Computer/ Machine typed and free from overwriting, erasing and correction? (Qualitative)(Doc Required)	10
Has the bidder indicated country of origin? (Qualitative)(Doc Required)	10
Has the bidder quoted for full tendered quantity? (Qualitative)(Doc Required)	10
Has the bidder indicated the Sales Tax Registration Number and National Tax Number? (Qualitative)(Doc Required)	10
Is the bidder on Active Tax Payer List (ATL) of FBR? (Mandatory) (Qualitative)(Doc Required)	10
Does the bid contain complete bidding documents (prescribed) i.e having all the pages of prescribed/ duly approved bidding documents and which are duly filled, signed and stamped (N.B:- Literature, Annexure, Letters etc attached with the prescribed document must be duly stamped and signed by the bidder(s). (Qualitative)(Doc Required)	10
Business History of supplying similar nature items / services in last three (03) years. (Qualitative)(Doc Required)	10

Items/Lots

Items Without Lots :

Item	UNSPSC	Delivery Schedule	Quantity	Bid Security	Sample Quantity	Manufacturer / Dealer Authorization	Warranty
Stock Code 801-12210 Coal Tar Creosote for treatment of wooden Sleepers/Timbers	Parts of railway or tramway locomotives or rolling stock	**Address:** DCP (I) MGPR/ DCP (I) KYC **Schedule:** 120 Days **Quantity:** 70000/Kg	70000/Kg	271600 PKR	4	--	12 Months

Related Services of Goods:

No

Items/Lot Specification

Items Without Lots :

Item: Stock Code 801-12210 Coal Tar Creosote for treatment of wooden Sleepers/Timbers

UNSPSC: Parts of railway or tramway locomotives or rolling stock

Specifications / Requirementsss:

Coal Tar Creosote for treatment of wooden Sleepers/Timbers according to BS Specifications No.144/1997. (As per specification attached at Annexure A)

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Price Schedule

For Individual Items

#	Item Title	Quantity	Unit Price (PKR)	Total Price (PKR)	Delivery Location	Delivery Period / Year	Country of Origin
1							
2							

For Lots

#	Lot Title	Total Lot Price (PKR)	Country of Origin
1	[Lot 1 Title]		

PUBLIC PROCUREMENT REGULATORY AUTHORITY
(PPRA)
EPADS

General Conditions of Contract

A. General

1. Definitions

1.1 Unless the context otherwise requires, the following terms whenever used in this Contract shall have the same meaning and shall be interpreted as indicated

a. “Applicable Law” means the laws and any other instruments having the force of law in the Government’s Country, or in such other country as may be specified in the Special Conditions of the Contract (SC), as they may be issued and in force from time to time;

b. The “Arbitrator” is the person appointed with mutual consent of both the parties, to resolve contractual disputes as provided for in the General Conditions of the Contract GCC Clause 35 hereunder.

c. “Authority” means Public Procurement Regulatory Authority.

d. The “Commencement Date” is the date when the Supplier shall commence execution of the contract as specified in the SCC.

e. “Completion date” means the date of completion of the Contract by the Bidder as certified by the Procuring Agency.

f. “Procuring Agency” means:-

a. any Ministry, Division, Department or any Office of the Government;

b. any authority, corporation, body or organization established by or under a Law or which is owned or controlled by the Government;.

g. “The Contract” means an agreement enforceable by law;

h. “The Contract Price” means the price payable to the Bidder under the Contract for the full and proper performance of its contractual obligations;

i. “Ancillary Services” means those services ancillary to the provision of Goods, such as transportation and insurance, and any other incidental services, such as installation, commissioning, provision of technical assistance, training, and other such obligations of the Bidder covered under the Contract;

j. “GCC” means the General Conditions of Contract contained in this section;

k. “SCC” means the Special Conditions of Contract by which the GCC may be amended or supplemented;

l. **“**Day” means calendar day unless indicated otherwise.

m. “Defective Goods” are those goods which are below standards, requirements or specifications stated by the Contract.

n. “Delivery” means the transfer of the goods from the supplier equipment, machinery, and /or other materials which the Supplier is required to supply to the Procuring Agency under Contract.

o. “Effective Date” means the date on which this Contract comes into force and effect.

p. “Force Majeure” means an unforeseeable event which is beyond reasonable control of either Party and which makes a Party’s performance of its obligations under the Contract impossible or so impractical as to be considered impossible under the circumstances.

For the purposes of this Contract, “Force Majeure” means an event which is beyond the reasonable control of a Party, is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of a Party, and which makes a Party’s performance of its obligations hereunder impossible or so impractical as reasonably to be considered impossible in the circumstances. and includes, but is not limited to, war, riots, civil disorder, earthquake, fire, explosion, storm, flood, epidemics, or other adverse weather conditions, strikes, lockouts or other industrial action (except where such strikes, lockouts or other industrial action are within the power of the Party invoking Force Majeure to prevent), confiscation or any other action by Government agencies.

q. The Bidder” means the individual or corporate body whose Bids to provide the Goods has been accepted by the Procuring Agency;

r. “The Project Site,” where applicable, means the place or places named in Bids Data Sheet and technical Specifications;

s. “Government” means the Government of Pakistan;

t. “Subcontractor” means any entity to which the Bidder subcontracts any part of the Goods.

u. The “Services” means the work to be performed by the Bidder pursuant to this Contract and as prescribed in the Specifications and Schedule of Activities included in the Bidder’s Bids;

v. “Party” means the Procuring Agency or the Bidder, as the case may be, and “Parties” means both of them;

w. “Foreign Currency” means any currency other than the currency of the country of the Procuring Agency;

x. “Completion Date” means the date of completion of the contract by the Bidder as certified by the Procuring Agency;

y. “In Writing” means communicated in written form with proof of receipt;

z. “Local Currency” means the currency of Pakistan;

a. “Origin” means the place where the Goods were mined, grown, or produced or from which the Services are supplied. Goods are produced when, through manufacturing, processing, or substantial and major assembly of components, a commercially recognized new produce results that is substantially different in basic characteristics or in purpose or utility from its components.

b. “Specification” means the Specification of the Goods and performance of incidental services in accordance with the relevant standards included in the Contract and any modification or addition made or approved by the Procuring Agency.

c. “Procuring Agency” means: -
any Ministry, Division, Department or any Office of the Federal Government;
any authority, corporation, body or organization established by or under a Federal Law or which is owned or controlled by the Federal Government;

2. Application and Interpretation

2.1 These General Conditions shall apply to the extent that they are not superseded by provisions of other parts of the Contract.

2.2 In interpreting these Conditions of Contract headings and marginal notes are used for convenience only and shall not affect their interpretations unless specifically stated; references to singular include the plural and vice versa; and masculine include the feminine. Words have their ordinary meaning under the language of the Contract unless specifically defined.

3. Applicable Law

3.1 The contract shall be governed and interpreted in accordance with the laws of Pakistan, unless otherwise specified in SCC.

4. Governing Language

4.1 The Contract as well as all correspondence and documents relating to the Contract exchanged between the Bidder and the Procuring Agency, shall be written in the **English language** unless otherwise stated in the **SCC**. Supporting documents and printed literature that are part of the Contract may be in another language provided these are accompanied by an accurate translation of the relevant passages in English, in which case, for purposes of interpretation of the Contract, this translation shall govern.

5. Notices

5.1 Any notice, request, or consent made pursuant to this Contract shall be in writing and shall be deemed to have been made when delivered in person to an authorized representative of the Party to whom the communication is addressed, or when sent by registered mail, telex, telegram, or facsimile to such Party at the address specified in the **SCC**.

6. Standard

6.1 The Goods supplied under this Contract shall conform to the standards mentioned in the Technical Specifications, and, when no applicable standard is mentioned, the American Standards (such as ACI, IEEE, ASME, etc.) or the Pakistani standards such as PSQCA Such standards shall be the latest issued by the concerned institution.

7. Delivery/Location

7.1 The Goods shall be delivered to such locations as the Procuring Agency may approve and as specified in SCC.

8. Authorized Representatives / Authority of Member in charge

8.1 Any action required or permitted to be taken, and any document required or permitted to be executed, under this Contract by the Procuring Agency or the Bidder may be taken or executed by the officials specified in the **SCC**.

B. Commencement, Completion, Modification, and Termination of Contract

8. Effectiveness of Contract

8.1 This Contract shall come into effect on the date the Contract is signed by both parties and such other later date as may be stated in the SCC.

9. Commencement of the Contract

9.1 The Bidder shall confirm availability of Key Experts and begin carrying out the Services not later than the number of days after the Effective Date specified in the SCC.

10. Program

10.1 Before commencement of the Contract, the Bidder shall submit to the Procuring Agency for approval a Program showing the general methods, arrangements, order and timing for all activities. The Services shall be carried out in accordance with the approved Program as updated.

11. Starting Date/Expiration Date

11.1 The Bidder shall start carrying out the Services Five (05) days after the date the Contract becomes effective, or at such other date as may be specified in the **SCC.**

11.2 Unless terminated earlier pursuant to Clause **GCC 16** hereof, this Contract shall expire at the end of such time period after the Effective Date as specified in the SCC.

12. Entire Agreement

12.1 This Contract contains all covenants, stipulations and provisions agreed by the Parties. No agent or representative of either Party has authority to make, and the Parties shall not be bound by or be liable for, any statement, representation, promise or agreement not set forth herein.

13. Modification

13.1 Any modification or variation of the terms and conditions of this Contract, including any modification or variation of the scope, may only be made by written agreement between the Parties. However, each Party shall give due consideration to any Bids for modification or variation made by the other Party.

13.2 In cases of any modifications or variations, the prior written consent of the Procuring Agency is required.

14. Force Majeure

14.1 Definition

For the purposes of this Contract, "Force Majeure" means an event which is beyond the reasonable control of a Party and which makes a Party's performance of its obligations under the Contract impossible or so impractical as to be considered impossible under the circumstances.

14.2 No Breach of Contract

The failure of a Party to fulfill any of its obligations under the contract shall not be considered to be a breach of, or default under, this Contract in so far as such inability arises from an event of Force Majeure, provided that the Party affected by such an event (a) has taken all reasonable precautions, due care and reasonable alternative measures in order to carry out the terms and conditions of this Contract, and (b) has informed the other Party as soon as possible about the occurrence of such an event.

14.3 Extension of Time

Any period within which a Party shall, pursuant to this Contract, complete any action or task, shall be extended for a period equal to the time during which such Party was unable to perform such action as a result of Force Majeure. However, such period shall not exceed sixty (60) days.

14.4 Payments

During the period of their inability to perform the Services as a result of an event of Force Majeure, the Bidder shall be entitled to continue to be paid under the terms of this Contract, as well as to be reimbursed for additional costs reasonably and necessarily incurred by them during such period for the purposes of the Services and in reactivating the Service after the end of such period.

15. Termination

15.1 By the Procuring Agency

The Procuring Agency may terminate this Contract in case of the occurrence of any of the events specified in paragraphs (a) through (e) of this Clause. In such an occurrence the Procuring Agency shall give at least thirty (30) calendar days' written notice of termination to the Bidder in case of the events referred to in (a) through (d); at least sixty (60) calendar days' written notice in case of the event referred to in (e);

a. If the Bidder fails to remedy a failure in the performance of its obligations hereunder, as specified in a notice of suspension;

b. If the Bidder becomes (or, if the Bidder consists of more than one entity, if any of its members becomes) insolvent or bankrupt or enter into any agreements with their creditors for relief of debt or take advantage of any law for the benefit of debtors or go into liquidation or receivership whether compulsory or voluntary;

c. If the Bidder fails to comply with any final decision reached as a result of arbitration proceedings;

d. If, as the result of Force Majeure, the Bidder is unable to perform a material portion of the Services for a period of not less than sixty (60) calendar days;

e. If the Procuring Agency, in its sole discretion and for any reason whatsoever, decides to terminate this Contract;

15.2 By the Bidder

The Bidder may terminate this Contract, by not less than thirty (30) calendar days' written notice to the Procuring Agency, in case of the occurrence of any of the events specified in paragraphs (a) through (d) of this Clause.

a. If the Procuring Agency fails to pay any money due to the Bidder pursuant to this Contract and not subject to dispute within forty-five (45) calendar days after receiving written notice from the Bidder that such payment is overdue.

b. If, as the result of Force Majeure, the Bidder is unable to perform a material portion of the Services for a period of not less than sixty (60) calendar days.

c. If the Procuring Agency fails to comply with any final decision reached as a result of arbitration.

d. If the Procuring Agency is in material breach of its obligations pursuant to this Contract and has not remedied the same within forty-five (45) days (or such longer period as the Bidder may have subsequently approved in writing) following the receipt by the Procuring Agency of the Bidder's notice specifying such breach.

C. Obligations of the Bidder

16. General

16.1 Standard of Performance

1. The Bidder shall deliver the product and carry out the Services with all due diligence, efficiency and economy, in accordance with generally accepted professional standards and practices, and shall observe sound management practices, and employ appropriate technology and safe and effective equipment, machinery, materials and methods. The Bidder shall always act, in respect of any matter relating to this Contract or to the Services, as a faithful adviser to the Procuring Agency, and shall at all times support and safeguard the Procuring Agency's legitimate interests in any dealings with the third parties.

16.2 Law Applicable to Goods

The Bidder shall deliver the goods in accordance with the Contract and in accordance with the Law of Pakistan and shall take all practicable steps to ensure that any of its Experts and Sub-Bidders, comply with the Applicable Law.

17. Conflict of Interests

17.1 Bidder Not to Benefit from Commissions and Discounts.

The remuneration of the Bidder shall constitute the Bidder's sole remuneration in connection with this Contract or the Services, and the Bidder shall not accept for their own benefit any trade commission, discount, or similar payment in connection with activities pursuant to this Contract or to the Services or in the discharge of their obligations under the Contract, and the Bidder shall use their best efforts to ensure that the Personnel, any Subcontractors, and agents of either of them similarly shall not receive any such additional remuneration.

17.2 Bidder and Affiliates Not to be Otherwise Interested in Project

The Bidder agree that, during the term of this Contract and after its termination, the Bidder and its affiliates, as well as any Subcontractor and any of its affiliates, shall be disqualified from providing Goods for any project resulting from or closely related to the Services.

17.3 Prohibition of Conflicting Activities

Neither the Bidder nor its Subcontractors nor the Personnel shall engage, either directly or indirectly, in any of the following activities:

a. during the term of this Contract, any business or professional activities in the Government's country which would conflict with the activities assigned to them under this Contract;

b. during the term of this Contract, neither the Bidder nor their Subcontractors shall hire public employees in active duty or on any type of leave, to perform any activity under this Contract;

18. Confidentiality

18.1 Except with the prior written consent of the Procuring Agency, the Bidder and the Experts shall not at any time communicate to any person or entity any confidential information acquired in the course of the contract.

19. Insurance to be Taken Out by the Bidder

19.1 The Bidder(a) shall take out and maintain, and shall cause any Subcontractors to take out and maintain, at its (or the Subcontractors', as the case may be) own cost but on terms and conditions approved by the Procuring Agency, insurance against the risks, loss or damage, and for the coverage, as shall be specified in the SCC; and (b) at the Procuring Agency's request, shall provide evidence to the Procuring Agency showing

that such insurance has been taken out and maintained and that the current premiums have been paid.

20. Bidder's Actions Requiring Procuring Agency's Prior Approval

20.1 The Bidder shall obtain the Procuring Agency's prior approval in writing before taking any of the following actions:

(a) appointing such members of the Personnel not provided by the Bidder;

(b) changing the Program of activities; and

(c) any other action that may be specified in the SCC.

21. Reporting Obligations

21.1 The Bidder shall submit to the Procuring Agency the reports and documents in the numbers, and within the periods as prescribed by the Procuring Agency.

22. Liquidated Damages

22.1 If the Supplier fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Contract, the Procuring Agency shall, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to the percentage specified in **SCC** of the delivered price of the delayed Goods or unperformed Services for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the performance security (or guarantee) specified in **SCC**. Once the said maximum is reached, the Procuring Agency may consider termination of the Contract pursuant to **GCC Clause 16.**

22.2 Correction for Over-payment

If the Intended Completion Date is extended after liquidated damages have been paid, the Procuring Agency shall correct any overpayment of liquidated damages by the Bidder by adjusting the next payment certificate. The Bidder shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in SCC.

22.3 Lack of performance penalty

If the Bidder has not corrected a Defect within the time specified in the Procuring Agency's notice, a penalty for Lack of performance will be paid by the Bidder. The amount to be paid will be calculated as a percentage of the cost of having the Defect corrected, assessed as specified in the SCC.

23. Performance Guarantee

23.1 The Performance Security (or Guarantee) shall be provided to the Procuring Agency no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form acceptable to the Procuring Agency as specified in SCC, and denominated in the types and proportions of the currencies in which the Contract Price is payable as specified in the SCC.

23.2 Within Seven (07) days from the issuance of acceptance letter from the Procuring Agency, the successful Bidder shall furnish the Performance Guarantee in shape of ------- at the discretion of the PA in the amount **specified in SCC.** In case the amount of Bids security is equal or greater than

23.3 The proceeds of the Performance Guarantee shall be payable to the Procuring agency as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.

23.4 The Performance Guarantee shall be denominated in the currency of the Contract, or in a freely convertible currency acceptable to the Procuring agency and shall be in the acceptable form as specified in SCC.

23.5 The Performance Guarantee will be discharged by the Procuring agency and returned to the Supplier not later than thirty (30) days following the date of completion of the Supplier's performance obligations under the Contract, including any warranty obligations, unless otherwise **specified in SCC.**

23.6 The bid security of the successful bidder shall not be substituted with the Performance Guarantee.

24. Fraud and Corruption

24.1 The Procuring Agency requires the Supplier to disclose any commissions or fees that may have been paid or are to be paid to agents or any other party with respect to the Bidding process or execution of the Contract. The information disclosed must include at least the name and address of the agent or other party, the amount and currency, and the purpose of the commission, gratuity or fee.

25. Sustainable Procurement

25.1 The Bidder shall conform to the sustainable procurement contractual provisions, if and as specified in the SCC.

D. Bidder's Personnel

26. Description of Personnel

26.1 The titles, agreed job descriptions, minimum qualifications, and estimated periods of engagement in the carrying out of the Services of the Bidder's Key Personnel. The Key Personnel listed by title as well as by name are hereby approved by the Procuring Agency.

27. Removal and/or Replacement of Personnel

27.1 Except as the Procuring Agency may otherwise agree, no changes shall be made in the Key Personnel. If, for any reason beyond the reasonable control of the Bidder, it becomes necessary to replace any of the Key Personnel, the Bidder shall provide as a replacement a person of equivalent or better qualifications.

27.2 If the Procuring Agency finds that any of the Personnel have (i) committed serious misconduct or have been charged with having committed a criminal action, or (ii) have reasonable cause to be dissatisfied with the performance of any of the Personnel, then the Bidder shall, at the Procuring Agency's written request specifying the grounds thereof, provide as a replacement a person with qualifications and experience acceptable to the Procuring Agency.

27.3 The Bidder shall have no claim for additional costs arising out of or incidental to any removal and/or replacement of Personnel.

E. Obligations of the Procuring Agency

28. Assistance and Exemptions

28.1 The Procuring Agency shall use its best efforts to ensure that the Government shall provide the Bidder such assistance and exemptions as specified in the SCC.

29. Change in the Applicable Law

29.1 If, after the date of this Contract, there is any change in the Applicable Law with respect to taxes and duties which increases or decreases the cost of the related Services rendered by the Bidder, then the remuneration and reimbursable expenses otherwise payable to the Bidder under this Contract shall be increased or decreased accordingly by agreement between the Parties, and corresponding adjustments shall be made to the amounts referred in the SCC.

30. Services and Facilities

30.1 The Procuring Agency shall make available to the Bidder and the Experts, for the purposes of the Services and free of any charge, the services, facilities and property described , at the times and in the manner specified in the SCC or terms of reference.

30.2 In case that such services, facilities and property shall not be made available to the Bidder, the Parties shall agree on (i) any time extension that it may be appropriate to grant to the Bidder for the performance of the Services, (ii) the manner in which the Bidder shall procure any such services, facilities and property from other sources, and (iii) the additional payments, if any, to be made to the Bidder as a result thereof.

F. Payments to the Bidder

31. Contract Price

31.1 The price payable shall be in Pakistani Rupees unless otherwise specified in the SCC. Prices charged by the Supplier for Goods delivered under the Contract shall not vary from the prices quoted by the Supplier in its Bid.

32. Terms and Conditions of Payment

32.1 Payments will be made to the Bidder according to the payment schedule stated in the SCC and as per actual invoice submitted by the Bidder.

32.2 Unless otherwise stated in the SCC, the advance payment shall be made against the provision by the Bidder of a bank guarantee for the same amount, and shall be valid for the period stated in the SCC. Any other payment shall be made after the conditions listed in the SCC for such payment have been met, and the Bidder have submitted an invoice to the Procuring Agency specifying the amount due.

33. Currency of Payment

33.1 Any payment under this Contract shall be made in the currency(ies) specified in the SCC.

G. Quality Control

34. Identifying Defects

34.1 The principle and modalities of Inspection of the Goods by the Procuring Agency shall be as indicated in the SCC. The Procuring Agency shall check the Bidder’s performance and notify him of any Defects that are found. Such checking shall not affect the Bidder’s responsibilities. The Procuring Agency may instruct the Bidder to search for a Defect and to uncover and test any service that the Procuring Agency considers may have a Defect. Defect Liability Period is as defined in the SCC.

35. Correction of Defects, and

Lack of Performance Penalty

35.1 The Procuring Agency shall give notice to the Bidder of any Defects before the end of the Contract. The Defects liability period shall be extended for as long as Defects remain to be corrected.

35.2 Every time notice a Defect is given, the Bidder shall correct the notified Defect within the length of time specified by the Procuring Agency's notice.

35.3 If the Bidder has not corrected a Defect within the time specified in the Procuring Agency's notice, the Procuring Agency will assess the cost of having the Defect corrected, the Bidder will pay this amount, and a Penalty for Lack of Performance.

36. Taxes and Duties

36.1 A Supplier shall be entirely responsible for all taxes, duties, fees, etc., incurred until delivery of the contracted Goods to the Procuring Agency.

H. Settlement of Disputes

37. Alternate Dispute Resolution

37.1 Upon the commencement of the Procurement Contract, any disputes arising between the contracting parties shall be resolved in accordance with Rule 66 of the Public Procurement Rules, 2026.

37.2 The procuring agency may refer the matter to the Chief Justice Islamabad High Court or Managing Director PPRA or the Secretary Ministry of Law & Justice for appointment of Arbitrator.

37.3 The fee for the Arbitrator shall be specified in Pak Rupees as determined by the appointing authority which shall be borne and shared equally by the contracting parties.

38. Change Orders

The Procuring Agency may at any time, by a written order given to the Supplier, make changes within the general scope of the Contract in any one or more of the following:

a)Drawings, designs, or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for the Procuring Agency;
b)The method of shipment or packing;
c)The place of delivery; and/or
d)The Services to be provided by the Supplier.

39. Contract Amendenments

39.1 Subject to GCC Clause 32, no variation in or modification of the terms of the Contract shall be made except by written amendment signed by the parties.

40. Sub-Contracts

40.1 The Supplier shall consult the Procuring Agency in the event of subcontracting under this contract if not already specified in the Bid. Subcontracting shall not alter the Supplier's obligations.

Special Conditions of Contract

SECTION VIII. SPECIAL CONDITIONS OF CONTRACT

The following Special Conditions of Contract shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the Conditions of Contract. The corresponding clause number of the GCC is indicated in parentheses.

Number of GC Clause

Amendments of, and Supplements to, Clauses in the General Conditions of Contract

Number of GC Clause 1

Definitions

The Procuring Agency is: **TSO (TSO), TSO Track Supply office, Pakistan Railways, Lahore**

The Supplier is:

The title of the subject procurement is: **Tender No. 211-S-1535-TSO**

Number of GC Clause 3

Applicable/Governing Law:

The Contract shall be interpreted in accordance with the laws of Islamic Republic of Pakistan

Number of GC Clause 4

Language:

The language of the Contract, all correspondence and communications to be given, and all other documentation to be prepared and supplied under the Contract shall be in **English.**

Number of GC Clause 5

Notices:

The addresses for the notices are:

The Authority:

TSO (TSO), TSO
Track Supply office, Pakistan Railways, Lahore
+92-335-307-9012
tsoprhq@gmail.com

Contractor/ Bidder:

[Name, address and telephone number].

The Contractor/ Bidder's Representative(s)

[Name, address, telephone number and e-mail address]

Number of GC Clause 7.1

The Authorized Representatives are:

For the Procuring Agency:

TSO (TSO), TSO
Track Supply office, Pakistan Railways, Lahore
+92-335-307-9012
tsoprhq@gmail.com

For the Bidder:

Name: ……

Designation: ……..

Address: ……..

Number of GC Clause 8

Effectiveness of the contract

Number of GC Clause 9

Commencement of Contract:

Number of GC Clause 11.2

Expiration of Contract:

Number of GC Clause 15

Termination

In the event of termination of the contract due to any reason as already defined in the General Conditions of Contract, the Bidder shall be responsible for providing to the Authority the Goods till the time of alternate arrangements.

Number of GC Clause 17

Conflict of Interest:

The Procuring Agency reserves the right to determine on a case-by-case basis whether the Bidder should be disqualified from providing goods or services due to a conflict of a nature described in Clause GCC 17**.**

Number of GC Clause 22

Liquidated Damages

If the Bidder fails to provide services as required under the contract or in case of any data loss/data breach or any incident compromising the data security or other such failures related to any services, the Bidder shall pay to the Procuring Agency as Liquidated Damages at a rate of **0.50%** to **10.00%** of the Contract value, in accordance with the extent of performance failure & the cost of investigating such incidents as judged by the Authority.

Number of GC Clause 23

Performance Guarantee:

Instrument of Performance Guarantee shall be in the Name of : **Chief Controller of Purchase, Pakistan Railways Headquarters office, Lahore**

The amount of performance guarantee shall be **5.00%** of the contract price in acceptable form of **Pay Order, Banker's Cheque, Call at Deposit, Bank Guarantee, Demand Draft**

Number of GC Clause 32

Payment terms:

Payment will be made to the Bidder against the procured Goods and services according to the actual invoice or running bills submitted by the Bidder against the services provided within the time given in the conditions of the contract.

Number of GC Clause 33

Currency of Payment:

All the payment to be released to the contractor/Bidder shall be in Pakistani Rupees.

Number of GC Clause 34

Identifying Defects:

The Authority reserves the right at any time to inspect the premises of the provider to inspect the goods and monitor the goods being provided.

Inspections & Tests Requirements

For being Brand New, bearing relevant reference numbers of the equipment (Certificate from supplier)

For Physical Fitness having No Damages (Certificate from supplier)

For the Country of Origin as quoted by the Supplier (Certificate from manufacturer)

For conformance to specifications and performance parameters, through Prior to delivery inspection (Inspection Report by Procurement Committee / Inspection Team)

For successful operation at site after complete installation, testing and commissioning of the equipment (Installation, Testing and Commissioning Report by Procurement Committee / Inspection Team)

Delivery & Documents

Copies of the Supplier’s invoice showing Goods’ description, quantity, unit price, and total amount;

Original and two copies of the usual transport document (for example, a negotiable bill of lading, a non-negotiable sea waybill, an inland waterway document, an air waybill, a railway consignment note, a road

consignment note, or a multimodal transport document) which the buyer may require to take the goods;

Copies of the packing list identifying contents of each package;

Insurance Certificate;

Manufacturer's or Supplier's Valid Warranty Certificate;

Inspection Certificate issued by the Nominated Inspection Agency (if any), and the Supplier's Factory Inspection Report;

Certificate of Origin.

The above documents would be required even if the equipment has already been imported and is available with the supplier ex-stock

Number of GC Clause 37

Following is the guidance for Dispute Resolution

(a) For Contracts to be entered with foreign Contractor/ Service Provider:

All disputes arising in connection with the present Contract shall be finally settled under the Rules of Conciliation and Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with said Rules.

(b) For Contracts to be entered with nationals of Pakistan:

i. If any dispute of any kind whatsoever shall arise between the Authority and the Bidder in connection with or arising out of the Contract, including without prejudice to the generality of foregoing, any question regarding its existence, validity, termination and the execution of the Contract – whether during developing phase or after their completion and whether before or after the termination, abandonment or breach of the Contract – the parties shall seek to resolve any such dispute or difference by mutual diligent negotiations in good faith within 14 (fourteen) days following a notice sent by one Party to the other Party in this regard.

ii. At future of negotiation the dispute shall be resolved through mediation and mediator shall be appointed with the mutual consent of the both parties.

iii. At the event of failure of mediation to resolve the dispute relating to this contract such dispute shall finally be resolved through binding Arbitration in accordance with GCC clause 38.

iv. The cost of the mediation and arbitration shall be shared by the parties in equal proportion however the both parties shall bear their own costs and lawyer's fees regarding their own participation in the mediation and arbitration. However, the Arbitrator may make an award of costs upon the conclusion of the arbitration making any party to the dispute liable to pay the costs of another party to the dispute.
v. Arbitration proceedings as mentioned in the above clause regarding resolution of disputes may be commenced prior to, during or after completion of the contract.

Notwithstanding any reference to the arbitration herein, the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree that the Authority shall pay the Bidder any monies due to the Bidder.

Rules of procedure for arbitration proceedings:

Any dispute between the Authority and a Bidder who is a national of the Islamic Republic of Pakistan arising in connection with the present Contract shall be referred to adjudication or arbitration in accordance with the laws of the Islamic Republic of Pakistan including Arbitration Act 1940, however above provision shall prevail in referring the case to the Arbitrator.

Place of Arbitration and Award:

The arbitration shall be conducted in English language and place of arbitration shall be at Islamabad. The award of the arbitrator shall be final and shall be binding on the parties.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Bid Securing Declaration

Form 9: Bid Securing Declaration

Date: *[insert date (as day, month and year)]*

Bid No.:***P196872***

Alternative No.: **[insert identification No if this is a Bid for an alternative]**

To: **TSO (TSO), TSO Track Supply office, Pakistan Railways, Lahore**

We, the undersigned, declare that:

We understand that, according to your conditions, Bids must be supported by a Bid Securing Declaration.

We accept that we will be blacklisted and henceforth cross debarred for participating in respective category of public procurement proceedings for a period of (not more than) six months, if fail to abide with a bid securing declaration, however without indulging in corrupt and fraudulent practices, if we are in breach of our obligation(s) under the Bid conditions, because we:

1. have withdrawn or modified our Bid during the period of Bid Validity specified in the Form of Bid;

2. Disagreement to arithmetical correction made to the Bid price; or

3. having been notified of the acceptance of our Bid by the Procuring Agency during the period of Bid Validity, (i) failure to sign the contract if required by Procuring Agency to do so or (ii) fail or refuse to furnish the Performance Security or to comply with any other condition precedent to signing the contract specified in the Bidding Documents.

We understand this Bid Securing Declaration shall expire if we are not the successful

Bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Bidder; or (ii) twenty-eight (28) days after the expiration of our Bid.

Signed: [insert signature of person whose name and capacity are shown] In the capacity of
[insert legal capacity of person signing the Bid Securing Declaration]

Name: [insert complete name of person signing the Bid Securing Declaration]

Duly authorized to sign the Bid for and on behalf of: [insert complete name of Bidder]

Dated on day of , [insert date of signing]
Corporate Seal (where appropriate)

Contract Form

SECTION IX: CONTRACT FORMS

THIS AGREEMENT made the _____ day of _____ 20_____ between **TSO (TSO), TSO Track Supply office, Pakistan Railways, Lahore**

(hereinafter called "the Procuring Agency") of the one part and *[name of Bidder]* of *[city and country of Bidder]* (hereinafter called "the Bidder") of the other part:

WHEREAS the Procuring Agency invited Bids for provision of goods, viz., **Tender No. 211-S-1535-TSO (*P196872*)** and has accepted a Bids by the Bidder for the provision of Goods in the sum of *[contract price in words and figures]* (hereinafter called "the Contract Price").

NOW THIS CONTRACT WITNESSETH AS FOLLOWS:

1. In this Contract words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Contract, In the event of any ambiguity or conflict between the Contract Documents listed below, the order of precedence shall be the order in which the Contract Documents are listed below:-

1. This form of Contract;
2. the Form of Bids and the Price Schedule submitted by the Bidder;
3. the Schedule of Requirements;
4. the Technical Specifications;
5. the Special Conditions of Contract;
6. the General Conditions of the Contract;
7. the Procuring Agency's Letter of Acceptance; and
8. [*add here: any other documents*]

3. In consideration of the payments to be made by the Procuring Agency to the Bidder as hereinafter mentioned, the Bidder hereby covenants with the Procuring Agency to provide the Goods related services and to remedy defects therein in conformity in all respects with the provisions of the Contract.

4. The Procuring Agency hereby covenants to pay the Bidder in consideration of the provision of Goods and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the contract at the times and in the manner prescribed by the contract.

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

Signed, sealed, delivered by _____the _____ (for the Procuring Agency)

Witness to the signatures of the Procuring Agency:

……

Signed, sealed, delivered by _____the _____ (for the Procuring Agency)

Witness to the signatures of the Bidder: ……

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Integrity Pact

Integrity Pact

DECLARATION OF FEES, COMMISSION AND BROKERAGE ETC. PAYABLE BYTHE SUPPLIERS OF GOODS, SERVICES & WORKS IN CONTRACTS WORTH RS.10.00 MILLION OR MORE

Contract Number: Contract Value: Contract Title:

Dated:

[Name of Supplier] hereby declares that it has not obtained or induced the procurement of any contract, right, interest, privilege or other obligation or benefit from Government of Pakistan or any administrative subdivision or agency thereof or any other entity owned or controlled by it (GoP) through any corrupt business practice.

Without limiting the generality of the foregoing [Name of Supplier] represents and warrants that it has fully declared the brokerage, commission, fee etc. paid or payable to anyone and not given or agreed to give and shall not give or agree to give to anyone within or outside Pakistan either directly or indirectly through any natural or juridical person, including its affiliate, agent, associate, broker, consultant, director, promoter, shareholder, sponsor or subsidiary, any commission, gratification, bribe, finder's fee or kickback, whether described as consultations fee or otherwise, with the object of obtaining or inducing the procurement of a contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP, except that which has been expressly declared pursuant hereto.

[Name of Supplier] certifies that it has made and will make full disclosure of all agreements and arrangements with all persons in respect of or related to the transaction with GoP and has not taken any action or will not take any action to circumvent the above declaration, representative or warranty.

[Name of Supplier] accepts full responsibility and strict liability for making and false declaration, not making full disclosure, misrepresenting fact or taking any action likely to defeat the purpose of this declaration, representation and warranty. It agrees that any contract, right interest, privilege or other obligation or benefit obtained or procured as aforesaid shall, without prejudice to any other right and remedies available to GoP under any law, contract or other instrument, be voidable at the option of GoP.

Notwithstanding any rights and remedies exercised by GoP in this regard, [Name of Supplier] agrees to indemnify GoP for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to GoP in an amount equivalent to ten time the sum of any commission, gratification, bribe, finder's fee or kickback given by [Name of Supplier] as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP.

Performance Guarantee Form

Performance Guarantee Form

To: **TSO (TSO), TSO Track Supply office, Pakistan Railways, Lahore**

WHEREAS *[name of Bidder]* (hereinafter called "the Bidder") has undertaken, in pursuance of Contract No. *[reference number of the contract]* dated *[insert date]* for provision of Goods (hereinafter called "the Contract").

AND WHEREAS it has been stipulated by you in the said Contract that the Bidder shall furnish you with a Bank Guarantee by a reputable bank for the sum specified therein as security for compliance with the Bidder's performance obligations in accordance with the Contract.

AND WHEREAS we have agreed to give the Bidders guarantee:

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

This guarantee is valid until the: *[insert date]*

Signature and seal of the Guarantors

_____

[name of bank or financial institution]

_____

[address]

_____

[date}

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Annexure

Specifications Annexure A

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Specifications Annexure A** (page number: 72)

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Procurement Forms

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Additional Forms and Documents

BRITISH STANDARD

BS 144 : 1997

Incorporating Amendment No. 1

Specification for

Coal tar creosote for wood preservation

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

ICS 71.100.50; 79.020

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee B/515, Wood preservation, upon which the following bodies were represented:

British Telecommunications plc
British Wood Preserving and Damp-proofing Association
Chemical Industries Association
Creosote Council
Department of the Environment (Building Research Establishment)
Timber Research and Development Association
Timber Trade Federation
Wood Panel Industries Federation

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

Association of Consulting Scientists
ITRI Ltd.
Ministry of Defence

This British Standard, having been prepared under the direction of the Sector Board for Building and Civil Engineering, was published under the authority of the Standards Board and comes into effect on 15 July 1997
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9947	April 1998	Indicated by a sideline in the margin

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

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Foreword

This revision of BS 144 has been prepared under the direction of Technical Committee B/515, Wood preservation.

This British Standard was first published in 1921, with revisions in 1954, 1973 and 1990. The 1990 revision brought all types of creosote under one standard (low viscosity creosote not requiring heat for application had previously been covered by BS 3051). The 1990 revision specified three types of creosote to cover all applications; it also incorporated the provisions of BS 913, which was withdrawn. This revision reflects the subsequent advances in technology and particular attention has been paid to environmental issues.

Four types of creosote are specified in this revision, together with methods for determining conformity to the specifications. Methods of application previously specified in BS 144 : Part 2 : 1990 are now given in an informative annex.

Materials conforming to this specification and used as a wood preservative require Government approval under the Control of Pesticides Regulations 1986 (SI 1510) before they can be sold, supplied, stored, advertised or used in the United Kingdom.

This revision supersedes BS 144 : Part 1 : 1990 and BS 144 : Part 2 : 1990, which are withdrawn.

CAUTION. Attention is drawn to the Health and Safety at Work etc. Act 1974, and the need for ensuring that the methods specified in this British Standard are carried out with suitable precautions.

The procedures described in this British Standard are intended to be carried out by appropriately qualified and experienced persons or other suitably trained and/or supervised personnel. Normal safety precautions should be taken throughout performing the methods.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 20, an inside back cover and a back cover.

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Specification

1 Scope

This British Standard specifies requirements for four types of coal tar creosote for wood preservation.

Type 1 creosote is intended for treatment of timber by pressure impregnation.

Type 2 creosote is also intended for pressure impregnation, but has a more closely defined distillation range and a more restricted residue content than creosote of type 1. Type 2 creosote is especially suitable for treatment of poles for overhead power and telecommunication lines, and for structural timbers where bleeding in service could present a problem.

Type 3 creosote is intended for treatment of timber by immersion and brushing.

Type 4 creosote is intended for treatment of timber by pressure impregnation at temperatures > 100 °C. This creosote excludes the lower boiling fractions allowable in the other three creosote types and is especially suitable where volatility leading to odour is a problem.

NOTE. Creosote of types 1, 2 and 3 may be used for the hot-and-cold open tank process.

2 References

2.1 Normative references

This British Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on page 20. For dated references, only the edition cited applies; any subsequent amendments to or revisions of the cited publication apply to this British Standard only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

2.2 Informative references

This British Standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this Standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Composition

All types of creosote shall consist of blends of distillates of coal tar and shall be free from petroleum oils or oils not derived from coal tar.

4 General requirements

4.1 When tested in accordance with the methods listed in table 1, the creosote, when manufactured, shall be in accordance with the limiting requirements given in that table. Samples for the assessment of conformity to these requirements shall be taken in accordance with BS EN 1014-1.

4.2 Requirements for creosote in use within treatment plants shall be as in table 1 except for:

water content (max.):	3.0 % (*V/V*);
insoluble matter content (max.):	0.6 % (*m/m*).

5 Methods of treatment of timber

Guidance on methods of treatment of timber for use with these preparations is given in annex I.

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Table 1. Requirements for creosote types 1, 2, 3 and 4

Property	Type 1		Type 2		Type 3		Type 4		Test method
Liquidity									
Temperature (°C) at which the product is completely liquid, after:									
2 h	32		32		—		50		Annex A
4 h	—		—		0				
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Density (kg/m^3) at:									
55 °C	—	—	—	—	—	—	1003	1144	
38 °C	1003	1108	1003	1108	—	—	—	—	Annex B
20 °C	—	—	—	—	910	1120	—	—	
Distillation									
Recovery of dehydrated creosote (% (*m/m*)) at:									Annex C
205 °C	—	6	—	5	—	15	—	—	
230 °C	—	40	5	30	—	40	—	—	
270 °C	—	—	—	—	30	—	—	—	
315 °C	—	78	40	78	40	90	—	18	
355 °C	60	—	73	90	65	—	65	95	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Extractable phenols content (ml/100 g of dehydrated creosote) in the distillate up to 315 °C (as obtained in annex D):									
Types 1, 2 and 4, density range 1003 kg/m^3 to 1045 kg/m^3	5	20	5	20	—	—	5	18	Annex D
Types 1, 2 and 4, density range 1046 kg/m^3 to 1144 kg/m^3	0	20	0	20	—	—	0	18	
Type 3	—	—	—	—	1	20	—	—	
Flash point (°C, Pensky-Martens closed tester)	61	—	61	—	61	—	61	—	BS EN 22719
Viscosity (mm^2/s), kinematic at 40 °C	—	—	4	20	—	—	—	—	Annex E
Water content (% (*V/V*))	—	1.5	—	1.5	—	1.5	—	1.5	Annex F
Insoluble matter content (% (*m/m*))	—	0.4	—	0.4	—	0.4	—	0.4	Annex G
Naphthalene content (% (*m/m*))	—	—	—	15	—	—	—	—	Annex H
Benzo[*a*]pyrene content (mg/kg)	—	500	—	500	—	50	—	500	DD ENV 1014-3
Water extractable phenols content (% (*m/m*))	—	3	—	3	—	3	—	3	BS EN 1014-4

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Annexes

Annex A (normative)
Method for the determination of liquidity

A.1 Principle

The sample is maintained at the specified temperature (50 °C, 32 °C or 0 °C) for 2 h or 4 h and then examined for the presence of separated solid matter.

A.2 Apparatus

A.2.1 *Conical flask*, capacity 100 ml.

A.2.2 *Thermometer*, partial immersion thermometer of range − 0.5 °C to 55 °C, graduated at each 0.1 °C and accurate to ± 0.2 °C.

NOTE. A thermometer conforming to BS 593 is suitable.

A.2.3 *Constant temperature baths*. Depending on the type of creosote being tested, baths able to maintain temperatures of (50 ± 0.1) °C, (32 ± 0.1) °C or (0 ± 0.1) °C.

A.3 Procedure

Pour about 50 ml of the laboratory sample (see BS EN 1014-1) into the conical flask. Fit the thermometer by means of a cork into the neck of the flask, with the bulb of the thermometer immersed in the creosote. Place the flask in the appropriate constant temperature bath.

Ensure that the surface of the creosote is below that of the water in the bath. Swirl the flask until the creosote reaches the appropriate temperature. Leave the flask in the bath for 2 h or 4 h as appropriate, then withdraw the flask and examine the surface of the creosote for solid matter. Rotate the flask slowly, holding it horizontally, and examine the sides for solid matter.

When the sample is free from solid matter, place the flask in the second bath, maintained at (32 ± 0.1) °C for types 1 and 2 creosote, (0 ± 0.1) °C for type 3, and (50 ± 0.1) °C for type 4. Re-examine the sample for solids when the contents have reached the bath temperature, and again after having maintained the sample at the bath temperature for 2 h for types 1, 2 and 4, or 4 h for type 3.

A.4 Acceptance criteria

The sample shall be deemed to pass the liquidity test if it remains completely liquid for the specified period at the specified temperature.

The sample shall be deemed to fail the liquidity test if any solid matter is observed, either after cooling to the specified temperature or at any time up to the end of the specified period at that temperature.

Annex B (normative)
Method for the determination of density

B.1 Principle

Density is determined by means of a density hydrometer.

B.2 Apparatus

B.2.1 *Hydrometer*, conforming to series L50 of BS 718, calibrated for determination of density at 20 °C in g/ml, for use in liquids of low surface tension, and constructed of soda-lime glass.

NOTE. Hydrometers calibrated in kg/m^3 are also available in series L50 of BS 718, and these may be used instead. If such a hydrometer is used, it should be read to the nearest kg/m^3 (see **B.3**); the corrections described in **B.4** should be multiplied by 1000, and the factor 1000 from the equation in **B.4.2** omitted.

Examine the hydrometer before use to see that it is clean and dry and that there has been no displacement of the paper scale during use.

NOTE. Any displacement of the paper scale can be detected by reference to the means provided for this purpose: e.g., a horizontal line may be etched on the stem of the hydrometer and the corresponding datum marked on the paper scale. If the scale has been displaced, recertification of the hydrometer is necessary.

B.2.2 *Hydrometer vessel*, free from local irregularities producing distortion and several millimetres greater in diameter than the hydrometer bulb.

NOTE. A 1 l measuring cylinder conforming to BS 604 is suitable.

B.2.3 *Partial immersion thermometer*, of range − 0.5 °C to 60 °C, graduated in 0.1 °C and accurate to ± 0.2 °C.

NOTE. A thermometer conforming to BS 593 is suitable.

B.3 Procedure

Warm the laboratory sample (see BS EN 1014-1) to approximately 38 °C for types 1 and 2, 20 °C for type 3 and 55 °C for type 4 creosote. Fill the clean hydrometer vessel with the liquefied laboratory sample to a depth sufficient to allow the hydrometer to float.

NOTE. Pour the sample down the side of the vessel, to avoid formation of air bubbles.

Gently stir the sample, avoiding formation of air bubbles. Hold the hydrometer by the top of the stem, insert it carefully into the sample, and release it when approximately in the position of equilibrium, i.e. when it rises or falls only to a small degree.

Lightly press the top of the hydrometer stem, to immerse it further by a few millimetres. Release the hydrometer. After a few oscillations, when the hydrometer is steady, note the reading.

Observe the meniscus. If the stem is clean the meniscus shape will remain unchanged during the hydrometer oscillations. If the meniscus shape changes, clean the hydrometer and repeat the procedure.

Record the hydrometer reading to the nearest 0.001 g/ml and the temperature of the creosote to the nearest 0.1 °C. If the bottom of the meniscus is not visible, take the reading at the level where the meniscus merges into the stem of the hydrometer.

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B.4 Calculation

B.4.1 *Correction of hydrometer reading*

Calculate the corrected hydrometer reading, R_t, as follows:

$$R_t = R + C + 0.0007$$

where

R is the hydrometer reading;

C is the certification correction;

0.0007 is the meniscus height correction (to be used for opaque creosotes only).

NOTE. The value of R_t is the corrected hydrometer reading for the sample at t °C, the temperature of the creosote in the test.

B.4.2 *Calculation of density*

Calculate the density d, at the required temperature (55 °C, 38 °C or 20 °C), as follows:

$$d = 1000\,(R_t m + a)$$

where

d is the density (kg/m^3);

R_t is the corrected hydrometer reading (see **B.4.1**);

m is the multiplication factor (see note);

a is the addition factor (see note).

NOTE. m and a are obtained from table B.1 for types 1 and 2, from table B.2 for type 3, and table B.3 for type 4 creosote.

B.5 Expression of results

Express the density of the sample, to the nearest kg/m^3, at the specified temperature.

Annex C (normative)
Method for the determination of distillation range

C.1 Principle

A sample of creosote is dehydrated and distilled, and the fractions collected at specified temperatures.

C.2 Apparatus

C.2.1 *Distillation apparatus*, described in BS 658. Assemble in accordance with BS 658, except as stated in a) to d).

a) *Distillation flasks*:
   1) capacity 250 ml, untared;
   2) capacity 150 ml, tared, held in the vertical position by means of a clamp at the extreme upper end of the neck.

b) *Condensers*, types 1 and 2.

c) *Draught screen*, type 2, from which the shelf has been removed.

d) *Crow receivers*, capacity 50 ml, tared.

C.2.2 *Thermometer*, with a range of − 2 °C to 400 °C, as described in BS 593.

C.2.3 *Separating funnels*, capacity 50 ml, as described in BS 2021.

C.2.4 *Fortin's barometer.*

C.3 Corrections

C.3.1 *General*

Apply the corrections described in **C.3.2** and **C.3.3** to the specified distillation temperatures before commencing the distillation.

C.3.2 *Barometer readings*

C.3.2.1 Read the barometer to obtain the atmospheric pressure in mbar or mmHg, and record the ambient temperature. Continue as described in either **C.3.2.2** for mbar or **C.3.2.3** for mmHg.

NOTE. If atmospheric pressure is measured in other units, the following conversion factors can be used:

1 mbar = 100 N/m^2 = 100 Pa;

1 mmHg = 133.322 N/m^2.

C.3.2.2 Correct the barometer readings for temperature as described in BS 658, and if the corrected reading differs from 1013 mbar, apply corrections to the specified distillation temperature by adding the value given in table C.1 for each millibar above 1013 mbar, or subtracting for each millibar below 1013 mbar.

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Table B.1 Multiplication (m) and addition (a) factors for conversion of corrected hydrometer readings at t °C to density at 38 °C (creosote types 1 and 2)

t °C	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
34	1.00318 − 0.00667	1.00309 − 0.00650	1.00299 − 0.00634	1.00290 − 0.00617	1.00281 − 0.00600	1.00271 − 0.00584	1.00262 − 0.00567	1.00253 − 0.00550	1.00243 − 0.00533	1.00234 − 0.00517
35	1.00225 − 0.00500	1.00215 − 0.00483	1.00206 − 0.00466	1.00197 − 0.00450	1.00188 − 0.00433	1.00178 − 0.00416	1.00169 − 0.00400	1.00160 − 0.00383	1.00150 − 0.00366	1.00141 − 0.00350
36	1.00132 − 0.00333	1.00122 − 0.00316	1.00113 − 0.00300	1.00104 − 0.00283	1.00094 − 0.00266	1.00085 − 0.00250	1.00076 − 0.00233	1.00067 − 0.00216	1.00057 − 0.00200	1.00048 − 0.00183
37	1.00039 − 0.00166	1.00030 − 0.00150	1.00020 − 0.00133	1.00011 − 0.00116	1.00002 − 0.00100	0.99992 − 0.00083	0.99983 − 0.00067	0.99974 − 0.00050	0.99964 − 0.00033	0.99955 − 0.00017
38	0.99946 0.00000	0.99937 0.00017	0.99928 0.00033	0.99918 0.00050	0.99909 0.00066	0.99900 0.00083	0.99890 0.00100	0.99881 0.00116	0.99872 0.00133	0.99863 0.00149
39	0.99853 0.00166	0.99844 0.00183	0.99835 0.00199	0.99826 0.00216	0.99816 0.00232	0.99807 0.00249	0.99798 0.00266	0.99789 0.00282	0.99780 0.00299	0.99770 0.00315
40	0.99761 0.00332	0.99752 0.00348	0.99743 0.00365	0.99733 0.00381	0.99724 0.00398	0.99715 0.00414	0.99706 0.00431	0.99697 0.00448	0.99687 0.00464	0.99678 0.00481
41	0.99669 0.00497	0.99660 0.00513	0.99650 0.00530	0.99641 0.00547	0.99632 0.00563	0.99623 0.00580	0.99614 0.00596	0.99604 0.00613	0.99595 0.00629	0.99586 0.00646

NOTE. The upper figure is the multiplication factor.

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Table B.2 Multiplication (m) and addition (a) factors for conversion of corrected hydrometer readings at t °C to density at 20 °C (creosote type 3)

t °C	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
15	1.00466 − 0.00835	1.00456 − 0.00818	1.00447 − 0.00801	1.00438 − 0.00785	1.00428 − 0.00768	1.00419 − 0.00751	1.00410 − 0.00734	1.00400 − 0.00718	1.00391 − 0.00701	1.00382 − 0.00684
16	1.00372 − 0.00667	1.00363 − 0.00651	1.00354 − 0.00634	1.00344 − 0.00617	1.00335 − 0.00600	1.00326 − 0.00584	1.00316 − 0.00567	1.00307 − 0.00550	1.00298 − 0.00533	1.00288 − 0.00517
17	1.00279 − 0.00500	1.00270 − 0.00483	1.00260 − 0.00467	1.00251 − 0.00450	1.00242 − 0.00433	1.00232 − 0.00416	1.00223 − 0.00400	1.00214 − 0.00383	1.00204 − 0.00366	1.00195 − 0.00350
18	1.00186 − 0.00333	1.00176 − 0.00316	1.00167 − 0.00300	1.00158 − 0.00283	1.00149 − 0.00266	1.00139 − 0.00250	1.00130 − 0.00233	1.00121 − 0.00216	1.00111 − 0.00200	1.00102 − 0.00183
19	1.00093 − 0.00166	1.00084 − 0.00150	1.00074 − 0.00133	1.00065 − 0.00117	1.00056 − 0.00100	1.00046 − 0.00083	1.00037 − 0.00067	1.00028 − 0.00050	1.00019 − 0.00033	1.00009 − 0.00017
20	1.00000 0.00000	0.99991 0.00017	0.99982 0.00033	0.99972 0.00050	0.99963 0.00067	0.99954 0.00083	0.99944 0.00100	0.99935 0.00117	0.99926 0.00133	0.99917 0.00150
21	0.99907 0.00166	0.99898 0.00183	0.99889 0.00200	0.99880 0.00216	0.99870 0.00233	0.99861 0.00250	0.99852 0.00266	0.99843 0.00283	0.99833 0.00300	0.99824 0.00316
22	0.99815 0.00333	0.99806 0.00350	0.99797 0.00366	0.99787 0.00383	0.99778 0.00400	0.99769 0.00416	0.99760 0.00433	0.99750 0.00450	0.99741 0.00467	0.99732 0.00483
23	0.99723 0.00500	0.99713 0.00517	0.99704 0.00533	0.99695 0.00550	0.99686 0.00567	0.99677 0.00584	0.99667 0.00600	0.99658 0.00617	0.99649 0.00634	0.99640 0.00651
24	0.99631 0.00667	0.99621 0.00684	0.99612 0.00701	0.99603 0.00718	0.99594 0.00734	0.99585 0.00751	0.99575 0.00768	0.99566 0.00785	0.99557 0.00801	0.99548 0.00818
25	0.99539 0.00835	0.99529 0.00852	0.99520 0.00868	0.99511 0.00885	0.99502 0.00902	0.99493 0.00919	0.99484 0.00935	0.99474 0.00952	0.99465 0.00969	0.99456 0.00986

NOTE. The upper figure is the multiplication factor.

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Table B.3 Multiplication (m) and addition (a) factors for conversion of corrected hydrometer readings at t °C to density at 55 °C (creosote type 4)

t °C	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
51	1.00315 − 0.00667	1.00306 − 0.00650	1.00297 − 0.00633	1.00288 − 0.00616	1.00279 − 0.00599	1.00270 − 0.00582	1.00261 − 0.00565	1.00252 − 0.00548	1.00243 − 0.00531	1.00234 − 0.00514
52	1.00222 − 0.00500	1.00213 − 0.00483	1.00204 − 0.00466	1.00195 − 0.00449	1.00186 − 0.00432	1.00177 − 0.00415	1.00168 − 0.00398	1.00159 − 0.00381	1.00150 − 0.00364	1.00141 − 0.00347
53	1.00129 − 0.00333	1.00120 − 0.00316	1.00111 − 0.00299	1.00102 − 0.00282	1.00093 − 0.00265	1.00084 − 0.00248	1.00075 − 0.00231	1.00066 − 0.00214	1.00057 − 0.00197	1.00048 − 0.00180
54	1.00036 − 0.00166	1.00027 − 0.00149	1.00018 − 0.00132	1.00009 − 0.00115	1.00000 − 0.00098	0.99991 − 0.00081	0.99982 − 0.00064	0.99973 − 0.00047	0.99964 − 0.00030	0.99955 − 0.00013
55	0.99943 0.00000	0.99934 0.00017	0.99925 0.00034	0.99916 0.00051	0.99907 0.00068	0.99898 0.00085	0.99889 0.00102	0.99880 0.00119	0.99871 0.00136	0.99862 0.00153
56	0.99850 0.00166	0.99841 0.00183	0.99832 0.00200	0.99823 0.00217	0.99814 0.00234	0.99805 0.00251	0.99796 0.00268	0.99787 0.00285	0.99778 0.00302	0.99769 0.00319
57	0.99757 0.00332	0.99748 0.00349	0.99739 0.00366	0.99730 0.00383	0.99721 0.00400	0.99712 0.00417	0.99703 0.00434	0.99694 0.00451	0.99685 0.00468	0.99676 0.00485
58	0.99664 0.00497	0.99655 0.00514	0.99646 0.00531	0.99637 0.00548	0.99628 0.00565	0.99619 0.00582	0.99610 0.00599	0.99601 0.00616	0.99592 0.00633	0.99583 0.00650
59	0.99571 0.00663	0.99562 0.00680	0.99553 0.00697	0.99544 0.00714	0.99535 0.00731	0.99526 0.00748	0.99517 0.00765	0.99508 0.00782	0.99499 0.00799	0.99490 0.00816

NOTE. The upper figure is the multiplication factor.

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C.3.2.3 Correct the barometer readings for temperature as described in BS 658, and if the reading differs from 760 mmHg, apply corrections to the specified distillation temperature by adding the value given in table 4 for each millimetre of mercury above 760 mmHg, or subtracting for each millimetre of mercury below 760 mmHg.

Table C.1 Corrections for barometric pressure

Specified temperature °C	Corrections °C	
	Per millibar	Per millimetre of mercury
205	0.076	0.057
230	0.080	0.060
270	0.087	0.065
315	0.095	0.071
355	0.100	0.075

C.3.3 *Thermometers*

If necessary, make the appropriate adjustments indicated by the thermometer test certificate at any of the specified distillation temperatures (see table 1).

C.4 Preparation of test portion of dehydrated creosote

Transfer about 120 g of the sample (see BS EN 1014-1) into the 250 ml untared distillation flask, to which has been added fragments of porous inert material. Using the type 1 condenser, distil the sample and collect the distillate in a separating funnel (**C.2.3**), stopping the distillation when water ceases to distil. Allow the contents of the separating funnel to settle, run the lower water layer off, and return the oil layer to the distillation flask when the flask has cooled to about 40 °C. Mix the contents of the flask thoroughly, ensuring that the oil is homogeneous.

C.5 Procedure

Weigh, to an accuracy of 0.1 g, approximately 100 g of the dehydrated creosote (see **C.4**) directly into the tared 150 ml distillation flask. Record this mass as M_c. Add fragments of porous inert material and assemble the distillation apparatus, with the side arm of the flask extending at least 25 mm beyond the cork in the upper end of the type 2 condenser.

Apply heat, and distil at a rate of (5 ± 0.5) ml/min. If for any reason the distillation rate falls outside the specified limits at any time after the first 5 ml of distillate has been collected, discontinue the test and start again on another portion of the original sample.

NOTE. The specified distillation rate corresponds to approximately 90 drops/min (i.e. three drops in 2 s), but this figure should only be taken as a guide so that the rate in millimetres per minute may be kept under close observation.

If solids are deposited in the condenser during the distillation, warm the condenser so that such solids are collected in the fraction with which they distil.

Change the receiver at each corrected specified temperature (see tables 1 and 4), without stopping the distillation. Remove the heat when the thermometer indicates the highest corrected specified temperature. The final fraction includes the oil that drains from the condenser within 5 min after the heat has been removed.

Weigh each receiver containing distillate fraction. Note the mass of each fraction (f_1, f_2, f_3, f_4, and f_5) and calculate the accumulative distillate as a percentage by mass of the dehydrated creosote (M_c).

Reserve the distillate fractions (f_1, f_2, f_3, and f_4) for testing in accordance with annex D.

C.6 Calculation

Calculate the percentage by mass of each fraction as follows:

let f_1 be the mass of the fraction distilled up to 205 °C;

let f_2 be the mass of the fraction distilled between 205 °C and 230 °C;

let f_3 be the mass of the fraction distilled between 230 °C and 270 °C;

let f_4 be the mass of the fraction distilled between 270 °C and 315 °C;

let f_5 be the mass of the fraction distilled between 315 °C and 355 °C.

Calculate the cumulative distillate up to each of the specified temperatures as a percentage by mass of the dehydrated creosote (M_c) as required in table 1, using the generalized formula:

$$\text{cumulative percentage to a specific temperature} = \frac{100 \sum f_n}{M_c}$$

for n = 1 to 5, as appropriate.

C.7 Expression of results

Express the cumulative distillate as a percentage by mass of the dehydrated creosote (M_c) at the specified temperature.

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Annex D (normative)
Method for the determination of extractable phenols

D.1 Principle

The phenols are extracted from the distillate up to 315 °C (obtained from the distillation described in annex C as f_1, f_2, f_3, and f_4) with sodium hydroxide. The neutral oils and bases are removed by boiling. The phenols are liberated by hydrochloric acid and measured.

NOTE. The phenols, as recovered, contain water derived from the reagents used in the test. No correction is made for this water.

D.2 Reagents

NOTE. All reagents should be of recognized analytical grade and water conforming to grade 3 of BS EN ISO 3696 should be used throughout.

D.2.1 *Hydrochloric acid* (HCl), concentrated, 425 g/l.

D.2.2 *Sodium chloride* (NaCl), powdered solid.

D.2.3 *Sodium chloride solution*, saturated.

D.2.4 *Sodium hydroxide solution* (NaOH), 100 g/l.

D.2.5 *Tbluene* [$C_6H_5CH_3$].

D.2.6 *Methyl orange indicator solution*, 4-[4–dimethylaminophenylazo]benzenesulfonic acid sodium salt, 1 g/l.

D.3 Apparatus

D.3.1 *Phenols flask*, capacity 200 ml or 150 ml (see notes 2 to 5 of **D.5**), with graduated neck conforming to BS 676.

D.3.2 *Separating funnel*, capacity 250 ml, stoppered, conforming to BS 2021.

D.3.3 *Measuring cylinder*, capacity 100 ml, conforming to BS 604.

D.3.4 *Thermometer*, of range − 10 °C to 110 °C, conforming to BS 593.

D.3.5 *Glass wool.*

D.4 Test portion

The test portion (see note) shall be obtained by combining distillate fractions $f_1 + f_2 + f_3 + f_4$, collected below 315 °C (see annex C).

NOTE. A known mass (approximately 100 g) of dehydrated creosote (M_C) will have been distilled to produce the combined fractions ($f_1 + f_2 + f_3 + f_4$) which constitute this test portion.

D.5 Procedure

If necessary, warm the test portion (see **D.4**) until completely liquid, and transfer it to the separating funnel (**D.3.2**). With 50 ml of sodium hydroxide solution (**D.2.4**) (see notes 1 and 2), rinse the receivers originally containing the test samples into the separating funnel. If the combined samples contain solids which have separated, warm the separating funnel just sufficiently to redissolve the solids.

Stopper the funnel, shake vigorously for 1 min to 2 min, and allow to stand. After separation (see note 1), pour the alkaline layer into a beaker. Repeat this operation with successive 25 ml portions of sodium hydroxide solution (**D.2.4**) until all the phenols have been removed from the oil layer (see notes 1 and 2).

After separation, add the alkaline layers to the first sodium hydroxide washing.

During the extraction procedure, ensure that the contents of the separating funnel are completely liquid. If necessary, immerse the funnel in warm water (40 °C to 70 °C).

Take the combined sodium hydroxide washings and boil for 20 min (using, if necessary, a fragment of inert material of approximately 2 mm^3, to prevent bumping), and roughly maintain the initial volume by adding water. Cool the sodium hydroxide washings to laboratory temperature and, if clear, transfer them directly to the phenols flask (see note 4). If the solution contains suspended matter, filter it through glass wool moistened with sodium chloride solution (**D.2.3**) and collect in the 200 ml phenols flask (**D.3.1**) (see note 4). Wash the glass wool with a further 25 ml of sodium chloride solution and add to the filtered sodium hydroxide washings.

Add a few drops of methyl orange indicator solution (**D.2.6**) to the washings, and slowly add concentrated hydrochloric acid (**D.2.1**) until the methyl orange just indicates distinct acidity, mixing the two layers by swirling. While adding the hydrochloric acid, keep the contents of the flask cool by immersing it periodically in cold water.

Add just sufficient powdered sodium chloride (**D.2.2**) to saturate the aqueous layer and leave a few particles undissolved. Shake to ensure thorough mixing and then stand to allow separation, the phenols forming the upper liquid layer. Bring the phenols into the graduated portion of the flask by adding the saturated sodium chloride solution (**D.2.3**). After setting (preferably overnight), measure the volume of phenols (see note 5). Record the volume as V_p.

NOTE 1. Complete removal of the phenols can be verified by slightly acidifying the final washings with concentrated hydrochloric acid (**D.2.1**) and examining for separated phenols.

NOTE 2. It may be assumed that 25 ml of sodium hydroxide solution (**D.2.4**) is sufficient to remove about 5 ml of phenols.

NOTE 3. If necessary, the upper layer of the flask may be diluted with toluene (**D.2.5**) to secure a satisfactory separation.

NOTE 4. If it is expected that the sample for test contains only a small amount of phenols, it is preferable to use about half the specified volumes of sodium hydroxide solution for the successive washings and to collect the sodium hydroxide washings (after filtration through the glass wool if necessary) in the 150 ml phenols flask.

NOTE 5. For some creosotes, measurement of the liberated phenols is difficult because of their viscous nature. This may be overcome by adding a measured volume of toluene (**D.2.5**) to the phenols flask immediately before the final addition of saturated sodium chloride solution. From the observed volume of the separated upper layer in the phenols flask, subtract the volume of toluene added.

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D.6 Expression of results

Express the volume of phenols (V_p), in millimetres, in 100 g of the original sample of dehydrated creosote (M_c), as follows:

$$\frac{V_p \times 100}{M_c}$$

D.7 Precision

D.7.1 *Repeatability*

Duplicate results for the volume of extractable phenols obtained by the same operator shall be considered suspect if they differ by more than 0.8 ml.

D.7.2 *Reproducibility*

Single results for the volume of extractable phenols obtained at separate laboratories shall be considered suspect if they differ by more than 2.9 ml.

Annex E (normative)
Method for the determination of kinematic viscosity

E.1 Principle

The kinematic viscosity of a sample of creosote at 40 °C is determined using a U-tube reverse flow viscometer.

E.2 Apparatus

E.2.1 *U-tube reverse flow viscometers*, type BS/IP/RF, conforming to BS 188 : 1977, size 2 (viscosity range 2 mm^2/s to 10 mm^2/s, nominal factor $C = 0.01\ mm^2/s^2$) and size 3 (viscosity range 6 mm^2/s to 30 mm^2/s, nominal factor $C = 0.03\ mm^2/s^2$), with certificate of calibration.

E.2.2 *Test sieve*, nominal aperture size 75 μm, conforming to BS 410.

E.2.3 *Water bath*, thermostatically controlled, able to adjust to (40 ± 0.1) °C.

NOTE. The temperature control should be such that the bath does not vary by more than 0.01 °C during the period of measurement, over the viscometer or between viscometers. The depth of the bath should be such that, when the viscometer and sample are in position, no part of the sample is less than 20 mm below the surface of the water, or less than 20 mm above the bottom of the bath.

E.2.4 *Thermometer*, total immersion type. Details of suitable thermometers are given in BS 2000 : Part 0 : Addendum 1.

E.2.5 *Viscometer holder*, to hold the viscometer firmly in the thermostatic bath, in the alignment described in the certificate of calibration.

E.2.6 *Timing device*, graduated in divisions of 0.2 s or less, accurate to 0.07 % over 15 min.

E.3 Preparation of test portion

Warm the creosote sample (see BS EN 1014-1) to 45 °C and filter a minimum of 20 ml through the test sieve (**E.2.2**).

E.4 Procedure

E.4.1 *Filling the viscometer*

NOTE. See figure E.1.

Vertically mount the thermometer (**E.2.4**) in the bath (**E.2.3**), so that the top of the mercury column is within 2 mm of the surface of the water. Mount the clean, dry viscometer (**E.2.1**) inside the viscometer holder (**E.2.5**) in the bath, in the alignment described in the certificate of calibration. Allow the viscometer to reach bath temperature. Stop tube L with a rubber bung fitted with a stopcock or similar device so that the air can be prevented from escaping. With the stopcock open, pour the creosote sample (**E.3**) into the filling tube N to a point just below the upper filling mark H, without wetting the glass above H. Allow the sample to flow through the capillary tube R, ensuring that the creosote column remains unbroken, until it has reached a position about 5 mm below the lower filling mark G. Stop the flow of creosote at this point by closing tube L.

Add more of the sample to the filling tube N to bring the upper surface of the creosote to just below the mark H. Keep the viscometer in the bath for at least 30 min, to allow the sample to reach bath temperature and for any air bubbles to rise to the surface. With the stopcock, carefully adjust the lower level of the creosote so that its ring of contact with the glass coincides with the bottom of mark G. Next add further sample to tube N, until the ring of contact of the creosote coincides with the bottom of mark H. Allow time for this additional amount of sample to reach bath temperature.

E.4.2 *Measurement*

Remove the rubber bung from tube L or open the stopcock to allow the creosote to flow under its own head. Measure the time for the uppermost ring of contact of the sample with the glass to rise from the bottom of mark E to the bottom of mark F. Record the thermometer readings before, during, and after the timed flow.

NOTE. As some of the sample may remain on the walls of the viscometer between the timing marks, repeat determinations of flow time may be made only after emptying, cleaning and drying the viscometer.

E.5 Expression of results

The kinematic viscosity of the creosote sample is calculated from the following equation:

$$\eta = Ct$$

where

η is the kinematic viscosity (mm^2/s);

C is the viscometer constant;

t is the mean flow time (s).

E.6 Repeatability

Duplicate results for the kinematic viscosity, obtained by the same operator with the same viscometer, shall be considered suspect if the difference is greater than 0.35 % of the mean.

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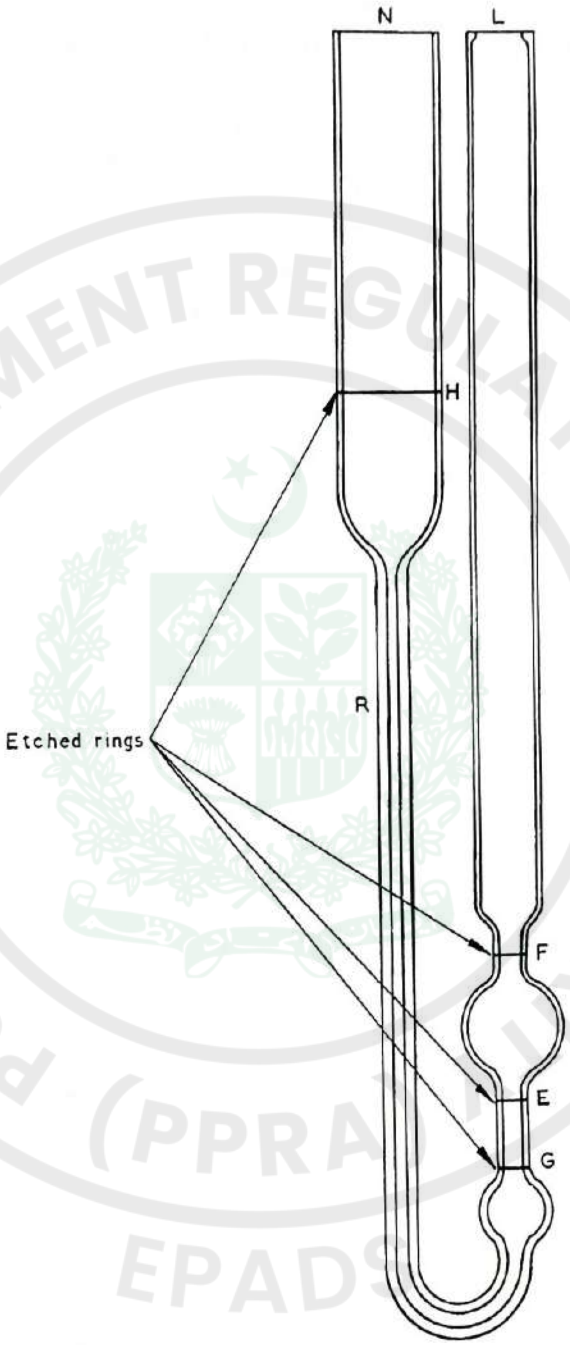


Figure E.1 BS/IP/RF U-tube reverse flow viscometer

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Annex F (normative)
Method for the determination of water content

F.1 Principle

The sample is azeotropically distilled with a suitable solvent, and the water collected and measured.

F.2 Reagent

F.2.1 *Solvent*, either:

a) toluene [$C_6H_5CH_3$]; or

b) xylene [$C_6H_4(CH_3)_2$].

F.3 Apparatus

F.3.1 *Measuring cylinder*, capacity 100 ml, conforming to BS 604.

F.3.2 *Dean and Stark condensing and collecting system*, conforming to BS 756 : 1952, type 1, with a 2 ml receiver.

F.3.3 *Round-bottomed flask*, capacity 500 ml.

F.4 Procedure

Fill the measuring cylinder (**F.3.1**) to the 100 ml mark with thoroughly mixed sample (see BS EN 1014 : Part 1) at laboratory temperature (or at the lowest temperature of complete liquidity if above laboratory temperature), and transfer it to the flask (**F.3.3**). Wash the measuring cylinder with successive quantities of solvent (**F.2.1**), using 100 ml altogether, and add the washings to the flask. Add a fragment of porous inert material and connect the flask to the Dean and Stark condensing and collecting system (**F.3.2**).

Heat the flask so that the condensate falls from the end of the condenser at a rate of 2 drops/sec to 5 drops/sec. Continue the distillation until condensed water is no longer visible in any part of the apparatus (except at the bottom of the graduated tube), and the volume of collected water remains constant. Record the volume of water in the graduated tube.

If a ring of condensed water persists in the condenser tube, clean the condenser and repeat the determination.

F.5 Expression of results

The water content, as a percentage by volume, is equal to the volume, in millimetres, of water in the graduated tube.

Annex G (normative)
Method for the determination of matter insoluble in toluene

G.1 Principle

A sample of creosote is mixed with toluene and the soluble matter filtered out. The remainder is washed, dried and weighed.

G.2 Reagent

G.2.1 *Toluene* [$C_6H_5CH_3$].

G.3 Apparatus

G.3.1 *Beakers*, capacity 250 ml, with glass covers.

G.3.2 *Filter crucibles*, capacity 30 ml, glass or porcelain, porosity grade P16, conforming to BS 1752 : 1983.

G.3.3 *Measuring cylinder*, capacity 100 ml, conforming to BS 604.

G.3.4 *Water bath*, able to heat to boiling.

G.3.5 *Laboratory oven*, (105 ± 5) °C.

G.3.6 *Desiccator*, with silica gel desiccant.

G.3.7 *Analytical balance.*

G.3.8 *Stainless steel filter*, mesh size 150 µm, conforming to BS 410.

G.4 Procedure

Dry a filter crucible (**G.3.2**) in the oven at 105 °C, cool in the desiccator and weigh to the nearest 0.1 mg. Repeat until successive weighings do not differ by more than 0.2 mg. Record the mass of the crucible (m_1).

Pour 25 g to 30 g of thoroughly mixed sample (see BS EN 1014-1) through the stainless steel filter (**G.3.8**) into a beaker (**G.3.1**), weigh to the nearest 0.1 g and record the mass of the sample (m_2). Add 100 ml of toluene (**G.2.1**) to the beaker, place a glass cover on the beaker, and heat on the boiling water bath. Cautiously stir the contents of the beaker with the glass rod. When the sample has dissolved, cover the beaker and leave on the water bath for about 10 min to allow the greater part of the insoluble matter to settle.

Heat approximately 200 ml of toluene (**G.2.1**) on the water bath (80 °C to 100 °C) for washing purposes.

Decant the supernatant solution in the beaker through the filter crucible, using gentle suction to assist filtration. With the hot toluene, quantitatively transfer the insoluble matter to the crucible and rinse out the beaker. Wash the filter and its contents three or four times using the remainder of the hot toluene.

Dry the crucible in the oven at 105 °C, cool in the desiccator and weigh to the nearest 0.1 mg. Repeat until successive weighings do not differ by more than 0.2 mg. Record the final mass of the crucible (m_3).

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G.5 Expression of results

Calculate the matter insoluble in toluene as a percentage by mass of the sample using the following equation:

$$\frac{(m_3 - m_1) \times 100}{m_2}$$

where

m_1 is the mass of the crucible (g);

m_2 is the mass of the test portion (g);

m_3 is the mass of the crucible and residue after drying (g).

Annex H (normative)
Method for the determination of naphthalene content by gas chromatography

H.1 Principle

A toluene solution of the creosote sample is analysed by gas chromatography using a flame ionization detector, and the response compared with that of a standard naphthalene solution.

H.2 Reagents and materials

NOTE. All reagents should be checked for purity by passing a sample through the chromatograph under the conditions of the determination (see **H.6**). If a response is obtained on the chromatogram that is likely to cause significant errors in the determination on the test sample, then the reagent or material should be rejected.

H.2.1 *Carrier gas*, nitrogen (N_2), oxygen-free.

H.2.2 *Detector gases*, hydrogen (H_2) and compressed air, to be used as directed by the manufacturers of the gas chromatograph.

H.2.3 *Toluene* [$C_6H_5CH_3$], giving no peaks that coincide with those of naphthalene or tetralin when 1 µl (see note) is analysed by gas chromatography.

NOTE. Some sample splitters may require a different injection volume to 1 µl. In these cases, account should be taken using the procedure given in **H.6.1.3**.

H.2.4 *Benzo[b]thiophene (thionaphthalene)*, of a purity such that, when used in the column performance solution (**H.5**), and the solution is analysed by gas chromatography, there are no additional peaks between the main, single peaks of naphthalene and benzo[*b*]thiophene.

H.2.5 *Naphthalene* [$C_{10}H_8$], minimum melting point 79.6 °C.

H.2.6 *1,2,3,4-tetrahydronaphthalene (tetralin)* [$C_6H_4(CH_2)_3CH_2$], showing no peaks that coincide with those of naphthalene by gas chromatography.

H.3 Apparatus

H.3.1 *Gas chromatograph*, fitted with a flame ionization detector and heated injection port with sample splitter, and the following:

a) a column temperature range of 130 °C to 200 °C;

b) the injection port temperature set at 200 °C to 250 °C;

c) a silica capillary column, approximately 25 m in length and 0.2 mm ID, coated with methyl silicone gum (OV1);

d) a potentiometric strip chart recorder with minimum chart width of 200 mm and maximum response time of 1 s.

NOTE. An electronic integrator may be used either in addition or as an alternative to the chart recorder.

H.3.2 *Micro-pipette*, syringe type, suitable for accurately injecting 1 µl portions into the gas chromatograph.

H.3.3 *Micro-pipette*, syringe type, able to accurately measure 100 µl.

H.3.4 *Analytical balance.*

H.3.5 *One-mark volumetric flasks*, capacity 10 ml, conforming to BS 1792.

H.4 Calibration solutions

Prepare duplicate calibration solutions of approximately the same composition by the following procedure.

Add approximately 0.1 g of naphthalene (**H.2.5**) to a tared 10 ml one-mark volumetric flask (**H.3.5**), stopper the flask, and weigh to the nearest 0.0002 g. Add carefully, from a syringe, 10 µl of 1,2,3,4-tetrahydronaphthalene (**H.2.6**), replace the stopper, and re-weigh. Dilute to the mark with toluene (**H.2.3**).

H.5 Column performance solution

Take approximately 0.01 g of naphthalene (**H.2.5**), weigh accurately and transfer quatitatively to a 10 ml one-mark volumetric flask (**H.3.5**). Take approximately 0.10 g of benzo[*b*]thiophene (**H.2.4**), weigh accurately and transfer quantitatively to the same 10 ml one-mark volumetric flask (**H.3.5**). Add toluene (**H.2.3**), first to dissolve, then to make up to the mark.

H.6 Procedure

NOTE. Throughout this procedure all solutions are analysed by injecting 1 µl samples into the gas chromatograph (see also the note to **H.2.3**).

H.6.1 *Setting up the gas chromatograph*

H.6.1.1 *Oven conditions*

For all analyses, maintain the column oven at 130 °C until the benzo[*b*]thiophene has been eluted. Then raise the oven temperature to 200 °C (either manually or by a temperature programmer) and maintain at this temperature until the rest of the sample has been eluted. Reset the oven to 130 °C, allowing sufficient time for the temperature to equilibrate before running the next sample.

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H.6.1.2 *Carrier gas*

Adjust the carrier gas flow to give a retention time for naphthalene of 15 min to 20 min.

H.6.1.3 *Detector signal*

If using a strip chart recorder, adjust the detector signal to give a naphthalene peak height of 50 % to 99 % of full-scale deflection.

H.6.1.4 *Column performance*

NOTE. The criteria in a), b), and c) should be checked during the adjustments to the chromatograph described in **H.6.1.1**, **H.6.1.2** and **H.6.1.3**.

Satisfy the following before the column is used for analysis:

a) that peaks to be measured are symmetrical, i.e. show no obvious tailing;

b) that the number of theoretical plates measured on the naphthalene peak is not less than 5000. The theoretical plate number (n) is calculated from the equation:

$$n = 16 \text{ (retention time/peak width)}^2$$

where both retention time and peak width are measured in length terms directly from the recorder chart;

c) that the separation between naphthalene and benzo[*b*]thiophene is such that the trough ratio is less than 0.2. The trough ratio is determined by dividing the height of the trough between two partially resolved peaks by the height of the smaller of the two peaks, both measurements being made from the baseline.

H.6.2 ***Calibration***

Analyse in turn 1 µl of each of the duplicate calibration solutions by chromatography (**H.4**), applying the conditions described in **H.6.1** to obtain separate chromatograms.

Measure the heights of the naphthalene and 1,2,3,4-tetrahydronaphthalene peaks from the chromatograms (or take the equivalent values from an integrator). Calculate the calibration factor f_n for each solution, from the formula:

$$f_n = \frac{H_t}{H_n} \times \frac{m_n}{m_t}$$

where

H_t is the peak height (or integrator reading) of 1,2,3,4-tetrahydronaphthalene;

H_n is the peak height (or integrator reading) of naphthalene;

m_t is the mass of 1,2,3,4-tetrahydronaphthalene in 10 ml of solution (g);

m_n is the mass of naphthalene in 10 ml of solution (g).

Determine the mean of the two factors.

H.6.3 ***Analysis***

If the approximate naphthalene content is not known, weigh 0.20 g of the test sample (see BS EN 1014-1) into a one-mark volumetric flask, dilute to 10 ml with toluene (**H.2.3**) and analyse 1 µl of the solution by chromatography under the same conditions as for the calibration (**H.6.2**).

NOTE. If the test sample requires warming to dissolve solid matter before analysis, care should be taken that volatile constituents are not lost.

Measure the peak height for naphthalene and compare this with the peak heights obtained from the calibration solutions. Calculate the approximate naphthalene content.

Weigh a test portion containing 0.05 g to 0.1 g of naphthalene into a tared 10 ml one-mark volumetric flask and dilute to the mark with toluene. Inject 1 µl of this solution into the chromatograph to obtain the first chromatogram. Weigh the flask and add 100 µl of 1,2,3,4-tetrahydronaphthalene as in the calibration. Shake and re-weigh the flask, and inject 1 µl of this solution into the chromatograph to obtain the second chromatogram.

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H.6.4 *Measurement of peak heights*

Draw in the peak base for each relevant peak on the chromatogram, and measure the vertical distance between the peak base and the apex of the peak.

NOTE. The peak base is defined as the interpolation line drawn between the start and the finish of the peak, and represents the base line that the chromatogram would have followed if the sample component forming the peak had not been present.

Record the peak heights for naphthalene and 1,2,3,4-tetrahydronaphthalene in the second chromatogram, and for naphthalene and any coincident peak at the 1,2,3,4–tetrahydronaphthalene retention time in the first chromatogram.

H.7 Expression of results

The naphthalene content of the test sample, as a percentage by mass, is given by the following formula:

$$\text{Naphthalene content} = \frac{(H_{n1} + H_{n2})}{2m_s} \times \frac{m_t}{(H_{t2} - H_{t1})} \times 100 f_n$$

where

f_n is the calibration factor;

m_t is the mass of 1,2,3,4-tetrahydronaphthalene added (g);

m_s is the mass of sample taken (g);

H_{n1} is the height of the naphthalene peak (or integrator reading) in the first chromatogram (mm);

H_{n2} is the height of the naphthalene peak (or integrator reading) in the second chromatogram (mm);

H_{t1} is the height of the peak (or integrator reading) at the 1,2,3,4-tetrahydronaphthalene retention time in the first chromatogram (mm);

H_{t2} is the height of the 1,2,3,4-tetrahydronaphthalene peak (or integrator reading) in the second chromatogram (mm).

If $H_{t1} = 0$, the formula simplifies to:

$$\text{Naphthalene content} = \frac{(H_{n1} + H_{n2})}{2m_s} \times \frac{m_t}{H_{t2}} \times 100 f_n$$

Annex I (informative)

Guidance on the methods of treatment of timber

Introduction

This annex gives guidance on the methods that can be used for the treatment of timber with creosote.

The method to select depends on the end use of the treated timber and the penetration and retention of creosote required by the specifier.

NOTE. Guidance on the treatment of timber with preservatives and an introduction to the European Standards for wood preservation is given in BS 1282 and DD239 (in preparation).

I.1 Condition and preparation of timber for treatment

I.1.1 *Moisture content*

Unless otherwise specified, or when using the Boulton process (see **I.2.6.5**), the average moisture content of the timber should not exceed 28 % (*m/m*) on an oven dry basis.

The Boulton process can be used on green or unseasoned timber, to ensure a moisture content of 28 % (*m/m*) or lower before continuing with a full cell or empty cell process.

NOTE. If timber is frozen, the penetration power of preservative is limited, so treatment should not be carried out in this condition.

I.1.2 *Incising*

If incising the timber is specified, incisions should be made parallel to the general direction of the grain. Incisions (usually of up to 20 mm in length) should penetrate to a depth of approximately 20 mm, and should be spaced 25 mm apart across the timber, in rows extending across all faces of the timber. The distance between each row along the timber should be 60 mm, and incisions in adjacent rows should not be in direct line but staggered at intervals of approximately 6 mm (i.e. incisions in every fourth row are in direct line, see figure I.1).

NOTE 1. Sawn timbers rated as resistant to preservative (e.g. Douglas fir), of thickness 75 mm or more, and intended for exterior use, can benefit from incising before treatment.

NOTE 2. For definitions of resistant or extremely resistant timber, refer to BS EN 350–1 and BS EN 350-2.

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I.2 Processing by pressure impregnation with creosote types 1, 2 or 4

I.2.1 *General*

Many different schedules for applying creosote under pressure have been devised; each requires the timber to be contained in a pressure cylinder and uses hot creosote with varying combinations of time, temperature, pressure and vacuum. Details of the most commonly used processes in the UK are given in **I.2.6.2**, **I.2.6.3** and **I.2.6.4**. An associated process that may be used to condition green or unseasoned timber prior to pressure impregnation, the Boulton process, is described in **I.2.6.5**.

Full cell processes are normally used where high absorption of creosote is required or where impermeable species are being treated. After treatment, the timber cells are nearly full of creosote, which may give rise to exudation of free creosote on the surface of the timber when in service.

Empty cell processes are normally used when permeable species are being treated, and the high absorption resulting from a full cell process is not necessary. After treatment, the timber cells contain almost no creosote, minimizing exudation of creosote on the surface.

I.2.2 *Stacking in the cylinder*

The timber should be stacked in the cylinder so that the creosote can reach all surfaces. If necessary, the timber should be separated by sticks or laths.

NOTE 1. Consideration of stacking is particularly important when planed timber is to be treated.

NOTE 2. Only timbers of the same species and similar cross-sectional areas should be treated in the same charge, and differing timbers should be separated unless the most intense schedule can be applied without detriment to the more easily treated timbers.

I.2.3 *Applied pressure and temperature*

The applied pressure should be a gauge pressure not lower than 10 bar and not higher than 14 bar. During the pressure period, the minimum temperature for type 1 and type 2 creosote should be 65 °C and the maximum temperature should be 100 °C.

For type 4 creosote the minimum temperature should be 90 °C and the maximum 125 °C.

I.2.4 *Pressure period*

The pressure period should be measured from the time the specified maximum working pressure (**I.2.3**) is reached. Pressure should be maintained until the required penetration and retention has been achieved.

I.2.5 *Penetration and retention*

I.2.5.1 *General*

The method that should be used by specifiers to describe the quality of treatment required in preservative-treated timber is given in BS EN 351. This method requires the result of the treatment to be expressed rather than the treatment process. The result is described in terms of the preservative penetration into the wood, and the retention of the wood preservative in the defined analytical zone.

NOTE 1. It is anticipated that penetration and retention requirements may be routinely achieved through a defined treatment process, provided that it has been established that the defined process is able to produce treated timber with the required penetration and retention values.

NOTE 2. Guidance on methods for sampling treated timber to determine penetration and retention values is presented in BS EN 351-2.

I.2.5.2 *Penetration*

Listed in BS EN 351-1 are nine penetration classes that can be used to specify penetration, starting from P1 (no penetration requirement) to P9 (full sapwood penetration and a minimum of 6 mm penetration of exposed heartwood).

I.2.5.3 *Retention*

The average retention for the charge, determined at the analytical zone (according to BS EN 351-1), should be not less than that specified. Retention values are based upon the critical value of the preservative for the hazard class concerned (see BS EN 599-1).

I.2.6 *Treatment schedules*

I.2.6.1 *General*

The timber should be treated with coal tar creosote of type 1, type 2 or type 4, using one of the procedures described in **I.2.6.2** to **I.2.6.4**, subject to any additional requirements of the user.

The Boulton process (see **I.2.6.5**) is essentially a conditioning process, and is particularly applicable to treatment of unseasoned timber. Immediately following treatment by this process, timber can be further treated using one of the processes detailed in **I.2.6.2** to **I.2.6.4**.

NOTE. The Boulton process is a very severe treatment process, and unless extreme caution is exercised, breakdown of the timber structure may occur. The process should only be used with prior agreement with the customer.

I.2.6.2 *Full cell (Bethel) process*

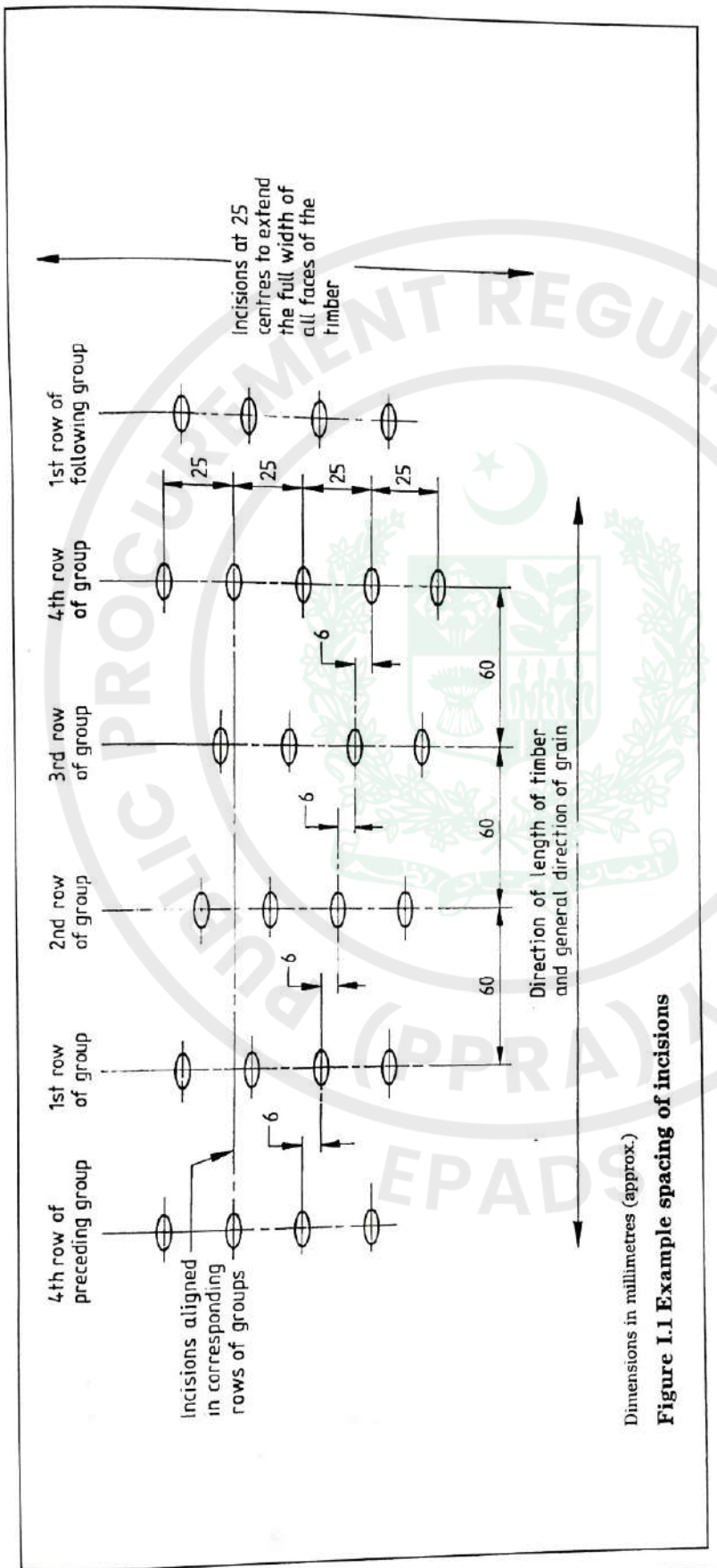
In the Bethel process, timber is enclosed in a pressure cylinder, and a vacuum of at least − 0.75 bar applied. Hot creosote is introduced into the cylinder until the cylinder is full, and the vacuum is then released.

Next, a pressure of sufficient magnitude (see **I.2.3**) is applied and maintained long enough to ensure that the requirements regarding penetration and retention (see **I.2.5**) are met.

The pressure is released and the cylinder emptied of creosote. Finally, a vacuum of not less than − 0.75 bar is applied so that the timber is substantially free from surplus creosote before removal from the cylinder.

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Dimensions in millimetres (approx.)

Figure I.1 Example spacing of incisions

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I.2.6.3 *Empty cell (Rueping) process*

In the Rueping process, timber is enclosed in a pressure cylinder, and an air pressure greater than atmospheric pressure but not exceeding 4 bar applied. While the gauge pressure is maintained, hot creosote is introduced into the cylinder until the cylinder is full. The pressure is increased to a sufficient magnitude and maintained for long enough to ensure that the requirements regarding retention and penetration (see **I.2.5**) are met.

The pressure is then released and the cylinder emptied of creosote. A final vacuum of not less than − 0.75 bar is applied for a sufficient period to ensure that the air in the cylinder has expanded and forced out any free creosote from the cells of the timber, reducing the creosote retention.

NOTE. With most permeable timber, creosote retention can be raised by lowering the initial air pressure.

I.2.6.4 *Empty cell (Lowry) process*

The procedure for the Lowry process is the same as for the Rueping process (**I.2.6.3**), except that the air in the cylinder is maintained at atmospheric pressure until the cylinder is full.

NOTE. Creosote retention by the Lowry process is normally higher than with the Rueping process.

I.2.6.5 *Boulton process (boiling under vacuum)*

In the Boulton process, timber is enclosed in a pressure cylinder, and sufficient hot creosote introduced to immerse the timber but ensuring that an air space is left. A vacuum is applied to the cylinder and a sufficiently high temperature maintained so that the water in the timber boils under the vacuum.

The boiling water vapour is condensed and measured in a suitable receiver. When sufficient water has been extracted to achieve the required moisture content in the timber, the process is halted by releasing the vacuum and emptying the creosote from the cylinder.

NOTE. This treatment can be followed immediately by pressure impregnation using any of the processes detailed in **I.2.6.2** to **I.2.6.4.**

I.3 Processing by hot-and-cold open tank with creosote types 1, 2 or 3

I.3.1 *Treatment materials*

The treatment material should be coal tar creosote conforming to either type 1, type 2 or type 3.

I.3.2 *General method*

The hot-and-cold open tank process can be carried out in any convenient open tank or drum suitable for the size and quantity of wood to be treated. It is essential to provide some means of lifting the timber in and out of the tank, and to ensure that the timber is completely submerged in the creosote during treatment. The timber is immersed in the creosote and then heated safely to (90 ± 5) °C (see caution), causing air to be extracted from the timber by expansion (the vapour pressure within the wood also increases, expelling further air). The temperature is maintained for at least 1 h, depending on the size and permeability of the timber, after which the creosote and timber are allowed to cool. On cooling, the remaining air in the timber contracts and the vapour pressure decreases, creating a partial vacuum that draws the creosote into the wood.

Caution. Naked flames should not be used for heating. Smoking and other potential sources of ignition should be avoided, because the creosote may be heated above its flash point.

NOTE 1. Practically all of the creosote absorption takes place during the cooling period. For this reason, equivalent results are not obtained if the timber is merely immersed in the hot preservative for steeping.

NOTE 2. Permeable species often absorb much more creosote than necessary. Excess creosote can be removed by reheating the charge to 85 °C to 95 °C for about 1 h, then removing the timber while still hot. During reheating, up to 50 % of the retained creosote is expelled.

I.3.3 *Variations*

I.3.3.1 It is permissible to vary the hot-and-cold open tank method in a number of ways. For example, cooling can be achieved more quickly by transferring the timber to a tank of cold preservative, or the timber can be preheated for 1 h or 2 h by any convenient alternative means, such as with hot air, before transferring into cold creosote.

I.3.3.2 A convenient but less efficient variation of the hot-and-cold open tank method, used to treat small numbers of fence posts, is the butt-treatment process. The fence posts are placed upright in a drum with only their ends immersed in the creosote, therefore covering the part of the post which will be in or near the ground, and then heated and cooled as described before.

I.4 Processing by brushing and immersion

I.4.1 *Treatment materials*

The treatment material should be coal tar creosote conforming to type 3.

I.4.2 *Brushing*

NOTE 1. Brushing is the easiest but generally the least effective method of applying wood preservatives.

NOTE 2. In situ brush treatment of outdoor timber is best carried out between late spring and early autumn, after a period of dry weather, when the surface of the timber is warm and dry. The timber is then in its most absorbent state, and the higher prevailing temperatures aid penetration. It is advisable to re-treat the timber periodically.

The creosote should be applied liberally and the timber allowed to absorb as much as possible, particularly into the sapwood and end grain. It is essential to cover the whole of the surface thoroughly and to ensure that the creosote penetrates into all the splits and surface checks. More than one coating should be applied and the timber allowed to dry between applications.

I.4.3 *Immersion*

The timber should be submerged in cold preservative for the period required by the appropriate commodity specification.

NOTE. The efficiency of this method largely depends on the species, sapwood content and period of immersion. Fairly deep penetration may be obtained with some species of timber if left in the preservative for several days or even weeks. Resistant timbers, however, will merely show surface penetration.

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List of references

Normative references

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