



टाटा मूलभूत अनुसंधान संस्थान हैदराबाद /
TATA INSTITUTE OF FUNDAMENTAL RESEARCH HYDERABAD

परमाणु ऊर्जा विभाग की स्वायत्त संस्था, भारत सरकार
Autonomous Institution of the Department of Atomic Energy, Government of India

सर्वेक्षण सं. 36/पी, गोपानपल्ली गांव, सेरिलिंगमपल्ली मंडल, रंगारेड्डी जिला, हैदराबाद - ५०० ०४६, तेलंगाना।
Survey No.36/P, Gopanpally village, Serilingampally Mdl., Rangareddy Dist., Hyderabad - 500 046, Telangana.

टेलीफोन / Telephone: +91-40-2020-3010
वेबसाइट / Website : www.tifrh.res.in

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तिथि / Date: 08.09.2026

NOTICE INVITING TENDER

निम्नलिखित कार्यों के लिए निविदा सह निविदा दस्तावेज (दो भाग सार्वजनिक निविदा) आमंत्रित करने की सूचना /
Notice Inviting Tender cum Tender Document (Two Part Public Tender) for the following works

Construction of MS Supporting structure for Over Head Water tank (OHT) of Fire services and Emergency External Staircase for Fire Exit Route for TRISHUL Building in Plot-B at TIFRH	
निविदा सं. / Tender No.	TIFR/PD/CF26-76/260899
प्रकाशन की तिथि / Date of Publishing	08.09.2026
निविदा का प्रकार / Type of Tender	Two Bid System (Part-I: Technical cum eligibility Bid and Part-II: Financial Bid)
अनुमानित लागत / Estimated Cost	Rs.22,43,323/- (Inclusive of GST)
Location	Tata Institute of Fundamental Research 36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy District, Hyderabad 500046
ईएमडी की लागत / Cost of EMD (Earnest Money Deposit)	Rs.44.866/- (Demand Draft / Online Payment, payment receipt to be enclosed with the Technical Bid Part – I).

बोली-पूर्व बैठक की तिथि और समय / Pre-Bid Conference: (a) Date & Time: (b) Zoom Link (c) Venue:	11.09.2026 at 12:00 Hrs. For Pre-bid conference Zoom link, check TIFRH webpage-Tenders- TIFR/PD/CF26-76/260899 TIFR, Survey No. 36/P, Gopanpally (Village), Serilingampally (Mandal), Ranga Reddy Dist., Hyderabad-500046. Phone: 040-2020-3001
निविदा प्रस्तुत करने की अंतिम तिथि / Last Date for Submission of Tender	17.09.2026 by 13:00 Hrs.
बोली खोलने की तिथि (केवल भाग-I: तकनीकी बिड) / Date of Opening Bids (Only Part-I: Technical Bid)	17.09.2026 by 15:00 Hrs.

टिप्पणी / NOTE:

- प्रतिष्ठित अनुसंधान संस्थानों, विश्वविद्यालयों, केंद्र सरकार / सार्वजनिक क्षेत्र के उपक्रम, निजी प्रयोगशालाओं, बहुराष्ट्रीय कंपनियों आदि में समान कार्य अनुभव रखने वाले ठेकेदारों से उपर्युक्त कार्यों के लिए सीलबंद ऑइटम दर निविदाएं आमंत्रित की जाती हैं। इच्छुक ठेकेदार जो टीआईएफआर, हैदराबाद द्वारा निर्धारित पात्रता मानदंडों को पूरा करते हैं, केवल अपनी बोलियां प्रस्तुत करेंगे। /
 Sealed Item Rate Tenders are invited for the aforementioned works from contractors having similar work experience in reputed Research Institutions, Universities, Central Government/Public Sector Undertaking, Private Laboratories, Multinational Companies, etc. Interested contractors who are satisfying eligibility criteria stipulated by TIFR, Hyderabad shall only submit their bids.
- तकनीकी सह पात्रता बोली (भाग-I) और वित्तीय बोली (भाग-II) दोनों को बोलीदाता द्वारा अलग-अलग लिफाफों में विधिवत रूप से लिखा हुआ सीलबंद किया जाना चाहिए और इन दोनों सीलबंद लिफाफों को एक बड़े लिफाफे में रखा जाना चाहिए, जिसे भी सीलबंद किया जाना चाहिए और उस पर निविदा संख्या, विवरण और नियत तारीख लिखी होनी चाहिए। /
 Both Technical cum eligibility Bid (Part-I) and Financial Bid (Part-II) should be sealed by the bidder in separate envelopes duly super-scribed and both these sealed covers are to be put in a bigger envelope which should also be sealed and duly super-scribed with the Tender No., Description and Due Date.
- यदि “भाग-I” और “भाग-II” बोलियां अलग-अलग लिफाफों में सीलबंद नहीं की जाती हैं तो निविदा अस्वीकार कर दी जाएगी। / In case, the “Part-I” and “Part-II” bids are not sealed in separate envelopes, the tender shall be rejected.
- तकनीकी बोली में मूल्य का कोई संकेत नहीं होना चाहिए। / Technical bid should not contain any indication of the price.

- बिना ईएमडी/अपर्याप्त ईएमडी के साथ प्राप्त तकनीकी बोली को सरसरी तौर पर अस्वीकार कर दिया जाएगा। / The Technical Bid received without EMD/with Insufficient EMD shall be summarily rejected.
- हाथ से डिलीवरी/कूरियर द्वारा भेजी गई बोलियां, टीआईएफआर, हैदराबाद सुरक्षा कार्यालय के सुरक्षा कर्मचारियों से मुहर, तारीख और हस्ताक्षर प्राप्त करने के बाद उन्हें सौंप दी जानी चाहिए। / Bids sent by hand delivery/courier are to be handed over to the security staff at TIFR, Hyderabad security office after obtaining stamp, date and signature from them.
- निविदा में उल्लिखित किसी भी तकनीकी या वाणिज्यिक शर्तों के स्पष्टीकरण के लिए श्री कृष्णा ए ई, टेलीफोन: **040-2020-3007**, ई-मेल: pkasi@tifrh.res.in से संपर्क करें। / Contact Mr.P.Kasiviswanath, Tel: **040-2020-3007**, Email Id: pkasi@tifrh.res.in for any technical or commercial terms clarifications mentioned in the tender.
- बोलियाँ प्रमुख, तकनीकी सेवाएँ, प्लॉट संख्या 36/पी, गोपनपल्ली गाँव, सेरिलिंगमपल्ली मंडल, रंगा रेड्डी जिला, हैदराबाद- ५०० ०४६, तेलंगाना, भारत को संबोधित की जानी चाहिए। / The Bids should be addressed to Head, Technical Services, Plot No.36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy District. Hyderabad- 500 046, Telangana, India.
- भविष्य में सभी शुद्धिपत्र/परिशिष्ट टीआईएफआर हैदराबाद वेबसाइट/सीपीपी पोर्टल पर प्रकाशित किए जाएंगे और इसके लिए कोई अलग विज्ञापन जारी नहीं किया जाएगा। सभी संभावित बोलीदाताओं से अनुरोध है कि वे ऐसे किसी भी अपडेट/शुद्धिपत्र के लिए नियमित रूप से हमारी वेबसाइट देखें। / All future corrigendum/addendum will be published on TIFR Hyderabad website / CPP portal and no separate advertisement will be released for the same. All prospective bidders are requested to visit our website regularly for any such updates/corrigendum.
- कृपया संलग्न बोली दस्तावेज देखें जिसमें विनिर्देश, निष्पादित की जाने वाली विभिन्न प्रकार की वस्तुओं की मात्रा की अनुसूची और अनुबंध की शर्तों का पालन किया जाना तथा अन्य आवश्यक दस्तावेज शामिल हैं जिन्हें टीआईएफआरएच वेबसाइट / सीपीपी पोर्टल से भी देखा और डाउनलोड किया जा सकता है। / Please see the attached bid document consisting of specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents which can also be seen and downloaded from TIFRH website / CPP portal.

After making the transfer, the Contractor/Vendor shall share the UTR/Transaction Reference No., date and amount with the Technical Services Section for verification and record.

- निविदा प्रस्तुत करने की अंतिम तिथि 17.09.2026 को 13:00 बजे तक है। / Last date for submission of the tender is 17.09.2026 by 13:00 Hrs.



प्रमुख, तकनीकी सेवा विभाग /
Head, Technical Services Dept.
टीआईएफआर, हैदराबाद / TIFR, Hyderabad.

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CHAPTER-I INFORMATION AND INSTRUCTIONS TO BIDDERS

1. INTRODUCTION: The Tata Institute of Fundamental Research (TIFR) is a National Centre of the Government of India, under the umbrella of the Department of Atomic Energy, as well as a deemed University awarding degrees for master's and doctoral programs. Webpage: <https://www.tifrh.res.in>

2. DEFINITION OF TERMS: In constituting these general conditions and the annexed specifications, the following words shall have the meanings herein assigned to them unless there is something in the subject or context inconsistent with such construction.

2.1. The term 'TIFR, Hyderabad' shall mean Tata Institute of Fundamental Research, Hyderabad, 36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy District, Hyderabad 500046 and shall include the TIFR, Hyderabad's heirs, successors and assigns.

2.2. The term 'Engineer' and 'Engineer-in-Charge' shall mean Engineer-in-Charge, TIFR, Hyderabad or such other officers as may be duly authorized and appointed in writing by the TIFR, Hyderabad to act as Engineer-in-Charge for the purposes of the Contract.

2.3. The term 'Bidder' shall mean any individual or organization that submits a proposal or offer in response to the invitation to tender for participating in a Tender Process.

2.4. The term "Contractor or Supplier" shall mean the tenderer whose tender has been accepted by the TIFR, Hyderabad for award of contract and shall include such tenderer's heirs, successors and assigns approved by the TIFR, Hyderabad.

2.5. The term 'Sub-Contractor' shall mean the firm or person other than the contractor named in the contract for any part of the work or any person to whom any part of the work has been sublet by the contractor with the consent in writing of the Engineer-in-Charge and shall include such person's heirs, successors and assigns approved by the TIFR, Hyderabad.

2.6. The Term 'Inspector' shall mean any person appointed by or on behalf of the TIFR, Hyderabad to inspect supplies, stores or work under the contract or any person deputed by the Inspector for the purpose.

2.7. The term 'Particulars' shall mean, the following:

2.7.1. Specifications

2.7.2. Drawing

2.7.3. Sealed Pattern denoting a pattern sealed and signed by the Inspector.

2.7.4. Proprietary make denoting the product of an individual firm.

2.7.5. Any other details governing the construction, manufacture and/or supply as existing for the contract.

2.8. The term 'Specifications' shall mean the specifications annexed to or issued with these Conditions of Contract.

2.9. The term 'Site' shall mean the whole of the premises, buildings and grounds in or upon which the work or works is / are to be provided, executed, erected, done or carried out.

2.10. The term 'Equipment' shall mean and include any equipment, stores and materials to be provided and work to be done by the contractor under the contract.

2.11. The term 'Contract' shall mean letter of Intent / Award, Letter of Acceptance of Tender and shall include the conditions of contract, specifications, schedules, tender, guarantee, drawings and any further conditions which may be specifically agreed to between the parties as forming a part of the contract.

2.12. The term 'Tests' shall mean such tests as prescribed in the contract and as instructed by the Engineer-in-Charge to be performed by the contractor before the works are finally accepted by the TIFR, Hyderabad ready for commercial use complete with all items to the satisfaction of the Engineer-in-Charge.

2.13. The term 'Writing' shall include any manuscript, typewritten or printed statement under or over signature and / or seal as the case may be. Words importing singular shall also include plural and vice versa where context requires.

2.14. The term 'Item Rate Tender' shall mean tenders in which the contractors are required to quote rates for individual items of work as given in the schedule of quantities.

3. SCOPE & OBJECTIVE:

3.1. The Objective of the tender is to execute “**Construction of MS Supporting structure for Over Head Water tank (OHT) of Fire services and Emergency External Staircase for Fire Exit Route for TRISHUL Building in Plot-B at TIFRH**” at TIFR Survey No. 36/P, Gopanpally (Village), Serilingampally (Mandal), Ranga Reddy Dist., Hyderabad – 500 046 as per the specifications and Bill of quantities mentioned in the Financial Bid.

3.2. Period of Completion of Work: **180 days** from the date of signing the work order and Contract / agreement.

3.3. Defect Liability Period: **12 months** from the date of handing over of completed work as per the tender.

4. INSTRUCTIONS:

4.1. Pre-Bid Conference: All prospective bidders are requested to attend a pre-bid conference on the time, date and venue (in-person) / zoom meeting (online) mentioned in the NIT above & TIFRH Tenders webpage for clarification on the Tenders' technical specifications and commercial conditions, besides discussions on any additional suggestions proposed by the bidders. If found necessary, a corrigendum to the tender documents would be issued and would be put up on TIFRH website for information of all contractors and thereafter no further query/condition shall be entertained.

4.2. Site visit by the tenderer: The tenderer is advised to visit the site of work, at his own cost, and examine it and its surroundings to himself collect all information that he considers necessary for proper assessment of the prospective assignment.

4.3. Sufficiency of Tender: The tenderer shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the rates and prices quoted in the Schedule of Quantities, which rates and prices shall, except as otherwise provided, cover all his obligations under the Contract and all matters and things necessary for the proper completion and maintenance of the works.

4.4. Submission of Bids: Bids shall be submitted to Head, Technical Services, TIFR, Survey No. 36/P, Gopanpally (Village), Serilingampally (Mandal), Ranga Reddy Dist, Hyderabad- 500046 in a **sealed Master envelope** superscribed with Tender No. **TIFR/PD/CF26-76/260899**, Description: **“Construction of MS Supporting structure for Over Head Water tank (OHT) of Fire services and Emergency External Staircase for Fire Exit Route for TRISHUL Building in Plot-B at TIFRH”** and **Due date:17.09.2026 upto 13:00 Hrs, containing two separate sealed covers clearly super-scribed as “Technical Bid” and “Financial Bid”** before the closing date and time of submission in the following manner:

4.4.1. “Technical cum eligibility Bid (Part-I)”: This will contain Technical part, Eligibility Documents along with testimonials and Earnest Money Deposit (EMD) which shall be submitted in the form of Online Payment / Demand Draft / Pay Order / Banker’s cheque issued by a Scheduled Bank, drawn in favor of “Tata Institute of Fundamental Research Hyderabad”, Payable at Hyderabad, (To be enclosed with the Technical Bid (Part-I)).

4.4.2. “Financial Bid (Part-II)”: This will contain the complete financial bidding document duly filled in Schedule of Financial Quote & Tender Drawings.

4.5. Evaluation of Technical Bids: The technical bids received will be opened first and examined for EMD, Eligibility Criteria, Conditions, etc. Tenders without EMD shall be summarily rejected.

4.6. Evaluation of Financial Bids: Financial Bids of technically qualified bidders will only be opened. The financial bids should contain the complete financial bid document duly filled in Schedule of Financial Quote of Financial Bid and signed along with Tender drawings. Work will be awarded to the lowest bidder (L1) based on the financial evaluation.

4.7. Other Instructions:

4.7.1. The Contractor should adhere to the building bye-laws applicable for the area.

4.7.2. The submission of the bid by the bidder would imply that they have carefully read and agreed to the terms and conditions contained in this bid document.

4.7.3. This notice inviting bid document shall form a part of the contract document.

4.7.4. Canvassing, either directly or indirectly, in connection with the tenders is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable to rejection.

CHAPTER-II**TECHNICAL CUM ELIGIBILITY BID (Part-I):
TENDER ELIGIBILITY CRITERIA****TECHNICAL CUM ELIGIBILITY BID
(PART-I)**

- (i) Earnest Money Deposit as stipulated.**
- (ii) “Eligibility Criteria” & “Schedules” for tender qualification.**

1. Earnest Money Deposit (EMD):

1.1. EMD shall be submitted in the form of Demand Draft/Pay Order/Banker's cheque issued by a Scheduled Bank, drawn in favor of "Tata Institute of Fundamental Research Hyderabad", Payable at Hyderabad, (To be enclosed with the Technical Bid (Part-I)).

Or

The applicable EMD may be remitted through online bank transfer to the following TIFR bank account:

Beneficiary Name	: TATA INSTITUTE OF FUNDAMENTAL RESEARCH HYDERABAD
Bank Account No	: 32994991036
Bank & Branch name	: State Bank of India, HUC Branch (HYD)
Bank Address	: Hyderabad University Campus, Gachibowli, Dist : Ranga Reddy, Hyderabad - 500019.
Branch Code	: 05916
IFSC Code	: SBIN0005916
SWIFT Code	: SBININBB214

**2. Eligibility Criteria: Contractors who fulfil the following requirements
shall ONLY be eligible to apply:**

2.1. The bidder should hold a valid labour license issued by appropriate authority and must be valid throughout the contractual period.

2.2. The bidder should provide copy of the following certificates:

- PAN card from Income Tax Authority.
- GST registration document.

2.3. The bidder should submit IT Returns documents for the last three consecutive financial years ended on March 31, 2025 audited by the licensed Chartered Accountant.

2.4. Turnover: The bidder should have an average annual financial turnover (gross) of **Rs.6.73 Lakhs** during the immediate last three consecutive financial years ending March 31, 2025 (certificate from licensed Chartered Accountant to be provided). The value of annual turnover figures shall be brought to current value by enhancing the actual turnover figures at a simple rate of 7% per annum.

2.5. Profit/Loss : The bidder should not have incurred any loss (profit after tax should be positive) in more than two years during the immediate last five consecutive financial years ending 31st March, 2025 certified and audited by the Chartered Accountant.

2.6. Experience:

2.6.1. The bidder should have an experience of having successfully completed similar works in Research Institutes, Universities, Private Laboratories, R & D institutes, etc. in any Government

/PSU/Private organizations of repute during the last seven years ending last day of the month previous to the one in which tender is invited.

- Three similar completed works each costing not less than **Rs.8.97 Lakhs**, or
- Two similar completed works each costing not less than **Rs.13.46 Lakhs**, or
- One similar completed work costing not less than **Rs.17.95 Lakhs**.
- The value of work executed shall be brought to current costing level by enhancing the actual value of work at a simple rate of seven (7) percent per annum, calculated from the date of completion to the date of Bid opening.

2.6.2. The bidder should furnish copies of work orders and completion certificates in support of the aforementioned works information.

2.6.3. Important Notes:

- a) 'Similar work' shall mean: "Similar Construction of MS Supporting structure Works"
- b) 'Cost of work' shall mean gross value of the completed work including the cost of materials supplied to the Client, but excluding those supplied free of cost. The applicant's performance for each work completed in the last seven (7) years should be certified by an officer not below the rank of Executive Engineer or equivalent, wherever such designation exists.
- c) The bidder should have a full-fledged in-house project management team to undertake the jobs.
- d) Bidder's non-adherence to furnishing of information in the given format/schedule will lead to disqualification of the tender.

2.7. The bidder should submit the Local Content Certificate as per Annexure-III enclosed with this tender document in 'Chapter-VI: Annexures'.

2.8. The bidder should not be blacklisted by any office / department of Central / State Government / Public Undertaking etc. The bidder should submit the undertaking form as per 'Annexure-VI' enclosed with this tender document in 'Chapter-VI; Annexures'.

(On bidder/firm's letterhead)

SCHEDULE – A
PROFILE AND DETAILS OF THE BIDDER

1. Name of the firm :
2. a) Address of the firm :
- b) Telephone No. :
- c) Mobile No. of Contact Person :
- d) Valid email id:
3. Type of Organization (Proprietorships / Partnership) Ltd. Co. / Co-Operative) (Copy of relevant document to be enclosed) :
4. Firm Registration Details: :
 - a) Year of Establishment / Date of Incorporation
 - b) Registration No.
 - c) GST Registration No.
 - d) Income Tax No. (PAN)
 - e) Labour License Details
5. Nature of Business :
6. Experience as prime Agencies/ Contractors (in Yrs.) :
7. Name and address of Bankers :
8. Organization chart of the Company including names and positions of directors :

SCHEDULE – B

DETAILS OF ELIGIBLE SIMILAR NATURE OF WORKS COMPLETED DURING THE LAST SEVEN YEARS ENDING PREVIOUS DAY OF LAST DAY OF SUBMISSION OF TENDERS

(I) Major “Similar Construction of MS Supporting Structural Works” (Copies of work orders and completion certificates are to be provided)

- Three similar completed works each costing not less than **Rs.8.97 Lakhs**, or
- Two similar completed works each costing not less than **Rs.13.46 Lakhs**, or
- One similar completed work costing not less than **Rs.17.95 Lakhs**

Sr. No.	Name of work/ project and location	Description of work in brief	Name of the Engineer with full postal address.	Name of the client, also specify whether Govt. / Semi Govt. / Pvt. body with full postal address	Contract Amount in (Rs.)	Year of commencement	Date of Completion		Whether work was completed /uncompleted/ the contract was terminated from either side? Give Details.	Any other relevant information
							Stipulated Date	Actual Date		
1.										
2.										

(II) List of works / projects under execution above **Rs.8.97**

Sr. No.	Name of work/ project and location	Description of work in brief	Name of the Engineer with full postal address.	Name of the Client, also specify whether Govt. or semi Govt. or Pvt. Body with full postal address	Contract Amount in (Rs.)	Stipulated date of work completion	Present stage of work; Slow progress if any, and reasons thereof	Any other relevant information
1.								
2.								
3.								

SCHEDULE – C**TECHNICAL PERSONNEL AND THEIR SPECIFIC EXPERIENCE**

1. List of technical personnel in your establishment and give details about their technical qualification and experience:

Sr. No.	Name	Age	Qualification	Project Experience	Nature of works handled	Name of the project Handled	Date of employment in your organization	Indicate specific experience in “similar works” which he/she was employed
1								
2								

2. Indicate other points if any, to show your technical and managerial competency to indicate any important points in your favour.

(On bidder/firm's letterhead)

SCHEDULE – D

FINANCIAL POSITION AND WORKING RESULTS

		<u>2022-23</u>	<u>2023-24</u>	<u>2024-25</u>
1	Annual turnover	:	Rs.	
2.	Net Profit	:	Rs.	
3.	Credit Facilities from the Bank	:	Rs.	
	a) Cash Credit	:	Rs.	
	b) Overdraft Limit	:	Rs.	
	c) Guarantee	:	Rs.	
	d) Others	:	Rs.	
4.	Certificate from the Bankers regarding financial soundness of the applicant	:	Enclosed (Yes / No)	
5.	Solvency Certificate from the Bankers	:	Enclosed (Yes / No)	

(Authorised Signatory)

(On bidder/firm's letterhead)

SCHEDULE – E

MISCELLANEOUS INFORMATION

- 1 Whether it would be possible to process Bank Guarantee for various advances during execution of the work.
- 2 Details of Civil Suits / Litigations arose during execution of the contracts in the last 5 years.
- 3 Latest Income Tax Clearance Certificate
- 4 Name of the two senior officials of Organizations preferably Govt./Semi Govt/ Autonomous/ Public Sector Organization for whom you have executed important and major similar works who may be directly contracted by TIFR to gather information about your ability, competence and capacity of your work/organization/etc.
- 5 Number of Supplementary sheets attached.

CHAPTER- III**TERMS & CONDITIONS OF THE CONTRACT****1. Validity Period of Tender:**

1.1. The validity period for acceptance of tender shall be of 75 (Seventy Five) days from the last day of receipt of technical bid, further

(a) If any tenderer withdraws his tender or makes any modification in the terms & conditions of the tender which is not acceptable to TIFR within 7 days from the last date of submission of bids, then the TIFR shall without prejudice to any other right or remedy, be at liberty to forfeit 50% of earnest money absolutely irrespective of whether a letter of acceptance for the work is issued or not.

(b) If any tenderer withdraws his tender or makes any modification in the terms & conditions of the tender which is not acceptable to TIFR after 7 days from the last date of submission of bids, then TIFR shall without prejudice to any other right or remedy, be at liberty to forfeit 100% of the earnest money absolutely irrespective of whether a letter of acceptance for the work is issued or not.

2. Acceptance of Tender:

2.1. The Competent Authority, on behalf of TIFR, Hyderabad reserves to itself the right of accepting the whole or any part of the tender and the tenderer shall be bound to perform the same at the rates quoted. The officer inviting tenders shall have the right of rejecting all or any of the tenders and will not be bound to accept the lowest tender or any other tender.

2.2. "Letter of Intent": A "Letter of Intent (LOI)" will be issued as an intimation to the successful tenderer / contractor that his/her tender has been accepted and the successful tenderer / contractor should submit the requirements within the due date specified in the LOI.

3. Performance guarantee:

3.1. The successful tenderer / contractor shall submit an irrevocable Performance Guarantee (PG) amounting to 5% of the contract value within 7 (seven) working days from the date of issue of the "Letter of Intent (LOI)" in addition to other deposits mentioned elsewhere in the contract for his proper performance of the contract agreement.

3.2. The performance guarantee shall be in the form of Online Payment / Demand Draft / Pay Order / Banker's cheque / Government Securities / Fixed Deposit Receipt (FDR) or Guarantee Bonds of any Scheduled Bank in accordance with the form as Annexure – I hereto. In case a fixed deposit receipt of any Bank is furnished by the contractor to TIFR as part of the performance guarantee and the Bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to TIFR to make good the deficit.

3.3. The Performance Guarantee shall be initially valid up to the stipulated date of completion period plus 60 days beyond the date of completion of all contractual obligations of the contractor including warranty obligations. In case the time for completion of work gets

enlarged, the contractor shall get the validity of performance Guarantee extended to cover such enlarged time for completion of work.

3.4. The letter for commencement of work / work order shall be issued to the contractor only after he/she submits the performance guarantee in an acceptable form within 7 (seven) working from the date of issue of the “Letter of Intent (LOI)”.

3.5. The Performance Security shall be released without interest after the contractor has duly performed and completed all contractual obligations, including the Defect Liability/Warranty Period, and subject to adjustment/recovery of any dues, in accordance with the terms of the contract, by the competent authority.

3.6. The Engineer-in-Charge shall make a claim under the Performance guarantee except for amounts to which TIFR is entitled under the contract (notwithstanding and / or without prejudice to any other provisions in the contract agreement) in the event of:

(a) Failure by the contractor to extend the validity of the Performance Guarantee as described herein above (or) failure to attend and rectify the problems in the guarantee period, in which event the Engineer in-Charge may claim the full amount of the Performance Guarantee.

(b) Failure by the contractor to pay TIFR, Hyderabad any amount due, either as agreed by the contractor or determined under any of the Clauses / Conditions of the agreement, within 30 days of the service of notice to this effect by Engineer-in-Charge.

3.7. In the event of the contract being determined or rescinded under provisions of any of the relevant clauses of the agreement, the performance guarantee shall stand forfeited in full and shall be absolutely at the disposal of TIFR, Hyderabad.

4. Security Deposit:

4.1. The successful tenderer / contractor shall also be required to submit a Security Deposit (SD) amounting to 2.5% of the contract value within 7 (seven) working days from the date of issue of the “Letter of Intent (LOI)” in addition to other deposits mentioned elsewhere in the contract for his proper performance of the contract agreement.

4.2. The Security Deposit shall be in the form of Online Payment / Demand Draft / Fixed Deposit Receipt (FDR) / Bank Guarantee.

4.3. Security Deposit shall be initially valid up to one year from the date of completion of work. In case the time for completion of work gets enlarged, the contractor shall get the validity of Security Deposit extended to cover such enlarged time for completion of work. The Security Deposit shall be returned to the contractor, without any interest, after expiry of the DLP and satisfactory rectification of defects.

4.4. All compensation or the other sums of money payable by the contractor under the terms of this contract may be deducted from, or paid by the sale of a sufficient part of his security

deposit or from the interest arising there from, or from any sums which may be due to or may become due to the contractor by TIFR or any account whatsoever and in the event of his Security Deposit being reduced by reason of any such deductions or sale as aforesaid, the contractor shall within 10 days make good in cash or fixed deposit receipt tendered by the State Bank of India or by scheduled banks (if deposited for more than 12 months) endorsed in favor of the Tata Institute of Fundamental Research, HYDERABAD, any sum or sums which may have been deducted from, or raised by sale of his security deposit or any part Thereof.

5. Signing of Work Order and Contract / Agreement:

5.1. The Notice Inviting Tender (NIT) and all the documents including drawings, if any, forming the tender as issued at the time of invitation of tender and acceptance thereof together with any correspondence leading thereto shall form a part of the work order / contract document.

5.2. A 'Work Order' will be issued to the successful tenderer / contractor fulfilling the provisions contained / issued in the "Letter of Intent (LOI)".

5.3. The successful tenderer / contractor within 7 days from receipt of 'Work Order' shall provide his/her acceptance by signing the work order and contract / agreement as per the provisions/requirements issued in the 'Work Order'.

5.4. Each page of the Work Order and Contract / Agreement and all the documents attached to it shall be signed by both the Engineer-in-Charge or his authorized representative and the contractor, as per the conditions of the NIT and Work Order.

5.5. The Contractor shall commence work immediately after signing the Work Order and Contract / Agreement.

5.6. No payment for the work done will be made unless the Work Order and Contract / Agreement is signed by the contractor.

6. Levy / Taxes payable by contractor:

6.1. GST or any other tax, levy or Cess in respect of input for or output by this contract shall be payable by the contractor and TIFR shall not entertain any claim whatsoever in this respect.

6.2. The contractor shall deposit royalty and obtain necessary permits as required for supply of the sand, aggregate, stone etc. from local authorities.

7. Deduction of Income Tax : Income Tax deductions shall be made from all payments made to the Contractor as per rules and regulations in force, in accordance with the Income Tax Act, 1961 under section 194-C prevailing from time to time.

8. Work at Site:

8.1. Access to the works shall be allowed only to the Contractor/Supplier, Sub-Contractors or his duly appointed representatives. The Contractor/ Supplier shall not object to the execution of other works by other contractors or tradesmen and shall afford them every facility for execution of their several works simultaneously with his own.

8.2. Work at the TIFR, Hyderabad's premises shall be carried out at such time as the TIFR, Hyderabad may approve but the TIFR, Hyderabad shall give the Contractor/ Supplier all reasonable facilities for the same. The Contractor/Supplier shall provide sufficient fencing, notice boards etc. to guard the works and warn the public.

8.3. The Contractor shall obey Central, Local and State regulations and enactments pertaining to workmen and labor and the Engineer-in-Charge shall have the right to enquire into and decide all complaints on such matters. The Contractor should comply with the Minimum Wages Act and should also ensure that safe practices are followed by his people at site.

8.4. The contractor should follow safety precautions and maintain safety PPE's to their workmen throughout the project. Any violations may attract action under the contract, by TIFRH if safety precautions are not followed.

9. Delays: The Contractor/Supplier shall not be entitled to claim any compensation for any loss suffered by him on account of delays in commencing or executing the work, including delays in procuring Government controlled or other materials and delay in obtaining instructions and decisions from the Engineer-in-Charge.

10. Taking Over: The works shall be deemed to have been taken over by TIFR when the Engineer-in-Charge certifies in writing that the works have been completed in accordance with the Contract, subject to completion of all prescribed tests, rectification of defects and submission of required documents.

11. Extension of Time: The time allowed for the execution of works as specified in para "Scope & Objective" above shall be the essence of the contract. If the work is hindered by the Contractor by any reasons, the Contractor should immediately give notice thereof in writing to the Engineer-in-Charge seeking extension of time within 14 days of the happening of the event causing delay in prescribed forms i.e. A form of application by the contractor for seeking extension of time (Annexure –V) to the authority is appended with this tender in "Chapter-VI: Annexures". The authority/Engineer-in-Charge shall, if justified, give a fair and reasonable extension of time for completion of work after due consideration of the same within 30 days of the date of receipt of such request from the Contractor in prescribed form.

12. Liquidated Damages:

12.1. For all delays, which do not merit any extension of time, the Contractor/ Supplier shall pay penalty or Liquidated Damages (LD) to the TIFR, Hyderabad at the rate of 0.5% of the contract value for each week of delay, up to a maximum of five percent (5%) of the total contract value. However, in cases of inordinate delay, the maximum penalty limit shall be increased to ten percent (10%) of the total contract value.

12.2. The amount of Liquidated Damages shall be recoverable from the payment due to the Contractor/Supplier up to maximum of 10% of value of contract. The deduction of Liquidated Damages shall not, however, absolve the Contractor/Supplier of his responsibility and obligations under the contract to complete the work in its entirety and shall also be without prejudice to action by the TIFR, Hyderabad under clause: 'Termination of Contract by the TIFR, Hyderabad'. After that the same shall be completed by the TIFR, Hyderabad at the Contractor's/Supplier's risk and cost.

13. Other Damages and Insurance:

13.1. Contractor's workmen / employee's Insurance: The Contractor/Supplier/Manufacturer shall be responsible for providing insurance for his/her workmen / employees engaged in performance of the contract. TIFR, Hyderabad shall not be liable in respect of any damages or compensation payable at law in respect of or in consequence of any accident or injury to any workman or any other person employed by the contractor and the Contractor shall indemnify and keep indemnified TIFR, Hyderabad against all such damages and compensation and against all claims, demands, proceedings, costs, charges & expenses, whatsoever in respect of or in relation thereof.

13.2. The Contractor/Supplier shall also indemnify the TIFR, Hyderabad against all claims which may be made upon the TIFR, Hyderabad whether under the Workmen's Compensation Act or any other statute in force during the currency of this contract or at common law in respect of any employee of the Contractor/Supplier or of any of his sub-contractor and shall at his own expense effect and maintain until the work has been 'Taken Over', with an approved office. The contractor shall furnish a copy of the labor license before commencement of work. If the aforesaid are not applicable, the contractor should furnish declaration to this effect and shall indemnify TIFR, Hyderabad, for violation of any such compliances.

13.3. "Contractor's All Risk (CAR)" / "Erection All Risk (EAR)" insurance: The Contractor shall insure the work for a sum equivalent to the Contract value together with materials and plants for incorporation therein, to the full replacement cost by providing the CAR/EAR policy document before the commencement of work.

13.4. Any other Insurance(s) and Evidence: The Contractor/Supplier shall also at his own cost carry and maintain any and all other insurance(s) which may be required for the Contractor's Equipment and other things brought onto the Site by the Contractor, for a sum sufficient to provide for their replacement at the Site.

13.5. The Contractor/Supplier shall reinstate all damage of every sort mentioned in this clause, so as to deliver up the whole of the contract works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damage to the property of the Owner/third parties.

13.6. The Contractor/Supplier shall indemnify the TIFR, Hyderabad against all claims which may be made against the TIFR, Hyderabad, by any member of the public or other party, in

respect of anything which may arise in respect of the works or in consequence thereof and shall, at his own expense, effect and maintain, until the work has been 'Taken Over'.

13.7. The Contractor/Supplier shall be responsible for all injury to persons, animals or things and for all damage to the works, structure of, and decorative work in the property which may arise from operation or neglect of himself or any of his Sub-Contractor or of his or Sub-Contractor's employees, whether such injury or damage may arise from carelessness, accident or any other cause whatever in any way connected with the carrying out of this contract. This clause shall be held to include any damage to buildings, whether immediately adjacent or otherwise, any damage to roads, streets, foot paths, as well as all damage caused to the works forming the subject of this contract by frost or other inclemency of weather. The Contractor/Supplier shall indemnify TIFR, Hyderabad and hold him harmless in respect of all and any expenses on property as aforesaid and also in respect of any claim made in respect of injury or damage under any acts of Government or otherwise and also in respect of any award of compensation or damages consequent upon such claim.

13.8. The TIFR, Hyderabad, with the concurrence of the Engineer In-Charge, shall be at liberty and is hereby empowered to deduct the amount of any damages compensation costs, charges and expenses arising or accruing from or in respect of any such claims or damages from any sums due to or become due to the Contractor/Supplier.

14. Contractor liable for damages, defects during Defect Liability Period: If the contractor or his working people or servants shall break, deface, injure or destroy any part of building in which they may be working, or any building, road, road kerb, fence, enclosure, water pipe, cables, drains, electric or telephone post or wires, trees, grass or grassland, or cultivated ground contiguous to the premises on which the work or any part of it is being executed, or if any damage shall happen to the work while in progress, from any cause whatever or if any defect, shrinkage or other faults appear in the work within **12 months** after a certificate final or otherwise of its completion shall have been given by the Engineer-in-Charge as aforesaid arising out of defective or improper materials or workmanship, the contractor shall upon receipt of a notice in writing on that behalf make the same good at his own expense, or in default, the Engineer-in-Charge cause the same to be made good by other workmen and deduct the expense from any sums that may be due, or at any time thereafter may become due to the contractor, or from his security deposit, or the proceed of sale thereof or of a sufficient portion thereof. The security deposit of the contractor shall not be refunded before the expiry of **12 months** after the issue of the certificate final or otherwise, of completion of work, or till the final bill has been prepared and passed whichever is later. Provided that in the case of road work, if in the opinion of the Engineer-in-Charge, half of the security deposit is sufficient to meet all the liabilities of the contractor under this contract, half of the security deposit will be refundable after **6 months** and the remaining half after **12 months** of the issue of the said certificate of completion or till the final bill has been prepared and passed whichever is later. Performance Security shall be refunded to the contractor after completion of the work and recording the completion certificate.

15. Terms of Payment:

15.1. The contractor shall submit the bills for payments along with a detailed statement showing the actual works carried out under different heads of items in the format specified by the TIFR. Minimum value of the work for interim payment (Two Running Bills) shall be 35% of the work order value. All interim and final bills will be settled based on the joint measurements of each item of work and certified by TIFR Engineer. The bills for non-perishable materials on site may also be submitted and the payment by TIFR against the same shall be to the maximum extent of 60% of the value of these materials on production of sufficient documentary evidence i.e. Original invoice, Inventory, etc.

15.2. All interim bills will be paid within 30 days from the date of submission and Final Bill along with all relevant documents will be settled within 30 days from the date of submission with certification of TIFR Engineer.

15.3. BILL FORMAT

Work Order-Item No.	Description of Items (At least 2 lines)	Unit	Work Order Quantity	Executed Quantity	Rate	% of work done	Total Amount

NOTE:

- All quantities in the bill should be cumulative.
- All measurements should be in the order of tender or work order sequence and should be recorded in the measurement book. The Measurement should be provided strictly in the below mentioned format only.

15.4. MEASUREMENT FORMAT

Work Order-Item No.	Description of Item & Location against each Measurement taken	Nos.	Length	Width	Height	Qty	Remarks

NOTE:

- The works which have been certified for running bills will also be verified along with the final bill and any defects found need to be replaced / rectified by the contractor at his cost. Till the time, the site is handed over in full, it is the

contractor's liability to safeguard the works done and completed at site. The Progress of work should not be affected in any way quoting the reason of non-availability of funds / materials / releasing of Running bill. The liability of the contractor is to complete all works in his scope in the scheduled time as per the terms of contract and will not relieve the contractors from his obligations once the Running bill is paid / kept pending.

15.5. Final Payment:

Payments of Final bill shall be made after deduction of Security Deposit /Performance Guarantee as specified. The Performance Security will be released after all contractual obligations including DLP. The Security Deposit will be released after DLP and satisfactory rectification. by TIFR, Hyderabad / E.I.C.

The acceptance of payment of the final bill by the Contractor would indicate that he would have no further claim in respect of the work executed.

16.1. Taxes & Duty:

16.1.1. Contractor/Manufacturer/Supplier shall quote the basic price of material. Excise Duty, Custom Duty, Sales Tax, GST, Octroi, Delivery Charges, Transit Insurance and/or any other charges, if any, must be indicated separately.

16.1.2. Transit Insurance: The Transit Insurance from the point of dispatch to the site of erection shall be in the scope of Supplier and the cost shall be indicated separately.

16.2. Delivery of Material:

16.2.1. The Contractor/Manufacturer/Supplier shall be held responsible for loading of all materials and for the stores being sufficiently and properly packed for transport by rail, road, sea or air so as to ensure their being free from any loss or damage on arrival at destination. The packing and marking of packages shall be done by and at the expenses of Manufacturer/Supplier. Each package shall contain a packing note quoting work order number and detail of the contents.

16.2.2. All the materials must be delivered at site i.e. TIFR at 36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy District, Hyderabad-500046. The unloading and positioning of all equipment at the designated locations specified by the Engineer In-Charge shall be in the scope of the Supplier. The Supplier shall arrange for handling equipment, labour for rigging, etc. as required.

16.2.3. Material must be delivered at site in all respects as mentioned in the work order prior approval of the respective technical data sheet /pre dispatch inspection report by TIFR, Hyderabad E.I.C.

16.3. Guarantee:

If during the period of guarantee any fault or defect arises, the material shall be replaced/repared immediately free of cost, as well as any replacement of accessories required shall be done free of cost.

16.4. Mistake in Drawing:

The Contractor/Supplier shall be responsible for and shall pay for any alterations in works due to any discrepancies, errors or omissions the drawings or other particulars supplied by him whether such drawings or particulars have been approved by the TIFR, Hyderabad or not.

16.5. Responsibility for Completeness:

Any fittings or accessories which may not be specifically mentioned in the specifications but which are usual or necessary are to be provided by the Contractor/Supplier without extra charge and the equipment must be complete in all details.

16.6. Extra/Deviation items & Variations in quantity

TIFR-Hyderabad has the right to omit/delete any of the items and also increase/decrease the quantities mentioned in the tender. No claim or any compensation in this regard will be accepted or paid to the contractor. However, if any new /additional items/deviated items are to be executed, the contractor is bound to execute such items with prior approval from TIFR-Hyderabad after furnishing the proper rate analysis for such extra/deviated items.

16.7. Rejection of Defective Materials:

16.7.1. If the equipment after the acceptance thereof is discovered to be defective, notwithstanding that such defects could have been discovered at the time of inspection or found to have failed to fulfill the requirements of the contract or developed defects after the erection within a period of 12 months from the date of erection, even if such erection is done by the TIFR, Hyderabad, he shall be entitled to give a notice on the Contractor/Supplier setting forth details of such defects or failure and the Contractor/Supplier shall, provided such notice is given within a period of 14 months from the date of such erection or acceptance, forthwith make the defective equipment good or alter the same to make it comply with the requirements of the contract at his own cost and further if in the opinion of the TIFR, Hyderabad, the defects are of such a nature that the defects cannot be made good or required without impairing the efficiency or workability of the equipment or if in the opinion of the TIFR, Hyderabad the Equipment cannot be repaired or altered to make it comply with the requirements of the Contract, the Contractor/Supplier shall, provided a notice given by the TIFR, Hyderabad in this behalf within a period of 14 months from the date of erection or acceptance thereof, remove and replace the same with the equipment conforming to the stipulated particulars, in all respects at the Contractor's/Supplier's own cost. Should he fail to do so within a reasonable time, the TIFR, Hyderabad may reject and replace, at the cost of the Contractor/Supplier, with equipment of the same particulars or if equipment conforming to the stipulated particulars are not in the opinion of the TIFR, Hyderabad readily procurable, such opinion being final, then with the nearest substitutes.

16.7.2. In the event of such rejection the TIFR, Hyderabad shall be entitled to use the Equipment in a reasonable and proper manner for a time reasonably sufficient to enable him to obtain replacement equipment as herein before provided.

16.8. Intimation about Delivery:

If the TIFR, Hyderabad shall have notified the Contractor/Supplier in writing that the former is not ready to take delivery, no equipment or materials shall be forwarded until an intimation in writing shall have been given to the Contractor/Supplier by the TIFR, Hyderabad that he is ready to take delivery.

16.9. Force Majeure:

Normally Force Majeure shall cover only acts of God, fire, wars, strike, riots and civil commotion, floods, epidemic, quarantine related strikes, freight embargoes, etc. The contractor shall not be liable for any liquidated damages for delay or any failure to perform the contract arising out of Force Majeure conditions, provided that the contractor shall within ten days from the beginning of such delay notify the department in writing the cause of delay along with convincing supporting evidence. The department once convinced and accepted the reason may extend the supply completion period by a suitable / reasonable margin.

16.10. Termination of Contract by the TIFR, Hyderabad:

16.10.1. If the Contractor/Supplier commits any 'Act of Insolvency' or shall be adjudged an Insolvent or shall have an order for compulsory winding up made against him or pass effective resolution for winding up voluntarily, or if the Contractor/Supplier shall suffer any payment under this contract to be attached by or on behalf of any of the creditors of the Contractor/ Supplier, or shall assign the Contract without the prior consent in writing of the Engineer In-Charge, or shall charge or encumber this Contract or any payments due or which may become due to the Contractor/Supplier there under, or if the Engineer In-Charge shall certify in writing to the TIFR, Hyderabad that the Contractor/Supplier –

16.10.1.1. has abandoned the Contract, or

16.10.1.2. has failed to commence the works, or has without any lawful excuse these conditions suspended the progress of the works for seven days after receiving from the Engineer In-Charge written notice to proceed, or

16.10.1.3. has failed to proceed with the work with such due diligence and failed to make such due progress as would enable the works to be completed in accordance with the approved programme of work, or

16.10.1.4. has failed to remove materials from the site or to pull down and replace work for seven days after receiving from the Engineer In-Charge written notice that the said materials or work were condemned and rejected by the Engineer In-Charge under these conditions, or

16.10.1.5. has neglected or failed persistently to observe and perform all or any of the acts matters or things by this contract to be observed and performed by the Contractor for seven days after written notice shall have been given to the Contractor/ Supplier requiring the Contractor/Supplier to observe or perform the same, or

16.10.1.6. has to the detriment of good workmanship or in defiance of the Engineer In-Charge's instructions to the contrary sub-let any part of the contract, then and in any of the above said causes, the TIFR, Hyderabad with the written consent of the Engineer In-Charge may, notwithstanding any previous waiver, after giving seven days' notice in writing under the provisions of this clause to the Contractor/Supplier, determine the contract

but without prejudice to the powers of the Engineer In- Charge or the obligations and liabilities of the Contract, the whole of which shall continue to be in force as if the contract has not been so determined and as if the work subsequently executed has been executed by and on behalf of the Contractor/ Supplier.

16.10.2. After the issue of such notice, the Contractor/Supplier shall not be at liberty to remove from site any equipment, tools and materials belonging to him which shall have been placed thereon for the purpose of the works and the TIFR, Hyderabad shall have lien upon such equipment, tools or materials to subsist from the date of such notice and until the notice shall have been complied with.

16.10.3. If the Contractor/Supplier shall fail to comply with the requirements of said notice for seven days after such notice has been given, the TIFR, Hyderabad shall have the power to enter upon and take possession of the works and site and all equipment, tools and materials thereon, and to engage any other person, firm or agency to complete the works, utilizing the equipment, tools and materials to the extent possible. The TIFR, Hyderabad shall not in any way be responsible for damage or loss of the tools, equipment and materials and the Contractor/Supplier shall not have any compensation therefore.

16.10.4. Upon completion of the works, the Engineer In-Charge shall certify the amount of expenditure properly incurred consequent on and incidental to the default of the Contractor/Supplier as aforesaid and such amount shall be deducted from the payments due to the Contractor/Supplier, including the Security Deposit. If the said amount exceeds the payment due to the Contractor/Supplier, the TIFR, Hyderabad shall be at liberty to dispose off any of the Contractor's/Supplier's materials, tools or equipment and apply the proceeds for the payments due from the Contractor/Supplier and recover the balance by process of law.

16.10.5. After the works have been completed after the amounts due to the Contractor/Supplier, the Engineer In- Charge shall give notice in writing to the Contractor/Supplier to remove the surplus equipment and material from site. If such equipment and materials are not removed within a period of 14 days after such notice, the TIFR, Hyderabad shall have the power to remove and sell the same holding the proceeds less the cost of removal and sale, to the credit of the Contractor/Supplier. The TIFR, Hyderabad shall not be responsible for any loss sustained by the Contractor/Supplier from the sale of the equipment and material.

16.11. Contractor's Representative:

The Contractor/Supplier shall employ one qualified representative with minimum 3 years of experience of similar works as stipulated by TIFR, Hyderabad in the work order, whose name shall have previously been communicated in writing to the Engineer In-Charge and approved by him to supervise the erection. Any written order or instructions given to the representative shall be deemed to have been given to the Contractor/Supplier. The Engineer In-Charge shall be at liberty to object to any particular representative/or any persons employed by the Contractor/Supplier on the work and the Contractor/Supplier shall remove the person objected to, on the receipt of the Engineer In-Charge, in writing, a request

requiring him to do so and shall provide in his place another competent representative acceptable to the Engineer In-Charge. The Contractor's/Supplier's representative shall be a qualified engineer possessing adequate site experience in similar nature of works.

16.12. Completion Time:

Unless otherwise agreed in writing between the TIFR, Hyderabad and the Contractor/Supplier, the work contract shall be completed within the stipulated period mentioned elsewhere in this tender document from the date of Work Order issued to Contractor/Supplier by the TIFR, Hyderabad.

16.13. Delivery of Material at Site:

The Contractor/Supplier/Manufacturer shall arrange for safe transit and delivery of material at site and unloading the material at site.

16.14. Measurements:

All joint measurements of quantities shall be done by the Contractor at his own cost in the presence of the Engineer In-Charge or any authorized person deputed by him who will certify the routes, length and quantities etc. for the purpose of determination of the amount payable.

16.15. Drawings and Documentation:

Contractor should make and submit the drawing as per the site conditions and take approval from EIC. As-built drawings as specified in this technical specifications shall be submitted by the Contractor.

CHAPTER-IV**SPECIFICATIONS AND ALLIED TECHNICAL DETAILS****I. GENERAL NOTES:**

- I. The detailed specifications given hereinafter are for the items of works described in the schedule of quantities attached herein, and shall be guidance for proper execution of work to the required standards.
- II. It may also be noted that the specifications are of generalized nature and these shall be read in conjunction with the description of item in schedule of quantities and drawings. The work also includes all minor details of construction which are obviously and fairly intended and which may not have been referred to in these documents but are essential for the entire completion in accordance with standard Engineering practice.
- III. Unless specifically otherwise mentioned, all the applicable codes and standards published by the Indian Standard Institution and all other standards which may be published by them before the date of receipt of tenders, shall govern in all respects of design, workmanship, quality and properties of materials and methods of testing, method of measurements etc. Wherever any reference to any Indian Standard Specifications occurs in the documents relating to this contract, the same shall be inclusive of all amendments issued there to or revisions thereof, if any, up to the date of receipt of tenders.
- IV. In case there is no I.S.I. specification for the particular work, such work shall be carried out in accordance with the instructions in all respects, and requirements of the Engineer-in-Charge. Wherever any reference to any Indian Standard Specification occurs in the documents relating to this contract, the same shall be inclusive of all amendments issued there to or revisions thereof, if any, up to the date of receipt of tenders.
- V. The work shall be carried out in a manner complying in all respects with the requirements of relevant bye-laws of the Municipal Committee/Municipal Corporation/Development Authority/Improvement Trust under the jurisdiction of which the work is to be executed or as directed by the Engineer-in-Charge and, unless otherwise mentioned, nothing extra shall be paid on this account.
- VI. Samples of various materials, fittings etc. proposed to be incorporated in the work shall be submitted by the contractor for approval of the Engineer-in-charge before order for bulk supply is placed.
- VII. The contractor shall take instructions from the Engineer-in-Charge regarding collection and stacking of materials in any place. No excavated earth or building materials shall be stacked on areas where other buildings, roads, services, compound walls etc. are to be constructed.
- VIII. The contractor shall maintain in perfect condition all works executed till the completion of the entire work awarded to him. Where phased delivery is contemplated, this provision shall apply to each phase.
- IX. The contractor shall give a performance test of the entire installation(s) as per standard specifications before the work is finally accepted and nothing extra whatsoever shall be payable to the contractor for the test.

- X. The contractor shall clear the site thoroughly of all scaffolding materials and rubbish etc. left out of his work and dress the site around the building to the satisfaction of the Engineer-in-Charge before the work is considered as complete.
- XI. **Post construction inspection and testing:** After completion of the work and during maintenance period liability of the contractor, the work shall also be subjected to 'Post construction inspection and testing'. In case the materials or articles incorporated in the work are found to be inferior, though the sample collected for the same might have been passed at the time of execution, it shall be the responsibility of the contractor to replace the same at his own cost, failing which the Department may rectify the same at the risk and cost of the contractor or Department may accept the work as sub-standard, and cost be adjusted from the outstanding security deposit, as per the terms and conditions of the contract for the work.
- XII. The **Head Technical Services, TIFRH**, shall be the sole deciding authority as to the meaning, interpretations and implications for various provisions of the specifications and his decision in writing shall be final and binding on all concerned.
- XIII. In case any difference or discrepancy between the specifications and the description in the schedule of quantities, the schedule of quantities shall take precedence. In case of any difference or discrepancy between specifications and drawing, the specifications shall take precedence.

II - LIST OF INDIAN STANDARDS:

Following are the various pertinent Indian Standards, relevant to buildings work:

(All Latest Versions of I.S. codes shall be referred)

I. S. CODE NO.	SUBJECT
1. CARRIAGE OF MATERIALS	
4082-1996	Recommendations on stacking & storage of construction materials and components at site.
2. EARTH WORK	
1200 Pt. I-1992	Method of measurement of Earth work.
4081-1986	Safety code for Blasting and related drilling operations.
6313 (Part 2) 2001	Anti-Termite Measures in Buildings Part – 2 Pre-constructional chemical treatment.
3. MORTAR	
196-1966	Atmospheric conditions for testing (Reaffirmed - 1990)
269-1989	33 Grade Ordinary, rapid hardening and low heat Portland cement
383-1970	Coarse and fine aggregates from natural sources for concrete.
455-1989	Portland blast furnace slag cement

650-1991	Standard sand for testing of cement
712-1984	Building Limes
1489-1991	Portland pozzolana cement Fly ash based
1514-1990	Methods of sampling & Test for Quick Lime & Hydrated Lime. (Reaffirmed - 1996)
1542-1992	Sand for Plastering.
1727-1967	Methods of tests for pozzolanic materials
2250-1981	Code of practice for preparation and use of masonry mortar. (Reaffirm-1990)
2386-1963	Methods of Test for Aggregates for Concrete
2386 Pt.I-1963	Particle size and shape
2386 Pt. II-1963	Estimation of deleterious materials and organic impurities
2386 Pt.III-1963	Specific gravity, density, voids, absorption and bulking
2686-1977	Cinder as fine aggregate for use of Lime Concrete. (Reaffirmed – 1992)
3025-1964	Methods of sampling & test (Physical & Chemical) water used in industry. (Reaffirmed-2003)
3068-1986	Broken brick (burnt clay) coarse aggregate for use in lime concrete (II-R.)
3182-1986	Broken brick (Burnt clay) fine aggregate for use in lime mortar
3812-1981	Fly Ash using as pozzolana and admixtures (Reaffirmed - 1999)
4031-1996	Methods of physical tests for hydraulic cement (Reaffirmed – 1996)

4032-1985.	Method of chemical analysis of hydraulic cement (Reaffirmed - 1990)
4098-1983	Lime pozzolana mixture (Reaffirmed - 1989)
6932 (Pt.I to X)	Methods of Test for Building Lime
6932 (Pt.I)-1973	Determination of insoluble residue, loss of ignition, silicon-dioxide, ferric & Alum. Oxide, calcium oxide & magnesium oxide insoluble matter.
6932 (Pt.II)-1973	Determination of carbon dioxide content
6932 (Pt.III)-1973	Determination of residue on slaking of quick lime.
6932 (Pt.IV)-1973	Determination of fineness of hydrated lime
6932 (Pt.V)-1973	Determination of unhydrated oxide
6932 (Pt.VI)-1973	Determination of volume yield of quick lime
6932 (Pt.VII)-1973	Determination of compressive and transverse strength.
6932(Pt.VIII)-1973	Determination of workability
6932 (Pt.IX)-1973	Determination of soundness
6932 (Pt.X)-1973	Determination of popping and pitting of hydrated Lime.

4. CONCRETE WORK	
383-1970	Coarse and fine aggregate from natural sources for concrete (Reaffirm - 1990)
456-2000	Code of practice for plain and reinforced concrete
516-1959	Method of test for strength of concrete (Reaffirmed in 2004)
1199-1959	Method of sampling and analysis of concrete
1200 (Pt.II)-1987	Methods of measurements of cement concrete work. (Reaffirm - 1992)
1322-1993	Bitumen felts for water proofing and damp proofing. (Reaffirm - 1998)
1661-1987(Pt.III)	Code of practice for application of cement lime plaster finishes.(Reaffirm- 1999
2386-1977(Pt.1 to 8)	Methods of test for aggregate for concrete
2386 (Pt.I)-1963	Test for particle size and shape
2386 (Pt.II)-1963	Test for estimation of deleterious materials and organic impurities
2386 (Pt.III)-1963	Test for specific gravity, density, voids, absorption and bulking
2386 (Pt.IV)-1963	Mechanical properties
2645-1975	Specification for integral water proofing compounds
2686-1977	Specification for cinder aggregate for use in lime concrete. (Reaffirm - 1992)
3812-1981	Fly Ash using as pozzolana and admixtures for concrete. (Reaffirmed - 1999)
7861-1975 (Pt.I)	Hot weather concreting. .(Reaffirmed -1990)
7861-1981 (Pt.II)	Cold weather concreting. .(Reaffirmed -1992)
9103-1999	Admixture for concrete.
5. R.C.C. WORK	

432-1982	Mild steel & medium tensile steel bars and hard drawn steel wire for concrete reinforcement.
432 (Pt.I)-1982	Mild steel and medium tensile steel bars
456-2000	Code of practice for plain and reinforced concrete
457-1957	COP for general const. of plain & reinforced concrete for dams & other massive structure.
516-1959	Methods of test for strength of concrete
1161-1963	Specifications for steel tubes for structural purposes
1199-1959	Methods of sampling and analysis of concrete. (Reaffirmed - 1999)

1200 (Pt.II)-1974	Method of measurement of cement concrete work
1200(Pt.V)-1982	Method of measurement of form work. (Reaffirmed - 1989)
1343-1980	Code of practice for pre-stressed concrete.
1566-1982	Hard drawn steel wire fabric for concrete reinforcements (II Rev.) (Reff.1998)
1780-1961	Specifications for cold twisted steel bars for concrete reinforcement *
1785-1983 (Part-I& II)	Specifications for plain hard drawn steel wire for pre-stressed concrete
1786-1985	H.Y.S.D./ Cold twisted steel bars for concrete reinforcement Reaffirmed - 1990)
2090-1983	Specifications for high tensile steel bars used in prestressed concrete.
2204-1962	Code of practice for construction of reinforced concrete shell roof. (Reaffirmed - 1990)
2210-1988	Criteria for the design of shell structure and folded plates (Reaffirmed - 1998)
2502-1963	COP for bending and fixing of bars for concrete reinforcement. (Reaffirmed - 1999)
2750-1964	Specifications for steel scaffoldings
2751-1979(Reaf- 1992)	COP for welding of mild steel bars used for reinforced concrete construction.
2911-1984	Code of practice for design & Construction of pile foundations
2911(Pt.I)-1979. (Reaf-97).	Design & construction of Pile Foundations - Bored precast concrete piles.
2911 (Pt.III)-1980	Under reamed pile foundations
2911 (Pt.IV)-1985	Load test on Piles
3201-1988	Criteria for design and construction of precast concrete trusses. (Reaffirmed - 1995)
3370. (Part I to IV)-1965	Code of practice for concrete structures for storage of liquids. (Reaffirmed(1999)
3385-1965	Code of practice for measurement of Civil Engineering works - Pile Foundation)
3414-1968	Code of practice for design and installation of joints in buildings. (Reaffirmed - 1990)
3558-1983(Reaf- 91)	Code of practice for use of immersion vibrators for consolidating concrete
3696 (Pt.I & II)	I-1987: Safety code of scaffolds; II-1991: Safety code of ladders
3935-1966	Code of practice for composite construction. (Reaffirmed – 1998)

4014-1967 (Pt. & II)	COP for steel tubular scaffolding (I: Defination/Material; II: Safety Resolutions) (Raffir 1999)
4926-2003	Code of practice for Ready Mix Concrete
4990-1993	Specifications for plywood for concrete shuttering work. (Reaffirmed - 1998)
10262-1982	Code of practice for design mix. (Reaffirmed - 1999)
6. EQUIPMENTS	
460-1985(Pt-I,II& III)	Specification for test sieves. (Reaffirmed - 1998)
1791-1985	Specification for batch type concrete mixer. (Reaffirmed – 1990)
2430-1986	Methods for sampling of Aggregates for concrete.
2505-1992	General requirement for concrete vibrators, immersion type
2506-1985	General requirements for screed board concrete vibrators
2514-1963	Specification for concrete vibrating tables. (Reaffirmed - 1991)
3366-1965	Specification for pan vibrators. (Reaffirmed – 1991)
4656-1968	Specification for form vibrators for concrete. (Reaffirmed-1991)
2722-1964(Reaf-95)	Specification for portable swing weigh batchers for concrete (single and double bucket type).
2750-1964	Specification for steel scaffolding. (Reaffirmed – 1991)
7. DEMOLITION AND DISMANTLING:	
1200(Pt.XVIII)-1974	Method of measurements of demolition and dismantling
8. SAFETY CODES	
818-1968 (Reaf-03)	Safety and healthy requirements in Electric and gas welding and cutting operations.
3696 (Pt.I)-1987	Safety code for scaffolds
3696 (Pt.II)-1991	Safety code for ladders
3764-1992	Safety code for Excavation works
4081-1986	Safety code for blasting and related drilling operation
4130-1991	Safety code for Demolition of Building
5916-1970	Safety code for construction involving use of hot bituminous materials
6922-1973	Structural subject to underground blasts code of practice for safety and design of
7293-1974	Working with construction machinery- safety code for

III. TESTS:

NOTES:

1. The tests shall be carried out when the quantity of materials to incorporate in the work exceeds the minimum quantity specified.
2. Optional tests specified or any other tests, shall be carried out in case of specialized works or important structures as per direction of the Engineer-in-Charge.
3. Testing charges, including incidental charges and cost of sample for testing shall be borne by the contractor for all tests.
4. In case of non-IS materials, it shall be the responsibility of the contractor to establish the conformity of material with relevant IS specification by carrying out necessary tests. Testing charges including incidental charge and cost of sample for testing shall be borne by the contractor for such tests.

Annexure 'A'-THE TESTS SHALL BE AS FOLLOWS:

Material	Test	Field / laboratory test	Test procedure	Minimum quantity of material / Work for carrying out the test	Frequency of testing
Reinforced cement concrete	a) slump test	Field	IS: 1199	a) 20 cu.m. for slabs, beams and connected columns . b) 5 Cu.m in case of columns	a) 20 cu.m. Part there of or more frequently as required by the Engr.-in-Charge . b) Every 5 Cu.m.
	b) cube test	Lab	IS: 516	a) 20 cu.m. In slab, beams, & connected columns. b) 5 cum in columns	Refer page no. 84 clause no. 6.7.1 for the frequency of test
Ready mixed cement concrete (IS-4926)	Cube test	Lab	IS-516 and as per para 6.3.2 of IS-4926-2003	50 cum	Refer page no. 84 clause no. 6.7.1 for the frequency of test
Note: For all other small items and where RCC done in a day is less than 5 cum, test may be carried out as required by Engineer-in-Charge.					

Material	Test	Field / laboratory test	Test procedure	Minimum quantity of material / Work for carrying out the test	Frequency of testing
Sand	Bulking of Sand	Field		20 CU.M.	Every 20 cu.m or part there of or more frequently as decided by Engineer-in-Charge
	Silt content	Field	IS:383	20 CU.M.	Every 20 cu.m or part there of or more frequently as decided by Engineer-in-Charge
	Particle size and distribution	Field or Laboratory as decided by the Engineer-in-Charge	IS:383	40 CU.M.	Every 40 cum. of fine aggregate / sand required in RCC. Work only
	Organic Impurities	Field	..DO..	20 CU.M.	Every 20 cu.m. or part thereof or more frequently as decided by the Engineer-in-Charge
	Chloride & sulphate content tests		Optional		Once in three months.
Cement	Test requirement	Fineness (m ² /kg)	IS 4031 (Part-II)	Each fresh lot	Every 50 MT or part thereof
		Normal consistency	IS 4031 (Part-IV)		
		Setting time (minutes) a) Initial b) Final	IS 4031 (Part-V)		

		Soundness a) Le-Chat expansion (mm) b) Auto clave (%)	IS 4031 (Part-III)		
		Compressive strength (Mpa) a) 72+/- hr b) 168+/-2hr	IS 4031 (Part-VI)		
Stone Aggregate	a) Percentage of soft or deleterious materials	General visual inspection/ Lab test where required by the Engineer-in-Charge	IS 2386 Part II	One test for each source	One test for each source
	b) Particle size distribution	Field / Lab	-	10 cu.m	Every 40 cum. Or part thereof and
	Once in three months for each source for coarse and fine aggregates required in RCC works, for a minimum quantity - 10 cum for coarse aggregate and 40 cum for fine aggregate.				
	a) Estimation of Organic impurities	Field / Lab	IS 2386 Part II	10 Cum	-do-
	b) Specific Gravity	Field / Lab	IS 2386	10 Cum	-do-
	c) Bulk Density	Field / Lab	IS 2386	10 Cum	-do-
	d) aggregate crushing strength	Field / Lab	IS 2386	10 Cum	-do-
	e) Aggregate impact value	Field / Lab	IS 2386	10 Cum	-do-

Material	Test	Field / laboratory test		Test procedure	Minimum quantity of material / Work for carrying out the test	Frequency of testing
Steel for RCC	Physical tests a) Tensile strength b) Retest	Lab / field	IS 1608 IS 1786 IS 1786	Each lot from each source from each	Below 100 Tonnes	Above 100 Tonnes

	c) Re-bound test d) Nominal mass e) Bend test f) Elongation test g) Proof stress		IS 1786 IS 1599 IS 1786 IS 1786	diameter of bar	Dia < 10 mm one sample for each 25 tonnes or part thereof If dia is >10 mm but less than 16 mm: One sample each 35 tonnes or part thereof. If dia >16 mm one sample for each 45 tonnes	Dia < 10 mm one sample for each 40 tonnes or part thereof If dia is >10 mm but less than 16 mm One sample for each 45 tonnes or part thereof. If dia >16 mm one sample for each 50 tonnes.
	Chemical Tests: 1. Carbon Constituent 2. Sulphur 3. Phosphorus 4. Phosphorus & Sulphur	Lab	IS 1786			For every fresh lot of one truck or less as directed by the Engineer-in-Charge.
Soil core test	OMC Proctor density	Lab / field	As per IS 12175		Two for every 50 sqm	As per para 4.10 & 4.11 of this book

TESTING, TOLERANCE, ACCEPTANCE AND MODE OF PAYMENT:

- The material should pass all tests and tolerance in dimensional, chemical, physical properties should be within the limit as stipulated in relevant IS for acceptance. Such materials shall be accepted as standard.
- Payment shall be restricted to standard unit mass, or as specified in the schedule of work, without making any cost adjustment towards mass or any other properties, provided the material pass all the tests and tolerances are within the specified limits.
- In case of non-standard materials, materials not covered under any IS Specifications, such as steel sections, the payment shall be made based on the actual unit weight basis as determined by testing at random sampling.

IV. STRUCTURAL STEEL:

4.1 SCOPE OF WORK:

The work covered by this specification consists of furnishing and erecting of structural steel complete in strict accordance with this specifications and the applicable drawings.

4.2 MATERIALS:

All structural steel shall be of standard sections as marked on the drawings and shall be free of scale, blisters, laminations, cracked edges and defects of any sort. If the structural steel is not supplied by the Department and the Contractor is required to bring such steel, the Contractor shall furnish duplicate copies of all mill orders and/ or also the test report received from the mills, to satisfy the Engineer-in-Charge.

All structural steel and electrodes shall comply in all respects with I.S.S. for structural steel.

4.3 WORKMANSHIP:

All workmanship shall be of first class quality in every respect to the greatest accuracy being observed to ensure that all parts will fit together properly on erection.

All ends shall be cut true to planes. They must fit the abutting surfaces closely. All stiffeners shall be fit tightly at both ends.

All butt ends of compression members shall be in close contact through the area of the joints.

All holes in plates and section between 12 mm. and 20 mm. thick shall be punched to such diameter that 3 mm. of metal is left all around the hole to be cleaned out to correct size by reamer.

The base connection shall be provided as shown on drawings and the greatest accuracy of workmanship shall be ensured to provide the best connections.

Figured dimensions on the drawings shall be taken.

4.4 ERECTION AND MARKING:

Erection and fabrication shall be according to I.S. 800-1984 section-11. During erection, the work shall be securely braced and fastened temporarily to provide safety for all erection stresses etc. No permanent welding shall be done until proper alignment has been obtained.

Any part which do not fit accurately or which are not in accordance with the drawings and specifications shall be liable to rejection and if rejected, shall be at once be made good.

Engineer-in-Charge shall have full liberty at all reasonable times to enter the contractors premises for the purpose of inspecting the work and no work shall be taken down, painted or dispatched until it has been inspected and passed. The contractor shall supply free of charge all labour and tools required for testing of work.

4.5 DELIVERY AT SITE:

The contractor shall deliver the component parts of the steel work in an undamaged state at the site of the works and the Engineer-in-Charge shall be entitled to refuse acceptance of any portion which has been bent or otherwise damaged before actual delivery on work.

4.6 SHOP DRAWINGS:

The shop drawings of structural steel based on contract drawings shall be submitted to the Engineer-in-Charge. The necessary information for fabrication, erection, painting of structure etc. must be furnished immediately after acceptance of the tender.

4.7 PAINTING:

Painting should be strictly according to I.S. 1477-1971 (Part I-Pretreatment) and I.S. 1477-1971 (Part II-painting).

Painting should be carried out on dry surfaces free from dust, scale etc. The paint shall be approved by the Engineer-in-Charge.

One coat of shop paint (red lead) shall be applied on steel, except where it is to be encased in concrete or where surfaces are to be field welded.

4.8 WELDING:

Welding shall be in accordance with I.S. 816-1969, I.S. 819-1957, I.S. 1024-1979, I.S. 1261-1959,

I.S. 1323-1982 and I.S. 9595-1980 as appropriate. For welding of any particular type of joint, welders shall give evidence of having satisfactory completed appropriate tests as described in any of I.S. 817-1966, I.S. 1393-1961, I.S. 7307 (Part I)-1974, I.S. 7310 (Part I)-1974 and I.S. 7318 (Part I)-1974 as relevant.

4.8.1 Welding Consumables: Covered electrodes shall conform to I.S. 814 (Part I)-1974 and I.S. 814 (Part II)-1974 or I.S. 1395-1982 as appropriate.

Filler rods and wires for gas welding shall conform to I.S. 1278-1972.

The bare wire electrodes for submerged arc welding shall conform to I.S. 7280-1974. The combination of arc and flash shall satisfy the requirements of I.S. 3613-1974.

The filler rods and bare electrodes for gas shielded metal, arc welding shall conform to I.S. 6419-1971 and I.S. 6560-1972 as appropriate.

4.8.2 Types of Welding: Arc welding (direct or alternating current) or Oxyacetylene welding may be used. Field welding may be used. Field welding shall be by D.C.

4.8.3 Size of Electrode Runs: The maximum gauge of the electrodes for welding any work and the size of run shall be based on the following tables.

Average thickness of plate or section	Maximum gauge or diameter of electrodes to be used.
Less than 3/16"	10 S.W.G.
3/16" and above but less than 5/16"	8 S.W.G.
5/16" and above but less than 3/8"	6 S.W.G.

3/8" and above but less than 5/8"	4 S.W.G.
5/8" and above but less than 1"	5/16" dia.
1" and above thick section	3/8" dia.

Note: On any straight weld the first run shall not ordinarily be deposited with a larger gauge electrode than No. 8 S.W.G. For subsequent runs the electrode shall not be increased by more than two electrode size between consecutive runs.

4.8.4 Welding Contractors: The contractor shall ensure that each welding operator employed on fabrication or erection is an efficient and dependable welder, who has passed qualifying tests on the types of welds which will be called upon to make. Sample test shall have to be given by the contractor to the entire satisfaction of the Engineer-in-charge.

4.8.5 Welding Procedure:

- a) Welding should be done with the structural steel in flat position in a down hand manner wherever possible. Adequate steps shall be taken to maintain the correct arc length, rate of travel, current and polarity for the type of electrode and nature of work. Welding plant capacity shall be adequate to carry out the welding procedure laid down. Adequate means of measuring the current shall be available either as a part of the welding plant or by the provision of a portable ammeter. In checking the welding current, a tolerance of 10% or 30 amperes from the specified value whichever is less shall be permitted.
- b) The welding procedure shall be such as to ensure that the weld metal can be fully and satisfactory deposited through the length and thickness of all joints so that distortion and shrinkage stresses are reduced to the minimum and thickness of welds meet the requirements of quality specified.

4.9 WORKMANSHIP:

4.9.1 Preparation of Fusion Faces: Fusion faces shall be cut by steering machine or gas cutting and later dressed by filing or grinding so that they shall be free from irregularities such as would interfere with the deposition of the specified size of weld to cause the defects. Fusion faces and the surrounding surfaces shall be free from heavy slag, oil paint or any substance which might affect the quality of the weld or impede the progress of welding. The welding face shall be free of rust and shall have metal shine surfaces.

The parts to be welded shall be brought into as close contact as possible and the gap due to faulty

workmanship or incorrect fit up shall not exceed 1/16". If separation of 1/16" or more occurs locally, the size of the fillet weld shall be increased at such position by an amount of equal to the width of the gap.

The parts to be welded shall be maintained to their correct position during welding. They shall be securely held in position by means of tack welds, service bolts, clamps or rings

before commencing welding so as to prevent and relative movement due to distortion, wind or any other cause.

4.9.2 Step Back Method should be used to Avoid Distortion: The minimum leg length of a fillet weld as deposited should not be less than the specified size and the throat thickness as deposited should be not less than that tabulated below:

Throat Thickness of Fillet

Angle between fusion faces	60°-90°	91°-100°	101°-106°	107°-113°	114°-120°
Throat thickness in cms.	0.70	0.65	0.60	0.55	0.50

In no case should a concave weld be deposited without the specific approval of the Engineer-in-Charge unless the leg length is increased above the specified length so that the resultant throat thickness is as great as would have been obtained by the deposition of a flat. All welds shall be deposited in a pre-arranged order and sequence taking due account of the effects of distortion and shrinkage stresses.

After making each run of welding, all slag shall be removed and final run shall be protected by clean boiled linseed oil till approved.

The weld metal, as deposited, shall be free from crack, slag, excessive porosity, cavities and other faults.

The weld metal shall be properly fused with the parent metal without overlapping or serious undercutting at the toes of the weld.

The surfaces of the weld shall have a uniform and consistent contour and regular appearance.

In welds containing crack, porosity or cavities in which the weld metal tends to overlap on the parent metal without proper fusion, the defective portions of the welds shall be out cut and re-welded. Where serious under cutting occurs, additional weld metal shall be deposited to make good reduction. Testing of welded joints shall be done as per relevant IS codes 3600, 3613, 4260, 7205, 7215, 7307, 7310, 7318.

4.10 MODE OF MEASUREMENT:

All structural steel shall be measured on weight basis in metric tonnes or quintals or kgs. As mentioned in the schedule of quantities. The length or areas of various members including gusset plates shall be measured correct to two places of decimals and the net weight worked out from the standard steel tables approved by Indian Standard Institution. No separate measurements shall be taken for welding, riveting, bolting, field connections etc. The rate shall include cost of all labour, materials, scaffolding, transport and also cost of welding, riveting and bolting, field connections if any all to complete the job as per specifications.

V. READY MIX CONCRETE:

(SPECIFICATIONS FOR READY MIXED CONCRETE, CONFORMING TO IS-4926)

1.1 Ready mix Concrete shall conform to latest revision of IS: 4926 following are the requirement for supply of R.M.C

1.1.1 Concrete delivered at site shall be in a plastic condition and requiring no further treatment before being placed in the position in which it is to set and harden

1.1.2 The process of continuing the mixing of concrete at a reduced speed during transportation to prevent segregation.

1.1.3 Truck mounted equipment designed to agitate concrete during transportation to the site of delivery.

1.1.4 Concrete produced by completely mixing cement, aggregates, admixtures if any and water at a stationary central mixing plant and delivered in containers fitted with agitating devices. The concrete may also be transported without being agitated as a special case and as requested.

1.1.5 Concrete produced by placing cement, aggregates and admixtures, if any other than those to be added with mixing water, in a truck mixer at the batching plant, the addition of water and admixtures to be added along with mixing water, and the mixing being carried out entirely in the truck mixer either during the journey or on arrival at the site of delivery. No water shall be added to the aggregate and cement until the mixing of concrete commences.

5.2. MATERIALS:

5.2.1 The cement used shall be of specified grade ordinary Portland cement or low heat Portland cement conforming to IS: 269 or Portland slag cement conforming to IS: 455 or Portland-pozzolana cement conforming to IS: 1489 or rapid hardening. Portland cement conforming to IS: 8041 as may be specified at the time of placing the order. If the type is not specified, ordinary Portland cement shall be used.

5.2.2 Fly ash when used for partial replacement of cement, shall conform to the requirements of IS-3812 (Part I) and as specified by the users.

5.2.3 The aggregate shall conform to IS: 383. Fly ash when used as fine aggregate shall conform to the requirements of IS 3812 – (Part - II).

5.2.4 Water used for concrete shall conform to the requirement of IS 456-2000.

5.2.5 The admixtures shall conform to the requirements of IS: 456-2000 and their nature, quantities and methods of use shall also be specified. Fly ash when used as an admixture for concrete shall conform to IS: 3812 (Part II) – 1981. However, partial replacement of cement by fly ash shall not be more than 15% of designed requirement.

In case if fly ash is used more than 15%, the same shall be guided under table 5.1 of the IS, and in which case specific care shall be taken in terms of curing, protecting, repairing, finishing, de-shuttering etc. as detailed in the Chapter “FLY ASH CONCRETE”, here in after.

5.3. SUPPLY:

The ready-mixed concrete shall be manufactured and supplied on either of the following basis:

- i) Specified strength based on 28-day compressive strength of 15 -cm cubes tested in accordance with IS: 456-2000.
- ii) Specified mix proportion.

NOTE: Under special circumstances and as specified the strength of concrete in (a) above may be based on 28-day or 7-day flexural strength of concrete instead of compressive strength of 15-cm cube tested in accordance with IS: 456-2000.

5.3.1 When the concrete is manufactured and supplied on the basis of specified strength, the responsibility for the design of mix shall be that of the manufacturer and the concrete shall conform to the requirements specified.

5.3.2 When the concrete is manufactured and supplied on the basis of specified mix proportions, the responsibility for the design of the mix shall be that of the purchaser and the concrete shall conform to the requirements specified.

5.4. GENERAL REQUIREMENTS:

5.4.1 When a truck mixer or agitator is used for mixing or transportation concrete, no water from the truck-water system or from elsewhere shall added after the initial introduction of the mixing water for the batch, when no arrival at the site of the work, the slump of the concrete is less that specified, such additional water to bring the slump within limits shall be injected into the mixer under such pressure and direct flow that the requirements for uniformity specified.

5.4.2 Unless otherwise specified when a truck or agitator is used for transporting concrete, the concrete shall be delivered to the site of the work and discharge shall be complete within 1 ½ hour (when the prevailing atmospheric temperature above 20°C) and within 2 hours (when the prevailing atmosphere temperature is at or below 20°C) of adding the mixing water to the mix of cement and aggregate or adding the cement to the aggregate whichever is earlier.

5.4.3 The temperature of the concrete at the place and time of delivery shall be not less than 5°C. Unless otherwise required by the purchaser.

5.4.4 Adequate facilities shall be provided by the manufacturer/supplier to inspect the materials used the process of manufacture and methods of delivery of concrete. He shall also provide adequate facilities to take samples of the materials used.

5.4.5 The tests for consistency or workable shall be carried out in accordance with requirements of IS 1199 by such other method as may be agreed to between the purchaser and manufacturer.

5.4.6 The sampling and testing of concrete shall be done in accordance with the relevant requirements of IS 456, IS 1199 and IS 516.

5.4.7 The compressive strength and flexural strength tests shall be carried out in accordance with the requirement of IS: 516 and the acceptance criteria for concrete whether supplied on the basis of specified strength or on the basis of mix proportion, shall conform to the requirements and other related requirements of IS: 456 -2000.

5.4.8 The testing shall be carried out in accordance with the requirements and the cost shall be borne by the Contractor.

5.4.9 The manufacturer shall keep batch records of the quantities by mass all the solid materials, of the total amount of water used in mixing and of the results of all tests. If required insisted, the manufacturer shall furnish certificates, at agreed intervals, giving this information.

5.4.10 Mode of measurement for ready mixed concrete (RMC) will be the same as mode of measurement for concrete work already mentioned at page No. 42 & 43 of clause 4.40. However, consumption of RMC shall be maintained at site. Wastage, spillover, wastage due to pump blockage etc. shall not be considered for payment.

5.5 FLY ASH CONCRETE:

NOTES:

- a) The fly ash should have consistent quality satisfying the requirements of Grade-1 FA of IS 3812 and Class-F of ASTM C-618.
- b) The source of fly ash should be so selected that test results of fly ash samples collected from these sources during last one year at frequency of maximum one month interval should satisfy the requirements of above codes.
- c) The characterization of fly ash which will be used should be done as per above two codes for each batch of fly ash.
- d) The fly ash should be stored in bins at the plant.
- e) All concrete should be manufactured at RMC plant.
- f) The mix proportion should be approved by competent authority. The information to be supplied for approval would be identified by the competent authority.
- g) Any change in mix proportion, after approval, should be concurred by appropriate authority.
- h) Samples to be taken, at each time of casting, for 7 days and 28 days.
- i) All ingredients of concrete should satisfy the requirements of relevant IS codes and specifications.

5.5.1 Curing, Protecting, Repairing and Finishing:

5.5.1.1 Curing: All concrete shall be cured by keeping it continuously damp for the period of time required for complete hydration and hardening to take place. Preference shall be given to the use of continuous sprays or ponded water, continuously saturated covering of sacking, canvas, hessian or other absorbent materials, or approved effective curing compounds applied with spraying equipment capable of producing a smooth, even textured coat. Extra precautions shall be exercised in curing concrete during cold and hot weather as outlined hereinafter the quality of curing water shall be the same as that used for mixing concrete.

Certain types of finish or preparation for overlaying concrete must be done at certain stages of curing process and special treatment may be required for specific concrete surface finish.

Curing of concrete made of high alumina cement and super sulphated cement shall be carried out as directed by Engineer-in-charge.

5.5.1.2 Curing of concrete with low water binder ratios having partial replacement of cement by pozzolanic materials.

5.5.1.3 The structural elements with concrete having water binder ratio less than or equal to 0.4 or partial replacement of cement by pozzolanic materials (5% or above replacement by silica fume or high reactivity metakaolin, or 15% or above by fly ash) shall be cured in two stages, initial curing and final curing.

i) The initial curing should be started not later than 3 hours or initial setting time, whichever is lower, after placement of concrete. The concrete surface exposed to environment should be covered by plastic sheet or other type of impermeable covers. The initial curing should be continued upto a minimum period of 12 hours or 2 hours plus final setting time of concrete, whichever is higher.

ii) Final curing should be done with water. It should commence immediately after initial curing and continue upto a minimum period of 14 days.

5.5.1.4 Curing with Water

Fresh concrete shall be kept continuously wet for a minimum period of 14 days from the date of placing of concrete, following a lapse of 12 to 24 hours after laying concrete. The curing of horizontal surfaces exposed to the drying winds shall however begin immediately the concrete has hardened. Water shall be applied to uniformed concrete surfaces within 1 hour after concrete has set. Water shall be applied to formed surfaces immediately upon removal of forms. Quantity of water applied shall be controlled so as to prevent erosion of freshly placed concrete.

5.5.1.5 Continuous Spraying

Curing shall be assured by use of ample water supply under pressure in pipes, with all necessary appliances of hose sprinklers and spraying devices. Continuous fine mist spraying or sprinkling shall be used, unless otherwise specified or approved by Engineer-in-charge.

5.5.1.6 Alternate Curing Methods:

Whenever in the judgement of Engineer-in-charge, it may be necessary to omit the continuous spray method, covering of clean sand or other approved means such as wet gunny bags, which will prevent loss of moisture from the concrete, may be used. Any type of covering which would slain or damage the concrete during or after the curing period, will not be permitted. Covering shall be kept continuously wet during the curing period.

For curing of concrete in pavements, side-walks, floors, flat roofs or other level surfaces, the ponding method of curing is preferred. The method of containing the ponded water shall be approved by Engineer-in-charge. Special attention shall be given to edge and corner of the

slab to ensure proper protection to these areas. The ponded areas shall be kept continuously filled with water during the curing period.

5.5.1.7 Curing Compounds: Surface coating type curing compound shall be used only on special permission of Engineer-in-charge. Curing compounds shall be liquid type while pigmented, conforming to U.S Bureau of Reclamation Specification. No curing compound shall be used on surface where future blending with concrete water or acid proof membrane or painting is specified.

VI. STEEL FOR CONCRETE REINFORCEMENT:

6.1 SCOPE OF MATERIAL:

The contractor shall make his own arrangement for procurement of Reinforcement steel bars and wires for use in Reinforced Cement Concrete works. Unless otherwise specified in drawings / Schedule of quantities, the steel bars shall be of “High strength deformed steel bars and wires” conforming to the IS 1786 (latest revision), in the following strength grades:

- a) Fe 415, Fe 415D;
- b) Fe 500, Fe 500D;
- c) Fe 550, Fe 550D; and
- d) Fe 600.

Where “Fe” stands for specified minimum 0.2% proof / yield stress in N/mm² and “D” stands for same specified minimum 0.2% proof / yield stress but with enhanced specified minimum percentage elongation.

6.2 TERMINOLOGY:

Elongation: The increase in length of a tensile test piece under stress, expressed as a percentage of the original gauge of a standard piece.

Longitudinal Rib -A uniform continuous protrusion, parallel to the axis of the bar/wire (before cold-working, if any).

Nominal Diameter or Size- The diameter of a plain round bar/wire having the same mass per metre length as the deformed bar/wire.

Nominal Mass -The mass of the bar/wire of nominal diameter and of density 0.00785 kg/cumm per meter.

Nominal Perimeter - 3.14 times the nominal diameter of a deformed bar/Wire.

Percent Proof Stress -The stress at which a non-proportional elongation equal to 0.2% of the original gauge length takes place.

Uniform elongation - The elongation corresponding to the maximum load reached in a tensile test (also termed as percentage total elongation at maximum force).

Tensile Strength - The maximum load reached in a tensile test divided by the effective cross-sectional area of the gauge length portion of the test piece (also termed as ultimate tensile stress).

Transverse Rib - Any rib on the surface of a bar/wire other than a longitudinal rib.

Yield Stress - Stress (that is, load per unit cross sectional area) at which elongation first occurs in the test piece without increasing the load during the tensile test. In the case of steels with no such definite yield point, proof stress shall be applicable.

The high strength deformed steel bars and wires for concrete reinforcement shall be hot rolled steel without subsequent treatment or hot rolled steel with controlled cooling and tempering and cold worked steel, and reinforcing bars and wires which may be subsequently coated.

Steel bars shall be supplied from M/s. Steel Authority of India Ltd. (SAIL) or M/s. TATA Steel (TISCO) or M/s. Rashtriya Ispat Nigam Ltd (RINL) or M/s. Indian Iron & Steel Co. (IISCO) Ltd., from their own plants rolled from virgin material, and shall be procured directly or from their authorized dealers and not from re-rollers or conversion agents. The contractor shall supply copy of Documentary evidence of purchase of steel from the specified manufacturers.

6.3 TESTS:

The contractor shall submit the test certificate of the manufacturer. Regular tests on steel supplied by the contractor shall be performed by the contractor at the approved lab, in presence of the Departmental Engineers as per relevant Indian Standards. Engineer-in-charge may require Contractor to perform necessary tests of samples at random as per relevant B.I.S. All cost of such tests and incidentals to such tests shall be borne by the Contractor. The quality, grade, colour coding embossing marks etc. all shall be to the entire satisfaction of the Engineer-in-Charge. Steel not conforming to above test criteria shall be rejected.

The Chemical, Physical & Mechanical properties of the steel reinforcement bars shall be as per IS 1786. Unless otherwise specified, Selection and Preparation of Test Sample shall be as per the requirements of IS 2062.

All test pieces shall be selected either from the cuttings of bars / wires; or from any bar/wire after it has been cut to the required or specified size and the test piece taken from any part of it. In neither case, the test piece shall be detached from the bar/wire except in the presence of the EIC or his authorized representative.

The test pieces shall be full sections of the bars/wires and shall be subjected to physical tests without any further modifications. No reduction in size by machining or otherwise shall be permissible, except in case of bars of size 28 mm and above. No test piece shall be annealed or otherwise subjected to heat treatment. Any straightening which a test piece may require shall be done cold.

For the purpose of carrying out tests for tensile strength, proof stress, percentage elongation and percentage elongation at maximum force for bars 28 mm in diameter and above, deformations of the bars only may be machined. For such bars, the physical properties shall

be calculated using the actual area obtained after machining. The following IS codes shall be referred for test methods:

S.No.	Title	IS No	ISO No.
i	Mechanical testing of metals -Tensile testing	1608	6892
ii	Methods for bend test	1599 7438 & 1786	15630-1
iii	Method for re-bend test for metallic wires & bars	1786	15630-1

THE PROPERTIES AS PER IS 1786 – 2008 ARE REPRODUCED BELOW:

Chemical Composition of the bars shall conform to the following requirement:

Constituents	Maximum Permissible Percent							Permissible max. Variation
	Fe 415	Fe 415D	Fe 500	Fe 500D	Fe 550	Fe 550D	Fe 600	
Carbon	0.300	0.250	0.300	0.250	0.300	0.250	0.300	0.020%
Sulphur	0.060	0.045	0.055	0.040	0.055	0.040	0.040	0.005%
Phosphorus	0.060	0.045	0.055	0.040	0.050	0.040	0.040	0.005%
Sulphur & Phosphorus	0.110	0.085	0.105	0.075	0.100	0.075	0.075	0.010%

Notes:

- I. For welding of deformed bars, the recommendations of IS 9417 shall be followed.
- II. In case of deviations from the specified maximum, two additional test samples shall be taken from the same batch and subjected to the test or tests in which the original sample failed. Should both additional test samples pass the test, the batch from which they were taken shall be deemed to comply with this standard. Should either of them fail, the batch shall be deemed not to comply with this standard

Mechanical Properties of High Strength Deformed Bars and Wires

Sl. No.	Property	Maximum Permissible Percent						
		Fe 415	Fe 415D	Fe 500	Fe 500D	Fe 550	Fe 550D	Fe 600
1	2	3	4	5	6	7	8	9
i	0.2 percent proof stress / yield stress, Min, N/mm ²	415.0	415.0		500.0	550.0	550.0	600.0

ii	Elongation , percent, Min. on gauge length $5.65 \sqrt{A}$, where A is the Cross – sectional area of the test piece	14.5	18.0	12.0	16.0	10.0		10.0
iii	Tensile strength , Min	10% more than the actual 0.2% proof stress/yield stress but not Less than 485.0 N/mm ²	12% more than the actual 0.2% proof stress/yield stress but not less than 500.0 N/mm ²	8% more than the actual 0.2% proof stress/yield stress but not less than 1805.0 N/mm ²	10% more than the actual 0.2% proof stress/yield stress but not less than 565.0 N/mm ²	6% more than the actual 0.2% proof stress/yield stress but not less than 585.0 N/mm ²		6% more than the actual 0.2% proof stress/yield stress but not less than 660.0 N/mm ²
iv	Total elongation at maximum force, percent, Min of gauge length $5.65 \sqrt{A}$, where A is the cross sectional area of the test piece	-	5	-	5	-	5	-

Note: To satisfy Clause 26 of IS 456 -2000, no mixing of different types of grades of bars shall be allowed in the same structural members as main reinforcement, without prior written approval of the Engineer-in-Charge.

6.4 STACKING & STORAGE:

Steel for reinforcement shall be stored in such a way as to prevent distorting and corrosion. The steel for reinforcement shall not be kept in direct contact with ground. Fresh / Fabricated reinforcement shall be carefully stored to prevent damage, distortion, corrosion and deteriorations. Care shall be taken to protect steel from exposure to saline atmosphere during storage, fabrication and use. It may be achieved by treating the surface of reinforcement with cement wash or by suitable methods. Bars of different classifications, sizes and lengths shall be stored separately to facilitate issue in such sizes and lengths to cause minimum wastage in cutting from standard length.

6.5 QUALITY:

Steel not conforming to specifications shall be rejected. All reinforcement shall be clean, free from grease, oil, paint, dirt, loose mill, scale, loose rust, dust, bituminous material or any other substances that will destroy or reduce the bond. All rods shall be thoroughly cleaned before being fabricated. Pitted and defective rods shall not be used. All bars shall be rigidly held in position before concreting. No welding of rods to obtain continuity shall be allowed unless approved by the Engineer-in-Charge. If welding is approved, the work shall be carried as per I.S. 2751, according to best modern practices and as directed by the Engineer-in-Charge. In all cases of important connections, tests shall be made to prove that the joints are of the full strength of bars welded. Substitution of reinforcement will not be permitted except upon written approval from Engineer-in-charge.

6.6 NOMINAL SIZES

The nominal sizes of bars/wires shall be 4mrn, 5mrn, 6mrn, 8mrn, 10mrn, 12mrn, 16mrn, 20mrn, 25 mm, 28mrn, 32mrn, 36mrn, 40 mm. (Other sizes viz. 7mrn, 18mrn, 22 mm, 45 mm and 50 mm may be procured on specific stipulations).

6.7 NOMINAL MASS

For the purpose of checking the nominal mass, the density of steel shall be taken as 0.00785 kg/mm³ of the cross-sectional area per meter. Unless otherwise specified, the tolerances on nominal mass shall be as per following Table.

Tolerances on Nominal Mass

	Nominal Size in mm	Tolerance on the nominal mass in Percent		
				Individual sample for coils only
	2	3	4	5
	Up to and including 10	± 7	- 8	± 8

	Over 10 up to and including 16	± 5	- 6	± 6
	Over 16	± 3	- 4	± 4

6.8 LAPS:

Laps and splices for reinforcement shall be shown on the drawings. Splices in adjacent bars shall be staggered and the locations of all splices, except those specified on the drawings, shall be approved by the Engineer-in-Charge. The bars shall not be lapped unless the length required exceeds the maximum available lengths of bars at site.

6.9 BENDING:

All bars shall be accurately bent according to the sizes and shapes shown on the detailed working drawing / bar bending schedules. They shall be bent gradually by machine or other approved means. Reinforcing bars shall not be straightened and re-bent in a manner that will injure the materials. Bars containing cracks or splits shall be rejected. They shall be bent cold, except bars of over 25 mm. in diameter which may be bent hot if specifically approved by the Engineer-in-Charge. Bars that depend for their strength on cold working shall not be bent hot. Bars bent hot shall not be heated beyond cherry red colour (not exceeding 645°C) and after bending shall be allowed to cool slowly with out quenching. Bars incorrectly bent shall be used only after straightening and re-bending be such as shall not, in the opinion of the Engineer-in-Charge, injure the material. No reinforcement bar shall be bent when in position in the work without approval, whether or not it is partially embedded in hardened concrete. Bars having kinks or bends other than those required by design shall not be used.

BENDING AT CONSTRUCTION JOINTS:

Where reinforcement bars are bent aside at construction joints and afterwards bent back into their original position, care should be taken to ensure that at no time the radius of the bend is less than 4 bar diameters for plain mild steel or 6 bar diameters for deformed bars. Care shall also be taken when bending back bars to ensure that the concrete around the bar is not damaged.

6.10 FIXING / PLACING AND TOLERANCE ON PLACING:

Reinforcement shall be accurately fixed by any approved means maintained in the correct position as shown in the drawings by the use of blocks, spacers and chairs as per I.S. 2502 to prevent displacement during placing and compaction of concrete. Bars intended to be in contact at crossing point shall be securely bound together at all such points with number 16 gauge annealed soft iron wire. The vertical distances required between successive layers of bars in beams or similar members shall be maintained by the provision of spacer bars at such intervals that the main bars do not perceptibly sag between adjacent spacer bars.

TOLERANCE ON PLACING OF REINFORCEMENT:

Unless otherwise specified, reinforcement shall be placed within the following tolerances:

	Tolerance in spacing
a) For effective depth, 200 mm or less	+ /- 10 mm
b) For effective depth, more than 200 mm	+ /- 15 mm

6.11 COVER TO REINFORCEMENT:

Nominal cover is the design depth of concrete cover to all steel reinforcements, including links. It is the dimension used in design and indicated in the drawings. It shall be not less than the diameter of the bar. Unless otherwise specified, cover to reinforcement shall be provided generally as per guidelines of IS 456.

Nominal cover to meet durability requirement:

Minimum values for the nominal cover of normal weight aggregate concrete which should be provided to all reinforcement, including links depending on the condition of exposure described in 4.4 above and as per (nominal cover to meet durability requirements).

However for a longitudinal reinforcing bar in a column nominal cover shall in any case not be less than 40 mm or less than the diameter of such a bar. In the case of columns of minimum dimension of 200 mm or under, whose reinforcing bar does not exceed 12 mm , a nominal cover of 25 mm may be used.

For footings minimum cover shall be 50 mm.

Nominal cover to meet specified period of fire resistance

Minimum values of nominal cover of normal-weight aggregate concrete to be provided to all reinforcement including links to meet specified period of the resistance as per the tables given under clause 4.4.1 of these specifications.

The cover shall in no case be reduced by more than one third of specified cover or 5 mm whichever is less.

Unless indicated otherwise on the drawings, clear concrete cover for reinforcement (exclusive of plaster or other decorative finish shall be as follows:

- a) At each end of the reinforcing bar not less than 25mm, nor less than twice the diameter of such, bar.
- b) For a longitudinal reinforcing bar not less than 25 mm, nor more than 40 mm, nor less than the diameter of such a bar. In the case of columns of maximum dimensions of 200 mm. or under, whose reinforcing bars do not exceed 12 mm, a cover of 25 mm. may be used.
- c) For a longitudinal reinforcing bar in a beam, not less than 25mm, nor less than diameter of such bar.
- d) For tensile, compressive, shear, or other reinforcement in a slab, not less than 25 mm, nor less than the diameter of such bar, and
- e) For any other reinforcement not less than 15 mm, nor less than the diameter of such bar.
- f) Increased cover thickness may be provided when surfaces of concrete members are exposed to the action of harmful chemicals (as in the case of concrete in contact with earth faces contaminated with such chemicals), acid, vapour, saline atmosphere, sulphurous

smoke (as in the case of steam-operated railways) etc. and such increase of cover may be between 15 mm. and 50 mm. beyond the figures given in (a to e) above as may be specified by the Engineer-in-Charge.

g) For reinforced concrete members, totally immersed in sea water, the cover shall be 40 mm. more than specified (a to e) above.

h) For reinforced concrete members, periodically immersed in sea water or subject to sea spray, the cover of concrete shall be 50 mm. more than that specified (a to e) above.

i) For concrete of grade M 25 and above, the additional thickness of cover specified in (f), (g) and (h) above may be reduced to half. In all such cases the cover should not exceed 75 mm.

j) Protection to reinforcement in case of concrete exposed to harmful surroundings may also be given by providing dense impermeable concrete with approved protective coating, as specified on the drawings. In such case the extra cover, mentioned in (h) and (i) above, may be reduced by the Engineer-in-Charge, to those shown on the drawing.

k) The correct cover shall be maintained by cement mortar briquettes or other approved means. Reinforcement for footings, grade beams and slabs on subgrade shall be supported on precast concrete blocks as approved by the Engineer-in-Charge. The use of pebbles or stones shall not be permitted.

l) The minimum clear distance between reinforcing bars shall be in accordance with I.S. 456 or as shown in drawing.

6.12 THE BARS SHALL BE KEPT IN CORRECT POSITION BY THE FOLLOWING METHODS.

a) In case of beam and slab construction precast cover blocks in cement mortar 1:2 (1 cement: 2 coarse sand) about 4 x 4 cm section and of thickness equal to the specified cover shall be placed between the bars and shuttering, so as to secure and maintain the requisite cover of concrete over reinforcement.

b) In case of cantilevered and doubly reinforced beams or slabs, the vertical distance between the horizontal bars shall be maintained by introducing chairs, spacers or support bars of steel at 1.0 metre or at shorter spacing to avoid sagging.

c) In case of columns and walls, the vertical bars shall be kept in position by means of timber templates with slots accurately cut in them; or with block of cement mortar 1:2 (1 cement: 2 coarse sand) of required size suitably tied to the reinforcement to ensure that they are in correct position during concreting.

d) In case of other R.C.C. structure such as arches, domes, shells, storage tanks etc. a combination of cover blocks, spacers and templates shall be used as directed by Engineer-in-Charge.

6.13 INSPECTION:

Erected and secured reinforcement shall be inspected and approved by Engineer-in-Charge prior to placement of concrete.

6.14 MODE OF MEASUREMENT FOR REINFORCEMENT FOR R.C.C. WORKS:

Reinforcement as detailed in schedule of quantities shall be measured for payment lineally as per the cutting length nearest to a centimeter shown in bar bending schedule submitted by the contractor and approved by the Engineer-in-Charge and weight calculated based on the standard weights as per I.S.1786, as indicated in the following table:

Nominal size in mm	6	7	8	10	12	16	18	20
Cross Sectional area in mm ² .	28.30	38.50	50.30	78.60	113.10	201.20	254.60	314.30
Mass / Weight in Kg / RM	0.222	0.302	0.395	0.617	0.888	1.580	2.000	2.47
Nominal size in mm	22	25	28	32	36	40	45	50
Cross Sectional area in mm ² .	380.30	491.10	614.00	804.60	1018.30	1257.20	1591.10	1964.30
Mass / Weight in Kg / RM	2.980	3.850	4.830	6.310	7.990	9.850	12.500	15.420

No allowance shall be made/ be measured in the weight for rolling margin. If weight of bar(s) found to be more than the standard weights, the measurement / payment shall be restricted to the standard weights as above. However, if weight of bar(s) found to be less than the standard weights (but within the permissible limit), the measurements / payment for the same shall be as per standard weights.

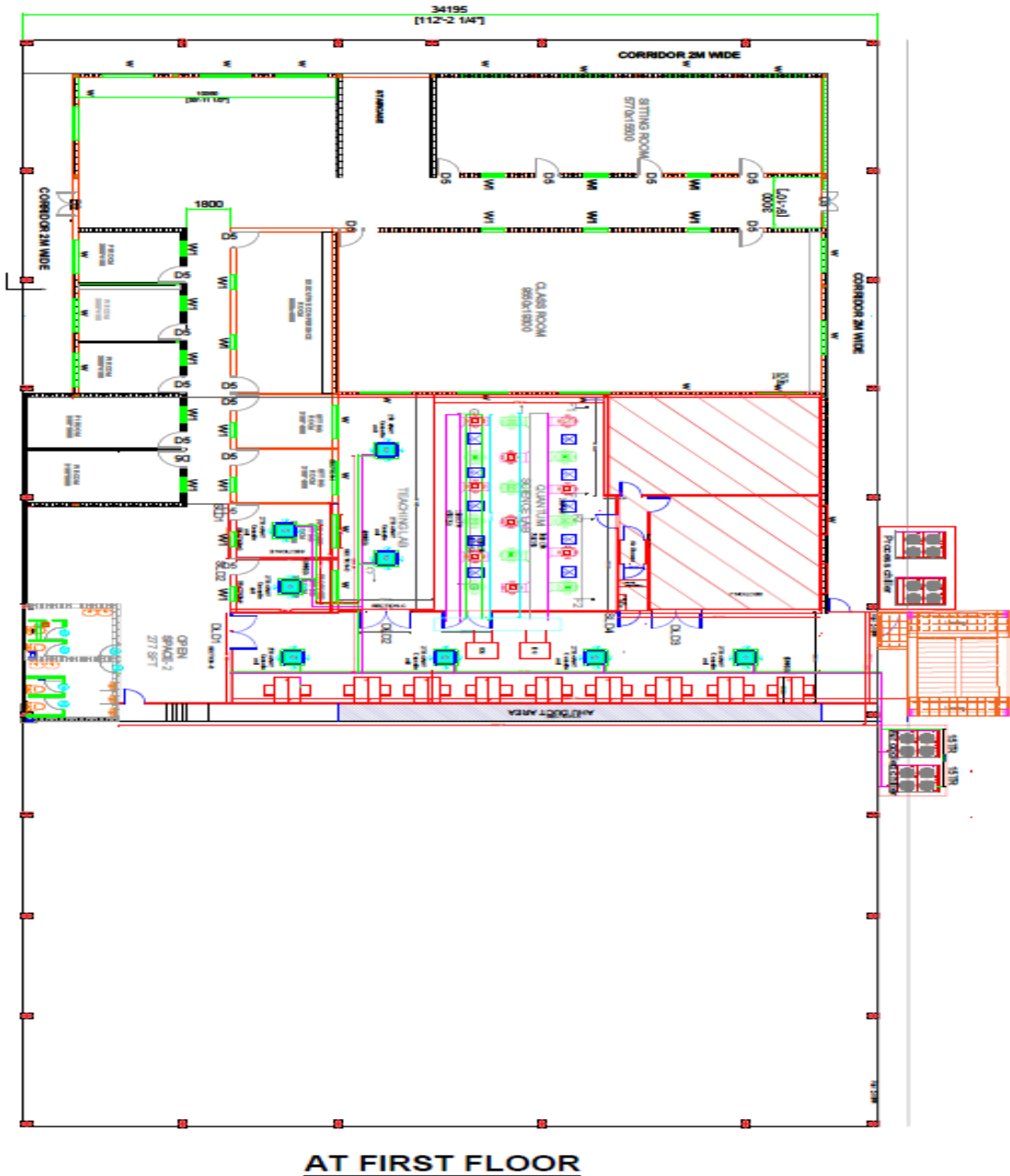
Only authorized laps shall be measured. The cost of steel used by the contractor in the reinforcement of beams, slabs and columns etc. will be paid as per the rate of reinforcement only upto the extent shown in the drawings. As far as possible laps in bars shall be avoided. Any laps and hooks provided by the contractor other than authorized as per approved bar bending schedule will be considered to have been provided by the contractor for his own convenience and shall not be measured for payment. Pins, chairs, spacers shall be provided by the contractor wherever required as per drawing and bar bending schedule and as directed by the Engineer-in-Charge and shall be measured for payment. Fan hooks as required shall be provided by the contractor under this item and shall be measured for payment.

The rate shall include the cost of all materials and labour required for all above operations including transport, wastage, straightening, cutting, bending, binding and the binding wire required.

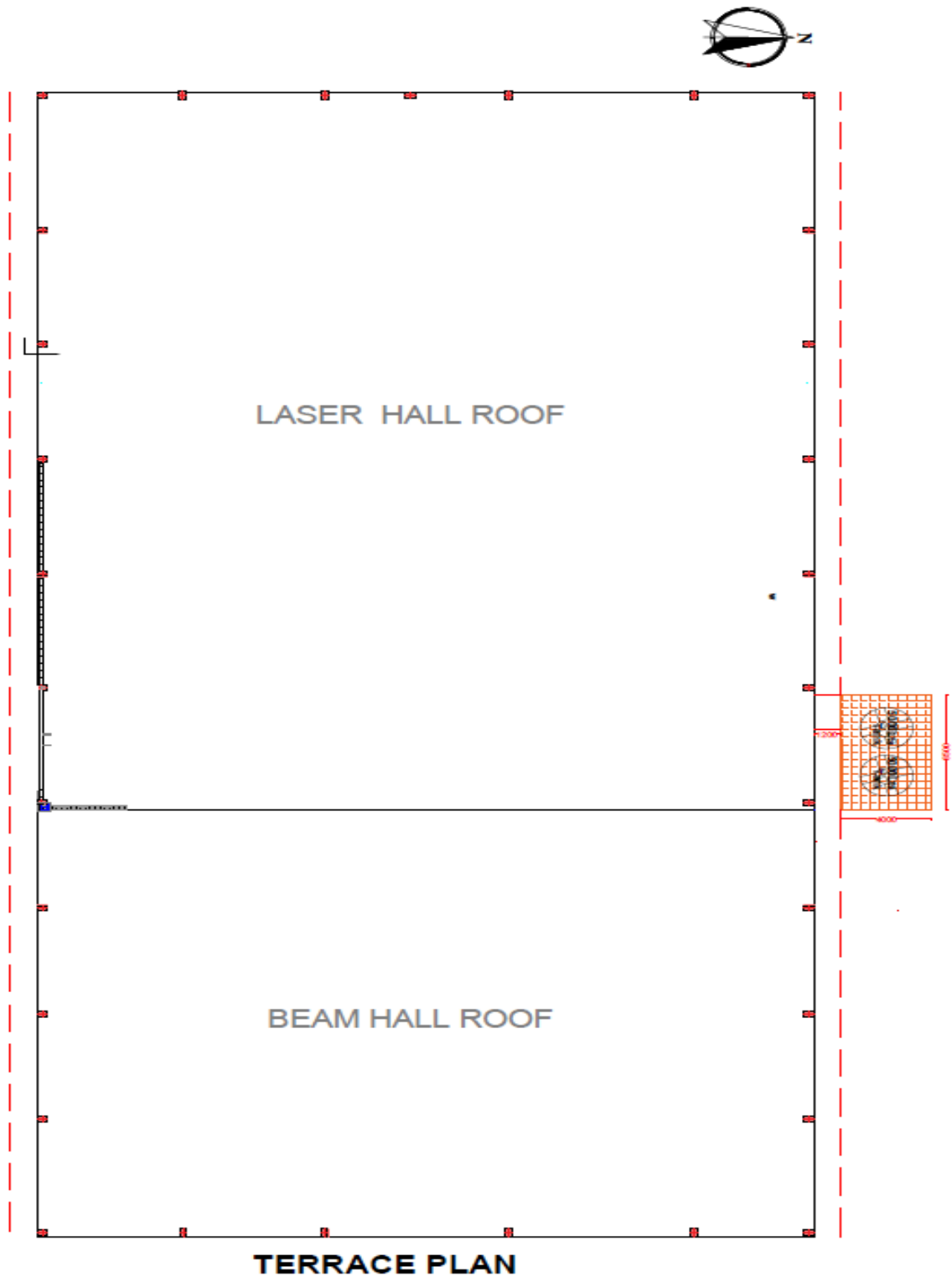
CHAPTER-V

DRAWINGS

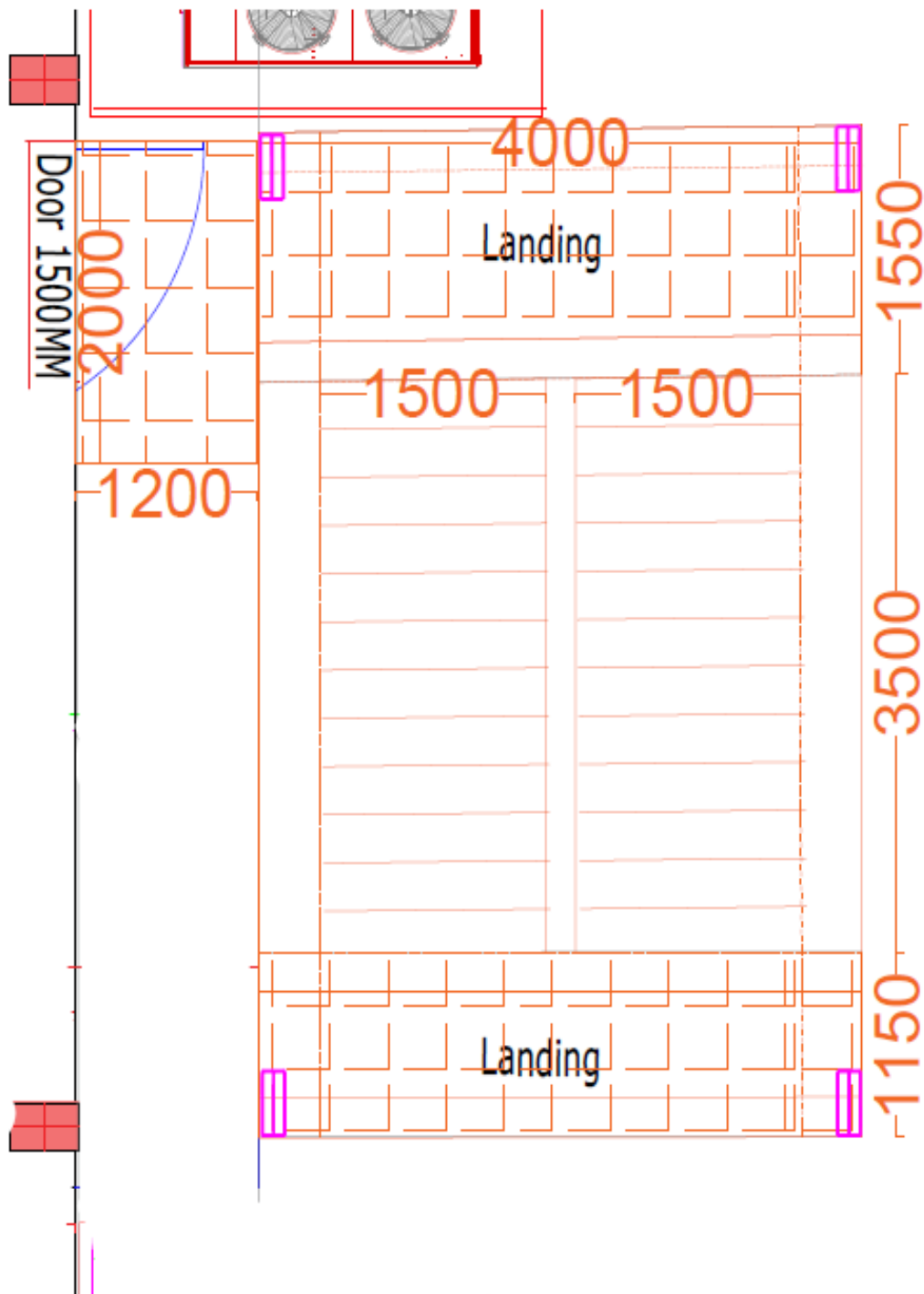
SITE AREA LAYOUT



Note: Plans mentioned are tentative, however the contractor shall obtain the structural designs and drawings from the licensed structural engineer as per the site conditions prior to commencement of the work.

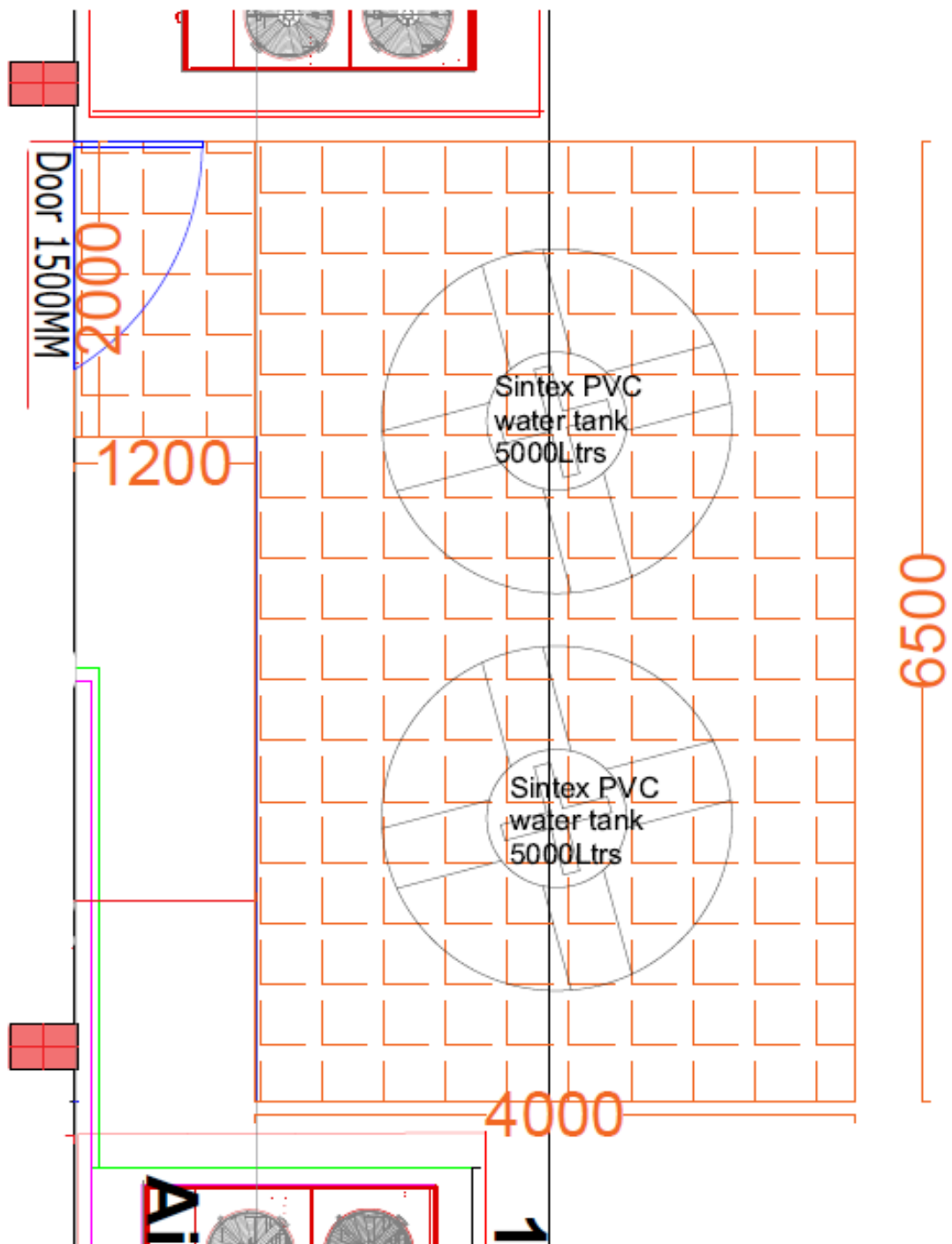


Note: Plans mentioned are tentative, however the contractor shall obtain the structural designs and drawings from the licensed structural engineer as per the site conditions prior to commencement of the work.



STAIRCASE PLAN IN DETAIL

Note: Plans mentioned are tentative, however the contractor shall obtain the structural designs and drawings from the licensed structural engineer as per the site conditions prior to commencement of the work.



TERRACE PLAN IN DETAIL

Note: Plans mentioned are tentative, however the contractor shall obtain the structural designs and drawings from the licensed structural engineer as per the site conditions prior to commencement of the work.

[illegible]

Contractor Signature

CHAPTER-VI**ANNEXURES****ANNEXURE-I****FORM OF PERFORMANCE GUARANTEE (BY BANK GUARANTEE)**

1. In consideration of the TIFR-Hyderabad, Hyderabad having agreed under the terms and conditions of Letter of Intent/ Agreement No..... dated..... made between and.....(Here in after called " the said Contractor(s)") for the work (Here in after called "the said Letter of Intent /Agreement") having agreed to production of an irrevocable bank Guarantee for Rs..... (Rupees only), as a security / guarantee from the contractor(s) for compliance of his obligations in accordance with the terms and conditions in the said agreement, we(Indicate the name of the Bank) (hereinafter referred to as "the Bank") Hereby undertake to pay to TIFR Hyderabad for an amount not exceeding Rs..... (Rupees..... only) on demand by TIFR Hyderabad
2. We..... (indicate the name of Bank) do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from TIFR stating that the amount claimed is required to meet the recoveries due or likely to be due from the said Contractor(s). Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs..... (Rupees..... only).
3. We, the said bank, further undertake to pay to TIFR any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) in any suit or proceeding pending before any Court or Tribunal relating thereto, our liability under this present being absolute and unequivocal. The payment made by us under this bond shall be a valid discharge of our liability for payment thereunder and the Contractor(s) shall have no claim against us for making such payment.
4. We (indicate the name of Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of TIFR under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till Engineer-in-charge on behalf of the TIFR certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee.
5. We (indicate the name of Bank) further agree with TIFR that TIFR shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by TIFR against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor(s) or for any forbearance, act of omission on the part of TIFR or any indulgence by TIFR to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.
6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).
7. We..... (indicate the name of Bank) lastly undertake not to revoke this guarantee except with the previous consent of TIFR in writing.
8. This guarantee shall be valid up to, unless extended on demand. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs (Rupees only) and unless a claim in writing is lodged with us within six months of the date of expiry or the extended date of expiry of this guarantee, all our liabilities under this guarantee shall stand discharged.

Signed and sealed

Dated the day of..... for..... (indicate the name of Bank)

*(Note: The Letter of Intent shall form part of the Agreement)

ANNEXURE-II**UNDERTAKING BY THE TENDERER**

I / We have read and examined the Tender document including terms & conditions, specifications, Schedule of quantities, drawings and designs, general rules & directions, General Conditions of Contract, Special Conditions of Contract and all relevant other documents, publications and rules referred to in the Conditions of Contract and all other contents in the tender documents for the work.

I / We, hereby tender for execution of the work specified for the TIFR-Hyderabad, Hyderabad within the time specified and in accordance in all respects with the specifications, designs, drawings and instructions in writing.

We agree to keep the tender open for seventy five (75) days from the last date of its submission and not to make any modifications in its terms and conditions. A sum of Rs..... has been deposited in online payment / cash / receipt treasury challan / deposit at call receipt of scheduled bank / fixed deposit receipt of scheduled bank / demand draft of a scheduled bank / Bank Guarantee issued by a Scheduled Bank as earnest money. If I / we, fail to furnish the prescribed performance guarantee within prescribed period, I / we agree that the said TIFR-Hyderabad, Hyderabad or its authorized officer shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely. Further, if I / we fail to commence work as specified, I / we agree that the TIFR-Hyderabad, Hyderabad shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said earnest money and the performance guarantee absolutely, otherwise the said earnest money shall be retained by TIFR-Hyderabad, Hyderabad towards security deposit to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to therein.

Further, I / We agree that in case of forfeiture of earnest money or both Earnest Money & Performance Guarantee as aforesaid, I / We shall be debarred for participation in the re-tendering process of the work.

I / We hereby declare that I / We shall treat the tender documents, drawings and other records connected with the work as secret / confidential documents and shall not communicate information derived there-from to any person other than a person to whom I / We am / are authorized to communicate the same or use the information in any manner prejudicial to the safety of the State.

Seal & Signature of Contractor Postal Address

Dated

Witness Address Occ

ANNEXURE-III

(To be submitted on bidder / firm's letterhead)

CERTIFICATE OF LOCAL CONTENT

*We _____ hereby confirm in respect of quoted item(s) that local Content is equal to or more than 50% and come under 'Class-I Local Supplier' Category. As being 'Class-I Local Supplier', we are eligible for Purchase Preference under 'Make in India' Policy vide GoI Order No.P-45021/2/2017-PP (B.E.-II) dated 15.06.2017 (subsequently revised vide orders dated 28.05.2018, 29.05.2019 and 04.06.2020)

OR

*We _____ hereby confirm in respect of quoted items(s) that Local Content is more than 20% but less than 50% and come under 'Class-II Local Supplier' Category.

The details of the location (s) at which the local value addition made is / are under:

1.

2.

Date:
Bidder

Seal & Signature of the

NOTE:

- Self-certification that the item offered meets the minimum local content (as above) giving details of the location(s) at which the local value addition is made in case the bidder wishes to avail the benefits under the make in India policy, if applicable.
- In cases of procurement for a value in excess of Rs.10 crores, the local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content to avail the benefits under the make in India policy, if applicable.

ANNEXURE-IV**Site Visit Declaration Certificate (To be submitted on bidder / firm's letterhead)****CERTIFICATE OF TENDERER'S VISIT TO SITE**

1. This is to certify that I _____(Name of bidder or his Representative) am from _____(Name of Firm of tendering) visited the site at TIFR, Hyderabad in connection with the Tender Ref No. TIFR/PD/CF26-76/260899, Survey No. 36/P, Gopanpally (Village), Serilingampally (Mandal), Ranga Reddy Dist., Hyderabad-500046, Telangana, India.

2. Having previously studied the contract documents, I carefully examined the site.

3. I have made myself familiar with all the local conditions likely to influence the works and the cost thereof.

4. I further certify that I am satisfied with the description of the work and the explanations given by the said Representative and that I understand perfectly the work to be done as specified and implied in the execution of the contract.

Signed by tendering firm representative and name:

Signed by tenderer and name:

Date:

ANNEXURE-V

(To be submitted on the bidder / firm's letterhead)

FORM OF APPLICATION BY THE CONTRACTOR FOR SEEKING EXTENSION OF TIME

1. Name of contractor: _____
2. Name of work as given in the work order: _____
3. Work Order No. & Date: _____
4. Work Order Value: _____
5. Period allowed for completion of work as per the work order: _____
6. Date of commencement of work: _____
7. Period for which extension of time if has been given by authority previously:

S. No.	Letter No. and Date	Reasons for which extension have been previously given (copies of the previous applications should be attached)	Extension granted	
			Months	Days
(a) 1st extension				
(b) 2nd extension				
Total extension previously given				

8. Period for which extension is applied for at present : _____ and Reason: _____

Submitted to the Authority with a copy to the Engineer-in-charge.

Signature of Contractor: _____

Dated: _____

ANNEXURE-VI

(To be submitted on the bidder / firm's letterhead)

UNDERTAKING REGARDING NOT BLACKLISTING / NON – DEBARMENT

To

The Head,
Department of Technical Services.
TATA INSTITUTE OF FUNDAMENTAL RESEARCH
Plot No.36/P, Gopanpally Village,
Serilingampally Mandal, Ranga
Reddy District. Hyderabad -
500046,
Telangana, India.

We hereby confirm and declare that we, M/s
-----, is not blacklisted/ De-registered/
debarred by any Government department/ Public Sector Undertaking/ Private Sector/ or
any other agency for which we have Executed/ Undertaken the works/Services during
the last 5 years.

Authorised Signatory

Date:

ANNEXURE-VII

(To be submitted on the bidder / firm's letterhead)

Audited Annual Turnover

S.No.	Financial/ Accounting Year	Profit (Rs.)	Loss (Rs.)	Annual Turnover (in INR)
1.				
2.				
3.				

**Authorized Signatory
with Seal**

Note:

(i) This Audited Annual Turnover for the last 3 years should be certified by Chartered Accountant (CA) as per the format given above duly signed and stamped by the CA on their letterhead.

(ii) The bidder should have an average annual financial turnover (gross) of Rs.6.73 Lakhs during the immediate last three consecutive financial years ending March 31, 2025.

ANNEXURE-VIII

(To be submitted on the bidder / firm's letterhead)

List of Documents to be enclosed along with the bid submission:

Sr. No.	Documents	Attached (Yes / No)
1	Proof of Firm Registration	
2	GST & PAN of the Firm	
3	A valid Labour License	
4	Earnest Money Deposit	
5	Annual Turnover during three previous financial years ending March 31, 2025 duly certified by the licensed Chartered Accountant. Refer to ANNEXURE-VII	
6	Income Tax returns for the last three consecutive financial years ended on March 31, 2025 audited by the licensed Chartered Accountant.	
7	Profit/Loss statements for the last five consecutive financial years ending March 31, 2025 duly certified by the licensed Chartered Accountant.	
8	'Undertaking by the Tenderer as per the specified format in Annexure-II	
9	'Site Visit Declaration Certificate' as per the specified format in Annexure-IV	
10	'Undertaking by the Tenderer' regarding Not Blacklisting / Non-Debarment as per the specified format in Annexure-VI	
11	'Local Content Certificate' by the Tenderer as per the specified format in Annexure-III	
12	Work Completion Certificates along with Work Orders and BOQs as specified the eligibility criteria.	
13	Acceptance of Terms and Conditions of the tender by the tenderer by signing every page of the tender document with stamp.	

CHAPTER-VII**FINANCIAL BID (Part-II):****FINANCIAL BID (PART-II)****Tender No. TIFR/PD/CF26-76/260899**

Work: Construction of MS Supporting structure for Over Head Water tank (OHT) of Fire services and Emergency External Staircase for Fire Exit Route for TRISHUL Building in Plot-B at TIFRH

Location: TIFR, Survey No.36/P, Gopanpally (Village), Serilingampally (Mandal), Ranga Reddy Dist., Hyderabad – 500 046.

INSTRUCTIONS:

1. Tenderer needs to submit the signed copy of the Financial Bid quoting amount in the stipulated format and signed copies of the tender drawings.
2. Rates must be filled both in words and figures. The amount should be worked out for all the items.
3. The bidder shall quote his rates keeping in mind the specifications, terms & conditions, additional and special conditions etc. and nothing extra shall be payable unless otherwise specified.

(To be submitted on the bidder / firm's letterhead with ref. no. and date)

SCHEDULE OF QUANTITIES / BOQ

**Work: Construction of MS Supporting structure for Over Head Water tank (OHT) of
Fire services and Emergency External Staircase for Fire Exit Route for TRISHUL
Building in Plot-B at TIFRH**

S. No.	Description	Unit	Qty(A)	Rate(B)	Total Amount (C=A*B)
1	Earth work in excavation by mechanical means in all kinds of soil (Hydraulic excavator) / manual means in foundation trenches or drains including dressing of sides and ramming of bottoms, lift upto 2.10 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 meter.	Cum	25		
2	Supplying and Laying Plain Cement Concrete of Grade 1:4:8 with stone aggregate of 40mm down size (including shuttering if required) in all leveling courses under Foundation, Floors, Pipelines, Pits, trenches etc., at all depths complete all as per Drawings and Specifications and instruction of the Engineer.	Cum	4.5		
3	Providing Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) upto plinth level with Cement mortar 1:6 (1 cement : 6 coarse sand) etc., complete all as per the directions of the Engineer - in - charge.	Cum	6.5		
4	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by	Cum	25		

	ramming and watering, lead up to 50 m and lift upto 1.5 m				
5	Basement filling Filling in plinth with selected earth excavated from nearby borrow areas identified by statutory authorities including excavation, all leads, lifts, loading, unloading, stacking, levelling, spreading, in layers not exceeding 150 mm thick, breaking clods, watering, consolidation to obtain 90% proctor density etc. complete as per specifications, drawings & as directed by the Engineer in Charge	Cum	7		
6	Providing structural design, load calculations, stability analysis, and preparation of detailed fabrication and construction drawings for the proposed steel staircase, including design of columns, beams, stringers, landings, connections, base plates, anchor bolts, and foundations, complete as per NBC guidelines, IS 800, IS 875, and relevant Indian Standards. The contractor shall submit designs and drawings from licensed Structural Engineer before proceeding with the work.	Job	1		
7	Reinforcement for RCC work including supplying steel bars of required diameter including loading, unloading, transporting, decoiling, straightening, cutting, bending, placing in position and binding with 18 gauge, soft drawn annealed steel binding wire as required at site for foundation base and pedestals all as per specifications, drawings & as directed by the Engineer-In-Charge (Cost of binding wire shall be borne by the contractor & shall not be measured for payment). Thermo Mechanically Treated bars of grade Fe-500D manufactured by SAIL, TATA Steel & RINL or equivalent.	Kg	250		

8	Supply & fixing in position of MS anchor bolts of 16mm diameters (250Mpa) for pedestals confirming with IS 2062-2006 with machine turned threads , MS washers, nuts including welding, embedding in concrete in position in required alignment as per design and drawing and instructions of Engineer-In-Charge..	Kg	72		
9	Providing and laying in position M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix including cost of centering, shuttering finishing and reinforcement, including cost of admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer - in - charge. (Note :- Cement content considered in this item is @ 330 kg/cum. Excess/less cement used as per design mix is payable/recoverable separately).	Cum	5		
10	Supplying, fabricating, hoisting and erecting in position PEB/ M S structural steel works at all heights including aligning/leveling /welding etc complete as per design. The cost includes scaffolding charges, lifting and shifting of materials, applying one coat of zinc chromite primer and two coat of synthetic enamel paint of approved make color, complete for finished item of work as per directions of Engineer-In-Charge. (Approximate quantity, however it may vary as per requirements of design and actual quantity executed shall be considered for payment)	Kg	13000		

11	Cement concrete flooring 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate) finished with a floating coat of neat cement, including cement slurry, but excluding the cost of nosing of steps etc. complete: 40 mm thick with 20 mm nominal size stone aggregate	Sqmt	25		
Sub-Total (D)					
GST 18% (E)					
GRAND TOTAL (D+E)					
Total Amount in Words Rs.....					
.....					
..... Only					

Note:

1. TIFR Hyderabad has the right to delete any of the above items from scope of work or may increase/reduce quantities as per its requirement during execution of work. No claim or compensation for such deletion/increase/decrease will be accepted/paid to the contractor.
2. Payment will be made as per actual quantities executed at tender rates.
3. Unit rate must be quoted in figures as well as in words.
4. Rates are all inclusive of profit, Transport, Loading & Unloading, Shifting Taxes, etc.
5. The site must be clean and remove all the debris after completion of work.
6. Manufacturer's warranty of respective supply items to be provided.
7. For any deviating items, the contractor shall take prior approval from TIFR Engineer-in with proper rate analysis.