

# ***MAHINDRA TECH PARKS***

AT

MAHINDRA WORLDCITY, JAIPUR

## **TENDER DOCUMENT FOR ALUMINIUM GLAZING WORKS (BLOCK-B1)**

ARCHITECTS



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**June, 2010**

# MAHINDRA WORLD CITY (JAIPUR) LIMITED, JAIPUR

## BID FOR **ALUMINIUM GLAZING WORKS** AT MAHINDRA TECHNOLOGY PARK WITHIN THE IT/ITES SEZ

**Bid No** : **MWCJL/MTP/B1/T-03A**  
**Date of Issue** : **09-06-2010**

**Bid Document issued to:**

M/s .....

.....

.....

**By**

**Mahindra World City (Jaipur) Limited**  
411, Neelkanth Tower#1,  
Bhawani Singh Marg, C-Scheme,  
Jaipur -302001  
Phone No: 0141-4007025  
Fax : 0141-4007030

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**MAHINDRA WORLD CITY (JAIPUR) LIMITED, JAIPUR**

**Bid No** : **MWCJL/MTP/B1/T-03A**

**(ALUMINIUM GLAZING WORKS)**

**NAME OF WORK** : **CONSTRUCTION OF MAHINDRA  
TECHNOLOGY PARK AT MAHINDRA  
WORLD CITY**

**PERIOD OF ISSUE OF  
BIDDING DOCUMENT** : FROM: **09-06-2010 to 10-06-2010**  
TIME:-**10:00 HOURS TO 17:00 HOURS**

**LAST DATE AND TIME** : Date: **19-06-2010 (Hard Copy Submission)**  
**FOR RECEIPT OF BIDS Time: 15:00 Hrs.**

# **INVITATION FOR BID**

## **(IFB)**

**MAHINDRA WORLD CITY (JAIPUR) LIMITED, JAIPUR****INVITATIONS FOR BIDS (IFB)****Date: - 09-06-2010****Bid No : MWCJL/MTP/B1/T-03A**

1. **MAHINDRA WORLD CITY (JAIPUR) LIMITED** having its Registered office at **411, Neelkanth Tower#1, Bhawani Singh Marg, C-Scheme, Jaipur -302001**, is developing an IT/ITES SEZ and invites item rate Bids for the below mentioned works from the selected Bidders.

2. Hard copies of the document can be obtained from the Architect office at the below mentioned address by paying **Rs. 3000/- in cash** upto **10-06-2010**

**M/s Rajinder Kumar Associates**

B-6/17 Shopping Center,  
Safdarjung Enclave  
New Delhi 110029, India  
T: (91)11-26179093  
F: (91) 11-26186874

3. Bids must be delivered to **Mahindra World City (Jaipur) Limited, 411, Neelkanth Tower#1, Bhawani Singh Marg, C-Scheme, Jaipur -302001**, on or before **15:00 Hours** on **19-06-2010** in Hard Copy. If the office happens to be closed on the date of receipt of the Bids as specified, the Bids will be received on the next working day at the same time and venue.

4. Other details can be seen in the Bidding documents.

**TABLE - IFB 1**

<b>Sr. No.</b>	<b>Name of work</b>	<b>Bid security / EMD (Rs.)</b>	<b>Cost of document (Rs.)</b>	<b>Period of completion</b>
1	<b>ALUMINIUM GLAZING WORKS</b> at <b>Mahindra Technology Park Block B1</b>	Rs. 50,000/-	Rs. 3000/-	(04) Four Months

**Seal of office**

**SECTION 1: INSTRUCTIONS TO BIDDERS**  
**(ITB)**

**Section 1: Instructions to Bidders****Table of Clauses**

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## 1A. General Instructions

### 1. Scope of Bid

- 1.1 Mahindra World City (Jaipur) Limited ("MWCJL"), (hereinafter referred to as "Employer") invite Bids for the [ALUMINIUM GLAZING WORKS for Mahindra Technology Park Block B1 at Mahindra World City](#) being developed by it (as defined in these documents and referred to as "the Works").

### 2. One Bid per Bidder

- 2.1 Each Bidder shall submit only one Bid for one Contract.  
2.2 Bid documents are not transferable

### 3. Cost of Bidding

- 3.1 The Bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer will in no case be responsible and liable for those costs.

### 4. Site visit

- 4.1 The Bidder, at the Bidder's own responsibility and risk is encouraged to visit and examine the Site (as defined in Clause 1 of GCC) and its surroundings and obtain all information that may be necessary for preparing the Bid and entering into a Contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.  
4.2 After visiting the site the bidder shall confirm the fact of actual visit of the site to the employer which will be testimony to the fact that in fact site is available for commencing the work.  
4.3 The Contractor shall be deemed to have inspected, tested and examined the site and surroundings and to have satisfied himself as to all the conditions, factors and risks which can be reasonably obtained or inferred from the inspections, and examinations that may influence or affect the progress and cost of Contract Works.

## 1B. Bidding Documents

### 5. Contents of Bidding Documents

- 5.1 The set of bidding documents comprises the documents listed in the table below and addenda issued in accordance with Clause 8 (if any)

Sections	1	Instructions to Bidders
	2	Letter of Acceptance and Agreement form
	3	Conditions of Contract
	4	Forms of Securities
	5.	Special Conditions, Technical Specifications & Bill of Quantities

- 5.2 Qualification of Bidders : To be qualified for award of contract, bidders are required to

- a) Submit a written power of attorney authorising the signatory.  
b) Update the following information submitted with the application for qualification.  
i) Financial strength.  
ii) Works in hand  
iii) litigation if any.

### 6. Clarification of Bidding Documents

Bidders requiring any clarification of the Bidding documents may notify the Employer by e-mail to [verma.shiva@mahindraworldcity.com](mailto:verma.shiva@mahindraworldcity.com) or by Fax only. The Employer will respond to any request for clarification. All such queries shall be made at least three (03) days before date of submission of Bids as per Clause 16.

## **1C. Preparation of Bids**

### **7. Language of the Bid**

7.1 All documents relating to the Bid shall be in the English language.

### **8. Documents comprising the Bid**

8.1 The Bid submitted by the Bidder shall comprise the following:

- a) The Bill of Quantities wherein the Bidder shall fill in the rates; original plus one photocopy duly signed and stamped by the Bidder on each page.
  - b) Specifications, original plus one photocopy duly signed and stamped by the Bidder on each page.
  - c) any other materials required to be completed and submitted by bidders in accordance with these instructions
- The Financial Bid (BOQ) under Sections 5 of Sub-Clause 5.1 shall be filled in without exception.

### **9. Item Rate Contract**

9.1 The Contractor shall note that unless otherwise stated, the Tender is strictly on item rate basis contract.

### **10. Currencies of BID and payment**

10.1 The rates and the prices given are in Indian Rupees.

### **11. Bid Validity**

11.1 Bids shall remain valid for a period not less than 60 (sixty) days after the date for Bid submission specified in Clause 16. A Bid corrected by the Bidder as valid for a shorter period shall be rejected by the Employer as non-responsive.

### **12. Bid Security**

12.1 The Bidder shall furnish as a part of his Bid, a Bid security in the amount as shown in column 3 of the table IFB-1. The Bid security shall be in favour of **Mahindra World City (Jaipur) Limited** in the form of a Demand Draft or Banker's Cheque or Pay order payable at Jaipur.

12.2 The Bid Security of unsuccessful Bidders will be returned within 30 days of the end of the Bid validity period specified in Sub-Clause 11.1.

12.3 The Bid Security of the successful Bidder will be adjusted with Performance Security when the Bidder has signed the Agreement and furnished the required Performance Security.

12.4 The Bid Security may be forfeited

- (a) if the Bidder does not accept the correction of the Bid Price, pursuant to Clause 18; or
- (b) in the case of a successful Bidder, if the Bidder fails within the specified time limit to
  - (i) sign the Agreement; or
  - (ii) furnish the required Performance Security within 10 days from the date of Letter of Acceptance.

12.5 No interest shall be paid on any Bid security/Performance Security/ or Guarantee in lieu thereof.

### **13. Format and Signing of Bid**

13.1 The Bidder shall prepare the Bid as specified in Clause 8 in two (02) copies.

13.2 The Rate in the original and one duplicate copy of the Bid shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Bidder. All pages of the Bid where entries or amendments have been made shall be signed by the person or persons signing the Bid.

13.3 The Bid shall contain no alterations or additions or omission or interlocation except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the Bidder, in which case such corrections shall be signed by the person or persons signing the Bid.

#### 14. Salient Points

The Scope of work proposed in this Bid is for the **ALUMINIUM GLAZING WORKS**:

- 14.1 The Bidder should make himself acquainted with the site conditions, level and any other information required for giving a proper quote.
- 14.2 Bidders requiring any technical clarification should seek it from Employer's office before quoting and any ambiguity regarding quantities/specification and drawings will not be entertained after the Bids are finalised.
- 14.3 The Contractor should make his own arrangement of water and power for construction purposes and make all necessary arrangement. The power for commissioning will however be supplied by Employer.

#### 1D. Submission of Bids

#### 15. Sealing and Marking of Bids

- 15.1 The Bidders are not expected to include any conditions contrary to Bid provisions. However, if it is necessary to include certain conditions, the same should be submitted with proper reasons, in a separate sealed cover. The covers should be suitably super scribed indicating the contents. All letters, enclosures, and Bill of quantities shall be submitted in duplicate. Bidder should clearly indicate on each copy under their full signature, whether it is the Original or duplicate copy.
- 15.2 The Bidder shall submit the original Bid in one sealed envelop marking as "**FINANCIAL BID for ALUMINIUM GLAZING WORKS for Mahindra Technical Park Block B1**" At **Mahindra World City, Jaipur**". The duplicate copy duly marked should be in separate sealed envelope.
- 15.3 The envelopes shall be addressed to the Employer at the following address:  
**Mahindra World City (Jaipur) Limited**  
411, Neelkanth Tower#1,  
Bhawani Singh Marg, C-Scheme,  
Jaipur -302001  
Phone No: 0141-4007025

#### 16. Deadline for Submission of the Bids

- 16.1 Bids must be received by the Employer at the address specified above no later than **15:00** hours on **19-06-2010**. In the event of the specified date for the submission of Bids declared a holiday for the Employer, the Bids will be received up to the appointed time on the next working day.
- 16.2 The Employer may extend the deadline for submission of Bids by issuing an amendment indicating the revised deadline.

#### 1E. Bid Opening and Evaluation

#### 17. Process to Be Confidential

- 17.1 Information relating to the examination, clarification, evaluation, and comparison of Bids and recommendations for the award of a Contract shall not be disclosed to Bidders or any other persons not officially concerned with such process Any effort by a Bidder to influence the Employer's processing of Bids or award decisions may result in the rejection of his Bid.
- 17.2 The employer may at its absolute discretion , ask the bidders for any clarification including breakdown of rates, subject to this no bidder shall contact the employer relating to the bid from the time of opening to the time of contract awarded.

#### 18. Correction of Errors

- 18.1 Bids determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows:
  - (a) Where there is a discrepancy between the rates in figures and in words, the rate in words will govern; and
  - (b) Where there is a discrepancy between the unit and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.

- 18.2 The amount stated in the Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and, with the concurrence of the Bidder, shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected amount the Bid will be rejected.

**19. Employer's Right to Accept any Variation**

- 19.1 The Employer reserves the right to accept or reject any variation, deviation from the Bid document, or any alternative offer. Variations, deviations and alternative offers and other factors which are in excess of the requirements of the Bidding documents or otherwise result in unsolicited benefits for the Employer shall not be taken into account in Bid evaluation.
- 19.2 Acceptance of tender on behalf of employer (Mahindra World City [Jaipur] Ltd) shall be done by the committee empowered in this behalf or by officer of company duly authorised in this behalf.
- 19.3 It is made clear that the employer is not bound to accept lowest or any tender(bid). The employer reserves the right to reject any or all tenders received for consideration without assigning any reasons and without incurring any liability to affected bidders.

**1F. Award of Contract**

**20. Award Criteria**

- 20.1 The Employer will negotiate with the Bidder whose Bid has been determined to be substantially responsive to the Bidding documents. On completion of negotiations the Employer will award the Contract to the most suitable Bidder.

**21. Employer's Right to Accept any Bid and to Reject any or all Bids**

- 21.1 Notwithstanding Clause 20, the Employer reserves the right to accept or reject any Bid or part of the Bid, and to cancel the Bidding process and reject all Bids, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Employer's action.

**22. Notification of Award and Signing of Agreement**

- 22.1 The Bidders whose Bid has been accepted will be notified of the award by the Employer prior to expiration of the Bid validity. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").
- 22.2 The Agreement will incorporate all Agreements between the Employer and the successful Bidder. Within 10 days of issue of Letter of Acceptance, the successful Bidder will sign the Agreement and deliver it to the Employer.
- 22.3 Upon accepting the Performance Security for the Successful Bidder and signing of the Agreement, the Employer shall issue a 'Notice to Proceed' to the Contractor, in which the date of commencement of the Contract shall be indicated.
- 22.4 Upon furnishing of the Performance Security by the successful Bidder, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful.

**23. Performance Security**

- 23.1 Within 10 days of receipt of the Letter of Acceptance, the successful Bidder shall deliver to the Employer a Performance Security valid till Completion of the Contract in the form of a bank guarantee in Employer's prescribed format for an amount equivalent to 5 % of the Contract price by adjusting Bid Security:
- 23.2 Failure of the successful Bidder to comply with the requirements of Sub-Clause 23.1 shall constitute a breach of Contract, cause for annulment of the award, forfeiture of the Bid security and any such other remedy the Employer may take under the Contract, and the Employer may resort to awarding the Contract to any other Bidder, on sole discretion of Employer.

**24. Corrupt or Fraudulent Practices**

- 24.1 The Employer expects the Bidders, Suppliers, Contractors, and Consultants, observe the highest standard of ethics and integrity during the procurement and execution of such

Contracts. Therefore, the Employer will reject the Bid/ terminate the contract with no obligations and blacklist such Bidder / contractor, barring him from participation in future Bidding in the event he found indulged in any malpractice such as gift, bribe, or other inducements to any person with a view to influence the placing or operation of the Contract.

- 24.2 The bidder hereby undertakes that if the information given in bidding documents or otherwise be found to be untrue or false, he will be liable to be disqualified and his security will be forfeited and further it is discovered to be false during the contract period affecting prejudicially the interest of employer, the contract will be terminated and security deposit will be liable to be forfeited.

**SECTION-2**

**LETTER OF ACCEPTANCE AND AGREEMENT FORM**

**Table of Forms:**

- LETTER OF ACCEPTANCE & PROCEED THE WORK
- AGREEMENT FORM

**Letter of Acceptance**  
(letterhead paper of the Employer)

To,  
.....  
.....

Dear Sirs,

This is to notify that your Bid and subsequent negotiations for the execution of **ALUMINIUM GLAZING WORKS AT MAHINDRA TECHNOLOGY PARK IN BLOCK B1 WITHIN THE IT/ITES SEZ** for the negotiated Contract Price of Rs..... (Rupees ..... ) is hereby accepted by Mahindra World City (Jaipur) Limited.

You are hereby requested to furnish Performance Security Deposit in the prescribed format of the Bank Guarantee attached herewith for an amount of Rs. .... within ten (10) days, of receipt of this Letter Of Acceptance, valid up to 180 days from the Date Of Intended Completion i.e. .... any extension thereof and sign the Contract, failing which action as per Sub-Clause 21.1 of Instruction to Bidders shall be taken.

Subsequent to furnishing the requisite security, you are hereby instructed to proceed with the execution of the said works as the site will be handed over to you on \_\_ \_\_2010\_ in accordance with the Contract documents. The stipulated date of commencement and stipulated completion dates will be \_\_\_\_\_ and \_\_\_\_\_ respectively.

Thank you

Yours faithfully,

Chief Operating Officer  
**Mahindra World City (Jaipur) Limited**  
411, Neelkanth Tower#1,  
Bhawani Singh Marg, C-Scheme,  
Jaipur -302001  
Phone No: 0141-4007025

**Agreement Form (On stamp paper of Rs 100/-)****Agreement**

This Agreement, made the \_\_\_\_\_ - 2010, between **Mahindra World City (Jaipur) Limited** (hereinafter called "the Employer") of the one part and

\_\_\_\_\_ [name and address of Contractor] (hereinafter called "the Contractor" ) of the other part.

Whereas the Employer is desirous that the Contractor execute **ALUMINIUM GLAZING WORKS AT MAHINDRA TECHNOLOGY PARK IN BLOCK B1 WITHIN THE IT/ITES SEZ** (Bid No. **MWCJL/MTP/B1/T-03A**) (hereinafter called "the Works") and the Employer has accepted the Bid by the Contractor for the execution and completion of such Works and the remedying of any defects therein, at a Contract price of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_)

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.
2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all aspects with the provisions of the Contract.
3. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying the defects wherein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.
4. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz.:
  - i) Letter of Acceptance;
  - ii) Contractor's Bid;
  - iii) Contract Data;
  - iv) Conditions of Contract (including Special Conditions of Contract);
  - v) Specifications;
  - vi) Drawings;
  - vii) Bill of Quantities and Rates; and
  - viii) Any other document listed in the Contract Data as forming part of the Contract.

In witness whereof the Parties thereto have caused this Agreement to be executed the day and year first before written.

The Common Seal of

\_\_\_\_\_ was hereunto affixed in the presence of:

Signed, Sealed and Delivered by the said \_\_\_\_\_

in the presence of:

Binding Signature of Employer \_\_\_\_\_

Binding Signature of Contractor \_\_\_\_\_



## **SECTION 3: CONDITIONS OF CONTRACT**

**SECTION 3:**  
**CONDITIONS OF CONTRACT : General Conditions**

**3A. General**

**1. Definitions**

The following terms shall have the meaning hereby assigned to them except where the context otherwise requires:

**ARCHITECT / CONSULTANT:**

Rajinder Kumar Associates  
B-6/17 Shopping Center, Safdarjung Enclave  
New Delhi 110029, India  
T: (91)11-26162930 / 26162931  
F: (91) 11-26186874

**Bill of Quantities or BOQ** means the priced and completed bill of quantities and rates forming part of the Contract.

The **Contract** is the binding between the Employer and the Contractor to execute, complete and maintain the Works. It consists of the documents listed in Clause 2.2 below.

The **Contractor** shall mean the successful Bidder and their heirs and legal representative, assigns and successors on whom the work order or letter of intent has been issued by the Employer.

The **Contractor's Bid** is the completed Bidding document submitted by the Contractor to the Employer.

The **Contract Price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

**Date of Commencement** is the date as stated in the Letter to Proceed from the Employer to the Contractor.

**Actual Date of Commencement** is the date from which the Contractor started his work.

**Days** are calendar days; **months** are calendar months.

A **Defect** is any part of the Works not completed in accordance with the Contract.

The **Defects Liability Period** is 24 months calculated from the Actual Completion Date

The Employer is the Party who will employ the Contractor to carry out the Works.

**Engineer in Charge** shall be HEAD (Infrastructure & Development) of the Employer or person nominated by him.

**Equipment** is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Engineer in Charge by issuing an extension of time.

The **Actual Completion Date** is the date on which the Engineer in Charges shall issue the Completion Certificate as per Clause 28

The **Site Possession Date** shall be the date within seven days from the date of issue of Notice to proceed with the work.

**Materials** are all supplies, including consumables, used by the Contractor for incorporation in the Works.

**Plant** is any integral part of the Works which is to have a mechanical, electrical, electronic or chemical or biological function.

The **Site** is located at **Mahindra World City (Jaipur) Limited, PO-Mahindra World City, Tehsil: Sanganer, District: Jaipur - 302037**

**Specification** means the Specification of the Works referred in the Contract and any modification or addition made or approved by the Engineer in Charge in writing.

**Temporary Works** are works designed, constructed, installed, and removed by the Contractor which are needed for construction or installation of the Works.

**A Variation** is a written instruction given by the Engineer in Charge which varies the Works.

The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the Contract Data.

**Party and Parties** is the Employer and the Contractor individually and the word Parties shall be construed accordingly

**Relevant Authority** shall mean all Parties which have jurisdiction on the works.

## 2. Interpretation

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Engineer in Charge will provide instructions clarifying queries about the Conditions of Contract.

2.2 The documents forming the Contract shall be as follows and their order of priority shall be interpreted in the given order

- (i) Agreement
- (ii) Letter of Acceptance, Notice to proceed with work.
- (iii) Contractor's Bid
- (v) Conditions of Contract including Special Conditions of Contract
- (vi) Bill of Quantities
- (vii) Drawings
- (viii) Specifications
- (ix) any other document listed in the Contract Data as forming part of the Contract.

## 3. Legal Construction

3.1 Subject to provision of clause, the Work Order shall be in all aspect, construed and operated as Contract under Indian Contract Act 1872, and in accordance with Indian Laws enforce for the time being and is subject to the jurisdiction of the court, Jaipur only.

## 4. Language and Law

4.1 The language of the Contract shall be English only and the Law governing the Contract shall be Law of Republic Of India and the law which will govern the conduct of the contract and according to which the contract shall be in force in the state of Rajasthan, it will include the exemption granted under various enactments.

## 5. Communications

5.1 Communications between Parties which are referred to in the conditions are effective only when given in writing. A notice shall be effective only when it is delivered. In the case delivery is refused, it will be deemed to be received if service is effected by postal agency. Any letter, notice and notification under the contract shall be served on the party concerned when received by fax, telex, courier deliver or registered post letter at the following address of contractor or employer.

Address of Contractor :

Address of Employers

Corporate Address

**Mahindra World City (Jaipur) Limited**

411, Neelkanth Tower#1,  
Bhawani Singh Marg, C-Scheme,  
Jaipur -302001

Phone No : 0141-4007025

Fax : 0141-4007030

## 6. Personnel

- 6.1 The Contractor shall submit organisation chart indicating the key personnel to carry out the functions stated in the Schedule or other personnel approved by the Engineer in Charge. The Engineer in Charge will approve any proposed replacement of key personnel only if their qualifications, abilities, and relevant experience are substantially equal to or better than those of the personnel listed in the Schedule.
- 6.2 If the Engineer in Charge or Construction Manager asks the Contractor to remove a person who is a member of the Contractor's staff or his work force the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

## 7. Insurance and obligation under labour and environment law :

- 7.1 Notwithstanding that the Contractor is to indemnify the Employer and submit the policies in original to the Employer, the Contractor shall take All Risks and Workmen's Compensation insurance policies to cover the whole project as envisaged under the Contract and without limiting the obligations, responsibilities, duties and/or liabilities of the Contractor, the Contractor shall effect at his own costs for others insurance policies deemed necessary in the joint names of the Employer and the Contractor to cover the Contract works as given below:  
Insurance requirements are as under:

Sr. No.	Policy for	Insurance cover required
1	All risk insurance for works	By Contractor
2	Loss or damage to Employer's Equipment & material.	By Contractor
3	Other Employers property	By Contractor
4	Personal injury or death insurance: a) Third Party	By Contractor
	b) For Contractor's Employee	By Contractor Contractor should ensure such insurance is in force through out the Contract period (Including defect liability period) and necessary proof to be submitted before the commencement of the project and at least a fortnight before the expiry of current insurance. The Contractor should indemnify and include in the policy the Employer
5	Motor Vehicle Insurance	Comprehensive insurance policy to be taken by contractor as per statutory requirement.
6	Third Party liability insurance (Including the name of Employer)	By Contractor Minimum cover Rs. 10 Lacs.

7	Contractor's Equipments (Including liability arising out of usages of such equipment)	By Contractor.
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## 8 Possession of the Site

- 8.1 The Employer shall give possession of the Site to the Contractor alongwith the **acceptance letter**.

## 9 Settlement of Dispute

- 9.1 If any dispute of any kind whatsoever shall arise between the Employer and the Contractor in connection with or arising out of the Contract, including without prejudice to the generality of foregoing, any question regarding its existence, validity or termination or the execution of the works, whether during the process of works or after completion and whether before or after termination or breach of the Contract, the Parties shall seek to resolve any such dispute or difference by referring the matter to Engineer in Charge. The Engineer in Charge will give its decision within fifteen (15) days of referring the dispute. Either Party if not in Agreement with Engineer in Charge's decision, may within fifteen days of decision by the Engineer in Charge refer to the senior management of the Employer, who will give its decision with thirty (30) days of referring the dispute. Either Party if not in Agreement with senior management decision, may refer to arbitration pursuant to Clause no. 10 of General Conditions of Contract.

## 10 Procedure for Disputes Resolution

- 10.1 The Arbitration shall be conducted in accordance with the arbitration procedure stated below. The procedure for arbitration will be as follows:
- 10.1.1 In case of dispute or difference arising between the Employer and a Contractor relating to any matter arising out of or connected with this Agreement, such disputes or difference shall be settled in accordance with the Arbitration and Conciliation Act, 1996. The arbitral tribunal shall consist of three (03) arbitrators one each to be appointed by the Employer and the Contractor. The third Arbitrator shall be chosen by the two Arbitrators so appointed by the Parties and shall act as Presiding arbitrator. In case of failure of the two arbitrators appointed by the Parties to reach upon a consensus within a period of thirty (30) days from the appointment of the arbitrator appointed subsequently, the Presiding Arbitrator shall be appointed by the Indian Council of Arbitration/President of the Institution of Engineer (India)/The International Centre for Alternative Dispute Resolution (India).
- 10.1.2 If one of the Parties fails to appoint its arbitrator in pursuance of sub-Clause 10.1.1 above within 30 days after receipt of the notice of the appointment of its arbitrator by the other Party, then the Indian Council of Arbitration/President of the Institution of Engineer (India)/The International Centre for Alternative Dispute Resolution (India), shall appoint the arbitrator. A certified copy of the order of the Indian Council of Arbitration /President of the Institution of Engineer in Charges (India)/The International Centre for Alternative Disputes Resolution (India), making such an appointment shall be furnished to each of the Parties.
- 10.1.3 Arbitration proceedings shall be at Jaipur, Rajasthan, India, and the language of the arbitration proceedings and that of all documents and communications between the Parties shall be English.
- 10.1.4 The decision of the majority of arbitrators shall be final and binding upon both Parties. The cost and expenses of Arbitration proceedings will be paid as determined by the arbitral tribunal. However, the expenses incurred by each Party in connection with the preparation, presentation, etc. of its proceedings as also the fees and expenses paid to the arbitrator appointed by such Party or on its behalf shall be borne by each Party itself.
- 10.1.5 Without prejudice to the above provision, Where the amount in dispute is Rs.50 lacs and below, the disputes or differences arising shall be referred to the Sole Arbitrator. To be nominated by employer. The arbitration will take place in accordance with the Indian Arbitration and Conciliation Act 1996. The Arbitration shall be at Jaipur. Arbitration may be commenced prior to or after completion of the contract provided that the obligation of the employer and the

contractor shall not be altered by reason of the arbitration being conducted during the progress of the contract.

- 10.1.6 Performance under the Contract shall continue during the arbitration proceedings and subject to the satisfactory performance of the Contractor, payments due to the Contractor by the Employers shall not be withheld, unless they are the subject matter of the arbitration proceedings.

### 3B. TIME CONTROL

#### 11 Avoidance Of Delay

- 11.1 It is paramount that the Contractor shall constantly plan his work so as to most efficiently utilize all or any available part or parts of the Site, any completed part or parts of another Contractor's works which is to be integrated into the Contract Works (if any), the available drawings and all others matters as are available to him, as well as his own resources in order to avoid or reduce any standstill and down time.
- 11.2 In the event that the Contractor cannot commence or proceed with a particular part of the Contract Works as per the programme furnished to the Employer in accordance with Clause 12.1, for any reason whether attributed to the Contractor or not, the Contractor shall be obliged to reschedule and proceed with other parts of the Contract Works at no costs to the Employer to ensure that the completion date of the Contract Works will be met.
- 11.3 Should the Contractor fall behind any program submitted in accordance with Clause 12.2, due to any act, default, neglect or omission of the Contractor and requires over- time, night work or shift work and /or an increase of man power and/or construction plant to regain the scheduled progress (whether or not instructed by the Employer), the cost of such measures shall be borne by the Contractor.
- 11.4 Within the time stated in the Contract Data, the Contractor shall submit to the Engineer in Charge for approval a Construction Program.
- 11.5 The Engineer in Charge's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Engineer in Charge again at any time. A revised Program is to show the effect of Variations.

#### 12 Extension of the Intended Completion Date

- 12.1 **Time shall be of the essence with respect to the commencement and completion as per the key Contractual dates as mentioned in the Contract Data as Milestones for the execution and completion of the Contract Works as stated.**
- 12.2 The Contractor acknowledges that a high rate of working is required to achieve the Dates for Completion of the Contract Works and Contractor shall be deemed to have allowed for shift working, sufficient plant, labour, floodlighting and any or all other measures to achieve the same.
- 12.3 The Dates of Completion of the Contract Works may be extended by the Employer subject to compliance by the Contractor with Clause 11 (Avoidance of Delay), by such period which reasonably reflects any delay in completion of the Contract Works which, notwithstanding due diligence and taking of all reasonable steps by the Contractor to avoid or reduce the delay as provided for in Clause 11, is caused:-
- a) By the occurrence of an event of Force Majeure;
  - b) By a delay in handing over of the Site or part of the Site by the Employer after the Dates for Commencement of the Contract Works;
  - c) Any variations requested by the Employer;
  - d) By other Contractors carrying out works not forming part of the works to be carried out under the Contract, and employed by the Employer;
  - e) By an instruction to suspend the Contract Works issued by the Employer pursuant to this Contract provided that such suspension is not due to the default of the Contractor; and which affects the Contract Works PROVIDED that such delays are not due to the Contractor. PROVIDED FURTHER THAT if, while the Contractor is continuing works during the period when liquidated and ascertained damages are being deducted, the Employer gives instruction

or matters occur which would entitle the Contractor to an extension of time then the Employer shall assess and give the Contractor an extension of time and so notify the Contractor accordingly.

- 12.4 It shall be a condition precedent that the Contractor shall notify the Employer in writing of any factors and the relevant Contract provision (if any) which entitles Contractor to an extension of time together with a statement of :
- a.) the reason why the delay in completion of the Contract Works is likely to result or has resulted;
  - b.) an estimate of the period by which the Contract Works are likely to be or had been delayed; and
  - c.) details of steps that the Contractor proposes to take to avoid or reduce the delay; within seven (07) days of the commencement or occurrence of any such factor or such extension of this seven (07) days period as the Employer may allow.
- 12.5 The Contractor shall notify The Employer within fourteen (14) days of the cessation of the factors notified to The Employer under Sub-Clause 12.4; to enable any provisions, that the Contractor may require to the proposed extended Date for Completion to be made as quickly as possible and such other particulars as shall be reasonably necessary to enable the Employer to properly consider the revision.
- 12.6 Without prejudice to any other grounds which do not entitle the Contractor to an extension of time, the Contractor shall not be entitled to extensions of time for delays resulting from weather conditions, or discrepancy in the Contract Documents, whether such events affect the Contract Works or not.
- 12.7 Notwithstanding the foregoing, the Employer shall not be obliged to take into account any circumstances that are not notified to The Employer in accordance with the periods referred to in Sub-Clause 12.3 and 12.4.
- 12.8 The Employer shall as soon as is reasonably practical after receipt of the Contractor's notification furnished in accordance with the sub-Clause 11.3 determine and notify the Contractor in writing of any extension of time to which the Employer considers the Contractor is entitled under Sub-Clause 12.4.
- 12.9 The Contractor had agreed NOT TO CLAIM for all costs, loss and /or expense suffered or incurred by reason of any extension of time granted by the Employer in accordance to Sub-Clause 12.4 herein.

### **13 Force Majeure**

- 13.1 Force Majeure shall mean any event beyond the reasonable control of the Employer or of the Contractor, as the case may be, and which is unavoidable notwithstanding the reasonable care of the Party affected, and shall include the following:
- 13.1.1 War, hostilities or warlike operations (whether a state of war be declared or not), invasion, act of foreign enemy and civil war, rebellion, revolution, insurrection, mutiny, usurpation of civil or military government, riot, civil commotion and terrorist acts, confiscation, nationalization, mobilization, commandeering or requisition by or under the order of any government authority or act of any local state or national government authority
  - 13.1.2 Strike (other than strike by employees/staff/labour of Contractor or Sub-Contractor), sabotage, embargo, import restriction, epidemics, quarantine and plague.
  - 13.1.3 Earthquake, volcanic activity, fire, flood or inundation, tidal wave, typhoon or cyclone, hurricane, storm, lightning, or nuclear or other natural disaster

### **14 Delays Ordered by the Engineer in Charge**

- 14.1 The Engineer in Charge may instruct the Contractor to delay the start or progress of any activity within the Works.

### 3C. QUALITY CONTROL

#### 15 Identifying Defects

- 15.1 The Engineer in Charge / Architect shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Engineer in Charge may instruct the Contractor to search for a Defect and to uncover and test any work that the Engineer in Charge considers may have a Defect.
- 15.2 The Contractor shall permit the Employer's technical auditor to check the Contractor's work and notify the Engineer in Charge and Contractor of any defects that are found..

#### 16 Correction of Defects

- 16.1 The Engineer in Charge shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. Once the defects are notified to the contractor the Defects Liability Period shall extend automatically for as long as Defects remain to be corrected.
- 16.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Engineer in Charge's notice.

#### 17 Uncorrected Defects

- 17.1 If the Contractor has not corrected a Defect within the time specified in the Engineer in Charge's notice, the Engineer in Charge will have the right to engage third party to the defects rectified at risk & cost of the contractor along with overheads. Such amount will be recovered from the Contractor.

### 3D. COST CONTROL

#### 18 Bill of Quantities

- 18.1 The Bill of Quantities shall contain items for the construction, installation, testing, and commissioning work to be done by the Contractor.
- 18.2 The Bill of Quantity is used to calculate the Contract Price. The Contractor Shall be paid for the actual quantities executed & inspected & duly approved and accepted by the Engineer in Charge and the Contract Price shall be adjusted based on approved actual quantities of the Contract works as described in Bill Of Quantity for each item.
- 18.3 The rates set out in the Bill of Quantity (BOQ) are fixed, firm and shall be inclusive of all costs and expenses as under. No escalation in rate is permitted during the tenure of contract and shall not be subject to variation on any account what so ever.
- 18.3.1 Preliminaries works / costs such as site measurement, supervision, setting out, insurances, water, electricity/power, security/ watch & ward protection of public, working/liasion with consultant engineers, Government and other Relevant Authorities etc.
- 18.3.2 All associated temporary and false works.
- 18.3.3 All tests, sampling, inspection, reports, opening up of works and related works
- 18.3.4 Material, labour, plant, equipment, machinery, tools and all related costs.
- 18.3.5 Shifts works, night works, overtime works, incentives, bonus, related labour employment costs etc.
- 18.3.6 Working with site constraints and conditions.
- 18.3.7 Liaison, including dealing and compliances with requirements, restrictions, etc. of all Relevant Authorities.
- 18.3.8 Overhead cost, profits, etc.
- 18.3.9 Protection and maintaining all Contract works and any thing affected by the Contract works until completion and handing over.
- 18.3.10 Coordination with Development Commissioner Office located within the SEZ for verification etc. for availing benefits of exemptions for works within SEZ
- 18.3.11 Any other costs and / or expenses deemed necessary for the due execution and completion of the works.



- 18.4 This Project is an SEZ. As per Special Economic Zone Act 2005, all the taxes, duties, royalties, levies (except income tax on the profit of the Contractor) are exempted; hence, the quoted rates shall be exclusive of all taxes, duties, royalties, levies, service tax etc. Any tax component, considered shall be indicated separately and shall be admissible only if applicable, proof of payment of such taxes will be required for acceptance of claim in there respect. The Contractor shall put his best efforts to forward the exemptions and benefits granted by the Government he gets from time to time. Employer shall deduct Tax Deduction at Source (TDS) for such taxes at the rates fixed and revised by Relevant Authorities from each payment/bill due to Contractor. Employer shall issue TDS certificate in favour of Contractor for the TDS so recovered. In case employer is not able to avail any tax benefit due to negligence or non compliance of SEZ rule and regulation by contractor then the same will be recovered from contractor.
- 18.4.1 The rates as contained in the BOQ shall include all PF, ESI etc. and all other payment as per the statutory requirements. The Contractor shall produce proof of compliance of such requirement to the Employer and upon submission of such proof only, the Employer shall release periodic payments to the Contractor. In the event that the Contractor fail to produce such proof / paying such payment, Employer shall pay such payment direct (but is not obliged) to the Relevant Authorities and shall recover the same from whatsoever monies due or to become due to the Contractor along with 15% overhead charges.

## 19 Tax

- 19.1 The rates quoted by the Contractor shall be deemed to be exclusive of taxes which are exempted under **SEZ Act 2005** and separate disclosure of all taxes which are not exempted alongwith basic rate in the bid. In case, any tax is levied inspite of Employer giving all requisite documents to the Contractor and Contractor's best efforts, same shall be paid extra to the Contractor upon Contractor submitting proof of such payments.
- 19.2 INCOME TAX: Deduction of income tax at source will be made by the Employer at the applicable rates which is obligatory as per the provisions of Income Tax Act. It shall be the responsibility of Contractor to arrange and produce a "No Deduction Certificate" from the Income Tax Authorities, if the payment of their invoices are to be made without deduction of Income Tax at source.
- 19.3 If any tax exemptions, concessions, reductions, allowances or privileges may be available to the Employer, the Contractor shall use its best endeavours to enable the Employer to benefit from any such tax savings to the maximum allowable extent.
- 19.4 BASE DATE : Base date for reimbursement of any new enactment in taxes, duties and levies by central or state govt. or any other statutory authorities as applicable to the Contract, shall be seven (7) days prior to the date on which the price bid or revised price bids were stipulated to be received.

## 20 Retention

- 20.1 Retention Money at the rate of 5 % of the value of work done for each running bill will be deducted until the actual completion of work, up to a maximum of 5% of Contract Price.
- 20.2 Retention money shall be refunded within 30 days after discharge of defect liability period of 12 months.
- 20.3 No retention sum shall be deducted from interim progress payment subject to the submission of an unconditional bank guarantee from a scheduled bank in the Employer's format equivalent to 5% of the Contract Price which would valid up to the Completion of Defect Liability period with 180 days extra claim period.

## 21 Liquidated Damages

- 21.1 If the contractor fails to complete the works by the date of completion as stated in the Tender or within extended time as per agreed project baseline schedule, the Owner shall withhold a sum calculated at the rate of 1 % of the total contract value per week (or part thereof) of delay as liquidated damages for the period during which the said work shall so remain or have remained in-complete. The owner may deduct such damages from any money's otherwise

payable to the contractor under this contract, up to a maximum of 10 % of the total contract value after which Owner will have right to terminate the contract and claim for compensation from contractor for the financial losses on account of delay of project. The contractor admits that the loss shall always be caused if there is failure on its part.

21.2 The delay shall be assessed based on average delay over all due milestones. Reconciliation statement for Project Tracking giving detail of delay, duly verified by Engineer-in-Charge / project manager shall be submitted alongwith monthly running bills.

21.3 The Liquidated Damages imposed for not achieving intermediate milestone shall be subjected to refund/adjustment in case of Contractor achieve the final Milestone with the period as stipulated in the Contract.

**21.4 Time shall be of the essence with respect to the commencement and completion as per the key Contractual dates for the execution and completion of the Contract Works as stated in Contract Data**, and payment or deduction of liquidated damages shall not relieve the Contractor from his obligation to complete the work as per agreed construction program and milestones or from any other of the Contractor's obligations and liabilities under the Contract.

## **22 Performance Security**

The Performance Security in the form of unconditional bank guarantee shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount equal to 5% of Contract Price from a Nationalised or Scheduled bank in the Employer's prescribed format the Performance Security shall be valid until a date 180 days from the date of expiry of Actual Date of Completion.

## **23 Defect Liability and Cost of Repairs**

Loss or damage to the Works or Materials to be incorporated in the Works between the Actual Date of Completion and the end of the Defects Liability Periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions. The Contractor shall be responsible to make good at his own expense any defect which may develop within the period mentioned as Defect Liability Period in the Contract Data. The Employer shall give the Contractor a notice in writing about the defects and the Contractor shall repair the defect within maximum of seven (07) days or fourteen (14) days depending upon whether the defect is minor or major. If the Contractor fails to repair/remove the defect, the Employer may get the work execute from others at Contractor's risk & cost . The Employer shall have the right to appropriate all or part of the Retention Money towards the expense in repairing the defects.

### **3E. FINISHING THE CONTRACT**

## **24 Completion**

24.1 After completion of the work, the Contractor will serve a written notice to the Engineer in Charge to this effect. The Engineer in Charge upon receipt of this notice shall conduct a complete joint survey of the work within seven (07) days and prepare a defects list jointly. The defects pointed out by the Engineer in Charge or his nominee would be rectified by the Contractor within fourteen (14) days and thereafter acceptance report be signed jointly by the Contractor, Engineer in Charge and the Employer. And a '**Completion Certificate**' shall be issued to Contractor by Employer.

## **25 Taking Over**

25.1 The Employer shall take over the Site and the Works within seven days of the Engineer in Charge issuing a certificate of Completion.

## **26 As Built Drawings**

26.1 The Contractor shall supply "As Built" Drawings 3 sets (hard copy) and soft copies in CAD format in CD alongwith Operation & Maintenance Manuals, SOPs and Gurantees by the dates stated in the Contract Data.

- 26.2 Contractor's rates include the As-built drawings and associated manuals. If the Contractor does not supply the As Built drawings by the dates stated in the Contract Data, or they do not receive the Engineer in Charge's approval, the Engineer in Charge shall withhold the amount stated in the Contract Data from payments due to the Contractor.

## **27 Termination Of Contract**

- 27.1 Due to any default by the Contractor, the Employer shall be entitled to terminate the Contractor's employment under the Contract by giving one (01) week advanced notice in writing by stating the reason. The date after seven (07) days from the date of issuance of the Termination Notice shall hence be defined as "Date of Termination". The Contractor will be paid for all works duly and properly completed up to the Date of Termination but shall not be entitled to anticipated profit or any consequential or indirect loss or damage and shall hold harmless and indemnify the Employer against Contractor's Contractors/suppliers or third parties arising from termination under this Clause.
- 27.2 The Contractor had agreed in the event of delay in progress or non-achievement of the Milestone Dates, The Employer shall reserve the sole discretion right in deploying its own plant and machinery or engaging third party to speed up the Contractor's works and the Contractor's Contract shall be terminated with written notice at any point of time without any compensation or claims to be paid to the Contractor. All additional / extra cost incurred by The Employer shall be charged to the Contractor due to such event.

## **28 Payment upon Termination**

- 28.1 Full payment to Contractor's workers, Contractors, suppliers and third parties engaged by the Contractor for any portion of the Contract works shall be paid in full by the Contractor and thereafter must be removed from site on or before the Date of Termination. If the Contractor failed to make full payment to these workers, Sub Contractors, suppliers and third parties and/or remove them from site on the Date of Termination, then the Employer will carry out such duties on behalf of the Contractor. The Employer will recover all cost incurred due to the performing of such duties on behalf of the Contractor by making deduction from amount/s due to the Contractor or by any other process.

## **29 Breach Of Contract**

The following events shall be fundamental breach of Contract:

- 29.1 The Contractor has contravened any Clause / sub-Clause of the Conditions of Contract.
- 29.2 The Contractor does not adhere to the agreed construction program and agreed environmental management plan and also fails to take satisfactory remedial action as per Agreements.

The Contractor shall carry out all instruction of the Engineer in Charge which comply with the applicable laws where the Site is located if the Contractor fails to carry out the instructions of Engineer in Charge within a reasonable time determined by the Engineer in Charge in accordance with General Condition of Contract Clause 11.

### 3F Special Conditions of Contract

#### 1. General

The Contractor is advised to note that the following Special Conditions are part of the Contract and he will not have any right to claim at any time for delays or for expenditure incurred by him in fulfilling the following special conditions.

#### 2. Scope of Works

2.1 The Contract Works shall comprise of but not be limited to:-

2.1.1 The scope of work is for the construction of Mahindra Technology Park **ALUMINIUM GLAZING WORKS** as defined in BOQ

2.1.2 The work to be carried out under the contract shall include all the items given in the Bill of Quantities and such other item as may be instructed by the Employer time to time and shall expect as otherwise specified in these conditions include all labour, materials, tools plant equipment and transport, hoisting, etc. which may be required in preparation and completion of the works.

2.1.3 All the above shall be as per issued relevant drawings, Specifications of IS and other relevant National and International Standard Specifications and good engineering practices, safety measures as required all as per agreed construction methodology in consultation and coordination with and under the inspection of the Employer's personnel / design consultants.

2.2 All the Contract Works shall be executed in full compliance with the Specifications of the Contract and all requirements and always to the satisfaction of the Employer.

2.3 The Contractor acknowledge that he understands the Special Economic Zone (SEZ) rules and regulation as per **SEZ Act 2005** and he further acknowledge that he will abide all the rules and regulations of SEZ Act, laws related to custom duties, notified area and all other related things affecting the Contract works directly or indirectly and shall keep the employer harmless from any violation of the provisions of SEZ Act 2005.

2.4 The Contractor shall resolve local constraints and problems, liaise, seek, and obtain any consent, permit, license, approval, etc. from all Relevant Authorities including paying all fees, charges, levies, etc all at his own cost.

2.5 Clearing all debris and disposing to location approved by Municipal authorities during progress of Contract works and before and after the dates of Completion.

2.6 All temporary works, haul/access roads that are necessary for the proper and due completion of the Contract Works.

#### 3. Milestone dates:

Milestone date shall be as negotiated and agreed at the time of award of contract.

#### 4. Schedule of Works

The Contractor shall submit a work schedule including the commencement date, to reflect the ground realities and indicating the milestones.

#### 5. Measurements

The payable quantity (ies) against the executed work shall be determined on the basis of quantity certified, wherein certification conducted jointly by the Contractor and the Engineer-in-Charge. Work accepted, approved and certified by the Contract Dept. / PM, will only be paid for as specified in Bills of Quantities and payments shall be at the same rates.

#### 6. Running Account Bills

The Contractor has to prepare and submit the Running Account Bills in triplicate once in a month along with details measurements in serially machine numbered register, abstract sheets, deviation statement and any specific instructions which may be given in this regard by the Engineer In-Charge shall also be attached to by the contractor

**Running Bill Certification:**

- 6.1 The Contractor shall prepare and submit running bill to the Engineer In-Charge once a month throughout the construction period considering that No payment shall be made for works estimated to cost less than rupees 1 (One) Lac.
- 6.2 Within 5 days of the receipt of Contractor's running bill for payment, the Engineer In-Charge / Employer's representative shall check and point out corrections, if any to be made in the bill. The Contractor shall correct the bill and resubmit the same to the Engineer In-charge.
- 6.3 Within 10 days of receipt of the corrected bill from the Contractor, the Engineer In-charge/ Employer representative shall check the bill and forward the same to Manger Contract for verification for certification, who will certify the amount due to Contractor and recommend payment of the amount by the accounts department to the Contractor
- 6.4 Within 6 days of receipt of the bill from Engineer In-Charge, account dept will release the payment along with certificate showing details pertaining to works done, total recoveries and statutory deductions.
- 6.5 Any running / interim Certificate of Payment given by the Infra / Account Dept. relating to work done or the materials delivered shall be adhoc in nature and may be modified or corrected by any subsequent interim Certificate or the Final Certificate of payment.
- 6.6 An interim payment not exceeding 75% of the provisional bill amount may be certified by the Engineer-in-charge. Balance payment shall be made once Engineer-in-charge certifies quantity and item rate. Interim payment can be made within 7 days of engineer-in-charge certificate.

**Final Bill payment**

- 6.7 The Final Bill shall be submitted by the Contractor within two month of the date of Completion of the Work or if the work is completed earlier, within one month of such completion. The contractor shall give to the employer a detailed account of the total amount which he consider payable to him under the contract..
- 6.8 The final bill will be checked in terms actual measurement at site, quality of works and material supplied / used, approved extra items, by the Engineer In-Charge within **30** days from the date of the bill is received by the Engineer In-Charge, provided the contractor has complied with all formalities as described in various clauses of the Contract and thereafter the same would be forwarded to the next concerned dept.
- 6.9 The payment of the final bill shall be made to the Contractor by the Employer within 15 days from the receipt of the Engineer in-charge approval certificate for payment.
- 6.9.1 No further claim shall be made by the Contractor in respect thereof even after submission of the final bill and the same shall be deemed to have been fully waived and absolutely extinguished.
- 6.10 The final billing shall be accompanied by all substantiating documents as required for running bills with the addition of the following items that shall be supplied by the contractor:
  - 6.10.1 All written guarantees / warranties and spares required by the Contract documents.
  - 6.10.2 Operation and Maintenance manuals and instructions for equipment and apparatus.
  - 6.10.3 Re producible and blue prints of all requisite As Built drawings along with the soft copy thereof on latest version of AutoCad software.

**Certificate for payment format : (may be finalized later with the Engineer In-Charge)**

	Value of Work done for Interim Certificate As per Contract	(1)
Less (-)	<b>Deductions :</b>	
	Retention 5% on '1' subject to a maximum of 5% on Contract Value	(a)
	Previous Payments made (Payment made till date including Advance/ Adhoc payments made upto the period of this bill)	(b)
	<b>Deductions (a+b)</b>	<b>(c)</b>
	Deduction on Govt. / Statutory liabilities such as TDS etc.	(d)
	<b>Total Deductions (c+d)</b>	<b>( 2 )</b>
	Net Value of This Bills (Amount payable)	<b>( 1 - 2 )</b>

**7. Subcontract or Subletting of Works****7.1 Sub-Letting:**

No part of the Contract shall be sublet without the written permission of the Employer nor shall transfers be made by the 'Power of Attorney' authorizing others to carryout the work or receive payment on behalf of the Contractor.

**7.2 Sub-Contract:**

7.2.1 The Contractor is not permitted to subcontract any part of his works in this Contract without prior approval in writing from the Employer. It may be made clear that under ordinary circumstances, no subcontract shall be permitted.

7.2.2 In any case, whether any part of the works is subcontracted or not; the principal liabilities of the works shall lie with the Contractor.

**8. Contract Drawings**

8.1 The Engineer in Charge shall give Two sets of Contract Drawings, approved for construction, to the Contractor within 2 weeks from the date of submission.

8.2 The Contractor shall ensure that a complete up to-date list of drawing is maintained at site. All Contract Drawings shall be properly filed and indexed for ready reference.

8.3 The Contractor shall ensure that only the valid up to-date Contract Drawings are used for preparation of Working Drawings.

8.4 The privilege of the authorship and Employership of drawing and designs of the building remains with Engineer in Charge. Drawings and design prepared by their Consultants shall be used only for the purpose specified in the Contract and all drawings issued shall be returned to Engineer in Charge after completion of works.

8.5 The Contractor shall submit shop and fabrication drawings as required by the Engineer- in-Charge.

8.6 Contractor is not authorize to disclose drawings or any part of drawing and photographs of site without written approval from the Employer.

**9 Additional Work**

Any additional works, instructed during the Contract Period and within the Contract Amount, will be paid as per Bill of Quantity rates and it shall not be considered as a cause for the Contractor to claim for delay, incurred overhead, mobilization etc.

**10 Protection of the Works during Contract Period**

It is clearly understood that any damage occurring to the Works (completed or under execution) is the Contractors responsibility and no claims will be entertained by the Employer since the matter shall be covered by the relevant Insurances.

**11 Discrepancies in alignment**

Discrepancies in alignment and levels etc. noticed during construction and/or on completion shall be rectified (including affected works executed by other Contractors) by the Contractor at his own cost and risk, Engineer in Charge's approval does not relieve the Contractor of his responsibilities.

**12 Temporary Power and Water Supply**

All costs, both for power supply and temporary installations and Power and Water required for construction and labour shall be borne by the Contractor.

**13 Site Offices of the Contractor**

The successful Bidder is to provide and maintain a site office at a location approved by the Engineer in Charge, within 15 days from the date of issue of Notice to Proceed.

**14 Safety on Site**

The Contractor shall ensure full compliance of Safety Code. All measures to ensure safety of workers and plant at site shall be taken by the Contractor. The cost of all safety equipments and the cost of full compliance of provisions given in safety code at site would be deemed to be included in various Items of the Bill of Quantities and Rates.

**15 As Built Drawings**

The Contractor shall prepare As Built Drawings both in hard copy and in digital format. The drawings shall be prepared for any given section of the work as soon as the work for that particular section is completed. Preparation of As Built Drawings shall keep pace with the work and shall not be left over towards the end of the project. Three (03) hard copies and one soft copy of all drawings shall be submitted.

No separate payment will be made for the preparation of As-Built Drawings; Cost of preparation of As Built Drawing is deemed to be included in all other priced bill items.

**16 Labour**

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

The Contractor shall, if required by the Engineer in Charge, deliver to the Engineer in Charge a return in detail, in such form and at such intervals as the Engineer in Charge may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Engineer in Charge may require.

The contractor shall make his/their arrangements for the engagement of all labour, skilled and unskilled. No Contractor shall employ any person who is under the age of 18 years.

The Contractor shall, in respect of labour employed by him, comply with or cause to be complied with the provision of various labour laws and rules as applicable to them from time to time in regard to all matters provided therein and shall indemnify the Employer in respect of all claims that may be made against the Employer for non-compliance thereof by the Contractor.

**17 Contractor's Other Obligations**

- 17.1 All safety training and skill development of Contractor's workers and operators shall be carried out by the Contractor and all costs related to such training shall be borne by the Contractor as required under statutory law.
- 17.2 The Contractor shall obtain all necessary approvals/ permission from the Relevant Authorities including where necessary securing the presence of the Relevant Authorities or their representative to inspect and supervise the operations in connection with the Contract Works. The Contractor shall bear all costs, fees, charges etc so imposed for the attendance of the Relevant Authorities or their representatives.
- 17.3 The Contractor shall be responsible for any damage caused by any work carried out by Contractor to the existing services and utilities whether shown or not shown in the drawings from whatsoever cause arising thereof and shall make good to its original condition at his own costs and expense to the satisfaction of the Employer.
- 17.4 Upon completion of the Contract Works the Contractor shall remove and clear all debris, waste and/or any excess materials, construction plant, and temporary works from the site and shall do all things to clear up the site which shall include any cleaning where instructed by the Employer to other areas affected by the Contract Works. During the Contract period the Contractor shall ensure that the site is kept clean and in proper order and free from rubbish, waste or debris and Contractor shall do all things necessary to prevent any damage to or pollution or the creation of any health or environmental hazard at or around or adjacent to the Site.
- 17.5 The Contractor shall defend (if requested to), save harmless and indemnify the Employer against all claims, demands, interest, penalties, proceedings, damages, loss, costs, charges and expenses arising out of or in connection with any failure, neglect or omission, by the Contractor to perform his obligations under the Contract or any damage to property (including the Contract Works) or injury to person (whether resulting in death or not) caused or contributed by the Contractor and/or his servants or agents or independent Contractors appointed by the Employer to carry out works on behalf of Contractor (whether or not such claims, losses and/or damages have been insured by the Employer). In addition, this indemnity shall include all legal costs incurred by the Employer as a consequence of such claim, demand or proceeding being made.
- 17.6 The Contractor shall, subject to this Contract and other obligations imposed by law, execute the Contract Works and provide all labour, materials, construction equipment and all things necessary and incidental for the Contract Works to the satisfaction of the Employer and / or the Relevant Authorities.
- 17.7 The contractor shall abide by labour laws. It will get itself registered under the provision of contract labours (Registration and abolition) Act'1970 and it will obtain a separate PF code number for payment of PF contribution to Fund. The contractor shall take all necessary precaution against the pollution of drinking water, underground water and for the protection of the environment, tree and vegetation etc.
- 17.8 The Contractor shall bear all payments and other related costs on his own in connection with the execution and completion of additional, rectification, etc, works due to or caused by any act, default, neglect or omission by the Contractor. This shall also include the employment of consulting Engineer in Charges, professional experts and such other personnel as may be necessary for such works.
- 17.9 The Contractor acknowledges that he will not have any objection in re-structuring the Contract with respect to material and labour in order to realize the exemptions and benefits granted by the Government whenever required, and he will pass on such benefits to the Employer.
- 17.10 The Contractor shall indemnify the Employer against all claims in respect of patent rights and any or all other intellectual property rights, and shall defend all actions arising from such claims, and shall himself pay all royalties, license fees, damages, cost of charges of all and every sort that may be legally incurred in respect thereof.



- 17.11 The Contractor shall never disclose, share, publish, and/or make copies of any drawing, specification, methodology or any other information in any manner given to the Contractor during the Contract or after the completion of the Contract without the written permission of Employer.

### **3G. SAFETY MANUAL**

#### **CHAPTER 01**

#### **1.0. THE MAIN CONTRACTOR.**

##### **1.1. RELATIONSHIP WITH THE CLIENT.**

A close relationship and continuous interaction must be maintained with the client by the Construction Manager of the main or managing contractor. The client does have specific safety and health requirements to be observed and co-operation with his contractor, throughout the contract is essential. The prospective main contractors are given information on which to base their tenders and at the Tender Stage; the prospective contractors are expected to understand fully the Scope and Design Intent of these provisions.

##### **1.2. Selection of sub contractors.**

Management contractors should select sub or works contractors, using the same criteria of practical safety policy. Again, it must be ensured that the terms of contracts include adequate provision for safe working and for specified safety and health items.

##### **1.3. Planning.**

**Detailed planning should take the following matters into account**

- Know hazardous operations, e.g., use of cranes and site transport, steel erection scaffolding, etc.
- Requirement for plant and equipment to ensure safe working, or ease of handling.
- The sequence of work and its phasing between contractors, to minimise the possibility of one contractor placing another contractor's men at risk. Where appropriate, the segregation of contractors should be considered.
- The need to provide information, instruction and appropriate training, both on general site safety and on hazards specific in the site. The latter could range from restricted zones, permit-to-work systems and lifting operation, to the wearing of safety helmets.
- The need for fire precautions and emergency procedures.
- The need for environmental monitoring and health surveillance.
- Site security and foreseeable risks to the public, including the need for directional and warning signs
- Safe access across the site for persons, vehicles and plant. Thought should be given to arrangements for keeping the site tidy, accommodation for site staff, welfare, first aid and other facilities
- The provision of safe places of work at different stages of the job, including the provision of scaffolding for a number of sub or works contractors.

##### **1.4. Control.**

Sub and works contractors should be briefed about the safety policy and site rules of the main contractor at an initial safety meeting. Decisions on all other matters affecting safety and health should be laid down so that the responsibilities of all parties are made clear before contractors start work. Such matters should include.

- Appropriate precautions and work methods for identified hazards or hazardous work.
- Necessary plant and equipment and arrangements for its provision, maintenance use and inspection.
- The question of trade union or other workforce safety representation and the need for a joint safety committee.
- Arrangements for some form of induction training for new-starters on site.
- Arrangements for any specialist training.
- Arrangements for promulgating safety and health information, e.g. on site notice boards.

It is important that such safety and health arrangements are reviewed at the first project meeting, where the site management can set the tone for the conduct of work by resolving, at an early stage, any difficulties which may arise.

#### **1.5 Co-ordination.**

The Construction Manager, appointed by the main contractor, must be totally responsible for compliance with health and safety code. He must appoint a Chief Safety Officer and form a Safety Committee along with operatives from sub vendors. This Safety Committee will be Chaired by the Client's representative and sit twice a week and report to the Project Controller. The Construction Manager must take suitable arrangements to ensure the effective co-ordination of the work of all contractors on site. He should ensure that he is kept informed on a day to day basis, of progress and problems which arise. Clear lines of communication should be set up between each contractor and the Safety Officer of the Main Contractor. Operatives must also know whom to contact over safety and health matters requiring action or a decision. Such effective co-ordination will be enhanced by ensuring that 'safety and health' figures prominently on the agenda of regular project meetings. Safety Committee's weekly report must be submitted to the Project Controller in every Project Meeting.

#### **1.6 Monitoring.**

Arrangements must be made for safety and health monitoring of the site on a regular basis. This will include, not only ensuring the safety of such items as scaffolding excavations and plant but also environmental matter such as hazardous dust fume noise etc. In all cases, the Construction Manager should ensure that daily site inspections are carried out, by Safety Officer, more in depth inspections being done periodically by visiting safety advisers. It may be necessary for arrangements to be made for specialist occupational health and hygiene advice. The Check List for daily inspection is given in the following Chapters.

#### **1.7 Records.**

The main contractor should ensure that all statutory notifications, examinations and inspections are carried out. Except for plant used exclusively by individual contractors, all records should be kept by the Construction Manager.

#### **1.8 Standards.**

The following standards shall be followed, unless more onerous provisions have been specified in the Safety Provisions given in this Code.

IS: 3696 (Part I) - 1966 Safety code for scaffolds and ladders: Part I Scaffolds

IS: 3696 (Part II) - 1966 Safety code for scaffolds and ladders: Part II Ladders

IS: 4082-1977- Recommendations on stacking and storage of construction materials at site (first revision)

#### **1.9 Non Compliance of Safety and Health Provisions:**

The Compliance of the Safety and Health provisions are of utmost important to the Client. The prospective contractors must note that the client will take a serious view of any non compliance report of Safety Committee. Based on Safety Committee's report, the Client has a right to order stoppage of work till rectification is carried out to the satisfaction of the Safety Committee and all stoppages on this account will be at the entire risk, costs and consequences of the Contractor.

**CHAPTER 2.0**

**2.0 CONTRACTOR’S SAFETY INSPECTION CHECKS LIST.**

Contractor\_\_\_\_\_ Contract No.\_\_\_\_\_

Project\_\_\_\_\_

Location\_\_\_\_\_

Type of Work\_\_\_\_\_

Date\_\_\_\_\_ Checked By \_\_\_\_\_

Sr	ITEM	STATUS	(Inspector) REMARKS
3.0	<b>ACCIDENT PREVENTION ORGANISATION.</b>		
3.1	Trained First Aid Person		
3.2	First Aid Kit.		
3.3	Safety Material Posted.		
3.4	Emergency Phone # Posted.		
4.0	<b>HOUSEKEEPING &amp; SANITATION</b>		
4.1	General neatness of working areas.		
4.2	Regular disposal of waste and trash.		
4.3	Passageways and walkways clear.		
4.4	Adequate lighting		
4.5	Projecting nails removed.		
4.6	Oil and grease removed.		
4.7	Waste containers provided and used.		
4.8	Sanitary facilities adequate and clean.		
4.9	Drinking water tested and approved.		
4.10	Adequate supply of water.		
4.11	Drinking cups, Clean Dispensers.		
5.0	<b>FIRE PREVENTION.</b>		
5.1	Fire extinguishers identified, checked, lighted.		
5.2	Hydrants clear access to public thoroughfare open.		
5.3	Good housekeeping.		
5.4	NO SMOKING posted and enforced where needed.		
6.0	<b>PERSONAL PROTECTION.</b>		
6.1	Hard-hats		
6.2	Noise Level Exposure.		
6.3	Eye Protection.		
6.4	Safety Lines & Belts.		
6.5	Life Jackets.		
7.0	<b>ELECTRICAL INSTALLATION.</b>		
7.1	Adequate well insulated wiring.		
7.2	Fuses & GFI provided.		
7.3	Fire hazards checked.		
7.4	Electrical dangers posted.		
8.0	<b>HAND &amp; POWER TOOLS</b>		
8.1	Tools and cords in good condition.		
8.2	Proper grounding.		
8.3	All mechanical safeguards in use.		
8.4	Tools neatly stored when not in use.		
8.5	Right tool being used for the job at hand.		
8.6	Wiring properly installed.		
8.7	Enough men used to handle material.		
9.0	<b>LADDERS.</b>		
9.1	Stock ladders in good condition.		
9.2	Stock ladders not spliced.		
9.3	Properly secured, top and bottom.		
9.4	Side rails on fixed ladders extend above top landing.		
9.5	Built-up ladders constructed of sound materials.		
9.6	Rungs not over 12 inches on centre.		
9.7	Stepladders fully open when in use.		

- 9.8 Metal ladders not used around electrical hazards.
- 9.9 Proper maintenance and storage.
- 10.0 **SCAFFOLDING.**
- 10.1 All structural members adequate for use.
- 10.2 All connections adequate
- 10.3 Safe tie-in to structure.
- 10.4 Ladders and working areas free of debris, snow, ice, grease.
- 10.5 Proper footings provided.
- 10.6 Passerby protected from falling objects.
- 10.7 Supports plumb, adequate cross bracing provided.
- 10.8 Guard rails and toe boards in place.
- 10.9 Scaffold machines in working order.
- 10.10 Ropes and cables in good condition.
- 11.0 **HOISTS, CRANES & DERRICKS.**
- 11.1 Inspect cables and sheaves.
- 11.2 Check slings and chains, hooks and eyes.
- 11.3 Equipment firmly supported.
- 11.4 Outriggers used if needed.
- 11.5 Power lines inactivated, removed, or at safe distance.
- 11.6 Proper loading for capacity at lifting radius.
- 11.7 All equipment properly lubricated and maintained.
- 11.8 Signalmen where needed.
- 12.0 **MOTOR VEHICLES.**
- 12.1 Brakes, lights, warning devices operative.
- 12.2 Weight limits and load sizes controlled.
- 12.3 Personnel carried in safe manner.
- 13.0 **BARRICADES.**
- 13.1 Floor openings planked over or barricaded.
- 13.2 Roadways and sidewalks effectively protected.
- 13.3 Adequate lighting provided.
- 13.4 Traffic controlled.
- 14.0 **HANDLING & STORAGE OF MATERIALS.**
- 14.1 Neat storage area, clear passageway.
- 14.2 Stacks on firm footings, not too high.
- 14.3 Men picking up loads, correctly.
- 14.4 Materials protected from heat and moisture.
- 14.5 Protection against falling into hoppers and bins.
- 14.6 Dust protection observed.
  
- 17.0 **MASONRY.**
- 17.1 Proper scaffolding.
- 17.2 Masonry saws properly equipped, dust protection provided.
- 17.3 Safe hoisting equipment.

## CHAPTER 3.0

### 3.0 ACCIDENT PREVENTION ORGANISATION.

#### 3.1 Trained First Aid Person

A contractor shall provide, or ensure that there is provided, such number of suitable persons as is adequate and appropriate in the circumstances for rendering first aid to his employees if they are injured or become ill at work: and for this purpose a person shall not be suitable unless he has undergone -

- a) Such training and has such qualifications as the Health and Safety Executive may approve for the time being in respect of that case of the class of case, and
- b) Such additional training, if any, as may be appropriate in the circumstances of that case.

In practice, (a) refers to a trained first aider and (b) to an occupational first aider. In addition, a person who holds a current first aid certificate issued by registered medical association or Indian Red Cross Society will be classed as a "Suitable Person" for the purposes of Regulation.

For most sites, the contractor should ensure that at least one first aider is normally present when the number of employees at work is between 50 and 150, there should be at least one additional first aider for every 150 or so should ensure that sufficient first aiders are appointed to provide adequate coverage for each shift. Provisions for medical care must be made available by the contractor for every employee covered by the regulations. In the absence of infirmaries, clinics, or hospitals in proximity to the work site, properly trained and certified first aid personnel must be available, and first aid supplies must be provided by the contractor. Appropriate equipment for transportation of injured personnel to a physician or hospital must be provided for.

#### 3.2. First Aid Kit

Regardless of the number of employees there must be at least one first-aid box on site. Every first aider and occupational first aider should have easy access to first-aid equipment, and provision should be made for every employee to have reasonably rapid access to first aid. Each box should be placed in a clearly identified and readily accessible location, and contain a sufficient quantity of suitable first-aid materials and nothing else. Boxes and kits should be checked frequently to ensure they are fully stocked and all items are in a usable condition. Sufficient quantities of each item should always be available in every first aid box or cabinet.

Sr.No	Item	Numbers of Employees.				
		1-5	6-10	11-50	100	150
1	Guidance Card individually wrapped.	1	1	1	1	1
2.	Sterile adhesive dressings.	10	20	40	40	40
3.	Sterile eye pads with attachment.	1	2	4	6	8
4	Triangular bandages	1	2	4	6	8
5	Sterile coverings for serious wounds (where applicable)	1	2	4	6	8
6	Safety pins.	6	6	12	12	12
7	Medium sized sterile un medicated dressings.	3	6	8	10	12
8	Large sterile un medicated dressings	1	2	4	6	10
9	Extra Large sterile un medicated dressings.	1	2	4	6	8
10	Sterile water or saline in 300 ml disposable containers, where tap water is unavailable.	1	1	3	6	6

The first-aid box or cupboard should protect the contents from dampness and dust and be clearly marked with a white cross on green background.

#### 3.2.1 First - Aid Rooms.

Where there is 250 or more person at work on site, a suitably staffed and equipped first-aid room should be provided. In addition, where there is a large (over 150) number of employees divided into several dispersed working groups, or the location of the site makes access to places of treatment outside it difficult, the contractor should consider whether a centralised first-aid room may be needed.

- A first aid room should:
- a) Be under the charge of an occupational first aider in most circumstances; names and locations of all first aiders should be displayed.
  - b) Be readily available and used only for the rendering of first aid
  - c) Be clearly identified and of sufficient size to allow access for a stretcher, wheelchair, etc. and to hold a couch with space for people to work around it
  - d) Contain in addition to the previously mentioned first aid materials ; a sink with hot and cold running water, drinking water, paper towels, impermeable work surfaces, clean garments for use by first aiders and occupational first aider's clinical thermometer a couch with pillow and blankets frequently cleaned
  - e) Be heated, lighted, ventilated and cleaned regularly
  - f) Be designed so that immediate contact can be made with the person on call, e.g. radio, siren, and a telephone link if feasible. It should be stressed that a sufficient number of first - aid boxes must be provided for any work area which is not within easy reach of the first aid room.

### 3.3 Emergency Phone # Posted.

Project Name \_\_\_\_\_ Project No. \_\_\_\_\_

The following are the business telephone numbers where project key personnel can be reached at all times. In addition, the emergency telephone numbers of other vital agencies are listed:

	<b>BUSINESS</b>	<b>RESIDENCE</b>
CLIENTS PROJECT CONTROLLER		
CHIEF CONSTRUCTION MANAGER		
SAFETY OFFICER (CONTRACTOR).		
<b>OTHER EMERGENCY TELEPHONE NUMBERS</b>		
FIRE		
AMBULANCE		
DOCTOR		
HOSPITAL		
POLICE		
GAS COMPANY		
ELECTRIC COMPANY		
WATER COMPANY		
TELEPHONE COMPANY		
INSURANCE CARRIER		
OTHER		
OTHER		
OTHER		

**CHAPTER 4.0****4.0 HOUSEKEEPING & SANITATION**

At the work site, an adequate supply of potable water must be provided, as well as clean drinking water dispensers. Potable water for cleanup must be provided. Where non potable water is used for industrial or fire fighting purposes it must be identified by appropriate signs.

**CHAPTER 5.0****5.0 FIRE PREVENTION.**

Electrical wiring equipment for heating, light, or power purposes must be installed in compliance with the requirements. Internal combustion engine-powered equipment must be located with exhausts well away from combustible materials. Smoking is to be prohibited in the vicinity of fire hazards, and such areas must be conspicuously posted. Care shall be taken properly to ground nozzles, hoses, or steam lines used in hazardous tankage or vessels.

In location of temporary buildings and yard storage, appropriate care shall be taken for proper separation to preclude an accumulation of fire potential. The contractor is responsible for maintaining the entire area, but particularly storage areas, free from accumulation of unnecessary combustible materials.

**Site Fire Check List**

1. Are safe ashtrays provided where smoking is permitted?
2. Are heaters properly guarded?
3. Are wet clothes kept clear of heaters?
4. Are portable heaters secure from being knocked over?
5. Is all temporary wiring well supported and protected?
6. Are any circuit's overloads?
7. Are all flammable liquids, gas cylinders and flammable materials separately and properly stored?
8. Are all gas appliances fitted with control taps?
9. Is rubbish being "burned in proper fashion"?
10. Is all flame cutting and welding taking place with proper precautions?
11. Are all blowlamps and blowtorches being used correctly?
12. Do all night watchmen and security patrols know the fire routines?

**Preventing the spread of fire**

1. Is waste accumulating in hoist shafts, under butts, in odd corners?
2. Are separate metal waste containers supplied for each of the following: oily rags, paint rags, paint scrapings, waste flammable liquids, wood shavings and off cuts?
3. Is all waste regularly cleared?
4. Are all huts safely sited?

**Means of escape**

1. Are all gangways, stairs and platforms free from obstruction?
2. Does everyone know what to do in emergency?
3. Is fire drill practised, and is there a system to ensure that all persons have evacuated the area?

**Fire Fighting**

1. Have all extinguishers been checked and / or recharged?  
Are they clearly identified and easily accessible? Are operatives trained in their use



**CHAPTER 6.0****6.0 PERSONAL PROTECTION.**

Workers are often reluctant to use protection equipment. Such items should not only be suitable for their purpose but also be as comfortable as possible and acceptable to the workers concerned. Only then can efforts to ensure that equipment is worn or used prove successful.

All necessary personal safety equipment as considered adequate by the Engineer-in-charge shall be available for use of persons employed on the site and maintained in a condition suitable for immediate use; and the contractor shall take adequate steps to ensure proper use of equipment by those concerned.

- a) Workers employed on mixing asphaltic materials, cement and lime mortars / concrete shall be provided with protective footwear and protective gloves.
- b) Those engaged in handling any material which is injurious to eyes shall be provided with protective goggles.
- c) Those engaged in welding works shall be provided with welder's protective eye-shields.
- d) Stone workers are employed in sewers and manholes, which are in use, the contractor shall ensure that man-holes cover are opened and manholes are ventilated at least for an hour before workers are allowed to get into them. Manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident to public.
- e) The contractor shall not employ men below the age of 18 and women on the work of painting with products containing lead in any form. Whenever men above the age of 18 are employed on the work of lead painting, the following precautions shall be taken :-
  - i) No paint containing lead or lead products shall be used except in the form of paste or ready.
  - ii) Suitable face masks shall be supplied for use by workers when paint is applied in the form of spray or a surface having lead paint dry rubbed and scraped.
  - iii) Overalls shall be supplied by the contractor to workmen and adequate facilities shall be provided to enable working painters to wash during and on cessation of work.

**CHAPTER 7.0****7.0 HAND & POWER TOOLS**

Hand and power tools must be maintained in a safe condition, whether furnished by the contractor or by the employee. When power-operated tools are designed to accommodate guards, they must be equipped with appropriate guards when in use. Belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains and other moving parts of equipment must be guarded if the parts are exposed to contact by employees.

All hand-held power tools must be equipped with a constant pressure switch that shuts off when the pressure is released. Electric power-operated tools shall be of the approved double insulated type, or grounded in accordance with good electrical practice. Pneumatic power tools must be secured to the hose or whip by positive means. Safety clips or retainers must be maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled.

Pneumatically driven nails, staplers, and similar equipment provided with automatic fastener feed that operate at more than 100 psi pressure at the tool must have safety devices on the muzzle to prevent the tool from ejecting fasteners, unless the muzzle is in direct contact with the work surface.

Hoses shall not be used for hoisting or lowering tools, and hoses exceeding ½-in inside diameter must have a safety shutoff at the source of supply to reduce pressure in case of a hose failure.

All fuel-powered tools must be stopped while being refuelled, serviced, or maintained.

Only trained employees may be allowed to operate a powder-actuated tool. Such tools must be tested each day before loading to see that the safety devices are in proper working condition, in accordance with manufacturer's recommended test procedure. Tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at any employee, and hands shall be kept clear of the open barrelled end. Fasteners shall not be driven into very hard or brittle materials such as cast iron, glass block, face brick, hardened steel, or hollow tile. For driving into materials that are easily penetrated, appropriate backing must be available to prevent the pin fastener from passing completely through.

All employees using abrasive wheels must use eye protection, and other tools must be operated using appropriate personal safety equipment.

**CHAPTER 8.0****8.0 LADDERS****Use of Ladders and Folding Step-Ladders.**

- This regulation applies to all ladders and pairs of steps but not roof ladders and crawling boards.

**Ladders must :**

- a) Be fixed near the top if practicable, or near the bottom if not: if suspended they must be secure,
  - b) Be placed (except when suspended) on a firm level base; they must not stand on loose packing (e.g. bricks),
  - c) Be intermediately secured, where necessary, to prevent swaying and sagging, and
  - d) Be supported, or suspended, equally on each stile.
- If a ladder, standing on the ground, cannot be fixed to prevent slipping, then someone must hold it at the base when it is being used.
  - A ladder which is not more than 3 m in length, need not be fixed or footed, provided it is securely placed so as to prevent it from slipping or falling. This exemption does not apply to ladders which are used as a means of communication between one working place and another, or to suspended ladders.
  - Ladder must :
    - a) Extend at least 1.05 m above any landing place beyond the highest rung from which a person may be working, or have a nearby handhold of equivalent height.
    - b) Be placed so that there is space behind each rung for proper foothold (e.g. no rung should coincide with a scaffold tube).

## **CHAPTER 9.0**

### **9.0 SCAFFOLDING**

Collapse of any scaffold or part of a substantial part of the scaffold falling or overturning; also collapse or part collapse of the suspension arrangements of a slung or suspended scaffold, causing the platform or cradle to fall more than 5m.

#### **9.1. Provision of Scaffolds, ETC.**

Scaffolds must be provided for all work which cannot be safely done from the ground or part of the building.

Ladders, properly secured, can be used - but only for light work which can be done with one hand.

#### **9.2. Supervision of Work and Inspection of Material.**

Scaffolds must be erected, altered, or dismantled only under competent supervision and, as far as possible, by experienced persons. All scaffolding materials must be inspected before use to check that they are up to standard.

#### **9.3. Construction and Material.**

Sufficient sound material must be provided for a scaffold to be strong enough and stable enough for the job.

Wherever timber is used for any kind of scaffolding purpose, it must be of the right type for the job, be free from back and must not be painted so that any defects are hidden.

Scaffold tubes and fittings must not be bent, distorted or unduly rusty.

#### **9.4. Defective Material**

- Scaffold tubes, couplers or fittings that are bent unduly rusty or distorted should be rejected.

**Timber with dangerous splits and knots should always be rejected.**

- Ropes and lashings showing signs of chafing through wear, or of being corroded, should be rejected.
- All scaffold components must be properly stored when not in use and kept separately from all other building materials.

#### **9.5. Maintenance of Scaffolds.**

Scaffolding must be kept in good order and every effort made to prevent the accidental displacement of any part.

#### **9.6. Partly Erected or Dismantled Scaffolds.**

In any scaffold is either partly erected (or partly dismantled), but nevertheless is still capable of being used to some extent, it must have a bold warning notice fixed, or all access blocked off or barred, at the point beyond which it cannot be safely used.

#### **9.7. Standards or Uprights, Ledgers and Putlogs.**

- Scaffold standards should be vertical and spaced closely enough for the intended use of the scaffold.
- Base plates must be used. Timber sole plates should also be used to distribute the load from the standard over a wider area, as well as to offset possible local subsidence.
- Ledgers must be level and fixed to standards with right-angle couplers.
- Putlogs and transoms must be firmly fixed to ledgers or standards.

**The flattened end of the putlog must be pushed right into the wall to provide maximum support.**

- Putlogs and transoms should be spaced according to the expected load and the thickness of the boards to be used in the platform.

In normal use, putlogs and transoms should be spaced so that the spans of scaffold boards should not be greater than:

32 mm boards : 1 m  
38 mm boards : 1.50 m  
50 mm boards : 4.60 m

#### **9.8. Ladders used in Scaffolds**

- Ladders used as uprights must be :
  - a) Strong enough for the load,
  - b) Equally supported on each stile, and
  - c) Secured to prevent slipping.
- Ladders are only to be used to support a scaffold platform when the work is light, e.g. painting.

#### **9.9. Stability of Scaffolds**

- All scaffolds must be :
  - a) On a solid, even base; or suspended from a sound structure.
  - b) Braced to prevent failure, and
  - c) Tied to the building or structure unless specially designed to be completely independent.
- Any building or structure which supports a scaffold must be strong enough to carry the scaffold and its load.
- Mobile scaffolds must :
  - a) Be stable, weighted at the base if necessary.
  - b) Be used only on a flat, level surface.
  - c) have the wheels locked to prevent movement whilst being used for work, and
  - d) Be pushed, or pulled only at the base when being moved.
- Scaffolds must not be built on loose bricks, drain pipes, chimney pots, etc. Bricks or blocks can be used to support a platform no higher than 600 mm from the ground or floor.

#### **9.10. Slung Scaffolds**

- a) Be strong enough,
  - b) Be properly secured to be overhead anchor-ages and to be platform frame,
  - c) Be spaced so as to keep the platform stable,
  - d) Be vertical, and
  - e) Be kept taut.
- No rope other than wire rope may be used for suspension.
  - Packing must be used to prevent damage to suspension ropes or chains at any point where sharp or rough - edged protrusions could cause chafing.
  - The platform must be secured to prevent swaying whilst in use.

#### **9.11. Cantilever, Jib, Figure and Bracket Scaffolds.**

Cantilever or jib scaffolds must be anchored to a structure which is strong enough to carry the total load. Outriggers must be long enough and strong enough and the scaffold must be braced to ensure stability.

Figure or bracket scaffolds supported by dogs or spikes must not be used if there is any danger of these pulling out of the brickwork or stone-work.

### 9.12. Support for Scaffolds, etc.

No part of the building may be used to support scaffolding unless it is strong enough to do so. Unless gutters have been designed as walkways and are strong enough to bear the weight, they must not be used to support scaffolding or ladders.

### 9.13 Suspended Scaffolds (Not Power Operated)

- The ropes, winches, blocks and tackle must be strong enough and correctly rigged. A safe anchorage for the suspension must be provided.
- Winches or similar lifting devices must :
  - a) Have brakes which apply when the operating lever is released, and
  - b) Be protected from the weather, falling dirt, etc.
- Outriggers must :
  - a) Be long enough and strong enough,
  - b) Be horizontal (light cradles are excepted),
  - c) Have stops at their outer ends (light cradles excepted)
  - d) Be tied down or properly counterweighted at the tail, and
  - e) Be close enough together to support the rails and scaffolds properly.
- Counterweights Must :
  - a) Be bolted or securely attached to the outriggers, and
  - b) Be at least three times the overturning moment or load.
- Platforms must be hung clear of the building or face of the structure.
- Runways must :
  - a) Be strong enough and in good condition,
  - b) Have stops at each, and
  - c) Be bolted or tied securely to their supports.
- Suspension ropes or chains must :
  - a) Be properly secured, both overhead and to the frame of the platform, and
  - b) Be kept taut.
- Winches must :
  - a) Have at least two full turns of rope on the drum when the platform is in its lowest position, and
  - b) Be marked with the length of rope on the drum.
- Suspended scaffolds and associated equipment must be maintained in good condition. Platforms must be prevented from tipping or swaying whilst in use.
- Steel wire rope must be used for the suspension of all platforms other than lightweight cradles.

Lightweight cradles may be suspended by fibre ropes and pulley blocks which should not be more than 3.20 m apart. (only ropes recommended by manufacturers for this purpose should be used).

- Platforms of suspended scaffold must :
  - a) Be close boarded,
  - b) Be at least 430 mm wide on lightweight cradles.  
be at least 600 mm wide on all other types, if used only for workmen, or be at least 800 mm wide, if used for workmen and materials, and
  - c) Never be used to carry another higher platform.

Platforms should be as close as possible to the face of the building, but where persons sit on the edge of the platform to carry out their work, then the distance between platform and building can be up to 300 mm.

#### **9.14. Boatswain's Chairs Cages, Skips etc. (Not Power Operated)**

- Hand-operated boatswain's chairs, skips etc. must :
  - a) Be well constructed, strong enough, and properly maintained.
  - b) have outriggers strong enough and firmly anchored,
  - c) Have chains, ropes and lifting gear firmly secured to the outriggers above and to the chair, skip etc. The construction (lifting operations) regulations apply to the lifting gear,
  - d) Be designed so that the occupant cannot fall out,
  - e) Carry no loose materials which could interfere with the safety of the occupant,
  - f) Have means of preventing spinning and tipping (a swivel connection at the suspension point is strongly advised),
  - g) In the case of skips, be at least 910 mm deep, and
  - h) Be under the supervision of a competent person during installation and use.
  
- A boatswain's chair may only be used as a workplace when the work would not take long enough to make the use of a suspended (or standard) scaffold reasonably practicable.

## CHAPTER 10.0

### 10.0 HOISTS, CRANES & DERRICKS

#### Safety of Hoist ways. Platforms and Cages.

- Hoist ways must be enclosed wherever access is provided or wherever persons could be struck by the platform or other moving parts. Gates must be fitted in the enclosure at all landing places and must normally be at least 2m high, but gates 910 mm high are acceptable where persons are not at risk of falling down the hoist-way or coming into contact with moving parts. Gates must be kept closed except for the movement of persons and materials; it is the duty of all persons to see that this is done.
- Hoist platforms and cages must be fitted with a device capable of supporting them, fully loaded, should hoists, ropes or driving gear fail.
- Hoists must be fitted with ver-run stops at the top.

#### Operation of Hoists.

- Hoists must only be capable of being operated from one position at a time, whether by rope, lever or switch. Hoists must not be operated from the cage.
- Where the hoist driver cannot see the platform or cage during its movement, a signalling system, which covers all landing places, must be used.

#### Safe working Load and Marking of Hoists.

- A) The platform of materials or goods hoists must carry a notice stating (i) the safe working load and (ii) that passengers must not ride on the platform.
- 
- The safe working load must not be exceeded except for test purposes.
- B) Cages for passenger's hoists must carry a notice stating (i) the safe working load and (ii) the number of passengers permitted.
- No greater number of passengers may be carried and the safe working load must not be exceeded except for test purposes.

### **Cranes & Derricks**

Manufacture's recommendations on operating conditions shall be followed by the contractor. Rated load capacities and recommended operating speeds and special hazard warnings or instructions must be conspicuously posted on all equipment visible to the operator while he is at his control station.

A boom angle indicator and a load-indicating device in good working order must be provided for cranes and derricks. Hand signals to crane and derrick operators shall be those prescribed by the applicable ANSI standards for the type of crane in use. Accessible areas within the swing radius of the rear of the rotating superstructure of a crane must be barricaded to prevent an employee from being struck or crushed by the crane.

In operating boom equipment, careful clearance shall be given to electrical distribution and transmission lines. For lines rated 50 kV or below, minimum clearance is 10 ft, whereas for loads rated over 50 kV, minimum clearance shall be 10 ft + 0.4 in per each kV over 50 - or use twice the length of the line insulator, but never less than 10 ft.

For hammerhead tower cranes, adequate clearance must be maintained between the moving and rotating structures and fixed objects to allow the passage of employees without harm. Employees required to perform duties on the horizontal booms of hammerhead tower cranes must be protected against falling by guard rails or by safety belts and lanyards. Overhead and gantry cranes must have the rated load of the crane plainly marked on each side, and if the crane has more than one hoisting unit, each must have its rated load marked on the load block in marking clearly legible from the ground or floor. All operation must be prescribed in ANSI B30.2, "Safety code for Overhead and Gantry Cranes"

Derricks in use must meet the applicable requirements for design, construction, installation, inspection, testing, maintenance, and operation prescribed in ANSI B30.6, "Safety code for Derricks"



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**CHAPTER 11.0****11.0 MOTOR VEHICLES**

Motor equipment left unattended at night near areas where work is in progress must have appropriate lights, reflectors, or barricades to identify the location of the equipment. A safety tire rack, cage, or equivalent protection must be used when a worker is inflating, mounting, tires installed on split rims or rims equipped with locking rings. Heavy machinery that is suspended or held aloft by the use of slings, hoists, or jacks must be blocked or cribbed to prevent falling or shifting before employees are permitted to work under them. Bulldozer and scraper blades and similar equipment shall be either fully lowered or blocked when being repaired or when not in use. All controls must be in the neutral position and the motor stopped and brakes set, unless work being performed requires otherwise. Parked equipment must be checked and parking brakes set. All cab glass shall be safety glass. All vehicles must have a service brake system, an emergency brake system, and a parking brake system. Vehicles that require additional light shall have at least two headlights, as well as brake lights.

Other standard vehicles equipment such as seat belts, rear-view mirrors, and safety latches on operating levers shall be in accordance with standard vehicle codes, and state-inspected where appropriate.

**CHAPTER 12.0****12.0 BARRICADES**

- i) Contractor shall erect and maintain barricades required in connection with his operation to guard or protect.
  - a) Hoisting Areas.
  - b) Areas adjudged hazardous by contractor or Client.
  - c) Owner's existing property subject to damage by Contractor's operations.
- ii) Contractor's employees and those of his subcontractors shall become acquainted with Project Managers barricading practice and shall respect the provisions thereof.

**12.1. Guarding of Floor Openings and Floor Holes.**

12.1.1 Every temporary floor opening shall have railings, or shall be constantly attended by someone. Every floor hole into which persons can accidentally fall shall be guarded by either:

- a) A railing with toe board on all exposed sides, or
- b) A floor hole cover of adequate strength and it should be hinged in place. When the cover is not in place, the floor hole shall be constantly attended by some one or shall be protected by a removable railing.

12.2. Every stairway floor opening shall be guarded by a railing on all exposed sides, except at entrance to stairway. Every ladder way floor opening or platform shall be guarded by a guard railing with toe board on all exposed sides (except at entrance to opening), with the passage through the railing either provided with a swinging gate or so offset that a person can not walk directly into the opening.

**12.3. Guarding of Open-Side Floors and Platform.**

Every open-sided floor or platform 120 cm or more above adjacent floor or ground level shall be guarded by a railing (or the equivalent) on all open sides, except where there is entrance to ramp, stair-way, or fixed ladder. The railing shall be provided with a toe board beneath the open sides wherever.

- a) Persons may pass;
- b) There is moving machinery ; or
- c) There is equipment with which falling materials could create a hazard.

**CHAPTER 13.0****13.0 HANDLING & STORAGE OF MATERIALS****13.1 Paints Varnishes and Thinners.**

- a) Storage and Stacking - Paints, varnishes, lacquers, thinners and other flammable materials shall be kept in properly sealed or closed containers. The containers shall be kept in a well ventilated location, free from excessive heat, smoke, sparks or flame. The floor of the paint stores shall be made up of 10 cm thick loose sand.

Paint materials in quantities other than required for daily use shall be kept stocked under regular storage place.

Where the paint is likely to deteriorate with age, the manner of storage shall facilitate removal and use of lots in the same order in which they are received.

Temporary electrical wiring / fittings shall not be installed in the paint store. When electric lights, switches or electrical equipment are necessary, they shall be of explosion proof design.

- b) Handling - Ventilation shall be adequate to prevent the accumulation of flammable vapours to hazardous levels of concentration shall be provided in all areas where painting is done.

When painting is done in confined spaces where flammable or explosive vapours may develop, any necessary heat shall be provided through duct work remote from the source of flame.

Sources of ignition, such as open flame and exposed heating elements, shall not be permitted in area or rooms where spray painting is done nor shall smoking be allowed there.

Care should be taken not to use any naked flame inside the paint store. Buckets containing sand shall be kept ready for use in case of fire. Fire extinguishers when required shall be of foam type conforming to accepted standards.

Each workman handling lead based paints shall be issued 1/2 litre milk per day for his personal consumption.

**CHAPTER 14.0****14.0 HEALTH STANDARDS****14.1 DRINKING WATER**

- a) In every work place, there shall be provided and maintained at suitable places, easily accessible to labour, a sufficient supply of cold water fit for drinking.
- b) Where drinking water is obtained from an intermittent public water supply, each work place shall be provided with storage where such drinking water shall be stored.
- c) Every water supply or storage shall be at a distance of not less than 50 feet from any latrine drain or any other source of pollution.

**14.2 WASHING FACILITIES**

- a) In every work place adequate and suitable facilities for washing shall be provided and maintained for the use of contract labour employed therein.
- b) Separate and adequate cleaning facilities shall be provided for the use of male and female workers.
- c) Such facilities shall be conveniently accessible and shall be kept in clean and hygienic condition.

**14.3 LATRINES AND URINALS**

- a) Latrines shall be provided in every work place on the following scale namely:-
  - i) Where female are employed there shall be at least one latrine for every 25 females.
  - ii) Where males are employed, there shall be at least one latrine for every 25 males.

Provided that where the number of males or females exceeds 100, it shall be sufficient if there is one latrine for 25 males or females as the case may be upto first 100, and one for every 50 thereafter.

- b) Every latrine shall be under cover and so partitioned off as to secure privacy and shall have proper door and fastenings.
- c) Construction of latrines: The inside walls shall be constructed of masonry or some suitable heat-resisting non-absorbent materials and shall be cement washed inside and outside at least once a year , latrines shall not be of standard lower than borehole system.
- d)
  - i) Where workers of both sexes are employed, there shall be displayed out side each block of latrine and urinal, a notice in the language understood by the majority of the workers " For Men only " or " For Women only " as the case may be.
  - ii) The notice shall also bear the figure of man or woman, as the case may be.
- e) There shall be at least one urinal for male workers upto 50 and for female workers upto 50 employed at a time, provided that where the number of male or female workers, as the case may be exceeds 500 , it shall be sufficient if there is one urinal for every 50 males or females upto the first 500 and one for every 100 or part thereafter.
- f)
  - i) The latrines and urinals shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times.
  - ii) Latrines and urinals other than those connected with a flush sewage system shall comply with the requirements of Public Health Authorities.
- g) Water shall be provided by means of tap or otherwise so as to conveniently accessible in or near the latrines and urinals.
- h) Disposal of excreta: Unless otherwise arranged by the local sanitary authority, arrangements for proper disposal of excreta by incineration at the work place shall be made by means of a suitable incinerator. Alternately excreta may be disposed off by putting a layer of night soil at the bottom of a pucca tank prepared for the purpose and covering it with 15 cm layer of waste or refuse and then covering it with a layer of earth for a fortnight (when it will turn to manure).

- i) The contractor shall at his own expense , carry out all instructions issued to him by the Engineer-in-charge to effect proper disposal of night soil and other conservancy work in respect of the contractor's workmen or employees of the site. The contractor shall be responsible for payment of any charges which may be levied by the municipal or cantonment authority for execution of such on behalf.

#### 14.4 PROVISION OF SHELTER DURING REST

At every place there shall be provided , free of cost , four suitable sheds , two for meals and other two for rest separately for the use of men and women labour . The height of each shelter shall not be less than 3m from the floor level to the lowest part of the shed roof. These shall be kept clean and the space provided shall be on the basis of 0.6sq.m per head.

Provided that the Engineer-in-charge may permit subject to his satisfaction , a portion of building under construction or other alternative accommodation to be used for the purpose.

#### 14.5 CRÈCHES

- i) At every work place , at which 20 or more women workers are ordinarily employed , there shall be provided two rooms of reasonable dimensions for the use of their children under at the age of six years . One room shall be used as a play room for the children and the other as their bedroom.
- ii) The rooms shall be provided with suitable and sufficient openings for light and ventilation. There shall be adequate provision of sweepers to keep the places clean.
- iii) The contractor shall supply adequate number of toys and games in playroom and sufficient number of cots and bedding in the bed room.
- iv) The contractor shall provide one aya to look after the children in the crèche when the number of women workers does not exceed 50 and two when the number of women workers exceeds 50.
- v) The use of the rooms earmarked as crèches shall be restricted to children, their attendants and mothers of the children.

#### 14.6 CANTEENS

- i) In every work place where the work regarding the employment of contract labour is likely to continue for six months and where in contract labour numbering 100 or more are ordinarily employed , an adequate canteen shall be provided by the contractor for the use of such labour .
- ii) The canteen shall be maintained by the contractor in an efficient manner.
- iii) The canteen shall consist of at least a dining hall, kitchen, storeroom, pantry and washing places separately for workers and utensils.
- iv) The canteen shall be sufficiently at all times when any person has access to it.
- v) The floor shall be made of smooth and impervious materials and inside walls shall be lime washed or colour washed at least once a year .The inside walls of the kitchen shall be lime washed every four months.
- vi) The premises of the canteen shall be maintained in a clean and sanitary condition.
- vii) Suitable arrangements shall be made for the collection of disposal of garbage.
- viii) Waste water shall be carried away in suitable covered drains and shall not be allowed to accumulate so as to cause nuisance.
- ix) The dining hall shall accommodate at a time 30 percent of the contract labour working at a time.
- x) The floor area of the dining hall, excluding the area occupied by the service counter and any furniture except tables and chairs shall not be less than one sq.m per diner to be accommodated as prescribed in sub-rule (ix).
- xi)
  - a)
    - 1. There shall be provided and maintained sufficient utensils crockery, furniture and any other equipment necessary for efficient running of canteen.
    - 2. The furniture utensils and other equipment shall be maintained in a clean and hygienic condition.
  - b)
    - 1. Suitable clean clothes for the employees serving in the canteen shall be provided and maintained.
    - 2. A service counter, if provided, shall have top of smooth and impervious material.
    - 3. Suitable facilities including an adequate supply of hot water shall be provided for the cleaning of utensils and equipment.
- xii) A portion of the dining hall and service counter shall be partitioned off and reserved for women workers in proportion to their number.

- xiii) Sufficient tables stools or benches shall be available for the number of diners to be accommodated as prescribed in sub rule (ix).
- xiv) The food stuff and other items to be served in the canteen shall be in conformity with the normal habits of the contract labour .
- xv) The charges for food stuffs, beverages and other items served in the canteen shall be based on "No profit No loss" and shall be conspicuously displayed in the canteen.
- xvi) In arriving at the price of foodstuffs, and other article served in the canteen , the following items shall not be taken into consideration as expenditure namely :-
  - a) The rent of land and building.
  - b) The depreciation and maintenance charges for the building and equipment provided for the canteen.
  - c) The purchase, repairs and replacement of equipment including furniture , crockery, cutlery and utensils.
  - d) The water charges and other charges incurred for lighting and ventilation.
  - e) The interest and amounts spent on the provision and maintenance of equipment provided for the canteen.
- xvii) The accounts pertaining to the canteen shall be audited once every 12 months by registered accountants and auditors.

#### **14.7 ANTI-MALARIAL PRECAUTIONS**

The contractor shall at his own expense, conform to all anti-malarial instructions given to him by Engineer-in-charge including the filling up of any borrow pits which may have been dug by him.

**CHAPTER 15.0**

**15.0 RECORD OF FIRST AID TREATMENT.**

**Project Data:** \_\_\_\_\_

Project:

Location:

**Injured Data:**

Name:

Employer:

Employer's Supervisor:

**Injury Data:**

Date:

Time:

Description of Injury:

**First Aid Treatment:**

Treatment administered by:

Type of treatment administered:

Referred for Medical Treatment:

\_\_\_\_\_ No

\_\_\_\_\_ Yes.

Doctor \_\_\_\_\_

Hospital \_\_\_\_\_

\_\_\_\_\_  
Report Prepared By:

\_\_\_\_\_  
Date:

Treatment Received By:

\_\_\_\_\_  
Date:

**CHAPTER 16.0**

**16.0 DAMAGE REPORT FORM**

Contract \_\_\_\_\_

Plant and equipment affected. \_\_\_\_\_

Serial numbers or identifying marks \_\_\_\_\_

Owner of plant or equipment \_\_\_\_\_

Place, date and time of incident \_\_\_\_\_

Circumstances of incident \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Details of damage \_\_\_\_\_

\_\_\_\_\_

Names of operators involved (if not Company employers, also give details of such contractors concerned) \_\_\_\_\_

Were normal working methods used ? \_\_\_\_\_

Contributory causes of incident \_\_\_\_\_

\_\_\_\_\_

Names of witness \_\_\_\_\_

(attach statements) \_\_\_\_\_

\_\_\_\_\_

**Preventative action proposed or taken** \_\_\_\_\_

**Signature of Site Agent or Manager** \_\_\_\_\_

Date \_\_\_\_\_.



**CHAPTER 17.0****17.0 PERSONNEL ACCIDENT REPORT FORM.**

Division / Dept (if applicable) \_\_\_\_\_

Contractor \_\_\_\_\_

Full name and address of injured person (IP) \_\_\_\_\_  
\_\_\_\_\_

Occupation of IP \_\_\_\_\_ Age of IP \_\_\_\_\_

Employed (state if self - employed or under training) \_\_\_\_\_

Trade of sub contractor (where applicable) \_\_\_\_\_

Particulars of accident:

Date and time of accident \_\_\_\_\_

Exact place where accident happened. \_\_\_\_\_

What was IP doing at time of accident? \_\_\_\_\_

Did IP cease work? \_\_\_\_\_

First air or hospital treatment. \_\_\_\_\_

Time lost (state if IP is still off work) \_\_\_\_\_

Brief description of accident, giving dimensions where applicable \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Details of tools, equipment plant or machinery. \_\_\_\_\_  
\_\_\_\_\_

What protective clothing / equipment was being worn / used by IP? \_\_\_\_\_

Nature of injury and part of the body injured. e.g. punctured foot, hand, broken leg. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Contributory factors:

Unsafe system of work YES/NO \_\_\_\_\_

Lack of training, supervision etc. YES/NO \_\_\_\_\_

Environmental Conditions (wind, rain, ice, etc.) YES/NO \_\_\_\_\_

State of equipment (faulty brakes, damaged lifting gear, etc.) YES/NO \_\_\_\_\_

Housekeeping (untidy access, nails in timber. etc) YES/NO \_\_\_\_\_

Other \_\_\_\_\_

Delete as appropriate and give details.

Names and address of witness \_\_\_\_\_  
\_\_\_\_\_

If reportable:

Date and time Safety Officer informed by Telephone \_\_\_\_\_

Preventative action taken or proposed \_\_\_\_\_

Signature of Site Agent or Manager \_\_\_\_\_

Date \_\_\_\_\_

## **SECTION 4: FORMS OF SECURITIES**

**Forms of Securities**

Acceptable forms of securities are annexed. Bidders should not complete the Performance and Advance Payment Security forms at this time. Only the successful Bidder will be required to provide Performance and Advance Payment Securities in accordance with one of the forms, or in a similar form acceptable to the Employer.

**Annex A:** Performance Bank Guarantee

**Annex B:** Bank Guarantee for Advance Payment

**ANNEXURE –A****PERFORMANCE GUARANTEE**

This Guarantee of guarantee (hereinafter referred to as “**Guarantee**”) made this date ..... by Bank (Bank Name)....., a scheduled bank with its head office at (address)..... (hereinafter referred to as the “**Bank**”) of the first part in favour of M/s. Mahindra World City (Jaipur) Limited, a company incorporated under Companies Act, 1956 and having its office at **411, Neelkanth Tower#1, Bhawani Singh Marg, C-Scheme, Jaipur -302001** (hereinafter referred to as “**Employer**” which expression shall, unless repugnant to the meaning and context here to, include its affiliates, successors and assigns) of the other part.

**WHEREAS:**

- A. M/s. Mahindra World City (Jaipur) Limited is developing a special economic zone at Jaipur called “Mahindra World City, Jaipur” (hereinafter referred to as “**SEZ**”);
- B. On the assurance of M/s -----having its office at ----- (hereinafter referred to “**Contractor**”) that they are having the necessary infrastructure and capacity to undertake construction of ----- package at the SEZ to the quality, specifications and time frame as per the terms and conditions stipulated by MWCJ, MWCJ and Contractor have entered into a contract ref: **MWCJL/MTP/B1/T-03A** dated \_\_\_\_ **day** \_\_\_\_ **Month** \_\_\_\_ **Year** (hereinafter referred to as “**Contract**” which expression shall include any agreed amendments or modifications thereto) to execute the work within the SEZ in accordance with the terms and conditions of such Contract;
- C. Contractor has, by its acceptance to enter into the Contract with MWCJ has agreed to furnish a bank guarantee to MWCJ to ensure timely and satisfactory performance and completion of the work as per terms of the Contract;
- D. The Bank has, at the request of the Contractor, agreed to grant in favour of MWCJ, a guarantee to secure performance by Contractor of its obligations under the said works contract.

**NOW THIS GUARANTEE WITNESSES AS FOLLOWS:**

1. The Bank hereby unconditionally, unequivocally and irrevocably guarantee to MWCJ and agrees and undertakes that if in the sole and unfettered opinion of MWCJ, Contractor has failed to perform its obligations under the said Contract and any amendments or modifications thereto, the Bank shall upon demand of MWCJ forthwith pay to MWCJ, without demur, contestation or dispute, without reference to Contractor, the amount set forth in certificate by MWCJ as the amount of loss / claim / damage / cost / expense arising or likely to arise out of breach or non fulfilment of the said Contract. Any such certificate or demand by MWCJ on the Bank, shall be conclusive as regards the amount due and payable by the Bank to MWCJ under this Guarantee, notwithstanding any dispute between Contractor and MWCJ as to the liability for or quantum of loss / damage / claim / costs / expenses and notwithstanding any notice by Contractor to the Bank withhold or not to pay any amount to MWCJ against this Guarantee either before or after invoking of this Guarantee by MWCJ Provided always the total liability of the Bank hereunder shall be limited to Rs. (.....) (Rupees.....).
2. This Guarantee of the Bank shall be effective immediately from the date hereof and shall be in force for till a certificate is issued by MWCJ to the Bank in accordance with Clause 4 of this Guarantee or the claim expiry date of this guarantee whichever is earlier. If a demand is served, before the claim expiry date, this Guarantee shall continue in full force and effect (notwithstanding the validity date) in respect of the amount so demanded until the obligation of the Bank in respect hereof is finally determined and the payment made to MWCJ.

3. The Bank agrees that MWCJ has the fullest liberty, without affecting in any manner the Bank's obligations hereunder, to vary any of the terms and conditions of the said Contract, to extend the time of performance by the Contractor from time to time and to forbear from enforcing any of the terms of the said Contract without any notice to or the consent of the Bank and the Bank shall not be released from its liability under this Guarantee by reason of any such variation or extension or forbearance being granted to Contractor. The Bank agrees that MWCJ has no obligation whatsoever to exercise its rights against collateral, if any, of Contractor but may immediately call on this Guarantee.
4. This Guarantee herein contained shall remain in valid and effect till MWCJ certify that the terms and conditions of the said Contract have been fully and properly carried out and that the Contractor has fulfilled all its obligations under the Contract and that MWCJ has no claim against the Contractor on any account against the said Contract or the expiry date whichever is earlier.
5. Only neglect or forbearance, on the part of MWCJ, in the enforcement of the payment of any money, the payment whereof is intended to be hereby secured or the giving of the time for the payment hereto shall in no way relieve the Bank of their liability under this Guarantee.
6. The Bank shall not revoke this Guarantee during its currency except with the previous consent in writing of MWCJ.
7. Any notice or communication under this Guarantee shall be in writing and shall be served on the Bank at its address first hereinbefore mentioned and to MWCJ at its address first hereinbefore mentioned. Either party may notify to the other in writing any change in such address for service of notice upon it. The notices shall be served personally against acknowledgement or by Registered Post
8. This Guarantee shall not be affected by any change in the constitution of the Bank or of Contractor or of MWCJ.
9. This Guarantee shall be governed by the applicable laws of India.
10. The expression "The Bank" and the Contractor hereinbefore used shall include their respective successors and permitted assigns.

Notwithstanding anything contained herein above in the Bank Guarantee.

- 1- Our liability under this Bank Guarantee shall not exceed Rs. \_\_\_\_\_/-
- 2- This Bank Guarantee shall be valid up to \_\_\_\_\_
- 3- We shall be liable to pay any amount under this Bank Guarantee or part thereof only if we received (if your serve upon us) a written claim or demand under this Guarantee up to \_\_\_\_\_ at \_\_\_\_\_ Bank Ltd., \_\_\_\_\_(Address)

**ANNEXURE –XXXX****DRAFT FOR ADVANCE BANK GUARANTEE****Bank Guarantee Bond (RE : Mobilization Advance)**

This Bond (hereinafter referred to as “**Guarantee**”) made this (date)..... by Bank (Bank Name)....., a scheduled bank with its head office at (address)..... (hereinafter referred to as the “**Guarantor**”) of the first part in favour of M/s. Mahindra World City (Jaipur) Limited, a company incorporated under Companies Act, 1956 and having its office at **411, Neelkanth Tower#1, Bhawani Singh Marg, C-Scheme, Jaipur -302001** (hereinafter referred to as “**Employer**” which expression shall, unless repugnant to the meaning and context here to, include its affiliates, successors and assigns) of the other part.

**WHEREAS:**

- A. M/s. Mahindra World City (Jaipur) Limited is developing a special economic zone at Jaipur called “Mahindra World City, Jaipur” (hereinafter referred to as “**SEZ**”);
- B. On the assurance of M/s -----having its registered office at ----- (hereinafter referred to “**Contractor**”) that they are having the necessary infrastructure and capacity to undertake construction of ----- package at the SEZ to the quality, specifications and time frame as per the terms and conditions stipulated by EMPLOYER, EMPLOYER and Contractor have entered into a contract Ref. No. \_\_\_\_\_ dated \_\_\_\_\_ (hereinafter referred to as “**Contract**” which expression shall include any agreed amendments or modifications thereto) to execute the work\_\_\_\_\_ (work specification) within the SEZ in accordance with the terms and conditions of such Contract;
- C. And whereas Employer has agreed to pay the said Contractor a sum of Rs.\_\_\_\_\_ (Rupees \_\_\_\_\_) as Mobilisation Advance as per terms and conditions of the above said Contract, that the said Contractor shall submit in favour of your company and an unconditional and irrevocable Bank Guarantee for an equal amount valid till completion period i.e \_\_\_\_\_.(Date)
- D. The said Contractor has agreed to refund to the Company the balance unrecovered sum in the event of the said Contract Agreement being terminated or coming to an end for whatsoever reason,
- E. We the Guarantor, at the request of the Contractor, agreed to Guarantee in favour of EMPLOYER, a guarantee to advance payment made by EMPLOYER to the Contractor.

**NOW THIS GUARANTEE WITNESSES AS FOLLOWS:**

1. The Bank hereby unconditionally, unequivocally and irrevocably guarantee to EMPLOYER and agrees and undertakes that if in the sole and unfettered opinion of EMPLOYER, Contractor has failed to pay the amount equivalent to Rs. -----given as advance by EMPLOYER to the Contractor (hereinafter referred to as “**Advance**”)with in the time stipulated in the Contract, the Bank shall upon demand of EMPLOYER forthwith pay to EMPLOYER, without demur, contestation or dispute, without reference to Contractor, amount equivalent to Advance. Any such certificate or demand by EMPLOYER on the Bank, shall be conclusive as regards the amount due and payable by the Bank to EMPLOYER under this Guarantee, notwithstanding any dispute between Contractor and EMPLOYER as to the liability for or quantum of loss / damage / claim / costs / expenses and notwithstanding any notice by Contractor to the Bank withhold or not to pay any amount to EMPLOYER against this Guarantee

- either before or after invoking of this Guarantee by EMPLOYER Provided always the total liability of the Bank hereunder shall be limited to Rs. (.....) (Rupees.....).
2. This Guarantee of the Bank shall be effective immediately from the date hereof and shall be in force for till a certificate is issued by EMPLOYER to the Bank in accordance with Clause 5 of this Guarantee unless a claim or demand in writing is served upon the Bank by EMPLOYER. If a demand is so served, this Guarantee shall continue in full force and effect (notwithstanding the expiration date) in respect of the amount so demanded until the obligation of the Bank in respect hereof is finally determined and the payment made to EMPLOYER.
  3. The Bank agrees that EMPLOYER has the fullest liberty, without affecting in any manner the Bank's obligations hereunder, to vary any of the terms and conditions of the said Contract, to extend the time of performance by the Contractor from time to time and to forbear from enforcing any of the terms of the said Contract without any notice to or the consent of the Bank and the Bank shall not be released from its liability under this Guarantee by reason of any such variation or extension or forbearance being granted to Contractor. The Bank agrees that EMPLOYER has no obligation whatsoever to exercise its rights against collateral, if any, of Contractor but may immediately call on this Guarantee.
  4. The Bank agrees that EMPLOYER has the fullest liberty, without affecting in any manner the Bank's obligation hereunder, to assign this guarantee in favour of any EMPLOYER affiliate company in India without the consent of but with prior intimation to, the Bank, and the Bank shall not be released from its liability under this Guarantee by reason of any such assignment. The Bank shall forthwith, on receipt of such intimation; undertake necessary endorsements or amendments hereto to incorporate the assignment in favour of such EMPLOYER affiliate assignee.
  5. This Guarantee herein contained shall remain in force and effect till EMPLOYER certify that the Contractor has dully paid the Advance back to EMPLOYER. The Bank shall be released of its liabilities and obligations under this Guarantee only after such a certificate as aforesaid is issued by EMPLOYER to the Bank.
    - i) The Bank shall not revoke this Guarantee during its currency except with the previous consent in writing of EMPLOYER.
    - ii) Only neglect or forbearance, on the part of EMPLOYER, in the enforcement of the payment of any money, the payment whereof is intended to be hereby secured or the giving of the time for the payment hereto shall in no way relieve the Bank of their liability under this Guarantee.
  6. Any notice or communication under this Guarantee shall be in writing and shall be served on the Bank at its address first hereinbefore mentioned and to EMPLOYER at its address first hereinbefore mentioned. Either party may notify to the other in writing any change in such address for service of notice upon it. The notices shall be served personally against acknowledgement or by Registered Post / Fax / Telex.
  7. The Bank hereby agrees that their liability hereunder shall not be discharged or released or altered or impaired in any manner by ay change in the constitution structure or our Bank or by merger or amalgamation by our Bank with any other Bank, Company, Corporation or Body.
  8. The Bank hereby agrees that their liability hereunder shall not be discharged or released or altered or impaired in any manner by ay change in the constitution structure or powers of the said, Contractor or of the Employer.
  9. This Guarantee shall be governed by the applicable laws of India.
-



- 10. The expression "The Bank" and the Contractor hereinbefore used shall include their respective successors and permitted assigns.

**Notwithstanding anything contained herein**

We the Bank \_\_\_\_\_ (Name) \_\_\_\_\_ (Address) \_\_\_\_\_ hereby irrevocably and unconditionally undertake to pay your company, by Banker's Cheque / Demand Draft favouring **Mahindra World City (Jaipur) Ltd., payable at Jaipur** on First Demand without protest or demur or proof or condition any and all amount demanded by your Company in writing, with reference to the guarantee and that the liability of the \_\_\_\_\_ (Bank Name), under this guarantee is restricted to Rs. \_\_\_\_\_ (amount in figures) \_\_\_\_\_ (Amount in words). Our guarantee shall remain in force until \_\_\_\_\_ (date) Unless a claim in writing is presented to us during the validity period of this Guarantee and / or during a further grace period of \_\_\_\_\_ (extended period) thereafter upon expiry of the said validity,

- 11. IN WITNESS WHEREOF..... FOR AND ON BEHALF OF THE BANK HAS SIGNED THIS GUARANTEE ON THE DAY AND THE YEAR FIRST ABOVE WRITTEN.

12. ( )

13. WITNESSES :

1-

2-

**SECTION 5:  
TECHNICAL SPECIFICATIONS  
BILL OF QUANTITIES**

## TECHNICAL SPECIFICATIONS

### GENERAL NOTES

#### I **Scope**

This specification applies to the Civil Engineering, Aluminium Glazing works and Hardfinishing work to be executed by the Contractor. It is to be read in conjunction with and subject to the general conditions of contract and in conjunction with the drawings, the schedule of rates and such other documents as may from time to time be agreed upon as comprising part of this contract. Where these specifications are not clear, specifications and tests as per BIS codes shall be followed.

#### II **Clearing**

The contractor shall clear the site of all rubbish and old buildings remove all grass and low vegetation and remove all bush wood, trees, stumps of trees, and other vegetation only after consultation with the Project Managers to which bushes and trees shall be saved. All disused foundations, drains or other obstructions met with during excavation shall be dug out and cleared.

#### III **Site Levels**

The contractor shall carry out the survey of the site and shall establish sufficient number of grids and level marks to the satisfaction of the Architect/Project Manager, who shall decide on the basis of this information, the general level of the plot and the plinth.

#### IV **Bench-marks**

Prior to commencement of construction, the contractor shall in consultation with the Project Manager, establish several site datum benchmarks, their number depending on the extent of the site. The benchmarks shall be sited and constructed so as to be undisturbed throughout the period of construction.

#### V **Setting out the work**

The contractor shall set out the works and during the progress of the building shall amend at his own cost any errors arising from inaccurate setting out.

During the execution of the work contractor must cross check his work with the drawings? The contractor shall be responsible for all the errors in this connection and shall have to rectify all defects and/or errors at his own cost, failing which the Project Manager reserves the right to get the same rectified at the risk and cost of the contractor.

#### VI **Cleaning up and handing over**

Upon completion of the work all the areas should be cleaned. All floors, doors, windows, surface, etc. shall be cleaned down in a manner, which will render the work acceptable to the Architect and Employer. All rubbish due to any reason, shall be removed daily from the site and an area of atleast ten metres on the outer boundaries of the premises will be cleaned by the

Contractor as a part of the contract. Upon completion of the project, the contractor shall hand over to the employer the following:

- a) Certified reports of tests (materials and workmanship)
- b) Written guarantee and certificates.

- c) Maintenance manuals, if any, and
- d) Keys.

## VII **Samples**

The contractor shall submit to the Architect / Project Manager samples of all materials for approval and no work shall commence before such samples are duly approved. Samples of precast concrete panels, masonry units, building insulation, finished hardware, metal window and door frames, sand stone, granite etc. and every other work requiring samples in the opinion of the Architect/Project Manager shall be supplied to the Project Manager and these samples will be retained as standards of materials and workmanship. The cost of the samples shall be borne by the contractor.

Throughout this specification, types of material may be specified by manufacturers' name in order to establish standard of quality, price and performance and not for the purpose of limiting competition. Unless specifically stated otherwise, the tenderers may assume the price of 'approved equivalent' except that the responsibility is upon the contractor to prove such equality, in writing.

A detailed programme shall be submitted by the Contractor for the material approvals, within four weeks of the order to commence. The detailed programme shall include but not limited to:

- Date/s of submitting the various materials samples.
- Date/s by which the Project Manager approval is required.
- Date/s of placing orders on the Manufacturers/Suppliers.
- Date/s of arrival of the approved material/s on to the site.
- Date/s of the completion of the 'Mock-ups', wherever required, and the Date/s by which the Architect / Project Manager inspection of such 'Mock-ups' should be completed and the Date/s by which the Architect / Project Manager should fully approve the said Mock-ups.

## VIII **Tests**

All materials and methods of tests shall conform to the latest rules, regulation and/or specifications of the following authorities where specified herein as applicable. Bureau of Indian Standards (BIS), British Standards Code of Practice (BS) in case no equivalent BIS is available. The Architect/Project Manager will have the option to have any of the materials tested and if the test results show that the materials do not conform to the specifications, such materials shall be rejected. A reasonable number of representative tests will be deemed to be included in the rates tendered.

## IX **Rates**

The item rates quoted in schedule of quantities are deemed to be included to execute the works in strict accordance with the relevant specifications read in conjunction with the appropriate Standard Specifications.

## X **Mode of Measurements**

All measurements will be taken in accordance with IS 1200 latest issue unless otherwise specified.

## 1.0 ALUMINIUM WORK

### 1.1 GENERAL

a) This specification applies to the Aluminium Doors, Glazing and Curtain wall works to be executed by the contractor. It is to be read in conjunction with and subject to the general and special conditions of contract and in conjunction with the drawings, the schedule of rates and such other documents as may from time to time be agreed upon as comprising part of this contract.

This section covers the aspects of technical performance, product specifications, and execution and time warrantee for the works shown or specified.

b) The exterior wall system requirements shown by the details are intended to establish dimensions of units or modules and maintain the visual design concept as shown. The exterior wall system manufacturer shall be required to design the entire exterior building wall system, and to make whatever modifications of and addition to, the details as may be required to fulfill the performance requirements. The system consists of all anchors, window and spandrel framing members, glazing, sealants and other components required for a complete system as indicated on drawings including framing as required to support the system independently from the structural frame of the building. This also incorporate for openable windows.

### 1.2 APPLICABLE CODES AND STANDARDS

The specified reference standards are Codes, which are intended to establish the quality of material and workmanship required for the works. More reference standards published in India and other countries may, in the sole judgment of the Owner's consultant, also be acceptable provided that the contractor furnishes sufficient data for the Owner's consultant to determine if the quality of materials and workmanship at least equals or exceeds the specified reference Codes.

Such other reference standards published by the following will be considered:

DIN	Deutsche Industries Norman (German Standards)
AFNOR	Association Francaise de Normalisation (French Standard Institute)
BSI	British Standard Institute
ASTM	American Society for Testing and Materials
ANSI	American National Standards Institute

The following is the list of codes included for guidance and compliance with applicable portions only and the omission of any from the list does not relieve the contractor from compliance therewith.

The materials and workmanship shall be in accordance with the requirement of the appropriate IS code wherever applicable together with any building regulations or bye-laws governing the works.

IS:504-1963	Method of Chemical Analysis of Aluminium and its Alloys
IS:733-1975	Wrought Aluminium And Aluminium alloy Bars, Rods and Sections (for General Engineering Purposes)
IS:1081-1960	Code of Practice for Fixing and Glazing of Metal (Steel And Aluminium) doors, windows and ventilators
IS:1285-1975	Specifications for Wrought Aluminium and Aluminium Alloy, Extruded Round Tube and Hollow Sections (for General Engineering Purposes)
IS:1382-1981	Glossary of Terms Relating to Glass and Glassware
IS:1868-1982	Specification for Anodic Coatings on Aluminium and its Alloys.
IS:1948-1961	Specification for Aluminium Doors Windows and Ventilators (Incorp. Amend 2)
IS:1949-1961	Specification for Aluminium Windows for Industrial Buildings.

IS:2553-2990	Safety Glass- Specification Part-2 General Purpose (third revision) Part-2)
IS:2657-1964	Method for Tensile Testing of Aluminium and Aluminium Alloys Tube
IS:2673-1979	Dimensions for Wrought Aluminium And Aluminium Alloys, Extruded Round Tube
IS:2835-1987	Specification for Flat Transparent sheet Glass
IS:3203-1982	Method for testing Local Thickness of Electroplated Coatings.
IS:3821-1973	Method for Determination of Mass of Aluminium Coating on Hot Dip Aluminized Iron or Steel Articles
IS:3965-1982	Dimensions for Wrought Aluminium and Aluminium Alloys, Bar, Rod and Section.
IS:5052-1969	Temper Designation of Aluminium and Its Alloys
IS:5523-1969	Methods of Testing Anodic Coatings on Aluminium
IS:5528-1969	Method of Testing Corrosion Resistance of Electroplated and Anodized Aluminium Coatings by Copper Accelerated Acetic Acid Salt Spray (CASS) Test
IS:6009-1970	Method for Evaluation of Results of Accelerated Corrosion Test.
IS:6012-1992	Measurement of Coating Thickness by Eddy Current Method (First Revision)
IS:6051-1970	Code for Designation of Aluminium and Its Alloys
IS:6477-1983	Dimension for Wrought Aluminium and Aluminium Alloys, Extruded Hollow Sections (first revision)
ASTM E 283	Air leakage through exterior windows, Curtain walls and Doors.
ASTM E 330	Structural performance of exterior window, Curtain walls and Doors under the influence of wind loads
ASTM E 331	Water penetration of exterior windows, Curtain walls and Doors by uniform static air pressure differential.

**Note:** Wherever a reference to any standard appears in this specification and as above it shall be taken as a reference to the latest version of the standard.

### 1.3 SUBMITTALS

The following submittals are required:

- a) Final design construction documents.
- b) Documentation showing conformance with performance criteria.
- c) Shop Drawing: The tenderer shall submit detailed shop drawings within 15 days of acceptance of tender giving full details such as size of sections, coupling members and method of fixing anchorage, caulking, flashing etc. The tenderer shall also give all mechanical properties of all sections (e.g. perimeters, area, moments of inertia about bending axes, principal axes, principal moments of inertia, weights etc.) in a tabular form.
- d) Design Analysis and Calculations: Include design calculations for review of design loads and member profiles.
- e) Samples
  - i) Submit three samples of each required metal finish on 300mm (12 inch) long extrusion of the alloys to be used for the work. Where normal colour and texture variations are to be expected, include two or more units in each sample, to show the range of such variation.
  - ii) Submit three samples of glass, 300mm (12 inch) square
  - iii) Provide two samples of typical fabricated sections showing joints, fastenings, quality of workmanship, hardware and necessary items before fabrication of the work proceeds.
  - iv) Glazing materials: 300 mm (12 inch) long samples each colour and type required for glazing gaskets and sealant (Silicon/polysulphide) with its catalogue. All samples to be provided at no cost to the Owner or Architect.
- f) Statement that the system meets the regulatory requirement of all statutory authorities having jurisdiction over the works in respect of fire, thermal aesthetics, mirroring effect, wind, loading, construction and warranty requirement, nothing in

detail any exceptions. The statement /under taking shall be signed by a person authorised to legally represent the company.

#### 1.4 **MOCK-UP**

Prior to beginning production, furnish and install a sample each for a full size mock up. Production of any item shall not proceed until the mock up is approved. Mock up with shop drawings shall be submitted for review prior to manufacturing. Use materials, fabrication and installation methods identical with those required for the project.

#### 1.5 **DESIGN RESPONSIBILITY AND PERFORMANCE REQUIREMENTS**

Manufacturer shall be required to design systems to conform to design intent of profiles shown and design criteria specified, allowing for dead loads, wind pressures, thermal movements, earthquake, forces, erection loads and other conditions of usage which may reasonably be anticipated.

##### a) **General:**

The requirements shown by the details are intended to establish basic dimension of unit area modules, and provide site line of members. The manufacturer shall be required to design the entire system, and to make whatever requirements as may be required to fulfill the performance requirements to maintain the visual design concept as shown, including member size and alignment of component.

##### b) **Wind Pressure**

Fabricate exterior windows, Curtain walls, doors, to withstand the wind pressure shown or if not shown 150 kg/sqm on the face area, acting inward and 150 kg/sqm acting outward.

##### c) **Temperature Variation**

Thermal expansion and contraction movements resulting from an ambient temperature range of 2 to 48<sup>o</sup>c. which may cause a metal surface with temperature variation.

##### d) **Weather Resistance:**

Fabricate exterior units with weather striping to prevent from uncontrolled penetration of air and water under normal shear weather conditions.

##### e) **Provision for Cleaning Gantry**

Curtain Glazing mullions shall be capable of providing lateral restraint for the cables of maintenance cleaning gantry car having a total laden weight of 300 kg cradle dead load. Mullions strength shall be such that all loads applied during gantry operation are safety accomodated without damage or distortion of any element.

The manufacturer shall be responsible for methods and means of joining fabrication, assembly, suspension, erection and compliance with all design criteria.

#### 1.6 **QUALITY ASSURANCE**

##### a) **General**

The works shall conform to the Bureau of Indian standard (BIS/IS) specifications for Aluminium glazing latest editions and in its absence the standards published in other countries.

##### b) **Test units**

It is required to perform all tests unless other wise noted each portion of exterior wall system for both frame and glazing (fixed / openable) to the satisfaction of Project Manager.

##### c) **Tests**

Following tests are to be performed as per relevant standards.

- i) Air infiltration test
- ii) Water Penetration under Static Pressure
- iii) Water Penetration under dynamic pressure
- iv) Uniform load deflection test
- v) Uniform load structural test
- vi) Testing anchor's to resist seismic stresses without damage of any kind
- vii) Wind resistance test
- viii) powder coated testing.

Deflections shall be measured at the centre line members and at other critical points as deemed appropriate.

#### 1.7 **Site Conditions:**

Manufacturer is to take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting of work. However, proceed with fabrication and coordination installation tolerances as necessary when field measurements might delay work.

#### 1.8 **Product handling, transport, storage and protection**

Protect units and finishes in manner that will not cause damage or discoloration to units by covering exposed surface with thick layer clear transparent lacquer or self adhesive non-staining PVC tape before they are brought on site. The lacquer/tape shall be removed on completion of erection / wet Civil work.

### 2.0 **PRODUCTS**

#### 2.1 **Materials**

All materials and finishes are to be new and free from defects which may impair the appearance, strength, function and durability of the exterior window system and related construction of the external coverings.

- a) **Aluminium:** The aluminium extruded sections shall conform IS designation HE/HV/9WP alloy with chemical composition and mechanical properties as per IS 733.1975 wall thickness to meet required loadings, with minimum for trim being 2.6mm. Test certificate for alloy and its extrusion from the manufacturer is required to be submitted by the contractor for its conformity.
- b) **Coating/Anodising:** All aluminium sections shall be anodised or powder coated. Anodising shall conform to IS : 1868 -1982 and shall be of AC 25 grade with minimum thickness of 25 +/- 3 microns when measured as per IS 6012-1992 and the density shall be at least 32mg/square inch. All sections are to be matt anodised in colour as per sample available with the architects. The anodic coating shall be properly scaled by steam or boiling in de-ionised water as per IS 1868-1982. In case of powder coating, factory applied electrostatic powder coated sections 50+/- 5 micron will be considered for approval. Colour consistency shall be accurate.

No visual variation in shade shall be permitted. The fabricator shall clearly indicate the shade variation tolerance as measured by standard equipment.

- c) **Structural and weather seal silicone sealant** of approved make duly approved is to be provided at shop and field joints which are sealed as part of assembly and installation procedures. It is to be applied appropriate for joint sizes, movement and substrate. Preshimmed tape shall be used against surfaces with grooves having backer rod at the groove of sufficient size and spacing to prevent shim migration.

Polysulphide sealant is to be applied between wall surface and sub frame in clear shade with preshimmed tape to prevent shim migration.

- d) **Glass and glazing**



External glass shall be laminated glass of uniform appearance. Manufacture is to be specified and the product sample be verified.  
Glass thickness shown are minimum thickness and shall be as per requirement to withstand loads criteria and their performance.

For all the glasses in glazing works 'edge distance' is to be clearly ascertained and maintained.

## 2.2 Tempered / Toughened Glass:

Toughened / Tempered glass shall be examined by the glass manufacturer to detect and discard any glass which exceed the following tolerance: 1.5mm bow in 600mm; 3mm bow in 1500mm; 6mm bow in 3000mm; 9mm bow in 4500mm. Where the strengthening process results in essentially parallel ripples or waves, the deviation from flatness at any peak shall not exceed 0.13mm, and the difference between adjacent peaks shall not exceed 0.13mm. Where bow tolerance and wave tolerance differ, the stricter requirements shall govern. Direction of ripples shall be consistent and in conformance with architectural design.

Following test shall be also carried out by the contractor at his own cost as per following provisions.

Thickness	Impact Strength	Fragmentation	Surface Compression	Bending Strength
IS-2835-1987	IS-2553-PART-I	IS-2553-PART-I	ASTM C-1048-90	DIN 1249-PART - 12

## 2.3 Float Glass

Glass that gives distorted reflections will not be accepted. Reflections due to pressure, paints poor manufacturing process, uneven thickness or poor storage are some of the reasons for distortion. All clear float glass quality should conform to BS – 952 and ASTM C 1036 – 90.

## 2.4 Hardware

The contractor shall procure all the hardware as specified in the schedule. The rate shall include for making mechanical chases to receive the hardware, and also the cost of approved screws, nails, clamps etc. The fixing shall be done in the best workmanship like manner and in accordance with that employed for fixing hardware. Any damage to the joinery or the hardware shall be made good at no extra cost to the Owner.

## 2.5 OTHER MATERIALS

### a) Glazing Gaskets and Weathers trips :

EPDM extruded gaskets of hardner 40+5 durometer shore A for sponge gaskets, 75+5 durometer shore A for hollow profiles and 60+5 for solid profiles having exception for flame propagation are to be used.

All interior corners of gaskets where compatible with procedures are to be vulcanized. Provide gaskets with continuous splines for positive engagements in splines pockets in frame members.

Gasket profiles are to be designed taking into cognizance the glass edge pressures and the required edge distance.

### b) Setting Blocks and Shims: Solid extruded EPDM with hardners 85+5 durometer shore A, minimum length 100mm minimum width corresponding to glass thickness.

### c) Side Blocks: Solid extruded EPDM 55+5 shore A durometer blocks shall be of sufficient length to prevent point loading on glass.

- d) Hardware: To be as per approved samples. Design and fixing of hardware shall be got approved by the Architects. The joining accessories shall be such that they do not cause any bimetallic action and shall be free from visible defects. Visible screws to be anodised made up of stainless steel.
- e) Fasteners and anchor devices: Fasteners shall be concealed. Bolts and nuts of zinc-coated steel may be used for concealed assembly and anchorage provided no possibility of electrolytic action is present.
- f) Mild steel supports sections of curtain walls should be hot dip galvanised and are to be separated by nylon or fibre gaskets, washers, sleeves and the like.

Fasteners used for bolting aluminium extrusions and their connecting members shall be aluminium or stainless steel. Fastener metals for joining various metal combinations shall be as follows:-

- i) Aluminium to aluminium  
Use only aluminium or stainless steel
- ii) Aluminium to stainless steel  
Use only stainless steel
- iii) Stainless steel to stainless steel  
Use only stainless steel
- iv) All exposed fastener materials are to be in stainless steel and anodised, except required otherwise.

The Contractor is required to submit test certificates to prove compatibility of any materials or components as required by the Architect/Project Manager without any additional cost for its conformance to the relevant standards.

### 3.0 FABRICATION

The details shown are based upon standard details by one or more manufacturers. Similar details by other approved manufacturer will be acceptable provided they comply with the size requirements.

#### 3.1 Shop Fabrication

- a) Aluminium glazing shall be fabricated from extruded aluminum member of alloys specified. Complete the cutting, fitting forming, drilling and grinding of all metal work prior to cleaning, finishing, treatment and application of coatings. Remove arises from cut edges and ease edges and corners to a reading of approx..4mm.
- b) Fabricate and shop assemble frame and sash members into complete window wall system as indicated along with anchors for support to the structure and with hairline joints where mechanical fasteners are used.
- c) No bolts, screws or fastenings to impair independent movement.
- d) Openable windows, typically, shall be fabricated to allow for inside glazing.
- e) Miter all corners and mechanically stake over solid aluminium corner block, set and sealed in epoxy leaving hairline joinery and then seal weather tight.
- f) Joinery methods must not discolor finish or be unsightly. Welding and brazing to comply with industry standards using system and rods for assembly and fabrication.
- g) All frame corners and meeting rail intersection shall be made permanently leak proof.
- h) Fasteners should be concealed except where otherwise shown, indicated or approved.

- i) Provision for anchorage to the structure allowing for erection tolerances, thermal expansion and building deflections to make the unit vibration free with no visible or audible evidence of movement.
- j) For glass to be fixed with minimum 'edge clearance' and 'bite' on glass, cutting is to be done precisely taking into consideration the recommendations by glass manufacturers, and design parameters alongwith performance requirement and gaskets and other practical considerations. Do not nip glass edges. Edges may be wheel cut or sawed and seamed at manufacturer's option. For glass to be cut at site, provide glass larger than required so as to obtain clean cut edges without the necessity of seaming or nipping Grind, polish, and ease arises, nip or abrade glass after heat tempering.
- k) For weather stripping by EPDM extruded gaskets provision shall be made to insure that water will not accumulate and remain in contact with the perimeter areas of glass and securely staking and joining at corners.
- l) All glass pockets, fixed and moving, shall be weeped to provide positive drainage. Water shall be weeped to the exterior via frame weep slots protected by snap-in weep covers integral drips.
- m) Except as otherwise indicated provide each continuous unit of framework and all accessory items as a packaged unit. Complete the fabricated assembly, finishing and all other work to the greatest extent possible in the factory before brought to the project site. Disassemble only to the extent necessary for transportation and installation.
- n) After fabrication all glazing units (including disassembled parts) shall carry their designation viz., W-1, G-2 etc., size and location to be fixed well identified through self adhesive non staining removable PVC tape.
- o) Fire stopping: Preformed incombustible insulation with retaining devices to meet the building code requirements .Insulation shall be of required depth to maintain required floor to floor fire separation and of sufficient width to ensure that it fills all voids under compression.

## 4.0 EXECUTION

### 4.1 Inspection

Examine all parts of supporting structure, the areas and conditions under which work comprising of glazing items, and associated items are to be executed. Identify conditions detrimental to the proper and timely completion of the work and proceed with the work after getting the unsatisfactory conditions corrected, if any.

### 4.2 Co-ordination

Wherever possible, check actual opening in the construction work by accurate field measurements before fabrication and execution as well. Show recorded deviation if any, on final shop drawings and co-ordinate installation within fabrication tolerance to ensure proper fit of units / modules.

### 4.3 Preparation

Co-ordinate setting drawings, diagram templates, in structions and directions for the installation of anchorages which are to be embedded in concrete or masonry construction.

Bench marks for elevations and building line offset marks for alignment shall be established on each floor level by the contractor who shall be responsible for their accuracy. Should any

error be found in their location the contractor so notify in writing and shall proceed in the affected areas after the errors have been corrected/rectified?

Aluminum sub frames are to be provided of profiles and dimensions, indicated with mitered or coped corners, welded and dressed smooth and finish matching adjacent surfaces having concealed mechanical joint fasteners. The fixing of subframes shall be so co-ordinated with the civil works of the finishing works like plaster, base plaster and exterior stone work etc. are completed without any hindrance to main civil contractor. Dimensional variations, if any, in the building work shall be adjusted while fixing sub frame in order to maintain the uniformity of glazing sizes, line, level and plumb.

Polysulphide sealant shall be applied around of subframe between subframe and walls adjoining as per architectural drawings and manufacturer instructions through an experienced applicator only.

## **5.0 INSTALLATION**

- 5.1 The installation of fabricated frames shall commence when called for by the Project Manager. This shall be properly co-ordinated with the finishing works.
- 5.2 Installation of frame works shall be done under direction and supervision of manufacturer's representative.
- 5.3 All parts of the work shall be erected, in plumb, level and true to line in proper alignment and in relation to established lines and grades and as shown on approved shop and or erection drawings without warp or rack of frames, sash or panels while positioning. Anchor securely in place. Separate corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- 5.4 Do not install defective component parts including warped, bowed, dented, abraded and broken members or glass with edge damage. Remove and replace members/unit which have been damaged prior to installation.
- 5.5 Do not cut, trim, weld or braze component parts during erection in any manner which would damage the finish, decrease the strength, or result in a visual imperfection or a failure in performance. Return component parts which require alteration to the shop for re-fabrication or for replacement by new parts.
- 5.6 Install component parts in level, plumb and true to line with uniform joints and reveals. Secure to structure with no staining and non corrosive shims, anchors, fasteners, spacers and fillers. use erection equipment which will not mar or stain finished surfaces or damage the component part in any way.
- 5.7 **Erection Tolerances**
- a) Dimensional variation in the building frame and/or work surrounding or surrounding the work are as determined in the field by field measurement of the work in place.
  - b) The work shall be designed to accommodate all tolerances and anticipated dead and live load movement, creep, sway and torsion of the structure without any harmful effects. All parts of the work, when completed shall be within the following tolerance:
    - i) General: 3mm (1/8 inch) maximum deviation in any storey height or in any 3m (20 ft) vertical or angular run or in any 6m (20 ft) horizontal run.  
6mm (1/4 inch) maximum deviation in any 22.2 m (40 ft) run, any direction.
    - ii) Locational: 3mm (1/8") maximum change in deviation for any member for any 3m (10 ft) run, any direction.  
20mm (3/8 inch) total maximum deviation for any member at any location.
    - iii) Offsets: Limit offsets in the end to end and edge to edge alignments of adjoining and consecutive members, which form planes, continuous runs and profiles to the following:

Slope or curvature shall not exceed 2% when measured at intervals of 25mm (inch) in any direction.

-4mm (1/6 inch) maximum offset in flush alignments including alignments which are to be 23mm (1/2 inch) or less out of flush, and alignments which separated 50mm (2 inch) or less by a reveal or protrusion in the plane of the wall .

-3mm (1/8 inch) maximum offset in alignments which are out of flush by more than 13.0mm (1/2 inch) or separated by a reveal or protrusion in the plane of the wall.

- Maximum offset from true alignment between two members abutting end-to-end, edge to edge in line or separated by less than 76mm, 0.8mm (shop and/or field joints 0< This limiting conditions shall prevail under both no load and full load conditions.

All aluminium frames shall be kept protected after installation by lacquer /tape to avoid scratches by Others.

## 6.0 Sealant

Sealing materials for sealing shall be structural or weather seal non – staining silicone sealant of approved make used in strict accordance with the manufacturer's printed instructions and shall be applied only by applicators/mechanics specially trained or experienced in their use. Before applying sealant all dirt, dust, moisture and other foreign matter shall be completely removed from surfaces and shall be masked, when required, to maintain a clean and neat appearance. This shall provide a smooth finish surface.

## 7.0 Anchorage

Anchorage of the work to the structure shall be by approved methods in strict accordance with approved shop and/or erection drawings. Supporting framework and brackets shall be so designed as to provide three dimensional adjustments and accurate location of all components. After the unit is properly positioned all connections so designated on approved shop drawings shall be rigidly fixed by welding or other positive means.

Anchor component parts securely in place as shown by bolting, welding or other permanent mechanical attachment system which will comply with performance requirements and permit movements which are intended or necessary. Install slip joint lining wherever possible to ensure movement as intended or necessary.

Wherever concealed contact surface or dissimilar materials before assembly or installation is existing or wherever there is the possibility of corrosive or electrolytic action, apply a suitable bituminous coating of approx. 0.76mm (0.03 inch) dry film thickness or other suitable permanent separator.

## 8.0 Setting

Set all members and other members in a bed of compounder with joint fillers or gaskets to provide weather tight construction.

## 9.0 Cleaning, postponement, protection and security

- a) Clean debris, dust and other substances caused during erection and keep the scrap, if any, away from thorough fare.
- b) If directed by the Project Manager installation of the work shall be postponed in any areas so as to facilitate moving material into out of the building during construction.
- c) The installed frames, sections and other components of aluminium glazing work in passages and exit(s) shall be kept protected and guarded for any damage by other working contractor's workmen in co-ordination with Project Manager.

## 10.0 GLAZING:

### 10.1 General:

Before glazing, openings shall be checked to see that they are square, plumb and true plane. If found otherwise glazing shall not proceed until proper corrections are made.

Inspect each piece of vision glass immediately before installation. Eliminate all which have edge damage or face imperfections.

## 10.2 Preparation

- a) Comply with recommendations and requirements of glass manufacturers for installation of all glass.
- b) Clean glazing channels, stop and rabbets to receive glazing materials of obstructions and deleterious substances which might impair the work.
- c) Apply primer or sealer to joint surfaces wherever recommended by gasket manufacturer.
- d) Clean with solvent all glass edges and faces which will be in contact with gaskets to remove all traces of cutting oils and other contaminants.

## 10.3 Setting blocks and spacers

Locate setting blocks of proper size at sill one quarter in from each end of the glass unless otherwise recommended by the glass manufacturer. Set blocks in this course of the heel-bead compound, if recommended.

Provide spacers for all glass sizes larger than a combined total of 1.27m or more for any two adjacent sides to separate glass from stops, except where continuous glazing gaskets are provided. Locate spacers no further than 600mm apart and no closer than 300mm to a corner. Place spacers opposite one another. Make bite of spacer on glass a nominal 6mm or greater.

## 10.4 Installation

Glasses shall be installed and blocked in such a manner as to assure proper glass bite on all sides. Correct glass sizes to insure glass bite shall be verified by measurement of the frames.

Protect glass from edge damage at all times during handling installation and subsequent construction operation.

Required glazing channel dimensions are to be provided as per glass size for necessary minimum 13mm bite on the glass, minimum edge clearance and adequate sealant thickness with reasonable tolerances.

Provide the correct glass size for each opening, within the tolerances and necessary dimensions by identified numbering from fabrication.

Perimeter clearance must be sufficient to avoid all point loading.

All structural silicone sealant to be applied by approved applicator of the manufacturer.

Provide watertight and airtight installation of each piece of glass so as to withstand temperature changes, wind forces and other effects as enumerated and specified.

## 10.5 CLEANING AND PROTECTION

Glass shall be protected from breakage immediately upon installation. Use streamers or ribbons suitably attached to framing and held free of the glass. Do not apply warning marking directly to the glass.

Protect glass and glazing materials during the construction period so that they will be without any indication of damage at the time of acceptance. Cover glass as required to protect it from abrasion and other activities that might abrade the surfaces.

Remove and replace glass which is broken, cracked, chipped or damaged in any way and from any source.

All debris caused by or incidental to the installation work shall be properly removed from the job site as the work progresses.

Wash glass on both faces (inside and outside) not more than 4 days prior to acceptance. Comply with instruction and recommendations of the glass manufacturer and glazing material for cleaning in each case. Remove manufacturer protective covering from frames when directed.

**11.0 WARRANTY**

1. Immediately on completion of the work contractor shall submit a warranty for all glazing work done by him against manufacturing defects, malfunctioning or under capacity functioning.
2. The warrantee shall be valid for a period of **Ten years from the date of virtual completion of the work** to be executed on non judicial stamp paper of Rs. 50( Fifty).
3. The warrantee shall relate to materials and its installation work within limits of specified tolerances for vibrations, wind whistles, colour, gloss and other performance levels.
4. The warranty shall include replacement of sealant and glazing materials which breakdown in any form, lose adhesion to the glass or metal framing. The contractor shall rectify and allow for all costs associated with making good, any defect or breakage during this period for the system.
5. The warrantee shall expressly include replacement and making good of all defective or under-rated capacity/efficiency parts as acceptable in the contract.

**12.0 Aluminium Composite Panels Cladding****Product**

Aluminium composite panels cladding shall comprise a thermoplastic core of large density polyethylene sandwiched between two skins of aluminum typically 4 mm thick.

Aluminium composite cladding to be as approved with high fibre filled sandwiched panel 4mm install on framing of Galvanised steel frames and brackets. Aluminium cladding panel to be PWDF fluorocarbon coated factory applied colours. Reverse side to be in mill finish. All the joints shall be sealed with DOW corning 19G silicon sealant or approved equivalent. The colour of sealant to be decided by architects.

A sample of panels and installation methods to be submitted to the Consultant for approval.

**Manufacture**

The panels must be visually flat. Any stiffener applied to compensate for wind load must not read through.

**Installation**

The panels shall be fixed in accordance with manufacture's recommendations.

**Support System** : Aluminium Support System would be a natural grey anodised / powder coated finish minimum 5 microns. Fixing to structure using galvanised and / or stainless steel bolts, depending on application.

**Technical Properties of Aluminium Composite Panels**

All cladding shall be of 4.0 mm thick aluminium composite panel comprising of high mineral filled core sandwiched between two skins of aluminium alloy.

- |    |                       |   |   |
|----|-----------------------|---|---|
| a) | Mechanical Properties | : | Tensile strength 130 N / mm <sup>2</sup>        |
|    |                       | : | 0.2 % proof stress 90 N / mm <sup>2</sup>       |
|    |                       | : | Elongation 5.65 10 %                            |
|    |                       | : | Modules of elasticity 70.000 N. mm <sup>2</sup> |
| b) | Vibration and Noise   |   |   |

	Damping	:	Average airborne - Sound Transmission loss R/N 25d3 (DIN 4109)
c)	Thermal Transmittance	:	R = 0.014 m <sup>2</sup> 0 C/W
d)	Moment of Inertia	:	0.347 cm <sup>4</sup> /m
e)	Panel Weight	:	5.5 Kg / m <sup>2</sup>
f)	Finish	:	PVDF stove lacquered (Fluoro carbon) on one side and reverse side in mill finish.
g)	Colour	:	Colour to be selected by Developer's Representative using standard PWDF colour chart from manufacturer.

### Protection

Protection should not be removed until after installation.

### Warranties

The Contractor shall provide a data to confirm compliance with specific requirements for resistance and fire properties. The guarantee should be for a 20 salt spray resistance and fire properties. The guarantee should be for a 20 year period against peeling chalking (No. 8 rating), fading, blistering, flaking, chipping and cracking.

## 13.0 Protection Of Work And Property

- 13.1 The Contractor shall continuously protect this and other Contractor's work, and the Owner's property from damage, injury or loss arising in connection with operations under the Contract Documents. He shall make good free of charge, any such damage, injury or loss, except such as may be caused solely by agents or employees of the Owner.
- 13.2 The Contractor shall protect all finished surfaces, including the jambs and soffits of all openings used as passageways or through which furniture and furnishings are handled, against any possible damage resulting from the conduct of work by his trades.

## 14.0 Progress Clean-Up

### 14.1 Garbage Collection

Provide adequately sized covered trash bins centrally located in each building level. Additionally, provide covered garbage cans and keep premises free of garbage. Provide sufficient collection cans in each level of the building and at locations on the site. All packing materials not deposited in cans shall be picked up daily.

### 14.2 Cleaning Up Of Work Areas

The premises and the job site shall be maintained in a neat and orderly condition and kept free from accumulations of waste materials and rubbish during the entire installation period. Remove all crates and other flammable waste materials or trash from the work areas at the end of each working day.

- 14.3 Floors shall be "broom-cleaned", or its equivalent during the course of the work. Additional cleaning of carpeting, and of all items which are provided as a part of the Contract including removal of dust, dirt, stains and finger marks from furniture and furnishings and all finished wood, metal and marble surfaces, shall be performed by the Contractor as required before acceptance of the work by the Project Manager/ Architect.



- 14.4 The Contractor shall be responsible for the general cleaning and maintenance of the premises and the job site and for the coordination and direction of the cleanup work of all furniture and furnishings. The Contractor shall require that each trade shall clean and maintain its portion of the work as required and as directed by the Project Manager/ Architect.
- 14.4 All furniture and furnishings shall be new, in an undamaged, bright clean, polished condition. Re-cleaning will not be required after the work has been inspected and accepted unless later operations of the Contractor, in the opinion of the Project Manager/ Architect, make re-cleaning of certain portions necessary.

#### **HARD FINISHING WORK:-**

#### **15.0 Flooring /Dado /Cladding**

##### **15.1 General:**

All flooring shall be laid to the best practice known to the trade. The flooring shall be laid to the level except where slopes are called for on the drawings in which case the slopes shall be uniform and so arranged to drain in to the indicated outlets.

Particular care shall be exercised to ensure that all flooring, skirting and dado are perfectly matched for colour and finish. Sufficient extra tiles (not less than 5%) shall be cast/ordered to ensure an adequate supply of matched floor tiles. The contractor shall furnish for approval by the Architect/Project Managers, samples of each type of floor finish.

##### **15.2 Granite/Marble Stone:**

Granite/ Marble shall be approved by the Architect/ Project Manager and a sample piece should be kept in the office of the Project Manager. The quality shall be uniform and it shall be hard and free from any discolorations, cracks, flaws, veins of foreign materials or any other defects. When Granite/ Marble of different colour and qualities are associated, care shall be taken to see that they are of equal hardness so as to wear evenly. The marble slabs shall be machine cut true to the shape and size and machine polished. Care shall be taken to cut the slabs so as to provide a pattern as indicated. Granite/ Marble stone slabs for wall lining and dado shall have machine polished edges. The wall shall be lined with the Granite/ Marble in courses as indicated and grain of the marble shall be arranged in pattern as per detailed drawings. The Granite/ Marble shall be bedded in cement mortar backing covering the full area of the marble. The wall surface shall be cleaned from all dirt, mortar droppings etc. before applying the base plaster. The Granite/ Marble shall be fixed to the wall by bronze/copper cramps 125 mm x 35 mm x 6 mm and Bronze pins 6 mm diameter 50mm long embedded firmly into wall by cutting/drilling holes and grouting. Alternately stainless steel cramps and pins as per design shall be used. The load of one Granite/ Marble slab shall not be borne by the slab below. Joints between slabs shall be hair fine and filled with coloured cement to match the marble. The Granite/ Marble lining and dados shall be finally hand polished by Carborundum stone, buffing with polishing felt and cleaned with diluted oxalic acid wash.

While fixing the Italian marble stone, the marble shall be bedded in cement mortar backing covering the full area of the marble. The slab or wall surfaces shall be cleaned thoroughly before applying cement slurry or mortar. Joints between slabs shall be hair fine and filled with white cement mixed with matching shade of pigment.

##### **15.3 Granite / Sand Stone Cladding (Dry Cladding)**

- a) Stone shall be all hard, sound durable and tough, free from cracks, decay and weathering and defects like cavities, cracks, flaws, sand holes, veins, patches of soft or loose materials uniform shade.
- b) The stone shall be cut into slabs of required thickness along the flames parallel to the natural bed of stones.

- c) The stone shall be wetted before laying. They shall then be fixed with cramps.
- d) Where so desired, the adjoining stones shall be secured to each other by means of stainless steel pins 40 mm long and 6mm diameter or as specified in the item of BOQ.
- e) The stones shall be secured to the backing by means of stainless steel angle or cramps of design/size given in the drawing or item of BOQ.

Stainless steel cramps can also be of 25x6mm flat 300mm or 165mm long required according to thickness of wall or as per site conditions unless specified otherwise they may be provided as directed by Consultant/ Construction Manager. The cramps shall be spaced not more than 600 mm apart or as shown on the drawing.

- f) Cramps may be attached to its sides or top and bottom and or sides top and bottom. The minimum number of cramps required for fixing facing unit to the wall shall be two and two pins. The actual number of cramps and their sections, however shall be as per requirements of design to carry the loads.
- g) When cramps are used to hold the unit in position only, the facings shall be provided with a continuous support in which the stones rest at the ground level and other storey levels, the support being in the form of projection from or recesses into the concrete floor slab, or a beam between the columns or stainless steel angle attached to the floor slab or beams.
- h) The pins, cramps and dowels shall be laid in cement mortar 1:2 (1 cement : 2 coarse sand) and their samples got approved by Project Manager.
- i) Stainless steel angle cramps/bracket shall be held in position with the help of expansion hold fasteners (Wedge expansion type).
- j) The stone veneering work curved on plan shall be measured at plain work, but extra payment shall be allowed for radius not exceeding 6 meters on external face. For radius beyond 6 meters the work shall be measured as plain work only, even when the face may have to be dressed to curve.  
Expansion fasteners and cramps and pins shall be paid separately if not included in the item of BOQ.

#### 15.4 Granite stone coping and cladding

The slabs shall be of selected quality, hard, sound, dense and homogeneous in texture free from cracks, decay, weathering and flaws. They shall be hand or machine cut to requisite thickness and of colour as indicated by the Architect. The slabs shall have the top (exposed) face polished before being brought to site, unless otherwise specified. Before starting the work, the contractor shall get the samples of slabs approved from the Architect. Every slab shall be cut to the required size and shape and fine chisel dressed on the sides to the full depth so that a straight edge laid along the side of the stone shall be in full contact with it. The sides (edges) shall be table rubbed with coarse sand or machine rubbed before paving. All angles and edges of the slab shall be true, square and free from clippings and the surface shall be true and plane. The surface shall be prepared and stone laid as described in para 2.7.2(ii) above except that the edges of the slabs to be joined shall be buttered with grey cement with admixture of pigment to match the shade of the slab. The polishing and finishing shall be as described in para 2.7.2(iii) above except that first polishing with coarse grade carborundum stone shall not be done.

#### i) Laying:

Base concrete or the R.C.C. slab on which the slabs are to be laid shall be cleaned, wetted and mopped. The bedding for the slab shall be with cement mortar 1:4 (1cement: 4 coarse sand) and of average thickness of 20mm. Mortar of the specified mix shall be spread under the area of each slab. The slab shall be washed clean before laying. It shall be laid on top, pressed tapped with wooden mallet and brought to level with the adjoining slabs. It shall be

lifted and laid aside. The top surface of the mortar shall then shall be corrected by adding fresh mortar at hollows. The mortar is allowed to harden a bit and cement slurry of honey like consistency shall be spread over the same at the rate of 4.4 Kg. of cement per sqm. The edges of the slab already paved shall be buttered with grey or white cement with or without admixture of pigment to match the shade of the granite slabs, The slab to be paved shall then be lowered gently back in position and tapped with wooden mallet till it is properly bedded in level with and close to the adjoining slabs with as fine a joint as possible. Subsequent slabs shall be laid in the same manner. After each slab has been laid, surplus cement on the surface of the slabs shall be cleaned off. The surface of the flooring as laid shall be true to levels and slopes as directed by the Architect. Due care shall be taken to match the grains of slabs which shall be selected judiciously having uniform pattern of veins/streaks as directed by the Architect. Slabs which are fixed in the floor adjoining the wall shall enter not less than 12mm under the plaster skirting or dado. The junction between wall plaster and floor shall be finished neatly and without waviness.

The necessary stainless steel cladding arrangement should be provided for ensuring the perfect cladding of the stone.

## ii) Polishing & Finishing:

The day after the slabs are laid, all joints shall be cleaned of the grey cement grout with a wire brush or trowel to a depth of 5mm and all dust and loose mortar removed and cleaned. Joints shall then be grouted with grey or white cement mixed with or without pigment to match the shape of the topping of the wearing layer of the slabs. The same cement slurry shall be applied to the entire surface of the slabs in a thin coat to protect the surface from abrasive damage. The floor shall be kept wet for a minimum period of 7 days. The surface shall thereafter be grounded evenly with machine fitted with coarse grade grit block (no.60). Water shall be used profusely during grinding. After grinding, the surface shall be thoroughly washed to remove all grinding mud, cleaned and mopped. The second grinding shall likewise be carried out with machine fitted with fine grade grit block (No. 120). The final grinding with machine fitted with the finest grade grit block (No. 320) shall be carried out the day after the second grinding over the floor. For small areas or where circumstances so require, hand grinding may be permitted in lieu of machine grinding. After the final grinding, oxalic acid shall be dusted over the surface at the rate of 33gm. Per square metre sprinkled with water and rubbed hard with a namdah block. The following day the floor shall be wiped with moist rag and dried with a soft cloth and finished clean. If any slab/tile is disturbed or damaged, it shall be refitted or replaced, jointed and polished. The finished floor shall not sound hollow when tapped with a wooden mallet.

### 15.5 Protection of Flooring and Cladding

All finished flooring works must be protected with two layers of polythene sheet and 30mm thick POP layer.

Contractor shall replace all broken, damaged and scratched tiles/ marbles/ granite caused in execution of the work or by faulty installation before acceptance of the building without cost to the owner.

## 16.0 PLASTERING

### 16.0 General

#### 16.1 Extent and Intent

The Contractor shall furnish all materials, labour, scaffolding, equipment, tools, plant and incidentals necessary and required for the completion of all plaster and wall finishes. The Contractor shall be responsible to take proper precautions to protect already installed work from damage.

#### 16.2 General

Plaster as herein specified shall be applied to all internal and external surfaces where called for areas called for on drawings and typical shall be considered to apply to appropriate,

adjoining areas whether shown on same drawings or not and whether indicated or not. All plaster work and other wall finishes shall be executed by skilled workmen in a workman like manner and shall be of the best workmanship and in strict accordance with the dimensions on drawings.

**16.3 Plaster work:**

The primary requirements of the plaster work shall be to provide an absolutely water tight enclosures, dense smooth and hard and devoid of cracks on the interior and exterior. The contractor shall do all that is necessary to ensure this result. All plastering shall be finished to true plane, without imperfections and square with adjoining work and shall form proper foundations for finishing materials such as paint etc.

Masonry and concrete surfaces to which plaster is to be applied shall be clean, free from efflorescence, damp and sufficiently rough and keyed to ensure proper bond.

Wherever directed all joints between concrete frames and masonry filling shall be expressed by a groove cut in the plaster. Said groove to exactly coincide with the joint beneath.

Where grooves are not called for the joints between concrete members and masonry in filling shall be covered by 24 gauge galvanized chicken mesh strips 40mm wide or as shown, installed before plastering.

**16.4 Chasing:**

All chasing, installation of conduits, boxes etc., to be completed before any plastering or other wall finish is commenced on a surface. Chasing or cutting of plaster or other finish will not be permitted. Broken corners shall be cut not less than 150mm on both sides and patched with plaster of paris as directed. All corners shall be rounded to a radius of 8mm or as directed by the Architect. Chasing if any should be carried out using a chase cutting tool only.

**16.5 Samples:**

Samples of each type of plaster and other wall finish shall be prepared for approval by the Architect/Project Manager

**16.6 Proportions:**

The material used for plastering shall be proportioned by volume by means of gauge boxes.

**16.6.1 Wall Plaster:**

**i. Preparation of surface**

The joints in all walls, both existing and freshly built shall be raked into a depth of 15mm, brushed clean with wire brushes dusted and thoroughly washed before starting plaster work. Concrete surfaces shall be roughened by backing over the entire surface as approved by the Architect to ensure proper key for the plaster.

**ii. Plaster to walls( behind dry cladding)**

Plaster to internal faces of walls shall be 15mmmm thick as called for consisting of 1 part cement and 5 parts clean sand or as specified.

**iii. External Plaster to walls**

The external plaster shall be of two coats on an overall thickness of minimum 20 mm. Preparations of walls to receive plaster work shall be the same as in internal plaster. Backing coat shall be 12 to 14 mm thick with cement mortar 1:5 and finishing coat shall be with cement mortar 1:4. Backing coats shall be combed on wet surface to form keys for finishing coat. All external plaster shall be waterproofed with approved water proofing powder added to cement in proportion of 1.5 Kg. to 50 Kg. of cement as per the manufacturers' instruction, for both the coats. Cost of waterproofing powder per Kg. shall be paid for separately.

**iv. Mortar Mixing**

The cement : fine aggregated proportion should be as per the BOQ. It shall be made in small quantities only as required and applied with 15 minutes of mixing.

v. **Appliances**

Plaster application shall be commenced only after the preparatory work viz cleaning the surface of any effloronce or any foreign material and the application of cement gola. Correct thickness of plaster shall be obtained by laying plaster screeds (gauges) at intervals 1.50 meters.

Mortar shall be firmly applied, well pressed into the joints, rubbed and finished to give a smooth and even surface.

vi. **Curing**

Finished plaster shall be kept wet for 10 days after completion. In hot weather walls exposed to sun shall be screened with matting kept wet or any other approved means.

## 17.0 PAINTING & POLISHING

### 17.1 Extent and intent:

The Contractor shall furnish all materials, labour, scaffolding, equipment, tools, plant and incidentals necessary and required for the completion of all painting and polishing of ceiling, wall, door & windows. The Contractor shall be responsible to take proper precautions to protect already installed work from damage.

### 17.2 General:

Painting herein specified shall be applied to all and external where called for areas called for on drawings and typical shall be considered to apply to appropriate, adjoining areas whether shown on same drawings or not and whether indicated or not. All painting work and other finishes shall be executed by skilled workmen in a workman like manner and shall be of the best workman ship and in strict accordance with the colour & shade.

### 17.3 Textured paint

The textured finish to external surfaces of walls as per manufacturer's specification and approved by the Architects including scaffolding etc. complete.

Painting priming coat on plastered surface

The surface shall ordinarily not be painted shall be applied to get correct finish until it has dried completely. Before primer is applied, holes and undulations shall be filled up with plaster of Paris and rubbed smooth.

The primer shall be applied with brushes, worked well into the surface and spread even and smooth. Painting shall be done by crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternately in opposite direction, two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left the laying off is finished. The full process of crossing and laying off will constitute one coat.

Rate

Rate shall include cost of all labour and material involved the operations described above including scaffolding etc.

Painting with enamel paint (conforming to IS:2933 - 1975) and with synthetic enamel paint (conforming to IS:2932 - 1964).

The surface to be painted shall have received the approval of the Architect after inspection, before painting is commenced.

**Application**

The number of coats including the under coat shall be stipulated in the item.

**a) Under Coat**

One coat of specified paint of shade suited to the shade of the topcoat shall be applied and allowed to dry overnight. It shall be rubbed next day with the finest grade of wet abrasive paper to ensure a smooth and even surface, free from brush marks and all loose particles dusted off.

**b) Top Coat**

tops coats of specified paint of desired shade shall be applied. Each coat shall be allowed to dry for not less than 24 hours and lightly rubbed down smooth with finest wet abrasion paper to get an even glossy surface. If, however, the surface is not satisfactory additional coats as required.

**17.4 Synthetic Emulsion Paint**

Synthetic Enamel Paint (conforming to IS: 1932 – 1964) of approved brand and manufacture and of the required colour shall be used for the top coat and an undercoat of shade to match the top coat as recommended by the manufacturer shall be used.

**Painting on New Surface****Preparation of surface**

Wood work :- The surface shall be cleaned and all unevenness removed. Knots if available, shall be covered with a preparation of red red lead. Holes and indentations on the surface shall be filled in with glazire's putty or wood putty and rubbed smooth before painting is done. The surface should be thoroughly dry before painting.

Iron and steel work :- The priming coat shall have dried up completely before painting is started. Rust and scaling shall be carefully removed by scraping or by brushing with steel wire brushes. All dust and dirt shall be carefully and thoroughly wiped away.

Plastered surface:- The priming coat shall have dried up completely before painting is started. All dust and dirt that has settled on the priming coat shall be thoroughly wiped away before painting is started.

**Application**

The number of coats including the undercoat shall be as stipulated in the item.

Under Coat :- One coat of the specified paint of shade suited to the shade of the top coat shall, be applied and allowed to dry overnight. It shall be rubbed next day with the finest grade of wet abrasive paper to ensure a smooth and even surface, free from brush marks and all loose particles dusted off.

Top Coat :- Top coats of specified paint of the desired shade shall be applied after the undercoat is thoroughly dry. Additional finishing coats shall be applied if found necessary to ensure properly uniform glossy surface.

**18.0 SPECIFICATIONS FOR STRUCTURAL STEEL WORK****18.1 General**

This specification covers the fabrication and transportation to site and erection on prepared foundations and structural steel work consisting of beams, columns, vertical trusses, bracings, shear connections etc.

18.2 Fabrication, erection and approval of steel structures shall be in compliance with:

- These General Specifications and IS: 800 - 1984
- Drawings and supplementary drawings to be supplied to the contractors during execution of the work.

18.3 Providing shop primer coat for steel structures. Grouting of holding-down bolt pockets and below base plates where required.

18.4 In case of conflict between the Clauses mentioned here and the Indian Standards, those expressed in this specification shall govern.

18.5 Scope

The fabrication and erection of the steel work consists of accomplishing of all jobs here-in enumerated including providing all labour, tools and plant all materials and consumables such as welding electrodes, bolts and nuts, oxygen and acetylene gases, oils for cleaning etc. of approved quality as per relevant IS. The work shall be executed according to the drawings, specifications, relevant codes etc. in an expeditious and workman like manner, as detailed in the specifications and the relevant Indian Standard Codes and Standard Practice and to the complete satisfaction of the Architect/Project Manager.

18.6 Fabrication Drawings

The contractor shall prepare all fabrication and erection drawings on the basis of design drawings supplied to him and submit the same in triplicate to the Project Manager for review, Project Manager shall review and comment, if any, on the same. Such review if any, by the Project Manager, does not relieve the contractor of any of his required guarantees responsibilities. The contractor shall however be responsible to fabricate the structural strictly conforming to specifications and reviewed drawings.

All work to be executed only after the due approval of the concerned shop drawings only.

18.7 Fabrication drawings shall include the following:

- Member sizes and details
- Types and dimensions of welds and bolts
- Shapes and sizes of edge preparation for welding
- Details of shop and field joints included in assemblies.

Bill of material

- Quality of structural steels, welding electrodes, bolts, nuts and washers etc. to be used.
- Erection assemblies, identifying all transportable parts and sub-assemblies, associated with special erection instructions, if required.
- Calculations where asked for, for approval.

18.8 Connections, splices etc. other details not specifically detailed in design drawings shall be suitably given on fabrication drawings considering normal detailing practices and developing full member strengths. Where asked for calculations for the merit shall also be submitted for approval.

18.9 Any alternate design or change in section is allowed when approved in

writing by the Project Manager.

- 18.10 However if any variation in the scheme is found necessary later, the contractor will be supplied with revised drawings. The contractor shall incorporate these changes in his drawings at no extra cost and resubmit for review.
- 18.11 Project Manager reviews shall not absolve the contractor of his responsibility for the correctness of dimensions, adequacy of details and connections. One copy will be returned reviewed with or without comments to the contractor for necessary action. In the former case further seven copies of amended drawings shall be submitted by the contractor for final approval and execution of the job.
- 18.12 The Project Manager will verify the correct interpretation of their requirements.
- 18.13 If any modification is made in the design drawing during the course of execution of the job, revised design drawings will be issued to the contractor. Further changes arising out of these shall be incorporated by the contractor in the fabrication drawings already prepared at no extra cost and the revised fabrication drawings shall be duly got reviewed as per the above Clauses.

18.14 Materials

18.15 Rolled Sections

The following grades of steel shall be used for steel structures:

Structural steel will generally be of standard quality conforming to IS: 226. Whenever welded construction is specified plates of more than 20 mm thickness will generally conform to IS: 2062. Grade of steel shall be Yst-250.

18.16 Welding Materials

Welding electrodes shall conform to IS: 814

E-6013 electrode shall be used.

Approval of welding procedures shall be as per IS: 823.

18.17 Bolts, Nuts & Washers

Bolts and nuts shall be as per IS: 1367 and tested as per IS:1608. It shall have a minimum tensile strength of 44 Kg/mm<sup>2</sup> and minimum elongation of 23% on a gauge length of 5.65 (A-Original cross sectional area of the gauge length). Washers shall be as per IS: 2016.

- 18.18 All materials shall conform to their respective specifications. The use of equivalent or higher grade or alternate materials will be considered only in very special cases subject to the approval of the Project Manager in writing.

18.19 Receipt & Storing of Materials

Steel materials supplied by the contractor must be marked for identification and each lot should be accompanied by manufacturer's quality certificate, conforming chemical analysis and mechanical characteristics.

All steel parts furnished by supplier shall be checked, sorted out, straightened, and arranged by grades and qualities in stores.

Structural with surface defects such as pitting, cracks, laminations etc. shall be rejected if the defects exceed the allowable tolerances specified in relevant standards or as directed by the Project Manager.



Welding wire and electrodes shall be stored separately by qualities and lots inside a dry and enclosed room, in compliance with IS: 816 - 1969 and as per instructions given by the Project Manager. Electrodes shall be perfectly dry and drawn from an electrode even, if required.

Checking of quality bolts of any kind as well as storage of same shall be made conforming to relevant standards.

Each lot of electrodes, bolts, nuts, etc. shall be accompanied by manufacturer's test certificate.

The contractor may use alternative materials as compared to design specification only with the written approval of the Project Manager.

#### 18.20 Material Tests

The contractor shall be required to produce manufacturer's quality certificates for the materials supplied by the contractor. Notwithstanding the manufacturer's certificates, the Project Manager may ask for testing of materials in approved test houses. The test results shall satisfy the requirements of the relevant Indian Standards.

Whenever quality certificates are missing or incomplete or when material quality differs from standard specifications the contractor shall conduct all appropriate tests as directed by the Project Manager at no extra cost.

Materials for which test certificates are not available or for which test results do not tally with relevant standard specifications, shall not be used.

All tests carried out in approved test houses at the behest of the Project Manager are to be carried out at the contractor expense and nothing extra shall be payable in this account.

#### 18.21 Fabrication

Fabrication shall be in accordance with IS: 800 Section V in addition to the following:

Fabrication shall be done as per approved fabrication drawings adhering strictly to work points and work lines on the same. The connections shall be welded or bolted as per design drawings. Work shall also include fabricating built up sections.

Any defective material used shall be replaced by the contractor at his own expense, care being taken to prevent any damage to the structure during removal.

All the fabricated and delivered items shall be suitably packed to be protected from any damage during transportation and handling. Any damage caused at any time shall be made good by the Contractor at his own cost.

Any faulty fabrication pointed out at any stage of work shall be made good by the contractor at his own cost.

#### 18.22 Preparation of Materials

Prior to release for fabrication, all rolled sections warped beyond allowable limit shall be pressed or rolled straight and freed from twists, taking care that a uniform pressure is applied.

Minor warping, corrugations etc. in rolled sections shall be rectified by cold working. All rectifications permitted in this clause are at the discretion of the Project Manager and in no way the right of the contractor.

The sections shall be straightened by hot working where the Project Manager so direct and

shall cooled slowly after straightening.

Warped members like plates and flats may be used as such only if wave like deformation does not exceed  $L/1000$  but limited to 10 mm (L-Length).

Surface of members that are to be jointed by lap or fillet welding or bolting shall be even so that there is no gap between overlapping surfaces.

#### 18.23 Marking

Marking of members shall be made on horizontal pads, of an appropriate racks or supports in order to ensure horizontal and straight placement of such members.  
Marking accuracy shall be atleast + 1 mm.

#### 18.24 Cutting

Members shall be cut mechanically (by saw or shear or by oxyacetylene flame).

All sharp, rough, or broken edges, and all edges of joints which are subjected to tensile or oscillating stresses, shall be ground.

No electric metal arc cutting shall be allowed.

All edges cut by oxyacetylene process shall be cleaned of impurities prior to assembly.

Cutting tolerances shall be as follows:

- a) For members connected at both ends + 1 mm.
- b) Elsewhere + 3 mm.

The edge preparation for welding of members more than 12 mm thick shall be done by flame cutting and grinding. Cut faces shall not have cracks or be rough.

Edge preparation shall be as per IS: 823 - 1964.

#### 18.25 Drilling

Bolts holes shall be drilled.

Drilling shall be made to the diameter specified in drawings.

No enlarging of holes filling, by mandrolling or oxyacetylene flame shall be allowed.

Allowed variations for holes (out-of-roundness, eccentricity, plumb-line deviation) shall be as per IS:800.

- Maximum deviation for spacing of two holes on the same axis shall be + 1 mm.
- Two perpendicular diameters of any oval hole shall not differ by more than 1 mm.

Drilling faults in holes may be rectified by reaming the holes to the next upper diameter, provided that spacing of new hole centres and distance of hole centres to the edges of members are not less than allowed and that the increase of hole diameter does not impair the structural strength. Hole reaming shall be allowed if the number of faulty holes does not exceed 15% of the total number of holes for one joint.

#### 18.26 Preparation of Members for Welding

Assembly of structural members shall be made with proper jigs and fixtures to ensure correct positioning of members (angles, axes nodes etc.)

Sharp edges, rust of cut edges, notches, irregularities and fissures due to faulty cutting shall be chipped or ground or filled over the length of the affected area, deep enough to remove faults completely.

Edge preparation for welding shall be carefully and accurately made so as to facilitate a good joint.

Generally no special edge preparation shall be required for members under 8 mm thick.

Edge preparation (beveling) denotes cutting of the same so as to result in V, X K or U seam shapes as per IS: 823.

The members to be assembled shall be clean and dry on the welding edges. Under no circumstances shall wet, greasy, rust or dirt covered parts be assembled. Joints shall be kept free from any foreign matter likely to get in to the gaps between members to be welded.

Before assembly the edges to be welded as well as adjacent areas extending for atleast 20 mm shall be cleaned (until metallic polish is achieved).

When assembling members, proper care shall be taken of welding shrinkage and distortions, as the drawing dimensions cover finished dimensions of the structure.

The elements shall be got checked and approved by the Project Manager or their authorised representative before assembly.

The permissible tolerances for assembly of members preparatory to welding shall be as per IS: 823-1964.

After the assemble has been checked, temporary tack welding in position shall be done by electric welding, keeping in view finished dimensions of the structure.

#### 18.27 Welding procedures

Welding shall be carried out only by fully trained and experienced welders as tested and approved by the Architect/ Project Managers. Any test carried out either by the Architect/ Project Managers or their representative or the inspectors shall constitute a right by them for such tests and the cost involved thereon shall be borne by the contractor himself.

Qualification tests for welders as well as tests for approval of electrodes will be carried out as per IS: 823. The nature of test for performance qualification of welders shall be commensurate with the quality of welding required on this job as judged by the Project Manager.

The steel structures shall be automatically, semi-automatically or manually welded.

The welder shall mark with his identification mark on each element welded by him. When welding is carried out in open air, steps shall be taken to protect the face of welding against wind or rain. The electrodes, wire and parts being welded shall be dry.

Before beginning the welding operation, each joint shall be checked to ensure that the parts to be welded are clean and root gaps provided as per IS: 823.

For continuing the welding of seems discontinued due to some reason, the end of the discontinued seems shall be melted in order to obtain a good continuity. Before resuming the welding operation, the groove as well as the adjacent parts shall be well cleaned for a length of approx. 50 mm.

For single butt welds (in V, 1/2 V or U) and double butt welds (in K, double U etc.) the rewelding of the root is mandatory but only the metal deposit on the root has been cleaned by back gouging or chipping.

The welding seams shall be left to cool slowly. The contractor shall not be allowed to cool the welds quickly by any other method.

For multi-layer welding, before welding the following layer, the formerly welded layer shall be cleaned metal bright by light chipping and wire brushing. Backing strips shall not be allowed.

The order and method of welding shall be so that -

- No unacceptable deformation appears in the welded parts.
- Due margin is provided to compensate for contraction due to welding in order to avoid any high permanent stresses.

The defects in welds must be rectified according to IS: 823 and as per instruction of Architect/Project Manager.

#### 18.28 Weld Inspection

The weld seams shall satisfy the following :

- shall correspond to design shapes and dimensions.
- shall not have any defects such as cracks, incomplete penetration and fusion, undercuts, rough surfaces, burns, blow holes and porosity etc. beyond permissible limits.

The mechanical characteristics of the welded joints shall be as in IS: 823.

#### 18.29 Preparation of Members for Bolting

The members shall be assembled for bolting with proper jigs and fixtures to sustain the assemblies without deformation and bending.

Before assembly, all sharp edges, shavings, rust dirt, etc. shall be removed.

Before assembly, the contacting surfaces of the members shall be cleaned and given a coat of primer as per IS: 2074.

The members, which are bolt assembled, shall be set according to drawings and temporarily fastened with erection bolts (minimum 4 pieces) to check the coaxiality of the holes.

The members shall be finally bolted after the deviations have been corrected, after which there shall not be gaps.

Before assembly, the members shall be checked and got approved by the Project Manager.

The difference in thickness of the sections that are butt assembled shall not be more than 3% or maximum 0.8 mm whichever is less. If the difference is larger, it shall be corrected by grinding or filling.

Reaming of holes to final diameter or cleaning of these shall be done only after the parts have been check assembled.

As each hole is finished to final dimensions (reamed if necessary) it shall be set and bolted up. Erection bolts shall not be removed before other bolts are set.

#### 18.30 Bolting up

Final bolting of the members shall be done after the defects have been rectified and approval

of joints obtained.

The bolts shall be tightened starting from the centre of joint towards the edge.

#### 18.31 Planning of Ends

Planning of ends of members like column ends shall be done by grinding when so specified in the design.

Planing of butt welded members shall be done after these have been assembled, the spare edges shall be removed with grinding machines or files.

The following tolerances shall be permitted on member that have been planed.

- On the length of the member having both ends planed, maximum + 2 mm with respect to design.
- Level differences of planed surfaces, maximum 0.3 mm.
- Deviation between planed surface and member's axis maximum 1/1500.

#### 18.32 Holes for Field Joints

Holes for field joints shall be drilled in the shop to final diameters and tested in the shop, with trial assemblies.

When three-dimensional assembly is not possible in the shop, the holes for field joints may be drilled in shop and reamed on site after erection, on approval by the Project Manager.

For bolted steel structures, trial assembly in shop is mandatory.

The tolerance for spacing of holes shall be + 1 mm.

#### 18.33 Tolerances

All tolerances regarding dimensions, geometrical shapes and sections of steel structures, shall be as per Annexure B, if not specified in the drawing.

#### 18.34 Marking for Identification

All elements and members prior to despatch for erection shall be shop marked.

The members shall be visibly marked with a weatherproof light coloured paint. The size and thickness of the numbers shall be chosen as to facilitate the identification of members.

For the small members that are delivered in bundles or crates, the required marking shall be done on small metal tags securely tied to the bundle, while the crates shall be marked directly.

Each bundle or crate shall be packed with members for one and the same assembly; in the same bundle or crate, general utility members such as bolts, nuts etc. may be packed.

All bills of materials showing weight, quality and dimension of contents shall be placed in the crates.

The members shall be marked with a durable paint, in a visible location, preferably at one end of the member so that these may be easily checked during storage and erection.

All members shall be marked in the shop before inspection and acceptance.

When the member is being painted, the marking area shall not be painted but bordered with

white paint.

The marking and job symbol shall be registered in all shop delivery documents (transportation, for erection etc.)

#### 18.35 Shop Test Pre-assembly

For steel structures that have the same type of welding the shop test pre-assembly shall be performed on one out of every 10 member's minimum.

For bolted steel structures, shop test pre-assembly is mandatory for all elements as well as for the entire structure in conformity.

#### 18.36 Shop Inspection and Approval

##### General

The Project Manager or their representative shall have free access at all responsible times to the contractors fabrication shop and shall be afforded all reasonable facilities for satisfying himself that the fabrication is being undertaken in accordance with drawings and specifications.

Technical approval of the steel structure in the shop by the Project Manager is mandatory.

The contractor shall not limit the number and kinds of tests, final as well as intermediate once, or extra tests required by the Project Manager.

The contractor shall furnish necessary tools, gauges, instruments etc. and technical non-technical personnel for shop tests by the Project Manager, free of cost.

#### 18.37 Shop Acceptance

The Project Manager shall inspect and approve at the following stages:

The following approvals may given in shop:

- Intermediate approvals of work that cannot be inspected later.
- Partial approvals
- Final approvals

Intermediate approval of work shall be given when a part of the work is performed later:

- Cannot be inspected later
- Inspection would be difficult to perform and results would not be satisfactory.

Partial approval in the shop is given on members and assemblies of steel structures before the primer coat is applied and includes:

- Approval of materials
- Approval of field joints
- Approval of parts with planed surfaces
- Test erection
- Approval of members
- Approval of markings
- Inspections and approvals of special features, like Rollers, loading platform mechanism etc.

During the partial approval, intermediate approvals as well as all former approvals, shall be taken in to consideration.

#### 18.38 Final approval in the Shop

The final approval refers to all elements and assemblies of the steel structures, with shop primer coat, ready for delivery from shop to be loaded for transportation, or stored.

The final approval comprises of:

- Partial approvals
- Approval of shop primer coat
- Approval of mode of loading and transport
- Approval of storage (for materials stored)

#### 18.39 Painting and Delivery

#### 18.40 Preparation of parts for shop painting

Painting shall consist of providing one coat of red oxide zinc chromate primer to steel members before despatch from shop.

Primer coat shall not be applied unless:

- Surface has been wire brushed, cleaned of dust, oil, rust etc.
- Erection gaps between members, spots that cannot be painted or where moisture or other aggressive agents may penetrate, have been filled with an approved type of oil and putty.
- The surface to be painted is completely dry.
- The parts where water of aggressive agents may collect (during transportation, storage, erection and operation) are filled with putty and provided with holes for drainage of water.
- Members and parts have been inspected and accepted
- Welds have been accepted.

The following are not to be painted or protected by any other product:

- Surface which are in the vicinity of joints to be welded at site.
- Surfaces bearing markings
- Other surfaces indicated in the design.

The following shall be given a coat of hot oil or any approved resistant lubricant only.

- Planed surfaces
- Holes for links

The surfaces that are to be embedded or in contact with the concrete shall be given a coat of cement wash.

The surfaces which are in contact with the ground, gravel or brick work and subject to moisture, shall be given bituminous coat.

The other surfaces shall be given a primer coating. All surfaces to be clean with sand paper before applying primer coating.

Special attention shall be given to locations not easily accessible, where water can collect and which after assembly and erection cannot be inspected, painted and maintained. Holes shall be provided for water drainage and in accessible box type sections shall be hermetically

sealed by welds.

If specified elsewhere, in the schedule of quantities, the contractor shall paint further coats of red-oxide after erection and placing in position of the steel structures.

#### 18.41 Packing, transportation, delivery

After final shop acceptance and marking, the item shall be packed and loaded for transportation.

Packing must be adequate to protect item against warping during loading and unloading.

Proper lifting devices shall be used for loading, in order to protect items against warping.

Slender projecting parts shall be braced with additional steel bars, before loading, for protection against warping during transportation.

Loading and transportation shall be done in compliance with transportation rules.

If certain parts cannot be transported in the lengths stipulated in the design, the position and type of additional splice joints shall be approved by the Project Manager.

Items must be carefully loaded on platforms of transportation means to prevent warping, bending or falling during transportation.

The small parts such as fish plates, gussets etc. shall be securely tied with wire to their respective parts.

Bolts, nuts and washers shall be packed and transported in crates.

The parts shall be delivered in the order stipulated by the Project Manager and shall be accompanied by document showing:

- Quality and quantity of structure or members
- Position of member in the structure
- Particulars of structure
- Identification number job symbol.

#### 18.42 Field Erection

18.43 The erection work shall be permitted only after the foundation or other structure over which the steelwork will be erected is approved and is ready for erection.

18.44 The contractor shall satisfy himself about the levels, alignment etc. for the foundations well in advance, before starting the erection. Minor chipping etc. shall be carried out by the contractor on his expense.

18.45 Any faulty erection done by the contractor shall be made good at his own cost.

18.46 Approval by the Project Manager or their representatives at any stage of work does not relieve the contractor of any of his required guarantees of the contract.

#### 18.47 Storage and preparation of parts prior to erection

The storage place for steel parts shall be prepared in advance and got approved by the Project Manager before the steel structures start arriving from the shop.

A platform shall be provided by the Contractor near the erection site for preliminary erection work.



The contractor shall make the following verifications upon receipt of material at site.

- for quality certificates regarding materials and workmanship according to these general specifications and drawings.
- Whether parts received are complete without defects due to transportation, loading and unloading and defects, if any, are well within the admissible limit.

For the above work sufficient space must be allotted in the storage area. Steps shall be taken to prevent warping of items during unloading.

The parts shall be unloaded, stored and stored so as to be easily identified.

The parts shall be stored according to construction symbol and markings so that these may be taken out in order or erection.

The parts shall be at least 150 mm clear from ground on wooden or steel blocks for protection against direct contact with ground and to permit drainage of water.

If rectification of members like straightening etc. are required, these shall be done in a special place allotted which shall be adequately equipped.

The parts shall be clean when delivered for erection.

#### 18.48 Erection & Tolerances

Erection in general shall be carried out as required and approved by the Project Manager.

Positioning and levelling of the structure, alignment and plumbing of the stanchion and fixing every member of the structure shall be in accordance with the relevant drawings and to the complete satisfaction of the Project Manager.

The following checks and inspection shall be carried out before during and after erection.

- damage during transportation
- accuracy of alignment of structures
- erection according to drawings and specifications
- progress and workmanship.

In case there be any deviations regarding positions of foundations or anchor bolts, which would lead to erection deviations, the Project Manager shall be informed immediately. Minor rectifications in foundations, orientation of bolts holes etc. shall be carried out as part of the work, at no extra cost.

The various parts of the steel structure shall be so erected so to ensure stability against inherent weight, wind and erection stresses.

The structure shall be anchored and final erection joints completed after plan and elevation positions of the structural members have been verified with corresponding drawings and approved by the Project Manager.

The bolted joints shall be tightened so that the entire surface of the bolt heads and nuts shall rest on the member. For parts with sloping surfaces tapered washers shall be used.

#### 18.49 Final acceptance and handing over the structure

#### 18.50 At acceptance, the contractor shall submit the following documents :

- Shop and erection drawings - either in tracings or reproducible.
- 4 copies of each of the following :

- shop acceptance documents
- quality certificate for structurals, plates, etc. (electrodes, welding wire, bolts, nuts, washers etc.)
- List of certified welders who worked on erection of structures.
- acceptance and intermediate control procedure of erection operations.

18.51 Approval by the Project Manager at any stage of work does not relieve the contractor of any of his required guarantees of the contract.

18.52 Method of Payments

Payment for steelwork shall be made on basis of admissible weight of the structure accepted, the weight being determined and to be paid.

All measurement to be done according to the over all preview of IS-1200 in addition to the methods mentioned herein

The rate for supply, fabrication and erection, shall include cost of all handling and transportation to Owner's store/site o work where supply and fabrication only are involved, trimming, straightening, edge preparation, preparation and getting reviewed of fabrication drawings, and providing one or more coat of Red-oxide zinc chromate primer as specified in the schedule of quantity.

In the case, Owner supplies materials the rate shall include cost of steel materials taking delivery of the materials, from owner's store all handling and re-handling, loading and unloading, transport to site or work, returning of surplus materials to owner's stores etc. complete as well as the cost of all handling and transport, scaffolding, temporary supports, tools and tackles, touching up primer coat, grouting etc.

18.53 The actual lengths installed shall be measured and the weight of structural material/plate shall be calculated wherever necessary on the basis of IS handbook. If sections are different from IS section, then manufacturers handbook shall be adopted. No allowance in weights shall be made for rolling tolerance.

18.54 Sections built out of plates, structural shall be paid on the actual weight incorporated except for gussets, which will be paid on the weight of the smallest rectangle enclosing the shape. No deductions shall be made for skew cuts in rolled steel sections.

18.55 Welds, bolts, nuts, washers, etc. shall not be measured. Rate for structural steel work shall be deemed to include the same.

18.56 No other payment either for temporary works connected with this contract or for any other item such as welds, shims, pacing plates etc. shall be made. Such item shall be deemed to have been allowed for in the rate quoted for steelwork.

18.57 Grouting of Pockets

Grouting of pockets and under base plates will be done only after the steelwork has been levelled and plumbed and the bases of stranchions are supported by steel shims. The space below the base plate and pockets shall be thoroughly cleaned.

The grouting of pockets in concrete especially those under the base plates of the structural steel members should be grouted with non-shrink grout.

iii) The mortar used for grouting shall not be leaner than 1:2 (1 cement: 2 sand) (grade 300 in case of concrete) and shall be mixed to the minimum consistency required. It shall be poured under suitable head and tamped until the space has been completely filled.

18.58 Tolerances allowed in the erection of plant building without cranes

The maximum tolerances for line and level of the steelwork shall be + 3.00 mm on any part of the structure. The structure shall not be out of plumb more than 3.5 mm on each 10 M.

section of height and not more than 7.0 mm per 30 M. section.

These tolerances shall apply to all parts of the structure unless the drawings issued for erection purposes state otherwise.

**19.0 Stainless Steel Materials**

- a. Bars: (ASTM A-276) annealed, Alloy 18-8, Type 302
- b. Plates, Sheets and Strips: ASTM A-167) Alloy 18-8, Type 302
- c. Tubing: (ASTM A-269) Alloy 18-8, Type 302
- d. Finish: American Iron and Steel Institute (AISI) No. 8 (mirror-like reflective, non-directional polish)

**Basic Rates of Materials – F. O. R. Site**

(Adopted for quoting item rates in the tender)

S. No.	Item	Rates	Unit	Source
	Plain glass 4mm thick	Rs.	Sqm	
	Plain glass 8mm thick	Rs.	Sqm	
	Plain glass 10mm thick	Rs.	Sqm	
	Plain glass 12mm thick	Rs.	Sqm	
	Sunergy green glass 6mm thick	Rs.	Sqm	
2.	Toughening of glass			
	4mm thick	Rs.	Sqm	
	8mm thick	Rs.	Sqm	
	10mm thick	Rs.	Sqm	
	12mm thick	Rs.	Sqm	
	6mm thick	Rs.	Sqm	

**Note:** The contractor is to fill in the rate and his source required above while tendering. Also the samples of all items as proposed while quoting are to be furnished with tender

Signature of the Contractor

**LIST OF APPROVED MAKES OF MATERIALS**

1.	Anchor Fastener	:	Fischer, Canon, Hilti or approved equivalent
2.	Weather Silicone Sealant (staining)	:	Wacker Elastosil – 355 non-staining, (non-Dow Corning 991 or as approved
3.	Backer Rods	:	Supreme Ind. Ltd. or approved equivalent
4.	Polysulphide Sealant	:	Fasroc, Pidilite, Beck Bond or approved equivalent
5.	Aluminium Sections	:	Hindalco, INDAL, Bhoruka or approved equivalent
6.	Stainless Steel Friction Stay	:	Alu-alfa, Securistyle, GIESSE or approved equivalent
7.	Door/ Window Aluminium Handle	:	Alu-alfa, Securistyle, GIESSE or approved equivalent
8.	Four Point/Multi Point locking Handle	:	Alu-alfa, Securistyle, GIESSE or approved equivalent
9.	Butt Hinges for openable shutters	:	Alu-alfa, Securistyle, GIESSE or approved equivalent
10.	E.P.D.M. Gaskets	:	Roop, Bohra, Anand or as approved
11.	Source for Toughening of Glass	:	Saint Gobain, GSC, Gold Plus, Gurind or as approved
12.	Masking Tapes	:	Sun Control, Wonder Polymer or as approved
13.	Aluminium Composite Panel	:	Alucobond, Alpolic, Alucomat or as approved
14.	Glass/Mirror	:	Glaverbel, Saint Gobain, Pilkington, Modi, Asahi or as approved equivalent
15.	Floor Spring	:	Dorma, Savex, Trium, Ozone or as approved equivalent
16.	S. S. Patch Fittings/ Patch Lock	:	Dorma, Savex, Trium, Ozone or as approved
17.	Cylindrical Lock	:	Dorma, Dorset or as approved
18.	Hardware	:	Dorma, B&R, Golden, , Doorset, D-line, or as approved.

**Note:**

1. The contractor shall produce all samples before procurement of the materials, for approval of the Architects/Project Managers.
2. Where more than one manufacturer is listed, the names are given in the order of preference. The contractor shall quote the rates for the various items of work based on the materials of first preference after ascertaining the availability, delivery schedule of the same. Unless the contractor

stipulates in this tender, it shall be presumed that the rates quoted are for material of first preference only.

3. In the event, the contractor is permitted to use the material of lower preference because of valid reasons, then the contract rates for the relevant items of work shall be suitably adjusted on the basis of variation in prices of the materials of first preference and those actually used. If the prices of the materials used are higher than the material of the first preference, the owner shall not be liable to make any enhanced payment for the affected items of work on this account.

In respect of materials for which approved makes are not specified above, these will be makes to be decided by the Architects/Project Managers and as per samples getting approved.

**PRELIMINARIES AND GENERAL MATTERS**

<b>S.No.</b>	<b>Description</b>	<b>Qty.</b>	<b>Unit</b>	<b>Rate</b>	<b>Amount</b>
<b>1</b>	<b>Safety Health and Welfare of Work People</b> Provide for all the costs and charges incurred by complying with all safety health and welfare regulations, appertaining to staff and work people employed on the site including those employed by all sub-contractors, including registration with the labour department of Government. The Contractor shall be responsible for and shall allow for providing medical facilities including emergency medical facilities for his staff.				Cost to be included in the Contract.
<b>2</b>	<b>Disposal of Refuse</b> Keep the site free from debris arising from the work during the construction period., and leave the site free from debris on completion to the satisfaction of the Project Manager.				Cost to be included in the Contract.
<b>3</b>	<b>Site Notice Board</b> The contractor shall provide necessary site notice boards as required by the Project Manager to display the project name, the Employers, name and the names of all consultants associated with the work and sign / warning boards, direction and demarcation signs at various location stressing the prime need for safety etc.				Cost to be included in the Contract.
<b>4</b>	<b>Statutory Approvals</b> Provide all assistance in getting statutory approvals from various bodies as directed by the Project Manager. A list of all such approvals the particulars of approving bodies and time & schedule shall be submitted by the contractor				Cost to be included in the Contract.
<b>5</b>	<b>General Lighting for the work</b> Provide electric lights, maintain system, all as required for the works and of other contractors, and remove the temporary installations on completion.				Cost to be included in the Contract.
<b>6</b>	<b>Insurance</b> Provide insurance policies as mentioned in General Condition of Contracts with an approved insurance company, jointly in the name of Project Manager and Contractor. The original policy to be deposited with Project Manager.				Cost to be included in the Contract.
<b>TOTAL TO SUMMARY</b>					Rs. NIL

## **PREAMBLE TO B.O.Q. (SPECIFICATIONS)**

### **GENERAL**

The conditions of contract and the drawings shall be read in conjunction with the specifications and matters referred to, shown or described in one are not necessarily repeated in the other. These specifications are comprehensive but may exceed the requirements of this project. Any ambiguity between the General Specifications, the Bill of quantities and contract drawings, shall be referred to the Project Manager for clarification not later than 10 days before the date fixed for delivery of Tenders. Any ambiguity may be referred to the Project Manager after signing of the contract and Project Manager shall give a ruling which shall prevail. No claim for additional cost due to above, however, will be entertained.

Notwithstanding the sub-division of the specification into various headings, every part of it is to be deemed supplementary to every other part and is to be read with it, so far as it may be practicable so to do, or when the context so admits.

In this contract, reference is made to the Indian Standards or CPWD specification as approved by Project Manager and these references shall be deemed to include the latest editions or issue of standards, specifications or By-Law including all revisions upto the date of invitation of Tenders. The contractor shall ensure that all materials and workmanship in so far as they apply to this contract shall comply in every specifications or any other equivalent or specification approved by the Project Manager.

The Contractor shall keep at site copies of all relevant standards and codes of practice referred in these specifications throughout the period of contract. These shall be the latest editions and shall include all revisions/addendums thereof.

Approved Manufacturers: Names of approved manufacturers are given in the specifications.

Reference in the specifications to approved manufacturers shall be construed as establishing a standard of quality and not as limiting competition.

The Contractor shall include in his prices for supplying the item or materials from the approved manufacturers listed or equal and approved.

All items or materials shall be delivered to the site in the manufacturers original unopened containers with the manufacturers brand and name clearly marked on.

All items or materials shall be assembled, mixed, fixed, applied or otherwise incorporated in the works in accordance with the printed instructions of the manufacturer of the item or materials.

Date of construction to be written on all respective items for monitoring curing.



**ALUMINIUM WORK:****◆ The rates for all items under this section include:**

1. Item description in bill of quantities is indicative and may not cover all Items, trades, materials, labour, specifications, conditions etc. However Contractor shall be responsible to read Item description in conjunction with Technical Specifications, drawings and trade practice and is required to follow all requirements. Further description of Item in BOQ. unless otherwise stated, includes, where ever necessary, conveyance and delivery, handling, unloading, storing, fabrication, hoisting, scaffolding, all labour for finishing to required shape and size, setting, fitting and fixing in position, straightening, cutting and waste, return of packing and other incidental charges and/ all applicable taxes and duties.

BOQ quantities are tentative and any changes will not allow the Contractor to claim extra.

- 3 Quantities stated in the Items are not to be used for ordering of any material. Contractor shall verify quantities himself and order with suppliers shall be placed with required wastage. Copies of orders shall be forwarded to Project Manager to verify date of order, supplier and materials order.
- 4 Any defective or unapproved materials shall be removed from site immediately at Contractor's cost.
- 5 The Contractor shall be responsible for protection of his own work and the work of other trades during the progress of his work.
- 6 The Contractor shall note the space for storage at the site is limited and shall allow for phase delivery of materials to site to overcome that problem.
- 7 Contractor shall provide required rigid double legged steel scaffolding accessible at all location.
- 8 Price of each Item inserted shall be considered as self supporting and do not have any bearing on other Items of the Project.
- 9 Aluminium windows are divided in parts in places Stone pillars to be part of stone work and shall be carried out by stone work Contractor. Rest Aluminium work will be part of Aluminium Contractor.
- 10 The Contractor shall be responsible to provide temporary monsoon protection covering to all structural opening. (Aluminium and curtain wall). This will include providing and installing of sub frames and temp protection work.
- 11 Supply of Aluminium and glazing shall include for
  - a) Designing, fixing and erecting aluminium windows with heavy duty aluminium sections.
  - b) Aluminium alloy – IS 733
  - c) Extrusion – HE 9 WP (IS 63400 WP) or BS 6063-T5, T6
  - d) Fabrication and Transport
  - e) EPDM Gaskets
  - f) Stainless steel medallion bands
  - g) Stainless steel fasteners
  - h) Stainless steel fixtures
  - i) Mock-up
  - j) Visual Mock-ups
  - k) Separators
  - l) Installation
  - m) Testing

n) Warranty

12 Sealant

- a) Sealant work is part of individual items and shall not be measured separately. Contractor to make allowance for in his quoted rates to complete the items and shall include
- b) Cleaning and preparation of surface
- c) Applying of primer
- d) Required tooling with the use of soap solution.

### **FLOORING AND CLADDING WORKS**

#### **NOTES :**

- 3 No work shall be started until the concealed conduit piping, drains etc. are laid by the other agencies prior to commencing, shall be got approved in writing by the Site Engineer/Architects representative.
- 4 The rate quoted shall include :
  - a) Cleaning and final preparation of base, sub-grade or sub-floor by trimming style undulation etc. including supplying neat cement slurry.
  - b) Use and waste of all temporary fillets, side forms, templates moulds, straight edges.
  - c) Laying floors at all floors to required slope in any size and shape of panels made either by wooden side forms or strips of any description. The strips shall be paid for separately if not included in the nomenclature of the item.
  - d) Samples of any type of flooring shall not be paid for.
- 5 All stone slabs for floors, treads and risers of steps skirting wall cladding etc. shall be machine cut and as per approved sample. Nothing extra shall be paid for machine cut slabs and all exposed edge of stone shall be repolished.
- 6 Samples of Granite, shall be got approved from the Architect before bulk purchase is made.
- 7 Granite stone shall be free from grinding stone marks and scratches etc.
- 9 Rate shall include cutout made in stone /tiles for any fixture in filling etc.
- 10 All finishing sample shall be submitted along with the bid on display board.
- 11 Contractor shall submit the shop drawing of Dholpur cladding work to the Architect/Project Manager for their approval, within 7 days of confirming the items. The drawings must indicate construction details, materials, fixing clamps etc

**STEEL WORK:**

**The rates for all items under this section include :**

1. Steel forging, reducing to required shape, size and figure, drilling, tapping, counter sinking for screws, filling etc. and satisfactory workmanship required to fabricate, finish, erect and fix in position, all structural steel and iron in a good and perfect manner.

Providing all bolts and nuts including holding down and anchor bolts, round, squared or tapered washers, anchor plates, rivets, packing pieces, gusset plates, cleats, wedges, brackets, separators etc. (net weight to be computed and paid).

3. Welding as per specifications and drawings but weight of welds not to be paid.
4. Weight of various members to be taken as standard ISI weights. No allowances being made for rolling margins in steelwork.
5. Providing all spikes, nails, service bolts, clamps, jigs etc.
6. Making all necessary templates patterns moulds and platforms for layout etc.
7. All smithy work, unloading, getting in, hoisting, erecting and fixing in position at all heights and locations.
8. Painting two topcoat of Red oxide primer before hoisting and erecting in position.  
All the provisions mentioned in schedule of owner supply material as mentioned in General Conditions of Contracts.
9. Before the fabrication of any steel works at site a sample for the same should be prepared and duly approved to the satisfaction of the architect/project manager.

<b>BILL OF QUANTITIES</b>					
<b>S.NO</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>UNIT</b>	<b>RATE</b>	<b>AMOUNT</b>
	<b>ALUMINIUM GLAZING WORK</b>				
1.0	<b>Ribbon type Fix Aluminium Window</b>				
	Providing and fixing windows as per the elevation drawings enclosed, fabricated out of heavy duty aluminium extruded profiles ( INDAL / HINDALCO/ BHORUKA ) powder coated as per approved shade (50 ± 5 micron) and specification with visible mullion and transom (Ribbon type) from inside and decorative Aluminium Caps on the outside as shown in elevation including providing Masking Tapes on the profiles for safety against external scratches at site (Masking Tapes to be removed only at the time of handing over as per the instructions of Project Manager).				
	The fabrication shall be done with all the joints mitred; the Outer Frames and Mullions jointed with appropriate Stainless Steel Screws				
	Appropriate profiles of EPDM gaskets shall be inserted between aluminium frames/beadings and glass; as well as both inside and outside around the periphery of the shutters, to make the windows air and water tight.				
	The fixing shall be done on existing aluminium rough ground (already fixed and paid separately) at anchorage locations, in jambs, sills and heads by drilling holes with an electric drill, inserting PVC sleeves and Stainless Steel Counter sunk screws of appropriate size to provide a minimum of 50 mm to 80mm anchoring in the masonry.				
	The entire periphery shall be sealed by application of approved weather silicon sealant between the aluminium and masonry from both outside and inside to make the windows water tight.				
	(Cost of glass including labour element for glass, stacking, carrying to heights and fixing in appropriate locations is to be included in the rate) as per the details given below:-				
	Windows with 23mm thick hermetically sealed glass ( 6mm thick clear toughened glass+ 12mm air gap+ 5mm thick clear toughned glass) sealing with approved non staining silicon sealant where as required as per drawing. (NORTH ELEVATION, 1st to 4th floor)	615	sqm		

S.NO	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
2.0	<p>Providing and Fixing of Semi Unitized system glazing, fabricated out of heavy duty aluminium extruded profiles (INDAL / HINDALCO/ BHORUKA) powder coated as per approved shade (50 +/- 5 micron) comprising of visible mullion and transom on the inside and decorative Aluminium Caps both horizontally &amp; Vertically on the outside as shown in elevation, with mullions fixed to existing beams/columns through adequately designed GI brackets. The curtain wall system is based on rainscreen and pressure equalised drainage. The complete drainage system is incorporated in the design which drains water at every transom in the unlikely event that water penetrates the pressure seal.The system includes 23mm thick hermetically sealed glass ( 6mm thk clear toughened glass + 12mm thick air gap + 5mm thick clear toughned glass) sealing with approved non staining silicone sealant, complete with specially designed extruded EPDM gaskets etc. to prevent water penetration as per standards.</p> <p>The item also including Masking Tapes on the profiles for safety against external scratches at site (Masking Tapes to be removed only at the time of handing over as per the instructions of Project Manager/ Architect). (NORTH ELEVATION, GF TO FF LEVEL)</p>	132	sqm		
3.0	<p>Providing and Fixing of Semi Unitized system glazing, fabricated out of heavy duty aluminium extruded profiles (INDAL / HINDALCO/ BHORUKA) powder coated as per approved shade (50 +/- 5 micron) comprising of visible mullion and transom on the inside and decorative Aluminium Caps horizontally on the outside as shown in elevation, with mullions fixed to existing beams/columns through adequately designed GI brackets. The curtain wall system is based on rainscreen and pressure equalised drainage. The complete drainage system is incorporated in the design which drains water at every transom in the unlikely event that water penetrates the pressure seal.The system includes 23mm thick hermetically sealed glass ( 6mm thk clear toughened glass + 12 mm air gap + 5mm thick clear toughned glass) sealing with approved non staining structural silicone sealant, complete with specially designed extruded EPDM gaskets etc. to prevent water penetration as per standards.</p> <p>The item also including Masking Tapes on the profiles for safety against external scratches at site (Masking Tapes to be removed only at the time of handing over as per the instructions of Project Manager/ Architect). ( EAST, WEST, SOUTH ELEVATION , GF TO FF LEVEL)</p>	260	sqm		

S.NO	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
4.0	Providing and fixing openable shutter made of extruded aluminium section, in existing frame with the help of self balancing friction stays sufficient to take the load of shutter with glass as shown in drawing. The framing shall be design as such that aluminium frame should not visible from outer side . Four point locking system shall be provided to the shutter openable with Ellen Key. (Shutter area to be measured for payment.)	11	sqm		
5.0	Designing, Providing and fixing Frameless glazing of 12mm thick clear toughned glass .The system shall be supported with stainless steel U- channel fixed ground level and SS Spider fittings of "RODAN" Dorma make.All holes in glass shall be drilled with CNC machine. The system is also supported with glass fins upto suitable height from ceiling level.All the stainless steel fixture shall of 316 grade with life time warranty.All the anchoring shaal be Hilti/Fisher/ Canon grouting system with RCC. All glass thermal expansion joints to be sealed with clear UV proof structural silicon sealents.All Gaps between glass and RCC members to be sealed with non-staining weather sealant. ( ENTRANCE AREA)	53	sqm		
6.0	<b>ALUMINIUM GLAZED DOOR</b>				
	Providing and fixing openable door shutter as per the elevation drawings enclosed, fabricated out of heavy duty aluminium extruded profiles ( INDAL / HINDALCO/ BHORUKA ) powder coated as approved shade (50 +/-5 micron) as per approved shade as per specification including providing Masking Tapes on the profiles for safety against external scratches at site (Masking Tapes to be removed only at the time of handing over as per the instructions of Project Manager).				
	The fabrication shall be done with all the joints mitred; the Outer Frames jointed with appropriate Stainless Steel Screws and Shutter Frames jointed with Heavy Duty Aluminium Angle / Cleat / box sleeve and Stainless Steel Screws.				
	Appropriate profiles of EPDM gaskets shall be inserted between aluminium frames/beadings and glass; as well as both inside and outside around the periphery of the shutters, to make the glazing air and water tight.				
	The fixing shall be done on existing aluminum rough ground (already fixed and paid separately) at anchorage locations, in jambs, sills and heads by drilling holes with an electric drill, inserting PVC sleeves and Stainless Steel Counter sunk screws of appropriate size to provide a minimum of 50 mm to 80mm anchoring in the masonry.				
	The entire periphery shall be sealed by application of appropriate silicon weather sealant between the aluminium and masonry from both outside and inside to make the door glazing water tight.				

S.NO	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	Openable shutters shall be provided with appropriate number of heavy duty floor spring of approved make, snap on aluminium beading, necessary hardwares such as aluminium handles, cylindrical locks, door stopper, stainless steel fixing screws with anchor sleeves of FISCHER or approved equivalent make as per design and drawing.				
	Fully openable door with 23mm thick hermetically sealed toughned glass ( 6mm thick clear toughned glass +12mm air gap + 5mm thick clear toughned glass) as per drawing. (SOUTH ELEVATION ,GF LEVEL)	13	sqm		
7.0	Providing and fixing 12mm thick clear toughened frame less glass doors in entrance area. The doors shall be fitted with imported patch fittings with floor spring, floor lock, top and bottom Patch fittings, Strike plate, side and over panel fitting etc. The item also include 38x1200mm SS handle etc.complete in all respect as shown in the drawing.All hardware shall be in SS of Dorma or approved make.	5	sqm		
8.0	<b>Casement Window</b>				
	Providing and fixing casement windows as per the elevation drawings enclosed, fabricated out of heavy duty aluminium extruded profiles ( INDAL / HINDALCO/ BHORUKA ) powder coated as approved shade (50 ± 5 micron) as per specification including providing Masking Tapes on the profiles for safety against external scratches at site (Masking Tapes to be removed only at the time of handing over as per the instructions of Project Manager).				
	The fabrication shall be done with all the joints mitred; the Outer Frames and Mullions jointed with appropriate Stainless Steel Screws				
	Appropriate profiles of EPDM gaskets shall be inserted between aluminium frames/beadings and glass; as well as both inside and outside around the periphery of the shutters, to make the windows air and water tight.				
	The fixing shall be done on existing aluminium rough ground (already fixed and paid separately) at anchorage locations, in jambs, sills and heads by drilling holes with an electric drill, inserting PVC sleeves and Stainless Steel Counter sunk screws of appropriate size to provide a minimum of 50 mm to 80mm anchoring in the masonry.				
	The entire periphery shall be sealed by application of approved weather silicon sealant between the aluminium and masonry from both outside and inside to make the windows water tight.				
	Fixed Window with 23mm thick hermetically sealed glass (6mm thick clear toughened glass + 12mm air gap + 5mm thick clear toughened glass) as per drg. ( EAST, WEST, SOUTH ELEVATION , FF TO FOURTH FLOOR LEVEL )	503	sqm		



S.NO	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
9.0	Designing, providing and fixing Aluminium Fins of 600mm to aluminium frame. The shape and size of Fins shall be as per drawing and as per approved sample . The finishing of Fins shall be the same as that of aluminium frame. The item also including providing Masking Tapes on the profiles for safety against external scratches at site (Masking Tapes to be removed only at the time of handing over as per the instructions of Project Manager/ Architect).	548	sqm		
10.0	<b>Smoke Seal</b>				
	Providing and Fixing 100mm deep, sufficient in width, smoke seal made up of 22 SWG thick G.I. sheet cover, filled with glass wool of density 48 kg/m <sup>3</sup> of M/s U.P. Twiga Fiber Glass Ltd. or approved equivalent, with structural building work and curtain wall transom and sealed by approved sealant including preparation of surfaces and angles to hold smoke seal, if required complete. If desired by client/ PMC, the contractor has to test the smoke seal after installation without extra claim.	225	Rmt		
11.0	<b>Flashing</b>				
	Providing and fixing Aluminium Flashing all-around the opening (pelmet / cill/ vertical sides) level made out of 1 mm thick Aluminium sheet bent to required profile and shape to seal the soffit/ cill (detailed drawing of this flashing including its proposed fixing arrangement to be submitted for the approval of the Architect), including fixing to GI framework / RCC members / masonry the fixing shall be done by drilling holes with an electric drill, inserting PVC sleeves, with at least two rows of screws under the Beam bottom with stainless steels screws of 8 x 38 mm at a spacing of 300 mm and necessary silicon if required.	30	sqm		
12.0	Providing and fixing 4mm thick Aluminium Composite cladding over RCC surface either segmental / straight in plan wherever specified with extruded aluminium U sections, angle cleats, weather sealants, backer rods of required size, stainless steel screws, rivets, brackets, drilling and fixing the cladding to either masonry or reinforced cement concrete as the case may be as per manufacturer's specifications, complete the work in all respects including all necessary accessories. At all soffits Aluminium Cladding shall be bend at 900 and joints at corner or edges will not be acceptable. On horizontal surface, the size of sheet should be maximum available of size.	480	sqm		

S.NO	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
13.0	Providing and fixing 4mm thick Aluminium Composite panel cladding over MS Frame as per required profile including necessary frame work with segmental / straight/ round extruded aluminium U sections, angle cleats, weather silicone sealants, stainless steel screws, rivets, brackets, plaster board for thermal separation, drilling and fixing sheet to MS frame work [MS frame work shall be done by civil contractor] as per specifications, complete the work in all respects as per drawing including all necessary accessories. At all soffits Aluminium Cladding shall be bend at 90° joints at corner or edges will not be acceptable.	480	sqm		
	Note - Aluminium composite panel consisting of a core of Polyethylene sandwiched between two aluminium skins of 0.5 mm thickness with a mild edge, 4mm total thickness with surface finish of fluorocarbon protective colour coating as approved by the Architect, as shown in the elevation, plan and cross section drawings alongwith labour element for cutting stacking, carrying to heights and fixing to appropriate locations is included in the rates.				
14.0	Providing and fixing aluminium louvered/ grill made of Powder coated(50+/- 5 micron) extruded aluminium section of approved colour and shade and other parts reinforced with polyamid clips. The item includes SS wire mesh from inside and louvered strips pitch of 75mm with appropriate number of mullions, as approved by Architect.	25	sqm		
15.0	Extra for using 23mm thick hermetically sealed glass ( 6mm thick sunergy green toughened glass+ 12mm air gap+ 5mm thick clear toughned glass) instead of 23mm thick hermetically sealed glass ( 6mm thick clear toughened glass+ 12mm air gap+ 5mm thick clear toughned glass)	1523	sqm		
	<b>TOTAL</b>				