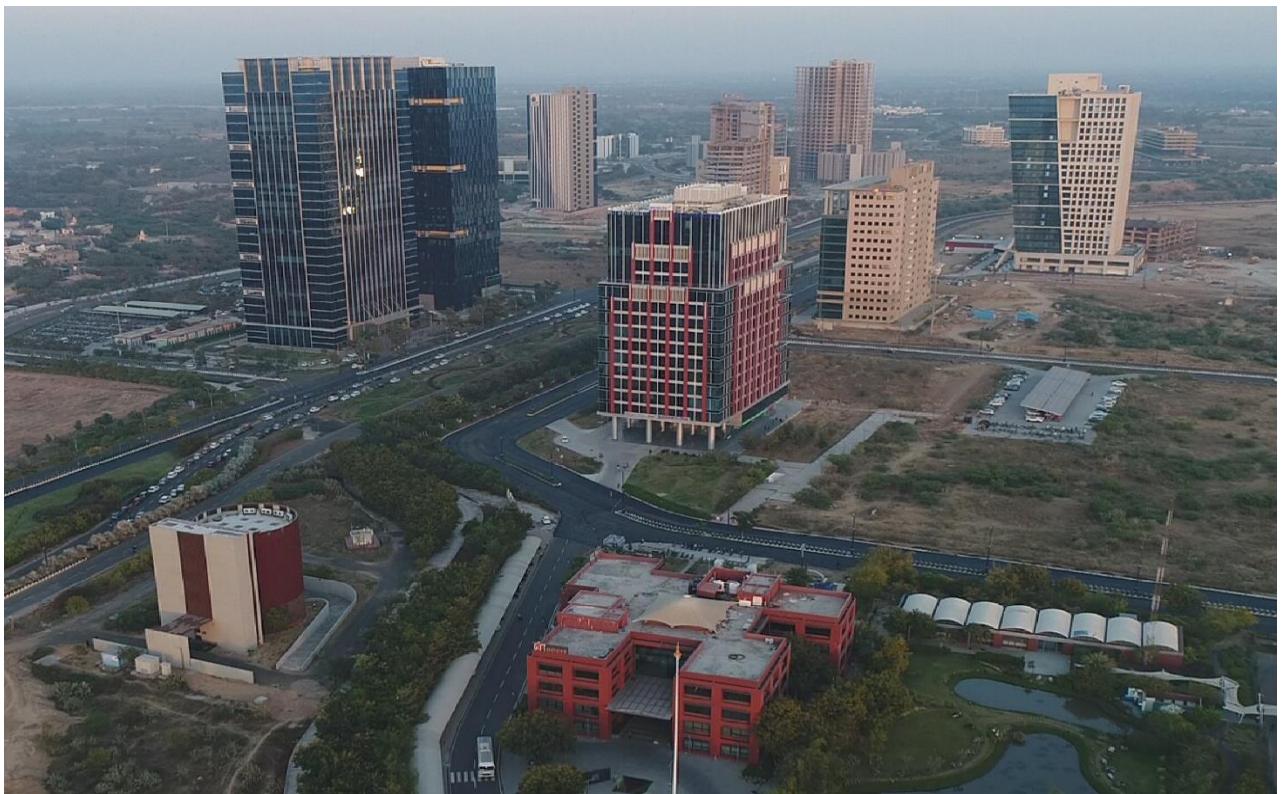

QUALITY ASSURANCE & QUALITY CONTROL (QA & QC) GUIDELINES FOR BUILDING CONSTRUCTION IN GIFT CITY



June 2022

Quality Assurance & Quality Control (QA&QC) Guidelines for Building Construction in GIFT City

Version: - R0

Prepared by
Durgesh Pandey
Manager - PA&E

Reviewed by
Mr. Kinjal Trambadia
GM- Building & Structures (PA&E)

Approved by
Mr. Loveleen Garg
Chief Planner

PREFACE

GIFT DCR, as well as **Handbook for Developers**, mandates periodic inspections/site visits by GIFT at Developer sites. In line with this, GIFT continuously strives to update & refine the processes. These quality guidelines are one of the essential steps in that direction, under the ambit of GIFT role.

Being in the midst of such a large-scale high-rise construction with numerous Developers on board, it was highly needed to set up & standardize the inspection processes, pertaining to construction activities. With various developers on board, having their varying expertise levels and respective processes, it was necessary to homogenize the process.

The guidelines & information mentioned here, is for maintaining quality standards in certain critical phases of the construction process of Projects, in compliance to relevant Indian Standards. This document encompasses necessary guidelines required for the construction projects. It is framed in line with provisions of relevant IS codes & other Govt. bodies. Starting from the Development Permission (DP), till Occupancy Certificate (OC) stage, it keeps a check on the processes followed and ensures strict compliance of standard quality processes in construction. It entails material checks, process checks, preventive control as well as corrective control. These checks and balances will in turn lead to development of long-lasting national assets.

With introduction of these guidelines, GIFT is making an endeavor to demonstrate commitment and continual efforts towards improvisation the construction quality standards.

Loveleen Garg
Chief Planner - GIFT City

Table Of Contents

I. Background.....	4
II. QA/QC Framework.....	5
1. Purpose.....	6
2. Scope.....	6
3. Plan Objectives.....	6
4. QC Organization.....	7
5. QC Personnel Authority.....	7
6. Responsibilities of QC Manager.....	7
7. QC Meetings.....	8
8. On-Site Inspections.....	8
9. Off-Site Quality Control.....	8
III. Site Visit Guidelines.....	11
IV. Inspection & Testing Plan (ITP).....	15
V. Project Review Meeting Guidelines.....	18
VI. Technical Requirements of TMT bars	20
VII. Structural steel Guidelines.....	26
VII. Annexures.....	29

I. Background

The Vision of the GIFT City is” To develop a global financial hub for international and domestic financial services which will serve as a paradigm for Next Class Development in terms of Quality of Life, Infrastructure, and ambience, utilizing Land as a precious resource.”

GIFT City is being developed as a global financial and IT/ITES hub in the state of Gujarat, a first of its kind in India. GIFT has been planned as a city with next generation infrastructure and real estate including commercial high-rise business districts, quality residential housing, retail, and recreational spaces.

GIFT City is unique in many ways. One of it is being setting up India’s first IFSC. With so much uniqueness and versatility, associated to this Project, its highly desirable to have full-fledged Quality Assurance Plan for the same, within the ambit of GIFT role. The pace of the Projects & the scale of construction in this city, enabled us to come up with various measures aimed at increased monitoring and quality control of construction. It encompasses various standard initiatives covered herein, to assess the Project Quality continuously and progressively, from Development Permission (DP) stage till Occupancy Certificate (OC) stage.

II.

QA&QC Framework

1. Guideline Objectives

This QA&QC Guideline is applicable to all the works to be performed in the Projects, spanning from DP, till OC stage, with special emphasis on significant critical milestones, as defined in *Site Visit Guidelines*. The program involves the strict adherence and implementation in compliance with the specification for all construction activities, which comprises of following but not limited to:

- Field and off-site inspections (material and executed work)
- Project Review Meetings
- Monitoring and inspection of field construction works.
- Documentation and record quality control filing system.
- Periodic RMC Plant inspections.
- Reporting to Top Management.

2. Quality Control Organization

The QA/QC functionary will operate as a separate and independent section, as shown below in Fig.1 within the PA&E Department, and its duty being to ensure conformance to applicable standards, specifications, and drawings with respect to materials, workmanship, construction, finish & functional performance, providing a state that assures the end product complies with specifications.

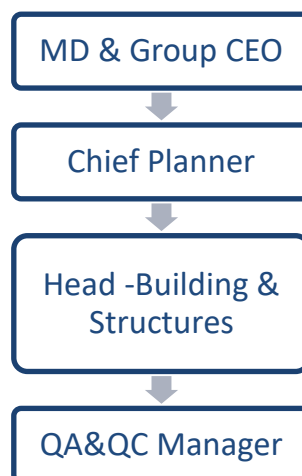


Fig.1- QA&QC Hierarchy

3. Quality Control Personnel Authority

3.1 Head -Building & Structures (PA&E) may at any time stop any work-in-progress, not fully complying with the quality standards and GDCR requirements. In stopping any sub-standard work, a formal communication to the Developer's Project Manager will be done. Work will not proceed until these unsatisfactory conditions have been rectified/corrected.

3.2 There must be full authority to implement all aspect of the QC Program including authority to reject non-complying work is vested to Quality Control personnel.

3.3 Any non-compliance will be corrected, and the QC Manager shall be notified accordingly, before concealment of such work.

4.Responsibility of the QC Manager

4.1 QC Manager

- a. Coordinate with Developer regarding quality matters.
- b. Ensure that all relevant Site Inspections/Visits are carried out as per Guidelines.
- c. Ensure that material testing (onsite & NABL Labs), are performed as per ITP.
- d. Maintain records of QC activities and ensure all relevant documents are submitted by Developers as per agreed timelines.
- e. To deal directly with Developer's PMC for timely correction/rectification of identified non-conformities.

5.QC Meetings

Meetings are an integral part of Quality Guidelines, and it provides a platform to assess the process regularly. These meetings to be conducted under purview of **Project Review Meetings**. In the last week of the passing month, a meeting to be conducted with Developer's PMC. Process guidelines & essential points of the meeting is attached separately at Annexure...

6. On-site Inspections

6.1 QC manager shall inspect the Structure elements, as per the milestone laid down in **Site Visit Guidelines**. All the necessary pre-checks of the mentioned elements, to be carried out in accordance with relevant Indian & International Standards. Post – Check of the Structural elements also to be carried out as per the laid frequency. Site Lab tests on RCC input materials, as well as concrete may also be witnessed by QC Manager at his discretion.

6.2 QC manager shall be aware at all times of the progress of work on each individual Project and shall carry out all necessary visits and inspections.

6.3 The QC section will be constantly aware of the stages of construction on each Project and prior to start of new phases, ensure that all the necessary inspections, reports & other relevant documents have been submitted and approved.

6.4 Site RMC plant and external RMC plants, along with other manufacturing/testing facilities, also to be periodically inspected, as defined in **Site Visit Guidelines, ITP** and as per relevancy. Calibration reports of the equipment to be inspected. It is to be done by independent body, specifically NABL accredited labs. A record showing the necessary information regarding the calibration of equipment should be available at respective sites.

7. Off-Site Quality Control

7.1 Revision/Changes, and /or Substitute for Specified Items Procedure

Proposal by Developer for revisions/changes and/or substitution to specific items must clearly indicate any impact on quality and performance and shall only be incorporated, after due deliberations with manufacturer, Structural Consultant, PCC and GIFT In-house QC Team.

7.2 Provisions of Samples, Calculations and Test Certificates by Suppliers/Manufacturers

a) Samples, Calculations, and/or certificates shall be provided by the Manufacturer/Supplier/Developer's PMC, as per requirements mentioned in ITP.

8. Quality Control Guidelines for the following: -

8.1. Control of Documents

All incoming documents will be properly stored. Hard copies to be filed project-wise and soft copies also to be stored suitable. Whenever, there is a change or revision of documents such as procedures, instruction, the obsolete documents will be removed and discarded. The new or revised documents will take the place of the old documents. All concerned stakeholders will be advised of the change and will be issued a copy of the new revised document.

8.2. Control of Non-Conformance

1. During the course of construction, if something diverts or does not meet project specifications, GIFT DCR, approved drawings or other IS Codal provisions, a non-conformance report will be issued. A non-conformance report form will be filled up in standard format (See Annexure...10.), stating the description of NCR, disposition of NCR, cause of NCR and actions taken to prevent its recurrence. Any work connected with activity, material with the NCR will be stopped until a satisfactory corrective action has been taken. The correction of the NCR shall be rework, repair, reject or use as is depending on the decision of GIFT QC Team/PCC.

2. The NC will be subject to reinspection, reverification by GIFT QC /PCC. If the corrective actions found satisfactory, it can be declared closed. A file to record the NCRs should be maintained, to have a proper tracking from date of issuance to close out date.

8.3 Record Control

All quality control documents will be filed in a cabinet. Each file has labels to show the contents and to ensure easiness in picking which file is needed. All quality control records are open for verification and perusal of concerned personnel.

III. Site Visit Guidelines

Site visit Guidelines for GIFT City

PCC & QA/QC visits at Developer' Projects in GIFT City

Sr. No.	Building Levels		PCC Visits with GIFT Official	GIFT Official QA/QC Visits
1	Substructure	Foundation/Raft	Raft (2 No.)	
		Basement Slabs	First or Second Basement (1 No.)	Every basement Slab
2	Superstructure		First, Fourth, Eighth, Twelfth, Terrace Slab (5 No.)	Every Slab before concrete pouring
3	Façade		Half & Full Completion (2 No.)	

Points to be Inspected during Visit:

A. PRE-CHECKING

1. Before Concreting: -

- Reinforcement binding as per approved GFC drawing.
- Shuttering of the corresponding RC element.

2. During Concreting: -

- Concrete Sampling
- Workability check on concrete.
- Random verification of batch-ticket with approved Mix Design.
- Workmanship and compaction process at slab.

B. POST CHECKING: -

- Visual check on preceding casted elements (Slab/columns etc.) for issues such as shrinkage cracks, honeycombs, verticality/horizontality etc. During post check, certain prominent issues are more bound to happen, which are as follows:
 - Shrinkage cracks
 - Honeycombing

- Failed cube results /doubtful results etc.

In such cases further actions to follow as per provisions of IS 456. These issues and recommended corrective actions will follow as per below mentioned guidelines: -

- **Honeycomb issues:** - Minor honeycombs occurring at sites to be well cleared of loose concrete and to be preferably, treated with micro concrete, in the presence of PMC/Quality Engineer at site.
- **Major Honeycombs/Cube test failures:** - As per IS 456, Non-Destructive Tests (NDT) can be conducted on those members. These are used to obtain estimation of properties of concrete in the structure. The methods adopted include ultrasonic pulse velocity (IS 13311 -Part 1) and Rebound hammer (IS 13311 -Part 2), probe penetration, pull-out, and maturity. These tests also provide alternative to the **Core Tests**, for estimation of concrete strength in a structure.
- **Core Tests:** - As per IS 456, In case of doubt regarding grade of concrete used, either due to poor workmanship or based on the result of cube strength tests, compressive strength test of concrete can be carried out by Core Tests or Load Tests. Core test to be carried out as per IS 456 Clause 17.4.1 to 17.4.3.

C. QUALITY WALK-THROUGH AT SITE

At the time of QA/QC visit, there will be a short quality walk-through at site testing laboratory & In-house Batching plants. This quality walk-through encompasses following: -

1. Site Testing Laboratory

- Inspection of cube test reports (28 days only) of preceding casted slabs/RC elements
- Material test reports as per IT&P. (Both site lab & NABL accredited labs).
- General site quality preparedness.

All the inspection processes to be followed, as per the mandate of the checklists attached in the Annexures (Refer Pg.29)

2. Batching Plant/RMC visits

RMC plants – both inhouse as well as external, to be visited as per the frequency laid down by GIFT. All the in-house batching plants of developers to be visited **quarterly** in a year. Quality controls to be exercised, for RMCs are as follows: -

a) Forward Control

- Control of material quality- Visual checks, sampling and third-party testing and certification from material suppliers conforming to Indian Standards.
- Mix Design & Mix Design modifications records to be maintained at the Plant.
- Calibration records of transfer and weighing equipment, to be maintained.
- Plant Mixers & Truck Mixers must be well maintained.

b) Immediate Control

➤ Production Control

- Production of concrete shall be in accordance with the specifications and requirements, of QAP and relevant Indian standards.
- Workability of the concrete shall be controlled on a continuous basis during production and any corrective action necessary taken.
- For each load printed records shall be made of the mass of materials batched, the estimated slump, the total amount of water added to the load, the delivery ticket number for that load and the time, concrete was loaded into the truck.

➤ Product Control

- Concrete mixes shall be randomly sampled and tested for workability, and where appropriate Plastic density, temperature, and Air content. Where significant variations from target values are detected, corrective actions shall be taken.
- It is important to maintain the water-cement ratio constant at its correct value. Any deviations observed, shall be taken care in forward control, by suitable modifications to the Mix Design.

c) Retrospective Control

➤ Mix Performances

- The system shall include continuous analysis of results from test cubes to compare actual with target values together with procedures for modifying mix proportions to correct for observed differences.

➤ Complaints and Redressal mechanism

- The Plant shall have a procedure in place to enable the diagnosis and correction of faults identified from complaints.

IV. Inspection & Testing Plan (ITP)

INSPECTION & TESTING PLAN - GIFT CITY PROJECTS						
ACTIVITY	CHARACTERISTICS	SPECIFICATIONS	REQUIREMENT AS PER SPECIFICATIONS	FREQUENCY	MONITORING RECORD	REMARKS
Calibration of machines/ Equipments						
Calibration of Compression Testing machine	Calibration of dial gauge	As per manufacturer's recommendation	As per manufacturer's recommendation	Once in 6 months/Upon relocation	Calibration Report	
Batching Plant	Accuracy of measurements					
Materials						
Cement						
Physical properties	Fineness	As per respective applicability of IS456/IS 12269/IS 8112/IS 4031	Not less than 225m ² /kg	Once in 3 months on random sample for every brand	NABL Lab Test certificate	
	Soundness Test		Expansion shall not be more than 10mm			
	Standard consistency		30 mins.			
	Initial Setting Time(min.)		600 mins.			
	Final Setting Time(max.)		As per IS , grade wise			
	Compressive Strength					
	7 days(Avg. of 3 specimens) 28 days(Avg. of 3 specimens)					
Testing of River Sand						
Physical Properties	Gradation of sand	As per respective applicability of IS 383-1970 (RA 2002) & IS 2386-1963(Part I to VII- RA 2002) , IS 10262	Percentage passing through standard sieves-Sieve Analysis	Weekly once at site lab & at three months from NABL Lab .	Site lab report & NABL Lab test certificate	
	Moisture content		clay,silt,salt,mica,organic matter	Daily at site lab	Site lab report	
	Deleterious material		Once in 3 months/upon change of source by NABL Lab	NABL Lab Test Certificates		
	Silt content		Max 3% (by weight)	Weekly once at site lab & at three months from NABL Lab .	Site lab report & NABL Lab test certificate	
	Specific Gravity and Density			At every 3 months by NABL Lab.	NABL Lab Test Certificates	

INSPECTION & TESTING PLAN - GIFT CITY PROJECTS						
ACTIVITY	CHARACTERISTICS	SPECIFICATIONS	REQUIREMENT AS PER SPECIFICATIONS	FREQUENCY	MONITORING RECORD	REMARKS
Testing of Coarse Aggregates						
Physical properties	Gradation of Coarse Aggregates	As per respective applicability of IS 383-1970 (RA 2002) & IS 2386-1963(Part I to VII- RA 2002)	Percentage passing	Weekly once at site lab & at three months from NABL Labs.	Site Lab report & NABL Lab Test Reports	
	Crushing Value		Shall not exceed 45% for concrete for non-wearing surface and 30% for wearing surface	Once in three months /upon change of source by NABL Labs.	NABL Lab test report	
	Impact value		do			
	Abrasion Value		Shall not exceed 50% for concrete for non-wearing surface and 30% for wearing surface			
	Water Absorption(%)		A good aggregate should not absorb water more than 5% by weight of water after 24hrs.			
	Flakiness Index			Monthly at site & Once in three months/upon change of source by NABL Labs	Site Lab report & NABL Lab test reports.	
Reinforcement Steel						
Physical Properties	Nominal Mass	As per respective applicability of IS 1786,IS 1608, IS 1599,IS 228 (latest Revisions)	Table 2 of IS 1786	Every consignment	MTC & NABL Lab Test Certificates	
	0.2% Proof Stress		Table 3 of IS 1786			
	Ultimate Tensile Stress		Table 3 of IS 1786			
	Elongation		Table 3 of IS 1786			
	Bend & Rebend Test		No cracks			
Chemical Properties	Carbon(%)		As per IS 228			do
	Sulphur(%)	do				
	Phosphorous(%)	do				
Admixture				Every batch/upon change of brand	MTC	

INSPECTION & TESTING PLAN - GIFT CITY PROJECTS						
ACTIVITY	CHARACTERISTICS	SPECIFICATIONS	REQUIREMENT AS PER SPECIFICATIONS	FREQUENCY	MONITORING RECORD	REMARKS
Water						
	pH value	As per IS 456:2000 & IS 3025/3550 (Latest Revisions)	Shall not be less than 6(6-9)	Every 6 months	NABL Lab test Certificates	
	ml of 0.02N NaOH consumed to neutralise 100ml of water using phenolphthalein as an indicator		Shall not be more than 5ml			
	ml of 0.02N H2SO4 consumed to neutralise 100ml of water using methylorange as an indicator		Shall not be more than 25ml			
	Inorganic solids(mg/l)		As per Table 1 of IS 456			
	Sulphates(mg/l)					
	Chlorides(mg/l)					
	Organic Solids(mg/l)					
	Suspended Solids(mg/l)					
RMC						
	Design Mix for all concrete grades in use at site	IS 456:2000, IS 4926, IS 516,		Project Start /Change of parameters		
	Concrete sampling(Cubes)			Every pour as per IS 456	Site	
	Workability (Slump check)			Every pour , as required.	Site	
	Cube test (Compressive Strength of Concrete)			28 days compressive strength test report	Site lab/NABL Lab	
Note: Water used from GIFT supply , need not furnish test reports.						

V.

Project Review Meeting Guidelines

Background

GIFT city is a rapidly growing city with numerous projects on board. The pace of the Projects & the scale of construction in this city, enabled us to come up with various measures aimed at intensive monitoring and quality control of Construction. It encompasses various initiatives such as *Site Visit Guidelines*, *Inspection Testing Plan (ITP)*, *RMC Plant inspections*, *General Quality walk-throughs at Developer sites etc.* In continuation of the above, it has been decided to conduct Project Review Meetings (PRMs), with the Developer's PMCs, to assess the Project Progress, Quality, and other general compliances.

Guidelines: -

- These PRMs to be conducted quarterly at GIFT office.
- Developer's PMC, to be the required attendee.
- To be preferably conducted in the last week of month of respective quarter. Dates of the same will be intimated to respective developers by GIFT, well in advance.
- There must be a brief presentation by Developer's PMC, on the quarterly progress, quality compliances and project Schedule.
- Presentation to be followed by discussion on various aspects of the process followed. Best Practices, Non-compliances (if any) and necessary corrective actions to be discussed.
- Any other issues whether external or internal impeding the quality compliance, to be discussed.

Essential subjects of the Meeting/Presentation (Max. 10 to 12 Slides): -

- A brief introduction on Project Progress.
- Internal Quality Inspections.
- Best practices followed at site.
- List of Non-Conformance Reports & Corrective actions taken.
- Internal RMC plant inspection Reports.
- Site Photographs
- 3 months look-ahead Schedules & Past milestone achieved.
- Site Quality Trainings to Manpower.

VI.

Technical Requirements of TMT Reinforcement Bars

A. Eligibility Criteria of Steel Vendors: -

I. Developer is required to purchase TMT reinforcement from reputed primary vendors. “The vendor from whom the steel is procured ,should be a producer of steel, irrespective of process route, starting their operations from iron making, using iron ore, virgin or processed, with necessary refining facilities/ methodology and rolling / processing facilities at a single location or else in multiple locations provided that the entire gamut of iron & steel production, from iron making to finished steel production, is owned by the same company or its subsidiary company(ies) and provided that the iron making capacity is sufficiently matching the steelmaking capacity. Further, downstream units should use material from the upstream units of the same company or its subsidiaries with traceability system”.

II. The vendor had already produced minimum 50,000 Metric Tonnes TMT Reinforcement bars in every year for the last 3 years. However, total production quantity 1,50,000 MT shall be considered up to last 36 months prior to the month of submission of application.

III. TMT reinforcement bars should comply to IS: 1786 (latest) as well as Para 5.3 of IS: 13920 (latest) for all seismic zones i.e., II, III, IV or V.

IV. For DRI – EIF process route of steelmaking – Firm should have refining facilities such as LRF or any other established technology of suitable capacity matching in line with the production of liquid steel for manufacturing of TMT reinforcement bars.

B. Requirements: -

Developer/Developer’s Contractor is required to submit below mentioned documents, fulfilling the technical requirements of TMT: -

1. Quality assurance Plan (QAP): - QAP should cover all the processes from raw material processing, till finished product. It should encompass manufacturing process, quality control

measures, internal inspection plan, details of tools and plant, system of maintaining the data of customer complaints/ warranty failures & details of testing equipment.

2.Certificate by Plant manufacturer/Plant Consultant: - It should certify that firm is producing raw steel from iron ore or processed iron ore and entire infrastructure for producing sponge iron, billet and TMT Reinforcement Bars using iron ore as the basic material at single / multiple locations by the same company or its subsidiary companies (with plant address details) with details of installed annual production capacity in terms of sponge iron, billets, and TMT Reinforcement Bars. It should also clearly mention the established process of Steel making at that plant.

3.Factory License: - Factory License showing work address and office address, to be presented.

4.MTCs & Third-party Test Reports: - The Developer shall have to obtain and furnish test certificates to GIFT, in respect of all supplies of steel brought by him to the site of work. In addition to the Manufacturer Test Certificates (MTC), Developer should carry out check on materials through third part NABL accredited labs for conforming to test results shown in MTCs so as to ensure the quality of steel supplied

5. Source of Raw Material: - All the sources of raw materials used in the production of steel, such as Iron ore, Coal, Limestone/Dolomite etc., to be presented by the Vendor.

6.Availability of BIS License: - BIS License for TMT Bars grade & dia. (IS 1786) and billets (IS 2830), should be made available, when asked for.

7. Supply to Govt.bodies/PSUs: - Vendor should make available past 3 years, supply, and approval record to Govt.bodies/PSUs, certifying them for supplying TMT Reinforcement bars.

Any brand of TMT Reinforcement bars, which are intended to be used By Developer, shall furnish documents satisfying above mentioned criteria. GIFT has the prerogative to conduct joint visit with Developer at Steel Plant facility, too, if required, to verify the credentials.

REFERENCES: -

1. Research Designs & Standards Organization (RDSO), Lucknow
2. Central Public Works Department (CPWD) SOPs.
3. IS 1786, IS 13920 & IS 2830

VII.

Structural Steel Guidelines

Introduction

Structural Steel is an integral part of the Projects herein, GIFT City. Its major application can be found in Façade Works, Truss Works, Entrance canopies, etc., along with other miscellaneous works. Respective Codal provisions, both from Indian as well as applicable international standards to be adhered to, for assuring designated strength & structural Stability of the members. Materials to be sourced from the primary vendors/manufacturers and no remelted/reframed steel to be used. The prominent members covered under this are – RHS, SHS, ISMC, ISMB, Plates, Hollow and solid circular sections, etc.

1.Materials, Inspection and Testing

All supplies of structural steel and other materials specified shall be supported by manufacturers Test certificates showing that the materials met the requirements of these specifications. GIFT Representative may require further sample tests.

2.Fabrication

2.1 Fabrication Drawings and Review

The fabrication drawings shall be prepared based on design drawings supplied by the designer. The fabrication drawings showing details of connection are required to be supported by the calculations showing adequacy of the connections. The fabrication drawings and calculations shall be prepared by qualified consulting engineer and fabricators.

2.2 Workmanship

Workmanship shall be as per prudent Industry practice, complying the relevant Indian and international codal provisions. The fabrication and testing shall be carried out by qualified operators.

2.3 Welding

Welding procedures and welder qualification shall be done in accordance with applicable provisions of the IS Standards. All welders must be qualified before employing them on the job

and requalified at frequent intervals. Welding tests such as **Dye penetration test, Radiography** etc., to be carried out as per stipulations of **IS 822** and other relevant IS codes. Frequency of the same, will be as per prudent industry practices, under the ambit of relevant IS codes.

2.4 Bolting

All the bolted connections must comply the requirements of Structural drawings, in terms of type of grip connection, grade of bolts and nuts, type of washers, material grades, etc. All fitters must be well trained for the job and periodic induction and training to be imparted to them. **Torque testing** to be done for the bolted connections, in case, it is mandated in the Structural Drawings, depending upon the type of connection.

2.5 Surface Preparation

All structural steel members shall be sand blasted to SA 2.5 grade or other applicable grades as per relevant Indian Standards, prior to applying primer, painting.

2.6 Painting

Type of primer, paint etc. to be clearly mentioned in the drawings. IS 2074 & IS 1477, may be referred to, for painting related guidelines. **Dry Film thickness (DFT)** test to be carried out, to ascertain the thickness of coating prescribed.

2.7 Material dispatch & Handling

Materials fabrication and painting etc., to be carried out at a designated location/yard. Before dispatching the materials, it should be properly wrapped and protected to avoid any dents /damages etc. Stacking at site /work locations, to be proper, preferably, on raised platforms.

References/IS Codes

IS 800 – Code of practice for use of structural steel in general building construction.

IS 822 – Code of practice for inspection of welds.

IS 1477 – Code of practice for painting of ferrous metals.

IS 3757 – High Tensile Friction Grip (HTFG) bolts.

IS 4000 – Code of practice for assembly of structural steel using HTFG fasteners.

VIII.

Annexures

Annexure-1
Inspection Comment Sheet

Name of Project: -

Name of Developer: -	RFI No.: -
Name of PMC: -	Report No.: -
Name of Contractor: -	Date of Inspection: -
Location of Inspection: -	Particulars: -
Time of Inspection: -	

Inspection Comments	
Next Inspection Date: -	Contractor's Representative: -
Next Inspection Time: -	PMC Representative: -
Remarks: -	

Annexure -2

Concrete Pour Plan

Name of Project:

Date of Pour:

Name of Developer:

Drawing Ref. No.:

A. Location of Concrete Pour

1. Structural Member: -

2. Grid Location: -

3. Sequence of Concrete Pour (to be shown in the dwg. attached) – Schematic Flowchart from concrete start point to complete point. To be marked in the drawing (blow up copy) and attached with this pour plan, highlighting the area of the pour.

B. Pour Details

1. Date & Time of Concrete Pour: -

2. Quantity of Pour: -

3. Duration of Pour: -

4. Source of Concrete: -

5. Grade of Concrete: -

6. Developer's Representative (Name & Contact No.): -

C. Quality Control

1. Quality Engineer (Name & Contact No.): -

2. Concrete cube moulds (nos.): -

3. Slump cone/ flow test apparatus availability: -

4. Vibrators (with extra needles): -

5. Rain protection measures – tarpaulin etc.: -

6. Survey instruments (for level cross-check etc.): -

D. Safety Measures

1. PPEs compliance at site: -
2. Sufficient illumination (During Night works): -
3. Scaffold inspection clearance: -
4. Fall protection measures: -
5. Emergency vehicle at site (Name of Driver & Contact No.): -

E. Observations on reinforcement & Shuttering, closed (Yes/No): - Final go-ahead status.

F. Remarks (if any): -

	Contractor – Site Engineer	Contractor- Quality Engineer	Contractor – Safety Inspector	PMC Representative	Client Representative
Signature					
Name					
Date					
Time					

Annexure -3

Aggregate Testing Format & Procedure

INTRODUCTION

Aggregates are an important constituent of concrete. Some of the important tests prescribed by relevant Indian codes are of paramount importance, to keep a check on quality of finished product i.e., Concrete. IS 383, defines the aggregates into 2 broad classifications: -

Coarse Aggregate: - Aggregates most of which is retained on 4.75mm IS Sieve and containing only so much finer material as is permitted for various types described in IS 383. Coarse Aggregates for mass concrete works, shall be supplied in sizes as specified in Table 2 of IS 383

TABLE 2 COARSE AGGREGATES

(Clauses 4.1 and 4.2)

IS SIEVE DESIGNATION	PERCENTAGE PASSING FOR SINGLE-SIZED AGGREGATE OF NOMINAL SIZE						PERCENTAGE PASSING FOR GRADED AGGREGATE OF NOMINAL SIZE			
	63 mm	40 mm	20 mm	16 mm	12.5 mm	10 mm	40 mm	20 mm	16 mm	12.5 mm
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
80 mm	100	—	—	—	—	—	100	—	—	—
63 mm	85 to 100	100	—	—	—	—	—	—	—	—
40 mm	0 to 30	85 to 100	100	—	—	—	95 to 100	100	—	—
20 mm	0 to 5	0 to 20	85 to 100	100	—	—	30 to 70	95 to 100	100	100
16 mm	—	—	—	85 to 100	100	—	—	—	90 to 100	—
12.5 mm	—	—	—	—	85 to 100	100	—	—	—	90 to 100
10 mm	0 to 5	0 to 5	0 to 20	0 to 30	0 to 45	85 to 100	10 to 35	25 to 55	30 to 70	40 to 85
4.75 mm	—	—	0 to 5	0 to 5	0 to 10	0 to 20	0 to 5	0 to 10	0 to 10	0 to 10
2.36 mm	—	—	—	—	—	0 to 5	—	—	—	—

IS : 383 - 1970

Graded coarse aggregates may be supplied in sizes as mentioned in Table 3 of IS 383.

IS : 383-1970

TABLE 3 SIZES OF COARSE AGGREGATES FOR MASS CONCRETE

(Clause 4.1.1)

CLASS AND SIZE	IS SIEVE DESIGNATION	PERCENTAGE PASSING
Very large, 150 to 80 mm	160 mm*	90 to 100
	80 mm	0 to 10
Large, 80 to 40 mm	80 mm	90 to 100
	40 mm	0 to 10
Medium, 40 to 20 mm	40 mm	90 to 100
	20 mm	0 to 10
Small, 20 to 4.75 mm	20 mm	90 to 100
	4.75 mm	0 to 10
	2.36 mm	0 to 2

*There being no IS Sieve having an aperture larger than 100 mm a perforated plate complying with IS : 2405-1963 and having a square aperture of 160 mm may be used.

Fine Aggregates: - Aggregates most of which passes 4.75mm IS Sieve and contains only so much coarser material, as is permitted in IS 383(Clause 4.3). The grading of Fine aggregates, when determined as described in IS 2386 (Part 1), shall be within the limits given in Table 4, and shall be described as Fine aggregates, Grading Zone I, II, III and IV.

IS : 383 - 1970

TABLE 4 FINE AGGREGATES
(Clause 4.3)

IS SIEVE DESIGNATION	PERCENTAGE PASSING FOR			
	Grading Zone I	Grading Zone II	Grading Zone III	Grading Zone IV
10 mm	100	100	100	100
4.75 mm	90-100	90-100	90-100	95-100
2.36 mm	60-95	75-100	85-100	95-100
1.18 mm	30-70	55-90	75-100	90-100
600 micron	15-34	35-59	60-79	80-100
300 micron	5-20	8-30	12-40	15-50
150 micron	0-10	0-10	0-10	0-15

1. Gradation Test (Sieve Analysis)

In order to get well graded aggregates & proper particle size distribution for concrete, IS 383 recommends, testing as per IS 2386(Part 1). The test procedure to be followed as mentioned in IS 2386(Part 1), and results to be reported in Table format as given below: -

S.No.	IS Sieve No. (As per aggregate type- Coarse/Fine)	Weight Retained (Kg/g)	Percentage wt. retained (%)	Cumulative percentage wt. retained (%)	Percentage passing (%)	Reference as per IS 383	Remarks

Note: - The result obtained must comply with specifications as mentioned in **IS 2386(Part 1)**.

2. Test for Moisture content (River sand)

Moisture content for aggregates, must be tested as per the procedure laid in **IS 2386 -Part III**. Result must be in compliance with the reference, mentioned, therein.

3. Test for Silt content/Deleterious material (River Sand)

Estimation of deleterious material to be done as **IS 2386- Part II**, and the result must comply with the specs., mentioned therein.

4. Test for Flakiness Index (Coarse Aggregates)

Flakiness Index, to be calculated as per the procedure laid in **IS 2386- Part I**, and the result must comply with the specs. mentioned therein.

Annexure -4

Reinforcement Checklist

Reinforcement Checklist			
Structure: - Grade of Steel: - Project: - Location: - Developer: -		Date: - Drawing No.: -	
Sr. No.	Description	Complied	
		Yes	No
Footings/Raft			
1.	Check if the area is ready for starting reinforcement (PCC complete).		
2.	Check if the main reinforcement provided for any member parallel and spaced, as per GFC drawings & BBS.		
3.	Check if the cover blocks are of correct sizes and at correct spacing.		
4.	Check if any bar is deformed in any manner?		
5.	Are the development lengths and lap lengths that are provided, are as per drawings?		
6.	Check if the chairs provided are not disturbed due to movement of laborer		
7.	Check if the secondary reinforcement provided for any member parallel and spaced, as per GFC drawing& BBS.		
Columns			
1.	Ensure that the reinforcement bars are lapped staggered /as per approved GFC		
2.	Check if stirrups for columns are provided up to the bottom of each footing and at the beam-column junction.		
3.	Check if the cover blocks are of correct sizes and at correct spacing.		
4.	Check if the adequate anchorage lengths are provided at the bottom of the column reinforcement.		
5.	Ensure that the provision of dowels for future extensions are done as per the drawings.		
6.	Check if the U bars for future shuttering support are provided, in the vicinity of column		
Slab & Beams			
1.	Ensure that the laying of reinforcement has not started before the checking of formwork.		
2.	Ensure that the reinforcement bars that are projecting out of the current area of concreting are parallel.		

3.	Check if the cover blocks are of correct sizes and at correct spacing.		
4.	Check if adequate anchorage lengths are provided at Column-beam junctions		
5.	Ensure that the provision of dowels for future extensions are done as per the drawings.		
6.	Check if the position of chairs is not disturbed due to movement of labourers.		
7.	Ensure that the extra reinforcement in sleeves and pipe openings in the slabs are as per design and checked by the structural consultant.		
8.	Check if the number of rods and their diameters, in beams and slabs and the provision of dowels are according to the drawings.		
9.	Ensure that spacing is maintained for main bars, transverse bars, and beam stirrups, as per GFC?		
Retaining wall			
1.	Ensure that the reinforcement bars that are projecting out of the current area of concreting are parallel.		
2.	Check if the cover blocks are of correct sizes and at correct spacing.		
3.	Check if adequate anchorage lengths are provided at the bottom of the column reinforcement.		
4.	Ensure that the provision of dowels for future extensions are done as per the drawings.		
5.	Ensure that proper reinforcement connections are provided in the wall junctions.		
6.	Ensure that U-Hooks are provided in the retaining walls.		
7.	Ensure that the spacing between the stirrups and the total number of stirrups along the length of the footings are as per design.		
8.	Ensure that the reinforcement bars that are projecting out of the current area of concreting are parallel.		
9.	Check if the cover blocks are of correct sizes and at correct spacing.		
10.	Check if the adequate anchorage lengths are provided at the bottom of the column reinforcement.		
Miscellaneous			
1.	Check if the extra diagonal steel is around at the periphery of cut-outs in slabs etc.		
2.	For staircases & Other elements, too, check if Ld sufficiently provided for lapping next flight/landing		
3.	In case of any missed rebars or design changes, if rebarring is required, it should be done with standard chemical anchor and check if the drilled hole is well cleaned, before inserting the rebar and chemical anchor.		
4.	Check if the anchorage depth is as mentioned in the Structural drawing.		

Annexure -5 Shuttering Checklist

Shuttering Checklist			
Structure: - Project: - Location: - Developer: -		Date: - Drawing No.: -	
Sr. No.	Description: -	Complied	
		Yes	No
Shuttering- General			
1.	To check for availability of all the latest relevant GFC drawings.		
2.	Is the staging placed on a hard even surface or on concrete pedestals/wooden runners, if placed directly on the earth?		
3.	To ensure clear access to the work area.		
4.	Are the props and staging given from below perfectly vertical and rigid?		
5.	Availability of adequate quantity of shuttering materials?		
6.	Only approved/ standard shuttering oil is being used on the shuttering materials.		
Footings			
1.	Has the shuttering been cleaned before usage?		
2.	Are the dimensions of the formwork according to relevant GFC drawings?		
3.	To ensure Footing shuttering is placed as per Surveyor marking on PCC.		
4.	Check if the corners of the shuttering are at right angles.		
5.	To ensure that shuttering edges & tie rod holes (if any), are sealed properly, to avoid any slurry leakage.		
6.	Are extra supports provided for footings of height more than 900mm?		
7.	Is the alignment of the formwork maintained using a nylon thread?		
8.	To ensure that the formwork is perfectly vertical.		
9.	To check that shuttering material used are not damaged & corroded.		
10.	To ensure that top level of concreting is marked on shuttering periphery?		
Columns			
1.	Ensure adequate no. of shuttering boards are available?		
2.	To ensure that shuttering boards are well cleaned.		
3.	Are the dimensions of formworks as per specifications?		
4.	To check that if the runners used are planed properly.		

5.	Check if the corners of the shuttering are at right angles.		
6.	Ensure that the formwork is perfectly vertical and in plumb.		
7.	Is the external line of the formwork maintained using a nylon thread?		
8.	Are foam strips provided at column junctions to avoid slurry leakage?		
9.	To check if the supports are well provided, maintaining proper rigidity at column shutter periphery		
10.	Check if the rubber hammer used for tamping the shutter box, during pour along with vibration, to ensure proper compaction.		
Beam and Slab			
1.	To check for availability of required shuttering materials.		
2.	To check if the shuttering materials are well cleaned & oiled with shuttering oil?		
3.	To ensure that the slab staging resting on a plain, firm, well compacted ground.		
4.	To check for the proper locking of cup locks, swivel clamps, locking with base plates etc.		
5.	Are the dimensions of formworks according to specifications?		
6.	To check if the runners used are planed properly.		
7.	Are the props and staging given from below perfectly vertical and rigid?		
8.	Check if the corners of the shuttering are at right angles.		
9.	Ensure that the dowel holes are covered properly.		
10.	To ensure that all the corners, junctions, joints, holes are well sealed to avoid any slurry leakage.		
11.	Are the shuttering sides of beam perfectly vertical and in plumb?		
12.	Is the external line of the formwork maintained using a nylon thread?		
13.	To ensure that reference lines for concrete level is properly marked		
14.	Check if there are any gaps in the beam and column junctions.		
15.	To ensure that all the services cut-outs and conduits, being provided as per latest GFC drawing?		
16.	To check if the cut-out boxes are rigidly supported, to avoid any slurry loss, while pouring		
17.	To ensure that shuttering is in level at the slab & beam bottom.		
18.	To ensure that tie-rods and extra supports are provided for higher beam depths.		
19.	To ensure that guard rails provided on the slabs for safety?		

Retaining Wall			
1.	To check if required number of shuttering material is available		
2.	To check if the shuttering surfaces are clean.		
3.	Are the dimensions of formworks according to specifications?		
4.	To check if the runners used are planed properly.		
5.	To check if the corners of the shuttering are at right angles.		
6.	To check if the gauge rods have been inserted.		
Miscellaneous			
1.	All other shuttering areas, must comply the general shuttering requirements mentioned in the above checklists.		

Annexure - 6
Concreting Checklist

Concreting - Checklist			
Structure: -		Date: -	
Project: -		Drawing No.: -	
Location: -			
Developer: -			
Sr. No.	Description	Complied	
		Yes	No
Concreting-General			
1.	To check for availability of all the latest relevant GFC drawings.		
2.	To check for the availability & proper functioning of slump cones, vibrators, cube moulds, tamping rods and other miscellaneous tools required for concreting, at site.		
3.	To check that grade of concrete as recommended by the structural engineer.		
4.	To check for availability of tarpaulin sheet and other rain protection measures		
5.	Proper lighting arrangement made for concreting during night-time.		
6.	Is sufficient manpower available for concreting on site.		
7.	Are pumps of suitable capacity provided on the site & standby pumps are available, to cope up with any sudden breakdown.		
8.	Are stand by vibrators and vibrator needles available at site?		
9.	Are the shuttering and the reinforcement works complete before concreting?		
10.	Does the concrete produced look fluffy and form the shape of a ball when rounded in the hands?		
11.	Is the concrete placed and compacted within standard time limit (prescribed by IS 456), since batching?		
12.	Are all the workers wearing safety gears like gloves, boots, face mask & goggles etc.?		
13.	Is the work executed in conformance with the drawings and details supplied by the structural consultant?		
14.	Approval from the quality engineer obtained regarding the satisfactory completion of formwork, reinforcement, cover block fixing and electrical conduit laying before concreting.		
15.	To check that the batch sheet matches the requirements of Mix Design for relevant grade of concrete.		
16.	Any concreting done at expected atmospheric temperatures above 40°C, temperature of concrete to be verified at site, for necessary temperature control.		

Footing			
1.	To check that shuttering is wet and clean before concreting?		
2.	To ensure that concrete is placed layer-wise and properly compacted		
3.	To ensure that required number of concrete cubes for testing casted on site.		
4.	Is curing by sprinkling of water started as soon as the surface starts drying?		
5.	Level of finish checked and corrected when concrete is fresh.		
6.	Is rough finishing done in the footing-column interface?		
Columns			
1.	Is the shuttering wet and clean before concreting?		
2.	To ensure that concreting of columns done up to the beam bottom level.		
3.	To ensure that uniform compaction done, to avoid any segregation etc.		
4.	To ensure that required number of concrete cubes for testing casted on site.		
5.	Level of finish checked and corrected when concrete is fresh.		
6.	Verticality/Plumb of the column box checked before & after concreting.		
7.	Is curing by sprinkling of water started as soon as the surface starts drying?		
Roof slab & Beam			
1.	Is the shuttering wet and clean before concreting?		
2.	To ensure that required number of concrete cubes for testing casted on site.		
3.	To ensure that workability is checked regularly, using slump cone/Flow test apparatus.		
4.	To ensure that Level of finish is checked and corrected when concrete is fresh, using gauge or level machines.		
5.	To check that Expansion Joint/Construction Joint provisions are in place, as per drawing or as recommended by Structural consultant		
6.	Is curing by sprinkling of water started as soon as the surface starts drying?		
7.	To ensure that concrete is placed layer-wise, as per the planned pour sequence and well compacted		
8.	To ensure that a dedicated gang of carpenters deployed, to check for any gap closure, supports strengthening etc.		
9.	To ensure that construction joint is well prepared and bonding agent is applied, before commencing the pour.		

Retaining Wall			
1.	Is the shuttering wet and clean before concreting?		
2.	To ensure that layer wise concreting followed.		
3.	To check that required number of concrete cubes for testing casted on site.		
4.	Is curing by sprinkling of water started as soon as the surface starts drying?		
5.	Level of finish checked and corrected when concrete is fresh.		

Annexure -7

Post Concreting Checklist

Name of Project: -

Name of Developer: -	RFI No.: -
Name of PMC: -	Deshuttering date: -
Name of Contractor: -	Date of Inspection: -
Location / Structure: -	Drawing Ref./ Particulars: -
Concrete Pour date: -	

S.No.	Description	Yes	No	NA
1.	Is the surface finish acceptable?			
2.	Are the edges proper (not damaged)?			
3.	Whether proper & continuous curing arrangements are in place?			
4.	Any honeycombs/segregation, cracks observed?			
5.	Is there any bulging observed?			
6.	Are there any surface undulations observed, which is beyond tolerance limit?			
7.	Any surface etching, slurry loss, slurry streak observed?			

Curing Surveillance (By Contractor/PMC)

Date							
Sign.							

Remarks: -

Compressive Strength Test 7 days result: -
Compressive Strength Test 28 days result: -
Accepted/Not Accepted

Site Engineer
(Contractor)

QA/QC
(Contractor)

PMC/Client

Annexure -8

Batching Plant Inspection Checklist

RMC Plant Inspection Checklist			
Name of Plant: -		Developer Name: -	
Sr. No.	Description	Complied	
		Yes	No
Input Materials - Storage & Handling			
1.	Are Cement Silos/bins and cement feeding area weatherproof?		
2.	When Cement is supplied in bulk, is there reasonable dust free flow of cement into silo, and further from silo to mixer?		
3.	Is there a separate storage system for different type of Supplementary Cementitious Materials (SCMs)?		
4.	Are silo/bag storage system for SCMs weatherproof?		
5.	Are there adequate provisions for separate storage for each size and type of aggregates to prevent mixing of different sizes and types?		
6.	Are adequate precautions taken to prevent intermixing of aggregates with dust, mud, soil, and other deleterious materials?		
7.	If temperature-controlled concrete is being produced, are provisions in place to control the temperature of aggregates?		
8.	Is there adequate storage of water to satisfy day to day needs?		
9.	Has the water storage facility been protected to minimize the risk of contamination of deleterious substances?		
10.	Are records available providing evidence that control on the temperature of water is exercised when producing temperature-controlled concrete?		
11.	Are chemical admixtures stored properly to avoid contamination and degradation on exposure to sunlight?		
12.	Does each container of admixture legibly marked with supplier's information (<i>Clause 10.1 of IS 9103</i>)?		
Process & Equipment			
1.	For all type of batching systems, is the batch operator able to read the load indicating devices from his normal position?		
2.	Have the weigh scales preset in increments not exceeding 5kg or less each for cement and mineral admixtures, 10 kg or less for aggregates and 2 kg or less for water? (<i>Clause E-1© of Annex E of IS 4926</i>)		

Sr No.	Description	Complied	
		Yes	No
3.	For continuous mixer plants, has the calibration been done in increments, not exceeding 10kg/m ³ each for cement and mineral admixtures, 25kg/m ³ for aggregates and 10l/m ³ for water? (Cl.E-1(d) of Annex IS 4926)		
4.	Do the digital read-outs have a scale increment not exceeding 2kg each for cement and mineral admixtures, 10 kg for aggregate and 1 kg for water? (Clause E-1 (e) of Annex E of IS 4926)		
5.	Does a systematic recheck of scales carried out frequently (at least once every 3 months for electrical/load cell system)? (Clause E-1(j) of Annex E of IS 4926)		
6.	Are the scales and weigh hoppers used for cement and other cementitious materials independent of scales and weigh hoppers used for non-cementitious ingredients?		
7.	Are adequate provisions in place to ensure that chemical admixtures are added to concrete incorrect dosage?		
8.	Are the pipes carrying admixtures free from leakage?		
9.	Do the admixture dispensers have scale increments which enable materials to be batched within a tolerance of 3% of the scale reading?		
10.	The accuracy, sensitivity and arrangement of weighing devices shall be such as to enable the materials to be batched within the tolerances mentioned in IS 4926.		
	Records		
1.	Does digital recorder provide a printed record of material being weighed /measured and reproduce the scale reading within ± 1 percent of scale and accuracy for cement, admixtures, and water and $\pm 3\%$ for aggregates?		
2.	Does that provide traceability of the particular batch with the corresponding delivery ticket?		
	General Maintenance of Plant		
1.	Does the organization establish and implement procedures for maintenance of plant equipment and facilities?		
2.	Does the organization ensure that proper upkeep and cleanliness are maintained in the plant?		
	Delivery Fleet Inspection		
1.	Are the truck mixers maintained in an efficient and clean condition?		

Annexure -9

MONTHLY QUALITY REPORT

NAME OF THE PROJECT:

TYPE OF PROJECT:

BUILDING CONFIGURATION:

1. QA/QC PROCEDURE DEPLOYMENT STATUS

S. No.	List of Approved QA/QC procedures	Proposed Frequency of Procedures	Status
1	Slab inspections	Every Slab pre-pour	
2	General Site Visits	Every Slab Inspection	
3	Quality Report Submission	Monthly	
4	RMC Plant Audit	Quarterly in a year	

2. AUDIT DETAILS

Auditors:

S.No.	Building/Block	Date of Audit	No. of NCs	Description of NC & root cause	CA Status/date of Closure

3. AGEING ANALYSIS

Building/Block/Section	No. of NCRs	Ageing		Remarks
		>15 days	> 30 days	

4. PROJECT QUALITY RATING

S.No.	Date of Assessment	Area	Rating	Lapses Identified	Corrective actions proposed/ taken

5. BEST PRACTICES AT SITE

6. QUALITY PERFORMANCE INDICATORS AT CONSTRUCTION PROJECTS

Indicators	Calculations	Data Sources
1. Work quality ratio	Ratio of number of inspections passed to total number of Inspections	ITP, Checklists & Monthly Quality Report
2. No. of NCR	No. of NCR received and rectified in each period	NCR Report
3. No. of CAR	No. of CAR received and rectified in each period.	CAR Report
4. Goal achievement Level	Ratio of actual data to goal values	Computation inside system

Annexure -10

Non- Conformance Report (NCR)

Name of the Project: -

Type of Project: -

Building Configuration: -

I. NCR Brief: -

1. NCR no.: -
2. Title: -
3. Building Element: -
4. Date of raising: -
5. Raised by: -
6. Closure date: -
7. Closed by: -

II. Issue Description: -

III. Recommended Corrective Actions: -

IV. Corrective Verification: -

V. Correction Acceptance: - Yes/No

Contractor

PMC/Developer

GIFT

Annexure - 11

Structural Steel Checklist (General)

Structural Steel - Checklist			
Structure: - Project: - Location: - Developer: -		Date: - Drawing No.: -	
Sr. No.	Description	Complied	
		Yes	No
Structural Steel-General			
1.	To check for availability of all the latest relevant GFC drawings.		
2.	To check for the relevant shop drawings by the fabricating agency.		
3.	To check that grade of steel members and accessories such as bolts, nuts, washers, welding rods etc. are as recommended by the structural engineer.		
4.	To check that raw material delivered is of approved make.		
5.	To check for proper earmarked location/yard for fabrication of members		
6.	To check for calibration and proper functioning of machines/ equipment used in fabrication.		
7.	Are manpower involved in fabrication especially welding works, are well qualified and trained?		
8.	To ensure that prior to sandblasting, all the members are checked for welding defects and welding test records are duly maintained at yard.		
9.	To check that, pull out tests are carried out, at anchorage locations, in compliance to relevant Indian Codes.		
10.	To ensure that DFT tests being done for painted members, before dispatching to sites for erection.		
11.	For bolted connections, to check if the tightness being ensured – by visual observations in case of snug tight requirements / by Torque testing using torque wrench.		

DISCLAIMER

The information given here, is not an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of Law. GIFT, its employees or advisors accept no responsibility for the accuracy or otherwise for any interpretation or opinion on law expressed herein.

GIFT also accepts no liability of any nature whatsoever, whether resulting from negligence or otherwise howsoever caused arising from reliance of any Developer upon the statements contained in this booklet.

For now, it focusses solely on RC Structure, Steel Structure and Envelope works. However, GIFT may in its absolute discretion but without being under any obligation to do so, update, amend or supplement the information (inclusion of other construction activities), contained in these guidelines Sample formats (Refer Annexures), given herein, are for first-hand information to Developers, and this in no way impose any mandatory compulsion on them, to follow the same checklists. However, tests pertaining to RC structure mentioned in ITP are standard tests & minimum frequency of these to be followed, in compliance to relevant IS codes.