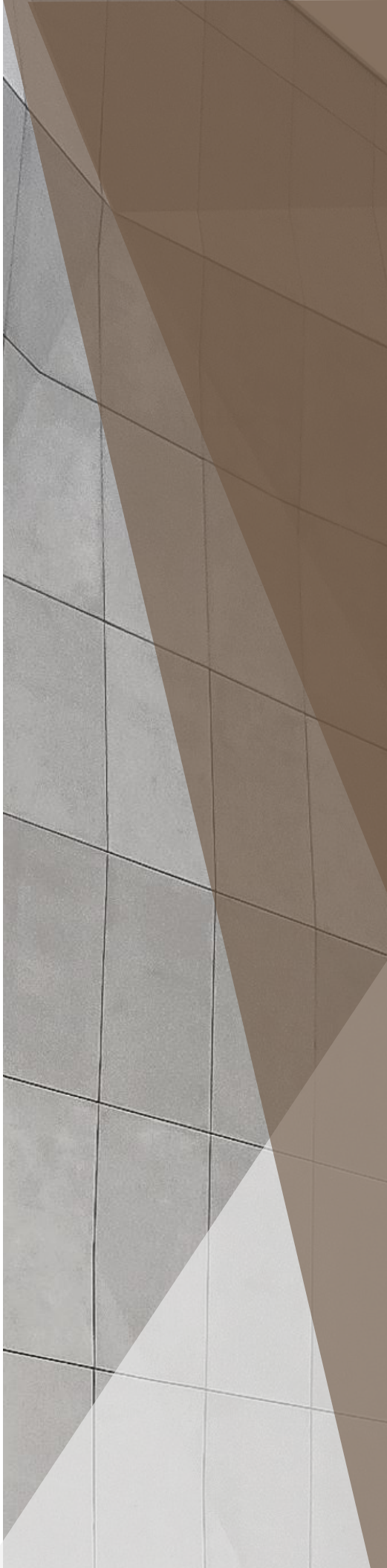
Petra Design Inc. Architectural Molded Composite

PETRA™

ARCHITECTURAL MOLDED COMPOSITES

GFRC Quality Manual



GFRC Quality Manual

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1. Management Responsibility

1.A.1 Quality Policy Statement

Policy Statement:
Petra Design Inc is committed to achieving the highest standards of quality in the manufacturing of Glass Fiber Reinforced Concrete (GFRC) products. Our quality policy emphasizes continuous improvement, customer satisfaction, and compliance with industry standards. We strive to foster a culture of quality across all levels of the organization, ensuring that each employee understands their role in contributing to our quality objectives.

Objectives:
- Deliver products that meet or exceed customer expectations.
- Ensure compliance with PCI MNL-130 and other relevant standards.
- Promote a culture of continuous improvement and innovation.

1.A.2 Quality System Awareness

Awareness Program:
To promote quality awareness, Petra Design Inc will implement a comprehensive training program for all employees.

This program will include:
- Regular training sessions on quality objectives, procedures, and responsibilities.
- Informational materials distributed via email and posted in common areas.
- Monthly quality newsletters highlighting quality achievements and initiatives.

Communication:
Management will communicate the importance of quality and the quality policy through:
- Company meetings.
- Internal communications and memos.
- Performance evaluations that include quality metrics.

1. Management Responsibility

1.B.1 Responsibility and Authority

1.B.1.a Organization Chart

An organizational chart will be maintained to illustrate the structure of the quality management system, including:

All Employees: Responsible for maintaining quality in their respective roles.
Appendix X - Separate attachment

1.B.1.b Personnel Responsibility

Detailed responsibilities for key personnel include:

- Quality Manager:
- Develop and maintain the quality management system.
- Ensure compliance with PCI MNL-130 and other regulations.
- Lead the Quality System Committee.

- Production Manager/Lead:
- Ensure staff are trained in quality processes.
- Monitor production for adherence to quality standards.

- All Employees:
- Understand and follow quality policies and procedures.
- Report any quality issues or nonconformities to management.

1.B.2.a Verification Resources and Personnel

Verification Resources:
- Petra Design Inc will allocate the necessary resources to verify that quality standards are met. This includes:
- Access to quality control software or for tracking and reporting.
- Budget for training and certifications related to quality management.

Personnel:
- A dedicated team of quality inspectors will be trained to perform inspections at various stages of production.
- External auditors may be engaged periodically to assess the effectiveness of the quality management system.

1. Management Responsibility

1.B.2.b Self-Inspections

Self-Inspection Program:
A self-inspection program will be implemented to ensure ongoing compliance with quality standards. Key components include:
- Scheduled self-inspections conducted by trained personnel.
- Checklists covering critical areas of production and quality control.
- Documentation of findings and follow-up actions.

Reporting:
Results from self-inspections will be reported to management and reviewed during management meetings to address any identified issues and implement necessary corrective actions.

1.C. Quality System Committee

Committee Structure:
The Quality System Committee will consist of representatives from key departments, including:
- Quality Assurance
- Production
- Engineering
- Sales and Customer Service

Responsibilities:
- Review and evaluate the effectiveness of the quality management system.
- Analyze quality performance data and identify trends.
- Recommend improvements to processes and quality policies.

Meetings:
- The committee will meet quarterly to discuss quality objectives, performance metrics, and necessary actions to enhance the quality management system.

This detailed section outlines the management's commitment to quality and establishes clear responsibilities and processes to ensure that quality standards are met consistently across all operations. Each element is designed to foster a culture of quality throughout the organization.

2. Quality System Definitions

Overview

The Quality Management System (QMS) at Petra Design Inc is designed to ensure that Glass Fiber Reinforced Concrete (GFRC) products consistently meet customer requirements and comply with PCI MNL-130 standards. This section outlines the QMS components and its systematic approach to managing quality.

2.1 Purpose

The QMS aims to:
- Provide a structured framework for managing quality throughout the GFRC lifecycle.
- Identify and resolve quality issues proactively.
- Promote continuous improvement and enhance customer satisfaction.

2.2 Scope

The QMS covers all aspects of GFRC production, including:
- Design and Development: Procedures for creating customer-focused products.
- Production: Quality controls in manufacturing processes.
- Inspection and Testing: Protocols for verifying material and product compliance.
- Delivery and Handling: Ensuring safe storage and transport of products.

2.3 Key Components

2.3.1 Quality Objectives
Measurable goals aligned with the company's quality commitment, regularly reviewed for progress.

2.3.2 Process Approach
Focus on managing interrelated processes, defining inputs, outputs, and performance indicators.

2.3.3 Documented Procedures
Standardized procedures for critical processes to ensure consistency and compliance.

2.3.4 Risk Management
Identifying and mitigating potential risks to product quality through assessments and strategies.

2.3.5 Management Review
Regular assessments of QMS effectiveness, focusing on performance and improvement opportunities.

2.3.6 Continuous Improvement

Fostering a culture of ongoing improvement through training, feedback, and corrective actions.

2.4 Compliance

The QMS will comply with PCI MNL-130 and, if applicable, ISO 9001 standards through regular audits and assessments.

2.5 Communication

Effective channels for sharing quality-related information, including performance metrics and nonconformity reports.

2.6 Training

Training programs will ensure all employees understand their roles and possess the skills necessary to meet quality objectives.

This concise definition outlines the core aspects of the QMS, emphasizing its purpose, scope, and components to maintain high-quality standards in GFRC products.

3. Document Control

The Quality System Committee at Petra Design Inc. is responsible for the distribution and oversight of the Quality System Manual (QSM). Only the Committee has the authority to approve any revisions. Employees throughout the company may propose changes, which must be submitted in writing at least two days prior to a scheduled Committee meeting.

A designated member of the Quality System Committee will maintain the master copy of the QSM. This master copy will include an acknowledgment page that must be signed by each individual responsible for implementing the manual, indicating their awareness of its provisions. This acknowledgment must be completed each time the manual is updated. If the plant has hard copies of the QSM, one copy should be designated as the master, and the acknowledgment page must be signed when revisions are approved.

Once the QSM is adopted by the plant's Quality System Committee, revisions can be made on a page-by-page basis as necessary. Each section of the manual will be numbered so that changes can be made to one section without impacting the numbering of others.

The plant will prepare shop and engineering drawings essential for product manufacturing. These drawings are a critical component of Petra Design Inc.'s Quality System. The Quality System Committee will designate an individual, potentially the Chief Engineer, to be responsible for keeping these drawings up to date. This person will maintain a master list of drawings for each project.

The master list will include contract drawings with revision dates as well as shop and engineering drawings produced by the plant. This list will be updated whenever a drawing is revised. An internal transmittal form, consisting of two copies, will be used for each drawing update issued to the plant. The copy returned with the initials of the receiver will serve as the record for drawing distribution.

Drawings will be distributed as determined by Plant Operations, with minimum distribution to include:
- Production (for setup and casting)
- Quality Control
- Production Control (for ordering reinforcing bars and production planning)

4. Control of Suppliers

At Petra Design Inc., when a project begins, the procurement of materials must align with both project specifications and standard plant requirements. Purchase agreements or orders should be formalized in written contracts that specify the technical standards for the materials or products to be acquired. Since purchased materials are crucial for production, they should only be sourced from reliable vendors. The Quality Control Department will conduct regular reviews of these suppliers based on the plant's experience, and those who meet our standards will be designated as approved vendors.

The process for evaluating, selecting, monitoring, and re-evaluating suppliers must be documented in the Quality System Manual (QSM). The term “supplier” encompasses all relevant components, including those for connections, reinforcing bars, and subcontracted processes from PCI-certified plants, including third-party batch plant operations.

Documentation demonstrating compliance, which includes:
- Purchase agreements with approval records and associated documentation.
- Qualification records, such as supplier and personnel certificates, for every PCI requirement.
- Records of the evaluation processes and any actions taken as a result.

When selecting suppliers and subcontracting services, potential non-conformances that could impact the quality system should be carefully considered.

An “approved vendor list” is not required to be submitted with the QSM; however, if it is submitted, it must be reapproved whenever it is revised. It is recommended that a current vendor list be part of the master QSM and maintained by an individual responsible for its availability during audits. The title of this individual should be specified in this section of the manual.

The list of approved vendors should be updated as changes occur or at least annually. This may include inspections by the Quality Control Department, where applicable. Vendors should have a quality control system comparable to that of the plant.

4. Control of Suppliers

A standard purchase agreement policy developed by the Quality System Committee may include the following criteria:

Standard Purchase Agreement Guidelines:
- Purchase agreements must be written and include specific standards regarding manufacturing, delivery, acceptance, rejection, and replacement.
- The approved vendor list, which will be reviewed annually, is maintained by the Quality System Committee and issued to the Purchasing Department after each review for use in procurement decisions.
- Specific standards for raw material acceptance, including:
- Cement mill certificates and ASTM C33 gradation standards for aggregates.
- ASTM standards for admixtures and reinforcing steel, including required chemical and physical data.
- Physical test data for welded-wire reinforcement and strand acceptance.
- Suppliers must provide mill certificates or test data confirming that materials shipped meet project-specific standards.
- Acceptance of materials at the plant will depend on inspection, testing, and conformity to specified standards.
- Suppliers must conduct tests on raw materials to ensure nonreactivity (e.g., tests for reactive aggregates).
- The Quality Control Department will handle acceptance inspections and address issues like shipping damage or contamination.
- Procedures for managing rejected materials, including return processes or disposal methods.
- Confirmation from vendors about their internal quality control programs.
- Vendor acceptance is contingent upon a review of their quality control practices and potential inspections by plant quality staff.

5. Product Identification and Traceability

At Petra Design Inc., each unit produced will be distinctly marked and dated to verify its production and connect it to specific conformance testing conducted by the Quality Control Department, as well as to the raw materials or assemblies used in its creation. The unit number and date will be linked to the production schedule and in-plant quality control records. Additionally, these identifiers will connect the product to the erection plan. Mark numbers and dates can be applied directly to the product or cast-in using designated date stamps, piece marks, or form numbers.

To effectively link a product to its raw materials or manufactured subassemblies, a comprehensive recordkeeping program is essential. In smaller plants handling a single project, recordkeeping is more straightforward. For instance, raw materials or assemblies can be tracked based on their arrival times and usage within the production time frame, thereby connecting the materials to the final product. However, as the number of projects increases, the complexity of traceability recordkeeping also escalates.

Various methods can be employed for tracking product usage and ensuring traceability. For bulk materials related to concrete, such as cement, aggregates, and admixtures, an inventory system that records dates of receipt, production, and subsequent shipments can help establish a general connection to product usage. It may also be necessary to document consumption quantities to reference when materials are utilized.

For reinforcing bars, a more sophisticated tracking system may be required. Color coding can differentiate bars within the fabrication shop for specific jobs, or steel shipments can be segregated to draw from controlled stock designated for particular projects. This will necessitate maintaining a log in the reinforcing bar shop to track shipment receipts, color markings, and storage locations.

Vendor-fabricated assemblies will also need tracking for material certifications. If multiple batches are manufactured and shipped by the vendor, a dating system will help link the assembly to the corresponding vendor material and testing records.

The traceability process and necessary recordkeeping should be developed collaboratively by production personnel and the Quality System Committee. The goal is to establish a clear and workable system understood by all. Inspection upon receipt of materials is critical for maintaining traceability, which includes documenting the arrival of materials and reviewing vendor-supplied documentation. Vendors must recognize that accurate documentation is as vital to the process as the materials themselves.

6. Control of Changes Summary

Before Petra Design Inc. begins any project, we establish a formal contract with the customer, adhering to our standard operational procedures. This initial process includes a thorough review of the customer's requirements, as detailed in project documents such as drawings and specifications. We ensure that we can meet these requirements and align with customer expectations. Additionally, we carefully examine the associated contract terms and conditions, securing the necessary approvals from management to proceed.

Once the initial agreement is in place, it is common for the customer or the project engineer/designer to request changes to the product design requirements. These changes may pertain to various aspects, including the finish of the product, the load specifications it must meet, or the placement of embedded items and openings. To effectively manage these changes, Petra Design Inc. has implemented a well-defined process for receiving and communicating modifications to all relevant personnel involved in the project.

We maintain comprehensive documentation outlining the process for managing changes to product requirements, including specific design and development criteria. This documentation provides clarity on how changes are reviewed and ensures that we uphold ongoing compliance with the specified requirements throughout the project lifecycle.

Petra Design Inc. is committed to providing detailed records of these activities.
This documentation will include:
- The source of the change, such as whether it originated from the architect, the owner, or another party.
- A list of all relevant documents that were affected by the requested change, ensuring transparency and traceability.
- Confirmation that the change has been communicated to all necessary parties, maintaining clear lines of communication throughout the project team.

By implementing this structured approach to managing changes, Petra Design Inc. aims to enhance our quality control measures and ensure that we consistently deliver products that meet or exceed customer expectations. This rigorous process not only fosters compliance but also promotes a culture of continuous improvement within our operations.

7. Process Control

The aim of this section is to ensure that a robust system is in place to manage production throughout the entire process at Petra Design Inc. Our plant typically utilizes a standard system for controlling production activities. After reviewing the client's product request, we will use the findings from this review to determine if any adjustments to our standard processes are necessary to create a suitable process control plan for the project. All documented information regarding these project-specific changes will be retained.

Consideration will be given to the following key areas, which may be discussed during a project kick-off meeting:

- Production Planning: We will identify the specific areas of the plant designated for production, accounting for space needed for molds and stripped products, as well as access for handling equipment (like overhead crane and forklifts). This may also include dedicated zones for vendor assemblies or specialized reinforcing steel, if required. Requirements for concrete may necessitate additional bins for material storage or the processing of bagged admixtures or pigments.

- Environmental Considerations: The production area must meet specific environmental requirements before production can begin. This includes adequate curing facilities or equipment and protection against adverse weather conditions, such as wind, rain, or extreme temperatures.

- Production Equipment Setup and Calibration:
- The batch plant must be calibrated at least semiannually and should be equipped to handle the necessary materials for each project.
- Forms or molds must be accurately set up to ensure dimensional precision for production.
- All tensioning and quality control laboratory equipment should be calibrated annually.
- Inspection and measuring equipment must be properly listed and calibrated.

- Production Equipment:
- All finishing and consolidation equipment must be in proper working order.
- Handling equipment, including straddle carriers, forklifts, front-end loaders, or overhead cranes, must be capable of managing product weights and shapes and must be maintained by operators and the Maintenance Department.
- Welding equipment should be checked for capacity, and welding personnel must hold current qualifications for the types of welds they perform.

7. Process Control

- Process Control:

- We will establish review and testing criteria applicable to the project. Standard items may include:
  - Acceptance inspection of materials or products.
  - Testing of materials upon receipt to ensure they meet project specifications.
  - Concrete testing for compliance with specifications regarding temperature, slump, entrained air, unit weight, and compressive strength.
  - Pre-Placement inspections to verify form or mold dimensions.
  - Post-placement inspections to assess product dimensions and review finishes against approved project samples.

- Work Instructions:

- Clearly defined control, use, and operation of production equipment.
- Quality test procedures that outline how to conduct various tests in accordance with standards.
- Defined workmanship standards focusing on concrete consolidation and the consistency of product finish.
- Work orders will be assigned a reference number for a group of products or the entire project, providing detailed instructions and dates to accommodate any change orders.
- Individual records for welders must be maintained, documenting their qualifications and verifying their competency in specific welding procedures, including aspects such as preheat or interpass temperatures, care of welding electrodes, and atmospheric limits.

Overall, the process control methods discussed in this section rely heavily on the intuition of production personnel. However, the concise and thorough documentation of these processes enhances training, control, and understanding among all plant staff.

8. Inspection and Testing

At Petra Design Inc., inspection and testing begin upon receipt of materials and continue throughout the production process, culminating in a final inspection of the finished product. The Quality System Committee is responsible for creating a detailed inspection plan for each stage of this process. Inspections will be conducted by Quality Control personnel or individuals not involved in production, particularly for testing purposes. The inspection plan must clearly identify those responsible for conducting inspections.

A. Receiving Inspection and Testing

1. Initial Setup Review: Before each project begins, the project design documents, including drawings and specifications, will be reviewed to establish project criteria. Standards will be set based on the stricter of the project criteria or our plant standards.

2. Material Review: As materials arrive, mill certificates, evaluations, or test results from vendors will be reviewed. Acceptance of materials is contingent upon compliance with these certificates or data.

3. Color Matching: For architectural and certain structural products, verifying the color of GFRC, is essential. Color verification against approved samples will be a standard acceptance criterion, and materials will not be stored until color match and consistency have been confirmed.

4. Vendor-Fabricated Assemblies: After verifying paperwork, vendor-fabricated assemblies will be checked for dimensional accuracy. Compliant assemblies will be marked for traceability, using color dots to link them to the date of receipt and verification. Checked dimensions will be recorded.

5. Handling Nonconforming Material: Nonconforming materials must be segregated and marked to prevent contamination of acceptable products.

B. In-Process Inspection and Testing

An inspection and testing plan will be established to ensure products are manufactured according to project specifications and plant standards. This plan will include:

1. Production Schedule: The production schedule will be shared with Quality Control to facilitate inspection and testing planning.

2. Standards and Practices: A clear outline of the specified standards and plant practices will be included.

3. Test Procedures: A written description of the tests and inspection procedures will be documented.

4. Approved Samples: Samples approved for comparison will be part of the plan.

5. Updated Drawings: Current shop or engineering drawings will be referenced, along with a project drawing master list.

6. Testing Records: Forms will be created to document project testing and inspection activities.

C. Final Inspection

The final inspection will ensure that products conform to project plans and specifications. The plan will include:

1. Current Drawings: Up-to-date shop or engineering drawings and a project drawing master list will be referenced.

2. Comparison Samples: Approved samples will be available for product comparison.

3. Dimension Review: Product dimensions will be reviewed and recorded.

4. Acceptance Criteria: Clear acceptance criteria for the project will be outlined.

5. Nonconforming Product Identification: A plan for identifying nonconforming products will be established, as detailed in Appendix.

By implementing these comprehensive inspection and testing protocols, Petra Design Inc. aims to maintain the highest quality standards throughout the production process.

9. Inspection, Measuring, and Testing Equipment

At Petra Design Inc., all equipment utilized by Quality Control personnel for monitoring processes or products must be properly calibrated and maintained. A comprehensive calibration list will be maintained, detailing each piece of equipment along with the dates of its current calibration and the next scheduled calibration.

For larger test equipment, such as compression testing machines, calibration is typically conducted by external agencies due to the specialized nature of the equipment. Calibration records will include references to national standards and will clearly present data recorded at various points during testing.

Additionally, some equipment can be self-calibrated by our Quality Control and Engineering teams, ensuring accuracy and reliability in our testing processes. This systematic approach guarantees that all measuring and testing equipment at Petra Design Inc. meets industry standards and supports our commitment to quality.

List of items which are considered under the calibration categories.

1. Compression testing machine
2. Rate of loading of compression testing equipment
3. Flexural testing machine
4. Temperature measuring devices
5. All weight scales inside the facility and in-house laboratory

10. Inspection and Testing Status

At Petra Design Inc., every product produced will be uniquely identified, as outlined in Section 5. In addition to piece and date markings, each product will meet the satisfactory requirements and will be placed in the shipping skids. The tracking will be done by Petra Design Inc ERP website.

The post-placement inspection record will document the status of each product, and the product itself will be clearly marked to indicate its handling and disposition status while it remains within the plant. This process ensures clear communication regarding the condition and readiness of each product throughout its lifecycle at Petra Design Inc.

11. Control of Nonconforming Product

At Petra Design Inc., any products, materials, or assemblies identified as nonconforming to project or plant standards will be clearly marked and separated from acceptable items. Nonconformance can be detected at any inspection stage, and actions taken will adhere to policies established by the Quality System Committee. The following criteria will guide the handling of nonconforming products:

Acceptance Inspection and Testing

- **Vendor Materials**: Purchase agreements will define the protocol for managing nonconforming materials. Such items must be segregated for appropriate disposition and clearly identified to prevent their use.
- **Inspection Standards:** The plant is responsible for inspecting materials or assemblies in accordance with purchase agreement standards. A standard record form for these inspections will be developed by the Quality System Committee and maintained for each shipment.

In-Process Inspection and Testing

- **Fresh GFRC:** During testing, if fresh GFRC does not meet standards, adjustments will be made or the concrete discarded to avoid nonconformance. The quality plan will define acceptable limits for fresh concrete.
- **Aggregates:** Upon receipt, aggregates will be tested for gradation compliance with project standards. Nonconforming materials will be returned to the supplier or discarded, as stipulated in the purchase agreement.
- **Fabricated Assemblies:** Nonconforming assemblies will be marked to indicate rejection. If repair is possible and approved by the customer, the plant engineer will draft a repair procedure, which will be reviewed by Quality Control. Accepted repairs will be marked and records will document these corrections.
- **Product Finish:** Products must match approved samples for texture and color. If a finish is nonconforming, it will be marked until it meets acceptable standards.

Final Inspection

- **Concrete Strength:**The required strength at 28 days must be achieved for full product acceptance. If this strength is reached in 7 days, the product may be approved at final inspection, provided all other criteria are met.
- **Finish Standards:** Compliance with finish standards is crucial for final approval, and project samples will serve as benchmarks.
- **Repair Mixtures:** At the project's start, Quality Control will test repair mixtures for color and texture match, preparing batches as needed for addressing any damage.
- Addressing Repetitive Non Conformance:Patterns of nonconformance will be analyzed to determine causes. Minor issues can be repaired following standard procedures, while major damage will require engineering review and a corrective action plan.

By following these protocols, Petra Design Inc. ensures effective management of nonconforming products throughout the production process.

12. Corrective Action

12.A. Product Corrective Actions

At Petra Design Inc., minor damages can often be repaired using established standard procedures. These procedures should be documented and shared with finishers or customers as needed. For major repairs, plant engineers will investigate the issues to determine the best course of action and develop an appropriate repair procedure.

Standard Repair Procedure Example:
- Minor Spall Repair
1. Inspect the minor spall requiring repair.
2. Remove all loose material from the affected area by chipping.
3. Prepare the standard repair mixture by combining it with the appropriate liquids to achieve the correct consistency.
4. Apply the repair material and finish the surface to match the panel.
5. Cure the repaired area by covering it with polyethylene.
6. Ensure the finish aligns with project standards.

Other standard repairs may include addressing minor cracks, some of which may require epoxy injection, with specific epoxy types detailed in the procedure.

For major corrective actions, such as cracks that penetrate completely through a section, plant engineers will need to conduct a thorough investigation and establish a repair procedure before any corrective action is taken.

Organization of Nonconformance Repairs:
- Nonstructural Nonconformity
- Cosmetic A: Finish of architectural products must match approved project samples. The Quality Control team or dry finish foreman will evaluate the product status and oversee remedial work.
- Cosmetic B: Issues like chips, spalls, excessive bug holes, or minor honeycombing. Quality Control or the dry finish foreman will be responsible for enhancing product status.

- Structural Nonconformity
- Standard: Minor issues such as uneven bearing plates or cracked tee flanges. Quality Control or the dry finish foreman will oversee upgrades unless welding is involved, in which case Quality Control will take responsibility.
- Nonstandard:Significant misalignments, missing connections, or dimensional nonconformities require engineering evaluation and direction. Repairs will be carried out by plant personnel and verified by Quality Control.

12. Corrective Action

12.B. Quality System Corrective Actions

In the event of a quality system nonconformity, including those arising from customer complaints, Petra Design Inc. will respond promptly to control and correct the issue. Additionally, the plant will assess the need to eliminate the root causes to prevent recurrence by:

- Reviewing and analyzing the nonconformity.
- Conducting a root-cause analysis to determine the underlying causes.
- Assessing whether similar nonconformities exist or could potentially arise.

Actions will be taken to address identified and potential nonconformities, including evaluating risks and opportunities associated with these issues, as well as any risks posed by the mitigation plans. When corrective actions are implemented, the quality system may need updates, such as:

- Revisions to the plant's Quality System Manual (QSM), if applicable.
- New or revised repair procedures.
- Updates to nonconforming product protocols.

The plant will document all processes related to handling non conformances identified during internal audits, external audits by PCI, and regular quality control inspections. Records to be maintained include:

- Details of the nonconformities and subsequent actions taken.
- Results of corrective actions implemented.
- Non-conformance tracking logs.
- Individual non-conformance reports that include root-cause analysis and actions taken.

The effectiveness of corrective actions will be reviewed in the next management meeting. Example forms for tracking quality system nonconformance and internal non conformance reports (NCR) are available for use. The NCR will document non conformances identified by internal auditors, while the tracking log will encompass non conformances found by both internal and external auditors.

13. Handling, Storage, Loading, and Delivery

A. General
This section supports the overall production plan. Equipment used for handling products should be evaluated for its capacity, design (including components like spreader bars), use of lift lines, safety hooks, and adequate clearance for safe product handling. This evaluation must consider both the weight of the products and the handling equipment.

Storage plans should align with product requirements and schedules. Include a layout of the storage area in your Quality System Manual (QSM), highlighting general storage arrangements and drive lanes for handling equipment.

The stacking plan for stored products should account for the soil's bearing capacity and the type and size of base and intermediate dunnage. These details must be documented in the storage plan. The layout must facilitate equipment movement to reduce product damage.

B. Handling
Handling equipment must be selected to safely move products without causing any damage. Shop drawings must indicate appropriate lifting points and devices to ensure the safe handling of products.

C. Storage
The storage plan should specify how different product types will be stored, ensuring dunnage aligns with lifting points unless otherwise required. Storage should be monitored for compliance with shop drawings. Regular yard inspections, monthly or as often as defined by the Quality System Committee, should be conducted by the designated personnel to detect and document any damage.

D. Loading and Delivery
Before shipment, products should undergo a final inspection by Quality Control to confirm readiness for delivery. Products approved for shipment can then be loaded, ensuring tie-downs do not exert damaging forces. Protective measures should be applied beneath tie-downs to prevent damage, and clear responsibility for securing products should be defined within this section of the manual.

14. Quality Records

At Petra Design Inc., we prioritize maintaining complete and accurate quality records. This section outlines our approach to quality recordkeeping, which aligns with the requirements of the PCI MNL-130.

Key Requirements:
1. Written Procedures:We ensure that all records are identifiable, traceable, and legible.
2. Retrievability:Records are stored in a manner that allows for easy retrieval from a suitable environment.
3. Retention: All records will be retained for a specified period, in accordance with established guidelines.

Responsibility and Location:
The Quality Control Manager is responsible for maintaining quality records, which will be physically stored in the [Inspector's office]. Any changes to this responsibility or location will be updated in the Quality System Manual (QSM).

To facilitate record retrieval, documents will be organized by job number. A reference list will also be available to allow for cross-referencing by job name or number.

Record Examples:
This section will include example sheets for each type of record, designed for simplicity. One sheet may be used to cover multiple records, including:
- Concrete testing
- Pre Placement reviews
- Post-placement inspections

By following these procedures, Petra Design Inc. ensures that our quality records are comprehensive and accessible, supporting our commitment to quality and compliance.

15. Performance Evaluation

At Petra Design Inc., we implement a comprehensive performance evaluation system to ensure adherence to our quality plan. This evaluation encompasses several key components.

15.A. Customer Satisfaction

We regularly assess customer needs and gather feedback related to our products and services, including any complaints. This process is essential for identifying areas for improvement in both our offerings and quality system.

Documentation is crucial; we will outline how customer feedback is collected, monitored, and reviewed. During on-site audits, we will provide the PCI plant auditor with records of customer feedback, including completed survey forms. While the specific topics on the survey form are not mandatory, the information collected should be actionable and aimed at enhancing our quality system.

15.B. Internal Audit

Internal audits are a fundamental aspect of our quality plan. The Quality System Committee will determine the individuals responsible for conducting these audits, ideally rotating among committee members.

Our internal audit process will be documented, detailing how audits will be carried out at planned intervals. Each audit will assess our conformance to the PCI Plant Certification Program and applicable regulatory requirements. Audit procedures will specify methods and personnel responsibilities.

Auditors will utilize standard internal audit forms included in our QSM. The audits aim to verify that our quality system functions effectively. Should any non conformances be identified, we will reinforce processes or update the QSM to reflect current practices.

Internal audits will occur at least annually, as stipulated by PCI requirements. We may choose to conduct audits similarly to PCI audits or spread assessments throughout the year. Following each audit, the Quality System Committee will review the results and create directives for necessary corrections, forwarding these to the relevant departments.

We will maintain records of audit activities for PCI plant auditors, including the audit plan and internal audit reports with findings. Example forms for planning and checklists will be provided.

15. Performance Evaluation

15.C. Management Review

We will document our management review process, which occurs at planned intervals to enhance the suitability, adequacy, and effectiveness of our quality system. Each review will include an evaluation of internal audits and all applicable monitoring activities.

The management review will consider:
- The status of previous action items
- Changes in internal and external factors
- Performance metrics, including:
- Achievement of quality objectives
- Process performance and product conformity
- Results from monitoring and measurement
- Supplier performance
- Audit results
- Nonconformities and corrective actions
- Customer satisfaction feedback
- Resource adequacy
- Effectiveness of actions addressing risks and opportunities
- Opportunities for improvement

The outcomes of these reviews will lead to decisions regarding quality system enhancements, any required changes, and resource allocations.

We will provide the PCI plant auditor with documentation of management review activities, including the agenda and minutes from the meeting, which will detail attendees, the date, and discussion points. Example forms for management reviews will be included.

Our discussions may cover topics unique to our situation, focusing only on those that result in decisions or planned actions. An action item summary will be part of this documentation, identifying responsible individuals and timelines for completion.

16. Training

At Petra Design Inc., personnel training is an essential aspect of our operations. However, we recognize that many plants fail to document this training effectively. This section of our manual is dedicated to ensuring that all training for plant personnel is properly recorded.

Training varies based on roles; some sessions are conducted by supervisors, safety directors, and plant managers, while others may involve external training programs. PCI offers three-day quality control schools that can be hosted at our facility, along with other programs available at central locations, including production and finishing classes. For further information, please contact PCI.

We will implement a series of training sessions for new employees that focus on safety protocols and standard plant practices. The Personnel Department will prepare a written outline of these training sessions, which may incorporate PCI slide presentations.

Additionally, extended training for staff will be outlined in a structured format. The training discussed in **Section 1.B.2.a,** which covers Verification Resources and Personnel, serves as a useful starting point.

The quality system at our plant will be integrated into the training for all employees. Presenting the quality plan will foster plant-wide support and understanding.

We will maintain records of all in-plant training activities. Sign-in sheets will be collected and stored by the Personnel Department. Employees who attend external training programs must submit their certificates of completion. Comprehensive training records will be kept for all personnel to facilitate scheduling of necessary sessions as needed.

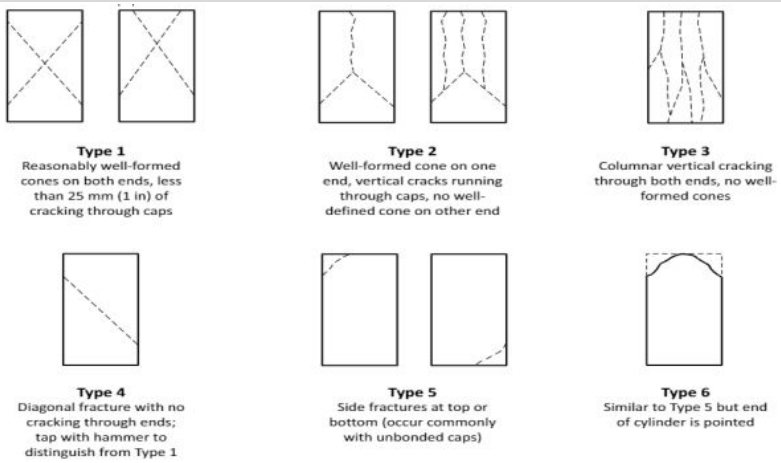
Appendix - A

Compressive strength

Project	Mountain View	**Client**	NA
Date	05- Apr - 2024	**Time**	3:00 PM

Name of Mix	PDI-240223-1	**Air Temperature (C°)**	16.3
Cast Slump/ Flow (mm)	650	**Density (Kg/m3)**	NA
Air Content (%)	6.9	**Type of cylinder**	100 x 200
Concrete Temperature (C°)	21.3	**Number of cylinder**	3

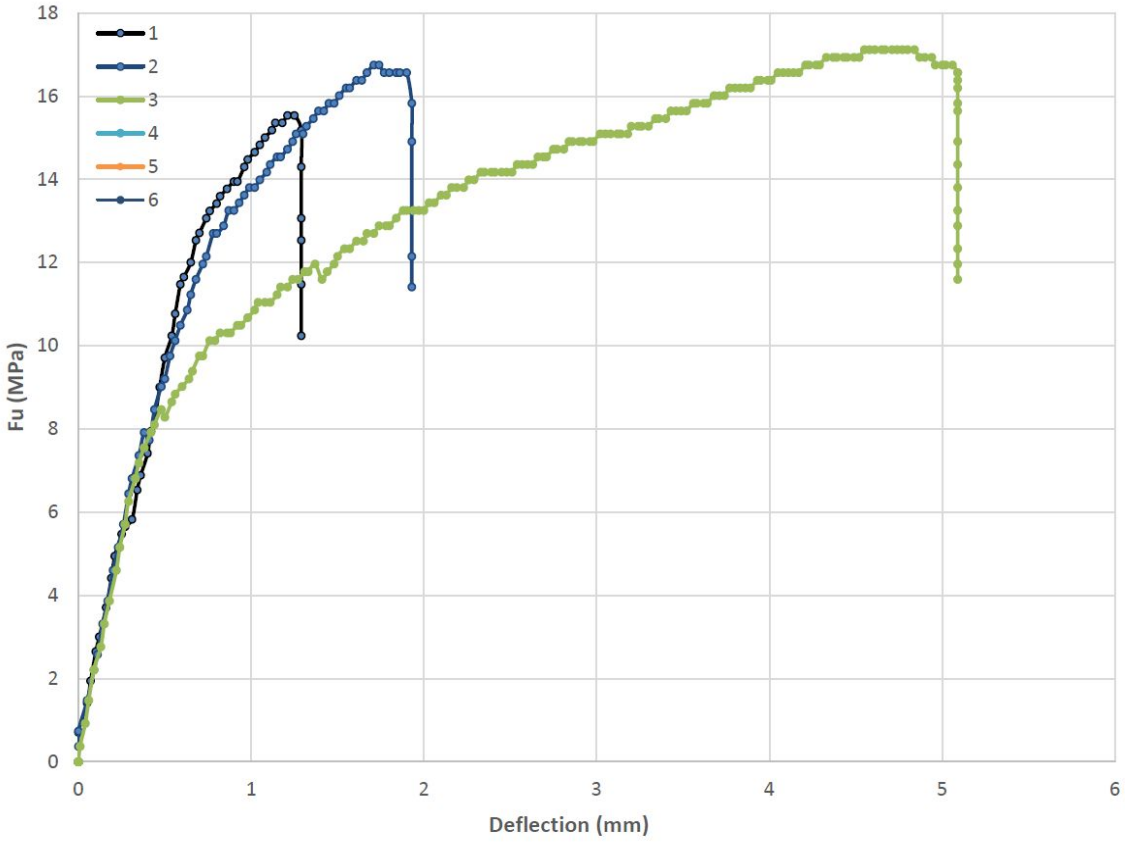
Cylinder	Date	Sample age	Diameter of Cylinder	Max Load (KN)	Comp. Strength (Mpa)	Type of Fracture
C-0504-7	09-Apr-24	4D	100	306.9	39.1	T - 2
C-0504-8	03-May-24	28D	100	354.2	45.1	T - 2

Remarks	Type of Fracture
	
Technician Name	Milan

Appendix - B

FLEXURAL STRENGTH

Sample No.	21- June - 2022	**Machine No.**	Flexural Test Machine
Client	NA	**Test Name:**	Flexural Test
Project	3D GFRC Panel	**Test Date:**	18- July -2022
Project		**Test Speed:**	3 mm/min
Sample Age	28 Days	**Total Length**	280 mm



Test NO.	Direction/ Face in Tension	Weight	Length	Width	Thickness	Fu	Fy	Deflection to Fu	Deflection to Fy	Flexural 3 or 4 Point	E
		gr	mm	mm	mm	(MPa)	(MPa)				(MPa)
1		**474**	**250**	**49**	**17**	**15.54**		**1.29**		**4 Point**	########
2		**456**	**250**	**47**	**17**	**16.75**		**1.93**		**4 Point**	########
3		**430**	**250**	**47**	**17**	**17.12**		**5.09**		**4 Point**	########
4											
5											
6											

Confirmed by : **Supervised by :** **Performed by :**

Appendix - C

Temperature Log for Curing

No.	Date	T1	T2	Recorded By
1	22-Aug-23	23.6	23.4	Milan
2	23-Aug-23	23.5	23.2	Milan
3	24-Aug-23	24.2	24.3	Milan
4	25-Aug-23	24.3	24.9	Milan
5	28-Aug-23	25.2	24.6	Milan
6	29-Aug-23	24.3	24.2	Milan
7	30-Aug-23	24.2	24.3	Milan
8	31-Aug-23	24.3	24.6	Milan
9	01-Sep-23	23.5	23.1	Milan
10	04-Sep-23	24.2	23.6	Milan
11	05-Sep-23	24.6	23.9	Milan
12	06-Sep-23	22.6	23.1	Milan
13	07-Sep-23	22.8	22.9	Milan
14	08-Sep-23	22.5	22.8	Milan
15	11-Sep-23	23.7	23.8	Milan
16	12-Sep-23	22.8	22.9	Milan
17	13-Sep-23	22.7	22.6	Milan
18	14-Sep-23	23.7	23.5	Milan
19	15-Sep-23	24.7	24.2	Milan
20	18-Sep-23	24.2	24	Milan
21	19-Sep-23	24.7	24.1	Milan
22	20-Sep-23	22.8	22.9	Milan
23	21-Sep-23	22.7	22.9	Milan
24	22-Sep-23	22.1	22.5	Milan
25	25-Sep-23	22	21.8	Milan
26	26-Sep-23	21.5	21.4	Milan
27	27-Sep-23	22.4	22.4	Milan
28	28-Sep-23	22.5	22.6	Milan
29	29-Sep-23	22.4	22.4	Milan
30	02-Oct-23	23.5	23.4	Milan
31	03-Oct-23	23.5	23.6	Milan
32	04-Oct-23	24.2	24.6	Milan
33	05-Oct-23	24.8	24.9	Milan
34	06-Oct-23	24.5	24.6	Milan
35	09-Oct-23	24.3	24.6	Milan
36	10-Oct-23	23.7	23.7	Milan
37	11-Oct-23	23.5	23.5	Milan
38	12-Oct-23	23.1	23.4	Milan
39	13-Oct-23	23.6	23.5	Milan
40	16-Oct-23	23.1	23.2	Milan
41	17-Oct-23	23	23.2	Milan

Appendix - D

PETRA
ARCHITECTURAL MOLDED COMPOSITES

Air Meter Calibration

No.	Date	Ref 5%	Ref 10%	Set IP (3%)	Verified By
1	17-Jan-24	5	10.1	3	Milan
2	20-Feb-24	5.1	10	3	Milan
3	12-Mar-24	5	10.1	3	Milan
4	05-Apr-24	5.1	10.1	3	Milan
5	09-Mar-24	5.1	10	3	Milan

Appendix - E

PETRA
ARCHITECTURAL MOLDED COMPOSITES

Compression Machine Rate of Loading

Date	Actual R	Time(T1)	Load(L1)	Time(T2)	Load(L2)	Time(T3)	Load(L3)	Time(T4)	Load(L4)	R1	R2	R3	Average
	kN	Second	kN	Second	kN	Second	kN	Second	kN	N/s	N/s	N/s	N/s
13-Oct-23	2002	0	12.3	20	52.4	40	92.6	60	132.5	2005	2010	1995	2003.333333
20-Oct-23	2002	0	15.7	40	96.2	80	176.4	120	256.5	2012.5	2005	2002.5	2006.666667
26-Oct-23	2002	0	30.1	20	70.2	40	110.2	60	150.3	2005	2000	2005	2003.333333
01-Nov-23	2002	0	45.2	30	105.2	60	164.4	90	224	2000	1973.33333	1986.66667	1986.666667
07-Nov-23	2002	0	59.2	30	118.6	60	179	90	238.8	1980	2013.33333	1993.33333	1995.555556
15-Nov-23	2002	0	42.2	30	101.4	60	161.1	90	221.1	1973.33333	1990	2000	1987.777778
23-Nov-23	2002	0	41.2	30	101.4	60	161.7	90	221.5	2006.66667	2010	1993.33333	2003.333333
29-Nov-23	2002	0	24.3	30	84.4	60	144.2	90	204.1	2003.33333	1993.33333	1996.66667	1997.777778
01-Dec-23	2002	0	54.1	30	114.4	60	174.8	90	235.2	2010	2013.33333	2013.33333	2012.222222
07-Dec-23	2002	0	23	30	83.4	60	143.6	90	203.7	2013.33333	2006.66667	2003.33333	2007.777778
14-Dec-23	2002	0	45.3	30	105.4	60	166	90	226.5	2003.33333	2020	2016.66667	2013.333333
20-Dec-23	2002	0	70.1	30	130.3	60	190.7	90	251	2006.66667	2013.33333	2010	2010
04-Jan-24	2002	0	26.1	30	86.4	60	146.6	90	206.6	2010	2006.66667	2000	2005.555556
09-Jan-24	2002	0	36.2	30	96.4	60	156.3	90	216.3	2006.66667	1996.66667	2000	2001.111111
17-Jan-24	2042	0	45.3	40	135	80	224.2	120	313.6	2242.5	2230	2235	2235.833333
25-Jan-24	2042	0	56.3	40	145.3	80	235.2	120	325.2	2225	2247.5	2250	2240.833333
01-Feb-24	2002	0	45.1	20	85.2	40	124.9	60	164.8	2005	1985	1995	1995
08-Feb-24	2002	0	55.2	20	95.1	40	135.2	60	175.8	1995	2005	2030	2010
15-Feb-24	2002	0	64.2	30	124.1	60	184.6	90	244.8	1996.66667	2016.66667	2006.66667	2006.666667
22-Feb-24	2002	0	51.3	30	111.2	60	171.5	90	231.8	1996.66667	2010	2010	2005.555556
29-Feb-24	2002	0	25.3	30	85.6	60	145.7	90	206	2010	2003.33333	2010	2007.777778
07-Mar-24	2002	0	24.2	30	84.6	60	144.7	90	205.1	2013.33333	2003.33333	2013.33333	2010
14-Mar-24	2002	0	36.1	40	115.7	80	195.6	120	275.5	1990	1997.5	1997.5	1995
20-Mar-24	2002	0	26.1	30	86.2	60	146.8	90	206.9	2003.33333	2020	2003.33333	2008.888889
28-Mar-24	2002	0	54.2	30	114.2	60	174.6	90	234.6	2000	2013.33333	2000	2004.444444
04-Apr-24	2002	0	51.2	30	111.8	60	171.7	90	231.8	2020	1996.66667	2003.33333	2006.666667
10-Apr-24	2002	0	26.5	40	106.8	80	187	120	267.7	2007.5	2005	2017.5	2010
18-Apr-24	2002	0	53.2	40	133.1	80	213.4	120	293	1997.5	2007.5	1990	1998.333333
26-Apr-24	2002	0	65.1	40	145.2	80	225.2	120	305.2	2002.5	2000	2000	2000.833333

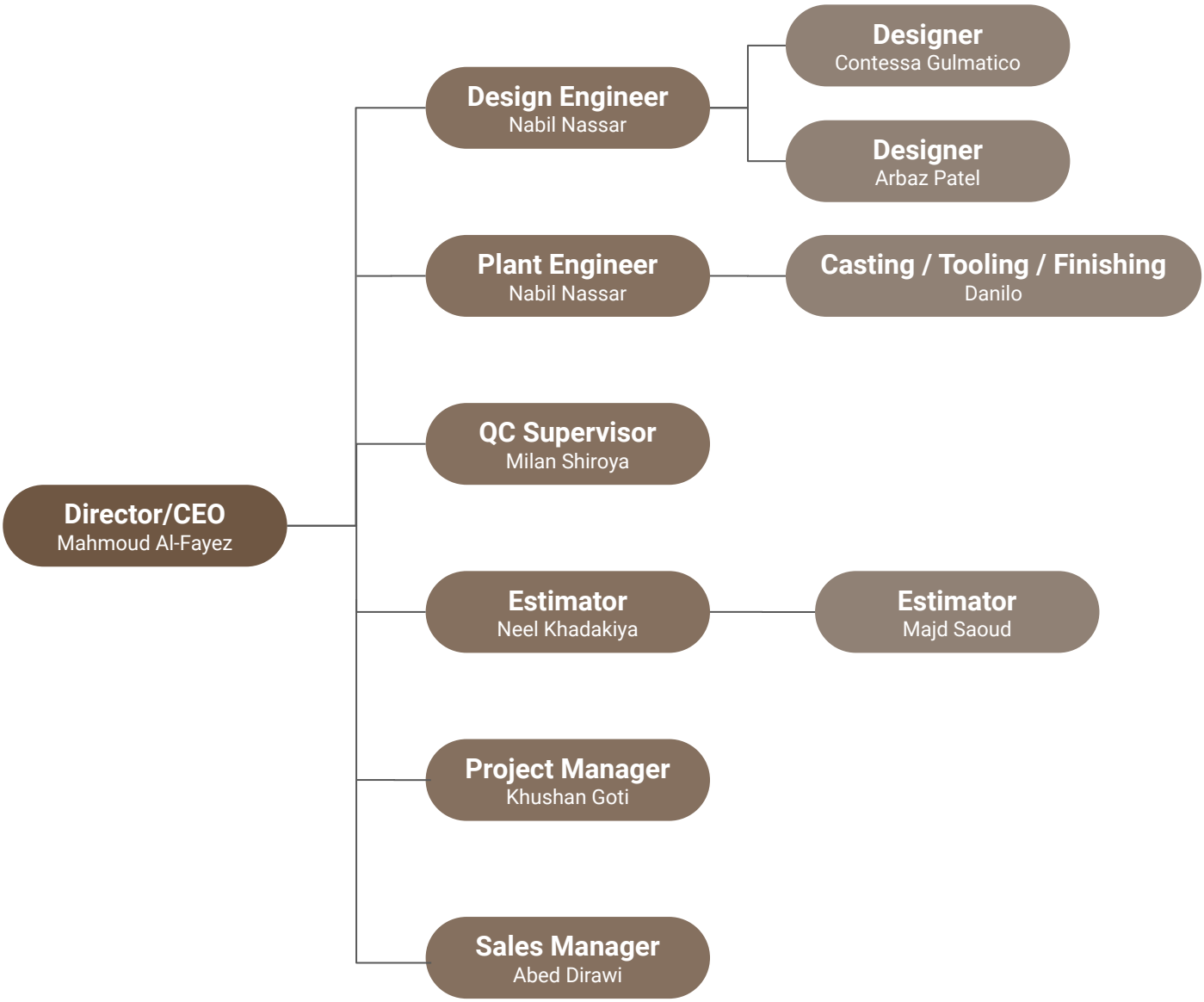
Appendix - F

Planeness of Bearing Face

No.	Date	Remarks	No.	Date	Remarks
1	21-Sep-23	Acceptable	42		
2	18-Oct-23	Acceptable	43		
3	23-Nov-23	Acceptable	44		
4	19-Dec-23	Acceptable	45		
5	26-Jan-24	Acceptable	46		
6	22-Feb-24	Acceptable	47		
7	19-Mar-24	Acceptable	48		
8	25-Apr-24	Acceptable	49		
9			50		
10			51		
11			52		
12			53		
13			54		
14			55		
15			56		
16			57		
17			58		
18			59		
19			60		
20			61		
21			62		
22			63		
23			64		
24			65		
25			66		
26			67		
27			68		
28			69		
29			70		
30			71		
31			72		
32			73		
33			74		
34			75		
35			76		
36			77		
37			78		
38			79		
39			80		
40			81		
41			82		

Appendix - G

Organizational Chart



Appendix - H

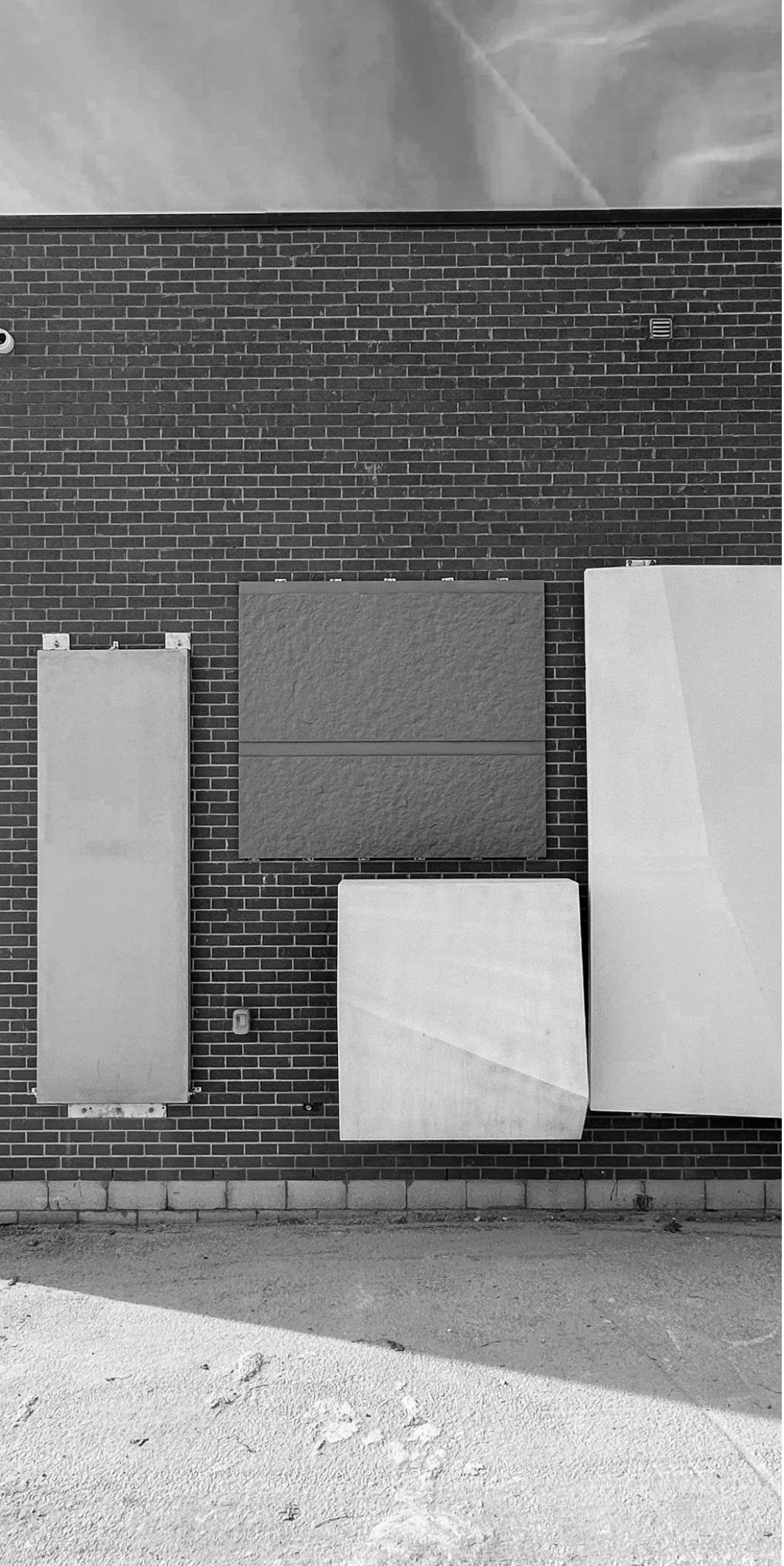
Unbound Caps Record of Use

No.	Type	Date of Installation	Date of Removal	Performed By
1	Du 70	13-Jun-23	26-Sep-23	Milan
2	Du 60	26-Jul-23	18-Oct-23	Milan
3	Du 70	26-Sep-23	18-Jan-23	Milan
4	Du 60	18-Oct-23	21-Mar-23	Milan
5	Du 70	18-Jan-23	16-Apr-23	Milan
6	Du 60	21-Mar-23		Milan
7	Du 70	24-Apr-24		Milan

Appendix - I

Revision log

Revision No.	Details of Change	Date	Revised by
R.01	Original Document	25 - Aug - 2022	Milan (QC Supervisor)
R.02	Change in Organization Chart	07 - Apr - 2023	Milan (QC Supervisor)
R.03	Changed the data in appendix section	28 - May - 2024	Milan (QC Supervisor)



PETRA™

ARCHITECTURAL MOLDED COMPOSITES

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