



COMPOSITEcore

'Architectural Cladding Systems'

A Division of DORALCO - *Architectural Metal Solutions*

Quality Control Guidelines

(Supplier Evaluation Procurement Control)

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Quality Guideline Manual

The purpose of this Quality Control Guideline Manual is to define the structure and operation of Doralco Company's quality control system for the fabrication of their products.

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COMPOSITEcore Division Manager
Project Manager
Quality Control Technician
Plant Division Supervisor

About

Doralco Architectural Metal Solutions specializes in innovative sunshade, grille and composite panel designs. Doralco's COMPOSITEcore and Intertec divisions create specialty façades and components to meet the needs of custom design and specific LEED requirements. Our design team has been helping Architects design their dream buildings for over 23 years with our free design assist service.

COMPOSITEcore Architectural Cladding Systems

- Rainscreen Systems
- Wet Joint Systems
- Composite and Plate Panels

Intertec Sunshades

- Vertical Sunshades
- Airfoil Sunshades
- Eggcrate Grille Sunshades
- Perforated Sunshades
- Radiused Sunshades
- Lightshelves
- Trellises

Intertec Grilles

- Airfoil Screenwall Grilles
- Architectural Incline Grilles
- Straightline/Eggcrate Grilles
- Lattice Grilles
- Medallion Grilles
- Perforated Grilles

All of Doralco's products are designed to meet the most stringent design criteria and are a 100% recyclable. Our exterior architectural systems and accessories are designed create a bold and unique look every time. It's the reason why the world's greatest architects and designers call on us to fabricate their masterpieces.

Responsibility, Personnel and Authority

All work will be performed in accordance with the contract requirements. COMPOSITEcore, a division of Doralco, will maintain an inspection system which assures compliance with the contract requirements. Any indication of system deficiencies whether discovered as a result of the subcontractor/supplier's checks and tests, will result in modifications to the system to correct these deficiencies.

This QCP does not endeavor to repeat or summarize contract requirements. It describes the process which COMPOSITEcore will use to assure compliance with those requirements. The QCP documents broad categories of contract work in accordance with the specification section for Contract's Quality Control. Necessary details dealing with minor items that may be overlooked in this plan will be addressed informally between the COMPOSITEcore's Quality Control Technician (QCT), installer / subcontractor's Project Manager / QCT and the Project Engineer (PE), as the work progresses; and will be documented in writing if so requested by the PE. It is understood that the level of QC accountability and control exercised by COMPOSITEcore on these items will be consistent with the details of this plan.

It is the responsibility of the Division Manager to provide education to the plant and field of unfamiliar or new metal panel wall systems. This is very important to marry the design intent to fabrication, assembly and installation. Doralco's pre-installation meetings are also required to kick off new installation projects. This will be an opportunity to discuss surrounding substrate conditions and interfacing with other system.

The Project Manager has overall responsibility for the successful completion of the project work. The project manager has had similar responsibilities on all COMPOSITEcore projects.

The responsibility and authority for Doralco's Quality Management System is the (Quality Control Technician - QCT). In this role he is responsible for:

- Ensuring that the processes are established, implemented, maintained and continually improved
- Overseeing day-to-day procurement and fabrication operations from a QC standpoint.
- Assure that all required fabrication and documentation are completed, and that the results are furnished to the Customer in the time frame required
- Reporting and resolving quality assurance issues from customers and third parties
- On quality assurance issues this individual reports directly to top management

(Quality Control Technician) is empowered to suspend any operations which he deems to be in noncompliance with the contract, and/or order corrective measures to assure compliance.

The (Plant Division Supervisor) reports to the (Project Manager) and (Division Manager) is responsible for the daily production operation at Doralco / COMPOSITEcore.

There is a designated Lead Fabricator that report directly to the (Plant Division Supervisor) and are responsible for performing and recording quality checks. Records of these checks are recorded and maintained in the Job File.

There is also a Shipping and Receiving Supervisor that checks all finished goods, this individual also reports to the (Plant Division Supervisor).

Fabricators are responsible for performing in-process inspection checks to ensure that the product is within the acceptable standards as identified on the product specification sheets. The Receiving Handler inspects incoming materials for quantity and quality, including surface defects, proper size, and functionality where applicable. Upon inspection, discrepancies are reported immediately to the (Plant Division Supervisor) for his/her inspection. Rejected materials provided by vendors will be photographed and sent back to the vendor.

As the number of operations or their dispersion on the project starts to overextend the (Quality Control Technician), QC responsibilities will specifically be assigned to Doralco / COMPOSITE core's supervisory personnel specifically responsible for given operations.

COMPOSITEcore has an experienced and highly professional staff that is used to the responsibility entailed by the QC requirements. We therefore do not anticipate any personnel or training problems in complying with them. If any such problems occur, Doralco / COMPOSITEcore will take whatever actions are necessary to correct them including retraining, providing more supervision or removal of poorly functioning personnel.

Documentation Requirements

This Quality Guideline Manual, Job Shop Drawings, Cut Sheets, Fabrication Tickets and Installation Drawings are considered controlled documents within Doralco. The Quality Guideline Manual is reviewed at least annually to ensure it is current and reflects the best practices of Doralco.

Doralco has a document control system to ensure that all quality assurance documents used:

- Have been reviewed and approved prior to use
- Changes to documents are also reviewed and approved
- All obsolete documents are destroyed, or clearly marked, to prevent unintentional use

Identification and Traceability

Once the panels have begun fabrication they are identified with the job register number, elevation identification as per the fabrication tickets and installation drawings. This permits traceability back to the fabrication tickets, which is retained in the job file. In addition, the job file also contains all purchase orders associated with the job, which allows traceability for all components used. If it were necessary, from the purchase order, a vendor could also trace their production.

Each panel / pan produced by Doralco has a fabrication tickets including quality control affixed to the panel by the assembling employee. This ticket indicates the panel information of: job name, register number, and elevation, along with the QC checks, system data, vertical & horizontal sizes, with their initials.

Each job has an approved Fabrication Ticket, which follow the job throughout the production process. These documents are all retained in the job file.

Quality Audits and Inspection

Daily Quality Control audits are performed by (Quality Control Technician - QCT) to ensure all production is in accordance with the Doralco job specific Quality Control Check Sheet. Company policy states that these audits are performed randomly on 1 out of every 50 panels produced. Also each panel is individually captured in a digital photograph with the identification number for a visual review.

Corrective Action Program

The Corrective Action Program established by Doralco / COMPOSITEcore incorporates an immediate and intensive investigation of any and all Quality Control issues. These problems include internal issues (quality, product, or manufacturing) and customer concerns.

Upon the first detection of a quality control failure the shop employee is to notify the (QCT). The (QCT) will notify (Project Manager) and (Division Manger) for an immediate investigation will begin. Production will be brought to a halt, until a unanimous decision is made on the reason / location of the failure. At this time production can resume on prior processes to the point of the error. The five previous panel units produced will incur the same quality control review, upon which the failed unit experienced.

Quality control issues that involve a vendor or product manufacturer will be immediately be reported to the (Quality Control Supervisor). Rejected materials provided by vendors will be photographed and sent back to the vendor. The (Quality Control Supervisor) will contact (Project Manager), upon which the findings will be resolved with that vendor or product manufacturer.

Material Inspection

Extrusions

1. Straightness of 1/16" is required within 48".
2. Dents are not acceptable.

Aluminum Composite Material (ACM)

1. Verify received material to purchase order.
2. Verify material's quantity, size, thickness, core and color.
3. Chips, clams, splinters and other defects are not acceptable.
4. Confirm ACM material is manufactured to the manufactures tolerances. (See attached exhibit)
5. Visually verify panel materials flatness.
6. Verify strippable film masking.
7. Verify ACM skid packaging, shipping and handling.

Silicone

1. Check and record batch number of product from the manufacturer.
2. Confirm batch has not exceeded the manufacturer expiration date.
3. Store all products in accordance with the manufacturer recommendations.

Fasteners

1. Validate hardware for compliance with contract documents and drawings, including engineering documents.
2. Confirm size, type, and COLOR against purchase order and fabrication documents.

Production Procedure

Once COMPOSITEcore has guaranteed dimensions or field dimensions, the procurement of fabrication tickets begins. The drafting department takes the shop drawings and modifies them to the approved dimensions, adds panel tags and method of installation, and these documents become "installation drawings." From these installation drawings, each individual panel receives a fabrication ticket graphically showing the method of assembly. Each person that performs a task in the "process" column must initial in the "checked by" column. The responsibilities are as follows:

Programming:

- CADD Dimensions: The specific drafting department personal assigned to the project isolates individual panels from approved shop drawings and creates an independent drawing based on the attachment details, engineering, and dimensions of the panels.
 - Confirm system type.
 - Check that project information complies with approved submittals.
 - Confirm authorization to commence fabrication sign-off.
 - Confirm production release with PM.
 - Verify plant material quantity, core and color.
- Shop/ Fab Release: Project Manager reviews and approves all fabrication tickets to assure that all relevant information to the fabrication of the individual panel is noted on the fabrication ticket. The drafter then inputs the program of the panel to the CNC router. The PM delivers the fabrication ticket(s) to the shop for production.
 - Verify panel fabrication tickets with approved shop drawings.
 - Confirm area of release and amount of panels required.
 - Verify amount of programmed panels vs. fabrication tickets.

Routing:

- Table / Machine Check: Before routing may begin, the CNC router operator must perform an inspection of components. All system components must be correct operation before work may proceed.
 - Verify operation of machining heads.
 - Confirm / replacing accordingly.
 - Verify operation of vacuum systems.
 - Verify flatness and grooving of MDF sacrificial boards. Replace as needed.

- Panel Dimension Check: After the CNC router operator cuts the panel out of the raw material, he verifies the dimensions to ensure that the panel that was program/ labeled was the panel that was cut.
 - Confirm that material is correct size, type, color, and thickness.
 - Verify overall panel height, length and return dimensions.
 - Inspect component parts for size with 1/16" maximum deviation
 - Inspect V-groove depth values: Max: 0.016" Nominal: 0.12" Min: 0.008"
 - Visually inspect finish. Scratches and other visual defects must not be visible from a distance of 10'.
 - Inspect all material surfaces and edges for any damages or blemishes.
 - Verify edge for clean cut.
- Identification – Staging: The CNC operator pulls the panel off the table and labels the panel and delivers it to the staging area.
 - Label job register number, elevation identification as per the fabrication tickets and installation drawings.

Fabrication:

- Fabrication Dimension Check: The fabricator retrieves the panel from the staging area and verifies the panel has been cut correctly per the fabrication ticket. He matches the panel number with the extrusions that have been cut for it and verifies the fasteners head color for the assembly.
 - Double checks fabrication ticket with panel.
 - Inspect all material surfaces and edges for any damages or blemishes.
 - Examine assembly instructions shop drawings prior to assembly.
- Bending/ Ext. Attachment: Per direction of the fabrication tickets, the fabricator bends the panels and panel returns as necessary and seals the return corners and any joints with a structural sealant. The installer then sets the continuous perimeter extrusion in the panel as laid out per the fabrication ticket. When the perimeter extrusion is set in place, the extrusion is clamped to the return and fastened to the panel by mechanical fasteners. These fasteners have painted heads to match the panel color.
 - Confirm against shop drawings that the preparations for extrusions are located properly.
 - Verify all extrusions have been installed properly and flush in panel return with a 1/32" maximum deviation.
 - Check that all screw head color is correct and free from color defect.

- Check that screws are in flush alignment of the material face at a 1/32" maximum projection with a 1/16" maximum indentation.
- Confirm all typical pan 1" rout & return corners are folded to complete closure with a 1/32" maximum deviation. (excluding exposed 0.20 material edge)
- Conform all pan 90 deg or other angle return legs are closed with a 1/16" maximum deviation.
- Verify structural sealant is used in all corners.

- Stiffener Installation: The fabricator applies an adhesion promoter, then double sided tape to the stiffener(s) designated for the panel. The fabricator then applies the adhesion promoter to the area of the panel that receives the stiffener and then attaches the stiffener pressing firmly to ensure thorough adhesion. Once the stiffener is attached the installer returns with a structural silicone and runs a continuous bead along the length of the stiffener on each side.
 - Verify stiffer used and spacing per fabrication tickets.
 - Verify all stiffeners are installed square.
 - Confirm structural sealant along edges

- Final Blemish Check: The fabrication is now complete and is ready for crating. The fabricator takes one last look at the panel, and makes sure that it was fabricated per the fab sheet and there are no nicks, dings, or scratches on the panel face. He initials the panels and they are picked up by the packager.
 - Double check that material is correct size, type, color, and thickness.
 - Double check job register number, elevation identification as per the fabrication tickets and installation drawings.
 - Inspect all material surfaces and edges for any damages or blemishes.
 - Verify overall panel height, length and return dimensions.
 - Verify all tolerances.

Product Packaging & Shipping

- Visually inspect crates for damage, prior to securing panels into the crates.
- Inspect spacers are installed between panels to prevent damage, rubbing, and/or bending during transportation
- Verify panels are secured using proper packing materials and methods.
- Confirm all panels, parts and pieces are in the crates and are on packing list.
- Confirm that all crates have been properly secured to flat bed.
- Complete final visual inspection of panels and crates for any damage.

Conclusion

The overall goal of COMPOSITEcore's quality control program is to conduct consistent and effective processes such that work performed naturally conforms to the contract requirements. Inspection will be performed and documented for the purpose of evaluating the effectiveness of our work processes, identifying and correcting non-conforming work, and ensuring the quality of the work is not compromised.