

METFAB METALS, LLC

[REVISED AS OF 12/06/16]

QUALITY CONTROL

Manual (as amended)

Ready Reference

Prepared by METFAB METALS, LLC Staff

[This Manual has been updated from prior editions for compliance with all applicable Regulations and other applicable specifications (including the AISC Code of Standard practice for the Fabrication & Erection of Structural Buildings as well as AWS D1.1 of the Structural Welding Code), and from other responsible authorities and the terms & directives of law and will be adjusted to the specifications of any specific contract, upon request. This is a trademarked manual that cannot be legally copied or reproduced, to any degree without the written consent of METFAB METALS, LLC.]

This Manual is intended to be available to all related customers as well as employees, and familiar to them to the degree relevant to their respective duties. It provides the guidance necessary to fully comply with the subject contract and law, as well as all other controlling regulations. See inside for more detail. If you still have any questions, please address them immediately, as they arise, to METFAB METALS, LLC Management.

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[Below on this page, in outline format only, is the skeleton of our **QC Plan**. It is followed by a narrative and fuller exposition of our full **QC Plan**. Also, as an appendix, we have added a specimen formatted sheet (Quality Control Plan Checklists, hereafter "**QCPC**") to be used for each and every part fabricated, on a daily basis, to "check off" and demonstrate in written form that the details of this **QC Plan** have been followed by all staff and fabricating personnel, from receipt of raw materials to actual site delivery. Supplementary (individual) (a) Welding and (b) Painting /Finishing QC Manuals have also been submitted.]

OUTLINE

- Overall QC Supervision/Plan Implementation: **Jim Murray**;
- Specs Compliance Oversight as QC: **Chris DeSimone**;
- QC for Component Fabrication: **Ed Huneke**, MMLLC Shop Gen Supervisor; **Edward Miechowicz**, Shop QC Supervisor,
- Weld Shop/Assembly: **Bob Petrone**, **Jim Dolan**, Weld Plan Formulators/ Inspectors;
- In-Shop Weld Supervisor: _____—Direct Oversight of welders----Direct Plan steps are given to the individual AWS-certified welders [All steps are recorded, tickets are signed off on, tickets/compliance certified in Project Weld **QC Binder**] [E.g., transit ticket #19 available for review, upon timely notice];
- **Jim Murray** again (personally) inspects and directs any "clean-ups" or non-fulfillment of Project Specs; reviews each component/sign-off by individual employee/staff as to each in **QC Job Book**;
- **Staff**---"Finished" Welded items prepared for next In-house step and/or shipment;
- **Staff**---Assembly Steps Implemented per that **QC Plan**, as designed;
- MMLLC's _____(on-site supervision at CPMP)--- Finishing/Painting **QC Plan** Implemented, as designed [See CPMP Detailed Plan];
- MMLLC's **Steve Bader** implements all steps for shipping, packaging, special handling, delivery, as designed; Consults (as necessary) by **Jack Thomson**---**JT Precast Consulting Services**.

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1. Purpose and Scope

Metfab Metals, LLC. (“*Metfab*” or “*MMLLC*”) has as its goal as a fabricator to consistently produce items meeting or exceeding the highest standards of quality. This Manual will assist us in achieving that quality goal and fully complying with the terms of this project.

This quality control Manual is for the internal use of *Metfab Metals, LLC*. (hereafter:“*Metfab*” or “*MMLLC*”) and the consideration of our customer. It is created to assure that the products of *MMLLC* are created in accordance with the highest standards of quality and in full compliance with all the terms of this job/contract Plans & Specifications (hereafter jointly referred to as “specs” and/or “plans & specs”). This Manual is also available to the project Owner and our customer to confirm this practice by *MMLLC* and its commitment to these standards.

This **Quality Control Manual** includes guidance on production processes and internal workflow processes, as well as reference to our Manual on *Quality Assurance (QA)* as to the acquisition/supply of raw materials and outsourced items/products. It also does include some guidance, representation and/or warranties as to weld design, design control, and/or design review, other such provisions required from time to time by this specific contract verbiage and/or these unique specs submitted by the job architects. *MMLLC* will, however always assure the highest quality reasonably available and strive to deliver a first-rate product in full contract compliance. This Manual draws on a number of nationally promulgated specifications referenced but not included verbatim herein. Compliance with such recognized standards is **ALWAYS** our goal.

This is **NOT** a **Safety Plan** as that has been separately undertaken by *MMLLC* and has been reviewed with all personnel, as part of the our regular safety program. Also available upon timely request.

2. Quality System Operated by Personnel

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MMLLC's quality system is dependent upon the personnel always operating within the framework of that quality system. *MMLLC* employees are always fully qualified and both experienced and trained in their duties. Regular re-training and upgraded training are part of the *MMLLC* commitment to excellence. Job functions, interrelationships and limits are completely understood by every member of the *MMLLC* team. It is the obligation of each team member to seek guidance if job functions are unclear or contradictory. Management/supervision oversees this commitment daily and reviews it as part of this quality program.

The *MMLLC* dedication to quality and safety has the full support of our management team. Team members are required to make decisions based upon producing a quality product. As part of our overall program, any potential shortfall in quality is to be brought to the immediate attention of management.

MMLLC team members are regularly and periodically trained and re-trained in the various related disciplines in order to maintain proficiency and expand new abilities. As new equipment comes online, mandatory operational and **OSHA** training is done and recorded, per Regulations.

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3. Job Planning

The established company policy is that planning any job is the first step in ensuring quality outcomes. Job planning necessarily includes the following:

- a) Personnel involved in the project;
- b) Materials required for the project (more fully covered in the QA Manual);
- c) Additional resources required to complete the project;
- d) Specifications set for & governing the project;
- e) Metfab's ability to complete the project safely, timely, and profitably;
- f) Consideration of required outside resources such as suppliers, subcontractors, rental equipment, etc. (more fully covered in the QA Manual);

4. Facility and Resources

MMLLC has constantly changed/adjusted/improved/updated capabilities to provide solutions based upon available personnel, resources and additional facilities. Part of the quality process requires the proper allocation of resources to a project to ensure a quality outcome.

The resources allocated will include a combination of the following:

- a) Personnel (both production and administrative)
- b) Machines, equipment and workstations
- c) Facilities available and/or added;
- d) Capacity of the lighter or heavier duty machines
- e) Size of the largest fabrications possible given other constraints
- f) Typical items fabricated for other customers
- g) Precision levels attainable

A regular maintenance program is required to ensure that all equipment, machinery and facilities are working at designed levels of safety, accuracy and efficiency. Everyone here at *MMLLC* is expected to comply fully with **ALL** the details of the maintenance program, as amended from time to time, safety rules and time-management/efficiency standards.

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5. Subcontracted Services

MMLLC strives to notify but is not required to obtain permission from customers before using needed subcontracted services.

MMLLC has an explicit system of *Quality Assurance (QA)* which covers *MMLLC*, as well as subcontractors. For example, when selecting an outside welding inspector, copies of the inspector's certifications are obtained and available.

The level of supervision and control exercised over a subcontractor shall be commensurate with the criticality and risk of the assigned tasks. For example, a subcontracted welder needs to be monitored more closely than a subcontracted janitor.

6. Documentation of Quality Control

MMLLC has a system of documentation which defines and documents work quality. This system includes the following:

- a) Shop drawings approved for fabrication, provided by the customer.
- b) Specifications and procedures for the materials.
- c) Specifications for fabrication, welding, finishing, delivery and other work to be performed.
- d) Work instructions.
- e) Handling instructions;
- f) Reports of step by step production/fabrication;
- g) Such other documents as required by contract or Regulation.

As the subject work here for **NMAAHC** is accomplished, detailed **QC** sheets/Quality Control Plan Checklists (hereafter "**QCPC**") will be maintained at *MMLLC* and supplied to our customer upon request. These will be kept in a format substantially like that in **Appendix "A" & "B"** attached hereto. As this document [*QC Manual*] is submitted, this **QCPC** is being refined to be even more job-specific. Our singular goal is to make each and every constituent part as spec'd and to report their development as fully as possible to the customer as required by the specs. These will cover the supply, fabrication, finishing, painting, packaging and handling/delivery phases of this job/project.

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7. Quality Records

MMLLC quality records include, but are not limited to:

- a) Welder Performance Qualification Records
- b) Material certifications
- c) Non-destructive examination and other inspection reports
- d) Manufacturer test reports
- e) Mill test reports
- f) Records and documentation from subcontractors/suppliers (per **QA** Manual);
- g) Day to day production/fabrication reports;
- h) “**QC**” spreadsheets per specs [Quality Control Plan Checklists (hereafter “**QCPC**”)].

8. Materials and Parts Control

The purchase of all materials, supplies and related parts used in the production process is done in a system designed to ensure the quality of such purchased items. Metfab must define situations where traceability is required for materials or consumables on this particular job/project.

The procurement system includes consideration of (a) where materials/supplies are produced and/or sourced; (b) how materials are received, handled, and stored. Where necessary, consideration is given to how materials are identified upon receipt, inspected, and checked for conformity with specifications, such as “Buy American”.

Compliance superintendence is the responsibility of the project manager to ensure that all operations are in full compliance with the job specs. Daily supervision is the responsibility of the COO, project manager, foremen and daily-assigned personnel. All structural steel materials will be checked upon delivery for general physical condition and compliance with specs. Any visible damage should be brought to the attention of the COO or his designated representative during his absence. All materials will be accompanied by mill test reports and will be marked to clearly identify them from other materials. Job numbers should also be clearly marked on each piece. Heat numbers and job numbers must be transferred to pieces cut from stock materials during fabrication. Mill test reports and material shipping documents will be

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held in this project's files.

Materials received into the shop must be stored in an acceptable manner so that they will not be damaged. Wood blocking must be used under items and they should be blocked in a manner that the weight from those above does not bend, twist or distort the ones below.

In all cases, materials, supplies and related parts used in the production process will be acquired only in full compliance with our *Quality Assurance (QA)* Manual (previously submitted) and the specs of this job/project.

9. Welding and fabrication procedures

The shop foreman will review the following information prior to commencement of the fabrication of detail parts for a specific project:

1. Project Drawings/Specs are current and approved;
2. Materials are in stock and specified grade as per current Project Drawings/Specs;
3. Applicable weld procedures are developed & certified in compliance with the specs.

During and after the fabrication, designated staff and shop foreman will examine all pieces for spec-compliant edges, punched holes, angles, sizes, drilled holes and overall appearance. Flame cutting of pieces is approved only where spec'd. All items, pieces and assemblies will be marked with job number and other relevant info/marks as per specs for tracking procedures and otherwise prepared for handling, shipping and delivery.

Prior to welding, all joints will be examined for joint alignment and all joints to receive full penetration welds or other welding requirements set by the specs. All joints will conform to the requirements of the AISC Code of Standard Practice for the Fabrication and Erection of Structural Steel Buildings and the AWS standards. Burning or Flame cutting will be minimized and done only when necessary. Whenever burning or flame cutting is done, the roughness of the cut surface shall not be greater than that defined by the American National Standards Institute surface roughness of 1000 micro inches for material up to 4 inches thick and 2000 micro inches for materials 4 to 8 inches. The surface will be free of slag and gouges in the cut surface and will be removed by grinding or machining with a slope towards the adjacent material

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surface. Gouges in excess of 3/16 inch will be repaired by filling, welding and grinding, in compliance with the specs. Weld access holes will be made only as needed and shown on the approved shop drawings. Punching/waterjet cutting will be used to make bolt holes, in compliance with the specs. All bolt holes, whether waterjetted, punched or drilled shall meet the requirements of the AISC Code Specification for the Design, Fabrication and Erection of Structural Steel for Buildings. Slotted holes shall be as stated on the drawings, in compliance with the specs. Punched holes should be deburred to remove burrs that might impair proper bolting of the joints. Any distorted, twisted or bent piece will be straightened prior to use or discarded as scrap. All holes shall conform to the requirements of the AISC Code Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

Welding will only be done by **AWS**-certified welders. A list of shop welders and their certifications will be held in our office. Welding will only be done in accordance with applicable codes. Each welder will visually examine each weld and check for weld size, convexity, concavity, undersize, porosity, or any other deficiency. Any deficiency will be reported to the supervisor who will further investigate for compliance with job specs. Any non-conforming will be rejected and re-worked to compliance, if feasible. If not, a replacement will be made. Bolted connections will be in accordance with the AISC Code for the use of ASTM A325 and A490 bolts. The correct size, bolt grade and other requirements will conform to the requirements of the AISC Code Specification for the Design, Fabrication and Erection of Structural Steel for Buildings. Bolted connections that do not require any work in the field will be bolted and tightened in the shop in their final positions to the torque specified in the specs. Torque wrenches will be calibrated, at regular intervals to be in compliance with the specs. All completed parts/assemblies will be marked and tagged as directed by field erection sequence drawings. Markings/packaging will be legible and contain the piece mark as shown on the fabrication detail drawing. Surface Cleaning/ Painting Prep/Paint Application will be in compliance with the specs. These are presently as follows:

PPG Corafon Paint System

Prep: Commercial Blast (SSPC-SP-10) Near White< Blast to be controlled to 1.0 to 2.0 Mil Surface profile

Primer: PPG Corafon ADS 573 High Build Epoxy 2 to 5 Mils

Finish: PPG Corafon ADS @ 1.5 to 2.5 Mils

Color AD3K1141N - Corafon ADS Intermix – Quaker Bronze Sheen – Satin

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Other coatings, which require more extensive surface preparation and coating applications, will be shipped to an approved painting contractor. Surfaces receiving shop primer will be manually cleaned to remove loose mill scale, soil, other shop residue or grease prior to painting. All painting sub-contractors will be experienced and pre-qualified to perform the tasks required to comply with all Project Painting Specs. All finished members will be stored in a designated staging to avoid pre-delivery damage. Blocking and other storage materials will be implemented to prevent twisting, bending or distortion of the parts/assemblies from their own weight or the weight of pieces above. Painted members will be stored, stacked, segregated, loaded and/or padded/cushioned in a manner to prevent damage to finished surfaces prior to site delivery or in transit.

The customer on a process-by-process basis shall define welding and other fabrication procedures in writing in the specs. Where deemed necessary, **Procedure Qualification Records**¹ shall be created. See Appendix "C" as an example.

AWS welding procedures shall be available to welders at all times. Welders and other production personnel are always directed to seek guidance whenever questions arise as to compliant, proper and safe procedures.

Welding procedures are qualified by an **AWS** Accredited Test Facility or other Accredited Welding Inspector. Other fabrication procedures shall be performed in accordance with governing specifications such that the resulting product is created in conformity with the authoritatively approved design and **AWS** standards.

An independent and supplemental Weld QC Plan has also been submitted. All welding will be reviewed by independent inspectors.

[*MMLLC* provided this independent inspection for the PMU (Project Mock-Up); Such independent Project Production Inspections will be provided by the Owner, as set forth in the Specs.]

10. Control of Production Consumables

Part of the job planning process is the determination as to which base metals, bolts or miscellaneous supplies, attachments, filler materials,

¹ These are brief written reports of a process we have followed or procedure designed per the Specs to be followed to fulfill a Project requirement on the specific subject, as provided in and for compliance with the project Specs.

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welding wire and gases, paints and finishes, and other consumables are used.

Consumables shall be stored with a consideration as to their preservation and use suitability. Any and all expired/outdated consumables will be discarded and not used for this Project.

11. Supervisory Personnel Requirements and Qualifications

MMLLC's quality control system is also designed and addressed to the provision of fully trained and adequate supervision and inspection from both inside or outside sources.

Fabrication and welding coordinators:

Such coordinators are *MMLLC* personnel with experience and expertise required and appropriate for the circumstances of this job/project. Such coordinators are authorized to call on the experience of outside fabrication or welding resources as required. Additionally, such coordinators are required to bring to the attention of management any deficiencies noticed in welding or fabrication performance.

Fabrication and welding inspectors:

Coordinators may designate inspectors on a job-by-job basis who are qualified to judge work product in terms of quality and procedural performance and safety. Such inspectors shall immediately notify the responsible coordinator if deficiencies are identified in fabrication procedure or welding performance.

The *MMLLC* quality control system has provision for tracking which job functions and operations are performed by which qualified personnel.

12. Welder and Fabricator Performance Qualification

MMLLC shall qualify all fabricators, welders and finishers for the specific work to be performed, in compliance with this Project's specs and **AWS** standards. The qualification system encourages certifications in the case of welders, and appropriate experience and training for machine operators and painters.

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One component of the job planning process is to consider the assignment of appropriately qualified personnel to individual project processes.

MMLLC's performance qualification system requires that personnel be reviewed periodically (at least annually) as to skills obtained, maintained, and / or not yet fully achieved. *MMLLC* maintains a log of welding certifications and other job qualifications.

13. Inspection and Examination

All product inspection is performed internally and / or by independent inspectors. The quality control system requires that acceptance criteria be understood in the planning process. The planning process also defines the frequency and level of inspection to be performed.

Prior to shipment to the field, outside painter or other coating applicator, the shop foreman will visually examine all members to ensure that at a minimum the following conditions are met:

1. All parts/assemblies are completed and appropriately marked;
2. All parts/assemblies have received shop primer/other coatings, if specified;
3. All parts/assemblies have not been damaged during production, handling and/or storage;
4. All parts/assemblies are grouped together
5. All post-fabrication spec changes have been implemented.

A ***FINAL*** inspection will be carried, prior to departure by all shop foremen/supervisors and our COO, if he is onsite at the time. All structural steel members, hardware and/or misc. equipment will be shipped only as safely loaded, properly chocked/padded/cushioned and secured onto the various trucks/trailers. Sufficient chocking/padding/cushioning/securements and/or tie-downs will be installed so as to minimize damage, dinging, chipping, denting or other loss in transit. It is our driver's responsibility to verify that the load is properly balanced, blocked and secured onto the bed of the truck. All accompanying documents, bills of lading and jobsite instructions will accompany each delivery. All mill test reports, shipping tags and bills of lading will be shipped to you and copies stored here for filing with other project documents.

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In the rare situation where product quality (as defined by the acceptance criteria in section 13) is not attained, this quality control system is designed to prevent the use of non-conforming products in *MMLLC*'s final products. A nonconformance situation can be said to occur, but is not limited to the following situations:

- a) Base metal identification and inspection before fabrication or welding is not performed, or,
- b) Required preparation of the base metal or consumables is not properly followed prior to fabrication, or,
- c) Required welding or fabrication procedure is not followed, or,
- d) Finishing or assembly procedures are not properly completed, or,
- e) Products do not meet acceptance criteria.

MMLLC requires that this company's owner be notified in the situation where any nonconforming work has been performed. The owner has the primary authority to devise a remediation scheme for such nonconformance.

Available remediations for nonconforming work include the following:

- a) Deviation – accept the product as it is.
- b) Rework – correct the product to bring it to full compliance.
- c) Repair – modify the product to bring it to acceptable quality, which may not be in full compliance with specification or acceptance criteria.
- d) Scrap – discard the nonconforming product and remake it.

MMLLC's quality control system requires that any nonconformance situation be identified, investigated and analyzed so that the root cause of the problem is identified and addressed. Our sole goal is to supply fully-compliant, first-rate products----**on time, every time!**

15. Customer Satisfaction

A customer who receives quality products in a timely manner is usually a satisfied customer. *MMLLC* monitors customer satisfaction for the purpose of identifying and correcting any and all deficiencies in quality or timeliness, before delivery to our customers. Every day we employ established processes to assure the highest quality in all the products we

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make and that we ultimately pass on to our customers as our finished products.

16. Conclusion

This brief overview cannot be, and is not meant to be, an exhaustive recital of the processes we everyday employ to assure the highest quality in all the products we make and that we ultimately pass on to our customers as our finished products. This is intended only as a short outline of the larger picture of what our customers may expect from us in jobs, both large & small. For more information, please consult our website (www.metfabmetals.com), call our COO, Jim Murray (973-675-7676) or, better yet, come in and see for yourself on a “shop visit”. [As this **Manual for Quality Control (QC)** is updated, revised and/or edited, we will supply copies to all our regular customers----- and to our new customers as they come online.]

More specific detail is recited in the attached Appendix.

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APPENDIX “A”

See Attached.

*An individual Quality Control Plan Checklist----- “**QCPC**”--- will be prepared, filled out and reviewed during the production of **each** assembly/part required by the specs.]*

APPENDIX “B”

See attached Specimen (formatted individual) Inspection Sheet to be used in the fabrication of each fabricated part and/or assembly.

APPENDIX “C”

See attached Specimen **WTTI** Report/Certification Form, as an example of those that will be kept per the Specs of this Project.