

This QA ITP supplements the inspection procedures of the SFQM and other supporting QA documents by tabulating the progression of QA inspections and tests required by MDOT as part of its acceptance of Level I structural steel fabricated members.

Level I structural steel fabrication inspection is considered standard shop inspection for main load carrying members, typically characterized by full time inspection frequency and sample size as indicated in the MDOT Work Assignment (WA). Full time inspection is defined as eight hours of inspection per day Monday through Friday while fabrication is occurring. Contact SFU for approval prior to exceeding these limits if more inspection time is proposed based on the Fabricator's operations and the inspection requirements established in this ITP. QAIs are required onsite full-time, although some related activities may be performed without the QAI present. Some activities may occur while the QAI is offsite when it has been prearranged with the SFU and the Fabricator. Visits to Fabricator subcontractors and component manufacturers require SFU approval or direction via WA.

QAI must not arrive to the fabrication shop earlier than the day prior to the start of fabrication to begin prefabrication activities without SFU approval.

All instances of required SFU approval noted in this document must be in writing from the MDOT PM.

## 1.1 QAI Activities (Inspection and Test Items)

QAI activities are listed in the table below along with their referenced requirements, activity codes, frequency, description, and output/record. Each activity is assigned a code to designate whether the activity is performed by the Fabricator and observed by the QAI or is performed by the QAI either solely or as an independent check of a QC inspection or test. The activity codes are defined in Section 1.2 below.

The term "Suitable intervals" when used in this ITP means the activity is required to occur at least once per project (or once per multiple projects going through the fabrication plant concurrently) with follow up duration and frequency determined by the QAI based on conditions such as QC inspection effectiveness and production workmanship provided the QAI works within the limits of their inspection hours. Duration is the time spent observing an activity. Frequency is how often an observation is required and is expressed as elapsed time or quantity of work completed between observations. At the QAI's discretion, duration and frequency may differ between projects based on project complexity or Fabricator experience and may change during a project based on Fabricator performance provided the QAI works within the limits of their inspection hours.

Conformance of certain quality control and fabrication activities that occur without QAI presence must be substantiated by the QAI with direct proof or competent evidence. QC inspections are substantiated by reviewing quality documentation supplied by the QCI and follow-up review with the QCI. Fabrication steps are similarly substantiated by observing and reviewing progress with QC inspectors.

When used in the Description column the term "verify" is the action by the QAI to establish correspondence of observed facts or details with recorded facts and details. It implies a responsibility by the QAI to confirm completion and conformance of an action or condition with expected requirements. For a Level I test plan it implies onsite QAI activity unless arrangements were made that satisfy the SFU.

## 1.2 Activity Codes

**M = Monitor:** QAI routinely observes the Fabricator's active quality control and fabrication activities at suitable intervals. The Fabricator's activities may be conducted without the QAI present to monitor, even if the QAI is onsite.

**P = Perform:** QAI is responsible for actual completion of the step. These activities include verification inspections, tests, and review of quality control records for adequacy and completeness.

**W = Witness:** QAI must be present and observe the required activity performed by the Fabricator.

## 1.3 Hold Points

Some activities are identified as hold points. These are sensitive steps that require QAI notification by the Fabricator. Fabrication must not proceed past these points until the QAI is either satisfied of the outcome through direct testing or observation of testing, or the QAI grants a waiver or conditional release of the hold point based on situational evaluation. QAI satisfaction or waiver does not constitute product acceptance, which is the responsibility of the Fabricator.

The prefabrication meeting minute template initially establishes the minimum number of QAI hold points – see blue shaded rows below. The QAI may recommend or request modification or addition of hold points for the approval of the MDOT Structural Fabrication Unit, at the start of fabrication – see note below.

QAI may request additional inspections, tests, or hold points during the fabrication process due to established action limits/suspension limits being exceeded or in reaction to a loss of confidence in a process. Additional inspections, tests, or hold points will be conveyed in writing to the Fabricator and must result in minimal impact to project schedule. Written conveyance must identify the duration and acceptance criteria in addition to the same level of detail as in the below ITP table. SFU approval is required – see note below.

Ideally, the Fabricator must convey project schedules in writing to confirm when hold point inspections will occur and that the QAI is available for the hold point inspection as requested by the Fabricator. The QAI must reply to any written requests for hold point inspections. Other forms of communication are acceptable if documented (recording Fabricator notification to the QAI and QAI response) and agreed to at the prefabrication meeting.

Note - Any increase in inspection criteria or inspection hold points must be based on objective evidence. Rationale for additional inspection or hold point should be discussed with the MDOT Structural Steel Specialist prior to notifying the Fabricator of the new inspection requirements.

## 1.4 Output/Records

Where the Fabrication Inspection Report (Form 5617) is listed in the Output/Record column, the QAI may substitute a Consultant form meeting the requirements of the SFQM. Where other MDOT forms are listed, it is implied they are only necessary when the associated activities are performed.

## 1.5 ITP Table

The ITP table starting next page is sufficient for most projects. However, adjustments are permitted to suit specific project needs. Any adjustments must conform to project requirements and must be made in writing and submitted to the SFU for approval. Once approved, it must be shared with the Fabricator prior to start of production, preferably before or during the prefab meeting. Adjustments to hold points must conform to Section 1.3 above.

Custom ITPs developed by the Contractor or Consultant are also permitted but must address all inspection and test activities listed in the ITP Table.

Altering the conditions detailed in the above introduction and outline is not permitted without SFU approval.

Inspection/Test Item	Referenced Requirement	QAI	Frequency	Description	Output / Record
Approved Shop Drawings	SFQM 1.9.1, SFQM 2.3.3.2 & 2.3.3.6 or SFQM 2.4.3.2 & 2.4.3.6	P	Initially and each revision	Visually confirm that shop drawings in use are approved. If Engineer permits Fabricator to proceed without approved drawings, notify Consultant PM and await instruction to proceed. If non-approved drawings are used for fabrication, compare approved drawings to unapproved drawings and note deviations during fabrication – notify Consultant PM of any discrepancy.	Fabrication Inspection Report (Form 5617)
Material Inventory	MDOT Prefabrication Meeting Minutes MDOT SSC 105.01.B SFQM 2.3.4.2.3 & 2.3.4.3.1 or SFQM 2.4.4.2.3 & 2.4.4.4.1	P	During all material inventory, prior to first use of each material	Inspect materials that will be used in the fabrication process and ensure they are being stored correctly, tagged for traceability purposes, and are in conformance with the contract. Conduct sampling and verify testing is completed as required. Verify mill test reports match base metals. Send email to QC and Consultant PM when there are deficiencies. Release hold point.	Fabrication Inspection Report (Form 5617) Sample Identification (Form 1923) Email
Operations (Facility and Equipment)	SFQM 2.3.4.2.3 & 2.3.4.7.3 or SFQM 2.4.4.2.3 & 2.4.4.8.3	M	Suitable intervals	Inspect and monitor the Fabricator's work area and equipment, ensuring it is adequate and maintained in a condition to yield products conforming to project requirements. Note - Equipment includes cutting, welding, handling, forming, hole-making, surface preparation, coating, and inspection and testing as applicable. Check calibrations of inspection and testing equipment.	Fabrication Inspection Report (Form 5617)
Qualified Welders	SFQM 2.3.4.3.2 or SFQM 2.4.4.4.2	P	Each welder, prior to first weld	Verify welders are MDOT qualified and have appropriate fracture critical qualification if applicable, including tack welders, welders, and welding operators. Verify welder continuity has not been disrupted in the three-month period.	Fabrication Inspection Report (Form 5617)
Approved Welding Procedures	SFQM 2.3.4.3.3 or SFQM 2.4.4.4.3	P	Prior to first weld for each WPS; Suitable intervals afterward	Verify that WPSs and welding sequences are agreed to and understood by QAI, QC, and Fabricator. Verify all WPSs are approved and posted at each welding station.	Fabrication Inspection Report (Form 5617)
Base Metal Preparation and Assembly for Welding	SFQM 2.3.4.3.1 & 2.3.4.3.4 or SFQM 2.4.4.4.1 & 2.4.4.4.4	M	Suitable intervals	Examine the steel and verify quality of fabrication, especially edge preparation, before fit-up. Verify that QC is maintaining heat number traceability back to piece mark in the structure	Fabrication Inspection Report (Form 5617)
Weld Joint Fit-up	SFQM 2.3.4.3.5 or SFQM 2.4.4.4.5	M	Suitable intervals	Check root face, bevel angle, cleanliness, match marks, alignment of adjoining parts, uniformity, and size of root openings. Check edges for internal discontinuities at weld joints. Check all critical measurements affecting fit-up.	Fabrication Inspection Report (Form 5617)
Fixturing and Fabrication Aids	SFQM 2.3.4.3.6 or SFQM 2.4.4.4.6	M	Suitable intervals	Check fixtures, clamping, and pre-cambering arrangements for adequacy. Ensure tack welds are small, smooth and of specified quality. Verify runoff tabs or extension plates are in place.	Fabrication Inspection Report (Form 5617)

Inspection/Test Item	Referenced Requirement	QAI	Frequency	Description	Output / Record
Pre-Welding Final Review	SFQM 2.3.4.3 or SFQM 2.4.4.4	P	Prior to first weld, each process; Suitable intervals afterward	Verify welder qualification, WPS qualification/pre-qualification, base metal preparation, as-fit joint details, and fixturing and fabrication aids are acceptable for production welding. Release hold point. Relax hold point after.	Fabrication Inspection Report (Form 5617)
WPS Review	SFQM 2.3.4.4 or SFQM 2.4.4.5	M	Suitable intervals	Verify that production welding is following the approved and stamped WPSs. Verify that welding is conducted properly with respect to weather conditions (wind and precipitation). Verify proper preheat is used prior to welding.	Fabrication Inspection Report (Form 5617)
Electrode Storage	SFQM 2.3.4.4 or SFQM 2.4.4.5	M	Suitable intervals	Verify that electrodes and fluxes are properly stored.	Fabrication Inspection Report (Form 5617)
Production Welding	SFQM 2.3.4.4 or SFQM 2.4.4.5	M	Suitable intervals	Verify that welder is using proper technique for the specified weld procedure and joint. Verify that arc strikes are not outside the weld joint. Verify root pass penetration. Verify weld pass cleaning with proper equipment.	Fabrication Inspection Report (Form 5617)
Heat Application	SFQM 2.3.4.4 or SFQM 2.4.4.5	M	Suitable intervals	Monitor use of heating procedures, use of equipment, and temperature monitoring for all applications other than preheat (cambering, curving, distortion control, straightening, etc.). Ensure heat correction is performed prior to NDT.	Fabrication Inspection Report (Form 5617)
Prior to NDT/Post QC Final Weld Inspection	SFQM 2.3.4.4 or SFQM 2.4.4.5	P	Each weld requiring NDT and suitable intervals for other welds	Spot check weld size, length, and proper location per the approved shop drawings. Verify welder identification on splices of main members. Verify visual appearance of weld for profile and surface discontinuities per AWS D1.X after QC inspection. Release hold point. Hold point may be waived if the Fabricator has an effective communication plan in place with the QAI on notification of upcoming NDT operations as established during the prefabrication meeting.	Fabrication Inspection Report (Form 5617)
NDT Process Review	SFQM 2.3.4.6 or SFQM 2.4.4.7	P	Each project	Observe use of NDT procedure and procedure appears to be correct for the type of NDT being performed (e.g., MT procedure for MT inspection). Verify all weld joints requiring NDT are addressed by the Fabricator's plan. Review NDT technician certifications.	Fabrication Inspection Report (Form 5617)
NDT: Non-critical Joints	SFQM 2.3.4.6 or SFQM 2.4.4.7	M	Suitable intervals	Observe NDT of non-critical joints at suitable intervals to verify proper procedures are used – duration of observation as determined by the QAI. Note - Unless joints are designated critical at the prefabrication meeting, consider all joints non-critical.	Fabrication Inspection Report (Form 5617)

Inspection/Test Item	Referenced Requirement	QAI	Frequency	Description	Output / Record
NDT: Critical Joints	SFQM 2.3.4.6 or SFQM 2.4.4.7	W	First critical joint for each type of NDT; Suitable intervals afterward	Witness at least one complete NDT examination of a critical joint to verify proper procedures are used, including equipment setup. Monitor as needed on remaining critical joints.  Note - Unless joints are designated critical at the prefabrication meeting, consider all joints non-critical.	Fabrication Inspection Report (Form 5617)
NDT Review	SFQM 2.3.4.6 or SFQM 2.4.4.7	P	Each NDT report	Verify the locations of rejected weld, or rejected portions of the weld, are identified in the NDT reports and on the welded joint. Obtain copies and review QC interpretations of the NDT reports and bring disagreements with QC or NDT Technician to the attention of the Consultant PM.	Fabrication Inspection Report (Form 5617)
Laydown Inspection	SFQM 2.3.4.5 or SFQM 2.4.4.6	W	Each girder line, each assembly	Observe QC inspection of final camber and sweep of all girder assemblies after fabrication is complete.  Verify results of reinspection after corrections are complete.  Release hold point.	Fabrication Inspection Report (Form 5617)
Approved Repairs	MDOT Prefabrication Meeting Minutes	P	Suitable intervals; at least once per repair type	Visually confirm use of approved repair procedures and materials.  Verify temperature monitoring tools for heating operations used to adjust camber and girder straightness/curvature.	Fabrication Inspection Report (Form 5617)
Pre-blast inspection	SFQM 2.3.4.7.4 or SFQM 2.4.4.8.4	M	Suitable intervals	Monitor the Fabricator's operations to ensure that grinding repairs, weld repairs, and other fabrication operations are complete before surface preparation begins.	Fabrication Inspection Report (Form 5617)
Surface Preparation	SFQM 2.3.4.7.5 or SFQM 2.4.4.8.5	M	Suitable intervals	Observe surface preparation of steel members.  Spot check surface preparation by evaluating steel cleanliness and surface profile.  Verify QC inspections meet project requirements for frequency.	Fabrication Inspection Report (Form 5617)
Environmental Conditions	SFQM 2.3.4.7.1 or SFQM 2.4.4.8.1	M	Suitable intervals	Monitor the Fabricator's methods of recording environmental conditions during surface preparation and coating operations.  Review daily environmental reports to ensure that coating operations meet the contract requirements.	Fabrication Inspection Report (Form 5617)
Coating Material Preparation	SFQM 2.3.4.7.2 or SFQM 2.4.4.8.2	M	Suitable intervals	Observe the Fabricator preparing the coating material for application.  Note the proper mixing, thinning, induction time, screening, and handling of the material.  Verify that QC is documenting all batch numbers, color numbers and one-year expiration date for acceptance.	Fabrication Inspection Report (Form 5617)
Coating Application	SFQM 2.3.4.7.6 or SFQM 2.4.4.8.6	M	Suitable intervals	Observe application technique for the coating system being applied follows the manufacturer's recommended practices and project requirements.	Fabrication Inspection Report (Form 5617)

Inspection/Test Item	Referenced Requirement	QAI	Frequency	Description	Output / Record
Coating Inspection	SFQM 2.3.4.7.7 or SFQM 2.4.4.8.7	P	Each main member and suitable intervals for secondary members	<p>Conduct dry film and/or wet film thickness inspections of completed coats applied to the members. Note: SSPC PA 2 frequency is not required for QAI verification testing. Spot checks by the QAI are sufficient to verify QC conformance to SSPC PA2.</p> <p>Confirm proper cure time between coats.</p> <p>Confirm approved coating repair procedures are followed.</p> <p>Verify that QC test reports and required documents for surface preparation and coating application are in conformance with the specifications.</p> <p>Verify that all coated materials are properly handled and stored for shipping.</p> <p>Release hold point.</p>	Fabrication Inspection Report (Form 5617)
Loading & Shipping – QAI Acceptance	MDOT Prefabrication Meeting Minutes SFQM 2.3.7 or SFQM 2.4.7	P	Each member, prior to shipping	<p>Inspect structural members after loading for storage and handling defects.</p> <p>Verify no unauthorized or undocumented repairs.</p> <p>Verify receipt of required QC documentation.</p> <p>Stamp the accepted members and the copies of the Bill of Lading after loading inspection.</p>	Fabrication Inspection Report (Form 5617) Fabricator Bill of Lading