PURPOSE: To specify requirements for equipment to be used to evaluate production parts for compliance to drawings or inspection standards at all phases as required by TMI Plant or Development QC.

SCOPE: Applies to gauges and fixtures which are used to confirm accuracy of parts supplied to TMI at all phases as explained in TMI SQAM Section 3.

NOTE: It is the supplier's responsibility to ensure that adequate gauges and / or fixtures are available to confirm parts accuracy at all phases.

EXPLANATION: The checking fixture is the method for checking the part to confirm its conformance to all requirements. The procedure applies to checking fixtures which are used to confirm accuracy of supplied parts in accordance with TMI parts inspection standards. Checking fixtures must be completed, approved, and available for 1st off tool parts unless otherwise negotiated and approved by TMI Purchasing.

TMI recognizes four separate levels of C/F responsibility as defined in the matrix below:

	C/F Specifications	C/F Drawing	C/F Fabrication
Level 1	TMI	TMI	TMI
Level 2	TMI	Supplier	Supplier
Level 3	Supplier	Supplier	Supplier
Level 4	TMI CMM Data	Supplier	Supplier

If the check fixture is made from a drawing that is at phase 1 and the fixture is not a pull ahead fixture, initiation and approval activities will be driven by TMI Development QC.

If the check fixture is made from a phase 2 or 3 level drawing or the fixture is a pull ahead fixture, initiation and approval activities will be driven by TMI Plant QC.

RELATED DOCUMENT(S):

INSPECTION STANDARD (TMI SQAM Section 7)
MQC / CONTROL PLAN (TMI SQAM Section 10)
CRITICAL CHARACTERISTIC MATRIX (TMI SQAM Section 22)
TMI QUALITY ASSURANCE PROJECT PLAN (TMI SQAM Section 25)
INSPECTION STANDARD REQUEST COVER SHEET (TMI SQAM Section 7)

REQUIRED DOCUMENT(S):

SUPPLIER CHECKING FIXTURE APPROVAL REQUEST - TMI APPENDIX 8A
CHECKING FIXTURE CHANGE REQUEST - TMI APPENDIX 8B
GAGE R & R STUDY (Reference AIAG MSA)

RESPONSIBILITIES:

1) The supplier is responsible for providing a means to verify all quality characteristics specified on the Drawing, "Inspection Standard", and "Critical Characteristic Matrix" at all part phases.

2) At the beginning of the program, TMI QC (Plant or Development) will determine the need for checking fixtures and notify the supplier by indicating the need on the INSPECTION STANDARD REQUEST COVER SHEET (TMI Appendix 7B). TMI QC (Plant or Development) will then determine the C/F specifications for all levels of responsibility and advise the supplier as to how the special tool is to be developed for the supplied part. The supplier must be capable of making the C/F from a mylar pattern of the part or from CAD data.

3) For a C/F with Level 1 responsibility, TMI will develop the C/F drawing and fabricate the fixture.

4) For C/F with Level 2, 3, and 4 responsibility, and after the design concept is finalized between the supplier and TMI QC (Plant or Development), the supplier must submit drawings for C/F using the SUPPLIER CHECKING FIXTURE APPROVAL REQUEST form (TMI Appendix 8A) to TMI QC (Plant or Development QC) for approval prior to manufacturing any C/F.

NOTE: Fabrication of any fixture may not begin until TMI Development or Plant QC has approved the drawing. Drawings must include dimensions and tolerances.

A) Check fixture specification - Concept of method for checking the applicable part detailing datum locations and methods, part checking locations and methods, and including specific pin sizes and distances blocks will be located from the part. A checking fixture specification may be created by hand sketching blocks, pins, etc. on the actual part drawing.

B) Check fixture drawing - Technical drawing of the physical features of the checking fixture including C/F datum locations, part datum locations, dimensions of measuring features from part datum locations, and appropriate pin sizes. **All dimensions shall be metric**. General guidelines for making checking fixtures are as follows:

DATUM POSITION –

a) Datum fixing point should be same as inspection standard.
b) There should be no looseness between fixture and part.
c) Datum surface should be appropriate size.
d) Clamps should be appropriate size.
e) Clamp pressure should not distort or damage the component

MEASURING POSITIONS -

a) Positions should have an appropriate gap between part and fixture to allow easy measurement.
b) Datum reference surfaces should be large enough to allow easy location of measuring instruments.
c) Nominal dimensions should be shown on the fixture if applicable.
d) All points on inspection standard should be unobstructed for easy measurement.

WORKABILITY -

a) Part should be easily loaded and removed from fixture without damage.
b) Clamps and datum pins should be easily fitted.
c) There should be no interference between fixture and part.

DURABILITY -

a) Fixture must be rigid enough to last through end of model life.
b) High usage areas must be strong and durable sections.
c) Clamps should be reliable.
d) Datum points should be wear resistant.

INTERCHANGEABILITY -

a) The ability must exist to measure multiple common parts.
b) Mating / machine parts should use gages / fixtures which can be fixed together.

C/F HOUSEKEEPING AND CARE -

a) Discrimination marks and color points should be clear.
b) Loose parts should be stored in such a manner to prevent loss.

5) The supplier must manufacture the C/F within the tolerances specified on the design drawings. C/F fabrication must be accomplished as defined by TMI Purchasing per purchase order. Target completion timing is two to eight weeks from the time the C/F specification is finalized. Timing will be negotiated if needed with the supplier prior to C/F kickoff.

Note: Fabrication of any check fixture may NOT be done without TMI's prior approval of the C/F specification and / or drawing.

6) The C/F must be manufactured within the tolerances specified on the gauge design drawings and should indicate the latest ECI level and must identify the part number, certification date, and re-certification due date.

7) After the C/F has been manufactured, TMI Development or Plant QC must approve the C/F before it can be used. The supplier must request approval by using the SUPPLIER CHECKING FIXTURE APPROVAL REQUEST with attachments as stipulated by TMI Plant or Development QC. Attachments may include the following:
   a) Copy of the C/F specifications
   b) C/F drawing
   c) C/F dimensional data submitted in matrix form and constructed so that data points are easily and clearly referenced to the drawing
   d) Photograph of the C/F
   e) Copy of calibration certification
   f) CMM data supplied by 3rd party test facility
   g) Gage R & R study

   NOTE: In order to receive Provisional Approval from TMI QC, Gage R & R must be submitted.

8) The supplier is responsible for revising the checking fixture as needed. If at phase 1, TMI Development QC will dictate and approve changes with further approval by TMI Purchasing. If at phases 2 or 3, TMI Plant QC will dictate and approve changes with further approval by TMI Purchasing.

   Changes to the C/F shall NOT be made without written approval from TMI QC (Development or Plant). The supplier must submit a CHECKING FIXTURE CHANGE REQUEST (TMI Appendix 8B) and obtain approval prior to implementing any changes.

9) Once revisions are approved and implemented the supplier is responsible for recalibration, recertification, and resubmission of gauge studies if required by TMI QC.

10) The supplier must have appropriate approval before disposal of any checking fixture.

REVISION	REVISION DATE	SECTION	UPDATING DESCRIPTION
0	07/09/01	ALL	Initial Release
1	05/20/03	ALL	Revision Record Added
2	08/09/04	Scope & Responsibilities	Added Phase 1 requirements / Added GR&R requirement / Revised flow chart / Changed routing on forms