 Michigan Automotive Compressor, Inc. Quality Assurance Manual for Suppliers	Document Number:
	QA-SM-05
	Page 1 of 9
Subject: Production Validation	

PURPOSE:

Production Validation (PV) is a confirmation process to verify that parts and/or materials are compliant to all requirements and specifications detailed on the Blueprint, Quality Standard, and all related standards referred to by the Blueprint (MCDS, DDS, etc.).

SCOPE:

It is the responsibility of the supplier to submit the necessary materials and information for Production Validation. Approval timing is dependent on completion of required reliability testing and final customer approval. Parts produced by multiple molds or equipment may require multiple submissions.

CONTENT:


Parts submitted for the PV must be made on mass production tooling, at the mass production location and by trained production associates.

The PV is to be performed for the following occasions:

- New part/supplier to MACI
- Design/Process Change of an existing part (including moving of manufacturing location. Refer to QA-SM-15)
- Change or replacement of major tooling (Die, Machine, Refurbishment, etc.)
- Parts which are delivered to MACI after a one year or longer suspension

The PV is composed of six sections:

- I. Measurement Correlation Report (QA-SM-05-F3)
- II. Initial Sample Inspection Report (ISIR) (QA-SM-05-F1) – Part Layout
- III. Capability Study (QA-SM-05-F2)
- IV. Durability Testing
- V. Line Trial Confirmation
- VI. Ramp-up to Mass Production


 Michigan Automotive Compressor, Inc. Quality Assurance Manual for Suppliers	Document Number:
	QA-SM-05
	Page 2 of 9
Subject: Production Validation	

Section I: Measurement Correlation Report (QA-SM-05-F3)

This activity shall take place after tooling is initially kicked off. MACI requests that the person that shall be responsible for quality to visit MACI to learn function of the part and how the part is used by MACI including handling methods at the line. The Measurement Correlation Report (QA-SM-05-F3) is to list all items identified on the blue print (including all notes and standards) and is to be filled out as follows:

- ① Supplier: Supplier name.
- ② Contact Name: Name of primary contact.
- ③ Part Name: Name of part.
- ④ Contact Phone: Phone number of primary contact.
- ⑤ Part Number: MACI part number (include revision level).
- ⑥ Inspector: Name of person preparing form.
- ⑦ Specification: Blue Print specification of item.
- ⑧ MACI Requirement: MACI's requirement for part submission (usually 2 pc layout or 30 pc capability study).
- ⑨ Supplier Measurement Method: Tool supplier will use to inspect part. If ISIR measurement differs from production method, please list both.
- ⑩ MACI Measurement Method: MACI's measurement method.
- ⑪ Supplier Control: Method supplier plans to use to control and record data.
- ⑫ Comments: Any notes pertaining to relevant information.
- ⑬ MACI Sign-Off: MACI QA sign off and approval of form.


Additionally, a measurement correlation may be done on capability items during this phase if parts are available.

 Michigan Automotive Compressor, Inc. Quality Assurance Manual for Suppliers	Document Number:
	QA-SM-05
	Page 4 of 9
Subject: Production Validation	

Section II: Initial Sample Inspection Report (ISIR) (QA-SM-05-F1)

This form contains complete dimensional layout of 2 samples. Measurements will be performed first by the supplier, and then by MACI, on the same samples to ensure measurement results are comparable. Each sample should be numbered by the supplier for identification. The Initial Sample Inspection Report Sheet is to be filled out as follows:

- ① Supplier: Supplier Name.
- ② Part Name: Name or description of part.
- ③ Part Number: MACI part number (Include minor revision level).
- ④ Reason For Submission: Indicate reason for submitting ISIR. If related to Process/Design Change Request (QA-SM-15), include Process/Design Change No.
- ⑤ Contact Name: Name of contact at supplier facility.
- ⑥ Contact Phone: Phone number of contact at supplier facility.
- ⑦ Inspector: Sign off from person performing inspection.
- ⑧ Approved By: Sign off from person authorizing submission.
- ⑨ No: Identify all dimensions numerically. Match numbers with a marked print.
- ⑩ Indicated Dimension: Include specification and tolerance.
- ⑪ Inspection Tool: Indicate inspection instrument used to inspect the dimension.
- ⑫ Supplier: Measurement results from Supplier
- ⑬ MACI: Measurement results from MACI. To be completed by MACI
- ⑭ Judge: Judgment & comparison of supplier and MACI results. To be completed by MACI. O = Acceptable X = No Good
- ⑮ Comments: Any comments from suppliers, i.e., more description on measuring method, reference to request for deviation, explanation of data out of specification (Section II-7), etc.
- ⑯ MACI Sign Off: Sign off and approval by MACI.

 Michigan Automotive Compressor, Inc. Quality Assurance Manual for Suppliers	Document Number:
	QA-SM-05
	Page 6 of 9
Subject: Production Validation	

Section III: Capability Study (QA-SM-05-F2)

This form contains data and process capability study for a 30 piece sample size for dimensions detailed in the Quality Standard. Measurements will be performed first by the supplier, then by MACI on the same samples. Each sample must be numbered by the supplier for identification purposes and correlated with ID number to the respective data. The initial Sample Inspection Report (Sheet B), if required, is to be filled out as follows:

- ① Supplier: Supplier Name.
- ② Part Name: Name or description of part.
- ③ Part Number: MACI Part Number.
- ④ Contact Name: Name of contact at supplier facility.
- ⑤ Contact Phone: Phone number of contact at supplier facility.
- ⑥ Approved By: Sign off by person authorizing submission.
- ⑦ Item: Item number referred to from Initial Sample Inspection Report (Section I).
- ⑧ LSL: Lower specification limit from Blue Print or Standard.
- ⑨ USL: Upper specification limit from Blue Print or Standard.
- ⑩ Supplier: Measurement results from supplier. It is required the Supplier numbers and identifies Samples 1 through 30.
- ⑪ MACI: Measurement results from MACI to be completed by MACI.
- ⑫ \bar{X} : Mean of samples = $\sum X / N$ where X = measurement and N = sample size.
- ⑬ σ : Standard Deviation of samples.
- ⑭ Cp: Process Capability Index.



Subject: Production Validation

⑮ Cpk: Process Capability Index.

For Two-way spec:

$$C_p = (USL - LSL) / (6\sigma)$$

$$C_{pk} = \min \{[(USL - \bar{X}) / (3\sigma)], [(\bar{X} - LSL) / (3\sigma)]\}$$

For One-way spec:

a. \leq USL (Max only)

$$C_p = (USL - 0) / (6\sigma)$$

$$C_{pk} = (USL - \bar{X}) / (3\sigma)$$

b. \geq LSL (Min only)

C_p – Not required

$$C_{pk} = (\bar{X} - LSL) / (3\sigma)$$

⑯ Comments: Any relevant information the supplier desires to submit.




Subject: Production Validation



Michigan Automotive Compressor, Inc.
Process Capability Study Report

Supplier: 1				Contact Name: 4				
Part Name: 2				Contact Phone: 5				
Part Number: 3				Approved By: 6				
ITEM	7							
LSL	8							
USL	9							
	SUPPLIER	MACI	SUPPLIER	MACI	SUPPLIER	MACI	SUPPLIER	MACI
1	10	11	10	11	10	11	10	11
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
\bar{x}	12							
σ	13							
Cp	14							
Cpk	15							
COMMENTS: 16								

 Michigan Automotive Compressor, Inc. Quality Assurance Manual for Suppliers	Document Number:
	QA-SM-05
	Page 9 of 9
Subject: Production Validation	

Section IV: Durability Testing

Additional samples may be required to perform endurance or other forms of testing as outlined by the Quality Standard.

Section V: Line Trial Confirmation

A sample size of a minimum of 300 pieces is required for Production Line Trials. The line trial will be scheduled after Sections I, II, III, & IV have been approved. Line trial samples must be accompanied by an Initial Flow Notification (QA-SM-16).

Section VI: Ramp-up to Mass Production

Quality issues that arise may delay the mass production ramp-up. During initial ramp-up, MACI may require that the supplier perform additional inspection of production parts. It is the responsibility of the supplier to identify and correct any defects found during this activity.