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| Procedure:  **QP-124** | Pages:  **4** |
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| Authorized By:  **Quality Assurance Manager** | |



**MEASUREMENT SYSTEMS DEVELOPMENT AND QUALIFICATION**

1. **Purpose and Scope**

**PURPOSE**

To specify the methods and performance targets used to establish the inspection capability of measurement devices. The target gage repeatability and reproducibility

(R & R) is 10 percent or less.

**SCOPE**

This procedure governs all measurement devices used to control production processes and accept or reject parts.

1. **Definitions**

**Control Plans**: The written description of the systems for controlling parts and processes that address important characteristics and engineering requirements. Each

part must have a control plan that may also apply to a family of parts or parts produced

with a common process.

**Corrective Action**: Action to correct a process or part quality issue.

**Gage Repeatability and Reproducibility (R & R):** When the same operator measures the

same part more than once (repeatability) and the variation when different operators

measure the same part with the same measurement device (reproducibility).

**MSA**: Measurement Systems Analysis

**AIAG**: Automotive Industry Action Group

1. **Process Owners**

**Quality Assurance Manager**

**Process Designees**: **SPC Coordinator**

**Engineer**

**Quality Lead Person**

**Quality Supervisor**

1. **Procedures**
2. **SPC Coordinator**

**Specify Measurements and Equipment**

When a new job is launched, the SPC Coordinator specifies measurement methods and equipment in the Control Plan.

1. **Engineer**

**Develops Check Fixtures**

The Engineer assigned, designs and supervises construction and tryout of checking fixtures and CMM holding fixtures to meet job requirements.

1. **Quality Lead Person**

**Conducts Gage Study**

The Quality Lead Person conducts a long method gage study (See AIAG Measurement Systems Analysis Handbook) with three (3) operators, ten (10) parts and three (3) trials. Results or R&R Gage Studies are recorded in the ERP System by the Quality Systems Coordinator. R&R Maintenance Studies are done yearly to ensure the continued accuracy of equipment. All gage R & R studies will be reviewed by the SPC Coordinator or Quality Supervisor, who will sign off on each Study.

1. **Quality Supervisor**

**Accept or Reject Equipment**

Measurement equipment with a Gage R&R error of 10 percent or less is considered acceptable. Equipment with total variation of 10-30% will be reviewed by the SPC Coordinator or Quality Supervisor to determine if the equipment is acceptable for use based on the criticality of the dimension/characteristic being evaluated. Equipment that scores over 30%, the SPC Coordinator will discuss with the QA Supervisor/Manager to determine whether training, repair or replacement of equipment is needed. After making necessary changes or replacements, a new R&R study will be conducted. Control plans will be updated by the SPC Coordinator when appropriate.

If the R&R study exceeds the 30% usage threshold, the gage will be pulled immediately from the production floor and made inactive in our gage calibration system. The disposition and any action taken are recorded on the Gauge R&R Study form by the SPC Coordinator and/or the Q.A. Supervisor. All parts checked on the gauge will also be placed on hold and checked using alternate methods. Customer will be contacted and product recalled, if parts are found to be out of tolerance using alternate inspection methods.

**Monitors Results, Over a Period of Time**

The Quality Supervisor compares performance in the current study to past studies and documents corrective action if performance has decreased.

1. **Quality Assurance Manager**

**Reviews Studies Periodically**

The Quality Assurance Manager Reviews R&R Studies periodically and if he deems it necessary, may request an additional long method gage study to ensure the accuracy of inspection capability.

1. **References**

**AC7004, 7.6.5**

**5.1 Related Procedure**

Inspection Equipment Control, Maintenance and Calibration: QP-125

Tooling Development QP-140

**5.2 Reference Documents**

Measurement Systems Analysis Reference Manual, AIAG, 4th Edition, 2010

1. **Records**

Gage R & R Studies R & R Retain Minimum of 7 Years

1. **Policy References**

Inspection and Testing

Inspection and Test Status

1. **Revision History to Procedure QP-124**

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| **Chg. No.** | **Date** | **Rev.** | **Change Description** |
| 1 | 2/13/1998 | 0 | Creation of Document |
| 2 | 10/18/2002 | 1 | Rev. 3: Added 'or less' to 'The target gage repeatability and reproducibility (R & R) is 10 percent' under section 1 'Purpose and Scope'. Changed 'Fixture' to 'Equipment' under heading 4.4. Section 4.4 was 'Accepts fixtures with a gage R & R score of 10 percent or less, or up to 30 percent when achieving higher capacity would be cost-prohibitive.  Develops a written improvement plan using the corrective action form when the error is 30 percent or higher. Updates control plan if a gage is changed. Gage R & R studies are made available to customer upon request. R & R of between 10 and 30 percent will be reviewed  by the SPC Coordinator. If acceptable, he/she will sign off on R & R form.' Also added Q.A. Supervisor as being responsible with the SPC Coordinator. |
| 3 | 9/11/2009 | 2 | "Statistical studies are done on each type of measuring and test  equipment system." Changed in 4.4 "SPC COOR" to "QUA SUP" and changed "and" to "or" in the sentence starting with "The SPC Coordinator and the Q.A. Supervisor"... Changed in 4.6 "SPC COOR" to "QUA SUP". |
| 4 | 1/12/2018 | 3 | Revised for ISO 9001 / IATF 16949 |
| 5 | 4/12/2018 | 4 | Wording changed in section 4.3 and 4.4:  FROM:4.3 Quality Leadperson  Conducts Gage Study-The Quality Leadperson conducts a long method gage study (See AIAG Measurement Systems Analysis Handbook) with three (3) operators, ten (10) parts and three (3) trials. Results or R & R Gage Studies are recorded in Oracle. R & R Maintenance Studies are done yearly to ensure the continued accuracy of equipment.  4.4 Quality Supervisor Accept or Reject Equipment  Measurement equipment with a Gage R & R error of 10 percent or less is acceptable. Equipment with total variation of 10-30% will be reviewed by the SPC Coordinator or Quality Supervisor to determine if equipment is acceptable to be used based on the criticality of the dimension being evaluated. Equipment that scores over 30%, the SPC Coordinator and/or the Q.A. Supervisor, will determine whether training, repair or replacement of equipment is needed. After making necessary changes a new R & R study will be conducted. Control plans will be updated by the SPC Coordinator when appropriate.  TO:  4.3 Quality Leadperson Conducts Gage Study  The Quality Leadperson conducts a long method gage study (See AIAG Measurement Systems Analysis Handbook) with three (3) operators, ten (10) parts and three (3) trials. Results or R & R Gage Studies are recorded in Oracle by the Quality Systems Coordinator. R & R Maintenance Studies are done yearly to ensure the continued accuracy of equipment. All gage R & R studies will be reviewed by the SPC Coordinator or Quality Supervisor, who will sign off on each Study.  4.4 Quality Supervisor  Accept or Reject Equipment  Measurement equipment with a Gage R & R error of 10 percent or less is considered acceptable. Equipment with total variation of 10-30% will be reviewed by the SPC Coordinator or Quality Supervisor to determine if the equipment is acceptable for use based on the criticality of the dimension/characteristic being evaluated. Equipment that scores over 30%, the SPC Coordinator will discuss with the QA Supervisor/Manager to determine whether training, repair or replacement of equipment is needed. After making necessary changes or replacements, a new R & R study will be conducted. Control plans will be updated by the SPC Coordinator when appropriate.  Added second paragraph under Section 4.4:  If the R&R study exceeds ………. methods. |
| 6 | 12/05/2023 | 5 | Changed Document Type from Instruction to Procedure.  Section 8-Removed “of”, added “History to Procedure.”  Added-Revised Styberg Logo, Revision History Block,  Changed revision number from 2 to 6 to reflect correct change history  Section 4.3 “oracle” changed to “ERP System” |