Gage R&R Study - ANOVA Method

**\* NOTE \* There are no operator values, or they are all the same. The operator factor will be  
omitted from the analysis.**

Gage R&R for FoundCaliper1Distance

|  |  |
| --- | --- |
| Gage name: | E-Locker |
| Date of study: | 06/23/2022 |
| Reported by: | AIS Technologies Group |
| Tolerance: | 13 |
| Misc: |  |

One-Way ANOVA Table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source | DF | SS | MS | F | P |
| Part No | 9 | 20.3006 | 2.25563 | 23557.8 | 0.000 |
| Repeatability | 20 | 0.0019 | 0.00010 |  |  |
| Total | 29 | 20.3025 |  |  |  |

*α to remove interaction term = 0.05*

Gage R&R

Variance Components

|  |  |  |
| --- | --- | --- |
| Source | VarComp | %Contribution (of VarComp) |
| Total Gage R&R | 0.000096 | 0.01 |
| Repeatability | 0.000096 | 0.01 |
| Part-To-Part | 0.751843 | 99.99 |
| Total Variation | 0.751939 | 100.00 |

Process tolerance = 13

Gage Evaluation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Source | StdDev (SD) | Study Var (6 × SD) | %Study Var (%SV) | %Tolerance (SV/Toler) |
| Total Gage R&R | 0.009785 | 0.05871 | 1.13 | 0.45 |
| Repeatability | 0.009785 | 0.05871 | 1.13 | 0.45 |
| Part-To-Part | 0.867089 | 5.20253 | 99.99 | 40.02 |
| Total Variation | 0.867144 | 5.20286 | 100.00 | 40.02 |

Number of Distinct Categories = 124

Probabilities of Misclassification

Joint Probability

|  |  |
| --- | --- |
| Description | Probability |
| A randomly selected part is bad but accepted | 0.000 |
| A randomly selected part is good but rejected | 0.000 |

Conditional Probability

|  |  |
| --- | --- |
| Description | Probability |
| A part from a group of bad products is accepted | 0.027 |
| A part from a group of good products is rejected | 0.000 |

Gage R&R for FoundCaliper1Distance

Gage R&R Study - ANOVA Method

**\* NOTE \* There are no operator values, or they are all the same. The operator factor will be  
omitted from the analysis.**

Gage R&R for FoundCaliper2Distance

|  |  |
| --- | --- |
| Gage name: | E-Locker |
| Date of study: | 06/23/2022 |
| Reported by: | AIS Technologies Group |
| Tolerance: | 13 |
| Misc: |  |

One-Way ANOVA Table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source | DF | SS | MS | F | P |
| Part No | 9 | 29.9313 | 3.32570 | 26702.7 | 0.000 |
| Repeatability | 20 | 0.0025 | 0.00012 |  |  |
| Total | 29 | 29.9338 |  |  |  |

*α to remove interaction term = 0.05*

Gage R&R

Variance Components

|  |  |  |
| --- | --- | --- |
| Source | VarComp | %Contribution (of VarComp) |
| Total Gage R&R | 0.00012 | 0.01 |
| Repeatability | 0.00012 | 0.01 |
| Part-To-Part | 1.10853 | 99.99 |
| Total Variation | 1.10865 | 100.00 |

Process tolerance = 13

Gage Evaluation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Source | StdDev (SD) | Study Var (6 × SD) | %Study Var (%SV) | %Tolerance (SV/Toler) |
| Total Gage R&R | 0.01116 | 0.06696 | 1.06 | 0.52 |
| Repeatability | 0.01116 | 0.06696 | 1.06 | 0.52 |
| Part-To-Part | 1.05287 | 6.31719 | 99.99 | 48.59 |
| Total Variation | 1.05292 | 6.31755 | 100.00 | 48.60 |

Number of Distinct Categories = 133

Probabilities of Misclassification

Joint Probability

|  |  |
| --- | --- |
| Description | Probability |
| A randomly selected part is bad but accepted | 0.000 |
| A randomly selected part is good but rejected | 0.000 |

Conditional Probability

|  |  |
| --- | --- |
| Description | Probability |
| A part from a group of bad products is accepted | 0.020 |
| A part from a group of good products is rejected | 0.000 |

Gage R&R for FoundCaliper2Distance

Gage R&R Study - ANOVA Method

**\* NOTE \* There are no operator values, or they are all the same. The operator factor will be  
omitted from the analysis.**

Gage R&R for FoundCaliper3Distance

|  |  |
| --- | --- |
| Gage name: | E-Locker |
| Date of study: | 06/23/2022 |
| Reported by: | AIS Technologies Group |
| Tolerance: | 13 |
| Misc: |  |

One-Way ANOVA Table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source | DF | SS | MS | F | P |
| Part No | 9 | 9.65350 | 1.07261 | 5109.33 | 0.000 |
| Repeatability | 20 | 0.00420 | 0.00021 |  |  |
| Total | 29 | 9.65769 |  |  |  |

*α to remove interaction term = 0.05*

Gage R&R

Variance Components

|  |  |  |
| --- | --- | --- |
| Source | VarComp | %Contribution (of VarComp) |
| Total Gage R&R | 0.000210 | 0.06 |
| Repeatability | 0.000210 | 0.06 |
| Part-To-Part | 0.357467 | 99.94 |
| Total Variation | 0.357677 | 100.00 |

Process tolerance = 13

Gage Evaluation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Source | StdDev (SD) | Study Var (6 × SD) | %Study Var (%SV) | %Tolerance (SV/Toler) |
| Total Gage R&R | 0.014489 | 0.08693 | 2.42 | 0.67 |
| Repeatability | 0.014489 | 0.08693 | 2.42 | 0.67 |
| Part-To-Part | 0.597885 | 3.58731 | 99.97 | 27.59 |
| Total Variation | 0.598061 | 3.58837 | 100.00 | 27.60 |

Number of Distinct Categories = 58

Probabilities of Misclassification

Joint Probability

|  |  |
| --- | --- |
| Description | Probability |
| A randomly selected part is bad but accepted | 0.000 |
| A randomly selected part is good but rejected | 0.000 |

Conditional Probability

|  |  |
| --- | --- |
| Description | Probability |
| A part from a group of bad products is accepted | 0.054 |
| A part from a group of good products is rejected | 0.000 |

Gage R&R for FoundCaliper3Distance

Gage R&R Study - ANOVA Method

**\* NOTE \* There are no operator values, or they are all the same. The operator factor will be  
omitted from the analysis.**

Gage R&R for FoundCaliper4Distance

|  |  |
| --- | --- |
| Gage name: | E-Locker |
| Date of study: | 06/23/2022 |
| Reported by: | AIS Technologies Group |
| Tolerance: | 13 |
| Misc: |  |

One-Way ANOVA Table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source | DF | SS | MS | F | P |
| Part No | 9 | 64.4112 | 7.15680 | 95108.5 | 0.000 |
| Repeatability | 20 | 0.0015 | 0.00008 |  |  |
| Total | 29 | 64.4127 |  |  |  |

*α to remove interaction term = 0.05*

Gage R&R

Variance Components

|  |  |  |
| --- | --- | --- |
| Source | VarComp | %Contribution (of VarComp) |
| Total Gage R&R | 0.00008 | 0.00 |
| Repeatability | 0.00008 | 0.00 |
| Part-To-Part | 2.38558 | 100.00 |
| Total Variation | 2.38565 | 100.00 |

Process tolerance = 13

Gage Evaluation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Source | StdDev (SD) | Study Var (6 × SD) | %Study Var (%SV) | %Tolerance (SV/Toler) |
| Total Gage R&R | 0.00867 | 0.05205 | 0.56 | 0.40 |
| Repeatability | 0.00867 | 0.05205 | 0.56 | 0.40 |
| Part-To-Part | 1.54453 | 9.26719 | 100.00 | 71.29 |
| Total Variation | 1.54456 | 9.26733 | 100.00 | 71.29 |

Number of Distinct Categories = 251

Probabilities of Misclassification

Joint Probability

|  |  |
| --- | --- |
| Description | Probability |
| A randomly selected part is bad but accepted | 0.000 |
| A randomly selected part is good but rejected | 0.000 |

Conditional Probability

|  |  |
| --- | --- |
| Description | Probability |
| A part from a group of bad products is accepted | 0.009 |
| A part from a group of good products is rejected | 0.000 |

Gage R&R for FoundCaliper4Distance