

Gauge R&R Evaluation

Part Number: 20098635		Supplier: Hansin Precision Enginee		OPERATOR		NAME		DATE				Number of Operators		3	
Part Name: FRONT COVER		Date: 24-Dec-2023		1		Yao Lixia		10-Apr-2024				Number of Trials		3	
Part Revision: B		Prepared By: Chu Libo		2		Tian Yuanhui		10-Apr-2024							
				3		Zhou Liujian		10-Apr-2024							

SPECIFICATION:		24.52		+ TOL:		0.2		- TOL:		0.2		TOTAL TOLERANCE:		0.4		UNITS:		mm		INSPECTION METHOD:		SS	
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MEASUREMENT	OPERATOR 1						OPERATOR 2						OPERATOR 3														
	Trial 1	Trial 2	Trial 3	Min	Max	Range	Trial 1	Trial 2	Trial 3	Min	Max	Range	Trial 1	Trial 2	Trial 3	Min	Max	Range									
1	24.450	24.460	24.460	24.450	24.460	0.010	24.450	24.450	24.450	24.450	24.450	0.000	24.450	24.460	24.450	24.450	24.460	0.010									
2	24.440	24.450	24.450	24.440	24.450	0.010	24.450	24.460	24.460	24.450	24.460	0.010	24.450	24.450	24.450	24.450	24.450	0.000									
3	24.450	24.450	24.450	24.450	24.450	0.000	24.450	24.460	24.450	24.450	24.460	0.010	24.450	24.450	24.450	24.450	24.450	0.000									
4	24.480	24.480	24.480	24.480	24.480	0.000	24.480	24.480	24.480	24.480	24.480	0.000	24.480	24.480	24.480	24.480	24.480	0.000									
5	24.470	24.450	24.460	24.450	24.470	0.020	24.450	24.460	24.460	24.450	24.460	0.010	24.460	24.460	24.460	24.460	24.460	0.000									
6	24.490	24.490	24.480	24.480	24.490	0.010	24.480	24.480	24.490	24.480	24.490	0.010	24.490	24.480	24.490	24.480	24.490	0.010									
7	24.470	24.470	24.470	24.470	24.470	0.000	24.470	24.460	24.470	24.460	24.470	0.010	24.470	24.470	24.470	24.470	24.470	0.000									
8	24.450	24.450	24.450	24.450	24.450	0.000	24.450	24.450	24.450	24.450	24.450	0.000	24.450	24.450	24.450	24.450	24.450	0.000									
9	24.530	24.530	24.530	24.530	24.530	0.000	24.530	24.530	24.530	24.530	24.530	0.000	24.530	24.530	24.510	24.510	24.530	0.020									
10	24.470	24.460	24.460	24.460	24.470	0.010	24.460	24.460	24.470	24.460	24.470	0.010	24.460	24.460	24.470	24.460	24.470	0.010									
TOTALS	244.700	244.690	244.690			0.060	244.670	244.690	244.710			0.060	244.690	244.690	244.680			0.050									
X _{MIN} : 24.4687	Operator						R _A	0.006						R _B	0.006						R _C	0.005					
X _{MAX} : 24.4693	2						SUM	734.080						SUM	734.070						SUM	734.060					
X _{diff} : 0.0007	(K2*Xdiff) ²						X _A	24.469						X _B	24.469						X _C	24.469					
	(EV) ² /nxt																										
	Diff																										

TEST FOR CONTROL

Upper Control Limit, UCLr = D4R D4: 2.570 x R: 0.006 = 0.015

If any individual range exceeds this limit, the measurement or reading should be reviewed, repeated, corrected, or discarded and new averages and ranges should be computed

MEASUREMENT SYSTEM ANALYSIS

STATISTICAL CONSTANT VALUE						QUALITY GOAL		
# Trials	2.00	3.00	# Oprs	2	3	ACCEPTABLE: LESS THAN 10%		
K1	4.56	3.05	K2	3.65	2.70	CONDITIONALLY ACCEPTABLE: BETWEEN 10% to 30%		
D4	3.27	2.57	n = # of parts	m = # of trials		NOT ACCEPTABLE: GREATER THAN 30%		

Repeatability - Equipment Variation (E.V)
E.V. = K₁R 3.050 x 0.006 = 0.017 % E.V. = 4.3

Reproducibility - Appraiser Variation (A.V)
A.V. = $\sqrt{\frac{[(X_{diff}) \times (K_2)]^2}{n \times m} - \frac{[(E.V.)^2]}{n \times m}}$ 3.24E-06 - 9.96E-06 = 0 % A.V. = 0.0

Repeatability and Reproducibility (R & R)
R&R = $\sqrt{(E.V.)^2 + (A.V.)^2}$ 0.0002987 + 0 = 0.017283 % R&R = 4.3

COMMENTS

RESULT: Acceptable