

Measurement System Analysis

Form: 000-5-Fo-0286

Version:03

Page:1/4

**1.Purpose:** Apply to evaluate MSA for measurement system**2.Application:** All measurement system need apply MSA**3.Reference Document:** 000-5-WI-1061**4.Content:****4.1 Registration information**

Record No:

Record Name:

Propose By:

Issue Date:

4.2 Object Information

GAGE NUMBER

GAGE NAME

PARTS

APPRAISER A

APPRAISER B

APPRAISER C

PART NUMBER

PART NAME

TRIALS

4.3 Measurement Unit Analysis**REPEATABILITY - EQUIPMENT VARIATION (EV)**EV = $R \times K1$ EV = $\frac{\text{Trail}}{3} \times K1$ EV = $\frac{0.5908}{3} \times K1$ **% TOTAL VARIATION (TV)****% TOLERANCE (Tol)**% EV = $100 (EV/TV)$ % EV = $100 (EV/Tol)$ % EV = $100 (EV/TV)$ % EV = $100 (EV/TV)$ % AV = $100 (AV/TV)$ % AV = $100 (AV/Tol)$ % AV = $100 (AV/TV)$ % AV = $100 (AV/TV)$ % R&R = $100 (R\&R/Tol)$ % R&R = $\#VALUE!$

Note: Guidelines for Acceptance of System Based on %GRR

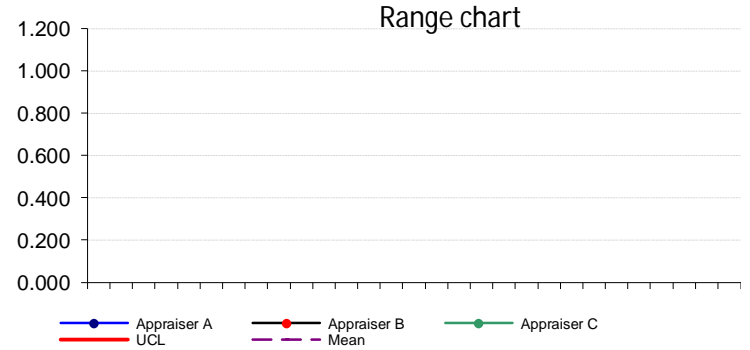
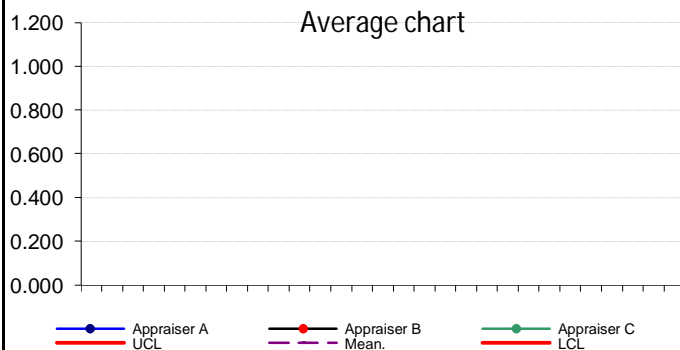
Under 10% = Measurement system is acceptable.

10%-30% = May be acceptable based on gauge cost.

Over 30% = Measurement system not acceptable.

% PV = $100 (PV/TV)$ % PV = $100 (PV/Tol)$ % PV = $100 (PV/TV)$ % PV = $100 (PV/TV)$ **REPRODUCIBILITY - APPRAISER VARIATION (AV)**AV = $\{(xDIFF \times K2)^2 - (EV^2/nr)\}^{1/2}$ AV = $\frac{\text{Appraiser}}{3} \times K2$ AV = $\frac{0.5231}{3} \times K2$ **REPEATABILITY & REPRODUCIBILITY (R&R)**R&R = $\{(EV^2 + AV^2)\}^{1/2}$ R&R = $\{(EV^2 + AV^2)\}^{1/2}$ R&R = $\{(EV^2 + AV^2)\}^{1/2}$ **PART VARIATION (PV)**

Parts

PV = $RP \times K3$ PV = $\frac{10}{3} \times K3$ PV = $\frac{0.3146}{3} \times K3$ **4.4 Conclusion & Recommendation:**

Evaluate by:

Confirm by:

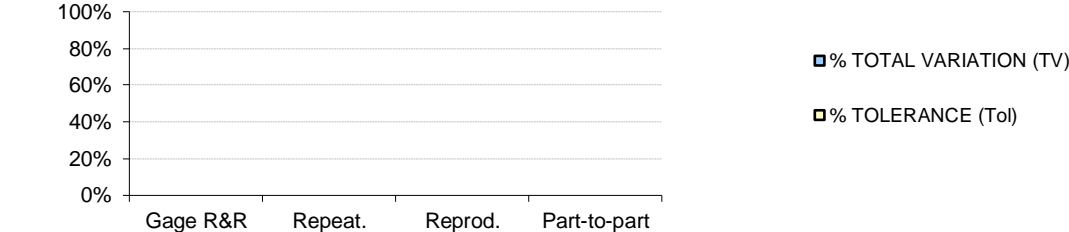
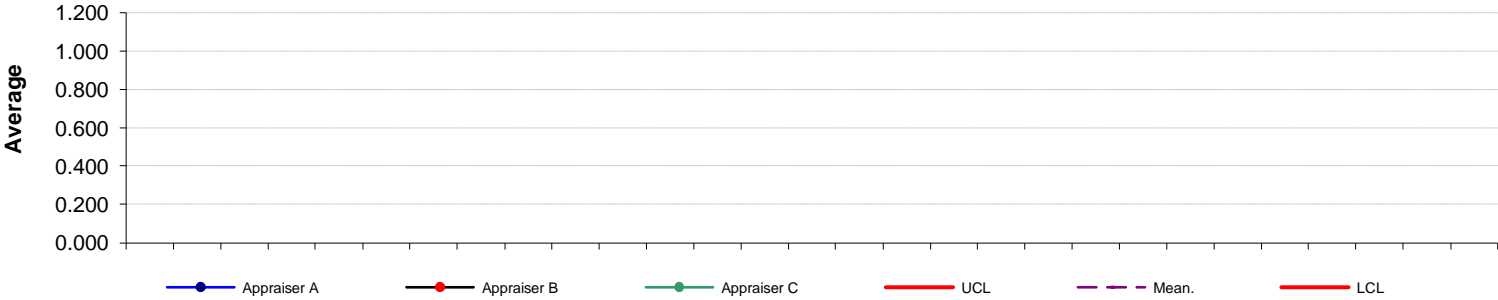
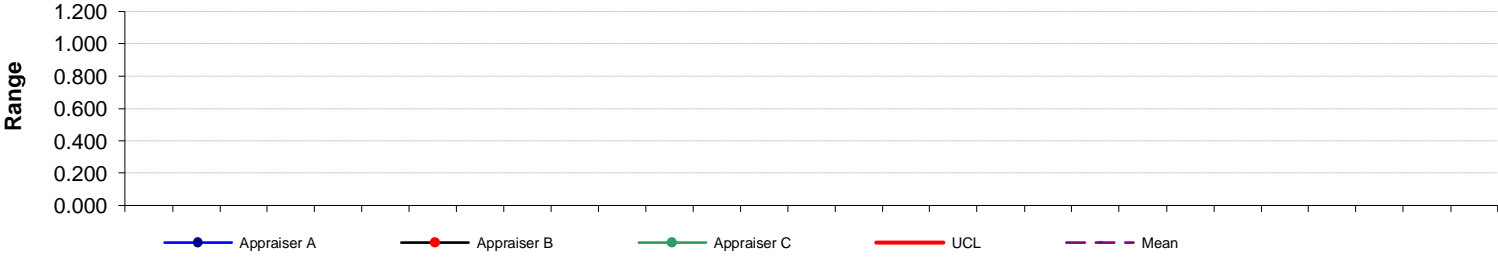
Approve by:

Date:

Date:

Date:

Fujikura Fiber Optics Vietnam Ltd.,											
Measurement System Analysis											
Form:		000-5-Fo-0286					Version:03		Trang 2/4		
5.Mẫu đánh giá MSA											
Fujikura Fiber Optics Vietnam Ltd.,		GAGE REPEATABILITY & REPRODUCIBILITY STUDY									
<div><div><div><div>GAGE NUMBER</div><div>0</div></div><div>GAGE NAME</div><div>0</div><div>CHARACTERISTIC</div><div></div><div>SPECIFICATION</div><div></div><div>APPRAISERS</div><div></div><div>GAGE USAGE FOR (mark)</div><div><div><input type="checkbox"/></div>Product Control</div><div><input type="checkbox"/></div>Process Control</div><div>APPRaiser A</div><div>0</div><div>APPRaiser B</div><div>0</div><div>APPRaiser C</div><div>0</div></div> <div><div>PART NUMBER</div><div>0</div><div>PART NAME</div><div>0</div><div>CONTROL PLAN</div><div></div><div>LSL</div><div></div><div>USL</div><div></div><div>TOL.</div><div></div><div>TRIALS</div><div></div><div>PARTS</div><div></div></div>											

Fujikura Fiber Optics Vietnam Ltd.,	GAGE REPEATABILITY & REPRODUCIBILITY STUDY						
			Trang 3/4				
MEASUREMENT UNIT ANALYSIS		% TOTAL VARIATION (TV)	% TOLERANCE (Tol)				
REPEATABILITY - EQUIPMENT VARIATION (EV) EV = $\overline{\overline{R}} \times K_1$ EV = EV = <table><tr><td>Trail</td><td>K₁</td></tr><tr><td>0</td><td>#N/A</td></tr></table>		Trail	K ₁	0	#N/A	% EV = 100 (EV/TV) % EV = <input type="text"/> 	100(EV/Tol) <input type="text"/>
Trail	K ₁						
0	#N/A						
REPRODUCIBILITY - APPRAISER VARIATION (AV) AV = $\{(x_{DIFF} \times K_2)^2 - (EV^2/nr)\}^{1/2}$ AV = AV = <table><tr><td>Appraiser</td><td>K₂</td></tr><tr><td>0</td><td>#N/A</td></tr></table>		Appraiser	K ₂	0	#N/A	% AV= 100(AV/TV) % AV= <input type="text"/> 	100(AV/Tol) <input type="text"/>
Appraiser	K ₂						
0	#N/A						
REPEATABILITY & REPRODUCIBILITY (R&R) R&R = $\{(EV^2 + AV^2)\}^{1/2}$ R&R = R&R =		100(R&R/Tol) <input type="text"/> Note: Guidelines for Acceptance of System Based on %GRR Under10% = Measurement system is acceptable. 10%-30% = May be acceptable based on gauge cost. Over 30% = Measurement system not acceptable.					
PART VARIATION (PV) PV = R _p x K ₃ PV = PV = <table><tr><td>Parts</td><td>K₃</td></tr><tr><td>0</td><td>#N/A</td></tr></table>		Parts	K ₃	0	#N/A	% PV= 100(PV/TV) % PV= <input type="text"/> 	100(PV/Tol) <input type="text"/>
Parts	K ₃						
0	#N/A						
TOTAL VARIATION (TV) TV = $\{(GRR^2 + PV^2)\}^{1/2}$ TV = TV =		%TV= <input type="text"/> NUMBER OF DISTINCT CATEGORIES (ndc) ndc= 1.41(PV/R&R) ndc= <input type="text"/> Note: Guidelines for Acceptance: ndc greater then or equal to 5=OK.					
Components of variations							
							
Average chart							
							
Range chart							
							
For information on the theory and constants used in the form see MSA Reference Manual, Third edition.							

Measurement System Analysis

Form: 000-5-Fo-0286

Version:03

Trang 4/4

6.Revision History

Date	P.I.C	Ver	Description		Reason of change	Change requester
			Old content	New content		
22-Aug-18	Võ Văn Hiệp	01	-	New Issue	New Issue	Đặng Công Sơn
4-Sep-18	Võ Văn Hiệp	02		Delete 100(R&R/TV) , only control 100(R&R/Tol)	QMR requirement	Đặng Công Sơn
30-Aug-24	Võ Văn Hiệp	03	% R&R=100(R&R/ TV)	Removed	Only evaluation stability of system by 100(R&R/Tol) parameter. No need evaluate R&R=100(R&R/TV) concern to Manpower , qualify method to control training procedure	Nguyễn Trung Kiên