

Gauge R&R in Minitab

Stap 1: open Minitab

The screenshot displays the Minitab software interface. At the top is the menu bar with options: File, Edit, Data, Calc, Stat, Graph, Editor, Tools, Window, Help, and Assistant. Below the menu bar is a toolbar with various icons for file operations, editing, and data analysis. The main workspace is divided into two panes. The top pane, titled 'Session', shows a timestamp '8-6-2017 15:56:49' and a welcome message: 'Welcome to Minitab, press F1 for help.' The bottom pane, titled 'Worksheet 1 ***', displays a grid with 16 columns (C1 to C16) and 5 rows (1 to 5). The cell at row 1, column C1 is selected. The status bar at the bottom indicates 'Current Worksheet: Worksheet 1'. The Windows taskbar is visible at the very bottom, showing various application icons and the system clock.

Minitab - Untitled

File Edit Data Calc Stat Graph Editor Tools Window Help Assistant

8-6-2017 15:56:49

Welcome to Minitab, press F1 for help.

Worksheet 1 ***

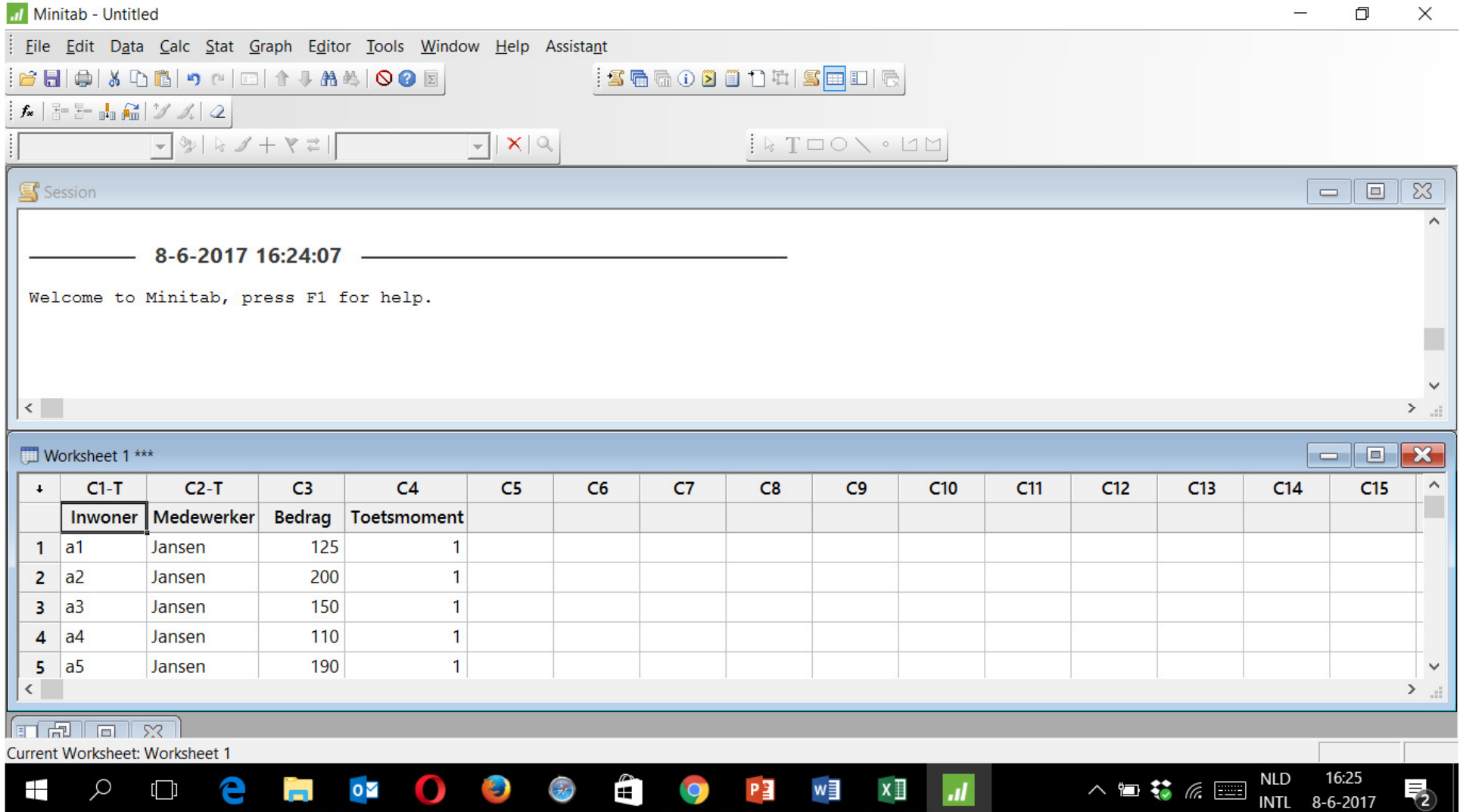
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
1																
2																
3																
4																
5																

Current Worksheet: Worksheet 1

NLD INTL 15:57 8-6-2017

Gauge R&R in Minitab

Stap 2: kopieer en plak de data uit excel voor gemeente A



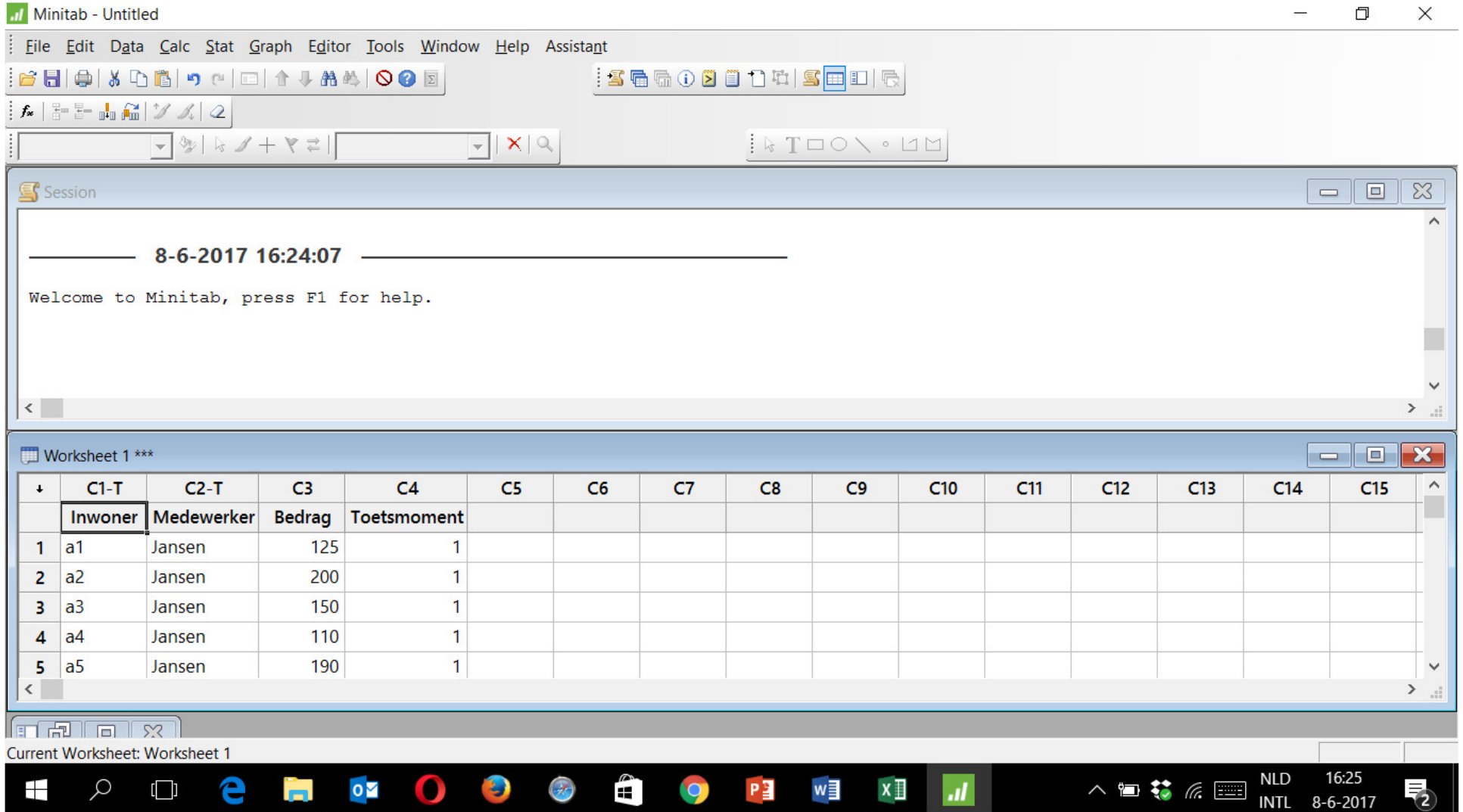
The screenshot shows the Minitab software interface. The main window is titled "Minitab - Untitled". The menu bar includes File, Edit, Data, Calc, Stat, Graph, Editor, Tools, Window, Help, and Assistant. The toolbar contains various icons for file operations, editing, and data analysis. The Session window displays the date and time "8-6-2017 16:24:07" and the message "Welcome to Minitab, press F1 for help." The Worksheet window, titled "Worksheet 1 ***", contains a table with 15 columns (C1-T to C15) and 6 rows (header and 5 data rows). The data is as follows:

	C1-T	C2-T	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15
	Inwoner	Medewerker	Bedrag	Toetsmoment											
1	a1	Jansen	125	1											
2	a2	Jansen	200	1											
3	a3	Jansen	150	1											
4	a4	Jansen	110	1											
5	a5	Jansen	190	1											

The bottom status bar shows "Current Worksheet: Worksheet 1". The Windows taskbar at the bottom displays various application icons and the system clock showing "16:25" on "8-6-2017".

Gauge R&R in Minitab

Stap 2: kopieer en plak de data uit excel voor gemeente A



The screenshot shows the Minitab software interface. The main window is titled "Worksheet 1 ***" and contains a table with 15 columns (C1-T to C15) and 6 rows (header and 5 data rows). The data is as follows:

	C1-T	C2-T	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15
	Inwoner	Medewerker	Bedrag	Toetsmoment											
1	a1	Jansen	125	1											
2	a2	Jansen	200	1											
3	a3	Jansen	150	1											
4	a4	Jansen	110	1											
5	a5	Jansen	190	1											

The bottom status bar indicates "Current Worksheet: Worksheet 1". The Windows taskbar at the bottom shows the date and time as 8-6-2017 16:25.

Gauge R&R in Minitab

Stap 3: ga naar Gauge R&R Crossed

The screenshot shows the Minitab software interface. The 'Stat' menu is open, and the 'Quality Tools' submenu is selected. Within 'Quality Tools', the 'Gage Study' option is highlighted, which has opened a sub-menu. In this sub-menu, 'Gage R&R Study (Crossed)...' is selected. A tooltip for this option is visible, stating: 'Gage R&R Study (Crossed) Assess the variation in your measurement system when every operator measures every part in the study.'

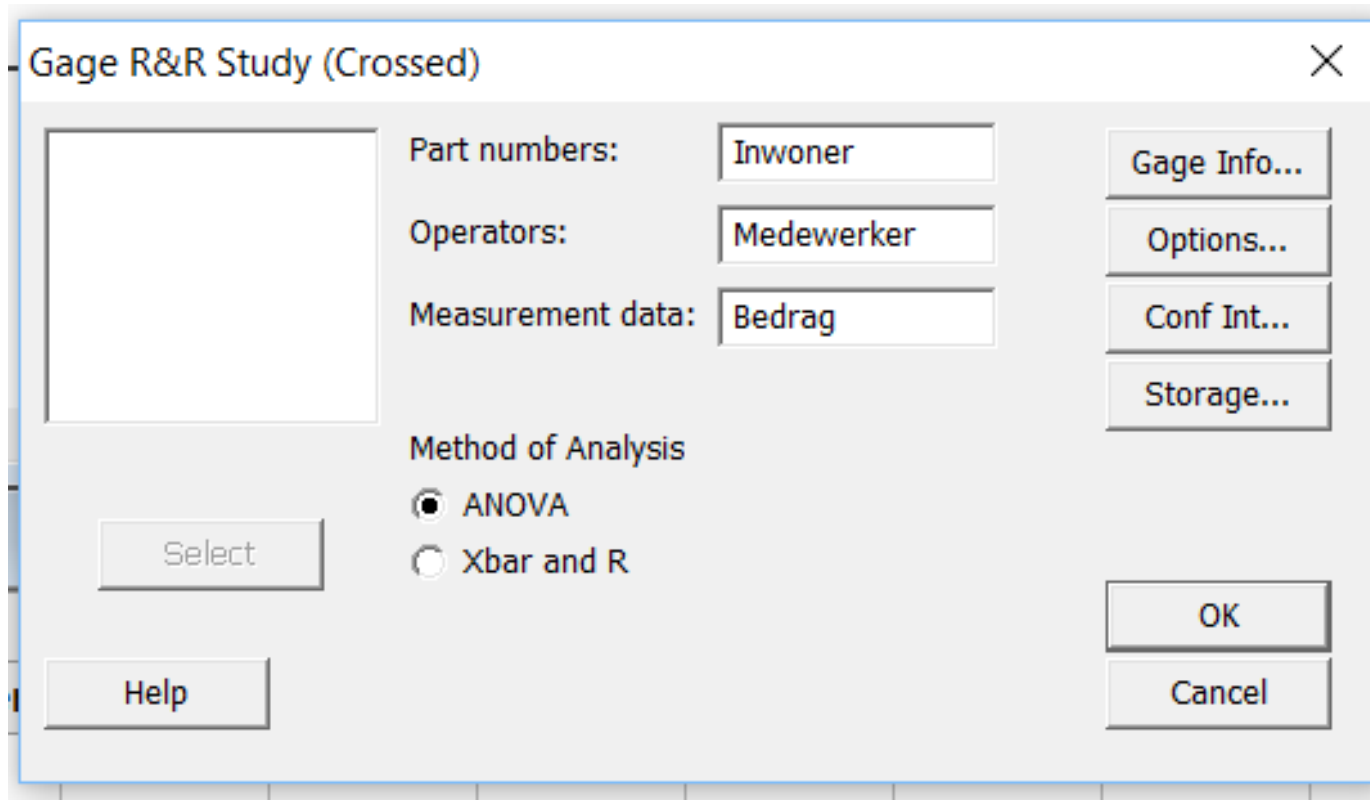
The background shows a worksheet with the following data:

	C1-T	C2-T	C3	C4
	Inwoner	Medewerker	Bedrag	Toetsm
1	a1	Jansen	125	
2	a2	Jansen	200	
3	a3	Jansen	150	
4	a4	Jansen	110	
5	a5	Jansen	190	

The bottom status bar indicates 'Current Worksheet: Worksheet 1' and the system clock shows '16:26 8-6-2017'.

Gauge R&R in Minitab

Stap 4: vul Part, Operator en Measurement in



The image shows the 'Gage R&R Study (Crossed)' dialog box in Minitab. The window has a title bar with a close button (X). Inside, there is a large empty rectangular box on the left. To its right, there are three input fields: 'Part numbers:' with the value 'Inwoner', 'Operators:' with the value 'Medewerker', and 'Measurement data:' with the value 'Bedrag'. Below these fields is the 'Method of Analysis' section, which has two radio buttons: 'ANOVA' (which is selected) and 'Xbar and R'. To the right of the input fields are four buttons stacked vertically: 'Gage Info...', 'Options...', 'Conf Int...', and 'Storage...'. At the bottom left, there are two buttons: 'Select' and 'Help'. At the bottom right, there are two buttons: 'OK' and 'Cancel'.

Gage R&R Study (Crossed) X

Part numbers: Inwoner

Operators: Medewerker

Measurement data: Bedrag

Method of Analysis

☒ ANOVA

☐ Xbar and R

Select

Help

Gage Info...

Options...

Conf Int...

Storage...

OK

Cancel



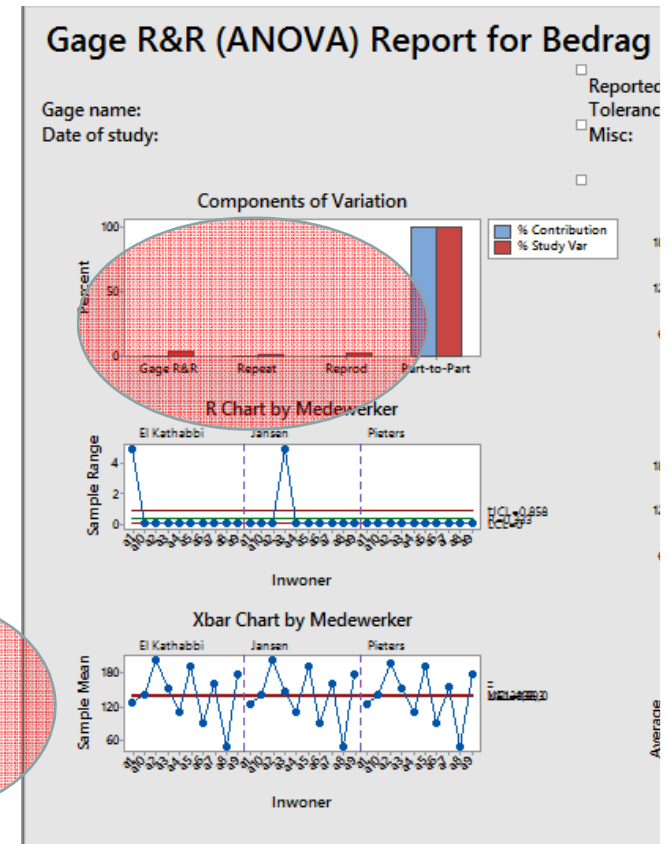
Gauge R&R in Minitab

Stap 5: concludeer dat het beoordelingsstelsel van gemeente A uitstekend is

Gage R&R

Source	VarComp	%Contribution (of VarComp)
Total Gage R&R	2,50	0,12
Repeatability	0,56	0,03
Reproducibility	1,94	0,09
Medewerker	0,14	0,01
Medewerker*Inwoner	1,80	0,08
Part-To-Part	2136,26	99,88
Total Variation	2138,76	100,00

Source	StdDev (SD)	Study Var (6 × SD)	%Study Var (%SV)
Total Gage R&R	1,5811	9,487	3,42
Repeatability	0,7454	4,472	1,61
Reproducibility	1,3944	8,367	3,02
Medewerker	0,3795	2,277	0,82
Medewerker*Inwoner	1,3418	8,051	2,90
Part-To-Part	46,2196	277,318	99,94
Total Variation	46,2467	277,480	100,00



Gauge R&R in Minitab

Stap 6: voer dezelfde stappen uit voor gemeente B en concludeer dat het beoordelingssysteem tekort schiet

Gage R&R

Source	VarComp	%Contribution (of VarComp)
Total Gage R&R	1171,37	46,18
Repeatability	341,11	13,45
Reproducibility	830,26	32,73
Medewerker	0,00	0,00
Medewerker*Inwoner	830,26	32,73
Part-To-Part	1365,19	53,82
Total Variation	2536,55	100,00

Source	StdDev (SD)	Study Var (6 × SD)	%Study Var (%SV)
Total Gage R&R	34,2253	205,352	67,96
Repeatability	18,4692	110,815	36,67
Reproducibility	28,8142	172,885	57,21
Medewerker	0,0000	0,000	0,00
Medewerker*Inwoner	28,8142	172,885	57,21
Part-To-Part	36,9484	221,690	73,36
Total Variation	50,3642	302,185	100,00

Number of Distinct Categories = 1

