

Adatsor:

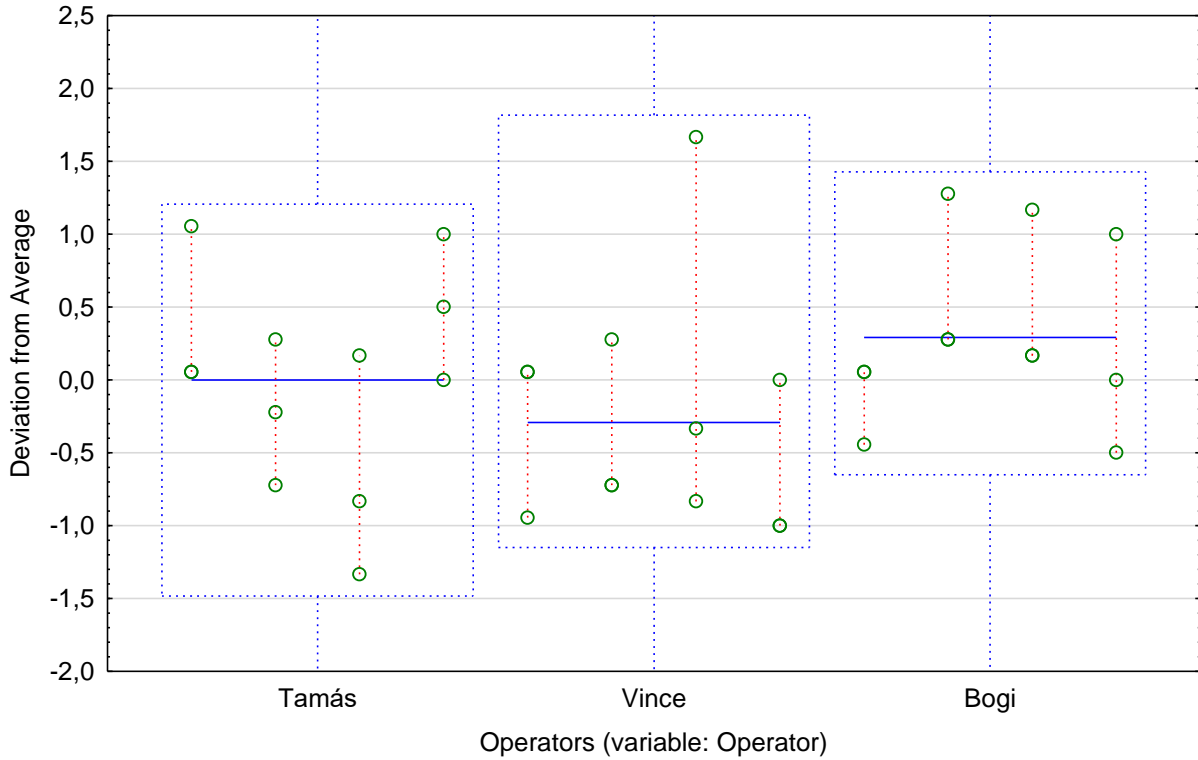
| Summary of Design for R & R Study (Spreadsheet3) | | | | |
|--|----------|------|--------|---------|
| Operators: 3 Parts: 4 Trials: 3 | | | | |
| | Operator | Part | Trials | Measure |
| 26 | Bogi | Anna | 1 | 172,0 |
| 30 | Bogi | Anna | 2 | 173,0 |
| 34 | Bogi | Anna | 3 | 172,0 |
| 2 | Tamás | Anna | 1 | 171,0 |
| 6 | Tamás | Anna | 2 | 171,5 |
| 10 | Tamás | Anna | 3 | 172,0 |
| 14 | Vince | Anna | 1 | 172,0 |
| 18 | Vince | Anna | 2 | 171,0 |
| 22 | Vince | Anna | 3 | 171,0 |
| 25 | Bogi | Cini | 1 | 162,0 |
| 29 | Bogi | Cini | 2 | 162,0 |
| 33 | Bogi | Cini | 3 | 161,5 |
| 1 | Tamás | Cini | 1 | 163,0 |
| 5 | Tamás | Cini | 2 | 162,0 |
| 9 | Tamás | Cini | 3 | 162,0 |
| 13 | Vince | Cini | 1 | 162,0 |
| 17 | Vince | Cini | 2 | 161,0 |
| 21 | Vince | Cini | 3 | 162,0 |
| 27 | Bogi | Dóri | 1 | 166,0 |
| 31 | Bogi | Dóri | 2 | 166,0 |
| 35 | Bogi | Dóri | 3 | 167,0 |
| 3 | Tamás | Dóri | 1 | 166,0 |
| 7 | Tamás | Dóri | 2 | 165,0 |
| 11 | Tamás | Dóri | 3 | 164,5 |
| 15 | Vince | Dóri | 1 | 167,5 |
| 19 | Vince | Dóri | 2 | 165,0 |
| 23 | Vince | Dóri | 3 | 165,5 |
| 28 | Bogi | Tomi | 1 | 181,0 |
| 32 | Bogi | Tomi | 2 | 180,5 |
| 36 | Bogi | Tomi | 3 | 182,0 |
| 4 | Tamás | Tomi | 1 | 182,0 |
| 8 | Tamás | Tomi | 2 | 181,0 |
| 12 | Tamás | Tomi | 3 | 181,5 |
| 16 | Vince | Tomi | 1 | 181,0 |
| 20 | Vince | Tomi | 2 | 180,0 |
| 24 | Vince | Tomi | 3 | 180,0 |

Repeatability & Reproducibility Summary Plot

No. of Operators: 3 (variable: Operator)

No. of Parts: 4 (variable: Part)

No. of Trials: 3 (variable: Trials)

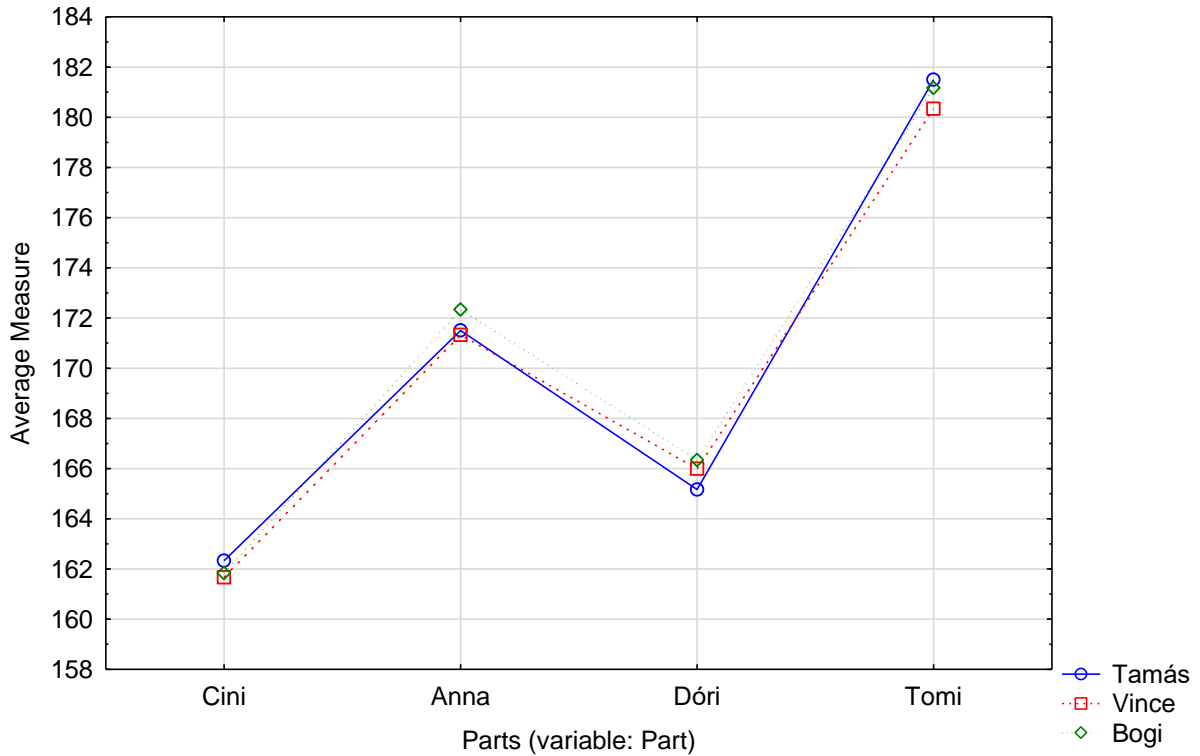


Plot of Average Measurements by Operator and Part

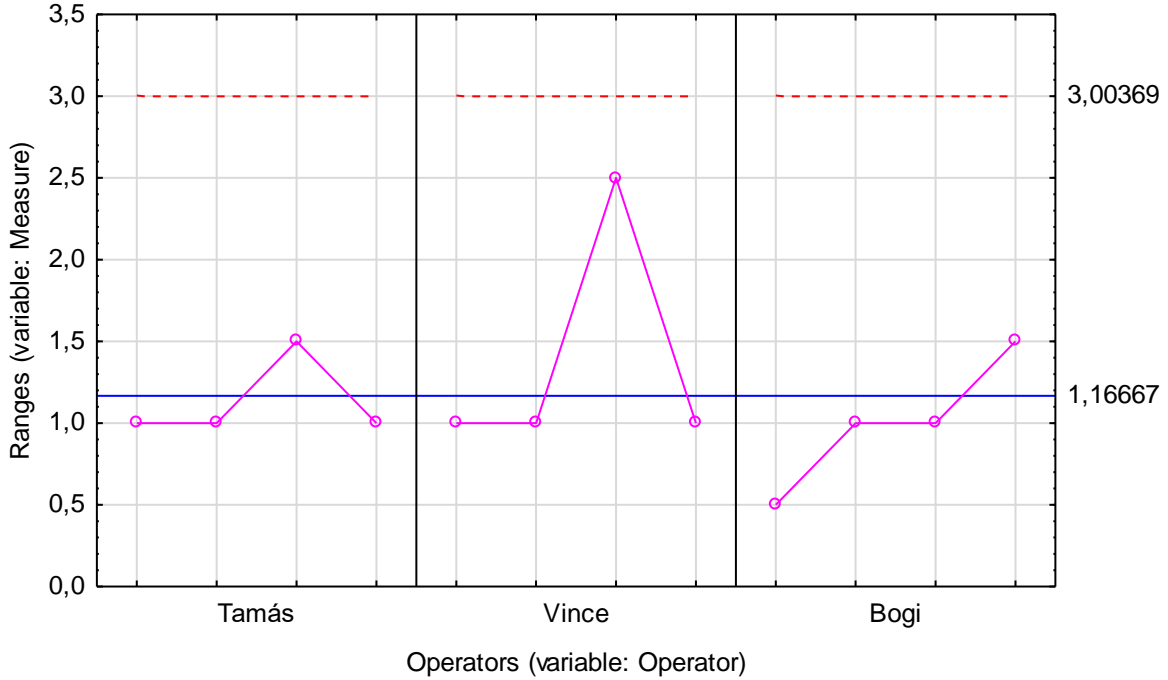
No. of Operators: 3 (variable: Operator)

No. of Parts: 4 (variable: Part)

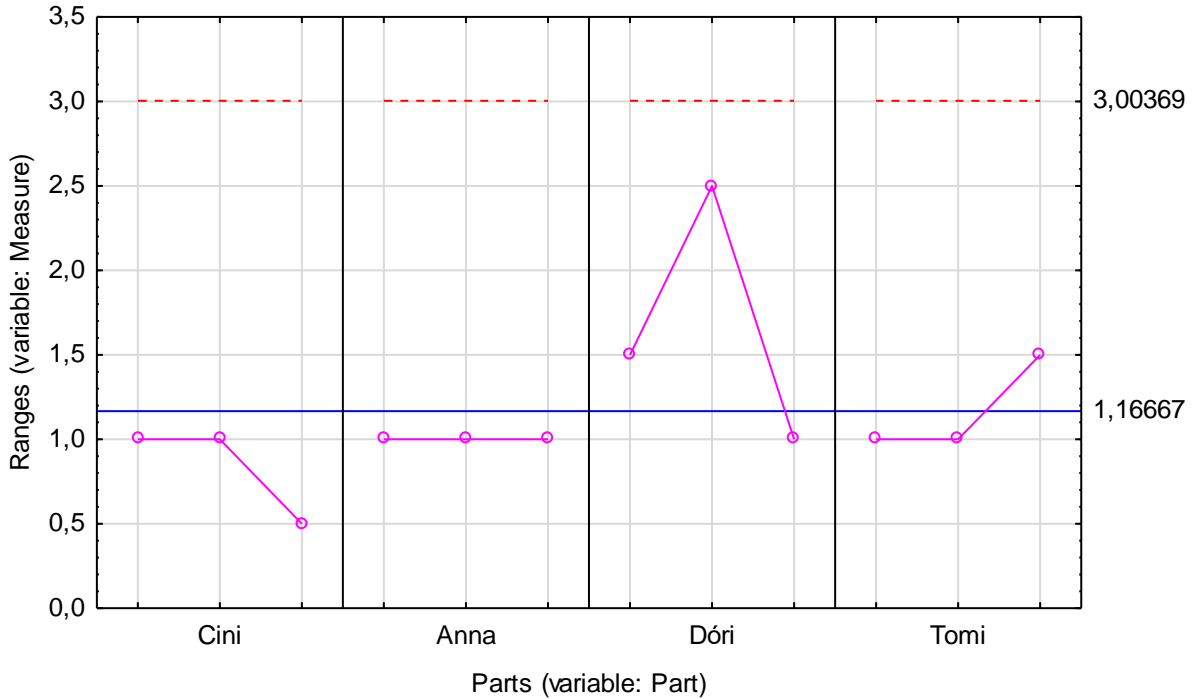
No. of Trials: 3 (variable: Trials)



Combined Range Chart
 Operators by Parts
 Average Range: 1,16667
 Sigma (Range): ,612341
 No. of Trials: 3



Combined Range Chart
 Parts by Operators
 Average Range: 1,16667
 Sigma (Range): ,612341
 No. of Trials: 3



| Variance Components; Variable: Measure (Summary of Design for R & R Study (Spreadsheet3) in ma Mean=170,125 Std.Dv=7,31571 Operators: 3 Parts: 4 Trials: 3 | | | | | | |
|--|-------------------|----------------------|----------------------|----------------------|---------------|---------------|
| Source (Expected MS) | Estimatd Sigma | ,90 Lowr Conf.Lim | ,90 Uppr Conf.Lim | Estimatd Variance | % of R & R | % of Total |
| Repeatability | 0,677003 | 0,549611 | 0,89124 | 0,45833 | 77,9528 | 0,6621 |
| Operator | 0,138889 | 0,000000 | 1,25641 | 0,01929 | 3,2808 | 0,0279 |
| Interaction (OP) | 0,332174 | 0,000000 | 0,92627 | 0,11034 | 18,7664 | 0,1594 |
| Part-to-Part | 8,284393 | 3,789188 | 24,78514 | 68,63117 | | 99,1506 |
| Combined R & R | 0,766787 | 0,728897 | 1,47016 | 0,58796 | 100,0000 | 0,8494 |
| Total | 8,319804 | | | 69,21914 | | 100,0000 |

| Percent Tolerance Analysis:Measure Sigma intervals:6, (Summary of Design for R & R Mean=170,125 Std.Dv=7,31571 Operators: 3 Parts: 4 Trials: 3 | | | | | | |
|--|-------------------|----------------------|----------------------|--------------------|---------------------|------------------|
| Source (Expected MS) | Measrmnt Units | ,90 Lowr Conf.Lim | ,90 Uppr Conf.Lim | % Proc. Variatn | % Total Contrib. | % of Tolernce |
| Repeatability (Equipment Var.) | 4,06202 | 3,29767 | 5,3475 | 8,1372 | 0,6621 | 5,8029 |
| Operator (Appraiser Var.) | 0,83333 | 0,00000 | 7,5385 | 1,6694 | 0,0279 | 1,1905 |
| Interaction (Operator x Part) | 1,99304 | 0,00000 | 5,5576 | 3,9926 | 0,1594 | 2,8472 |
| Part Variation | 49,70636 | 22,73513 | 148,7109 | 99,5744 | 99,1506 | 71,0091 |
| Combined R & R | 4,60072 | 4,37338 | 8,8210 | 9,2164 | 0,8494 | 6,5725 |
| Total Process Variation | 49,91882 | | | 100,0000 | 100,0000 | 71,3126 |
| Tolerance | 70,00000 | | | | | 100,0000 |