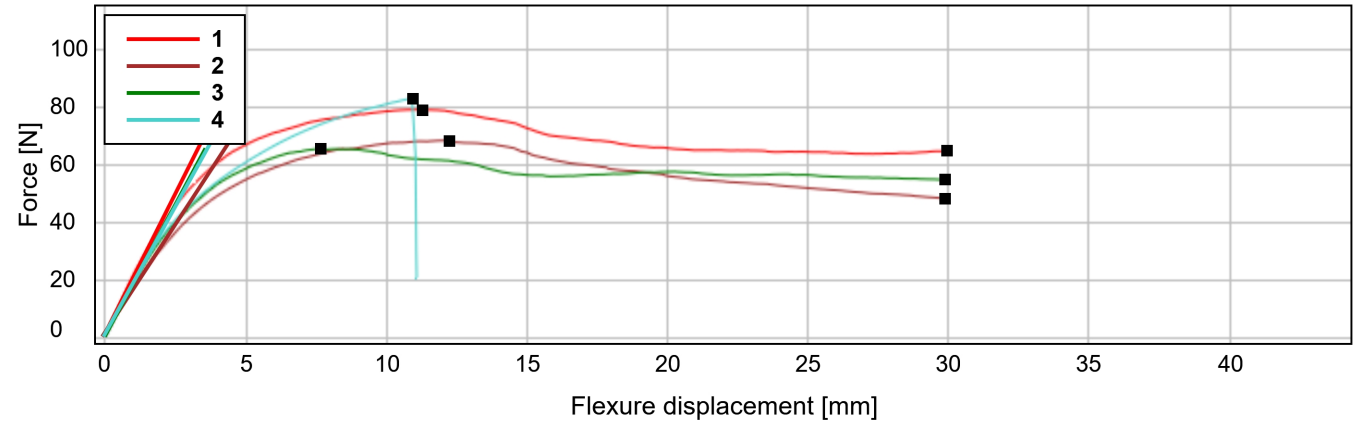


Material properties contribution to stalk flexural stiffness Week8

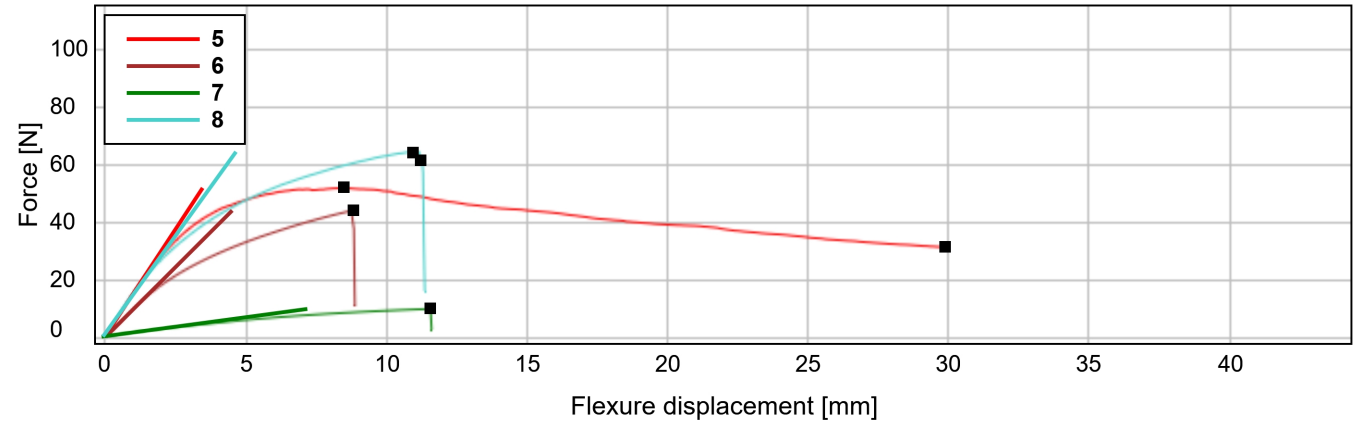
3-Point Bend Testing Protocol for Maize Stalks  
Erin Sparks Lab  
University of Delaware

|          |               |
|----------|---------------|
| Rate 1   | 1.50 mm/s     |
| Operator | Irene Ikiriko |

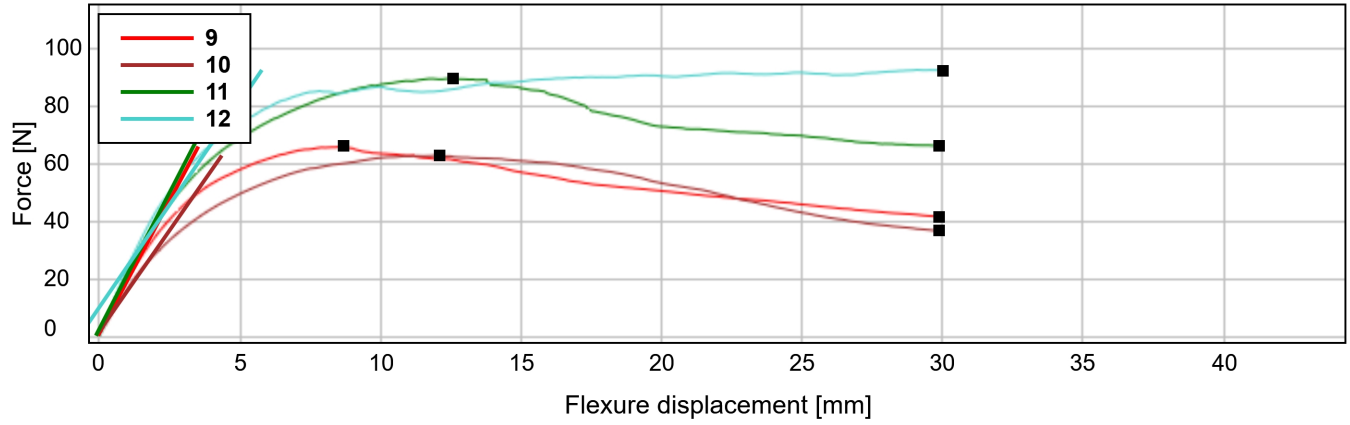
Specimen 1 to 4



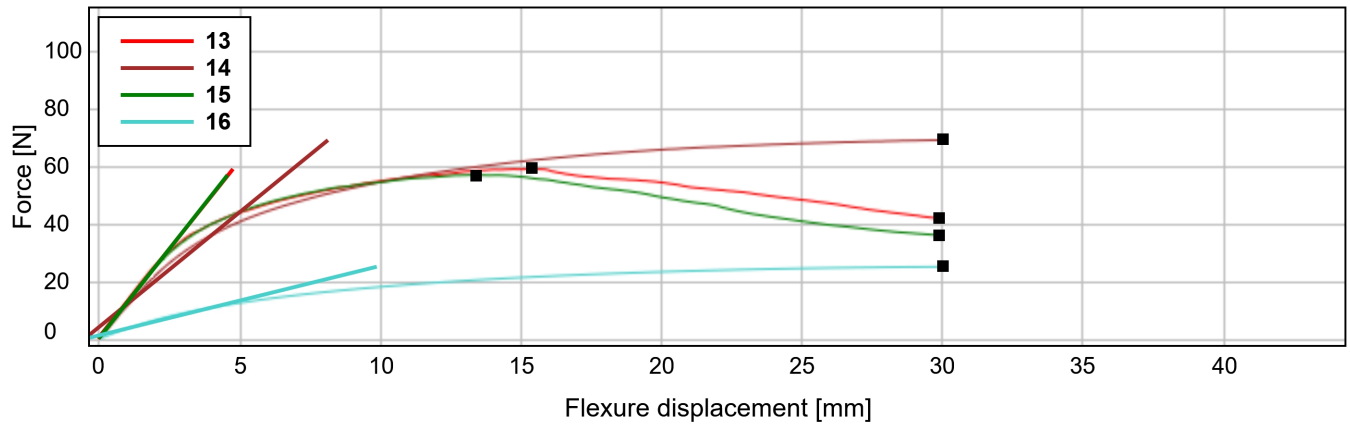
Specimen 5 to 8



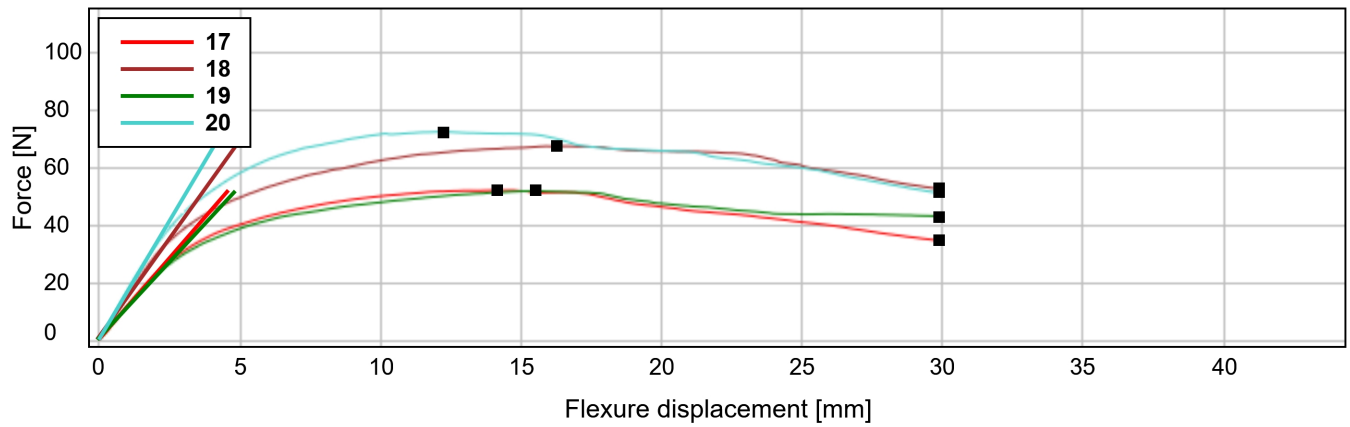
Specimen 9 to 12



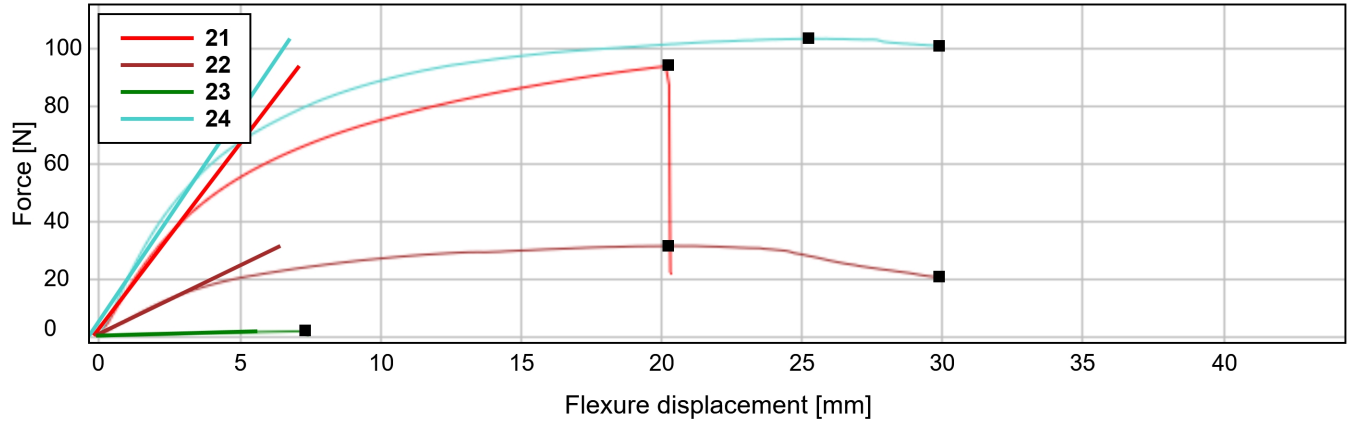
Specimen 13 to 16



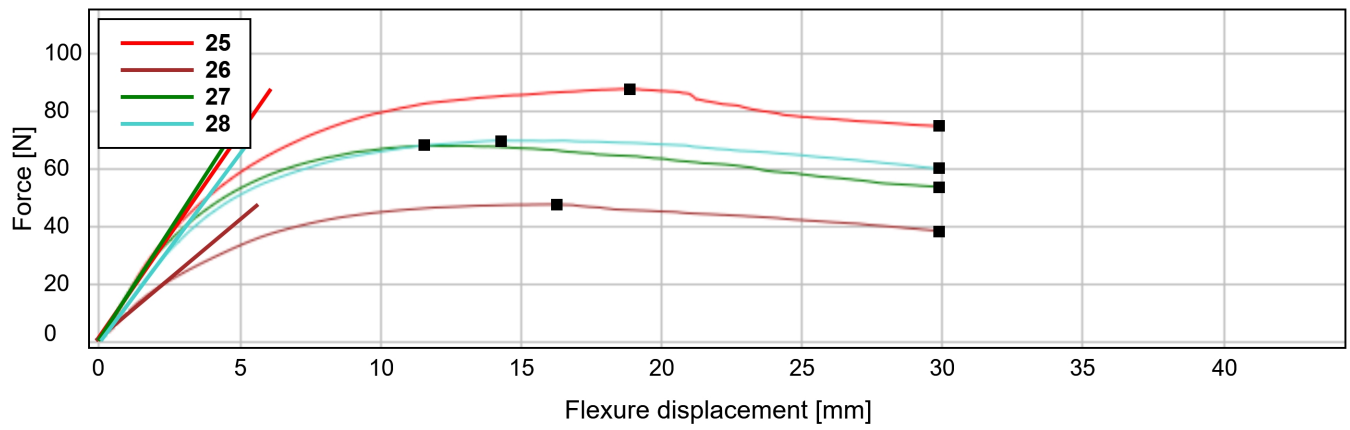
Specimen 17 to 20



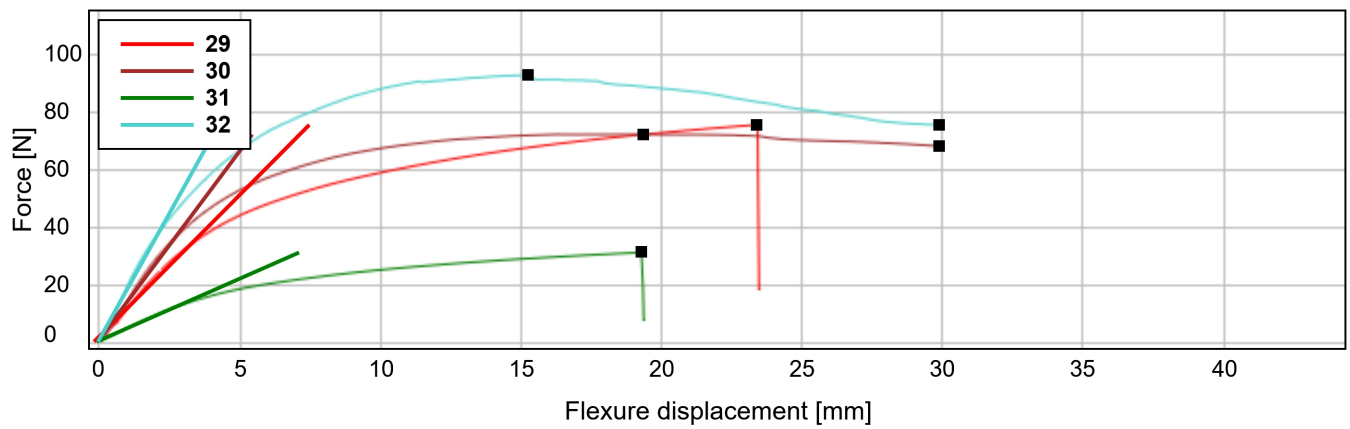
Specimen 21 to 24



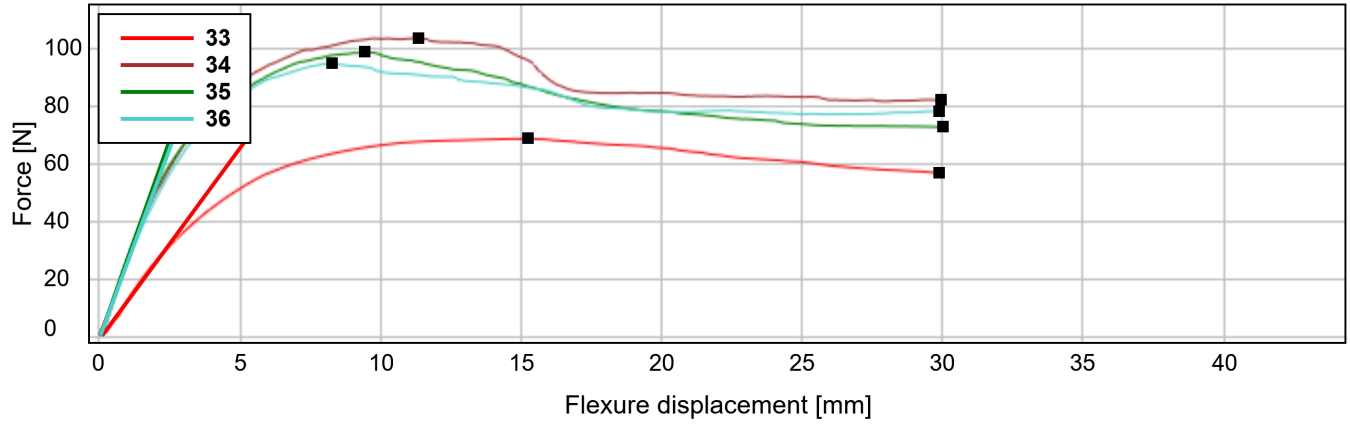
Specimen 25 to 28



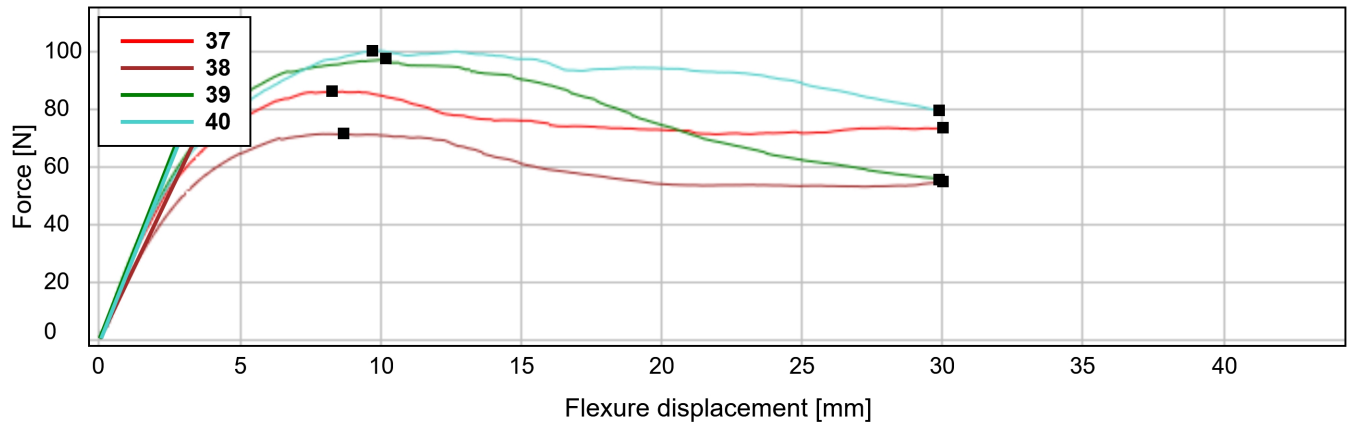
Specimen 29 to 32



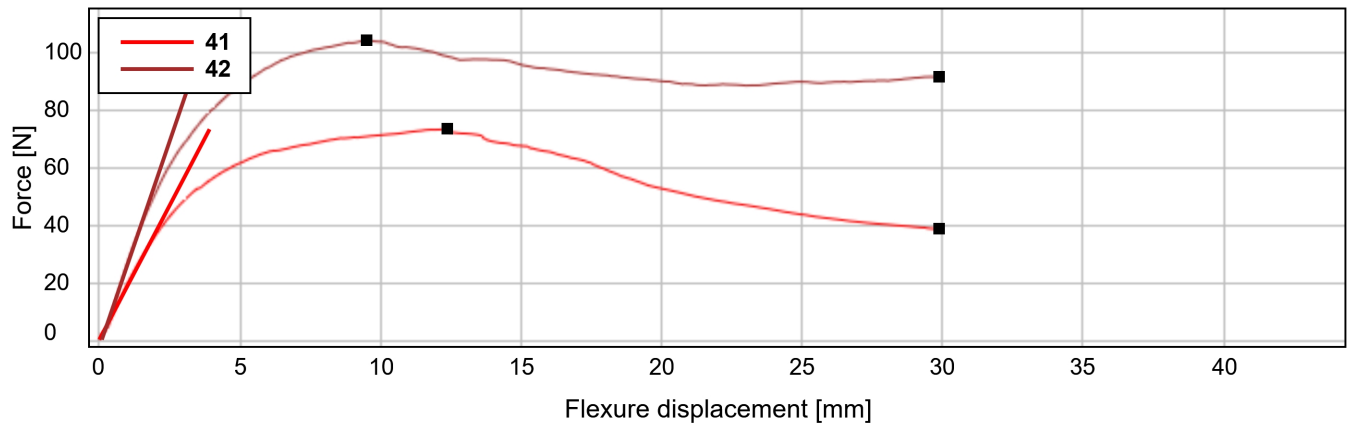
Specimen 33 to 36



Specimen 37 to 40



Specimen 41 to 42



|   | Genotype | Plant Number | Plot Number |
|---|----------|--------------|-------------|
| 1 | B73      | 1            | 355         |
| 2 | B73      | 2            | 355         |
| 3 | B73      | 3            | 355         |
| 4 | B73      | 4            | 355         |

|    | Genotype | Plant Number | Plot Number |
|----|----------|--------------|-------------|
| 5  | B73      | 5            | 355         |
| 6  | B73      | 6            | 355         |
| 7  | B73      | 7            | 355         |
| 8  | B73      | 8            | 355         |
| 9  | B73      | 9            | 355         |
| 10 | B73      | 10           | 355         |
| 11 | B73      | 11           | 355         |
| 12 | B73      | 12           | 355         |
| 13 | Mo17     | 1            | 438         |
| 14 | Mo17     | 2            | 438         |
| 15 | Mo17     | 3            | 438         |
| 16 | Mo17     | 4            | 438         |
| 17 | Mo17     | 5            | 438         |
| 18 | Mo17     | 6            | 438         |
| 19 | Mo17     | 7            | 438         |
| 20 | Mo17     | 8            | 438         |
| 21 | Mo17     | 9            | 438         |
| 22 | Mo17     | 10           | 438         |
| 23 | Mo17     | 11           | 438         |
| 24 | Mo17     | 1            | 440         |
| 25 | Mo17     | 2            | 440         |
| 26 | Mo17     | 3            | 440         |
| 27 | Mo17     | 4            | 440         |
| 28 | Mo17     | 5            | 440         |
| 29 | Mo17     | 6            | 440         |
| 30 | Mo17     | 7            | 440         |
| 31 | Mo17     | 8            | 440         |
| 32 | Mo17     | 9            | 440         |
| 33 | Mo17     | 10           | 440         |
| 34 | B73      | 1            | 353         |
| 35 | B73      | 2            | 353         |
| 36 | B73      | 3            | 353         |
| 37 | B73      | 4            | 353         |
| 38 | B73      | 5            | 353         |
| 39 | B73      | 6            | 353         |
| 40 | B73      | 7            | 353         |
| 41 | B73      | 8            | 353         |
| 42 | B73      | 9            | 353         |

|    | Whorl Number (use<br>field-based numbering<br>- top down) | Root Sample Number | Vertical Specimen<br>Diameter<br>[mm] |
|----|---|--------------------|---------------------------------------|
| 1  |   |                    | 19.20                                 |
| 2  |   |                    | 17.34                                 |
| 3  |   |                    | 18.03                                 |
| 4  |   |                    | 18.75                                 |
| 5  |   |                    | 16.61                                 |
| 6  |   |                    | 17.11                                 |
| 7  |   |                    | 14.48                                 |
| 8  |   |                    | 17.36                                 |
| 9  |   |                    | 17.20                                 |
| 10 |   |                    | 16.88                                 |
| 11 |   |                    | 18.89                                 |
| 12 |   |                    | 20.00                                 |
| 13 |   |                    | 15.52                                 |
| 14 |   |                    | 15.24                                 |
| 15 |   |                    | 15.08                                 |
| 16 |   |                    | 12.64                                 |
| 17 |   |                    | 14.79                                 |
| 18 |   |                    | 15.26                                 |
| 19 |   |                    | 14.64                                 |
| 20 |   |                    | 16.78                                 |
| 21 |   |                    | 16.97                                 |
| 22 |   |                    | 13.26                                 |
| 23 |   |                    | 10.68                                 |
| 24 |   |                    | 16.98                                 |
| 25 |   |                    | 16.48                                 |
| 26 |   |                    | 14.52                                 |
| 27 |   |                    | 15.53                                 |
| 28 |   |                    | 15.28                                 |
| 29 |   |                    | 16.77                                 |
| 30 |   |                    | 15.64                                 |
| 31 |   |                    | 13.07                                 |
| 32 |   |                    | 16.19                                 |
| 33 |   |                    | 15.11                                 |
| 34 |   |                    | 20.10                                 |
| 35 |   |                    | 19.50                                 |
| 36 |   |                    | 19.35                                 |
| 37 |   |                    | 19.21                                 |
| 38 |   |                    | 17.70                                 |

|    | Whorl Number (use field-based numbering - top down) | Root Sample Number | Vertical Specimen Diameter [mm] |
|----|---|--------------------|---------------------------------|
| 39 |   |                    | 18.61                           |
| 40 |   |                    | 19.14                           |
| 41 |   |                    | 17.32                           |
| 42 |   |                    | 20.16                           |

|    | Horizontal Specimen Diameter [mm] | Specimen Length [mm] | Force at Break (Standard) [N] |
|----|-----------------------------------|----------------------|-------------------------------|
| 1  | 22.75                             | 300.00               | 64.63                         |
| 2  | 20.49                             | 300.00               | 48.17                         |
| 3  | 20.65                             | 300.00               | 54.66                         |
| 4  | 22.43                             | 300.00               | 82.98                         |
| 5  | 19.20                             | 300.00               | 31.27                         |
| 6  | 21.04                             | 300.00               | 44.00                         |
| 7  | 17.58                             | 300.00               | 9.82                          |
| 8  | 21.30                             | 300.00               | 61.72                         |
| 9  | 20.10                             | 300.00               | 41.55                         |
| 10 | 20.57                             | 300.00               | 36.57                         |
| 11 | 22.98                             | 300.00               | 66.06                         |
| 12 | 23.54                             | 300.00               | 92.41                         |
| 13 | 19.49                             | 300.00               | 41.93                         |
| 14 | 19.93                             | 300.00               | 69.12                         |
| 15 | 18.96                             | 300.00               | 36.12                         |
| 16 | 15.52                             | 300.00               | 25.16                         |
| 17 | 19.14                             | 300.00               | 34.57                         |
| 18 | 20.22                             | 300.00               | 52.53                         |
| 19 | 18.53                             | 300.00               | 42.97                         |
| 20 | 20.40                             | 300.00               | 51.08                         |
| 21 | 22.56                             | 300.00               | 93.81                         |
| 22 | 16.25                             | 300.00               | 20.46                         |
| 23 | 15.38                             | 300.00               | 1.71                          |
| 24 | 21.19                             | 300.00               | 100.63                        |
| 25 | 20.86                             | 300.00               | 74.61                         |
| 26 | 17.73                             | 300.00               | 38.17                         |
| 27 | 20.03                             | 300.00               | 53.61                         |
| 28 | 19.04                             | 300.00               | 59.79                         |
| 29 | 20.78                             | 300.00               | 75.45                         |
| 30 | 20.45                             | 300.00               | 68.11                         |
| 31 | 15.29                             | 300.00               | 31.14                         |

|    | Horizontal Specimen<br>Diameter<br>[mm] | Specimen Length<br>[mm] | Force at Break<br>(Standard)<br>[N] |
|----|---|-------------------------|-------------------------------------|
| 32 | 20.66                                   | 300.00                  | 75.37                               |
| 33 | 19.70                                   | 300.00                  | 56.71                               |
| 34 | 24.35                                   | 300.00                  | 82.10                               |
| 35 | 21.96                                   | 300.00                  | 72.70                               |
| 36 | 23.91                                   | 300.00                  | 77.85                               |
| 37 | 22.53                                   | 300.00                  | 73.31                               |
| 38 | 20.84                                   | 300.00                  | 54.50                               |
| 39 | 22.07                                   | 300.00                  | 55.60                               |
| 40 | 21.66                                   | 300.00                  | 79.24                               |
| 41 | 20.06                                   | 300.00                  | 38.52                               |
| 42 | 22.94                                   | 300.00                  | 91.15                               |

|    | Displacement at Break<br>(Standard)<br>[mm] | Flexure displacement<br>at Break (Standard)<br>[mm] | Maximum Force<br>[N] |
|----|---|---|----------------------|
| 1  | 36.22                                       | 29.96   | 79.05                |
| 2  | 36.55                                       | 29.87   | 68.32                |
| 3  | 36.92                                       | 29.87   | 65.54                |
| 4  | 17.72                                       | 10.94   | 82.98                |
| 5  | 37.88                                       | 29.87   | 51.82                |
| 6  | 16.69                                       | 8.81  | 44.00                |
| 7  | 23.52                                       | 11.54   | 9.82                 |
| 8  | 18.87                                       | 11.24   | 64.37                |
| 9  | 37.23                                       | 29.87   | 65.83                |
| 10 | 37.87                                       | 29.87   | 62.72                |
| 11 | 37.03                                       | 29.87   | 89.40                |
| 12 | 34.46                                       | 30.00   | 92.41                |
| 13 | 39.31                                       | 29.87   | 59.08                |
| 14 | 39.62                                       | 30.00   | 69.12                |
| 15 | 41.16                                       | 29.87   | 56.99                |
| 16 | 43.63                                       | 30.00   | 25.16                |
| 17 | 40.13                                       | 29.87   | 52.05                |
| 18 | 39.30                                       | 29.87   | 67.36                |
| 19 | 40.78                                       | 29.87   | 51.79                |
| 20 | 40.02                                       | 29.87   | 72.34                |
| 21 | 28.23                                       | 20.24   | 93.81                |
| 22 | 41.99                                       | 29.87   | 31.35                |
| 23 | 19.47                                       | 7.31  | 1.71                 |
| 24 | 39.13                                       | 29.87   | 103.30               |



|    | Displacement at Break<br>(Standard)<br>[mm] | Flexure displacement<br>at Break (Standard)<br>[mm] | Maximum Force<br>[N] |
|----|---|---|----------------------|
| 25 | 38.09                                       | 29.87   | 87.56                |
| 26 | 43.68                                       | 29.87   | 47.48                |
| 27 | 38.35                                       | 29.87   | 67.83                |
| 28 | 39.80                                       | 29.87   | 69.61                |
| 29 | 32.30                                       | 23.39   | 75.45                |
| 30 | 38.71                                       | 29.87   | 72.12                |
| 31 | 33.74                                       | 19.31   | 31.14                |
| 32 | 38.86                                       | 29.87   | 92.70                |
| 33 | 38.84                                       | 29.87   | 68.50                |
| 34 | 35.42                                       | 29.93   | 103.57               |
| 35 | 36.19                                       | 30.00   | 98.49                |
| 36 | 34.83                                       | 29.87   | 94.71                |
| 37 | 34.92                                       | 30.00   | 85.94                |
| 38 | 36.60                                       | 30.00   | 71.28                |
| 39 | 35.93                                       | 29.87   | 97.14                |
| 40 | 37.56                                       | 29.87   | 100.07               |
| 41 | 37.44                                       | 29.87   | 73.23                |
| 42 | 35.10                                       | 29.87   | 104.08               |

|    | Flexure displacement<br>at Maximum Force<br>[mm] | Maximum Slope<br>(Automatic)<br>[N/mm] |
|----|--|--|
| 1  | 11.27  | 19.41                                  |
| 2  | 12.23  | 14.95                                  |
| 3  | 7.67   | 18.21                                  |
| 4  | 10.94  | 17.66                                  |
| 5  | 8.48   | 14.85                                  |
| 6  | 8.81   | 9.74                                   |
| 7  | 11.54  | 1.32                                   |
| 8  | 10.91  | 13.55                                  |
| 9  | 8.66   | 18.40                                  |
| 10 | 12.11  | 13.99                                  |
| 11 | 12.56  | 18.92                                  |
| 12 | 30.00  | 14.24                                  |
| 13 | 15.41  | 12.24                                  |
| 14 | 30.00  | 7.97                                   |
| 15 | 13.43  | 12.38                                  |
| 16 | 30.00  | 2.41                                   |
| 17 | 14.18  | 11.23                                  |

|    | Flexure displacement<br>at Maximum Force<br>[mm] | Maximum Slope<br>(Automatic)<br>[N/mm] |
|----|--|--|
| 18 | 16.28  | 13.61                                  |
| 19 | 15.53  | 10.51                                  |
| 20 | 12.26  | 16.40                                  |
| 21 | 20.24  | 12.79                                  |
| 22 | 20.27  | 4.73                                   |
| 23 | 7.31   | 0.27                                   |
| 24 | 25.25  | 14.43                                  |
| 25 | 18.89  | 14.08                                  |
| 26 | 16.28  | 8.19                                   |
| 27 | 11.54  | 15.07                                  |
| 28 | 14.27  | 13.11                                  |
| 29 | 23.39  | 9.83                                   |
| 30 | 19.34  | 13.06                                  |
| 31 | 19.31  | 4.30                                   |
| 32 | 15.26  | 17.53                                  |
| 33 | 15.23  | 13.27                                  |
| 34 | 11.33  | 26.23                                  |
| 35 | 9.44   | 27.55                                  |
| 36 | 8.30   | 26.34                                  |
| 37 | 8.27   | 24.61                                  |
| 38 | 8.66   | 20.42                                  |
| 39 | 10.19  | 24.91                                  |
| 40 | 9.74   | 24.56                                  |
| 41 | 12.35  | 18.62                                  |
| 42 | 9.53   | 28.55                                  |