Collaborative Testing Services, Inc.

# Paper & Paperboard Testing Program

## Summary Report #4241 - May 2023

Introduction to the Paper & Paperboard Interlaboratory Program
Explanation of Tables and Definitions of Terms

| Analysis | Analysis Name |
|---|---|
| 3101 | Thickness (Caliper), Printing papers |
| 3111 | Bursting Strength - Printing Papers |
| 3113 | Tearing Strength - Printing Papers |
| 3115 | Tensile Breaking Strength - Printing Papers |
| 3116 | Tensile Energy Absorption - Printing Papers |
| 3117 | Elongation to Break - Printing Papers |
| 3121 | Air Resistance - Gurley Oil Type |
| 3123 | Porosity - Sheffield Type - Sheffield Units for 3/4 inch Diameter Orifice |
| 3131 | Roughness - Print Surf Method - 2.5 to 6.0 Microns |
| 3133 | Roughness - Sheffield Type |
| 3135 | Grammage (Mass per Unit Area) |
| 3141 | Opacity (89% Reflectance Backing) - Fine Papers |
| 3143 | Opacity (Paper Backing) - Fine Papers and Newsprint |
| 3145 | Directional Brightness of Fluorescent Samples |
| 3146 | Fluorescent Component of Directional Brightness |
| 3201 | Bending Resistance, Taber Type - 0 to 10 Units |
| 3203 | Bending Resistance, Taber Type - 10 to 100 Taber Units |
| 3205 | Bending Resistance, Taber Type - 50 to 500 Taber Units - Recycled Paperboard |
| 3207 | Z-Direction Tensile, Recycled Paperboard |
| 3209 | Z-Direction Tensile |
| 3211 | Internal Bond Strength - Modified Scott Mechanics |
| 3213 | Internal Bond Strength - Scott Bond Models |

## The CTS Paper & Paperboard Interlaboratory Program

In 1969, the National Bureau of Standards (now designated the National Institute for Standards and Technology) and the Technical Association of the Pulp and Paper Industry (TAPPI) developed an interlaboratory program for paper and paperboard testing. Since 1971, Collaborative Testing Services has operated the Collaborative Reference Program for Paper and Paperboard. With hundreds of organizations from around the world participating in these tests, this program has become one of the largest of its kind. The program allows laboratories to compare the performance of their testing with that of other participating laboratories, and provides a realistic picture of the state of paper testing.

## About CTS

Founded in 1971, Collaborative Testing Services, Inc. (CTS) is a privately - owned company that specializes in interlaboratory tests for a variety of sectors: including color, rubber, plastics, fasteners and metals, containerboard, paper, agriculture, hemp, and wine, as well as proficiency tests for forensic laboratories. All of the tests are designed to assist organizations in achieving and maintaining quality assurance objectives. Labs from the U.S., as well as more than 100 countries, currently participate in the CTS programs.

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# Key for Web Summary Reports (Page 1 of 2)

**WebCode** — Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Paper Report published on the CTS Website. The WebCode for each analysis can be found on the datasheets and in the Performance Analysis Report mailed to each participant.

**Lab Mean** — The average of the values obtained for each sample by the participant.

**Grand Mean** — The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN.

**Difference from Grand Mean** — The difference of the LAB MEAN from the GRAND MEAN.

**Between-Lab Standard Deviation** — An indication of the precision of measurement between the laboratories. The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa).

**Comparative Performance Value** — An indication of how well a laboratory's results agree with the other participants. The CPV is a ratio indicating the number of standard deviations from the GRAND MEAN. The closer a laboratory's COMPARATIVE PERFORMANCE VALUE is to zero, the more consistent its results are with the other participants' data (and vice versa). The critical value for each CPV will vary depending on the number of labs participating in a test.

**Inst Code** — A code indicating the manufacturer of the instrument used to perform the test (see separate INSTRUMENT CODE LIST for each test section), if instruments are tracked.

**Data Flag** — DATA FLAGS are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol:

| DATA FLAG | STATISTICALLY INCLUDED/EXCLUDED | ACTION REQUIRED |
|---|---|---|
| * | INCLUDED | CAUTION -review testing procedure and monitor future results. Results fall outside 95% ellipse but within a 99% ellipse that is calculated but not drawn. |
| X | EXCLUDED | STOP - immediate review of data and/or testing procedure is required. Results fall outside the 99% ellipse. See specific notes following each table for more information on why the data is excluded. |
| M | EXCLUDED | PROCEED - lab was unable to report data for at least one sample. |

**Graph** - For each laboratory, the LAB MEAN for the first sample (x-axis) is plotted against the LAB MEAN for the second sample (y-axis) with each point representing a laboratory. The horizontal and vertical cross-hairs are the GRAND MEANS for each sample. When 20 or more laboratories are in the statistics, an ellipse is also drawn so that 95% of the time a randomly selected laboratory will be included inside the ellipse. Plotted data flags are explained on the previous page.

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**Common Problems Highlighted in Footnotes**

1. ***Extreme data*** - The laboratory's results for one or both samples are so inconsistent with those of the other participants that the lab mean(s) fall outside the plot. The participant is advised to immediately review his data and/or testing procedure.

2. ***Systematic bias*** - The laboratory's results are either consistently high or low for both samples when compared to the other participants (the plotted point falls near the top or bottom of the ellipse). This indicates that the participant is performing the test with a constant bias. Causes of systematic errors include improper calibration, the particular make/model of equipment or a modification to the testing procedure.

3. ***Inconsistency in testing between samples/sample sets*** - The laboratory's results indicate that there are differences in the way the two samples tested (the plotted point falls to the side of the ellipse). This type of error may be attributed to the analyst deviating from the procedure when testing one of the samples or a material interaction occurrence with the instrument or room conditions. The inconsistency is reflected in the CPVs for the two samples, such as a +1.5 CPV for sample A and a -2.2 CPV for sample B. CTS also will specify if the laboratory's data for one sample are high/low compared to the other participants. If this inconsistency is slight, the lab's plotted point will be an * that falls on the edge of the ellipse.

4. ***Inconsistency in testing within a sample*** - The laboratory's within-lab standard deviation for a specified sample is high when compared to the other participants, often causing the lab's plotted point to fall outside of the ellipse.

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Labs flagged with an * are not typically included in the footnotes of a data table. These labs may locate their position in the control ellipse and use the definitions above to help identify the type of testing error. An * should serve as a caution flag, a "yellow light", to a lab. If this error is repeated in future rounds, a lab may need to stop and review its testing procedures. The initial data flag is not cause for alarm. Interlaboratory tests conducted at regular intervals permit a lab to recognize trends in testing.

| WebCode | Data Flag | Sample CP17 Lab Mean | Sample CP17 Diff from Grand Mean | Sample CP17 CPV | Sample CP18 Lab Mean | Sample CP18 Diff from Grand Mean | Sample CP18 CPV |
|---|---|---|---|---|---|---|---|
| 2JHMRP | | 5.048 | 0.073 | 0.83 | 5.027 | 0.058 | 0.66 |
| 3ANZXB | | 5.031 | 0.056 | 0.63 | 5.015 | 0.047 | 0.53 |
| 46TJ6G | | 4.967 | -0.008 | -0.09 | 4.959 | -0.009 | -0.11 |
| 494NRB | | 4.864 | -0.111 | -1.25 | 4.853 | -0.115 | -1.31 |
| 4GZEDK | | 5.105 | 0.130 | 1.46 | 5.076 | 0.108 | 1.22 |
| 4HT8BP | | 4.888 | -0.087 | -0.98 | 4.950 | -0.018 | -0.21 |
| 6VGR77 | | 5.150 | 0.175 | 1.97 | 5.128 | 0.160 | 1.81 |
| 82W8VL | | 5.025 | 0.050 | 0.56 | 5.016 | 0.048 | 0.54 |
| 9NQBCJ | | 4.910 | -0.065 | -0.73 | 4.912 | -0.056 | -0.64 |
| ANZULF | | 4.968 | -0.007 | -0.08 | 4.894 | -0.074 | -0.85 |
| AQP27C | | 5.078 | 0.103 | 1.16 | 5.022 | 0.054 | 0.61 |
| CDDKZJ | | 4.958 | -0.017 | -0.19 | 5.013 | 0.045 | 0.51 |
| CYT6WJ | | 4.888 | -0.087 | -0.98 | 4.903 | -0.065 | -0.74 |
| DMGYFP | | 5.048 | 0.073 | 0.82 | 5.003 | 0.035 | 0.39 |
| EJDLDH | | 4.985 | 0.010 | 0.11 | 4.999 | 0.031 | 0.35 |
| F4D98K | | 5.019 | 0.044 | 0.50 | 5.004 | 0.036 | 0.40 |
| F9936L | | 4.900 | -0.075 | -0.84 | 4.848 | -0.120 | -1.37 |
| GGWB8N | X | 5.098 | 0.123 | 1.39 | 4.953 | -0.016 | -0.18 |
| GZAV7D | | 4.966 | -0.009 | -0.10 | 4.981 | 0.012 | 0.14 |
| HFFEEP | | 4.866 | -0.109 | -1.23 | 4.859 | -0.109 | -1.24 |
| HZ9BX4 | | 4.978 | 0.003 | 0.03 | 4.950 | -0.018 | -0.21 |
| JBHEH6 | | 5.097 | 0.122 | 1.37 | 5.069 | 0.100 | 1.14 |
| LG2ET3 | X | 5.045 | 0.070 | 0.79 | 3.914 | -1.054 | -11.99 |
| LVER2M | | 4.840 | -0.135 | -1.52 | 4.832 | -0.136 | -1.55 |
| MDE493 | | 5.000 | 0.025 | 0.28 | 5.004 | 0.035 | 0.40 |
| NVEAEC | | 4.890 | -0.085 | -0.96 | 4.880 | -0.088 | -1.01 |
| NZ94H6 | | 4.944 | -0.031 | -0.35 | 4.920 | -0.048 | -0.55 |
| P3TK4W | | 4.928 | -0.047 | -0.53 | 4.981 | 0.013 | 0.14 |
| PFXVC6 | | 4.897 | -0.078 | -0.88 | 4.932 | -0.036 | -0.41 |
| Q4LLQZ | | 5.017 | 0.042 | 0.47 | 4.968 | 0.000 | -0.01 |
| Q6DTQ4 | | 5.024 | 0.049 | 0.55 | 5.043 | 0.075 | 0.85 |
| QEZU4R | | 4.897 | -0.078 | -0.88 | 4.915 | -0.053 | -0.61 |
| TDEZE2 | | 5.005 | 0.030 | 0.34 | 5.067 | 0.099 | 1.12 |
| TUN2WA | | 5.011 | 0.036 | 0.41 | 4.995 | 0.027 | 0.30 |
| U6LWWQ | X | 4.970 | -0.005 | -0.06 | 5.118 | 0.150 | 1.70 |
| UBAP2Y | | 4.999 | 0.024 | 0.27 | 5.029 | 0.061 | 0.69 |
| V3P9MU | | 5.016 | 0.041 | 0.46 | 5.016 | 0.047 | 0.54 |
| V6CRNR | | 4.927 | -0.048 | -0.54 | 4.931 | -0.037 | -0.43 |
| VLXBGT | * | 4.786 | -0.189 | -2.13 | 4.740 | -0.228 | -2.60 |
| X4TM3Y | | 5.098 | 0.123 | 1.39 | 5.102 | 0.134 | 1.52 |


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| WebCode | Data Flag | Sample CP17 Lab Mean | Sample CP17 Diff from Grand Mean | Sample CP17 CPV | Sample CP18 Lab Mean | Sample CP18 Diff from Grand Mean | Sample CP18 CPV |
|---|---|---|---|---|---|---|---|
| XCLVMP | | 5.023 | 0.048 | 0.54 | 5.031 | 0.063 | 0.71 |
| YCL4GU | | 4.962 | -0.013 | -0.15 | 4.977 | 0.009 | 0.10 |
| YK3KCP | | 5.067 | 0.092 | 1.03 | 5.047 | 0.079 | 0.90 |
| YLA4TX | * | 5.097 | 0.122 | 1.37 | 5.002 | 0.033 | 0.38 |
| ZRULKE | | 5.024 | 0.049 | 0.55 | 5.036 | 0.067 | 0.77 |
| ZZA67Y | * | 4.731 | -0.243 | -2.74 | 4.715 | -0.253 | -2.88 |

| Summary Statistics | Sample CP17 | Sample CP18 |
|---|---|---|
| **Grand Means** | 4.97 mils | 4.97 mils |
| **Stnd Dev Btwn Labs** | 0.09 mils | 0.09 mils |

Statistics based on 43 of 46 reporting participants.

**Comments on Assigned Data Flags for Test #3101**

U6LWWQ (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample CP18.

LG2ET3 (X) - Extreme Data for Sample CP18.

GGWB8N (X) - Inconsistent in testing between samples.


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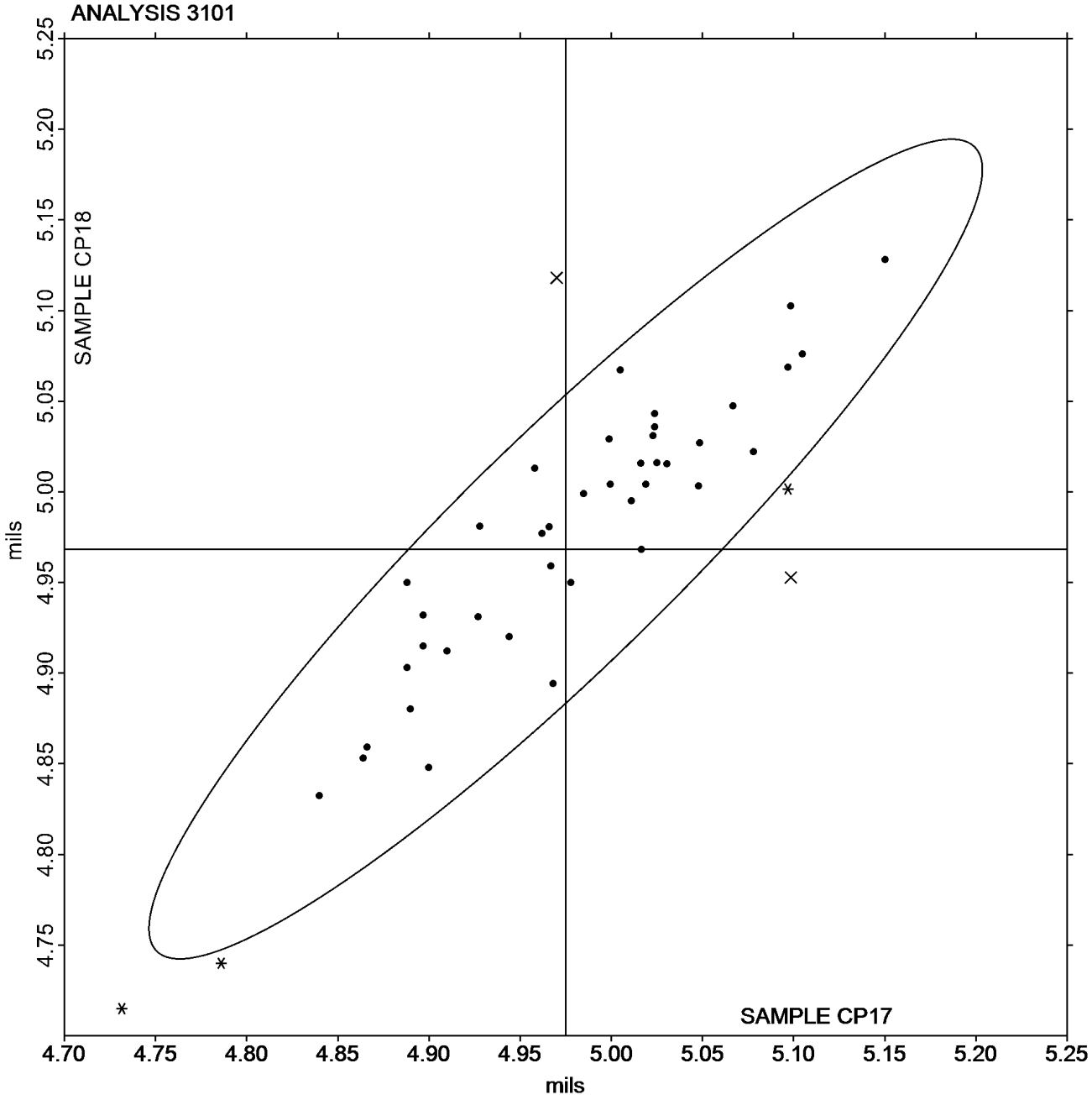
**Grand Mean Sample CP17 = 4.9749 mils**

**Grand Mean Sample CP18 = 4.9684 mils**

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# Paper & Paperboard Interlaboratory Testing Program

## Analysis 3111

## Bursting Strength - Printing Papers

## TAPPI Official Test Method T403

| WebCode | Data Flag | Sample BP17 Lab Mean | Sample BP17 Diff from Grand Mean | Sample BP17 CPV | Sample BP18 Lab Mean | Sample BP18 Diff from Grand Mean | Sample BP18 CPV |
|---|---|---|---|---|---|---|---|
| 2JHMRP | | 45.30 | 1.46 | 0.58 | 41.71 | -1.86 | -0.69 |
| 46TJ6G | | 45.62 | 1.78 | 0.71 | 45.07 | 1.50 | 0.56 |
| 4HT8BP | | 43.26 | -0.58 | -0.23 | 44.27 | 0.70 | 0.26 |
| 82W8VL | | 46.90 | 3.06 | 1.22 | 47.10 | 3.53 | 1.31 |
| 9NQBCJ | | 45.70 | 1.86 | 0.74 | 47.30 | 3.73 | 1.38 |
| ANZULF | | 43.17 | -0.67 | -0.27 | 41.54 | -2.03 | -0.76 |
| B8B2F9 | | 47.00 | 3.16 | 1.26 | 45.90 | 2.33 | 0.86 |
| BH974E | | 41.10 | -2.74 | -1.09 | 40.50 | -3.07 | -1.14 |
| C96ZE8 | | 44.29 | 0.45 | 0.18 | 42.99 | -0.59 | -0.22 |
| JBHEH6 | | 41.45 | -2.39 | -0.95 | 41.66 | -1.92 | -0.71 |
| MDE493 | | 46.50 | 2.66 | 1.06 | 42.80 | -0.77 | -0.29 |
| NKRDBP | | 44.21 | 0.37 | 0.15 | 44.10 | 0.53 | 0.20 |
| NRFVVT | | 42.85 | -0.99 | -0.40 | 43.77 | 0.19 | 0.07 |
| PFXVC6 | | 44.93 | 1.09 | 0.44 | 46.90 | 3.33 | 1.24 |
| Q4LLQZ | | 42.15 | -1.69 | -0.68 | 41.90 | -1.67 | -0.62 |
| Q6DTQ4 | | 43.50 | -0.34 | -0.14 | 44.40 | 0.83 | 0.31 |
| QEZU4R | | 48.47 | 4.63 | 1.85 | 48.41 | 4.84 | 1.80 |
| TTUXJ3 | | 44.89 | 1.05 | 0.42 | 46.09 | 2.52 | 0.94 |
| TUN2WA | * | 37.01 | -6.83 | -2.73 | 37.16 | -6.41 | -2.38 |
| U6LWWQ | | 41.11 | -2.73 | -1.09 | 38.94 | -4.63 | -1.72 |
| UBAP2Y | | 40.20 | -3.64 | -1.45 | 41.30 | -2.27 | -0.85 |
| V3P9MU | | 45.40 | 1.56 | 0.62 | 43.81 | 0.24 | 0.09 |
| VGRJC2 | | 45.10 | 1.26 | 0.50 | 46.60 | 3.03 | 1.12 |
| XWVNX4 | | 44.30 | 0.46 | 0.18 | 43.75 | 0.18 | 0.07 |
| YCL4GU | | 44.40 | 0.56 | 0.22 | 43.10 | -0.47 | -0.18 |
| ZRULKE | | 41.05 | -2.79 | -1.12 | 41.84 | -1.73 | -0.64 |

| Summary Statistics | Sample BP17 | Sample BP18 |
|---|---|---|
| **Grand Means** | 43.84 psi | 43.57 psi |
| **Stnd Dev Btwn Labs** | 2.50 psi | 2.69 psi |

Statistics based on 26 of 26 reporting participants.


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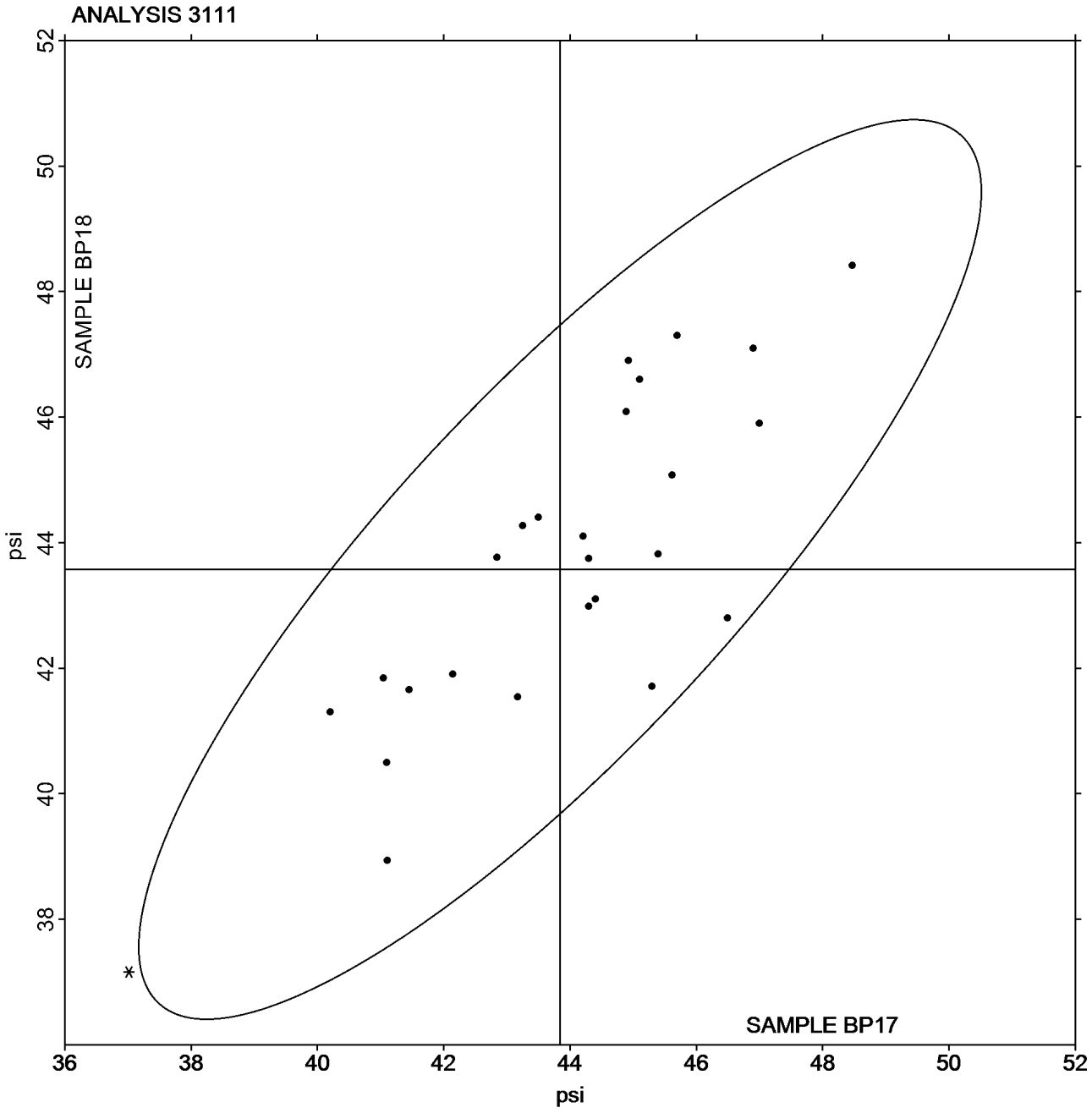
**Grand Mean Sample BP17 = 43.840 psi**

**Grand Mean Sample BP18 = 43.574 psi**





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| WebCode | Data Flag | Sample RP17 Lab Mean | Sample RP17 Diff from Grand Mean | Sample RP17 CPV | Sample RP18 Lab Mean | Sample RP18 Diff from Grand Mean | Sample RP18 CPV |
|---|---|---|---|---|---|---|---|
| 3ANZXB | | 63.71 | 1.32 | 0.32 | 63.71 | 1.37 | 0.33 |
| 46TJ6G | | 56.76 | -5.63 | -1.34 | 57.68 | -4.66 | -1.12 |
| 494NRB | | 55.72 | -6.67 | -1.59 | 55.76 | -6.58 | -1.58 |
| 4GZEDK | | 56.70 | -5.69 | -1.36 | 56.70 | -5.64 | -1.35 |
| 4HT8BP | | 61.28 | -1.11 | -0.26 | 61.13 | -1.22 | -0.29 |
| 6VGR77 | | 62.70 | 0.31 | 0.08 | 62.16 | -0.19 | -0.05 |
| 82W8VL | | 64.99 | 2.60 | 0.62 | 66.93 | 4.59 | 1.10 |
| 92RAZF | | 58.64 | -3.75 | -0.89 | 59.24 | -3.10 | -0.74 |
| 9ANUE6 | | 62.21 | -0.18 | -0.04 | 63.32 | 0.98 | 0.23 |
| 9NQBCJ | | 58.80 | -3.59 | -0.85 | 58.00 | -4.34 | -1.04 |
| B8B2F9 | | 71.40 | 9.01 | 2.15 | 70.80 | 8.46 | 2.02 |
| BYGWM8 | | 60.38 | -2.01 | -0.48 | 62.01 | -0.34 | -0.08 |
| CDDKZJ | X | 82.93 | 20.54 | 4.90 | 81.21 | 18.87 | 4.51 |
| DMGYFP | | 57.84 | -4.55 | -1.08 | 60.12 | -2.22 | -0.53 |
| DQXCC7 | | 71.92 | 9.53 | 2.27 | 71.24 | 8.90 | 2.13 |
| HJLWJC | | 59.04 | -3.35 | -0.80 | 58.26 | -4.08 | -0.98 |
| JBHEH6 | | 65.59 | 3.20 | 0.76 | 65.03 | 2.68 | 0.64 |
| JQR922 | | 63.26 | 0.87 | 0.21 | 65.44 | 3.10 | 0.74 |
| KD69X7 | | 66.18 | 3.79 | 0.90 | 65.47 | 3.12 | 0.75 |
| LVER2M | * | 63.42 | 1.03 | 0.25 | 66.86 | 4.52 | 1.08 |
| LVFKYV | | 65.76 | 3.37 | 0.80 | 64.82 | 2.48 | 0.59 |
| MDE493 | | 62.17 | -0.21 | -0.05 | 62.38 | 0.03 | 0.01 |
| NKRDBP | | 61.74 | -0.65 | -0.15 | 62.60 | 0.26 | 0.06 |
| NVEAEC | | 60.00 | -2.39 | -0.57 | 58.78 | -3.56 | -0.85 |
| NZ94H6 | | 63.40 | 1.01 | 0.24 | 64.20 | 1.86 | 0.44 |
| P3TK4W | | 58.11 | -4.28 | -1.02 | 58.24 | -4.10 | -0.98 |
| PBJ66N | | 58.79 | -3.60 | -0.86 | 59.59 | -2.75 | -0.66 |
| PFXVC6 | | 57.60 | -4.79 | -1.14 | 55.50 | -6.84 | -1.64 |
| PNBPPL | | 60.77 | -1.62 | -0.38 | 59.65 | -2.69 | -0.64 |
| Q4LLQZ | | 66.63 | 4.24 | 1.01 | 65.81 | 3.47 | 0.83 |
| Q6DTQ4 | | 63.00 | 0.61 | 0.15 | 63.80 | 1.46 | 0.35 |
| RRJVX4 | | 58.40 | -3.99 | -0.95 | 58.68 | -3.66 | -0.88 |
| TDEZE2 | | 68.97 | 6.59 | 1.57 | 69.44 | 7.10 | 1.70 |
| TUN2WA | | 63.52 | 1.13 | 0.27 | 63.64 | 1.30 | 0.31 |
| U6LWWQ | | 62.56 | 0.17 | 0.04 | 64.30 | 1.96 | 0.47 |
| UBAP2Y | X | 77.62 | 15.23 | 3.63 | 78.94 | 16.60 | 3.97 |
| V3P9MU | | 63.04 | 0.66 | 0.16 | 63.48 | 1.14 | 0.27 |
| VLXBGT | | 56.26 | -6.13 | -1.46 | 54.18 | -8.17 | -1.95 |
| XCLVMP | | 59.92 | -2.47 | -0.59 | 57.98 | -4.36 | -1.04 |
| YCL4GU | | 62.20 | -0.19 | -0.04 | 61.90 | -0.44 | -0.11 |


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| WebCode | Data Flag | Sample RP17 Lab Mean | Sample RP17 Diff from Grand Mean | Sample RP17 CPV | Sample RP18 Lab Mean | Sample RP18 Diff from Grand Mean | Sample RP18 CPV |
|---|---|---|---|---|---|---|---|
| YK3KCP | | 66.40 | 4.01 | 0.96 | 63.60 | 1.26 | 0.30 |
| YLA4TX | | 65.68 | 3.30 | 0.79 | 64.12 | 1.77 | 0.42 |
| ZRULKE | * | 72.34 | 9.95 | 2.37 | 69.61 | 7.26 | 1.74 |

| Summary Statistics | Sample RP17 | Sample RP18 |
|---|---|---|
| **Grand Means** | 62.39 Grams | 62.34 Grams |
| **Stnd Dev Btwn Labs** | 4.20 Grams | 4.18 Grams |

Statistics based on 41 of 43 reporting participants.

## Comments on Assigned Data Flags for Test #3113

CDDKZJ (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample RP17.

UBAP2Y (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.


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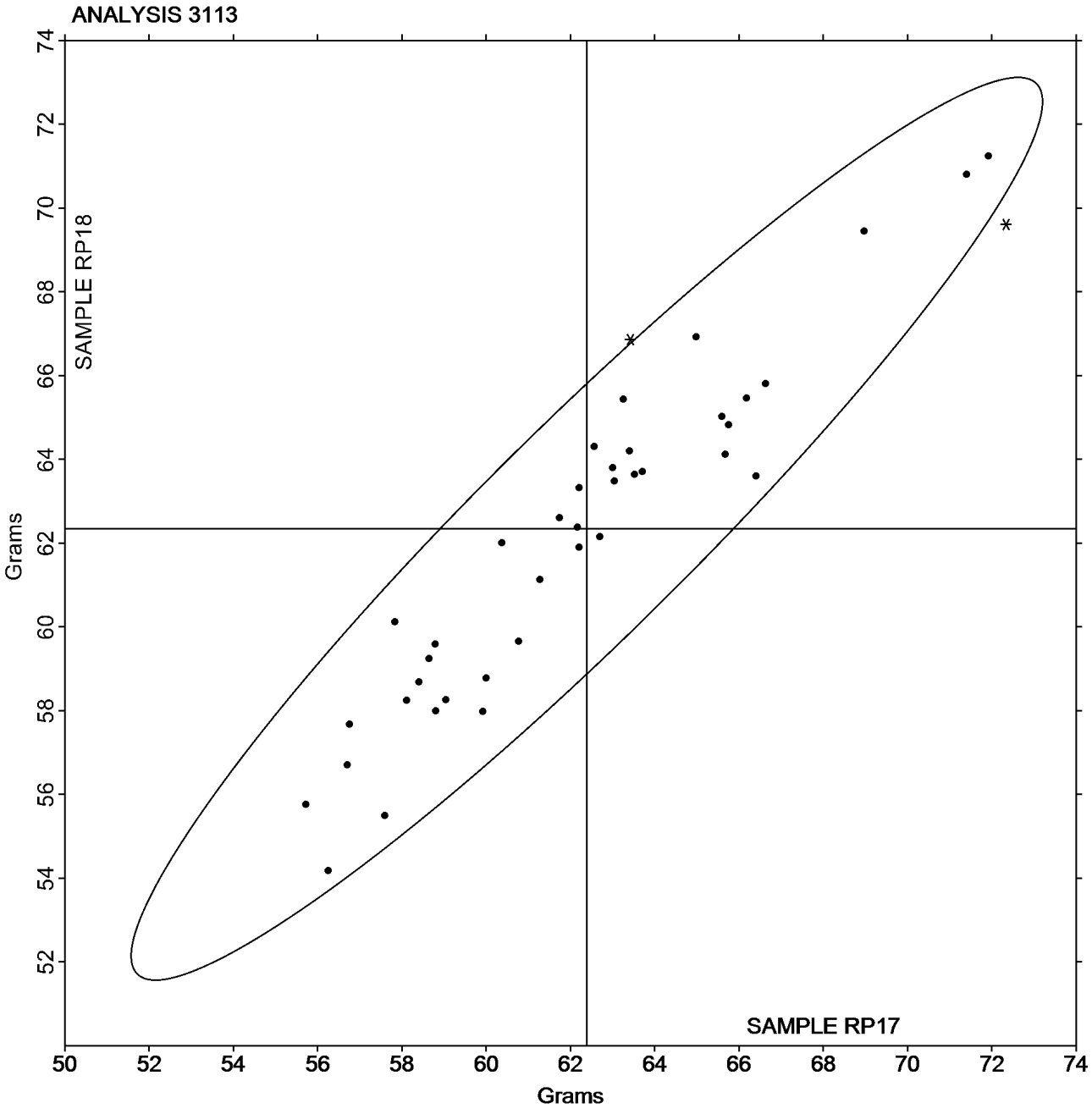
**Grand Mean Sample RP17 = 62.385 Grams**

**Grand Mean Sample RP18 = 62.345 Grams**





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| WebCode | Data Flag | Sample NP17 Lab Mean | Sample NP17 Diff from Grand Mean | Sample NP17 CPV | Sample NP18 Lab Mean | Sample NP18 Diff from Grand Mean | Sample NP18 CPV |
|---|---|---|---|---|---|---|---|
| 2FEQ7Z | | 6.848 | 0.008 | 0.02 | 6.997 | 0.164 | 0.35 |
| 2JHMRP | | 7.287 | 0.447 | 0.96 | 7.159 | 0.327 | 0.69 |
| 3ANZXB | | 7.111 | 0.271 | 0.59 | 7.057 | 0.225 | 0.47 |
| 46TJ6G | | 7.574 | 0.734 | 1.58 | 7.397 | 0.565 | 1.19 |
| 494NRB | | 7.355 | 0.515 | 1.11 | 7.309 | 0.476 | 1.00 |
| 4GZEDK | | 7.000 | 0.160 | 0.35 | 6.991 | 0.159 | 0.33 |
| 4HT8BP | | 6.746 | -0.094 | -0.20 | 6.756 | -0.077 | -0.16 |
| 6VGR77 | * | 5.592 | -1.247 | -2.69 | 5.450 | -1.383 | -2.91 |
| 82W8VL | | 6.569 | -0.271 | -0.58 | 6.507 | -0.325 | -0.68 |
| 92RAZF | | 7.322 | 0.482 | 1.04 | 7.397 | 0.564 | 1.19 |
| 9ANUE6 | | 7.142 | 0.302 | 0.65 | 6.933 | 0.101 | 0.21 |
| 9NQBCJ | | 6.554 | -0.286 | -0.62 | 6.393 | -0.439 | -0.92 |
| ANHX2T | * | 5.810 | -1.030 | -2.22 | 5.507 | -1.325 | -2.79 |
| ARJ2TE | | 6.867 | 0.027 | 0.06 | 6.863 | 0.031 | 0.06 |
| CDDKZJ | | 6.763 | -0.077 | -0.17 | 6.872 | 0.040 | 0.08 |
| CYT6WJ | | 6.996 | 0.156 | 0.34 | 6.653 | -0.180 | -0.38 |
| DDNUHH | | 7.218 | 0.378 | 0.82 | 7.083 | 0.251 | 0.53 |
| DMGYFP | | 6.461 | -0.379 | -0.82 | 6.335 | -0.497 | -1.05 |
| EFUGT2 | | 6.212 | -0.628 | -1.36 | 6.121 | -0.712 | -1.50 |
| EJDLDH | | 7.793 | 0.953 | 2.06 | 7.789 | 0.957 | 2.01 |
| GGWB8N | * | 7.142 | 0.302 | 0.65 | 7.540 | 0.708 | 1.49 |
| GZAV7D | | 6.556 | -0.284 | -0.61 | 6.612 | -0.220 | -0.46 |
| HJLWJC | | 6.791 | -0.049 | -0.11 | 6.911 | 0.079 | 0.17 |
| HXWMCJ | | 6.546 | -0.294 | -0.63 | 6.835 | 0.003 | 0.01 |
| HZ9BX4 | | 6.412 | -0.428 | -0.92 | 6.537 | -0.295 | -0.62 |
| JBHEH6 | | 7.065 | 0.225 | 0.49 | 6.741 | -0.091 | -0.19 |
| JQR922 | | 6.979 | 0.139 | 0.30 | 7.014 | 0.181 | 0.38 |
| L9TKZV | | 6.539 | -0.301 | -0.65 | 6.660 | -0.172 | -0.36 |
| LVER2M | | 6.858 | 0.018 | 0.04 | 7.047 | 0.215 | 0.45 |
| MDE493 | | 6.847 | 0.007 | 0.02 | 6.704 | -0.128 | -0.27 |
| NKRDBP | | 6.714 | -0.126 | -0.27 | 6.505 | -0.327 | -0.69 |
| NZ94H6 | | 7.660 | 0.820 | 1.77 | 7.559 | 0.727 | 1.53 |
| P3TK4W | | 6.283 | -0.557 | -1.20 | 6.283 | -0.550 | -1.16 |
| PNBPPL | | 7.114 | 0.274 | 0.59 | 7.246 | 0.414 | 0.87 |
| Q4LLQZ | | 6.749 | -0.091 | -0.20 | 6.724 | -0.108 | -0.23 |
| Q6DTQ4 | | 7.283 | 0.443 | 0.96 | 7.330 | 0.497 | 1.05 |
| QEZU4R | | 6.663 | -0.177 | -0.38 | 6.795 | -0.037 | -0.08 |
| RRJVX4 | | 6.450 | -0.390 | -0.84 | 6.570 | -0.262 | -0.55 |
| TDEZE2 | | 6.394 | -0.446 | -0.96 | 6.530 | -0.302 | -0.64 |
| TUN2WA | | 6.518 | -0.322 | -0.70 | 6.838 | 0.006 | 0.01 |


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# Paper & Paperboard Interlaboratory Testing Program

## Analysis 3115

## Tensile Breaking Strength - Printing Papers

## TAPPI Official Test Method T494

| WebCode | Data Flag | Sample NP17 Lab Mean | Sample NP17 Diff from Grand Mean | Sample NP17 CPV | Sample NP18 Lab Mean | Sample NP18 Diff from Grand Mean | Sample NP18 CPV |
|---|---|---|---|---|---|---|---|
| U22AXC | | 6.649 | -0.191 | -0.41 | 6.679 | -0.153 | -0.32 |
| U6LWWQ | | 6.521 | -0.319 | -0.69 | 6.410 | -0.423 | -0.89 |
| UBAP2Y | | 7.724 | 0.884 | 1.91 | 7.667 | 0.835 | 1.76 |
| VLXBGT | | 7.210 | 0.370 | 0.80 | 6.990 | 0.158 | 0.33 |
| X4TM3Y | | 6.544 | -0.296 | -0.64 | 6.749 | -0.084 | -0.18 |
| XCLVMP | | 7.671 | 0.831 | 1.79 | 7.606 | 0.773 | 1.63 |
| YK3KCP | | 6.714 | -0.126 | -0.27 | 6.799 | -0.033 | -0.07 |
| YLA4TX | | 6.355 | -0.485 | -1.05 | 6.432 | -0.400 | -0.84 |
| ZRULKE | | 6.984 | 0.144 | 0.31 | 6.905 | 0.073 | 0.15 |

| Summary Statistics | Sample NP17 | Sample NP18 |
|---|---|---|
| **Grand Means** | 6.84 kN/m | 6.83 kN/m |
| **Stnd Dev Btwn Labs** | 0.46 kN/m | 0.47 kN/m |

Statistics based on 49 of 49 reporting participants.


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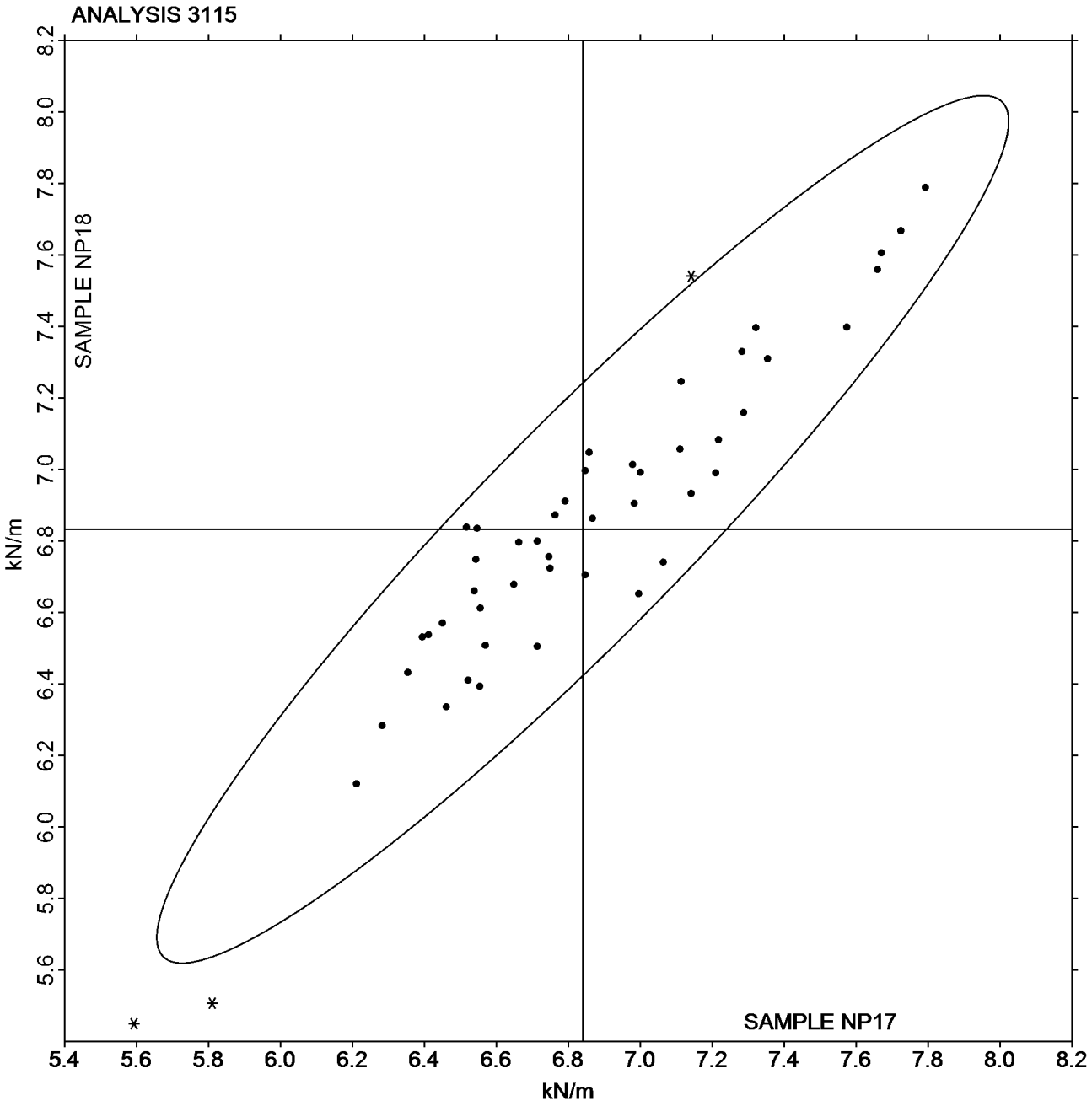
**Grand Mean Sample NP17 = 6.8399 kN/m**

**Grand Mean Sample NP18 = 6.8324 kN/m**





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| WebCode | Data Flag | Sample NP17 Lab Mean | Sample NP17 Diff from Grand Mean | Sample NP17 CPV | Sample NP18 Lab Mean | Sample NP18 Diff from Grand Mean | Sample NP18 CPV |
|---|---|---|---|---|---|---|---|
| 2FEQ7Z | | 111.78 | 15.66 | 1.94 | 113.62 | 17.71 | 1.91 |
| 2JHMRP | | 111.65 | 15.53 | 1.92 | 107.29 | 11.38 | 1.23 |
| 3ANZXB | | 89.31 | -6.82 | -0.84 | 86.45 | -9.46 | -1.02 |
| 494NRB | | 89.04 | -7.08 | -0.88 | 85.56 | -10.35 | -1.12 |
| 4GZEDK | | 100.79 | 4.67 | 0.58 | 105.44 | 9.53 | 1.03 |
| 6VGR77 | X | 61.51 | -34.61 | -4.28 | 56.94 | -38.97 | -4.20 |
| 82W8VL | | 86.37 | -9.75 | -1.21 | 85.84 | -10.07 | -1.09 |
| 92RAZF | | 83.62 | -12.50 | -1.54 | 84.02 | -11.89 | -1.28 |
| 9ANUE6 | | 97.76 | 1.64 | 0.20 | 90.53 | -5.38 | -0.58 |
| 9NQBCJ | | 99.66 | 3.54 | 0.44 | 91.12 | -4.79 | -0.52 |
| ANHX2T | | 84.94 | -11.18 | -1.38 | 79.07 | -16.84 | -1.82 |
| ARJ2TE | | 106.31 | 10.19 | 1.26 | 112.86 | 16.95 | 1.83 |
| CYT6WJ | | 94.92 | -1.20 | -0.15 | 87.13 | -8.78 | -0.95 |
| DDNUHH | | 97.90 | 1.78 | 0.22 | 95.97 | 0.06 | 0.01 |
| EFUGT2 | | 88.29 | -7.83 | -0.97 | 85.84 | -10.07 | -1.09 |
| EJDLDH | | 102.96 | 6.84 | 0.85 | 104.99 | 9.08 | 0.98 |
| GGWB8N | | 87.50 | -8.62 | -1.07 | 97.49 | 1.58 | 0.17 |
| GZAV7D | | 88.94 | -7.18 | -0.89 | 87.54 | -8.38 | -0.90 |
| HXWMCJ | | 97.15 | 1.03 | 0.13 | 99.87 | 3.96 | 0.43 |
| HZ9BX4 | | 97.90 | 1.78 | 0.22 | 101.47 | 5.56 | 0.60 |
| JBHEH6 | | 95.58 | -0.54 | -0.07 | 95.42 | -0.49 | -0.05 |
| JQR922 | | 103.62 | 7.50 | 0.93 | 103.03 | 7.12 | 0.77 |
| L9TKZV | | 96.12 | 0.00 | 0.00 | 95.20 | -0.71 | -0.08 |
| LVER2M | | 92.88 | -3.24 | -0.40 | 102.14 | 6.23 | 0.67 |
| MDE493 | | 93.79 | -2.33 | -0.29 | 90.89 | -5.02 | -0.54 |
| NKRDBP | | 102.57 | 6.45 | 0.80 | 94.74 | -1.17 | -0.13 |
| NZ94H6 | | 99.45 | 3.33 | 0.41 | 96.02 | 0.11 | 0.01 |
| PNBPPL | | 87.02 | -9.10 | -1.13 | 89.47 | -6.45 | -0.70 |
| Q4LLQZ | | 95.67 | -0.45 | -0.06 | 95.90 | -0.01 | 0.00 |
| Q6DTQ4 | | 82.28 | -13.84 | -1.71 | 85.19 | -10.72 | -1.16 |
| RRJVX4 | | 89.45 | -6.67 | -0.82 | 89.71 | -6.20 | -0.67 |
| TDEZE2 | | 89.61 | -6.51 | -0.81 | 95.30 | -0.61 | -0.07 |
| TUN2WA | | 105.20 | 9.08 | 1.12 | 112.17 | 16.26 | 1.75 |
| U22AXC | | 101.38 | 5.26 | 0.65 | 99.80 | 3.89 | 0.42 |
| U6LWWQ | | 101.40 | 5.28 | 0.65 | 98.07 | 2.16 | 0.23 |
| UBAP2Y | | 112.18 | 16.05 | 1.98 | 110.65 | 14.74 | 1.59 |
| VLXBGT | | 98.60 | 2.48 | 0.31 | 90.00 | -5.91 | -0.64 |
| X4TM3Y | | 91.12 | -5.00 | -0.62 | 93.47 | -2.44 | -0.26 |
| XCLVMP | | 106.23 | 10.11 | 1.25 | 115.61 | 19.70 | 2.13 |
| YLA4TX | | 83.06 | -13.06 | -1.61 | 84.53 | -11.38 | -1.23 |


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| | | Sample NP17 | | | Sample NP18 | | |
|---|---|---|---|---|---|---|---|
| WebCode | Data Flag | Lab Mean | Diff from Grand Mean | CPV | Lab Mean | Diff from Grand Mean | CPV |
| ZRULKE | | 100.85 | 4.72 | 0.58 | 97.01 | 1.10 | 0.12 |

| Summary Statistics | Sample NP17 | Sample NP18 |
|---|---|---|
| Grand Means | 96.12 Joules/sq m | 95.91 Joules/sq m |
| Stnd Dev Btwn Labs | 8.09 Joules/sq m | 9.27 Joules/sq m |

Statistics based on 40 of 41 reporting participants.

**Comments on Assigned Data Flags for Test #3116**

6VGR77 (X) - Data for both samples are low. Possible Systematic Error.


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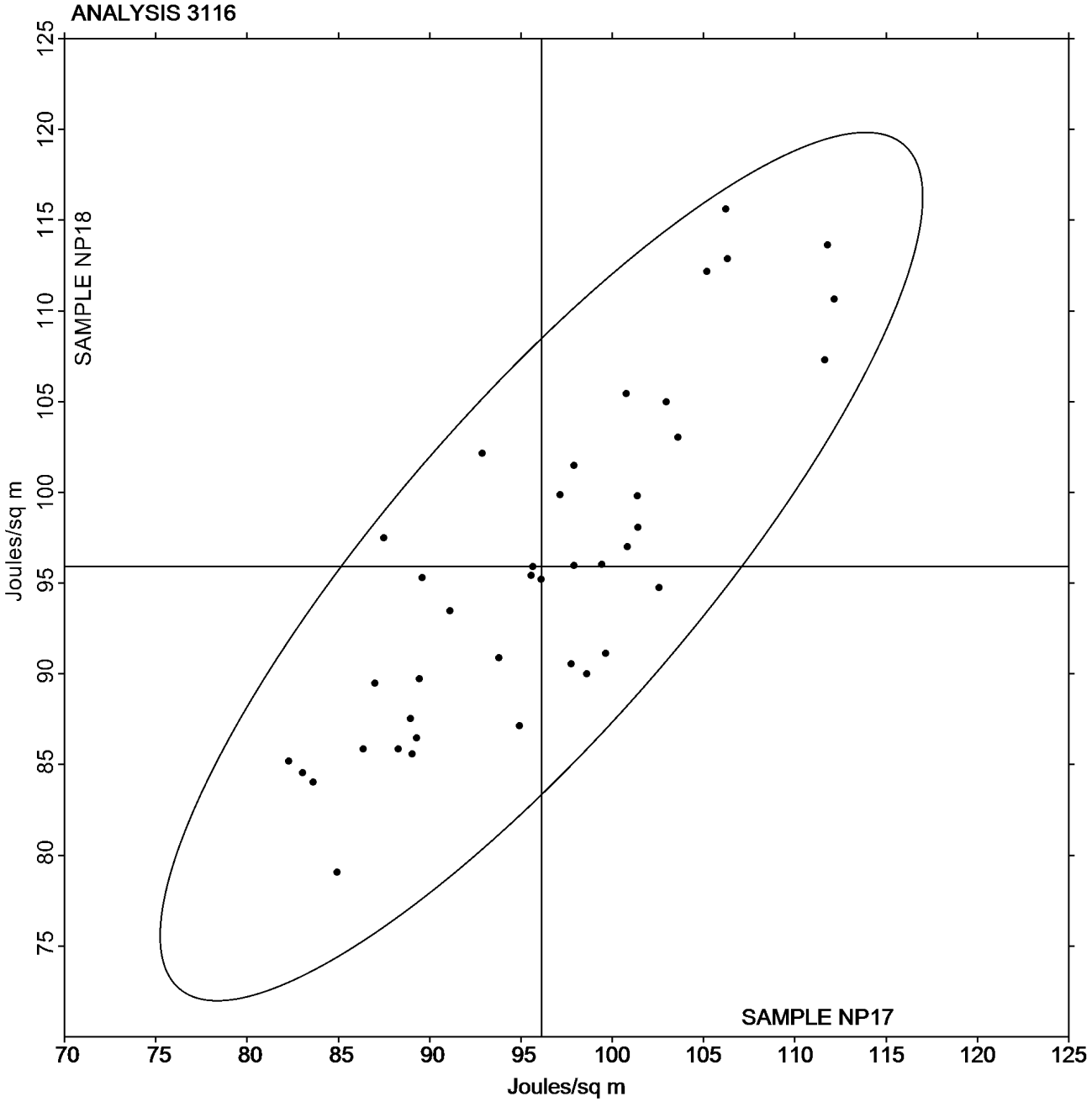
**Grand Mean Sample NP17 = 96.120 Joules/sq m**

**Grand Mean Sample NP18 = 95.910 Joules/sq m**





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| WebCode | Data Flag | Sample NP17 Lab Mean | Sample NP17 Diff from Grand Mean | Sample NP17 CPV | Sample NP18 Lab Mean | Sample NP18 Diff from Grand Mean | Sample NP18 CPV |
|---|---|---|---|---|---|---|---|
| 2FEQ7Z | | 2.588 | 0.410 | 1.85 | 2.605 | 0.434 | 1.82 |
| 2JHMRP | | 2.361 | 0.182 | 0.83 | 2.278 | 0.107 | 0.45 |
| 3ANZXB | | 1.949 | -0.230 | -1.04 | 1.899 | -0.272 | -1.14 |
| 494NRB | | 1.848 | -0.331 | -1.50 | 1.789 | -0.382 | -1.60 |
| 4GZEDK | | 2.374 | 0.195 | 0.88 | 2.417 | 0.246 | 1.03 |
| 6VGR77 | | 1.767 | -0.412 | -1.87 | 1.680 | -0.491 | -2.06 |
| 82W8VL | | 2.009 | -0.170 | -0.77 | 2.004 | -0.167 | -0.70 |
| 92RAZF | | 1.810 | -0.369 | -1.67 | 1.799 | -0.372 | -1.56 |
| 9ANUE6 | | 2.189 | 0.010 | 0.05 | 2.100 | -0.071 | -0.30 |
| 9NQBCJ | | 2.415 | 0.236 | 1.07 | 2.262 | 0.091 | 0.38 |
| ANHX2T | | 2.409 | 0.230 | 1.04 | 2.361 | 0.190 | 0.80 |
| ARJ2TE | | 2.414 | 0.235 | 1.07 | 2.524 | 0.353 | 1.48 |
| CDDKZJ | | 2.160 | -0.019 | -0.08 | 2.150 | -0.021 | -0.09 |
| CYT6WJ | | 2.118 | -0.061 | -0.27 | 2.055 | -0.116 | -0.49 |
| DDNUHH | | 2.123 | -0.056 | -0.25 | 2.123 | -0.048 | -0.20 |
| DMGYFP | X | 9.462 | 7.283 | 32.97 | 9.474 | 7.303 | 30.64 |
| EFUGT2 | | 2.156 | -0.023 | -0.10 | 2.128 | -0.043 | -0.18 |
| EJDLDH | | 1.986 | -0.193 | -0.87 | 2.012 | -0.159 | -0.67 |
| GGWB8N | | 1.982 | -0.197 | -0.89 | 2.087 | -0.084 | -0.35 |
| GZAV7D | | 2.082 | -0.097 | -0.44 | 2.036 | -0.135 | -0.57 |
| HXWMCJ | | 2.257 | 0.078 | 0.35 | 2.243 | 0.072 | 0.30 |
| HZ9BX4 | | 2.344 | 0.165 | 0.75 | 2.381 | 0.210 | 0.88 |
| JBHEH6 | | 1.891 | -0.288 | -1.30 | 1.988 | -0.183 | -0.77 |
| JQR922 | | 2.307 | 0.128 | 0.58 | 2.279 | 0.108 | 0.45 |
| L9TKZV | | 2.270 | 0.091 | 0.41 | 2.240 | 0.069 | 0.29 |
| LVER2M | | 2.263 | 0.084 | 0.38 | 2.407 | 0.236 | 0.99 |
| MDE493 | | 2.074 | -0.105 | -0.47 | 1.981 | -0.190 | -0.80 |
| NKRDBP | | 2.331 | 0.152 | 0.69 | 2.209 | 0.038 | 0.16 |
| NZ94H6 | | 2.020 | -0.159 | -0.72 | 1.985 | -0.186 | -0.78 |
| P3TK4W | | 2.106 | -0.073 | -0.33 | 2.053 | -0.118 | -0.49 |
| PNBPPL | | 1.886 | -0.293 | -1.32 | 1.901 | -0.270 | -1.13 |
| Q4LLQZ | | 2.160 | -0.019 | -0.08 | 2.164 | -0.007 | -0.03 |
| Q6DTQ4 | * | 2.738 | 0.559 | 2.53 | 2.779 | 0.608 | 2.55 |
| RRJVX4 | | 2.200 | 0.021 | 0.10 | 2.190 | 0.019 | 0.08 |
| TDEZE2 | | 2.361 | 0.182 | 0.83 | 2.435 | 0.264 | 1.11 |
| TUN2WA | | 2.607 | 0.428 | 1.94 | 2.664 | 0.493 | 2.07 |
| U22AXC | | 2.354 | 0.175 | 0.79 | 2.297 | 0.126 | 0.53 |
| U6LWWQ | | 2.406 | 0.227 | 1.03 | 2.362 | 0.191 | 0.80 |
| UBAP2Y | | 2.028 | -0.151 | -0.68 | 2.015 | -0.156 | -0.65 |
| VLXBGT | | 1.920 | -0.259 | -1.17 | 1.810 | -0.361 | -1.51 |


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| WebCode | Data Flag | Sample NP17 Lab Mean | Sample NP17 Diff from Grand Mean | Sample NP17 CPV | Sample NP18 Lab Mean | Sample NP18 Diff from Grand Mean | Sample NP18 CPV |
|---|---|---|---|---|---|---|---|
| X4TM3Y | | 2.049 | -0.130 | -0.59 | 2.167 | -0.004 | -0.02 |
| XCLVMP | | 2.171 | -0.008 | -0.03 | 2.321 | 0.150 | 0.63 |
| YLA4TX | | 1.985 | -0.194 | -0.88 | 2.001 | -0.170 | -0.71 |
| ZRULKE | | 2.216 | 0.037 | 0.17 | 2.162 | -0.009 | -0.04 |

| Summary Statistics | Sample NP17 | Sample NP18 |
|---|---|---|
| **Grand Means** | 2.18 Percent | 2.17 Percent |
| **Stnd Dev Btwn Labs** | 0.22 Percent | 0.24 Percent |

Statistics based on 43 of 44 reporting participants.

**Comments on Assigned Data Flags for Test #3117**

DMGYFP (X) - Extreme Data.


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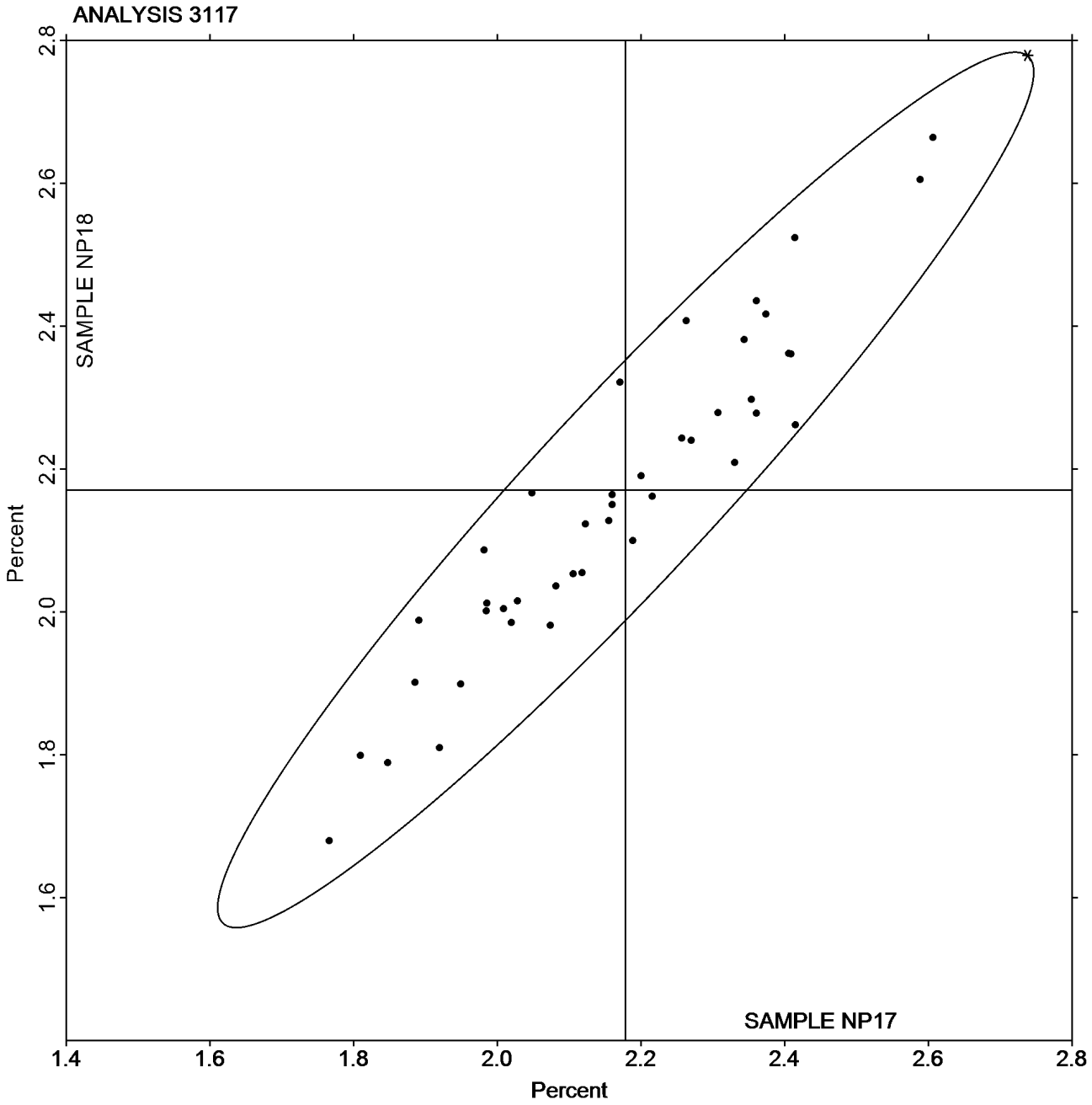
**Grand Mean Sample NP17 = 2.1787 Percent**

**Grand Mean Sample NP18 = 2.1707 Percent**





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| WebCode | Data Flag | Sample PP17 Lab Mean | Sample PP17 Diff from Grand Mean | Sample PP17 CPV | Sample PP18 Lab Mean | Sample PP18 Diff from Grand Mean | Sample PP18 CPV |
|---|---|---|---|---|---|---|---|
| 2FEQ7Z | | 17.02 | -0.33 | -0.34 | 18.04 | -0.60 | -0.60 |
| 2JHMRP | | 16.73 | -0.62 | -0.64 | 18.27 | -0.37 | -0.37 |
| 46TJ6G | | 17.35 | 0.00 | 0.00 | 18.95 | 0.30 | 0.30 |
| 4GZEDK | | 17.14 | -0.21 | -0.22 | 18.61 | -0.03 | -0.03 |
| 6VGR77 | | 16.73 | -0.62 | -0.64 | 18.04 | -0.60 | -0.60 |
| 87PBKJ | | 17.34 | -0.01 | -0.01 | 18.60 | -0.04 | -0.04 |
| 9NQBCJ | | 18.63 | 1.28 | 1.32 | 20.40 | 1.76 | 1.75 |
| AQP27C | | 17.70 | 0.35 | 0.36 | 19.54 | 0.90 | 0.89 |
| B8B2F9 | | 18.60 | 1.25 | 1.29 | 19.00 | 0.36 | 0.36 |
| BH974E | | 17.77 | 0.42 | 0.43 | 18.83 | 0.19 | 0.19 |
| BU62NP | | 17.01 | -0.34 | -0.35 | 17.82 | -0.82 | -0.82 |
| C96ZE8 | | 17.86 | 0.51 | 0.53 | 18.79 | 0.15 | 0.15 |
| CDDKZJ | | 15.51 | -1.84 | -1.90 | 16.75 | -1.89 | -1.89 |
| DBNEFL | | 16.69 | -0.66 | -0.68 | 17.85 | -0.79 | -0.79 |
| DMGYFP | * | 17.38 | 0.03 | 0.03 | 17.12 | -1.52 | -1.52 |
| E9VZ73 | | 15.74 | -1.61 | -1.66 | 16.57 | -2.07 | -2.07 |
| F9936L | | 15.09 | -2.26 | -2.33 | 16.20 | -2.44 | -2.43 |
| JBHEH6 | | 17.14 | -0.21 | -0.22 | 18.68 | 0.04 | 0.04 |
| LG2ET3 | | 18.65 | 1.30 | 1.34 | 19.61 | 0.97 | 0.96 |
| NKRDBP | | 18.94 | 1.59 | 1.64 | 19.74 | 1.10 | 1.09 |
| NRFVVT | | 17.13 | -0.22 | -0.23 | 18.37 | -0.27 | -0.27 |
| P3TK4W | | 17.14 | -0.21 | -0.22 | 18.71 | 0.07 | 0.07 |
| PFXVC6 | | 16.75 | -0.60 | -0.62 | 18.71 | 0.07 | 0.07 |
| Q6DTQ4 | | 16.47 | -0.88 | -0.91 | 17.52 | -1.12 | -1.12 |
| RRJVX4 | | 15.63 | -1.72 | -1.77 | 17.05 | -1.59 | -1.59 |
| TDEZE2 | | 19.27 | 1.92 | 1.98 | 20.36 | 1.72 | 1.71 |
| TTUXJ3 | | 17.66 | 0.31 | 0.32 | 18.84 | 0.20 | 0.20 |
| TUN2WA | | 19.14 | 1.79 | 1.85 | 19.52 | 0.88 | 0.88 |
| U22AXC | | 18.11 | 0.76 | 0.78 | 19.79 | 1.15 | 1.14 |
| U2H8PB | | 17.94 | 0.59 | 0.60 | 19.28 | 0.63 | 0.63 |
| U6LWWQ | | 17.35 | -0.01 | -0.01 | 19.08 | 0.44 | 0.44 |
| UBAP2Y | | 18.77 | 1.42 | 1.46 | 20.45 | 1.81 | 1.80 |
| VGRJC2 | | 17.49 | 0.14 | 0.14 | 19.02 | 0.38 | 0.38 |
| VRR3YM | | 17.07 | -0.28 | -0.29 | 18.54 | -0.10 | -0.10 |
| VU2AD2 | | 16.84 | -0.51 | -0.53 | 19.46 | 0.82 | 0.81 |
| XCLVMP | | 17.01 | -0.34 | -0.35 | 19.26 | 0.62 | 0.61 |
| YCL4GU | | 18.05 | 0.70 | 0.72 | 18.79 | 0.15 | 0.15 |
| YK3KCP | | 17.80 | 0.45 | 0.46 | 19.10 | 0.46 | 0.45 |
| YLA4TX | | 16.69 | -0.66 | -0.68 | 18.36 | -0.28 | -0.28 |
| YPUQRD | | 16.70 | -0.65 | -0.67 | 18.11 | -0.53 | -0.53 |


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| Summary Statistics | Sample PP17 | Sample PP18 |
|---|---|---|
| Grand Means | 17.35 sec/100 cc | 18.64 sec/100 cc |
| Stnd Dev Btwn Labs | 0.97 sec/100 cc | 1.00 sec/100 cc |

Statistics based on 40 of 40 reporting participants.


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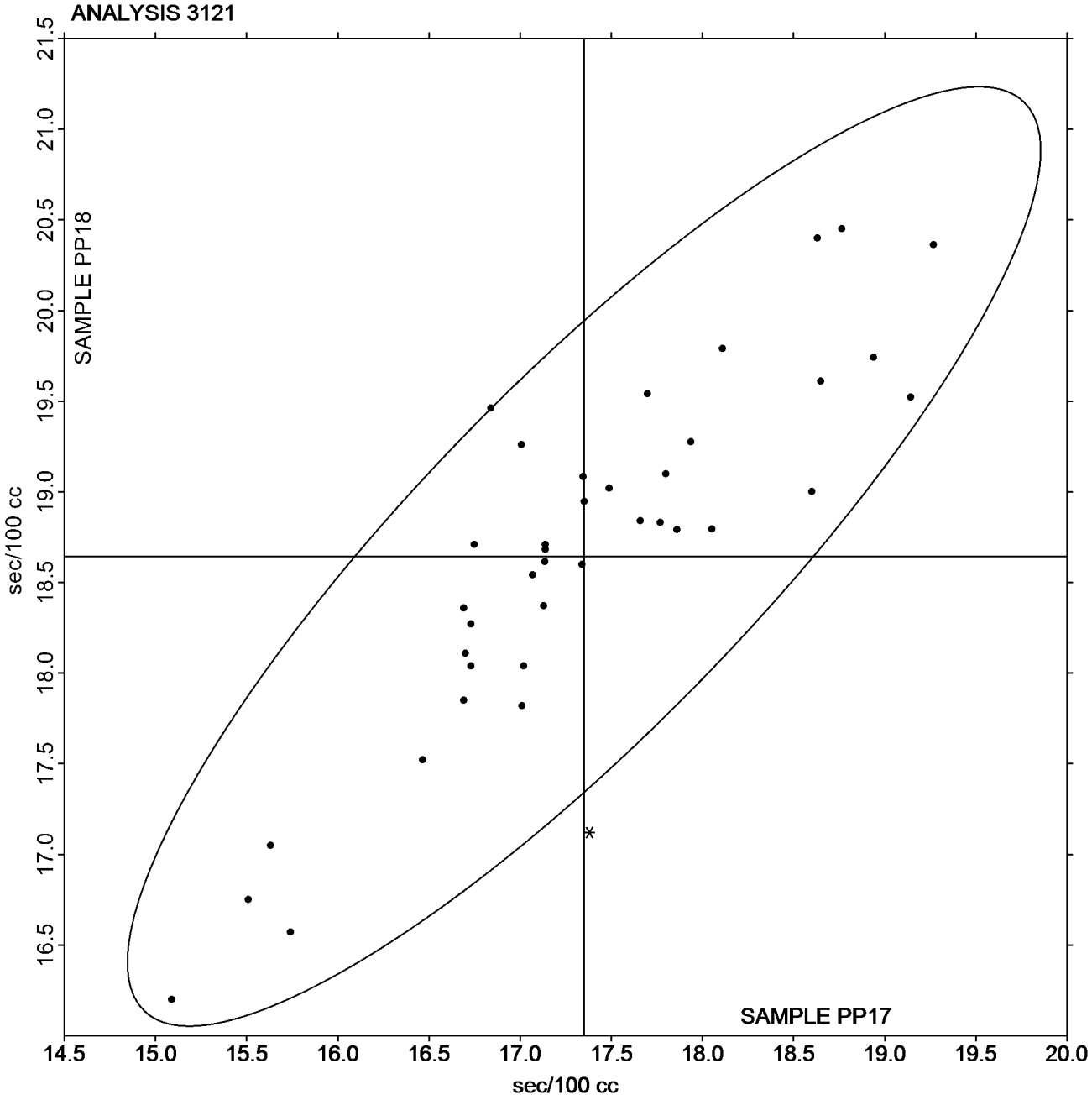
**Grand Mean Sample PP17 = 17.350 sec/100 cc**

**Grand Mean Sample PP18 = 18.643 sec/100 cc**





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# Paper & Paperboard Interlaboratory Testing Program

## Analysis 3123

## Porosity - Sheffield Type - Sheffield Units for 3/4 inch Diameter Orifice

## TAPPI Official Test Method T547

| WebCode | Data Flag | Sample PP17 Lab Mean | Sample PP17 Diff from Grand Mean | Sample PP17 CPV | Sample PP18 Lab Mean | Sample PP18 Diff from Grand Mean | Sample PP18 CPV |
|---|---|---|---|---|---|---|---|
| B8B2F9 | | 156.8 | -0.1 | -0.01 | 155.2 | 3.3 | 0.50 |
| HZ9BX4 | | 151.5 | -5.4 | -0.78 | 149.2 | -2.7 | -0.39 |
| NZ94H6 | | 166.7 | 9.8 | 1.42 | 159.2 | 7.3 | 1.09 |
| YCL4GU | | 152.6 | -4.3 | -0.62 | 143.8 | -8.0 | -1.19 |

| Summary Statistics | Sample PP17 | Sample PP18 |
|---|---|---|
| **Grand Means** | 156.90 Sheffield Units | 151.85 Sheffield Units |
| **Stnd Dev Btwn Labs** | 6.92 Sheffield Units | 6.76 Sheffield Units |

Statistics based on 4 of 4 reporting participants.


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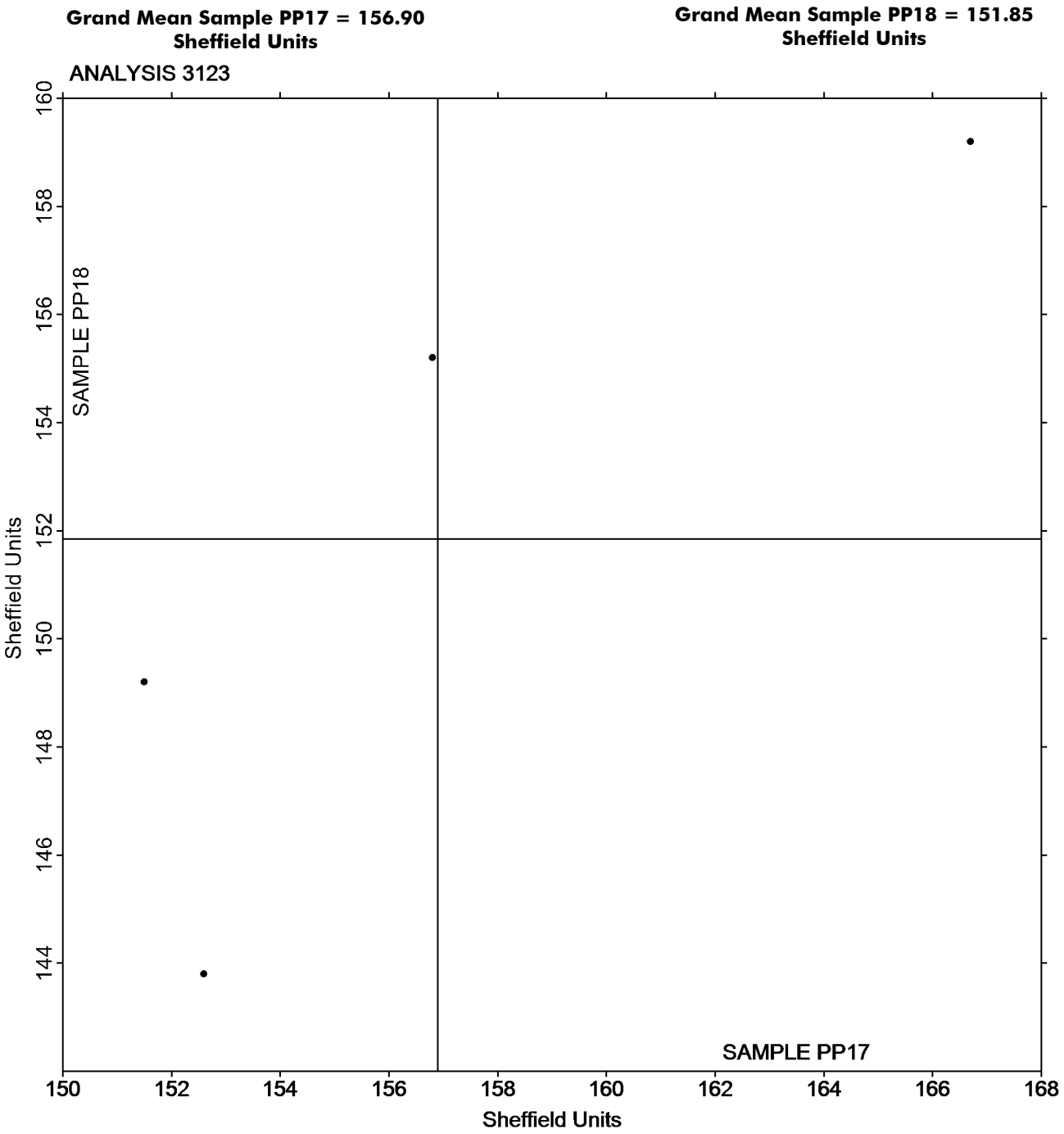


If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.


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# Paper & Paperboard Interlaboratory Testing Program

**Analysis 3131**

**Roughness - Print Surf Method - 2.5 to 6.0 Microns**

**TAPPI Official Test Method T555**

| WebCode | Data Flag | Sample PH17 Lab Mean | Sample PH17 Diff from Grand Mean | Sample PH17 CPV | Sample PH18 Lab Mean | Sample PH18 Diff from Grand Mean | Sample PH18 CPV |
|---|---|---|---|---|---|---|---|
| 82W8VL | | 4.155 | 0.174 | 0.68 | 4.248 | 0.158 | 0.81 |
| AHD2AF | | 4.194 | 0.213 | 0.83 | 4.121 | 0.031 | 0.16 |
| BWTBZB | | 3.793 | -0.188 | -0.73 | 4.194 | 0.104 | 0.53 |
| CYT6WJ | | 3.714 | -0.267 | -1.04 | 3.816 | -0.274 | -1.41 |
| EJDLDH | | 4.087 | 0.106 | 0.41 | 3.970 | -0.120 | -0.62 |
| NKRDBP | | 3.432 | -0.549 | -2.14 | 3.853 | -0.237 | -1.22 |
| Q6DTQ4 | | 4.091 | 0.110 | 0.43 | 4.095 | 0.005 | 0.02 |
| U2H8PB | | 4.229 | 0.248 | 0.97 | 4.232 | 0.142 | 0.73 |
| U6LWWQ | | 4.133 | 0.152 | 0.59 | 4.430 | 0.340 | 1.75 |
| YPUQRD | | 3.986 | 0.005 | 0.02 | 3.943 | -0.147 | -0.76 |

| Summary Statistics | Sample PH17 | Sample PH18 |
|---|---|---|
| **Grand Means** | 3.98 Microns | 4.09 Microns |
| **Stnd Dev Btwn Labs** | 0.26 Microns | 0.19 Microns |

Statistics based on 10 of 10 reporting participants.


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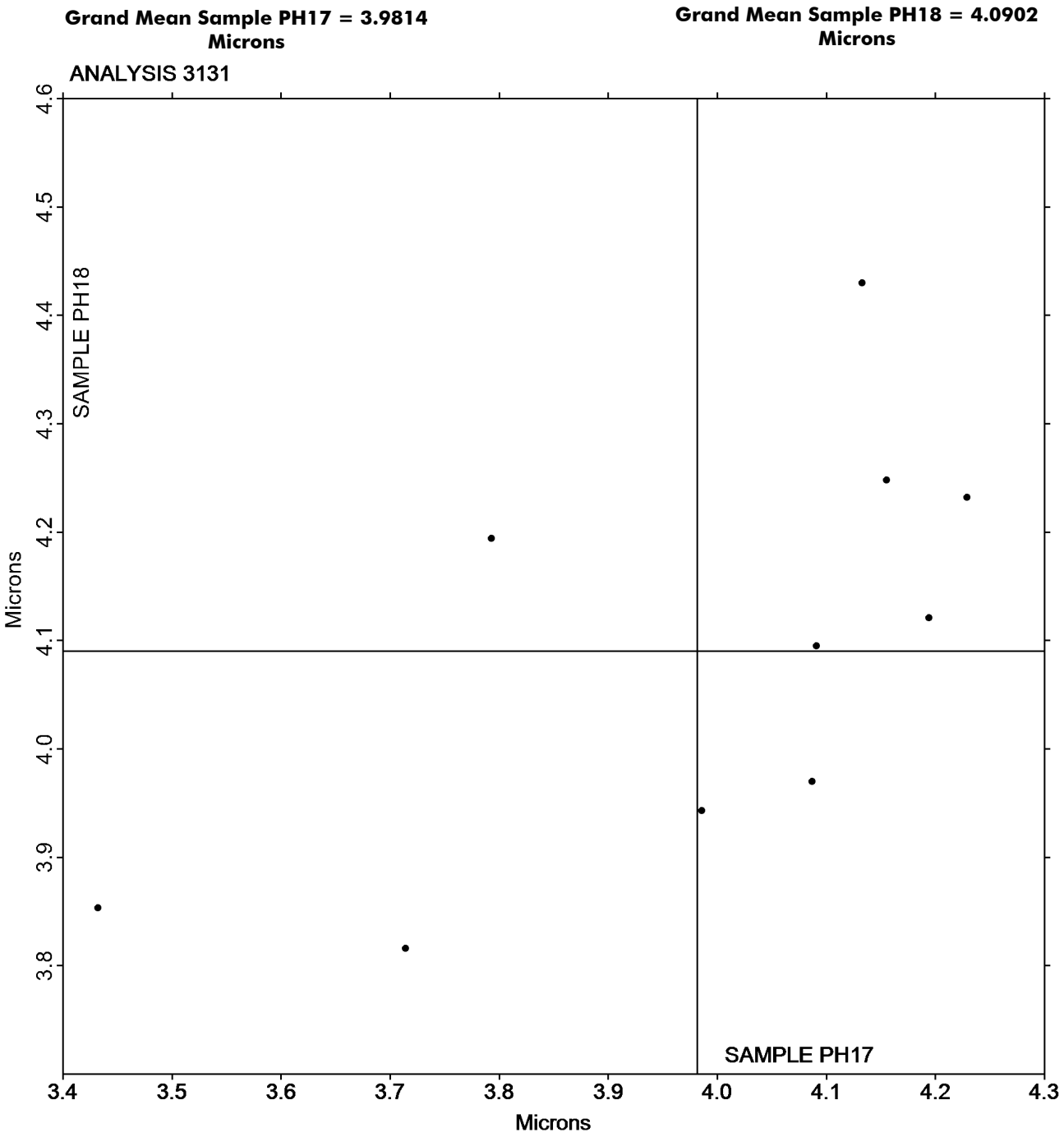


If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.


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# Paper & Paperboard Interlaboratory Testing Program

## Analysis 3133
## Roughness - Sheffield Type
## TAPPI Official Test Method T538

| WebCode | Data Flag | Sample SR17 Lab Mean | Sample SR17 Diff from Grand Mean | Sample SR17 CPV | Sample SR18 Lab Mean | Sample SR18 Diff from Grand Mean | Sample SR18 CPV |
|---|---|---|---|---|---|---|---|
| 2FEQ7Z | | 137.0 | 14.2 | 2.21 | 133.2 | 11.1 | 1.51 |
| 2JHMRP | X | 158.2 | 35.4 | 5.51 | 173.5 | 51.4 | 6.96 |
| 46TJ6G | | 121.8 | -1.0 | -0.15 | 119.9 | -2.2 | -0.30 |
| 494NRB | | 116.7 | -6.1 | -0.95 | 118.5 | -3.6 | -0.48 |
| 4GZEDK | | 120.1 | -2.7 | -0.42 | 118.5 | -3.5 | -0.48 |
| 6942TC | | 133.6 | 10.8 | 1.69 | 135.1 | 13.0 | 1.76 |
| 6M9Z44 | | 119.6 | -3.2 | -0.50 | 116.7 | -5.3 | -0.72 |
| 7DX6FN | | 121.5 | -1.3 | -0.20 | 119.8 | -2.3 | -0.31 |
| 82W8VL | | 119.2 | -3.6 | -0.56 | 117.6 | -4.5 | -0.61 |
| 8ZKEYX | X | 166.8 | 44.0 | 6.85 | 151.2 | 29.1 | 3.94 |
| 9NQBCJ | | 121.8 | -1.0 | -0.15 | 120.8 | -1.3 | -0.17 |
| AQP27C | | 111.5 | -11.3 | -1.75 | 110.0 | -12.1 | -1.63 |
| B8B2F9 | | 119.1 | -3.7 | -0.57 | 123.7 | 1.6 | 0.22 |
| CDDKZJ | X | 135.8 | 13.0 | 2.03 | 182.8 | 60.7 | 8.22 |
| DMGYFP | | 119.9 | -2.9 | -0.45 | 114.2 | -7.9 | -1.07 |
| F9936L | | 121.0 | -1.8 | -0.28 | 126.5 | 4.4 | 0.60 |
| JN7JLV | | 130.0 | 7.3 | 1.13 | 129.3 | 7.2 | 0.98 |
| KQTFPF | | 126.5 | 3.7 | 0.58 | 128.3 | 6.2 | 0.84 |
| LG2ET3 | | 110.3 | -12.5 | -1.94 | 110.8 | -11.3 | -1.53 |
| LVFKYV | X | 147.1 | 24.3 | 3.79 | 136.6 | 14.5 | 1.97 |
| NKRDBP | | 129.5 | 6.7 | 1.05 | 127.5 | 5.4 | 0.73 |
| NZ94H6 | | 121.6 | -1.2 | -0.18 | 123.0 | 0.9 | 0.13 |
| P3TK4W | | 132.8 | 10.0 | 1.56 | 126.0 | 3.9 | 0.53 |
| PFXVC6 | | 128.1 | 5.3 | 0.83 | 126.0 | 3.9 | 0.53 |
| Q6DTQ4 | | 132.0 | 9.2 | 1.43 | 128.5 | 6.4 | 0.87 |
| TDEZE2 | | 123.3 | 0.5 | 0.08 | 117.0 | -5.0 | -0.68 |
| TTUXJ3 | | 120.9 | -1.9 | -0.29 | 117.4 | -4.7 | -0.63 |
| TUN2WA | | 121.2 | -1.5 | -0.24 | 119.9 | -2.2 | -0.30 |
| U2H8PB | | 124.4 | 1.6 | 0.25 | 133.8 | 11.7 | 1.59 |
| U6LWWQ | | 129.7 | 6.9 | 1.08 | 131.1 | 9.1 | 1.22 |
| UBAP2Y | | 118.3 | -4.5 | -0.69 | 116.1 | -6.0 | -0.81 |
| VGRJC2 | | 126.2 | 3.4 | 0.53 | 125.9 | 3.8 | 0.52 |
| VYDXX7 | | 122.4 | -0.4 | -0.06 | 127.9 | 5.8 | 0.79 |
| XCLVMP | | 115.1 | -7.7 | -1.20 | 113.1 | -9.0 | -1.21 |
| XFA3FY | * | 122.4 | -0.4 | -0.06 | 108.9 | -13.2 | -1.79 |
| XGZ9RJ | | 110.1 | -12.7 | -1.97 | 109.6 | -12.5 | -1.69 |
| YCL4GU | | 117.6 | -5.2 | -0.81 | 126.4 | 4.3 | 0.59 |
| YK3KCP | | 129.4 | 6.6 | 1.03 | 133.4 | 11.3 | 1.53 |
| YPUQRD | X | 144.8 | 22.0 | 3.43 | 111.1 | -11.0 | -1.49 |
| YZQY6N | | 122.7 | -0.1 | -0.01 | 118.2 | -3.9 | -0.52 |


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| Summary Statistics | Sample SR17 | Sample SR18 |
|---|---|---|
| Grand Means | 122.78 Sheffield | 122.07 Sheffield |
| Stnd Dev Btwn Labs | 6.42 Sheffield | 7.39 Sheffield |

Statistics based on 35 of 40 reporting participants.

## Comments on Assigned Data Flags for Test #3133

YPUQRD (X) - Data for sample SR17 are high.

LVFKYV (X) - Data for sample SR17 are high.

CDDKZJ (X) - Extreme Data for Sample SR18.

2JHMRP (X) - Extreme Data.

8ZKEYX (X) - Extreme Data.


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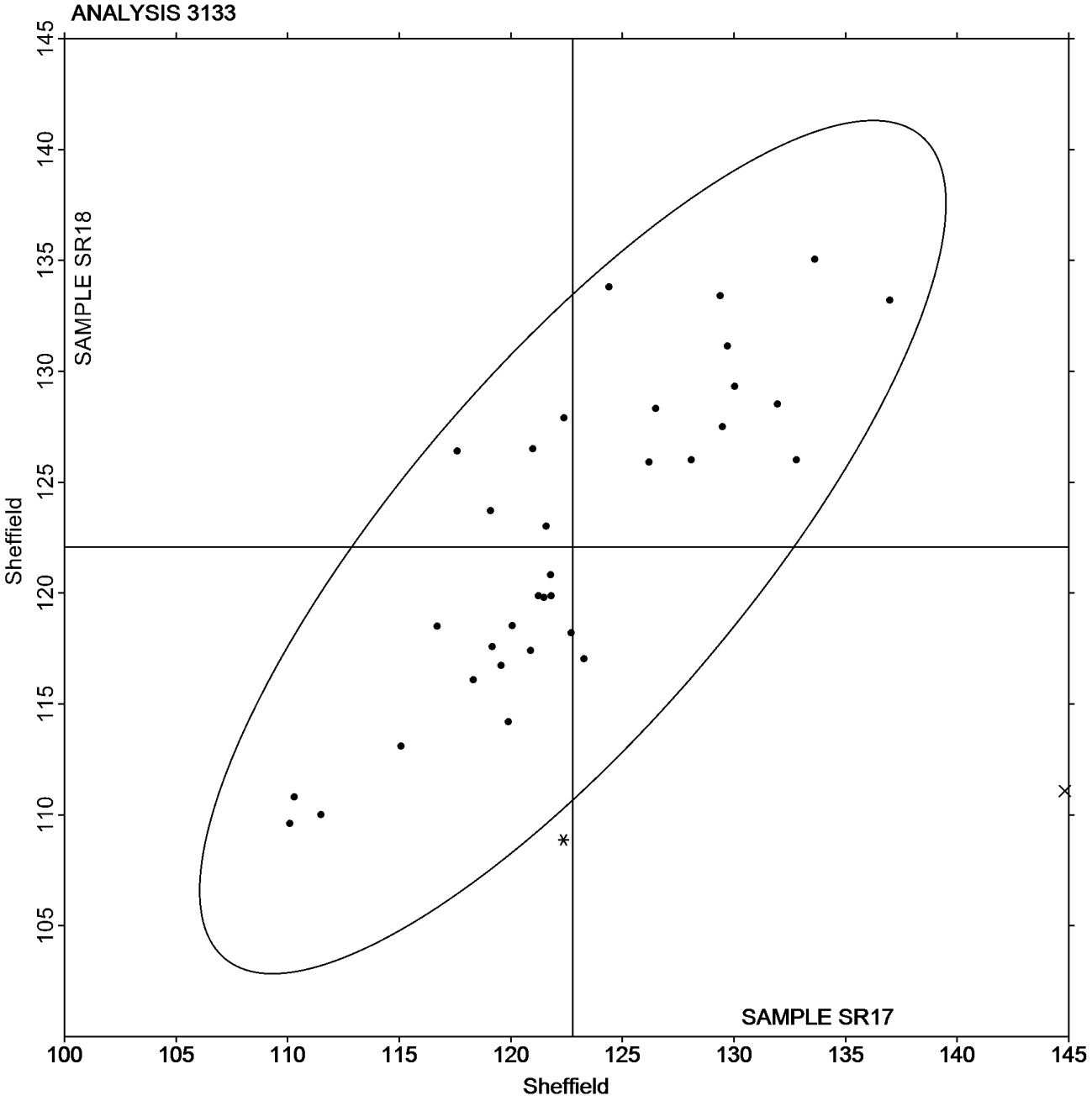
**Grand Mean Sample SR17 = 122.78**
**Sheffield**

**Grand Mean Sample SR18 = 122.07**
**Sheffield**





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# Paper & Paperboard Interlaboratory Testing Program

## Analysis 3135
## Grammage (Mass per Unit Area)
## TAPPI Official Test Method T410

| WebCode | Data Flag | Sample GM17 Lab Mean | Sample GM17 Diff from Grand Mean | Sample GM17 CPV | Sample GM18 Lab Mean | Sample GM18 Diff from Grand Mean | Sample GM18 CPV |
|---|---|---|---|---|---|---|---|
| 2JHMRP | | 104.5 | 0.8 | 1.34 | 90.86 | 1.03 | 2.01 |
| 4HT8BP | | 103.3 | -0.4 | -0.64 | 89.63 | -0.20 | -0.39 |
| 6BVXJQ | | 103.7 | 0.0 | 0.05 | 90.13 | 0.31 | 0.60 |
| 6VGR77 | | 103.8 | 0.0 | 0.08 | 89.92 | 0.09 | 0.18 |
| 9KHA2K | | 103.3 | -0.4 | -0.75 | 88.99 | -0.84 | -1.64 |
| 9NQBCJ | | 103.1 | -0.6 | -0.94 | 89.27 | -0.55 | -1.08 |
| ANHX2T | | 104.4 | 0.7 | 1.14 | 90.12 | 0.29 | 0.57 |
| ANZULF | * | 104.8 | 1.1 | 1.90 | 89.46 | -0.37 | -0.72 |
| BF3G27 | | 103.4 | -0.3 | -0.55 | 89.46 | -0.37 | -0.72 |
| DMGYFP | | 104.9 | 1.2 | 2.11 | 90.10 | 0.27 | 0.53 |
| F4D98K | X | 69.1 | -34.6 | -58.70 | 60.07 | -29.76 | -58.07 |
| GGWB8N | | 104.0 | 0.3 | 0.57 | 90.71 | 0.88 | 1.71 |
| GZAV7D | | 104.0 | 0.3 | 0.46 | 90.15 | 0.32 | 0.62 |
| HZ9BX4 | | 103.1 | -0.6 | -0.94 | 89.33 | -0.50 | -0.97 |
| L9TKZV | | 103.8 | 0.1 | 0.14 | 90.20 | 0.37 | 0.73 |
| LFPHMX | | 104.0 | 0.3 | 0.56 | 90.07 | 0.24 | 0.47 |
| MDE493 | | 103.2 | -0.5 | -0.78 | 89.48 | -0.35 | -0.68 |
| NZ94H6 | | 103.2 | -0.6 | -0.93 | 88.78 | -1.05 | -2.04 |
| P3TK4W | | 103.2 | -0.5 | -0.85 | 89.84 | 0.01 | 0.02 |
| RRJVX4 | | 103.2 | -0.5 | -0.80 | 90.20 | 0.37 | 0.73 |
| V3P9MU | | 103.4 | -0.3 | -0.46 | 89.56 | -0.27 | -0.53 |
| VRR3YM | | 103.8 | 0.1 | 0.10 | 89.81 | -0.01 | -0.03 |
| X2PKMV | | 103.6 | -0.1 | -0.23 | 90.50 | 0.68 | 1.32 |
| X4TM3Y | | 102.6 | -1.1 | -1.89 | 89.35 | -0.48 | -0.93 |
| YCL4GU | | 103.6 | -0.1 | -0.18 | 89.56 | -0.27 | -0.53 |
| YK3KCP | | 104.6 | 0.9 | 1.49 | 90.22 | 0.39 | 0.77 |

| Summary Statistics | Sample GM17 | Sample GM18 |
|---|---|---|
| **Grand Means** | 103.70 g/sq m | 89.83 g/sq m |
| **Stnd Dev Btwn Labs** | 0.59 g/sq m | 0.51 g/sq m |

Statistics based on 25 of 26 reporting participants.

**Comments on Assigned Data Flags for Test #3135**

F4D98K (X) - Extreme Data.


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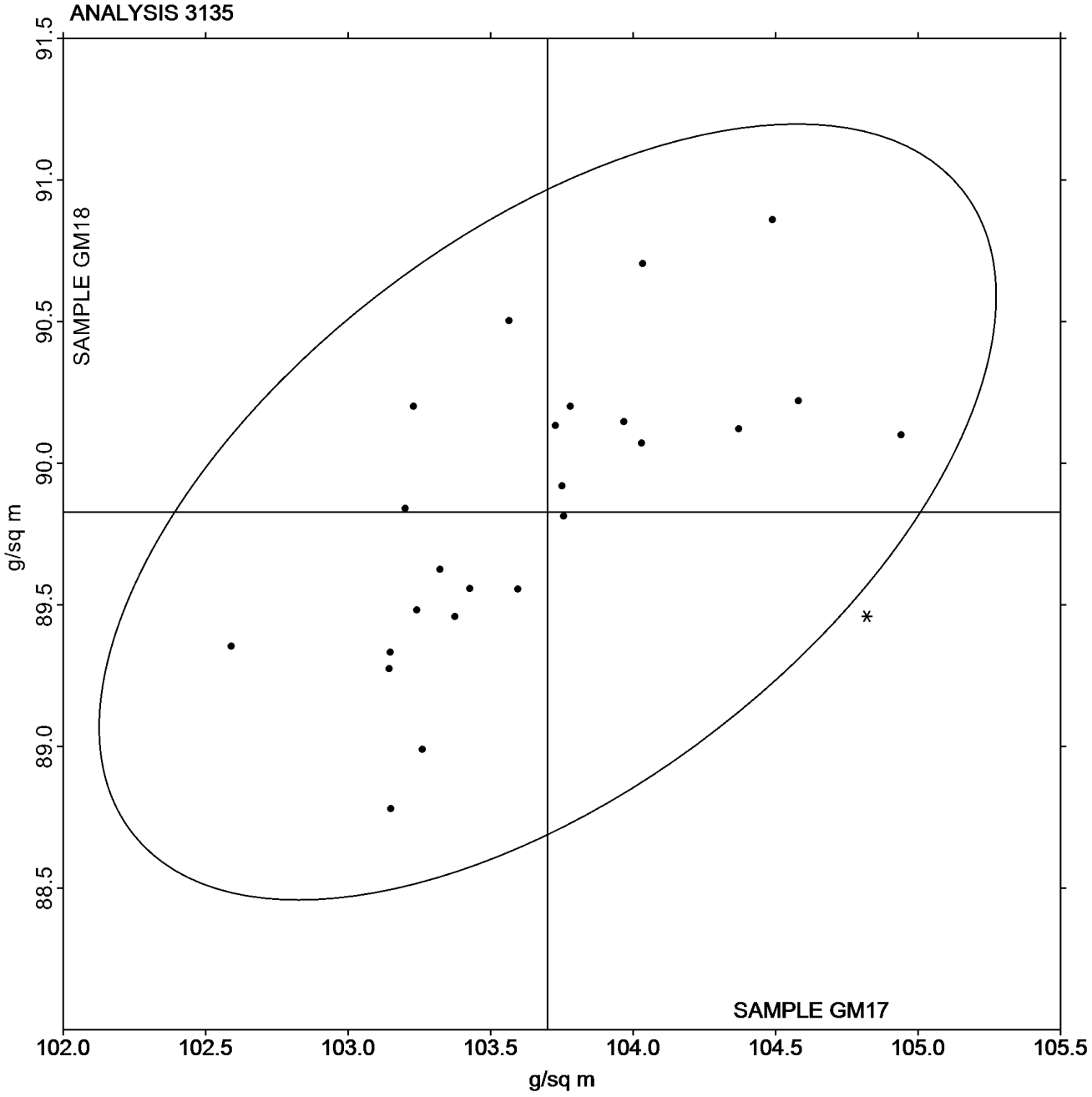
**Grand Mean Sample GM17 = 103.70 g/sq m**

**Grand Mean Sample GM18 = 89.828 g/sq m**





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# Paper & Paperboard Interlaboratory Testing Program

## Analysis 3141

## Opacity (89% Reflectance Backing) - Fine Papers

## TAPPI Official Test Method T425

| WebCode | Data Flag | Sample VR17 Lab Mean | Sample VR17 Diff from Grand Mean | Sample VR17 CPV | Sample VR18 Lab Mean | Sample VR18 Diff from Grand Mean | Sample VR18 CPV |
|---|---|---|---|---|---|---|---|
| 46TJ6G | | 93.59 | 0.04 | 0.06 | 93.59 | 0.06 | 0.16 |
| 6VGR77 | | 93.42 | -0.13 | -0.22 | 93.03 | -0.50 | -1.32 |
| 82W8VL | | 93.91 | 0.35 | 0.56 | 93.67 | 0.15 | 0.39 |
| 92RAZF | | 93.85 | 0.29 | 0.47 | 93.51 | -0.02 | -0.05 |
| AHD2AF | | 93.95 | 0.39 | 0.63 | 93.63 | 0.10 | 0.28 |
| B8B2F9 | * | 92.40 | -1.15 | -1.85 | 93.60 | 0.07 | 0.20 |
| D43MMY | | 93.64 | 0.09 | 0.14 | 93.45 | -0.08 | -0.20 |
| DMGYFP | * | 95.01 | 1.46 | 2.34 | 94.70 | 1.17 | 3.13 |
| F4D98K | | 93.31 | -0.24 | -0.39 | 93.59 | 0.06 | 0.16 |
| F9936L | | 93.26 | -0.29 | -0.47 | 93.11 | -0.42 | -1.11 |
| LVFKYV | | 93.85 | 0.30 | 0.47 | 93.70 | 0.17 | 0.46 |
| NVEAEC | | 93.74 | 0.18 | 0.29 | 93.59 | 0.06 | 0.16 |
| NZ94H6 | | 93.66 | 0.11 | 0.17 | 93.78 | 0.25 | 0.68 |
| P3TK4W | * | 91.63 | -1.92 | -3.09 | 93.00 | -0.53 | -1.40 |
| Q6DTQ4 | | 94.18 | 0.63 | 1.00 | 93.83 | 0.30 | 0.81 |
| QEZU4R | | 93.78 | 0.23 | 0.36 | 93.96 | 0.43 | 1.16 |
| TDEZE2 | | 93.52 | -0.04 | -0.06 | 93.16 | -0.37 | -0.98 |
| TUN2WA | | 93.63 | 0.07 | 0.11 | 93.65 | 0.12 | 0.32 |
| U6LWWQ | | 93.48 | -0.08 | -0.13 | 93.50 | -0.02 | -0.06 |
| UBAP2Y | | 93.44 | -0.11 | -0.18 | 93.37 | -0.16 | -0.42 |
| VLXBGT | | 93.12 | -0.43 | -0.70 | 92.95 | -0.58 | -1.53 |
| YCL4GU | | 93.65 | 0.10 | 0.15 | 93.52 | -0.01 | -0.01 |
| YK3KCP | | 93.76 | 0.21 | 0.33 | 93.22 | -0.31 | -0.81 |

| Summary Statistics | Sample VR17 | Sample VR18 |
|---|---|---|
| **Grand Means** | 93.55 Percent | 93.53 Percent |
| **Stnd Dev Btwn Labs** | 0.62 Percent | 0.38 Percent |

Statistics based on 23 of 23 reporting participants.


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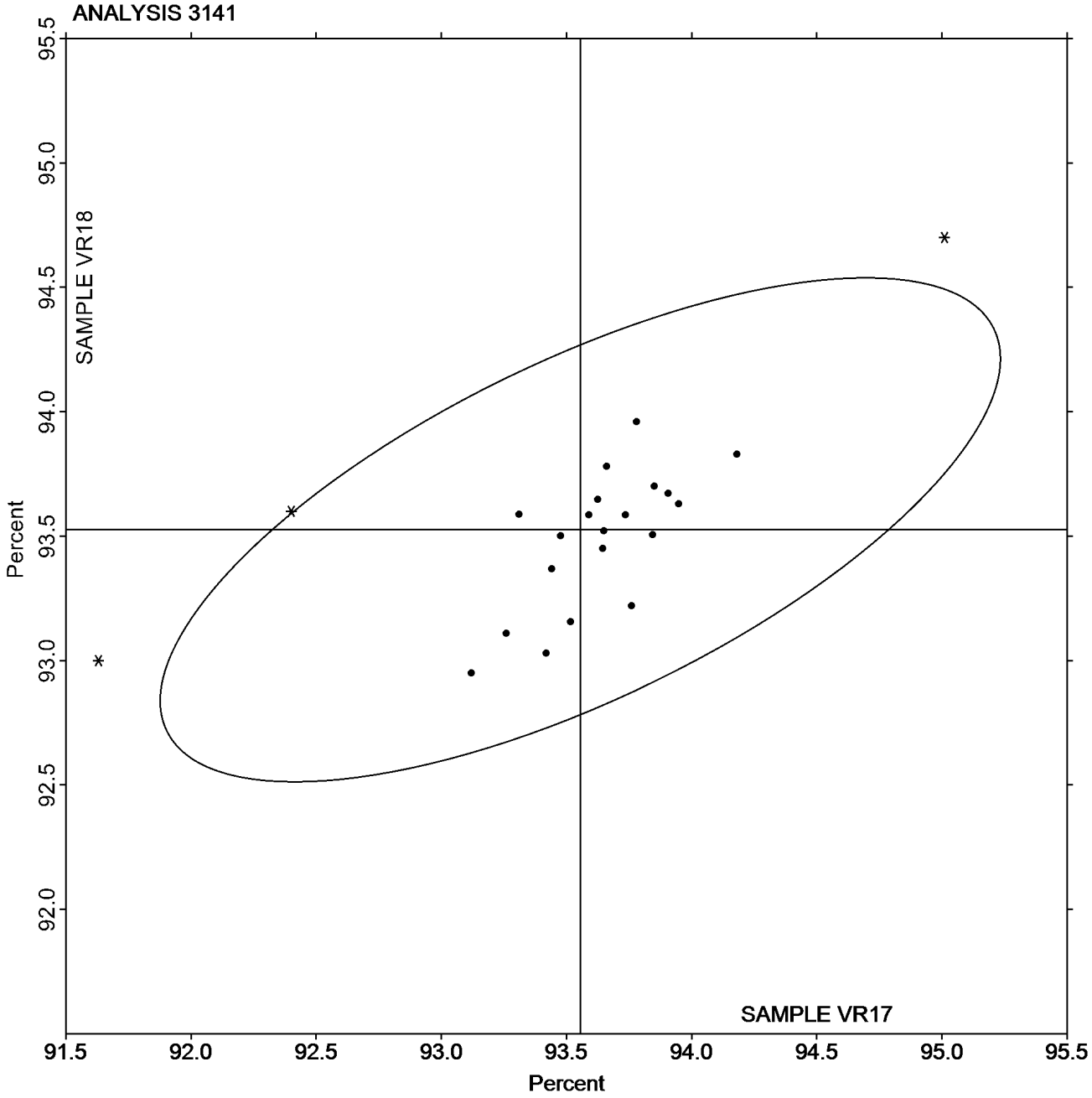
**Grand Mean Sample VR17 = 93.555 Percent**

**Grand Mean Sample VR18 = 93.526 Percent**





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| WebCode | Data Flag | Sample VP17 Lab Mean | Sample VP17 Diff from Grand Mean | Sample VP17 CPV | Sample VP18 Lab Mean | Sample VP18 Diff from Grand Mean | Sample VP18 CPV |
|---|---|---|---|---|---|---|---|
| 2JHMRP | | 94.18 | -0.11 | -0.89 | 94.33 | 0.01 | 0.09 |
| MDE493 | | 94.39 | 0.10 | 0.76 | 94.29 | -0.03 | -0.58 |
| RRJVX4 | | 94.17 | -0.12 | -0.97 | 94.25 | -0.07 | -1.21 |
| VRR3YM | | 94.46 | 0.16 | 1.29 | 94.34 | 0.01 | 0.24 |
| YLA4TX | | 94.27 | -0.02 | -0.19 | 94.41 | 0.09 | 1.46 |

| Summary Statistics | Sample VP17 | Sample VP18 |
|---|---|---|
| **Grand Means** | 94.29 Percent | 94.32 Percent |
| **Stnd Dev Btwn Labs** | 0.13 Percent | 0.06 Percent |

Statistics based on 5 of 5 reporting participants.


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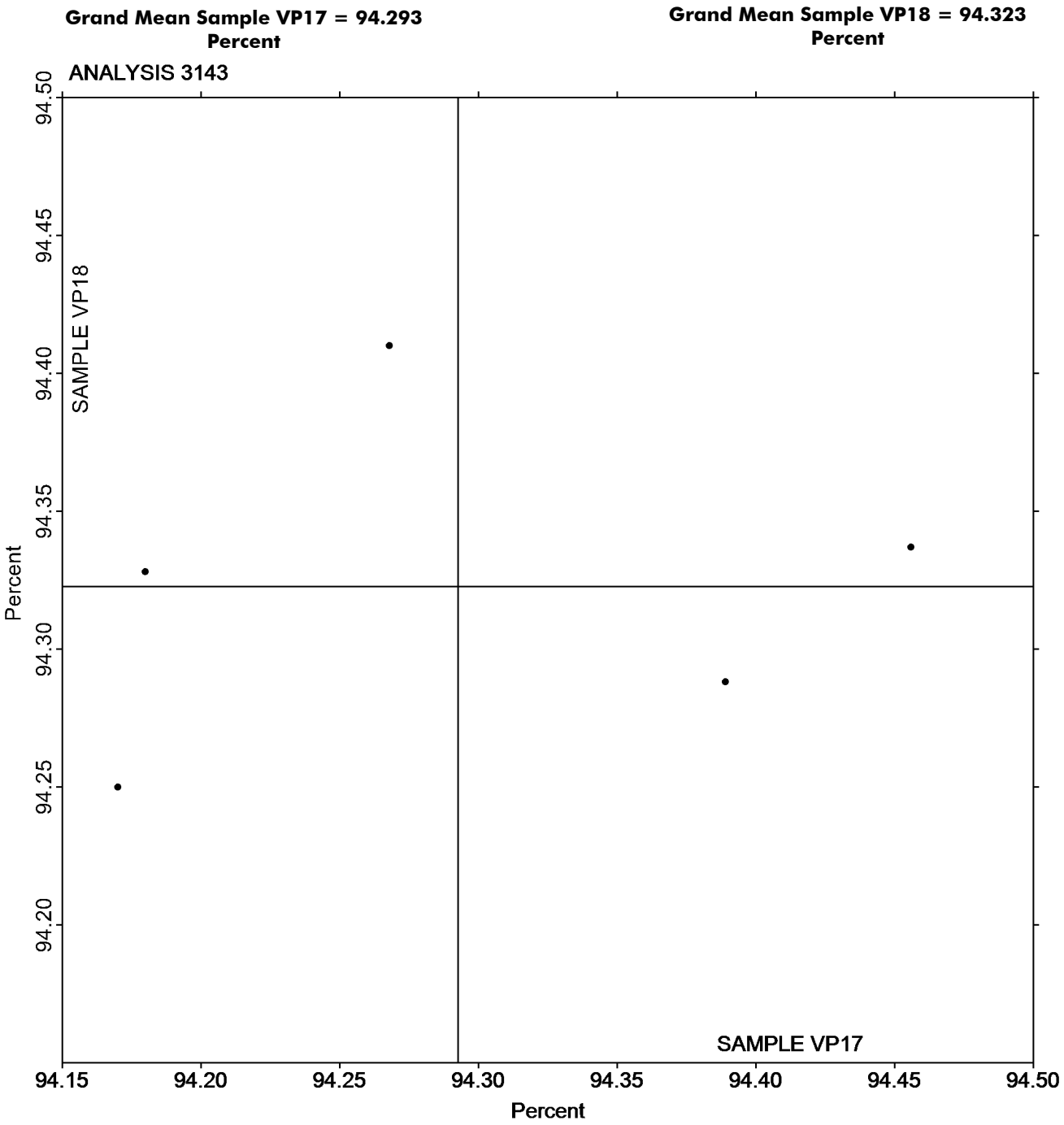


If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.


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# Paper & Paperboard Interlaboratory Testing Program

## Analysis 3145

## Directional Brightness of Fluorescent Samples

## TAPPI Official Test Method T452

| WebCode | Data Flag | Sample BF17 Lab Mean | Sample BF17 Diff from Grand Mean | Sample BF17 CPV | Sample BF18 Lab Mean | Sample BF18 Diff from Grand Mean | Sample BF18 CPV |
|---|---|---|---|---|---|---|---|
| 46TJ6G | | 98.81 | 1.16 | 0.73 | 99.68 | 1.67 | 0.88 |
| 6VGR77 | | 99.12 | 1.47 | 0.93 | 99.10 | 1.09 | 0.58 |
| 92RAZF | | 99.04 | 1.39 | 0.88 | 99.08 | 1.08 | 0.57 |
| EFUGT2 | X | 112.04 | 14.39 | 9.04 | 112.32 | 14.32 | 7.56 |
| F4D98K | | 98.41 | 0.76 | 0.48 | 98.94 | 0.94 | 0.50 |
| LVER2M | | 94.87 | -2.77 | -1.74 | 94.65 | -3.36 | -1.77 |
| NVEAEC | | 99.30 | 1.65 | 1.04 | 99.40 | 1.40 | 0.74 |
| PFXVC6 | | 98.42 | 0.77 | 0.49 | 99.34 | 1.33 | 0.70 |
| Q6DTQ4 | | 95.94 | -1.71 | -1.07 | 96.16 | -1.85 | -0.97 |
| QEZU4R | | 96.60 | -1.05 | -0.66 | 96.32 | -1.69 | -0.89 |
| TDEZE2 | | 98.56 | 0.91 | 0.57 | 99.41 | 1.40 | 0.74 |
| U6LWWQ | | 98.60 | 0.95 | 0.60 | 99.62 | 1.61 | 0.85 |
| UBAP2Y | | 94.92 | -2.73 | -1.71 | 94.92 | -3.09 | -1.63 |
| X4TM3Y | | 96.15 | -1.50 | -0.94 | 96.13 | -1.87 | -0.99 |
| YK3KCP | | 98.32 | 0.67 | 0.42 | 99.32 | 1.31 | 0.69 |

| Summary Statistics | Sample BF17 | Sample BF18 |
|---|---|---|
| **Grand Means** | 97.65 Percent | 98.01 Percent |
| **Stnd Dev Btwn Labs** | 1.59 Percent | 1.89 Percent |

Statistics based on 14 of 15 reporting participants.

**Comments on Assigned Data Flags for Test #3145**

EFUGT2 (X) - Extreme Data.


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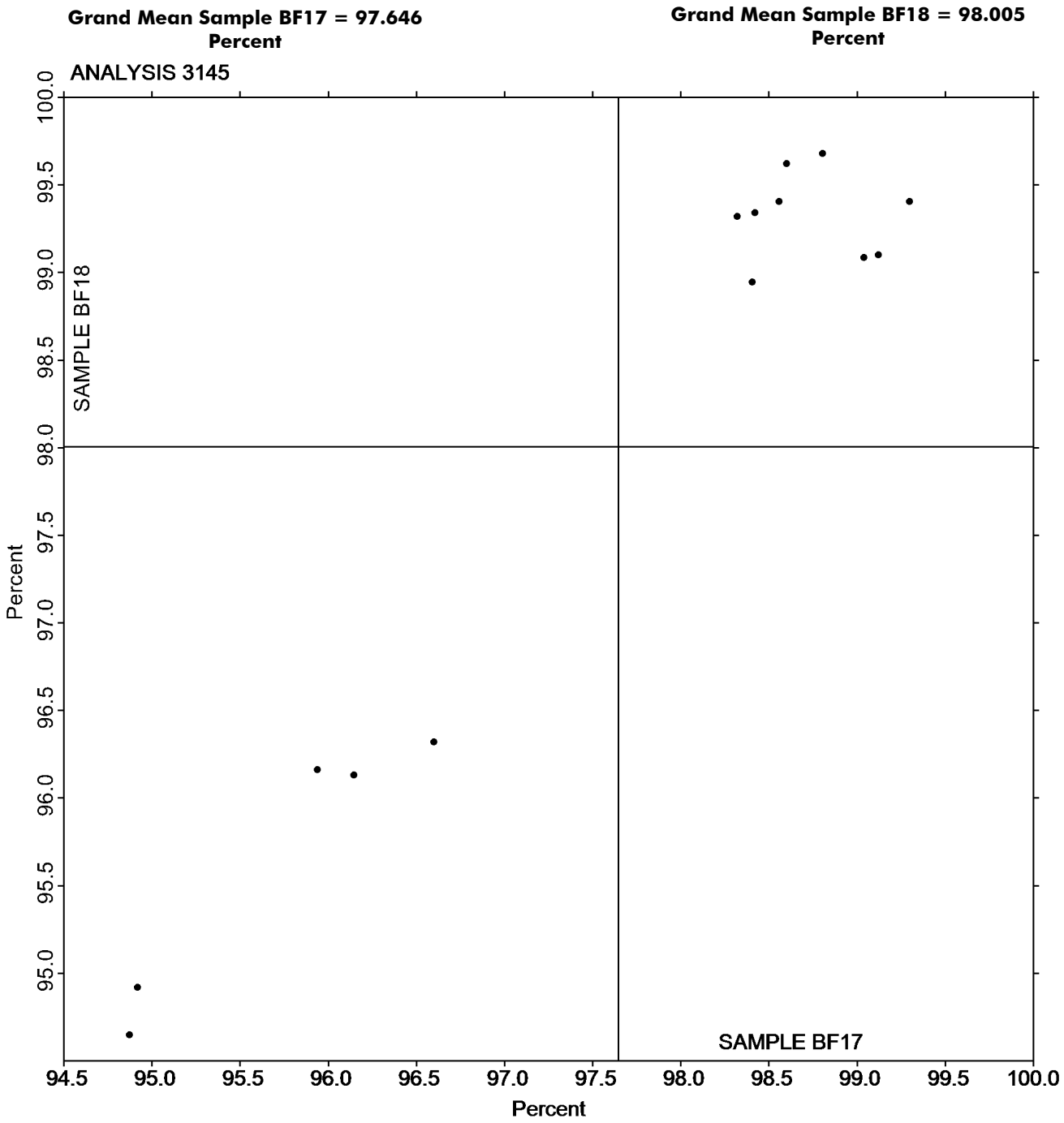


If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.


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# Paper & Paperboard Interlaboratory Testing Program

## Analysis 3146

## Fluorescent Component of Directional Brightness

## TAPPI Official Test Method T452

| WebCode | Data Flag | Sample BF17 Lab Mean | Sample BF17 Diff from Grand Mean | Sample BF17 CPV | Sample BF18 Lab Mean | Sample BF18 Diff from Grand Mean | Sample BF18 CPV |
|---|---|---|---|---|---|---|---|
| 46TJ6G | | 7.742 | 0.011 | 0.02 | 7.796 | 0.091 | 0.18 |
| 6VGR77 | | 7.780 | 0.049 | 0.09 | 7.800 | 0.095 | 0.19 |
| 92RAZF | | 7.322 | -0.409 | -0.74 | 7.370 | -0.335 | -0.67 |
| EFUGT2 | X | 20.870 | 13.139 | 23.88 | 21.196 | 13.491 | 26.83 |
| F4D98K | | 8.308 | 0.577 | 1.05 | 8.214 | 0.509 | 1.01 |
| LVER2M | | 6.990 | -0.741 | -1.35 | 7.066 | -0.639 | -1.27 |
| NVEAEC | | 8.094 | 0.363 | 0.66 | 8.072 | 0.367 | 0.73 |
| PFXVC6 | | 7.920 | 0.189 | 0.34 | 7.680 | -0.025 | -0.05 |
| Q6DTQ4 | | 8.160 | 0.429 | 0.78 | 8.280 | 0.575 | 1.14 |
| TDEZE2 | | 8.318 | 0.587 | 1.07 | 8.138 | 0.433 | 0.86 |
| U6LWWQ | | 8.272 | 0.541 | 0.98 | 8.128 | 0.423 | 0.84 |
| UBAP2Y | | 7.020 | -0.711 | -1.29 | 7.080 | -0.625 | -1.24 |
| X4TM3Y | | 6.846 | -0.885 | -1.61 | 6.832 | -0.873 | -1.74 |

| Summary Statistics | Sample BF17 | Sample BF18 |
|---|---|---|
| **Grand Means** | 7.73 Percent | 7.70 Percent |
| **Stnd Dev Btwn Labs** | 0.55 Percent | 0.50 Percent |

Statistics based on 12 of 13 reporting participants.

**Comments on Assigned Data Flags for Test #3146**

EFUGT2 (X) - Extreme Data.


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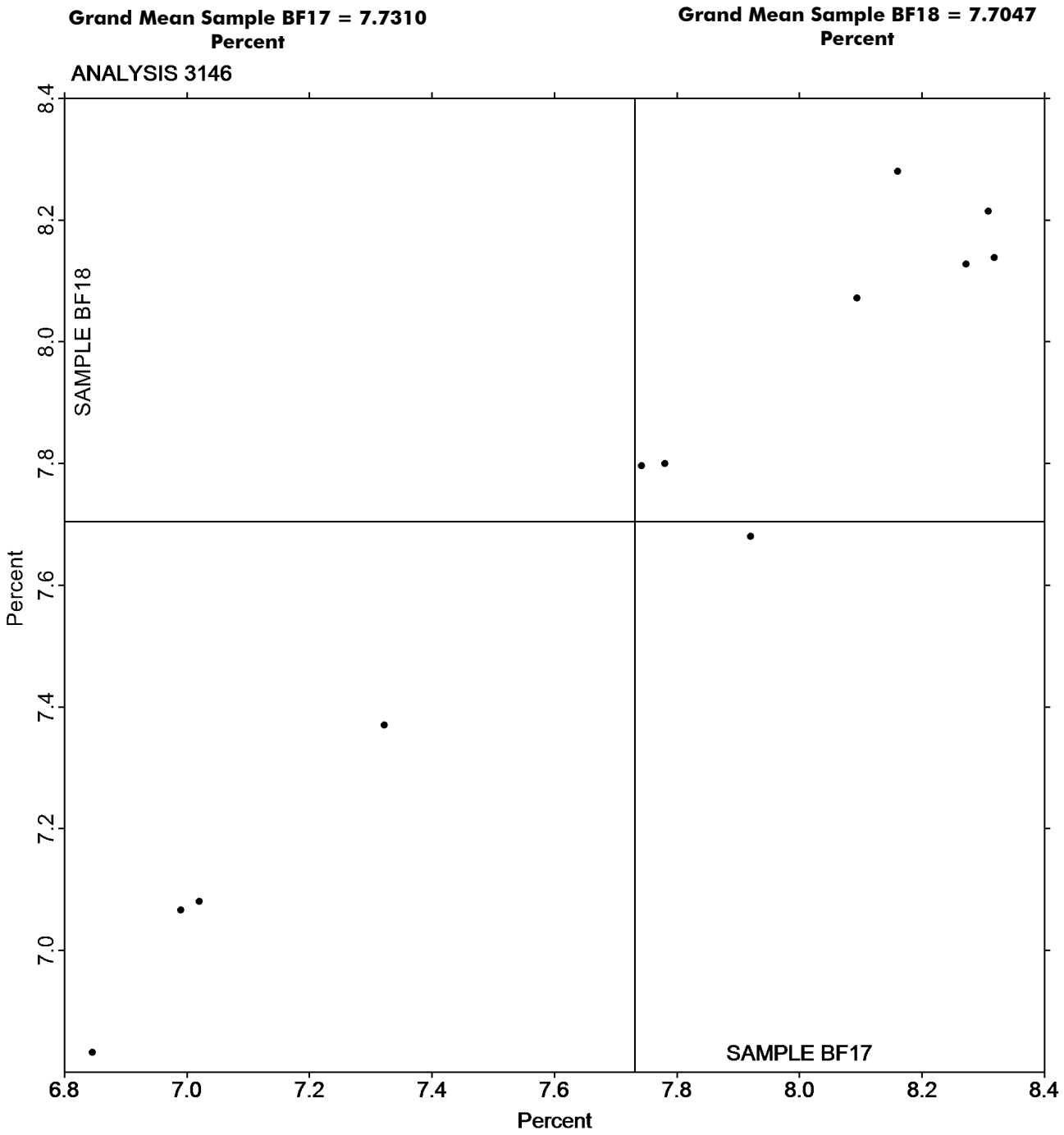


If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.


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# Paper & Paperboard Interlaboratory Testing Program

## Analysis 3201

## Bending Resistance, Taber Type - 0 to 10 Units

## TAPPI Official Test Method T566

| WebCode | Data Flag | Sample TP17 Lab Mean | Sample TP17 Diff from Grand Mean | Sample TP17 CPV | Sample TP18 Lab Mean | Sample TP18 Diff from Grand Mean | Sample TP18 CPV |
|---|---|---|---|---|---|---|---|
| 46TJ6G | | 4.161 | -0.083 | -0.10 | 3.981 | -0.278 | -0.23 |
| B8B2F9 | | 4.630 | 0.386 | 0.46 | 4.370 | 0.111 | 0.09 |
| LG2ET3 | | 4.280 | 0.035 | 0.04 | 3.830 | -0.429 | -0.36 |
| NZ94H6 | | 6.000 | 1.756 | 2.08 | 7.214 | 2.955 | 2.49 |
| Q4LLQZ | | 3.795 | -0.449 | -0.53 | 3.765 | -0.494 | -0.42 |
| Q6DTQ4 | | 4.342 | 0.098 | 0.12 | 3.999 | -0.260 | -0.22 |
| TDEZE2 | | 4.101 | -0.143 | -0.17 | 4.001 | -0.258 | -0.22 |
| U6LWWQ | | 4.129 | -0.116 | -0.14 | 4.293 | 0.034 | 0.03 |
| UBAP2Y | | 2.763 | -1.481 | -1.76 | 2.874 | -1.385 | -1.16 |

| Summary Statistics | Sample TP17 | Sample TP18 |
|---|---|---|
| **Grand Means** | 4.24 Taber Units | 4.26 Taber Units |
| **Stnd Dev Btwn Labs** | 0.84 Taber Units | 1.19 Taber Units |

Statistics based on 9 of 9 reporting participants.


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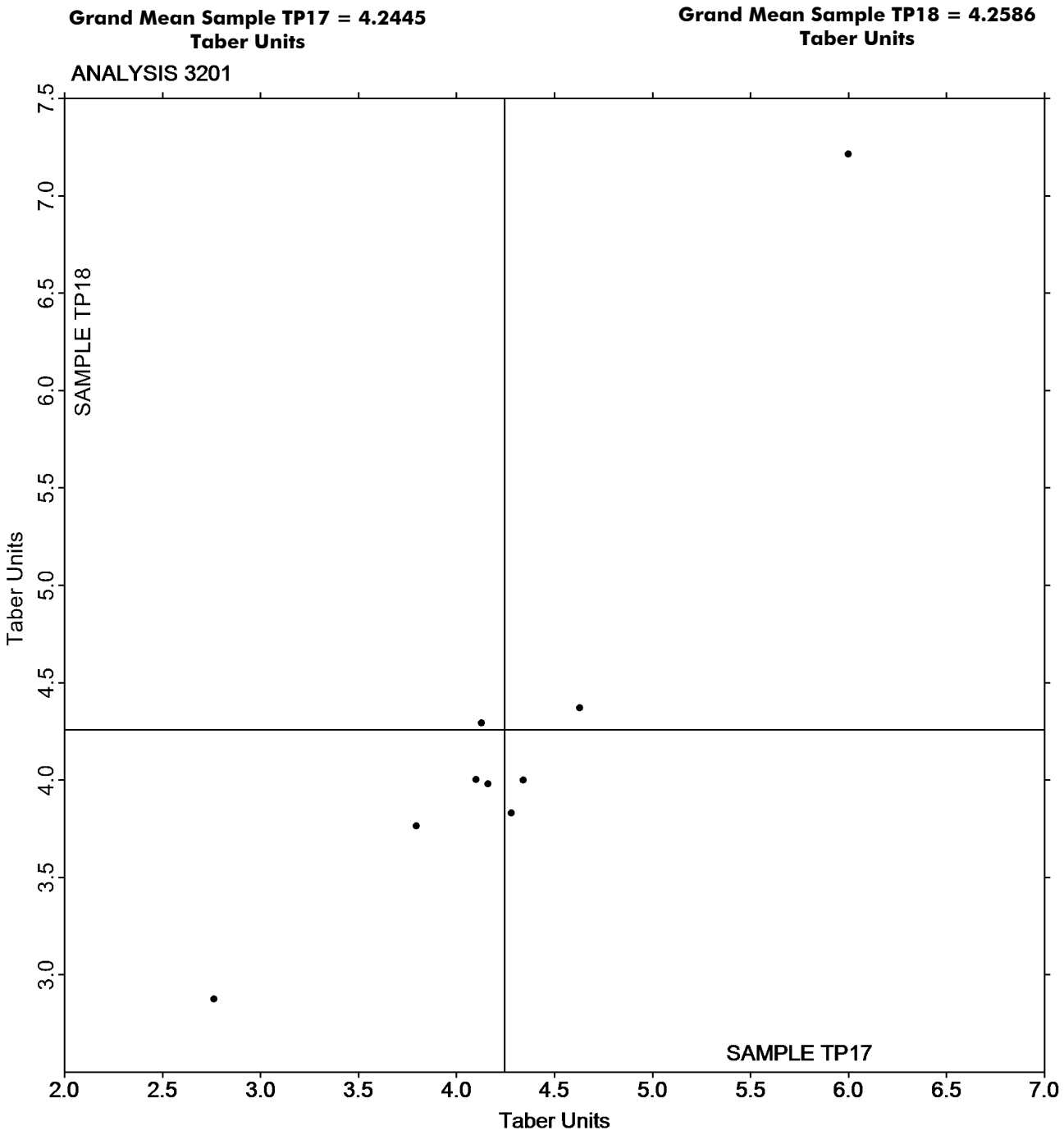


If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.


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# Paper & Paperboard Interlaboratory Testing Program

## Analysis 3203

## Bending Resistance, Taber Type - 10 to 100 Taber Units

## TAPPI Official Test Method T489

| WebCode | Data Flag | Sample TC17 Lab Mean | Sample TC17 Diff from Grand Mean | Sample TC17 CPV | Sample TC18 Lab Mean | Sample TC18 Diff from Grand Mean | Sample TC18 CPV |
|---|---|---|---|---|---|---|---|
| 6942TC | | 18.72 | 1.27 | 1.11 | 18.78 | 1.35 | 1.08 |
| 77C8PF | | 16.39 | -1.06 | -0.92 | 16.37 | -1.06 | -0.85 |
| 9NQBCJ | | 16.18 | -1.27 | -1.10 | 16.21 | -1.22 | -0.97 |
| BWTBZB | | 17.79 | 0.34 | 0.30 | 17.15 | -0.28 | -0.22 |
| CYT6WJ | | 16.50 | -0.95 | -0.82 | 17.40 | -0.03 | -0.02 |
| JN7JLV | | 19.51 | 2.06 | 1.80 | 19.81 | 2.38 | 1.90 |
| L9TKZV | | 18.45 | 1.00 | 0.87 | 18.55 | 1.12 | 0.90 |
| NKRDBP | | 17.25 | -0.20 | -0.17 | 17.37 | -0.06 | -0.05 |
| Q6DTQ4 | | 17.33 | -0.12 | -0.10 | 16.65 | -0.78 | -0.62 |
| YPUQRD | | 16.35 | -1.10 | -0.96 | 16.00 | -1.43 | -1.14 |

| Summary Statistics | Sample TC17 | Sample TC18 |
|---|---|---|
| **Grand Means** | 17.45 Taber Units | 17.43 Taber Units |
| **Stnd Dev Btwn Labs** | 1.15 Taber Units | 1.25 Taber Units |

Statistics based on 10 of 10 reporting participants.


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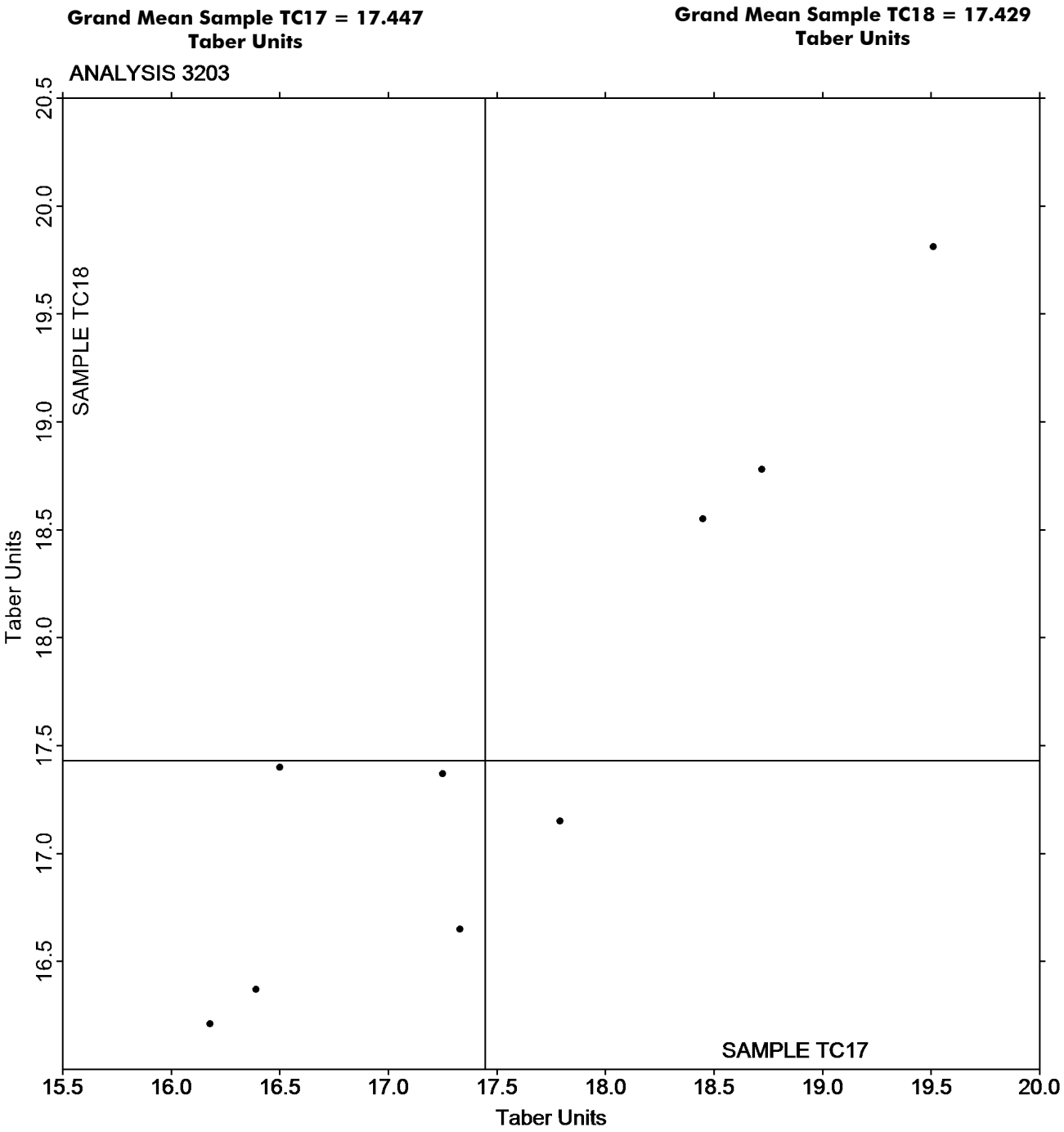


If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.


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# Paper & Paperboard Interlaboratory Testing Program

**Analysis 3205**

**Bending Resistance, Taber Type - 50 to 500 Taber Units - Recycled Paperboard**

**TAPPI Official Test Method T489**

| WebCode | Data Flag | Sample TR17 Lab Mean | Sample TR17 Diff from Grand Mean | Sample TR17 CPV | Sample TR18 Lab Mean | Sample TR18 Diff from Grand Mean | Sample TR18 CPV |
|---|---|---|---|---|---|---|---|
| 6M9Z44 | | 179.8 | 7.9 | 1.13 | 182.0 | 9.6 | 1.26 |
| 7DX6FN | | 174.6 | 2.7 | 0.39 | 175.7 | 3.3 | 0.44 |
| CYT6WJ | | 171.7 | -0.2 | -0.03 | 175.0 | 2.6 | 0.34 |
| E6DPAX | | 178.7 | 6.8 | 0.97 | 179.3 | 6.9 | 0.91 |
| KQTFPF | | 168.4 | -3.5 | -0.50 | 162.4 | -10.0 | -1.30 |
| LVFKYV | | 166.6 | -5.4 | -0.77 | 165.5 | -6.9 | -0.90 |
| NKRDBP | | 176.1 | 4.2 | 0.61 | 174.9 | 2.5 | 0.33 |
| U2H8PB | | 173.9 | 2.0 | 0.29 | 176.1 | 3.7 | 0.49 |
| VRR3YM | | 157.4 | -14.5 | -2.08 | 160.4 | -12.0 | -1.57 |

| Summary Statistics | Sample TR17 | Sample TR18 |
|---|---|---|
| **Grand Means** | 171.90 Taber Units | 172.36 Taber Units |
| **Stnd Dev Btwn Labs** | 6.98 Taber Units | 7.66 Taber Units |

Statistics based on 9 of 9 reporting participants.


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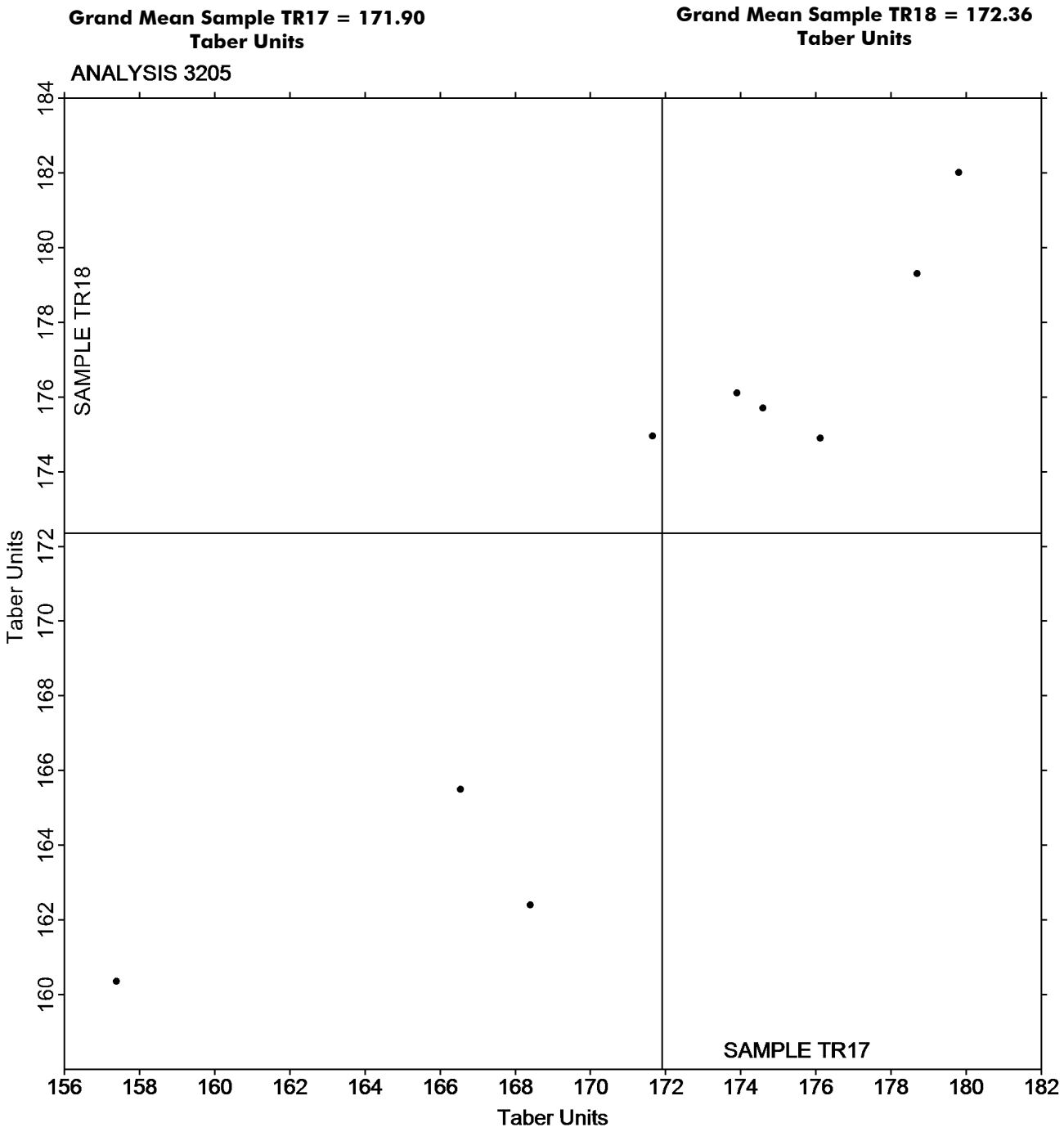


If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.


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# Paper & Paperboard Interlaboratory Testing Program

**Analysis 3207**
**Z-Direction Tensile, Recycled Paperboard**
**TAPPI Official Test Method T541**

| WebCode | Data Flag | Sample ZR17 Lab Mean | Sample ZR17 Diff from Grand Mean | Sample ZR17 CPV | Sample ZR18 Lab Mean | Sample ZR18 Diff from Grand Mean | Sample ZR18 CPV |
|---|---|---|---|---|---|---|---|
| 6M9Z44 | | 63.36 | 0.04 | 0.01 | 61.32 | -1.82 | -0.34 |
| 7DX6FN | | 57.26 | -6.06 | -0.92 | 57.16 | -5.98 | -1.11 |
| 87PBKJ | | 76.82 | 13.50 | 2.04 | 67.26 | 4.12 | 0.76 |
| CYT6WJ | | 67.28 | 3.96 | 0.60 | 65.84 | 2.70 | 0.50 |
| E6DPAX | | 52.40 | -10.92 | -1.65 | 54.00 | -9.14 | -1.69 |
| HHMWBY | | 61.18 | -2.14 | -0.32 | 58.32 | -4.82 | -0.89 |
| HKET3E | | 63.16 | -0.16 | -0.02 | 63.32 | 0.18 | 0.03 |
| LVFKYV | | 57.98 | -5.34 | -0.81 | 59.58 | -3.56 | -0.66 |
| NKRDBP | | 61.58 | -1.74 | -0.26 | 67.02 | 3.88 | 0.72 |
| PAWGXV | | 56.20 | -7.12 | -1.08 | 54.60 | -8.54 | -1.58 |
| U22AXC | | 75.86 | 12.54 | 1.89 | 69.86 | 6.72 | 1.24 |
| U2H8PB | | 60.80 | -2.52 | -0.38 | 70.80 | 7.66 | 1.42 |
| VU2AD2 | | 68.78 | 5.46 | 0.82 | 70.50 | 7.36 | 1.36 |
| VZJHJK | | 62.00 | -1.32 | -0.20 | 62.40 | -0.74 | -0.14 |
| X6QQ32 | | 61.10 | -2.22 | -0.34 | 62.38 | -0.76 | -0.14 |
| XGZ9RJ | | 67.38 | 4.05 | 0.61 | 65.94 | 2.80 | 0.52 |

| Summary Statistics | Sample ZR17 | Sample ZR18 |
|---|---|---|
| **Grand Means** | 63.32 psi | 63.14 psi |
| **Stnd Dev Btwn Labs** | 6.62 psi | 5.40 psi |

Statistics based on 16 of 16 reporting participants.


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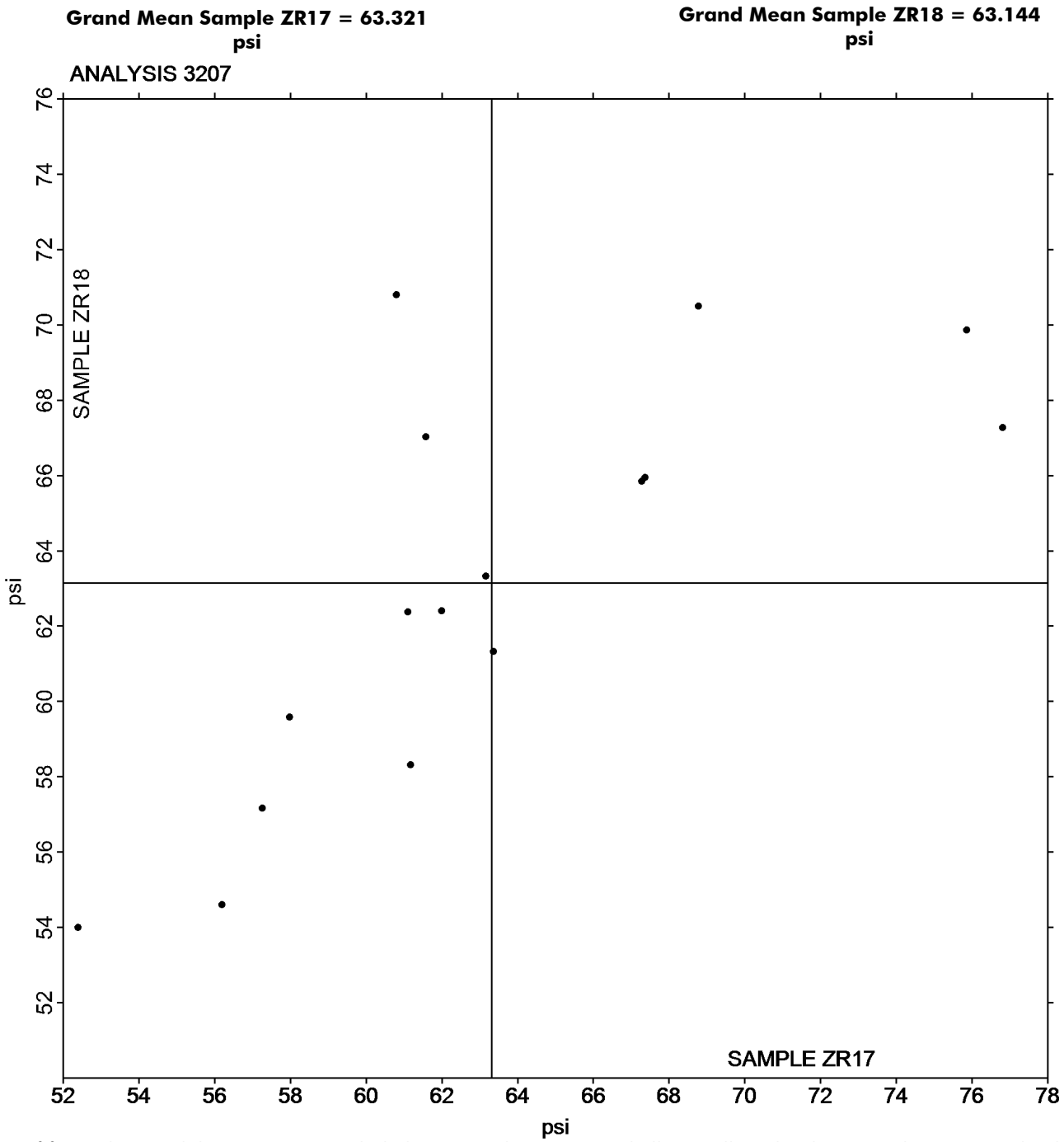


If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.


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# Paper & Paperboard Interlaboratory Testing Program

## Analysis 3209
## Z-Direction Tensile
## TAPPI Official Test Method T541

| WebCode | Data Flag | Sample ZP17 Lab Mean | Sample ZP17 Diff from Grand Mean | Sample ZP17 CPV | Sample ZP18 Lab Mean | Sample ZP18 Diff from Grand Mean | Sample ZP18 CPV |
|---|---|---|---|---|---|---|---|
| 2JHMRP | | 70.95 | -10.16 | -1.25 | 70.43 | -10.02 | -1.27 |
| 6942TC | | 77.76 | -3.35 | -0.41 | 78.04 | -2.41 | -0.31 |
| 77C8PF | | 88.16 | 7.05 | 0.87 | 85.98 | 5.53 | 0.70 |
| BWTBZB | | 73.88 | -7.23 | -0.89 | 73.44 | -7.01 | -0.89 |
| CYT6WJ | | 94.32 | 13.21 | 1.63 | 94.12 | 13.67 | 1.74 |
| JN7JLV | | 76.32 | -4.79 | -0.59 | 79.60 | -0.85 | -0.11 |
| KQTFPF | | 87.70 | 6.59 | 0.81 | 86.38 | 5.93 | 0.75 |
| UCHW9X | | 79.80 | -1.31 | -0.16 | 75.60 | -4.85 | -0.62 |

| Summary Statistics | Sample ZP17 | Sample ZP18 |
|---|---|---|
| **Grand Means** | 81.11 psi | 80.45 psi |
| **Stnd Dev Btwn Labs** | 8.10 psi | 7.86 psi |

Statistics based on 8 of 8 reporting participants.


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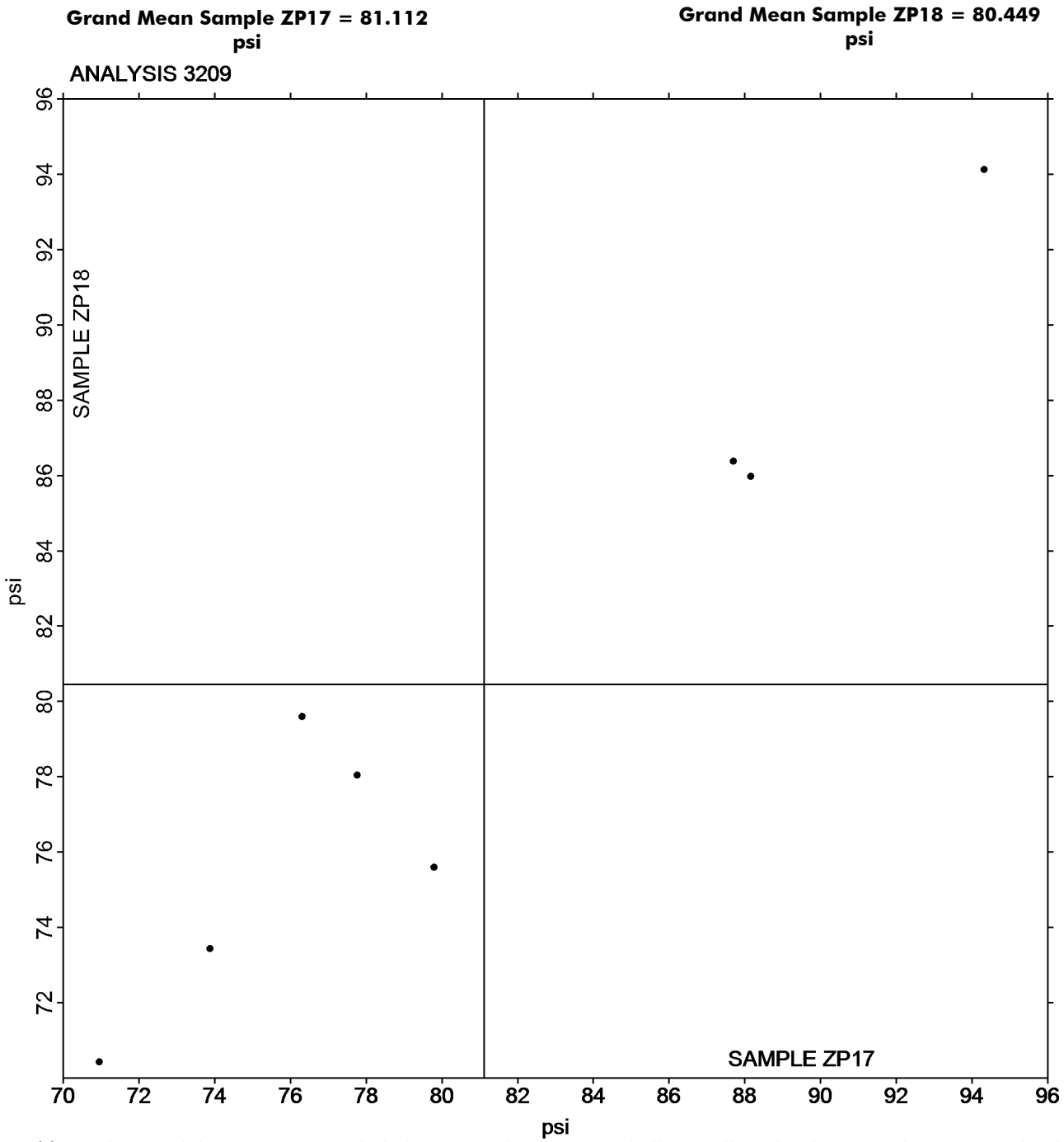


If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.


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# Paper & Paperboard Interlaboratory Testing Program

## Analysis 3211

## Internal Bond Strength - Modified Scott Mechanics

## TAPPI Provisional Test Method T569

| WebCode | Data Flag | Sample SM17 Lab Mean | Sample SM17 Diff from Grand Mean | Sample SM17 CPV | Sample SM18 Lab Mean | Sample SM18 Diff from Grand Mean | Sample SM18 CPV |
|---|---|---|---|---|---|---|---|
| 494NRB | | 151.8 | 16.6 | 1.51 | 141.4 | 6.8 | 0.75 |
| 4GZEDK | | 118.0 | -17.2 | -1.56 | 134.2 | -0.4 | -0.04 |
| 6942TC | | 142.0 | 6.8 | 0.62 | 134.0 | -0.6 | -0.06 |
| 77C8PF | | 128.5 | -6.7 | -0.61 | 131.2 | -3.4 | -0.37 |
| CDDKZJ | | 125.4 | -9.8 | -0.89 | 125.2 | -9.4 | -1.02 |
| CYT6WJ | | 132.0 | -3.2 | -0.29 | 131.6 | -3.0 | -0.32 |
| JN7JLV | | 148.8 | 13.6 | 1.24 | 152.4 | 17.8 | 1.95 |
| JQR922 | | 149.0 | 13.8 | 1.26 | 146.4 | 11.8 | 1.30 |
| KQTFPF | | 124.2 | -11.0 | -1.00 | 121.2 | -13.4 | -1.46 |
| LVFKYV | | 135.2 | 0.0 | 0.00 | 129.0 | -5.6 | -0.61 |
| Q4LLQZ | | 134.8 | -0.4 | -0.03 | 130.0 | -4.6 | -0.50 |
| TUN2WA | | 124.2 | -11.0 | -1.00 | 127.6 | -7.0 | -0.76 |
| U2H8PB | | 143.4 | 8.2 | 0.75 | 145.0 | 10.4 | 1.14 |

| Summary Statistics | Sample SM17 | Sample SM18 |
|---|---|---|
| **Grand Means** | 135.17 1000th ft-lbs | 134.55 1000th ft-lbs |
| **Stnd Dev Btwn Labs** | 11.01 1000th ft-lbs | 9.13 1000th ft-lbs |

Statistics based on 13 of 13 reporting participants.

**Analysis Notes:**

CDDKZJ - Data appear to be off by a factor of .001; data converted by CTS (x1000). CTS will not correct data going forward


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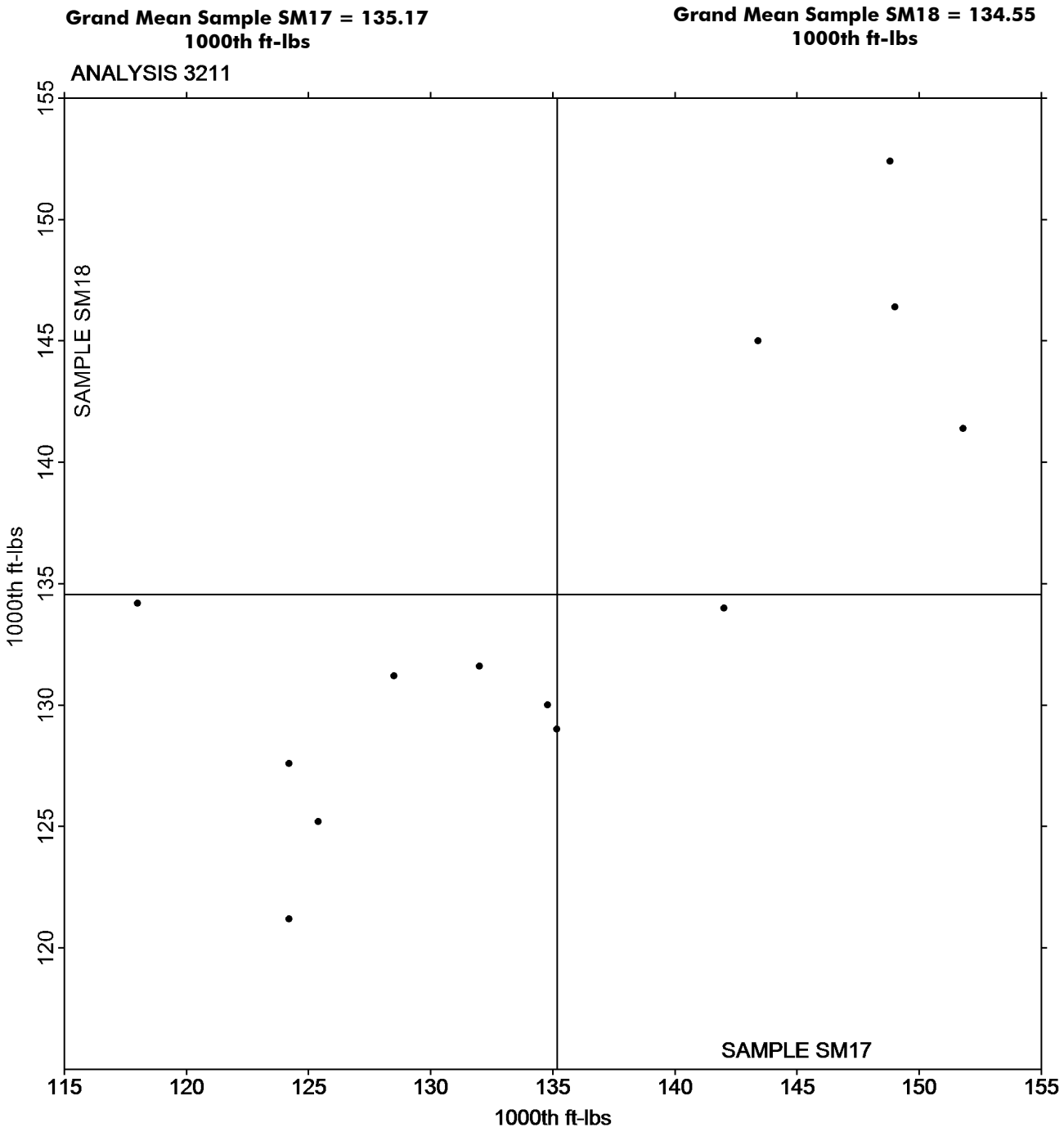


If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.


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# Paper & Paperboard Interlaboratory Testing Program

## Analysis 3213

## Internal Bond Strength - Scott Bond Models

## TAPPI Provisional Test Method T569

| WebCode | Data Flag | Sample SB17 Lab Mean | Sample SB17 Diff from Grand Mean | Sample SB17 CPV | Sample SB18 Lab Mean | Sample SB18 Diff from Grand Mean | Sample SB18 CPV |
|---|---|---|---|---|---|---|---|
| 2QFJBK | | 113.2 | -10.9 | -0.64 | 107.2 | -16.4 | -1.01 |
| 87PBKJ | | 157.8 | 33.6 | 1.98 | 131.4 | 7.8 | 0.48 |
| EFUGT2 | | 111.3 | -12.9 | -0.76 | 100.3 | -23.3 | -1.43 |
| MDE493 | | 130.4 | 6.2 | 0.37 | 131.8 | 8.3 | 0.51 |
| Q6DTQ4 | | 123.4 | -0.8 | -0.04 | 125.6 | 2.0 | 0.13 |
| TDEZE2 | | 115.4 | -8.8 | -0.51 | 111.2 | -12.4 | -0.76 |
| TTUXJ3 | | 130.6 | 6.4 | 0.38 | 138.2 | 14.6 | 0.90 |
| U6LWWQ | | 90.6 | -33.6 | -1.97 | 99.4 | -24.2 | -1.48 |
| VGRJC2 | | 125.8 | 1.6 | 0.10 | 136.2 | 12.6 | 0.78 |
| VLXBGT | | 136.2 | 12.0 | 0.71 | 131.2 | 7.6 | 0.47 |
| YPUQRD | | 131.1 | 6.9 | 0.41 | 146.7 | 23.1 | 1.42 |

| Summary Statistics | Sample SB17 | Sample SB18 |
|---|---|---|
| **Grand Means** | 124.16 1000th ft-lbs | 123.56 1000th ft-lbs |
| **Stnd Dev Btwn Labs** | 17.02 1000th ft-lbs | 16.27 1000th ft-lbs |

Statistics based on 11 of 11 reporting participants.


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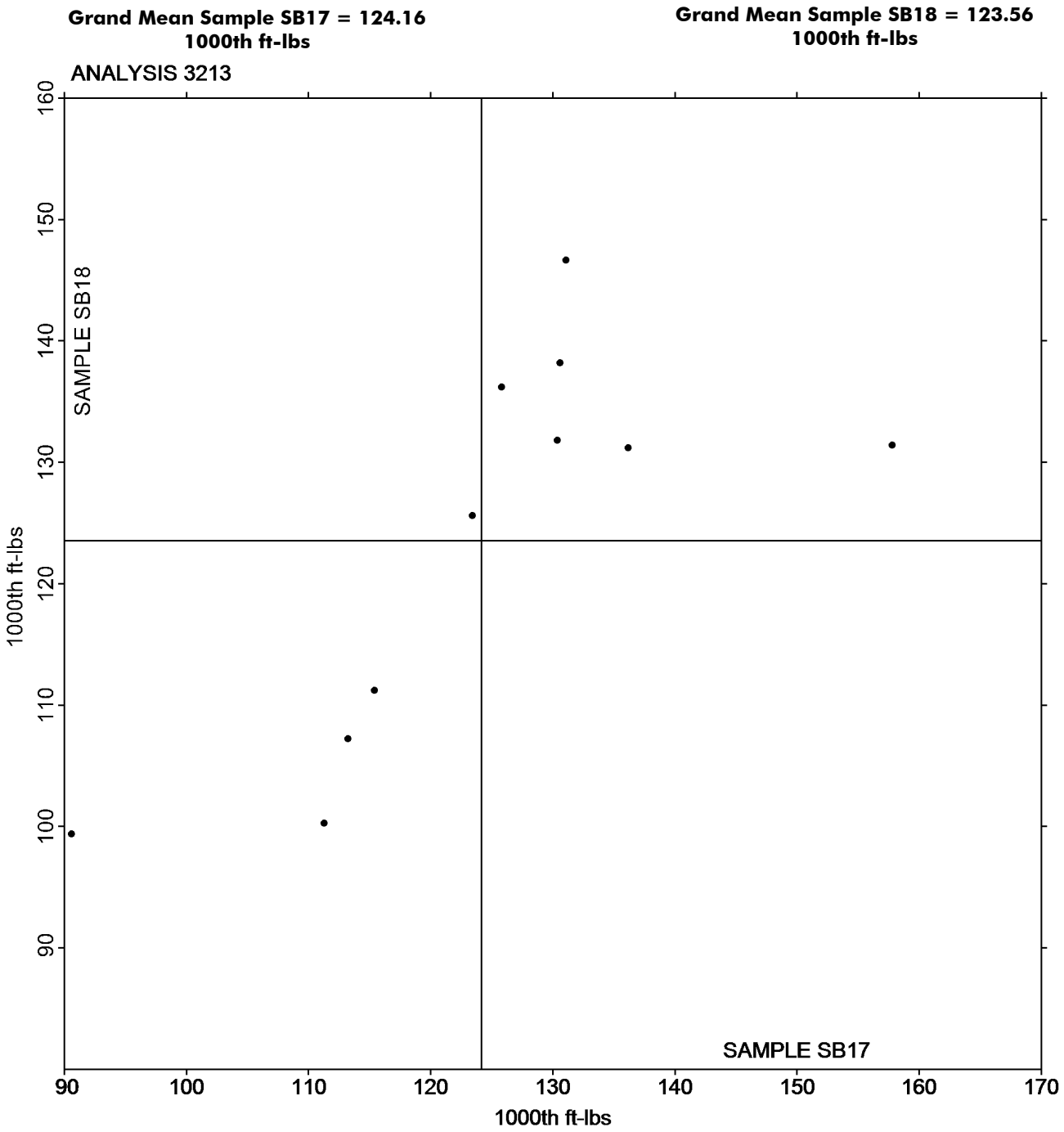


If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

-End of Report-


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