Collaborative Testing Services, Inc.

# Containerboard Interlaboratory Testing Program

## Participant Summary Report #554 (M) - November 2015

---

Introduction to the Containerboard Program

Explanation of Tables and Definitions of Terms

| Analysis | Sample Lot | Analysis Name |
|---|---|---|
| 201 | BOX9 | Box Compression Strength, Corrugated Boxes |
| 202 | ECT8 | Edgewise Compressive Strength, Wax (T811), Corrugated board |
| 203 | ECT8 | Edgewise Compressive Strength by Clamp (T839), Corrugated board |
| 205 | 42D1 | Mullen Burst of Linerboard, 42 lb Linerboard |
| 206 | 69C2 | Mullen Burst of Linerboard, 69 lb Linerboard |
| 215 | 42D1 | Ring Crush of Linerboard, Rigid Platen Type, 42 lb Linerboard |
| 216 | 69C2 | Ring Crush of Linerboard, Rigid Platen Type, 69 lb Linerboard |
| 223 | 42D1 | STFI of Linerboard, 42 lb Linerboard |
| 224 | 69C2 | STFI of Linerboard, 69 lb Linerboard |
| 228 | 69C | Roughness - Stylus Method, 69 lb Linerboard |
| 231 | 36Z | Internal Bond Strength, Linerboard, 36 lb Linerboard |
| 234 | 36Z | Coefficient of Static Friction - Inclined Plane, 36 lb Linerboard |
| 237 | 36Z | Air Resistance - Gurley Method, Linerboard, 36 lb Linerboard |
| 240 | CM81 | Flat Crush Strength (CMT) of Medium, 26 lb Corrugating Medium |
| 250 | CM81 | Fluted Crush of Medium, 26 lb Corrugating Medium |
| 255 | CM81 | Ring Crush of Medium, 26 lb Corrugating Medium |
| 261 | CM81 | STFI of Medium, 26 lb Corrugating Medium |

Collaborative Testing Services, Inc.
CONTAINERBOARD INTERLABORATORY TESTING PROGRAM

## INTRODUCTION

The Interlaboratory Testing Program for Containerboard is operated and maintained by Collaborative Testing Services, Inc. (CTS), with technical guidance provided by the Containerboard Group of the American Forest & Paper Association. The tests are conducted on a monthly basis.

For these tests samples of linerboard and corrugating medium, that each have been separately randomized from narrow rolls, are distributed for testing weekly. One weight of medium (26 lb.) is used for Concora Flat Crush Strength, Corrugated Fluted Crush Strength, Ring Crush Strength, and STFI Compression. Two weights of linerboard are tested each month for Mullen Burst, Ring Crush, and STFI Compression: 42 lb. - every month; 36 lb. and 69 lb. - alternate months. The participants return their test results for analysis and receive a monthly report.

Please refer to the section, "EXPLANATION OF TABLES", for definitions of terms and guidelines to interpreting the results.

## USE OF AVERAGE MEAN AS A COLLABORATIVE REFERENCE VALUE

The samples of linerboard and corrugating medium, which have been randomized and placed in sealed packages for distribution in this program, may be used as collaborative reference materials. The values most representative of each material are the Cumulative Grand Means in the latest reports, given at the bottom right of each table. Comparisons can only be made within one lot of material; therefore check your measurements against the Cumulative Grand Means with the same lot code as on the packages being tested.

| Material | Lot Code | Dates in Use |
|---|---|---|
| 36# Linerboard | 36Z2 | December 2012 - November 2014 |
| | 36Z3 | December 2014 - Current |
| 42# Linerboard | 42B4 | June 2014 - April 2015 |
| | 42D1 | May 2015 - Current |
| 69# Linerboard | 69A2 | February 2013 - November 2013 |
| | 69C,C1 | December 2013 - Current |
| 26# Corrugating Medium | CM73 | Janruary 2013 - September 2015 |
| | CM81 | October 2015 - Current |

## ABOUT CTS

Founded in 1971, Collaborative Testing Services, Inc. (CTS) is a privately-owned company that specializes in interlaboratory tests for a wide variety of industries, including rubber, plastics, fasteners and metals, containerboard, paper, color, and wine, as well as proficiency tests for forensic laboratories. All of the tests are designed to assist organizations in achieving and maintaining quality control objectives. Labs from the U.S., as well as more than 80 countries, currently participate in the CTS programs.

For further information, contact:
Collaborative Testing Services, Inc
21331 Gentry Drive
Sterling, VA 20166 USA
Voice: 571-434-1925
Fax: 571-434-1937
containerboard@cts-interlab.com

## EXPLANATION OF TABLES

Each analysis is divided into three time spans. On the left side of the table are the individual laboratory results for each week of the month; in the center are each lab's statistical data for the month; and on the right are each lab's cumulative data for up to 16 weeks. At the bottom of the table are the consensus statistics for all the participants for each of the three time spans.

## Definitions of Terms Used

### Weekly Results

#### Laboratory Data

WebCode - A six character laboratory identifier used to maintain information on a confidential basis. The WebCode is unique for each cycle and will change for each report. Your WebCode can be found in your Individual Report (Current Month Performance Report) and your datasheet.

Weekly Means - The average of the test results obtained by the participant for each week that data were reported.

#### Consensus Data

Wk Mean - For each week, the average of the Means for all the participants, excluding those laboratories flagged with an 'X'.

Avg SDr - For each week, the average of the within-laboratory standard deviations (SDr's) for all the participants, excluding those laboratories flagged with an 'X'. The Avg SDr is an indication of the variation of measurements within an average laboratory.

SD btwn Labs - For each week, the standard deviation of the laboratory Means about the Wk Mean, excluding those laboratories flagged with an 'X'. The SD LABS is an indication of the precision of measurement between the laboratories.

Labs Incld - The number of laboratory Means included in the Wk Mean for that week.

Labs Excld - The number of laboratory Means reported but excluded from the Wk Mean for that week because of outlying results ('X' following Mean).

Labs not rcvd - The number of laboratories failing to report for that week.

### Monthly Results

#### Laboratory Data

Mean - For each laboratory, the average of all the weekly Means reported for this month.

CPV - Comparative Performance Value, an indication of how well a laboratory's Mean agrees with the other participants. The CPV is a ratio indicating the number of standard deviations from the consensus mean (Monthly Mean). The closer a laboratory's CPV is to zero, the more consistent its results are with the other participants' data.

SDr - For each laboratory, the average of the weekly within-lab standard deviations (SDr's) for all reported Weekly Means this month.

SD Wk - The standard deviation among the laboratory's weekly Means, including those Means flagged with an 'X'. The SD Wks is an indication of that laboratory's ability to obtain constant results from week to week.

#### Consensus Data

Month Mean - The average of the Means for all the participants, excluding those laboratories flagged with an 'X,' reporting data for this month.

Avg SDr - For the current month, the average of the within-laboratory standard deviations (SDr's) for all the participants, excluding those laboratories flagged with an 'X'.

SD btwn Labs - For the current month, the standard deviation of the laboratory Means about the Month Mean, excluding those laboratories flagged with an 'X'.

SD btwn Group - For the current month, the standard deviation of the laboratory Means within the group about the Month Mean, excluding those laboratories flagged with an 'X'.

SD btwn Wks - For the current month, the average of the laboratory between week standard deviations (SD Wks') for all

## Cumulative Results

### Laboratory Data

| | |
|---|---|
| Mean | - For each lab, the average of all the monthly Means reported for the weeks shown. |
| CPV | - Comparative Performance Value, an indication of how well a laboratory's cumulative mean agrees with the other participants. The CPV is a ratio indicating the number of standard deviations from the consensus mean (Monthly Mean). |
| SDr | - For each laboratory, the average of the weekly within-lab standard deviations (SDr's) for the weeks shown. |
| SD Wk | - The standard deviation among the laboratory's weekly Means for the weeks shown, including those Means flagged with an 'X'. The SD Wks is an indication of that laboratory's ability to obtain constant results from week to week. |
| Wks | - The number of weeks included in the cumulative period. |
| Inst | - The two letter instrument code. Codes are summarized at the bottom of the last analysis page. |

### Consensus Data

| | |
|---|---|
| Grand Mean | - The average of the Means for all the participants, excluding those laboratories flagged with an 'X,' reporting data for the number of weeks included in the cumulative period. |
| Avg SDr | - For the cumulative period, the average of the within-laboratory standard deviations (SDr's) for all the participants, excluding those laboratories flagged with an 'X'. |
| SD btwn Labs | - For the cumulative period, the standard deviation of the laboratory Means about the Month Mean, excluding those laboratories flagged with an 'X'. |
| SD btwn Wks | - For the cumulative period, the average of the laboratory between week standard deviations for all the participants. |

**Any laboratory that receives a 'flag' following a mean or standard deviation should refer to the chart below for an explanation of the data flag symbol:**

| Flag | Explanation |
|---|---|

Data Flags " X " and " * " indicate a laboratory's performance on an average value differed from the consensus.
Data Flags " H " and " L " indicate a laboratory's performance on a standard deviation differed from the consensus.

Flags assigned to Weekly Means, Monthly Mean and Cumulative Mean:

| | |
|---|---|
| X | Excluded from the weekly means, monthly means and/or the cumulative mean. Immediate review of data and/or testing procedure is recommended. |
| * | Included in the weekly means, monthly means and/or the cumulative mean; however, lab should review testing procedure and monitor future results. |

Flags assigned to Weekly Means:

| | |
|---|---|
| H | Indicates high within-laboratory standard deviation. The laboratory SDr for each week is not shown, but laboratory average SDr and consensus average SDr values are shown. |
| L | Indicates low within-laboratory standard deviation. The laboratory SDr for each week is not shown, but laboratory monthly average SDr and consensus average SDr values are shown. |

Flags assigned to Monthly SD Wks and Cumulative SD Wks:

| | |
|---|---|
| H | Indicates high variabilty between weekly means (high week-to-week variation). |
| L | Indicates low variabilty between weekly means (low week-to-week variation). |

**Report #554**

# Containerboard Interlaboratory Testing Program

Analysis 201

**Top to Bottom Box Compression Strength,** Corrugated Boxes - BOX9

TAPPI Official Test Method T804

| | Monthly Results | | | Cumulative Results | | | | |
|---|---|---|---|---|---|---|---|---|
| WebCode | Mean | CPV | SDr | Mean | CPV | SDr | Months | Inst |
| 3MQTLT | 951.0 | 1.34 | 30.7 | 927.9 | 1.43 | 29.3 | 4 | ER |
| 4F3THL | 938.1 | 1.17 | 98.0 | 827.8 | -0.23 | 66.6 | 4 | LH |
| 79WXCH | 799.0 | -0.71 | 56.4 | 837.6 | -0.06 | 55.9 | 4 | EX |
| 7DAFUZ | 801.3 | -0.68 | 15.2 | 805.8 | -0.59 | 43.3 | 4 | LM |
| 99ZEF7 | 793.6 | -0.79 | 75.1 | 815.1 | -0.44 | 62.2 | 4 | LL |
| AJ2284 | 836.1 | -0.21 | 46.4 | 836.1 | -0.09 | 46.4 | 1 | ET |
| CE3HZP | 716.4 | -1.83 | 81.3 | 740.8 | -1.66 | 77.2 | 4 | LG |
| DVJTK3 | 918.1 | 0.90 | 11.6 | 932.3 | 1.50 | 23.9 | 4 | TE |
| GZ634C | 941.0 | 1.21 | 30.3 | 876.8 | 0.58 | 43.8 | 4 | LH |
| HQXGGA | 874.2 | 0.30 | 37.8 | 897.9 | 0.93 | 38.6 | 4 | TB |
| JG326B | 974.2 | 1.65 | 22.8 | 947.9 | 1.76 | 67.0 | 4 | EX |
| MXV38J | 747.6 | -1.41 | 34.2 | 767.5 | -1.22 | 31.3 | 4 | ER |
| QEXJ8G | 857.8 | 0.08 | 84.4 | 852.4 | 0.18 | 73.0 | 4 | ES |
| RAW23K | 762.3 | -1.21 | 46.3 | 719.6 | -2.01 * | 74.1 | 3 | LS |
| RNHCX4 | 834.0 | -0.24 | 81.3 | 875.8 | 0.57 | 53.7 | 4 | ER |
| TRBTM3 | 952.0 | 1.35 | 115.8 | 866.7 | 0.42 | 70.9 | 4 | LM |
| U2GXBC | 814.6 | -0.50 | 46.4 | 788.7 | -0.87 | 59.4 | 4 | ER |
| VTVJMX | 850.0 | -0.02 | 72.3 | 856.2 | 0.24 | 61.9 | 4 | ER |
| XJ4KAX | 853.6 | 0.02 | 35.7 | 838.6 | -0.05 | 33.6 | 2 | ES |
| YBJ4UT | 820.6 | -0.42 | 63.9 | 818.2 | -0.38 | 66.8 | 4 | LS |

## Consensus (All Labs) Results

| | | | |
|---|---|---|---|
| Month Mean | 851.78 | Grand Mean | 841.48 |
| Avg SDr | 61.06 | Avg SDr | 56.31 |
| SD btwn Labs | 74.00 | SD btwn Labs | 60.54 |
| Labs Incld | 20 | Labs Incld | 20 |

## Consensus By Method

| Test Method | Group Mean | SD btwn Group | Difference from Grand Mean | Labs Included |
|---|---|---|---|---|
| Hot melt adhesive sealing | 823.17 | 91.95 | 28.62 | 4 |
| Clip sealing | 844.34 | 67.58 | 7.44 | 13 |
| Tape sealing | 922.17 | 50.12 | 70.39 | 3 |

**Report #554**

Containerboard Interlaboratory Testing Program

Analysis 201

**Top to Bottom Box Compression Strength,** Corrugated Boxes - BOX9

TAPPI Official Test Method T804

## Instrument Code List as Reported by the Labs

(ER) - Emerson 6200 Series

(ES) - Emerson 8510

(ET) - Emerson 7200

(EX) - Emerson Apparatus (Model not specified)

(LG) - TLS / L.A.B. Validator Series

(LH) - L.A.B. Compression Tester Model #10610

(LL) - Lansmont 76-5K

(LM) - Lansmont 122-15k

(LS) - Lansmont Squeezer

(TB) - TMI Monitor/Compression Tester, Model 17-70

(TE) - Testometric M500 - 25 KN

**Report #554**

# Containerboard Interlaboratory Testing Program

Analysis 202

**Edgewise Compressive Strength, by T811,** Corrugated board - ECT8

TAPPI T811

| | Monthly Results | | | Cumulative Results | | | | |
|---|---|---|---|---|---|---|---|---|
| WebCode | Mean | CPV | SDr | Mean | CPV | SDr | Months | Inst |
| 8PTPP4 | 59.4 | 0.62 | 2.3 | 54.1 | -0.92 | 2.4 | 4 | XX |
| C6CYLG | 55.8 | -0.39 | 0.8 | 58.4 | 0.71 | 1.1 | 4 | WK |
| GZ634C | 55.4 | -0.49 | 3.6 | 56.5 | -0.03 | 2.5 | 4 | TC |
| LDGVL7 | 54.0 | -0.91 | 1.9 | 55.1 | -0.53 | 2.2 | 4 | LC |
| RAW23K | 51.9 | -1.49 | 2.0 | 52.0 | -1.70 | 1.6 | 3 | EM |
| RNWY86 | 61.5 | 1.19 | 2.5 | 59.1 | 0.98 | 1.8 | 3 | TB |
| VTVJMX | 61.9 | 1.31 | 2.1 | 59.7 | 1.20 | 2.0 | 4 | EN |
| YBJ4UT | 57.8 | 0.16 | 1.6 | 57.3 | 0.29 | 2.4 | 4 | LC |

## Consensus (All Labs) Results

| | | | |
|---|---|---|---|
| Month Mean | 57.21 | Grand Mean | 56.54 |
| Avg SDr | 2.23 | Avg SDr | 2.06 |
| SD btwn Labs | 3.56 | SD btwn Labs | 2.66 |
| Labs Incld | 8 | Labs Incld | 8 |

## Instrument Code List as Reported by the Labs

(EM) - Emerson 1200 Series

(LC) - L&W Crush Tester 48

(TC) - TMI Monitor/Compression Tester, Model 17-37

(XX) - Instrument make/model not specified by lab

(EN) - Emerson 2200

(TB) - TMI Monitor/Compression Tester, Model 17-70

(WK) - Zwick Z005 Crush Tester

**Report #554**

# Containerboard Interlaboratory Testing Program

Analysis 203

**Edgewise Compressive Strength by T839,** Corrugated board - ECT8

TAPPI T839

| | Monthly Results | | | Cumulative Results | | | | |
|---|---|---|---|---|---|---|---|---|
| WebCode | Mean | CPV | SDr | Mean | CPV | SDr | Months | Inst |
| 2FDKKR | 52.6 | -2.42 * | 1.7 | 56.8 | -1.50 | 1.5 | 4 | TG |
| 3MQTLT | 59.3 | -0.43 | 2.0 | 57.3 | -1.27 | 1.8 | 4 | EM |
| 4F3THL | 67.0 | 1.84 | 3.4 | 61.6 | 0.75 | 3.9 | 4 | EM |
| 687C7M | 58.5 | -0.69 | 1.8 | 58.3 | -0.78 | 2.1 | 4 | EX |
| 6HA8PR | 65.0 | 1.25 | 1.8 | 61.4 | 0.67 | 1.8 | 4 | LC |
| 79WXCH | 63.6 | 0.81 | 2.2 | 62.5 | 1.18 | 2.0 | 4 | TL |
| 7DAFUZ | 62.7 | 0.57 | 2.2 | 60.3 | 0.16 | 1.9 | 4 | EM |
| 7NA7DL | 54.9 | -1.75 | 1.7 | 56.2 | -1.77 | 2.0 | 4 | TD |
| 8YLVQH | 61.1 | 0.09 | 1.9 | 57.3 | -1.27 | 3.7 | 4 | EM |
| 99ZEF7 | 58.5 | -0.67 | 2.1 | 57.1 | -1.33 | 1.6 | 4 | BU |
| AJ2284 | 66.8 | 1.75 | 3.4 | 66.8 | 3.17 X | 3.4 | 1 | TD |
| ATRMD2 | 59.8 | -0.28 | 1.4 | 62.4 | 1.13 | 2.2 | 4 | LD |
| GZ634C | 62.9 | 0.63 | 1.1 | 62.7 | 1.29 | 1.2 | 4 | TC |
| HHJV6K | 62.6 | 0.53 | 1.7 | 62.2 | 1.04 | 2.5 | 4 | LD |
| HQXGGA | 61.7 | 0.27 | 1.4 | 60.8 | 0.36 | 1.1 | 4 | LC |
| JCP3QW | 61.4 | 0.16 | 1.6 | 61.6 | 0.76 | 1.5 | 4 | LC |
| JG326B | 65.2 | 1.28 | 1.9 | 61.5 | 0.72 | 2.2 | 4 | CT |
| JLUA7V | 60.3 | -0.14 | 2.1 | 57.8 | -1.01 | 1.9 | 4 | TB |
| K66KTE | 67.4 | 1.93 | 2.3 | 60.2 | 0.10 | 3.3 | 4 | LC |
| LDGVL7 | 60.5 | -0.08 | 2.0 | 62.6 | 1.21 | 1.8 | 4 | LC |
| LWPYJB | 60.1 | -0.21 | 2.0 | 61.6 | 0.77 | 2.2 | 3 | TK |
| MXV38J | 63.8 | 0.89 | 2.3 | 61.4 | 0.68 | 3.0 | 4 | LD |
| N7TRQ9 | 63.4 | 0.77 | 1.2 | 63.4 | 1.60 | 1.2 | 1 | LC |
| QEXJ8G | 61.6 | 0.24 | 2.7 | 62.1 | 0.97 | 2.5 | 4 | LD |
| QXNXK6 | 55.3 | -1.62 | 3.0 | 56.8 | -1.51 | 2.6 | 2 | LC |
| RAW23K | 58.8 | -0.60 | 2.0 | 59.6 | -0.16 | 1.7 | 3 | EM |
| RNHCX4 | 60.6 | -0.05 | 2.2 | 58.5 | -0.70 | 1.7 | 4 | TB |
| RNWY86 | 62.2 | 0.40 | 2.0 | 59.1 | -0.42 | 1.6 | 3 | TG |
| TRBTM3 | 61.1 | 0.08 | 2.2 | 58.9 | -0.49 | 1.7 | 4 | TC |
| U2GXBC | 57.6 | -0.94 | 3.7 | 59.2 | -0.39 | 3.0 | 4 | EN |
| UB32JC | 60.2 | -0.16 | 1.9 | 60.6 | 0.29 | 2.8 | 4 | LD |
| UYP2N4 | 59.8 | -0.29 | 1.9 | 58.8 | -0.54 | 2.0 | 4 | TM |
| VK3B38 | 57.8 | -0.89 | 1.1 | 72.7 | 5.95 X | 3.8 | 4 | LC |
| VTVJMX | 60.5 | -0.07 | 1.8 | 61.4 | 0.68 | 2.0 | 4 | EN |
| YBJ4UT | 59.2 | -0.47 | 2.4 | 61.0 | 0.45 | 2.1 | 4 | LC |
| YKU7FT | 54.8 | -1.75 | 2.1 | 56.4 | -1.69 | 2.6 | 3 | LD |

**Report #554**

# Containerboard Interlaboratory Testing Program

Analysis 203

**Edgewise Compressive Strength by T839,** Corrugated board - ECT8

TAPPI T839

## Consensus (All Labs) Results

| | | | |
|---|---|---|---|
| Month Mean | 60.79 | Grand Mean | 59.98 |
| Avg SDr | 2.14 | Avg SDr | 2.24 |
| SD btwn Labs | 3.40 | SD btwn Labs | 2.14 |
| Labs Incld | 36 | Labs Incld | 34 |

## Instrument Code List as Reported by the Labs

(BU) - Buchel Digital Crush Tester

(CT) - Con-Ten

(EM) - Emerson 1200 Series

(EN) - Emerson 2200

(EX) - Emerson (model not specified)

(LC) - L&W Crush Tester 48

(LD) - L&W Crush Tester 248

(TB) - TMI Monitor/Compression Tester, Model 17-70

(TC) - TMI Monitor/Compression Tester, Model 17-37

(TD) - TMI Digital Crush Tester, Model 17-09

(TG) - TMI Digital Crush Tester, 17-76

(TK) - TLS Compression Tester, Model 5184

(TL) - Tech-Lab Systems Compression

(TM) - TMI/Hinde & Dausch

**Report #554**

# Containerboard Interlaboratory Testing Program

Analysis 205

**Bursting Strength (Mullen),** 42 lb Linerboard - 42D1

TAPPI Official Test Method T807

| | Weekly Means | | | | Monthly Results | | | | Cumulative Results | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WebCode | Week 1 | Week 2 | Week 3 | Week 4 | Mean | CPV | SDr | SD Wks | Mean | CPV | SDr | SD Wks | Wks | Inst |
| 23NDDV | 105.2 | 107.4 | 107.7 | 110.8 | 107.8 | -0.40 | 11.9 | 2.3 | 108.0 | -0.40 | 11.0 | 2.9 | 16 | LA |
| 29UGCP | 103.0 | 102.2 | 102.9 | 112.3 | 105.1 | -1.29 | 9.8 | 4.8 | 106.6 | -0.88 | 10.9 | 3.9 | 12 | LC |
| 2G8BP7 | 107.5 | 105.9 | 107.2 | 107.3 | 107.0 | -0.65 | 7.8 | 0.7 | 107.4 | -0.58 | 8.5 | 1.4 | 16 | LA |
| 7DAFUZ | 105.8 | 103.7 | 102.2 | 108.9 | 105.1 | -1.27 | 11.8 | 2.9 | 107.7 | -0.47 | 9.6 | 2.7 | 16 | AH |
| 7MR3W9 | 105.8 | 100.6 *L | 109.4 | 101.4 | 104.3 | -1.56 | 6.6 | 4.1 | 105.0 | -1.41 | 6.8 | 3.4 | 16 | RE |
| 9493MV | 108.5 | 106.4 | 102.2 | 107.7 | 106.2 | -0.92 | 11.2 | 2.8 | 103.7 | -1.85 | 10.9 | 2.4 | 16 | LA |
| 9D3B8L | 111.6 L | 109.5 | 106.4 | 107.1 | 108.6 | -0.11 | 10.9 | 2.4 | 111.4 | 0.77 | 11.2 | 3.3 | 16 | LZ |
| 9X8XQ6 | 115.1 | 107.9 | 112.3 | 116.7 | 113.0 | 1.35 | 12.1 | 3.9 | 111.1 | 0.67 | 12.3 | 3.5 | 16 | TP |
| 9YE9PU | 104.0 | 105.2 | 106.1 | 102.9 | 104.5 | -1.48 | 12.0 | 1.4 | 105.9 | -1.10 | 11.2 | 4.4 | 16 | LC |
| BUH49V | 108.5 | 116.0 | 113.4 | 110.1 | 112.0 | 1.01 | 12.4 | 3.4 | 108.8 | -0.12 | 11.9 | 7.0 H | 16 | LA |
| CH3TWP | 113.4 | 114.0 | 105.4 | 106.5 | 109.8 | 0.28 | 10.7 | 4.5 | 107.8 | -0.46 | 10.6 | 3.3 | 15 | LC |
| DK7NFR | 119.6 * | 118.3 * | 120.3 * | 116.0 L | 118.6 | 3.20 X | 9.6 | 1.9 | 116.3 | 2.45 * | 10.4 | 3.0 | 16 | LA |
| DTYYPM | 108.5 | 111.5 | 111.1 | 110.3 | 110.3 | 0.45 | 11.7 | 1.3 | 110.0 | 0.29 | 11.3 | 2.8 | 16 | LA |
| DU8B8P | 108.6 | 109.3 | 104.3 | 109.4 | 107.9 | -0.36 | 11.3 | 2.4 | 111.1 | 0.69 | 25.4 | 7.7 H | 16 | LC |
| EGJNCG | 112.6 | 106.7 | 107.2 | 109.8 | 109.1 | 0.04 | 9.9 | 2.7 | 108.3 | -0.28 | 11.1 | 2.3 | 16 | LJ |
| ELBVVQ | 110.6 | 109.1 | 112.9 | 111.4 | 111.0 | 0.68 | 15.2 | 1.6 | 109.8 | 0.23 | 12.5 | 3.5 | 16 | AX |
| EZC8QP | 106.2 | 103.3 | 103.7 | 111.3 | 106.1 | -0.95 | 10.1 | 3.7 | 104.8 | -1.47 | 10.8 | 3.0 | 15 | AH |
| FAV2HC | 106.9 | 108.8 | 100.9 | 101.4 | 104.5 | -1.50 | 7.8 | 4.0 | 106.5 | -0.89 | 8.2 | 7.0 H | 16 | AX |
| G8P3JN | 108.9 | 106.7 | 104.5 | 106.4 H | 106.6 | -0.79 | 13.3 | 1.8 | 108.6 | -0.16 | 11.8 | 3.3 | 12 | LZ |
| GQYVNC | 104.9 | 113.1 | 113.1 | 111.2 | 110.6 | 0.54 | 11.5 | 3.9 | 113.6 | 1.54 | 15.5 | 4.3 | 16 | LC |
| GZ634C | 116.5 | 110.5 | 114.5 | 115.5 | 114.3 | 1.76 | 12.0 | 2.6 | 113.7 | 1.57 | 12.9 | 2.6 | 16 | AA |
| HBL7NF | 106.3 | 106.6 | 112.9 | 113.2 | 109.7 | 0.26 | 11.8 | 3.8 | 111.1 | 0.69 | 11.7 | 3.2 | 16 | LC |
| JG326B | 109.8 H | 106.6 | 111.8 | 114.5 | 110.7 | 0.57 | 14.4 | 3.3 | 112.6 | 1.19 | 15.6 | 3.4 | 16 | XX |
| K66KTE | 108.7 | 108.5 | 115.0 | 108.9 | 110.3 | 0.44 | 11.2 | 3.2 | 110.0 | 0.32 | 11.4 | 3.0 | 16 | LA |
| MGT9UR | 108.9 | 111.0 | 110.3 | 106.4 | 109.2 | 0.06 | 7.9 | 2.0 | 108.3 | -0.27 | 8.9 | 2.6 | 16 | AH |
| MNUH8C | 110.6 | 109.8 | 112.0 | 109.5 | 110.5 | 0.50 | 11.8 | 1.1 | 109.4 | 0.11 | 11.8 | 3.8 | 16 | LA |
| MXV38J | 117.0 | 111.8 | 111.4 | 108.3 | 112.1 | 1.06 | 11.5 | 3.6 | 112.0 | 1.00 | 12.0 | 3.8 | 16 | AH |
| NE2LL2 | 103.4 | 104.5 | 102.6 | 106.4 | 104.2 | -1.58 | 10.0 | 1.6 | 102.6 | -2.23 * | 11.5 | 1.8 | 12 | XX |
| NWZK7G | 112.2 | 112.0 | 108.6 | NO DATA | 110.9 | 0.66 | 12.5 | 2.0 | 108.3 | -0.26 | 11.8 | 2.8 | 15 | TB |
| NZH4QC | 117.7 * | 112.0 | 113.4 | 114.2 | 114.3 | 1.79 | 12.3 | 2.5 | 113.9 | 1.65 | 12.4 | 2.5 | 16 | LA |
| PUQUGD | 108.2 | 112.5 | 110.6 | 115.3 | 111.6 | 0.90 | 12.0 | 3.0 | 110.6 | 0.51 | 11.9 | 2.3 | 16 | TB |
| PV3TD9 | 105.4 | 107.3 | 104.8 | 104.4 | 105.5 | -1.16 | 10.7 | 1.3 | 107.5 | -0.57 | 11.4 | 2.9 | 16 | LC |
| QEXJ8G | 112.3 H | 111.1 | 105.0 | 103.4 | 108.0 | -0.34 | 13.3 | 4.4 | 109.3 | 0.06 | 12.3 | 3.3 | 16 | LA |
| QWREJ4 | 108.3 | 115.1 | 113.6 | 115.5 | 113.1 | 1.39 | 9.0 | 3.3 | 110.7 | 0.53 | 11.8 | 5.2 | 16 | LC |
| RAW23K | 95.5 X | 99.0 * | 100.8 | 101.4 | 99.2 | -3.27 X | 9.0 | 2.6 | 99.5 | -3.28 X | 9.1 | 2.8 | 12 | RE |

**Report #554**

# Containerboard Interlaboratory Testing Program

Analysis 205

**Bursting Strength (Mullen),** 42 lb Linerboard - 42D1

TAPPI Official Test Method T807

| WebCode | Weekly Means Week 1 | Week 2 | Week 3 | Week 4 | Monthly Results Mean | CPV | SDr | SD Wks | Cumulative Results Mean | CPV | SDr | SD Wks | Wks | Inst |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RNHCX4 | 107.9 | 109.5 | 109.0 | 108.3 | 108.7 | -0.10 | 10.3 | 0.7 | 107.5 | -0.57 | 11.3 | 2.7 | 16 | LA |
| TKRPFZ | 108.2 L | 110.8 L | 110.8 L | 109.2 | 109.8 | 0.26 | 4.4 | 1.3 | 109.6 | 0.17 | 9.6 | 2.7 | 16 | AX |
| TQYP34 | 112.6 | 113.9 | 117.5 | No Data | 114.7 | 1.91 | 11.3 | 2.6 | 114.1 | 1.69 | 12.0 | 2.1 | 14 | LZ |
| TT7CP4 | 110.7 | 109.0 | 107.9 | 113.7 | 110.3 | 0.46 | 10.0 | 2.5 | 110.2 | 0.39 | 12.3 | 3.9 | 16 | LJ |
| UB32JC | 108.2 | 102.2 L | 105.8 | 104.4 | 105.1 | -1.27 | 6.8 | 2.5 | 104.3 | -1.66 | 7.7 | 2.9 | 16 | LA |
| VCCWR3 | 113.6 | 109.6 | 116.2 | 115.6 | 113.7 | 1.59 | 10.6 | 3.0 | 112.4 | 1.14 | 9.7 | 2.6 | 12 | LC |
| VK3B38 | 107.3 | 112.7 | 109.5 | 110.9 | 110.1 | 0.38 | 10.0 | 2.3 | 105.4 | -1.26 | 10.9 | 3.5 | 16 | LA |
| WU8FT3 | 110.7 L | 105.4 L | 108.4 L | 107.1 L | 107.9 | -0.35 | 4.5 | 2.2 | 109.5 | 0.12 | 5.1 | 2.4 | 12 | LA |
| XHRGPY | 106.5 | 108.6 | 104.4 | 97.1 X | 104.1 | -1.61 | 6.8 | 5.0 | 108.8 | -0.12 | 8.7 | 4.6 | 16 | TB |
| XKCZG4 | 113.6 | 109.2 | 110.4 | 84.2 XL | 104.3 | -1.54 | 10.4 | 13.6 H | 108.6 | -0.19 | 10.3 | 7.1 H | 16 | AH |
| YBJ4UT | 103.1 | 109.9 | 110.1 | 104.8 | 107.0 | -0.66 | 10.1 | 3.6 | 104.8 | -1.46 | 9.5 | 2.5 | 16 | AH |
| YKU7FT | 104.1 | 114.9 | 111.8 | 111.2 | 110.5 | 0.51 | 9.0 | 4.6 | 112.0 | 0.99 | 9.7 | 3.2 | 12 | AA |
| YXV2CZ | 109.0 | 115.0 | 107.6 | 111.3 | 110.7 | 0.59 | 12.7 | 3.2 | 108.1 | -0.36 | 11.2 | 2.9 | 16 | LC |
| YYRHNX | 109.1 | 109.2 | 109.3 | 109.2 | 109.2 | 0.08 | 8.3 | 0.1 L | 108.8 | -0.10 | 6.6 | 0.7 | 16 | LJ |
| Z4ZT8W | 112.5 | 108.0 | 109.8 | 109.9 | 110.1 | 0.36 | 9.1 | 1.9 | 110.0 | 0.32 | 10.1 | 2.4 | 16 | LB |

## Consensus (All Labs) Results

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Wk Mean | 109.33 | 109.03 | 108.98 | 109.37 | Month Mean | 108.96 | Grand Mean | 109.11 |
| Avg SDr | 10.73 | 10.57 | 10.63 | 10.86 | Avg SDr | 10.72 | Avg SDr | 11.45 |
| SD btwn Labs | 3.90 | 4.05 | 4.44 | 4.10 | SD btwn Labs | 3.00 | SD btwn Labs | 2.93 |
| Labs Incld | 49 | 50 | 50 | 46 | SD btwn Wks | 3.51 | SD btwn Wks | 3.64 |
| Labs Excld | 1 | 0 | 0 | 2 | Labs Incld | 48 | Labs Incld | 49 |
| Labs not rcvd | 0 | 0 | 0 | 2 | | | | |

## Instrument Code List as Reported by the Labs

(AA) - Perkins Model A

(AH) - Perkins Model AH

(AX) - Perkins Mullen Tester (model not specified)

(LA) - L & W Bursting Strength Tester

(LB) - L & W Burst-O-Matic

(LC) - L & W Autoline

(LJ) - L & W Bursting Strength Tester J-Type

(LZ) - L & W (model not specified)

(RE) - Regmed/Mullen Tester

(TB) - TMI Monitor/Burst 1000

(TP) - Technidyne PROFILE/Plus

(XX) - Instrument make/model not specified by lab

**Report #554**

# Containerboard Interlaboratory Testing Program

Analysis 206

**Bursting Strength (Mullen),** 69 lb Linerboard - 69C2

TAPPI Official Test Method T807

| | Weekly Means | | | | Monthly Results | | | | Cumulative Results | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WebCode | Week 1 | Week 2 | Week 3 | Week 4 | Mean | CPV | SDr | SD Wks | Mean | CPV | SDr | SD Wks | Wks | Inst |
| 23NDDV | 154.8 | 156.4 | 162.8 | 162.2 | 159.1 | 0.80 | 13.1 | 4.0 | 157.1 | 0.41 | 13.2 | 3.9 | 12 | LA |
| 29UGCP | 148.3 | 143.4 | 152.6 | 149.3 | 148.4 | -1.24 | 12.9 | 3.8 | 150.8 | -0.90 | 11.5 | 5.5 | 8 | LC |
| 2G8BP7 | 160.2 | 156.8 | 157.6 | 158.9 L | 158.4 | 0.67 | 9.8 | 1.5 | 158.9 | 0.78 | 8.6 | 2.2 | 12 | LA |
| 7DAFUZ | 155.3 | 155.7 | 151.9 | 152.9 | 153.9 | -0.18 | 7.8 | 1.8 | 155.8 | 0.13 | 9.9 | 3.1 | 12 | AH |
| 7MR3W9 | 154.0 L | 151.8 | 152.8 | 148.6 | 151.8 | -0.59 | 10.5 | 2.3 | 152.9 | -0.47 | 10.6 | 3.8 | 12 | RE |
| 9493MV | 158.3 | 152.5 | 160.2 | 151.7 | 155.7 | 0.15 | 11.8 | 4.2 | 153.6 | -0.34 | 11.2 | 4.0 | 12 | LA |
| 9D3B8L | 154.4 | 153.7 | 156.8 | 157.1 | 155.5 | 0.12 | 11.9 | 1.7 | 156.1 | 0.20 | 11.1 | 2.8 | 12 | LZ |
| 9X8XQ6 | 152.0 | 140.5 * | 145.0 | 154.7 | 148.1 | -1.30 | 9.7 | 6.5 | 151.8 | -0.70 | 9.6 | 4.6 | 12 | TP |
| 9YE9PU | 155.1 | 149.6 | 151.2 | 147.2 | 150.8 | -0.78 | 12.3 | 3.3 | 147.5 | -1.60 | 12.7 | 7.4 H | 12 | LC |
| BUH49V | 163.7 | 158.2 | 159.0 | 157.9 H | 159.7 | 0.92 | 15.5 | 2.7 | 156.5 | 0.28 | 15.0 | 10.3 H | 12 | LA |
| CH3TWP | 165.7 | 152.6 | 152.1 | 150.2 | 155.1 | 0.05 | 10.5 | 7.1 | 156.7 | 0.31 | 11.8 | 4.9 | 12 | LA |
| DK7NFR | 166.6 | 164.8 | 173.5 X | 168.2 * | 168.3 | 2.56 * | 10.9 | 3.8 | 166.5 | 2.35 * | 10.6 | 3.0 | 12 | LA |
| DTYYPM | 150.6 | 158.4 | 153.2 | 154.7 | 154.2 | -0.12 | 11.0 | 3.2 | 156.8 | 0.33 | 12.0 | 4.6 | 12 | LA |
| DU8B8P | 154.9 | 145.4 | 150.3 | 157.1 | 151.9 | -0.57 | 10.6 | 5.2 | 152.3 | -0.59 | 9.3 | 4.6 | 12 | LC |
| EGJNCG | 151.2 | 158.1 | 152.2 | 147.5 | 152.2 | -0.50 | 11.5 | 4.4 | 154.5 | -0.15 | 10.5 | 3.7 | 8 | LJ |
| ELBVVQ | 159.3 | 156.6 | 155.6 | 159.0 | 157.6 | 0.53 | 13.5 | 1.8 | 158.1 | 0.61 | 13.0 | 3.3 | 12 | AX |
| EZC8QP | 148.6 | 149.5 | 158.4 | 151.1 | 151.9 | -0.57 | 10.7 | 4.5 | 152.0 | -0.66 | 11.4 | 3.7 | 12 | AH |
| FAV2HC | 142.8 * | 142.9 * | 141.3 * | 144.6 | 142.9 | -2.29 * | 9.1 | 1.3 | 147.3 | -1.64 | 9.1 | 4.3 | 12 | AX |
| G8P3JN | 151.8 | 151.6 | 151.6 | 156.1 | 152.8 | -0.40 | 11.6 | 2.2 | 153.1 | -0.43 | 9.6 | 4.3 | 12 | LZ |
| GQYVNC | 160.8 | 163.2 | 161.6 | 157.8 | 160.9 | 1.14 | 12.4 | 2.3 | 161.6 | 1.35 | 17.8 | 8.8 H | 12 | LC |
| GZ634C | 153.8 | 155.5 | 159.0 | 154.8 | 155.8 | 0.17 | 11.0 | 2.3 | 155.3 | 0.02 | 11.9 | 4.3 | 12 | AA |
| HBL7NF | 156.5 | 156.5 | 156.3 | 150.5 | 155.0 | 0.01 | 10.8 | 2.9 | 155.1 | -0.03 | 10.7 | 3.1 | 12 | XX |
| JG326B | 164.1 | 163.5 | 167.3 * | 164.8 | 164.9 | 1.92 | 13.4 | 1.7 | 164.4 | 1.92 | 12.9 | 4.4 | 12 | XX |
| K66KTE | 150.7 | 154.1 | 151.4 | 148.1 | 151.1 | -0.73 | 9.4 | 2.5 | 155.5 | 0.08 | 9.7 | 4.7 | 12 | LA |
| MGT9UR | 151.6 | 157.7 | 150.2 | 149.5 | 152.3 | -0.50 | 10.0 | 3.7 | 153.8 | -0.28 | 9.9 | 3.2 | 12 | AH |
| MNUH8C | 154.7 | 159.0 | 149.9 | 157.4 | 155.3 | 0.07 | 10.4 | 4.0 | 154.5 | -0.14 | 10.6 | 3.9 | 12 | LA |
| MXV38J | 159.9 | 159.1 | 160.8 | 160.1 | 160.0 | 0.97 | 10.4 | 0.7 L | 160.5 | 1.11 | 11.3 | 3.0 | 12 | AH |
| NE2LL2 | 143.9 * | 147.0 | 146.7 | 146.3 | 146.0 | -1.70 | 11.4 | 1.4 | 147.9 | -1.52 | 11.5 | 3.0 | 8 | XX |
| NWZK7G | 154.1 | 155.0 | 155.5 | NO DATA | 154.9 | 0.00 | 11.6 | 0.7 L | 154.0 | -0.25 | 12.2 | 2.9 | 10 | TB |
| NZH4QC | 161.2 | 165.3 | 154.8 | 150.5 | 157.9 | 0.58 | 11.7 | 6.6 | 155.2 | 0.01 | 11.4 | 4.8 | 12 | LA |
| PUQUGD | 160.3 | 153.7 | 154.4 | 165.5 | 158.5 | 0.69 | 11.8 | 5.5 | 157.0 | 0.37 | 12.8 | 3.6 | 12 | TB |
| PV3TD9 | 149.5 | 154.6 | 151.0 | 151.6 | 151.7 | -0.61 | 12.5 | 2.1 | 150.3 | -1.02 | 12.3 | 3.0 | 12 | LC |
| QEXJ8G | 161.0 | 154.4 | 150.8 | 156.2 | 155.6 | 0.14 | 9.0 | 4.2 | 157.5 | 0.48 | 11.5 | 5.0 | 12 | LA |
| RAW23K | 141.3 * | 143.3 | 143.9 * | 141.5 * | 142.5 | -2.36 * | 10.8 | 1.3 | 142.7 | -2.60 * | 10.4 | 2.1 | 8 | RE |
| RNHCX4 | 153.1 | 147.6 | 158.9 | 152.5 | 153.0 | -0.35 | 11.1 | 4.6 | 154.0 | -0.25 | 10.9 | 4.0 | 12 | LA |

**Report #554**

# Containerboard Interlaboratory Testing Program

Analysis 206

**Bursting Strength (Mullen),** 69 lb Linerboard - 69C2

TAPPI Official Test Method T807

| | Weekly Means | | | | Monthly Results | | | | Cumulative Results | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WebCode | Week 1 | Week 2 | Week 3 | Week 4 | Mean | CPV | SDr | SD Wks | Mean | CPV | SDr | SD Wks | Wks | Inst |
| TKRPFZ | 152.8 | 159.0 L | 153.6 L | 155.6 L | 155.3 | 0.07 | 5.1 | 2.8 | 154.0 | -0.25 | 5.5 | 2.1 | 11 | AX |
| TQYP34 | 164.0 | 153.2 | 162.2 | No Data | 159.8 | 0.94 | 9.6 | 5.8 | 160.7 | 1.14 | 11.1 | 5.4 | 11 | LZ |
| TT7CP4 | 156.1 | 158.0 | 158.2 | 149.6 | 155.5 | 0.11 | 12.9 | 4.0 | 157.3 | 0.44 | 11.7 | 3.5 | 12 | LJ |
| UB32JC | 151.6 | 154.5 | 152.9 | 153.9 | 153.2 | -0.32 | 8.5 | 1.3 | 152.1 | -0.65 | 8.7 | 3.1 | 12 | LA |
| VCCWR3 | 153.4 | 160.4 | 156.8 | 164.0 | 158.7 | 0.72 | 10.5 | 4.6 | 157.0 | 0.39 | 10.9 | 3.9 | 12 | LC |
| VK3B38 | 155.2 | 153.6 | 160.0 | 154.6 | 155.8 | 0.18 | 11.0 | 2.8 | 149.8 | -1.11 | 10.9 | 5.1 | 12 | LA |
| WU8FT3 | 163.2 | 163.3 | 158.8 | 169.4 * | 163.7 | 1.68 | 9.1 | 4.4 | 165.3 | 2.11 * | 8.9 | 5.3 | 12 | LA |
| XHRGPY | 164.8 | 161.1 | 151.6 | 160.0 | 159.4 | 0.85 | 11.2 | 5.6 | 162.5 | 1.52 | 10.7 | 5.0 | 12 | TB |
| XKCZG4 | 152.2 | 152.0 | 150.0 | 117.9 XL | 143.0 | -2.27 * | 10.1 | 16.8 H | 147.4 | -1.63 | 10.6 | 10.4 H | 12 | AH |
| YBJ4UT | 152.5 | 157.1 | 157.4 | 151.3 H | 154.6 | -0.06 | 13.7 | 3.1 | 150.7 | -0.93 | 11.6 | 6.2 | 12 | AH |
| YKU7FT | 158.9 | 153.5 | 151.7 | 159.5 | 155.9 | 0.20 | 12.3 | 3.9 | 156.6 | 0.29 | 12.7 | 3.0 | 12 | AA |
| YXV2CZ | 155.0 | 159.1 | 149.7 | 150.6 | 153.6 | -0.24 | 12.4 | 4.3 | 155.4 | 0.05 | 11.0 | 3.8 | 12 | LC |
| YYRHNX | 155.7 | 155.5 | 155.6 | 155.6 | 155.6 | 0.14 | 9.9 | 0.1 L | 155.6 | 0.08 | 9.6 | 0.1 L | 12 | LJ |
| Z4ZT8W | 161.0 | 163.8 | 163.1 | 158.8 | 161.7 | 1.30 | 10.1 | 2.3 | 161.8 | 1.38 | 9.6 | 1.9 | 12 | LB |

## Consensus (All Labs) Results

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Wk Mean | 155.52 | 154.94 | 154.55 | 154.76 | Month Mean | 154.88 | Grand Mean | 155.17 |
| Avg SDr | 11.40 | 11.23 | 11.11 | 10.84 | Avg SDr | 11.13 | Avg SDr | 11.21 |
| SD btwn Labs | 5.79 | 5.83 | 5.26 | 6.12 | SD btwn Labs | 5.23 | SD btwn Labs | 4.80 |
| Labs Incld | 49 | 49 | 48 | 46 | SD btwn Wks | 4.34 | SD btwn Wks | 4.61 |
| Labs Excld | 0 | 0 | 1 | 1 | Labs Incld | 49 | Labs Incld | 49 |
| Labs not rcvd | 0 | 0 | 0 | 2 | | | | |

## Instrument Code List as Reported by the Labs

(AA) - Perkins Model A

(AH) - Perkins Model AH

(AX) - Perkins Mullen Tester (model not specified)

(LA) - L & W Bursting Strength Tester

(LB) - L & W Burst-O-Matic

(LC) - L & W Autoline

(LJ) - L & W Bursting Strength Tester J-Type

(LZ) - L & W (model not specified)

(RE) - Regmed/Mullen Tester

(TB) - TMI Monitor/Burst 1000

(TP) - Technidyne PROFILE/Plus

(XX) - Instrument make/model not specified by lab

**Report #554**

# Containerboard Interlaboratory Testing Program

## Analysis 215

## **Ring Crush,** 42 lb Linerboard - 42D1

TAPPI Official Test Method T822

| | Weekly Means | | | | Monthly Results | | | | Cumulative Results | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WebCode | Week 1 | Week 2 | Week 3 | Week 4 | Mean | CPV | SDr | SD Wks | Mean | CPV | SDr | SD Wks | Wks | Inst |
| 23NDDV | 83.2 | 85.4 | 87.1 | 90.0 | 86.4 | -0.05 | 3.7 | 2.9 | 85.7 | -0.19 | 3.1 | 3.2 | 16 | LC |
| 29UGCP | 92.5 | 88.3 | 93.7 | 96.0 | 92.6 | 1.53 | 4.1 | 3.2 | 91.1 | 1.42 | 3.9 | 3.1 | 12 | LD |
| 2FDKKR | 86.6 | 87.7 | 87.0 | 87.3 | 87.1 | 0.13 | 3.0 | 0.4 L | 89.2 | 0.86 | 3.0 | 2.1 | 16 | TH |
| 2G8BP7 | 83.8 | 83.9 | 84.5 | 83.4 L | 83.9 | -0.71 | 3.3 | 0.5 L | 83.3 | -0.87 | 3.4 | 1.2 | 16 | LD |
| 3MQTLT | 83.0 | 83.8 | 80.0 | 80.9 | 81.9 | -1.20 | 3.1 | 1.8 | 81.3 | -1.46 | 2.6 | 2.0 | 16 | EX |
| 3WACWD | 89.3 | 85.3 | 86.9 | 89.7 | 87.8 | 0.29 | 4.3 | 2.1 | 88.1 | 0.53 | 3.9 | 1.5 | 12 | TH |
| 4F3THL | 95.1 * | 95.8 * | 92.1 L | 93.3 | 94.1 | 1.90 | 3.3 | 1.7 | 86.0 | -0.09 | 3.9 | 7.9 H | 16 | EM |
| 7DAFUZ | 86.2 | 87.3 | 87.0 | 88.4 | 87.2 | 0.15 | 3.7 | 0.9 | 85.3 | -0.29 | 3.1 | 3.4 | 16 | EM |
| 7MR3W9 | 92.7 | 93.0 | 93.5 | 94.2 | 93.4 | 1.72 | 3.8 | 0.7 | 87.9 | 0.46 | 3.6 | 5.2 | 16 | LZ |
| 7NA7DL | 94.1 L | 91.3 L | 91.7 L | 92.5 L | 92.4 | 1.48 | 1.1 | 1.3 | 92.3 | 1.76 | 1.6 | 2.2 | 16 | TD |
| 8YLVQH | 82.0 | 76.4 * | 85.7 | 69.5 X | 78.4 | -2.12 * | 5.1 | 7.0 H | 79.0 | -2.14 * | 3.8 | 4.2 | 16 | EM |
| 9493MV | 88.2 | 85.9 | 85.6 | 83.4 | 85.8 | -0.22 | 4.4 | 1.9 | 84.6 | -0.50 | 3.9 | 1.5 | 16 | LD |
| 9X8XQ6 | 88.2 | 88.3 | 86.3 | 90.5 | 88.3 | 0.43 | 3.5 | 1.7 | 87.3 | 0.29 | 3.4 | 1.9 | 16 | TH |
| 9YE9PU | 89.0 | 87.5 | 90.0 | 88.9 | 88.9 | 0.57 | 3.9 | 1.0 | 87.2 | 0.26 | 4.4 | 7.0 H | 16 | LC |
| B8PHHL | 81.3 H | 82.6 | 80.6 | 80.8 | 81.3 | -1.37 | 6.1 | 0.9 | 83.1 | -0.93 | 6.8 | 3.1 | 16 | MB |
| BUH49V | 92.0 | 89.2 | 87.8 | 90.0 | 89.8 | 0.80 | 3.5 | 1.8 | 88.3 | 0.59 | 5.7 | 11.3 H | 15 | LC |
| CH3TWP | 92.4 H | 87.5 H | 82.0 | 90.4 | 88.1 | 0.37 | 6.0 | 4.5 | 74.5 | -3.46 X | 8.0 | 22.1 H | 15 | LA |
| DK7NFR | 93.2 | 88.8 | 85.8 | 88.9 | 89.2 | 0.65 | 4.1 | 3.0 | 87.7 | 0.40 | 4.0 | 3.2 | 16 | LZ |
| DTYYPM | 91.9 | 92.7 | 93.7 | 94.3 | 93.2 | 1.67 | 3.8 | 1.1 | 91.1 | 1.39 | 3.7 | 1.7 | 16 | LD |
| DU8B8P | 91.6 | 90.6 | 93.8 H | 92.9 | 92.2 | 1.43 | 4.7 | 1.4 | 91.9 | 1.63 | 4.1 | 1.4 | 16 | LC |
| DVJTK3 | 86.2 | 86.8 | 86.6 | 88.7 | 87.1 | 0.11 | 3.9 | 1.1 | 86.8 | 0.15 | 3.4 | 1.7 | 16 | LD |
| EAYBRW | 90.6 | 88.0 | 89.0 | 90.6 | 89.5 | 0.74 | 4.1 | 1.3 | 88.9 | 0.77 | 3.9 | 2.7 | 12 | XX |
| EGJNCG | 75.1 XH | 80.4 | 79.0 | 80.9 | 78.9 | -2.00 | 6.3 | 2.6 | 80.7 | -1.66 | 5.1 | 3.8 | 12 | LD |
| ELBVVQ | 86.9 | 88.6 | 73.8 *H | 90.4 | 84.9 | -0.45 | 5.5 | 7.6 H | 81.9 | -1.31 | 6.5 | 5.2 | 16 | LC |
| FAV2HC | 89.9 | 92.1 | 91.9 | 92.5 H | 91.6 | 1.27 | 4.9 | 1.2 | 90.3 | 1.16 | 4.8 | 2.3 | 16 | LZ |
| FAZHFB | 67.4 XH | 78.2 *H | 94.4 H | 91.6 | 82.9 | -0.96 | 8.1 | 12.5 H | 85.1 | -0.37 | 6.8 | 8.6 H | 14 | MB |
| G8P3JN | 80.6 | 81.0 | 77.2 | 81.0 | 80.0 | -1.71 | 3.9 | 1.9 | 80.2 | -1.79 | 4.2 | 1.9 | 12 | LC |
| K66KTE | 82.3 | 84.5 | 79.6 | 87.0 | 83.4 | -0.84 | 4.6 | 3.2 | 88.6 | 0.68 | 5.0 | 5.0 | 16 | LC |
| LWPYJB | 79.4 | 81.1 | 80.8 | 79.7 | 80.2 | -1.64 | 5.0 | 0.8 | 75.8 | -3.08 X | 4.8 | 5.8 | 12 | MB |
| MXV38J | 84.0 | 85.0 | 86.7 | 84.3 | 85.0 | -0.42 | 3.6 | 1.2 | 85.2 | -0.32 | 3.6 | 1.4 | 16 | LD |
| NE2LL2 | 88.3 | 90.6 | 91.0 | 88.9 | 89.7 | 0.78 | 4.1 | 1.3 | 89.5 | 0.94 | 4.4 | 1.5 | 12 | LC |
| NKBM6J | 83.9 | 81.7 | 84.0 | 84.4 | 83.5 | -0.80 | 3.7 | 1.2 | 83.8 | -0.74 | 3.6 | 1.0 | 16 | LD |
| NWZK7G | 85.9 | 88.3 | 83.3 | No Data | 85.8 | -0.20 | 3.7 | 2.5 | 81.5 | -1.40 | 3.8 | 6.7 H | 15 | LZ |
| PUQUGD | 82.2 | 80.6 | 84.7 | 85.7 | 83.3 | -0.86 | 3.0 | 2.4 | 84.1 | -0.64 | 4.1 | 2.4 | 16 | LC |
| QWREJ4 | 86.6 | 88.6 | 96.2 * | 95.7 | 91.8 | 1.31 | 3.9 | 4.9 | 94.0 | 2.26 * | 4.1 | 4.3 | 16 | TC |

**Report #554**

# Containerboard Interlaboratory Testing Program

## Analysis 215

## **Ring Crush,** 42 lb Linerboard - 42D1

TAPPI Official Test Method T822

| | Weekly Means | | | | Monthly Results | | | | Cumulative Results | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WebCode | Week 1 | Week 2 | Week 3 | Week 4 | Mean | CPV | SDr | SD Wks | Mean | CPV | SDr | SD Wks | Wks | Inst |
| RAW23K | 85.1 | 85.0 | 84.2 | 84.4 | 84.7 | -0.50 | 4.0 | 0.4 L | 85.9 | -0.13 | 3.8 | 4.4 | 12 | EM |
| RKYHVB | 86.9 | 86.4 | 86.3 | 85.9 | 86.4 | -0.07 | 3.5 | 0.4 L | 87.9 | 0.48 | 3.5 | 1.4 | 16 | LD |
| TKRPFZ | 84.0 | 89.3 | 88.8 | 83.2 | 86.3 | -0.08 | 4.1 | 3.2 | 87.9 | 0.47 | 4.4 | 3.4 | 16 | LD |
| TQYP34 | 87.0 | 89.7 | 88.5 | NO DATA | 88.4 | 0.45 | 3.1 | 1.3 | 87.7 | 0.40 | 3.4 | 2.5 | 14 | LC |
| TT7CP4 | 80.8 | 83.1 | 79.9 L | 81.3 | 81.3 | -1.37 | 3.3 | 1.3 | 80.5 | -1.70 | 3.3 | 1.9 | 16 | LC |
| U2GXBC | 81.6 | 80.2 | 78.6 | 82.8 | 80.8 | -1.50 | 3.1 | 1.8 | 83.1 | -0.93 | 3.2 | 3.1 | 16 | EN |
| UB32JC | 88.2 | 89.9 | 90.2 | 90.7 | 89.7 | 0.79 | 4.1 | 1.1 | 88.5 | 0.66 | 3.5 | 1.4 | 16 | LD |
| VK3B38 | 85.9 | 87.0 | 88.1 | 83.8 | 86.2 | -0.12 | 3.9 | 1.8 | 85.8 | -0.14 | 3.6 | 2.7 | 16 | LC |
| WU8FT3 | 86.5 L | 87.5 L | 87.0 L | 87.5 | 87.1 | 0.12 | 1.8 | 0.5 L | 87.1 | 0.22 | 2.1 | 0.7 L | 12 | LZ |
| XHRGPY | 90.3 | 91.0 | 89.3 | 95.2 | 91.4 | 1.23 | 4.9 | 2.6 | 91.5 | 1.51 | 4.5 | 2.0 | 16 | LX |
| XKCZG4 | 86.8 | 90.1 | 85.7 | 84.2 | 86.7 | 0.02 | 4.0 | 2.5 | 84.9 | -0.42 | 5.5 | 8.3 H | 16 | LC |
| XQJ93D | 87.5 | 83.9 | 81.9 | 82.3 | 83.9 | -0.70 | 4.1 | 2.5 | 83.2 | -0.93 | 4.3 | 2.7 | 16 | TH |
| YBJ4UT | 87.3 | 86.2 | 83.9 | 82.0 | 84.8 | -0.46 | 3.9 | 2.4 | 86.9 | 0.17 | 3.8 | 2.0 | 16 | LC |
| YKU7FT | 84.5 | 86.0 | 85.1 | 86.1 | 85.4 | -0.31 | 3.2 | 0.7 | 84.6 | -0.51 | 3.2 | 1.6 | 12 | LD |
| YXV2CZ | 88.2 | 90.8 | 86.4 | 86.7 | 88.0 | 0.35 | 4.5 | 2.0 | 86.8 | 0.14 | 3.9 | 1.4 | 16 | LD |
| YYRHNX | 89.2 | 89.3 | 89.1 | 89.2 | 89.2 | 0.66 | 2.9 | 0.1 L | 87.2 | 0.25 | 3.2 | 1.2 | 16 | LD |
| Z4ZT8W | 87.5 | 88.5 | 86.1 | 85.8 L | 87.0 | 0.09 | 2.6 | 1.2 | 88.8 | 0.74 | 4.2 | 2.3 | 16 | LC |
| ZQCY6X | 84.7 | 85.1 | 84.5 | 86.2 | 85.1 | -0.39 | 3.8 | 0.7 | 82.6 | -1.10 | 4.6 | 3.0 | 16 | LD |

### Consensus (All Labs) Results

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Wk Mean | 86.96 | 86.71 | 86.34 | 87.48 | Month Mean | 86.64 | Grand Mean | 86.31 |
| Avg SDr | 3.93 | 4.23 | 4.00 | 4.04 | Avg SDr | 4.14 | Avg SDr | 4.10 |
| SD btwn Labs | 3.81 | 3.95 | 4.77 | 4.44 | SD btwn Labs | 3.90 | SD btwn Labs | 3.40 |
| Labs Incld | 51 | 53 | 53 | 50 | SD btwn Wks | 2.95 | SD btwn Wks | 3.85 |
| Labs Excld | 2 | 0 | 0 | 1 | Labs Incld | 53 | Labs Incld | 51 |
| Labs not rcvd | 0 | 0 | 0 | 2 | | | | |

### Instrument Code List as Reported by the Labs

(EM) - Emerson 1200

(EN) - Emerson 2200

(EX) - Emerson (model not specified)

(LA) - L&W Autoline

(LC) - L & W Crush Tester 48

(LD) - L&W Crush Tester 248

(LX) - L & W 506

(LZ) - L & W Crush Tester (model not specified)

(MB) - Messmer Buchel K440

(TC) - TMI Monitor/Compression Tester, Model 17-37

(TD) - TMI Digital Crush Tester, Model 17-09

(TH) - TMI Compression Tester, Model 17-76

(XX) - Instrument make/model not specified by lab

**Report #554**

# Containerboard Interlaboratory Testing Program

## Analysis 216

## **Ring Crush,** 69 lb Linerboard - 69C2

TAPPI Official Test Method T822

| | Weekly Means | | | | Monthly Results | | | | Cumulative Results | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WebCode | Week 1 | Week 2 | Week 3 | Week 4 | Mean | CPV | SDr | SD Wks | Mean | CPV | SDr | SD Wks | Wks | Inst |
| 23NDDV | 124.7 | 124.0 L | 124.4 | 127.5 | 125.2 | -0.83 | 2.5 | 1.6 | 126.0 | -0.65 | 3.3 | 6.1 | 12 | LC |
| 29UGCP | 133.1 | 132.2 | 138.2 | 131.9 | 133.9 | 0.36 | 5.1 | 2.9 | 131.9 | 0.23 | 4.7 | 4.9 | 8 | LD |
| 2FDKKR | 132.7 L | 132.6 | 133.0 L | 134.1 | 133.1 | 0.26 | 3.6 | 0.7 L | 132.8 | 0.36 | 3.3 | 0.9 L | 12 | TH |
| 2G8BP7 | 125.2 | 125.3 | 125.5 | 125.2 | 125.3 | -0.81 | 3.7 | 0.1 L | 125.2 | -0.76 | 3.1 | 0.6 L | 12 | LD |
| 3MQTLT | 118.6 L | 127.1 L | 125.1 L | 129.0 | 124.9 | -0.86 | 2.1 | 4.5 | 123.8 | -0.97 | 2.9 | 4.0 | 12 | EX |
| 3WACWD | 134.8 | 137.4 | 129.0 | 134.3 | 133.8 | 0.36 | 3.2 | 3.5 | 132.6 | 0.34 | 3.6 | 3.0 | 8 | TH |
| 4F3THL | 142.0 | 143.5 | 146.2 | 140.0 | 142.9 | 1.60 | 3.9 | 2.6 | 134.4 | 0.61 | 3.7 | 7.1 | 12 | EM |
| 7DAFUZ | 123.2 | 122.5 | 128.7 | 126.1 | 125.1 | -0.83 | 3.7 | 2.8 | 124.3 | -0.90 | 3.2 | 5.1 | 12 | EM |
| 7MR3W9 | 131.2 | 130.5 | 127.5 | 131.2 | 130.1 | -0.15 | 3.4 | 1.7 | 125.7 | -0.69 | 3.3 | 4.8 | 12 | LZ |
| 7NA7DL | 146.1 L | 148.6 *L | 143.7 L | 144.2 L | 145.6 | 1.97 | 1.0 | 2.2 | 145.2 | 2.20 * | 2.5 | 2.1 | 12 | TD |
| 8YLVQH | 116.2 H | 129.1 | 135.8 | 116.7 H | 124.4 | -0.93 | 8.3 | 9.6 H | 121.4 | -1.33 | 6.2 | 6.4 | 12 | EM |
| 9493MV | 128.3 | 127.0 | 127.8 | 127.7 | 127.7 | -0.48 | 4.3 | 0.6 L | 128.3 | -0.31 | 4.3 | 1.7 | 12 | LD |
| 9X8XQ6 | 130.6 L | 132.9 | 132.6 | 131.5 | 131.9 | 0.09 | 3.1 | 1.1 | 133.9 | 0.53 | 3.3 | 2.4 | 12 | TH |
| 9YE9PU | 141.4 | 132.4 H | 147.9 * | 151.4 * | 143.3 | 1.65 | 8.9 | 8.3 H | 140.8 | 1.55 | 8.4 | 10.6 H | 12 | LC |
| B8PHHL | 139.7 H | 136.6 H | 142.4 | 140.8 | 139.9 | 1.19 | 8.3 | 2.4 | 141.7 | 1.68 | 6.2 | 2.4 | 11 | MB |
| BUH49V | 146.1 | 134.6 L | 129.6 | 131.1 | 135.4 | 0.57 | 4.5 | 7.5 | 130.4 | 0.01 | 6.7 | 13.2 H | 12 | LC |
| CH3TWP | 133.2 | 140.5 | 127.2 H | 120.2 | 130.3 | -0.13 | 10.1 | 8.7 H | 125.4 | -0.73 | 7.9 | 7.4 | 12 | LA |
| DK7NFR | 128.3 | 126.8 | 135.1 | 129.1 L | 129.8 | -0.19 | 3.2 | 3.6 | 128.9 | -0.22 | 3.7 | 4.1 | 12 | LZ |
| DTYYPM | 140.3 | 137.8 | 137.5 | 137.7 | 138.3 | 0.97 | 3.3 | 1.3 | 133.0 | 0.39 | 3.8 | 4.2 | 12 | LD |
| DU8B8P | 146.9 | 146.3 | 145.0 | 144.5 | 145.7 | 1.98 | 4.0 | 1.1 | 144.8 | 2.14 * | 4.1 | 3.7 | 12 | LC |
| DVJTK3 | 126.9 | 127.4 L | 125.0 | 126.4 | 126.4 | -0.65 | 3.3 | 1.1 | 126.0 | -0.65 | 3.3 | 1.2 | 12 | LD |
| EAYBRW | 133.9 | 138.8 | 134.1 | 140.1 | 136.7 | 0.75 | 4.5 | 3.2 | 136.9 | 0.97 | 4.2 | 2.8 | 8 | XX |
| EGJNCG | 138.0 | 134.9 H | 136.2 | 140.0 | 137.3 | 0.83 | 5.6 | 2.2 | 136.4 | 0.90 | 4.3 | 1.8 | 12 | LD |
| ELBVVQ | 130.6 | 125.9 | 124.1 | 127.6 | 127.1 | -0.57 | 3.7 | 2.8 | 123.8 | -0.97 | 10.0 | 7.0 | 12 | LC |
| FAV2HC | 139.0 | 142.0 H | 143.3 | 140.0 | 141.0 | 1.35 | 5.5 | 1.9 | 136.7 | 0.94 | 6.1 | 7.3 | 12 | LZ |
| FAZHFB | 132.5 H | 144.6 L | 140.5 | 147.1 | 141.2 | 1.36 | 7.4 | 6.4 | 140.8 | 1.55 | 6.1 | 5.1 | 10 | MB |
| G8P3JN | 126.1 | 119.1 | 119.4 | 125.7 | 122.6 | -1.18 | 4.3 | 3.8 | 122.7 | -1.13 | 4.9 | 2.7 | 12 | LC |
| K66KTE | 122.2 | 124.2 | 123.7 | 132.1 | 125.6 | -0.77 | 3.9 | 4.4 | 130.3 | -0.01 | 4.4 | 5.1 | 11 | LC |
| LWPYJB | 118.9 | 116.8 | 119.8 | 122.3 | 119.5 | -1.61 | 5.7 | 2.3 | 116.2 | -2.11 * | 5.6 | 3.3 | 12 | MB |
| MXV38J | 131.8 | 123.3 | 123.0 | 121.1 | 124.8 | -0.87 | 5.1 | 4.8 | 124.3 | -0.90 | 4.3 | 8.1 | 12 | LD |
| NE2LL2 | 135.6 | 139.1 | 136.7 | 137.2 | 137.1 | 0.81 | 4.2 | 1.5 | 136.5 | 0.92 | 4.4 | 1.3 | 8 | LC |
| NKBM6J | 125.8 | 124.3 L | 124.4 | 125.2 | 124.9 | -0.86 | 3.2 | 0.7 L | 125.5 | -0.72 | 3.0 | 1.3 | 12 | LD |
| NWZK7G | 137.8 | 118.5 | 133.2 | No Data | 129.8 | -0.19 | 5.0 | 10.1 H | 127.2 | -0.47 | 4.5 | 14.6 H | 10 | LZ |
| PUQUGD | 136.4 | 138.3 | 130.3 | 135.0 | 135.0 | 0.52 | 4.7 | 3.4 | 134.2 | 0.57 | 5.6 | 5.9 | 12 | LC |
| RAW23K | 125.2 | 127.2 | 119.8 H | 125.6 | 124.4 | -0.93 | 7.9 | 3.2 | 136.4 | 0.90 | 6.3 | 13.2 H | 8 | EM |

**Report #554**

# Containerboard Interlaboratory Testing Program

Analysis 216

**Ring Crush,** 69 lb Linerboard - 69C2

TAPPI Official Test Method T822

| WebCode | Weekly Means Week 1 | Week 2 | Week 3 | Week 4 | Monthly Results Mean | CPV | SDr | SD Wks | Cumulative Results Mean | CPV | SDr | SD Wks | Wks | Inst |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RKYHVB | 127.9 | 124.6 | 126.3 | 126.1 | 126.2 | -0.68 | 4.2 | 1.3 | 126.8 | -0.52 | 4.6 | 1.4 | 12 | LD |
| TKRPFZ | 129.1 | 132.3 | 132.8 | 125.9 | 130.0 | -0.16 | 4.6 | 3.2 | 131.7 | 0.20 | 4.0 | 5.7 | 11 | LD |
| TQYP34 | 137.5 | 127.7 | 131.5 | No Data | 132.2 | 0.14 | 2.7 | 5.0 | 133.0 | 0.39 | 3.0 | 3.8 | 11 | LC |
| TT7CP4 | 127.1 | 122.5 | 121.9 | 123.5 H | 123.7 | -1.02 | 5.4 | 2.3 | 121.6 | -1.30 | 4.7 | 3.3 | 12 | LC |
| U2GXBC | 118.7 | 129.6 L | 122.2 L | 123.2 | 123.4 | -1.07 | 2.9 | 4.5 | 126.8 | -0.53 | 3.2 | 4.3 | 12 | EN |
| UB32JC | 129.1 | 129.5 | 129.4 | 127.9 | 129.0 | -0.31 | 3.3 | 0.7 | 128.5 | -0.28 | 3.1 | 2.1 | 12 | LD |
| VK3B38 | 130.9 | 132.8 | 128.5 | 133.3 | 131.4 | 0.02 | 4.6 | 2.2 | 132.4 | 0.30 | 4.6 | 2.8 | 12 | LC |
| WU8FT3 | 131.3 L | 131.0 | 131.4 | 131.0 L | 131.2 | 0.00 | 2.3 | 0.2 L | 132.5 | 0.33 | 1.8 | 1.2 | 12 | LZ |
| XHRGPY | 150.0 * | 148.3 * | 152.3 * | 150.3 * | 150.2 | 2.60 * | 3.5 | 1.7 | 151.0 | 3.06 X | 3.8 | 2.0 | 12 | LX |
| XKCZG4 | 130.0 | 128.7 | 118.8 | 117.9 | 123.8 | -1.01 | 6.0 | 6.4 | 120.2 | -1.50 | 6.4 | 7.5 | 12 | LC |
| XQJ93D | 137.8 | 128.2 | 120.1 | 136.2 | 130.6 | -0.09 | 3.9 | 8.2 | 134.5 | 0.62 | 3.9 | 5.9 | 12 | TH |
| YBJ4UT | 127.8 | 134.8 | 125.5 | 122.6 | 127.7 | -0.49 | 3.7 | 5.2 | 128.1 | -0.34 | 3.5 | 4.3 | 12 | LC |
| YKU7FT | 119.8 L | 120.7 | 119.9 | 120.5 | 120.2 | -1.50 | 3.0 | 0.4 L | 119.7 | -1.58 | 3.0 | 1.8 | 12 | LD |
| YXV2CZ | 138.0 | 138.2 | 134.3 | 134.5 L | 136.2 | 0.69 | 3.0 | 2.1 | 134.6 | 0.63 | 3.4 | 1.8 | 12 | LD |
| YYRHNX | 133.1 | 133.1 | 133.1 | 133.1 | 133.1 | 0.26 | 3.0 | 0.0 L | 133.4 | 0.46 | 2.6 | 0.3 L | 12 | LD |
| Z4ZT8W | 135.7 | 134.9 | 135.3 | 138.2 | 136.0 | 0.66 | 3.7 | 1.5 | 139.9 | 1.42 | 4.2 | 3.6 | 12 | LC |
| ZQCY6X | 117.9 | 119.0 | 116.7 | 118.2 | 117.9 | -1.82 | 3.6 | 1.0 | 119.9 | -1.55 | 4.0 | 1.9 | 12 | LD |

## Consensus (All Labs) Results

| | Wk Mean | Wk Mean | Wk Mean | Wk Mean | | | | |
|---|---|---|---|---|---|---|---|---|
| Wk Mean | 131.63 | 131.31 | 130.68 | 131.23 | Month Mean | 131.21 | Grand Mean | 130.35 |
| Avg SDr | 4.77 | 4.92 | 5.06 | 4.11 | Avg SDr | 4.73 | Avg SDr | 4.69 |
| SD btwn Labs | 7.91 | 7.82 | 8.34 | 8.39 | SD btwn Labs | 7.31 | SD btwn Labs | 6.74 |
| Labs Incld | 52 | 52 | 52 | 50 | SD btwn Wks | 4.05 | SD btwn Wks | 5.49 |
| Labs Excld | 0 | 0 | 0 | 0 | Labs Incld | 52 | Labs Incld | 51 |
| Labs not rcvd | 0 | 0 | 0 | 2 | | | | |

## Instrument Code List as Reported by the Labs

(EM) - Emerson 1200

(EN) - Emerson 2200

(EX) - Emerson (model not specified)

(LA) - L&W Autoline

(LC) - L & W Crush Tester 48

(LD) - L&W Crush Tester 248

(LX) - L & W 506

(LZ) - L & W Crush Tester (model not specified)

(MB) - Messmer Buchel K440

(TD) - TMI Digital Crush Tester, Model 17-09

(TH) - TMI Compression Tester, Model 17-76

(XX) - Instrument make/model not specified by lab

**Report #554**

# Containerboard Interlaboratory Testing Program

## Analysis 223

## **STFI,** 42 lb Linerboard - 42D1

TAPPI Provisional Test Method T826

| | Weekly Means | | | | Monthly Results | | | | Cumulative Results | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WebCode | Week 1 | Week 2 | Week 3 | Week 4 | Mean | CPV | SDr | SD Wks | Mean | CPV | SDr | SD Wks | Wks | Inst |
| | 23.9 | No Data | No Data | No Data | 23.9 | 1.62 | 2.1 | 0.0 L | 23.9 | 1.47 | 2.1 | 0.0 L | 1 | TT |
| 23NDDV | 21.3 | 21.0 | 20.9 | 21.7 | 21.2 | -0.96 | 1.8 | 0.4 | 21.3 | -0.84 | 2.0 | 0.5 | 16 | LA |
| 29UGCP | 23.2 | 20.9 | 24.2 | 23.4 | 22.9 | 0.72 | 1.7 | 1.4 | 22.3 | 0.10 | 1.8 | 1.2 | 12 | LZ |
| 3WACWD | No Data | 23.4 | 23.7 | 23.5 | 23.5 | 1.29 | 1.9 | 0.2 | 24.1 | 1.65 | 1.9 | 1.3 | 11 | TT |
| 93FCGG | 22.1 L | 20.9 L | 21.6 L | 22.8 L | 21.8 | -0.35 | 0.0 | 0.8 | 21.9 | -0.24 | 0.0 | 0.6 | 16 | TT |
| 9493MV | 21.4 | 21.3 | 21.4 | 21.4 | 21.4 | -0.80 | 2.0 | 0.1 L | 21.5 | -0.67 | 1.8 | 0.4 | 16 | LW |
| 9D3B8L | 23.4 | 23.8 | 22.3 | 22.5 | 23.0 | 0.77 | 1.7 | 0.8 | 23.6 | 1.23 | 2.0 | 1.0 | 16 | LZ |
| 9X8XQ6 | 21.8 | 22.4 | 22.2 | 22.4 | 22.2 | -0.02 | 1.1 | 0.3 | 22.1 | -0.11 | 1.0 | 0.3 | 16 | TT |
| 9YE9PU | 22.6 L | 20.7 L | 21.3 L | 21.7 L | 21.6 | -0.62 | 0.4 | 0.8 | 22.1 | -0.09 | 0.9 | 0.7 | 16 | LA |
| B8PHHL | 24.4 | 24.4 L | 24.1 L | 22.7 L | 23.9 | 1.66 | 0.6 | 0.8 | 23.0 | 0.70 | 0.5 | 1.0 | 16 | BK |
| BQHTDV | 20.0 L | 21.4 | 21.2 L | 21.1 L | 20.9 | -1.25 | 0.5 | 0.6 | 20.4 | -1.61 | 0.5 | 1.3 | 15 | LW |
| BUH49V | 21.8 L | 21.7 | 22.5 L | 20.3 L | 21.6 | -0.61 | 0.6 | 0.9 | 20.7 | -1.34 | 0.7 | 5.2 H | 16 | LW |
| CH3TWP | 22.8 L | 23.9 L | 22.0 L | 20.7 L | 22.3 | 0.12 | 0.4 | 1.4 | 21.0 | -1.11 | 0.3 | 1.3 | 14 | LA |
| DK7NFR | 20.3 | 21.6 | 21.2 | 21.2 | 21.1 | -1.09 | 1.7 | 0.6 | 21.2 | -0.91 | 1.7 | 0.5 | 16 | LW |
| DTYYPM | 23.7 | 24.0 | 24.1 | 23.0 | 23.7 | 1.43 | 2.0 | 0.5 | 23.0 | 0.73 | 2.0 | 0.7 | 16 | XX |
| DU8B8P | 23.1 L | 23.5 L | 22.5 L | 23.0 L | 23.0 | 0.80 | 0.0 | 0.4 | 23.1 | 0.78 | 0.0 | 0.6 | 16 | LA |
| DVJTK3 | 21.8 | 21.3 | 21.6 | 21.7 | 21.6 | -0.60 | 1.9 | 0.2 | 21.6 | -0.54 | 1.8 | 0.5 | 16 | LY |
| EAYBRW | 23.0 L | 21.0 L | 22.7 L | 24.3 L | 22.8 | 0.54 | 0.1 | 1.4 | 29.6 | 6.54 X | 0.1 | 10.3 H | 12 | XX |
| EGJNCG | 21.8 L | 21.6 L | 21.8 L | 21.8 L | 21.8 | -0.43 | 0.0 | 0.1 L | 22.4 | 0.15 | 0.1 | 0.7 | 16 | LU |
| ELBVVQ | 20.6 | 20.2 | 20.0 | 21.5 | 20.6 | -1.61 | 1.4 | 0.7 | 19.8 | -2.12 * | 1.8 | 0.9 | 16 | XX |
| EZC8QP | 23.4 | 23.9 | 20.8 | 22.6 | 22.7 | 0.45 | 1.9 | 1.4 | 23.2 | 0.84 | 1.9 | 1.2 | 14 | LU |
| FAZHFB | 21.1 L | 21.1 L | 21.7 L | 22.3 L | 21.6 | -0.63 | 0.1 | 0.5 | 21.3 | -0.80 | 0.1 | 0.7 | 15 | LA |
| G8P3JN | 21.5 | 22.0 | 22.4 | 22.8 | 22.2 | -0.04 | 2.4 | 0.6 | 22.1 | -0.12 | 2.2 | 0.6 | 12 | LW |
| GQYVNC | 20.5 L | 21.3 L | 19.8 *L | 21.0 L | 20.6 | -1.52 | 0.4 | 0.7 | 20.5 | -1.51 | 0.3 | 0.5 | 16 | LA |
| HBL7NF | 23.1 | 22.7 | 22.8 | 22.8 | 22.9 | 0.63 | 1.7 | 0.2 | 22.8 | 0.55 | 1.6 | 0.8 | 16 | XX |
| K66KTE | 23.2 | 23.3 | 23.7 | 21.8 | 23.0 | 0.77 | 1.5 | 0.8 | 23.0 | 0.68 | 1.4 | 0.9 | 16 | LU |
| LT74GH | 21.0 | 21.4 | 21.5 | 20.1 | 21.0 | -1.17 | 1.6 | 0.7 | 21.0 | -1.05 | 1.6 | 0.5 | 16 | LW |
| MGT9UR | 22.2 | 23.0 | 22.8 | 22.6 | 22.7 | 0.44 | 0.9 | 0.3 | 22.6 | 0.35 | 0.9 | 0.2 | 16 | TT |
| MNUH8C | 22.9 | 22.6 | 23.6 | 22.8 | 23.0 | 0.73 | 1.4 | 0.4 | 23.0 | 0.72 | 1.3 | 0.6 | 16 | LU |
| MXV38J | 20.8 | 21.4 | 20.8 | 20.5 | 20.9 | -1.29 | 1.8 | 0.4 | 21.2 | -0.86 | 1.9 | 0.5 | 16 | LU |
| NE2LL2 | 21.7 | 21.5 | 21.4 | 21.2 | 21.4 | -0.74 | 1.5 | 0.2 | 21.5 | -0.62 | 1.7 | 0.5 | 12 | LU |
| NWZK7G | 21.3 | 21.3 | 21.5 | No Data | 21.4 | -0.81 | 1.7 | 0.1 | 21.4 | -0.69 | 1.7 | 0.5 | 15 | LZ |
| NZH4QC | 23.9 | 24.0 | 24.2 | 24.8 * | 24.2 | 1.96 | 2.3 | 0.4 | 24.2 | 1.80 | 2.2 | 0.8 | 16 | LW |
| PUQUGD | 23.0 | 23.2 | 23.2 | 24.5 | 23.5 | 1.23 | 2.0 | 0.7 | 23.1 | 0.78 | 1.9 | 0.7 | 16 | LW |
| PV3TD9 | 24.3 | 23.5 | 23.7 | 22.1 | 23.4 | 1.14 | 2.0 | 0.9 | 23.8 | 1.37 | 2.1 | 1.2 | 16 | LA |

**Report #554**

# Containerboard Interlaboratory Testing Program

## Analysis 223

## **STFI,** 42 lb Linerboard - 42D1

### TAPPI Provisional Test Method T826

| | Weekly Means | | | | Monthly Results | | | | Cumulative Results | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WebCode | Week 1 | Week 2 | Week 3 | Week 4 | Mean | CPV | SDr | SD Wks | Mean | CPV | SDr | SD Wks | Wks | Inst |
| QWREJ4 | 23.8 | 24.4 | 21.1 L | 20.0 L | 22.3 | 0.12 | 1.5 | 2.1 H | 22.7 | 0.40 | 0.8 | 1.2 | 16 | LA |
| RAW23K | 22.7 | 22.7 | 22.8 | 23.7 | 23.0 | 0.75 | 1.4 | 0.5 | 23.2 | 0.86 | 1.5 | 0.6 | 12 | LZ |
| RKYHVB | 24.0 | 23.8 | 22.9 | 23.0 | 23.4 | 1.20 | 1.9 | 0.6 | 23.4 | 1.10 | 2.0 | 1.2 | 16 | LY |
| RNHCX4 | 21.9 | 21.5 | 21.8 | 22.2 | 21.9 | -0.33 | 1.9 | 0.3 | 21.8 | -0.36 | 1.9 | 0.5 | 16 | LY |
| TELWL4 | 23.1 L | 22.0 L | 23.4 L | 21.1 L | 22.4 | 0.19 | 0.0 | 1.0 | 22.1 | -0.14 | 0.0 | 0.6 | 16 | LU |
| TQYP34 | 21.4 | 22.0 | 22.6 | No Data | 22.0 | -0.23 | 1.7 | 0.6 | 21.5 | -0.64 | 1.6 | 0.6 | 14 | LW |
| U2GXBC | 19.3 * | 21.1 | 20.5 | 20.0 | 20.2 | -1.97 | 1.8 | 0.8 | 20.6 | -1.46 | 1.8 | 0.6 | 12 | LY |
| UB32JC | 22.6 | 22.1 | 22.5 | 22.5 | 22.4 | 0.19 | 1.3 | 0.2 | 22.1 | -0.13 | 1.5 | 0.5 | 16 | BK |
| VCCWR3 | 27.7 X | 25.1 * | 24.0 | 24.5 | 25.3 | 3.05 X | 2.1 | 1.7 H | 25.0 | 2.45 * | 2.2 | 1.1 | 12 | LA |
| VK3B38 | 21.7 | 23.3 | 22.5 | 24.4 | 22.9 | 0.72 | 1.7 | 1.2 | 22.7 | 0.48 | 2.1 | 0.9 | 16 | LY |
| XKCZG4 | 23.6 | 23.6 | 22.3 | 22.2 | 22.9 | 0.69 | 1.0 | 0.8 | 22.8 | 0.55 | 1.0 | 0.7 | 16 | LY |
| YBJ4UT | 21.4 | 21.5 | 21.1 | 20.9 | 21.2 | -0.97 | 1.6 | 0.2 | 21.6 | -0.55 | 1.8 | 0.5 | 16 | LU |
| YKU7FT | 20.5 | 20.6 | 20.7 | 20.3 | 20.5 | -1.63 | 1.7 | 0.2 | 20.8 | -1.29 | 1.8 | 0.4 | 12 | LW |
| YXV2CZ | 23.6 | 23.2 | 22.4 | 22.4 | 22.9 | 0.66 | 2.0 | 0.6 | 22.9 | 0.57 | 1.9 | 0.7 | 16 | LA |
| Z4ZT8W | 22.6 | 22.6 | 22.4 | 23.2 | 22.7 | 0.48 | 1.5 | 0.4 | 22.8 | 0.52 | 1.6 | 0.3 | 16 | LU |
| ZQCY6X | 20.5 | 20.2 | 21.0 | 20.5 | 20.5 | -1.63 | 1.9 | 0.3 | 21.1 | -1.02 | 1.9 | 0.5 | 16 | LY |

## Consensus (All Labs) Results

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Wk Mean | 22.22 | 22.30 | 22.18 | 22.16 | Month Mean | 22.21 | Grand Mean | 22.21 |
| Avg SDr | 1.45 | 1.53 | 1.53 | 1.62 | Avg SDr | 1.54 | Avg SDr | 1.59 |
| SD btwn Labs | 1.25 | 1.26 | 1.14 | 1.27 | SD btwn Labs | 1.03 | SD btwn Labs | 1.13 |
| Labs Incld | 49 | 50 | 50 | 48 | SD btwn Wks | 0.74 | SD btwn Wks | 1.07 |
| Labs Excld | 1 | 0 | 0 | 0 | Labs Incld | 50 | Labs Incld | 50 |
| Labs not rcvd | 1 | 1 | 1 | 3 | | | | |

## Instrument Code List as Reported by the Labs

(BK) - Buchel Strip Compression Tester BK-155

(LA) - L & W Autoline

(LU) - L & W 52 without moisture correction(was 53)

(LW) - L & W 53 with moisture correction (was 53M)

(LY) - L & W 152 without moisture correction

(LZ) - L & W (model not specified)

(TT) - TMI Short Span Compression, 17-34 (MB K455)

(XX) - Instrument make/model not specified by lab

**Report #554**

# Containerboard Interlaboratory Testing Program

## Analysis 224

## **STFI,** 69 lb Linerboard - 69C2

TAPPI Provisional Test Method T826

| | Weekly Means | | | | Monthly Results | | | | Cumulative Results | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WebCode | Week 1 | Week 2 | Week 3 | Week 4 | Mean | CPV | SDr | SD Wks | Mean | CPV | SDr | SD Wks | Wks | Inst |
| 23NDDV | 31.3 | 33.9 | 31.4 | 31.6 | 32.1 | -0.64 | 1.4 | 1.2 | 31.3 | -0.81 | 1.4 | 1.0 | 12 | LA |
| 29UGCP | 34.9 | 32.7 | 35.0 | 33.7 | 34.1 | 0.41 | 1.5 | 1.1 | 32.9 | -0.07 | 1.8 | 1.5 | 8 | LZ |
| 3WACWD | 33.1 | 33.7 | 34.2 | 34.7 | 33.9 | 0.32 | 2.5 | 0.7 | 33.0 | -0.06 | 2.1 | 1.2 | 8 | TT |
| 93FCGG | 35.5 L | 34.1 L | 35.2 L | 36.0 L | 35.2 | 0.99 | 0.0 | 0.8 | 34.9 | 0.80 | 0.0 | 0.9 | 12 | TT |
| 9493MV | 30.9 | 31.6 | 30.6 | 31.2 | 31.1 | -1.14 | 1.2 | 0.4 | 31.2 | -0.86 | 1.4 | 0.4 | 12 | LW |
| 9D3B8L | 35.6 | 35.9 | 34.7 | 35.1 | 35.4 | 1.07 | 2.1 | 0.5 | 35.6 | 1.12 | 3.2 | 0.9 | 12 | LZ |
| 9X8XQ6 | 33.8 L | 32.9 | 33.0 | 32.7 | 33.1 | -0.09 | 0.9 | 0.5 | 33.2 | 0.05 | 1.0 | 0.4 | 12 | TT |
| 9YE9PU | 31.7 L | 33.5 | 32.5 L | 31.8 L | 32.4 | -0.48 | 0.6 | 0.8 | 33.1 | -0.01 | 0.6 | 1.0 | 12 | LA |
| B8PHHL | 36.2 | 35.4 L | 36.9 | 35.5 L | 36.0 | 1.40 | 0.8 | 0.7 | 37.0 | 1.75 | 0.8 | 1.3 | 11 | BK |
| BQHTDV | 33.2 | 34.4 L | 33.1 | 29.9 L | 32.6 | -0.35 | 1.4 | 1.9 H | 31.5 | -0.71 | 1.8 | 1.7 | 11 | LW |
| BUH49V | 31.2 | 32.3 | 32.8 | 30.2 | 31.6 | -0.87 | 1.7 | 1.2 | 31.0 | -0.92 | 1.6 | 4.9 H | 12 | LW |
| CH3TWP | 34.1 L | 34.9 L | 33.1 L | 30.6 | 33.1 | -0.07 | 0.7 | 1.9 H | 31.5 | -0.72 | 0.6 | 1.7 | 12 | LA |
| DK7NFR | 32.5 | 32.6 | 33.7 | 31.4 | 32.5 | -0.39 | 1.6 | 0.9 | 32.3 | -0.37 | 1.6 | 0.8 | 12 | LW |
| DTYYPM | 34.8 | 35.8 | 34.6 | 34.8 | 35.0 | 0.89 | 1.7 | 0.5 | 33.8 | 0.31 | 1.7 | 1.0 | 12 | XX |
| DU8B8P | 34.8 L | 34.7 L | 35.9 L | 35.7 L | 35.3 | 1.03 | 0.0 | 0.6 | 35.6 | 1.13 | 0.0 | 0.8 | 12 | LA |
| DVJTK3 | 31.3 | 31.5 | 31.1 | 31.4 | 31.3 | -1.01 | 1.6 | 0.2 | 31.4 | -0.74 | 1.7 | 0.3 L | 12 | LY |
| EAYBRW | 35.7 L | 35.5 L | 36.0 L | 35.5 L | 35.7 | 1.23 | 0.1 | 0.3 | 36.6 | 1.57 | 0.1 | 7.1 H | 8 | XX |
| EGJNCG | 35.3 L | 36.5 L | 35.6 L | 35.5 L | 35.7 | 1.25 | 0.0 | 0.5 | 35.0 | 0.87 | 0.0 | 1.0 | 8 | LU |
| ELBVVQ | 27.4 * | 27.1 X | 26.2 X | 27.5 * | 27.0 | -3.22 X | 1.6 | 0.6 | 27.4 | -2.56 * | 1.6 | 0.8 | 12 | XX |
| EZC8QP | 35.8 | 34.6 | 32.9 | 34.2 | 34.4 | 0.56 | 1.8 | 1.2 | 34.9 | 0.81 | 1.8 | 1.0 | 12 | LU |
| FAZHFB | 35.4 L | 35.4 L | 35.4 L | 36.5 L | 35.7 | 1.24 | 0.1 | 0.6 | 34.5 | 0.62 | 0.1 | 1.3 | 11 | LA |
| G8P3JN | 30.4 | 34.4 | 33.5 | 34.9 | 33.3 | 0.01 | 1.9 | 2.0 H | 33.1 | 0.02 | 1.8 | 1.4 | 12 | LW |
| GQYVNC | 29.6 L | 30.7 L | 29.2 *L | 30.7 L | 30.1 | -1.67 | 0.5 | 0.8 | 30.0 | -1.37 | 0.4 | 0.7 | 12 | LA |
| HBL7NF | 35.5 | 35.5 | 36.5 | 36.1 | 35.9 | 1.34 | 1.4 | 0.5 | 35.2 | 0.95 | 1.6 | 1.2 | 12 | LU |
| K66KTE | 34.7 | 35.1 | 36.0 | 35.5 | 35.3 | 1.05 | 1.5 | 0.6 | 35.2 | 0.95 | 1.5 | 0.8 | 12 | LU |
| LT74GH | 30.3 | 30.0 | 30.3 | 30.2 | 30.2 | -1.59 | 1.5 | 0.1 L | 30.9 | -1.00 | 1.3 | 0.7 | 12 | LW |
| MGT9UR | 33.4 | 33.2 | 33.2 | 33.4 | 33.3 | 0.01 | 0.9 | 0.1 L | 33.2 | 0.05 | 1.1 | 0.2 L | 12 | TT |
| MNUH8C | 36.6 | 34.7 | 34.4 | 35.2 | 35.2 | 1.00 | 1.4 | 1.0 | 35.2 | 0.94 | 1.8 | 1.5 | 12 | LU |
| MXV38J | 30.8 | 30.2 | 31.3 | 31.4 | 30.9 | -1.21 | 1.6 | 0.5 | 30.7 | -1.05 | 1.8 | 0.7 | 12 | LU |
| NE2LL2 | 31.2 | 30.7 | 30.6 | 29.9 | 30.6 | -1.37 | 1.6 | 0.5 | 30.7 | -1.06 | 1.7 | 0.6 | 8 | LU |
| NWZK7G | 31.3 | 30.7 | 30.4 | No Data | 30.8 | -1.28 | 1.5 | 0.5 | 30.9 | -0.98 | 1.6 | 0.6 | 10 | LZ |
| NZH4QC | 34.1 | 34.2 | 34.6 | 34.9 | 34.4 | 0.59 | 3.0 | 0.4 | 35.2 | 0.96 | 2.4 | 0.7 | 12 | LW |
| PUQUGD | 32.8 | 32.5 | 33.7 | 34.8 | 33.5 | 0.08 | 2.0 | 1.0 | 33.2 | 0.07 | 1.9 | 0.7 | 12 | LW |
| PV3TD9 | 37.1 | 32.6 | 33.8 | 35.4 | 34.7 | 0.73 | 1.8 | 2.0 H | 36.1 | 1.35 | 2.0 | 1.9 | 12 | LA |
| RAW23K | 32.6 | 32.6 | 32.4 | 34.6 | 33.1 | -0.12 | 1.6 | 1.0 | 34.7 | 0.71 | 1.7 | 1.9 | 8 | LZ |

**Report #554**

# Containerboard Interlaboratory Testing Program

## Analysis 224

## **STFI,** 69 lb Linerboard - 69C2

### TAPPI Provisional Test Method T826

| | Weekly Means | | | | Monthly Results | | | | Cumulative Results | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WebCode | Week 1 | Week 2 | Week 3 | Week 4 | Mean | CPV | SDr | SD Wks | Mean | CPV | SDr | SD Wks | Wks | Inst |
| RKYHVB | 34.0 | 34.0 | 33.0 | 34.1 | 33.8 | 0.26 | 1.6 | 0.5 | 33.0 | -0.02 | 1.6 | 1.4 | 12 | LY |
| RNHCX4 | 32.4 | 31.3 | 31.9 | 31.3 | 31.7 | -0.80 | 1.5 | 0.5 | 31.6 | -0.68 | 1.5 | 0.5 | 12 | LY |
| TELWL4 | 32.8 L | 33.0 L | 32.7 L | 31.2 L | 32.4 | -0.44 | 0.0 | 0.8 | 32.3 | -0.37 | 0.0 | 0.5 | 12 | LU |
| TQYP34 | 31.1 | 31.8 | 31.9 | No Data | 31.6 | -0.87 | 1.4 | 0.5 | 31.2 | -0.83 | 1.4 | 0.6 | 11 | LW |
| U2GXBC | 29.5 | 29.9 | 29.9 | 29.3 | 29.7 | -1.86 | 1.7 | 0.3 | 30.2 | -1.30 | 1.6 | 0.8 | 12 | LY |
| UB32JC | 32.2 | 33.1 | 32.0 | 31.0 | 32.1 | -0.63 | 1.5 | 0.9 | 31.7 | -0.63 | 1.4 | 0.9 | 12 | BK |
| VCCWR3 | 37.4 | 37.0 | 37.4 * | 37.2 | 37.2 | 2.03 * | 1.9 | 0.2 | 38.0 | 2.23 * | 1.9 | 0.7 | 12 | LA |
| VK3B38 | 34.4 | 35.4 | 34.5 L | 34.6 | 34.7 | 0.73 | 1.6 | 0.4 | 34.8 | 0.78 | 1.7 | 1.0 | 12 | LY |
| XKCZG4 | 36.3 | 37.3 * | 35.6 | 35.9 | 36.2 | 1.52 | 1.4 | 0.7 | 36.5 | 1.55 | 1.3 | 1.0 | 12 | LY |
| YBJ4UT | 31.8 | 31.8 | 31.4 | 29.7 | 31.2 | -1.09 | 1.6 | 1.0 | 31.0 | -0.93 | 1.6 | 0.6 | 12 | LU |
| YKU7FT | 31.4 | 31.9 | 31.3 | 31.7 | 31.6 | -0.89 | 1.3 | 0.3 | 31.3 | -0.82 | 1.7 | 1.2 | 12 | LW |
| YXV2CZ | 32.9 | 32.3 | 33.6 | 32.2 | 32.8 | -0.26 | 1.3 | 0.6 | 32.0 | -0.47 | 1.5 | 0.8 | 12 | LA |
| Z4ZT8W | 34.0 | 35.0 | 34.9 | 34.7 | 34.7 | 0.71 | 2.1 | 0.4 | 34.8 | 0.78 | 1.9 | 0.6 | 12 | LU |
| ZQCY6X | 30.5 | 30.6 | 30.3 | 31.6 | 30.7 | -1.32 | 1.5 | 0.6 | 30.7 | -1.07 | 1.6 | 0.5 | 12 | LY |

### Consensus (All Labs) Results

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Wk Mean | 33.17 | 33.40 | 33.29 | 33.13 | Month Mean | 33.29 | Grand Mean | 33.08 |
| Avg SDr | 1.44 | 1.49 | 1.56 | 1.53 | Avg SDr | 1.51 | Avg SDr | 1.56 |
| SD btwn Labs | 2.26 | 1.93 | 2.02 | 2.39 | SD btwn Labs | 1.94 | SD btwn Labs | 2.22 |
| Labs Incld | 49 | 48 | 48 | 47 | SD btwn Wks | 0.87 | SD btwn Wks | 1.59 |
| Labs Excld | 0 | 1 | 1 | 0 | Labs Incld | 48 | Labs Incld | 49 |
| Labs not rcvd | 0 | 0 | 0 | 2 | | | | |

### Instrument Code List as Reported by the Labs

(BK) - Buchel Strip Compression Tester BK-155

(LA) - L & W Autoline

(LU) - L & W 52 without moisture correction (was 53)

(LW) - L & W 53 with moisture correction (was 53M)

(LY) - L & W 152 with moisture correction

(LZ) - L & W (model not specified)

(TT) - TMI Short Span Compression, 17-34 (MB K455)

(XX) - Instrument make/model not specified by lab

**Report #554**

# Containerboard Interlaboratory Testing Program

Analysis 228

**Roughness - Stylus Method,** 69 lb Linerboard - 69C

TAPPI Provisional Test Method T575

| | Monthly Results | | | Cumulative Results | | | | |
|---|---|---|---|---|---|---|---|---|
| WebCode | Mean | CPV | SDr | Mean | CPV | SDr | Months | Inst |
| 29UGCP | 150.0 | 0.95 | 13.1 | 149.9 | 0.84 | 17.1 | 3 | LA |
| 9493MV | 144.6 | 0.66 | 15.4 | 144.5 | 0.53 | 14.4 | 4 | EV |
| 9D3B8L | 120.9 | -0.63 | 8.7 | 123.7 | -0.64 | 10.7 | 4 | LA |
| 9YE9PU | 134.3 | 0.10 | 25.5 | 143.8 | 0.49 | 24.3 | 4 | LA |
| B8PHHL | 135.7 | 0.18 | 17.9 | 139.4 | 0.25 | 13.1 | 4 | EV |
| BUH49V | 136.3 | 0.21 | 11.0 | 139.7 | 0.26 | 11.3 | 4 | EV |
| CH3TWP | 408.3 | 15.03 X | 35.3 | 275.7 | 7.94 X | 25.1 | 4 | LA |
| DK7NFR | 145.4 | 0.71 | 9.0 | 149.6 | 0.82 | 11.6 | 4 | EV |
| DU8B8P | 122.2 | -0.56 | 11.4 | 124.3 | -0.61 | 12.2 | 4 | LA |
| EAYBRW | 155.1 | 1.24 | 9.3 | 164.3 | 1.65 | 9.5 | 3 | EV |
| G8P3JN | 124.9 | -0.41 | 11.1 | 131.0 | -0.23 | 12.9 | 3 | EV |
| GQYVNC | 125.6 | -0.37 | 6.5 | 126.8 | -0.47 | 9.1 | 4 | EV |
| K66KTE | 99.2 | -1.81 | 6.4 | 101.3 | -1.91 | 10.0 | 2 | LA |
| MNUH8C | 135.6 | 0.17 | 12.2 | 133.0 | -0.12 | 12.9 | 4 | EV |
| MXV38J | 143.0 | 0.58 | 8.7 | 141.0 | 0.33 | 11.4 | 4 | EV |
| PV3TD9 | 105.4 | -1.47 | 8.8 | 115.6 | -1.10 | 11.0 | 4 | LA |
| RNHCX4 | 155.9 | 1.28 | 14.7 | 150.6 | 0.88 | 13.1 | 4 | EV |
| U2GXBC | 153.1 | 1.13 | 7.8 | 154.6 | 1.10 | 11.5 | 4 | EV |
| XKCZG4 | 96.6 | -1.95 | 8.6 | 98.7 | -2.06 * | 8.2 | 4 | EV |

## Consensus (All Labs) Results

| | | | |
|---|---|---|---|
| Month Mean | 132.44 | Grand Mean | 135.11 |
| Avg SDr | 12.32 | Avg SDr | 12.94 |
| SD btwn Labs | 18.35 | SD btwn Labs | 17.70 |
| Labs Incld | 18 | Labs Incld | 18 |

## Instrument Code List as Reported by the Labs

(EV) - Emveco Microgage Model 210-R

(LA) - L & W Autoline

**Report #554**

# Containerboard Interlaboratory Testing Program

## Analysis 231

## **Internal Bond,** 36 lb Linerboard - 36Z

TAPPI Provisional Test Method T569

| | Monthly Results | | | Cumulative Results | | | | |
|---|---|---|---|---|---|---|---|---|
| WebCode | Mean | CPV | SDr | Mean | CPV | SDr | Months | Inst |
| 23NDDV | 204.2 | 1.45 | 11.0 | 193.0 | 0.89 | 8.4 | 4 | HY |
| 2G8BP7 | 184.3 | 0.69 | 7.0 | 183.3 | 0.55 | 7.8 | 4 | SC |
| 9493MV | 191.8 | 0.98 | 9.0 | 197.8 | 1.06 | 10.5 | 4 | HY |
| BUH49V | 220.0 | 2.06 * | 14.1 | 235.0 | 2.37 * | 12.1 | 4 | SC |
| CH3TWP | 155.4 | -0.41 | 6.3 | 162.8 | -0.17 | 5.1 | 4 | TM |
| EBCXAB | 158.5 | -0.30 | 6.8 | 160.9 | -0.24 | 4.5 | 4 | TM |
| EGJNCG | 168.8 | 0.10 | 9.5 | 172.0 | 0.15 | 11.5 | 3 | HZ |
| ELBVVQ | 139.5 | -1.02 | 20.1 | 136.5 | -1.10 | 20.0 | 4 | SC |
| K66KTE | 146.4 | -0.76 | 10.5 | 151.1 | -0.58 | 10.0 | 4 | TM |
| MNUH8C | 129.2 | -1.41 | 5.1 | 130.6 | -1.30 | 8.4 | 4 | TM |
| MXV38J | 145.4 | -0.80 | 2.9 | 146.7 | -0.74 | 4.1 | 4 | TM |
| QWREJ4 | 144.6 | -0.83 | 4.7 | 135.9 | -1.12 | 5.4 | 4 | SC |
| YBJ4UT | 169.3 | 0.12 | 3.7 | 174.0 | 0.22 | 4.0 | 4 | HY |
| YKU7FT | 169.4 | 0.12 | 2.3 | 168.3 | 0.02 | 5.3 | 3 | TM |
| YXV2CZ | 66.5 | -3.81 X | 3.3 | 63.8 | -3.65 X | 2.6 | 4 | LZ |

### Consensus (All Labs) Results

| | | | |
|---|---|---|---|
| Month Mean | 166.20 | Grand Mean | 167.70 |
| Avg SDr | 9.33 | Avg SDr | 9.37 |
| SD btwn Labs | 26.16 | SD btwn Labs | 28.45 |
| Labs Incld | 14 | Labs Incld | 14 |

### Instrument Code List as Reported by the Labs

(HY) - Huygen Digitized Scott Internal Bond Tester

(HZ) - Huygen Internal Bond Tester with AccuPress

(LZ) - L & W (model not specified)

(SC) - Scott Internal Bond Tester (Manual)

(TM) - TMI Monitor/Internal Bond Tester

**Report #554**

# Containerboard Interlaboratory Testing Program

Analysis 234

**COF Inclined Plane (Slide Angle),** 36 lb Linerboard - 36Z

TAPPI Official Test Method T815

| | Monthly Results | | | Cumulative Results | | | |
|---|---|---|---|---|---|---|---|
| WebCode | Mean | CPV | SDr | Mean | CPV | SDr | Months |
| 2QV2CY | 33.7 | 1.68 | 6.4 | 29.9 | 0.86 | 3.8 | 4 |
| 9493MV | 24.6 | -0.81 | 1.1 | 26.2 | -0.37 | 1.3 | 4 |
| 9D3B8L | 25.0 | -0.70 | 2.3 | 25.0 | -0.77 | 1.8 | 4 |
| BUH49V | 26.4 | -0.32 | 1.1 | 25.7 | -0.52 | 1.5 | 4 |
| CH3TWP | 32.4 | 1.32 | 3.2 | 33.4 | 2.03 * | 2.5 | 4 |
| G8P3JN | 26.0 | -0.43 | 1.6 | 25.9 | -0.46 | 1.6 | 3 |
| HBL7NF | 30.7 | 0.86 | 1.0 | 28.9 | 0.52 | 1.4 | 4 |
| K66KTE | 30.7 | 0.86 | 1.0 | 28.5 | 0.42 | 1.2 | 4 |
| MNUH8C | 28.3 | 0.20 | 1.3 | 28.8 | 0.52 | 1.1 | 4 |
| MXV38J | 30.6 | 0.83 | 0.7 | 29.4 | 0.71 | 2.4 | 4 |
| PUQUGD | 26.2 | -0.37 | 3.8 | 25.8 | -0.49 | 3.3 | 4 |
| QWREJ4 | 29.2 | 0.45 | 1.3 | 29.6 | 0.75 | 1.2 | 4 |
| RAW23K | 22.3 | -1.44 | 2.0 | 22.0 | -1.73 | 2.0 | 3 |
| RNHCX4 | 31.0 | 0.94 | 3.5 | 30.9 | 1.19 | 3.2 | 4 |
| U2GXBC | 23.0 | -1.23 | 2.3 | 22.6 | -1.55 | 1.6 | 4 |
| YBJ4UT | 23.2 | -1.19 | 1.9 | 24.4 | -0.95 | 1.4 | 4 |
| YKU7FT | 22.4 | -1.42 | 2.5 | 24.7 | -0.86 | 2.2 | 3 |
| YXV2CZ | 30.4 | 0.77 | 0.9 | 29.4 | 0.69 | 1.0 | 4 |

## Consensus (All Labs) Results

| | | | |
|---|---|---|---|
| Month Mean | 27.56 | Grand Mean | 27.27 |
| Avg SDr | 2.52 | Avg SDr | 2.08 |
| SD btwn Labs | 3.66 | SD btwn Labs | 3.02 |
| Labs Incld | 18 | Labs Incld | 18 |

## Instrument Code List as Reported by the Labs

(ZZ) - Instruments No Longer Tracked

**Report #554**

# Containerboard Interlaboratory Testing Program

## Analysis 237

## **Air Resistance,** 36 lb Linerboard - 36Z

TAPPI Official Test Method T460

| | Monthly Results | | | Cumulative Results | | | | |
|---|---|---|---|---|---|---|---|---|
| WebCode | Mean | CPV | SDr | Mean | CPV | SDr | Months | Inst |
| 2G8BP7 | 51.5 | -0.81 | 1.4 | 51.4 | -0.49 | 1.4 | 4 | LP |
| 2QV2CY | 53.5 | 1.03 | 1.9 | 53.5 | 1.47 | 2.4 | 4 | GA |
| 9493MV | 52.8 | 0.43 | 1.8 | 52.7 | 0.69 | 1.9 | 4 | LP |
| 9D3B8L | 48.6 | -3.40 X | 4.5 | 47.2 | -4.41 X | 3.8 | 4 | XX |
| 9YE9PU | 50.1 | -2.06 * | 2.4 | 51.2 | -0.65 | 2.1 | 4 | LA |
| B8PHHL | 54.9 | 2.29 * | 1.4 | 54.6 | 2.42 * | 1.4 | 4 | XX |
| BUH49V | 51.8 | -0.49 | 3.0 | 52.2 | 0.26 | 2.7 | 4 | HG |
| CH3TWP | 52.5 | 0.18 | 1.8 | 51.3 | -0.64 | 3.1 | 4 | LP |
| DU8B8P | 53.3 | 0.90 | 3.1 | 52.8 | 0.82 | 2.6 | 4 | TL |
| DVJTK3 | 50.9 | -1.31 | 1.6 | 50.3 | -1.57 | 1.3 | 4 | LP |
| EAYBRW | 51.4 | -0.84 | 3.4 | 52.5 | 0.48 | 4.8 | 3 | LW |
| GAVKHK | 51.9 | -0.45 | 1.2 | 52.3 | 0.36 | 1.5 | 4 | XX |
| HBL7NF | 40.8 | -10.47 X | 1.9 | 41.7 | -9.54 X | 2.3 | 4 | XX |
| K66KTE | 53.0 | 0.55 | 1.9 | 50.2 | -1.62 | 1.9 | 4 | LA |
| MNUH8C | 45.0 | -6.71 X | 1.7 | 44.8 | -6.62 X | 2.0 | 4 | XX |
| PUQUGD | 51.8 | -0.46 | 1.9 | 51.1 | -0.74 | 1.7 | 3 | LP |
| RNHCX4 | 52.7 | 0.31 | 2.5 | 51.5 | -0.39 | 2.2 | 4 | LP |
| TKRPFZ | 51.9 | -0.40 | 3.6 | 51.1 | -0.76 | 3.1 | 4 | GG |
| WU8FT3 | 51.9 | -0.40 | 0.7 | 51.9 | -0.04 | 1.5 | 3 | XX |
| YBJ4UT | 53.9 | 1.39 | 2.4 | 52.0 | 0.07 | 2.4 | 4 | TP |
| YKU7FT | 52.3 | -0.03 | 1.8 | 51.4 | -0.50 | 2.5 | 3 | HG |
| YXV2CZ | 52.5 | 0.18 | 1.2 | 52.8 | 0.82 | 1.7 | 4 | LA |

### Consensus (All Labs) Results

| | | | |
|---|---|---|---|
| Month Mean | 52.34 | Grand Mean | 51.94 |
| Avg SDr | 2.18 | Avg SDr | 2.37 |
| SD btwn Labs | 1.10 | SD btwn Labs | 1.08 |
| Labs Incld | 19 | Labs Incld | 19 |

### Instrument Code List as Reported by the Labs

(GA) - Gurley Precision #4340 Automatic Densometer

(GG) - Gurley Precision #4320 Densometer

(HG) - Technidyne - Hagerty Model #1 and Profile System

(LA) - L & W Autoline

(LP) - L & W Air Permeance Tester SE 166

(LW) - L & W Gurley Densometer, Oil Flotation

(TL) - Teledyne Gurley Densometer #4110, Oil Flotation

(TP) - Technidyne Profile/ plus Roughness & Porosity

(XX) - Instrument make/model not specified by lab

**Report #554**

# Containerboard Interlaboratory Testing Program

Analysis 240

**Flat Crush Strength (CMT),** 26 lb Corrugating Medium - CM81

TAPPI Official Test Method T809

| | Weekly Means | | | | Monthly Results | | | | Cumulative Results | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WebCode | Week 1 | Week 2 | Week 3 | Week 4 | Mean | CPV | SDr | SD Wks | Mean | CPV | SDr | SD Wks | Wks | Inst |
| 23NDDV | 59.6 | 60.1 | 57.8 | 57.5 | 58.8 | -0.26 | 2.3 | 1.3 | 58.2 | -0.30 | 2.2 | 1.1 | 8 | LC |
| 29UGCP | 56.9 | 58.8 | 55.9 | 59.2 | 57.7 | -0.66 | 2.6 | 1.6 | 58.2 | -0.30 | 2.6 | 1.5 | 6 | LD |
| 2CTT9P | 60.5 | 62.3 | 61.8 | 61.7 | 61.6 | 0.80 | 2.5 | 0.8 | 60.9 | 0.87 | 2.3 | 1.0 | 8 | TM |
| 3WACWD | 61.1 | 60.0 | 59.8 | 58.4 | 59.8 | 0.13 | 3.2 | 1.1 | 57.2 | -0.76 | 2.8 | 3.0 | 8 | TH |
| 69Z3C2 | 58.9 | 59.6 | 59.3 | 59.8 | 59.4 | -0.02 | 2.4 | 0.4 | 58.5 | -0.20 | 2.4 | 1.1 | 8 | LD |
| 7AQNHX | 56.2 | 55.4 | 56.9 | 57.5 | 56.5 | -1.11 | 2.2 | 0.9 | 56.5 | -1.06 | 2.2 | 0.9 | 4 | EM |
| 7DAFUZ | 61.6 | 62.0 | 61.8 | 62.3 | 61.9 | 0.92 | 3.0 | 0.3 L | 60.9 | 0.88 | 2.8 | 1.4 | 8 | EM |
| 7MR3W9 | 68.4 X | 68.0 * | 70.0 X | 69.9 X | 69.1 | 3.61 X | 2.9 | 1.0 | 69.1 | 4.43 X | 2.9 | 0.9 | 8 | XX |
| 7NA7DL | 64.4 L | 62.9 L | 62.7 L | 62.0 L | 63.0 | 1.33 | 0.9 | 1.0 | 63.0 | 1.78 | 0.9 | 1.0 | 4 | TD |
| 8MUAKM | 61.0 | 61.6 | 62.2 | 62.2 | 61.7 | 0.86 | 1.9 | 0.6 | 61.5 | 1.12 | 2.0 | 0.6 | 7 | LZ |
| 8TGWFR | 23.4 XH | 22.1 XH | 25.5 XL | 25.8 XL | 24.2 | -13.18 X | 3.4 | 1.8 | 31.0 | -12.16 X | 5.1 | 8.6 H | 7 | TX |
| 9493MV | 60.0 | 60.3 | 63.5 | 61.7 | 61.4 | 0.73 | 2.9 | 1.6 | 60.3 | 0.59 | 3.4 | 1.9 | 8 | LD |
| 9X8XQ6 | 59.6 | 63.5 | 61.0 | 58.0 | 60.5 | 0.41 | 3.0 | 2.3 | 60.5 | 0.71 | 2.6 | 1.8 | 8 | TH |
| ATRMD2 | 56.1 | 56.6 | 56.9 | 56.6 | 56.6 | -1.08 | 2.4 | 0.3 | 57.4 | -0.64 | 2.6 | 1.2 | 8 | LD |
| B8PHHL | 61.7 | 60.7 | 58.8 | 60.3 | 60.4 | 0.36 | 2.4 | 1.2 | 60.2 | 0.57 | 2.7 | 1.0 | 8 | MB |
| BMJERQ | 58.8 | 59.1 | 59.0 | 58.4 | 58.8 | -0.23 | 2.0 | 0.3 | 58.5 | -0.19 | 2.1 | 0.4 | 8 | LD |
| CE3HZP | 59.7 | 29.1 XL | 59.4 | 19.9 XL | 42.0 | -6.51 X | 1.8 | 20.6 H | 50.2 | -3.78 X | 1.8 | 16.1 H | 8 | LZ |
| CT6UVN | 60.2 | 63.3 | 61.6 | 62.0 | 61.8 | 0.87 | 2.5 | 1.2 | 61.2 | 1.01 | 2.6 | 1.2 | 8 | LD |
| DTYYPM | 56.5 | 55.8 | 56.3 | 55.6 | 56.1 | -1.27 | 3.1 | 0.4 | 56.1 | -1.25 | 3.1 | 0.4 | 4 | LD |
| EAYBRW | 58.4 | 58.8 | 57.8 H | 56.7 | 57.9 | -0.57 | 3.3 | 0.9 | 57.9 | -0.43 | 3.3 | 0.9 | 4 | XX |
| EGJNCG | 58.3 H | 64.8 | 72.2 X | 67.9 X | 65.8 | 2.38 * | 4.2 | 5.8 H | 48.4 | -4.59 X | 3.4 | 19.1 H | 8 | LC |
| ELBVVQ | 57.0 | 55.8 | 57.9 | 57.1 | 56.9 | -0.93 | 2.7 | 0.9 | 57.2 | -0.75 | 2.9 | 1.5 | 8 | LC |
| FAZHFB | 57.5 | 57.7 | 53.8 | 57.3 | 56.6 | -1.07 | 2.5 | 1.8 | 52.7 | -2.69 * | 2.3 | 10.7 H | 7 | MB |
| GAVKHK | 58.6 | 59.0 | 60.0 | 59.3 | 59.2 | -0.07 | 2.4 | 0.6 | 59.5 | 0.24 | 2.1 | 0.5 | 8 | LD |
| K66KTE | 60.7 | 68.7 X | 64.7 * | 64.5 * | 64.7 | 1.95 | 3.5 | 3.3 | 62.0 | 1.34 | 3.4 | 4.2 H | 8 | LC |
| KJLKGR | 59.6 | 60.3 | 60.9 | 59.9 | 60.2 | 0.27 | 2.3 | 0.6 | 47.6 | -4.90 X | 1.8 | 13.6 H | 8 | TH |
| LWPYJB | 64.7 | 63.1 | 59.5 | 61.4 | 62.2 | 1.02 | 3.7 | 2.2 | 62.2 | 1.42 | 3.7 | 2.2 | 4 | MB |
| MGT9UR | 61.2 H | 60.8 | 61.5 | 59.8 H | 60.8 | 0.50 | 4.3 | 0.7 | 60.1 | 0.53 | 3.9 | 1.1 | 8 | TG |
| MXV38J | 54.9 | 55.0 | 56.1 | 56.7 | 55.7 | -1.41 | 2.5 | 0.9 | 55.7 | -1.38 | 2.6 | 0.8 | 8 | LD |
| NE2LL2 | 64.9 * | 65.7 | 64.1 | 62.3 | 64.3 | 1.80 | 3.3 | 1.5 | 48.3 | -4.61 X | 2.4 | 17.1 H | 8 | LC |
| NWZK7G | 60.8 | 54.8 | 54.0 | 59.7 H | 57.3 | -0.79 | 3.2 | 3.4 H | 57.3 | -0.69 | 3.2 | 3.4 | 4 | LZ |
| NZH4QC | 54.6 H | 55.6 | 57.4 | 59.4 | 56.7 | -1.01 | 3.4 | 2.1 | 56.5 | -1.06 | 3.6 | 1.8 | 7 | LC |
| PUQUGD | 60.3 | 59.6 L | 63.4 | 61.6 | 61.2 | 0.66 | 2.2 | 1.7 | 59.9 | 0.42 | 2.1 | 1.9 | 8 | LC |
| PWXCEA | 63.4 | 64.0 | 63.4 | 64.3 * | 63.8 | 1.61 | 2.9 | 0.5 | 63.8 | 2.11 * | 2.9 | 0.5 | 4 | LC |
| R23R23 | 60.6 | 60.8 | 60.1 | 59.3 | 60.2 | 0.28 | 1.8 | 0.7 | 60.9 | 0.86 | 1.8 | 0.9 | 8 | LC |

**Report #554**

# Containerboard Interlaboratory Testing Program

## Analysis 240

## **Flat Crush Strength (CMT),** 26 lb Corrugating Medium - CM81

TAPPI Official Test Method T809

| | Weekly Means | | | | Monthly Results | | | | Cumulative Results | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WebCode | Week 1 | Week 2 | Week 3 | Week 4 | Mean | CPV | SDr | SD Wks | Mean | CPV | SDr | SD Wks | Wks | Inst |
| RAW23K | 53.0 * | 55.2 | 55.5 | 54.4 | 54.5 | -1.83 | 2.9 | 1.1 | 55.8 | -1.35 | 2.4 | 1.6 | 8 | LZ |
| RKYHVB | 59.5 | 60.2 | 58.9 | 57.9 | 59.1 | -0.12 | 2.5 | 1.0 | 58.8 | -0.03 | 2.5 | 0.8 | 8 | LD |
| RNHCX4 | 58.2 | 58.5 | 57.4 | 60.5 | 58.6 | -0.30 | 2.6 | 1.3 | 58.8 | -0.06 | 2.6 | 1.0 | 8 | LZ |
| TQYP34 | 65.0 * | 61.4 | 61.5 | NO DATA | 62.6 | 1.20 | 2.2 | 2.0 | 61.7 | 1.19 | 2.1 | 1.8 | 6 | LC |
| TT7CP4 | 53.5 * | 56.3 | 56.5 | 56.0 | 55.6 | -1.45 | 2.5 | 1.4 | 56.3 | -1.16 | 2.4 | 1.7 | 8 | LC |
| VCCWR3 | 56.7 | 56.7 | 57.4 | 57.7 | 57.1 | -0.87 | 2.9 | 0.5 | 57.1 | -0.78 | 2.9 | 0.5 | 4 | LD |
| WQNLPA | 58.6 | 59.3 | 58.2 | 59.9 | 59.0 | -0.16 | 2.2 | 0.8 | 58.2 | -0.33 | 2.3 | 1.1 | 8 | LC |
| WYYMBB | 59.5 | 59.5 | 60.7 | 60.5 | 60.1 | 0.23 | 2.5 | 0.6 | 60.4 | 0.63 | 2.5 | 1.1 | 8 | LC |
| XHRGPY | 58.5 | 58.6 | 57.1 | 56.7 | 57.7 | -0.64 | 2.2 | 1.0 | 57.7 | -0.54 | 2.2 | 0.9 | 8 | LD |
| XQJ93D | 59.3 | 56.4 | 55.7 L | 57.1 | 57.1 | -0.87 | 2.3 | 1.6 | 58.3 | -0.26 | 2.1 | 1.8 | 8 | TD |
| YBJ4UT | 60.5 | 59.0 | 57.4 | 57.6 | 58.6 | -0.32 | 3.2 | 1.5 | 59.4 | 0.21 | 2.9 | 1.4 | 8 | LC |
| YXV2CZ | 56.4 | 56.8 | 54.3 | 53.7 * | 55.3 | -1.55 | 2.2 | 1.5 | 55.6 | -1.45 | 2.0 | 1.3 | 8 | LD |
| YYRHNX | 60.5 | 60.4 | 60.5 | 60.5 | 60.5 | 0.39 | 2.4 | 0.0 L | 60.5 | 0.69 | 2.4 | 0.0 L | 8 | LD |
| Z4ZT8W | 59.3 | 57.8 | 59.2 | 60.1 | 59.1 | -0.12 | 1.6 | 1.0 | 60.1 | 0.52 | 1.7 | 1.3 | 8 | LD |

### Consensus (All Labs) Results

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Wk Mean | 59.29 | 59.79 | 59.12 | 59.21 | Month Mean | 59.44 | Grand Mean | 58.91 |
| Avg SDr | 2.74 | 2.60 | 2.74 | 2.72 | Avg SDr | 2.72 | Avg SDr | 2.63 |
| SD btwn Labs | 2.74 | 3.30 | 2.78 | 2.46 | SD btwn Labs | 2.67 | SD btwn Labs | 2.30 |
| Labs Incld | 47 | 47 | 46 | 44 | SD btwn Wks | 1.60 | SD btwn Wks | 2.22 |
| Labs Excld | 2 | 3 | 3 | 4 | Labs Incld | 46 | Labs Incld | 43 |
| Labs not rcvd | 0 | 0 | 0 | 1 | | | | |

### Instrument Code List as Reported by the Labs

(EM) - Emerson 1200 Series

(LD) - L&W Crush Tester 248

(MB) - Messmer Buchel K440

(TG) - TMI Compression Tester, Model 17-10

(TM) - TMI/Hinde & Dauch

(XX) - Instrument make/model not specified by lab

(LC) - L & W Crush Tester 48

(LZ) - L & W Crush Tester (model not specified)

(TD) - TMI Digital Crush Tester, Model 17-09

(TH) - TMI Compression Tester, Model 17-76

(TX) - TMI Crush Tester (model not specified)

**Report #554**

# Containerboard Interlaboratory Testing Program

Analysis 250

**Fluted Edge Crush Strength (CFC),** 26 lb Corrugating Medium - CM81

TAPPI Official Method T824

| | Weekly Means | | | | Monthly Results | | | | Cumulative Results | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WebCode | Week 1 | Week 2 | Week 3 | Week 4 | Mean | CPV | SDr | SD Wks | Mean | CPV | SDr | SD Wks | Wks | Inst |
| 7NA7DL | 71.1 L | 69.1 L | 70.0 | 71.2 | 70.3 | 0.88 | 1.0 | 1.0 | 70.3 | 0.84 | 1.0 | 1.0 | 4 | TD |
| BMJERQ | 60.8 | 61.0 | 61.0 | 59.8 | 60.6 | -1.19 | 2.1 | 0.6 | 59.6 | -1.41 | 2.6 | 1.1 | 8 | LD |
| LWPYJB | 56.5 | 57.6 | 57.2 | 55.3 * | 56.6 | -2.04 * | 1.8 | 1.0 | 56.6 | -2.03 * | 1.8 | 1.0 | 4 | MB |
| NWZK7G | 65.3 H | 67.7 H | 63.5 H | 69.8 | 66.6 | 0.07 | 4.4 | 2.7 | 66.6 | 0.05 | 4.4 | 2.7 | 4 | LZ |
| PUQUGD | 70.8 | 65.2 | 66.5 | 65.2 | 66.9 | 0.14 | 2.0 | 2.7 | 67.2 | 0.19 | 2.3 | 2.2 | 8 | XX |
| TQYP34 | 68.1 | 64.9 | 68.6 | No Data | 67.2 | 0.21 | 1.6 | 2.0 | 65.9 | -0.09 | 2.3 | 2.0 | 6 | LC |
| WU8FT3 | 71.2 L | 72.5 | 71.6 | 71.9 | 71.8 | 1.19 | 1.5 | 0.5 | 71.8 | 1.15 | 1.5 | 0.5 | 4 | XX |
| WYYMBB | 65.8 | 66.9 | 69.2 | 65.8 | 66.9 | 0.15 | 2.7 | 1.6 | 66.9 | 0.12 | 4.3 | 2.0 | 8 | LZ |
| YBJ4UT | 71.6 | 69.4 | 68.6 L | 69.9 | 69.9 | 0.78 | 1.9 | 1.3 | 71.2 | 1.03 | 1.7 | 1.8 | 8 | LC |
| YXV2CZ | 71.6 | 68.1 | 70.3 | 69.5 | 69.9 | 0.78 | 1.5 | 1.5 | 69.6 | 0.68 | 1.4 | 1.1 | 8 | LD |
| Z4ZT8W | 60.4 | 61.1 | 61.8 | 63.4 | 61.7 | -0.96 | 2.2 | 1.3 | 63.8 | -0.53 | 1.9 | 2.4 | 8 | LD |

## Consensus (All Labs) Results

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Wk Mean | 66.65 | 65.76 | 66.19 | 66.17 | Month Mean | 66.22 | Grand Mean | 66.32 |
| Avg SDr | 2.28 | 2.17 | 2.59 | 1.86 | Avg SDr | 2.24 | Avg SDr | 2.52 |
| SD btwn Labs | 5.37 | 4.38 | 4.65 | 5.43 | SD btwn Labs | 4.70 | SD btwn Labs | 4.77 |
| Labs Incld | 11 | 11 | 11 | 10 | SD btwn Wks | 1.62 | SD btwn Wks | 1.77 |
| Labs Excld | 0 | 0 | 0 | 0 | Labs Incld | 11 | Labs Incld | 11 |
| Labs not rcvd | 0 | 0 | 0 | 1 | | | | |

## Instrument Code List as Reported by the Labs

(LC) - L & W Crush Tester 48

(LD) - L&W Crush Tester 248

(LZ) - L & W Crush Tester (model not specified)

(MB) - Messmer Buchel K440

(TD) - TMI Digital Crush Tester, Model 17-09

(XX) - Instrument make/model not specified by lab

**Report #554**

# Containerboard Interlaboratory Testing Program

Analysis 255

**Ring Crush (RCT),** 26 lb Corrugating Medium - CM81

TAPPI Official Test Method T822

| | Weekly Means | | | | Monthly Results | | | | Cumulative Results | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WebCode | Week 1 | Week 2 | Week 3 | Week 4 | Mean | CPV | SDr | SD Wks | Mean | CPV | SDr | SD Wks | Wks | Inst |
| 29UGCP | 38.7 | 38.3 | 39.6 L | 40.3 | 39.2 | 1.01 | 2.1 | 0.9 | 39.5 | 1.27 | 2.0 | 1.2 | 6 | LD |
| 2CTT9P | 37.7 L | 37.4 | 32.9 H | 35.8 | 35.9 | -0.01 | 5.5 | 2.2 | 35.6 | -1.11 | 4.0 | 1.6 | 8 | LD |
| 2FDKKR | 36.5 | 36.7 | 36.1 | 36.4 | 36.4 | 0.14 | 2.4 | 0.3 L | 38.5 | 0.67 | 2.1 | 2.3 | 8 | TH |
| 7AQNHX | 38.0 | 39.4 | 38.4 | 37.8 | 38.4 | 0.76 | 1.5 | 0.7 | 38.4 | 0.62 | 1.5 | 0.7 | 4 | LC |
| 8TGWFR | 32.2 *H | 33.6 H | 33.1 H | 21.0 X | 30.0 | -1.87 | 4.3 | 6.0 H | 28.1 | -5.58 X | 3.9 | 4.6 H | 8 | TX |
| ATRMD2 | 37.5 | 38.0 | 37.5 | 37.3 | 37.6 | 0.50 | 1.6 | 0.3 | 37.5 | 0.04 | 1.5 | 0.4 L | 8 | LD |
| C6CYLG | 36.4 | 37.7 L | 35.9 L | 36.0 L | 36.5 | 0.16 | 1.0 | 0.8 | 36.5 | -0.55 | 1.0 | 0.8 | 4 | WK |
| CT6UVN | 39.5 | 40.1 | 39.2 | 39.5 | 39.6 | 1.12 | 1.9 | 0.4 | 39.3 | 1.14 | 2.0 | 0.6 | 8 | LD |
| EAYBRW | 37.1 | 38.7 | 37.7 | 40.6 | 38.5 | 0.79 | 1.7 | 1.5 | 38.5 | 0.68 | 1.7 | 1.5 | 4 | XX |
| EGJNCG | 33.0 | 28.6 * | 29.8 | 29.6 H | 30.2 | -1.78 | 2.9 | 1.9 | 36.2 | -0.74 | 4.7 | 6.6 H | 8 | LD |
| GAVKHK | 36.0 | 36.4 | 35.0 | 34.5 | 35.5 | -0.15 | 2.1 | 0.9 | 36.1 | -0.76 | 2.0 | 0.9 | 8 | LD |
| KJLKGR | 35.1 | 35.6 | 35.7 L | 33.0 | 34.8 | -0.35 | 1.3 | 1.3 | 37.6 | 0.12 | 1.6 | 3.5 H | 8 | TH |
| LWPYJB | 27.9 X | 28.2 * | 29.0 *L | 27.7 * | 28.2 | -2.41 * | 2.4 | 0.6 | 28.2 | -5.52 X | 2.4 | 0.6 | 4 | MB |
| PUQUGD | 33.4 | 33.8 | 32.9 | 32.7 | 33.2 | -0.86 | 2.1 | 0.5 | 33.9 | -2.12 * | 1.8 | 1.3 | 8 | LC |
| R23R23 | 39.3 | 39.7 | 40.0 | 38.6 | 39.4 | 1.07 | 1.3 | 0.6 | 38.8 | 0.86 | 1.2 | 0.9 | 8 | LC |
| R92J2J | 35.7 | 36.1 | 38.6 | 34.8 | 36.3 | 0.11 | 2.4 | 1.6 | 35.1 | -1.37 | 2.4 | 2.9 | 8 | LZ |
| RAW23K | 36.3 | 35.1 | 35.8 L | 34.8 | 35.5 | -0.15 | 1.7 | 0.6 | 36.5 | -0.56 | 1.6 | 1.2 | 8 | EM |
| TT7CP4 | 34.6 | 33.9 | 33.3 L | 34.6 | 34.1 | -0.59 | 1.7 | 0.6 | 35.5 | -1.17 | 1.7 | 1.6 | 8 | LC |
| XHRGPY | 40.2 | 39.9 | 39.4 | 40.3 | 40.0 | 1.24 | 2.1 | 0.4 | 39.6 | 1.32 | 2.2 | 1.2 | 8 | LZ |
| YBJ4UT | 36.6 H | 36.6 | 36.4 | 35.0 | 36.1 | 0.05 | 2.6 | 0.8 | 38.3 | 0.52 | 2.1 | 2.3 | 8 | LC |
| YXV2CZ | 38.4 | 38.9 | 38.6 | 37.9 | 38.5 | 0.77 | 1.5 | 0.4 | 39.3 | 1.15 | 1.4 | 1.0 | 8 | LD |
| YYRHNX | 37.5 | 37.5 | 37.3 | 37.4 | 37.4 | 0.45 | 1.6 | 0.1 L | 37.4 | 0.00 | 1.6 | 0.1 L | 8 | LD |

## Consensus (All Labs) Results

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Wk Mean | 36.65 | 36.38 | 36.01 | 35.92 | Month Mean | 35.97 | Grand Mean | 37.40 |
| Avg SDr | 2.01 | 2.26 | 3.10 | 1.84 | Avg SDr | 2.37 | Avg SDr | 2.18 |
| SD btwn Labs | 2.14 | 3.24 | 3.09 | 3.36 | SD btwn Labs | 3.22 | SD btwn Labs | 1.66 |
| Labs Incld | 21 | 22 | 22 | 21 | SD btwn Wks | 1.61 | SD btwn Wks | 2.16 |
| Labs Excld | 1 | 0 | 0 | 1 | Labs Incld | 22 | Labs Incld | 20 |
| Labs not rcvd | 0 | 0 | 0 | 0 | | | | |

**Report #554**

# Containerboard Interlaboratory Testing Program

Analysis 255

**Ring Crush (RCT),** 26 lb Corrugating Medium - CM81

TAPPI Official Test Method T822

## Instrument Code List as Reported by the Labs

(EM) - Emerson 1200 Series

(LD) - L&W Crush Tester 248

(MB) - Messmer Buchel K440

(TX) - TMI Digital Crush Tester (model not specified)

(XX) - Instrument make/model not specified by lab

(LC) - L & W Crush Tester 48

(LZ) - L & W Crush Tester (model not specified)

(TH) - TMI Compression Tester, Model 17-76

(WK) - Zwick Z005 Crush Tester

**Report #554**

# Containerboard Interlaboratory Testing Program

## Analysis 261

## **STFI,** 26 lb Corrugating Medium - CM81

TAPPI Provisional Test Method T826

| | Weekly Means | | | | Monthly Results | | | | Cumulative Results | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WebCode | Week 1 | Week 2 | Week 3 | Week 4 | Mean | CPV | SDr | SD Wks | Mean | CPV | SDr | SD Wks | Wks | Inst |
| 29UGCP | 13.1 * | 13.3 * | 12.8 | 12.2 | 12.8 | 1.09 | 0.7 | 0.5 | 12.8 | 0.26 | 0.7 | 0.6 | 7 | LZ |
| 2CTT9P | 11.6 | 12.1 | 12.3 | 12.5 | 12.2 | -0.11 | 0.8 | 0.4 | 12.6 | -0.09 | 0.8 | 0.8 | 8 | LA |
| 3WACWD | 12.3 | 13.0 | 11.8 | 12.2 | 12.3 | 0.17 | 0.8 | 0.5 | 13.1 | 0.59 | 0.8 | 0.9 | 8 | TT |
| 69Z3C2 | 12.9 | 13.0 | 12.7 | 12.8 | 12.9 | 1.12 | 0.9 | 0.1 L | 12.8 | 0.18 | 0.9 | 0.1 L | 8 | LB |
| 7AQNHX | 12.2 | 11.8 | 11.5 | 11.5 | 11.8 | -0.81 | 0.9 | 0.3 | 11.8 | -1.21 | 0.9 | 0.3 | 4 | LB |
| 8MUAKM | 11.4 | 11.9 | 11.3 | 11.9 | 11.6 | -1.04 | 0.7 | 0.3 | 12.1 | -0.76 | 0.7 | 0.6 | 7 | LW |
| 8TGWFR | 12.0 L | 12.0 L | 12.1 L | 21.9 XL | 14.5 | 4.03 X | 0.0 | 5.0 H | 19.1 | 8.61 X | 0.0 | 5.9 H | 8 | TS |
| 9X8XQ6 | 12.4 | 12.5 | 12.7 | 12.4 | 12.5 | 0.50 | 0.7 | 0.2 L | 12.3 | -0.42 | 0.7 | 0.4 | 8 | TT |
| ATRMD2 | 11.6 | 11.6 | 12.1 | 11.9 | 11.8 | -0.72 | 0.7 | 0.3 | 11.7 | -1.23 | 0.7 | 0.3 | 8 | LA |
| B8PHHL | 11.8 L | 11.8 L | 11.7 L | 11.9 L | 11.8 | -0.74 | 0.1 | 0.1 L | 12.5 | -0.20 | 0.1 | 0.8 | 8 | BK |
| BMJERQ | 14.9 X | 14.9 X | 14.7 X | 15.1 X | 14.9 | 4.72 X | 0.7 | 0.2 L | 14.6 | 2.59 X | 0.7 | 0.4 | 8 | LA |
| CE3HZP | 11.2 | 11.3 | 11.1 L | 19.9 XL | 13.4 | 2.02 * | 0.5 | 4.4 H | 12.7 | 0.08 | 0.5 | 3.0 H | 8 | LU |
| EAYBRW | 11.8 L | 11.6 L | 11.5 L | 12.0 L | 11.7 | -0.84 | 0.1 | 0.2 | 11.8 | -1.10 | 0.0 | 0.2 | 8 | XX |
| FAZHFB | 12.0 L | 10.8 *L | 10.8 L | 10.8 XL | 11.1 | -1.89 | 0.0 | 0.6 | 15.8 | 4.25 X | 0.0 | 5.9 H | 7 | LA |
| NZH4QC | 11.9 | 11.8 | 12.0 | 12.5 | 12.1 | -0.28 | 0.8 | 0.3 | 12.8 | 0.19 | 0.8 | 1.0 | 7 | LW |
| R23R23 | 12.7 | 14.2 X | 13.8 * | 12.9 | 13.4 | 2.06 * | 0.7 | 0.7 | 13.8 | 1.47 | 0.7 | 0.8 | 8 | XX |
| R92J2J | 12.3 | 12.2 | 12.2 | 12.4 | 12.3 | 0.09 | 0.8 | 0.1 L | 11.9 | -0.98 | 0.8 | 0.5 | 8 | LA |
| RAW23K | 12.0 | 12.2 | 12.7 | 12.3 | 12.3 | 0.15 | 0.5 | 0.3 | 12.7 | 0.05 | 0.5 | 0.5 | 8 | LZ |
| RNHCX4 | 11.9 | 12.1 | 12.2 | 11.8 | 12.0 | -0.37 | 0.8 | 0.2 L | 12.3 | -0.53 | 0.8 | 0.4 | 8 | LB |
| VK3B38 | 12.3 | 12.7 | 13.1 | 12.0 | 12.5 | 0.48 | 0.8 | 0.5 | 12.5 | -0.22 | 0.8 | 0.5 | 4 | LB |
| WQNLPA | 12.6 | 23.9 X | 12.8 | 12.8 | 15.5 | 5.82 X | 1.1 | 5.6 H | 14.1 | 1.98 | 1.0 | 4.0 H | 8 | LB |
| YBJ4UT | 11.8 | 11.8 | 12.0 | 12.0 | 11.9 | -0.55 | 0.9 | 0.1 L | 12.2 | -0.66 | 0.8 | 0.3 | 8 | LU |
| YXV2CZ | 12.1 | 11.9 | 12.3 | 12.0 | 12.0 | -0.31 | 0.7 | 0.2 L | 12.7 | 0.02 | 0.6 | 0.7 | 8 | LA |

## Consensus (All Labs) Results

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Wk Mean | 12.08 | 12.06 | 12.16 | 12.21 | Month Mean | 12.21 | Grand Mean | 12.65 |
| Avg SDr | 0.69 | 0.69 | 0.68 | 0.72 | Avg SDr | 0.69 | Avg SDr | 0.72 |
| SD btwn Labs | 0.46 | 0.60 | 0.69 | 0.39 | SD btwn Labs | 0.57 | SD btwn Labs | 0.75 |
| Labs Incld | 22 | 20 | 22 | 19 | SD btwn Wks | 1.03 | SD btwn Wks | 1.21 |
| Labs Excld | 1 | 3 | 1 | 4 | Labs Incld | 20 | Labs Incld | 21 |
| Labs not rcvd | 0 | 0 | 0 | 0 | | | | |

**Report #554**

# Containerboard Interlaboratory Testing Program

Analysis 261

**STFI,** 26 lb Corrugating Medium - CM81

TAPPI Provisional Test Method T826

## Instrument Code List as Reported by the Labs

(BK) - Buchel Strip Compression Tester BK-155

(LB) - L & W Model 152

(LW) - L & W 53 with moisture correction (was 53M)

(TS) - TMI Monitor/STFI Compression Tester, 17-33

(XX) - Instrument make/model not specified by lab

(LA) - L & W Autoline

(LU) - L & W 52 without moisture correction (was 53)

(LZ) - L & W (model not specified)

(TT) - TMI Short Span Compression, 17-34 (MB K455)