



# PRODUCT TESTING CASE STUDY

## UHMW Injection Molded Formulation for High Wear Parts

### THE PROJECT

#### Third Party Testing of DPI's Proprietary Injection Molded UHMW Parts

In further testing of one of our proprietary Injection Molded UHMW formulations against standard extruded UHMW sheet stock, we continue to see incredible durability results. Through third party lab testing, a large study was conducted to ensure that DPI's injection molded UHMW parts and components would perform as well as parts that are produced from standard sheet stock UHMW, which is commonly used in high wear part applications. The specific parts used in this testing were from our line of Injection Molded UHMW drag paddles, which are designed for use in grain handling systems in this case.

### THE CHALLENGE

#### High Wear Parts: Injection Molded UHMW vs. Extruded Sheet

High wear parts are essential to many applications and industries. Because of this, material scientists and engineers are always searching for better wearing materials and analyzing for performance and wear life. High wear parts regularly have to be replaced, so minimizing the cost of these items is very important to our customers. With this in mind, an outside lab tested both our injection molded UHMW parts and extruded sheet stock UHMW parts for: abrasion resistance, tensile properties, deflection under load, deflection with a cyclical load, and hardness.

### THE RESULTS

#### Uncompromised Performance and Cost Savings is Achieved

Third party testing and the resulting data proved that DPI's Injection Molded UHMW parts outwear parts made from standard extruded UHMW sheet stock. In fact, in this drag paddle testing, our Taber abrasion wear index was less than half of that of standard extruded sheet at 72.8 versus 164.



Report Date: 12/14/2024  
Test Date: 11/3-12/12/2024

**ABRASION RESISTANCE TEST**

**SAMPLE ID:** 12" Injection Molded Paddle-Green – Diversified Plastics Inc.

**TEST EQUIPMENT:** Teledyne Taber Abrasion Tester, Model #: 1750, SN: 20221336

**TEST PROCEDURE:** Testing performed in accordance with ASTM D4060-19.

**CONDITIONED:** Yes (48 Hours)

**TEMPERATURE/HUMIDITY:** 70.2°F @ 47.8%RH

**ABRADANT:** CS 17

**LOAD:** 1000 Grams

**SUCTION:** Yes

**WHEELS REFACED AT START:** Yes

**DURING TEST:** Every 1000 cycles

**WEAR CYCLES:** 1,000

**TEST TEMP/HUMIDITY:** 70.5°F/ 46.3%RH

| Test    | Weight Before<br>(mg) | Weight After<br>1,000 Cycles<br>(mg) | Loss<br>(mg) | Wear Index |
|---------|-----------------------|--------------------------------------|--------------|------------|
| 1       | 123206.8              | 123134.0                             | 72.8         | 72.8       |
| 2       | 123660.3              | 123589.5                             | 70.8         | 70.8       |
| 3       | 123122.3              | 123047.6                             | 74.7         | 74.7       |
| AVERAGE |                       |                                      |              | 72.8       |

*Note: Identification of tested specimen(s) was provided by the client. Test run at 72 rpm,  $\pm$  2 rpm.*

KS/mlb

Karl Schmitz, Director  
Materials Testing

Report Date: 12/14/2024  
Test Date: 11/3-12/12/2024

**ABRASION RESISTANCE TEST**

**SAMPLE ID:** 12" Extruded Paddle-White – Cut from sheet

**TEST EQUIPMENT:** Teledyne Taber Abrasion Tester, Model #: 1750, SN: 20221336

**TEST PROCEDURE:** Testing performed in accordance with ASTM D4060-19.

**CONDITIONED:** Yes (48 Hours)      **TEMPERATURE/HUMIDITY:** 70.2°F @ 47.8%RH

**ABRADANT:** CS 17      **LOAD:** 1000 Grams      **SUCTION:** Yes

**WHEELS REFACED AT START:** Yes      **DURING TEST:** Every 1000 cycles

**WEAR CYCLES:** 1,000      **TEST TEMP/HUMIDITY:** 70.5°F/ 46.3%RH

| Test    | Weight Before<br>(mg) | Weight After<br>1,000 Cycles<br>(mg) | Loss<br>(mg) | Wear Index |
|---------|-----------------------|--------------------------------------|--------------|------------|
| 1       | 84815.6               | 84615.7                              | 199.9        | 199.9      |
| 2       | 85021.7               | 84873.9                              | 147.8        | 147.8      |
| 3       | 85182.5               | 85038.3                              | 144.2        | 144.2      |
| AVERAGE |                       |                                      |              | 164.0      |

*Note: Identification of tested specimen(s) was provided by the client. Test run at 72 rpm, ± 2 rpm.*

KS/mlb

Karl Schmitz, Director  
Materials Testing

Report Date: 12/14/2024  
Test Date: 11/3-12/12/2024

**REPORT OF MECHANICAL TEST**

**SAMPLE ID:** 12" Injection Molded Paddle-Green – Diversified Plastics Inc.  
**SUBJECT:** Mechanical Properties-Tensile  
**SPECIFICATION:** ASTM D638-22  
**SPECIMEN TYPE:** Type 1  
**INSTRUMENT:** INSTRON 5500R BLUEHILL 3- Wedge Grips  
**SPECIMEN CONDITIONING:** ASTM D618 Procedure A—Condition 40/23/50  
**TEST CONDITION:** 73°F/50%Rh

**RESULTS:**

| Test          | Tensile Stress [psi] | Elongation [%] | Modulus [psi] | Test | Tensile Stress [psi] | Elongation [%] | Modulus [psi] | Test | Tensile Stress [psi] | Elongation [%] | Modulus [psi] |
|---------------|----------------------|----------------|---------------|------|----------------------|----------------|---------------|------|----------------------|----------------|---------------|
| 1             | 4250                 | 150            | 17800         | 16   | 4410                 | 85             | 21900         | 31   | 4430                 | 150            | 20300         |
| 2             | 4410                 | 110            | 16300         | 17   | 4380                 | 120            | 23000         | 32   | 4240                 | 120            | 15800         |
| 3             | 4450                 | 100            | 14700         | 18   | 4270                 | 150            | 13700         | 33   | 4300                 | 96             | 19400         |
| 4             | 4410                 | 130            | 19800         | 19   | 4440                 | 130            | 22600         | 34   | 4380                 | 98             | 17700         |
| 5             | 4230                 | 230            | 19100         | 20   | 4430                 | 190            | 17600         | 35   | 4340                 | 140            | 17400         |
| 6             | 4310                 | 180            | 16200         | 21   | 4300                 | 96             | 13800         | 36   | 4230                 | 130            | 19300         |
| 7             | 4260                 | 150            | 14400         | 22   | 4470                 | 140            | 20900         | 37   | 4330                 | 140            | 17100         |
| 8             | 4380                 | 110            | 20600         | 23   | 4400                 | 230            | 19600         | 38   | 4310                 | 110            | 20300         |
| 9             | 4360                 | 95             | 16200         | 24   | 4540                 | 97             | 16200         | 39   | 4310                 | 110            | 17500         |
| 10            | 4410                 | 120            | 16800         | 25   | 4330                 | 150            | 19600         | 40   | 4420                 | 130            | 19700         |
| 11            | 4290                 | 130            | 14800         | 26   | 4070                 | 62             | 17900         | 41   | 4260                 | 150            | 27300         |
| 12            | 4380                 | 94             | 21100         | 27   | 4160                 | 92             | 16500         | 42   | 4340                 | 110            | 16700         |
| 13            | 4390                 | 110            | 19300         | 28   | 4530                 | 77             | 18800         | 43   | 4360                 | 140            | 21400         |
| 14            | 4390                 | 110            | 21900         | 29   | 4160                 | 53             | 16700         | 44   | 4350                 | 110            | 18800         |
| 15            | 4250                 | 150            | 14700         | 30   | 4140                 | 180            | 20500         | 45   | 4190                 | 160            | 13800         |
| Mean          |                      |                |               |      |                      |                |               |      | 4333                 | 123            | 18344         |
| STD Deviation |                      |                |               |      |                      |                |               |      | 101                  | 40             | 2840          |

Report Date: 12/14/2024  
Test Date: 11/3-12/12/2024

**REPORT OF MECHANICAL TEST**

**SAMPLE ID:** 12" Extruded Paddle-White – Cut from sheet  
**SUBJECT:** Mechanical Properties-Tensile  
**SPECIFICATION:** ASTM D638-22  
**SPECIMEN TYPE:** Type 1  
**INSTRUMENT:** INSTRON 5500R BLUEHILL 3- Wedge Grips  
**SPECIMEN CONDITIONING:** ASTM D618 Procedure A—Condition 40/23/50  
**TEST CONDITION:** 73°F/50%Rh

**RESULTS:**

| Test          | Tensile Stress [psi] | Elongation [%] | Modulus [psi] | Test | Tensile Stress [psi] | Elongation [%] | Modulus [psi] | Test | Tensile Stress [psi] | Elongation [%] | Modulus [psi] |
|---------------|----------------------|----------------|---------------|------|----------------------|----------------|---------------|------|----------------------|----------------|---------------|
| 1             | 3540                 | 380            | 22700         | 16   | 3560                 | 310            | 24500         | 31   | 3600                 | 400            | 20700         |
| 2             | 3570                 | 370            | 29500         | 17   | 3740                 | 300            | 21100         | 32   | 3600                 | 370            | 20400         |
| 3             | 3470                 | 340            | 37600         | 18   | 3780                 | 390            | 21700         | 33   | 3580                 | 410            | 20200         |
| 4             | 3700                 | 410            | 23300         | 19   | 3710                 | 310            | 23400         | 34   | 3560                 | 320            | 45400         |
| 5             | 3720                 | 390            | 25900         | 20   | 3670                 | 400            | 22600         | 35   | 3610                 | 320            | 22400         |
| 6             | 3400                 | 386            | 22900         | 21   | 3650                 | 370            | 21800         | 36   | 3650                 | 340            | 23600         |
| 7             | 3510                 | 350            | 25400         | 22   | 3750                 | 390            | 22000         | 37   | 3480                 | 440            | 18400         |
| 8             | 3550                 | 380            | 25300         | 23   | 3760                 | 390            | 21400         | 38   | 3560                 | 380            | 18900         |
| 9             | 3450                 | 360            | 24100         | 24   | 3740                 | 410            | 23600         | 39   | 3570                 | 340            | 19900         |
| 10            | 3420                 | 350            | 22600         | 25   | 3730                 | 370            | 15500         | 40   | 3560                 | 380            | 19900         |
| 11            | 3460                 | 320            | 22500         | 26   | 3700                 | 320            | 26400         | 41   | 3620                 | 370            | 20100         |
| 12            | 3530                 | 370            | 21300         | 27   | 3650                 | 390            | 15000         | 42   | 3380                 | 340            | 29800         |
| 13            | 3640                 | 370            | 23400         | 28   | 3670                 | 370            | 24400         | 43   | 3380                 | 390            | 22300         |
| 14            | 3680                 | 390            | 22000         | 29   | 3690                 | 370            | 23500         | 44   | 3530                 | 400            | 22600         |
| 15            | 3590                 | 360            | 25100         | 30   | 3520                 | 310            | 35800         | 45   | 3570                 | 360            | 24600         |
| Mean          |                      |                |               |      |                      |                |               |      | 3596                 | 366            | 23678         |
| STD Deviation |                      |                |               |      |                      |                |               |      | 106                  | 32             | 5250          |

Report Date: 12/14/2024  
Test Date: 11/3-12/12/2024

**REPORT OF TEST**

**SAMPLE ID:** 12" Injection Molded Paddle-Green – Diversified Plastics Inc.  
**SUBJECT:** Flex Strength  
**SPECIFICATION:** ASTM D790  
**INSTRUMENT:** INSTRON 5500R BLUEHILL 3  
**SPECIMEN CONDITIONING:** ASTM D618 Procedure A—Condition 40/23/50  
**TEST CONDITION:** 73°F/50%Rh

**RESULTS:**

| Test          | Flex Stress [psi] | Flex Modulus [psi] | Flex Extension at Max Load (in) | Test | Flex Stress [psi] | Flex Modulus [psi] | Flex Extension at Max Load (in) | Test | Flex Stress [psi] | Flex Modulus [psi] | Flex Extension at Max Load (in) |
|---------------|-------------------|--------------------|---------------------------------|------|-------------------|--------------------|---------------------------------|------|-------------------|--------------------|---------------------------------|
| 1             | 5460.2            | 119690.0           | 0.890                           | 16   | 5463.8            | 121507.0           | 0.905                           | 31   | 5409.5            | 123498.6           | 0.915                           |
| 2             | 5732.6            | 136919.8           | 0.875                           | 17   | 5655.1            | 131286.9           | 0.880                           | 32   | 5466.0            | 121565.5           | 0.895                           |
| 3             | 5824.5            | 139611.6           | 0.870                           | 18   | 5453.0            | 128776.8           | 0.890                           | 33   | 5426.0            | 124515.8           | 0.905                           |
| 4             | 6930.1            | 164860.8           | 0.890                           | 19   | 5530.3            | 130362.7           | 0.885                           | 34   | 5626.3            | 128960.9           | 0.900                           |
| 5             | 5596.8            | 133948.7           | 0.895                           | 20   | 5636.7            | 129214.9           | 0.890                           | 35   | 4873.5            | 107838.9           | 0.910                           |
| 6             | 5655.0            | 121959.2           | 0.910                           | 21   | 5428.6            | 114493.3           | 0.920                           | 36   | 5623.9            | 128570.5           | 0.935                           |
| 7             | 5430.6            | 123043.7           | 0.875                           | 22   | 5443.1            | 124230.3           | 0.925                           | 37   | 5473.6            | 122441.3           | 0.935                           |
| 8             | 5617.1            | 133176.4           | 0.890                           | 23   | 5523.2            | 125246.0           | 0.905                           | 38   | 5506.8            | 121618.7           | 0.910                           |
| 9             | 5691.3            | 133128.9           | 0.890                           | 24   | 5335.1            | 118524.6           | 0.900                           | 39   | 5218.4            | 116609.7           | 0.925                           |
| 10            | 5594.0            | 122811.8           | 0.885                           | 25   | 5515.5            | 116784.9           | 0.955                           | 40   | 5393.0            | 123107.3           | 0.915                           |
| 11            | 5353.1            | 125238.9           | 0.905                           | 26   | 5537.8            | 126998.5           | 0.920                           | 41   | 5562.0            | 119119.5           | 0.950                           |
| 12            | 5684.1            | 130416.0           | 0.890                           | 27   | 5535.8            | 123498.8           | 0.939                           | 42   | 5706.8            | 127893.6           | 0.900                           |
| 13            | 5505.6            | 129315.4           | 0.905                           | 28   | 5535.4            | 122834.8           | 0.930                           | 43   | 5259.7            | 120226.7           | 0.915                           |
| 14            | 5086.7            | 109318.4           | 0.925                           | 29   | 5553.4            | 125344.9           | 0.910                           | 44   | 5405.6            | 123584.9           | 0.910                           |
| 15            | 5476.9            | 129874.5           | 0.910                           | 30   | 5495.0            | 114527.2           | 0.955                           | 45   | 5408.2            | 114700.7           | 0.945                           |
| Mean          |                   |                    |                                 |      |                   |                    |                                 |      | 5525.3            | 125137.7           | 0.908                           |
| STD Deviation |                   |                    |                                 |      |                   |                    |                                 |      | 271.5             | 9016.5             | 0.021                           |

Report Date: 12/14/2024  
Test Date: 11/3-12/12/2024

### REPORT OF TEST

**SAMPLE ID:** 12" Extruded Paddle-White – Cut from sheet  
**SUBJECT:** Flex Strength  
**SPECIFICATION:** ASTM D790  
**INSTRUMENT:** INSTRON 5500R BLUEHILL 3  
**SPECIMEN CONDITIONING:** ASTM D618 Procedure A—Condition 40/23/50  
**TEST CONDITION:** 73°F/50%Rh

### RESULTS:

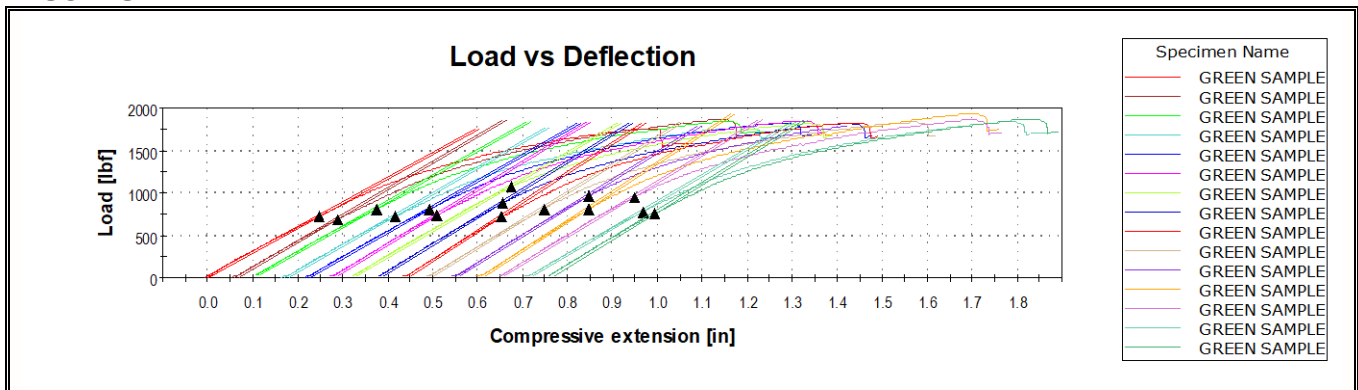
| Test          | Flex Stress [psi] | Flex Modulus [psi] | Flex Extension at Max Load (in) | Test | Flex Stress [psi] | Flex Modulus [psi] | Flex Extension at Max Load (in) | Test | Flex Stress [psi] | Flex Modulus [psi] | Flex Extension at Max Load (in) |
|---------------|-------------------|--------------------|---------------------------------|------|-------------------|--------------------|---------------------------------|------|-------------------|--------------------|---------------------------------|
| 1             | 4476.1            | 81833.9            | 0.955                           | 16   | 4466.7            | 75930.7            | 0.990                           | 31   | 4209.1            | 78459.3            | 0.980                           |
| 2             | 4722.1            | 87770.9            | 0.965                           | 17   | 4461.0            | 78747.3            | 0.995                           | 32   | 4354.9            | 81272.5            | 0.965                           |
| 3             | 4603.4            | 84243.5            | 0.960                           | 18   | 4573.9            | 85022.6            | 0.985                           | 33   | 4291.5            | 73483.9            | 1.005                           |
| 4             | 4527.4            | 77890.6            | 0.985                           | 19   | 4509.6            | 82618.4            | 0.960                           | 34   | 3894.9            | 68318.6            | 0.980                           |
| 5             | 4171.1            | 76866.5            | 0.975                           | 20   | 4316.9            | 79210.6            | 0.970                           | 35   | 4194.7            | 74524.2            | 1.000                           |
| 6             | 4344.3            | 81056.8            | 0.990                           | 21   | 4227.3            | 76472.3            | 0.965                           | 36   | 4123.5            | 74037.7            | 0.965                           |
| 7             | 4070.3            | 76424.4            | 0.975                           | 22   | 4413.9            | 80330.1            | 0.985                           | 37   | 4439.1            | 77796.7            | 0.985                           |
| 8             | 4391.9            | 80756.7            | 0.970                           | 23   | 4292.5            | 78389.9            | 0.980                           | 38   | 5251.3            | 93276.8            | 0.990                           |
| 9             | 4519.9            | 85551.3            | 0.995                           | 24   | 4322.2            | 78693.9            | 1.000                           | 39   | 4138.4            | 72883.1            | 0.985                           |
| 10            | 4561.1            | 85335.0            | 0.975                           | 25   | 4101.4            | 75688.4            | 0.975                           | 40   | 5126.9            | 89196.1            | 0.965                           |
| 11            | 4501.5            | 82964.4            | 0.935                           | 26   | 4286.8            | 71309.7            | 0.985                           | 41   | 4799.5            | 87713.0            | 0.970                           |
| 12            | 4407.8            | 81802.2            | 0.975                           | 27   | 4307.4            | 77820.8            | 0.985                           | 42   | 4477.6            | 80925.0            | 0.970                           |
| 13            | 5006.0            | 92298.0            | 0.940                           | 28   | 4516.6            | 80639.6            | 0.985                           | 43   | 4229.1            | 76650.5            | 1.005                           |
| 14            | 4596.1            | 85348.9            | 0.960                           | 29   | 4720.4            | 84767.2            | 1.010                           | 44   | 4278.0            | 78241.1            | 1.010                           |
| 15            | 4628.0            | 85790.8            | 0.965                           | 30   | 4463.4            | 80952.8            | 0.950                           | 45   | 4171.5            | 74516.5            | 1.005                           |
| Mean          |                   |                    |                                 |      |                   |                    |                                 |      | 4433.0            | 80307.2            | 0.978                           |
| STD Deviation |                   |                    |                                 |      |                   |                    |                                 |      | 266.9             | 5332.3             | 0.018                           |

Report Date: 12/14/2024  
Test Date: 11/3-12/12/2024

### REPORT OF MECHANICAL TEST

**SAMPLE ID:** 12" Injection Molded Paddle-Green – Diversified Plastics Inc.  
**SUBJECT:** Paddle Load Test  
**INSTRUMENT:** Testing was performed on the above parts using an Instron 5500R Universal Testing Machine, S/N H3483  
**TEST CONDITION:** 70°F / 45%RH  
**PROCEDURE:** The paddle was supported around the outer edges and an axial load was applied to the center bolt connect area.

### RESULTS:



| Test                 | Load at Yield<br>(Offset 0.01 in)<br>[lbf] | Extension<br>at Yield<br>[in] | Test | Load at Yield<br>(Offset 0.01 in)<br>[lbf] | Extension<br>at Yield<br>[in] | Test | Load at Yield<br>(Offset 0.01 in)<br>[lbf] | Extension at Yield<br>[in] |
|----------------------|--------------------------------------------|-------------------------------|------|--------------------------------------------|-------------------------------|------|--------------------------------------------|----------------------------|
| 1                    | 724                                        | 0.251                         | 6    | 735                                        | 0.240                         | 11   | 963                                        | 0.306                      |
| 2                    | 686                                        | 0.212                         | 7    | 1073                                       | 0.350                         | 12   | 806                                        | 0.251                      |
| 3                    | 807                                        | 0.268                         | 8    | 882                                        | 0.265                         | 13   | 956                                        | 0.300                      |
| 4                    | 722                                        | 0.254                         | 9    | 713                                        | 0.221                         | 14   | 778                                        | 0.264                      |
| 5                    | 801                                        | 0.276                         | 10   | 815                                        | 0.247                         | 15   | 756                                        | 0.236                      |
| <b>MEAN</b>          |                                            |                               |      |                                            |                               |      | <b>814</b>                                 | <b>0.263</b>               |
| <b>STD DEVIATION</b> |                                            |                               |      |                                            |                               |      | <b>110</b>                                 | <b>0.035</b>               |

KS/mrh

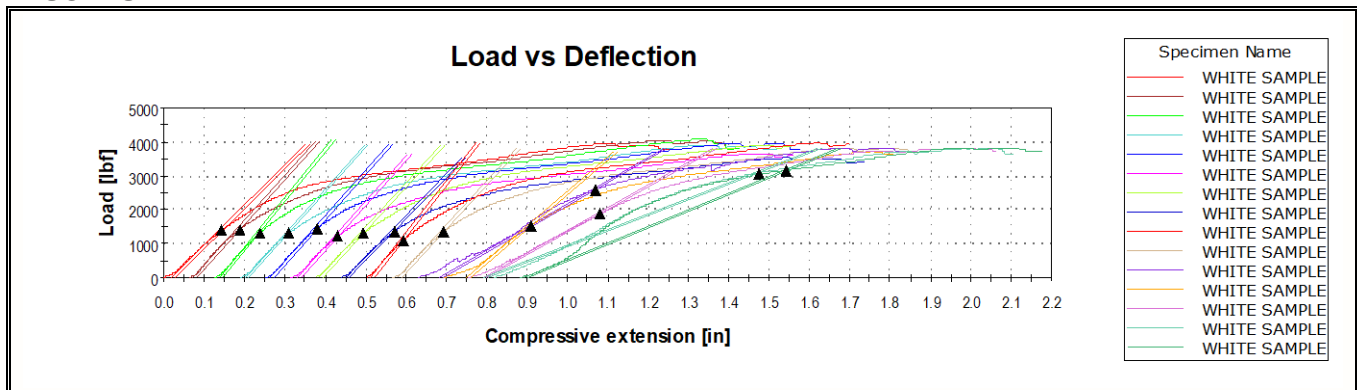
Karl Schmitz, Director  
Materials Testing

Report Date: 12/14/2024  
Test Date: 11/3-12/12/2024

### REPORT OF MECHANICAL TEST

**SAMPLE ID:** 12" Extruded Paddle-White – Cut from sheet  
**SUBJECT:** Paddle Load Test  
**INSTRUMENT:** Testing was performed on the above parts using an Instron 5500R Universal Testing Machine, S/N H3483  
**TEST CONDITION:** 70°F / 45%RH  
**PROCEDURE:** The paddle was supported around the outer edges and an axial load was applied to the center bolt connect area.

### RESULTS:



| Test                 | Load at Yield<br>(Offset 0.01 in)<br>[lbf] | Extension<br>at Yield<br>[in] | Test | Load at Yield<br>(Offset 0.01 in)<br>[lbf] | Extension<br>at Yield<br>[in] | Test | Load at Yield<br>(Offset 0.01 in)<br>[lbf] | Extension at Yield<br>[in] |
|----------------------|--------------------------------------------|-------------------------------|------|--------------------------------------------|-------------------------------|------|--------------------------------------------|----------------------------|
| 1                    | 1392                                       | 0.197                         | 6    | 1209                                       | 0.135                         | 11   | 2599                                       | 0.453                      |
| 2                    | 1422                                       | 0.126                         | 7    | 1299                                       | 0.116                         | 12   | 1534                                       | 0.228                      |
| 3                    | 1313                                       | 0.120                         | 8    | 1358                                       | 0.162                         | 13   | 1871                                       | 0.334                      |
| 4                    | 1296                                       | 0.127                         | 9    | 1104                                       | 0.091                         | 14   | 3082                                       | 0.670                      |
| 5                    | 1449                                       | 0.134                         | 10   | 1354                                       | 0.132                         | 15   | 3160                                       | 0.669                      |
| <b>MEAN</b>          |                                            |                               |      |                                            |                               |      | <b>1696</b>                                | <b>0.246</b>               |
| <b>STD DEVIATION</b> |                                            |                               |      |                                            |                               |      | <b>679</b>                                 | <b>0.197</b>               |

KS/mrh

Karl Schmitz, Director  
Materials Testing

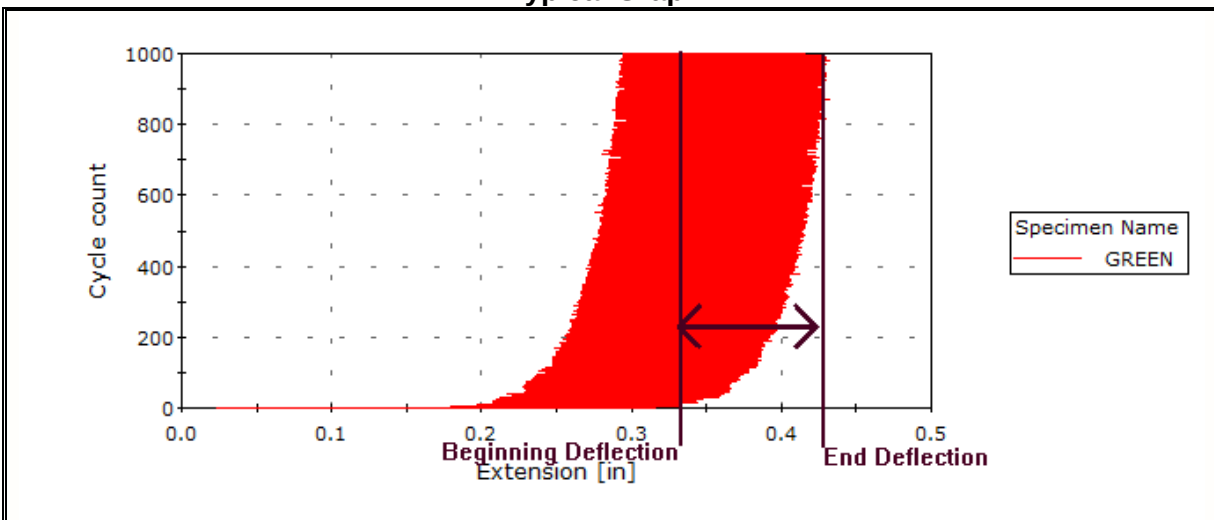
Report Date: 12/14/2024  
Test Date: 11/3-12/12/2024

### REPORT OF MECHANICAL TEST

**SAMPLE ID:** 12" Injection Molded Paddle-Green – Diversified Plastics Inc.  
**SUBJECT:** Paddle CYCLE Load Test  
**INSTRUMENT:** Testing was performed on the above parts using an Instron 5500R Universal Testing Machine, S/N H3483  
**TEST CONDITION:** 70°F / 45%RH  
**PROCEDURE:** The paddle was supported around the outer edges and an axial load between 100–500 lbs was applied at a rate of 1 cycle per second for a total of 1000 cycles.

### RESULTS:

Typical Graph



| Test | Deflection at 1 <sup>st</sup> Cycle Inches | Deflection at 1000 <sup>th</sup> Cycle Inches | Increase of Deflection at end of Test Inches | Test        | Deflection at 1 <sup>st</sup> Cycle Inches | Deflection at 1000 <sup>th</sup> Cycle Inches | Increase of Deflection at end of Test Inches |
|------|--------------------------------------------|-----------------------------------------------|----------------------------------------------|-------------|--------------------------------------------|-----------------------------------------------|----------------------------------------------|
| 1    | 0.230                                      | 0.303                                         | 0.073                                        | 9           | 0.300                                      | 0.407                                         | 0.107                                        |
| 2    | 0.208                                      | 0.285                                         | 0.077                                        | 10          | 0.193                                      | 0.279                                         | 0.086                                        |
| 3    | 0.254                                      | 0.331                                         | 0.077                                        | 11          | 0.168                                      | 0.250                                         | 0.082                                        |
| 4    | 0.222                                      | 0.303                                         | 0.081                                        | 12          | 0.171                                      | 0.252                                         | 0.081                                        |
| 5    | 0.230                                      | 0.331                                         | 0.101                                        | 13          | 0.174                                      | 0.251                                         | 0.077                                        |
| 6    | 0.222                                      | 0.287                                         | 0.065                                        | 14          | 0.164                                      | 0.236                                         | 0.072                                        |
| 7    | 0.140                                      | 0.202                                         | 0.062                                        | 15          | 0.193                                      | 0.279                                         | 0.086                                        |
| 8    | 0.230                                      | 0.309                                         | 0.079                                        | <b>Mean</b> |                                            |                                               | <b>0.080</b>                                 |

KS/mrh

Karl Schmitz, Director  
Materials Testing

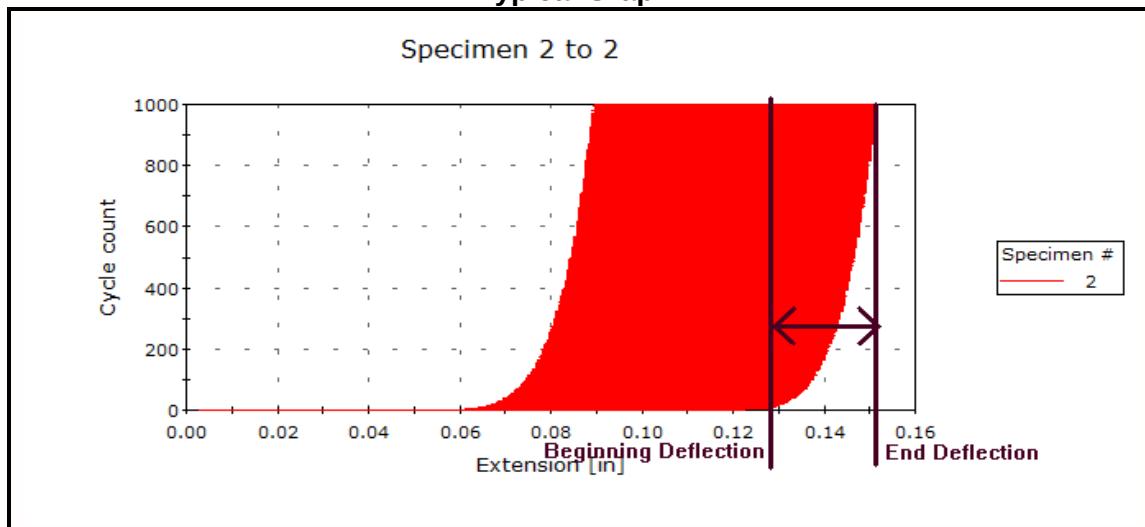
Report Date: 12/14/2024  
Test Date: 11/3-12/12/2024

### REPORT OF MECHANICAL TEST

**SAMPLE ID:** 12" Extruded Paddle-White – Cut from sheet  
**SUBJECT:** Paddle CYCLE Load Test  
**INSTRUMENT:** Testing was performed on the above parts using an Instron 5500R Universal Testing Machine, S/N H3483  
**TEST CONDITION:** 70°F / 45%RH  
**PROCEDURE:** The paddle was supported around the outer edges and an axial load between 100–500 lbs was applied at a rate of 1 cycle per second for a total of 1000 cycles.

### RESULTS:

**Typical Graph**



| Test | Deflection at 1 <sup>st</sup> Cycle | Deflection at 1000 <sup>th</sup> Cycle | Increase of Deflection at end of Test | Test        | Deflection at 1 <sup>st</sup> Cycle | Deflection at 1000 <sup>th</sup> Cycle | Increase of Deflection at end of Test |
|------|-------------------------------------|----------------------------------------|---------------------------------------|-------------|-------------------------------------|----------------------------------------|---------------------------------------|
| 1    | 0.037                               | 0.056                                  | 0.019                                 | 9           | 0.159                               | 0.19                                   | 0.031                                 |
| 2    | 0.130                               | 0.159                                  | 0.029                                 | 10          | 0.157                               | 0.174                                  | 0.017                                 |
| 3    | 0.130                               | 0.15                                   | 0.02                                  | 11          | 0.166                               | 0.182                                  | 0.016                                 |
| 4    | 0.195                               | 0.212                                  | 0.017                                 | 12          | 0.122                               | 0.147                                  | 0.025                                 |
| 5    | 0.125                               | 0.146                                  | 0.021                                 | 13          | 0.057                               | 0.091                                  | 0.034                                 |
| 6    | 0.130                               | 0.146                                  | 0.016                                 | 14          | 0.14                                | 0.167                                  | 0.027                                 |
| 7    | 0.134                               | 0.15                                   | 0.016                                 | 15          | 0.175                               | 0.197                                  | 0.022                                 |
| 8    | 0.190                               | 0.209                                  | 0.019                                 | <b>Mean</b> |                                     |                                        | <b>0.022</b>                          |

KS/mrh

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Report Date: 12/14/2024  
Test Date: 11/3-12/12/2024

## REPORT OF TEST

**SAMPLE ID:** 12" Injection Molded Paddle-Green – Diversified Plastics Inc.  
**SUBJECT:** Hardness Test  
**SPECIFICATION:** ASTM D785  
**INSTRUMENT:** Rockwell R Scale  
**SPECIMEN CONDITIONING:** ASTM D618 Procedure A—Condition 40/23/50  
**TEST CONDITION:** 73°F/50%Rh  
**RESULTS**

## ROCKWELL HARDNESS -R Scale

| Reading | Hardness<br>HRR | Reading | Hardness<br>HRR | Reading | Hardness<br>HRR |
|---------|-----------------|---------|-----------------|---------|-----------------|
| 1       | 61              | 6       | 62              | 11      | 61              |
| 2       | 60              | 7       | 61              | 12      | 60              |
| 3       | 60              | 8       | 60              | 13      | 59              |
| 4       | 61              | 9       | 60              | 14      | 59              |
| 5       | 59              | 10      | 60              | 15      | 61              |
| Average |                 |         |                 |         | 60.2            |

KS/mrh

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CWI 92120161/D17.1 1910011I  
ACCP VT Level II GI:PE 280554

Report Date: 12/14/2024  
Test Date: 11/3-12/12/2024

## REPORT OF TEST

**SAMPLE ID:** 12" Extruded Paddle-White – Cut from sheet  
**SUBJECT:** Hardness Test  
**SPECIFICATION:** ASTM D2583  
**INSTRUMENT:** Barcol Impresser  
**SPECIMEN CONDITIONING:** ASTM D618 Procedure A—Condition 40/23/50  
**TEST CONDITION:** 73°F/50%Rh  
**RESULTS**

## ROCKWELL HARDNESS -R Scale

| Reading | Hardness | Reading | Hardness | Reading | Hardness |
|---------|----------|---------|----------|---------|----------|
| 1       | 66       | 6       | 65       | 11      | 67       |
| 2       | 65       | 7       | 65       | 12      | 64       |
| 3       | 65       | 8       | 65       | 13      | 66       |
| 4       | 66       | 9       | 65       | 14      | 66       |
| 5       | 68       | 10      | 66       | 15      | 67       |
| Average |          |         |          |         | 65.7     |

KS/mrh

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