Precision Wheel Balance
Composite System

SPE ACCE 2021
Precision Wheel Balance System
OEM Trends in Wheel Assemblies

<table>
<thead>
<tr>
<th>Model Year</th>
<th>Model</th>
<th>Wheel Size</th>
<th>Wheel Size</th>
<th>Wheel Size</th>
<th>Wheel Size</th>
<th>Wheel Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>MY13</td>
<td>Toyota RAV4</td>
<td>17”</td>
<td>18”</td>
<td>21”</td>
<td>21”</td>
<td>21”</td>
</tr>
<tr>
<td>MY15</td>
<td>Ford Edge</td>
<td>26.3 kg</td>
<td>27.4 kg</td>
<td>31.2 kg</td>
<td>29.2 kg</td>
<td>30.1 kg</td>
</tr>
<tr>
<td>MY19</td>
<td>Chevrolet Blazer</td>
<td>31.2 kg</td>
<td>31.2 kg</td>
<td>31.2 kg</td>
<td>31.2 kg</td>
<td>31.2 kg</td>
</tr>
<tr>
<td>MY20</td>
<td>Tesla Model Y</td>
<td>29.2 kg</td>
<td>30.1 kg</td>
<td>30.1 kg</td>
<td>30.1 kg</td>
<td>30.1 kg</td>
</tr>
<tr>
<td>MY20</td>
<td>Kia Telluride</td>
<td>30.1 kg</td>
<td>30.1 kg</td>
<td>30.1 kg</td>
<td>30.1 kg</td>
<td>30.1 kg</td>
</tr>
<tr>
<td>MY21</td>
<td>BMW X7</td>
<td>37.5 kg</td>
<td>37.5 kg</td>
<td>37.5 kg</td>
<td>37.5 kg</td>
<td>37.5 kg</td>
</tr>
</tbody>
</table>

Images and Data Source: A2Mac1
Precision Wheel Balance System
Legacy Balance Weight Solutions
Precision Wheel Balance System

3M Solution - Introduction

3M Cut-to-Length Precision Wheel Balance System

- Ultra High Density Thermoplastic Composite
- 5.8 SG. Density precision controlled to +/- <2%
- Flexible + Conformable
- Extruded to customizable continuous profile
- Level wound and supplied in 82kg continuous spools
- Easy to cut to precision weight (+/-0.5g)
- Color matched to customer preference
- 9 OEM customers in Americas & Europe

20+ SKUs → 1 SKU
Precision Wheel Balance System

3M Solution - Construction

3M Dyneon Fluorothermoplastic Matrix:
- High density polymer - 1.93g/cc
- Excellent flexibility - Flex Modulus 80MPa
- Material rheology favorable for high filler loading w/uniform dispersion
- Inherently chemical resistant (fuel, oils, lubricants, brake fluid, carwash solvent, tire + wheel cleaners)
- Inherently weather and UV resistant

Highly Filled Composite:
- 67 vol % PIR metal alloy filler
- Mix of alloy powders to impart magnetic properties while maintaining superb corrosion resistance
- Proprietary surface coating for compatibility with matrix
- Retention of polymer-like properties

3M Acrylic Pressure Sensitive Adhesive Tape
- Provides excellent bond to any wheel type
- Robust bond even to mounting lube contaminated surface
- Removable for aftermarket service without wheel damage
Precision Wheel Balance System

Customer Advantages

Precision Balanced Wheel Assembly (+/-0.5g) = Improved Ride Quality + Increased Tire Life

Continuous Material Solution Enables High Speed Automation vs Previous Manual Assembly Solution

Reduced Tire Balance Assembly Cycle Time (up to 50%). First Time Throughput increased 20%

Manufactured from 89% Recycled Content. End of Life Recyclable. Returnable & Reusable Packaging

Direct + Indirect Cost Savings. Material Cost Savings (~10%), Inventory Cost Savings, Labor Cost Savings ($200K/yr), Reduced Rework and Warranty Cost. Replicated across GM; Total Cost Save to OEM ~$3M/yr
Precision Wheel Balance System
Turnkey Automation Enabled by 3rd Party Automation Integrators
Precision Wheel Balance System
Turnkey Automation Enabled by 3rd Party Automation Integrators

AutoW8t
Assembly
Automation
Precision Wheel Balance System
Low Volume Solution

• Available In Planetary Rolls
• Ideal for Service, Aftermarket, and Repair Applications
• 3M Surface Cleaning Solutions Ensure Proper Preparation of Wheel Substrate
• Proprietary Adhesive Tape For Robust Bond in Challenging Cold Temperature Environment
• 3M Manual Application Kits
• Used Prevalently By US Based Wheel & Tire Service Retailers
• Adhesive Mounted Profiles Can Replace Clip Mounted Weights used on Steel & Flanged Wheels
Precision Wheel Balance System

Industry Recognition

Images Source: Society of Plastics Engineers