Tyre and Vehicle Winter Testing
At Millbrook, we are fortunate to have outstanding test tracks in two wonderful locations in the UK and Finland. From these, we serve the best Companies in the World and we help them to develop the vehicles, tyres, engines and fuels of the future. We are independent and impartial in everything that we do.

Test World's indoor test facilities make testing on natural snow, ice, and wet and dry asphalt, available at one location twelve months of the year.

At Test World, we specialise in vehicle and tyre testing in winter conditions. We offer extensive snow and ice tracks and the World's first indoor winter test facilities, making testing on natural snow available twelve months of the year. We invest in our people and our facilities and strive to be the best service provider in the markets we serve.

Please do not hesitate to contact us if we can be of service.

Janne Seurujärvi
Managing Director, Test World

Alex Burns
President, Millbrook
# Millbrook at a Glance

- Test World as a Venue
- Facilities and Infrastructure
- Winter Vehicle Testing
- Tyre Testing

## Services

- Test World as a Venue
- Facilities and Infrastructure
- Winter Vehicle Testing
- Tyre Testing

## Test Tracks

- Mellatracks Proving Ground
- Airport Proving Ground
- Millbrook Proving Ground
- Year-Round Wet and Dry Testing
- Year-Round Winter Testing

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</tr>
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<td>Total</td>
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Millbrook at a Glance

Millbrook is part of the Test and Measurement business segment of Spectris plc

Spectris is a leading supplier of productivity-enhancing instrumentation and controls.

Millbrook is best known for its test tracks where it performs repeatable tests in a safe and secure environment. Millbrook also has a range of test facilities for full vehicles, tyres and components, including engine dynamometers, e-motor and e-axle test cells, structural test laboratories, crash laboratories, interior systems laboratories, advanced emissions chassis dynamometers, battery test facilities and innovative indoor winter test tracks.

Millbrook supports its customers with the supply and service of dynamometer based test systems, specialist vehicle conversions, workshops in its Technology Park and vehicle-related events.
Services

Test World’s highly experienced teams of engineers test tyres in winter and summer conditions, all year round. They test vehicles on purpose-built snow, ice and asphalt tracks, offering highly repeatable, accurate results. Test World’s well-served and connected location provides customers with a wide range of options to satisfy test track and infrastructure requirements.
Tyre Testing

C1, C2 and C3 Tyres

Certification

Wet Braking

Dry Braking

Noise

Labelling

Development Testing
Test World in Finland is the premier test facility for winter tyres and is part of Millbrook. Innovative indoor facilities allow testing on natural snow, ice and asphalt throughout the year.

The teams in Finland and the UK can undertake a wide range of tests necessary during tyre development and tyre certification. With two locations and the indoor facilities at Test World, Millbrook is a one-stop-shop for all tyre tests.

The team in Finland is expert at preparing snow and ice tracks. Customers report very high levels of repeatability throughout the testing season.

Certification and Labelling Tests
- All tyre categories and tests
  - C1, C2, C3 tyres
  - Retreaded tyres
- R117/R109 snow braking for C1/C2*
- R117/R109 snow acceleration for C3*
- ASTM1805 US snowflake - from Q3 2019*
- R117 spin traction for C1/C2 - from Q3 2019*
- ISO19447 ice grip*
- R117/EC1222 wet braking
- R117/EC1222 pass-by noise
- 408/2003, 466/2009 / SFS7503 studded tyre road wear (over run)

Development Tyre Testing Services
- Snow acceleration and braking*
- Ice acceleration and braking*
- Snow handling, objective and subjective*
- Ice handling, objective and subjective
- Constant radius snow and ice
- Wet and dry braking*
- Longitudinal aquaplaning*
- Wet handing, objective and subjective
- Dry handing, objective and subjective
- Tyre wear and durability tests
- Accelerated stud wear tests*
- Studded tyre road wear tests

Approvals and Accreditations
- Test World Oy is testing laboratory no. T236 accredited by FINAS Finnish Accreditation Service, accreditation requirement EN ISO/IEC 17025
- Designated by RDW (E4)
- Notified by TRAFI for studded tyre road wear, HA-001

* These tests can be carried out throughout the year using indoor facilities
Vehicle Winter Testing

Vehicle Dynamics Area

Snow and Ice Platforms

Handling Tracks

Indoor Facilities

Cold Chambers

Durability

Testing Services

Workshops and Experienced Staff

Vehicle Dynamics Area
Millbrook’s winter proving ground, Test World in Northern Finland, offers a long winter season and range of safe and secure test facilities to challenge all types of on and off-highway vehicles.

Test World boasts 1,250 hectares of proving ground, split over two sites. Its specially designed and maintained tracks are suitable for anything from sports cars to the biggest on-highway vehicles.

Test tracks developed specifically for vehicle testing include a vehicle dynamics area and vehicle snow handling tracks. These shared access tracks, offering faster speeds with increased run off for safety, are based on compressed snow.

Their construction method avoids the negative ‘polishing’ effect typical of lake-based test tracks. The expertly prepared snow tracks do not suffer from unwanted surface depression, and have a longer operational season.

Customers benefit from the availability of service buildings nearby, from a wide range of accommodation and hospitality options, and from Test World’s legendary customer service.
Facilities and Infrastructure

Test World offers to its customers a range of conveniently located workshops and offices and any other infrastructure required to make tests run as efficiently as possible.

Test World is famous for providing excellent customer service, which includes satisfying customers’ specific infrastructure requirements.

Each visiting team is provided with its own office and workshop to support work carried out on site. Electric vehicle charging is provided with 22kW AC and Ultra Fast 150kW DC chargers.

Test World has many years of experience in large infrastructure projects. Space is available on the proving grounds to develop snow and ice test tracks, garages and offices dedicated to a customer’s exclusive use.
Test World as a Venue

Test World offers an extraordinary and exciting opportunity to drive vehicles on snow and ice in a safe and secure environment, providing one of the most varied winter driving experiences available.

The location is famous for its natural, unspoilt beauty. At the same time, it is very well served by numerous hotels, restaurants and excellent flight connections.

Ivalo airport is conveniently located close to the proving grounds and benefits from frequent daily flights to Helsinki with connections to all major European and Asian cities, and direct flights from Germany and UK during the winter season.

Whatever the event, Test World will make it easy for customers and guests to have an experience they will be talking about long after they have left the frozen North.
Test Tracks

The location 300km North of the Arctic Circle provides an exceptionally long winter test season, with outdoor tracks typically open from November to April and indoor tracks open year-round.
Year-Round Winter Testing

Test World is a pioneer in indoor winter testing, having built the world’s first objective and subjective year-round winter test facilities.

The indoor facilities use natural snow to give an accurate representation of winter conditions. The team at Test World brings snow indoors in the spring.

The team is expert at managing the snow so that it remains consistent. The sheltered tracks give highly repeatable winter test results, whatever the weather outside.

Indoor 1 and 3 (Snow Flat with Ice Lane)
For objective acceleration and braking work
- Test Surface Each 205m x 16m or combined 410m x 16m

Indoor 2 (Snow Handling)
Closed circuit loop
- Test Surface 350 × 9m
On both tracks:
- Adjustable
  - Air temperature: -13°C to +15°C (default -8°C during summer)
  - Air humidity: 70% to 90% RH
  - Surface temperature: -10°C to +10°C
- Maximum vehicle weight: 3500kg
- Maximum vehicle height: 2.7m

Cold Chambers:
Length 11.7m, Width 2.3m, Height 2.3m and down to -40°C
The innovative Indoor test facilities are available for rent or as part of testing carried out by the Test World team.

Test World offers a flexible approach, providing its customers with whatever is required to suit their winter testing needs.
Year-Round Wet and Dry Testing

Newly opened in 2018, Test World now offers indoor wet and dry braking surfaces and longitudinal aquaplaning, all year round. Uniquely, the wet braking surfaces, designed to conform to R117, include a designated lane for testing studded tyres.

These facilities can be operated at temperatures below freezing to create one large or two smaller ice lanes. The ability independently to control platform and air temperature makes it possible to create specialist conditions. For example, the platform can be set to below freezing and the air set to above freezing, leading to the formation of black ice. This makes Indoors 4 and 5 a true winter research laboratory.

Indoor 4 and 5 (Asphalt – Wet and Dry, Aquaplaning and Ice Platform)
For objective braking work, longitudinal aquaplaning and objective acceleration and braking on ice

- Test facility 410m x 8m
- Adjustable
  - Air temperature: -13°C to +15°C
  - Air humidity: 70% to 90% RH
  - Track surface temperature: -10°C to +1°C
- Wet Braking Surfaces 100m x 4m
- Dry Braking Surface 100m x 4m
- Aquaplaning Trough 100m x 1.8m, 8mm water depth
- Ice Platform 205m or 410m x 8m
Electric Vehicle Charging

With the growth in plug-in hybrid and full battery electric vehicles, Test World is investing in the charging infrastructure needed to test these vehicle types and their tyres. Both AC and ultrafast DC chargers are available installed in workshops and outdoors.

- ENSTO Chago Pro EFV200
  - Mode 3 charging (max. 22kW)

- ENSTO Chago Highpower Ultra Fast EV Charger
  - DC charge points
    - CCS & CHAdeMO
    - 150kW 300A 170-500V

  - AC charge points
    - 22kW IEC 62196-2 Mode 3, Type 2
    - 43kW IEC 62196-2 Mode 3, Type 2
Time to market remains important to both tyre and vehicle manufacturers.

Test World’s existing and new indoor facilities allow testing in controlled conditions at any time of the year.

This allows its customers to get their test results when they need them, giving more flexibility to product development programmes.
Mellatracks Proving Ground

Mellatracks Proving Ground is Test World’s main 1,100 hectare site providing a variety of tracks close to workshops and other facilities.

The proving ground is laid out to provide each visiting team with its own garage and set of handling tracks, so maximising test efficiency and confidentiality.

Test World’s team prepares the snow and ice tracks to test anything from the smallest tyres to the largest on-highway vehicles.

### Handling Tracks

<table>
<thead>
<tr>
<th>Number</th>
<th>Type</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Ice Handling</td>
<td>1000 × 6m</td>
</tr>
<tr>
<td>5</td>
<td>Ice Handling</td>
<td>700 × 6m</td>
</tr>
<tr>
<td>9</td>
<td>Snow Handling</td>
<td>1200 × 6m</td>
</tr>
<tr>
<td>21</td>
<td>Snow Handling</td>
<td>1200 × 6m</td>
</tr>
<tr>
<td>22</td>
<td>Snow Handling</td>
<td>800 × 6m</td>
</tr>
<tr>
<td>27</td>
<td>Snow Handling</td>
<td>1200 × 6m</td>
</tr>
<tr>
<td>31</td>
<td>Snow Uphill</td>
<td>900 × 6m</td>
</tr>
<tr>
<td>32</td>
<td>Snow Uphill</td>
<td>950 × 6m</td>
</tr>
<tr>
<td>43</td>
<td>Snow Handling</td>
<td>1300 × 6m</td>
</tr>
<tr>
<td>44</td>
<td>Snow Handling</td>
<td>1300 × 6m</td>
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<tr>
<td>45</td>
<td>Snow Handling</td>
<td>1400 × 6m</td>
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<tr>
<td>55</td>
<td>Snow Handling</td>
<td>1100 x 6m</td>
</tr>
<tr>
<td>56</td>
<td>Snow Handling</td>
<td>970 x 6m</td>
</tr>
</tbody>
</table>

### Customer Specific Areas

51 – 54
Flat Tracks
1A. Snow Flat 500 × 50m
1B. Snow Flat 500 × 50m
1C. Ice Flat 500 × 35m
2A. Snow Flat 500 × 50m
2B. Snow Flat 500 × 50m
6. Snow Flat 330 × 55m
23. Snow Flat 400 × 40m
24. Ice Flat 420 × 20m
41. Ice Flat 420 × 20m
42. Snow Flat 350 × 40m

Other Tracks
3. Ice and Snow Circle Ø 50–200m
62. Snow Vehicle Dynamics Area 1200 × 380m
63. Snow Vehicle Handling Track 1830 × 10m
Other Facilities

- G3: Garage 3 62m²
- O3: Office 3 31m²
- S3: Storage 3 31m²
- G4A: Garage 4A 215m²
- O4A: Office 4 48m²
- S4A: Storage 4A 74m²
- G4B: Garage 4B 95m²
- O4B: Office 4B 38m²
- O4A: Office 4 48m²
- IGO1: Indoor Garage 1 107m²
- IGO1: Indoor Office 1 45m²
- IGO2: Indoor Garage 2 106m²
- IGO2: Indoor Office 2 44m²
- IGO3: Indoor Garage 3 107m²
- IGO3: Indoor Office 3 45m²
- IGO4: Indoor Garage 4 107m²
- IGO4: Indoor Office 4 45m²
- R: Mellakka Restaurant 50pax
- CCS3: Cold Chamber and Storage 30m²
- F: Fuel
- TWGO: Test World Garage and Office
- M: Maintenance
- TWOR: Test World Office and Reception
Indoor Testing

Indoor 1 and 3 (Snow Flat with Ice Lane)
For objective acceleration and braking work
- Testing Surface: Each 205m x 16m or combined 410m x 16m
- Snow Platform: 13m Wide
- Ice Flat: 3m Wide

Indoor 2 (Snow Handling)
Closed circuit loop
- Testing Surface: 350m x 9m

Indoor 4 and 5
(Asphalt – Wet and Dry, Aquaplaning and Ice Platform)
For objective braking work, longitudinal aquaplaning and objective acceleration and braking on ice
- Testing Surface: 410m x 8m (asphalt) or 2 x 205m x 8m (ice)

On all tracks
- Adjustable
  - Air temperature: -13°C to +15°C (default -8°C during summer)
  - Air humidity: 70% to 90% RH
  - Track surface temperature: -10°C to +10°C
- Maximum vehicle weight: 3500kg
- Maximum vehicle height: 2.7m

Cold Boxes
- Length: 11.7m
- Width: 2.3m
- Height: 2.3m
- Temperature: -40°C

EV Charging
1. ENSTO Chago Highpower Ultra Fast EV Charger
   - DC charge points
     - CCS & CHAdeMO
     - 150kW 300A 170-500V
   - AC charge points
     - 22kW IEC 62196-2 Mode 3, Type 2
     - 43kW IEC 62196-2 Mode 3, Type 2
2. ENSTO Chago Pro EFV200
   - Mode 3 charging (max. 22kW)
The Airport Proving Ground is conveniently situated in Ivalo and can be hired exclusively or accommodate up to three teams.

The site has the longest available outdoor season, with the tracks often open from October to late April.

<table>
<thead>
<tr>
<th>Handling Tracks</th>
<th>Other Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Snow Handling 1800 x 8m</td>
<td>11. Split Friction Slope 40m, 14° (25°)</td>
</tr>
<tr>
<td>7. Ice Handling 1100 x 6m</td>
<td>13. Oval Track 1400m</td>
</tr>
<tr>
<td>8. Snow Handling 1400 x 6m</td>
<td>14. Soft Snow Tracks 600 x 6m</td>
</tr>
<tr>
<td>9a. Snow Handling 800 x 8m</td>
<td>15. Split Friction Track 150m</td>
</tr>
<tr>
<td>9b. Snow Handling 800 x 8m</td>
<td>16. Ice and Snow Circle Ø 50–80m</td>
</tr>
<tr>
<td>10. Snow Uphill 400 x 6m</td>
<td>17. Comfort Road 700 x 6m</td>
</tr>
<tr>
<td>12. Snow Handling 1600 x 8m</td>
<td>18. Hill Slope 30m, 8.6° (15°)</td>
</tr>
<tr>
<td></td>
<td>19. Hill Slope 30m, 11.5° (20°)</td>
</tr>
<tr>
<td>20. City Block</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Flat Tracks</th>
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<tbody>
<tr>
<td>2. Snow Flat 900 x 40m</td>
<td>21. Garage 1A 100m²</td>
</tr>
<tr>
<td>3. Snow Flat 700 x 30m</td>
<td>22. Garage 1B 66m²</td>
</tr>
<tr>
<td>4. Snow Flat 500 x 12m</td>
<td>23. Garage 1C 150m²</td>
</tr>
<tr>
<td>5. Ice Flat 500 x 20m</td>
<td>24. Garage 2A 200m²</td>
</tr>
<tr>
<td>41. Snow Flat 400 x 45m</td>
<td>25. Garage 2B 200m²</td>
</tr>
<tr>
<td></td>
<td>26. Fuel Station</td>
</tr>
</tbody>
</table>
Test World is part of Millbrook, which enables its customers to benefit from access to the test tracks in the UK, the finest available commercially anywhere in the world.

Custom-built to simulate the World’s toughest terrains, they provide an invaluable test and development resource at a single secure and well supported site.
34. Log Run
35. Steps
36. One in One
37. 25° Traverse
38. Gravel Hills
39. 35% Gravel Hill and 155° Breakover
40. Snake Climb
41. Sand Hills
42. Deep Ditches
43. Twist Climb
44. Offset Sinusoidals
45. Structural Test Features
46. Berm Road
47. Gravel Road
48. 60% Hill Slope
49. Severe Articulation/Hummer Hollows
50. Recovery Vehicle Winch
      Anchor Points
51. Gravel Pits