

Tyre and Vehicle Winter Testing





Welcome to Test World

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.

In this brochure you will find details of the services and test facilities we offer to our customers at Test World, Millbrook's proving grounds in Northern Finland.

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

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Millbrook at a Glance



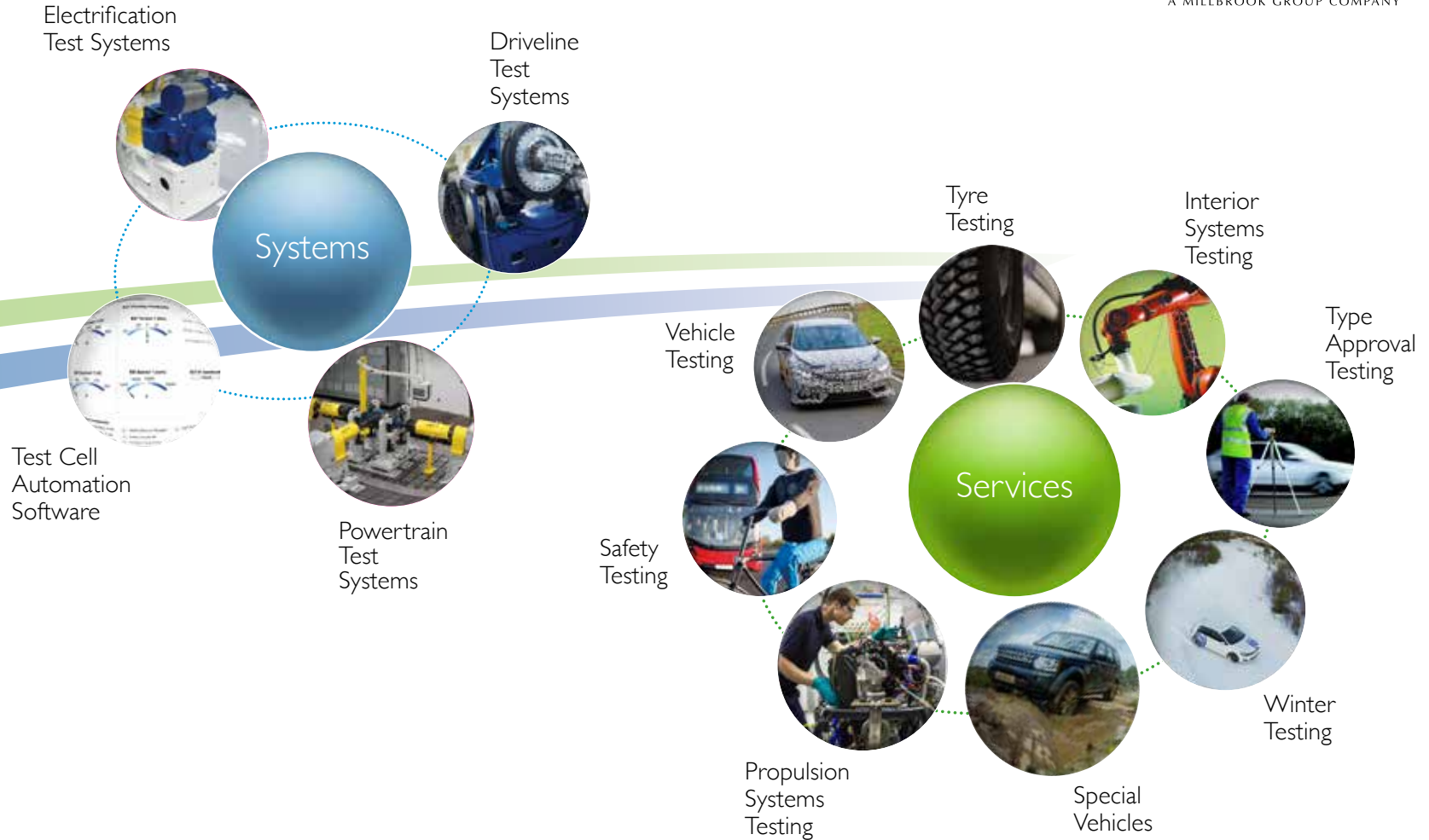
Millbrook is part of the Test and Measurement business segment of Spectris plc

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 and ice 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



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

The teams in Finland and the UK can undertake the full suite 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.

Tyre Testing and Track Rental

- Indoor snow platform
 - Indoor ice lane
 - Indoor snow handling
 - Snow braking
 - Ice braking
 - Snow handling
 - Ice handling
 - Constant radius snow
 - Constant radius ice
 - Wear and durability tests
- Aquaplaning
 - Wet braking
 - High μ
 - Low μ
 - Split μ
 - Dry braking
 - Dry handling
 - External rolling noise
- Studded Tyre Road Wear Certification



Tyre Certification to UN/ECE Regulation 117

- Wet grip
- Snow grip
- Pass by noise
- Rolling resistance

Vehicle Winter Testing



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 high speed circuit, a vehicle dynamics area and a snow handling track. 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 are inherently safer, 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.

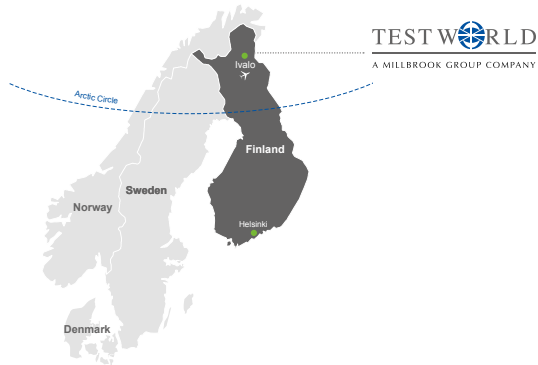
Ivalo airport is conveniently located close to the proving grounds and benefits from frequent daily flights to Helsinki with connections to all major European and Asian cities.

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 bring snow indoors in the spring.

They are 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

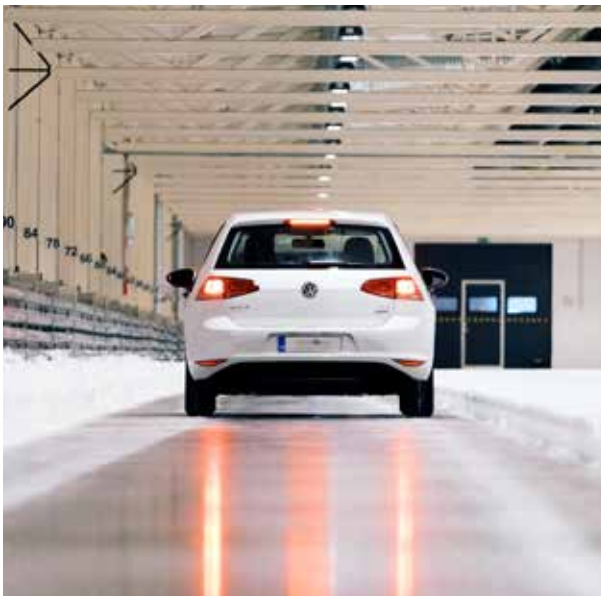


On both tracks:

- 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 Boxes:

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, conforming to R117, include a designated lane for testing studded tyres.

These facilities can also be operated at temperatures below freezing to create one large or two smaller ice lanes. The ability independently to control platform and air temperatures, makes it possible to create a differential so that, for example, the platform can be below freezing and the air 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 (asphalt) or 205m x 8m (ice)
- Adjustable
 - Air temperature: -13°C to $+15^{\circ}\text{C}$
 - Air humidity: 70% to 90% RH
 - Track surface temperature: -10°C to $+1$
- Wet Braking Surfaces 100m x 4m
- Dry Braking Surface 100m x 8m
- Aquaplaning Surface 100m x 1m, 8mm water depth

Garages and Offices

- Garage Indoor 1 107m² with two lifts
- Office Indoor 1 45m²
- Garage Indoor 2 106m² with two lifts
- Office Indoor 2 44m²
- Garage Indoor 3a and b Two, each 107m² with two lifts
- Office Indoor 3a and b Two, each 45m²

Electric Vehicle Charging

- 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

4. Ice Handling	1000 × 6m
5. Ice Handling	700 × 6m
9. Snow Handling	1200 × 6m
21. Snow Handling	1200 × 6m
22. Snow Handling	800 × 6m
27. Snow Handling	1200 × 6m
31. Snow Uphill	900 × 6m
32. Snow Uphill	950 × 6m
43. Snow Handling	1300 × 6m
44. Snow Handling	1300 × 6m
45. Snow Handling	1400 × 6m

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
23. Snow Flat	400 × 40m
24. Ice Flat	420 × 20m
41. Ice Flat	420 × 20m
42. Snow Flat	350 × 40m
55. Snow Flat	500 × 40m
64. Snow Flat	600 × 50m

Customer Specific Areas

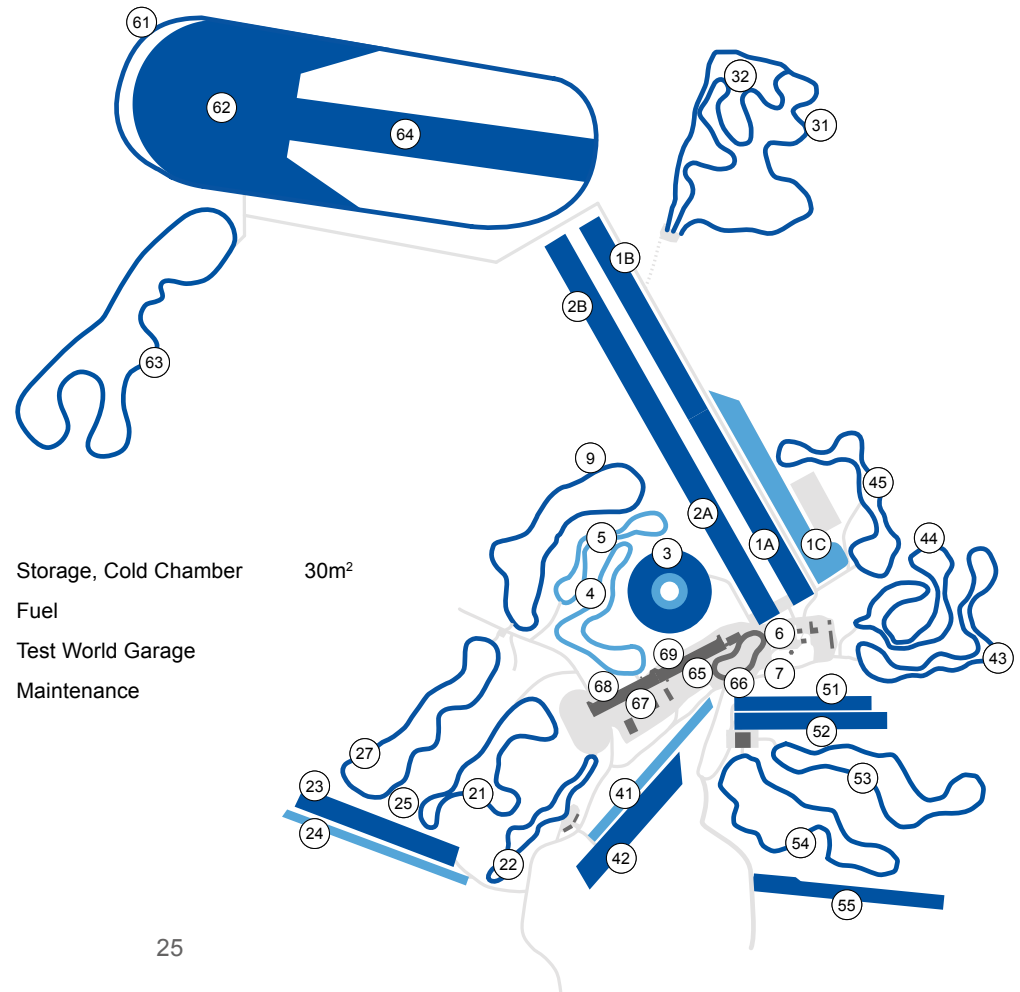
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Other Tracks

3. Ice and Snow Circle	Ø 50–200m
6. Hill Climb	10°
7. Snowhill	25°
25. Snow Storage for Indoors	900 x 35m
61. High Speed Snow Circuit	3120 x 12m
62. Snow Vehicle Dynamics Area	380 x 380m
63. Snow Vehicle Handling Track	1830 x 10m
65. Indoor 1	3280m ²
66. Indoor 2	5000m ²
67. Indoor 3	3280m ²
68. Indoor 4	1640m ²
69. Indoor 5	1640m ²

Other Facilities

Garage 1	240m ²	Office Indoor 1	45m ²
Garage 2	110m ²	Office Indoor 2	44m ²
Garage 3	63m ²	Office Indoor 3a/b	45m ²
Garage 4A	215m ²	Office 1	80m ²
Garage 4B	38m ²	Office 2	30m ²
Garage 4C	95m ²	Office 3	35m ²
Garage Indoor 1	107m ²	Office 4	48m ²
Garage Indoor 2	106m ²	Mellakka Restaurant	
Garage Indoor 3a/b	107m ²	50 pax	



Airport Proving Ground

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.



Handling Tracks

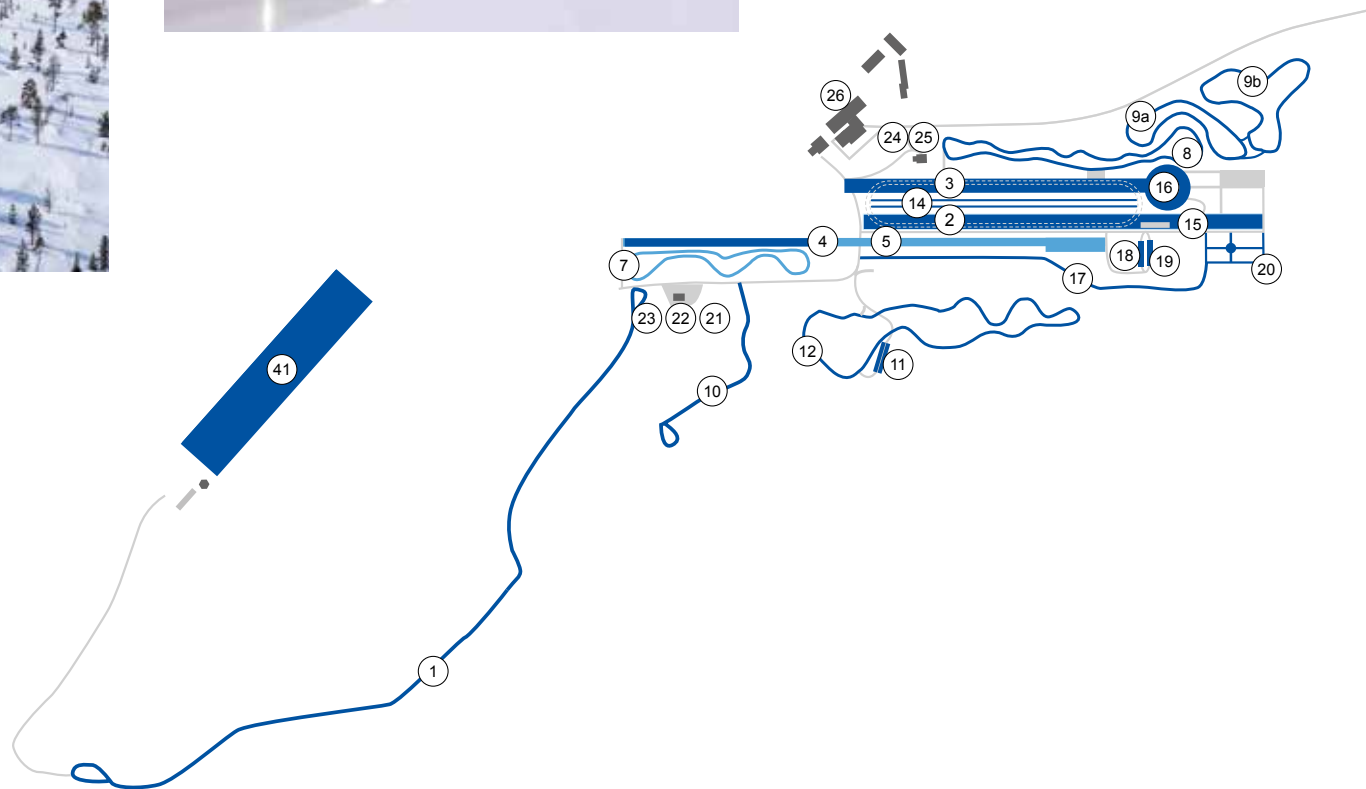
1. Snow Handling	1800 × 8m
7. Ice Handling	1100 × 6m
8. Snow Handling	1400 × 6m
9a. Snow Handling	800 × 8m
9b. Snow Handling	800 × 8m
10. Snow Uphill	400 × 6m
12. Snow Handling	1600 × 8m

Flat Tracks

2. Snow Flat	900 × 40m
3. Snow Flat	700 × 30m
4. Snow Flat	500 × 12m
5. Ice Flat	500 × 20m
41. Snow Flat	400 × 45m

Other Facilities

11. Split Friction Slope	40m, 14°
13. Oval Track	1400m
14. Soft Snow Tracks	600 × 6m
15. Split Friction Track	150m
16. Ice and Snow Circle	Ø 50–80m
17. Comfort Road	700 × 6m
18. Hill Slope	30m, 8.6°
19. Hill Slope	30m, 11.5°
20. City Block	
21. Garage 1A	100m ²
22. Garage 1B	66m ²
23. Garage 1C	150m ²
24. Garage 2A	200m ²
25. Garage 2B	200m ²
26. Fuel Station	



Test World manages the tracks to give consistent, repeatable test results that are highly valued by tyre and passenger car test teams alike.





Millbrook Proving Ground

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.



● On-Road Tracks and Features

1. Hill Route
2. Hill Route Loop 1
3. Hill Route Loop 2
4. Hill Route Loop 3
5. High/Constant Speed Circuit
6. City/Handling Circuit
7. Outer Handling Circuit
8. Steering Pad
9. Dynamics Pad
10. Mile Straight/Mile Straight Apron
11. Driveway Ramps
12. Truck Slopes
13. Sine Waves
14. Random Waves
15. Noise Generating
16. Belgian Pavé
17. ABS and Traction Control
18. Drive-by External Noise

19. Twist Humps

20. Troughs

21. Rough Tracks, Kerbs and Features

● Off-Road Tracks

22. Off-Road and Severe Off-Road

● Off-Road Technical Features

23. Wading Pond

24. Semi Axle Bumps

25. Axle Bumps

26. Severe Vehicle Twist

27. Rock Run

28. Wading Trough

29. Concrete Ditches

30. Concrete Kerbs

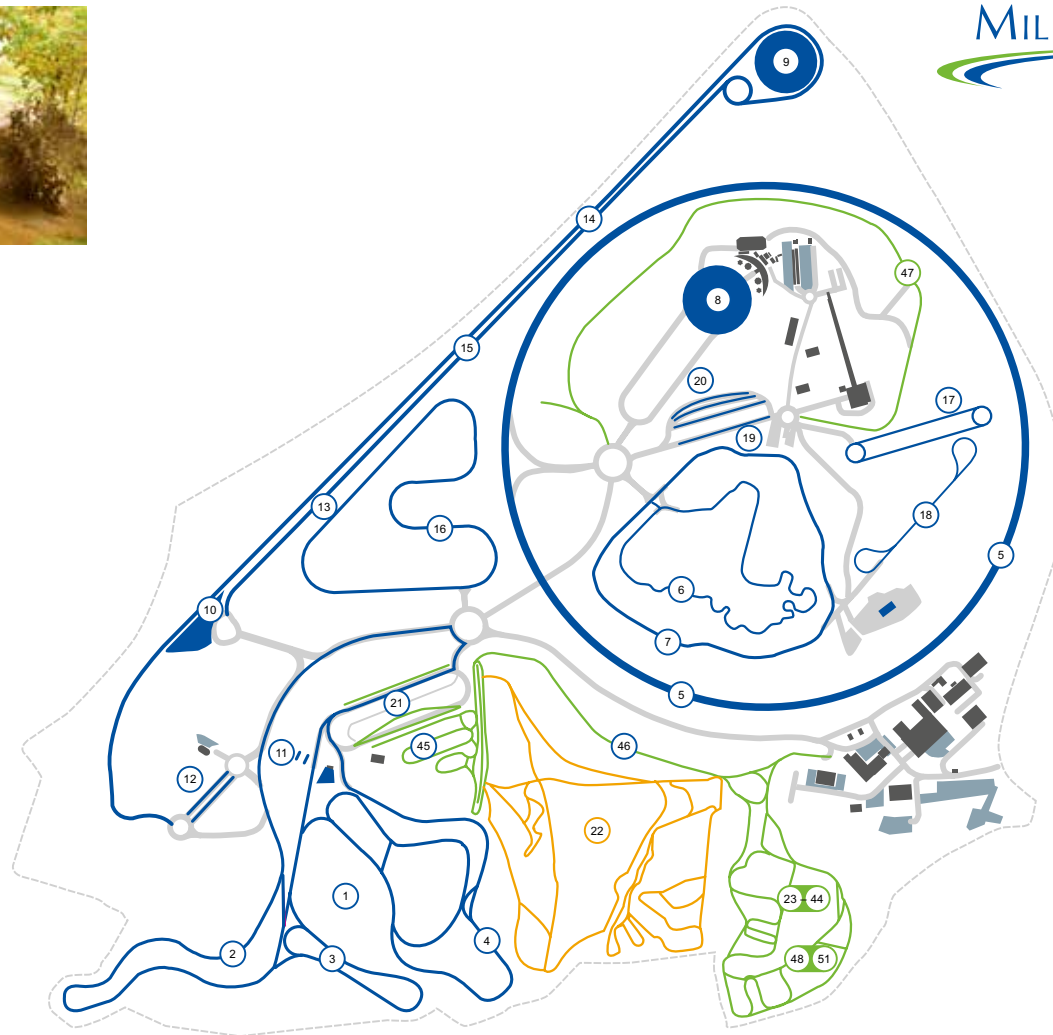
31. Ditch Run

32. Mortar Holes

33. Log Roll



- 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





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