



ALDENHOVEN
testing
center



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TEST YOURSELF TO THE NEXT LEVEL



TEST UNDER BEST CONDITIONS

Aldenhoven Testing Center provides the ideal environment for research, development and assessment of future connected mobility solutions. The same applies to events and product presentations.

Since its opening, Aldenhoven Testing Center has always provided best in class infrastructure for development and testing of vehicles of all kinds. In addition to the classic elements oval, vehicle dynamics area, braking test track, rough road, handling course and hill section as well as the adjacent Autobahn element, a fully comprehensive urban environment complements the offer. The range and coverage of latest networking technologies is one of a kind. Aldenhoven Testing Center is particularly available to small and medium-sized enterprises (SMEs). Of course, all other commercial users are welcome as well!

The mobility of today and tomorrow is above all automated and networked. Therefore, the entire site is suitable for testing and safeguarding automated driving functions. In addition, the Vodafone 5G Mobility Lab is an open mobile radio test field that provides the latest mobile radio technologies in its own network. There is also wide-area coverage with various WLANs, an extensive fibre optic network and numerous intelligent traffic elements such as V2X traffic lights and smart parking spaces. All routes and features of our site are available for you as a high-precision digital model in all common data formats.

TRACK ELEMENTS OVERVIEW

Oval circuit

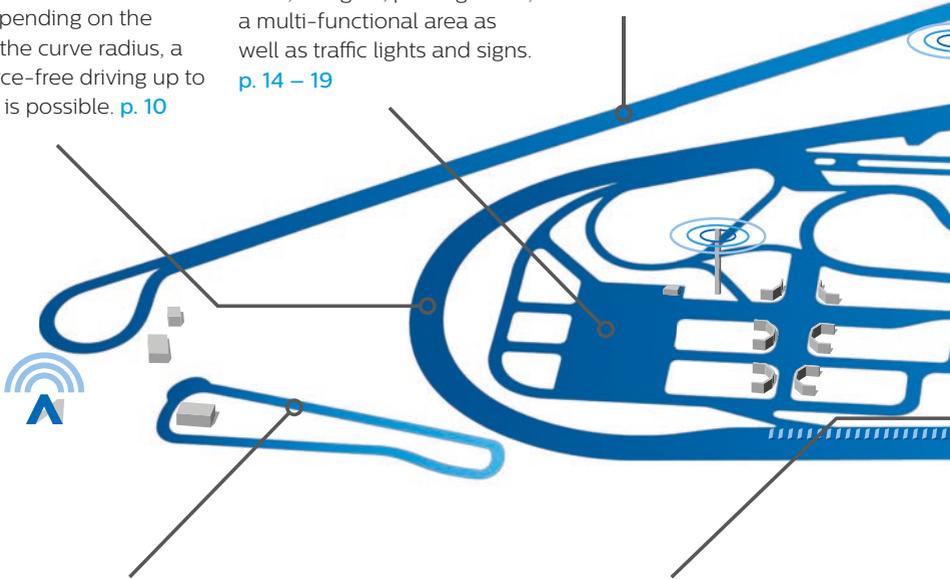
The oval circuit is about 2 km long in total and has three lanes. Depending on the lane and the curve radius, a lateral force-free driving up to 120 km/h is possible. [p. 10](#)

Urban environment

The urban environment allows simulation of almost all situations that occur in inner city traffic thanks to intersections, straights, parking areas, a multi-functional area as well as traffic lights and signs. [p. 14 – 19](#)

Autobahn

In direct vicinity, FTL GmbH runs the so-called Film + Test Location. It comprises an Autobahn segment, which can be used for test drives. The segment is two-lanes wide and about 1,100 m long. [p. 6](#)



Hill section

The hill section provides inclinations of 5 %, 12 % and 30 %. The 12 % track can be flooded. [p. 12](#)

Digital test field

The entire site is covered by a local 5G test field. There are also WiFi of different standards, a comprehensive fiber-optic network as well as V2X elements. All routes and features are as digital maps available. [p. 20 – 22](#)

Braking test track

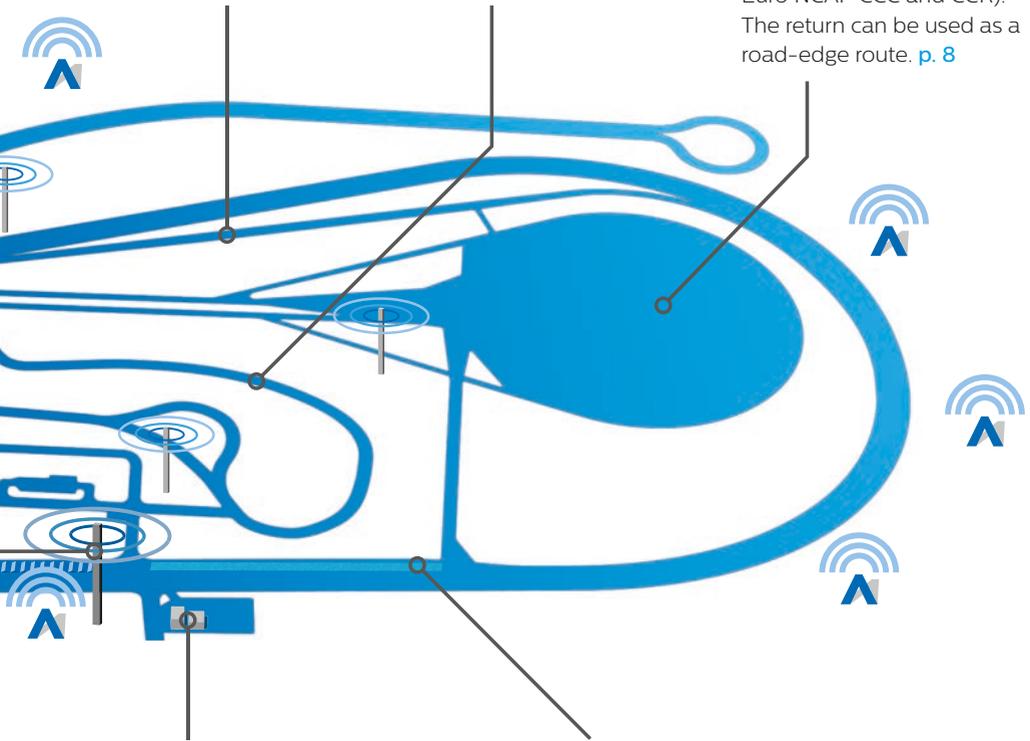
The measuring part of the braking test track is 150 m long, with an asphalt and a tiles lane. Each of them is 4 m wide. [p. 7](#)

Handling track

The handling track is 800 m long, with an extension up to 1,200 m. It is 6 m wide and holds asphalt run-off zones. [p. 9](#)

Vehicle dynamics area

The vehicle dynamics area is a flat, 210 m diameter circular surface. It can be used for dynamic tests as well as for tests of automated systems (e.g. Euro NCAP CCC and CCR). The return can be used as a road-edge route. [p. 8](#)



Workshops, offices, garages and event space

To support your on-site work or events, we are offering workshops, offices and seminar space. In addition, an event area allows a versatile usage. [p. 23 – 25](#)

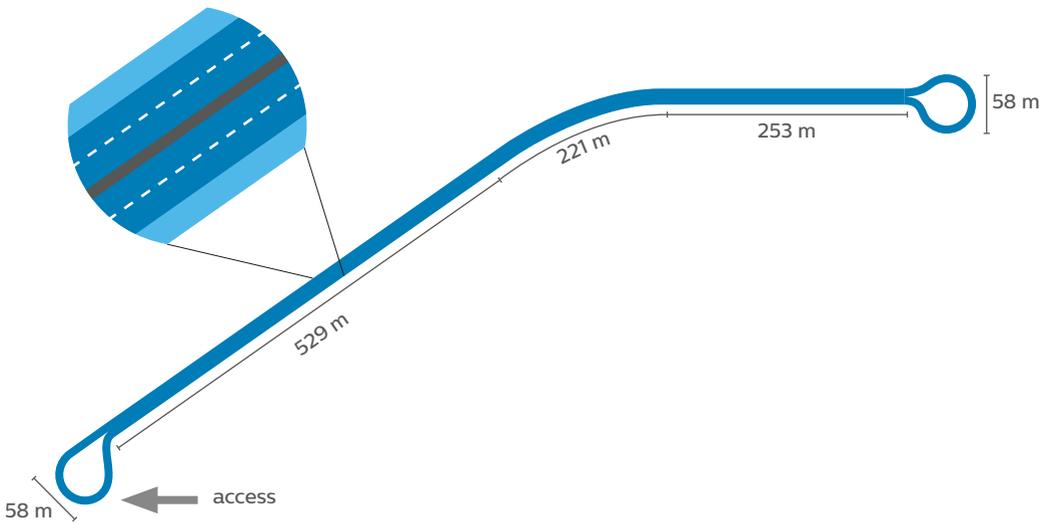
Rough road

The rough road is located just next to the eastern straight of the oval. It holds four different segments: concrete plate bumps, saw tooth profiles, Belgian blocks as well as rough asphalt. [p. 11](#)

Track element

upon request

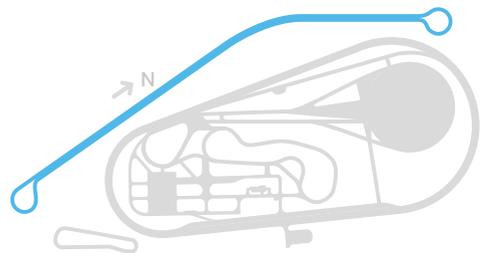
AUTOBAHN



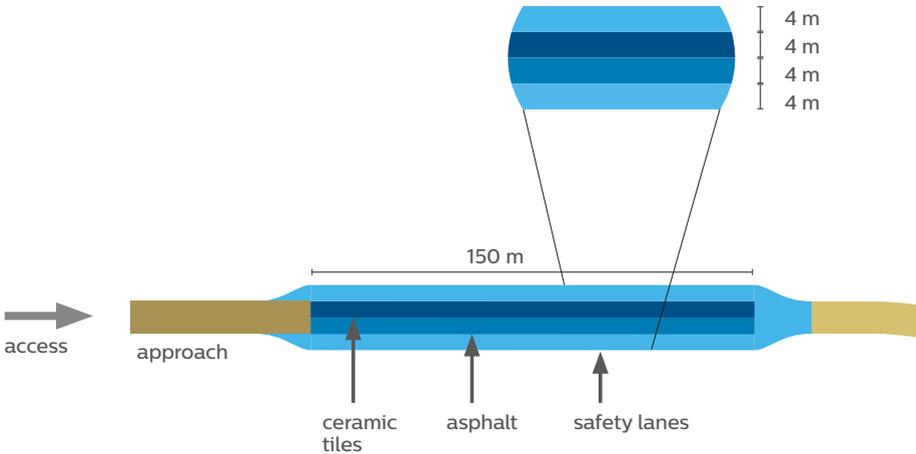
Parameter

Surface	Asphalt
Length of first straight [m]	529
Length of second straight [m]	253
Length of curve [m]	221
Diameter of end loops [m]	58
Lanes per direction	2
Traffic barrier	Concrete, segmented
Height of traffic barrier [m]	0.81
Event space L x W [m ²]	100 x 25 (2500 m ²)
Workshop tent L x W x H [m ³]	20 x 10 x 6
Office container	1 office room (25 m ²) with kitchenette and WC

Overview



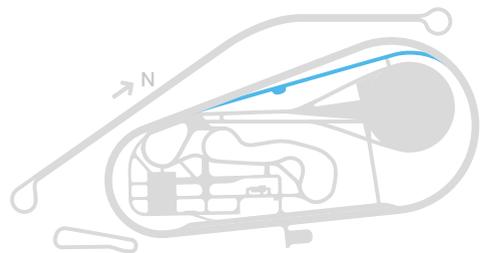
BRAKING TEST TRACK



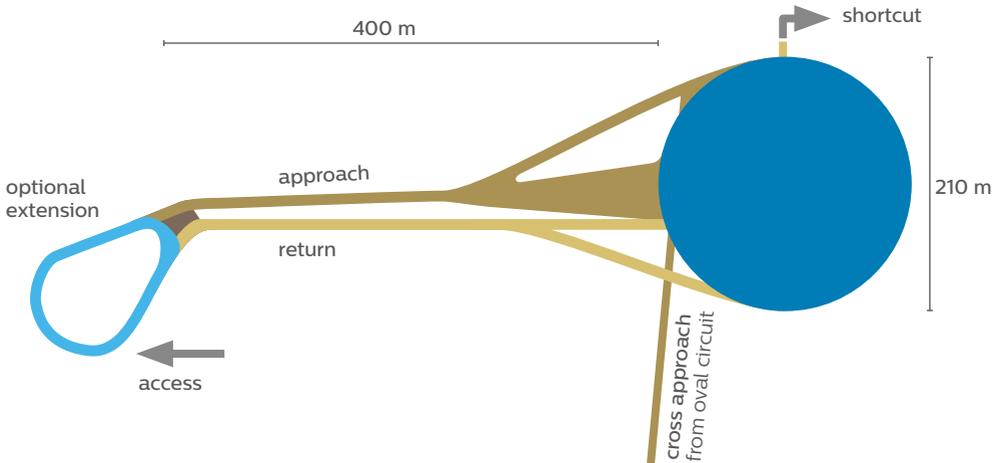
Parameter

Surface	Ceramic / asphalt
Length approach [m]	200
Length / width ceramic tiles surface [m]	150 / 4
Length / width asphalt [m]	150 / 4
Longitudinal / lateral inclination braking track [%]	0 / 0.5
Water level tiles (Asphalt optional) [mm]	< 2
Friction tiles [μ] (flooded)	approx. 0.1
Friction asphalt [μ] (flooded / dry)	approx. 0.6 / 0.9
Width safety lanes [m]	4
Maximum load per axle [t]	10

Overview



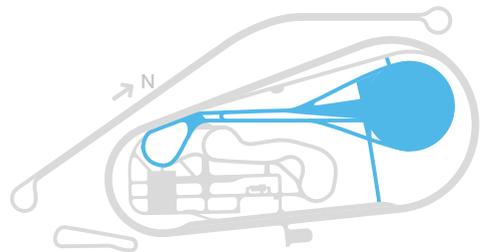
VEHICLE DYNAMICS AREA



Parameter

Surface	Asphalt
Length approach [m]	400
Length cross approach [m]	230
Length approach with optional extension [m]	500
Minimum / maximum width cross approach [m]	6 / 40
Minimum / maximum width approach [m]	8 / 10
Diameter vehicle dynamics area [m]	210
Maximum load per axle [t]	10
Resulting inclination of return lane [%]	< 1

Overview



Tests according to Euro NCAP

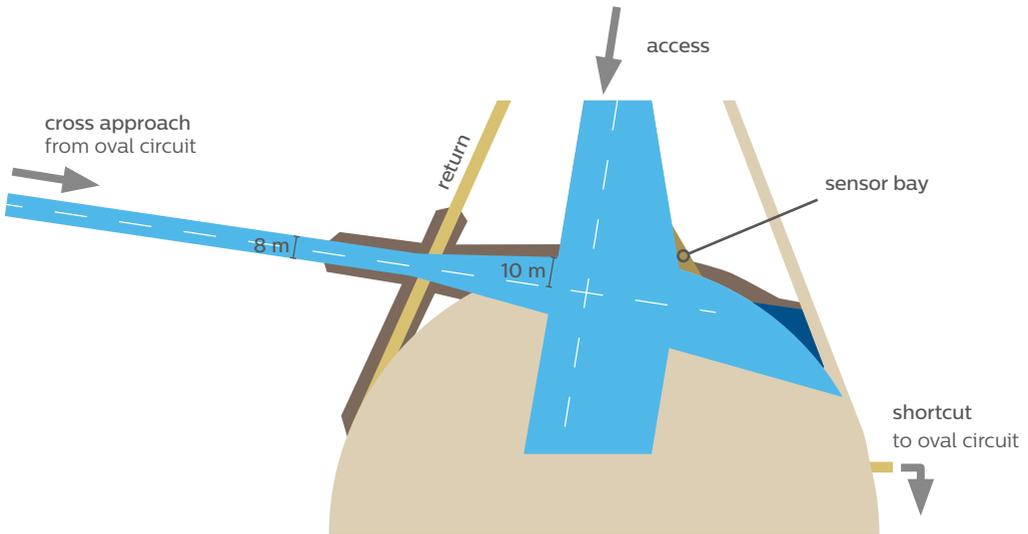
VEHICLE DYNAMICS AREA

The cross approach from the oval enables the latest tests according to Euro NCAP test protocol 2023 on the vehicle dynamics area.

Car to Car Crossing tests (CCC) are possible at speeds up to 80 km/h.

The return is available as a Road Edge route according to Euro NCAP test protocol "Lane Support Systems".

More tests of this type are possible in the urban environment, where you can find straights and intersections. [p. 16 – 17](#)



Possible test scenarios according to Euro NCAP

AEB Autonomous Emergency Break
C2C Car-to-Car Tests
CCC, CCRs, CCRm, CCRb
ELK Emergency Lane Keeping
FCW Forward Collision Warning
LDW Lane Departure Warning
LKA Lane Keeping Assistant
LSS Lane Support Systems

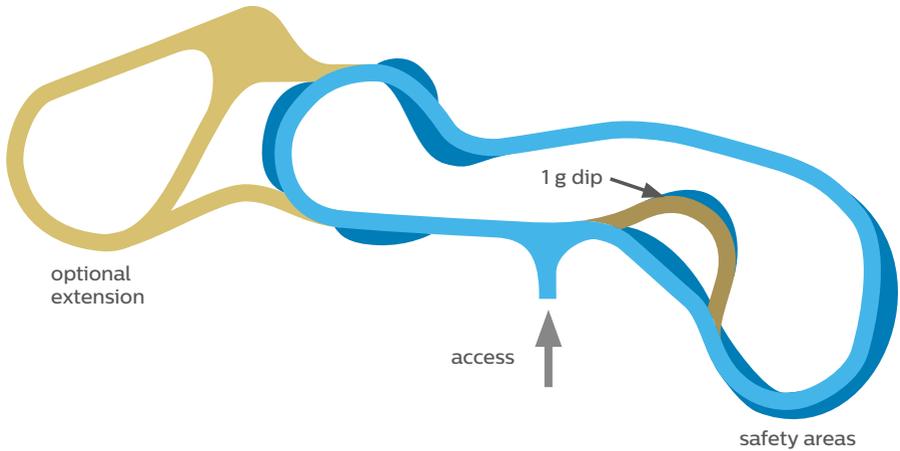
iACC intelligent Adaptive Cruise Control
SAS Speed Assistant System
SCF Speed Control Function
SLIF Speed Limit Information Function

further test scenarios [p. 19](#)

Track element

from 95.–

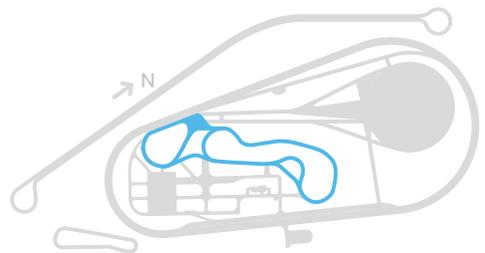
HANDLING TRACK



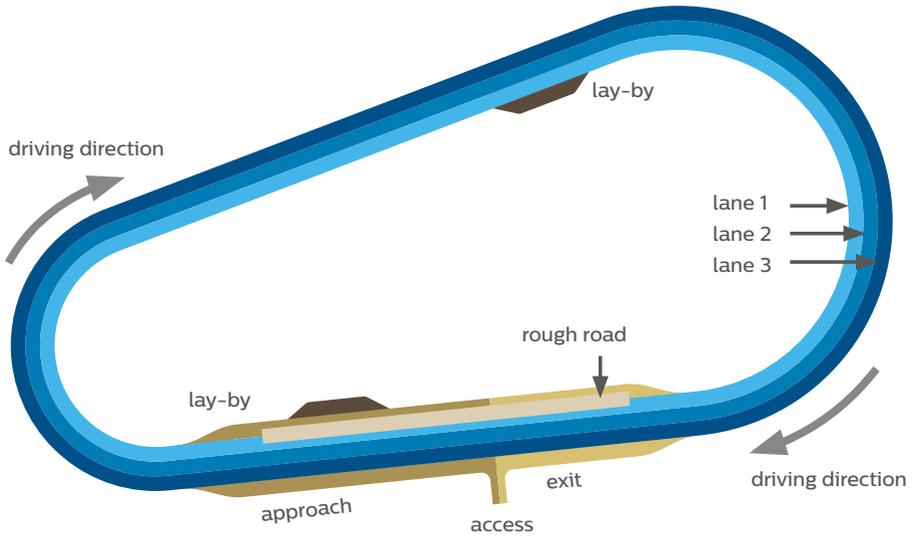
Parameter

Surface	Asphalt
Driving direction	variable
Total length [m]	800
Total length with optional extension [m]	1,200
Width [m]	6
Length / width 1 g dip [m]	10 / 6
Vertical offset 1 g dip [m]	0.25
Width safety areas [m]	< 7
Maximum total weight [t]	< 10

Overview



OVAL CIRCUIT



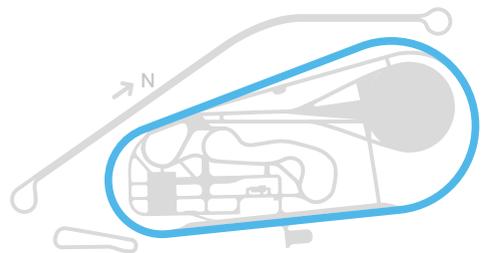
Parameter

Surface	Asphalt
Length of straight [m]	2 x 400
Length lane 1 / 2 / 3 [m]	2074 / 2097 / 2120
Width lane 1 / 2 / 3 [m]	3.75 / 3.75 / 4
Longitudinal inclination straight [%]	< 0.4
Maximum lateral inclination North / South curve [%]	67 / 72
Lateral inclination straight West / East straight [%]	2.5 / 1.4
Radius North / South curve	186.5 / 113.5
Maximum load per axle [t]	10

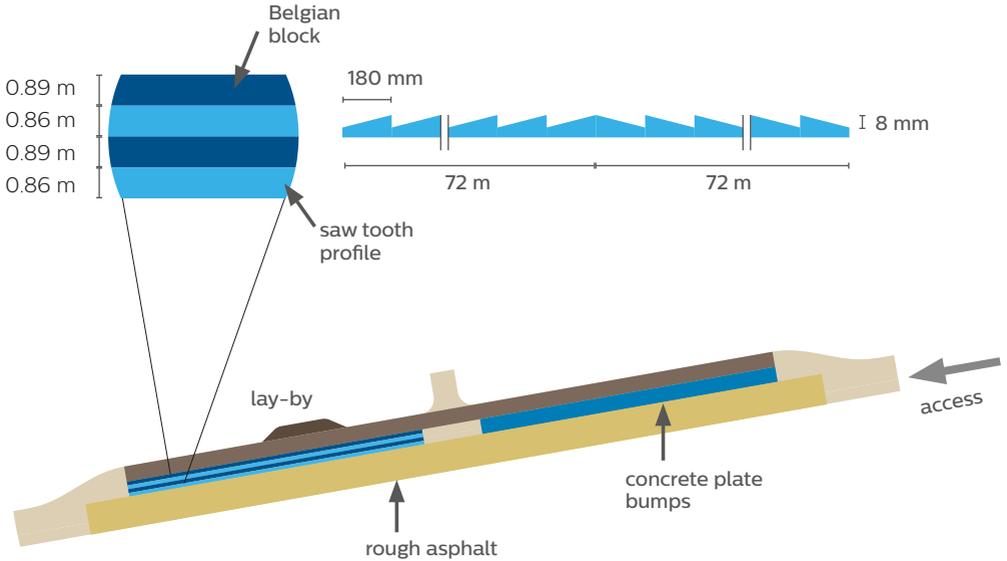
Lateral force-free speed

Lane 1 North / South curve [km/h]	42 / 34
Lane 2 North / South curve [km/h]	79 / 64
Lane 3 North / South curve [km/h]	117 / 96

Overview



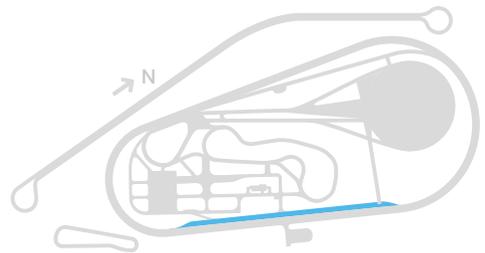
ROUGH ROAD



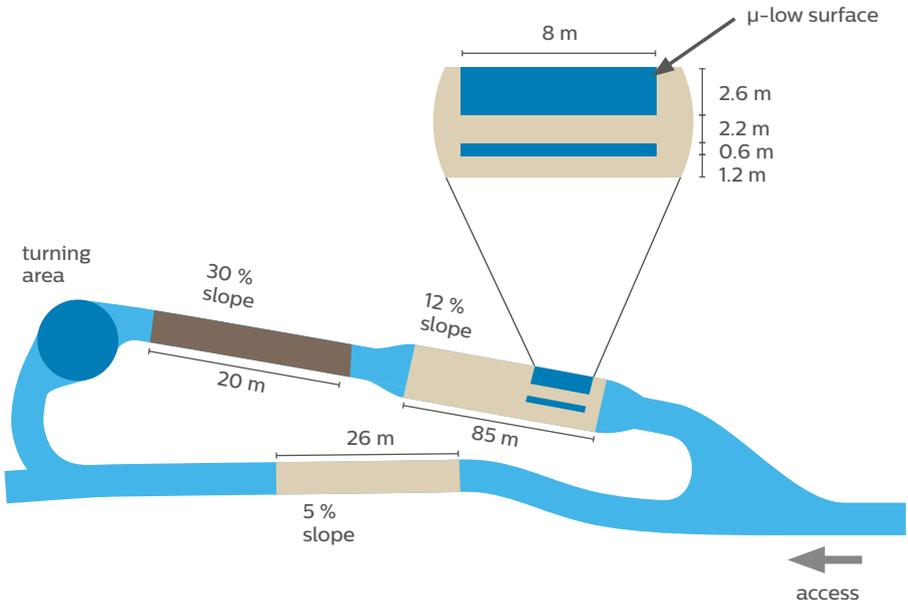
Parameter

Surface access	Asphalt
Length [m]	400
Length / width [m]	340 / 3.5
Longitudinal / lateral inclination access [%]	0.3 / 3.5
Length / width concrete plate bumps [m]	175 / 3.5
Length saw tooth profile [m]	144
Length Belgian block [m]	144
Length / width rough asphalt [m]	400 / 5
Longitudinal / lateral inclination rough road [%]	< 0.4 / 1.4 - 2.5
Maximum load per axle [t]	10

Overview



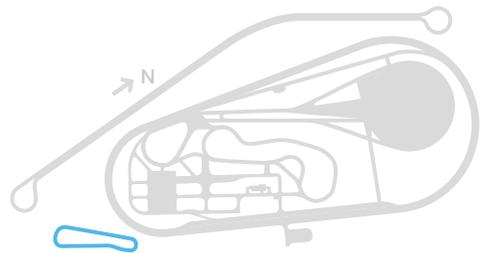
HILL SECTION



Parameter

Surface	Asphalt
Slope [%]	5 / 12 / 30
Lateral inclination [%]	2.5 / 1 / 1
Length of constant slope [m]	26 / 85 / 20
Constant width [m]	6.5 / 6.6 / 5
μ-low surface	Avertol
Water level [mm]	< 2
Diameter turning area [m]	19
Maximum load per axle [t]	10

Overview



URBAN ENVIRONMENT OVERVIEW



Multi-functional area

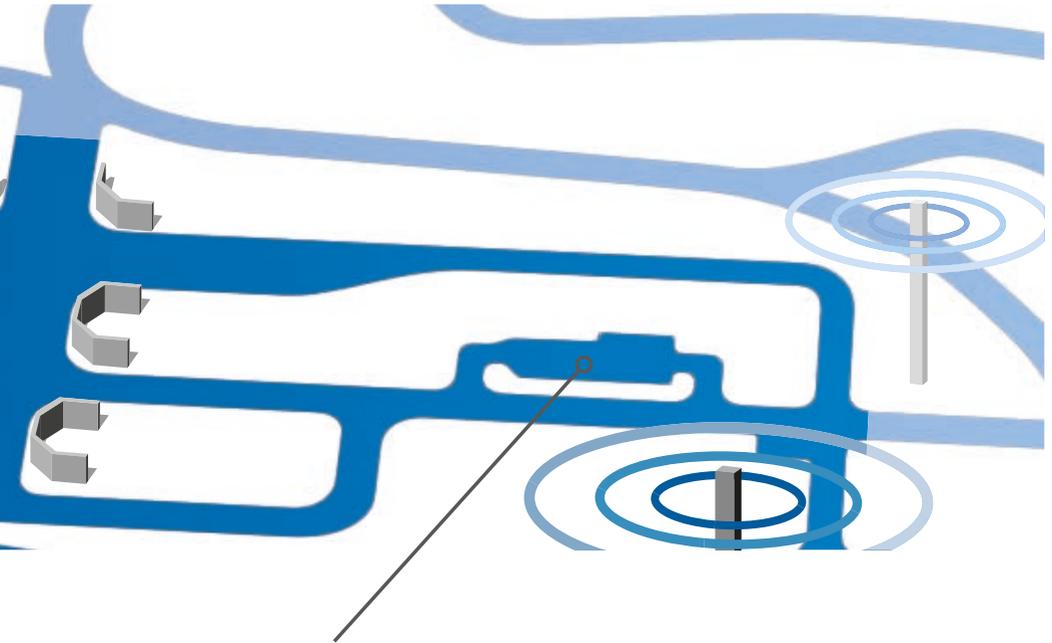
The multi-functional area is 65 x 100 m² and has a max. longitudinal inclination of 1%. It has numerous access roads and an observation container. [p. 17](#)

Intersections

Three intersections of different dimensions are equipped with V2X traffic lights. Variable housing scenes can be built along. Other T-junctions are available for tests. [p. 16](#)

Straights

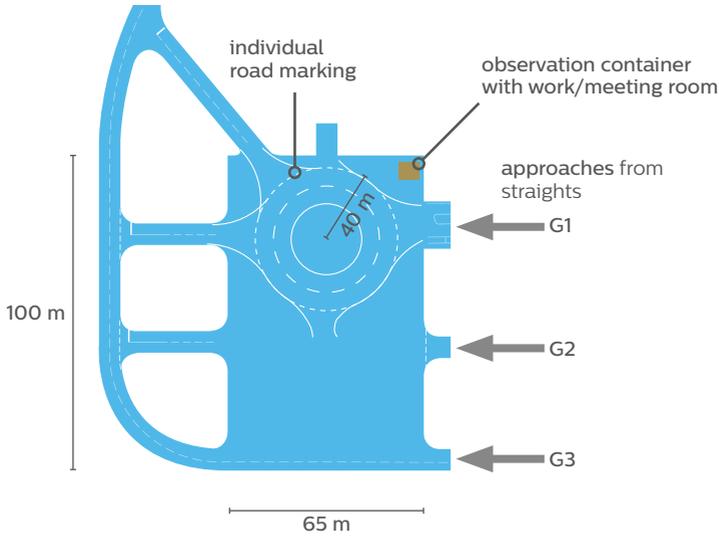
Three straights lead partly through intersections and open into the multifunctional area. They are suitable for testing with targets and automated platforms. [p. 16](#)



Parking area

In the parking area several lots of different orientation and enclosure (like curbs, banquet, guardrails) are available. They can be equipped with parking sensors. [p. 16](#)

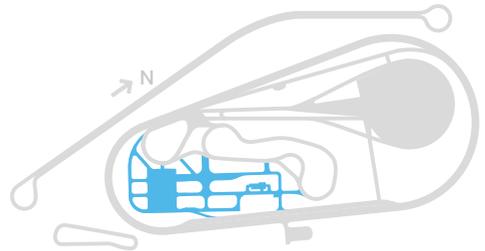
MULTI-FUNCTIONAL AREA



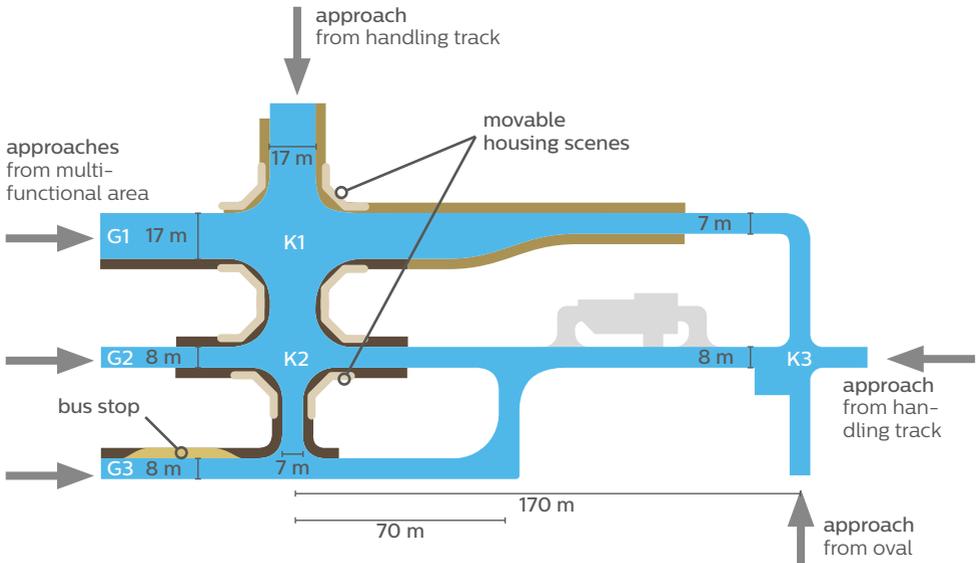
Parameter

Surface	Asphalt
Length x width [m ²]	100 x 65
Lateral inclination [%]	0
Longitudinal inclination [%]	1 (SE to NW)
Markings	variable, as by customer demand

Overview



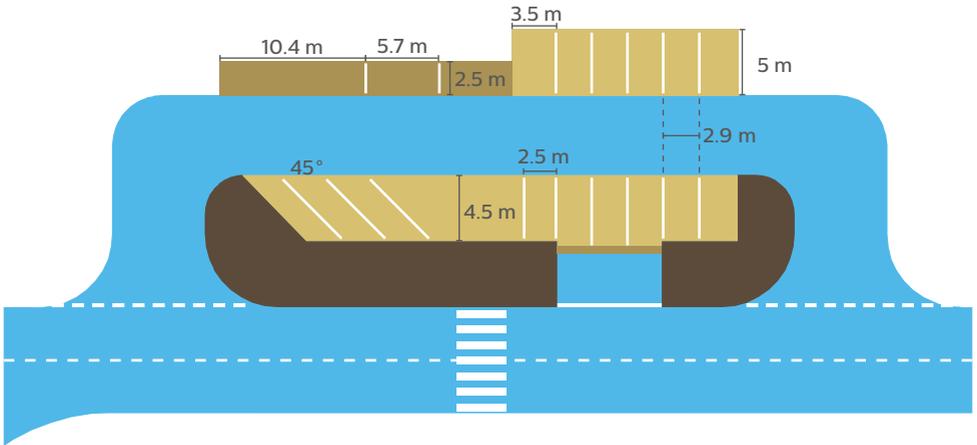
INTERSECTIONS / STRAIGHTS



Parameter

Intersections	K1	K2	K3
Surface	Asphalt	Asphalt	Asphalt
Maximum length of approach [m]	170	190	50
Width in intersection area [m ²]	17 x 17	17 x 8 x 7	7 x 8
Distance of connection points [m] (network and power)	15	15	20
Lane setup	variable, up to 5	variable, up to 3	variable, up to 3
Housing scenes	variable, built of concrete	variable, built of concrete or wood	none
Traffic lights	yes, V2X	yes, V2X	yes, V2X
Straights	G1	G2	G3
Length [m]	210	260	130
including multi-functional area	350	400	210
Width [m]	7 – 17	7 – 8	8

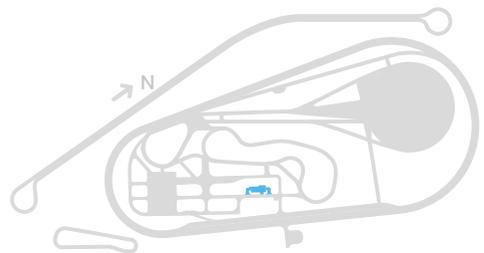
PARKING AREA



Parameter

Surface	Asphalt
Parallel lots	3
Rectangular lots with various widths	12
Diagonal lots	3
Lateral inclination [%]	< 1
Longitudinal inclination [%]	< 1
Curbs	yes, at west side
Guard rail	yes, at west side
Parking sensors	possible

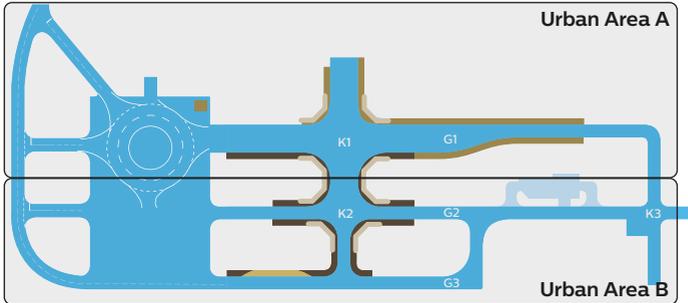
Overview



Booking options of the urban environment

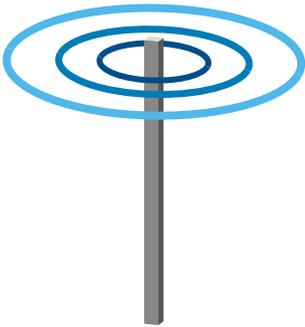
The city environment can be booked in various packages with the intersections/straights..

The booking options are shown below.



	Area A	Area B	
Intersections	K1	K2	K3
Surface	Asphalt	Asphalt	Asphalt
Maximum length of approach [m]	170	190	50
Width in intersection area [m ²]	17 x 17	17 x 8 resp. 17 x 7	8 x 7
Distance of connection points [m] (network and power)	15	15	20
Lane setup	variable, up to 5	variable, up to 3	variable, up to 3
Artificial buildings	variable, built of concrete	variable, built of concrete or wood	none
Traffic lights	yes, V2X	yes, V2X	yes, V2X
Straights	G1	G2	G3
Length [m]	210	260	130
Width [m]	7 – 17	7 – 8	8
Multifunctional-area			
Length x Width [m ²]	50 x 65	50 x 65	
Cross slope [%]	0	0	
Longitudinal slope [%]	1 (SE to NW)	1 (SE to NW)	
Markings	variable, according to customer requirements		
Euro NCAP protocols	AEB VRU CCFTap further test scenarios p. 9		

MOBILE COMMUNICATIONS



Communication of vehicles and their environment is quickly gaining importance. Thus, Vodafone installed in 2017 a mobile communications test field, the 5G Mobility Lab, which is directly connected to the Vodafone Innovation Park Labs in Düsseldorf. This makes Aldenhoven Testing Center an unique automotive proving ground for connected mobility in Europe.

The test field is open, which allows live testing of the interoperability of automotive solutions offered by different vehicle manufacturers and network equipment providers. Users can thus see how different systems and technologies interact within the solutions of different manufacturers.

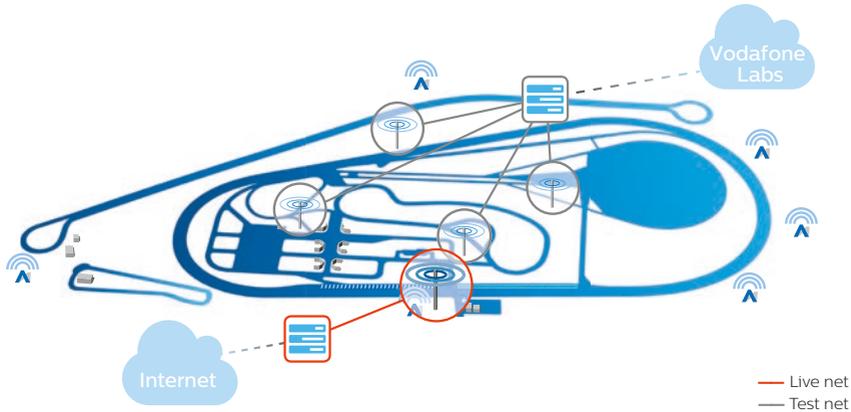
State-of-the-art mobile radio test environments for mobile connectivity are available. In addition to live network coverage with 4G and 5G, a sophisticated mobile test network with four different sites has been implemented at the test field. This is equipped with the latest 5G and LTE-Advanced-Pro technology. The 5G SA technology is as well provided on site and will be continuously expanded with new functions in line with the development of the 3GPP standard. Thus, the 5G Mobility Lab already offers the ideal prerequisite for testing and evaluating mobility applications with the mobile radio technologies of tomorrow directly under real conditions in the open field.

In addition to the mobile radio test field, a WLAN of the automotive standard 802.11p and a general radio network for data exchange are available on the entire site.

5G MOBILITY LAB



The 5G Mobility Lab provides one of the most advanced development and testing environments for connected and autonomous traffic of the future. Besides 4G/5G standard configurations, specific, individual mobility configurations are possible. In connection with customer-specific ICT components and solutions, the required ecosystem for automotive and mobility applications and related services can be generated.



Parameter

Live net	5G, 4G/LTE, GSM and NB IoT
Test net	4 bases
	various technology suppliers (Ericsson, Nokia, etc.)
	LTE Advanced Pro, 5G, NSA and 5G-SA-Technology
	1800 MHz, 2100 MHz, 2600 MHz (FDD & TDD)
	WiFi 802.11p and local WiFi
	Edge Core & Local Breakout, Edge Cloud and LTE Broadcast
	Connection to Vodafone Innovation Park Labs www.vodafone-innovationpark.com
	Broadband internet connection
	Extensive V2X platform and cloud systems for Vodafone and customer-owned applications; technical rooms

Digital

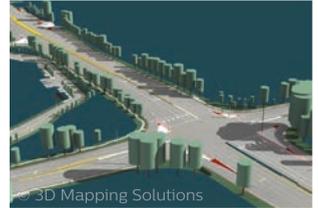
DIGITAL TWIN



In order to design future driver assistance systems or automated driving functions safely, high-resolution digital map data are an important pillar.

High-resolution map data offer the following application possibilities:

- Map as reference for tests in the vehicle
- Map matching as reference for data collected in the test vehicle
- Basis for scenario extraction from test vehicle data
- Basis for simulation applications
- Basis for sensor simulation
- Basis for driving simulator application

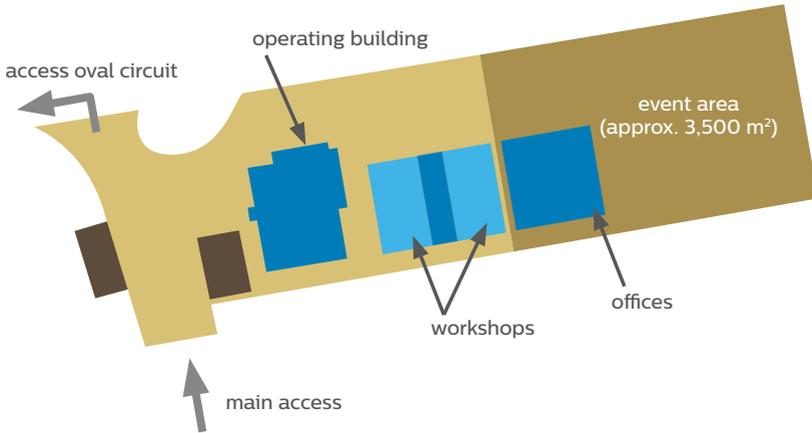


The digital data of the Aldenhoven Testing Center are available from the company 3D Mapping Solutions. We will be happy to put you in touch with them.

Parameter

Relative accuracy [m]	< 0,01
Height resolution [mm]	0,1
Formata	OpenDRIVE, Road 5, Lanelet2, more on request

WORKSHOPS AND OFFICES



Parameter

Workshops

2 work spaces L x W x H [m³] 10 x 6 x 6.75

Aperture W x H [m²] 4 x 4.5

- car lift
- pressured air supply
- tire mounting and balancing machines

Office building

Customer office 1 [m²] 15

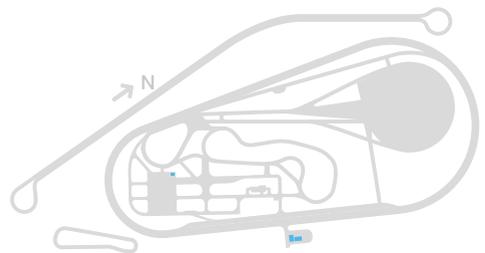
Customer office 2 [m²] 11

Seminar room with projector and kitchenette [m²] 30
max. persons 28

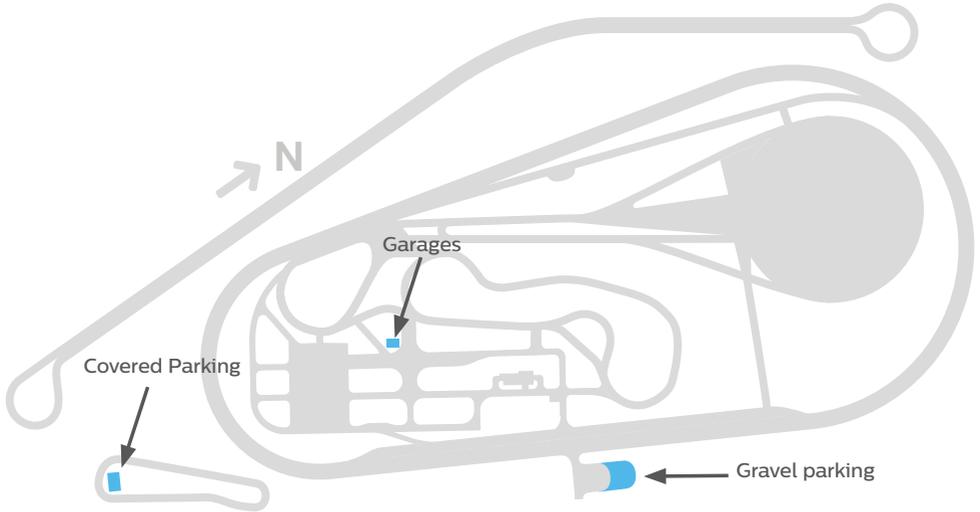
Mobile office

Number of work spaces 4

Overview



PARKING



Parameter

Garages	Single garage	Double garage
Garage dimensions L x W x H [m ³]	5,98 x 2,98 x 2,55	5,98 x 5,95 x 2,55
Raw gate clearance L x W [m ²]	2,88 x 2,01	5,04 x 2,01
Gate clearance L x W [m ²]	2,80 x 2,00	5,00 x 2,00

Covered Parking

Parking spots (Passenger cars)	24
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Gravel area

Parking spots (Passenger cars)	150+
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Infrastructure

TEST EQUIPMENT

If you need useful equipment for your tests, the Aldenhoven Testing Center will be happy to provide it.

You are welcome to book the following equipment:

- Ballon Car
- Four mobile traffic lights
- Various traffic signs
- One power generator
- One mobile lifting platform
- Tyre changer and balancer
- Two e-scooters for use on the site



Furthermore, the complete Euro NCAP test tools such as VRU targets (pedestrians, cyclists, motorcyclists) and vehicle targets with the necessary robot platforms and measurement systems can be rented from 4activeSystems GmbH, AB Dynamics Ltd. and other suppliers - including operators if required. We will be happy to establish contact.



Our team will also be happy to apply temporary markings and speed bumps to the asphalt for you with our road taper.



In addition, a water trailer with a capacity of 3000 litres is now available. We can use this to partially water the driving dynamics area or the handling course, for example.



Events

EVENTS

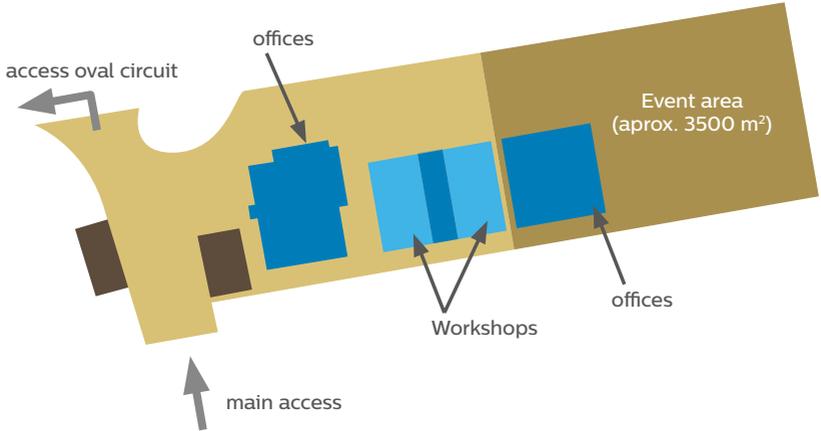
Your guests would like to know vehicles or systems not just in theory, but should also experience them live? Aldenhoven Testing Center is the ideal event location for this. The twelve track elements allow almost every driving manoeuver that highlights the advantages of your product.

Our compact layout offers participants the chance to follow the action on the track even if they are not driving themselves at that moment. For presentations and catering, our seminar and workshop facilities are available just like our event spaces for vehicle presentations or temporary installations.

Our team has extensive and many years of experience in planning, preparation and realization of events. We are happy to early on and develop together with you the optimal and develop together with you the optimal event concept. In addition to our facilities, we can provide all the necessary services such as security, paramedics, track marshals, catering or event or event technology for you. For this purpose we have an extensive network of suppliers at our disposal.



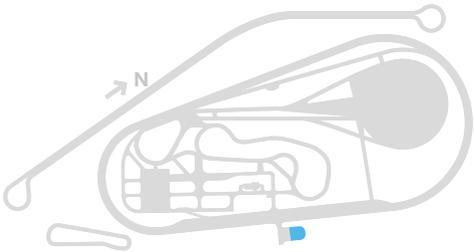
EVENT AREA



Parameter

Event area	
Surface	Gravel
Area L x B [m²]	approx. 94 x 38 (3500 m²)

Overview



TEST DRIVER? YOU SHOULD KNOW THESE RULES

- The German highway code (StVO) is effective on all grounds – exceptions are explained during the mandatory introduction.
- Maximum speed on all connecting roads and around the buildings is 30 km/h.
- Alcohol and drugs prohibited. Smoking only in designated areas.
- Staff directions and signs must be followed at all times.
- Usage of smartphones or station radio prohibited while driving.
- No driving on closed tracks.
- Driving on oval only clockwise.
- Crossing of the oval is strictly forbidden at any place.
- Maximum speed on the oval 120 km/h. Exemptions can be agreed upon at exclusive use.
- Driving on the service track of the oval only for stop & go cycles and only in agreement and after approval by the dispatcher.
- Driving on the oval can lead to ESP intervention – deactivation is recommended.
- High-visibility vests must be worn when leaving the car on the tracks.
- Changes between track elements must be announced over the radio.
- Lights on – fasten seat belts.
- Use indicators when turning or changing lanes.
- No photography or filming.





Please take our billing system into account when planning and conducting your tests:

- We provide each test vehicle with an on-board unit that records all usage based on GPS.
- Billing begins as soon as a vehicle is in a route area for more than two minutes.
- Billing is per half hour or part thereof / per route element used / per test vehicle according to the current price list.
- You can leave and re-enter the booked route area as often as you wish within an hour or part thereof without incurring any further costs.
- If several route areas are used in alternation, each route element is recorded and charged individually according to the billing system.
Example: You alternate between oval and handling course for 1 hour with 1 vehicle. In the settlement, you will be charged for the oval for 1 hour and the handling course for 1 hour.
- If you book a route element exclusively, it can be used with any number of vehicles, provided that the safety is given.

PRICELIST

You can find our full pricelist online:
www.aldenhoven-testing-center.de/preisliste

Extra Service

We offer our customers free coffee, water and Wi-Fi.



Additional usage and services on request.

Funded by



Bundesministerium
für Bildung
und Forschung

Ministerium für Wirtschaft, Innovation,
Digitalisierung und Energie
des Landes Nordrhein-Westfalen



EUROPÄISCHE UNION
Investition in unsere Zukunft
Europäischer Fonds
für regionale Entwicklung

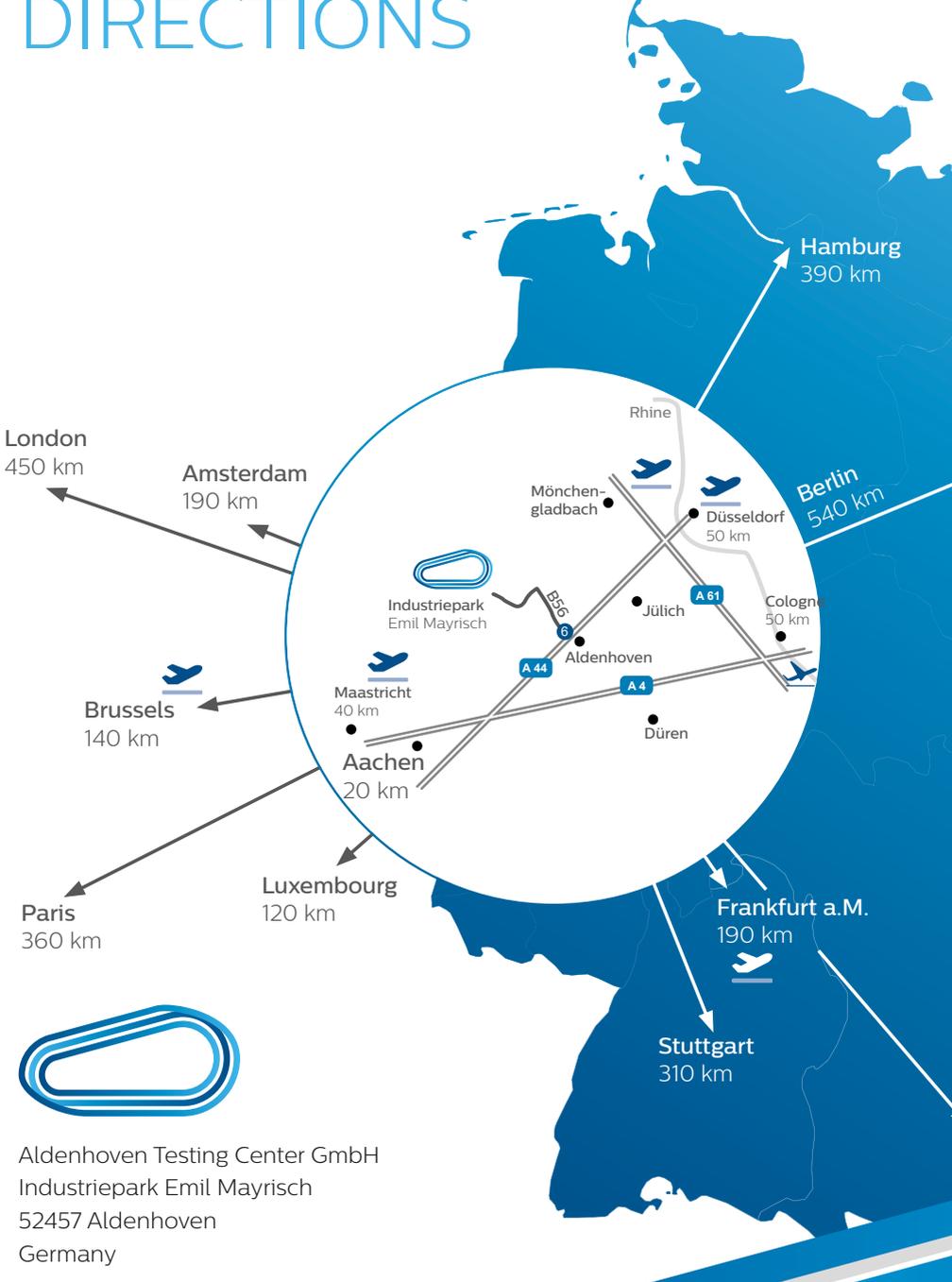
Our network



Digitale Stadt
Düsseldorf



DIRECTIONS



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