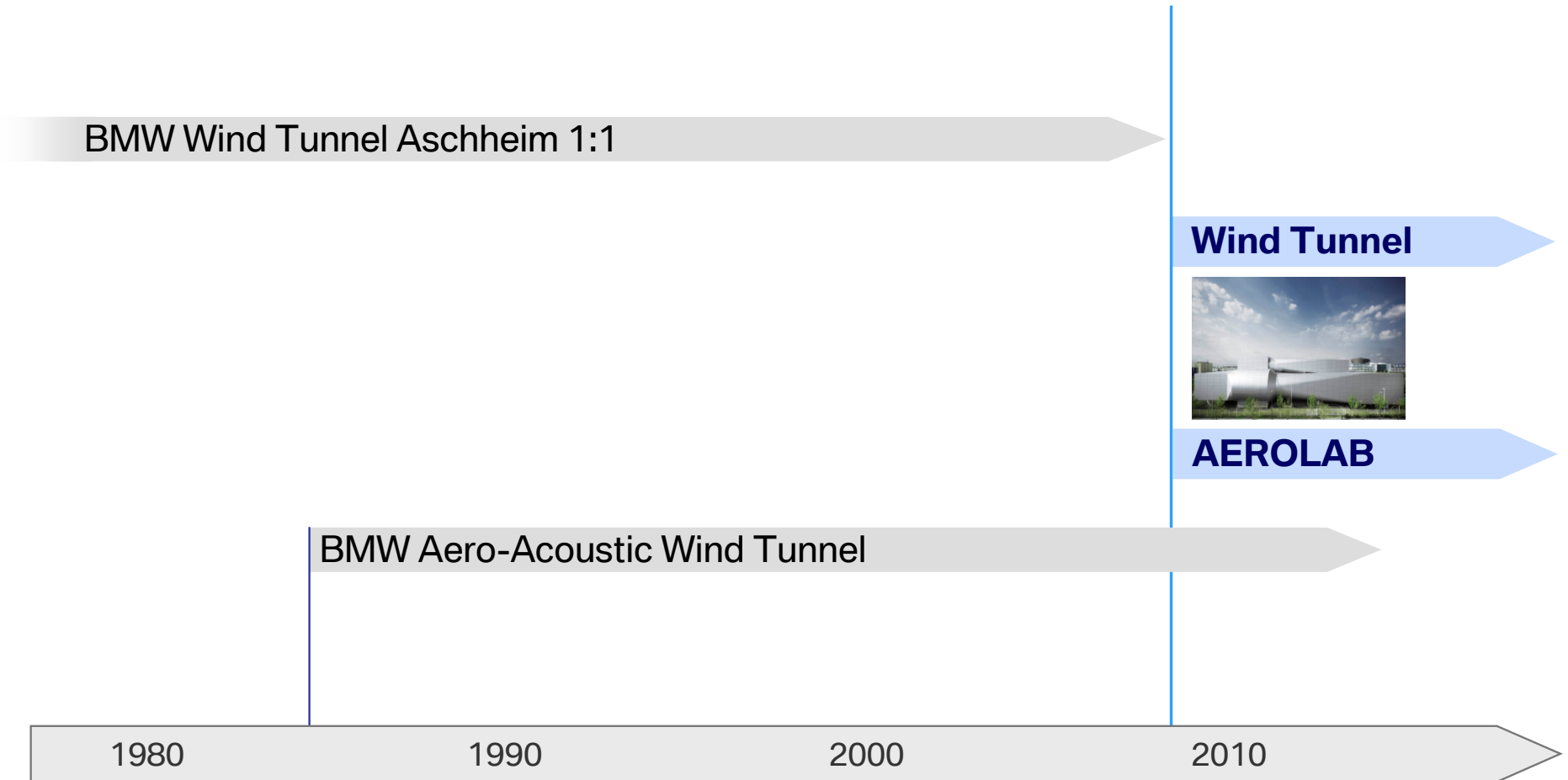


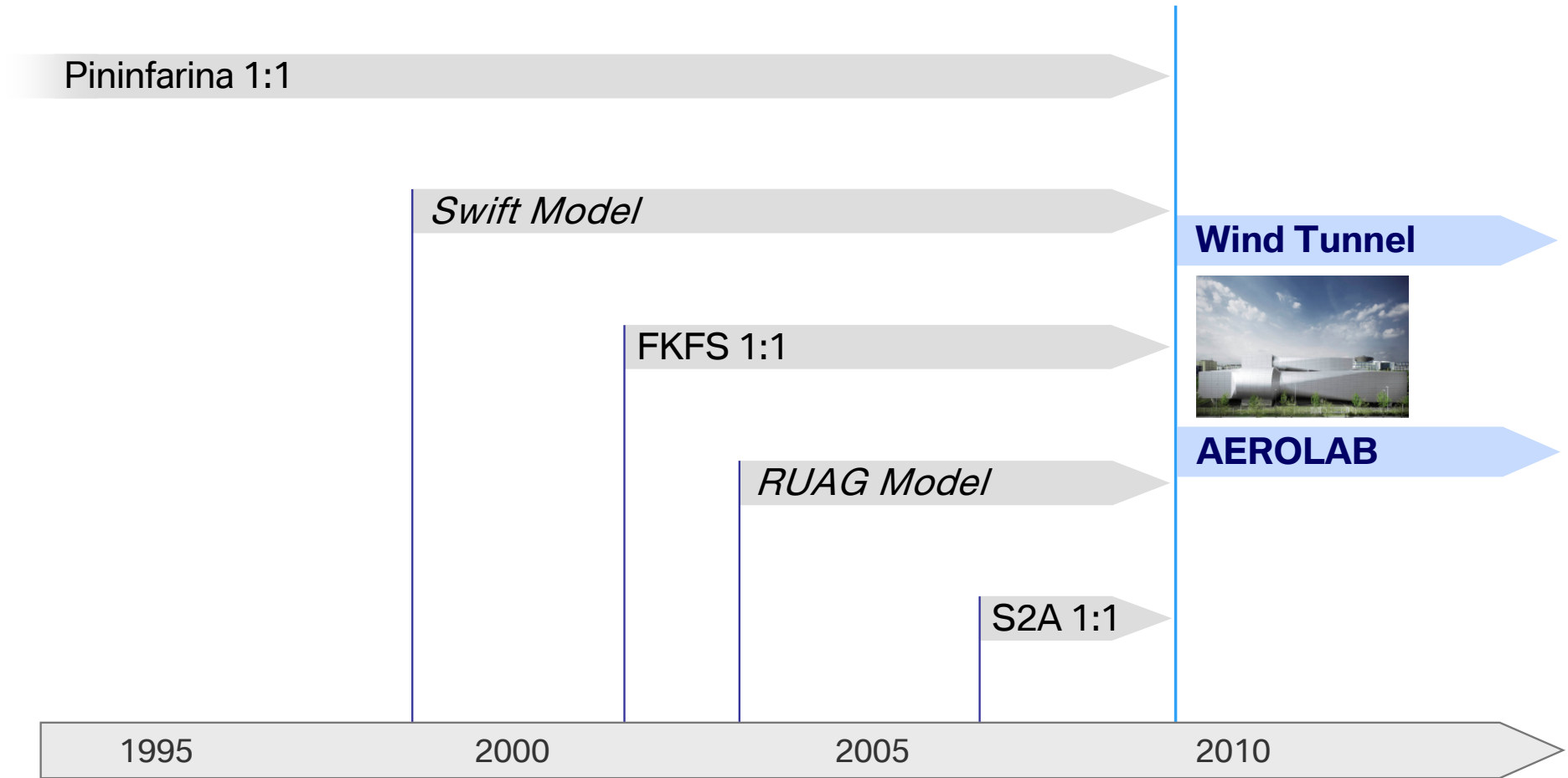
# BMW Group AEROLAB.

## BMW Group Wind Tunnels.

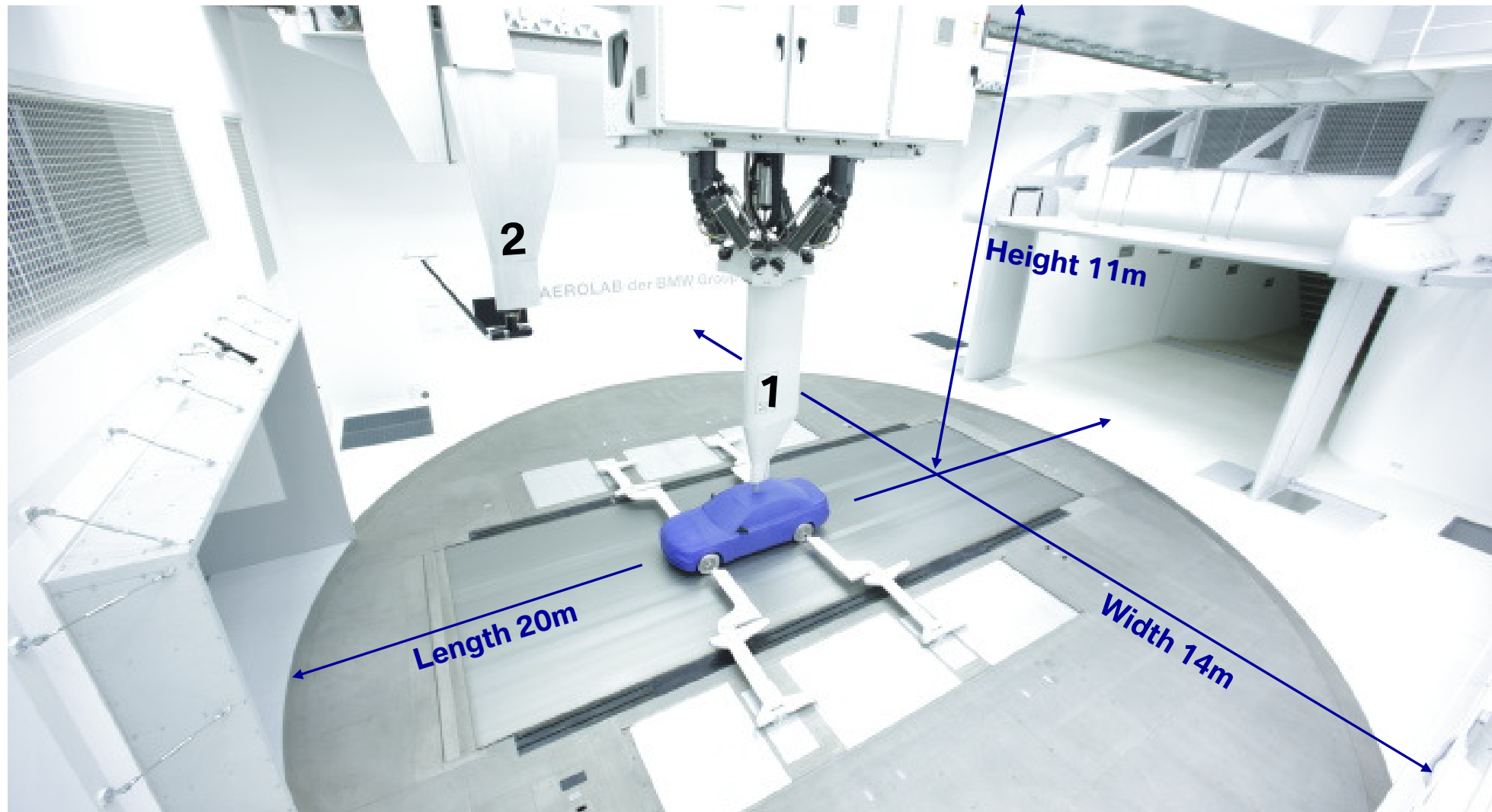


# BMW Group AEROLAB.

## Use of External Wind Tunnels with Moving Ground Facility.

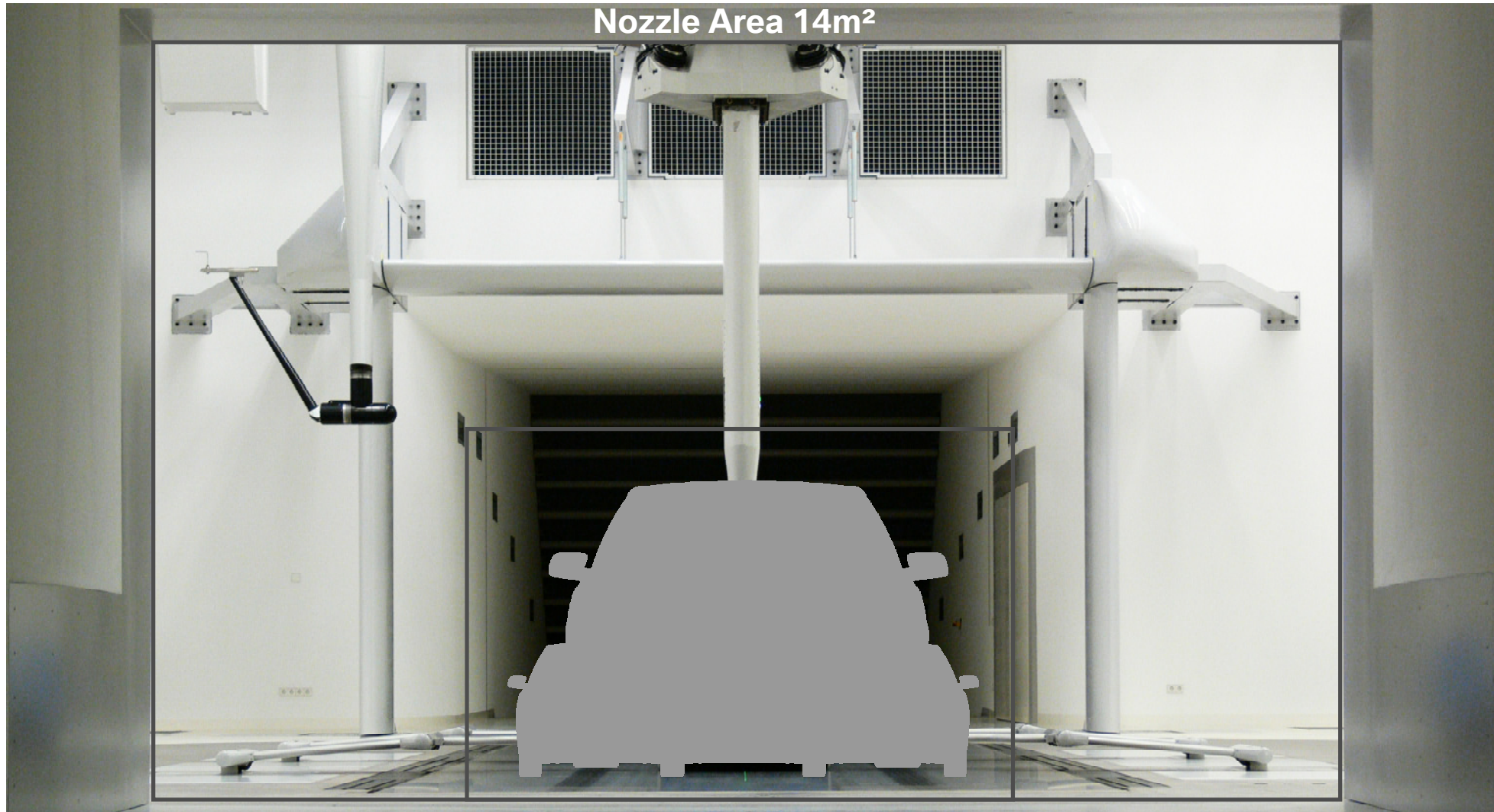


# BMW Group AEROLAB. Plenum.





# BMW Group AEROLAB. Nozzle Cross Section.

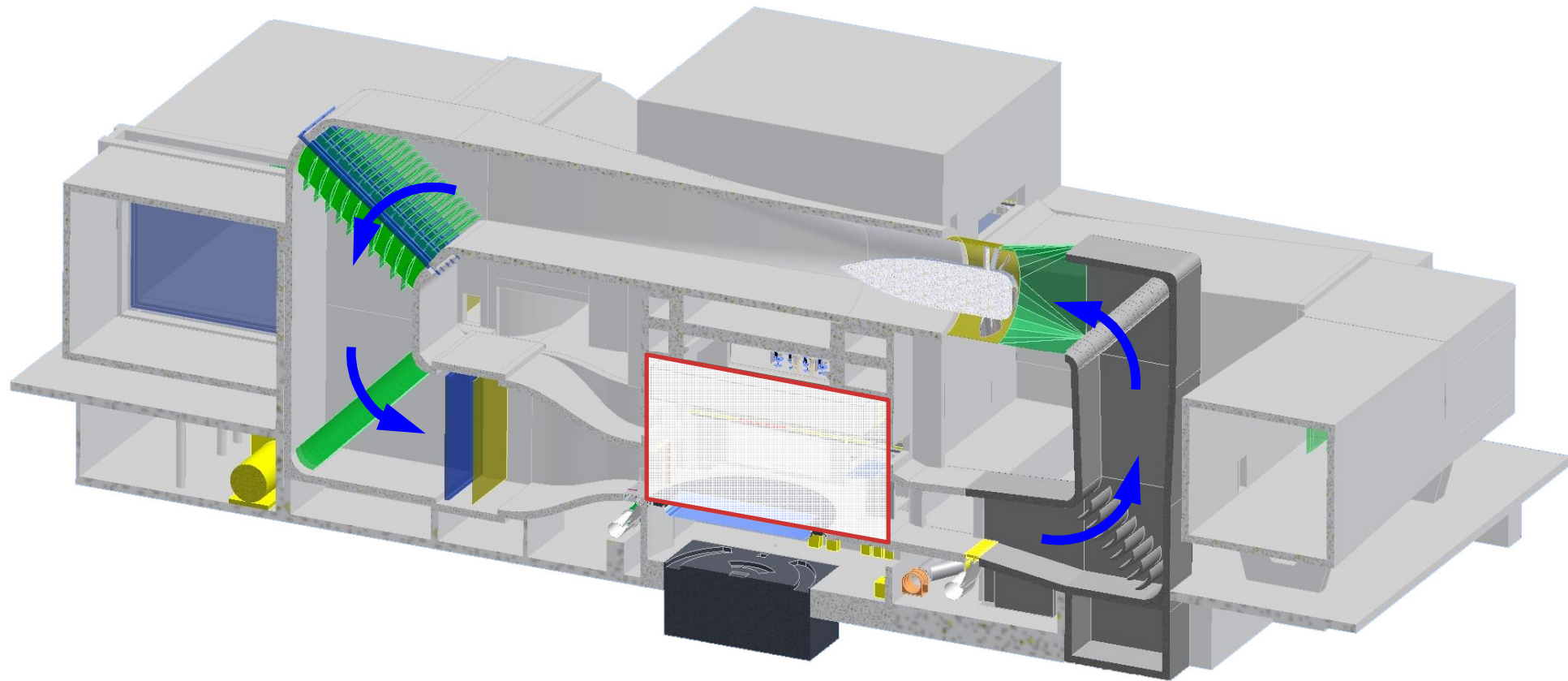


# BMW Group AEROLAB. Rolling Road.



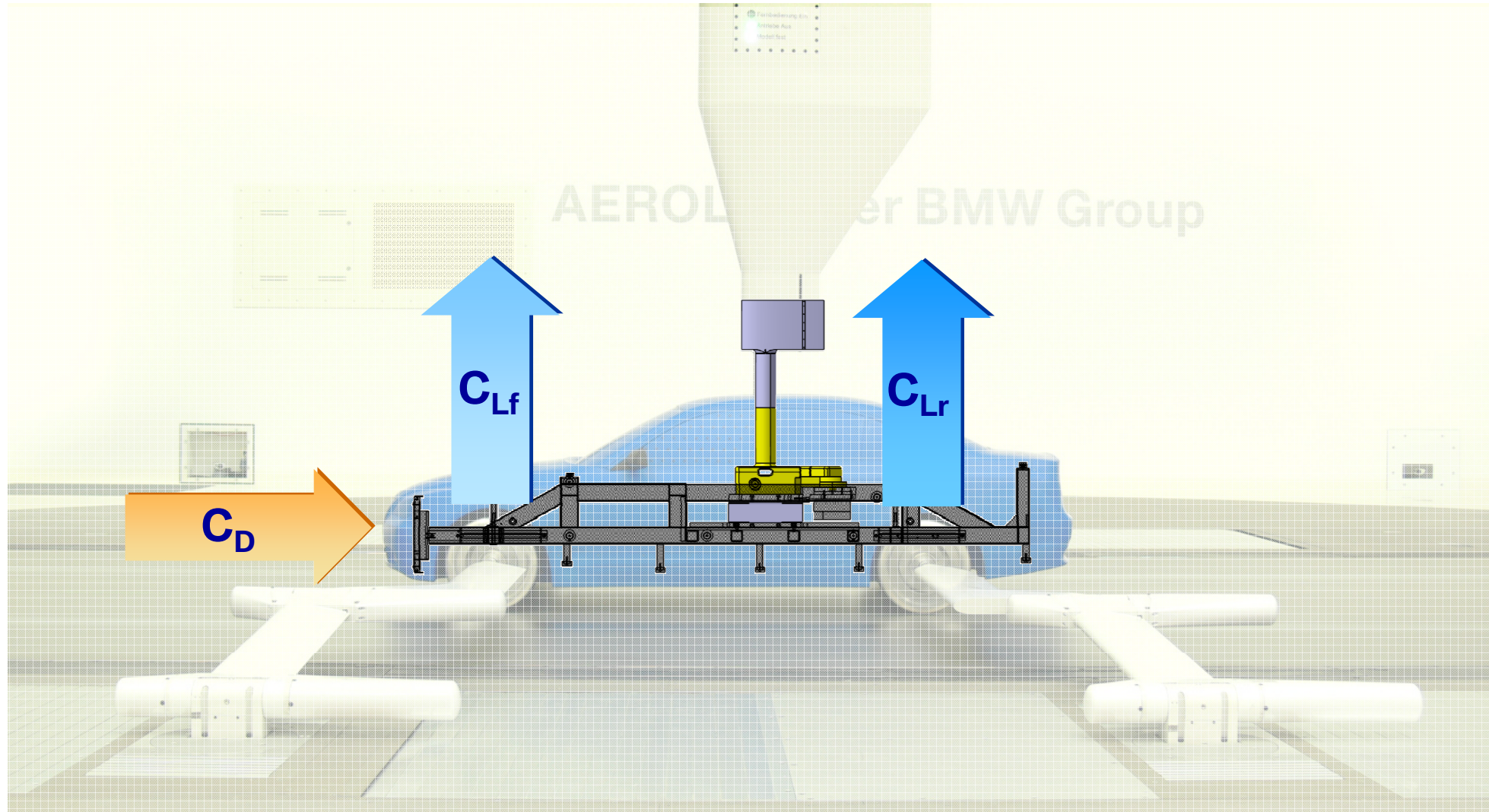
# BMW Group AEROLAB.

## Overall View AEROLAB.



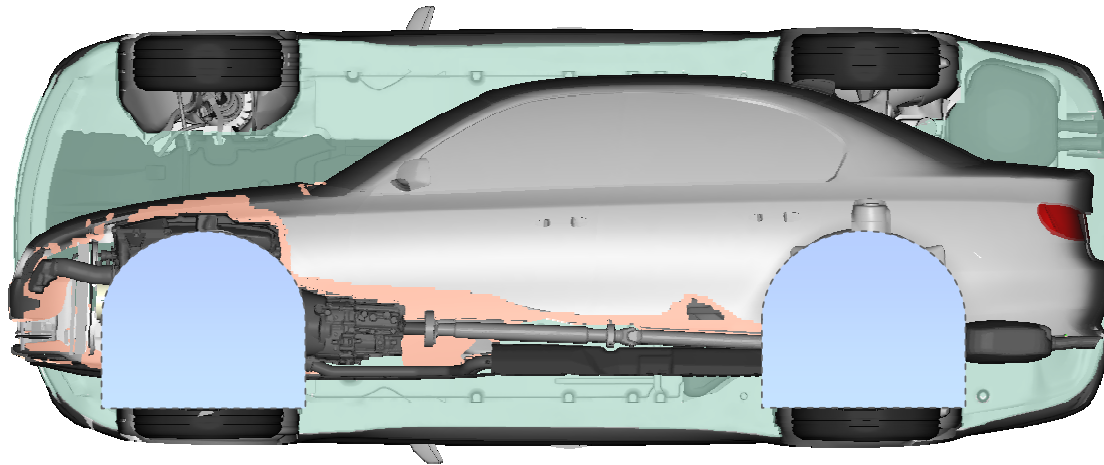


# BMW Group AEROLAB. Force Measurement.



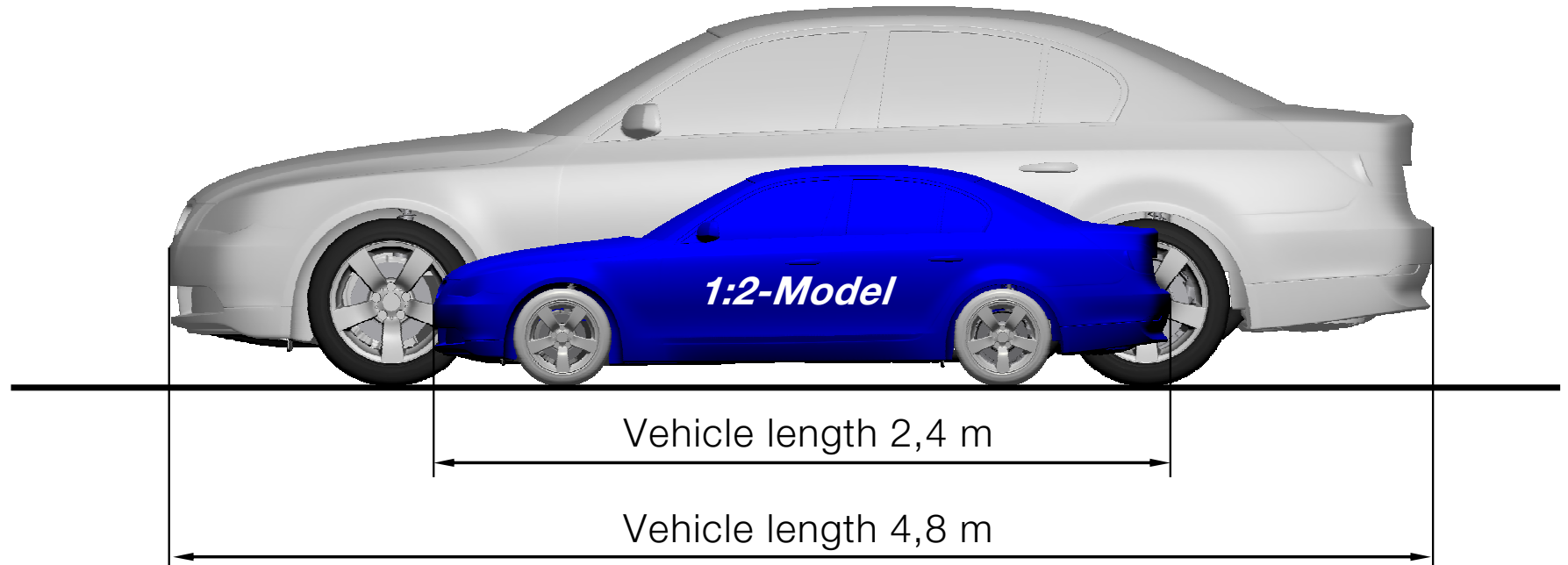


# BMW Group AEROLAB. Shares to Total Drag.



Shape & Proportions	40%
Wheel / Wheelhouse	30%
Underbody	20%
Air Intakes	10%
Total Drag	100%

# BMW Group AEROLAB. Flow Similarity.



**Test Speed:**

***1:1-Vehicle***

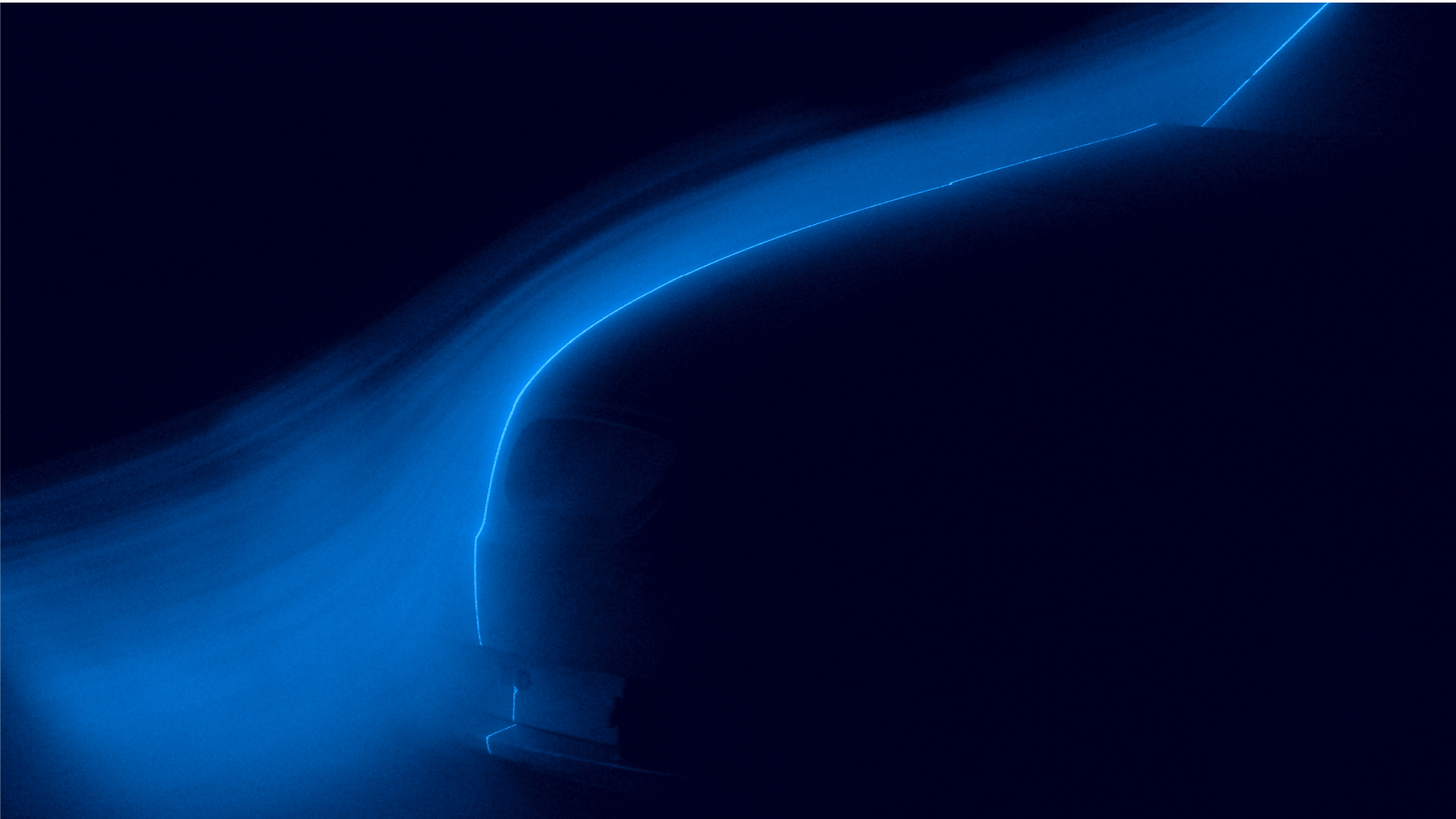
***1:2-Model***

Example:

**100 km/h**



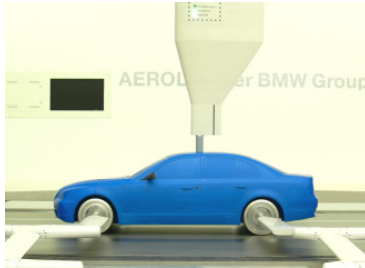
**200 km/h**





# BMW Group AEROLAB. Drag Measurement with Stationary Wheels.

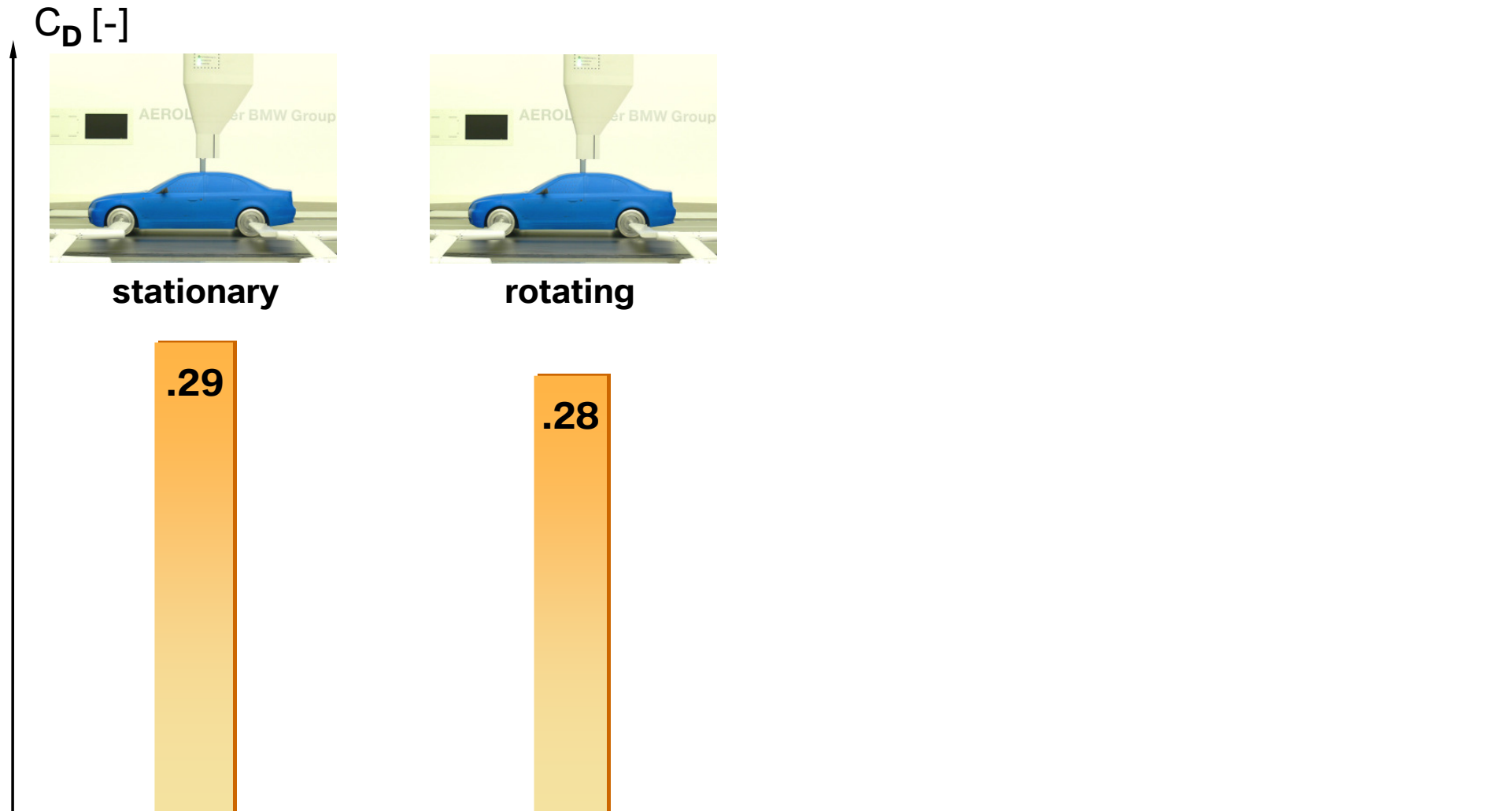
$C_D$  [-]



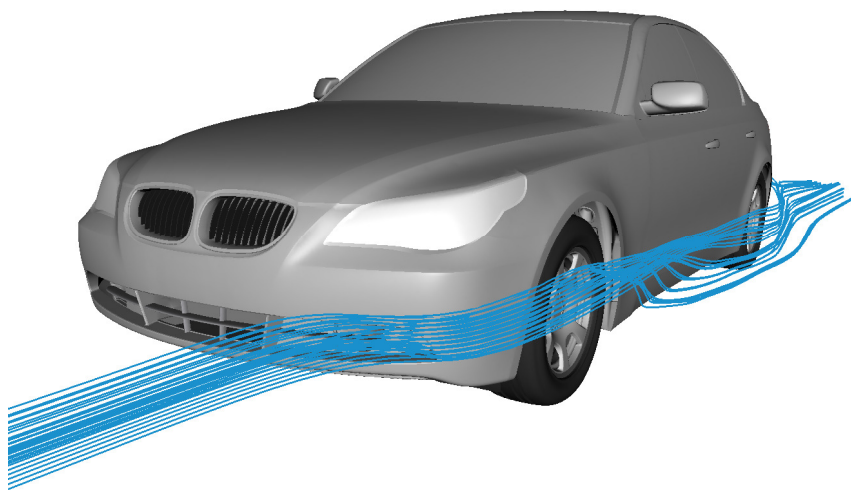
stationary

.29

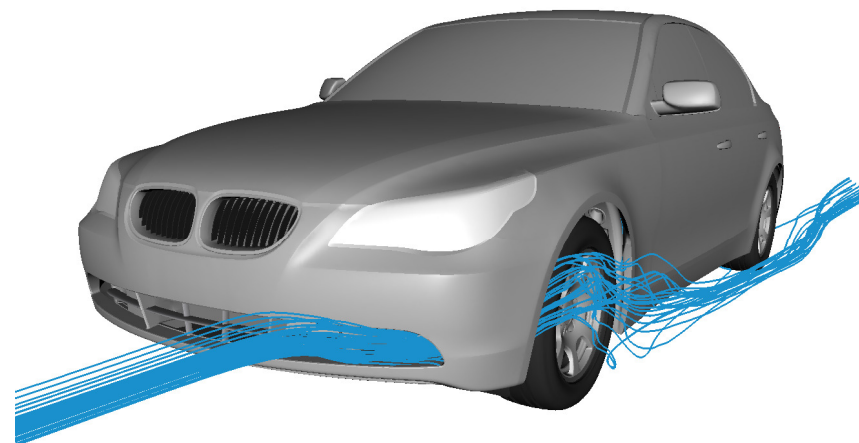
# BMW Group AEROLAB. Drag Measurement with Rotating Wheels.



# BMW Group AEROLAB. Air Curtain.

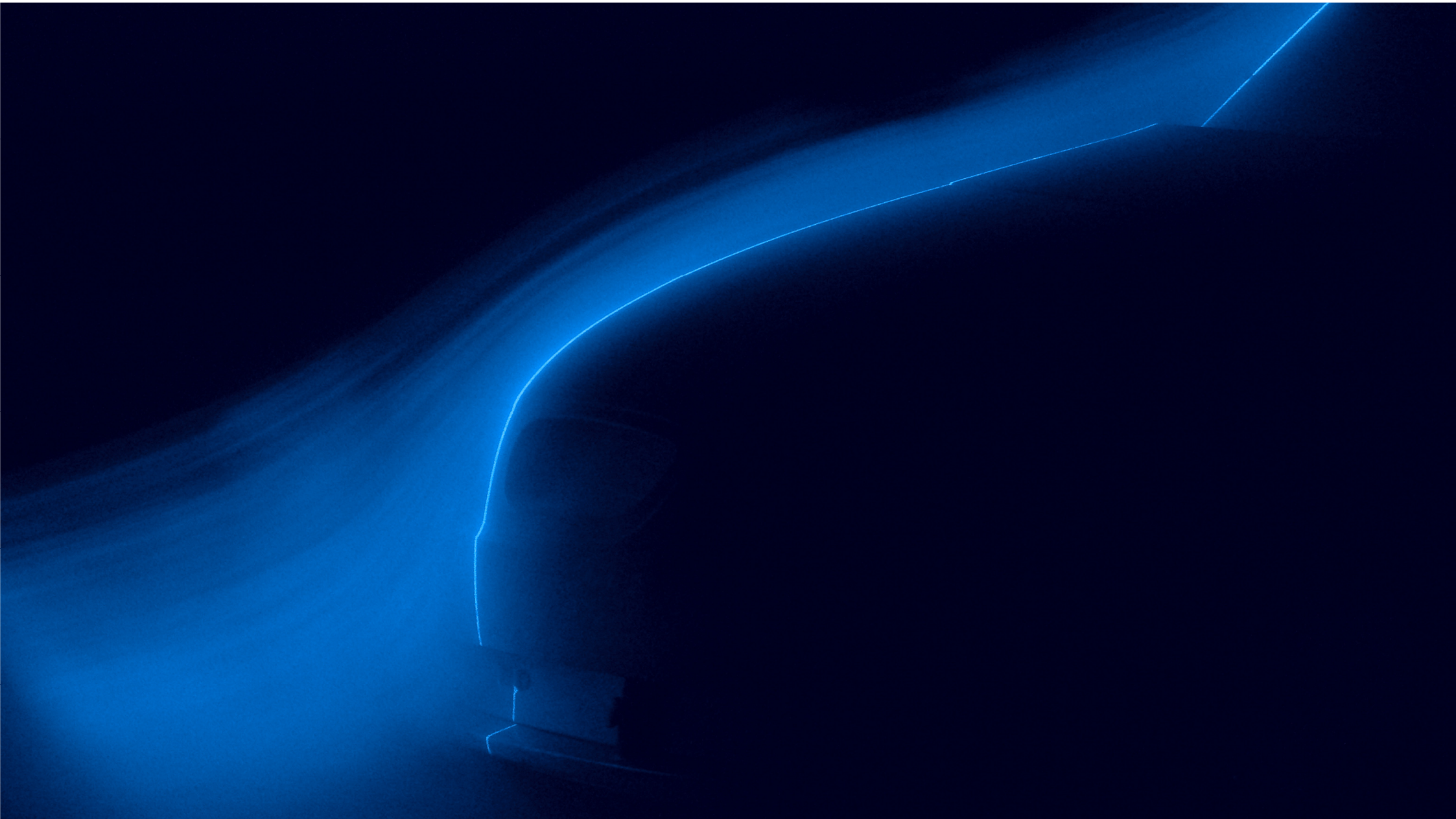


Without Air Curtain

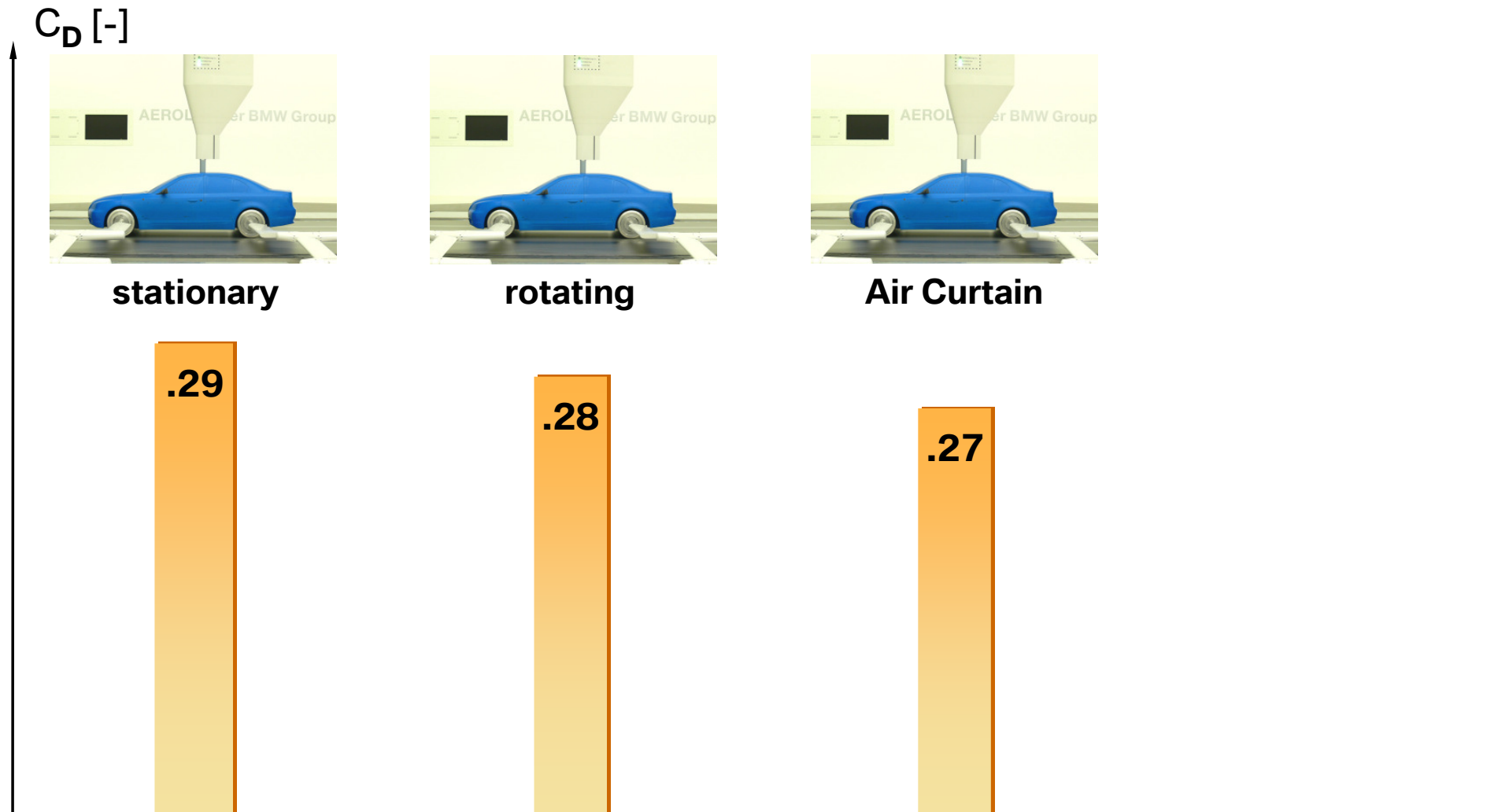


With Air Curtain

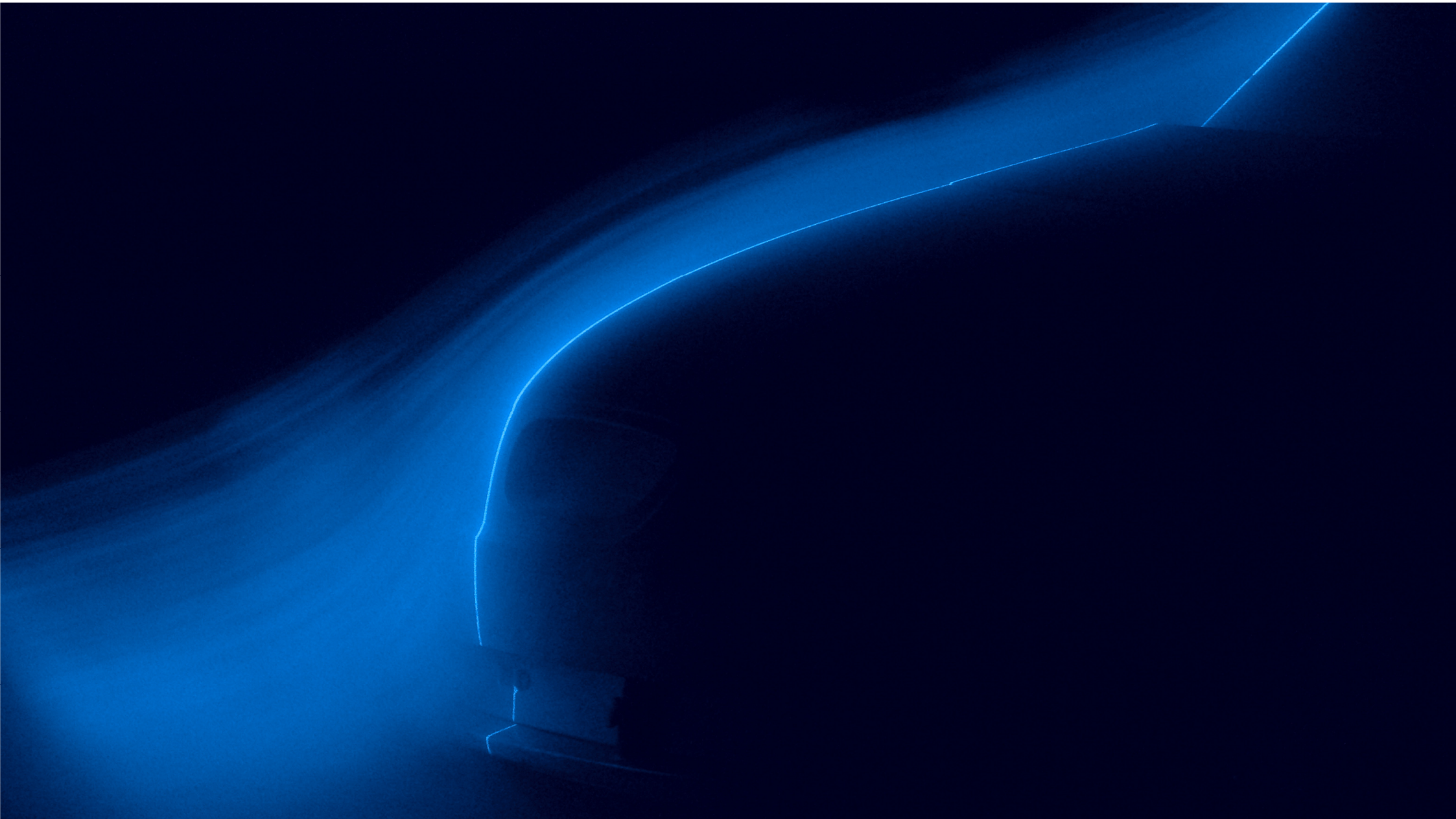




# BMW Group AEROLAB. Drag Measurement with Air Curtain.

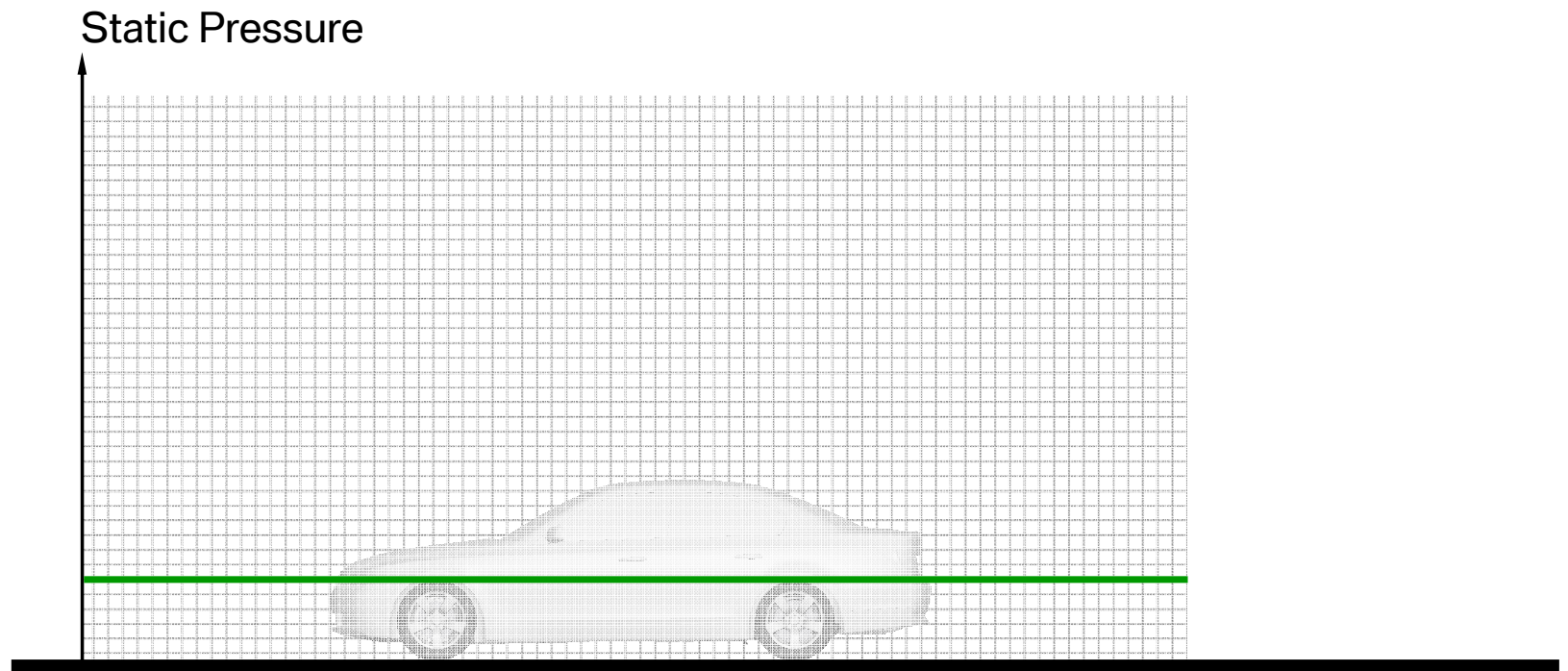






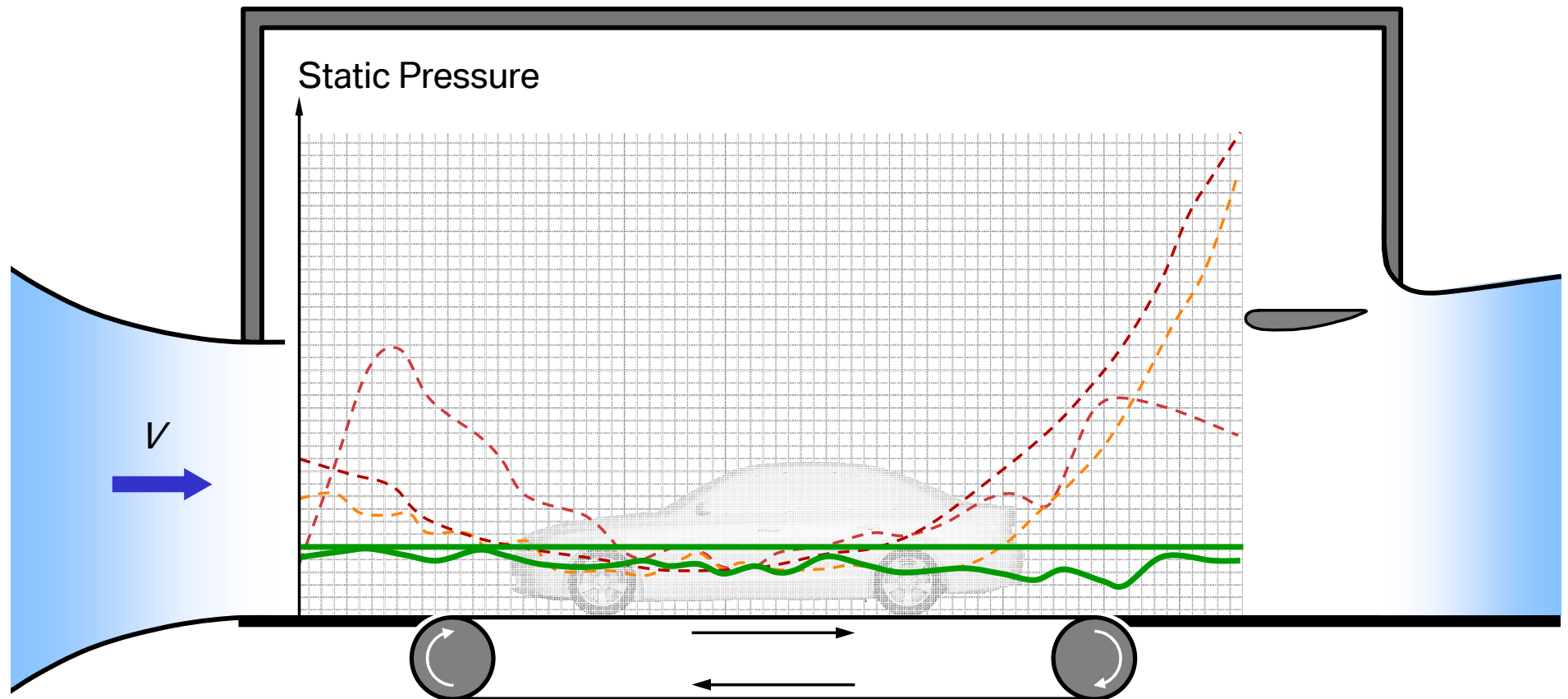


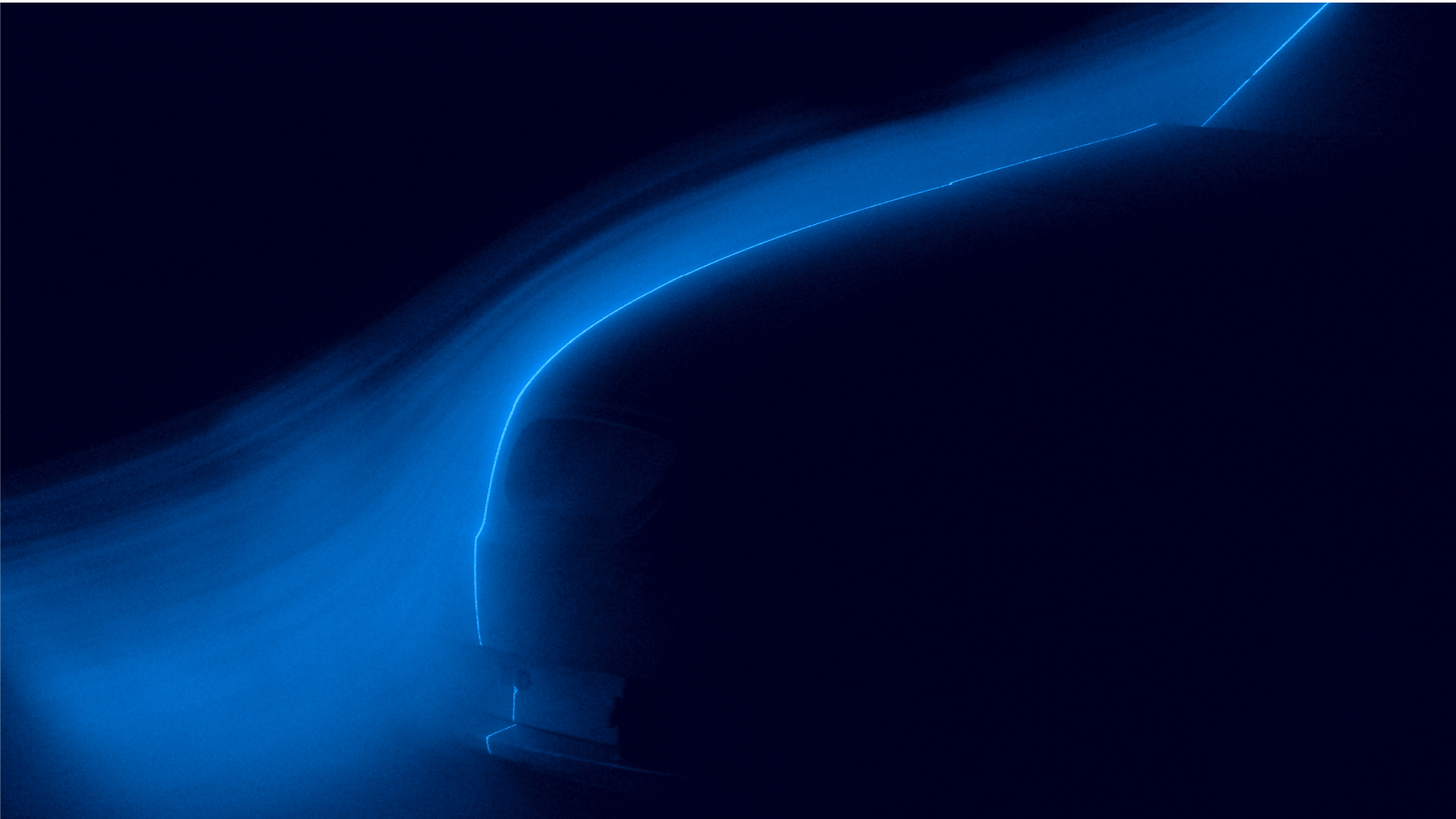
# BMW Group AEROLAB. On-road Static Pressure Gradient.



# BMW Group AEROLAB.

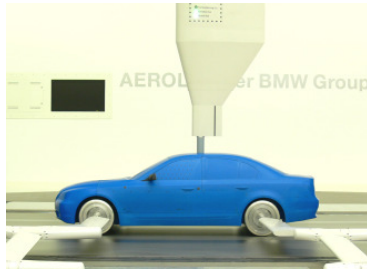
## AEROLAB Static Pressure Gradient.





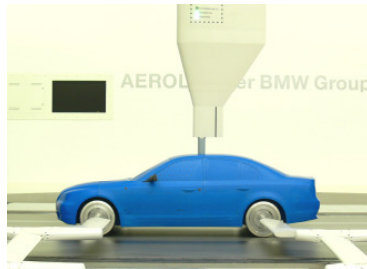
# BMW Group AEROLAB. Drag Measurement „Gliding Fish“.

$C_D$  [-]



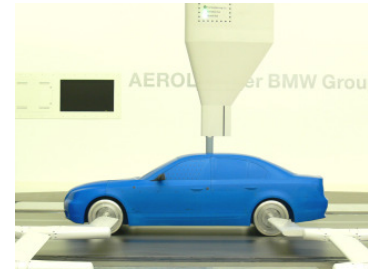
stationary

.29



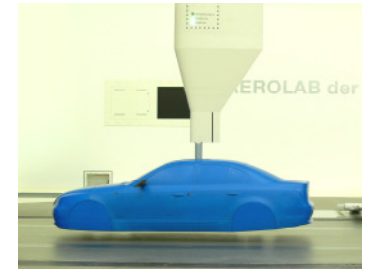
rotating

.28



Air Curtain

.27



„Gliding Fish“

-35%

.18

