

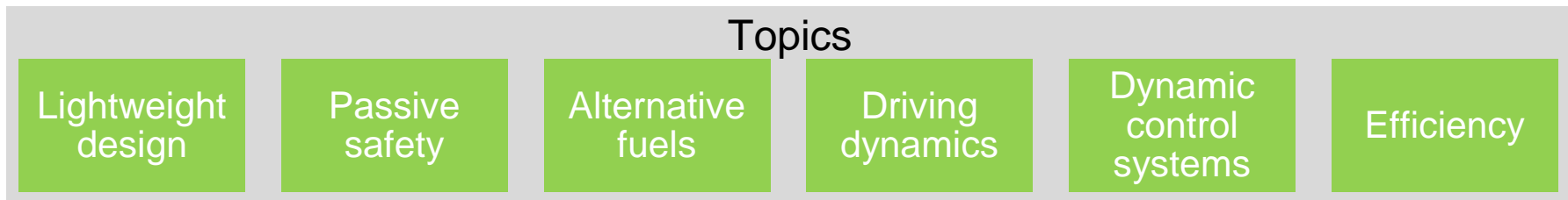
Tuning Akademie



Tuning Akademie – Team, Car and Project Strategy

Dipl.-Ing. Thomas Hanisch, June 25th 2011

Concept / Motivation



Races

Testing of innovative technologies under race conditions

Representation of project partners, ika and Tuning Akademie in public view

Development

Integration of innovative concepts

Gathering measurement data under reproducible conditions

Information transfer to project partners

Exhibitions/Publications

Exhibition of technologies by Tuning Akademie and project partners

Scientific publications of these technologies during scientific conferences and exhibitions



Tuning Akademie

Team Structure *Tuning Akademie*

Members of Tuning Akademie



- Dipl.-Ing. Thomas Hanisch
managing director
driver
ABS/ESP, suspension
sponsoring / marketing



- Dr.-Ing. René Henn
aerodynamics
orga of race and test events
sponsoring / marketing



- Dipl.-Ing. Michael Kühne
driver
electronics
data analysis
data acquisition & sensors



- Bastian Goercke
driver
electric / body



- Dipl.-Ing. Andrei Filep
race engineer
concept development
steering / suspension



- Wolfgang Rödiger
coordination race event
mechanic



- Dipl.-Ing. Klaus Leinfelder
driver
tire development



- Andreas Goercke
chief mechanic

Team Structure (Partners)

Members of ika / fka



- Dipl.-Ing. Christian Sahr
Project coordination ika/fka



- Marcel Völker
Chief mechanic ika



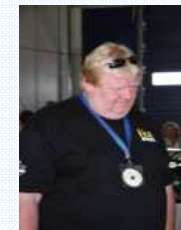
- Dennis Drießen
Mechanic

Partners race & test events



- Hans Keutmann
Fuel & truck logistics, driver

ITT Keutmann GmbH



- Ralf Klee
Senior expert
KFZ-Klee

Development of the Vehicle Technical Data

Audi A4 quattro

- Engine: V6 TDI
- Capacity: 3.0 l
- Power: approx. 230 kW
- Torque: 600 Nm
- Permanent 4-wheel drive
- Body: Audi RS4 (B7)



Tuning Akademie

From the Body-in-White to a Race Car

Body-in-white 2007



Assembly



Assembly chassis



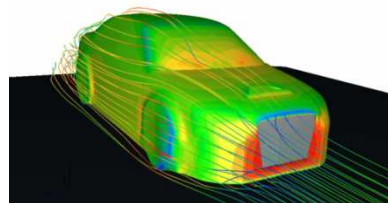
Assembly drivetrain



Races 2009



Optimization efficiency



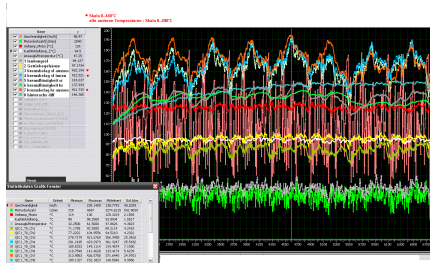
Races 2008



Assembly of light weight components



Technology platform



Races 2010



Change to NExBTL

NESTE OIL

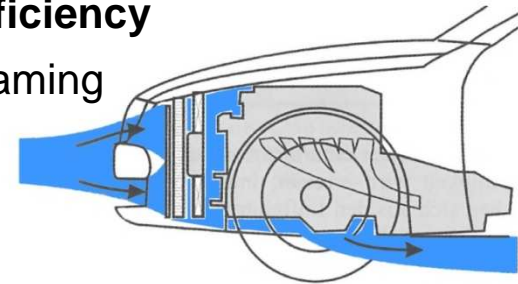
Races 2011



Aerodynamic Optimization Engine Compartment Streaming

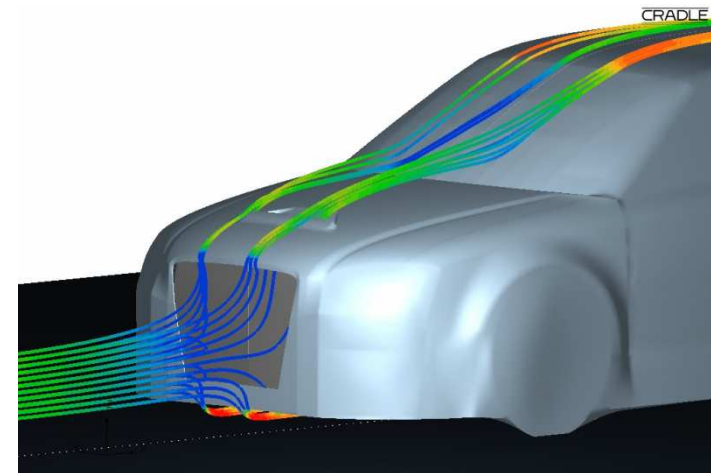
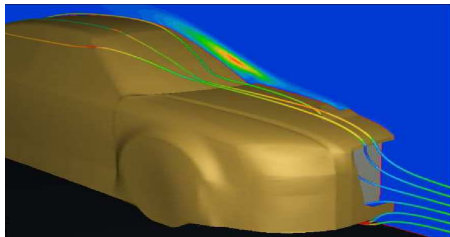
Boundary conditions

- **Water and oil temperatures must be reduced to improve efficiency**
 - Main part of internal resistance: Engine compartment streaming
 - Position of air intake near to the stagnation point
 - Additional usage of a ventilator at low speeds
 - Usage of ventilator requires 3 to 4 % of engine power



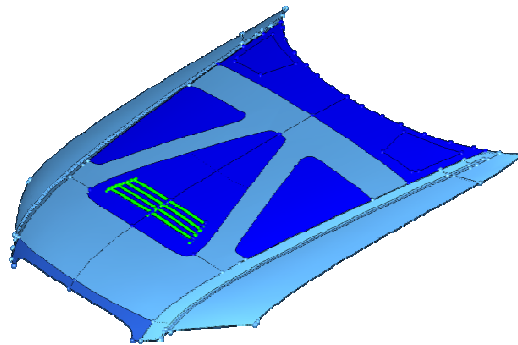
Measures of air intake optimisation

- Enlargement of the intake near to the stagnation point
 - Removal of one ventilator
 - Removal of license plate bracket
- **Optimization of the hood air outlet required**

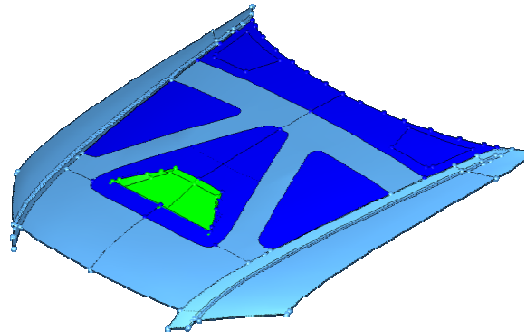


Aerodynamic Optimization Design of the Hood Air Outlets

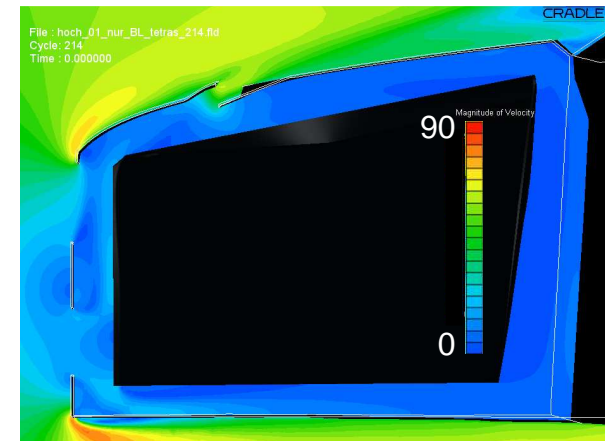
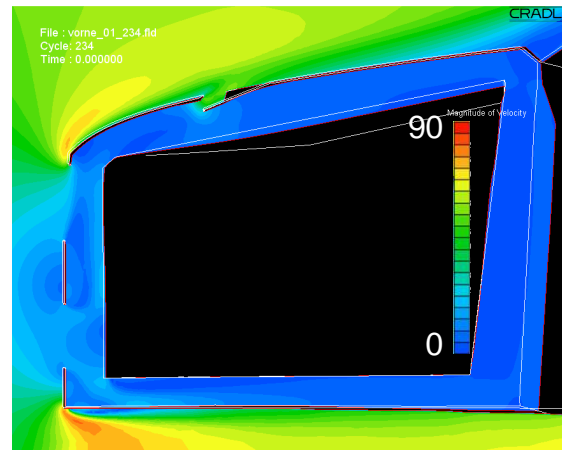
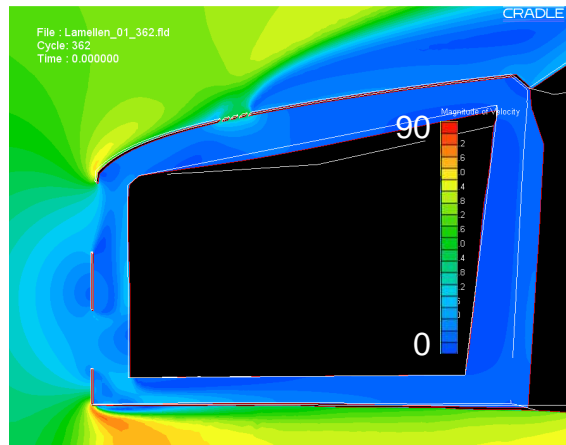
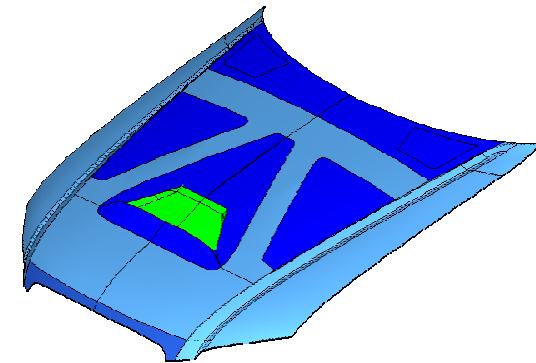
Lamellae



Ramp

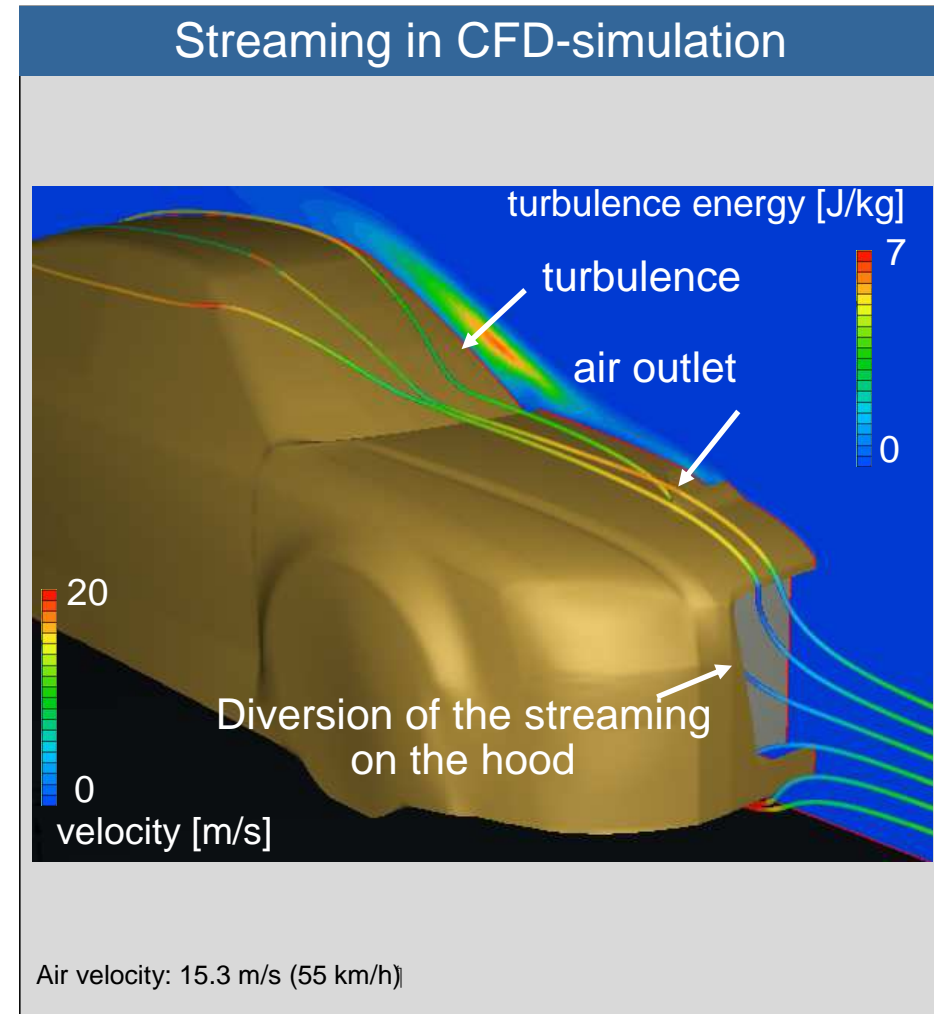
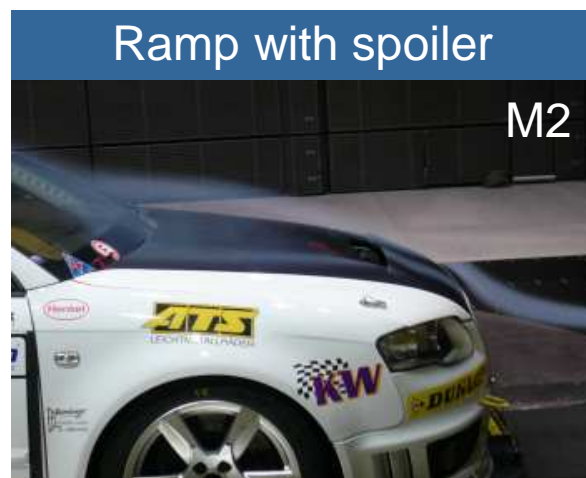
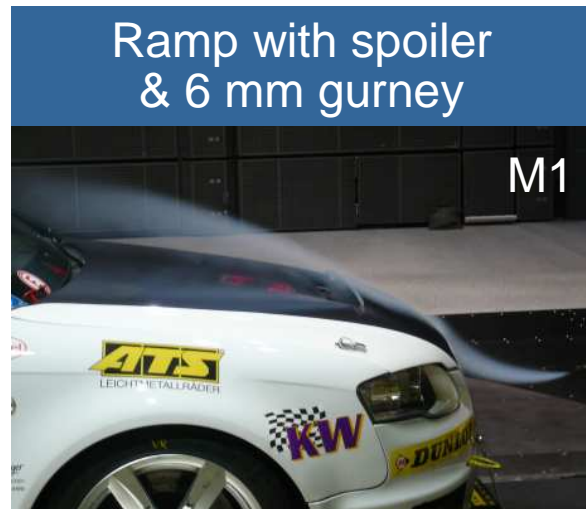


Ramp with spoiler



Final design

Aerodynamic Optimization Hood Air Outlet



Aerodynamic Optimization Results

Verification of calculated and analysed variants on the race track

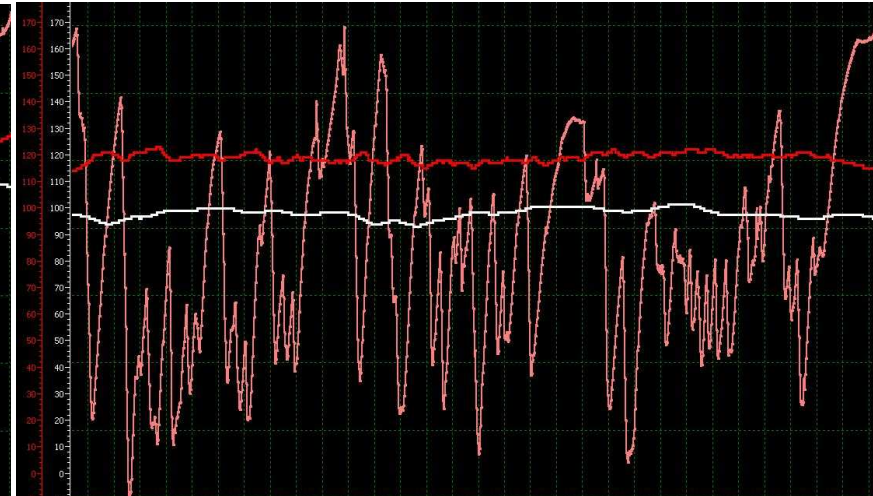
- Direct comparison on the race track between old and new simulated design showed a **reduction of water and oil temperature by 10 °C**



Basis



Optimised

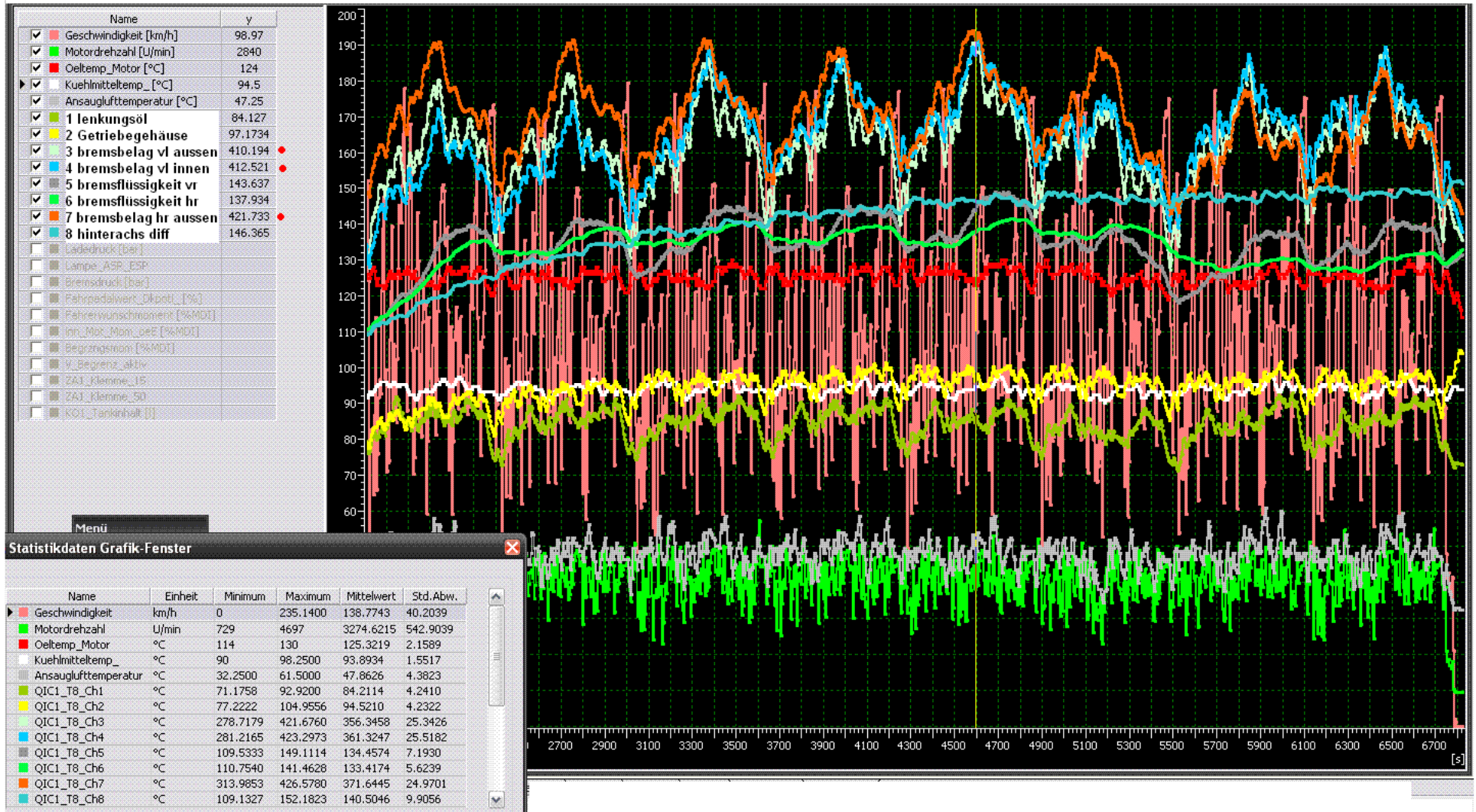


— Oil temperature

— Water temperature

— Velocity

Verification of Fluid & Brake Temperature Distribution



Project Cooperation with **NESTE OIL**

Verification of NexBTL (HVO) under reproducible racing conditions.

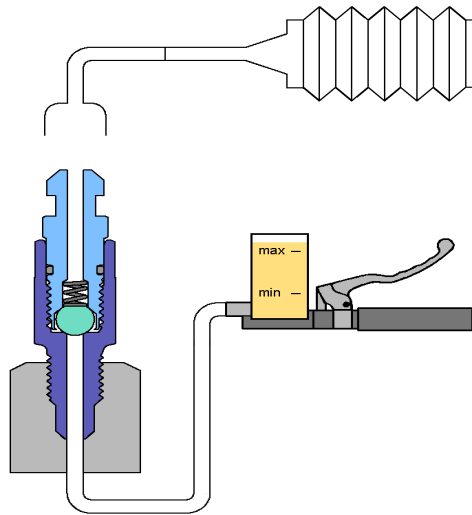
Measurements of the emission behaviour of non fossil fuel compared with currently available diesel fuel.

Further development of NExBTL based on gathered data of races.



Detailed analysis of effects on the passenger car's ABS braking performance due to aged brake fluid.

Development of a brake fluid filling system for OEM's and workshops in order to get an completely air evacuated hydraulic brake system.



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Thank You very much for Your Attention!

