

# **Emission behaviour in WLTC at low ambient temperatures of light commercial vehicles**

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Low Temp Task force, 16<sup>th</sup> meeting  
Empa Dübendorf, 12.+13. of December 2017

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# Agenda

- Introduction
- Emission behaviour comparison 23°C to -7°C
- Summary

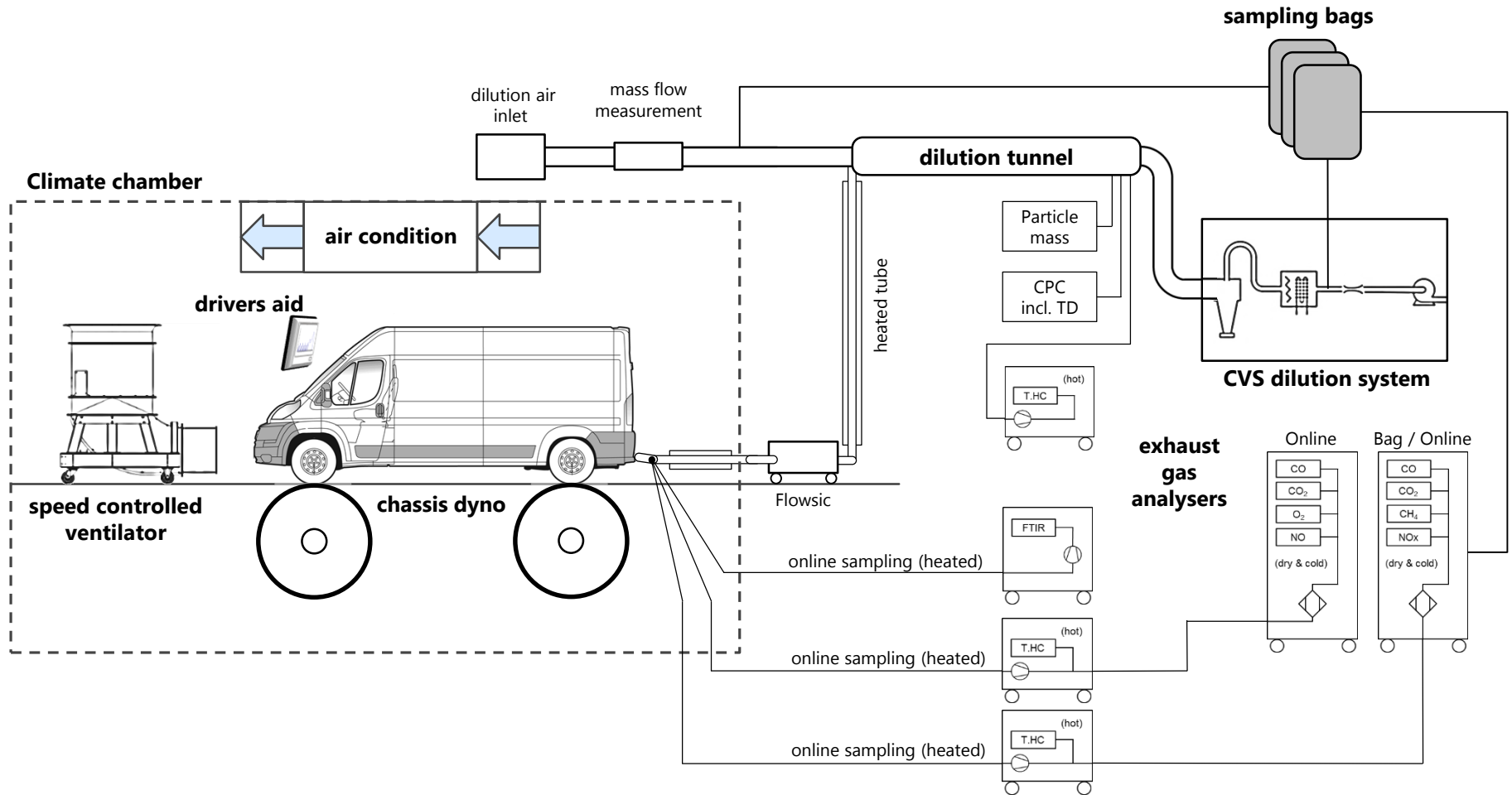
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- Chassis Dyno
  - Dyno coefficients (F0, F1, F2) according to manufacturer
  - Weight setting according to WLTP procedure (+28%)
  - Same dyno settings (mass, F0, F1, F2) at all temperatures
  
- Ambient
  - Temperatures: 23°C, -7°C
  - Humidity: 50% RH (below 12°C no humidity control available)
  
- Post processing
  - No NOx correction factors applied

# Introduction

## Measurement setup

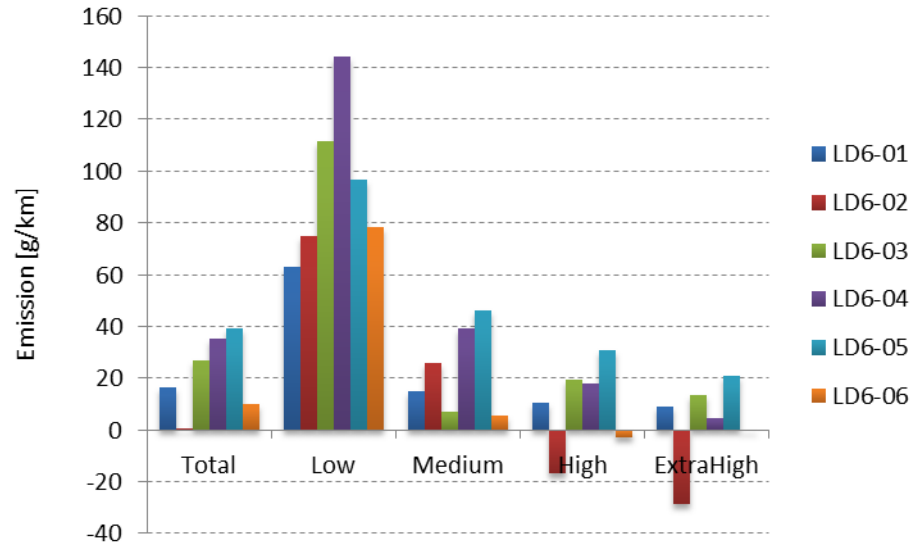
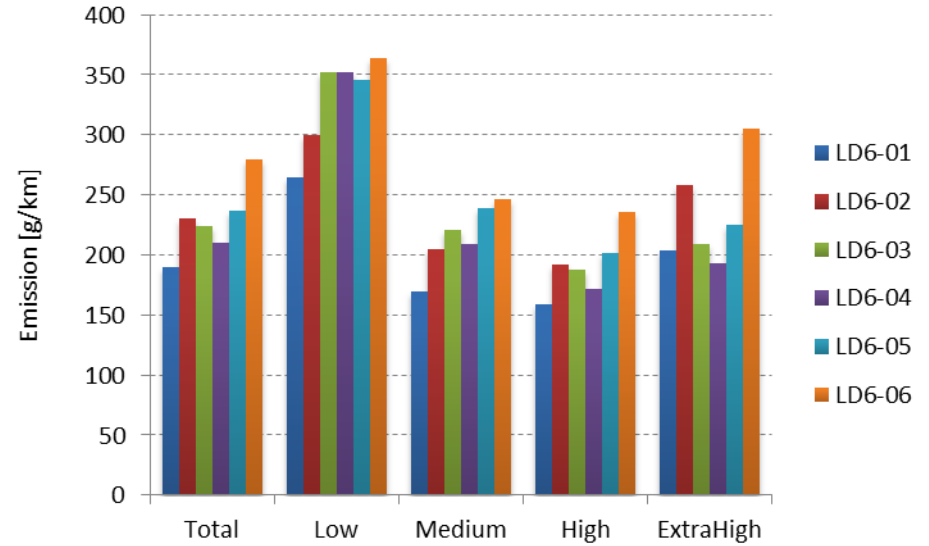
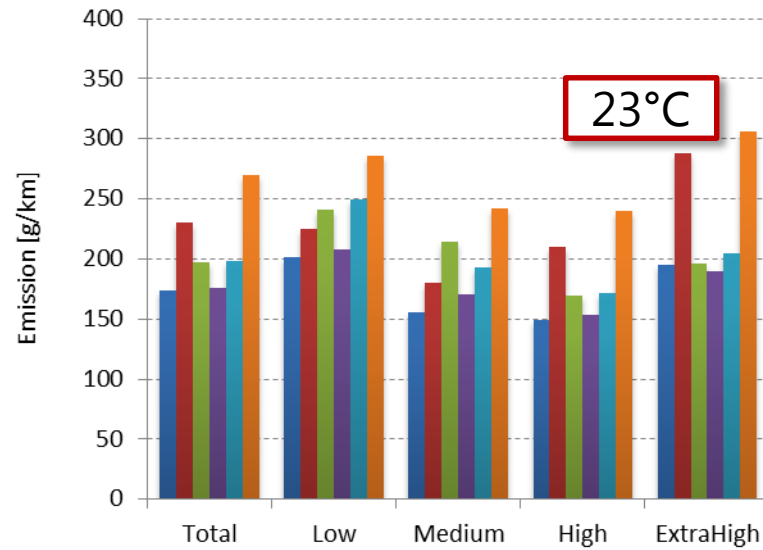


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# Emission behaviour comparison

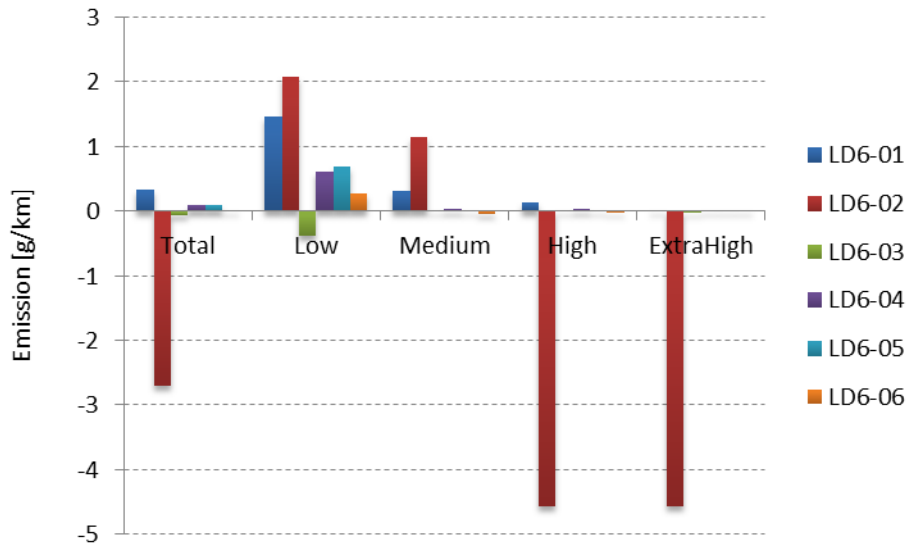
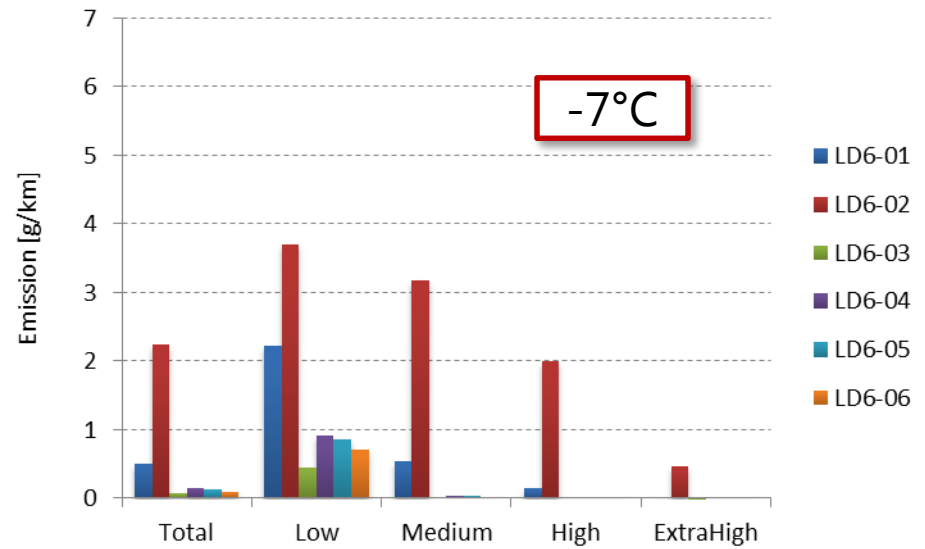
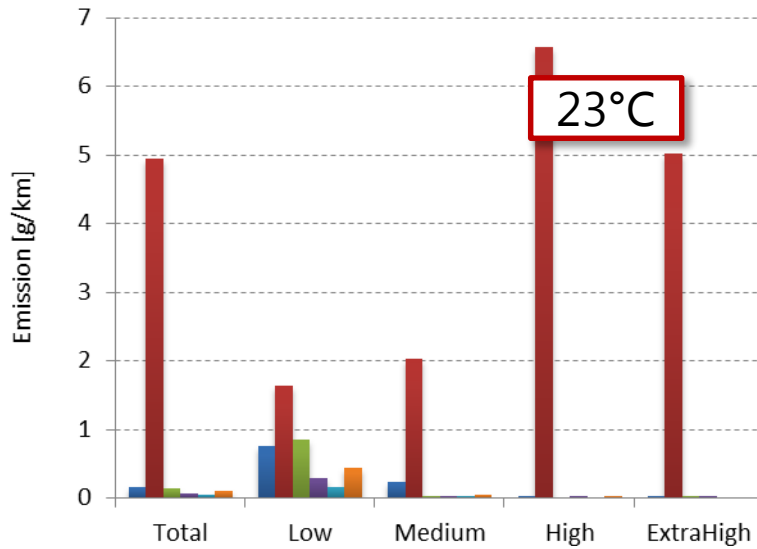
## LCV Diesel Euro 6b, CO2



**CO2**

# Emission behaviour comparison

## LCV Diesel Euro 6b, CO

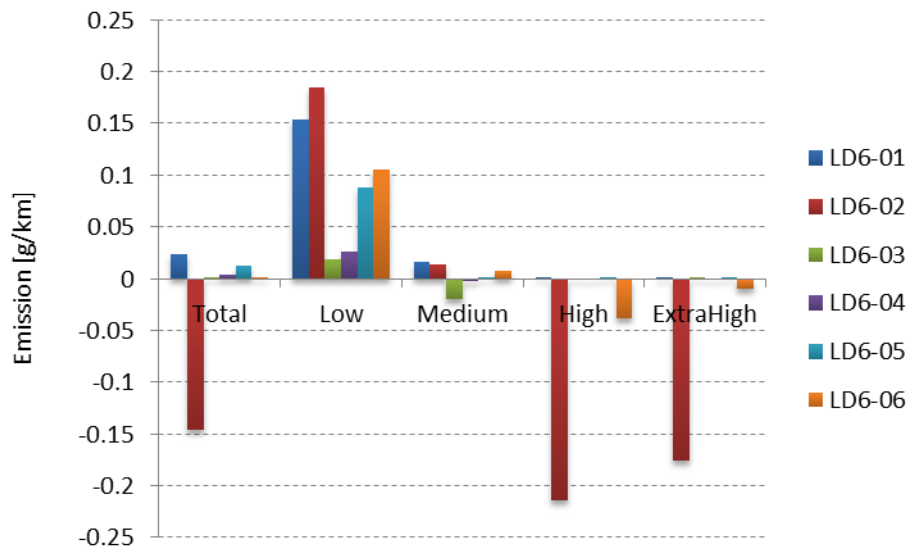
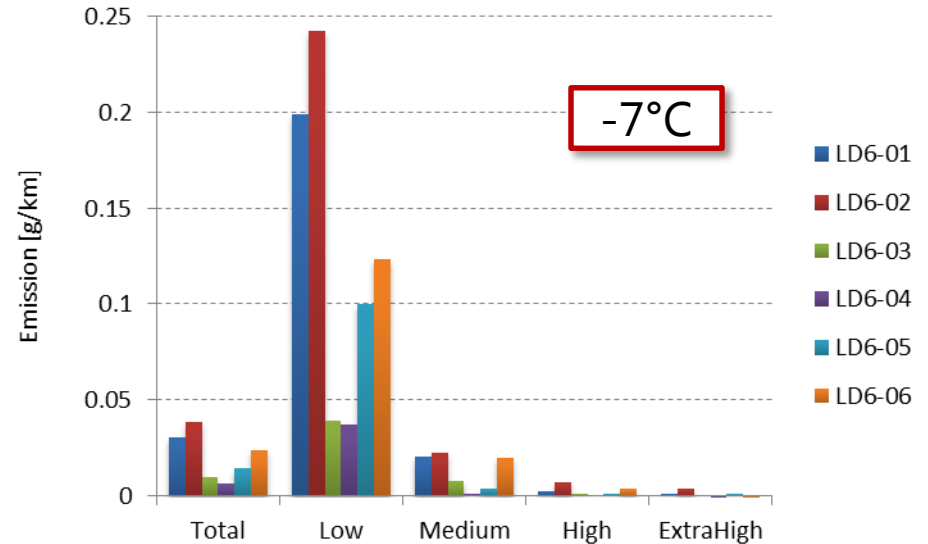
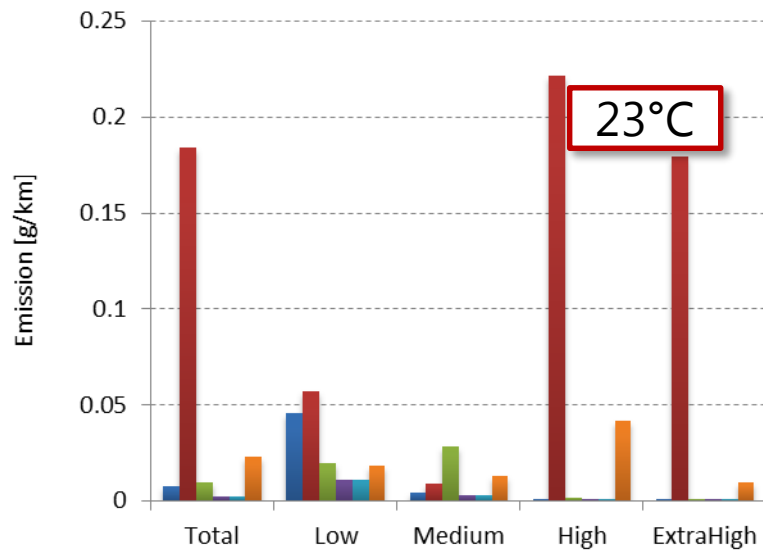


CO



# Emission behaviour comparison

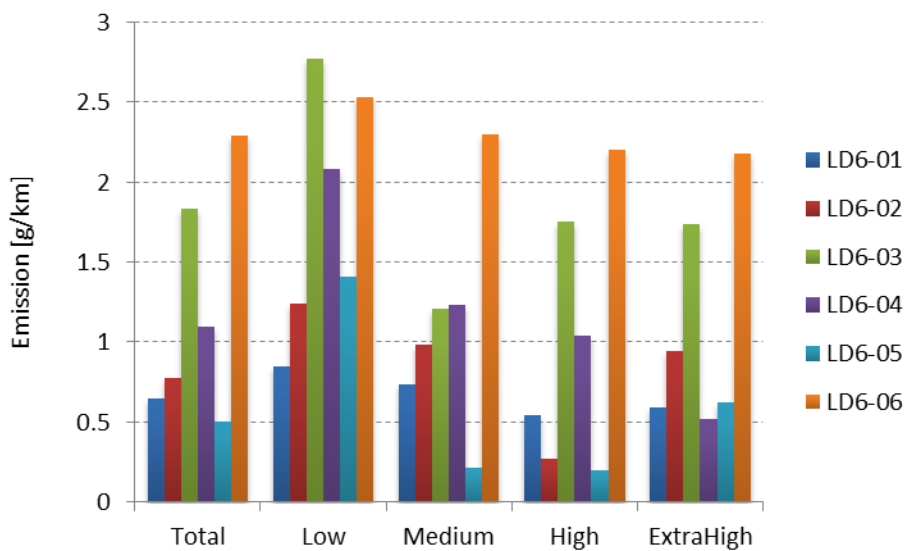
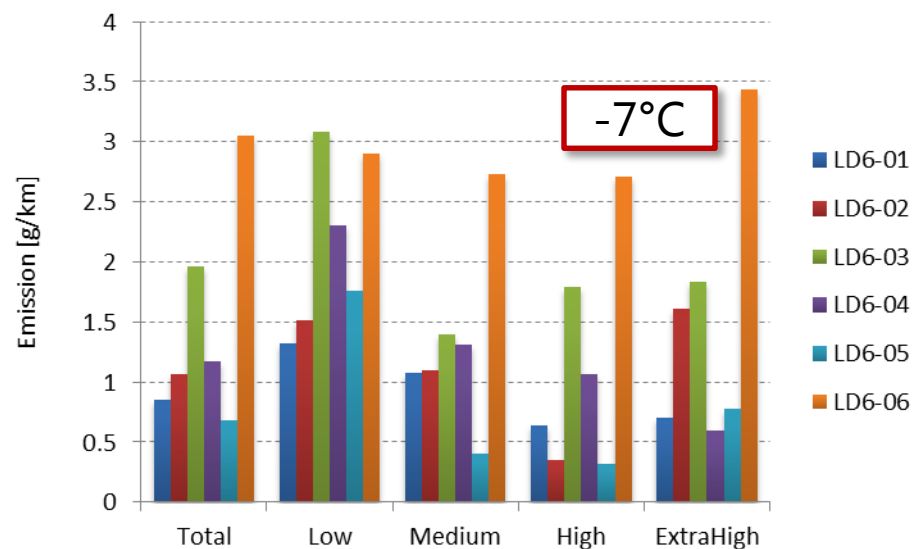
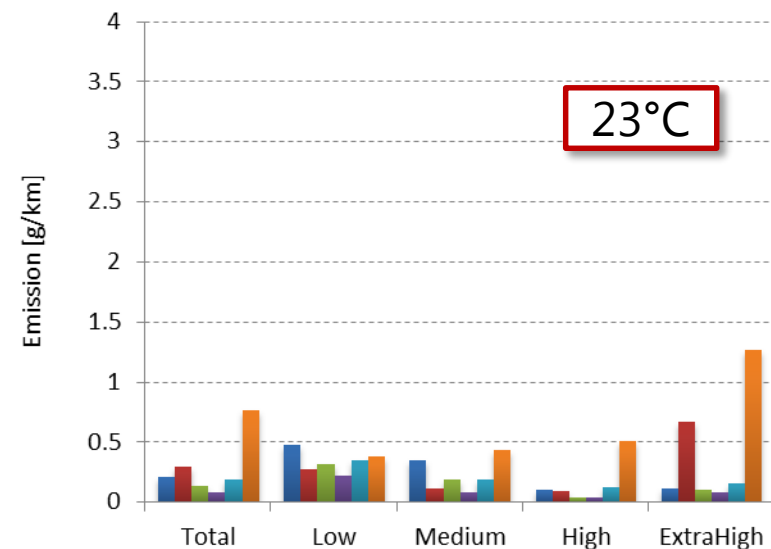
LCV Diesel Euro 6b, T.HC



**T.HC**

# Emission behaviour comparison

LCV Diesel Euro 6b, NOx (as NO<sub>2</sub>-equivalent)

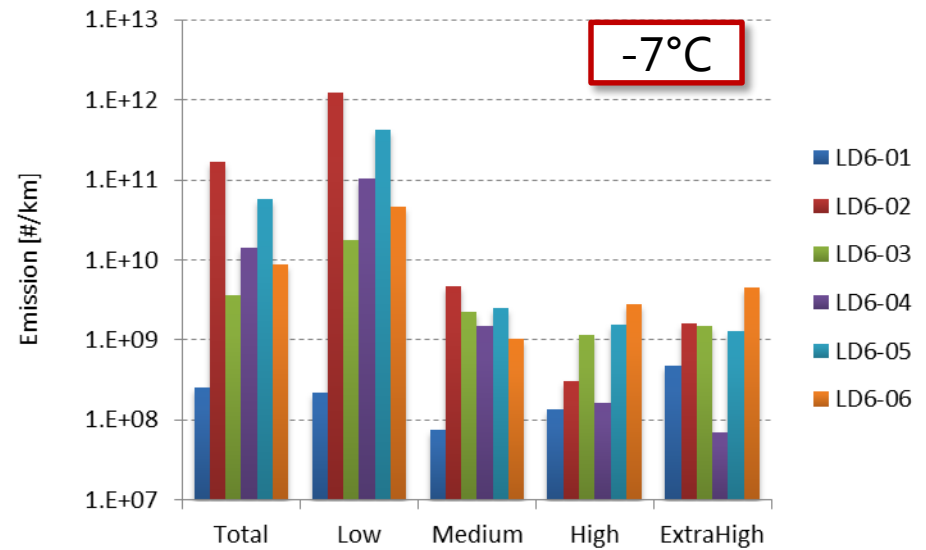
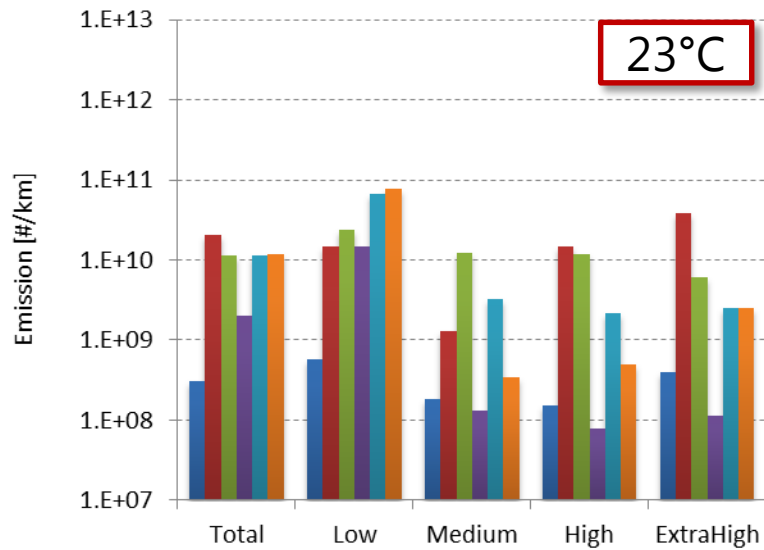


**NO SCR**

**NOx**

# Emission behaviour comparison

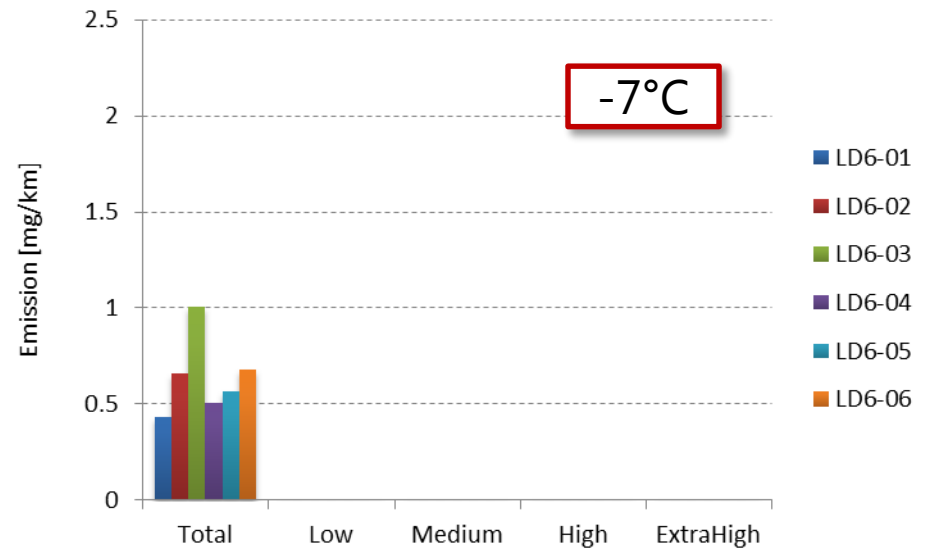
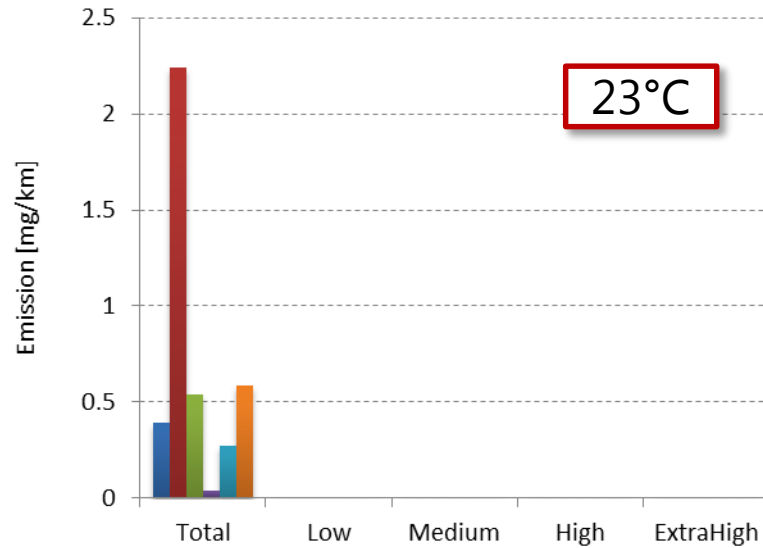
LCV Diesel Euro 6b, PN



**PN**

# Emission behaviour comparison

LCV Diesel Euro 6b, PM



**PM**

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- Low Temperature Emissions LCV
  - CO and T.HC behave similar to Euro 6b passenger cars even though vehicle weight is higher
  - Higher NOx emissions due to higher engine load at 23°C but similar behaviour to Euro 6b passenger cars at -7°C
  - PM levels slightly higher compared to passenger cars
  
- Recommendation
  - Same -7° procedure as passenger cars
  - Payload setting like 23°C test (+28%)

# Thank you for your attention!

## **With a sincere vote of thanks to:**

Swiss Federal Office for the Environment FOEN, Air Pollution Control and Chemicals Division, Traffic Section

Dr. Brigitte Buchmann, Head of Department Mobility Energy and Environment, Empa

Christian Bach, Head of the Automotive Powertrain Technologies Laboratory, Empa

Team of the Automotive Powertrain Technologies Laboratory, Empa

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