



Evolution of Pollution Control in PTI: Past, Present and Future

VERT Focus Day on NPTI for All Engines
20th March 2026 - METAS, Bern, Switzerland

Alejandro Checa
CITA Technical Director

Agenda



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- A 3D bar chart graphic on the left side of the slide, composed of four stacked rectangular blocks of varying shades of green and blue. The top block is light green, the second is dark green, the third is medium green, and the bottom is dark blue. The bars extend to the right, forming a series of arrowheads pointing towards the right.
- 01 | Pollution Control in PTI in the Past
 - 02 | Evolution of PTI Emission Testing
 - 03 | Future of Environmental Protection in PTI
 - 04 | Conclusion & Call to Action

Pollution Control in PTI in the Past

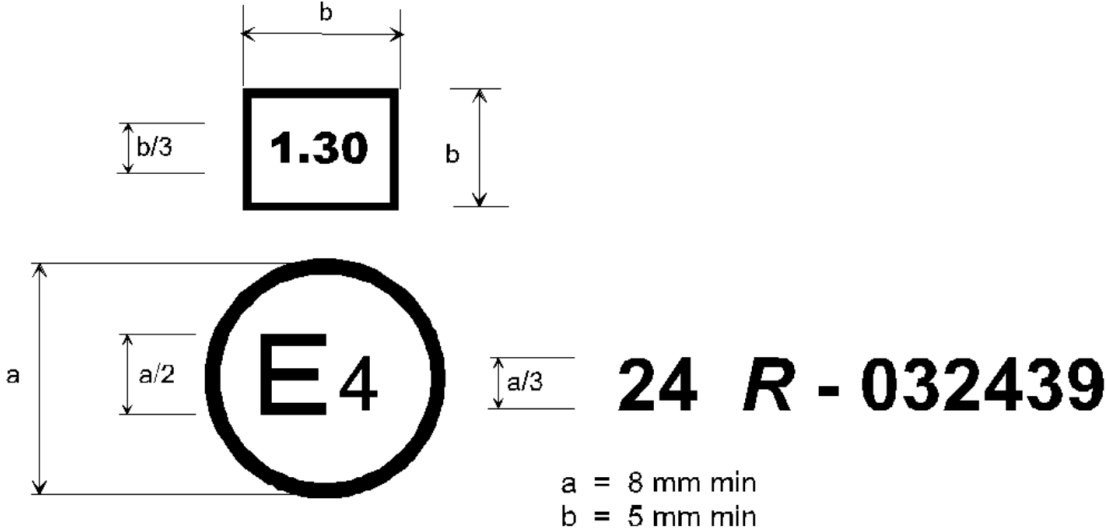


- **Diesel Engines – Smoke Opacity**
 - Measures exhaust smoke density (soot particles)
 - Engine is revved under test conditions
 - Uses a smoke meter (opacity meter)
 - High opacity = poor combustion / high particulate emissions
- **Gasoline Engines – CO Emissions**
 - Measures Carbon Monoxide (CO) in exhaust
 - Tested at idle (and sometimes higher RPM)
 - Uses a gas analyzer
 - High CO = inefficient combustion / incorrect air–fuel mixture

Pollution Control in PTI in the Past



Diesel emissions control in PTI up to 2022



UN – ECE R-24 (1972)

Agenda



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Evolution of PTI Emission Testing



Particle Number measurement already implemented in PTI in Europe:

Gross polluters
identified*

$\pm 10\%$

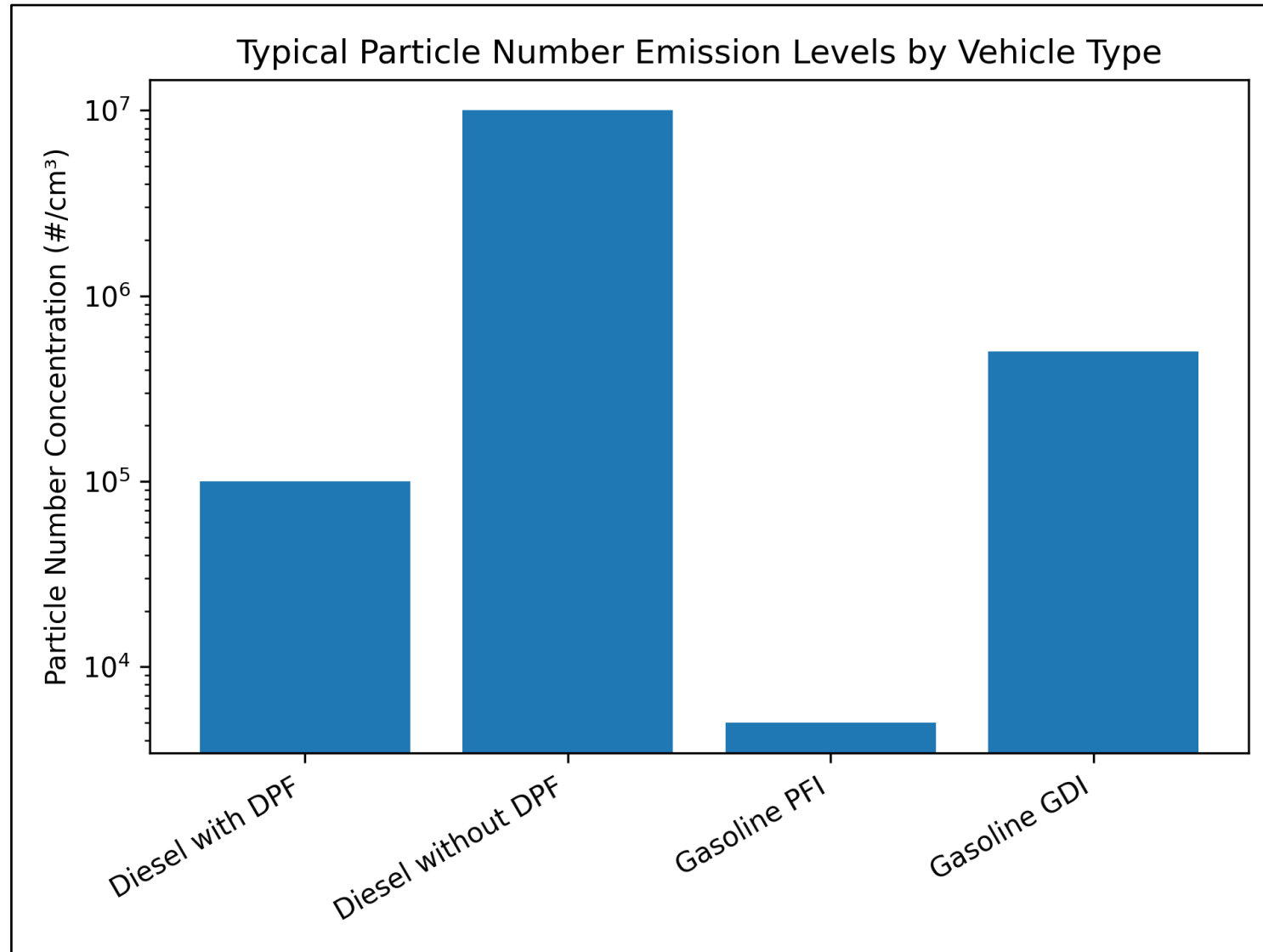


OBD detected

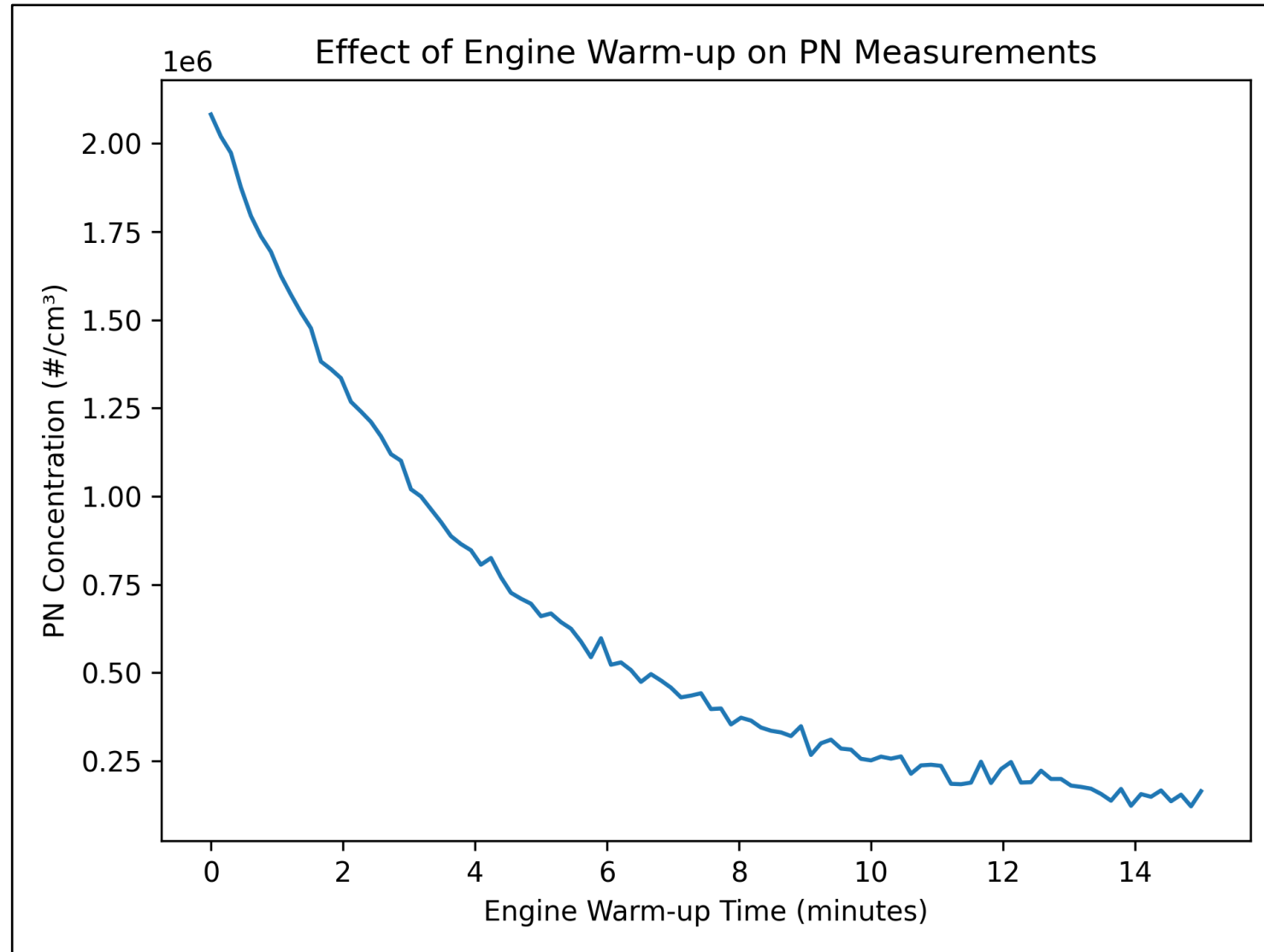
$< 1\%$

*After almost 4.000.000 of inspections with PN counting technologies in Flanders (north of Belgium)

Evolution of PTI Emission Testing

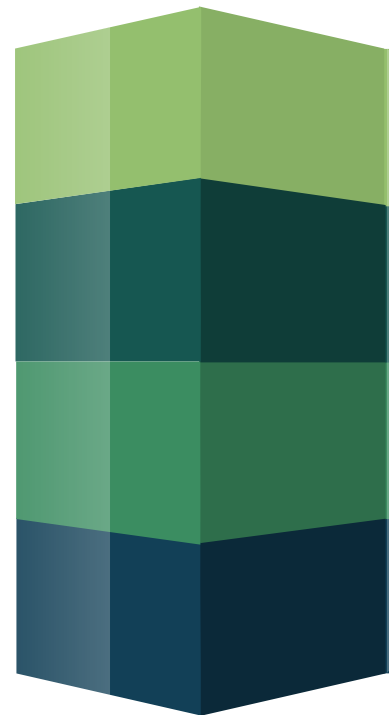


Evolution of PTI Emission Testing



Agenda



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- **PN for Petrol Engines**

- Lower particle emissions than faulty diesel vehicles
- Higher measurement sensitivity required
- Larger influence of cold start effects

- **NO_x-PTI**

- Requires engine warm-up to reach stable conditions
- Sensitive to aftertreatment system performance (e.g. SCR)
- Challenge: accurate results depend on proper thermal state

- **OBM (Euro 7)**

Strengthening Collaboration Between Key Stakeholders

- Governments, manufacturers, and PTI agencies must **share emissions data in real time.**
- **Harmonization of regulations across regions** to prevent vehicle manufacturers from exploiting weaker laws.
- Cross-border initiatives, like **EU-wide emission databases**, should be expanded globally.

Agenda



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Conclusion & Call to Action



- **Type approval and periodic technical inspections (PTI) are essential tools for emission control.**
- **PN-PTI represents one of the biggest advantages of pollutants emissions control in PTI.**
- **Best practices demonstrate that better integration of approval and PTI reduces real-world emissions.**
- **It is not realistic that vehicle approval intends to keep vehicles clean through their whole life only with manufacturer requirements, and PN-PTI is the best proof of it.**



Thank you for your attention!

Alejandro Checa
CITA Technical Director
a.checa@citainsp.org

www.citainsp.org

Rue du Commerce 123 - 1000 Brussels, Belgium

+32 (0)2 469 06 70

secretariat@citainsp.org