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# Accelerating the flywheel!

State of the art of the implementation of the Particulate Filter Check (PFC)

VERT Online Forum  
24 March 2022  
Gerrit Kadijk

# Your presenter



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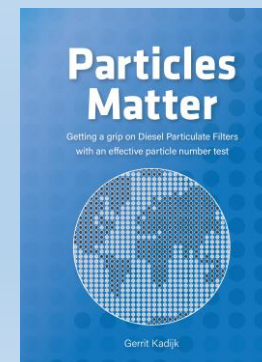
- Gerrit Kadijk Bsc (1963), Delft – The Netherlands
- Researcher/scientist @ TNO (1988 – 2020)
- Developer of the Dutch Particulate Filter Check (2012 – 2020)
- Owner of Emission Training Services (2020 - )
- Lecturer at Da Vinci College in Dordrecht (2020 - )



- Author and publisher of



and



# Content presentation



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1. Why time flies!
2. Requirements for implementation PFC
3. PFC in NL, B, D, S
4. Other initiatives/developments
5. Particle counters
6. Book 'Particles Matter'
7. What next?



# 1. Why time flies!



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## Why has the Particulate Filter Check only be introduced after 25 years?

- The miracle of new DPF technology (1998).
- Development and implementation (1998-2008).
- Awareness of risks or negative effects and failures of DPF technologies.
- Spread of responsibilities, democracy (air quality, vehicle TA, PTI).
- VERT and NL research (TNO) (2012-2015), development of a PN test method and PN-tester (2015 – 2019)
- Implementation of PFC in NL, B, D and S legislation (2020-2023)



## 2. Requirements for a PFC in the PTI



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What does a member state/country need?



Definition of the particle counter (type approval, calibration standards)

National metrology institute with dedicated knowledge

Definition of the particulate filter check test method

Definition of the PN limit values and vehicles to be tested

Organisation for execution of the Particulate Filter Check in the PTI

### 3. PFC in NL, B, D, S



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Country	Start date	Limit value	Euro Class
Netherlands	01-07-2022	1,000,000	3,4,5,6 and VI
Belgium	01-07-2022	1,000,000	5 and 6
Germany	01-01-2023	250,000	6 and VI
Switzerland	01-01-2023	250,000	5b, 6 and VI

Video demonstration NL PFC: [www.particlesmatter.com/particulate-filter-check](http://www.particlesmatter.com/particulate-filter-check)

## 4. Other initiatives / developments



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UNECE IWG-PTI prepares a Resolution for a PTI-PN test method.



EU (DG MOVE) prepares a Guidance paper with minimum requirements for a PTI-PN test method.



## 5. Particle counters, status March 2022



18 suppliers  
3 CPC and 15 DC types

**7 Dutch type approvals (March 2022)**  
Price range: € 4,000 to € 5,250

**Arex**, Assemblad, **AVL-Ditest**, Bosch, Brainbee, **Capelec**, Continental, Dekati, Hella Gutmann, Maha, Mahle, Pegasor, **Saarloos**, Saxon-Junkalor, **TEN**, TEXA, **VLT**, WOW!.

More information: [www.particlesmatter.com/particle-counters](http://www.particlesmatter.com/particle-counters)



# 6. 'Particles Matter', just published!



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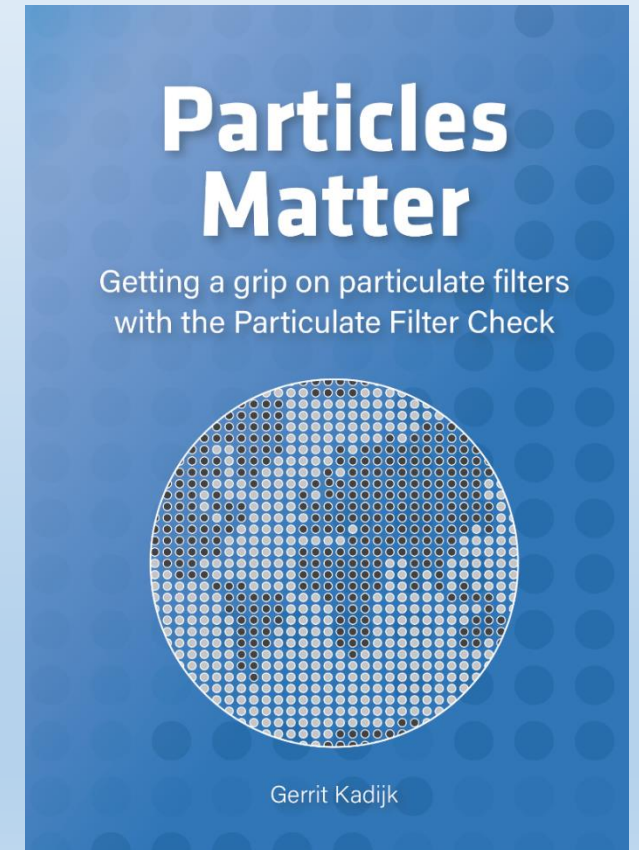
Detailed description of the Particulate Filter Check  
126 pages, 12 chapters, 92 questions & answers

Unmissable for

- Policymakers
- PN counter suppliers
- PTI operators & inspectors

[www.particlesmatter.com/book](http://www.particlesmatter.com/book)

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## 7. What next?

- Type approvals and production of new test equipment.
- Training of PTI operators.
- Startup issues with PN-testers and execution of the PFC.
- Disappointments..... because some DPF's must be repaired/renewed.
- Quality of DPF-technologies per trademark.
- Export of vehicles to countries without a PFC.
- Field calibration of particle counters.
- UNECE and EU test procedures



## 7. What next?

- EU-standardisation of the PN-counter
- PFC for gasoline vehicles? Further research is needed.
  - Is there a potential threat of cracked and/or removed GPF's?
  - Exhaust gas contains appr. 10 mass% water. Sample conditioning.
  - PN limit values need further investigation.





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**Your effort matters!  
Are you in?**

**Let's take care of our health!  
Let's keep the DPF's in good condition !**

# Thank you for your attention



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Emission Training Services (ETS)

Gerrit Kadijk

[gerrit.kadijk@emissiontrainingservices.nl](mailto:gerrit.kadijk@emissiontrainingservices.nl)

M: +31-(0)6-341 88 376

[www.deeltjestest.nl](http://www.deeltjestest.nl)

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## Particles Matter

Getting a grip on particulate filters  
with the Particulate Filter Check



Gerrit Kadijk