Type approval of inland waterway vessel engines with regard to new fuels

Roadmap and actions towards zero-emission Danube fleet
Budapest, 8 October 2024

Krisztián Uhlik, Policy officer
EC - DG GROW I.2
Mobility (NRMM)

Inland Waterway Vessels and NRMM

REGULATION (EU) 2016/1628 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 14 September 2016

on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC

- **Non-road mobile machinery**
- **Type-approval**
- **Pollutant emissions**
- **Co-decision act**
  - *European Parliament*
  - *The Council*

NRMM – non-road mobile machinery

- *any mobile machine, transportable equipment or vehicle with or without bodywork or wheels,*
- *not intended for the transport of passengers or goods on roads,*
- *and includes machinery installed on the chassis of vehicles intended for the transport of passengers or goods on roads*

    - Directive 97/68 as amended by Directive 2004/26/EC
    - Regulation (EU) 2016/1628

Directive 97/68/EC → Regulation (EU) 2016/1628

Land-based NRMM

SI – Spark-ignited (gasoline)

SI 0-19kW | SI 19-56kW

CI 0-8kW | CI 8-19kW | CI 19-37kW | CI 37-56kW

CI – Compression-ignited (diesel)

56-130kW | 130-560kW | >560kW

Gen-Sets >560kW

Rail - Locomotives

>0kW

Rail - Railcars

>0kW

Inland Waterway Vessels (IWV: IWP + IWA)

19- | 37-75kW | 75-130kW | 130-300kW | ≥300kW

Snowmobiles

>0kW

All Terrain & Side-by-Side Vehicles

>0kW

Scope of Directive 97/68/EC

Scope extensions new NRMM Regulation

European Commission

Regulation (EU) 2016/1628

supplementing regulations:

- **2017/654** - technical requirements
- **2017/655** - in-service monitoring
- **2017/656** - administrative provisions

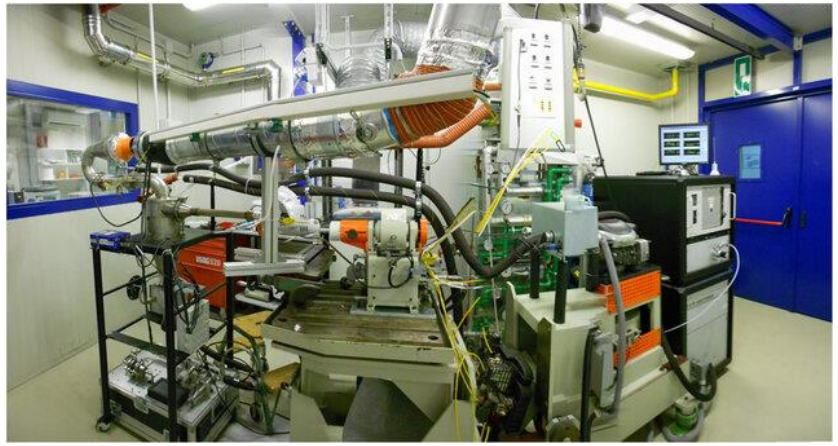
Delegated regulations

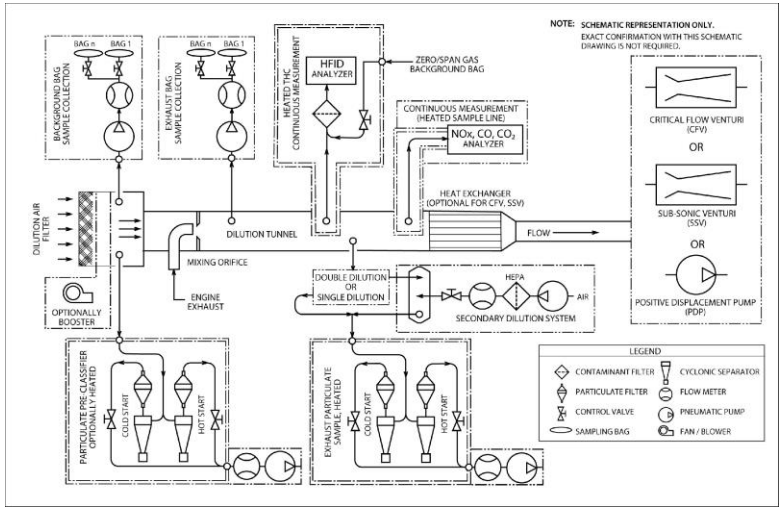
Article 16 & Annex XIII:

Acceptance of equivalent engine type-approvals

- *UNECE Regulation No 96*
- *UNECE Regulation No 49*

Pollutant emissions





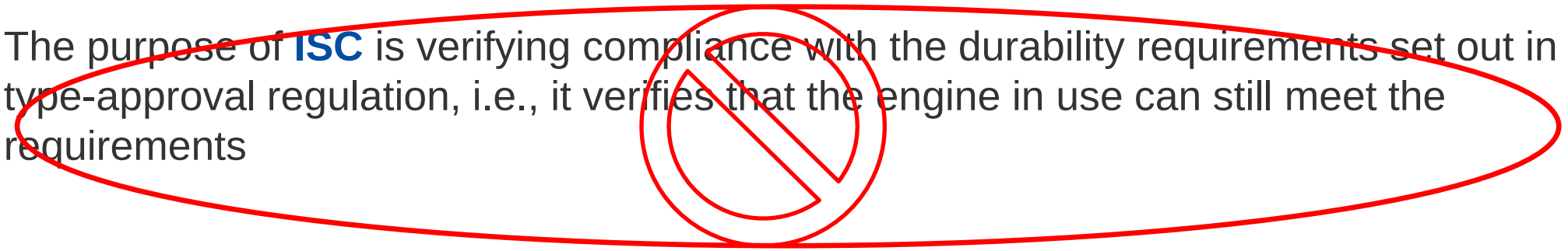
- Gaseous pollutants
  - *CO, HC, NOx,*
- Particulate matter
  - *PM*
- Particle number
  - *PN*

Type-approval

- Type-approval means the procedure whereby an approval authority certifies that an engine type or engine family satisfies the relevant administrative provisions and technical requirements of this Regulation
  - Initial compliance test
  - Conformity of Production (CoP)
  - In-service conformity (ISC)

Pollutant emissions type approval

- **Initial test**: Prototypes are used to test compliance with EU emissions limits and if all relevant requirements are met, the national authority delivers an EU type-approval to the manufacturer authorising the sale of the engine type in the EU. The system is based on the mutual recognition of approvals granted by Member States (certified once, accepted everywhere in the EU).
- **The CoP** procedure ensures that the products placed on the market comply with the requirements set out in the Regulation, i.e., it verifies that the engine leaving the production line has the same characteristics as the approved type
- The purpose of **ISC** is verifying compliance with the durability requirements set out in the type-approval regulation, i.e., it verifies that the engine in use can still meet the requirements



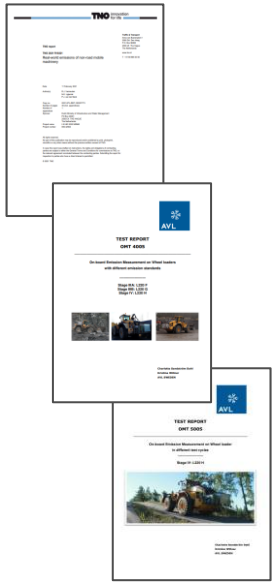
Regulation (EU) 2016/1628

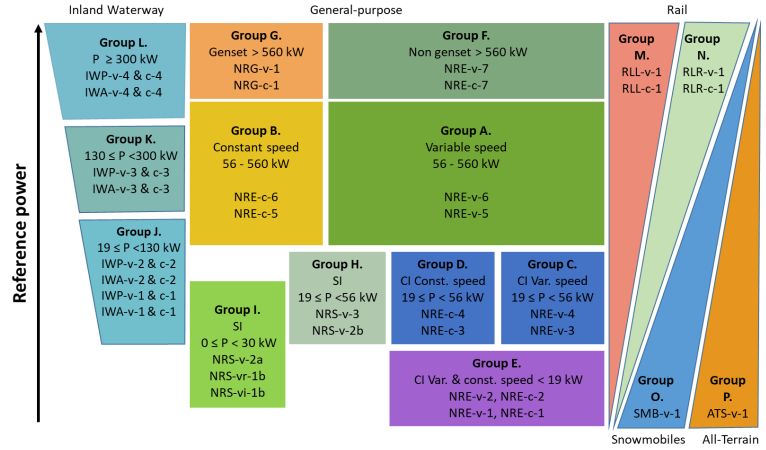
supplementing regulations:

- **2017/654** - technical requirements
- **2017/655** - in-service monitoring
- **2017/656** - administrative provisions

Delegated regulations

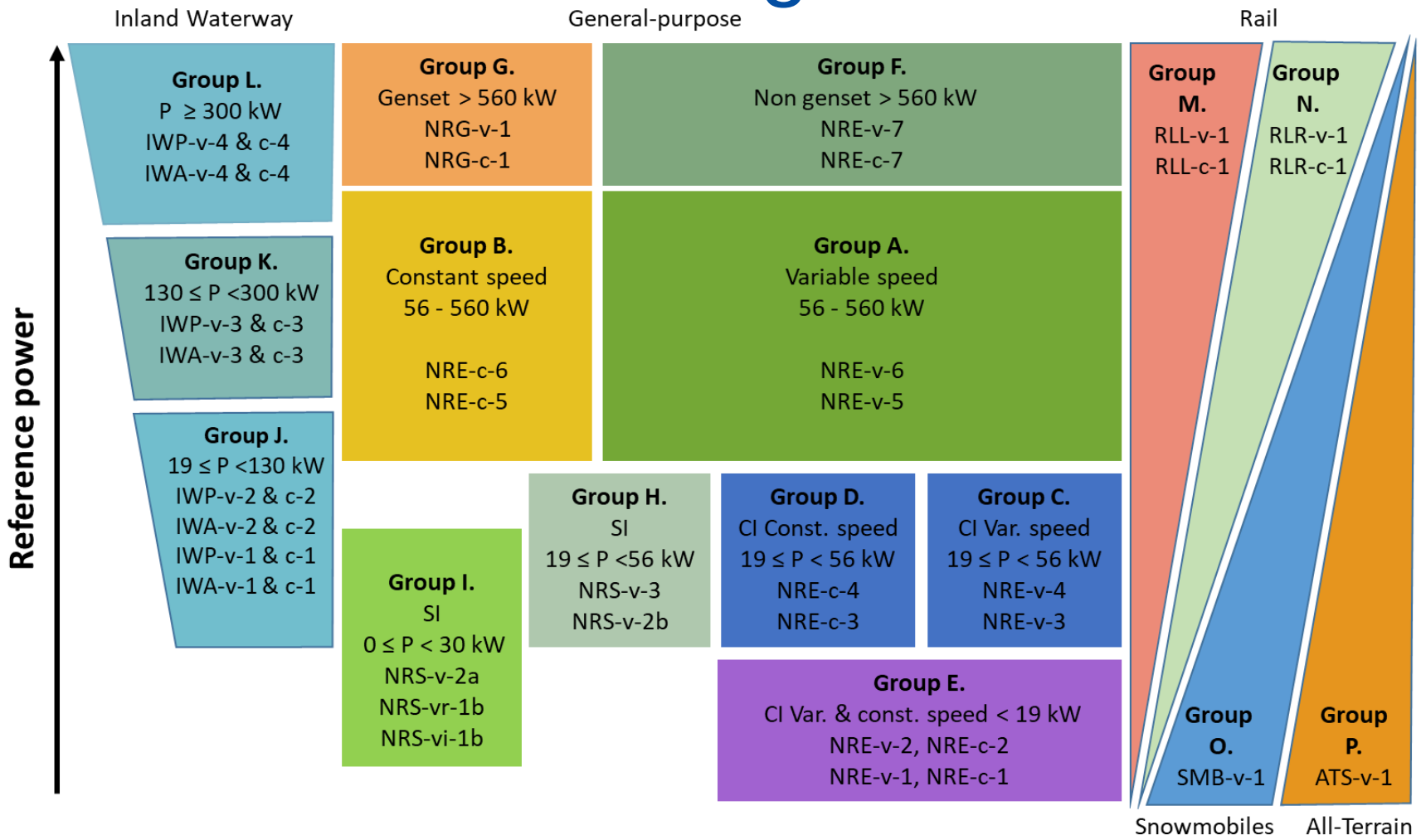
To define the compliance limits for pollutant emissions of engine types or engine families during in-service operations: the so-called in-service conformity (ISC); and to ensure that the designed procedure, which is based on a reduced set of data, is appropriate to guarantee the limitation of the emissions of engines installed in NRMM over their normal operation.





European Commission

In-service monitoring



Regulation (EU) 2016/1628 - Fuels

Reference fuels:

- *diesel*
- *petrol*
- *petrol/oil mixture (2T)*
- *natural gas/biomethane*
- *liquid petroleum gas (LPG)*
- *ethanol*
- *hydrogen*
- *methanol*

- Reference fuels are standardized types of fuel specified by regulatory bodies to be used in emissions testing and type approval.
- Using reference fuels ensures that all engines are tested under similar conditions, enabling regulators to accurately assess compliance with emission limits and ensuring fairness across different manufacturers.

Fit for 55 package (2021)

- **Hydrogen**
- **Methanol**

European Commission

Exemption – Article 35 procedure

A manufacturer may apply for an EU type-approval in respect of an engine type or engine family that incorporates new technologies or new concepts and that, as a result of those new technologies or new concepts, is incompatible with one or more requirements of this Regulation.

1. *Provisional EU approval valid on the territory of the Member State*
2. *Commission Implementing Decision authorizing the Member State to grant the approval*
3. *The approval become valid in all Member States*
4. *The Commission adapts the delegated acts concerned to technological development (Art. 36)*

Exemption – Article 35 procedure

The approval authority grants the EU type-approval if all of the following conditions are met:

a) the application states the reasons why the new technologies or new concepts make the engine type or engine family incompatible with one or more of the requirements of this Regulation;
b) the application describes the environmental implications of the new technologies or new concepts and the measures taken in order to ensure a level of environmental protection that is at least equivalent to the level provided by the requirements of the Regulation;
c) test descriptions and results are presented, which prove that the condition in point (b) is met.

Hydrogen Vs methanol

REGULATION (EU) 2016/1628 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 14 September 2016

on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC

(Text with EEA relevance)

(OJ L 252, 16.9.2016, p. 53)

- ***Hydrogen*** *– already in UNECE Regulation No 96*
- ***Methanol*** *– needs impact assessment due to unregulated and secondary pollutant formaldehyde*

Directive 97/68/EC → Regulation (EU) 2016/1628

Land-based NRMM

SI – Spark-ignited (gasoline)

SI 0-19kW | SI 19-56kW

CI 0-8kW | CI 8-19kW | CI 19-37kW | CI 37-56kW

CI – Compression-ignited (diesel)




56-130kW | 130-560kW | >560kW

Gen-Sets >560kW




Rail - Locomotives

>0kW


Rail - Railcars

>0kW

Inland Waterway Vessels (IWV: IWP + IWA)

37-75kW | 75-130kW | 130-300kW | ≥300kW

not in UNECE R.96

Snowmobiles

>0kW

All Terrain & Side-by-Side Vehicles

>0kW

Scope of Directive 97/68/EC

Scope extensions new NRMM Regulation

European Commission

Summary

- Regulation (EU) 2016/1628 applies to NRMM engines of all ignition types and powers operated on all fuels
- Decarbonisation and the use of carbon-free and low carbon fuels were not foreseen when the NRMM regulation was developed
- Reference fuels are specified in Regulation (EU) 2016/1628
- Exemption is possible according to the Article 35 procedure for new technologies, but it needs to be well-justified, and the level of equivalent environmental protection is maintained
- When authorisation is granted, regulations must be adapted
- Hydrogen will be included as reference fuel
- Use of methanol requires an impact assessment to include

Questions?

Thank you

European Commission