



Michele Barbagli, M. Sc.

ASSESSMENT AND CERTIFICATION ON THE BASE OF THE STANDARD EN 45545

Vth International Conference Modern Trend of Fire Protection in Rolling Stock
Instytut Kolejnictwa, Warszaw
2022-05-10/11

Content

Assessment and Certification on the Base of the Standard EN 45545

1. Introduction to EN 45545-2
2. Assessment / certification in the private and in the EU-regulated sectors
3. Examples

Content

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EN 45545

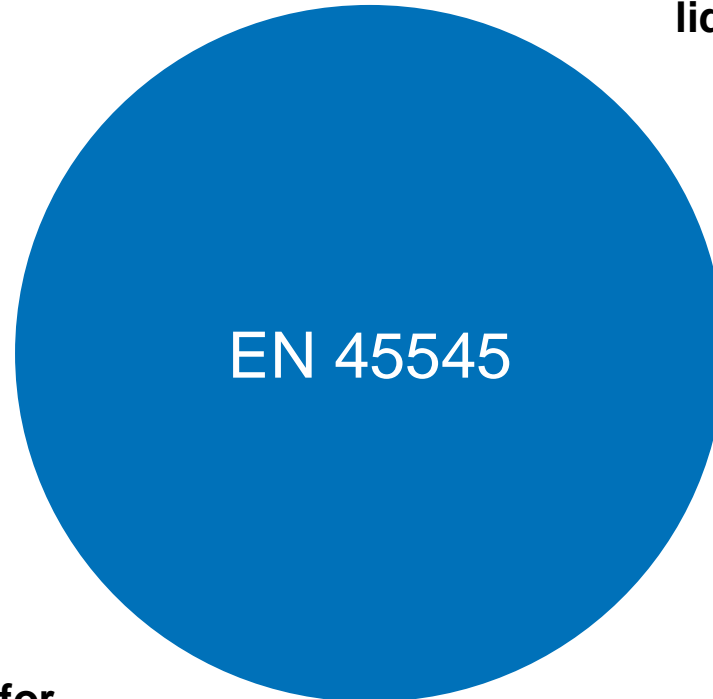
Parts of the EN 45545 – Fire Protection on Railway Vehicles

EN 45545-1:2013
General

EN 45545-2:2020 *
Requirements for fire behavior of
materials and components

EN 45545-3:2013 *
Fire resistance requirements
for fire barriers

EN 45545-4:2015 *
Fire safety requirements for
rolling stock design



EN 45545-7:2013
Fire safety requirements for flammable
liquid and flammable gas installations

EN 45545-6:2015
Fire control and management
systems

EN 45545-5:2016
Fire safety requirements for electrical
equipment including that of trolley
buses, track guided buses and
magnetic levitation vehicles

* New / updated edition awaited

EN 45545

Target

Target of the fire protection approach of the EN 45545 is to:

- Minimize the probability of a fire event
- Limit the fire propagation in speed and size
- Minimize therefore the effects of the fire on passengers and staff.

The fire protection target are taken into consideration in the context of the operations and design category of the vehicle (hazard level classification)

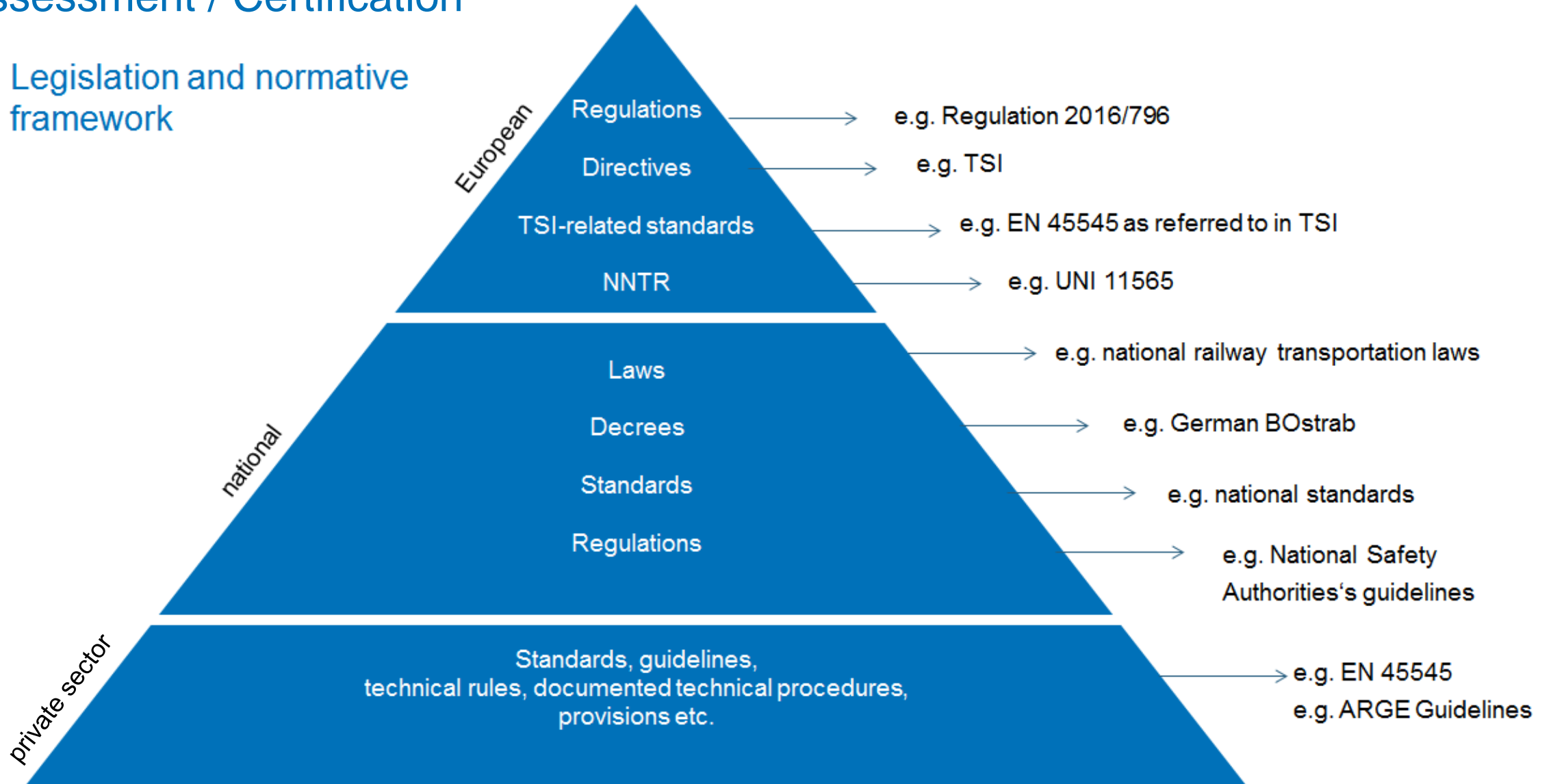
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1. Introduction to EN 45545
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3. Examples
4. Conclusions

Assessment / Certification

Legislation and normative framework



Assessment / Certification

Private sector vs EU-regulated sector

EN 45545 assessment in the private sector

- Not required by laws/regulations
- Performed by Inspection Organization ISO/IEC 17020
- Applicable to various contexts (railway but also tramways, metros, APMs...)
- Can be used in preparation/support for an assessment required by laws/regulations

EN 45545 assessment in the EU-regulated sector

- Required by laws/regulations
- Performed by NoBo
- Results in an EC ISV certificate

Assessment / Certification

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Assessment / Certification

Private sector

| | |
|--------------------------|--------------------------------|
| ISO/IEC 17000 | General requirements |
| ISO/IEC 17020 | Inspection → Inspection Report |
| ISO/IEC 17025 | Lab test → Test report |
| ISO/IEC 17065 | Certification → Certificate |



Assessment / Certification

Private sector

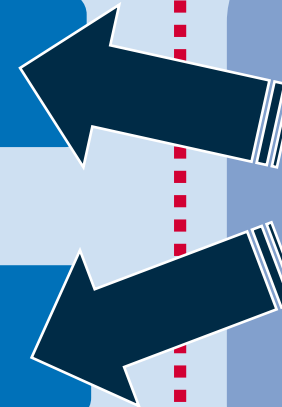
Evaluation / Assessment

Inspection ISO/IEC 17020

Testing ISO/IEC 17025

Review and Decision

Certification
ISO/IEC 17065



Assessment / Certification

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Assessment / Certification

EU-Regulated sector

LOC & PAS TSI technical requirements – fire protection

- 4.2 Functional and technical specification of the sub-system
 - 4.2.1 General
 - 4.2.2 Structure and mechanical parts
 - 4.2.3 Track interaction and gauging
 - 4.2.4 Braking
 - 4.2.5 Passenger related items
 - 4.2.6 Environmental conditions and aerodynamic effects
 - 4.2.7 External lights & visible and audible warning devices
 - 4.2.8 Traction and electrical equipment
 - 4.2.9 Driver's Cab and driver-machine interface
 - 4.2.10 Fire safety and evacuation
 - 4.2.11 Servicing
 - 4.2.12 Documentation for operation and maintenance

Assessment / Certification

EU-Regulated sector

LOC & PAS TSI technical requirements – fire protection

4.2.10.2. 1 Material requirements

- 1) fire behaviour properties, such as flammability, smoke opacity and toxicity
- 2) compliance with requirements of the specification referenced in Appendix J-1, index 58 (EN 45545-2)
- 3) time limit 5 years of certificates to prove compliance of a material with the standard

Assessment / Certification

EU-regulated sector

LOC & PAS TSI technical requirements – fire protection

4.2.10.2.2 Specific Measures for flammable liquids

- 1) measures preventing a fire from occurring and spreading due to leakage of flammable liquids or gases.
- 2) Flammable liquids used as cooling medium in high voltage equipment of freight locomotives shall be compliant to the requirement R14 of the specification referenced in Appendix J-1, index 59 (EN 45545-2)

Assessment / Certification

EU-regulated sector

EC Intermediate Statement of Verification (ISV)

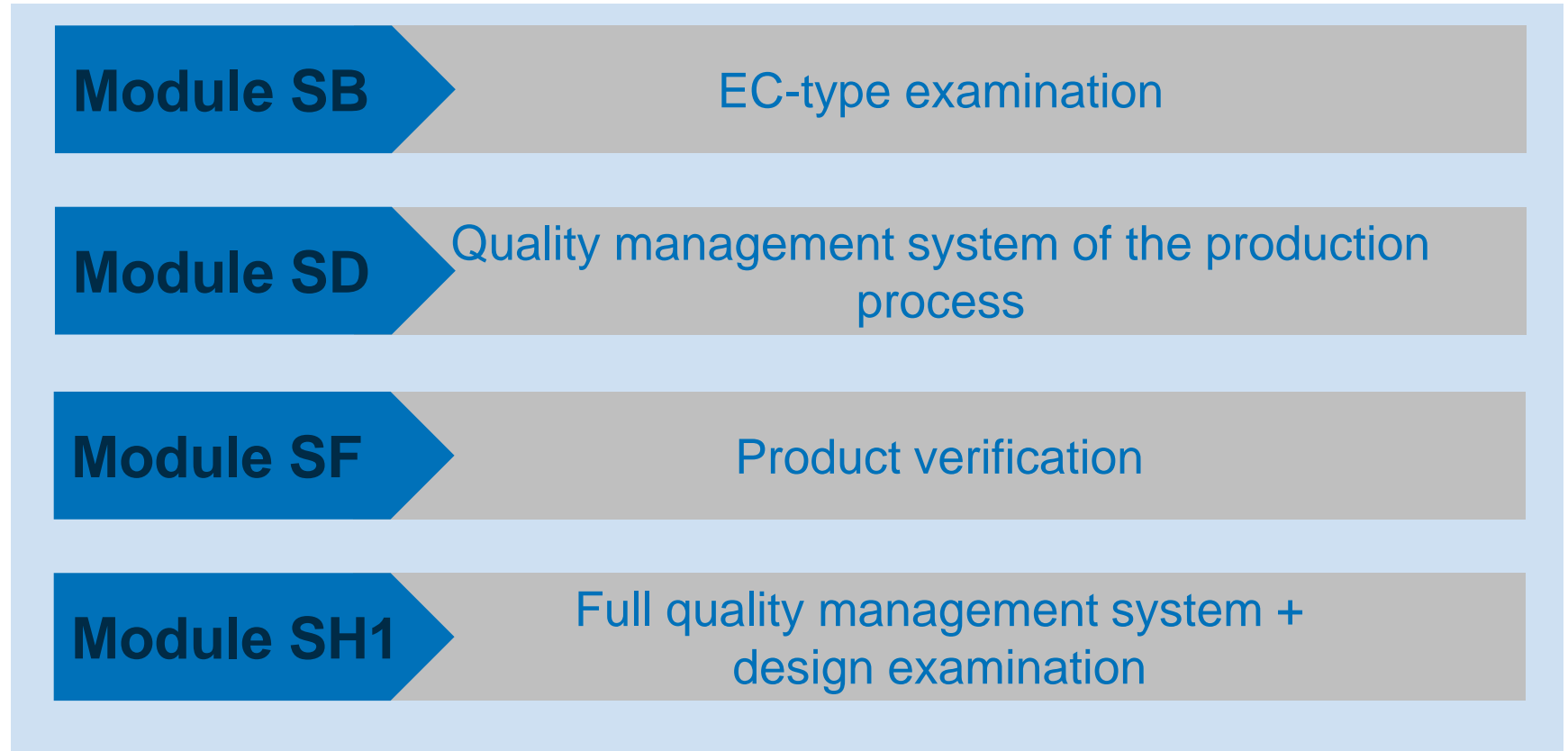
- Covering fire protection of the whole rolling stock
- Covering fire protection of a component / equipment

Note: fire protection is not defined by TSI LOC&PAS as an Interoperability Component

Assessment / Certification

EU-regulated sector

Modules for EC
verification
TSI subsystem
rolling stock



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Examples

Private sector – „small“ board mounted electro/electromechanical equipment

E.g.:

- - E/E/PE control unit
- on-board WiFi router

Examples

Private sector – „small“ board mounted electro/electromechanical equipment

E.g.:

- E/E/PE control unit
- on-board WiFi router

EN 45545-2:2020
§4.2 h)

[...] the housing contains only mechanical or low power electrical equipment, the walls of the cabinet are closed and made out of aluminum, steel or glass, the internal volume is $\leq 0,1 \text{ m}^3$, and openings are covered by connectors or switches and are negligible [...]

Examples

Private sector – „small“ board mounted electro/electromechanical equipment

E.g.:

- E/E/PE control unit
- on-board WiFi router

Evaluation / Assessment

**Inspection ISO/IEC 17020
Conformity to requirements from
EN 45545-2:2020, section 4.2 h)**

Review and Decision

**Certification
ISO/IEC 17065**

Examples

EU-regulated sector– door system

Assessment / Certification

EU-Regulated sector

LOC & PAS TSI technical requirements – fire protection

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Assessment / Certification

EU-Regulated sector

EC-type examination – Module SB

Examination of technical documentation

Inspection of specimen

**EC ISV Module B certificate
EN 45545-2:2013**

Resume

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Your contact

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Thank you very much for your
attention!