
GTR Electric Vehicle Safety

1. Meeting inf. Group EVS

Position on Electric Safety of Light duty Vehicles

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VW Position on Harmonization of electric vehicle safety regulations

Safety provisions of conventional vehicles should also be carry over to electric vehicles, but they need to be modified or drafted in following manner:

- Vehicle in-use electric safety
 - Direct contact (IPXXB, IPXXD, marking)
 - Indirect contact (galvanically connected barriers)
 - Isolation resistance (100 Ω /VDC or 500 Ω /VAC)
 - Functional safety (charging while stand still)
 - Hydrogene emissions (passenger compartment)
- Battery safety
 - Mechanical: vibration, integrity, shock
 - Electrical: over-charging/-discharging, short circuit
 - Thermal: over-temperature, fire
- Braking
 - Recuperation (if part of brake systems)
- Vehicle post crash electric safety options
 - Isolation resistance (100 Ω /VDC or 500 Ω /VAC)
 - Barriers and enclosures (IPXXB, IPXXD)
 - Low voltage (automatic power-off)
 - Low energy
- EMC
 - Normal use and charging
- Symbols and controls
 - Unified information based upon ISO 2575














Example of proper framework conditions under UN ECE

| | | | |
|---|--|--------------------------------|--------------------------------------|
| R 101 CO2 and fuel consumption | R 42 bumpers | R 17 seat anchorage | R 125 direct view |
| R 84 Fuel consumption | R 94 front crash | R 26 exterior protections | R 100 electric safety + batteries |
| R 85 power | R 28 horn | R 121 controls and displays | R 32 rear crash |
| R 67 LPG | R 6 direction indicator | R 95 side impact | R 33 frontal collision |
| R 51 noise | R 116 theft protection (s. R18 / R97) | R 55 towing device | R 34 tank |
| R 112 Head lamps | R 21 interior fittings | R 11 locks and latches | R 4 registration plate lighting |
| R 48 lighting | R 79 steering | R 68 maximum speed | R 3 rear reflector |
| R 37 bulbs | R 12 steering crash | R 14 seat belt anchorage | R 7 Rear lighting |
| R 45 Head lamp cleaning | R 24 diesel smoke | R 83 emissions | R 23 reversing lamp |
| R 19 Fog lamps | R 119 cornering lamps | R 16 seat belts | R 38 rear fog lamp |
| R 123 Adaptive front lighting system | R 87 daytime running light | R 110 CNG | R 64 spare tyre |
| R 99 gas discharge lamps | R 35 pedals | R 122 heating | R 13 / R 13H brakes |
| R 91 sidemarker | R 10 EMC | R 43 glas | R 25 head restraints |
| R 39 speedometer | R 30 tires | R 46 mirror | R 44 child restraints |
| | R 98 Gas discharge lamps | R 117 tyre noise | |



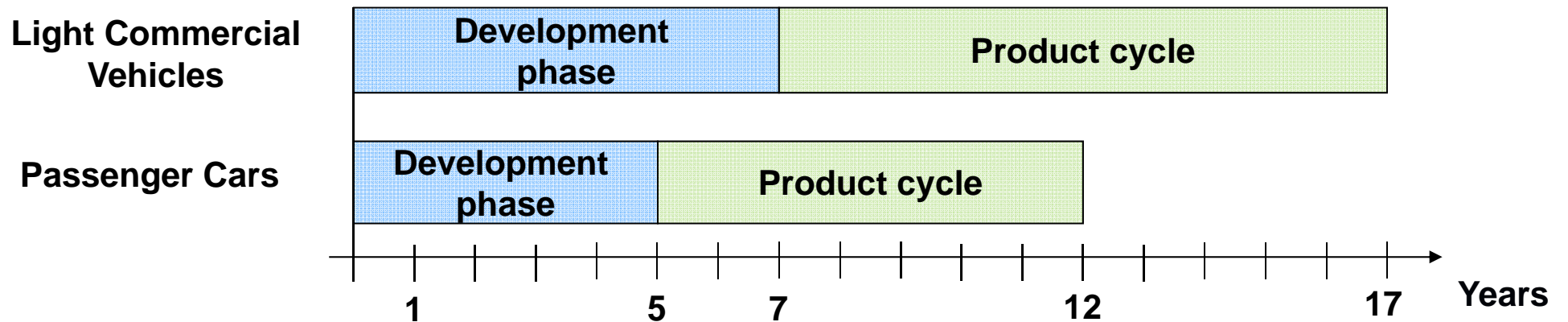
Norms and Regulations - Global Harmonization has priority

| | Norm | | | Regulation |
|--------------------|---|--|---|---|
| | General | Electric | Communication | |
| International |  |  |  |  |
| Region (Europe) |  |  |  |  EC |
| National (Germany) |  |  |  | National Approval System |

eMobility will be influenced by all bodies

Lead time

- Development phase about 5-7 years → additional requirements (durability, mileage, etc.) require longer test times & more engineering work
- Investments in platforms higher thus longer pay-back time
- Engineering and production capacities already allocated at manufacturer and supplier level



VW position on homologation systems

Conclusion:

Homologation (type approval and self-certification) should be:

- **related to safety and environmental protection**
- **harmonized upon international legal requirements**
- **performance based on a minimum level**
- **verified with limited administration burdens (acceptance of in-house tests)**
- **not hamper the technical progress (technology neutral and not design restrictive)**
- **not be based on abuse/misuse and transport requirements**