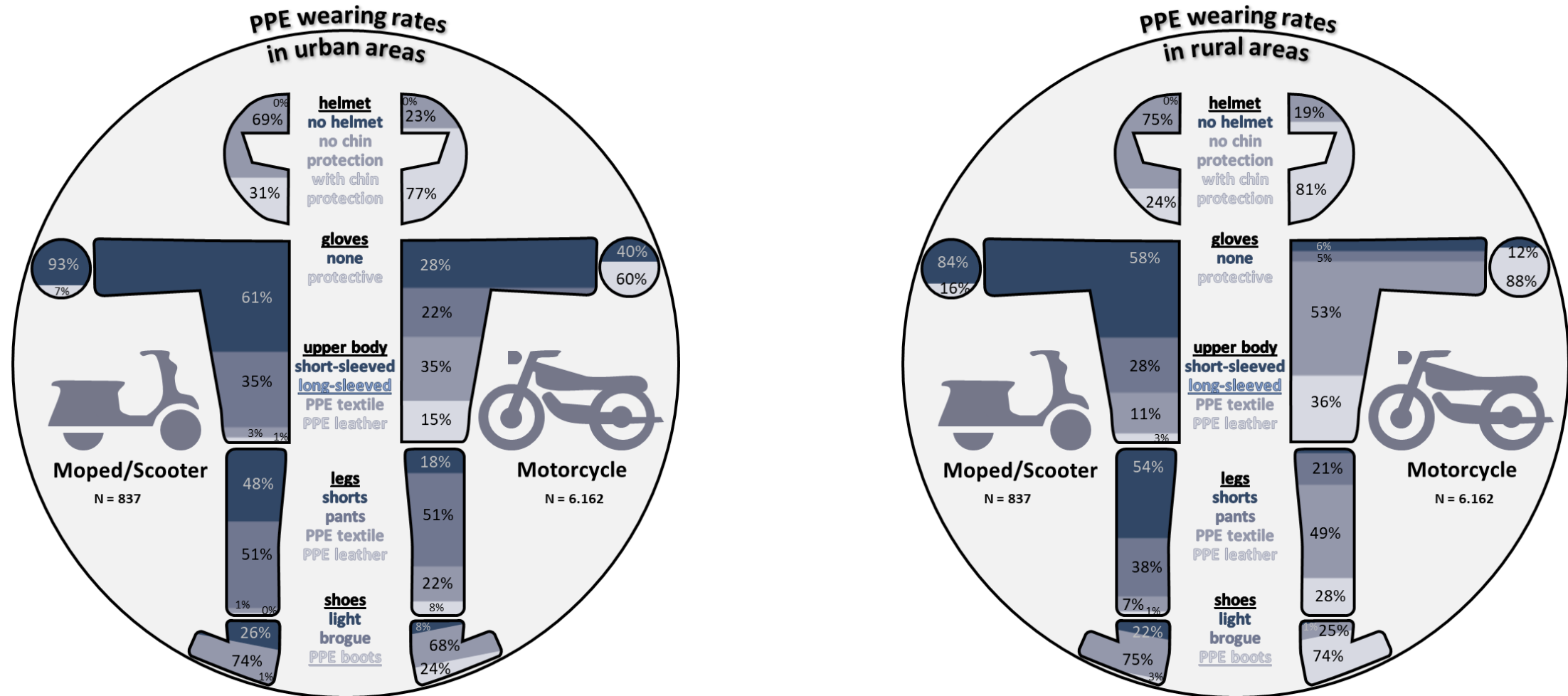


Protective equipment for Powered Two Wheeler riders

Martin Winkelbauer | 04.11.2025 | PIN talk “Reducing serious injuries in Europe”

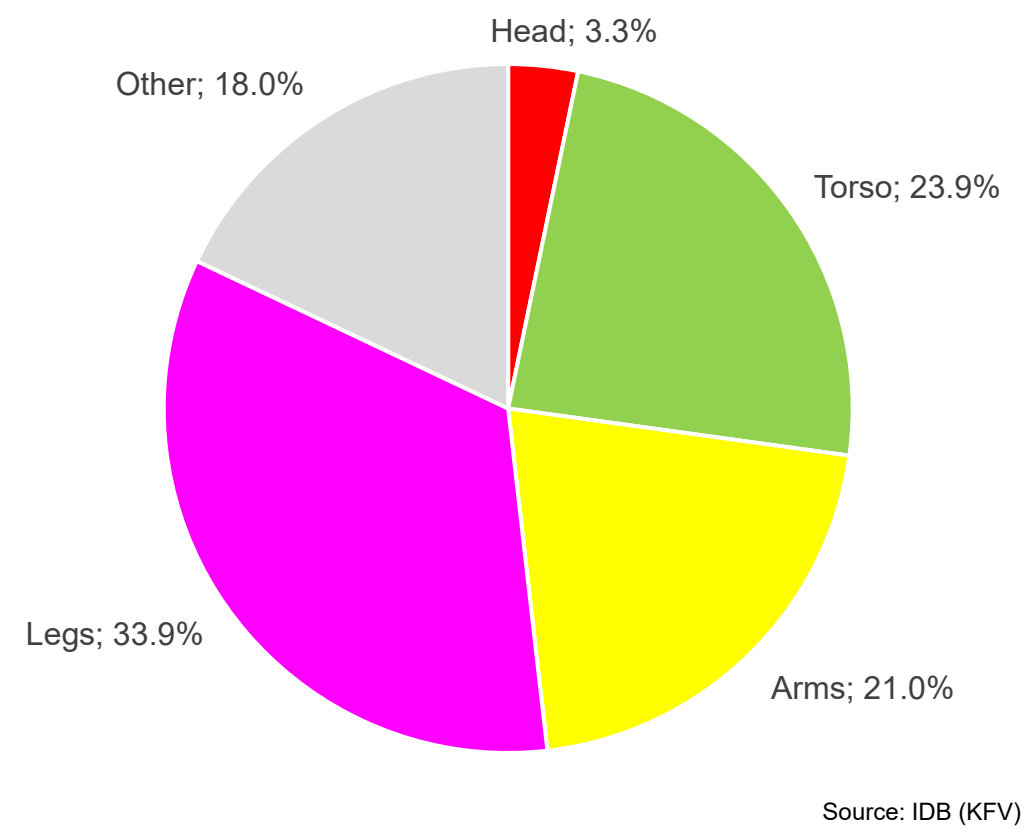
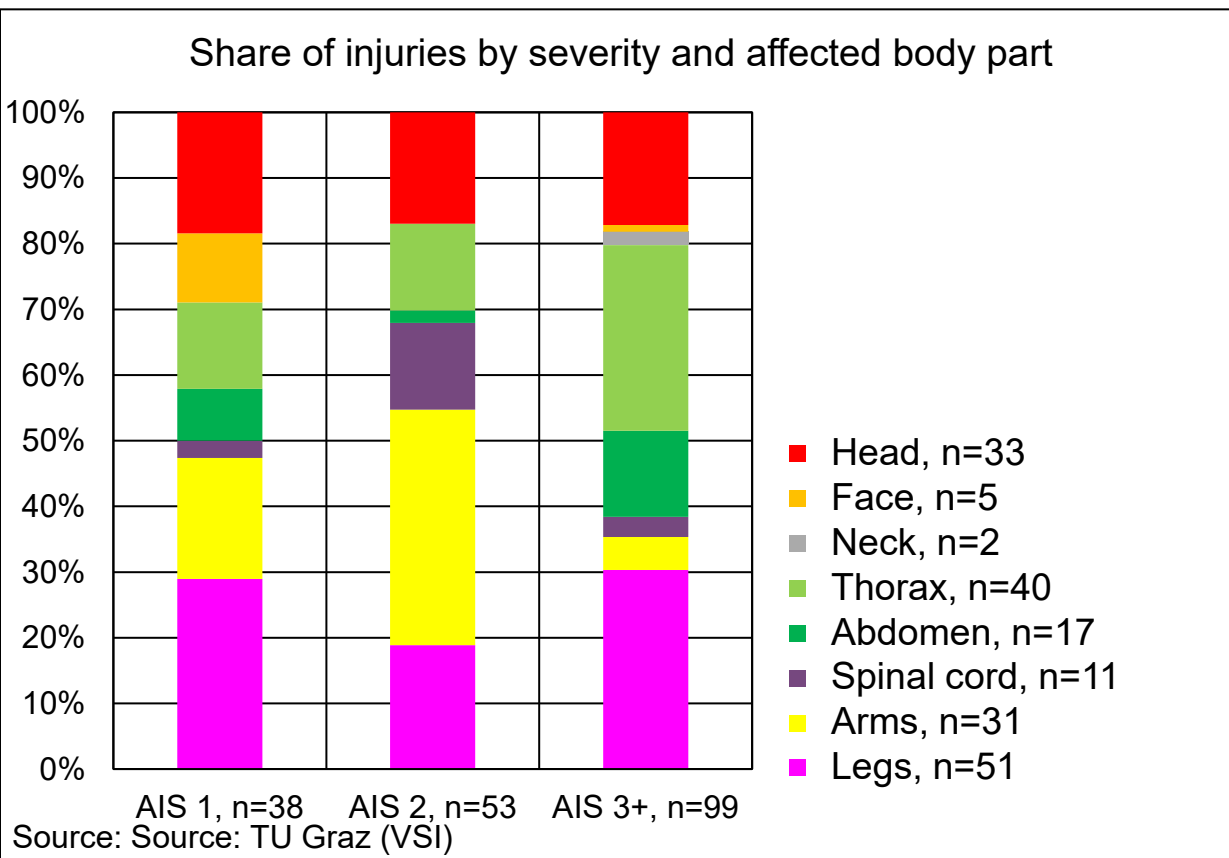


Vulnerable, but not necessarily (the darker, the worse)



Motorcycle injuries, Austria CEDATU vs. IDB

Both: PTW rider suffer multiple injuries!



Airbag jackets: ADAC-ÖAMTC test at 50 kph

Trigger / deployment (autonomous) OK, limited potential at high speed



Serre et al

- **Trigger / deployment OK**
- **limited potential > 30-40 kph**
- **for both cable & radio trigger**



The UDV-Airbag-Study

- Not needed at low speed
- No effect > 70 kph
- More benefit from optimized airbag

								
	0,075 m			0,25 m			road surface	
60 km/h	0	St	Opt					
50 km/h				0	St	Opt		
25 km/h	0	St	Opt					
17 km/h							0	St

■ severe injuries
 ■ slight injuries
 O: no Airbag; St: Standard Airbag; Opt: optimized Airbag

My own study ...

- 125 Members OÖ (500 in total)
- 250 Helite airbag jackets conveyed
- 34 interviewees, 1 excluded
- 25 airbag users (11 had a crash)
- 8 non-users
 - 5 with 1 crash 3 with multiple crashes
- Age 34 to 75, Ø 60
 - Airbag users 1 year younger
- 27 ♂, 6 ♀
- 26 married
- Users: 1.96 kids, non-users 1.16



Find the full paper here:
www.ifz.de/wordpress/wp-content/uploads/2025/06/IMC2024-Proceedings_Forschungsheft-21_.pdf



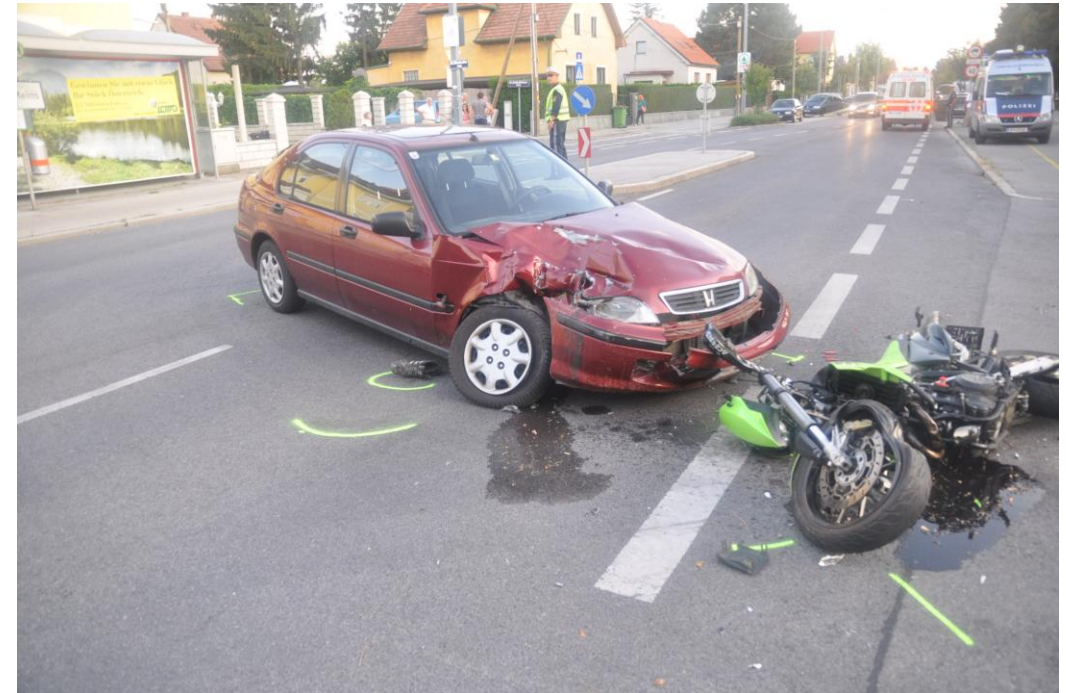
28 Crashes

- 3 with other road user
- 16 road surface primary impact
- 6 objects at road side
- Full gear except 1
- 11 with airbag (11 deployed)
- 17 on bends, 10 straight section
- All seperated from bike
- **20 no police, no ambulance**
- **...what they were afraid of**
- **Good for falling off**



Injuries

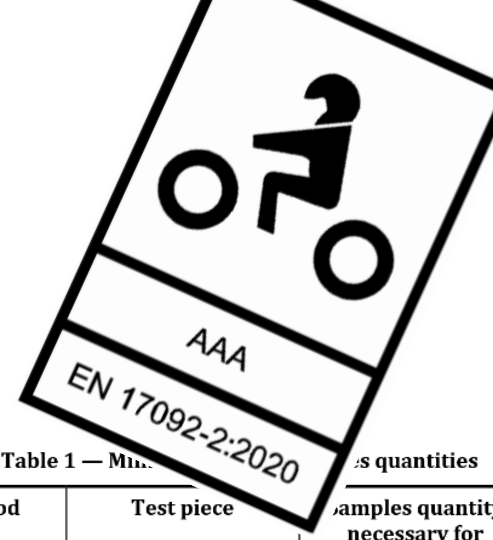
- **9 uninjured, 10 minor, 8 serious**
- **2 multiple severe injuries**
 - both > 100 kph
 - 1 with, 1 without airbag
 - With airbag no rib or vertebra fractures
- **1 intensive care treatment**
- **Mainly bruises, abrasions**
- **With airbags: Clavicle, shoulder, arms, legs (wrist and ankle)**





Martin Winkelbauer | PIN talk "Reducing serious injuries in Europe"

Standards – new in 2020



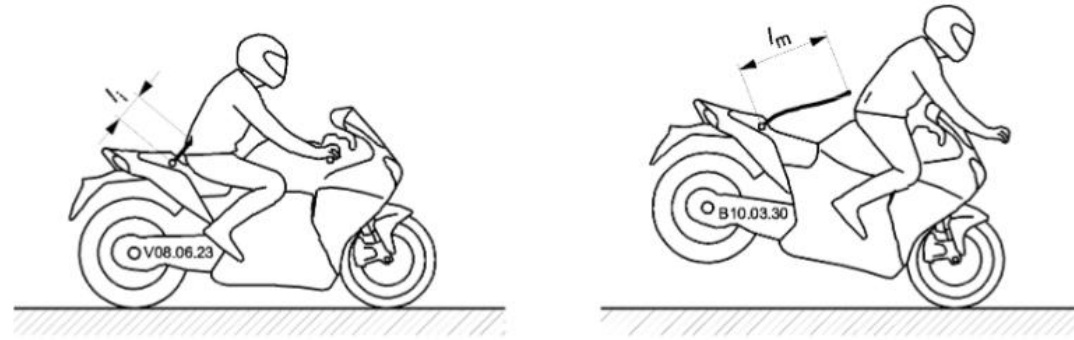
EN 17092, clothing in general

- AAA, AA, A, B, C
- Part 1: Methods !!!
- Abrasion resistance
- Seams
- Permiability
- Tear resistance
- Fasteners
- Comfort
- Test procedures

Table 1 — Minimum sample quantities

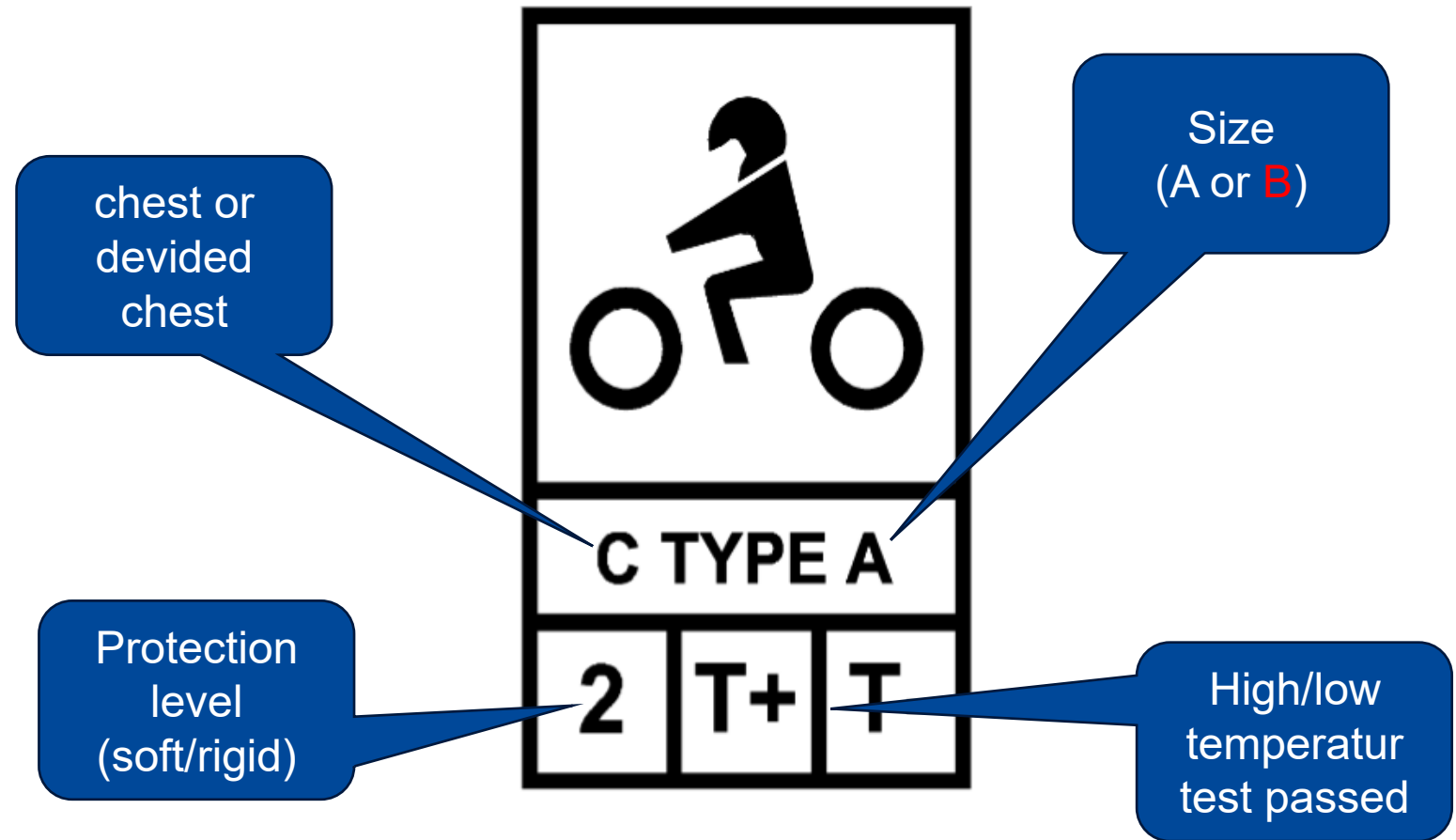
EN 17092-2:2020 and following parts clause	Test	Test method	Test piece	Samples quantity necessary for classes AAA, AA, A	Samples quantity necessary for class B	Samples quantity necessary for class C
4.1.1	Innocuousness	EN ISO 13688:2013, 4.2		one garment or one sample of each material equivalent to an area of two A4 sheets and one sample of each metallic material which could come into prolonged contact with the skin		
4.1.2	Dimensional stability of garments	EN ISO 5077:2008; EN ISO 13688:2013, 5.2 (for garment preparation)	one garment	one garment	one garment	one garment
4.2.1 (not relevant for part 5)	Impact energy absorption (general)	EN 1621-1:2012, EN 1621-2:2014, EN 1621-3:2018, EN 1621-4:2013 according to the type and location of the protector	One garment and, if applicable, all mandatory and optional impact protectors specified by the manufacturer in the garment's information notice	See the relevant part of EN 1621 series	Not applicable	See the relevant part of EN 1621 series
4.2.2 (not relevant for part 5)	Impact protector location and fixation	5.5.2	One garment with all mandatory and optional impact protectors specified by the manufacturer in the garment's information notice		Not applicable	one garment with all mandatory and optional impact protectors specified by the manufacturer in the garment's information notice

Standards



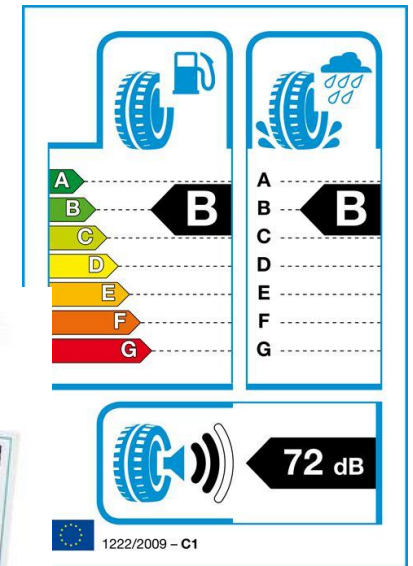
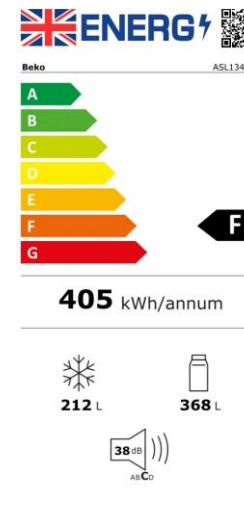
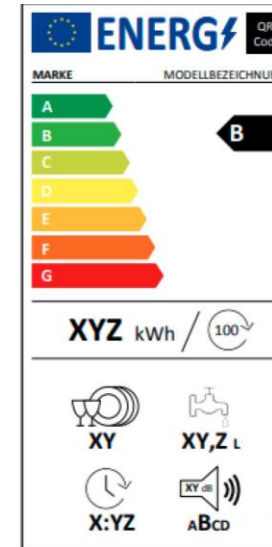
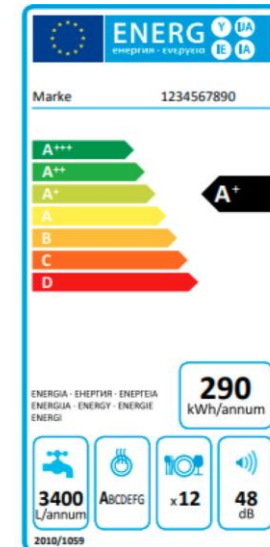
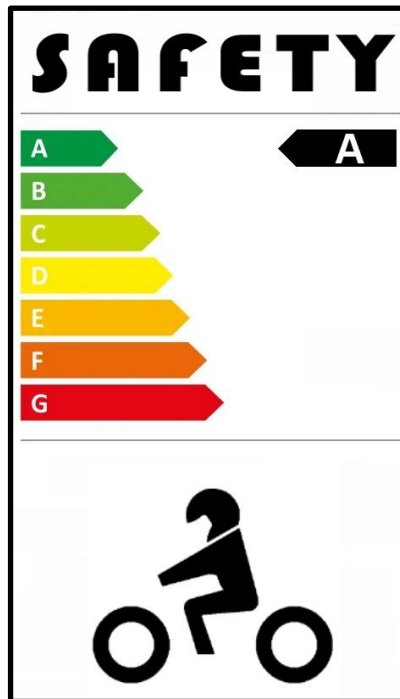
EN 1621, protectors

- minimum sizes
- impact absorption
- Area covered
- High/low temperature
- Airbags (part 4)
 - Inflation speed!



Survey results

- a) 50% knew about standards
- b) 100% consider label helpful

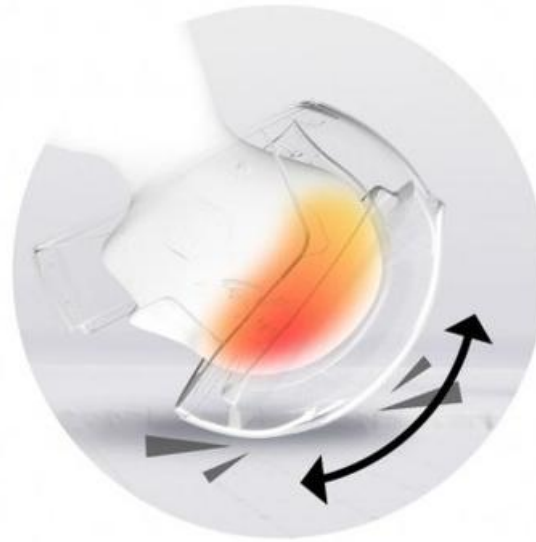


Obligations

- **Helmet**
- **1977 obligation, no fines**
- **1985 mopeds, fines**
- **1986 motorcycles, fines**
- **1987 ECE**
- **Gear: 2Ob119/15m**
25% less compensation for pain
- **15 R 38/17v:**
even if 35°C



Multidirectional Impact Protection system “Mips”®



Forgiving roadsides



Conclusions

- Least protected -> most injured
- Severe -> slight
- Increase use of PPE (urban!)
We need something
as smart as Hermann Maier's helmet
- Consider target crashes
- Consider potential risk compensation
- Self-explaining safety ratings
for helmets and PPE
- Promote airbag use



Thanks for listening!

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