UN ECE – GRSG – IGPG
5th Meeting
Research drop height

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1. Introduction
2. Ball drop heights of glazing material
3. Comparison of ball drop heights
4. Extract of ECE/TRANS/180/add.6/Appendix 1
5. Conclusion

Introduction

Ball drop test at EVONIK

- Promised ball drop test results not yet available
- Laminated PMMA is still in development
- We need more time

We made a research/summary of existing ball drop tests in ECE R43

Ball drop heights of glazing material

Annex 5: Uniformly-toughened glass glazing

ECE R43, series 00:

Nominal thickness of glass pane (e)	Height of drop @ 20 °C
e ≤ 3.5 mm	2.0 m
3.5 mm < e	2.5 m

gtr6 and ECE R43, series 01:

2 m equal the thickness

Maximum drop height is reduced (one drop height)

Ball drop heights of glazing material

Annex 6: Ordinary laminated-glass windscreens

ECE R43, series 00:

Nominal thickness of glass pane (e)	Height of drop @ +40 °C	Height of drop @ -20 °C
e ≤ 4.5 mm	9 m	8,5 m
4.5 mm < e ≤ 5.5 mm	10 m	9 m
5.5 mm < e ≤ 6.5 mm	11 m	9,5 m
6.5 mm < e	12 m	10 m

gtr6 and ECE R43, series 01 :

9 m and 8.5 m equal the thickness

Maximum drop height is reduced (one drop height)

Ball drop heights of glazing material

Annex 7: Laminated glass glazing

ECE R43, series 00:

Nominal thickness of glass pane (e)	Height of drop 20 °C
e ≤ 5.5 mm	5 m
5.5 mm < e ≤ 6,5 mm	6 m
6,5 mm < e	7 m

gtr6 and ECE R43, series 01 :

9 m equal the thickness

Maximum drop height is higher (one drop height)

Ball drop heights of glazing material

Annex 14: Rigid plastic glazing other than windscreens

ECE R43, series 00:

Nominal thickness of glass pane (e)	Height of drop @ +20 °C	Height of drop @ -18 °C
< 3 mm	2 m	2 m
4 mm	3 m	3 m
5 mm	4 m	4 m
> 6 mm	5 m	5 m

gtr6 and ECE R43, series 01 :

still the same

Ball drop heights of glazing material

New Annex 18: Laminated rigid plastic panes

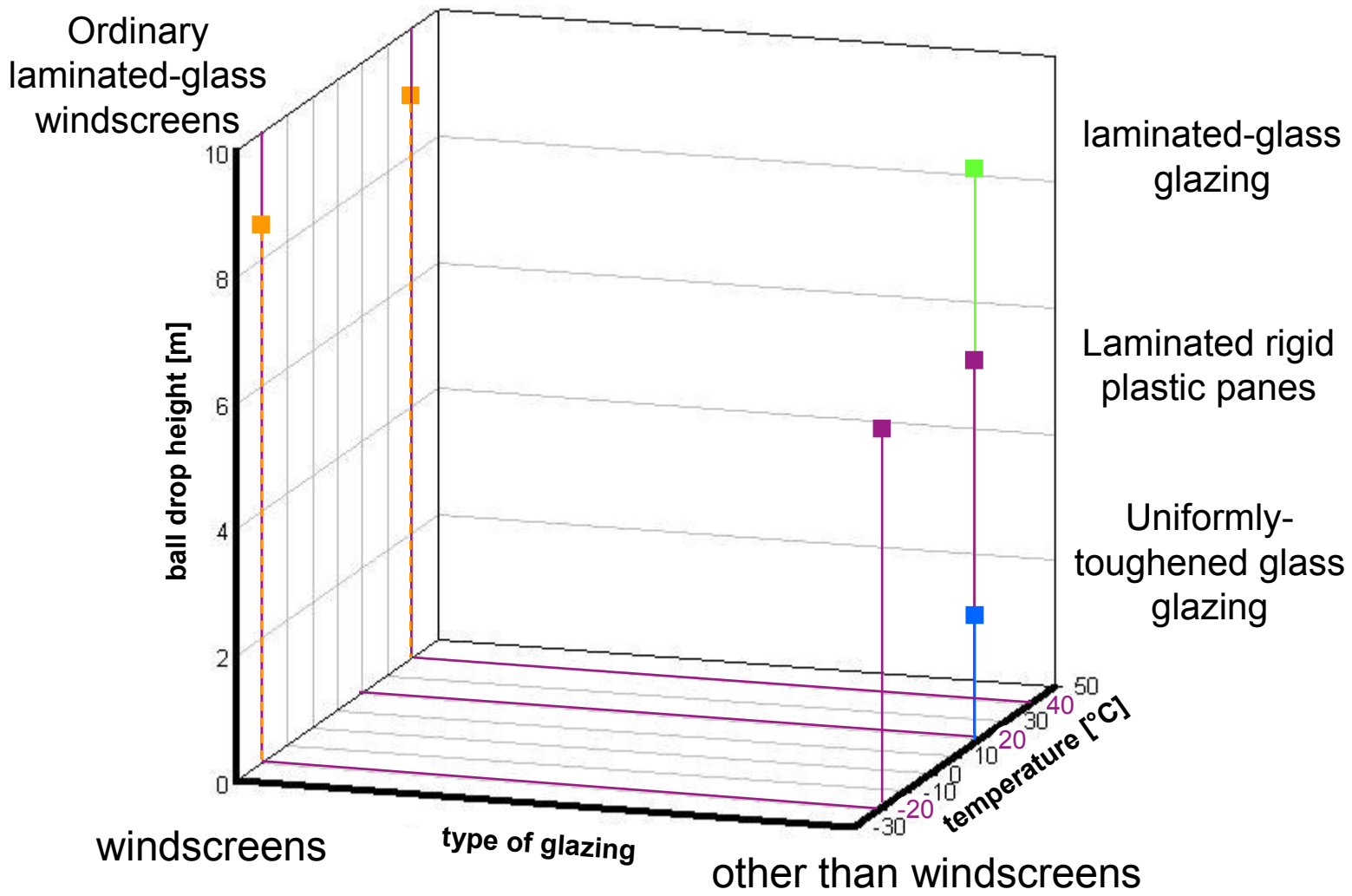
Proposal for draft amendment to ECE R43
ECE/TRANS/WP.29/GRSG/2009/8

Nominal thickness of glass pane (e)	Height of drop @ +20 °C	Height of drop @ -18 °C
< 4 mm	3 m	3 m
5 mm	4 m	4 m
6 mm	5 m	5 m
> 7 mm	6 m	6 m

New proposal of IGPG (IGPG-05-02-Rev.1):

6 m equal the thickness

Comparison of ball drop heights



Extract of ECE/TRANS/180/add.6/Appendix 1

Uniformly-toughened glass glazing

Article 42: Tests in Japan led to the conclusion that a drop height of 2.0 m is sufficient for this type of glazing. The typically encountered stone was determined to have a mass of 2-3 g. In the case of a windscreen, an impact velocity of 150 km/h may be reached. ...
Assuming a worst-case impact velocity of 150 km/h, the impact energy of a 3 g object would be equivalent to the impact energy of the 227 g ball dropped from a height of 1.17 m. Therefore, it was decided that the lowest height, 2 m, used in any national or regional regulation, would be sufficient to assess a pane impacted, penetrated by a stone or other small object. ...

ECE/TRANS/180/Add.6/Appendix 1

16 May 2008

GLOBAL REGISTRY

Created on 18 November 2004, pursuant to Article 6 of the
AGREEMENT CONCERNING THE ESTABLISHING OF GLOBAL TECHNICAL REGULATIONS FOR WHEELED VEHICLES, EQUIPMENT AND PARTS WHICH CAN BE FITTED AND/OR BE USED ON WHEELED VEHICLES
(ECE/TRANS/132 and Corr.1)
Done at Geneva on 25 June 1998

Addendum

Global technical regulation No. 6

SAFETY GLAZING MATERIALS FOR MOTOR VEHICLES AND MOTOR VEHICLE EQUIPMENT

(Established in the Global Registry on 12 March 2008)

Appendix

Proposal and final report pursuant to Article 6, paragraph 6.3.7. of the Agreement

- Proposal to develop a global technical regulation concerning safety glazing materials for motor vehicles and motor vehicle equipment (TRANS/WP.29/AC.3/9)
- Final report on the development of the global technical regulation concerning safety glazing (ECE/TRANS/WP.29/2008/48), adopted by AC.3 at its twenty-second session (ECE/TRANS/WP.29/1066, para. 60)

UNITED NATIONS

Conclusion

General considerations to ball drop test

- At the moment:
  - The drop height depends on the glazing material
  - The temperature of ball drop test depends on the glazing material
- The drop heights for different materials are not consistent

It make sense to set the drop height for

Laminated rigid plastic panes

in dependence of the typical impact incidence

to a drop height of 2 m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