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| --- |
| **Test Report** |
| {{report\_no}} |
|  |
| UNIFORM PROVISIONS CONCERNING THE APPROVAL OF SAFETY GLAZING MATERIALS  AND THEIR INSTALLATION ON VEHICLES |
|  |
| **Test basis** |
| **UN Regulation No. 43** |
| {{version\_4}} series of amendmends, supplements {{version\_3}} |
| dated 17 May 2025 |
|  |

|  |  |  |  |
| --- | --- | --- | --- |
| Confidentiality category | | confidential | |
| Recipients | | manufacturer {{company\_name}} approval authority RDW | |
|  | | | |
| Approval status | | | |
| ☒ | Granting of a Type Approval | | {{approval\_no}} |
| ☐ | Extension to the Type Approval No. | |
| ☐ | Revision to Type Approval No. | |
| ☐ | Correction of Type Approval No. | |

|  |  |  |  |
| --- | --- | --- | --- |
| **0.** | **General information** | | |
| 0.1. | Make(s) (Trade name(s) of the manufacturer) | : | {{trade\_names}}{% for image in trade\_marks %}{{image}} {% endfor %} |
| 0.2. | Name and address of manufacturer | : | {{company\_name}}  {{company\_address}} |
| 0.3 | Name and address of the manufacturer´s representative | : | not applicable |
| 0.4. | Location of approval mark | : | Marked on the glass |
| 0.5. | Information folder/ information document |  |  |
| 0.5.1. | Labeling or No. | : | {{information\_folder\_no}} |
| 0.5.2. | Date of issue | : | {{approval\_date}} |
| 0.5.3. | Amendment | : | not applicable |

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| --- | --- | --- | --- |
| **1.** | **General information about ~~test vehicle/~~ test object** | | |
| 1.1. | Type / ~~Trade name~~ | : | {{safety\_class}}\*{{windscreen\_thick}} |
| 1.1.1. | Variant(s) / Version | : | not applicable |
| 1.1.2. | Identification of the test object | : | See Attachment 1 |
| 1.2. | Principal characteristics of the test object |  |  |
| 1.2.1. | Number of layers of glass | : | {{glass\_layers}} |
| 1.2.2. | Number of layers of interlayer | : | {{interlayer\_layers}} |
| 1.2.3. | Nominal thickness of the windscreen | : | {{windscreen\_thick}} |
| 1.2.4. | Nominal thickness of interlayer(s) | : | {{interlayer\_thick}} |
| 1.2.5. | Special treatment of glass | : | {{glass\_treatment}} |
| 1.2.6. | Nature and type of interlayer(s) | : | {{interlayer\_type}} |
| 1.2.7. | Nature and type of plastics coating(s) | : | {{coating\_type}} |
| 1.2.8. | Nominal thickness of plastic coating(s) | : | {{coating\_thick}} |
| 1.3. | Representative test object | : | ~~The tested vehicle/ object was selected by the worst criteria regarding the variant/ version and the equipment. Further information is available on request from the Technical Service.~~  There is no worst case selection applicable |
| 1.4. | Sampling | : | The test object presented for testing was provided by the applicant. The time of provision is irrelevant for the test result. |

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| **2.** | **Test record** | | |
| 2.1. | Test laboratory |  |  |
| 2.1.1. | Name and address (Place of testing) | : | {{company\_name}}  {{company\_address}} |
| 2.1.2. | Measuring and testing equipment | : | The tests were carried out using calibrated measuring and testing equipment that complied with the regulations. |
| 2.1.2.1. | Identification of measuring and testing equipment | : | {% for item in equipment %}no. {{ item.no }}: {{ item.name }}  {% endfor %} |
| 2.2. | Date of test | : | {{test\_date}} |
| 2.3. | Ambient conditions | : | Temperature : 20 °C ± 5 °C  Pressure: 860 to 1,060 mbar  Relative humidity: 60 ± 20 per cent. |
| 2.3.1. | Temperature | : | {{temperature}} |
| 2.3.2. | Ambient pressure | : | {{ambient\_pressure}} |
| 2.3.3. | Relative humidity | : | {{relative\_humidity}} |
| 2.4. | Decision rule | : | Binary conformity statement with simple acceptance (w = 0). |
| 2.5. | Uncertainty of measurement | : | Not shown in the test report according to VA 30. |

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| **3.** | **Test results** | | |
|  | Headform test (Annex 6 / 3) | : | Pass ~~/ Fail~~ |
|  | Mechanical strength test  (Annex 6 / 4.2 / 4.3) | : | Pass ~~/ Fail~~ |
|  | Resistance to abrasion Outer face  (Annex 6 / 5.1) | : | Pass ~~/ Fail~~ |
|  | Resistance to high temperature  (Annex 3 / 5) | : | Pass ~~/ Fail~~ |
|  | Resistance to radiation  (Annex 3 / 6.3) | : | Pass ~~/ Fail~~ |
|  | Resistance to humidity  (Annex 3 / 7) | : | Pass ~~/ Fail~~ |
|  | Light transmission test  (Annex 3 / 9.1) | ： | Pass ~~/ Fail~~ |
|  | Optical distortion test  (Annex 3 / 9.1) | ： | Pass ~~/ Fail~~ |
|  | Secondary-image-separation test  (Annex 3 / 9.1) | ： | Pass ~~/ Fail~~ |

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| **4.** | **Remarks** |
|  | The test report(s) and/ or the test minutes(s) of the Technical Service including all documents and measurement results required for the assessment are available. The test results were checked for correctness and plausibility.  The report presented here summarizes and completely covers the entire scope of the type test including the documentation of the test object. |

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| **5.** | **Changes** | | |
|  | to be changed | :: | not applicable |
|  | to be added | :: | not applicable |
|  | to be deleted | :: | not applicable |
|  | to be corrected | :: | not applicable |

|  |  |  |  |
| --- | --- | --- | --- |
| **6.** | **Attachements** | | |
|  | Attachment 1 | :: | Test data |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **7.** | **Final confirmation** | | | | |
|  | The information document/ folder as mentioned under No. 0.5. and the type described therein are **- in compliance -** with the test specification mentioned above. | | | | |
|  |  | | | | |
|  | The used test objects were representative in terms of the mentioned type under No. 0.5. | | | | |
|  |  | | | | |
|  | ☐ | The worst-case was selected in accordance with No. 1.3. | | | |
|  | ☒ | A worst-case is not applicable. | | | |
|  |  |  | | | |
|  | Measurement results refer exclusively to the test object presented for testing. | | | | |
|  |  | | | | |
|  | This test report may only be reproduced and passed on by the client and only in full. Reproduction and publication of extracts of the test report is only permitted with the written authorisation of the test laboratory. | | | | |
|  |  | | | | |
|  | This test report comprises pages 1 to 12. | | | | |
|  |  | | | | |
|  | TEST LABORATORY  **TÜV NORD Mobilität GmbH & Co.KG (HQ) IFM - Institut für Fahrzeugtechnik und Mobilität** Schönscheidtstrasse 28, 45307 Essen, Germany | | | | |
|  |  | | | | |
|  | Branch | | : | TÜV NORD (Hangzhou) Co., Ltd.  No. 1, Lane 288 Kangning Road, Jing'an District, Shanghai, 200443, China (PRC) | |
|  | Date | | : | {{report\_date}} | |
|  |  | |  | Release | Counter sign |
|  |  | |  | Xuchun DING | Yijun CHEN |
|  |  | |  |  | |
|  | Order | | : | --- | |
|  | E-Mail | | : | [xding@tuv-nord.com](mailto:xding@tuv-nord.com); china.mobility@tuv-nord.com | |
|  | Phone | | : | +86 21-3319 6445; +86 21-3319 6200 | |
|  |  | |  |  | |
|  | This test report is signed with a digital signature. Attached to the approval certificate, it is also valid without a visible signature. | | | | |

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| **8.** | **Competences** | | | |  |  | | |
|  | The following competence statement applies to the undersigned testing laboratory with regard to the above-mentioned test procedure, if marked with ☒. | | | | | | | |
|  | ☐ | Accredited testing laboratory by DAkkS according to DIN EN ISO/IEC 17025:2018.  The accreditation is valid only for the scope listed in the annex of the accreditation certificate D-PL-11109-01-00. | | | | | | |
|  |  |  | | | | | | |
|  |  | Designated as Technical Service for the scope listed in the respective annex of the designation certificate. | | | | | | |
|  | ☐ | The assessments were carried out as Technical Service category **A** or D. | | | | | | |
|  | ☒ | The assessments were carried out as Technical Service category **B** or D. | | | | | | |
|  |  |  | Type Approval Authority | Country/Region | | | ECE / EU country code | Registration number |
|  |  | ☐ | KBA | DE | | | E1 / e1 | KBA-P 00004 |
|  |  | ☒ | RDW | NL | | | E4 / e4 | RDWT-T04 |
|  |  | ☐ | STA | SE | | | E5 / e5 | TT 0012 |
|  |  | ☐ | SNCH | LU | | | E13 / e13 | ST\_HOM\_TÜV\_Nord\_Mobilität |
|  |  | ☐ | TRAFICOM | FI | | | E17 / e17 | TL-0015 |
|  |  | ☐ | NSAI | IE | | | E24 / e24 | 115 |
|  |  | ☐ | VSCC | TW | | | - | DE09-07-1 |
|  |  | | | | | | | |
|  | ☐ | The laboratory statement is based on existing accreditation or designation competences. | | | | | | |
|  |  | | | | | | | |
|  | End of Test Report | | | | | | | |
|  |  | | | | | | | |

Test data Attachment 1

## **Test sample: 20241029-01#-48#**

## **Headform test: (Annex 6 / 3):**

{% for vehicle in vehicles %}

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test on a complete windscreen | | | | |
| Type of vehicle: {{vehicle.veh\_type}} | | | | |
| Height of fall (m) | | 1.5 m +0/-5mm | | |
| Stored in above-mentioned condition for at least 4 hrs: Yes / ~~No~~ | | | | |
| sample | Cracks nearest to impact point not more than 80mm | | 1 or more partial interlayer separation less than 4mm in breath, on either crack side, 60mm diameter centered impact point | on impact point the interlayer must not be laid bare over an area of more than 20cm2 & a tear in interlayer up to a length of 35mm is allowed |
| 07# | Yes / ~~No~~ | | Yes / ~~No~~ | Yes / ~~No~~ |
| 08# | Yes / ~~No~~ | | Yes / ~~No~~ | Yes / ~~No~~ |
| 09# | Yes / ~~No~~ | | Yes / ~~No~~ | Yes / ~~No~~ |
| 10# | Yes / ~~No~~ | | Yes / ~~No~~ | Yes / ~~No~~ |
| Result: | Pass / ~~Fail~~ | | | |

{% endfor %}

Mechanical strength test (Annex 6 / 4.2. / 4.3.)

|  |  |  |  |
| --- | --- | --- | --- |
| 2,260 g ball on Inner face ( Annex 6 / 4.2) | | | |
| Height of fall (m): 4m +25/-0mm | | | |
| Stored in 23±2°C at least 4 hrs: Yes / ~~No~~ | | | |
| sample | Ball not pass through within 5 seconds | sample | Ball not pass through within 5 seconds |
| 37# | Yes ~~/ No~~ | 43# | Yes ~~/ No~~ |
| 38# | Yes ~~/ No~~ | 44# | Yes ~~/ No~~ |
| 39# | Yes ~~/ No~~ | 45# | Yes ~~/ No~~ |
| 40# | Yes ~~/ No~~ | 46# | Yes ~~/ No~~ |
| 41# | Yes ~~/ No~~ | 47# | Yes ~~/ No~~ |
| 42# | Yes ~~/ No~~ | 48# | Yes ~~/ No~~ |
| Result: | Pass ~~/ Fail~~ | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 227 g ball on outer face (Annex 6 /4.3) | | | | | | | |
| Stored in +40±2°C for at least 4 hrs: Yes ~~/ No~~ | | | | Stored in -20±2°C for at least 4 hrs: Yes ~~/ No~~ | | | |
| Height of fall (m): 9 m | | | | 8.5 m | | | |
| Sample | Ball not pass through | Not break into several pieces | Total weight of fragment  Limit value:  ~~12~~/15/~~20/25~~ g | Sample | Ball not pass through | Not break into several pieces | Total weight of fragment  Limit value:  ~~12~~/15/~~20/25~~ g |
| 27# | Yes ~~/ No~~ | Yes ~~/ No~~ | 1.5 | 17# | Yes ~~/ No~~ | Yes ~~/ No~~ | 1.0 |
| 28# | Yes ~~/ No~~ | Yes ~~/ No~~ | 2.7 | 18# | Yes ~~/ No~~ | Yes ~~/ No~~ | 1.0 |
| 29# | Yes ~~/ No~~ | Yes ~~/ No~~ | 1.5 | 19# | Yes ~~/ No~~ | Yes ~~/ No~~ | 0.8 |
| 30# | Yes ~~/ No~~ | Yes ~~/ No~~ | 4.3 | 20# | Yes ~~/ No~~ | Yes ~~/ No~~ | 0.6 |
| 31# | Yes ~~/ No~~ | Yes ~~/ No~~ | 3.1 | 21# | Yes ~~/ No~~ | Yes ~~/ No~~ | 2.1 |
| 32# | Yes ~~/ No~~ | Yes ~~/ No~~ | 1.8 | 22# | Yes ~~/ No~~ | Yes ~~/ No~~ | 1.1 |
| 33# | Yes ~~/ No~~ | Yes ~~/ No~~ | 2.9 | 23# | Yes ~~/ No~~ | Yes ~~/ No~~ | 0.9 |
| 34# | Yes ~~/ No~~ | Yes ~~/ No~~ | 3.4 | 24# | Yes ~~/ No~~ | Yes ~~/ No~~ | 1.0 |
| 35# | Yes ~~/ No~~ | Yes ~~/ No~~ | 2.0 | 25# | Yes ~~/ No~~ | Yes ~~/ No~~ | 1.1 |
| 36# | Yes ~~/ No~~ | Yes ~~/ No~~ | 2.6 | 26# | Yes ~~/ No~~ | Yes ~~/ No~~ | 3.0 |
| Result: | Pass / ~~Fail~~ | | | | | | |
| remark, e≤4.5(12), 4.5<e≤5.5(15), 5.5<e≤6.5(20), e>6.5(25) | | | | | | | |

Resistance to abrasion: outer face (Annex 6 / 5.1)

|  |  |  |  |
| --- | --- | --- | --- |
| Stored in above-mentioned condition for at least 48 hrs: Yes / ~~No~~ | | | |
| 11# | Initial haze | Haze after abrasion | Difference ( 2% max) |
| 0.19 | 0.67 | 0.48 |
| 12# | Initial haze | Haze after abrasion | Difference ( 2% max) |
| 0.13 | 0.63 | 0.50 |
| 13# | Initial haze | Haze after abrasion | Difference ( 2% max) |
| 0.15 | 0.70 | 0.55 |
| Result: | Pass / ~~Fail~~ | | |

## **Resistance to high temperature (Annex 3 / 5)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Immersing sample vertically | | | Yes / ~~No~~ | | |
| Heat to 100 °C for 2 hours | | | Yes / ~~No~~ | | |
| Cool to room temperature | | | Yes / ~~No~~ | | |
| Colorless  interlayer | sample | No bubble or other defects | ~~Tinted~~  ~~interlayer~~ | ~~sample~~ | ~~No bubble or other defects~~ |
| 14# | Yes / ~~No~~ | ~~1~~ | ~~Yes / No~~ |
| 15# | Yes / ~~No~~ | ~~2~~ | ~~Yes / No~~ |
| 16# | Yes / ~~No~~ | ~~3~~ | ~~Yes / No~~ |
| Result | Pass / ~~Fail~~ | | ~~Result~~ | ~~Pass / Fail~~ | |

## **Resistance to radiation (Annex 3 / 6.3)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| maintain the temperature of test piece at 45±5 °C throughout test : Yes / ~~No~~ | | | | | |
| outer face direct to lamp. The exposure time shall be 100hours : Yes / ~~No~~ | | | | | |
| secondary characteristics: | | | | | |
| Glass | Interlayer | Sample | Initial transmittance | Transmittance after radiation  ( min transmittance: 70% | Difference  ( min: 95%) |
| ~~Colorless~~ | ~~Colorless/ Tinted~~ | ~~1~~ | --- | --- | --- |
| ~~2~~ | --- | --- | --- |
| ~~3~~ | --- | --- | --- |
| Tinted | Colorless/ ~~Tinted~~ | 04# | 77.9 | 77.0 | 98.8 |
| 05# | 77.9 | 77.0 | 98.8 |
| 06# | 78.0 | 77.0 | 98.7 |
| Result | | Pass / ~~Fail~~ | | | |

## **Resistance to humidity (Annex 3 / 7)**

|  |  |  |
| --- | --- | --- |
| Immersing sample vertically | | Yes ~~/ No~~ |
| keep temperature 50±2 °C , relative humidity: 95±4%  maintained for 2 weeks | | Yes ~~/ No~~ |
| maintain in ambient atmosphere for 2 hrs | | Yes ~~/ No~~ |
|  | Sample | No Significant change existing |
| Colorless  interlayer | 01# | Yes / ~~No~~ |
| 02# | Yes / ~~No~~ |
| 03# | Yes / ~~No~~ |
| ~~Tinted~~  ~~interlayer~~ | ~~1~~ | ~~Yes / No~~ |
| ~~2~~ | ~~Yes / No~~ |
| ~~3~~ | ~~Yes / No~~ |
| Result: | Pass / ~~Fail~~ | |

## **Light transmission test (Annex 3 / 9.1)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Second characteristics involved | | | Actual transmittance | Comparison  ( limit ≥70%) |
| Coloring of glass | Coloring of interlayer | Opaque obscuration |
| ~~Clear~~ | ~~Clear/Tinted~~ | ~~yes/no~~ | --- |
| Tinted | Clear/~~Tinted~~ | ~~yes/no~~ | 77.9 / 77.9 / 78.0 |
| Result: | Pass / ~~Fail~~ | | | |

## **Optical distortion test (Annex 3 / 9.2)**

{% for vehicle in vehicles %}

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Type of vehicle: {{vehicle.veh\_type}} | | | | |
|  | M1/ N1 Category | | ~~M, N Category others than M1,N1~~ | ~~Agricultural vehicles etc.~~ |
| Sample | Area A | Area B | ~~Area I~~ | ~~Area I'~~ |
| 07# | 0.1 | 0.9 | ~~---~~ | --- |
| 08# | 0.1 | 0.8 | ~~---~~ | --- |
| 09# | 0.2 | 0.9 | ~~---~~ | --- |
| 10# | 0.2 | 0.8 | ~~---~~ | --- |
| Limit value | 2’ of arc | 6’ of arc | ~~2’ of arc~~ | ~~2’ of arc~~ |
| Result | Pass / ~~Fail~~ | | | |

{% endfor %}

## **Secondary-image-separation test (Annex 3 / 9.3)**

{% for vehicle in vehicles %}

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Type of vehicle: {{vehicle.veh\_type}} | | | | |
|  | M1 / N1 Category | | ~~M, N Category others than M1,N1~~ | ~~Agricultural vehicles etc.~~ |
| Sample | Area A | Area B | ~~Area I~~ | ~~Area I'~~ |
| 07# | 6 | 6 | ~~---~~ | ~~---~~ |
| 08# | 4 | 6 | ~~---~~ | ~~---~~ |
| 09# | 4 | 6 | ~~---~~ | ~~---~~ |
| 10# | 4 | 6 | ~~---~~ | ~~---~~ |
| Limit value | 15’ of arc | 25’ of arc | ~~15’ of arc~~ | ~~15’ of arc~~ |
| Result | Pass / ~~Fail~~ | | | |

{% endfor %}