Function Specification

Door Paneling Assembly

Release

Department/Function	Name	Date	Signature
Author of function specification Daimler AG	Andreas Wuestner Andreas Neye		
Department E3 Daimler AG	Alexander Pfeffer		

Modification documentation of the function specification

ZGS	Description of amendment	Edited by	(Date)	Approved	(Date)
002	YAP 1067/96: Rewritten with change (Pg. 6-10 new)	Rebbert	1996-01-18	Moach	1996-01-18
003	YAP9004/01: Completely revised with changes rewritten	Steeb	2003-04-03	Eissler	2003-04-03
004	Completely revised and changes rewritten	Steeb	2006-11-28		2008-03-15
005	Complete revised and transferred to DOORS. Flexing test and suppleness test for padded armrest, noise test, draft test added	Dr. Beyer	2008-04-28	Bartels	2008-04-28
006	General revision of the layout. Revision of the suppleness tests Revision of the inside opener endurance test	Dr. Beyer	2009-05-08	Bartels	2009-05-15
007	Completely revised and changes rewritten	Daiber/Neye	2012-03-26	Kuonath	2012-03-26
008	Completely revised	Wuestner/ Neye	2014-09-02	Pfeffer	2013-09-02
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1 General

1.1 Scope

The test specification applies regardless of type to all listed individual or assembly components with drawing reference to the function specification and is a binding part of the drawing. Functioning shall be ensured between -30°C and +90°C (component temperature). Test temperatures for individual inspections may differ.

1.2 Scope of Testing

All tests must be carried out in the vehicle environment with installed parts.

Any deviations in tests and target values shall only be permissible if these are coordinated with the contractor's development department. This status shall be confirmed before the start of testing.

The availability of part builds cannot generally be ensured by the client. If available, the supplier shall be provided with a part build on a loan basis for the development phase.

As an alternative, a laboratory rig can be used which simulates the environment of the component to be tested with an alternative geometry of surrounding area (e.g. with milled aluminum or ureol parts).
This applies in particular when no partial construction is available in the early development phases.

The geometry of the screw-on points and lay-on edges, etc. of the part build shall conform to the current released data status for the component being tested.

Deviations must be documented and reported to the client.

1.3 Documentation

The supplier shall ensure that the properties and values requested in this document are complied with.

When requested to do so by the client, the contractor shall already provide verification for the test-vehicle phase as part of the trial sample inspection report (VMPB) that the DBL and function specification of the component will be complied with by the later production part. Individual tests may be omitted for the VMPB if so agreed with the client's development/testing manager.

The test results shall be documented in the specified format and shall be presented at the latest as part of the PPAP as part of the VMPB and the PPAR. The tested components shall be stored until the assessment by Daimler has taken place. As a back-up sample, a representative component mix shall be selected via the equipment and coordinated with the client. Scrapping is only permitted following written approval by the client.

1.4 General Requirements for Test Parts

1.4.1 Dimensional Accuracy of Test Parts

The data record approved by the development department is binding.

The contractor shall provide verification of the dimensional accuracy of the components with measuring reports of the parts to be tested prior to the tests.

The type and scope of the measuring reports must be coordinated with the client's quality and development department.

The inspection of the component shall be carried out on a component gage approved by Daimler.

If no approved Daimler component gage is available, then the contractor shall coordinate the further procedure with the client's quality department.

1.4.2 Component Approval Before Start of Testing

The acceptance of the components to be tested must take place together with the client prior to the tests. The acceptance includes the measuring reports of the test parts, a visual evaluation (in the assembly) and an (image) documentation. The E/Q status of all component parts used in the assembly is to be fully documented for every test, and accordingly visible in the report.

1.4.3 Basic and Consumable Materials of Test Parts

Materials, adhesive, paints, surface finishes, lubricants, anti-creaking agents etc. shall comply with the currently documented release status. The complete documentation including the manufacturer's designation shall be made available to the client before the start of testing.

1.4.4 Quality of Workmanship of Test Parts

Prior to the start of each test, the components to be tested shall be checked as regards to correct workmanship e.g. in the case of bonding, welding, attaching component/bracket securing, condition of trimmed edges, design of bends and assembly.

1.4.5 Minimum Requirements for VMPB

- Parts from series production material
- Parts from prototype tools
- Parts manufactured with process parameters for achieving the properties of the series production material
- Hand-cut parts
- Manually welded parts; compliance with the series process parameters for welding (temperature, duration, force, etc.) shall be used to achieve the series production properties
- Manually laminated parts
- Representative mixture of materials and colors including trim parts – coordinated with DAI

Any deviation shall be reported to the responsible developer by DAI in writing prior to the start of testing. The full testing ability must be ensured.

1.4.6 Minimum Requirements for PPAR

- Parts from series production material
- Part from production tools
- Parts manufactured in the series production process with series production parameters
- Parts from series production systems (all process steps)
- Parts in all material and color versions

For additional details, see MBST.

Any deviation shall be reported to the responsible developer by DAI in writing prior to the start of testing. The full testing ability must be ensured.

2 Thermal Tests

The heat change test, heat aging and the climate tests shall be conducted successively on the same door and window frame lining incl. the mirror triangle, with installed detachable components (e.g. trim, wiring harnesses, switches, speakers, etc.) without any dismantling involved. For variants equipped with roller blinds the window frame lining is also to be checked with the roller blinds in retracted and extended positions.

The door paneling assemblies will be visually evaluated after each individual inspection. A conditioning time of at least 6 h at room temperature shall be adhered to prior to assessment.

: If a measuring of the components is carried out after the test, the cooling phase shall be at least 12 h.

The evaluation of elastic parts (nets, elastic bands, etc.) may not be carried out until 12 h after the end of the load - independent of the test temperature - in order to give the parts sufficient time for relaxation.

The components to be evaluated in the thermal tests shall be inspected before and after the tests and documented by means of a test report.

The evaluation shall be carried out before, during and after the tests by means of photogrammetry, laser scanning or comparable measuring methods.

: Should reversible deviations occur during the tests (e.g. with hygroscopic materials), then these shall be noted additionally in the test report and coordinated with Daimler.

2.1 Thermal Cycle Test

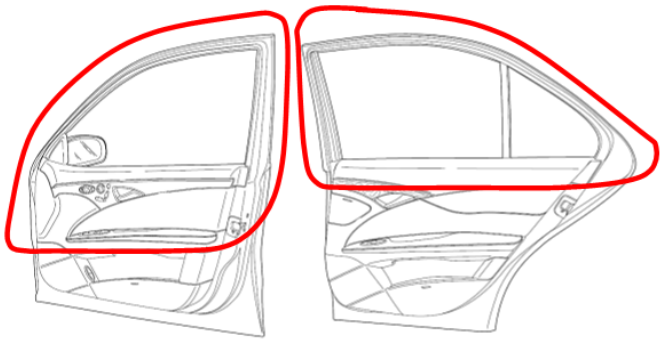
2.1.1 Part Exposed Either Completely or Partially to Direct Solar Radiation

In general, all parts in the area of the beltline and above it shall withstand this load, including a second trim part level on the driver's door below the armrest (see illustration of doors).

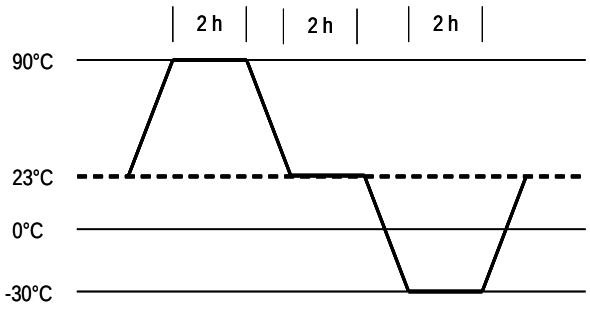
Test cycle:	2 h 90°C/2 h room temperature/2 h -30°C/2 h room temperature (holding time 2 h each without taking the heat-up and cool-down phase into account)
Duration of test:	10 cycles (approx. 5 d)
Heat-up speed:	approx.1 K/min
Cool-down speed:	approx. 1 K/min

Room ambient temperature = 23°C ± 2K (standard climate DIN 50 014–23/50-2; ISO 554/ 3205)

Illustration of doors (test area with direct solar radiation):



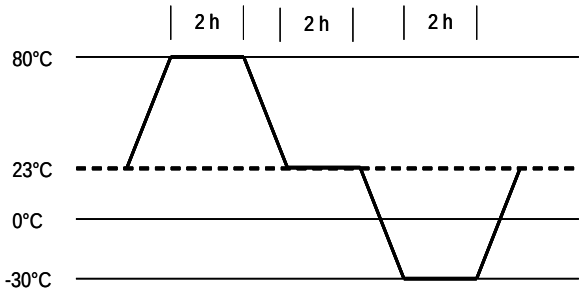
Example of temperature cycle for parts of the partial or direct solar radiation area:



2.1.2 Part Not Exposed to Direct Solar Radiation

Test cycle:	2 h 80°C/2 h room temperature/2 h -30°C/2 h room temperature (holding time 2 h each without taking the heat-up and cool-down phase into account)
Duration of test:	10 cycles (approx. 5 d)
Heat-up speed:	approx.1 K/min
Cool-down speed:	approx. 1 K/min

Example of a temperature cycle for parts in the indirect solar radiation area
e.g. B-pillar trim:



2.2 Thermal Aging Test

2.2.1 Part is Partially or Entirely Exposed to Direct Solar Radiation

7 d/ 90°C

2.2.2 Part is Not Exposed to Direct Solar Radiation

7 d/ 80°C

2.3 Climate Test

21 days at 40°C/ 92% r. h. (relative humidity)

2.4 Temperature Tests for Natural Skin (leather)

If natural skin is additionally used, the leather test shall only be carried out on a separate component.

Information:
To deal with the leather-specific material properties, a separate test cycle is required to reveal problem areas.

If artificial leather (e.g. polyurethane cargo shade) and real leather are used as decorative surfaces, this means the WWP, WAP and KLP tests are conducted with artificial leather and the leather is tested separately (e.g. for the real leather door paneling).
If only real leather is used (e.g. Maybach), the WWP, WAP and KLP tests are conducted on one component and the leather test additionally on a separate component.

2.4.1 Part is Partially or Entirely Exposed to Direct Solar Radiation

The test must be conducted in a climatic chamber.
Test cycle

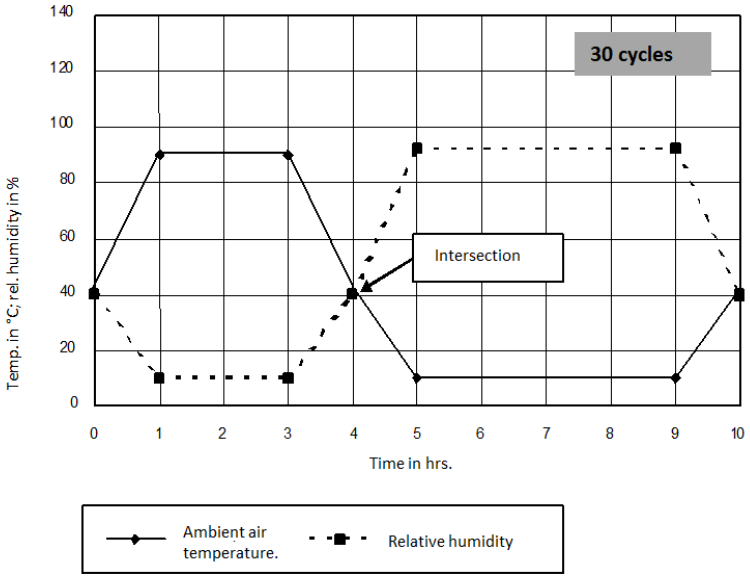


Figure: Graphic representation of cycle

No.	Cycle	Duration	Circulation temperature	Relative tumidity
0	Start		RT	
1	Heat	1:00h + X	90°C	10%
2	Dwell	2:00h	90°C	10%
3	Cool down	1:00h	40°C	40%
4	Cool down	1:00h	10°C	92%
5	Dwell	4:00h	10°C	92%
6	Heat	1:00h	40°C	40%

Test cycles no. 1 to 6 are run through 30 times. Total time for a test is approx. 300 hrs.
The moisture of the leather must be reduced during the initial heat-up phase (heating from 10 to 40°C circulated air temperature) before the second heat-up phase begins (heating from 40 to 90°C circulated air temperature). Leather that possesses a high moisture content during the second heating phase causes an appreciable amount of shrinkage in the leather. For this reason, the intersection of 40°C and 40% relative humidity shall be maintained. If the chamber (e.g. as a result of puddles forming) has not been sufficiently dehumidified, it is possible that the heating phase (Section No. 6) could be prolonged.

2.5 Assessment Criteria

No impairment of the functions described in the Component Requirement Specifications.

No swelling/no fraying.

No hardening of the foam (insulating material)/no peeling off of the foam padding.

No hardening of the equipment (backing)/no separation of the equipment (backing).

No annoying odors (evaluation according to VDA).

No visible discoloration at part (e.g. water spotting, color changes, etc.).

No loosening of surface material up into the visible area (e.g. local buckling, cracks, formation of folds).

No visible changes to the surface (visible and rear sides).

No opening up of connecting points (welds/adhesive points, seams, etc.).

No fracture points within the part.

No failure of the fasteners (paneling to body shell, within paneling, etc.).

No tearing off of net fasteners/no wearing out of the nets/no runs in nets. No fatigue/slackening (loss of pretension) of elastic strips, e.g. in ruffled pockets.

No visible deformations at part (e.g. edges or borders sticking out).

No warping, detachment or swelling of wooden parts in the carrier area.

No changes in the butt joints and gap dimensions.

No peeling off of decorative inlays.

No visible deformation in roller-blind suspension and mounting area.

No inhomogeneous change in gap pattern between extended roller blind and window frame lining.

The window frame lining overlap to the adjacent sealing components must be given.

Additional Assessment Criteria During the Leather Test

With wrinkled leather midsections, the wrinkles may not flatten out. The original gathered appearance must be clearly maintained. Reference samples of the components after the leather test shall be coordinated with the responsible developer by DAI and shall be stored as back-up samples. In addition, a suitable photo documentation shall be produced. For stitched leather midsections, the shape and geometry shall clearly be maintained over the entire length.
Minor dimensional deviations require the approval of the client. No broken stitching.

Any deviation shall be reported by DAI to the responsible developer in writing following the test. Deviations require an approval by DAI; otherwise corrective measures must be implemented by the contractor in coordination with DAI.

3 Weathering Tests

During all weathering tests, both the surface temperatures occurring on the component and the respective ambient temperatures shall be detected and documented (instrument panel Y0 in front of windshield, parcel shelf, cargo compartment cover/retractable net and cover).

3.1 Solar Simulation DIN 75220 (SoSi)

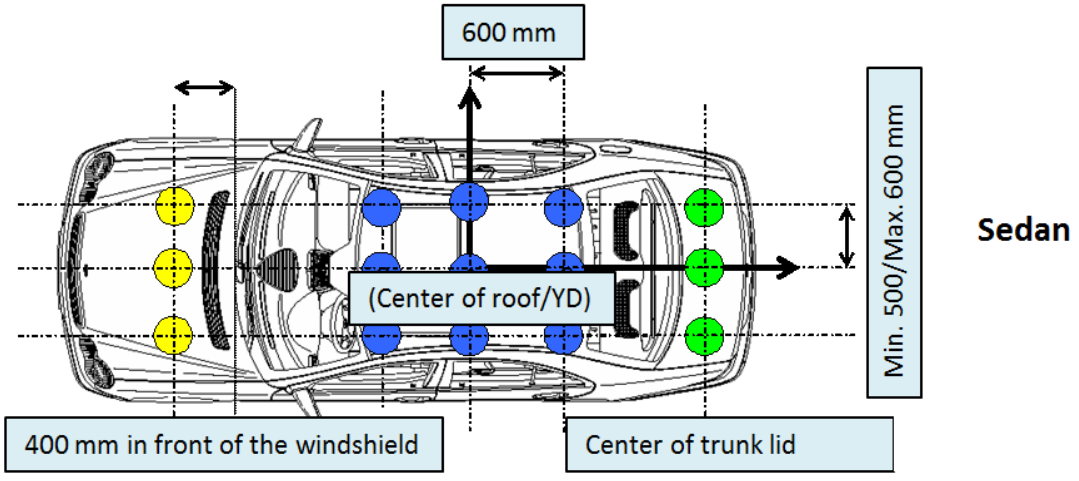
Concluding overall testing of the complete interior equipment on the overall vehicle by Daimler AG (new parts produced with off-series tools, dark equipment color).
The test shall be conducted on the closed vehicle (soft top, windows, air nozzles, flaps).

The "outdoor solar simulation" test shall be conducted following the PPAR process. It will be carried out by Daimler AG using 100% green sampled parts. The condition for this is an OK result of the light-fast test of the individual materials.

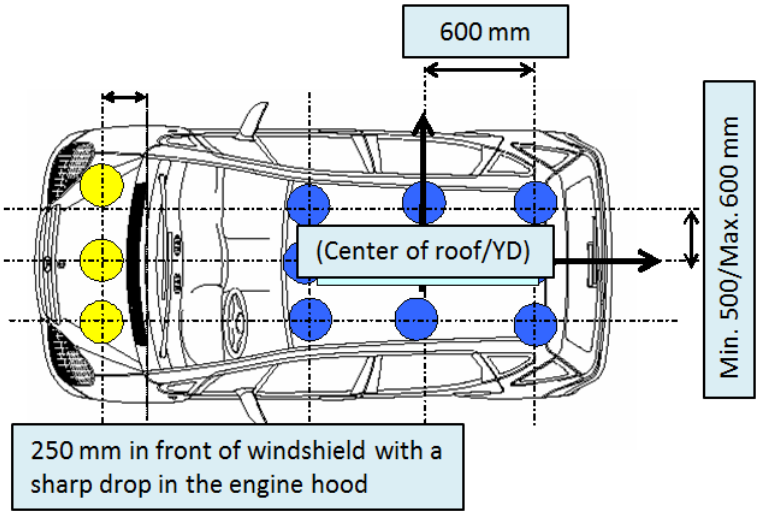
The outdoor solar simulation shall be conducted in accordance with DIN 75220, Pt. 7.2.3, Tab. 2.

Radiation intensity:	1000 W/m^2
Measuring tolerance:	
Engine hood/trunk lid	± 30 W/m^2
Roof:	± 50 W/m^2
Test chamber temperature:	42°C
Test time:	240 hrs.
Rel. humidity in the test chamber:	10% < r.h. < 20%

Light intensity measuring points:
See illustration of sedan/hatchback
The irradiance shall be adjusted at the measuring points.



Sedan



Hatchback

3.1.1 Black Standard Thermometer (According to DIN 75220)

The black standard thermometer shall be positioned horizontally at Y0 (± 150 mm) on the instrument panel 100 mm away from the windshield. The distance is measured from the center/bottom edge to the windshield at a right angle to the instrument panel.

During the outdoor solar simulation, a temperature is measured on the instrument panel with the black standard thermometer and recorded during the entire test which is independent of the material. During the test, the black standard thermometer is to act as the monitoring instrument for the source of radiation. A drop in temperature is an indicator that the radiation load is decreasing (e.g. deterioration/malfunction in the lamps). The irradiance is also recorded.

Monitor and document the intensity of the radiation in the test log.

3.2 Outdoor Weathering (FBW)

During outdoor weathering, surface temperatures which occur on the components shall be detected and documented with the measuring schedule coordinated with the component manager. As standard, a black standard thermometer and a global radiation sensor shall be used in the area of the instrument panel Y0 at a distance of 100 mm away from the window.

Concluding overall testing of the complete interior equipment on the overall vehicle by Daimler AG (new parts produced with off-series tools, dark equipment color). Conduct a test on the closed vehicle (soft top, disks, air nozzles, flaps).

Humid tropical climate (e.g. Florida/USA or Natal/South Africa)

Dry tropical climate (e.g. Arizona/USA or Kalahari/South Africa)

: The "outdoor weathering" test shall be conducted following the PPAR process. It will be carried out by Daimler AG using 100% green sampled parts. The condition for this is an OK result of the light-fast test of the individual materials.

The outdoor exposure test is performed on a completely constructed vehicle (at the earliest from PRO 2), set up for a defined period (24 months) in the corresponding region. The vehicle front shall then be directed towards the maximum solar radiation.

3.3 Assessment Criteria for all Weathering Tests

Fogging on the test box glass pane or the body shall lie within the limit values applicable for Daimler AG.

No visible deformation or discoloration of the part.

With lamps or light-wave conductors, the luminous intensity or color of the light shall not cause any discoloration or blooming.

No visible changes to the surface (visible and rear sides).

No opening up of connecting points (welds/adhesive points, seams, etc.).

No fracture points within the part.

No discernible change to butt joints and gap dimensions. Dimensional deviations are tolerable only if the functioning and appearance are not affected (assessment and approval by Daimler test manager).

No failure of the fasteners (paneling to body shell, within paneling, etc.).

No loosening of surface material up into the visible area (e.g. local buckling, cracks, formation of folds). No separation of the equipment (backing).

No negative effects on the functions described in the component requirement specifications.

Worsening of operating noises is only tolerable in coordination with the Daimler test manager.

No corrosion of trim parts, functional parts or detachable parts.

No peeling of trim inlays, stickers or information labels.

4 Mechanical Tests

The mechanical tests shall be carried out in the assembly (ZB) with all adjacent trim parts.

Force application points shall be coordinated with Daimler AG or documented on the drawing.

The temperatures refer to the component temperature

4.1 Driving Test

All tests described in Chapter "Driving Test" and "Durability, Target Endurance Test in the Overall Vehicle" shall be carried out by the respective entire-vehicle model series departments at part of overall vehicle testing together with the specialized department. The exact boundary conditions for the road tests (speeds, routes, etc.) are stored in the corresponding VAWs of the model series.

The driving test serves the evaluation of the overall functioning in the vehicle under different driving conditions. This also includes the investigation of flapping, creaking and functioning noises during automotive operation.

The driving tests will be carried out on varying profile stretches at various speeds, temperatures (TT/ RT/ HT) and environmental conditions:

- Highway
- Freeway
- Rough road
- Winding, hilly road

4.1.1 Assessment Criteria

: The assessment of the overall function shall be carried out in the vehicle under various test conditions (cross-country route, city traffic, freeway, rough road, etc).

No failure of fasteners from the body shell or paneling.

Assessment with regard to subjective annoying reflections in the windows.
Assessment and approval by component manager and the Daimler test manager.

No noise produced with adjacent parts from vehicle vibrations.
No resonance vibrations. A sufficient inherent stiffness must be ensured. Assessment and approval by the component manager and the Daimler test manager.

No noise from the components and the parts attached to them.

No creaking noise when body subject to torsional stress.

No failure, no permanent deformation or damage.

No corrosion.

No opening up of connecting points (welds/adhesive points, seams, etc.).

Folding and locking functions OK

No functional impairment.

4.2 Contamination

Assessment of contamination caused by handling and driving.
Interior care according to DBL 5399 Soiling and cleaning.

The component to be tested and the adjacent components may not be soiled by internal auxiliary production materials, lubricants, etc. in normal use.

Example:
Greased bearing points may not cause any soiling of the surrounding area./

Anti-creaking measures: The auxiliary material applied may not be visible.

4.2.1 Assessment Criteria

Soiling which commonly occurs during use may not impair the function and appearance and shall be removable from the installed part by vacuuming and brushing or with water and soap or interior care agents approved by Daimler AG. Textile surfaces shall not become frayed.

Approved cleaning agents shall not cause discoloration, material changes or functional impairment.

4.3 Durability Test

4.3.1 Durability, Target Service Life Test on Overall Vehicle

The "Durability, Target Endurance Test in the Overall Vehicle" test is not part of the PPA. The test is performed by the complete vehicle departments of the particular model series at Daimler. The supplier's component shall meet all corresponding requirements.

The endurance test takes place under actual operating conditions in the overall vehicle.

150,000 km	Road endurance test
80,000 km	Accelerated endurance test
25,000 km	Trailer endurance test
2,000 km	Rough road endurance test (heath)
10-15,000 km	Final board approval
51,000 km	Worldwide endurance test

4.3.1.1 Assessment Criteria

No failure; no permanent deformation or damage on the part itself; no loosening/coming out or breaking of fasteners; no impairment of function.

No functional impairment.

No opening up of connecting points (welds/adhesive points, seams, etc.).

No corrosion.

No functional impairments of moving parts (i.e. belt vertical displacement, nozzle adjustment wheels, switches, etc.).

None of the components of the part being tested are allowed any change in location and position (basic setting, etc.)

No noise from wear or distortion.

4.4 Lighting Test

This test serves the validation of lighting elements and their adjacent components.

The corresponding lighting elements are then switched on continuously for a period of 12 h.

4.4.1 Assessment Criteria

No escaping of diffused light, not even at adjacent parts, connecting points/gaps.

The door pockets with courtesy lights shall show no distortion at the base of the part after a 12-hour light test. They shall be lightproof in the assembly.

The lamps and adjacent components may only heat up to such a degree that no deformations, separation of individual parts or ignition (due to illuminants) result.

4.5 Corrosion Test

The corrosion resistance is tested as part of the corrosion endurance test in the complete vehicle. The test is carried out in accordance with Meko-D (Mercedes-Benz corrosion endurance test) under the direction of EP/CRK.

4.5.1 Assessment Criteria

No functional impairment.

No change in the visual appearance.

4.6 Leak Test

These tests apply to all trim parts with sealing functions relative to the wet area.

4.6.1 Leaktightness

This test is performed on the overall vehicle.

8 h rain test in Daimler test bench
Inclination:
X-axis approx. 11°
Y-axis approx. 11°
each inclination (ft, re, rh, lh) must be tested.

With twist (simulation of parking with a wheel on the curb):

Single-sided twist at maximum curb height (approx. 250 mm).

Each twist, i.e. all 4 wheels consecutively.

4.6.2 Car Wash Test

10 cycles with brush/wash unit.

1 cycle = 1 passage through car wash, as well as high-pressure car wash (80 bar) as per process procedure.

4.6.3 Steam Jet Test

Steam cleaning of the entire vehicle.

Test procedure:

Steam jet cleaning for 60 sec at 120 bar and 80°C with a nozzle distance of 1,000 mm. Steam jet shall be guided along the door joint.

4.6.4 Assessment Criteria

No ingress of water in the dry areas

No damage

No breaking off of fasteners

No changes to surface

No change in the visual appearance.

4.7 Draft Test

The tightness of fastening clips is to be validated according to the standard "Mercedes-Benz MBN 10 355".

The freedom from leaks of the door paneling component shall be determined as part of the overall vehicle testing using the air flow hand-held measuring device. The test requirements apply to all test conditions and equipment configurations.

The following shall be tested:

The driving condition with sliding roof in tilt position, vehicle speed 120 km/h, the A/C system is to be set to "Off" and the air outlet nozzles should be manually closed. The flow is to be measured using an air flow measuring instrument and then documented. Approval shall be issued during the confirmation vehicle test along with the overall vehicle.

4.7.1 Assessment Criteria

No escaping of draft air in areas relevant to the customer, e.g. around the armrest, ashtray, loudspeaker, inside opener, switches, etc.

4.8 Door-Specific Tests

4.8.1 Door Durability

During the door endurance test, the durability of all installed individual components is tested.

The endurance test is carried out with the thermally completely tested door paneling assembly on a body shell with all adjacent trim parts. If there are any side roller blind variants, then this has to be checked on one of the side of vehicles in pulled out/extended position and checked on one side in retracted condition. Thermally tested parts including documentation (see Chapter 1) must be provided by the contractor for this purpose.

4.8.1.1 Door Test Setup

A white body shell with doors installed, mounted on a body transport vehicle. The measuring equipment with integrated proximity switches are attached to the vehicle lifting supports in the door sill. Inside the body the operating unit (pneumatic unit/cylinder) is screwed onto the

center tunnel. The piston rod is connected to the handle/linkage via a compensating piece (with leather straps). The compensating piece causes a decoupled lift to approx. 150 mm, which ensures that the last section is overcome without force during the closing process.

The door paneling test shall be carried out taking into consideration all special equipment. It shall be ensured that the maximum masses of the door assembly and the number of all available individual components in the door paneling are taken into consideration.

Should the door paneling enable a beverage bottle to be stored, the largest bottle defined in the market basket (filled) shall be taken into account during the endurance test. In this case, the differential weight of 2 kg shall be added with corresponding weights in the door pocket.

Should the storage of the vehicle document wallet in the door paneling be planned, then this must be taken into account in the endurance test (max. equipment). In this case, the differential weight of 2 kg shall be added with corresponding weights in the door pocket.

Conducting the test:

e.g. left driver's door with bottle and additional weight right driver's door with vehicle document wallet and additional weight

4.8.1.2 Design of DAI System

Control with monitoring of the entered parameters (closing and opening speed, pausing time per ½ cycle, number of cycles). A cycle comprises the one-time opening and closing of all doors. In the event of deviation from the target value, automatic readjustment is carried out with the exhaust air. In the event of severe deviation, the control shall cancel the test.

The pneumatic cylinders shall be controlled by the exhaust-air volume flow. Charging of the supply and exhaust-air side with 6 bar each.

A pausing time per ½ cycle results from the inertial movement of the compensating piece and a set value. For opened doors this is at least 1 sec and for closed doors at least 2 sec.

Partitioning of test cycles:

Actuations	Unlocking			Window pane		Opening angle	
	Outside	Inside	Door locked	Top	Bottom	Stop *	As per specification **
0 – 25.000	X				X	X	
25.000 – 50.000	X			X		X	
50.000 – 75.000		X	X***		X	X	
75.000 – 100.000		X	X***	X		X	

* Hinge stop
** is predefined by Daimler development department
(normal opening to stop; opening to 75% => "soft opening")
*** door locked, door safety knob in lower position

The introduction of force is always carried out from the inside at the handle element provided for this purpose.

Test speed: Will be empirically determined by the Daimler development department

(formula through the durability EP/SPB (Mr. Varveris and Mr. Gaeckle), depending on the door length:

Guideline value for opening driver's door:	0.3-0.4 m/s
Guideline value for closing driver's door:	0.6-0.8 m/s
Guideline value for opening rear door:	0.35-0.5 m/s
Guideline value for closing rear door:	0.7-1.0 m/s
Measuring location for opening:	500 mm from hinge axis, 70 mm before limit stop
Measuring location for closing:	500 mm from hinge axis, shortly before beginning of first braking effect by lock or rubber seal.

Formula through the durability EP/SPB (Mr. Varveris and Mr. Gaeckle):

Factor F is dependent on the door length
Factor F=1.45 when the door length (hinge axis up to center of ratchet) < 1,150 mm
Factor F=1.55 when the door length (hinge axis up to center of ratchet) > 1,150 mm

$$clo\sin g\ speed\ [m/s] = \frac{factor F\ *500[mm]}{door\ length\ (hinge\ axis\ to\ rotary\ tumbler\ center)[mm]}$$

$$opening\ speed = clo\sin g\ speed\ [m/s] * 45\%$$

Opening: e.g. 0.66 m/s (closing speed) x 45%= 0.3 m/s (opening speed)

The test speeds shall be detected and documented (e.g. with light barriers).

Type and direction of the force application point is defined by the position of the linkage/handle in the door paneling.

Prior to the start of the test, an acceptance of the laboratory rig shall be conducted with the development department.

4.8.1.3 Grab Handle or Handle Recess

The grab handle shall withstand 100,000 cycles at RT without failing.

4.8.1.4 Door Pocket

The door pocket shall withstand 5,000 cycles at RT without failing.

The application point is the center of the door pocket (weakest point) over a U-shaped profile. The test is conducted following the complete door/flap endurance test (4.8.1), and therefore with the same, aged paneling.

4.8.1.5 Assessment Criteria for Chapter 4.8.1.2 to 4.8.1.4

No failures; no lasting deformations or damage; no loosening or breaking of the assembly, attachment or mounting parts and fastening; no impairment of functionality.

No annoying noises may occur during the door endurance test.

Kinematic elements may not open as a result of the door endurance test.

Generally, no soiling may result due in the visible area to abrasion or lubricants.

4.8.2 Door Pocket and Storage Trays (Open and Closed)

4.8.2.1 Door Pocket Weight Drop Test

Test weight:	1 kg
Test piece:	steel ball ∅ 63 mm
Fall height:	1,000 mm
Test temperature:	-30°C

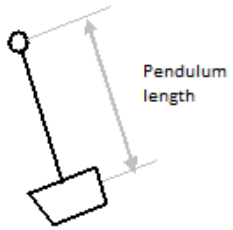
The ball fall test shall be carried out in the center of the door pocket (weakest point).

4.8.3 Loudspeaker Grille

4.8.3.1 Pendulum Impact Test (Area Below Armrest)

Pendulum length	600 mm
Pendulum weight	2.3 kg
Test speed	1.5 m/s (impact)
Test piece	Rubber tip of shoe (shore A 75 ± 5), Radius 10 mm, height 15 mm (in agreement with Daimler development department)
Test area applies to entire grill.	
Test temperature	60°C, RT, -10°C

Sketch of pendulum:



4.8.3.2 Ball Fall Test for Speaker Above Armrest

Test weight:	0.5 kg
Test piece:	steel ball ∅ 50 mm
Fall height:	500 mm
Test temperature:	60°C, RT, -10°C

Test area applies to entire grill.

4.8.3.3 Assessment Criteria for Chapter 4.8.2 and 4.8.3

No failure; no permanent deformation or damage; no loosening and breaking of fasteners; no impairment of functioning.

No open sharp-edged breaking off during the ball fall test, no splintering (permanent deformation of real-metal grills shall be coordinated with the client).

4.8.4 Armrest

Unless otherwise stated, all tests are to be conducted at room temperature.

The following text distinguishes between different version types:

Hard armrest: injection-molded or laminated with compact or foam film

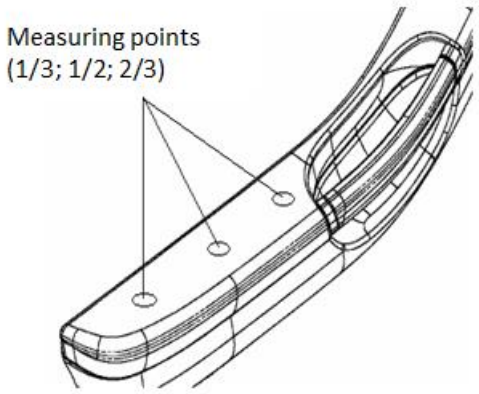
Soft armrest: foam laminated with leather or film

4.8.4.1 Support Test

Test force	500 N
Test ram	∅ 20 mm with rounded edges (R3)
Material of test ram	steel
Test direction	Z or vertical to horizontal surface (armrest)
Test speed:	50 mm/min
Test area:	Entire armrest (at RT)

The measuring points shall be defined for the respective model series in coordination with the client (for example: 1/4, 1/2, 3/4 in x-direction and centered in y).

Diagrammatic figure of the measuring points of a padded armrest:



4.8.4.1.1 Assessment Criteria

No permanent deformation or damage; no loosening and breaking of fasteners; no impairment of functionality.

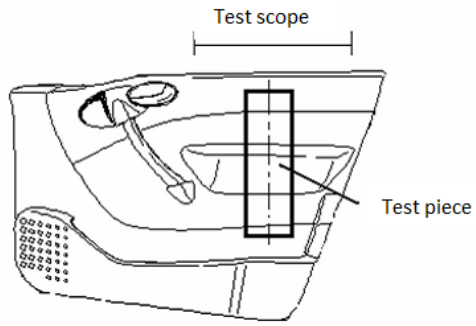
The force-path graph produced in the process shall correspond to the specified field of the softness characteristic.

4.8.4.2 Force-Travel Test

The following requirement applies to armrests with a mounting height of less than 200 mm above the seat reference point:

in Y-direction:	at least 40 mm
Test setup:	The door paneling (without body shell) shall be provided with a hard support over the entire test area and screwed on all around in order, among other things, to assess the elasticity of the armrest.
Test piece	∅ 150 x 330 mm (metal body)
Test speed:	50 mm/min
Test area:	Will be specified by Daimler AG development department

Sketch : Door lining



Special requirements apply with regard to the support force in y for armrests which are more 200 mm over the seat reference point. These shall be defined in a model series specific basis.

4.8.4.2.1 Assessment Criteria

No open break.

Maximum of 1,000 N (any infringement only permissible if requirements for the overall system/requirements specification are met)

4.8.4.3 Softness Test of the Armrest

This test serves the simulation of a customer problem.

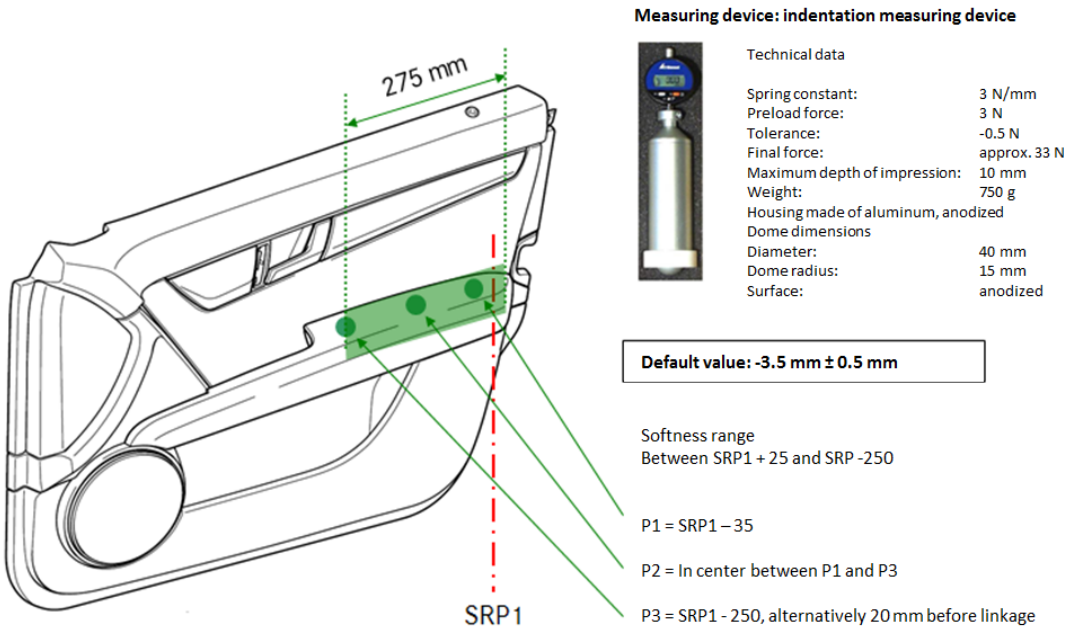
Test agent: Indentation depth measurement unit (indentation measuring device) in holding device

Calotte diameter:	30 mm
Spring constant:	3 N/mm
Preload force:	3 N
tolerance:	-0.5 N
Final force:	approx. 33 N
Maximum depth of impression:	10 mm

The indentation measuring device to be used, new version, 3-33 N, shall be purchased from TUEV SUED Automotive GmbH (http://www.tuev-sued.de/).

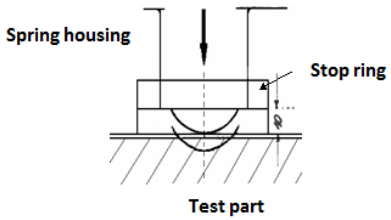
The measuring points are defined in accordance with the sketch. The measurement is performed at room temperature of measuring device and test specimen on components at least 5 days old. For material variants in the armrest, all variants are to be checked.

Measuring points and softness area:



Measurement: The center of the calotte rapidly penetrates vertically into the surface of the unit under test with a distance-dependent force and must be pressed in until it touches the stop ring. The measurement value can be read following a dwell time of 3 seconds. The measurement value is given in mm.

Diagrammatic figure: Test with measuring device



4.8.4.3.1 Assessment Criteria

The softness target value to be achieved is -3.5 mm ± 0.5 mm. The measurement values are anchored in the component requirement specifications and they shall be specified on the drawing.

4.8.4.4 Flexing Test

This test serves the simulation of a customer problem.

This test is used only on soft padded armrests.

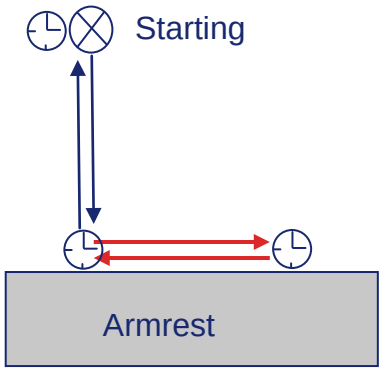
A test piece ("dummy arm") is moved back and forth on the center of the padded armrest along the X-axis.

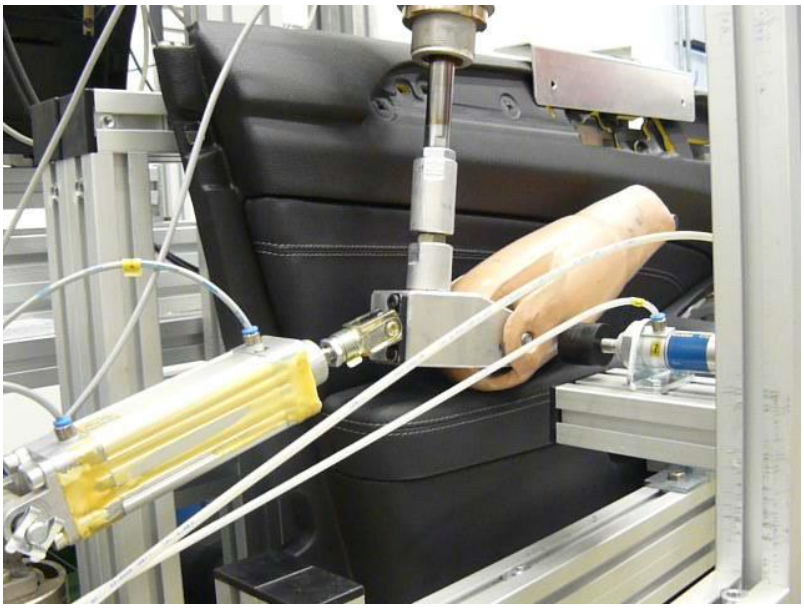
Test distance along X-axis:	60 mm
Bearing strength:	100 N
Number of cycles:	5,000 at RT
Test procedure:	Starting position in unloaded state
	Duration of downward movement approx. 2 sec.
	Load 100 N; dwell time approx. 1 sec.
	Duration of forward movement with 100 N approx. 1.5 sec.
	Dwell time with 100 N approx. 1 sec.
	Duration of rearward movement with 100 N approx. 1.5 sec.
	Dwell time with 100 N approx. 1 sec.
	Duration of upward movement approx. 1 sec.
	Dwell time approx. 6 sec.
	Start of new cycle
	Cycle time approx. 15 sec. (5,000 cycles approx. 21 h)

Note:

Hybrid II lower arm (50% man) on left with sock "STFI MD 100"
Procurement: Humanetics Europe GmbH;
Order number: VEC/ATD-3145-1 (Lower Arm Hybrid II, left)

Schematic design of test:





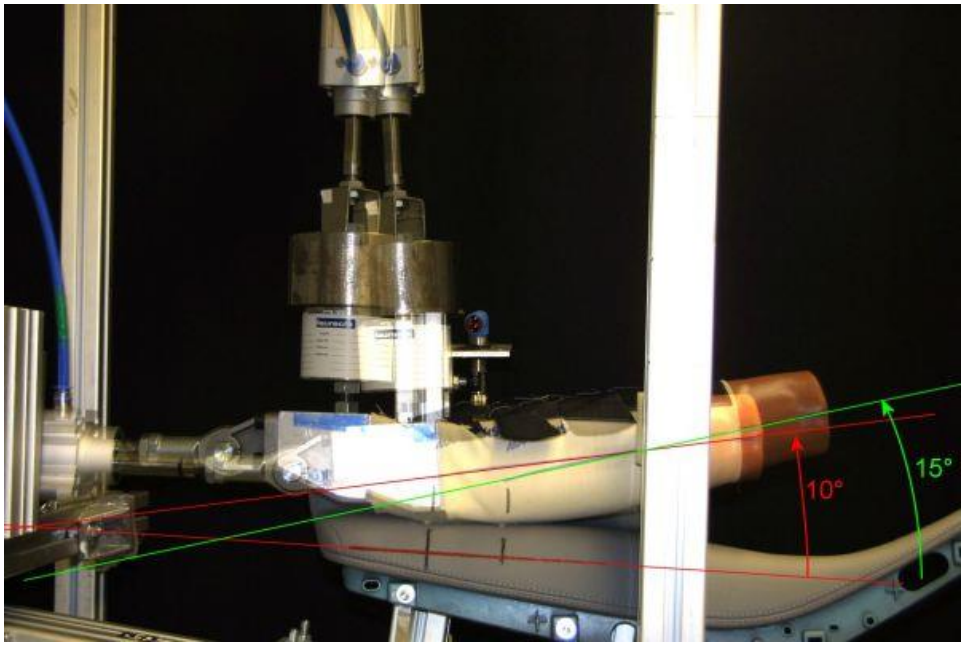
The permanent attachment between the lifting cylinder and the dummy arm results in varying angle of incidence in the respective end position

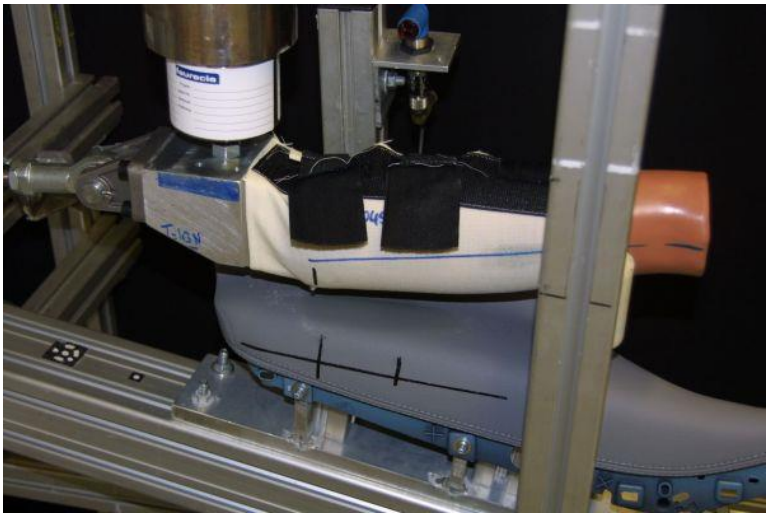
Rear position approx. 10°

Front position approx. 15°

Textile orientation (direction of shot = direction of movement of arm)

Fixing of sock with Velcro strap





Illustrations and test setup for felting test: Source: Faurecia as example of test setup

4.8.4.4.1 Assessment Criteria

None

- Damage to component
- Breaking open of welded joints
- Glossy spots
- Thrust folding of surface material

4.8.5 Beltline

Unless otherwise stated, all tests are to be conducted at room temperature.

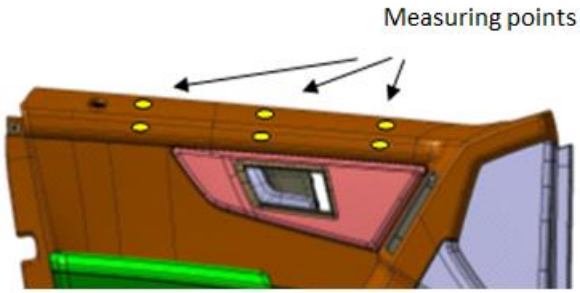
4.8.5.1 Suppleness Test of the Upper Body Edge at Window Level

Test agent: Indentation measuring device (HPE II Interior) in holding device

Calotte diameter:	10 mm
Spring constant:	5 N/mm
Final force:	approx. 25 N
Maximum depth of impression:	5 mm

Test agent: fm02373 - HPE II Car Interior digital hardness tester from Heinrich Bareiss (www.bareiss-germany.com).

Diagrammatic figure of measuring points:



The recess center is quickly pressed perpendicularly into the surface of the unit under test until it touches the stop ring. After a holding time of 3 sec. the measured value is read off at the dial gage. The measurement value is given in mm. The measurement is performed at room temperature of measuring device and test specimen on components at least 5 days old.

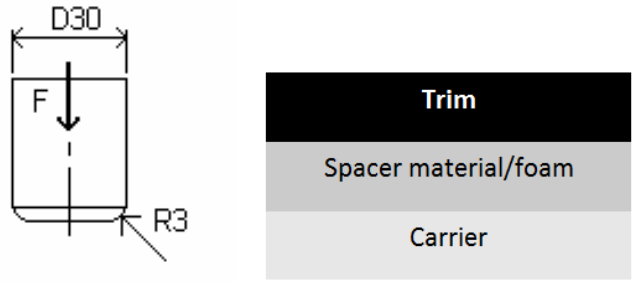
4.8.5.1.1 Assessment Criteria

The measured values to be achieved are defined in the component requirement specifications and must be specified on the drawing.

4.8.5.2 Soft Trim and Soft Armrests (Deformation)

The force application point and the test area shall be defined by the Daimler development department in the drawing or in the component requirement specifications/project description

Diagrammatic figure of test stamp:



Test surface:	452 mm² (∅ 24 mm)
Material of test piece:	Metal
Test duration:	5 cycles
Test force:	50 N
Cycle:	1 h load/ 1 h relief
Test scope:	Horizontal surface (shall be defined by Daimler development department)
Test temperature:	RT

4.8.5.3 Assessment Criteria

No permanent deformation or damage; no loosening and breaking of fasteners; no impairment of functionality.

4.8.6 Kinematic Components

4.8.6.1 Actuation Forces/Torques

Functioning shall be ensured between -30°C and +90°C (component temperature).

The force application points, type and direction of the force measurement, actuation forces, operating distances, closing forces and closing areas for storage compartments shall be coordinated with the client or shall be specified in the component requirements specification.
Actuation forces and torques shall generally be measured at room temperature (RT= 23°C ± 2 K).
Actuation force with folding cover with push button (e.g. storage compartment of door paneling):

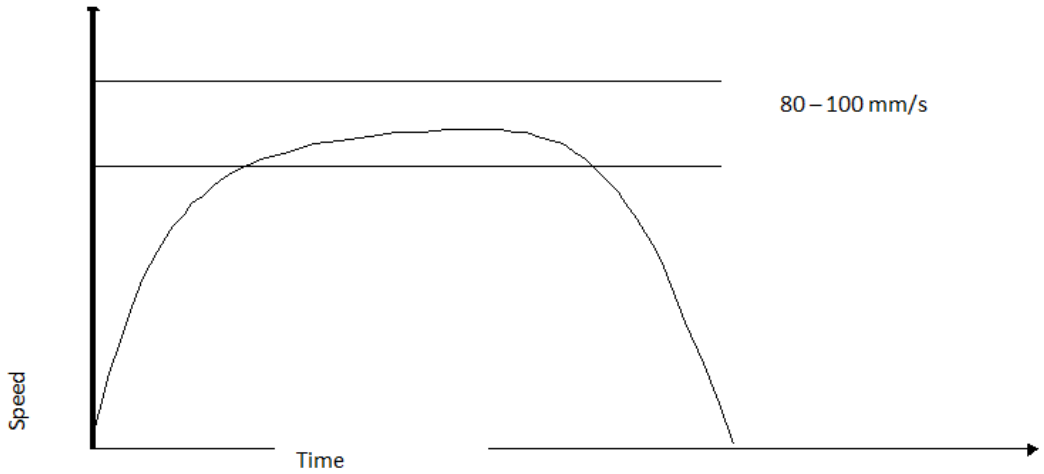
15 N < F < 20 N or according to the drawing

The locking force must be high enough tat the compartment remains closed in a crash. As an alternative, crash locking must be possible with a manual lock. Control force of push-push compartment (e.g. ashtray, storage compartment, etc.):

10 N < F < 14 N or according to the drawing.

4.8.6.2 Opening Curve

Opening characteristics shall be smooth (no jerking). Make sure there is an adequate cushioning effect when in the final position.



Curve (example) for opening characteristics

The curve describes the opening characteristics for the lids' or the compartments' movements when opening. After being triggered there is an acceleration. As it continues, the

movement should be as even and consistent as possible. At the end, the speed of the movement will slow down smoothly.

Opening speeds at RT (23°C ± 2 K): 80 -100 mm/s

: This results in opening times of 1-2 seconds depending on the compartment side. The goal is to achieve a uniform characteristic for all of the storage compartments found in the vehicle.

As a result, the speeds or opening times must generally be coordinated with the client.

Opening speeds at +60°C (± 2 K): 80 -100 mm/s + 30%
Opening speeds at -15°C (± 2 K): 80 -100 mm/s - 30%

The function must be ensured between -30°C and -15°C and between +60°C and +90°C (component temperature), however there is no speed specification.

4.8.6.2.1 Assessment Criteria for Chapter 4.8.6.1 and Chapter 4.8.6.2

Harmonious, smooth motion without conspicuous noise
No afterbounce at limit position.
Functioning shall be ensured between -30°C and +90°C (component temperature, no speed specification).

4.8.6.3 Endurance Test

The endurance test shall be performed with a new off-tool production part according to the sequence given.

The temperatures refer to the component temperature

3,000 cycles at RT

1,000 cycles at -20_°C

1,000 cycles at 80_°C

1,000 cycles at 40_°C/92% r. h.

Pausing times per ½ cycle: 10 s each at 80°C and 40°C -92% r. H.
5 s each at RT and -20°C

Deviations shall be coordinated with the Daimler development department.

4.8.6.4 Assessment Criteria

Functionality must be guaranteed after the test (no failures; no lasting deformations or damage; no loosening or breaking of the assembly, attachment or mounting parts and fastening; no impairment of functionality).

No noise produced, even by wearing or distortion.

Generally, no soiling may result due in the visible area to abrasion or lubricants.

No visible deformation or discoloration of the part.

No loosening of fasteners from the body shell or paneling.

The kinematic components may not open during the door endurance test.

During endurance testing of kinematic elements, the originally specified control force may not be changed by the endurance test. Deviations shall be reported to the client.

4.8.7 Door Closing Elements

For the component elements handle, door handle recess and door pocket a quasi-static test shall be conducted in dependence on the temperature.

The test shall be performed with a new off-tool production part in the sequence given.

Test procedure:

The quasi-static test shall be carried out on a permanently mounted and completely assembled door shell and controlled in dependence on force. The force to be set is generally 300 N. (Deviations can be caused by the hinge system and by the gross weight of the doors and shall be arranged in agreement with the client).

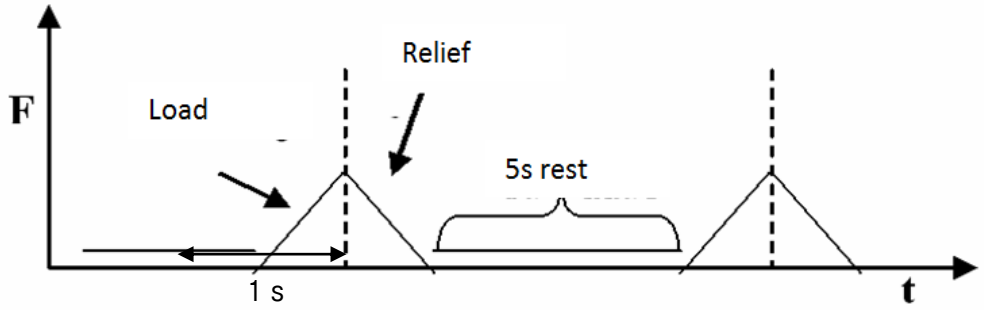
The temperatures refer to the component temperature

Cycle definition: Loading and unloading

Pause time: 5 s

1,000	cycles at	+60_°C
300	cycles at	-20_°C
50	cycles at	-30_°C

Diagrammatic figure:



4.8.7.1 Assessment Criteria

No breakage, no strain whitening of the parts, no visible deformations, no perforation or breakage of the component connections are permissible. No noise.

This test shall be carried out at the contractor's plant in addition to the door/lid endurance test (Chapter 4.8.1).

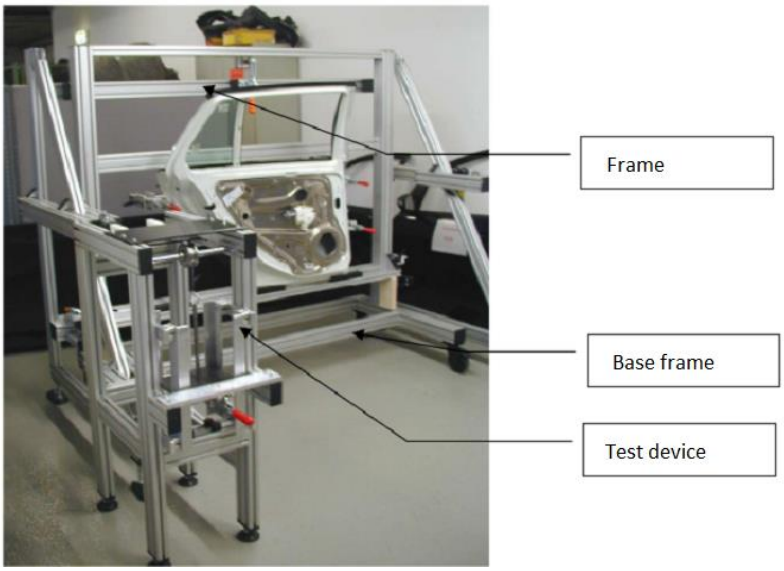
4.8.8 Interior Actuator

The connection between the inside door opener and door paneling shall withstand all listed stresses. The test shall be performed with new parts each time.

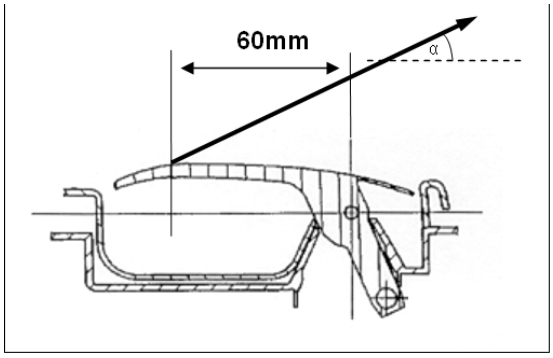
The components: stop, handle, axle and abutment shall not be destroyed. The test parts shall be held under near-production-level conditions in the test apparatus.

An abusive test shall be performed in coordination with Daimler.

4.8.8.1 Dynamic Lever Test



Diagrammatic figure:



The test setup is shown as an example.

The test is performed at the client's location.

The force application point at the lever is 60 mm away from the fulcrum (see sketch).
The force application angle is 15° relative to the door paneling (see sketch).

The drop weight is specified at 17 kg (3 plates + 2 kg).

The force acting between the lever and the drop weight is to be measured (check value) and it shall be at least 450 N.

The test temperature is -20_°C, RT, +60_°C.

The temperature of the test device and the parts to be tested must be equal to the respective test temperature.

Ten door paneling assemblies per door shall be tested.

4.8.8.1.1 Assessment Criteria

The stop, handle, axle and abutment components must not be destroyed.
Breakage or damage to the chrome surface of the lever are not permissible under any circumstances. Functioning shall be ensured after testing.

4.8.8.2 Static Lever Test (Tensile Test of Inside Opener with Test Device)

The test shall be divided into:

a) Static test on component part lever

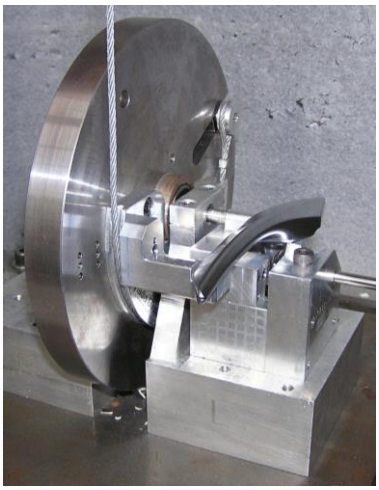
> 500 N static at RT
> 350 N at +70°C/- 20°C
10 tests per tool nest
Test at limit stop in device

b) Static test on door lining assembly

> 500 N static at RT
> 350 N at +70°C/- 20°C
3 tests per door
Test at limit stop in door lining assembly

Test of parts at a temperature of + 70°C:
The units under test are taken from the climatic chamber at 80°C and immediately mounted in the testing device. 1 minute after removal of the parts the tensile test is started. The inside part temperature is then approximately 70°C.

Test of parts at a temperature of -20°C:
The units under test are taken from the climatic chamber at -30°C and immediately mounted in the testing device. 1 minute after removal of the parts the tensile test is started. The inside part temperature is then approximately -20°C.



Test setup as per 4.8.8.2 a) on separate part
Source: ITW

Test velocity:	100 mm/min
Test force (on component):	500 N/350 N (temperature-dependent)
Force application point:	60 mm from bearing
Direction of force:	normal relative to lever surface

Test procedure:

The static lever test is a destructive test; force is introduced until the lever breaks. The force determined must match the specification.

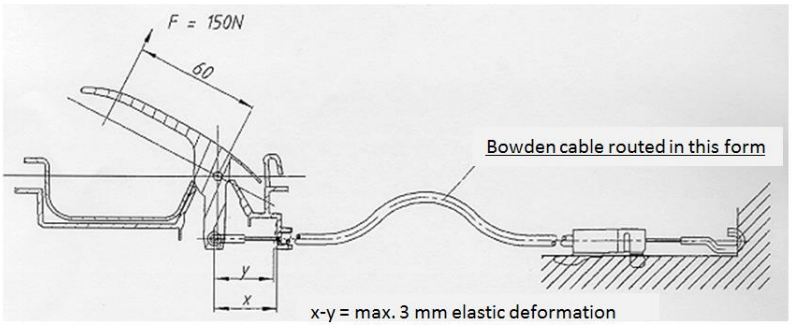
For testing on the assembly, the door trim is to be fixed into the installation position on a body shell.

4.8.8.2.1 Assessment Criteria

Fractures or damage to the chrome surface are not permitted under any circumstances. Functioning shall be ensured after testing.

4.8.8.3 Static Abutment Test (Tensile Test of Inside Opener with Bowden Cable)

Test speed: 100 mm/min.



Brief Description

The Bowden cable shall be permanently clamped in place in the lock area.
The door inside actuating lever is loaded with 150 N 60 mm before the rotating axis.

4.8.8.3.1 Assessment Criteria

Maximum elongation of the Bowden cable of 3 mm (elastic deformation).

No deformation/breakage on the lever (eye and crown clip) or of the Bowden cable abutment on the inside door opener.

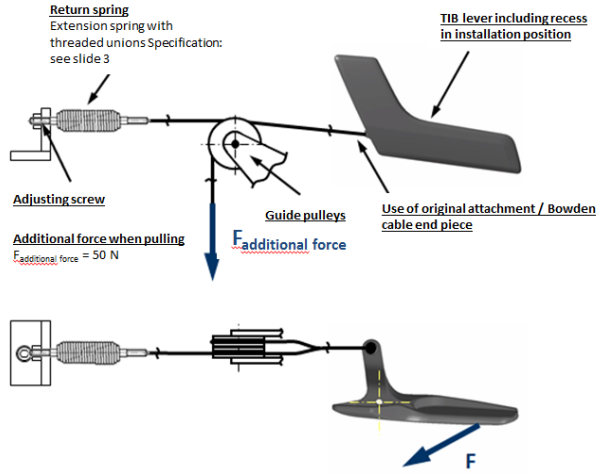
4.8.8.4 Endurance Test (INT-FR-04-1001)

- The endurance run test shall be performed with a new off-tool production part in the sequence given.
- The temperatures refer to the component temperature
- Cycle definition: 1x complete opening and closing procedure.
- Test speed: 4 cycles/min.
- The speed when opening is 50°/s

- F_{Pull}: 70 N (spring force [20 N] + additional force [50 N])
- F_{Return}: 20 N
- F_{Park}: 7 N
- Everything is closed by the return spring without any further Influencing parameters/damping elements

Actuation	Temperature	Rel. Humidity
50 000	+23_°C +/- 2_°C	50% +/- 5%
10 000	+80_°C +/- 2_°C	90% +/- 5%
10 000	-30_°C +/- 2_°C	

Standard climate as per ISO 554



Procedure

Step 1:
Pull the TIB lever

Step 2:
Decouple fixing of TIB lever force F_{Pull}

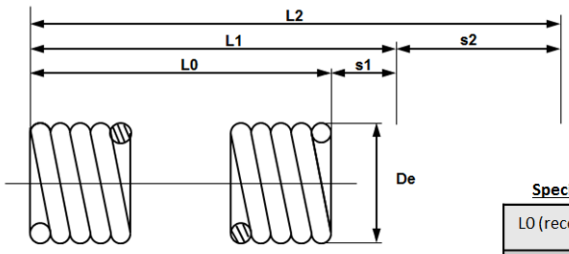
Step 3:
Reset the actuator from step 1

Step 4:
Release the TIB lever fixing (TIB lever flicks back)

Step 5:
System in original condition

Return spring

Extension spring with 2 threaded parts 1x with M3 and 1x with M6



Specificati

L0 (recommendation)	40 – 60 mm
F1 at L1	7 N
S2	25 mm
F2 at L2	20 N

All other spring parameters can be dimensioned to suit

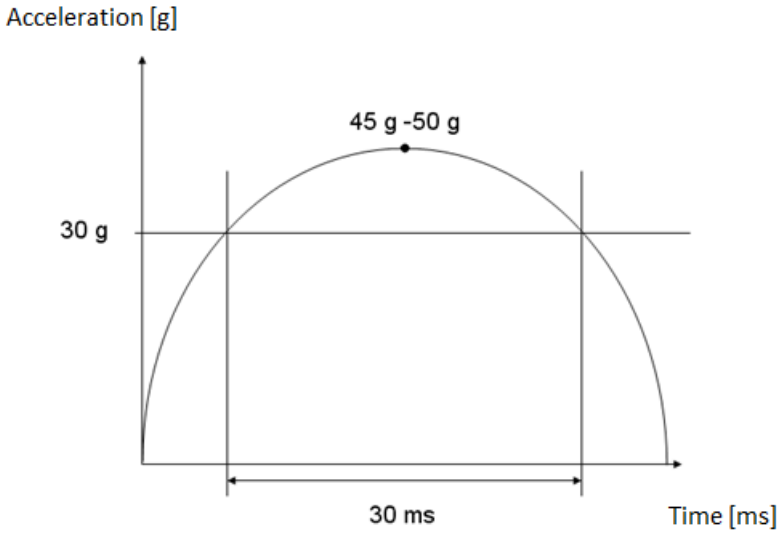
4.8.8.5 Acceleration Test

If the return is not performed from the lock, this shall take place through a spring at the inside door opener. In both cases the system must be designed so that the lever does not carry out any movement for the following test criteria:

The test is carried out on the system secured by calculation.

Test direction: ±X-axis
± Y-axis

Acceleration: 40 g over t = 30 ms ± 10 ms (mech. shock test



4.8.8.5.1 Assessment Criteria

The components: stop, handle, axle and abutment must not be destroyed.
Breakage or damage to the chrome surface of the lever are not permissible under any circumstances. Functioning shall be ensured after testing.

4.8.9 Noise Tests (Creaking, Rattling)

A door assembly with all modules and components (e.g. door module, wiring harness, channel seal, window frame lining, etc.) shall be assembled and fastened with the production fastening elements.

The test shall be carried out as follows:
Armrest, door pockets, beltline areas: These shall be loaded with approx. 500 N by means of hand or elbow.
Trim strip, switches, fiber optics, molding, speaker grill areas: These shall be loaded and unloaded with approx. 100 N with the thumb (finger).
Handles and linkages areas: These shall be pulled and pressed (open door, close door) and also torqued.
Pressing occurs on customer-relevant surfaces and handles, especially in areas of the component separations and transitions between components.
The analysis is carried out at room temperature, + 40°C, - 10°C (component temperature).

4.8.9.1 Assessment Criteria

No perceptible noises may occur when slamming the doors or while driving.

No annoying noises (e.g. break-away noises, creaking, rattling, grunting, etc.) may occur during loading.

4.8.10 Shaker test

The endurance test is performed with a new off-tool production part of a door paneling, fitted on a door shell with all add-on parts (seals, window lift, glass pane, lock/door module, etc...).

The paneling is therefore fitted to the shell with the standard fittings. On a four-door vehicle, all four doors are to be tested.

After the shaker test has been carried out, a noise test is to be carried out with the tested paneling according to Ch. 4.8.9. The assessment criterion for a new component apply.

Shaker technical data

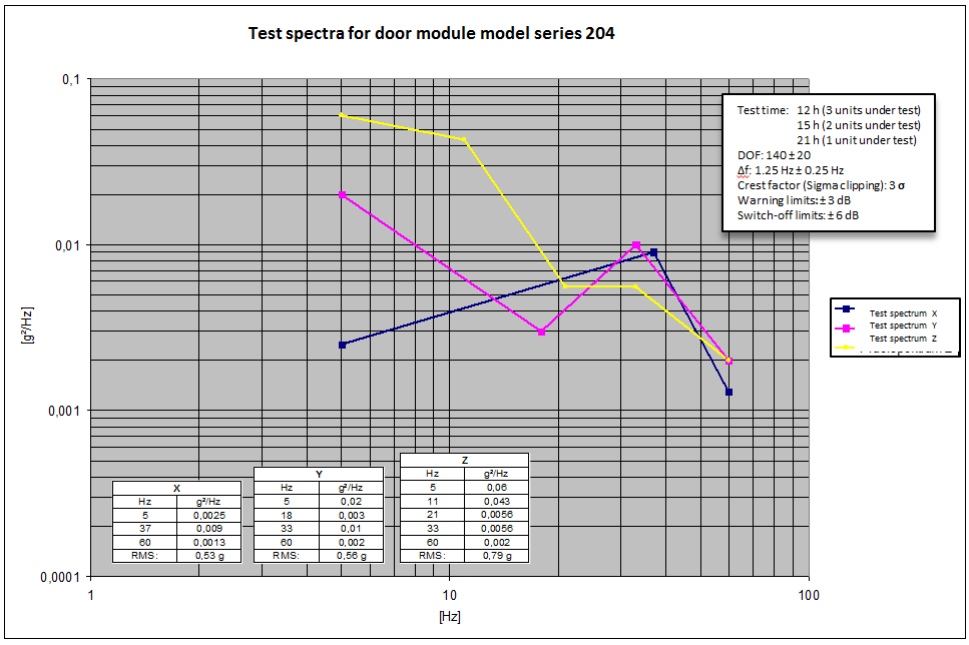
Test bench: Single-axle vibration exciter (shaker),
Temperature: RT
Units under test: The door trim equipment shall be coordinated in advance with the Client (e.g. benchmark type and maximum equipment)

Before starting the test

More precise analysis carried out on paneling (gap dimensions, attachment points, surface condition, noise) and documented accordingly
in order to carry out the comparison after the test;

Conducting the test:

Test duration: 15 hours per axle
Test frequency: See diagram



For a single axis shaker, the acceleration sensors must be fastened to both the hinges and the door lock (as with recording time signal).

Test frame:

The door shells with add-on parts and paneling are attached to a test frame (see image), which shows the connection points for the hinges and vehicle locks:

-> the standard hinges and the standard closing handles are used.

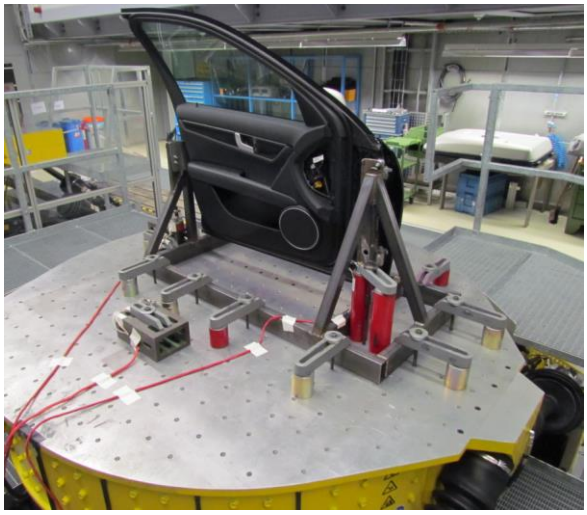
-> the spatial alignment of the door in the test frame must be standard, as depicted;

-> there may not be any play in the lock

-> the frame, including the door, must be continuously stable. (no oscillations, no bending)

The frame must be fastened to the shaker support plate without any external stimulus

-> the frames are to be set up by the contractor



Assessment Criteria:

- no separation/tearing out or breaking off of fasteners
- no diminishing of function
- no connecting points coming apart (weld/glue points, seams, etc.)
- no visible deformation or damage to the part.
- no function impairment of maneuverable components
- none of the components of the part being tested are allowed any change in location and position (basic setting, etc.)
- no noise (creaking, rattling, etc.)
- no changes to the gap dimensions and joints

4.8.11 Noise Tests (Excitation by Loudspeaker)

No annoying noises may occur via speaker excitation. The noise test shall be carried out by the client on the overall vehicle with a special sound CD. All sound versions shall be tested.

4.8.11.1 Assessment Criteria

No noises may occur during the tests, e.g. creaking, rattling, grunting or breaking loose.

5 Assembly and Disassembly

The following applies to all holding force tests:
The application point, type and direction of the force measurement must match the direction of bonding.

Assembly and disassembly shall be possible at least 5 times on new parts without destruction of the component (breaking out/off of the fasteners, deformation, etc.) and without damage to the adjacent parts.

Under no circumstances shall the clips break and fall either completely or partly into inaccessible areas of the body shell (noise).

Reusable fasteners (e.g. clips) may not be damaged during disassembly.

With removable parts (e.g. removable compartments or ashtray inserts), removal and reassembly must be possible at least 1,000 times without damage or recognizable wear.

An Assembly Workshop shall always be conducted in advance for the window frame lining with the managers responsible at the Client's, to check and approve the assembly process for the window frame lining/mirror triangle with regard to series suitability.

5.1 Retention Forces of Fasteners

The forces are determined on new parts manufactured with off-series tools.

For holding forces of fasteners 50% of the specified draw-off strength shall be attained (at RT) even after all thermal tests on the assembly in installation position and all weathering tests.

5.1.1. Fastener on Body Shell (Clips and Clamps)

Holding force of the fastener on the body:
200 N < F < 250 N or according to the drawing

Assembly force of the fastener on the body:
F < 80 N or according to the drawing

The data apply per fastener (see component requirement specifications/drawing).

5.1.2. Retainer On Door Paneling (and Comparable Elements Such As Hooks, etc.)

The retainers shall be mounted so that the direction of insertion in carried out on the Z-axis from above or at most in the horizontal direction.

Disengaging force of the clips from the retainer in the direction of insertion ≥ 5 N
(new part at RT).
The retainers for the clips shall be designed so that they are secured against falling off.

Pull-off forces for retainers from carrier component at RT ≥ 450 N.

Pull-off force for clip from retainer in assembly direction of body shell at RT ≥ 450 N

Test speed 100 mm/min.

Pull-off direction is vertical to surface or in Y-direction.

All values apply per fastener.

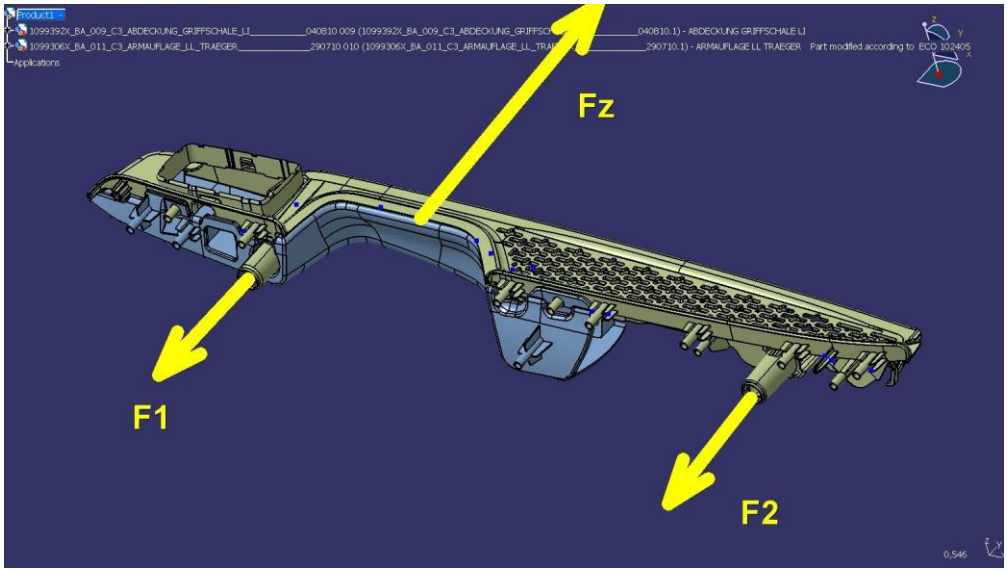
5.1.3. Decoupling Elements on Door Paneling

The door lining may not separate from the decoupling element under any load conditions and in an entire vehicle crash.

The armrest shall be mounted on a rigid plate. The component may separate from the plate at forces of

F < 2,000 N/screw-on point when pulled vertically

F <1,500 N/screw-on point, pulled 30 degrees to vertical on a horizontal plane



5.1.4. Fasteners for Components on Door Paneling

The following fasteners may not become detached under any load conditions and in an overall vehicle crash.
The connections may not cause any noises.

Guideline values for holding forces at RT per element:

Spot welds/flanges	(PP)	≥ 400 N
Spot welds/flanges (ABS)		≥ 600 N

Alternative spot weld/flange materials shall be coordinated with the Client.

Self-tapping nut (metal bolt)	≥ 800 N
Speed nuts/Pal nuts (plastic bolts)	≥ 500 N
Self-tapping bolt, plastic drift	≥ 600 N
Clip connections	depending on request
Draw-off speed	100 mm/min
Draw-off direction	vertical to surface or in Y direction

5.1.5. Switch in Door Paneling

All switches installed in the door paneling may not separate under any load conditions and in an entire vehicle crash and must meet the following requirements:
The test shall be conducted on the same component (except heat change test)

Press-out force for switches	> 200 N
Pull-out force for switches	> 200 N

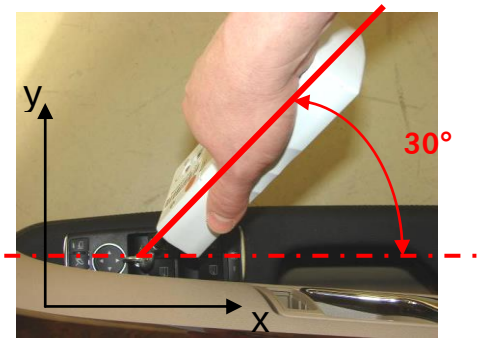
Conducting test:

- Normal relative to switch surface
- Direction of pull 45° toward rear (in x-direction)
- Direction of pull 45° toward rear + angled pulling in accordance with illustration (30° toward vehicle interior)

Test conditions:

- Pulling/pressing test at room temperature (pull/press 5x)
- Pulling/pressing test at +80°C (pull/press 5x)
- Pulling/pressing test at -30_°C (5x pull/press)
- Pulling/pressing test at RT after successful heat change in accordance with Chapter 2.1 (5x pull/press)

- Test: Disassembly of switch with special tool



Angled pulling in direction of Y0

5.2 Door-Specific Requirements

5.2.1 Molding on the Upper Body Edge at Beltline

Test the connection of a mounting strip and upper body edge at window level (e.g. welding, gluing, etc.):

Draw-off force ≥ 200 N

Test speed 100 mm/min

Length of test 50 mm

Test direction: Assembly direction of molding

5.2.2 Fabric Tape

Fabric tape, installed between the door paneling and the door frame to prevent noise, is subject to the following requirement profile.

It shall be ensured that the fabric tape is in contact with the door paneling and the body shell.

The draw-off forces shall not fall below a value of 4N/cm of strip width.

The tape strips may not separate (e.g.: during transport, driving, thermal tests, etc.). They may not be visible when mounted.

6 Safety

6.1 Design Provisions

According to ECE-R 21 and FMVSS 201

6.2 Flame Retardant Properties

CNCA-02C-060 and GB 8410 apply for CCC-relevant ("CCC" stands for "China Compulsory Certification") components.

DBL 5307 (FMVSS 302, CMVSS 302, UTAC No. ST 18-502).
Also see information on drawing.

6.3 Requirements and Tests for Crashworthiness

Current values for crashworthiness shall be taken from the following sections and, if applicable, coordinated with the department for vehicle safety.

Attention: Requirements and tests shall be continually updated.

6.3.1 Load Requirements for Installation Parts

Attention: Requirements and tests shall be continually updated.

6.3.2 Obstruction Sensor and Operating Safety

Attention: Requirements and tests shall be continually updated.

The final validation and/or release takes place in the general vehicle test, and/or in dynamic tests (e.g. sled tests) in accordance with the specifications of the JSR in coordination with the Component/General Vehicle Manager.
FMVSS 118
ECE-R 21

6.3.3 Assessment Criteria

Compliance with the requirements of the department for vehicle safety.

6.4 Pendulum Impact Test

Impact energy absorption and breakage behavior for the statutory impact velocities in accordance with FMVSS 201 and ECE-R 21. It shall be specified in the requirement specifications whether testing is carried out in accordance with FMVSS 201 or with ECE-R 21.

6.5 Accident Studies

Setup of the assembly scope in the complete vehicle or in body section with all fasteners and components required for the test.

Arrangement of standard accident situations (head-on, side and rear-end collisions, rollover) in the real accident trial according to Daimler standard.

Tests/acceleration trials in the body section/vehicle according to FMVSS 201.

6.6 Side, Head-Thorax and Window Curtain Airbags

The safety-critical requirements on the side, head-thorax and window curtain airbags shall be considered.

The currently released function specification applies to the production-concurrent tests of the midsection assembly with side impact air bag.

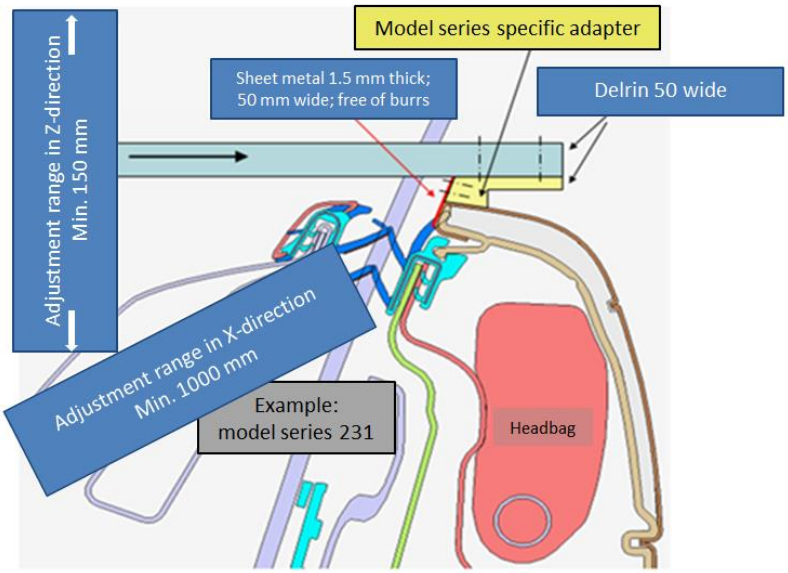
Good pelvic restraint is required for meeting more stringent legal and rating requirements of passive safety. A prerequisite is a sufficiently large and stable pelvic thrusting surface. This shall have sufficient stability through the appropriate connections or provided ribbing or foam inserts so as to allow good support of the employed restraint system (e.g. pelvis airbag or thorax-pelvis airbag). The stability of the pelvic thrusting surface along the Y-axis shall be verified by means of semi-static pressure tests with a stamp 100 mm in diameter (from the current perspective a support force of at least 2 kN shall be verified). The exact position underneath the padded armrest shall be specified together with the client for the specific vehicle.

6.6.1 Draw-off Strength on Beltline from Inner Channel Seals (Variant with Headbag)

This test is used to record the detachment force of each catch hook for the beltline on the door trim in the Y-direction when engaged with the inner channel seals. The forces are determined on a door cover or on the vehicle (door opened and locked) with the window up or down. The test hook is to be aligned here in the X direction, centered to the catch hook to be checked, then slipped in and lowered in the Z-direction between the lip of the channel seals and the outer geometry of the door trim. The test unit shall be aligned in the front X direction and in the lower Z direction on the body shell folding edge on the A-pillar using rubber suction feet on the door shell and/or using plastic hooks on the door shell flange.

The test shall be conducted at the specified test temperatures on new parts (door trim and channel seals). The force/displacement curve is to be recorded here.

Adjustment range test stamp:	adaptable for each door shell At least 150 mm in Z and 1000 mm in X direction shall be available to align the test geometry on the beltline
Precision positioning:	Test hook in X with +/- 2 mm tolerance to catch hook/ marking on beltline
Test distance along Y-axis:	50 mm towards inside of vehicle
Test speed:	100 mm/min
Test temperature:	-35_°C; RT and +90_°C (can take place outside chamber, if temperature is held constant)
Draw-off force:	Min. 20 N up to max. 250 N +/-2 N (specific to model series, to be determined on basis of preliminary tests)
Test hook geometry:	50 mm wider model-series specific adapter (specified by Client)



6.6.2 Assessment Criteria

The point of contact, the type and direction of the force measurement is to be coordinated with the Daimler development department and/or to be defined in the requirement specifications/project description.

Fulfillment of the corresponding legal requirements at the single part and in the assembly for a vehicle with two or three seat rows.

No fracture with slivers or sharp edges in the impact area. Impact energy absorption according to the legal requirements.

During the collision occupants shall not be subject to stress beyond the legally allowable limits regarding HIC and the maximum forces acting on the body.

The covers of storage compartments shall remain closed in the test according to FMVSS 201.

The detachment force specified by the model series may not be dropped below. At +90_°C the detachment force shall reach min. 80% of the specified value. The function (locking of catch hook in beltline when door closed) shall be ensured.

7 Responsibility

	A	To be tested/ensured by the supplier for the validation of the components before initial sampling and production start-up.
	B	To be tested/ensured by the supplier for the regular validation of series production (repeating test)
	C	To be tested by Daimler for the validation of the components before initial sampling and production start-up (if not otherwise specified, the component manager's department is responsible). Parts shall be provided by the supplier.
	D	To be tested by Daimler for the regular validation of series production (repeating test). Parts shall be provided by the supplier.

1	**General**	A	B	C	D
	Ensuring adherence to all of the requirements listed in this point – both prior to production startup and during series production - is the responsibility of the supplier. The client merely reserves the right to subsequently check individual points.	X	X	X	
2	**Thermal Tests**				
	Thermal Cycle Test	X	X	X*	X*
	Thermal Aging Test	X	X	X*	X*
	Climate Test	X	X	X*	X*
	These points also include adherence to boundary conditions (e.g. stresses on nets and hooks) plus further thermal tests of individual components which exceed the above basic tests.	X	X	X*	X*
3	**Weathering Tests**				
	Solar simulation / hot light aging – only if relevant to the components	X	X	X*	
	Outdoor Weathering				X
4	**Mechanical Tests**				
	Tests which refer to the behavior of the component during overall vehicle operation. These are, e.g. test drives and vehicle endurance tests conducted by the resp. overall vehicle areas for the model series.			X	
	Tests on component parts which do not have to be carried out in the overall vehicle but are also carried out on test stands or in body sections.	X		X	
	Special cases:				
	Misuse test – responsibility is borne by the client in this case.			X	
	Illumination engineering tests – ultimate responsibility is borne by the client, as the overall vehicle environment is crucial.	X	X	X*	
	Centrifuge test of inside opener			X	
5	**Assembly and Disassembly**				
	Holding force for the fasteners	X	X	X*	
	Holding force for attached parts	X	X	X*	
	Multiple remove and installation in vehicle environment	X		X	
6	**Safety**				
	Design provisions	X		X*	X
	Flame retardant properties	X	X	X*	X
	Requirements and tests for crashworthiness Request latest documentation from EP/SP	X**		X	X

X* = The supplier's test may be approved by Daimler

X** = The supplier is not obliged to carry out tests on its own. However, it must ensure that the component meets the corresponding requirements. The initiation of activities (coordination with the client's accident safety departments) is the responsibility of the supplier

8 Glossary

Abbreviation	Description
BR	Model Series
BTV	Component Manager
CAD	Computer-Aided Design
CCC	China Compulsory Certification
CMVSS 302	Canadian Motor Vehicle Safety Standard 302 –Flammability of Interior Materials
CNCA-02C-060	Chinese standard: Implementation Rules for Compulsory Certification of Motor Vehicle Products-Interior Trimming Materials for Motor Vehicles
DAI	Daimler
DBLs	Daimler-Benz Supply Specification
DIN	Deutsches Institut fuer Normung (German Institute of Standardization)
E-Veh.	Test vehicle
ECE	Economic Commission for Europe
FBW	Outdoor Weathering
FMVSS	Federal Motor Vehicle Safety Standards
FuVo	Function Specification
Veh	vehicle
GB 8410	Flammability of automotive interior materials
HT	High temperature
OK	OK
I-panel	Instrument panel
JSR	Joint Specification of Requirements
K	Kelvin
KLH	Component Requirement Specifications
KLP	Climate Test
MBN	MB Standard
MBST	Mercedes-Benz Special Terms
PPA	Production and Process Approval
PPA Report	Production and Process Approval report
PRO	Production test (e.g. PRO 1)
PUR	Polyurethane
r.h.	Relative humidity: The most common dimension for humidity is relative humidity, specified in %. It describes the ratio of the momentary water vapor content in the atmosphere to the maximum possible water vapor content at the same temperature.
RT	RT=room temperature 23°C ± 2K (standard atmosphere DIN 50 014–23/50-2; ISO 554/3205)
Black standard thermometer	See function specification for instrument panel assembly 170 680 01 00
SRP	Seat Reference Point
TT	Low temperature

Abbreviation	Description
UTAC No. ST 18-502	French standard regarding flame retardant properties of interior equipment parts (ability to drip off, burning speed)
VAW	Test instructions and values
VDA	Verband deutscher Automobilhersteller (German Association of Car Manufacturers)
VMPB	Trial Sample Inspection Report
WAP	Thermal Aging Test
WWP	Thermal Cycle Test
ZB	Assembly
ZGS	Drawing and geometry status