Mercedes-Benz	**Supply Specification** **Trim and molded padded parts for vehicle interiors (composite parts)**	**DBL 5471** **BQF available** ☐

Additional DaimlerChrysler Standards required:
DBL 5306, DBL 5307, DBL 8585, MB Special Terms.

Supersedes
edition: 03.2000

Refer to Section
Changes: Page 5

Overview of product versions:

Table 1

All product versions up to PV 89 not for new designs
For technical data, if required, refer to DBL 5471, edition March 2000

Product versions	Solar irradiation	Temperature exposure	Examples (The PV indicated on the drawing shall apply)
.90	is replaced by PV 95		
.91	is replaced by PV 92		
.92	partly	90°C	- Trim rear space Roadster - Roof grab handles - Center armrests - Door arm rests, door handles, door pocket lids - Trim station wagon trunk complete - Seat gap cover inside - Mirror triangle - Edge guards - Tunnel trim - Housing with stowage tray - Trim for commercial vehicle cab (e.g. roof trim) - Sun visors - Instrument panel lower parts (knee bolster) - A, B, C pillar trim - Head restraint driver - Door trim with waistline - Seat cushion, seat backrests - Roof frame trim, roof frame elements convertible - Molded ceiling, sliding sunroof - Glove box lid - Air bag assy
.93	is replaced by PV 92		
.94	full	120 °C	- Instrument panel upper section - Rear shelf and speaker grille - Rear head restraint
.95	without	80°C	- Trunk lining - Seat facings, seat gap covers outside, driver's backrest lining Floor area occupant compartment, footrest - Door pockets, central door panels, in-door speaker grilles -

Note:
In the case of systems (assemblies), the PV with the higher temperature shall be selected for testing.

DBL 5470 has been superseded by DBL 5471 (05.92).

Fortsetzung Seite 2 bis 9

Issued by: DaimlerChrysler AG, 70546 Stuttgart, Standards (GR/EQS)
Technical responsibility (name): Höfel
Department: PWT/VWK Plant: 050
Phone: +49(0)7031 90 83298 HPC: F105
Technical coordination by PWT
Plant 59, Department PWT/VWK Name: Dr. Schuh
Telephone +49(0)7031 90 44270 HPC: 059 X 685

Abbreviated designation : e.g. Composite material DBL 5471.90

1. APPLICATIONS

This Specification is intended to facilitate the accelerated aging of assembly components by means of different storage parameters. It specifically applies to the assessment of surface materials of trim and molded padding used in vehicle interiors incl. the luggage compartment. Non-laminated plastic components shall be aged in accordance with DBL 5471 and assessed visually. In addition, DBL 5404 shall be observed for these components. Painted plastic parts shall be assessed according to DBL 7384.

2. MATERIALS

The technical values of all starting materials shall correspond to the individual material DBLs, requirements specifications and drawings.

3. PROPERTIES

3.1 General requirements

- In line with the specifications of the Quality Management unit of the receiving plant, the components shall be free of manufacturing defects of any kind which would impair the processing and utilization properties or the appearance (e.g. free from release agents). Cleaning agents used during the manufacturing process shall not cause any material/surface damage.

- Trim:
  The bond between the surface material and the substrate shall extend across the whole surface and shall be uniform, sufficiently strong and resistant to aging. The surface material shall be turned over and glued at the outside edges with sufficient strength and without disturbing overlaps. The pull-off force of any glued-on, riveted or integrated attachment or assembly parts (holders, clips or similar) shall correspond to the values indicated on the drawing, and the values shall be indicated in the ISIR.

- Molded padded parts:
  These shall be molded with correct dimensions in accordance with the drawing or the functional specifications and demonstrate the specified hardness (indentation depth). The foam expansion shall be even and without noticeable pockets. The foam shall have completed all reactions after a storage time of the molded padded part of 24 hours at room temperature, i.e. it shall not be tacky nor brittle. The bond between cover material and foam as well as between foam and substrates shall be firm enough to ensure that no separation can occur during assembly or use (e.g. as a result of release agent residues). This requires appropriate conditioning of the surface of the materials. The surfaces of the molded padded parts shall correspond to the specified design pattern.

- The availability of a certificate of testing in accordance with the following method is specified as an overriding requirement for adherence to the emission values for interior trim materials: VDA 278; threshold values DBL 8585.
  The user is responsible for checking whether the version in his possession is the latest version. For inquires on threshold values, please apply to VDA278.DC-Info@daimlerchrysler.com.
  In particular in the case of substances listed in DBL 8585 Section 2.3, the supplier is required to continuously minimize the concentration and emission at least in accordance with the state of the art, even when values have fallen below the required DBL threshold values.

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  In installed condition, the materials used shall comply with the following requirements when tested in accordance with the test instruction: "Formteile für den Fahrzeuginnenraum - Bestimmung der Abgabe von Formaldehyd, Ammoniak und Phenolen - Messverfahren in der 1 m³- Kammer“ (draft October 1994, issued by Arbeitskreis "Kfz.-Formteile - einfache Prüfmethoden“ under the leadership of FhG-WKI, Bienroder Weg 54 E, D-38108 Braunschweig):
  - Formaldehyde emission: initial value max. **0,2 ppm**, in equilibrium max. **0,05 ppm**
  - Phenol emission: max. 0,04 ppm
  - Ammonia emission: minimal

Measurements shall be carried out on finished parts under the following testing conditions:
- Temperature 65 °C
- Relative humidity 11 %
- Cabinet load 2 m² per m^3
- Change of air 0,5 h^{-1}

The consistency of production with regard to formaldehyde release shall be tested by means of a simple method and documented, e.g. bottle method (determination of formaldehyde release of molded parts by the bottle method, VDA recommendation 275- DKF, Ulrichstr. 14, D-74321 Bietigheim) or gas analysis method DIN-EN 717-2 (was: DIN 52 368 - Beuth Verlag GmbH, D-10772 Berlin). It is a condition, however, that this value is determined already for the initial sample. For this reason, it shall also be indicated on the acceptance test certificate.

3.2 Shape, dimensions, cut-outs and markings
In accordance with drawing and/or template.

3.3 Color
In accordance with order, approval, reference sample and other specifications (DE/QM).

3.4 Grain
In accordance with order MBN 31 030

4. TECHNICAL DATA
Refer to Table 2, pages 6 to 9.

5. TEST METHODS
DIN/EN/ISO (refer to Table 2) or DBL 5306, Part II and DBL 5307.

5.1 Separating force for laminated parts (cover material/substrate)
The test shall be carried out in analogy with the separation test in accordance with DIN 53 357 immediately after the specified storage periods. Test specimens shall be taken in longitudinal, transverse and diagonal directions and shall provide a representative cross-section of the complete part and shall be documented in the ISIR.
The test specimens shall be prepared by sawing out pieces approx. 70 mm wide and approx. 200 mm long. For testing the separating force, cut the surface material through to the substrate 50 ± 1 mm wide with a knife in the longer direction of the test specimen.

5.2 Foam adhesion for molded paddings (excerpt from DBL 5306.16)
Strips 50 mm wide shall be cut into the narrow side of the molded padding, and the surface material (e.g. deep drawn films, molded skins) shall be pulled off at an angle of approx. 120° and at a rate of approx. 100 mm/5 s constantly and without sudden movements. The area-based foam adhesion on the reverse of the pulled-off materials and the surface of the substrate shall be assessed. As a representative average, at least 75 % of the total surface of the molded padding shall be pulled off from various locations and assessed. Adhesion values are specified in the specific material DBL. Each individual strip shall be assessed; the result shall be calculated by averaging. No individual strip shall lie more than 50% below the foam adhesion. Where the visual foam adhesion between the molded skin and the foam yields a result lower than 75%, compliance can be proven by indicating the separating force value in N. Attach a spring balance (compression-tension measuring unit 0 to 50 N) to the test strip and determine the separating force under the test conditions indicated above. The test result shall not fall below the lower threshold value required in the specific material DBL (10 N/5 cm strip width). The test shall be performed on components which have been stored at 23 ± 5 °C for at least 48 h after foaming or which have been subjected to heat storage.

5.3 Climatic resistance tests

Assessment criteria:	The parts shall not demonstrate any changes interfering with the application in comparison with the as-supplied state (e.g. warping, flattening, deflection, shrinkage or extension of the finished parts, detachment of the surface material and of the fastening and making-up parts, glue embrittlement, blistering, impressions and piercing, waviness, brittleness and cracking or discoloration (assessment in accordance with ISO 105-A02), tackiness, marked glossiness and grain flattening of the surface material, marked swelling, spalling, layer and fiber separation of the substrate or similar). Weld joints shall not separate.

S = Focus point test (see DBL 5306.104) shall always be performed.

Temperature requirements deviating from the functional specification:
There is a temperature differential between the surface and substrate in the vehicle. For climatic chamber storage, the requirements profile for the surface is higher.
The components are stored unassembled and shall therefore not be used for the assessment of dimensional requirements.

Test sequence:

1. Alternating atmospheres
2. All constant atmospheres
3. Solar simulation
4. Low temperature storage

5.4 More precise indication of color fastness to light (hot light fastness) and aging (hot light aging) to artificial light at high temperatures in accordance with DIN / EN / ISO 105-B06.

Exposure conditions: 3 (normal); irradiance 1,2 W/m² (420nm)
For type of apparatus C, filter system BS/SL shall be used.

Color fastness (HLF)

- Determination of end point:	Exposure to ∆E 4,3+/-0,4 of reference 6 (exposed/to covered). Color measurement of reference with white reference tile as substrate.
- Assessment:	Comparison exposed specimen with original specimen for light source D65. Assessment with blue scale (references).

Determination of aging (HLA)

- Determination of end point:	as for HLF, but with several consecutive cycles. For each cycle, a new reference 6 shall be used.
- Assessment:	Comparison exposed specimen with original specimen for light source D65. Assessment with gray scale in accordance with DIN EN 20105-A02

5.5 Abrasion resistance*

1. To be tested in as-supplied condition
2. To be tested following testing according to 5.3. in sequence 1, 2, 3 (item 3 only for PV 94)
3. To be tested following hot light aging (HLA)
4. To be tested on leather-faced parts following testing according to 5.3 in sequence 1, 2
5. To be tested on leather-faced parts following hot light aging (HLA)

5.6 Sun cream test*

Required components: instrument panel, upper and lower sections, center consoles, door linings. Only for films and
molded skin surfaces. Testing in as-supplied condition, not in aged condition.

*) For Sections 5.5 and 5.6 also refer to DBL 5399

5.7 The contact staining problem shall be assessed in accordance with PAPP PWT 7329.

5.8 The corrosion behavior of metallic components shall be assessed in accordance with test instruction PB VWT 217.

6. DUTIES OF THE SUPPLIER
Refer to MercedesBenz Special Terms No. 13 and No. 16, Purchase Conditions for Production Materials and Spare Parts for Motor Vehicles.

7. SAMPLES
Refer to MercedesBenz Special Terms No. 13.

8. DELIVERIES
Refer to MercedesBenz Special Terms No. 13 and DBL 5306, Section 104.

9. MARKING
Refer to MercedesBenz Special Terms No. 4, No. 24, No. 27 and DBL 5306, Section 105.

10. PACKAGING, FORM OF SUPPLY AND DELIVERY CONDITIONS
Refer to Mercedes-Benz Special Terms No. 30.
Freedom from silicones shall be assured in general.

11. STORABILITY
Refer to DBL 5306, Section 107.

12. SPECIAL INSTRUCTIONS
Refer to DBL 5306, Section 108.

13. COMPLAINTS
Refer to MercedesBenz Special Terms No. 16 and Purchase Conditions for Production Materials and Spare Parts for Motor Vehicles.

14. ENVIRONMENTAL PROTECTION REGULATIONS/INDUSTRIAL SAFETY
Refer to MercedesBenz Special Terms No. 30, No. 36 and DBL 8585 Negative substance list for the selection of materials.

Changes:
PV 93 deleted, PV 92, PV 94 and PV 95 revised.
Revision 01.2006

Table 2:

4.	Technical data	Product version requirements 90	91	92	93	94	95	Test method
	Conditioning of parts	Parts shall only be tested after the reaction of the glue or foam has been completed (refer to data sheets). If no indications are made: storage 48 h min. at room temperature.						
	General requirements for all alternating atmospheres	Time/temperature/relative humidity Note: All times are holding times. Tolerances: Temperature ± 1 K; relative humidity ± 3 %; rate of change of temperature, heating: approx. 1,5 K/min, cooling: approx. 1,5 K/min; crossover point temperature/relative humidity in heating and cooling phases at 40°C max./ 40% r.h. max. The recorded diagrams shall be documented for leather surfaces.						
	Climatic resistance storage	For requirements text, refer to Section 5.3, page 4						
4.1	Alternating atmospheres							
4.1.1	Dry-warm/humid-cold (warm climate cycle test A)							
	Film, skin and textile surfaces	-	-	-	-	-	S:+	6 cycl. {2h / 80°C / max. 20% + 1h / 23 ± 3°C / 50 ± 15%}
	Leather surface	-	-	-	-	-	S:+	30 cycl. {4h / 10°C / 92% + 2h / 80°C / max. 20%} for series production monitoring 10 cycl.
4.1.2	Dry-warm/humid-cold (warm climate cycle test B)							
	Film, skin and textile surfaces	S:+	S:+	S:+	S:+ followed by 2 h 105 °C	-	-	6 cycl. {2h / 90°C / max. 20% + 1h / 23 ± 3°C / 50 ± 15%}
	Leather surface	S:+	S:+	S:+	S:+ followed by 2 h 105 °C	-	-	30 cycl. {4h / 10°C / 92% + 2h / 90°C / max. 20%} for series production monitoring 10 cycl.
4.1.3	Dry-hot/humid-cold (hot climate cycle test)							
	Film, skin and textile surfaces	-	-	-	-	S:+	-	6 cycl. {2h / 120°C / max. 20% + 1h / 23 ± 3°C / 50 ± 15%}
	Leather surface	-	-	-	-	S:+	-	30 cycl. {4h / 10°C / 92% + 2h / 105°C / max. 20%} for series production monitoring 10 cycl.

4.	Technical data (continued)	Product version requirements 90	91	92	93	94	95	Test method
4.2	Constant atmospheres							
4.2.1	Dry-warm endurance test A (warm temperature test)	-	-	-	-	-	S:+	7d / 80 °C / max. 20%
4.2.2	Dry-warm endurance test B (warm temperature test)	S:+	S:+	S:+	S:+	-	-	7d / 90 °C / max. 20%
4.2.3	Dry-hot endurance test (heat test) Film, skin and textile surfaces	-	-	-	-	S:+	-	7d / 120 °C / max. 10%
	Leather surface					S:+		7d / 105 °C / max. 10%
4.2.4	Humid-warm aging Film, skin and textile surfaces, not for parts with leather surfaces	S:+	S:+	S:+	S:+	S:+	S:+	21d / 40 °C / 92%
4.3	Change in color after climate storage 4.1 and 4.2 Minimum Rating	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5	DIN/EN 20105-A02
4.4	Solar simulation							DIN 75 220
4.4.1	Indoor 1	-	-	-	-	+	-	Indoor 1 dry climate
4.5	Color change after solar after solar simulation 4.4 Minimum Rating	-	-	-	-	4	-	ISO 105-A02
4.6	Cold resistance							DBL 5306.7.3; storage 24 h at -30 ±2 °C, Drop height: 200mm
4.6.1	Ball drop test	+	+	+	+	+	+	
4.7	Hardness test	The required indentation depth is specified on the relevant drawing for the individual parts and shall be documented in the ISIR.						DBL 5306.15.2 ????

4.	Technical data (continued)	Product version requirements 90	91	92	93	94	95	Test method
4.8	Layer separation force * Minimum N							Refer to Section 5.1.
4.8.1	For substrates with rough surface (e.g. hardboard, pressed non-woven fabric etc.) and for covering materials with very high elongation (min. 45% elongation at 50N; e.g. knitted fabric)							*If the separating forces are not reached, a waiver shall be agreed with DC and documented. These shall be recorded in the ISIR.
4.8.1.1	after storage in standard atmosphere	15	15	15	15	15	15	
4.8.1.2	after climatic storage	S: 12	S: 12	S: 12	S: 12	S: 12	S: 12	For storage, refer to Section 4.1, 4.2, 4.4
4.8.2	For substrates with smooth surface (e.g. injection-molded ABS, PUR-GF)							
4.8.2.1	after storage in standard atmosphere	20	20	20	20	20	20	
	but for film	50	50	50	50	50	50	
4.8.2.2	after climatic storage	S: 15	S: 15	S: 15	S: 15	S: 15	S: 15	For storage, refer to
	but for film	S: 50	S: 50	S: 50	S: 50	S: 50	S: 50	Section 4.1, 4.2, 4.4
4.9	Surface adhesion for molded padding Minimum %							Section 5.2, DBL 5306.16; for storage, refer to
4.9.1	Cover material to foam	S: 75	S: 75	S: 75	S: 75	S: 75	S: 75	Section 4.1, 4.2, 4.4
4.9.2	Substrate to foam	S: 75	S: 75	S: 75	S: 75	S: 75	S: 75	
4.10	Burning test	S: Fulfillment of requirements in accordance with DBL 5307, product version 10 / 20.						DBL 5307.5.1 or 5.2
4.11	Abrasion resistance, only for film, skin or plastic surfaces Minimum Rating							DBL 5306.4.1 Refer to Section 5.5
4.11.1	dry	4	4	4	4	4	4	
4.11.2	wet	3-4	3-4	3-4	3-4	3-4	3-4	* 5 strokes without additional weight
4.11.3	*MB stain remover	3-4	3-4	3-4	3-4	3-4	3-4	
4.11.4	MB plastics cleaner	3-4	3-4	3-4	3-4	3-4	3-4	
4.11.5	MB glass cleaner	3-4	3-4	3-4	3-4	3-4	3-4	BQF 7528.00 BQF 6960.20
4.12	Sun cream test Maximum Rating	1	1	1	1	1	1	PAPP/PWT 7328 Refer to Section 5.6
4.13	Scratch resistance only for film, skin or plastic surfaces	The surface shall demonstrate no or only a small scribing effect when marking with a finger nail.						DBL 5306.3.1
4.14	Scratch exposure of surface with chisel, only for flexible cellular TPO and PVC sheeting	No violation of surface.						DBL 5306.3.2; for total load, refer to individual material DBL, otherwise 1600g

4.	Technical data (continued)	Product version requirements 90	91	92	93	94	95	Test method
4.15	Color fastness (HLF) Minimum blue scale Rating	6	6	6-7	6-7	6-7	6	DIN/EN/ISO 105-B06
4.16	Aging (HLA) Minimum gray scale Rating	-	-	4 periods	4 periods	4 periods 3-4	-	For test methods refer to Section 5.4
		Requirement: Cover product DBL shall determine the requirements for the finished part with regard to the rating and number of periods. Possible deviation: If cover product DBL-PV is better in rating (with a number of periods of at least 4) than in the corresponding PV of DBL 5471, the following criteria shall apply: u Number of periods as specified in cover product DBL. u Rating max. deviation 0,5 downwards. If no cover product is specified, rating and number of periods of corresponding PV of DBL 5471 shall apply.						
4.17 4.17.1 4.17.2	Emission analysis VOC value µg/g (ppm) FOG value µg/g (ppm)	Target value: ≤ 100 Target value: ≤ 250 Critical individual substances shall not exceed the limit/target values indicated in DBL 8585, Section 2.3.						DBL 8585 VDA 278*
4.18	Odor test Maximum Rating	3	3	3	3	3	3	VDA 270; depending on component size
4.18	Fogging test	For the composite, the fogging values specified in the relevant DBL of the surface materials apply. The relevant approval shall be available already before the approval of the relevant parts. If no allocation is possible or no value has been specified, the following shall apply Fogging test: Quantity of condensable substance: Maximum 1,0 mg For the substrate materials the values specified in the DBL, if available, shall apply. If no allocation is possible or no value has been specified, the following shall apply Fogging test: Quantity of condensable substance: Maximum 2,0 mg						DIN 75 201

* In the event of deviations, the value specified in the individual material DBLs shall apply.