

Class. No.: 55126

Descriptors: adhesive label, label, self-adhesive, adhesive coating, adhesive film

**D**

**Labels**

**Self-Adhesive, Material Requirements**

4 types: without index, A, B, C

**Previous issues**

1978-10; 1990-02; 1999-11; 2004-12; 2005-11

**Changes**

The following changes have been made as compared to Technical Supply Specification TL 52038: 2005-11:

- Section 4: Table revised
- Section 5.1: Testing notes expanded (determination of comparison force), footnote: fragment size removed
- Section 5.2: Testing media E85 and urea additive added
- Referenced standards updated

Check standard for current issue prior to usage. The English translation is believed to be accurate. In case of discrepancies the German version shall govern. Numerical notation acc. to ISO practice.

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## Basic supply requirements

Approval of first supplies and changes according to Volkswagen standard VW 01155.

Avoidance of hazardous substances according to VW 91101.

As evidence of fulfillment of the requirements of the Kraftfahrt-Bundesamt (German Federal Motor Transport Authority) by the supplier (only types A and C), the corresponding document is to be appended to the first-sample documentation.

## 1 General information

### 1.1 Types and their application

The adhesion substrate must be specified in the drawing. Adhesion values for adhesion substrates other than painted sheet metal must be specified in the drawing.

**1.1.1 Type without index** Adhesive labels in the interior and on the exterior of the vehicle

**1.1.2 Type A** Adhesive labels of documentary nature in the interior and on the exterior of the vehicle (data transfer to another vehicle or data falsification must be ruled out)

**1.1.3 Type B** Adhesive labels in the engine compartment

**1.1.4 Type C** Adhesive labels of documentary nature in the engine compartment (data transfer to another vehicle or data falsification must be ruled out)

### 1.2 Structure

Film structure according to drawing and release

Preferably, the adhesive coating is to be produced using adhesives based on acrylic ester.

Adhesive layer on back with peel-off protective film.

### 1.3 National standards and requirements

The respective national standards and requirements must be considered (in the US e.g. 49 CFR 567, FMVSS 302, in China e.g. GB 8410).

Sections marked with a documentation bar are subject to mandatory documentation.

## 2 Materials

Emission behavior acc. to VW 50180 and VW 50179 and/or acc. to drawing (only applicable to adhesive labels in the interior)

### **3 Physical properties**

The adhesive labels must have a flawless surface. The film must be free of flaws such as bubbles and inclusions. Bubbles or stains must not occur due to a subsequent, e.g. in-house, lettering by laser.

If perforation of the substrate material is chosen considering the removal requirements specified in Section 4.5, then this perforation must be uniform throughout the surface or, respectively, the extent of the label.

The back must be evenly covered with adhesive.

The adhesive labels must adhere tightly to the surface specified in the drawing, even after the aging periods specified in Section 4.1, without the labels forming folds, rolling up, tearing or loosening.

The protective film must protect the adhesive from soiling and undesired adhesion. It must be easily removable from the complete adhesive label without any pre-treatment being necessary. Flawless application of the labels must be guaranteed.

The protective film must be specified during the sampling process.

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## 4 Functional requirements

See Table 1.

**Table 1**

|                |   | Removal force (N/1 cm sample width),<br>Type <sup>1)</sup>   |                          |       |                          |
|----------------|---|--|--------------------------|-------|--------------------------|
|                |   | With-<br>out<br>index  | A                        | B     | C                        |
| <b>4.1</b>     | <b>Adhesive properties (see 5.1)</b>  | After tests 4.1.1 to 4.1.8, a change in surface (loosening, cracking or similar), color or dimensions must not occur. The specified removal forces must be achieved. |                          |       |                          |
| <b>4.1.1</b>   | <b>As-received condition</b>  | ≥ 3,5  | Destructive removal only | ≥ 3,5 | Destructive removal only |
| <b>4.1.2</b>   | <b>After aging at elevated temperature</b>  |  |                          |       |                          |
| <b>4.1.2.1</b> | <b>(300 ± 10) h at 90 °C recirculated air</b>   | ≥ 3,5  | Destructive removal only | -     | -                        |
| <b>4.1.2.2</b> | <b>(72 ± 2) h at 130 °C recirculated air</b>  | -  | -                        |       |                          |
| <b>4.1.3</b>   | <b>After low temperature aging (22 ± 2) h at -40 °C</b>   | ≥ 3,5  | Destructive removal only | ≥ 3,5 | Destructive removal only |
| <b>4.1.4</b>   | <b>Moisture condensate aging (300 ± 10) h DIN EN ISO 6270-2 <sup>2)</sup></b>                               | ≥ 3,5  |                          |       |                          |
| <b>4.1.5</b>   | <b>Environmental cycle test, 30 cycles acc. to Test Specification PV 1200</b>                               | ≥ 3,5  |                          |       |                          |
| <b>4.1.6</b>   | <b>Steam jet test (see 5.4) based on PV 1503, but without cross-cut test <sup>3)</sup></b>                  | ≥ 3,5  |                          |       |                          |
| <b>4.1.7</b>   | <b>Fuel immersion aging (see 5.2) 30 min at (23 ± 2) °C</b>   | Removal force acc. to drawing specification  |                          |       |                          |
| <b>4.1.8</b>   | <b>Moisture condensate climate aging (only for labels on vehicle exterior) 4 cycles DIN 50018-KFW 2,0 S</b> | Removal force acc. to drawing specification  |                          |       |                          |

<sup>1)</sup> Requirements for testing on painted test sheet metals (see Sections 3 and 5.1)

<sup>2)</sup> Slight bleaching as compared to as-received condition is permissible

<sup>3)</sup> For labels in the passenger compartment/trunk; only if specified in the drawing

|        |  | Removal force (N/1 cm sample width),<br>Type <sup>1)</sup>   |   |  |   |
|--------|--|--|---|--|---|
|        |  | With-<br>out<br>index  | A | B  | C |
| 4.1.9  | <b>Dimensional change<br/>Shrinkage after 48 h of recondi-<br/>tioning (see 5.3)</b> | ≤ 1,0 %  |   |  |   |
| 4.2    | <b>Resistance to agents (see 5.5)</b>  | There must not be any change in lettering (print)<br>after aging.<br>The adhesive labels must not change in color or<br>size or become wavy. |   |  |   |
| 4.2.1  | <b>Transit coating</b>   | For requirements see Section 4.2,<br>deviation acc. to drawing   |   |  |   |
| 4.2.2  | <b>Transit coating remover</b>   |  |   |  |   |
| 4.2.3  | <b>Premium unleaded fuel<br/>acc. to TL 52138</b>                                    |  |   |  |   |
| 4.2.4  | <b>Diesel fuel acc. to TL 788</b>  |  |   |  |   |
| 4.2.5  | <b>RME (biodiesel) acc. to<br/>DIN EN 14214</b>                                      |  |   |  |   |
| 4.2.6  | <b>Methylated spirits</b>  |  |   |  |   |
| 4.2.7  | <b>Engine oil acc. to TL 52185</b>   |  |   |  |   |
| 4.2.8  | <b>Brake fluid acc. to TL 766</b>  | -  | - | For requirements see<br>Section 4.2,<br>deviation acc. to draw-<br>ing |   |
| 4.2.9  | <b>Coolant acc. to TL 774</b>  | -  | - |  |   |
| 4.2.10 | <b>FAM testing fluid DIN 51604-B<br/>See DIN 51604-2</b>                             | For requirements see<br>Section 4.2, deviation<br>acc. to drawing <sup>4)</sup>  |   | For requirements see<br>Section 4.2,<br>deviation acc. to draw-<br>ing |   |
| 4.2.11 | <b>Urea solution acc. to ISO 22241-<br/>1, (AdBlue)</b>                              |  |   |  |   |
| 4.2.12 | <b>Ethanol fuel E85, DIN 51625</b>   |  |   |  |   |
| 4.3    | <b>Resistance of lettering (print) to<br/>mechanical influences</b>                  |  |   |  |   |
| 4.3.1  | <b>Abrasion resistance see 5.6,<br/>specimen preparation see 5.1</b>                 | With the naked eye, signs of abrasion must not be<br>visible.<br>Color transfer onto the cotton rubbing cloth is per-<br>missible.           |   |  |   |

<sup>4)</sup> Only applies to labels that can come into contact with fuels in the course of normal operation, e.g. on the fuel filler door

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|       |   | Removal force (N/1 cm sample width),<br>Type <sup>1)</sup>  |   |   |   |
|-------|---|---|---|---|---|
|       |   | With-<br>out<br>index   | A | B | C |
| 4.3.2 | <b>Scratch resistance test with Erichsen hardness test pencil type 318, engraving tip no. 1 (Bosch 0,75 mm), load (5 ± 0.1) N, for specimen preparation see 5.1</b> | Damage to the surface which is visible to the naked eye must not occur. A trace of indentation is permissible.  |   |   |   |
| 4.4   | <b>Burning behavior</b>   | According to TL 1010 (vehicle interior).  |   |   |   |
| 4.5   | <b>Removal requirement valid only for types A and C, (adhesive labels of documentary nature)</b>  | Removal of the adhesive labels at temperatures of -40 °C to 90 °C (type C: 130 °C) and after the tests in Sections 4.1 to 4.1.8 must only be possible with complete destruction <sup>5)</sup> . |   |   |   |

## 4.6 Lightfastness requirements

### 4.6.1 For applications in the vehicle interior

Lightfastness according to PV 1303

Exposure period according to the label location (see PV 1303 Appendix A.1)

Fastness grade > 4 on the gray scale according to DIN EN 20105-A02

### 4.6.2 For applications on the vehicle exterior

#### 4.6.2.1 Weathering in dry, hot climate

According to PV 3929, intensity of irradiation: one year cycle for parts exposed to constant direct irradiation, ½ year cycle for parts in shaded areas (e.g. at B-pillar), no visible change in gloss and color permissible

#### 4.6.2.2 Weathering in moist, hot climate

According to PV 3930, intensity of irradiation: one year cycle for parts exposed to constant direct irradiation, ½ year cycle for parts in shaded areas (e.g. engine compartment, inside of fuel filler door, B-pillar), no visible change in gloss and color permissible

## 4.7 Weathering resistance

Resistance to open-air weathering according to VW 50185: no complaints, deviations according to drawing

<sup>5)</sup> Complete destruction: Fragmentation or inner delamination of the structure with destruction of the lettering (print). Delamination means that the lettering must also be destroyed on fragments that have been removed.

## **5 Notes on testing**

### **5.1 Testing note 1**

The adhesive labels must be cut to a size of 100 mm in length and 20 mm in width if these dimensions are exceeded in the as-received condition.

#### **Type: without index/B**

The protective film is removed on 2/3rds of the specimen length and cut off so that 1/3rd of the adhesive label is still covered.

#### **Type: A/C**

The label is to be adhered over the entire surface, but with the protective film placed underneath a corner extending to an area of ~ 0,5 cm<sup>2</sup>.

#### **All types**

The test specimens are then glued in the center of painted test sheet metals, or for testing according to Section 3, on the adhesion substrate specified in the drawing (original component from standard production tool).

The test sheet metals (size 200 mm x 100 mm) must be prepared according to the manufacturing specifications for painted panels for testing the paint indifference of elastomer parts<sup>6)</sup>.

Neither soiling nor flaws must be present on the surface. For this, a lint-free paper towel is moistened with an isopropanol/water mixture (75 volume percent isopropanol/25 volume percent deionized water) and the surface is cleaned by wiping. A film of liquid remaining on the surface to be cleaned after wiping is an indicator of adequate moistening of the paper towel. The remaining film of liquid must be absorbed by a dry part of the paper towel when wiped a second time. In doing so, the surface to be cleaned is wiped dry.

The label is affixed by pressing forcefully and continuously using a felt pad (thickness 1,0 mm ± 0,2 mm) starting at the narrow side.

Each test sheet metal must only be used once.

Prior to testing without climatic stress and prior to aging in the test agents and test climates, the specimens prepared in this way must be conditioned for at least 72 h in accordance with ISO 554 23/50 (ordinary).

After removal from the individual test agents and test climates, the specimens must be reconditioned for 24 h (48 h in case of moisture condensate testing) in accordance with ISO 554 23/50 (ordinary).

After reconditioning, the adhesive properties must be tested. Also, the peel-off requirement must be tested directly after removal at 90 °C, 130 °C, and -40 °C.

Using the obtained load/displacement curve, the medium range (approx. 30% to 90% of the tested distance) must be evaluated. For this range, the mean value for the peel strength (removal force, see Section 4.1) must be determined as a comparison value (target value).

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<sup>6)</sup> Quality Specification QP F082, Section 3.4, Baking temperature as mean value from overbaking and underbaking ± 5 K

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### **Type: without index/B**

The test is carried out as a peel test with a tensile test machine, with the use of a roller support (principle: see Bild 1), at a traverse speed of 50 mm/min, peeling angle 90°, peeling distance approx. 15 mm.

Three specimens must be tested in each case.

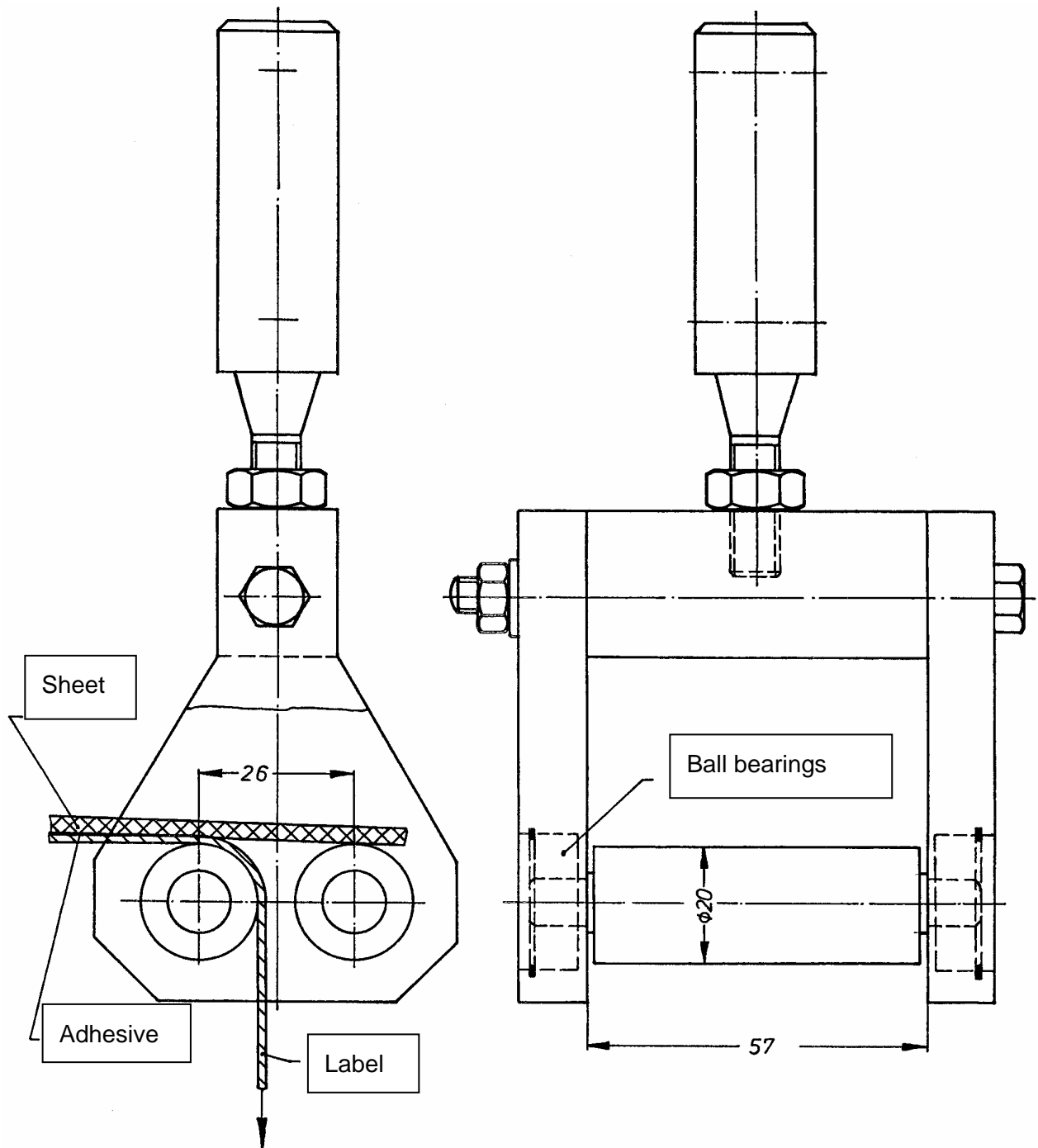
### **Type: A/C**

The label is grabbed by hand at the corner which has not been affixed and slowly subjected to a tensile stress at a peeling angle of  $90^\circ \pm 15^\circ$  to the adhesive area. In the course of the test, variations in the peeling angle are permissible. Twisting may lead to increased stress at the edge of the label and must be avoided.

It must not be possible to remove the label without destroying it (also refer to 1.1.2, 1.1.4, 4.1, 4.2, 4.5, footnote 3)

Three specimens must be tested in each case.





**Bild 1** Roller support

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## 5.2 Testing note 2

Testing media:

- Fuel mixture consisting of:
  - 50 volume percent gasoline regular unleaded acc. to TL 781
  - 30 volume percent toluene chemically pure
  - 20 volume percent ethanol absolute R 9 acc. to DAB 8 (German Pharmacopoeia)
- Ethanol fuel E85 acc. to DIN 51625
- AdBlue (32,5 % aqueous urea solution)

## 5.3 Testing note 3

The adhesive labels must be prepared in accordance with testing note 1 (see Section 5.1). The protective film is removed from the entire specimen length. The labels to be tested must be affixed onto painted test sheet metals and stored for at least 72 h in accordance with ISO 554 23/50 (ordinary).

Before and after aging (see Section 4.1.1 through to Section 4.1.8), the specimens are measured in longitudinal and transverse direction using a caliper gage.

$$\text{Shrinkage} = \frac{L_0 - L_1}{L_0} \times 100 \%$$

Where:

L<sub>0</sub> = initial length

L<sub>1</sub> = length after load application

The aging test that has produced the worst test result must be repeated on the original substrate. If the test results are comparable, the test acc. to aging 4.1.5 must be conducted on the original substrate.

## 5.4 Testing note 4

Prior to testing, the molded parts onto which the labels have been affixed must be stored for at least 72 h in accordance with ISO 554 23/50 (ordinary). After that, the test specimens are exposed to the agents specified in Section 4.2. Following removal, the specimens must be reconditioned over a period of at least 48 h in accordance with ISO 554 23/50 (ordinary). After that, the specimens are sprayed with a pressure washer (10 min with water, temperature 40 °C, operating pressure 50 bar, jet angle 90° ± 45°, nozzle spacing 0,4 – 0,6 m).

## 5.5 Testing note 5

Specimen size max. (100 x 20) mm or supplied size

Affix specimens onto painted test sheet metals (see 5.1) according to instructions

72 h aging acc. to ISO 554 23/50 (ordinary)

Wet the surface with a lint-free paper towel, that has first been moistened with the test agent.

The surface is wetted by wiping across the surface (10 times), applying light pressure. No circular movement. A film of liquid remaining on the surface to be cleaned after wiping is an indicator of adequate moistening of the paper towel. Wipe surface clean with a dry lint-free paper towel 5 seconds after it was wetted last.

Evaluate 15 minutes after cleaning.

### 5.6 Testing note 6

Crockmeter test with cotton rubbing cloth according to DIN EN ISO 105-X12 (100 cycles, pressure force  $9 \pm 0,2$  N, stroke  $0,2 \pm 3$  mm, cylindrical friction pin  $\varnothing$  16 mm, 1 cycle/3 seconds). The labels to be tested are affixed onto painted body panel. For samples with dimensions that are smaller than the required stroke, the stroke must be reduced without altering the speed. Any travel beyond the label edges must be prevented.

## 6 Referenced documents

The following documents cited in this standard are necessary for application. In this Section, terminological inconsistencies can occur as the original titles are used.

|                    |  |
|--------------------|--|
| DIN 50018          | Testing in a Saturated Atmosphere in the Presence of Sulfur Dioxide  |
| DIN 51604-2        | Methanolic FAM Testing Fluid for Polymer Materials; Composition and Requirements   |
| DIN 51625          | Automotive Fuels – Ethanol Fuel – Requirements and Test Methods  |
| DIN EN 14214       | Automotive Fuels; Fatty Acid Methyl Esters (FAME) for Diesel Engines; Requirements and Test Methods  |
| DIN EN 20105-A02   | Textiles – Tests for Color Fastness – Part A02: Grey Scale for Assessing Change in Colour  |
| DIN EN ISO 105-X12 | Textiles – Tests for Color Fastness – Part X12: Colour Fastness to Rubbing   |
| DIN EN ISO 6270-2  | Paints and Varnishes – Determination of Resistance to Humidity – Part 2: Procedure for Exposing Test Specimens in Condensation-Water Atmospheres |
| ISO 554            | Standard Atmospheres for Conditioning and/or Testing; Specifications   |
| ISO 22241-1        | Diesel Engines - NOx Reduction Agent AUS 32 - Part 1: Quality Requirements   |
| PV 1200            | Vehicle Parts; Testing of Resistance to Environmental Cycle Test (+80/-40) °C  |
| PV 1303            | Non-Metallic Materials; Exposure Test of Passenger Compartment Components  |
| PV 1503            | Paint Coating of Metallic and Non-Metallic Materials; Pressure Washer Test   |
| PV 3929            | Non-Metallic Materials; Weathering in Dry, Hot Climate   |
| PV 3930            | Non-Metallic Materials; Weathering in Moist, Hot Climate   |
| QP F082            | Two-Component Clear Coat; Quality Requirements   |
| TL 766             | Brake Fluid; Material Requirements   |
| TL 774             | Ethylene Glycol-Based Coolant Additive; Material Requirements  |
| TL 781             | Ottokraftstoff-Normal, bleifrei; Kraftstoffanforderungen (Regular Unleaded   |

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|----------|---|
|          | Gasoline; Fuel Requirements – currently only available in German)   |
| TL 788   | Diesel Fuel; Fuel Requirements  |
| TL 1010  | Materials for Vehicle Interiors; Burning Behavior, Material Requirements  |
| TL 52138 | Ottokraftstoff-Super, bleifrei; Kraftstoffanforderungen (Premium Unleaded Fuel; Fuel Requirements – currently only available in German) |
| TL 52185 | Reference Engine Oil SAE 5W-30 for Testing of Compatibility with Respect to Elastomer Materials; Lubricant Requirements                 |
| VW 01155 | Vehicle Supply Parts; Approval of First Supply and Changes  |
| VW 50179 | Emission Behavior of Components in the Passenger Compartment  |
| VW 50180 | Components in Passenger Compartment; Emission Behavior  |
| VW 50185 | Vehicle Components; Resistance to Open-Air Weathering   |
| VW 91101 | Environmental Standard for Vehicles; Vehicle Parts, Materials, Operating Fluids; Avoidance of Hazardous Substances                      |