

## Group standard

**TL 527**

Issue 2020-05

Class. No.: 55117

Descriptors: ABS, cover, door trim panel, door waist rail, glove compartment lid, radiator grille, seat, side trim panel, suitable for electroplating, trim panel

## ABS Graft Polymer, Finished Parts

### Materials Requirements

3 types: no suffix, A, B

### Previous issues

TL 527: 1966-02, 1987-06, 1997-11, 2002-12, 2010-11, 2013-03

### Changes

The following changes have been made to TL 527: 2013-03:

- a) Section 3.1 "General requirements": VW 52000 and VW 50026 added
- b) Section 2 "Designation": Example designation changed
- c) Section 3.1 "General requirements": Requirement for emission behavior and colorimetric evaluation moved to Table 1
- d) Table 1, consec. no. 1 "Density": Requirements changed
- e) Table 1, consec. no. 3 "Flexural modulus E": Requirements changed
- f) Table 1, consec. no. 5 "Impact strength": Requirements changed
- g) Table 1, consec. no. 6 "Dimensional stability under heat": Requirements changed
- h) Table 1, consec. no. 7 "High-temperature behavior": Aging temperatures removed (temperatures as per drawing)
- i) Table 1, consec. no. 11/Table 1, consec. no. 12: Footnote added
- j) Appendix A "List of released materials" added
- k) Section 4 "Notes on testing": Notes on testing revised
- l) Standard edited

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## 1 Scope

This standard defines the materials requirements for finished parts made of ABS graft polymer such as, e.g., seat side trim panels, radiator grilles, glove compartment lids, trim panels, and covers.

NOTE: The use of ABS for parts that are located on the vehicle exterior and that are subjected to direct solar radiation is not possible without appropriate surface protection (e.g., paint finish as per Technical Supply Specification TL 211).

## 2 Designation

Example designation for the high-temperature-resistant type:

**ABS as per TL 527-B**

## 3 Requirements

### 3.1 General requirements

Approval of first supply and changes as per Volkswagen standard VW 01155.

Resistance to open-air weathering as per VW 50185.

Material conformity as per VW 91101.

Materials sample inspection as per VW 52000

Granular material for thermoplastic parts as per VW 50026

For decorative exterior parts not in body color, the determination of color and gloss as per VW 50196 additionally applies.

10 finished parts are necessary for complete testing. Deviating from this requirement, 5 finished parts are required in the "radiator grille" use case.

### 3.2 Properties

The surface and interior of the finished parts must be free of irregularities caused by manufacturing (e.g. flow lines, cracks, voids). Sink marks at the base of ribs and reinforcements are only permissible if they do not adversely affect the function, appearance, and/or assembly of the parts. The finished parts must allow for trouble-free installation. After storage and use, they must not have any dust accumulation which is characteristic of non-antistatic plastics.

### 3.3 Manufacture

The finished parts must be manufactured using injection molding.

### 3.4 Types

- TL 527                    ABS graft polymer with high impact strength for injection-molded parts which are easy to manufacture, e.g., seat side trim panels, electroformed mold types
- TL 527-A                ABS graft polymer with dimensional stability under heat up to 90 °C for parts that are subject to greater heat load due to their shape and design, e.g., radiator grilles
- TL 527-B                ABS graft polymer with dimensional stability under heat up to 100 °C for parts having an installation position that requires greater dimensional stability under heat for the material, e.g., glove compartment lids, door waist rails

### 3.5 Marking as per German Association of the Automotive Industry (VDA) standard VDA 260

All types: > ABS <

### 3.6 Conditioning

Prior to testing, the specimens required for the individual tests must be conditioned for at least 48 h in standard atmosphere as per [VW 50554 - 23/50-2](#).

### 3.7 Evaluation of the measurement results

The required numerical values apply to each individual measurement.

### 3.8 Material

All types: Acrylonitrile-butadiene styrene graft polymer, antistatic

See [section 4.1](#).

### 3.9 Color

As per drawing

### 3.10 Requirements for parts that are to be chrome-plated

For the material used, the manufacturer of the raw material must specify that the material is suitable for electroplating ("electroplating-compatible"). Uncoated blanks are used for the material tests. These blanks must meet the requirements defined in TL 528 in terms of appearance (section "Blank appearance and stress"), surface texture (section "Surface texture of the uncoated molded part"), and quality (section "Finished part").

### 3.11 Requirements for properties

The requirements for properties are shown in table 1.

For released materials, only a reduced test scope needs to be verified, as identified in column "No." in table 1 with the footnote <sup>a)</sup>. For a list of released materials, see appendix A.

**Table 1**

No.	Property	Unit	Requirement		
			TL 527	TL 527-A	TL 527-B
1	Density as per DIN EN ISO 1183-1, buoyancy method	g/cm <sup>3</sup>	1,02 to 1,08	1,04 to 1,08	
2	Flexural strength as per DIN EN ISO 178 and section 4.2	MPa	≥ 60		≥ 70
3	Flexural modulus E as per DIN EN ISO 178 and section 4.2	MPa	-	≥ 1 900	
4	Notched impact strength as per section 4.3				
4.1	Notched impact strength as per DIN EN ISO 179-1/1eA	kJ/m <sup>2</sup>	-	≥ 7	-
4.2	Notched impact strength as per DIN EN ISO 179-1	kJ/m <sup>2</sup>	≥ 9	≥ 7	≥ 8
5	Impact strength as per DIN EN ISO 179-1/1fU and section 4.4	kJ/m <sup>2</sup>	No fracture		
6 <sup>a)</sup>	Dimensional stability under heat according to Vicat as per DIN EN ISO 306, method B50 Potential part humidity must be taken into account; the specimens must be dried if necessary (2 h/80 °C).	°C	≥ 93	≥ 100	≥ 105
7 <sup>a)</sup>	High-temperature behavior as per section 4.5		Finished parts must not have any embrittlement or other changes in shape, color, or surface that are visible and/or that impair the parts' function.		
8	Low-temperature behavior as per section 4.6		The finished parts must remain fully functional at low temperatures and remain free of any damage. They must not have any cracks or other damage after heating to 23 °C, either; see drawing for special requirements.		

**Table 1 (continued)**

No.	Property	Unit	Requirement		
			TL 527	TL 527-A	TL 527-B
9 <sup>a)</sup>	High-temperature light exposure <sup>b)</sup> as per Test Specification PV 1303 and section 4.7		The surface exposed to light must not have any changes when compared to the as-received condition, e.g., color changes, chalking, and/or cracking. Gray-scale grade $\geq 4$ as per DIN EN 20105-A02 Slight gloss is permissible.		
10 <sup>a)</sup>	Flammability as per TL 1010		If required in the drawing		
11 <sup>a)</sup>	Emission behavior as per VW 50180		If required in the drawing		
12 <sup>a)</sup>	Colorimetric evaluation as per VW 50190		If required in the drawing		
<p>a) This must be verified in the reduced test scope for released materials. For a list of released materials, see appendix A.</p> <p>b) The requirement only applies to visible parts in the vehicle interior or if specified in the drawing. Number of light exposure periods as per drawing</p>					

## 4 Notes on testing

### 4.1 Material

The identity test is performed with infrared spectroscopy.

### 4.2 Flexural strength

The flexural stress must be determined at the maximum load as per DIN EN ISO 178, but:

Specimen length:	(50 $\pm$ 1) mm
Specimen width:	(6 $\pm$ 0,2) mm
Specimen thickness:	Based on article thickness (up to a maximum of 4 mm)
Distance between supports:	40 mm
Support radius:	1,0 mm to 1,2 mm
Test speed:	(14 $\pm$ 1) mm/min

Specimens taken from finished parts that are grained or painted on one side must be placed on the test machine support in such a way that the grained or painted side faces the loading edge.

### 4.3 Notched impact strength

If, due to equipment and/or specimen shape and size, a test as per table 1, consec. no. 4.1 cannot be performed, the following procedure (as per table 1, consec. no. 4.2) can be used, following consultation with the purchaser:

Impact strength test (broadside impact) as per DIN EN ISO 179-1, but:

Specimen length:	(50 ±1) mm
Specimen width:	(6 ±0,2) mm
Specimen thickness:	Based on article thickness (up to a maximum of 4 mm)
Distance between supports:	40 mm
Test device:	Pendulum impact tester as per DIN EN ISO 13802

A 0,8-mm-wide notch must be made on the broad side of the specimens. The notch depth must be 1/3 of the specimen thickness. The edges outlining the notch root must have a curvature radius of < 0,1 mm.

Specimens taken from finished parts that are grained or painted on one side must be notched and then placed on the supports of the pendulum impact tester so that the center of the notch is located precisely in the impact plane. It is important to ensure that the notch is on the side facing away from the hammer edge.

However, this requires prior agreement with the purchaser.

### 4.4 Impact strength

Specimens taken from finished parts grained or painted on one side must be placed on the supports of the pendulum impact tester such that the grained or painted side faces the direction of impact.

Test device: Pendulum impact tester as per DIN EN ISO 13802

### 4.5 High-temperature behavior

Heat aging test in forced-air oven with closed damper flap on at least two complete finished parts; temperatures as required in the drawing; aging duration of (22 +2) h

### 4.6 Low-temperature behavior

Aging of at least two complete finished parts; temperatures as required in the drawing; aging duration of (22 +2) h

### 4.7 High-temperature light exposure

If the number of exposure periods is not defined in the drawing, the following applies:

- 3 exposure periods for parts in areas with indirect solar radiation
- 5 exposure periods for parts in areas with direct solar radiation (e.g., door waist rail)
- 10 exposure periods for parts in areas with maximum solar radiation (e.g., dashboard)

## 5 Applicable documents

The following documents cited in the standard are required for the application of this standard:

Some of the cited documents are translations from the German original. The translations of German terms in such documents may differ from those used in this standard, resulting in terminological inconsistency.

Standards whose titles are given in German may be available only in German. Editions in other languages may be available from the institution issuing the standard.

PV 1303	Non-Metallic Materials; Xenon Arc Light Aging of Vehicle Interior Components
TL 1010	Materials for Vehicle Interiors; Burning Behavior; Material Requirements; updated translation: 2018-06
TL 211	Coating of Plastic Exterior Parts; Requirements
TL 528	Chrome-Plated Plastic Parts; Material Requirements
VW 01155	Vehicle Parts; Approval of First Supply and Changes
VW 50026	Granular Material for Components Made From Thermoplastics and Thermoplastic Elastomers; Classification and Basic Principles of Use
VW 50180	Components, Semi-Finished Products, and Materials in the Vehicle Interior; Emission Behavior
VW 50185	Testing for Resistance to Open-Air Weathering on Whole Vehicles and of Components
VW 50190	Vehicle Interior Equipment Components; Measurement-Based Evaluation of Color and Gloss Level; Visual Evaluation of Chrome Surfaces
VW 50196	Decorative Exterior Parts in Non-Body Color; Determining Color and Gloss
VW 50554	Standard Atmospheres and Room Temperatures; Requirements on Standard Atmospheres
VW 52000	Material Sample Inspection; Requirements and Documentation
VW 91101	Environmental Standard for Articles; Material and Chemical Conformity
DIN EN 20105-A02	Textiles - Tests for colour fastness - Part A02: Grey scale for assessing change in colour
DIN EN ISO 1183-1	Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method
DIN EN ISO 13802	Plastics - Verification of pendulum impact-testing machines - Charpy, Izod and tensile impact-testing
DIN EN ISO 178	Plastics - Determination of flexural properties
DIN EN ISO 179-1	Plastics - Determination of Charpy impact properties - Part 1: Non-instrumented impact test
DIN EN ISO 306	Plastics - Thermoplastic materials - Determination of Vicat softening temperature (VST)

VDA 260

Components of motor vehicles; marking of material

**Appendix A (informative) List of released materials**

The list of released materials is stored on the ONE.Konzern Business Plattform (ONE.KBP) – Volkswagen Group Supply ([www.vwgroupsupply.com](http://www.vwgroupsupply.com)):

Start > Information > Divisions > Quality Assurance > Materials Engineering > Material Release Lists