

BONDING FUNCTIONS AFTER FINISHING PAINT GLAZING COMPONENTS BONDED TO THE BODYWORK EXTERIOR

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1.OBJECT AND FIELD OF APPLICATION

This norme specifies the features to be observed by adhesive sealants (such as polyurethane) designed for fixed windows.

It applies to the following features:

- Functional characteristics:
 - sealing, rigidity, removability, tamper-proofing.
- Implementation characteristics (process) :
 - creep, pumpability and ability to pressure application.

Note: *These implementation characteristics only apply to production products and not After Sales products.*

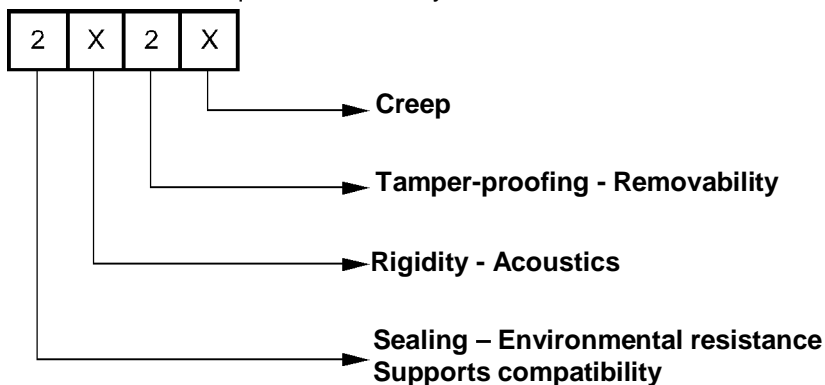
This norme applies to all fixed windows on the vehicle: windscreen, roof, quarter panel, small window, etc.

This document should be accompanied by normes B14 0100 and B74 0100 which give general requirements for consultation by suppliers.

2. EXPRESSION ON DOCUMENTS

The application of the requirements in this norme must be indicated on the documents by:

- the product description,
- the reference number of this norme,
- A 4 digit number which defines the requirement level by function:



The first and third figures are always 2, the two other figures are to be specified for each vehicle.

This four digit number appears on the windows fitting drawing.

For example: WINDSCREEN bonding IN ACCORDANCE WITH NORME B14 1820 2X2X.

The functional requirement levels of each of the fixed windows on the vehicle are specified in the following guidance table § 4.

3.REQUIREMENT LEVELS

Several requirement levels are specified for each function in accordance with the performances deemed necessary for the vehicle. The requirement levels are denoted by levels between 0 and 3:

Requirement	Level
No requirement	0
Reduced requirement	1
Standard requirement	2
Reinforced requirement	3

4.GUIDANCE TABLE (Requirement level selection)

The table below specifies the functional requirement levels of each of the fixed windows on the vehicle. Each window is defined by a four digit number according to § 3, each figure being the requirement level for a function.

Vehicle zone	Fixed windows	Sealing Environmental resistance Supports compatibility	Rigidity acoustics	Tamper- proofing / removability	Creep
Frontal area	Windscreen	2	2 or 3	2	1 or 2 or 3
	Glass roof	2	2 or 3	2	1 or 2 or 3
Rear area	Saloon screen	2	2 or 3	2	1 or 2 or 3
	Hatchback screen	2	2	2	1 or 2 or 3
	Hinged door glass	2	2	2	1 or 2 or 3
Side area	Quarter panel	2	2	2	1 or 2 or 3
	Small window	2	2	2	1 or 2 or 3

Comment: The quarter panel, hinged door glass, hatchback screen and small window are denoted by the same combination of figures.

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5.FUNCTIONAL CHARACTERISTICS:

DOCUMENTS	CHARACTERISTICS	EXPRESSION OF RESULTS	REQUIREMENT LEVEL 2
	FUNCTIONS: <ul style="list-style-type: none"> Sealing Environmental resistance Supports compatibility 		
D51 1709 Condition A	5.1. Peeling on glass (Type of supports see appendix 3)		
	5.1.1. Before ageing: - After 10 days at 24 °C ± 4 °C and ambient hygrometry	Note type of failure	Bonded surface ≤ 30 % RA Continuous bead width ⁽⁵⁾
	5.1.2. After ageing ⁽¹⁾ :		
D47 1165	- After H7 (70 °C) ⁽²⁾	Note type of failure	Bonded surface ≤ 30 % RA Continuous bead width ⁽⁵⁾
D27 1389	- After 2000 hrs in the WOM ⁽³⁾	Note type of failure	Bonded surface ≤ 30 % RA Continuous bead width ⁽⁵⁾
Confidential test method	5.2. Critical peeling on painted support (Type of supports see appendix 3)		
-	5.2.1. Before ageing: - After 10 days at 24 °C ± 4 °C and ambient hygrometry	Note type of failure	Bonded surface ≤ 30 % RA Continuous bead width ⁽⁵⁾
	5.2.2. After ageing ⁽¹⁾ :		
D47 1165	- After H7 (60 °C) ⁽²⁾	Note type of failure	Bonded surface ≤ 30 % RA Continuous bead width ⁽⁵⁾
D41 5225	5.3. Tensile shear strength (Type of supports see Appendix 3)		
	5.3.1. Before ageing: - After 10 days at 24 °C ± 4 °C and ambient hygrometry		
	- temperature = - 40 °C ± 2 °C ⁽⁴⁾	MPa	3
	- temperature = 23 °C ± 2 °C ⁽⁴⁾	MPa	3
	- temperature = 85 °C ± 2 °C ⁽⁴⁾	MPa	2
	5.3.2. After ageing ⁽¹⁾ : - Test at 24 °C ± 4 °C and ambient hygrometry		
D47 1165	- After H7 (60 °C) ⁽²⁾	MPa	3
D27 1389	- After 2000 hrs in the WOM ⁽³⁾	MPa	3
D47 5448	- After fatigue	MPa	3
D47 5445	- After protection/protection removal	MPa	3
D47 5445	- After protection removal	MPa	3
D47 5445	- After glass wash immersion	MPa	3
-	Type of failure under the above conditions	Note type of failure	Bonded surface ≤ 30 % RA Continuous bead width ⁽⁵⁾

Note: Details of the numerical cross references (*) are given in Appendix 1

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5. FUNCTIONAL CHARACTERISTICS (continued)

DOCUMENTS	CHARACTERISTICS	EXPRESSION OF RESULTS	REQUIREMENT LEVELS	
			2	3
	FUNCTIONS: <ul style="list-style-type: none"> • Rigidity • Acoustics 			
	5.4. Modulus features			
D42 5424	5.4.1. Dynamic modulus E' tension/compression (Type of supports see Appendix 3)	E' (MPa) t = 20 °C ± 1 °C f = 60 Hz	0 – 20	>20
	- Before ageing After 10 days at 24 °C ± 4 °C and ambient hygrometry Measurements at 1, 5, 8, 14, 22, 40 and 60 Hz with temperature scanning from - 40 °C to 85 °C ± 1 °C	Curve E' (MPa) = f(t)	No drop Young's modulus E' over the temperature range (tg sealant < - 40 °C)	
D42 5450	5.4.2. Shear static modulus G ₁₀ (Type of supports see Appendix 3)	G ₁₀ (MPa) T = 23 °C ± 2 °C	0 – 2	>2
	- Before ageing After 10 days at 24 °C ± 4 °C and ambient hygrometry	G ₁₀ (MPa) t = - 40°C ± 2 °C	To be defined (without requirement)	
		G ₁₀ (MPa) t = 85°C ± 2 °C		

Note: Details of the numerical cross references (*) are given in Appendix 1

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5. FUNCTIONAL CHARACTERISTICS (continued)

DOCUMENTS	CHARACTERISTICS	EXPRESSION OF RESULTS	REQUIREMENT LEVELS	
			2	3
	FUNCTIONS: <ul style="list-style-type: none"> Removability Tamper-proofing 			
	5.6. Removability tests			
D41 5449	5.6.1. Resistance to cutting (Type of supports see Appendix 3)			
	5.6.1.1. Before ageing: - After 10 days at 24 °C ± 4 °C and ambient hygrometry			
	- temperature = 10 °C ± 2 °C ⁽⁴⁾	N	≤ 500	
	- temperature = 35 °C ± 2 °C ⁽⁴⁾	N	≤ 500	
D47 1165	5.6.1.2. After ageing ⁽¹⁾ H7 (70 °C) ⁽²⁾			
	- temperature = 10 °C ± 2 °C ⁽⁴⁾	N	≤ 500	
	- temperature = 35 °C ± 2 °C ⁽⁴⁾	N	≤ 500	
D41 5451	5.6.2. Resistance to perforation (Type of supports see Appendix 3)			
	5.6.2.1. Before ageing: - After 10 days at 24 °C ± 4 °C and ambient hygrometry			
	- temperature = 10 °C ± 2 °C ⁽⁴⁾	N	≤ 180	
	- temperature = 35 °C ± 2 °C ⁽⁴⁾	N	≤ 140	
D47 1165	5.6.2.2. After ageing ⁽¹⁾ H7 (70 °C) ⁽²⁾			
	- temperature = 10 °C ± 2 °C ⁽⁴⁾	N	≤ 180	
	- temperature = 35 °C ± 2 °C ⁽⁴⁾	N	≤ 140	
D41 5447	5.7. Tamper-proofing test (Type of supports see Appendix 3)			
D47 1165	Static separation - After ageing ⁽¹⁾ H7 (60 °C) ⁽²⁾ - temperature = - 40 °C ± 2 °C ⁽⁴⁾ - temperature = 23 °C ± 2 °C ⁽⁴⁾ - temperature = 85 °C ± 2 °C ⁽⁴⁾	Note Note Note	No visible break Assembly	
	Sample peeling			
	The glued joint of the circular specimen is cut out with an after sales tool. The two residual beads will be peeled off.	Type of failure	Bonded surface ≤ 30 % RA Continuous bead width ⁽⁵⁾	

Note: Details of the numerical cross references (*) are given in Appendix 1.

6. IMPLEMENTATION CHARACTERISTICS (Process)

DOCUMENTS	CHARACTERISTICS	EXPRESSION OF RESULTS	REQUIREMENT LEVELS		
			1	2	3
D41 5461	Creep under load	mm	... > 2	2 ≥ ... ≥ 0.5	... < 0.5

Appendix 1

SPECIFIC CONDITIONS

To produce test specimens the samples, the supports shall be stored for 30 minutes at $24\text{ °C} \pm 4\text{ °C}$ and ambient hygrometry.

The use of degreasing agent(s) and/or primer(s) will be specified in the test methods.

Information concerning the conditions for the application of the sealant shall be contained in the recommendation guide.

NUMERICAL CROSS REFERENCES

- (1) Wait 10 days at $24\text{ °C} \pm 4\text{ °C}$ and ambient hygrometry before submitting the samples to ageing.
- (2) H7 ageing on painted supports is carried out at 60 °C to avoid any delamination of the paint film.

H7 (D47 1165) humid cataplasma	
Test	Steaming
Peeling on glass (D51 1709, Condition A) Removability (D41 5449, D41 5451)	at $70\text{ °C} \pm 2\text{ °C}$
Critical peeling on painted support Tensile shear strength (D41 5225) Tamper-proofing (D41 5447)	at $60\text{ °C} \pm 2\text{ °C}$

(3) The printed glass support shall ensure UV opacity in accordance with test method D15 1807, TL with illuminant D65, the criteria to observe are as follows:

- at 342 nm $T_L \leq 0.02\%$,
- at 555 nm $T_L \leq 0.1\%$.

Note: These specifications are drawn from a PSA/Suppliers working group from 1993 according to CR No. 6257/93/0854.

(4) The test specimens are stored at the temperature indicated for 1 hour before the test is carried out.

(5) Peeling test requirement

The type of failure must not account for more than 30 % of the adhesive failure on the total surface of the test specimen and there must be no adhesive failure over the full width of the glued joint.

Note: Adhesive failure includes the side effect (eb) as well as the tunnel effect (et).

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Appendix 2

TEST RESPONSIBILITY

The table below specifies the responsibility of the tests in the following cases:

- Approval of an adhesive with lacquer primer
- Approval of an adhesive without lacquer primer
- Approval of an enamel or transfer of the priming procedure to the glassmaker

Responsibility	Approval of an adhesive with lacquer primer	Approval of an adhesive without lacquer primer	Approval of an enamel or Transfer of priming to the glass maker
Adhesive supplier	<p>All tests from the present norme</p> <p>Critical peeling on a painted support to be carried out with lacquer primer (Confidential test method)</p> <p>Important note: The critical peeling test on a painted support must conform with lacquer primer.</p>	<p>All tests from the present norme</p> <p>Critical peeling on a painted support to be carried out without lacquer primer (Confidential test method)</p> <p>Important note: The critical peeling test on a painted support must conform without lacquer primer.</p>	-
Glass supplier	-	-	<p>Peeling on glass (D51 1709 Condition A)</p> <p>Tensile shear strength (D41 5225)</p>
PSA DPTA/DMOV/MXP	Examination and verification of results	Examination and verification of results	Examination and verification of results

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Appendix 3

TEST SUPPORTS

Test		GLASS SUPPORT		SHEET METAL SUPPORT	
		Type	DIMENSIONS	Type	DIMENSIONS
5.1. Peeling on glass according to D51 1709 Condition A	WOM ageing	Production support Unleaded silk-screen glass T (ref. 484) and F (ref. 488) ⁽⁷⁾ Laminated silk-screen painted glass Face 2	180 x 90 x 4 mm (as a guideline)	-	-
	New condition and H7 ageing				
5.2. Critical peeling on painted support (Confidential norme)	New condition and H7 ageing	-	-	Production varnishes and lacquers in critical conditions (see associated test method)	180 x 90 x 2 mm (as a guideline)
5.3. Tensile shear strength according to D41 5225	Ageing in the WOM	Unleaded silk-screen painted glass T (ref. 484) and F (ref. 488) ⁽⁷⁾ Laminated silk-screen painted glass Face 2	100 x 25 x 4 mm	Sheet metal painted in standard stoving (9) with varnish (8) phase 2 BASF VER20 varnish	100 x 25 x 2 mm
	New condition and other ageing	Non silk-screen painted tempered glass			
5.4.1. Material dynamic modulus according to D42 5424		-			
5.4.2. Assembly static modulus according to D42 5450		-		Aluminium support to be primed	See associated test method
5.6.1. Resistance to cutting according to D41 5449		-		Cataphoretic sheet metal or painted with primer	See associated test method
5.6.2. Resistance to perforation according to D41 5451		-		Cataphoretic sheet metal or painted with primer	See associated test method
5.7. Tamper-proofing according to D41 5447		Quenched silk-screen painted glass T (ref. 484) ⁽⁷⁾	130 x 130 x 5 mm	Sheet metal painted in standard stoving (9) with varnish (8) phase 2 BASF VER20 varnish	See associated test method
6. Creep under load according to D41 5461		See test method			

(7) T Silk-screen printing: silk-screen printing for quenched glass

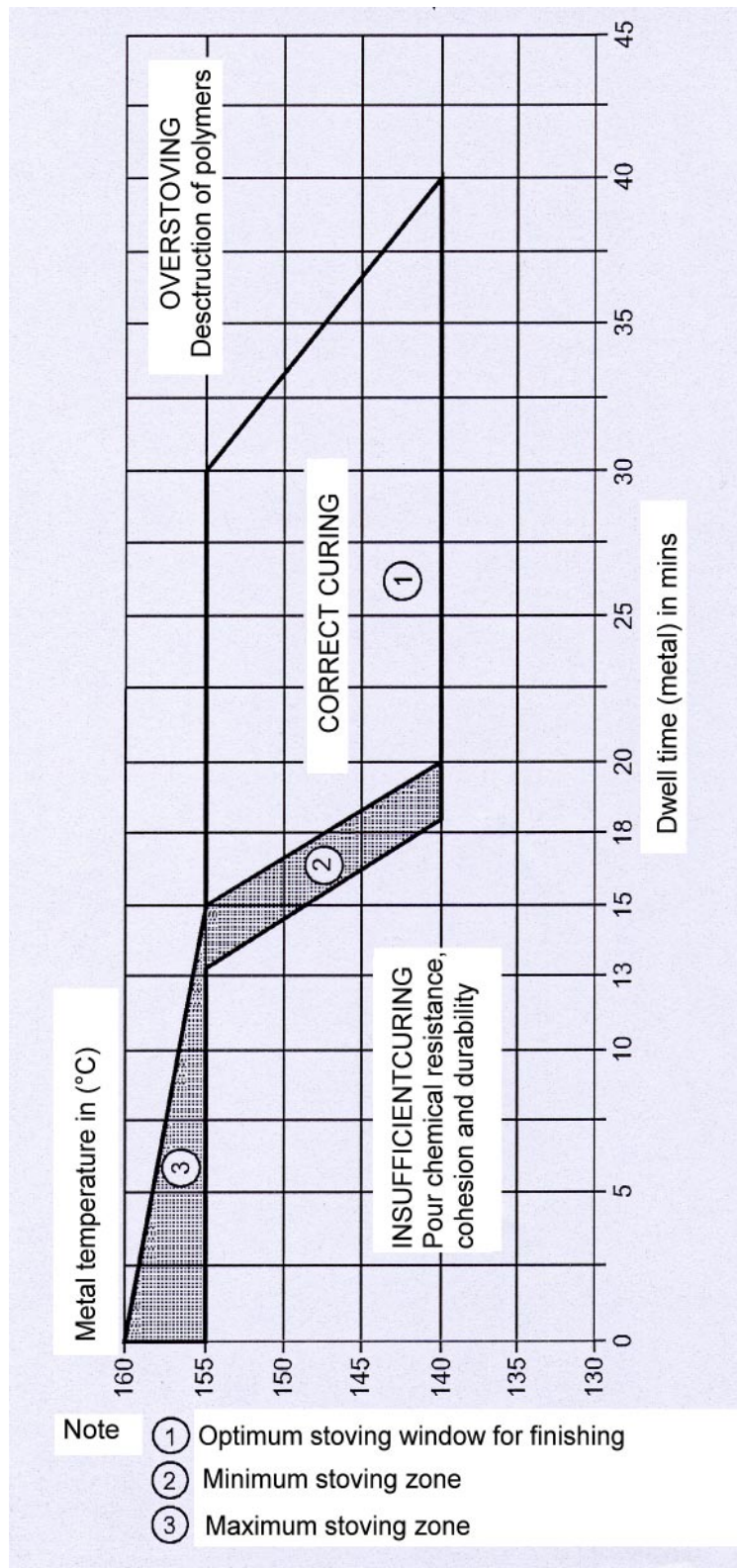
F Silk-screen printing: silk-screen printing for laminated glass

(8) The associated shade is quartz grey.

(9) Standard paint stoving conditions: stoving window for finishes according to Appendix 4.

Appendix 4

FINISH STOVING WINDOW



7. RECORDS AND REFERENCE DOCUMENTS

7.1.RECORDS

7.1.1.CREATION

- OR : 01/01/1984 - CREATION DE LA NORME.

7.1.2.SUBJECT OF THE MODIFICATION

- C: 17/11/2000 – COMPLETE REWRITE OF THE NORME
- B: 23/01/1997 – USE OF A PRIMARY LACQUER IN THE GLASS ADHESIVE RANGE (CONCLUSION OF TWO STUDIES LEAD BY SOCHAUX AND AULNAY ON THIS SUBJECT)

7.2.REFERENCE DOCUMENTS

7.2.1.PSA DOCUMENTS

7.2.1.1.Normes

B14 0100	BONDING, SEALING, ANTI-CHIPPING, DAMPING, ANTICORROSION AND PROTECTION FUNCTIONS - GENERAL INFORMATION
B74 0100	SUPPLY OF PRODUCTS – BONDING, SEALING, ANTI-CHIPPING, DAMPING, ANTICORROSION AND PROTECTION – GENERAL REQUIREMENTS
D15 1807	TRANSLUCENT OR TRANSPARENT PARTS AND SAMPLES - MEASUREMENT OF OPTICAL DENSITY USING A TRANSPARENCY DENSITOMETER
D27 1389	PAINT COATINGS – RUBBERS AND PLASTICS – ARTIFICIAL AGEING BY WEATHER-OMETER
D41 5225	POLYURETHANE SEALANTS FOR BONDING WINDOWS – TENSILE SHEAR STRENGTH
D41 5447	POLYURETHANE SEALANTS FOR BONDING WINDOWS – TAMPER-PROOFING TEST
D41 5449	POLYURETHANE SEALANTS FOR BONDING WINDOWS – RESISTANCE TO CUTTING (REMOVABILITY)
D41 5461	POLYURETHANE SEALANTS FOR BONDING WINDOWS – CREEP RESISTANCE UNDER LOAD
D41 5451	POLYURETHANE SEALANTS FOR BONDING WINDOWS – RESISTANCE TO PERFORATION (REMOVABILITY)
D42 5424	WEDGIN OR SEALING MASTICS – DETERMINATION OF DYNAMIC MECHANICAL CHARACTERISTICS
D42 5450	POLYURETHANE SEALANTS FOR BONDING WINDOWS – DETERMINATION OF SHEAR MODULUS
D47 1165	PRODUCTS APPLIED TO BODY-IN-WHITE OR PAINT COATED BODYWORK, PLASTICS – ACCELERATED AGEING
D47 5445	SEALANTS AND ADHESIVES APPLIED ON FITTING – BEHAVIOUR ON CONTACT WITH PROTECTION, PROTECTION REMOVAL, GLASS-WASH FLUIDS
D47 5448	POLYURETHANE SEALANTS FOR ATTACHING WINDOWS – FATIGUE AGEING OF A SHEAR-TENSILE TEST SPECIMEN
D51 1709	POLYURETHANE SEALANTS FOR ATTACHING WINDOWS – ADHESION TEST BY PEELING

7.2.1.2.Others

CR No. 6257/93/0854	MULTIVEHICLE – BONDING OF FIXED WINDOWS – PSA/RENAULT AND GLASS AND ADHESIVE SUPPLIERS WORKING GROUP
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7.2.2.EXTERNAL DOCUMENTS

7.3. EQUIVALENT TO:

7.4. CONFORMS TO:

7.5. KEY WORDS