

**PAINT COATINGS
PITTING LIMIT ASSESSMENT
ON FINISHING PAINTS**

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Restrictions described in the normeThis Méthode d'Essai **CANCELS** and **REPLACES** document MXP_PEI00_0021*This is a translation, the French original shall be used in all cases of litigation**Date of translation : 08/11/2001***1. OBJECT AND FIELD OF APPLICATION**

The object of this méthode is to determine the minimum thickness of material to be tested (primer surfacer, lacquer or base and clearcoat) applied according to an adopted range from which the first signs of pitting may be observed.

It applies to finishing paints : primer surfacers, lacquers, bases and clearcoats.

2. PRINCIPLE

The operation consists of producing several plates of different thickness of the material to be tested and covering the thickness range to be studied (from 30 μm to 70 μm), or of applying a graded thickness onto one plate only. Where the material to be tested is a base, the studied thickness range is reduced (5 μm to 30 μm); it is then covered with a clearcoat, and in all cases, it is then stoved in a horizontal position.

The minimum material thickness is determined when the first pitting is observed.

3. EQUIPMENT**3.1. SHEET METAL PLATES,**

500 mm x 300 mm, 0,8 mm thick.

3.2. APPLICATION EQUIPMENT

defined in Appendix 1.

3.3. TWO VENTILATED OVENS

minimum working volume 250 l, regulated to the nearest 2° C within the temperature range of 20° C to 250 ° C in order to obtain the stoving profiles defined in Appendix 1.

3.4. THICKNESS MEASURING EQUIPMENT

according to méthode d'essai D26 5316.

3.5. CHRONOMETER**3.6. VISCOMETRIC CUP AND RELATED EQUIPMENT**

to adjust the dilution according to méthodes d'essai D55 1016 and D55 1339.

3.7. APPLICATION BOOTH

with forced air.

3.8. ADHESIVE PAPER

25 mm wide.

4. METHOD OF OPERATION

4.1. PRIMER SURFACER, LACQUER OR CLEARCOAT ASSESSMENT

According to available equipment and requirements, one of the following procedures shall be applied :

Application onto single thickness plates :

- Setting of the conveyor speed : 4 m/min.
- Setting of the spraying jet :
 - On the sheet metal of 500 mm x 300 mm, set the spray of the product to be tested so as to obtain perfect primer surfacer thickness homogeneity at 40 µm in 2 layers. After the setting has been carried out, the application parameters will be frozen (shaping air, rotating speed of bell,...).
- Application onto test plates :
 - In the range of the relevant site, as per Appendix 1, apply the product to be tested to the bell at the setting conditions previously defined, directly onto the sheet metal.
 - Leave to dry for 5 minutes, in a vertical position.
 - Carry out the stoving in an oven in horizontal position, at the specific conditions set by the relevant site.
 - After cooling, examine the plate.
 - The pitting limit thickness is reached as soon as a few pits appear in accordance with norme B15 5020.
 - If the pitting limit is exceeded or not reached, modify the thickness of the material to be tested deposited onto another plate, so that the limit may be within the nearest bracket. To achieve this, the only parameter to be modified is the conveyor speed using the following formula :

$$Vc_1 = Vc_0 \times \text{thickness}_0 / \text{thickness}_1$$

In which :

Vc_0 = conveyor speed at the measured thickness

thickness₀ = measured thickness

Vc_1 = conveyor speed to obtain the desired thickness

thickness₁ = desired thickness

- Check that the pitting limit obtained is greater than the run limit determined by means of méthode d'essai D25 5471.

Note : The material to be tested may be applied onto plates in a vertical position, the flash off and stoving phases are then carried out in a horizontal position.

Grading application :

- Apply a graded thickness of the product to be tested, to the bell, from 30 µm to 70 µm, in a horizontal position, directly onto the sheet metal.
- Leave to dry for 5 minutes in horizontal position.
- Stove in an oven in a horizontal position at the specific conditions of the relevant site.
- Leave to cool at ambient temperature.
- Record the incipient pitting according to norme B15 5020 for the definition of the defect.
- Measure the deposited thickness of the product to be tested at the first pitting and check that this is greater than the run limit determined by means of méthode d'essai D25 5471.

Note : The material to be tested may be applied onto plates in vertical position, the flash off and stoving phases are then carried out in a horizontal position.

4.2. BASE ASSESSMENT

According to available equipment and requirements, one of the following procedures shall be applied :

Application onto single thickness plates :

- Setting of the conveyor speed : 4 m/min.
- Setting of the spraying jet :
 - On the sheet metal of 500 mm x 300 mm, set the spray of the product to be tested so as to obtain perfect base thickness homogeneity at 20 µm in 2 layers. After the setting has been carried out, the application parameters will be frozen (shaping air, rotating speed of bell,...).
- Application onto test plates :
 - Stick adhesive paper lengthwise, as per Appendix 2, for checking the deposited thickness.
 - In the range of the relevant site, as per Appendix 1, apply the base at the setting conditions previously defined, directly onto the sheet metal.
 - Immediately after the application, observe the appearance of the material in order to detect any possible dust or other application defect.
- Pre-dry, in horizontal position, in the range conditions of the relevant site.
- Remove the adhesive paper.
- Apply a uniform clearcoat layer of 40 µm (for base + clearcoat) according to the range of the relevant site.
- Pre-dry in the conditions specified in the range of the relevant site with the plate maintained in a horizontal position.
- Stove in an oven in horizontal position at the specified conditions of the relevant site.
- After cooling, examine the plate.
- The pitting limit thickness is reached as soon as a few pits appear, in accordance with norme B15 5020 for the definition of the defect.
- If the pitting limit is exceeded or not reached, modify the base thickness deposited onto another plate so that the limit may be within the nearest bracket. To achieve this, the only parameter to be modified is the conveyor speed using the following formula :

$$Vc_1 = Vc_0 \times \text{thickness}_0 / \text{thickness}_1$$

In which :

Vc_0 = conveyor speed at the measured thickness

thickness_0 = measured thickness

Vc_1 = conveyor speed to obtain the desired thickness

thickness_1 = desired thickness

- Check that the pitting limit obtained is greater than the run limit determined by means of méthode d'essai D25 5471.

Note : The material to be tested may be applied onto plates in vertical position, the flash off and stoving phases are then carried out in a horizontal position.

Grading application :

- Stick adhesive paper lengthwise, as per Appendix 2, for checking the deposited thickness.
- Apply the diluted material to be tested, graded from 5 µm to 30 µm secs, to the test specimen maintained in horizontal position according to the range of the relevant site.
- Immediately after the application, observe the appearance of the material in order to detect any possible dust or other application defect.
- Pre-dry in the range conditions of the relevant site.
- Remove the adhesive paper.
- Apply a uniform clearcoat layer of 40 µm (for base + clearcoat) according to the range of the relevant site.
- Pre-dry in the conditions specified in the range of the relevant site, with the plate maintained in horizontal position.
- Stove in an oven in horizontal position at the specific conditions of the relevant site.
- Leave to cool at ambient temperature.
- Record the incipient pitting according to norme B15 5020 for the definition of the defect.
- Measure the base thickness at the first pitting and check that this is greater than the run limit determined by means of méthode d'essai D25 5471.

Note :

- *The material to be tested may be applied onto plates in vertical position, the flash off and stoving phases are then carried out in horizontal position.*
- *The ranges defined in Appendix 1 correspond to the relevant sites through the Exploring Request issued by the Product Management (DPMP and DPMC) : pilot site for a vehicle project, cross sites in the case of Model Years. These are issued from the DMOV-PEI-0349-REFE procedure.*

Remark : For practical reasons, it may be preferable to apply the base entirely to the bell.

5. EXPRESSION OF RESULTS

Indicate the minimum primer surfacer, lacquer, base or clearcoat thickness, according to the material assessed, from which the first pitting occur.

6. TEST REPORT

As well as the results obtained, the test report must indicate :

- the reference to this méthode,
- the thicknesses deposited,
- the equipment and application parameters,
- the details not specified in the methods of operation of méthodes d'essai and the anomalies which may have a repercussion on the results.
- the operating details not specified in the method as well as any possible incidents likely to have affected the results.

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Appendix 1 (1/2)

DEFINITION OF PARAMETERS TO BE USED FOR EACH RANGE

	RANGE 1			RANGE 2					RANGE 3
	MADRID	MULHOUSE	RYTON	SEVEL NORD	RENNES	SOCHAUX	AULNAY	VIGO	POISSY
Sheet metal	Cold rolled – Continuously galvanised – Appearance Z – According to normes B53 3059 and B53 3220								
Cataphoresis	Reference : PPG – 742.962 – Thickness : 20 μ \pm 2 μ - Stoving : Rise 10 min + Dwell 20 min – 180°C								
Primer surfacer	Primer surface of the site : Colour matching the base – Thickness : 35 μ \pm 5 μ - Stoving according to DMOV-PEI-0349-REFE								
Clearcoat	Clearcoat of the site – Thickness : 45 μ \pm 5 μ in horizontal and 35 μ \pm 5 μ in vertical - Stoving according to DMOV-PEI-0349-REFE								

APPLICATION RANGES

Metal, Mother of pearl Bases	1 MAP coat (*)	2 MAP layers (*)	1 Mini-bell coat + 1 MAP (*) coat		
Opaque base	1 MAP coat (*)	2 MAP layers (*)	1 Mini-bell coat		
Lacquer	1 Mini-bell coat	2 Mini-bell coats			2 Mini-bell coats
Clearcoat	1 Mini-bell coat	2 Mini-bell coats			2 Mini-bell coats

APPLICATION TIME

Speed of application 4,5 min to 5 min

FLASH OFF TIME

Between base coats	-	2 min		1 min
Between base and clearcoat	3 min	8,5 min	2 min	4 min – 80°C in convection and cooling at 35°C
Between clearcoat layers	-	1 min		
Before stoving	5 min	8 min		

Note : MAP (*) Paint robot

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Appendix 1 (2/2)

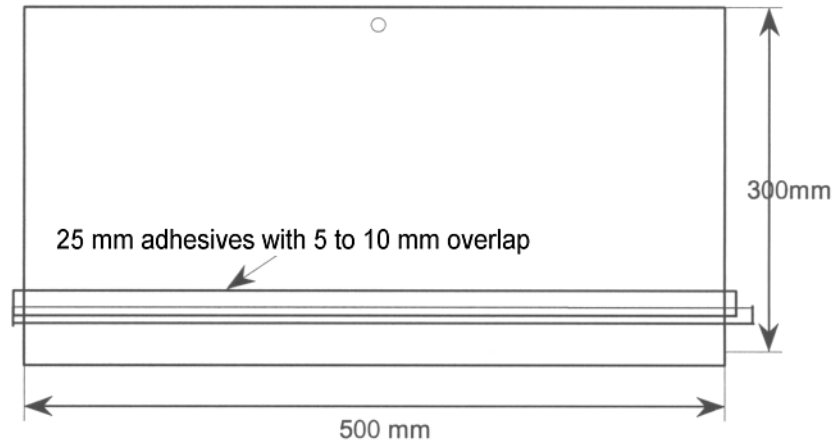
DEFINITION OF THE PARAMETERS TO BE USED FOR EACH RANGE

RECOMMENDED APPLICATION EQUIPMENT

	RANGE 1			RANGE 2					RANGE 3
	MADRID	MULHOUSE	RYTON	SEVEL NORD	RENNES	SOCHAUX	AULNAY	VIGO	POISSY
Base manual spray gun	DEVILBISS JGV 563								
Cap	797								
Nozzle	AV 601 FZ (diameter 1,2 mm)								
Base mini-bell	-			-	SAMES or BEHR				SAMES or BEHR
Type of bell	-			-	Rounded or serrated edge				Negative edge
Type of load	-			-	Internal				External
Lacquer mini-bell	SAMES or BEHR								
Type of bell	Rounded or serrated edge								
Loading type	Internal								
Base automatic spray gun	SAMES TRP 500								
Cap Ref.	436939			428376					429063
Nozzle Ref.	439058 (1,2) mm			428375 (1, 2/2, 6 mm)					429064 (1,5/2,6 mm)
Number of spray guns	2 with 50% overlapping								
	1 with 75% overlapping								
Clearcoat mini- bells	SAMES or BEHR								

Note :

- Distance between the plate to be painted and the spray gun : 250 mm to 300 mm
- Distance between the plate to be painted and the Mini-bell : 275 mm to 300 mm.

Appendix 2**DIAGRAM OF THE TEST PLATE**

7. RECORDS AND REFERENCE DOCUMENTS

7.1. RECORDS

7.1.1. CREATION

- OR : 28/06/2001 – CREATION OF THE METHODE D'ESSAI.

7.1.2. SUBJECT OF THE MODIFICATION

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7.2. REFERENCE DOCUMENTS

7.2.1. PSA DOCUMENTS

7.2.1.1 Normes

B15 5020	COATINGS OF PAINT - DEFINITION OF SPECIFIC TERMS
B53 3059	STEEL – FLAT PRODUCTS FOR PRESSING – SURFACE TEXTURE
B53 3220	STEEL – FLAT PRODUCTS COLD ROLLED CONTINUOUSLY GALVANISED
D25 5471	PAINT COATINGS – RUN LIMIT ASSESSMENT OF PRIMER SURFACERS AND CLEARCOATS
D26 5316	COATINGS – ORGANIC ON MAGNETIC OR NON-MAGNETIC METAL SUPPORT – NON DESTRUCTIVE MEASUREMENT OF THE THICKNESS
D55 1016	ADHESIVES, PAINTS AND SIMILAR PREPARATIONS – CONSISTENCY (CUP METHOD)
D55 1339	PAINTS AND SIMILAR PREPARATIONS – RATE OF DILUTION

7.2.1.2. Others

DMOV-PEI-0349-REFE DESCRIPTION OF THE PRIMER SURFACER AND FINISHING PAINT PROCESSES FOR THE PSA GROUP PAINTSHOPS.

7.2.2. EXTERNAL DOCUMENTS

7.3. EQUIVALENT TO :

7.4. CONFORMS TO :

7.5. KEY-WORDS