

**PAINT COATINGS
RESISTANCE TO HIGH PRESSURE WASH**

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No use restriction*This is a translation, the French original shall be used in all cases of litigation**Date of translation : 26/04/2006***FOREWORD**

*This document, as an experimental standard, is applicable and submitted for observations for a duration of **9 months**. If no comments are received by **31/12/2006** at the address: normesExp@mpsa.com the content of this document shall be confirmed.*

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RECORDS

Suffix	Date	Type of modifications
OR	01/04/1995	CREATION OF THE NORME.
A	15/05/1997	INTRODUCED INTO IDEM (<i>French only</i>).
B	14/11/2000	UPDATE OF THE TEST METHOD.
C	16/09/2004	ADDITION OF ANTI-CHIPPING MASTICS.
D	13/04/2006	CHANGE TO THE TEST TEMPERATURE FROM 70°C DOWN TO 60°C (SEE § 9.1.).

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1.OBJECT AND FIELD OF APPLICATION

The object of this method is to characterise the resistance of paint, anti-chipping mastics, decorative films type of coatings ... to the action of a high pressure wash.

It applies to coatings on sheet metal or plastic supports, test specimens or complete parts.

2.REFERENCE DOCUMENTS

2.1.NORMES

Not applicable.

2.2.REGULATIONS

Not applicable.

2.3.OTHER DOCUMENTS

MXP_PEI05_0220 EQUIPMENT SPECIFIC TO PAINT TESTS WITHIN PSA PLANT LABORATORIES

2.4.EXPRESSION ON DOCUMENTS

Not applicable.

3.TERMINOLOGY AND DEFINITION

A dictionary (glossary) of the main terms and their definitions used within the "Direction des Plates-formes, des Techniques et des Achats" can be consulted in-house via the DPTA glossary.
([Nectar](http://nectar.inetpsa.com) : <http://nectar.inetpsa.com>). This glossary is constantly up-dated.

3.1.DEFINITIONS

Not applicable.

3.2.ACRONYMS

Not applicable.

4.TEST METHOD PRINCIPLE

The test consists of subjecting a paint film, an anti-chipping mastic or a decorative film... to the action of a high pressure wash. The test may be carried out with or without damage on a same substrate but in two different areas.

The possible detachment observed is comparable to that met on vehicles during the use of commercial high pressure wash installations or domestic high pressure cleaners.

5.EQUIPMENT

5.1.HIGH PRESSURE CLEANER

Equipment providing an operation at the temperature of $60^{\circ}\text{C} \pm 10^{\circ}\text{C}$, with a delivery of 750 litres/hour ± 50 litres/hour, for a stabilised effective pressure of 65 bar ± 2 bar (6,5 Mpa $\pm 0,2$ MPa).

(See equipment references in the note "Equipment specific to paint tests within psa plant laboratories").

Reference example : KARCHER HDS 995 type apparatus.

5.2.FLAT JET NOZZLE

Forming a jet angle of $40^{\circ} \pm 5^{\circ}$ in the test conditions (for example reference WASHJET EG 25065 from SPRAYING SYSTEMS EMANI), as per Appendix 1.

The nozzle service life is 1000 tests (i.e. 1000 cross cuts or sweeps).

If after one year's use, the 1000 tests are not attained, it is necessary to test the jet angle (identical test to that carried out when changing the nozzle § 9.2.).

The nozzle may then be used over a period greater than one year and if the 1000 tests are not attained after the second year's use, it must still be changed.

The nozzle service life is therefore two years maximum.

Note : *The requirement on the nozzle service life implies that it is not used for anything else..*

5.3.SUPPORT

Rigid, fixed to the rod and produced so that a constant distance of 100 mm ± 5 mm is maintained between the nozzle outlet (§ 5.2.) and the test specimen, according to Appendix 2.

The support also enables a normal angle to be obtained between the nozzle axis and the test specimen.

5.4.CUTTER

Safety device, dedicated for the test only.

Reference: Cutter MARTOR-PROFI : N° 07152, MABEC: P645 410 022 (right-handed person),
N° 07252, MABEC: P645 410 026 (left-handed person).

Corresponding blades (box of 10) : ref. MARTOR No 5232, MABEC Z000 114 676.

Service life : 50 tests (i.e. 50 cross cuts).

5.5.CHRONOMETER

Accurate to one second.

5.6.CHECKING DEVICE

System for checking the pressure and temperature parameters at the quasi nozzle outlet (example of apparatus : reference PPC04, from the Company TRANSFLEX).

See installation diagram according to the figure in Appendix 1. The distances shown in mm on the rod are for information.

5.7.TRANSPARENT SQUARED PAPER

In squares of 5 mm x 5 mm for the measurement of the detachment surface.

5.8.THERMOMETER

Accurate to one degree.

5.9.OVEN

For a conditioning at $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ at ambient hygrometry.

6.PREPARATION OF SOLUTIONS

Not applicable.

7.REPRESENTATIVENESS OF TEST SPECIMENS OR SAMPLES

The test specimens or samples must be representative of the scale to be characterised. To provide this representativeness, it is necessary to find out the basic characteristics of the population studied. The selection criteria for the test specimens or samples must be specified in the Test Report (RE), in conformity with norme A10 0156.

8.PREPARATION OF TEST SPECIMENS

- The test specimens or parts must be 150 mm x 100 mm minimum (non restrictive optimum conditions).
- The test specimens must be conditioned at $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and ambient hygrometry for approximately 24 hours before carrying out the tests. For curable paints at temperatures below 120°C , proceed with the same conditioning for 7 days, except otherwise indicated on standard documents.

9.PROCEDURE

The test must be carried out at ambient temperature and hygrometry. The temperature of the part to be tested must be between 15°C and 30°C .

Place the part, wedging it if required, in order to guarantee its rigidity, particularly at the point of impact of the jet.

9.1.TEST CONDITIONS

- Pressure : $65 \text{ bar} \pm 2 \text{ bar}$, read off the checking device (§ 5.6.).
- Temperature : $60^{\circ}\text{C} \pm 10^{\circ}\text{C}$, measured with the checking device (§ 5.6.) after 5 min of operation.
- Delivery : $750 \text{ litres/hour} \pm 50 \text{ litres/hour}$; to be checked before each test.
- Distance between nozzle and test specimen : $100 \text{ mm} \pm 5 \text{ mm}$ (§ 5.3.).
- The nozzle axis must be perpendicular to the test specimen (§ 5.3.).

9.2.INSPECTION OF A NEW NOZZLE

The inspection of a new nozzle is mandatory and is made by producing an imprint on extruded polystyrene approximately 300 mm thick, in the conditions of temperature and pressure from the previous paragraph (§ 9.1.).

So that all PSA sites have the same polystyrene reference, it is the responsibility of DPTA/DMOV/IMT/MXP/PEI to send the polystyrene slabs.

- Check the delivery of the cleaner in the conditions of § 9.1. The delivery obtained with a complying nozzle is 750 ± 50 litres/hour.
- Position the nozzle at a distance from the polystyrene slab of $100 \text{ mm} \pm 5 \text{ mm}$, and perpendicularly to the polystyrene slab.
- Start the high pressure cleaner and maintain the position for $60 \text{ seconds} \pm 2 \text{ seconds}$.
- Measure the length of the imprint.

The imprint of a complying nozzle measures between 60 mm and 87 mm in length, giving a nozzle angle characteristic of $40^\circ \pm 5^\circ$.

Note : *The polystyrene slab must not be pierced by the jet which would be the case if the pressure was too high..*

9.3.TEST WITHOUT DAMAGE TO THE COATING (ON PARTS ONLY)

This test without damage to the coating (paint film, decorative film...) is to be carried in the following cases :

- adhesion to tape limit,
- air intake grille,
- gouge or styling line,
- return arm,
- sharp edge.

This test does not apply to anti-chipping mastics.

- Position the nozzle (§ 5.2.) at a distance of $100 \text{ mm} \pm 5 \text{ mm}$ from the surface to be tested,
- Make 3 forward/return movements, slowly over the area to be tested.
- Measure the surface of possible detachments, by means of the transparent squared paper (§ 5.7.) specifying at which interface they are located and their location when parts are concerned.

9.4.TEST WITH DAMAGE TO THE COATING (PARTS AND TEST SPECIMENS)

9.4.1.TEST ON PAINT FILM OR DECORATIVE FILM

This test with damage to the coating is to be carried out over an area which has not been subjected to the sweep described in § 9.3.

- Make an incision into the paint film as far as the substrate, using the cutter (§ 5.4.) to form a cross with arms 100 millimetres long and forming an angle of 60° (non restrictive optimum conditions) according to Appendix 3.
- The use of a support, to be placed on the part or test specimen and allowing the crosses to be traced in a reproducible manner, is recommended.
- These incisions must be at least 10 millimetres from all the edges of the test specimen or the part. On large parts, produce as many crosses as possible in order to validate the adhesion over the exposed areas.

Note : *For parts with smaller dimensions than those mentioned above, the lengths of the arms of the cross shall be proportionally adapted.*

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- Position the nozzle at the centre of the cross, at a distance of 100 mm \pm 5 mm from the surface to be tested and with the jet parallel with one arm (according to Appendix 3), start the high pressure cleaner and maintain the position for 60 seconds \pm 2 seconds.
- Measure the surface for possible detachments using the transparent squared paper (§ 5.7.), specifying at which interface these are located and their location when parts are concerned.

9.4.2.TEST ON ANTI-CHIPPING MASTIC

- Make an incision into the mastic film as far as the substrate using the cutter (5.4.) to form a cross with arms 100 mm long and forming an angle of 60° (non restrictive optimum conditions), according to Appendix 3.
- The use of a support, to be placed on the part or test specimen and allowing the crosses to be traced in a reproducible manner, is recommended.
- These incisions must be at least 10 millimetres from all the edges of the test specimen or the part. On large parts, produce as many crosses as possible in order to validate the adhesion over the exposed areas.

Note : *For parts with smaller dimensions than those mentioned above, the lengths of the arms of the cross shall be proportionally adapted.*

- Position the nozzle at the centre of the cross, at a distance of 100 mm \pm 5 mm from the surface to be tested and with the jet parallel with one arm (according to Appendix 3), start the high pressure cleaner and maintain the position for 60 seconds \pm 2 seconds.
- Measure the detachment of the mastic obtained from either side of the cross arm subjected to the jet according to Appendix 4.

10.REMARKS : MEASUREMENT UNCERTAINTY

The assessment of the resistance to high pressure wash is a grading method : its measurement uncertainty may not be determined.

11.TEST REPORT AND EXPRESSION OF RESULTS

11.1.EXPRESSION OF RESULTS

For each part, quote the most critical area with its grading. Quote all defective areas.

Express the result by the corresponding figure from the grading below :

11.1.1.TEST WITHOUT DAMAGE

- Grading 0 = detachment less than 1 cm² over the whole test area.
- Grading 1 = detachment greater than or equal to 1cm² and less than 3 cm² over the whole test area.
- Grading 2 = detachment greater than or equal to 3 cm² over the whole test area.

11.1.2.TEST WITH DAMAGE TO PAINT FILM OR DECORATIVE FILM

- Grading 0 = detachment less than 1 cm² per cross.
- Grading 1 = detachment greater than or equal to 1cm² and less than 3 cm² per cross.
- Grading 2 = detachment greater than or equal to 3 cm² per cross.

11.1.3.TEST WITH DAMAGE TO ANTI-CHIPPING MASTIC FILM

Measure with the rule the maximum detachment distance from either side of the cross arm.

Express this distance in mm.

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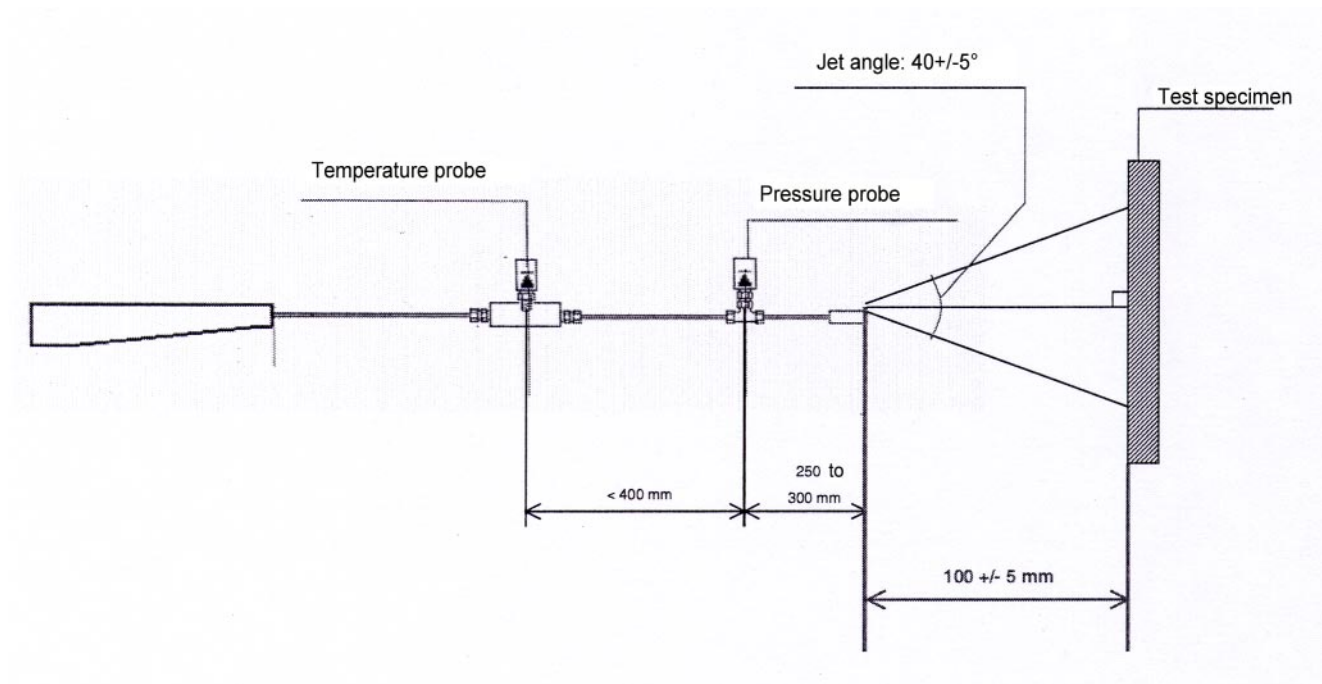
11.2.TEST REPORT

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

- the reference to this method,
- the complete identification of the test specimen or part tested (name of the Supplier, support reference and paint range),
- the delivery measurements, the water temperature range (min and max), the operating pressure,
- the operating details not specified in the method as well as any incidents likely to have affected the results..

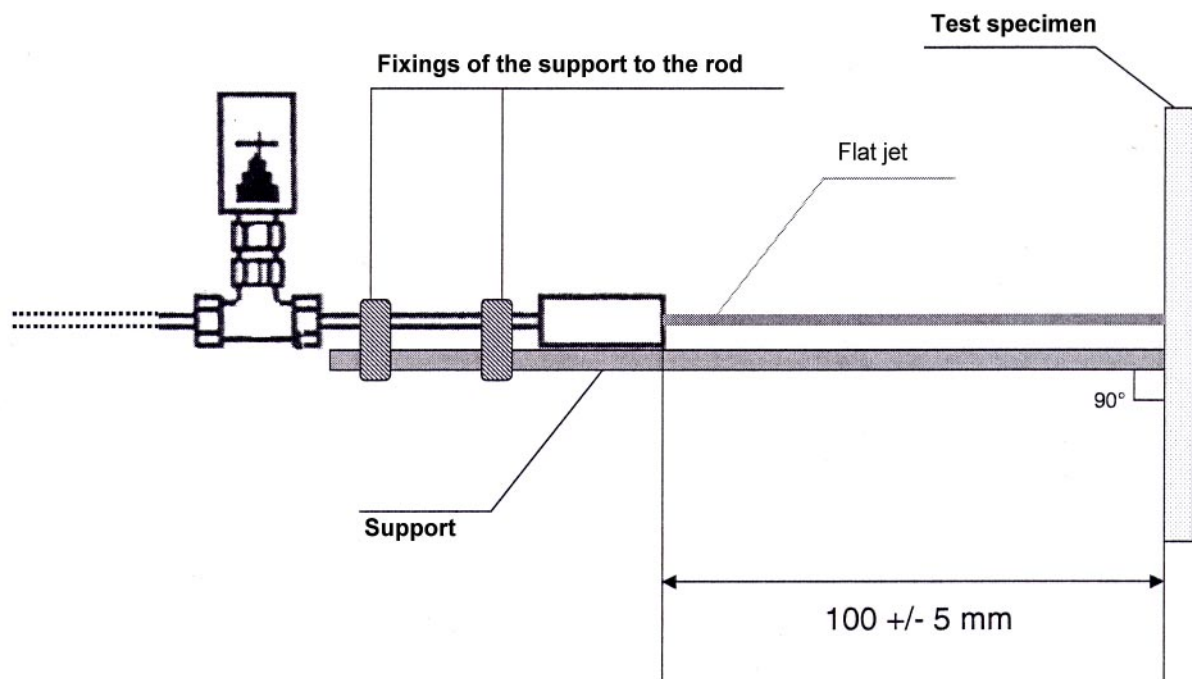
Appendix 1

Protection rod and nozzle



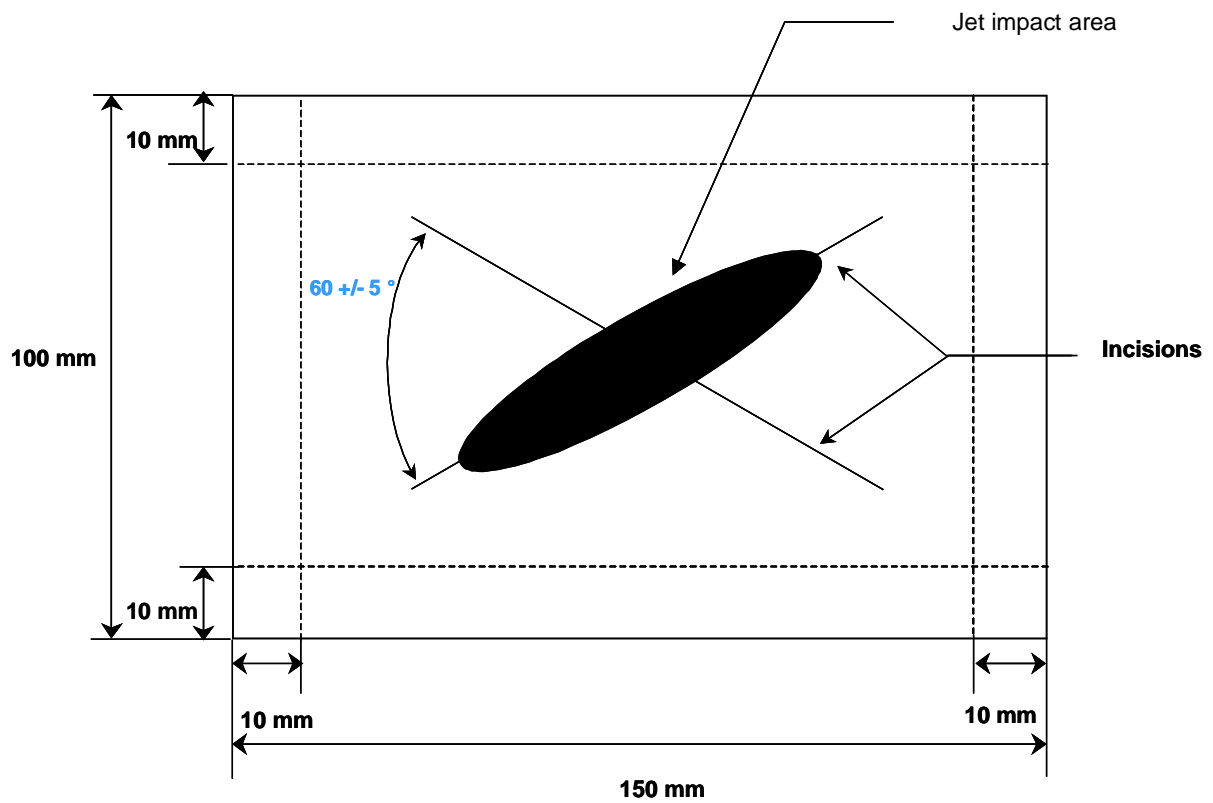
Appendix 2

Use of the support



Appendix 3

Test specimen with damage to the film



Appendix 4

Test specimen with damage to the mastic

