PS: 396-2017(1st Rev)

PAKISTAN STANDARD SPECIFICATION

FOR

PAINTS, BRUSHING UNDERCOAT AND EXTERIOR FINISHING FOR VEHICLES

PAKISTAN STANDARDS AND QUALITY CONTROL AUTHORITY,

STANDARDS DEVELOPMENT CENTRE,

Plot No. ST-7A, Block-3, Scheme 36, Gulistan-e- Johar

Karachi.

PAKISTAN STANDARD SPECIFICATION FOR PAINTS, BRUSHING UNDERCOAT AND EXTERIOR FINISHING FOR VEHICLES"

0. FOREWORD

0.1 This Pakistan Standard was adopted by the Pakistan Standards and Quality Control Authority on 28th, February, 2017 after the draft finalized by the Paints and Allied Materials Technical Committee, had been approved by the "National Standards Committee for Chemicals".

0.2 This Pakistan Standard was first published in 1964. In order to keep abreast with the progress of trade and Industry, this revision has been prepared on the bases of views/recommendations of consumers, manufacturers; paint specialists, chemists, chemical engineers, scientist and other stakeholders have been given full consideration. Suggestions from the members are welcomed and will be placed before the Technical Committee meeting

0.3 The Technical Committee responsible for the preparation of the Standard revised and updated it according to the requirement and progress in the country.

0.4 While preparing this standard, assistance taken from ISO, ASTM IS acknowledge with thanks.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with the final values observed or calculated expressing the result of a list or analysis, shall be rounded off in accordance with PS: 103-1991 "Rule for Rounding off Numerical Values (1st Revision). The number of Significant places returned in the rounded off values shall be same as that of the specified values in this standards.

0.6 This standard is intend chiefly to cover the technical provision relating to the manufacture and supply of the material, and it does not include all necessary provisions of a contract.

1. SCOPE

1.1 The standard prescribes the performance requirements, methods of sampling and testing for the material commercially known as "Paints for Vehicles" including both the Polyurethane base and Nitrocellulose base materials. The material includes undercoating and surface paints used for the vehicles.

2. Normative References:

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 835-1, Laboratory glassware — Graduated pipettes — Part 1: General requirements

ISO 1517:1973, Paints and varnishes — Surface-drying test — Ballotini method

ISO 2114, Plastics (polyester resins) and paints and varnishes (binders) — Determination of partial acid value and total acid value

ISO 2811-1, Paints and varnishes — Determination of density — Part 1: Pyknometer method

ISO 3681, Binders for paints and varnishes — Determination of saponification value — Titrimetric method

ISO 4630-1, Clear liquids — Estimation of colour by the Gardner colour scale — Part 1: Visual method

ISO 4630-2, Clear liquids — Estimation of colour by the Gardner colour scale — Part 2: Spectrophotometric method

ISO 4793, Laboratory sintered (fritted) filters — Porosity grading, classification and designation

ISO 5661, Petroleum products — Hydrocarbon liquids — Determination of refractive index

ISO 15528, Paints, varnishes and raw materials for paints and varnishes — Sampling

ISO 2813:2014: Paints and varnishes -- Determination of gloss value at 20 degrees, 60 degrees and 85 degrees.

ISO 9117-1:2009, Paints and varnishes -- Drying tests -- Part 1: Determination of through-dry state and through-dry time.

ISO 9117-3:2010, Paints and varnishes -- Drying tests -- Part 3: Surface-drying test using ballotini.

ASTM D 1640: Drying time, set to touch, dust free, etc.

ISO 3270:1984, Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing.

ISO 3696:1987, Water for analytical laboratory use — Specification and test method.

ISO 15184:2012, Paints and varnishes -- Determination of film hardness by pencil test

ASTM D 3363 “Standard Test Method for Film Hardness by Pencil Test”.

ISO/DTR 19402, Paints and varnishes -- Adhesion of coatings. ASTM D 3359, Method A, Adhesion or ASTM D 4541.

ASTM D 522, Method-B, Flexibility:

ASTM D 56 “Standard Test Method for Flash Point by Tag Closed Cup Tester”.

ASTM D 3278 “Standard Test Methods for Flash Point of Liquids by Small Scale Closed Cup Apparatus”

AOAC 974.02, ASTM 1645, 1613, ASTM E1613-04 by AAS, USEPA 6010, USEPA 6020, USEPA 3052, “Determination of heavy metal by AAS/ICP-OES”

ASTM Designation: E 1347, Determination of opacity.

3. TERMINOLOGY

3.1 For the purpose of this standard, the terms and definition will be incorporated from ISO 4618.

4. REQUIREMENTS:

4.1 The material shall also comply with the requirements given in Table 1

Requirements For Paint Standard for vehicles (PU Base)

Table-1

Characteristic	Requirements		Test Method
	Primer	Finish	
Mixing Ratio	As per manufacturer specifications	As per manufacturer specifications	
Drying time, max at 25 °C and 40-60 % RH (1) Surface Dry (2) Hard Dry 3) Full Cure (for testing)	1 hour maximum 24 hours max 07 days	1 hour maximum 24 hours max 07 days	(1) ISO 9117-1:2009 Paints and varnishes -- Drying tests -- Part 1: Determination of through-dry state and through-dry time. (2) ISO 9117-3:2010 Paints and varnishes -- Drying tests -- Part 3: Surface-drying test using ballotini. (3) Drying time, set to touch, dust free, etc.: Refer to ASTM Designation: D 1640.
Finish (1)Undercoating (2)Finishing	Smooth and matt	Smooth & matt/glossy	Physical evaluation
Opacity	40 micron max		Dry opacity: On a black/white Leneta chart, Form 2A Opacity, draw down a film of the sample covering both black and white portions of the chart. Unless otherwise specified, use a 10 mil gap draw-down blade. Dry the specimen 24 hours at 25ºC. Using a suitably calibrated filter photometer conforming to ASTM Designation: E 1347, measure alternately the 45°/0° daylight luminous directional reflectance of the specimen over the white and black portions of the chart. Calculate dry opacity as follows: Dry Opacity = Reflectance over black / Reflectance over white Similar results may be obtained from spectrophotometers conforming to ASTM Recommended Practice E 308.
Gloss	Matt 0-30 at angle of 60°	Matt 0-30 at angle of 60° Glossy- 70% min. at angle of 60°.	ISO 2813:2014: Paints and varnishes -- Determination of gloss value at 20 degrees, 60 degrees and 85 degrees
Color (1)Undercoating (2)Finishing	On choice	On choice	
Scratch Hardness	F pencil pass	F pencil pass	ISO 15184:2012 Paints and varnishes -- Determination of film hardness by pencil test ASTM D 3363 “Standard Test Method for Film Hardness by Pencil Test”.

Flash Point	-4C	-4 C	(1)ASTM D 56 "Standard Test Method for Flash Point by Tag Closed Cup Tester". (2) ASTM D 3278 "Standard Test Methods for Flash Point of Liquids by Small Scale Closed Cup Apparatus"
Heavy Metal 1. Lead (Pb), max 2. Chromium (Cr), max 3. Cadmium (Cd), max	 100 ppm 100 ppm 100 ppm	 100 ppm 100 ppm 100 ppm	AOAC 974.02 ASTM 1645, 1613, ASTM E1613-04 by AAS, USEPA 6010, USEPA 6020, USEPA 3052
Weight per Liter	1.2-1.6 kg per liter	0.90 -1.30 kg per liter	
Shelf Life	Normally 1years, Keep in shade.	Normally 1 years, Keep in shade.	
Marketing & Delivery	As agreed with the purchase	As agreed with the purchase	

- Primer and under coating have same meanings

Paint Standard for vehicles Requirement Table-1 (Nitro Cellulose base)

Parameter	Proposed Draft		Test Method
	Primer	Finish	
Mixing Ratio	As per manufacturer specifications	As per manufacturer specifications	
Drying time, max at 25 °C and 40-60 % RH (1) Surface Dry (2) Hard Dry 3) Full Cure (for testing)	1 hour maximum 24 hours max	1 hour maximum 24 hours max	(1) ISO 9117-1:2009 Paints and varnishes -- Drying tests -- Part 1: Determination of through-dry state and through-dry time. (2) ISO 9117-3:2010 Paints and varnishes -- Drying tests -- Part 3: Surface-drying test using ballotini. (3) Drying time, set to touch, dust free, etc.: Refer to ASTM Designation: D 1640.
Finish (1)Undercoating (2)Finishing	Smooth and matt	Smooth & matt/glossy	Physical evaluation
Opacity	40 micron max		Dry opacity: On a black/white Leneta chart, Form 2A Opacity, draw down a film of the sample covering both black and white portions of the chart. Unless otherwise specified, use a 10 mil gap draw-down blade. Dry the specimen 24 hours at 25ºC. Using a suitably calibrated filter photometer conforming to ASTM Designation: E 1347, measure alternately the 45°/0° daylight luminous directional reflectance of the specimen over the white and black portions of the chart. Calculate dry opacity as follows: Dry Opacity = Reflectance over black /

			Reflectance over white Similar results may be obtained from spectrophotometers conforming to ASTM Recommended Practice E 308.
Gloss	Matt 0-30 at angle of 60°	Matt 0-30 at angle of 60° Glossy- 70% min. at angle of 60°.	ISO 2813:2014: Paints and varnishes -- Determination of gloss value at 20 degrees, 60 degrees and 85 degrees
Color (1)Undercoating (2)Finishing	On choce	On choice	
Scratch Hardness	F pencil pass	F pencil pass	ISO 15184:2012 Paints and varnishes -- Determination of film hardness by pencil test ASTM D 3363 "Standard Test Method for Film Hardness by Pencil Test".
Flash Point	-4 C	-4 C	(1)ASTM D 56 "Standard Test Method for Flash Point by Tag Closed Cup Tester". (2) ASTM D 3278 "Standard Test Methods for Flash Point of Liquids by Small Scale Closed Cup Apparatus"
Heavy Metal 1. Lead (Pb), max 2. Chromium (Cr), max 3. Cadmium (Cd), max	 100 ppm 100 ppm 100 ppm	 100 ppm 100 ppm 100 ppm	AOAC 974.02 ASTM 1645, 1613, ASTM E1613-04 by AAS, USEPA 6010, USEPA 6020, USEPA 3052
Weight per Liter	1.2-1.6 kg per liter	0.90 -1.30 kg per liter	
Shelf Life	Normally 1years, Keep in shade.	Normally 1 years, Keep in shade.	
Marketing & Delivery	As agreed with the purchase	As agreed with the purchase	

- Primer and under coating have same meanings

5. PACKING AND MARKING

5.1 **Packing**— unless otherwise agreed between the purchaser and the supplier, the paint shall be packed in metal containers.

5.2 **Marking**— Each container shall be marked with the following:

a) Name and class of material
b) Name and address of the manufacture and/or his recognized trade-mark, if any;
c) Volume of the material
d) Batch No. or lot No. in code otherwise; and
e) Month and year manufacture.
f) Container may also be marked with the PSQCA Certification Mark.

6. SAMPLING

6.1 Preparation of Test Samples

6.1.1 **For Registration—** The sample shall be submitted in three different containers each containing not less than 500ml of the material.

6.1.2 **Bulk supply sample—**Representative sample of the material shall be drawn and treated as prescribed.

7. TEST METHODS

7.1 Test shall be conducted according to the methods prescribed in ISO, ASTM and IS.

7.2 **Quality of Reagent—** Unless specified otherwise, pure chemicals and distilled water shall be employed in tests.

NOTE. Pure chemicals shall means chemical that not contains impurities which affect the result of analysis.

7.3 Comparison with the performance of the registered sample shall be carried out on the basis of the records maintained for the registered sample (see 4.2.1).

8. CRITERIA FOR CONFORMITY

9.1 A lot shall be declared conforming to the requirements of this standard if the test results of the composite samples satisfy the requirements prescribed in clause 4 of this standard.