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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 26395-2024

Replacing GB/T 26395-2011

Water based gravure ink for cigarette packing

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1 Scope

This document lays down the requirements, inspection rules, marking, labelling, packaging,

transport and storage of water based gravure ink for cigarette packing, and describes the test methods.

This document applies to the quality control of water based gravure ink for cigarette packing used in rotary and sheet-fed gravure printing.

3 Terms and definitions

3.1 volatile organic compounds, VOCs - any organic compound whose initial boiling point at the standard pressure of 101.3 kPa is 250 °C or lower. Source: HJ 2542-2016, 3.2.

3.2 transfer primer coat - the liquid substance coated or printed on the surface of the substrate so that the metallized layer or its own ink film can be transferred completely. Source: GB/T 15962-2018, 2.63, modified.

3.3 peel - the force required to peel the transfer primer coat off the printing substrate with adhesive tape.

3.4 peeling - the state shown by the ink film after the transfer primer coat has been peeled off the printing substrate.

4 Requirements

4.1 Technical performance. The technical performance of the products shall comply with Table 1. Table 1 covers six products in parallel columns - the ink itself, the overprint varnish, the reducer, the gold medium, the primer and the transfer primer - and fixes the following. Appearance, for all six: a uniform fluid of consistent colour, free from skinning, lumps and obvious settling. Colour, for the ink only: grade 4 or better. Fineness of grind, for the ink only: not more than 20 µm. Viscosity, in seconds with the Zahn no. 2 cup, for each of the six in turn: 17 to 70 for the ink, 25 to 70 for the overprint varnish, 14 to 60 for the reducer, 20 to 70 for the gold medium, 14 to 60 for the primer and 14 to 60 for the transfer primer. Tinting strength, for the ink only: 95 % to 105 %. Adhesion: not less than 90 % for the ink, the overprint varnish, the reducer, the gold medium and the primer, with no requirement for the transfer primer. Peel force, for the transfer primer only: not more than 0.2 N per 25.4 mm. Peel behaviour, for the transfer primer only: slight force needed at the start of peeling, the edge of the ink film even and not sharp, a small fringe of 1 mm to 3 mm, no residue left on the substrate, and no fine crazing after stretching. Light fastness, for the ink only: grade 4 or better. Heat resistance, for each of the six in turn: not less than 120 °C, 150 °C, 120 °C, 120 °C, 120 °C and 140 °C. Rub resistance, for the overprint varnish only: not less than 200 rubs. Content of specified aromatic amines, for the ink only: not more than 50 mg/kg where the ink is used for cigarette cartons and boxes, and not detected where it is used for tipping paper and inner liner paper. Formaldehyde content: not more than 50 mg/kg.

A footnote to Table 1 lists the specified aromatic amines: o-toluidine, 2,4-dimethylaniline, 2,6-dimethylaniline, o-anisidine, p-chloroaniline, 2,4,5-trimethylaniline,

2-methoxy-5-methylaniline, 4-chloro-o-toluidine, 2,4-diaminotoluene, 2,4-diaminoanisole, 2-naphthylamine, 4-aminobiphenyl, 2-amino-4-nitrotoluene, 4,4'-diaminodiphenyl ether, 4,4'-diaminodiphenylmethane, benzidine, 3,3'-dimethyl-4,4'-diaminodiphenylmethane, 3,3'-dimethylbenzidine, 4,4'-diaminodiphenyl sulphide, 3,3'-dichlorobenzidine, 3,3'-dichloro-4,4'-diaminodiphenylmethane, 3,3'-dimethoxybenzidine and o-aminoazotoluene. Further footnotes explain that use for cartons and boxes means water based gravure ink for cigarette packing used for printing tobacco cartons and boxes, and that use for tipping paper and inner liner paper means such ink used for printing tobacco tipping paper and inner liner paper.

4.2 Maximum limits for volatile organic compounds. The maximum limits for volatile organic compounds in the products shall comply with Table 2: the VOCs content shall meet the requirements of GB 38507; the benzene content shall be not more than 1 mg/kg; the combined content of toluene, ethylbenzene and xylene shall be not more than 50 mg/kg; and the content of other volatile organic compounds shall be not more than 500 mg/kg. A note adds that in drawing the calibration curve, methanol, ethanol, n-propanol, isopropanol, ethyl acetate, isopropyl acetate, n-propyl acetate, acetone, methyl ethyl ketone and methyl isobutyl ketone should be added when selecting the reference materials. A footnote defines other volatile organic compounds as n-butanol, propylene glycol methyl ether, ethylene glycol ethyl ether, propylene glycol ethyl ether, n-butyl acetate, styrene, ethylene glycol ethyl ether acetate and cyclohexanone.

4.3 Maximum limits for soluble harmful elements. The maximum limits for soluble harmful elements in the products shall comply with Table 3, expressed in milligrams per kilogram: antimony 60, arsenic 25, barium 1 000, cadmium 75, chromium 60, lead 90, mercury 60 and selenium 500.

5 Test methods

5.1.1 Sampling shall be carried out in accordance with GB/T 3186.

5.1.2 The tests shall be carried out at a temperature of 23 °C plus or minus 2 °C and a relative humidity of 65 % plus or minus 5 %, avoiding direct sunlight, avoiding contamination by chemicals, gases, vapours, dust and other substances that affect the test, and avoiding vibration and draught.

5.2 Appearance. Open the container, examine visually and observe while stirring.

5.3 Colour. Carried out in accordance with GB/T 13217.1.

5.4 Fineness of grind. Carried out in accordance with 6.2 of GB/T 13217.3-2022.

5.5 Viscosity. Carried out in accordance with clause 4 of GB/T 13217.4-2020.

5.6 Tinting strength. Carried out in accordance with GB/T 13217.1.

5.7 Adhesion. Carried out in accordance with clause 4 or clause 5 of GB/T 13217.7-2023; in case of arbitration, clause 4 of GB/T 13217.7-2023 applies.

5.8.1 Peel force, principle. The transfer primer is coated on the substrate and dried to form a primer film. A tape of a specified adhesive type (acrylate pressure sensitive adhesive) and a specified width (normally 25.4 mm) is stuck evenly and flat on the ink film, and a 180° T-peel is carried out at a given speed; the force at which the ink film layer separates from the substrate is the peel force at that specified width.

5.8.2 Peel force, apparatus and materials. Tensile tester, force measurement accuracy plus or minus 0.5 %, able to display the tensile value in real time and to take readings at any stage. Wire bar, wet film thickness 6 µm to 10 µm. Hair dryer, with hot air, about 1 000 W. Substrate: biaxially oriented polypropylene (BOPP) film, polyethylene terephthalate (PET) film and the like. Transparent tape: acrylate pressure sensitive adhesive, width 25.4 mm, peel adhesion to steel 30 N per 100 mm. Cutter. Pressing roller, mass about 2 kg.

5.8.3 Peel force, procedure. Draw down the transfer primer on the substrate with the wire bar, blow with hot air from the hair dryer at about 20 cm from the drawdown for about 10 s, and cut specimens 25.4 mm plus or minus 0.2 mm wide and 200 mm long. Stick the tape evenly and flat on the ink film of the specimen and press with the pressing roller three times back and forth. Lift a corner of the tape so that the ink film separates from the substrate. Set the speed to 300 mm/min plus or minus 50 mm/min and the width to 25.4 mm, fix the lifted corner of the tape and the separated substrate in the upper and lower grips respectively, the longitudinal axes of the tape and the substrate coinciding with the centre line of the grips and the tension being suitable, with the unpeeled part forming a T with the direction of pull. Carry out the test according to the operating procedure of the instrument, take the mean value after the pull has become steady, test two specimens in parallel, and where the difference between the two results is not more than 0.005 N per 25.4 mm take the mean.

5.9.1 Peel behaviour, principle. The transfer primer is coated on the substrate and dried to form a primer film; the state shown by the ink film after it has been peeled off by the tape is examined - whether the edge is even or sharp, whether there is a fringe and how wide it is, whether any ink film is left on the substrate and how much, and whether force is needed at the start of peeling and how much.

5.9.2 Peel behaviour, apparatus and materials. Wire bar, wet film thickness 6 µm to 10 µm. Hair dryer, with hot air, about 1 000 W. Substrate: BOPP film, PET film and the like. Transparent tape: acrylate pressure sensitive adhesive, width 25.4 mm, peel adhesion to steel 30 N per 100 mm.

5.9.3 Peel behaviour, procedure. Draw down the transfer primer on the substrate with the wire bar and blow with hot air from the hair dryer at about 20 cm from the drawdown for about 10 s. Stick the tape evenly and flat on the ink film. Holding the substrate down with one hand, lift the tape from the ink film with the other, sensing the force needed at the start