

TT-I-548A

December 11, 1974

SUPERSEDING

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November 28, 1955

FEDERAL SPECIFICATION

INK, BLACK, FOR OFFSET DUPLICATING PROCESS

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. The ink covered by this specification is intended to operate satisfactorily on any plates used in the offset duplicating process under conditions normally existing in Government activities.

1.2 Classification. The ink shall be of one type.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

Federal Specification:

UU-P-121 - Paper, Bond and Writing; White and Colored.

Federal Standard:

Fed. Std. No. 123 - Marking for Domestic Shipment (Civil agencies).

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, US Government Printing Office, Washington, DC 20402.

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, WA.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Standard:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.

MIL-STD-129 - Marking for Shipment and Storage.

(Copies of Military Specifications and Standards required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

National Motor Freight Traffic Association, Inc., Agent:

National Motor Freight Classification.

(Application for copies should be addressed to the American Trucking Associations, Inc., Tariff Order Section, 1616 P Street, N.W., Washington, DC 20036.)

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Uniform Classification Committee, Agent:

Uniform Freight Classification.

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using agencies.)

3. REQUIREMENTS

3.1 Material. The material shall be suitable for the intended purpose as hereinafter specified. Ingredients shall be of the quality normally used for offset duplicating inks in standard practice. All ingredients shall be free from impurities that may affect the satisfactory storage and use of the finished product.

3.2 Description. Offset ink is a soft solid-like plastic material in which pigments have been dispersed. The ingredients composing the inks should be free from impurities that may affect the use and storage of the finished product. The product should be ready for use, as received, without further additions. The working properties of an offset ink include its ability to be fed from the press ink fountain, to transfer properly from roller to roller in the inking system, and to the plate, blanket, and surface being printed. These functions are incorporated into the printing tests.

3.3 Condition in container. From a visual examination while manually stirring, the material should be a soft plastic-like ink having no skins and lumps, free from impurities, and should show no more pigment caking than can be readily reincorporated to a smooth homogeneous state.

3.4 Printability. Physical properties of the ink shall be balanced so that it will not mist or fly off the rollers; it will print sharp, clean lines and halftones; will not scum or tint; will not pull the sheets out of the grippers; cause distortion or curl; pick the paper surface; or tear the sheet (see 4.5.1.1.1).

3.5 Setting and drying. The ink, when printed on 40 pound white bond paper conforming to Federal Specification UU-P-121, type IV, shall set rapidly and dry within four hours to a hard, non-smutting condition (see 4.5.1.1.2).

3.6 Scumming and bleeding. There shall be no showthrough or loss of half tone detail from a 140 line halftone master (see 4.5.1.1.3).

3.7 Pigment grind. There shall be no coarse particles or undispersed agglomerates which might cause piling or caking on the press rollers, plates and blankets; wear of plate images, filling-in of halftones or scumming. Fineness of grind shall not be less than 5 on the Hegman fineness-of-grind gage (see 4.5.1.1.4).

3.8 Color. The ink shall give a jet black impression when printed on paper conforming to the requirements of type IV, Federal Specification UU-P-121.

3.9 Tack. The ink shall maintain a relatively constant tack over a period of at least seven hours. When measured on an inkometer, the ink shall start with a tack between 10 and 20 at 400 rpm and not exceed 25 after seven hours, (see 4.5.1.1.5).

3.10 Shelf life. The ink shall be so compounded that it will pass the accelerated livering test (see 4.5.1.1.7).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.1.1 Inspection of preparation for delivery. An inspection shall be made to determine whether the preservation, packaging, packing, and marking comply with the requirements of section 5. Defects shall be scored in accordance with Table I. For examination of interior packaging the sample unit shall be one shipping container fully prepared for delivery, selected at random just prior to closing.

operations. Sampling shall be in accordance with MIL-STD-105. Defects of closure listed shall be examined on shipping containers fully prepared for delivery. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 with an AQL of 4.0 defects per hundred units.

TABLE I. Classification of preparation for delivery defects.

Examine	Defects
Marking	Omitted; incorrect; illegible; improper size, location, sequence, or method of application.
Material	Any component missing or damaged.
Workmanship	Inadequate application of components, such as incomplete closure of container flaps, loose strapping, inadequate stapling, or distortion of container.
Contents	Quantity per container is more or less than specified. Gross weight exceeds requirements of the box specification.

4.2 Lot. All ink presented at one time for delivery shall be considered a lot for purposes of inspection and tests.

4.3 Sampling.

4.3.1 For examination. The samples shall be taken in accordance with MIL-STD-105.

4.3.2 For tests. Sufficient ink shall be taken to perform the tests specified in 4.5.1.1.

4.4 Examination. Each of the samples taken shall be visually examined to verify compliance with the requirements of this specification. Acceptable Quality Level (AQL) shall be 2.5 percent defective in accordance with MIL-STD-105.

4.5 Tests.

4.5.1 Acceptance tests. The sample inks taken in accordance with 4.3.2 shall be subjected to the following tests. Failure of any sample to meet the test requirements shall be cause for rejection of the lot.

4.5.1.1 Test procedures.

4.5.1.1.1 Printability. The ink shall be tested as follows: Aluminum master plates shall be prepared from a Xerox Corporation test plate and a 140 line halftone picture. 5000 sheets of type IV chemical wood, white bond paper meeting the requirements of UU-P-121 shall be stacked on the paper table and the necessary adjustments made. The speed control dial shall be set to produce 120 copies per minute. The basic test consisting of 5000 printed copies on type IV paper using the aluminum Xerox master shall be run without a stop. Then the Xerox master shall be exchanged for the aluminum picture master and 500 sheets run. Following these the ink shall undergo a delayed printing test using the aluminum Xerox master. The delayed test shall consist of a 1000 copy run on type IV paper, a two hour waiting period, and then another 1000 copy run. From the basic 5000 copy test run every 500th sheet shall be pulled and likewise the last 25 sheets. From the 500 copy test run every 100th sheet shall be pulled and likewise the last 25 sheets. From the delayed 100 sheet test every 200th sheet shall be pulled as well as the last 25 sheets. All retained sheets shall then be examined for sharpness of characters, clarity of detail, sharpness of halftone and solids as well as the other requirements listed in 3.4.

4.5.1.1.2 Setting and drying time. The setting and drying time shall be determined on sample impressions taken from the printing test (see 4.5.1.1.1). The time of the impression shall be noted and the printed sheets checked by drawing a finger across the printed surface. The time at which the ink produces a drag on the finger is considered the setting time. To determine drying time, a printed sheet is placed on a flat surface and a clean, unprinted sheet of the same paper is placed on top. A 100 gram weight is placed at the upper edge and grasping the lower edge. The top sheet is dragged across the printed sheet. A smudge produced by the weight indicates the ink has not dried. The test shall be made at intervals before the four hour time limit.

4.5.1.1.3 Scumming and bleeding. These conditions shall be checked during the printing test (see 4.5.1.1.1). Scumming occurs when the non-image areas of the plate lose their desensitization and begin to take ink. The scum shows on the plate and cannot be washed off with water. The first evidence is loss of halftone shadow detail. Pigments that bleed in oil penetrate the paper along with the vehicle when the ink sets. This increases "show through" of the printing and produces halos around halftone dots, lines and lettering, reducing their sharpness. While this is a subjective test, no "show through" or loss of halftone detail shall be permitted.

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4.5.1.1.4 Pigment grind. With the tip of a spatula, place a small quantity of ink across the deep end of the channel of a Hegman fineness of grind gage and with the scraper draw the ink down toward the shallow end of the channel. Use a smooth, steady, slow pull and enough pressure to wipe the bearing surfaces of the block clean. This stroke should take at least four seconds. As the depth of the channel decreases, any particles that will not pass between the scraper and the channel bottom produce streaks and particles in the remaining ink film. Estimate the gage number where the particles are most populous.

4.5.1.1.5 Tack. - Special precautions - Since results obtained on the first ink applied to an inkometer after several hours standing is often erratic even when the machine is carefully warmed up, it is best to proceed as follows: After the water bath comes up to temperature (90°F.) apply with a spatula enough of any convenient ink to cover the rollers, and allow the machine to run at low speed for one minute. Readings on this ink are unnecessary since it serves only to warm up the rollers. Clean the rollers as described in 4.5.1.1.6.

Fill the ink metering pipette with the ink to be tested, by means of a spatula. Push the piston all the way out, and then allow it to return slowly, meanwhile working the ink into the cup with the spatula to eliminate air bubbles. Finally, scrape off the excess ink by passing the edge of the spatula across the end of the pipette.

Stop the inkometer and spread the ink evenly across the upper roller. Wipe any ink remaining in the pipette off on the vibrator.

To avoid excessive flying when the inkometer is started, obtain initial distribution by turning the motor coupling by hand. This should take no longer than ten seconds. Start the inkometer and timer. Allow the ink to distribute for one minute at slow rpm, then shift the machine to 400 rpm and balance the beam with the sliding weight or zero the digital display on electronic inkometers. The reading may then be read from the calibrations on the beam or from the digital display.

4.5.1.1.6 Cleaning. With the inkometer running at low speed, put enough ink solvent on the rollers to soften the ink to a very liquid consistency. Fold a rag in the form of a pad, leaving no loose strings to get caught on the roller, and clean the machine by holding this against the lower side of the water-cooled brass roller, moving it from side to side and using a fresh surface occasionally until the rollers become practically free from ink and solvent. Clean the sides of the water-cooled roller with the rag and lightly touch the edges of the two elastic rollers, if necessary, to clean the ridge which often forms there. Add smaller amounts of solvent and repeat until the rag shows no color from the ink.

The bar behind the upper roller must be cleaned occasionally by scraping it to prevent build-up of ink which would eventually transfer to the brass roller and cause incorrect readings.

The inkometer should be run dry for ten minutes before the next ink is applied.

4.5.1.1.7 Shelf life. Tests for suitable shelf life shall be determined by an accelerated living test. This test shall consist of placing the sealed sample container of the ink in an oven and exposing it to a constant temperature of $175^{\circ} \pm 5^{\circ}\text{F}$. for 72 hours. The ink, upon cooling to room temperature, shall not show any signs of deterioration, appreciable change in viscosity, or living.

5. PREPARATION FOR DELIVERY

5.1 Packaging (Level C). Offset duplicating ink shall be furnished in collapsible tubes containing one (1) pound net of ink or in metal cans containing one (1) pound and five (5) pounds net, as specified. All containers shall be further packaged in accordance with the manufacturer's standard practice.

5.2 Packing (Level C). Offset duplicating ink, packaged as specified in 5.1, shall be packed in containers that will assure carrier acceptance and safe arrival at destination in accordance with the Uniform Freight Classification or National Motor Freight Classification as applicable.

5.3 Marking. In addition to any special markings required by the contract or order, all interior packages and shipping containers shall be marked in accordance with Fed. Std. No. 123, (Civil Agencies) or MIL-STD-129 (Military Agencies) as applicable including date of manufacture on packages.

6. NOTES

6.1 Intended use. The ink covered by this specification is for use on plates used in the offset duplicating process.

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5.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

- (a) Title, number, and date of this specification.
- (b) Marking required (see 5.3).

6.3 It is believed that this specification adequately describes the characteristics necessary to secure the desired material, and that normally no samples will be necessary prior to award to determine compliance with this specification. If, for any particular purpose, samples with bids are necessary, they should be specifically asked for in the invitation for bids and the particular purpose to be served by the bid sample should be definitely stated, the specification to apply in all other respects.

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