JAN 2 3 2001

Mr. Lawrence W. Bierlein
2175 K Street, NW
Washington, DC 20037

Dear Mr. Bierlein:

On September 1, 2000, on behalf of Hewlett-Packard Company, you applied for an approval to ship certain inkjet cartridges as unregulated materials. This is in response to your subsequent letter of January 5, 2001, enclosing results of certain steel corrosion tests and a comparative chart on steel compositions.

We have reviewed that test data and chart, and conclude that the K02400 steel tested is sufficiently "similar to" P3 and P235 steels, as that term is used in the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) and the United Nations Model Regulations on the Transport of Dangerous Goods, to be accepted for Class 8 classification purposes. We also conclude, based upon the 14-day test results you provided, that the ink in the Hewlett-Packard inkjet printer cartridges does not meet the definition of a corrosive material as set forth in 49 CFR §§ 173.136 and 173.137, and in international regulations based upon Chapter 2.8 of the UN Model Regulations on the Transport of Dangerous Goods.

Accordingly, because the ink is not regulated as a hazardous material, the approval you originally requested is not necessary.

Sincerely,

Edward T. Mazzullo, Director
Office of Hazardous Materials Standards
Mazzullo:gt:dhm-10:68553:01/17/2001
Revised
File:173.136

01-0234

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Mr. Lawrence W. Bierlein
2175 K Street, NW
Washington, DC 20037

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We have reviewed that test data and chart, and conclude that the K02400 steel tested is sufficiently "similar to" P3 and P235 steels, as that term is used in the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) and the United Nations Model Regulations on the Transport of Dangerous Goods, to be accepted for Class 8 classification purposes. We also conclude, based upon the 14-day test results you provided, that the ink in the Hewlett-Packard inkjet printer cartridges does not meet the definition of a corrosive material as set forth in 49 CFR §§ 173.136 and 173.137, and in international regulations based upon Chapter 2.8 of the UN Model Regulations on the Transport of Dangerous Goods.

Accordingly, because the ink is not regulated as a hazardous material, the approval you originally requested is not necessary and, as you requested, we are returning the approval application to you.

Sincerely,

Edward T. Mazzullo, Director
Office of Hazardous Materials Standards

Mazzullo:gt:dhm-10:68553:01/17/2001
File:173.136

CONCURRENCES

RTG. SYMBOL	INITIALS/SIG.	DATE
DHM-10		01/19/01
DHM-20		01/17/2001

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McCARTHY, SWEENEY & HARKAWAY, P.C.
2175 K Street, N.W.
Washington DC 20037

(202) 393-5710
(202) 393-5721 (Fax)
lwbierlein@mshpc.com

Date: October 1, 2000

To: JIM O'STEEN
ED MAZZULLO

Fax No.: 366-3753
366-3012

From: LARRY BIERLEIN

Pages: 9

MESSAGE:

FYI – The people at Hewlett-Packard are running tests on their inkjet printer ink in accordance with the two attached test suites. Also attached is test protocol SW-846 Method 1110 on steel corrosion. We think the results will support a revised "quantity and form" approach to an approval. I will let you know when the results are in, along with additional info about the ink and its properties. Thanks.

Test Suite One

1) Obtain 3 samples of SAE 1020 Steel with dimensions of approximately 12"X12".
2) Prepare surfaces of all samples per SW-846 Method 1110 test methods.
3) Simulate an ink spill (using our most aggressive ink) on 2 of the steel samples (basically, cover the entire surface area with ink). The 3rd sample will be used as a control.
4) Let the ink dry in standard atmospheric conditions (23C, 60% relative humidity).
5) Measure the dry time.
6) Clean and measure the corrosivity of 1 of the samples and the control sample per SW-846 Method 1110 test methods.
7) Let the other sample remain in standard atmospheric conditions (23C, 60% relative humidity) for an extended period (~1week).
8) Clean and measure the corrosivity of the 2nd sample per SW-846 Method 1110 test methods.
9) Compare the results of all 3 samples relative to each other and guidelines for corrosion rates (6.35 mmpy).
10) Document all results.

Test Suite Two

1) Obtain 3 samples of SAE 1020 Steel standard coupons.
2) Prepare surfaces of all samples per SW-846 Method 1110 test methods.
3) Subject two of the coupons per SW-846 Method 1110 tests methods (using our most aggressive ink) for a period of time equal to the dry time calculated in Test Suite One. The 3rd sample will be used as a control.
4) Clean and measure the corrosivity of 1 of the coupons and the control coupon per SW-846 Method 1110 test methods.
5) Let the other coupon remain in standard atmospheric conditions (23C, 60% relative humidity) for an extended period (~1week).
6) Clean and measure the corrosivity of the 2nd coupon per SW-846 Method 1110 test methods.
7) Compare the results of all 3 coupons relative to each other and guidelines for corrosion rates (6.53 mmpy).
8) Document all results.

METHOD 1110

CORROSIVITY TOWARD STEEL

1.0 SCOPE AND APPLICATION

1.1 Method 1110 is used to measure the corrosivity toward steel of both aqueous and nonaqueous liquid wastes.

2.0 SUMMARY OF METHOD

2.1 This test exposes coupons of SAE Type 1020 steel to the liquid waste to be evaluated and, by measuring the degree to which the coupon has been dissolved, determines the corrosivity of the waste.

3.0 INTERFERENCES

3.1 In laboratory tests, such as this one, corrosion of duplicate coupons is usually reproducible to within 10%. However, large differences in corrosion rates may occasionally occur under conditions where the metal surfaces become passivated. Therefore, at least duplicate determinations of corrosion rate should be made.

4.0 APPARATUS AND MATERIALS

4.1 An apparatus should be used, consisting of a kettle or flask of suitable size (usually 500 to 5,000 mL), a reflux condenser, a thermowell and temperature regulating device, a heating device (mantle, hot plate, or bath), and a specimen support system. A typical resin flask set up for this type of test is shown in Figure 1.

4.2 The supporting device and container shall be constructed of materials that are not affected by, or cause contamination of, the waste under test.

4.3 The method of supporting the coupons will vary with the apparatus used for conducting the test, but it should be designed to insulate the coupons from each other physically and electrically and to insulate the coupons from any metallic container or other device used in the test. Some common support materials include glass, fluorocarbon, or coated metal.

4.4 The shape and form of the coupon support should ensure free contact with the waste.

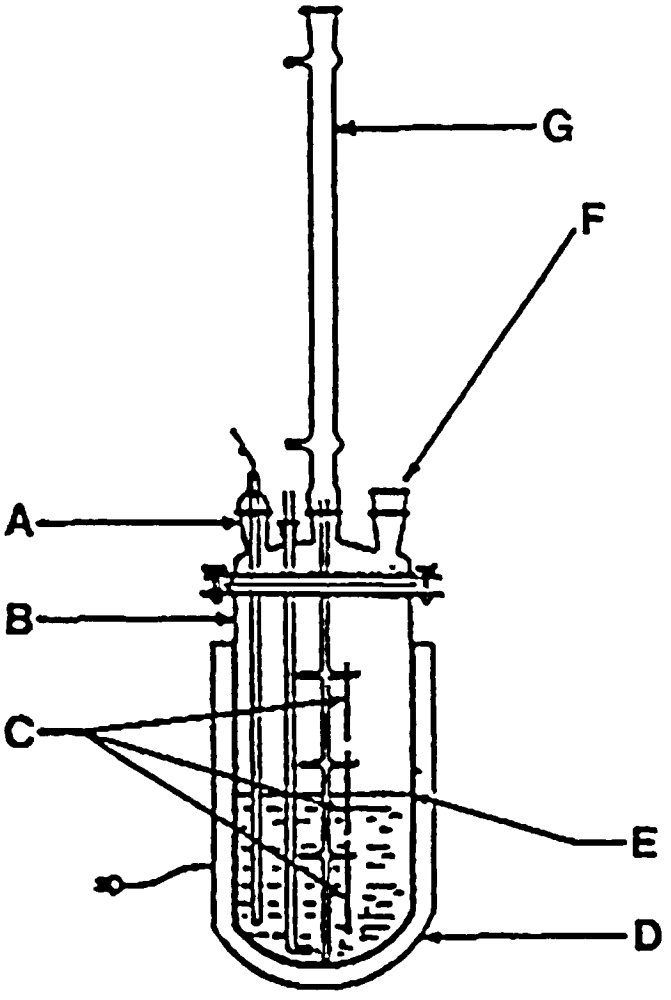


Figure 1. Typical resin flask that can be used as a versatile and convenient apparatus to conduct simple immersion tests. Configuration of the flask top is such that more sophisticated apparatus can be added as required by the specific test being conducted. A = thermowell, B = resin flask, C = specimens hung on supporting device, D = heating mantle, E = liquid interface, F = opening in flask for additional apparatus that may be required, and G = reflux condenser.

4.5 A circular specimen of SAE 1020 steel of about 3.75 cm (1.5 in.) diameter is a convenient shape for a coupon. With a thickness of approximately 0.32 cm (0.125 in.) and a 0.80-cm (0.4-in.)-diameter hole for mounting, these specimens will readily pass through a 45/50 ground-glass joint of a distillation kettle. The total surface area of a circular specimen is given by the following equation:

$$A = 3.14/2(0^2-d^2) + (t)(3.14)(0) + (t)(3.14)(d)$$

where:

t = thickness.
0 = diameter of the specimen.
d = diameter of the mounting hole.

If the hole is completely covered by the mounting support, the last term in the equation, (t)(3.14)(d), is omitted.

4.5.1 All coupons should be measured carefully to permit accurate calculation of the exposed areas. An area calculation accurate to ±1% is usually adequate.

4.5.2 More uniform results may be expected if a substantial layer of metal is removed from the coupons prior to testing the corrosivity of the waste. This can be accomplished by chemical treatment (pickling), by electrolytic removal, or by grinding with a coarse abrasive. At least 0.254 mm (0.0001 in.) or 2-3 mg/cm² should be removed. Final surface treatment should include finishing with #120 abrasive paper or cloth. Final cleaning consists of scrubbing with bleach-free scouring powder, followed by rinsing in distilled water and then in acetone or methanol, and finally by air drying. After final cleaning, the coupon should be stored in a desiccator until used.

4.5.3 The minimum ratio of volume of waste to area of the metal coupon to be used in this test is 40 mL/cm².

5.0 REAGENTS

5.1 Sodium hydroxide (NaOH), (20%): Dissolves 200 g NaOH in 800 mL Type II water and mix well.

5.2 Zinc dust.

5.3 Hydrochloric acid (HCl): Concentrated.

5.4 Stannous chloride ($SnCl_2$).

5.5 Antimony chloride ($SbCl_3$).

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

6.1 All samples should be collected using a sampling plan that addresses the considerations discussed in Chapter Nine of this manual.

7.0 PROCEDURE

7.1 Assemble the test apparatus as described in Paragraph 4.0. above.

7.2 Fill the container with the appropriate amount of waste.

7.3 Begin agitation at a rate sufficient to ensure that the liquid is kept well mixed and homogeneous.

7.4 Using the heating device, bring the temperature of the waste to 55°C (130°F).

7.5 An accurate rate of corrosion is not required: only a determination as to whether the rate of corrosion is less than or greater than 6.35 mm per year is required. A 24-hr test period should be ample to determine whether or not the rate of corrosion is >6.35 mm per year.

7.6 In order to determine accurately the amount of material lost to corrosion, the coupons have to be cleaned after immersion and prior to weighing. The cleaning procedure should remove all products of corrosion while removing a minimum of sound metal. Cleaning methods can be divided into three general categories: mechanical, chemical, and electrolytic.

7.6.1 Mechanical cleaning includes scrubbing, scraping, brushing, and ultrasonic procedures. Scrubbing with a bristle brush and mild abrasive is the most popular of these methods. The others are used in cases of heavy corrosion as a first step in removing heavily encrusted corrosion products prior to scrubbing. Care should be taken to avoid removing sound metal.

7.6.2 Chemical cleaning implies the removal of material from the surface of the coupon by dissolution in an appropriate solvent. Solvents such as acetone, dichloromethane, and alcohol are used to remove oil, grease, or resinous materials and are used prior to immersion to remove the products of corrosion. Solutions suitable for removing corrosion from the steel coupon are:

Solution	Soaking Time	Temperature
20% NaOH + 200 g/L zinc dust	5 min	Boiling
or		
Conc. HCl + 50 g/L $SnCl_2$ + 20 g/L $SbCl_3$	Until clean	Cold

7.6.3 Electrolytic cleaning should be preceded by scrubbing to remove loosely adhering corrosion products. One method of electrolytic cleaning that can be employed uses:

Solution:	50 g/L H_2SO_4
Anode:	Carbon or lead
Cathode:	Steel coupon
Cathode current density:	20 amp/cm^2 (129 amp/in.^{2})
Inhibitor:	2 cc organic inhibitor/liter
Temperature:	74°C (165°F)
Exposure Period:	3 min.

NOTE: Precautions must be taken to ensure good electrical contact with the coupon to avoid contamination of the cleaning solution with easily reducible metal ions and to ensure that inhibitor decomposition has not occurred. Instead of a proprietary inhibitor, 0.5 g/L of either diorthotolyl thiourea or quinolin ethiodide can be used.

7.7 Whatever treatment is employed to clean the coupons, its effect in removing sound metal should be determined by using a blank (i.e., a coupon that has not been exposed to the waste). The blank should be cleaned along with the test coupon and its waste loss subtracted from that calculated for the test coupons.

7.8 After corroded specimens have been cleaned and dried, they are reweighed. The weight loss is employed as the principal measure of corrosion. Use of weight loss as a measure of corrosion requires making the assumption that all weight loss has been due to generalized corrosion and not localized pitting. In order to determine the corrosion rate for the purpose of this regulation, the following formula is used:

$$\text{Corrosion Rate (mmpy)} = \frac{\text{Weight loss} \times 11.145}{\text{area} \times \text{time}}$$

where: weight loss is in milligrams,
area in square centimeters,
time in hours, and
corrosion rate in millimeters per year (mmpy).

8.0 QUALITY CONTROL

8.1 All quality control data should be filed and available for auditing.

8.2 Duplicate samples should be analyzed on a routine basis.

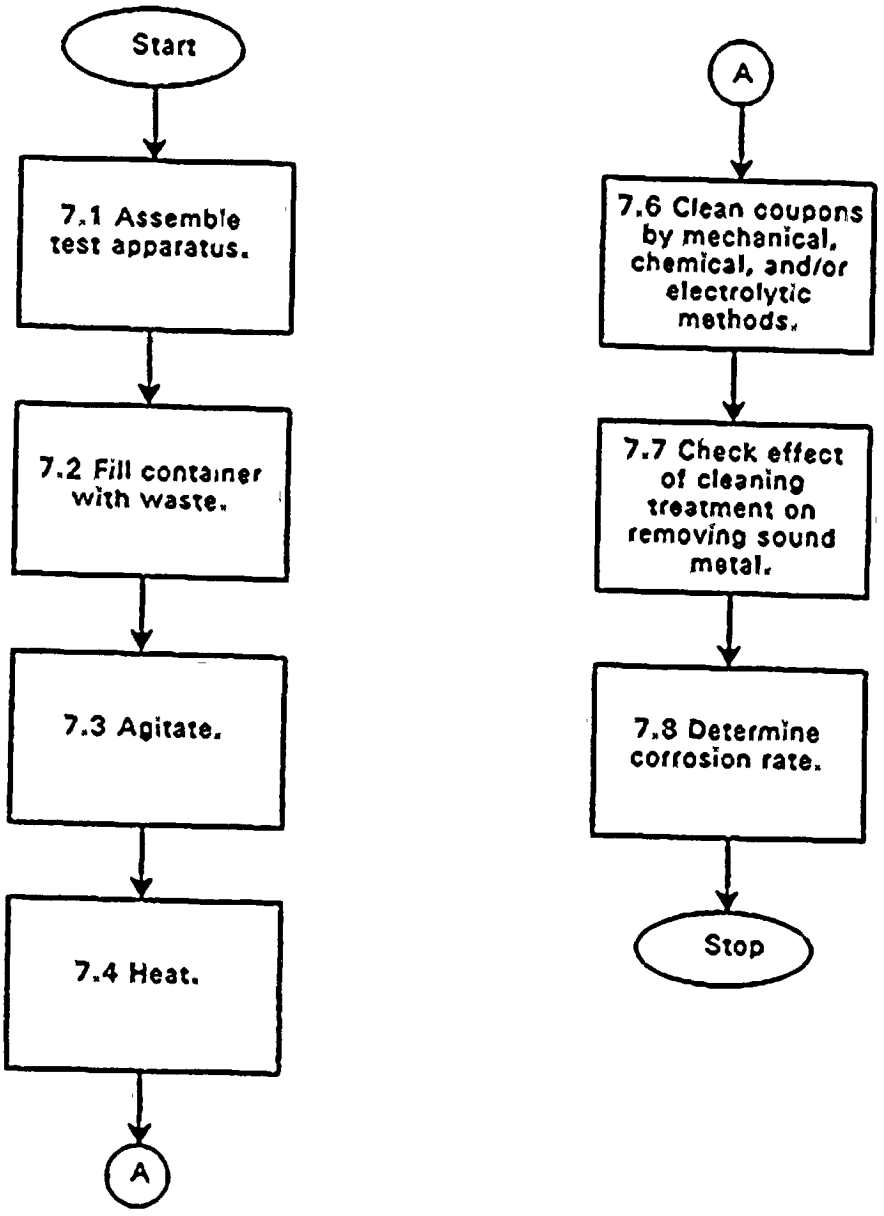
9.0 METHOD PERFORMANCE

9.1 No data provided.

10.0 REFERENCES

1. National Association of Corrosion Engineers. "Laboratory Corrosion Testing of Metals for the Process Industries." NACE Standard TM-01-69 (1972 Revision). NACE, 3400 West Loop South, Houston, TX 77027.

METHOD 1110
CORROSIVITY TOWARD STEEL



Mazzullo, Ed

From: lwbierlein [lwbierlein@mshpc.com]
Sent: Monday, January 22, 2001 11:08 AM
To: Mazzullo, Ed <RSPA>
Subject: Hewlett-Packard

Ed, we are eager to bring closure to this inkjet matter. Any chance of getting a letter this week? When ever it may be ready, please have someone phone me at 393-5710 and I will send a messenger to pick it up. Thanks.

LAWRENCE W. BIERLEIN
DOUGLAS M. CANTER
JOHN M. CUTLER, JR.
ANDREW P. GOLDSTEIN
STEVEN J. KALISH
RICHARD D. LIEBERMAN
HARVEY L. REITER

OF COUNSEL
WILLIAM I. HARKAWAY
KAREN R. O'BRIEN
DANIEL J. SWEENEY

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WEBSITE
HTTP://WWW.MSHPC.COM

October 17, 2000

To: Jim O'Steen
Ed Mazzullo ✓

From: Larry Bierlein

Re: Hewlett-Packard ink testing

I appreciated the chance to talk to you about the Hewlett-Packard inkjet cartridges and our pending request for an approval. In order to provide you with more information about the ink itself, I have enclosed two items

First is an MSDS for the most aggressive of the range of inks affected, Zaphod Yellow. As you can see, the flash point is greater than 200°F The second enclosure is a test report. As noted in the original application, the cartridges range in capacity from about 35 ml to 750 ml, with more than 90% being about 35 ml. Because the device contains the ink, and the device itself is extensively overpacked, the likelihood of any release is virtually non-existent.

If there were a release, however, the amount released would be small. This is an ink and it is intended to dry rapidly. While it would dry faster on paper, nonetheless even a spill onto a metal surface dries quickly. In order to assess the corrosive effects of a simulated spill, i.e., in which the steel coupon is wet with the ink but then the ink is allowed to dry, the company ran three tests. The test method is somewhat different from the draft I sent you last week.

In the enclosed test report, three sample steel coupons were used. As described in the report, one was immersed in the ink and allowed to air dry. One was immersed in distilled water and allowed to dry, and a third was a control in air. As seen in the report, no significant differences were detected between the specimens with regard to their corrosion rate. Another sample was immersed in ink and is being allowed to dry and sit for a week. The assumption is that the corrosive effects on steel stop when the ink dries, and this longer test should confirm that assumption.

I will call one of you tomorrow to see how this information might be used to support the requested "quantity and form" approval requested Thank you.

Memorandum

To: Tim Carey/SERM
Jim Colby/ISO Packaging

CC: Kathy Brewer/SERM

From: Barbara Hanley/SERM

Date: October 12, 2000

Re: Results and Summary of Zaphod Yellow Ink Dry Tim and the Observed Affects on the Corrosion Rate to SAE1020 Steel

---

This memo is to inform the distribution of the results from a materials compatibility analysis completed today. The memo is structured by giving a background as to why the experiment was performed, the summary of the results, followed by the analysis procedure used.

Background and Analysis Goal

During routine internal product testing of the inks and cartridge material used to manufacture inkjet supplies, it was discovered that the color (yellow, magenta and cyan) inks that are used in the No. 10 and No. 80 inkjet supplies exceeded the federal waste and transportation threshold for corrosivity to steel. The method used to determine corrosivity is found in EPA 530/SW-846 Method 1110, Corrosivity Towards Steel.

The method calls for the immersion of an SAE 1020 steel specimen in approximately 1000-ml of liquid, which is heated to 55 degrees C and agitated. Although the inks exhibit the corrosivity characteristic under these test conditions, it was not known if they would corrode steel under more "real world" conditions. The analysis goal was to simulate an ink spill and determine if the ink would continue to exhibit the corrosion characteristic while drying or when dry. It is hoped that the data may answer this question.

Summary of Results

The ink used in the No. 10 and No. 80 inkjet supply were developed under the codename Zaphod, with Zaphod yellow showing the highest corrosion rate. For this reason, Zaphod yellow was chosen as the ink for this experiment. Three SAE1020 round steel coupons were used as the specimens. The experiment was set-up in one of the Acid/Base fume hoods in the HP Corvallis Building 7 Analytical Lab as shown in Figures 1 and 2. For quality control, a specimen was also exposed to DI Water, while another specimen was suspended in the hood, but not exposed to any liquid. Both the specimen and the liquid weights were measured on a Sartorius Model R200 Balance, shown in Figure 3, capable of measuring out to five significant figures and calibrated in September of this year. The conditions of the analyses are listed at the end of this document.

No significant differences were detected between the specimens with regard to their corrosion rates. Table 1 shows the corrosion rate in millimeters per year (mmpy) of the three specimens used in the experiment. It can be seen from the table that there were no significant differences detected between the specimens with regard to their corrosion rate.

Table 1: Summary results from experiment

ZAPHOD-BASED COLOR INK CORROSIVITY ANALYSIS Zaphod Yellow and SAE 1020 steel coupons, tested in B-7 Analytical Lab (10/10-11/00)										
Sample ID	Surface Area (cm^2)	Exposed To:	Sample Volume	Length of Exposure (hr)	Dry Time (hr)	Initial Wt (g)	Final Wt (g)	Weight Loss (g)	Convert to (mg)	Corrosivity (mm/Yr)
IAO181	25.63	DI Water	1000 ml	0.0167	24	23.81670	23.81526	0.00144	1.44	0.03
AO182	25.66	Z-Y	1000 ml	0.0167	24	23.99731	23.99481	0.00250	2.50	0.05
AO184	25.54	Air	N/A	0.0167	24	23.45772	23.45735	0.00037	0.37	0.01

Figure 1: Experiment set-up

Figure 2: Experimental setup after exposure

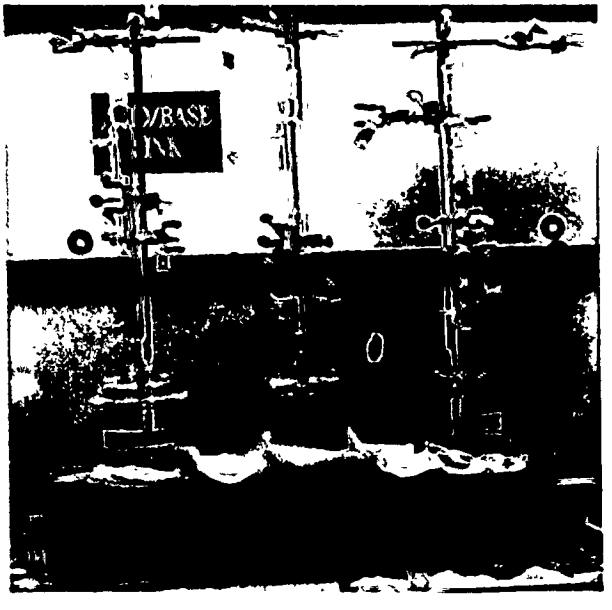


Figure 3: Balance used to weigh specimens

Analysis procedure

Specimen preparation and cleaning:

The specimens were ordered from Alabama Specialty Metals, Inc. and arrived in sealed paper packets. Each specimen was stamped with a material code (C1020) and individual identification number (A0XXX). The sealed packets for the specimens used in this experiment were not opened until the day of the experiment and were always handled using nitrile gloves. Because the samples were brand new, a pre-clean step was not performed. After measuring the outer diameter, inner hole diameter and thickness, the specimens were sent to the Scanning Electron Microscope (SEM) lab for pre-exposure surface micrographs.

Although the specimens arrived with a weight log report, to reduce experimental variability, the samples were weighed on the Sartorius scale shown in Figure 3, both before and after exposure. After weighing, the hole of each specimen was threaded with plastic fishing line.

After exposure, each specimen was immersed in a 1:10 non-chlorine cleanser/tap water mixture at ambient temperature and allowed to soak for 5 minutes. Then, the immersed specimens were placed on an electric stirrer for another five minutes. The specimens were removed from the immersion jars, rinsed with tap water and patted dry using a sterile Tec-Wipe. The specimens were weighed and sent back to the SEM lab, where post-exposure micrographs were taken. While at the SEM lab, the specimens were cleaned with high-pressure CO_2 gas to remove ink residue. To reduce variability, the cleaning technique was applied to all three specimens.

Liquid Preparation, Set-up and Specimen Exposure:

The ink used was Zaphod Yellow from the Building 7 Proto Ink Lab. Two 1000-ml Pyrex Keck flasks, fitted with a four neck Pyrex lid. Standard non-mercury filled thermometers were used to monitor liquid and air temperature. The DI Water was obtained through the house system, which has a resistivity specification set at 18 MOhms. The flasks were fitted with condensers, although these were not used during this experiment. Also, only one ink-filled flask was in use for this experiment, the right-most flask shown in Figures 1 and 2.

One specimen was suspended on the end of the lab rack as a control. The other two specimens were immersed in Zaphod yellow ink or DI water for one minute. These specimens were suspended on the lab rack for 24 hours, with period dry time checks taken at one hour and 13 hours and 24 hours, as shown in Figures 4, 5, and 6, respectively. After the dry-time measurement, the specimens were removed from the lab rack, cleaned, dried, and weighed as shown in Figure 7.

Figure 4: Dry time check after exposure.
Elapsed dry time: 1 hour

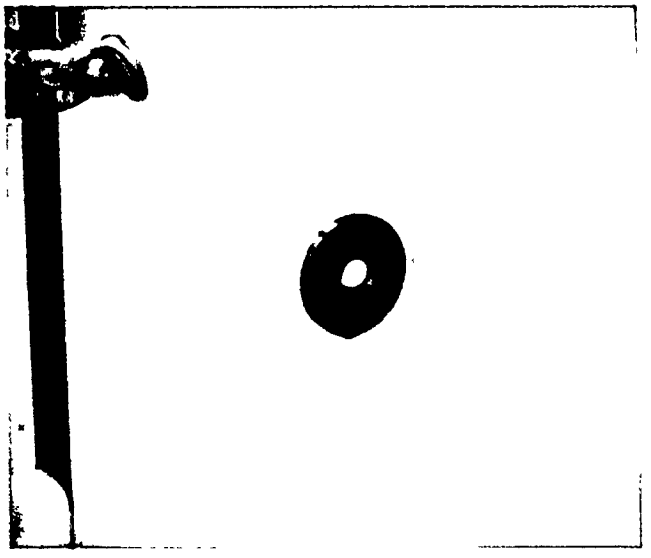


Figure 5: Dry time check after exposure.
Elapsed dry time: 13 hours

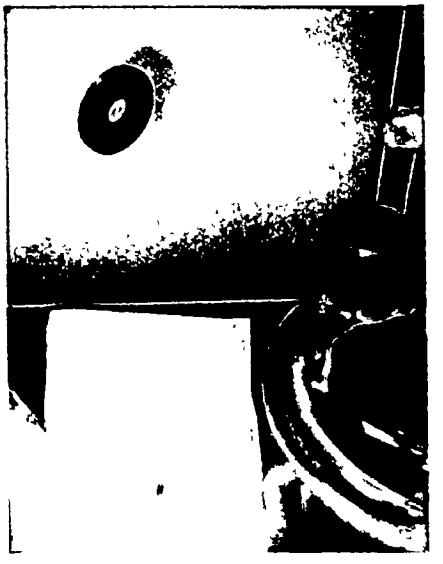


Figure 6: Dry time check after exposure.
Elapsed dry time: 24 hours

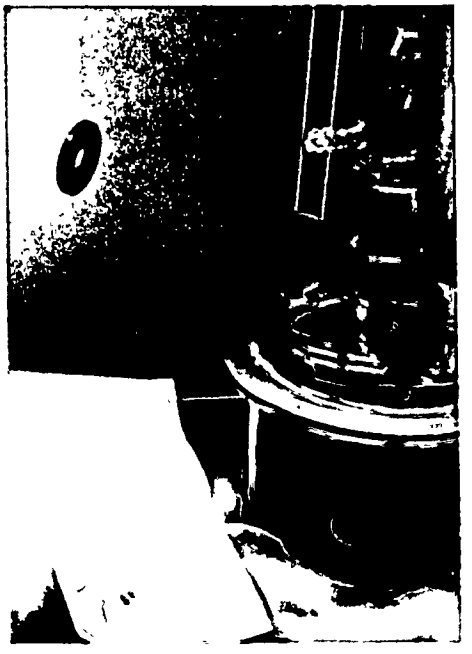
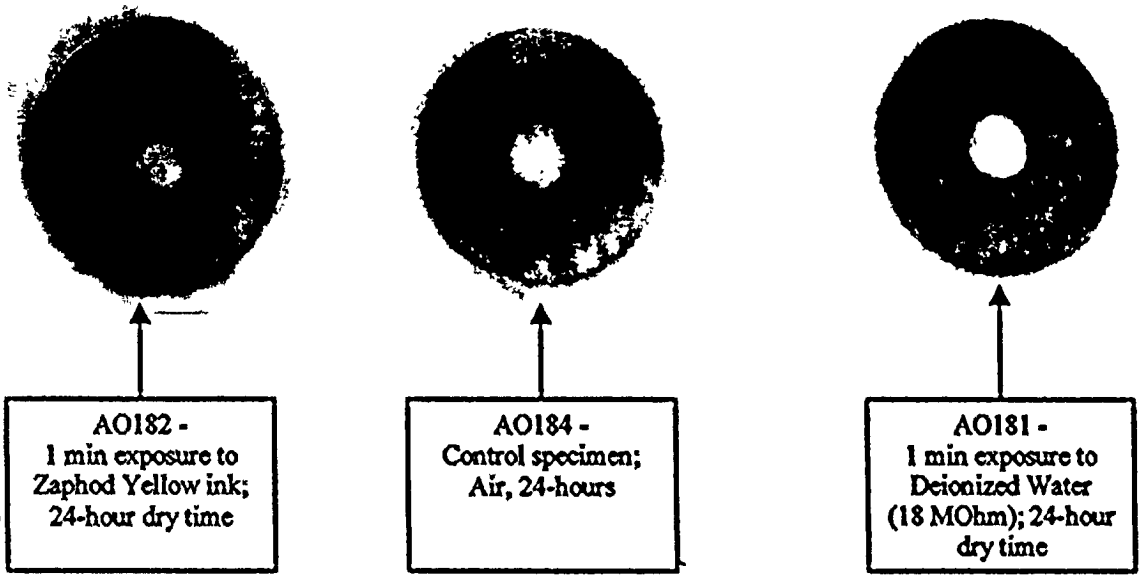


Figure 7: Specimens after various exposures



ZAPHOD YELLOW INK

Revised 21 June 2000

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: **ZAPHOD YELLOW INK**

Product Code: **Not Assigned**

Company Identification

MANUFACTURER/DISTRIBUTOR
DuPont Ink Jet Inks and Specialty Colorants
Barley Mill Plaza
Wilmington, DE (USA)

PHONE NUMBERS

Product, Safety, Health and Environmental Information	: 1-302-695-9682 (8 a.m.-5 p.m. ET, M-F, U.S.A)
Transport Emergency	: CHEMTREC: 1-800-424-9300 (24 hours, U.S.A)
Medical Emergency	: 1-800-441-3637 (24 hours, U.S.A.)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components (% by weight)

Material	CAS Number	%
Water	7732-18-5	55-80
Humectant	**	5-10
Succinic Acid	110-15-6	5-10
Aliphatic Polyol	**	5-10
2-Pyrrolidone	616-45-5	5-10
Inorganic Nitrate	**	<1
Yellow Dyes	**	<5

Components (Remarks)

**The specific identity for each component not identified by a CAS Registry Number is withheld as a trade secret.

3. HAZARDS IDENTIFICATION

Potential Health Effects

THIS PRODUCT CAN BE USED SAFELY WHEN USED AS DIRECTED AND WHEN APPLICABLE SAFETY PRECAUTIONS ARE FOLLOWED.

POTENTIAL HEALTH EFFECTS FROM PRODUCT

Potential routes of overexposure to this product are skin contact, eye contact and inhalation of vapor.

Ingestion is not expected to be a significant route of exposure for this product under normal use conditions.

There is no toxicity data available for this specific formulation. Any potential hazards are presumed to be due to exposure to the components.

This material has been found to be corrosive to SAE Type 1020 steel. No skin test data are available.

ADDITIONAL HEALTH EFFECTS

Since this mixture has not been tested as a whole to determine the hazards by all routes of exposure, information is provided for each hazardous component of the mixture to meet requirements of OSHA's Hazard Communication Standard (29 CFR 1910.1200). The effects noted occur from exposure to the pure component unless otherwise noted.

INFORMATION FOR COMPONENTS

HUMECTANT
Skin Contact - Essentially non-irritating. Slightly toxic to animals by absorption.

Eye Contact - Essentially non-irritating.

Medical Conditions Aggravated by Exposure - Significant exposure to this chemical may adversely affect people with chronic disease of the respiratory system, skin and/or eyes.

SUCCINIC ACID
This material is a slight skin irritant and a strong eye irritant. Short term feeding studies in rats showed no adverse effects. Tests in chick embryos demonstrated no mutagenic activity. Symptoms of acute toxicity in rats are weakness and diarrhea.

Human health effects of overexposure by inhalation, ingestion, or skin or eye contact may initially include: skin irritation with discomfort or rash; or eye irritation with discomfort, tearing or blurring of vision. Data to evaluate the skin permeation hazard of this material are insufficient.

ALIPHATIC POLYOL
Not a skin or eye irritant in animals. Low toxicity in animals by ingestion and slight toxicity by skin absorption. Harmful if inhaled or swallowed. May cause eye irritation. May cause skin irritation. Exposure can cause gastrointestinal disturbances, nausea, headache and vomiting.

2-PYRROLIDONE
2-Pyrrolidone may irritate skin, eyes, nose and throat. Ingestion may cause nausea, vomiting or diarrhea.

INORGANIC NITRATE
This material is an eye and upper respiratory tract irritant. Ingestion may lead to methemoglobinemia and gastric irritation with symptoms of weakness, shortness of breath, bluish discoloration of the skin and mucous membranes, nausea and headache.

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

4. FIRST AID MEASURES

First Aid

INHALATION

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SKIN CONTACT

Flush skin with water after contact. Wash contaminated clothing before reuse.

EYE CONTACT

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

INGESTION

Ingestion is not an expected route of exposure during normal use of the product. If ingested, consult a physician.

5. FIRE FIGHTING MEASURES

Flammable Properties

Flash Point	: >200 °F (>93.3 °C)
Method	: Closed Cup
Approximate Flammable Limits in Air, % by Volume	
LEL	: Not Available
UEL	: Not Available
Autoignition Temperature	: Not Available

Material is a nonflammable water-based solution.

Hazardous combustion products (gases/vapors) produced in fire can include carbon monoxide, carbon dioxide and smoke.

Extinguishing Media

Use media appropriate for surrounding material.

Fire Fighting Instructions

This material is not flammable. Use normal firefighting procedures for the area.

6. ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Initial Containment

Dike spill.

Spill Clean Up

Soak up with absorbent material.

7. HANDLING AND STORAGE

Handling (Personnel)

Avoid contact with eyes, skin, or clothing.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal Protective Equipment

EYE/FACE PROTECTION
Wear safety glasses. Wear coverall chemical splash goggles and face shield when the possibility exists for eye and face contact due to splashing or spraying of the material.

RESPIRATORS
Respirators are not needed for normal use.

PROTECTIVE CLOTHING
If there is potential for significant dermal contact wear appropriate impervious clothing and gloves.

Exposure Guidelines

Applicable Exposure Limits

HUMECTANT

PEL (OSHA)	: None Established
TLV (ACGIH)	: None Established
AEL * (DuPont)	: None Established

SUCCINIC ACID

PEL (OSHA)	: None Established
TLV (ACGIH)	: None Established
AEL * (DuPont)	: None Established

ALIPHATIC POLYOL

PEL (OSHA)	: None Established
TLV (ACGIH)	: None Established
AEL * (DuPont)	: None Established

2-PYRROLIDONE

PEL (OSHA)	: None Established
TLV (ACGIH)	: None Established
AEL * (DuPont)	: 10 ppm, 35 mg/m^3, 8 & 12 Hr. TWA

INORGANIC NITRATE

PEL (OSHA)	: None Established
TLV (ACGIH)	: None Established
AEL * (DuPont)	: 10 mg/m^3, 8 Hr. TWA

YELLOW DYES

PEL (OSHA)	: None Established
TLV (ACGIH)	: None Established
AEL * (DuPont)	: None Established

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Form	: Liquid
Color	: Yellow
Odor	: Slight
Solubility in Water	: Miscible
pH	: 3.5-4.5
Specific Gravity	: 1.06

10. STABILITY AND REACTIVITY

Chemical Stability

Stable at normal temperatures and storage conditions.

Incompatibility with Other Materials

Corrosive to SAE Type 1020 steel.

Decomposition

Decomposition does not occur during normal use.

Polymerization

Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

Animal Data

No data available for product.

12. ECOLOGICAL INFORMATION

Ecotoxicological Information

No data available for product.

13. DISPOSAL CONSIDERATIONS

Waste Disposal

Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations.

14. TRANSPORTATION INFORMATION
(Not meant to be all inclusive)

DOT (Department of Transportation):

Proper Shipping Name	: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (SUCCINIC ACID)
Hazard Class	: 8
Packing Group	: III
Identification Number	: UN3265

15. REGULATORY INFORMATION
(Not meant to be all inclusive - selected regulations represented)

U.S. Regulations

Federal Regulations

TSCA Inventory Status - All components of this product are compliant with TSCA chemical inventory regulations.

TSCA Section 12(b) Export Notification - This product can contain:

None

State Regulations

State Right-To-Know

WARNING - SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM (California Proposition 65)

Ethylene Oxide (75-21-8)	<0.5 ppm
Formaldehyde (50-00-0)	<0.1 ppm
1,4-Dioxane (123-91-1)	<0.1 ppm
Acetaldehyde (75-07-0)	<0.1 ppm

The above are trace impurities that can occur in the product.

European Union Regulations

EU Inventory Status - All components of this product are compliant with EU chemical inventory regulations.

16. OTHER INFORMATION

HMIS Rating

Health	1
Flammability	1
Reactivity	0

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

MSDS Contact Information

Product Stewardship Coordinator
DuPont Ink Jet Inks and Specialty Colorants
Barley Mill Plaza
Wilmington, DE (U.S.A.)
1-302-695-9682 (U.S.A.)

Revision History

2 February 2000	New MSDS format
2 May 2000	Modifications to Sections 3 and 4 - Inhalation Section 15 - California Proposition 65
21 June 2000	Sections 2, 3, 8, 10, 14, 15 - Corrosive to steel

Key

ACGIH	American Conference of Governmental Industrial Hygienists
AEL	Acceptable Exposure Limit (DuPont)
Cmpds	Compounds
ET	Eastern Time (U.S.A.)
EU	European Union
HMIS	Hazardous Material Information System (National Paint and Coatings Association)
IARC	International Agency for Research on Cancer
LEL or LFL	Lower Explosive Limit or Lower Flammable Limit
M-F	Monday through Friday
NTP	National Toxicology Program (U.S.A.)
OSHA	Occupational Safety and Health Administration (U.S.A.)
PEL	Permissible Exposure Limit
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TSCA	Toxic Substances Control Act (U.S.A)
TWA	Time-weighted Average
UEL or UFL	Upper Explosive Limit or Upper Flammable Limit
WEEL	Workplace Environmental Exposure Level

End of MSDS

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January 5, 2001

Mr. James O'Steen
Director, Office of Hazardous Materials Technology (DHM-20)
Research & Special Programs Administration
Department of Transportation
Washington, DC 20590

cc: Mr. Edward Mazzullo, Standards (DHM-10)
Mr. James Enoch Jones, Approvals (DHM-32)

Re: Pending Hewlett-Packard approval application; inkjet printer cartridges

Dear Mr. O'Steen:

On September 1, 2000, I submitted an application on behalf of Hewlett-Packard Company for an approval under 49 CFR 173.136(b) covering a range of inkjet printer cartridges shipped by that company and its customers.

My request was prompted by preliminary test information indicating that some of the inks utilized in the company's printers fell within the definition of a steel-corrosive material in 49 CFR 173.137(c)(2), and therefore would require shipment of the cartridges in Class 8, Packing Group III.

As you know, while we have been discussing this application, the company has continued to have corrosivity tests conducted on its inks under the standards in the U.S. and the international dangerous goods regulations. This has been made somewhat more difficult because of the commercial unavailability of the P3 and P235 steels cited in the regulations. Both title 49 CFR and the UN Orange Book, however, indicate that test steels of "a similar type" may be used to determine the classification.

Enclosed are the most recent results using K02400 steel to test the company's Zaphod Yellow Ink. This ink was chosen because both company chemists and outside laboratories determined it would be the most aggressive of the inks offered in the cartridges. Along with these test results is a chart comparing the chemistry of K02400 steel to that of P3 and P235 steels. Based on this chart, we believe K02400 to be a "similar" steel to P3 and P235 as that term is used in the regulations.

Based upon the 14-day test results utilizing this steel, we believe that the ink does not fall within the scope of the hazardous materials regulatory definitions for steel-corrosion. We chose this time period because we know it has been used before in the context of DOT corrosive materials classification, and because it appears to be a closer replicate to an annual corrosion rate as specified in the regulations than a shorter test period. As indicated in our original application, based upon actual testing, we know that the ink is not skin or aluminum-corrosive, and that it does not meet the definition of any other hazard class.

If, upon your review of this data and test results, you agree with my conclusion that these inks do not fall not within the scope of the regulations, consider this a request to withdraw the pending approval application.

Please contact me if you have any questions on this material. Thank you.

Sincerely,

Lawrence W. Bierlein
For Hewlett-Packard

Enclosures

Columbia Analytical Services, Inc.
An Employee-Owned Company

January 3, 2001 Service Request No: K2009326

Barbara Hanley
Hewlett Packard Company
1000 NE Circle Boulevard
Corvallis, OR 97330

Dear Barbara:

Enclosed are the results of the rush sample(s) submitted to our laboratory on December 04, 2000. For your reference, these analyses have been assigned our service request number K2009326.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 3280.

Respectfully submitted,

Columbia Analytical Services, Inc.

Les Kennedy
Project Chemist

LK/gep

Page 1 of_____

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hewlett-Packard Company
Project: NA
Sample Matrix: Misc

Service Request: K2009326
Date Collected: 12/4/00
Date Received: 12/4/00

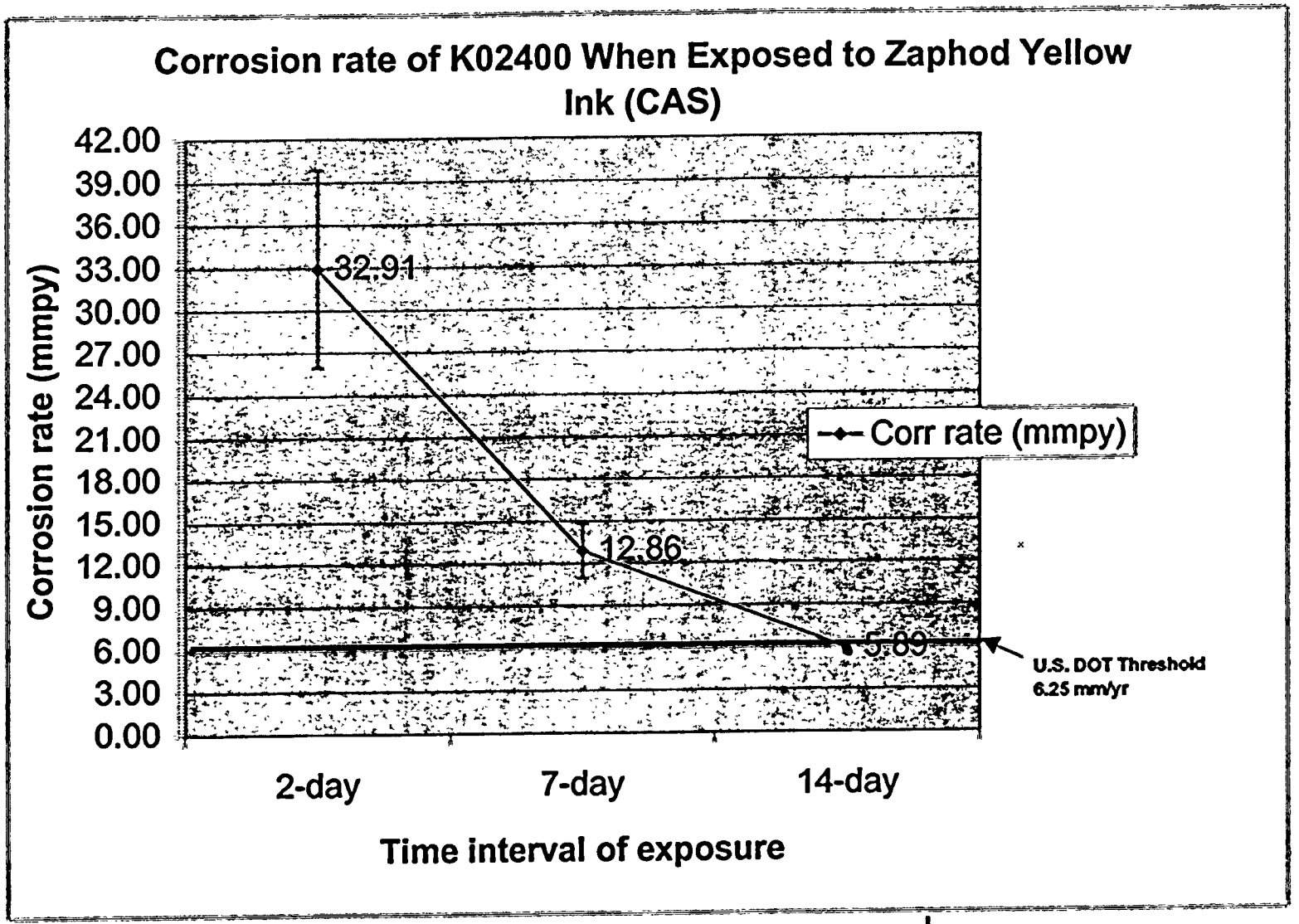
Corrosivity Toward Steel (type K02400)

Prep Method: NONE
Analysis Method: ASTM G31-72
Test Notes:

Units: mm/YR
Basis: NA

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Zaphod Yellow Ink A 48hr	K2009326-001	--	--	1	NA	12/5/00	40.1	
Zaphod Yellow Ink B 48hr	K2009326-002	--	--	1	NA	12/5/00	39.8	
Zaphod Yellow Ink C 48hr	K2009326-003	--	--	1	NA	12/5/00	30.6	
Zaphod Yellow Ink D 48hr	K2009326-004	--	--	1	NA	12/5/00	26.1	
Zaphod Yellow Ink E 48hr	K2009326-005	--	--	1	NA	12/5/00	29.8	
Zaphod Yellow Ink F 7 day	K2009326-006	--	--	1	NA	12/7/00	11.2	
Zaphod Yellow Ink G 7 day	K2009326-007	--	--	1	NA	12/7/00	15.0	
Zaphod Yellow Ink H 7 day	K2009326-008	--	--	1	NA	12/7/00	14.0	
Zaphod Yellow Ink I 7 day	K2009326-009	--	--	1	NA	12/7/00	12.0	
Zaphod Yellow Ink J 7 day	K2009326-010	--	--	1	NA	12/7/00	12.1	
Zaphod Yellow Ink K 14 day	K2009326-011	--	--	1	NA	12/15/00	5.71	
Zaphod Yellow Ink L 14 day	K2009326-012	--	--	1	NA	12/15/00	5.65	
Zaphod Yellow Ink M 14 day	K2009326-013	--	--	1	NA	12/15/00	6.22	
Zaphod Yellow Ink N 14 day	K2009326-014	--	--	1	NA	12/15/00	5.87	

Approved By: Les Kennedy Date: 1/3/01



CAS, K02400						
	average	low	high	range	error+/-	# of samples
2-day	32.91	25.82	39.35	13.53	6.94	5
7-day	12.86	11.2	15.02	3.82	1.91	5
14-day	5.89	5.71	6.22	0.51	0.25	4

Steel Type Composition

Steel Type	Carbon (%)	Silicon (%)	Chromium (%)	Manganese (%)	Aluminum (%)	Molybdenum (%)	Copper (%)	Nickel (%)
P3*	<0.1	0.1 - 0.4	0.4 - 0.75	0.2 - 0.6	--	--	--	1.0 - 1.5
P235	<0.17	<0.35	<0.3	0.4 - 1.2	>0.2	<0.08	<0.3	<0.3
K02400	0.24	0.13 - 0.55	0.25	0.65 - 1.4	--	0.08	0.35	0.25
SAE 1020	0.18 - 0.24	--	--	0.3 - 0.6	--	--	--	--

* Sum of chromium, copper, molybdenum, and nickel is less than 0.7%
-- Indicates elements are not added as an alloying agent but may be present in trace quantities

Sources: ASTM DS-56G: Unified Number System, 8th Ed., January 1999
International Standards Organization, Standard 9328-2, 1991

January , 2001

Mr. Lawrence W. Bierlein
2175 K Street, NW
Washington, DC 20037

Dear Mr. Bierlein:

On September 1, 2000, on behalf of Hewlett-Packard Company, you applied for an approval to ship certain inkjet cartridges as unregulated materials. This is in response to your subsequent letter of January 5, 2001, enclosing results of certain steel corrosion tests and a comparative chart on steel compositions.

We have reviewed that test data and chart, and conclude that the K02400 steel tested is sufficiently "similar to" P3 and P235 steels, as that term is used in the Hazardous Materials Regulations (HMR) and the UN Model Regulations on the Transport of Dangerous Goods, to be accepted for Class 8 classification purposes. We also conclude, based upon the 14-day test results you provided, that the ink in the Hewlett-Packard inkjet printer cartridges does not meet the definition of a corrosive material as set forth in the U.S. HMR in 49 CFR 173.136-137, and in international regulations based upon Chapter 2.8 of the UN Model Regulations on the Transport of Dangerous Goods.

Accordingly, because the ink is not regulated as a hazardous material, the approval you originally requested is not necessary and, per your letter, we are returning the approval application to you.

Sincerely,