

**FACT SHEET**  
Final TSCA Section 5 (a)(2) Rule on  
Benzidine-based Chemical Substances

This TSCA Section 5 (a)(2) Significant New Use Rule (SNUR) requires persons to notify EPA at least 90 days before commencing the manufacture, import, or processing of the benzidine-based chemical substances listed in the rule for any use listed in the rule as a significant new use. This rule is part of an overall strategy EPA is pursuing to address the cancer risk to workers from exposure to benzidine-based chemical substances.

**RULE REQUIREMENTS:**

EPA is designating any use of the benzidine-based chemical substances listed in the rule, except for uses specified in the rule, as a significant new use. The SNUR requires persons to notify EPA through the submission of a Significant New Use Notice (SNUN) at least 90 days before commencing the manufacture, import, or processing of the listed benzidine-based chemical substances for any use listed in the SNUR as a significant new use.

**CHEMICAL DEFINITIONS**

Benzidine-based chemical substances shall be defined as those chemical substances listed in §721.1660 of the regulatory text.

**SIGNIFICANT NEW USES**

A significant new use of the listed benzidine-based chemical substances is any use other than as: a reagent to test for hydrogen peroxide in milk; a reagent to test for hydrogen sulfate, hydrogen cyanide, and nicotine; a stain in microscopy; a reagent for detecting blood an analytical standard, and the use of Colour Index (C.I.) Direct Red 28 (Congo Red, CAS No. 573-58-0) as an indicator dye.

**NEED FOR INFORMATION:**

EPA believes that this action is necessary because the benzidine-based chemical substances listed in the rule pose significant cancer risks to humans and that the uses governed by this rule may result in significant human exposure. The required notice provides EPA with the opportunity to evaluate the intended use and associated activities before these substances can be re-introduced into the marketplace and an opportunity to protect against potentially adverse exposure before it can occur.

## DISCUSSION

The benzidine-based substances listed in the rule are used primarily in dyes. However, the benzidine-based chemical substances listed in the rule are no longer in commerce in the U.S., except for use in small amounts for specific diagnostic purposes. If fashion trends change and these substances were put into commerce, there would be significant cancer concerns for workers who manufacture dyes or who weigh dyes at facilities that use benzidine-based dyes, and also some concern for exposure to workers who operate dyeing machinery. This SNUR prevents these chemical substances from re-entering commerce without prior notification of EPA.

## BACKGROUND

Concerns for the use of benzidine as a dye feedstock were first raised in the last century, when some workers manufacturing dyes developed bladder cancer. Benzidine was subsequently found to be a potent carcinogen in humans and animals. It was later discovered that dyes derived from benzidine release free benzidine via metabolic pathways. Animal bioassays by the National Cancer Institute (NCI) determined that administration of three benzidine-based dyes each led to cancer.

Industry has completely phased out of commerce those benzidine-based chemical substances listed in the final rule, except for use in small amounts for specific diagnostic uses. EPA is currently negotiating with the dye industry to reduce the risks associated with the related benzidine congener-based dyes.

## HEALTH EFFECTS

The overwhelming health concern for benzidine-based chemical substances is bladder cancer in humans, generally believed to be caused through any route of exposure. Benzidine is classified by EPA as Group A, a human carcinogen (IRIS, 1996). Benzidine is also classified by the International Agency for Research on Cancer (IARC) as a Group 1 carcinogen, which are chemicals known to cause cancer in humans and animals.

The American Conference of Governmental Industrial Hygienists (ACGIH) has classified benzidine as a "confirmed human carcinogen" with no Threshold Limit Value (TLV) assigned, and has recommended that "all exposure to benzidine should be kept to an absolute minimum" (ACGIH 1991). Because benzidine can only be isolated as a salt, and there are identical concerns for the salts, benzidine has been defined for this final rule as including benzidine salts.

Based on NTP cancer bioassays and bioavailability studies of certain benzidine-based dyes, IARC has classified these dyes as Group 2A chemicals, which are carcinogenic to animals and probably carcinogenic to humans. Given the consistent results from testing these dyes, the entire class of benzidine-based dyes are expected to have a similar degree of toxicity, based on known mechanistic similarities.

## FOR MORE INFORMATION

*For general information about this rule, contact the TSCA Hotline, Telephone: (202)554-1404, TDD: (202)554-0551, email: [TSCAHotline@epamail.epa.gov](mailto:TSCAHotline@epamail.epa.gov). For technical information about this rule, contact Karen Lannon, Telephone: (202)260-2797, email: [lannon.karen@epamail.epa.gov](mailto:lannon.karen@epamail.epa.gov).*