Product Stewardship Summary
Diphenylamine

Chemical Identity:
- Product name: Diphenylamine
- DPA;
- N,N-Diphenylamine;
- N-Penylbenzeneamine;
- DFA;
- Anilinobenzene
- CAS # 122-39-4

Uses:
Diphenylamine (DPA) is a chemical widely used as an antioxidant for lubricants, propellants and explosives. It is also an important intermediate in the dye, agrochemical, pharmaceutical, and rubber and plastic additive industries. Derivatives of DPA are used as antioxidants and antiozonants to retard the degradation of the products into which they are incorporated: rubber, urethanes and plastics. DPA is available in bulk (molten) or chip form. DPA Chip meets USA Military Specification D-98A.

DPA has numerous Food and Drug Administration (FDA) clearances. For instance, it is used for surface treatment of apples, both pre- and post-harvest, for the prevention of scald disorder. It protects the apple skin on the tree and during storage. Derivatives of DPA are used to make pharmaceuticals and many other products that benefit our health and our daily lives. Compounds made from DPA are used in laboratories to detect DNA.

Physical/Chemical Properties:
Diphenylamine is a solid crystalline organic compound with a floral odor. It can be off-white, tan or possibly brown/amber. The material’s color is dependent on the amount and length of exposure to air and light. It is insoluble in water. DPA is reactive with oxidizing agents.
DPA is a stable material under normal storage and use conditions. It may be combustible at high temperature. DPA is considered slightly flammable to flammable in the presence of open flames and sparks and slightly explosive in the presence of open flames and sparks. The product is not flammable or explosive in the presence of shocks.

**Health Effects:**
DPA is hazardous in case of skin contact, as both a potential irritant and through skin absorption. The material can also be an eye irritant and hazardous, if inhaled or ingested. Inhalation may cause respiratory tract irritation with coughing and sneezing. It is absorbed through the respiratory tract and may cause effects similar to those of acute ingestion. If ingested, it may cause digestive tract irritation. DPA is readily absorbed orally. It may affect behavioral/central nervous system functions, respiration and blood. Excessive overexposure may cause irritation of the mucous membranes, methemoglobinemia, and liver and renal effects. DPA may cause red blood cell damage. Severe overexposure can result in death. The substance may be toxic to blood, kidney, liver, and bladder. Repeated or prolonged exposure to DPA can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs. DPA may cause birth defects (teratogenic) based on animal test data.

**Environmental Effects:**
Avoid the material’s entry into waterways and sewer systems. Diphenylamine is classified as a marine pollutant. The products of degradation are less toxic than the product itself.

**Exposure:**
Worker routes of entry are skin, inhalation and ingestion. Prolonged or repeated exposure may increase the potential health effects and the potential for some effects to become chronic.

Personnel must be mindful of the exposure limits established by OSHA, ACGIH, NIOSH, and other national and local authorities. The latest limits need to be consulted and adhered to for inhalation exposure.
Product Stewardship:

It is important to refer to the Material Safety Data Sheet and information contained on the container label. As DPA is air and light sensitive, protect from air and light by keeping in light-proof containers with all containers tightly closed and stored in a dry, well-ventilated location.

Personal protective equipment, including appropriate chemical resistant gloves, goggles, dust respirator, and protective clothing, should be worn when handling DPA. Other situations of use, including the handling of large spills, may require full face mask, full suit, boots and self-contained breathing apparatus. Consult a specialist before handling DPA. Use appropriate engineering controls to keep airborne levels below the recommended exposure limits. If user operations generate dust, fume, or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Do not touch spilled material. Vapors are reduced by the use of water spray on the spill. Dike if needed. Eliminate all ignition sources. Prevent entry into sewers, waterways and confined areas.

Chemtura conducts an ongoing analysis of its products to evaluate potential risk areas throughout the product’s life cycle. Chemical risks are identified at the very early stage of new products. They are evaluated by stage-gated reviews using environmental, health, and safety (EHS) criteria. The analysis of existing products will evaluate raw materials, manufacturing, transportation, customer end-use and disposal. Additionally, before changes in existing product formulations are made, a detailed evaluation is made of the proposed change. A critical component of all of these processes is the Material Safety Data Sheet, which lists detailed product hazard information.

Potential product risks are reviewed according to current controls. In the context of a continually improving risk-reduction program, periodic reviews of current controls occur in order to identify opportunities for improvements or enhancements. This includes adaption of existing procedures to changes in regulations (e.g., covering workplace and transportation).
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References
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Important Note:
This Product Stewardship Summary is intended to provide the general public basic property and use information about the chemical. It is not intended to be, and should not be relied upon as, a substitute for the detailed health and safety information contained on the Material Safety Data Sheet, product label, and technical data sheet which should be consulted by people who will handle and process the chemical. This Product Stewardship Summary does not supplant or replace required regulatory and/or legal communication documents.