TOXIC GAS ORDINANCE CONSENSUS GUIDELINES

For Use By All Unidocs Member Agencies or Where Approved By Your Local Jurisdiction
Authority Cited: Toxic Gas Ordinance

A. Materials Regulated

1. Nitrous Oxide, Silane, and Sulfur Hexafluoride are not regulated by the Toxic Gas Ordinance (TGO). These materials are regulated, however, pursuant to the California Fire Code (CFC) and shall also be subject to the requirements of the Santa Clara County Hazardous Materials Subcommittee Guidelines. [11/08/90]
2. Hydrogen Fluoride shall be regulated as a Class II gas, based on a current IDLH of 30 ppm. [07/12/90]
3. The TGO shall not apply to the registration and application of pesticides since this is preempted by a provision of an Act of Congress. Handling and storage of cylinders, however, shall comply with all requirements of the TGO. [11/29/90]
4. In the event that a revised IDLH is published which affects the hazard classification of a material, individual jurisdictions shall establish a new timetable for existing facilities to upgrade their systems. [07/26/90]
5. Substitute materials for toxic gases (e.g., Trimethyl Phosphite, Tetraethylorthosilicate, etc.) shall be regulated by the TGO based on toxicological data presented by a qualified third party. [01/24/91]
6. Mixtures of Regulated Materials: In the absence of an established IDLH for a mixture containing a regulated material, the following formula may be used:

   A calculated LC_{50} for mixtures containing regulated materials can be determined by using the following formula. The calculated LC_{50} can then be used in the formula to calculate the Material Hazard Index (MHI) for the mixture.

$$LC_{50} \text{ of Gas Mixture (in ppm)} = \frac{1}{(\text{molar fraction of toxic component}) \,/\, (\text{ppm } LC_{50} \text{ of toxic component})}$$

$$\text{If more than one toxic component: } LC_{50} \text{ (mixture)} = \frac{1}{\sum_{i=1}^{n} \left[(f_i) \,/\, (LC_{50i}) \right]}$$

   ...where f_i is the mole fraction of the i^{th} toxic component of the gas mixture and LC_{50i} is the LC_{50} of the i^{th} toxic component of the gas mixture. [03/02/94]

7. Dilute toxic gas mixtures are regulated by the TGO. However, when the concentrations are such that they are less than the standards required by a specific control, the material may be exempted from that particular control (e.g., concentrations less than PEL). [01/24/91]
8 Recent amendments to 49 CFR, Parts 171-180, [U.S. Department of Transportation (DOT) regulations], expanded the definition of toxic gases. The Poison-A classification was eliminated and the definition expanded to conform to United Nations standards on hazardous materials. Although this change greatly increased the chemicals regulated as a poison gas by DOT, it was the intent of the TGO to classify those gases listed as Poison-A materials as Class I regulated materials. Therefore, the following materials shall continue to be regulated pursuant to the TGO requirements for Poison-A materials: [08/01/91]
   - Arsine;
   - Bromoacetone;

- Chloropicrin and Methyl Chloride mixture;
- Chloropicrin and nonflammable, nonliquefied compressed gas mixture;
- Cyanogen Chloride containing less than 0.9% water;
- Cyanogen gas;
- Germane;
- Hexaethyl Tetraphosphate and compressed gas mixture;
- Hydrocyanic (Prussic) Acid solution (5% or more Hydrocyanic Acid);
- Hydrocyanic Acid, liquefied;
- Hydrogen Selenide;
- Insecticide, Liquefied Gas, containing Poison-A or Poison-B material;
- Methyldichloroarsine;
- Nitric Oxide;
- Nitrogen Dioxide, liquid;
- Nitrogen Peroxide, liquid;
- Nitrogen Tetroxide, liquid;
- Organic Phosphate, Organic Phosphate compound, or Organic Phosphorus compound; mixed with compressed gas;
- Parathion and compressed gas mixture;
- Phosgene (Diphosgene);
- Phosphine;
- Poisonous liquid or gas, N.O.S.;
- Tetraethyl Pyrophosphate and compressed gas mixture.

9. Halogenated, non-carbon-based gases may hydrolyze to their base mineral acid upon contact with moisture. Therefore, the TGO requirements (i.e., monitoring, treatment, compatibility, etc.) for these gases shall apply to their decomposition products. [10/17/91]

   [Example: Tungsten Hexafluoride decomposes to Hydrogen Fluoride (HF). Therefore, monitoring shall be required for HF at PEL, treatment shall be required for HF to ½ IDLH, and piping materials must be compatible with HF or secondary containment shall be required.]

B. Material Hazard Index (MHI)

NIOSH shall be used as the primary reference when determining the Material Hazard Index. If no data is available from NIOSH, then the EPA's published Level of Concern (LOC) may be used or "third party" data shall be submitted. [07/12/90]

C. Piping and Controls

1. Partial gas system upgrades shall require permits under the same conditions as upgrades to existing underground fuel lines. [06/21/90]

   a. If a permit is required for a piping modification, then upgrading of the entire system for that gas shall be required.

   b. If a permit is not required, such as for connecting an existing piping system to a new piece of equipment, then upgrading will not be required at this time.

2. All primary piping for toxic gas systems shall pass a Helium Leak Test of 10-9 cc/sec., where practical. Persons conducting the tests shall possess a certificate of training. Individual jurisdictions may require "third party" testing. [09/13/90]
3. For the purpose of calculating the Maximum Threshold Quantity (MTQ), storage tanks, cylinders and piping systems which can be isolated in a manner approved by the Fire Chief may be designated as separate storage vessels. [02/21/91]

D. Incompatible Materials

Compatibility of materials shall be determined by the National Association of Corrosion Engineers (NACE). [06/21/90]

E. Compliance

1. The compliance proposal, due within 1 year of adoption of the TGO, shall address each aspect of the project (i.e., identify dates for submitting plans, obtaining funding, initiating upgrades, completing upgrades, etc.). [07/12/90]
2. Special considerations may be given by the Fire Chief, in accordance with the specific section of the local ordinance (if such a section was provided) granting the Fire Chief this authority or with Section 2.301 of the California Fire Code (i.e., vacuum distribution systems for Chlorine, Ammonia, Sulfur Dioxide and Silicon Tetrachloride). [07/26/90]

F. Seismic Protection

Automatic shut-down shall be required for the toxic gas sources in the event of seismic activity at 0.3 G, or lower, as specified by each individual jurisdiction. [11/08/90]

G. Gas Detection

1. Monitoring systems shall be tested at the point of use. [06/21/90]
2. The interval time for "continuous" gas detection shall be determined by the Fire Chief in each jurisdiction. The maximum interval time shall be 30 minutes, as defined by the UFC. [08/23/90]
3. Automatic shut-down shall occur upon gas detection at or below PEL in occupied areas, and at or below 1/2 IDLH in unoccupied areas. [10/11/90]
4. Continuous gas detection may not be required to detect the presence of gas at or below the PEL when the upper range of the odor threshold limit is less than the PEL, as determined by the critiqued and approved data published by the American Industrial Hygiene Association, "Odor Thresholds for Chemicals with Established Occupational Health Standards" (1989, or as amended thereafter). That notwithstanding, monitoring may be required to provide for the proper function of the treatment system and other emergency controls. Moreover, this exemption may apply only in those jurisdictions (i.e., Campbell, Milpitas, Palo Alto, San Jose, Santa Clara, Sunnyvale) which provide an exception based on the physiological warning properties of certain gases. [09/19/91]

H. Treatment Systems

1. Maximum release rates shall be calculated based upon a worst-case, single event from a single cylinder, taking into account all engineering controls. [06/21/90]

2 Restrictive flow orifices (RFOs) must be in the cylinder valve to be considered in calculating the maximum release rate from a cylinder. [06/21/90]

3 Where cylinders are manifolded together, the maximum release rate shall be the sum of the release rates for all of the manifolded cylinders. [06/21/90]

I. Storage

1. All exterior storage shall be considered as one area when determining the exempt amounts or the minimum threshold quantity of toxic gases. [10/25/90]
2. It was the consensus of the TGO Committee that the issue of "temporary storage" be handled by each individual jurisdiction. [07/26/90]
3. For the purpose of the TGO, an exhausted enclosure shall be defined as an approved laboratory fume hood or process equipment which is exhausted to a treatment system and protected by an automatic sprinkler system. [03/27/91]

4 Exterior storage shall be defined as a storage area enclosed by no more than two (2) contiguous walls, so as not to impede exiting or confine air movement. [05/09/91]

J. Secondary Containment

1. Secondary containment systems shall be approved and tested on a case-by-case basis by individual jurisdictions. New types of systems shall be evaluated by the TGO Committee as they are proposed. [09/13/90]
2. Secondary containment may not be required for systems operating under sub-atmospheric conditions (i.e., vacuum piping systems) if it is demonstrated that equivalent protection is provided (e.g., When the system is equipped with an alarm and a fail-safe-to-close valve activated by a loss in vacuum pressure). [11/29/90]

K. Portable Tanks and Cylinders

1. For portable tanks and cylinders, the maximum flow rate of release shall be based on the actual valve manufacturer 's specifications. Where this data is not available, the maximum release rate may be calculated by assuming the total release of gas from the cylinder or tank within the time specified in Table No. 80.303-B of the California Fire Code. [09/27/90]
2. When portable tank or cylinder valves are equipped with approved RFOs, the worst-case release shall be determined by the maximum achievable flow rate, as determined by the valve manufacturer or gas supplier's data. [09/27/90]
3. All portable toxic gas tanks and cylinders shall be marked to indicate the valve's orifice size, in inches. The orifice size shall be printed on the certification tag for the portable tank or cylinder as well as on the vessel itself. The lettering shall be ¼" high, minimum, and be in contrast to the color it is printed upon. [09/27/90]
4. Excess flow control valves, as defined in UFC, Article 80, shall be permanently marked to indicate the maximum designed flow rate, based on air under standard conditions. [09/27/90]

5. Encapsulating equipment designed to contain high pressure cylinders and their contents, as approved by the Fire Chief, shall be acceptable in meeting the intent of providing a gas cabinet or exhausted enclosure for leaking gas cylinders. [03/27/91]

L. Inert Gas Purge Systems

1. A dedicated inert gas purge system may be used to purge more than one gas provided that the gases are compatible. [02/21/91]
2. Purge gas systems shall be located in an approved gas cabinet unless the system operates by vacuum demand. [02/21/91]

M. Existing Ammonia Refrigeration Systems

1. For facilities where Ammonia refrigeration systems store more than the Maximum Threshold Quantity (Max T.Q. = 12,500 lbs.) in a single vessel, automatic valves shall be used to isolate zone areas or equipment areas to less than the Max T.Q. Isolation shall be achieved by shutting off the liquid supply to an area within the system. The isolated area shall then be evacuated by suction from the compressor. [03/02/93]
   a. The isolated area shall not contain more than 12,500 lbs. of Ammonia (calculated at normal temperature and pressure), and shall provide pressure relief for both gas and liquid. Pressure relief devices shall be directly connected to one or more of the following:
      i. Enclosed expansion chamber;
      ii. Exhausted enclosure;
      iii. Treatment.
   b. Automatic isolation shall be provided for:
      i. Seismic, fire, or other remote location alarm;
      ii. Ammonia detection at 100 ppm, or at a concentration acceptable to the individual jurisdiction, not to exceed 250 ppm;
      iii. Emergency power failure;
      iv. Exhaust system failure.
2. Redundant Ammonia gas detection shall be used to monitor non-welded connections located within non-exhausted enclosures. [03/02/93]
   a. Pipe valves shall meet current, nationally recognized standards (i.e., California Codes and ASME/ANSI Standards) for threaded and flanged valves.
   b. Sensors shall automatically isolate zone or equipment areas upon detection at 100 ppm, or at a concentration acceptable to the individual jurisdiction, not to exceed 250 ppm.
   c. Gas sensors shall be tested, at the discretion of the individual jurisdiction.
3. Approved vacuum procedures shall be used to purge an Ammonia refrigeration system. [03/02/93]
   a. Information shall be submitted to the individual jurisdiction which documents the vacuum purge procedure. Such information shall, at a minimum, include:
      i. Valve sequencing;
      ii. Ammonia flow directions;
      iii. Destination vessels.

b. A demonstration of the Ammonia vacuum purge method (i.e., the procedure used for a leak repair) shall be performed at the discretion of the individual jurisdiction.

4. Appropriate nationally recognized standards shall be used to verify a "tight" system. [03/02/93]

   a. Information shall be submitted to the individual jurisdiction which documents that the system has passed pressure testing in accordance with current, nationally recognized standards (i.e., Uniform Codes and ASME/ANSI Standards) for pressure testing of Ammonia systems.

   b. An Ammonia gas sensing device, approved by the individual jurisdiction, shall be used to verify a "tight" system by a qualified, independent testing firm or during inspection conducted by the individual jurisdiction. Additional pressure testing (at 150% of maximum anticipated operating pressure) may be required at the discretion of the individual jurisdiction.

   c. Optional pressure testing (at 150% of maximum anticipated operating pressure) may be required at the discretion of the individual jurisdiction.