INTRODUCTION TO THE TABLE OF INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

The Table of Initial Isolation and Protective Action Distances suggests distances useful to protect people from vapors resulting from spills involving dangerous goods which are considered toxic by inhalation (TIH), including certain chemical warfare agents, or which produce toxic gases upon contact with water. The Table provides first responders with initial guidance until technically qualified emergency response personnel are available.
Distances show areas likely to **be affected during the** first **30 minutes after materials are spilled and** could increase with time.

The Initial Isolation Zone defines an area SURROUNDING the incident in which persons may be exposed to dangerous (upwind) and life threatening (downwind) concentrations of material. The Protective Action Zone defines an area DOWNWIND from the incident in which persons may become incapacitated and unable to take protective action and/or incur serious or irreversible health effects. The Table provides specific guidance for small and large spills occurring day or night.

Adjusting distances for a specific incident involves many interdependent variables and should be made only by personnel technically qualified to make such adjustments. For this reason, no precise guidance can be provided in this document to aid in adjusting the table distances; however, general guidance follows.

Factors That May Change the **Protective Action Distances**

The guide for a material clearly indicates the evacuation distance required to protect against fragmentation hazard. If the material becomes involved in a FIRE, the toxic hazard may become less important than the fire or explosion hazard.

If more than one tank car, cargo tank, portable tank, or large cylinder involved in the incident is leaking, LARGE SPILL distances may need to be increased.

For material with a protective action distance of 11.0+ km (7.0+ miles), the actual distance can be larger in certain atmospheric conditions. If the dangerous goods vapor plume is channeled in a valley or between many tall buildings, distances may be larger than shown in the Table due to less mixing of the plume with the atmosphere. Daytime spills in regions with known strong inversions or snow cover, or occurring near sunset, accompanied by a steady wind, may require an increase in protective action distance. When these conditions are present, airborne contaminants mix and disperse more slowly and may travel much farther downwind. In addition, protective action distances may be larger for liquid spills when either the material or outdoor temperature exceeds 30°C (86°F).

Materials which react with water to produce significant toxic gases are included in the Table of Initial Isolation and Protective Action Distances. Note that some materials which are TIH (e.g., bromine trifluoride, thionyl chloride, etc.) produce additional TIH materials when spilled

in water. For these materials, two entries are provided in the Table of Initial Isolation and Protective Action Distances. If it is not clear whether the spill is on land or in water, or in cases where the spill occurs both on land and in water, choose the larger Protective Action Distance. Following the Table of Initial Isolation and Protective Action Distances is a table that lists the materials which, when spilled in water, produce toxic gases and the toxic gases that these water reactive materials produce.

When a water reactive TIH producing material is spilled into a river or stream, the source of the toxic gas may move with the current or stretch from the spill point downstream for a substantial distance.

Certain chemical warfare agents have been added to the Table of Initial Isolation and Protective Action Distances. The distances shown were calculated using worst case scenarios for these agents when used **as a weapon.**

The choice of protective options for a given situation depends on a number of factors. For some cases, evacuation may be the best option; in others, sheltering in-place may be the best course. Sometimes, these two actions may be used in combination. In any emergency, officials need to quickly give the public instructions. The public will need continuing information and instructions while being evacuated or sheltered in-place.

Proper evaluation of the factors listed below will determine the effectiveness of evacuation or in-place protection. The importance of these factors can vary with emergency conditions. In specific emergencies, other factors may need to be identified and considered as well. This list indicates what kind of information may be needed to make the initial decision.

The Dangerous Goods

Degree of health hazard

Amount involved

Containment/control of release

Rate of vapor movement

The Population Threatened

Location

Number of people

Time available to evacuate or shelter in-place

Ability to control evacuation or shelter in-place

Building types and availability

- Special institutions or populations, e.g., nursing homes, hospitals, prisons

Weather Conditions

Effect on vapor and cloud movement

Potential for change

Effect on evacuation or protection in-place

PROTECTIVE ACTION DECISION FACTORS TO CONSIDER

Protective Actions are those steps taken to preserve the health and safety of emergency responders and the public during an incident involving releases of dangerous goods. The Table of Initial Isolation and Protective Action Distances (green-bordered pages) predicts the size of downwind areas which could be affected by a cloud of toxic gas. People in this area should be evacuated and/or sheltered in-place inside buildings.

Isolate Hazard Area and Deny Entry means keep everybody away from the area if they are not directly involved in emergency response operations. Unprotected emergency responders should not be allowed to enter the isolation zone. This "isolation" task is done first to establish control over the area of operations. This is the first step for any protective actions that may follow. See the Table of Isolation and Protective Action Distances (green-bordered pages) for more detailed information on specific materials.

Evacuate means move all people from a threatened area to a safer place. To perform an evacuation, there must be enough time for people to be warned, to get ready, and to leave an area. If there is enough time, evacuation is the best protective action. Begin evacuating people nearby and those outdoors in direct view of the scene. When additional help arrives, expand the area to be evacuated downwind and crosswind to at least the extent recommended in this guidebook. Even after people move to the distances recommended, they may not be completely safe from harm. They should not be permitted to congregate at such distances. Send evacuees to a definite place, by a specific route, far enough away so they will not have to be moved again if the wind shifts.

Shelter In-Place means people should seek shelter inside a building and remain inside until the danger passes. Sheltering in-place is used **when evacuating the public would** cause greater risk than staying where they are, or when an evacuation cannot be performed. Direct the people inside to close all doors and windows and to shut off all ventilating, heating and cooling systems. In-place protection may not be the best option if (a) the vapors are flammable; (b) if it will take a long time for the gas to clear the area; or (c) if buildings cannot be closed tightly. Vehicles can offer some protection for a short period if the windows are closed and the ventilating systems are shut off. Vehicles are not as effective as buildings for in-place protection.

It is vital to maintain communications with competent persons inside the building so that they are advised about changing conditions. Persons protected-in-place should be **warned to stay**

far from windows because of the danger from glass and projected metal fragments in a fire and/or explosion.

Every dangerous goods incident is different. Each will have special problems and concerns. Action to protect the public must be selected carefully. These pages can help with initial decisions on how to protect the public. Officials must continue to gather information and monitor the situation until the threat is removed.

PROTECTIVE ACTIONS

BACKGROUND ON THE INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCE TABLE

Initial Isolation and Protective Action Distances in this guidebook were determined for small and large spills occurring during day or night. The overall analysis was statistical in nature and utilized state-of-the-art emission rate and dispersion models; statistical release data from the U.S. DOT HMIS (Hazardous Materials Incident Reporting System) database; 5 years of meteorological observations from over 120 locations in United States, Canada and Mexico; and the most current toxicological exposure guidelines.

For each chemical, thousands of hypothetical releases were modeled to account for the statistical variation in both release amount and atmospheric conditions. Based on this statistical sample, the 90% percentile Protective Action Distance for each chemical and category was selected to appear in the Table. A brief description of the analysis is provided below. A detailed report outlining the methodology and data used in the generation of the Initial Isolation and Protective Action Distances may be obtained from the U.S. Department of Transportation, Research and Special Programs Administration.

Release amounts and emission rates into the atmosphere were statistically modeled based on (1) data from the U.S. DOT HMIS database; (2) container types and sizes authonzed for transport as specified in 49 CFR §172.101 and Part 173; (3) physical properties of the materials involved, and (4) atmosphenc data from a histoical database. The emission model calculated the release of vapor due to evaporation of pools on the ground, direct release of vapors from the container, or a combination of both, as would occur for liquefied gases which can flash to form both a vapor! aerosol mixture and an evaporating pool. In addition, the emission model also calculated the emission of toxic vapor by-products generated from spilling water-reactive chemicals in water. Spills that involve releases of approximately 200 liters or less are considered Small Spills, while spills that involve quantities greater than 200 liters are considered Large Spills.

Downwind dispersion of the vapor was estimated for each case modeled. Atmospheric parameters affecting the dispersion, and the emission rate, were selected in a statistical fashion from a database containing hourly meteorological data from 120 cities in United States, Canada and Mexico. The dispersion calculation accounted for the time dependent emission rate from the source as well as the density of the vapor plume (i.e., heavy gas effects). Since atmospheric mixing is less effective at dispersing vapor plumes during nighttime, day and night were separated in the analysis. In the Table, “Day” refers to time periods after sunrise and

before sunset, while “Night” includes all hours between sunset and sunrise.

Toxicological short-term exposure guidelines for the chemicals were applied to determine the downwind distance to which persons may become incapacitated and unable to take protective action or may incur serious health effects. Toxicological exposure guidelines were chosen from (1) emergency response guidelines, (2) occupational health guidelines, or (3) lethal concentrations determined from animal studies, as recommended by an independent panel of toxicological experts from industry and academia.

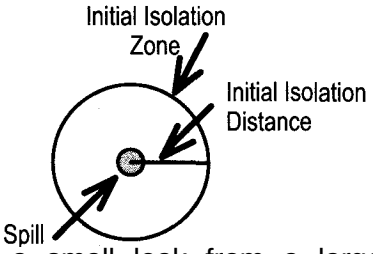
PROTECTIVE ACTIONS

HOW TO USE THE TABLE OF INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

(1) The responder should already have:

- Identified the material by its ID Number and Name; (if an ID Number cannot be found, use the name of material index in the blue-bordered pages to locate that number.)
- Found the three-digit guide for that material in order to consult the emergency actions recommended jointly with this table;
- Noted the wind direction.

(2) Look in this Table (the green-bordered pages) for the ID Number and Name of the Material involved in the incident. Some ID Numbers have more than one shipping name listed—look for the specific name of the material. (If the shipping name is not known and the Table lists more than one name for the same ID Number, use the entry with the largest protective action distances.)



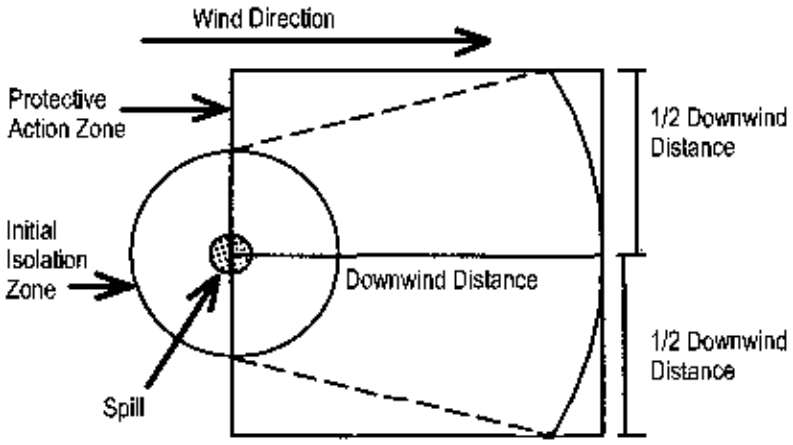
(3) Determine if the incident involves a SMALL or LARGE spill and if DAY or NIGHT. Generally, a SMALL SPILL is one which involves a single, small package (e.g., a drum containing up to approximately 200 liters), a small cylinder, or a small leak from a large package. A LARGE SPILL is one which involves a spill from a large package, or multiple spills from many small packages. DAY is any time after sunrise and before sunset. NIGHT is any time between sunset and sunrise.

(4) Look up the initial ISOLATION distance.
Direct all persons to move, in a crosswind direction, away from the spill to the
distance specified—in meters and feet.

(5) Look up the initial PROTECTIVE ACTION DISTANCE shown in the Table. For a given dangerous goods, spill size, and whether day or night, the Table gives the downwind distance—in kilometers and miles— for which protective actions should be considered. For practical purposes, the Protective Action Zone (i.e., the area in which people are at risk of harmful exposure) is a square, whose length and width are the same as the downwind distance shown in the Table.

PROTECTIVE ACTIONS

(6) Initiate Protective Actions to the extent possible, beginning with those closest to the spill site and working away from the site in the downwind direction. When a water-reactive TIH producing material is spilled into a river or stream, the source of the toxic gas may move with the current or stretch from the spill point



downstream for a substantial distance.

The shape of the area in which protective actions should be taken (the Protective Action Zone) is shown in this figure. The spill is located at the center of the small circle. The larger circle represents the INITIAL ISOLATION zone around the spill.

NOTE: See introduction To The Table Of Initial Isolation And Protective Action Distances for factors which may increase or decrease Protective Action Distances.

Call the emergency response telephone number listed on the shipping paper, or the appropriate response agency as soon as possible for additional information on the material, safety precautions, and mitigation procedures.

TABLE OF INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

ID No.	NAME OF MATERIAL	SMALL SPILLS (From a small package or small leak from a large package)						LARGE SPILLS (From a large package or from many small packages)					
		First ISOLATE in all Directions		Then PROTECT persons Downwind during-				First ISOLATE in all Directions		Then PROTECT persons Downwind during-			
				DAY		NIGHT				DAY		NIGHT	
		Meters	(Feet)	Kilometers	(Miles)	Kilometers	(Miles)	Meters	(Feet)	Kilometers	(Miles)	Kilometers	(Miles)
1005	Ammonia, anhydrous Ammonia, anhydrous, liquefied Ammonia, solution, with more than 50% Ammonia Anhydrous ammonia Anhydrous ammonia, liquefied	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	1.1 km	(0.7 mi)
1008	Boron trifluoride Boron trifluoride, compressed	30 m	(100 ft)	0.2 km	(0.1 mi)	0.6 km	(0.4 mi)	215 m	(700 ft)	1.6 km	(1.0 mi)	5.1 km	(3.2 mi)
1016	Carbon monoxide Carbon monoxide, compressed	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	125 m	(400 ft)	0.6 km	(0.4 mi)	1.8 km	(1.1 mi)
1017	Chlorine	30 m	(100 ft)	0.3 km	(0.2 mi)	1.1 km	(0.7 mi)	275 m	(900 ft)	2.7 km	(1.7 mi)	6.8 km	(4.2 mi)
1023	Coal gas Coal gas, compressed	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.3 km	(0.2 mi)	0.5 km	(0.3 mi)
1026	Cyanogen Cyanogen, liquefied Cyanogen gas	30 m	(100 ft)	0.3 km	(0.2 mi)	1.1 km	(0.7 mi)	305 m	(1000 ft)	3.1 km	(1.9 mi)	7.7 km	(4.8 mi)
1040	Ethylene oxide Ethylene oxide with Nitrogen	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	1.8 km	(1.1 mi)
1045	Fluorine Fluorine, compressed	30 m	(100 ft)	0.2 km	(0.1 mi)	0.5 km	(0.3 mi)	185 m	(600 ft)	1.4 km	(0.9 mi)	4.0 km	(2.5 mi)
1048	Hydrogen bromide, anhydrous	30 m	(100 ft)	0.2 km	(0.1 mi)	0.5 km	(0.3 mi)	125 m	(400 ft)	1.1 km	(0.7 mi)	3.4 km	(2.1 mi)
1050	Hydrogen chloride, anhydrous	30 m	(100 ft)	0.2 km	(0.1 mi)	0.8 km	(0.4 mi)	185 m	(600 ft)	1.6 km	(1.0 mi)	4.3 km	(2.7 mi)
1051	AC (when used as a weapon)	60 m	(200 ft)	0.2 km	(0.1 mi)	0.5 km	(0.3 mi)	460 m	(1500 ft)	1.8 km	(1.0 mi)	3.9 km	(2.4 mi)
1051	Hydrocyanic acid, aqueous solutions, with more than 20% Hydrogen cyanide Hydrocyanic acid, liquefied Hydrogen cyanide, anhydrous, stabilized Hydrogen cyanide, stabilized	60 m	(200 ft)	0.2 km	(0.1 mi)	0.5 km	(0.3 mi)	400 m	(1300 ft)	1.3 km	(0.8 mi)	3.4 km	(2.1 mi)
1052	Hydrogen fluoride, anhydrous	30 m	(100 ft)	0.2 km	(0.1 mi)	0.6 km	(0.4 mi)	125 m	(400 ft)	1.1 km	(0.7 mi)	2.9 km	(1.8 mi)
1053	Hydrogen sulfide Hydrogen sulfide, liquefied Hydrogen sulphide Hydrogen sulphide, liquefied	30 m	(100 ft)	0.2 km	(0.1 mi)	0.3 km	(0.2 mi)	215 m	(700 ft)	1.4 km	(0.9 mi)	4.3 km	(2.7 mi)
1062	Methyl bromide	30 m	(100 ft)	0.2 km	(0.1 mi)	0.3 km	(0.2 mi)	95 m	(300 ft)	0.5 km	(0.3 mi)	1.4 km	(0.9 mi)
1064	Methyl mercaptan	30 m	(100 ft)	0.2 km	(0.1 mi)	0.3 km	(0.2 mi)	95 m	(300 ft)	0.8 km	(0.5 mi)	2.7 km	(1.7 mi)
1067	Dinitrogen tetroxide Dinitrogen tetroxide, liquefied Nitrogen dioxide Nitrogen dioxide, liquefied Nitrogen peroxide, liquid Nitrogen tetroxide, liquid	30 m	(100 ft)	0.2 km	(0.1 mi)	0.5 km	(0.3 mi)	305 m	(1000 ft)	1.3 km	(0.8 mi)	3.9 km	(2.4 mi)
1069	Nitrosyl chloride	30 m	(100 ft)	0.3 km	(0.2 mi)	1.4 km	(0.9 mi)	385 m	(1200 ft)	3.5 km	(2.2 mi)	9.8 km	(6.1 mi)
1071	Oil gas Oil gas, compressed	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	30 m	(100 ft)	0.3 km	(0.2 mi)	0.5 km	(0.3 mi)
1076	CG (when used as a weapon)	155 m	(500 ft)	1.3 km	(0.8 mi)	3.2 km	(2.0 mi)	765 m	(2500 ft)	7.2 km	(4.5 mi)	11.0+ km	(7.0+ mi)
1076	Diphosgene	60 m	(200 ft)	0.2 km	(0.1 mi)	0.5 km	(0.3 mi)	95 m	(300 ft)	1.0 km	(0.6 mi)	1.9 km	(1.2 mi)
1076	DP (when used as a weapon)	60 m	(200 ft)	0.3 km	(0.2 mi)	1.0 km	(0.6 mi)	185 m	(600 ft)	1.6 km	(1.0 mi)	4.5 km	(2.8 mi)
1076	Phosgene	95 m	(300 ft)	0.8 km	(0.5 mi)	2.7 km	(1.7 mi)	765 m	(2500 ft)	6.6 km	(4.1 mi)	11.0 km	(6.9 mi)
1079	Sulfur dioxide Sulfur dioxide, liquefied Sulphur dioxide Sulphur dioxide, liquefied	30 m	(100 ft)	0.3 km	(0.2 mi)	1.1 km	(0.7 mi)	185 m	(600 ft)	3.1 km	(1.9 mi)	7.2 km	(4.5 mi)

"+" means distance can be larger in certain atmospheric conditions

TABLE OF INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

ID No.	NAME OF MATERIAL	SMALL SPILLS (From a small package or small leak from a large package) First ISOLATE in all Directions Meters	(Feet)	Then PROTECT persons Downwind during- DAY Kilometers	(Miles)	NIGHT Kilometers	(Miles)	LARGE SPILLS (From a large package or from many small packages) First ISOLATE in all Directions Meters	(Feet)	Then PROTECT persons Downwind during- DAY Kilometers	(Miles)	NIGHT Kilometers	(Miles)
1082	Trifluorochloroethylene	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	30 m	(100 ft)	0.3 km	(0.2 mi)	0.8 km	(0.5 mi)
1082	Trifluorochloroethylene, inhibited												
1092	Acrolein, inhibited	60 m	(200 ft)	0.5 km	(0.3 mi)	1.6 km	(1.0 mi)	400 m	(1300 ft)	3.9 km	(2.4 mi)	7.9 km	(4.9 mi)
1098	Allyl alcohol	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	30 m	(100 ft)	0.3 km	(0.2 mi)	0.6 km	(0.4 mi)
1135	Ethylene chlorohydrin	30 m	(100 ft)	0.2 km	(0.1 mi)	0.3 km	(0.2 mi)	60 m	(200 ft)	0.6 km	(0.4 mi)	1.3 km	(0.8 mi)
1143	Crotonaldehyde, inhibited	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	30 m	(100 ft)	0.3 km	(0.2 mi)	0.8 km	(0.5 mi)
1143	Crotonaldehyde, stabilized												
1162	Dimethyldichlorosilane (when spilled in water)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.3 km	(0.2 mi)	125 m	(400 ft)	1.1 km	(0.7 mi)	2.9 km	(1.8 mi)
1163	1,1-Dimethylhydrazine	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	1.1 km	(0.7 mi)
1163	Dimethylhydrazine, unsymmetrical												
1182	Ethyl chloroformate	30 m	(100 ft)	0.2 km	(0.1 mi)	0.3 km	(0.2 mi)	60 m	(200 ft)	0.6 km	(0.4 mi)	1.4 km	(0.9 mi)
1185	Ethyleneimine, inhibited	30 m	(100 ft)	0.3 km	(0.2 mi)	0.8 km	(0.5 mi)	155 m	(500 ft)	1.4 km	(0.9 mi)	3.5 km	(2.2 mi)
1238	Methyl chloroformate	30 m	(100 ft)	0.3 km	(0.2 mi)	1.1 km	(0.7 mi)	155 m	(500 ft)	1.6 km	(1.0 mi)	3.4 km	(2.1 mi)
1239	Methyl chloromethyl ether	30 m	(100 ft)	0.2 km	(0.1 mi)	0.6 km	(0.4 mi)	125 m	(400 ft)	1.1 km	(0.7 mi)	2.7 km	(1.7 mi)
1242	Methyldichlorosilane (when spilled in water)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	1.6 km	(1.0 mi)
1244	Methylhydrazine	30 m	(100 ft)	0.3 km	(0.2 mi)	0.8 km	(0.5 mi)	125 m	(400 ft)	1.1 km	(0.7 mi)	2.7 km	(1.7 mi)
1250	Methyltrichlorosilane (when spilled in water)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.3 km	(0.2 mi)	125 m	(400 ft)	1.1 km	(0.7 mi)	2.9 km	(1.8 mi)
1251	Methyl vinyl ketone	155 m	(500 ft)	1.3 km	(0.8 mi)	3.4 km	(2.1 mi)	915 m	(3000 ft)	8.7 km	(5.4 mi)	11.0+ km	(7.0+ mi)
1251	Methyl vinyl ketone, stabilized												
1259	Nickel carbonyl	60 m	(200 ft)	0.6 km	(0.4 mi)	2.1 km	(1.3 mi)	215 m	(700 ft)	2.1 km	(1.3 mi)	4.3 km	(2.7 mi)
1295	Trichlorosilane (when spilled in water)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.3 km	(0.2 mi)	125 m	(400 ft)	1.3 km	(0.8 mi)	3.2 km	(2.0 mi)
1298	Trimethylchlorosilane (when spilled in water)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	95 m	(300 ft)	0.8 km	(0.5 mi)	2.3 km	(1.4 mi)
1340	Phosphorus pentasulfide, free from yellow or white Phosphorus (when spilled in water)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.5 km	(0.3 mi)	155 m	(500 ft)	1.3 km	(0.8 mi)	3.2 km	(2.0 mi)
1340	Phosphorus pentasulphide, free from yellow or white Phosphorus (when spilled in water)												
1360	Calcium phosphide (when spilled in water)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.8 km	(0.5 mi)	215 m	(700 ft)	2.1 km	(1.3 mi)	5.3 km	(3.3 mi)
1380	Pentaborane	155 m	(500 ft)	1.3 km	(0.8 mi)	3.7 km	(2.3 mi)	765 m	(2500 ft)	6.6 km	(4.1 mi)	10.6 km	(6.6 mi)
1384	Sodium dithionite (when spilled in water)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	30 m	(100 ft)	0.3 km	(0.2 mi)	1.1 km	(0.7 mi)
1384	Sodium hydrosulfite (when spilled in water)												
1384	Sodium hydrosulphite (when spilled in water)												
1397	Aluminum phosphide (when spilled in water)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.8 km	(0.5 mi)	245 m	(800 ft)	2.4 km	(1.5 mi)	6.4 km	(4.0 mi)
1412	Lithium amide (when spilled in water)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	95 m	(300 ft)	0.8 km	(0.5 mi)	1.9 km	(1.2 mi)
1419	Magnesium aluminum phosphide (when spilled in water)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.8 km	(0.5 mi)	215 m	(700 ft)	2.1 km	(1.3 mi)	5.5 km	(3.4 mi)
1432	Sodium phosphide (when spilled in water)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.5 km	(0.3 mi)	155 m	(500 ft)	1.4 km	(0.9 mi)	4.0 km	(2.5 mi)
1433	Stannic phosphides (when spilled in water)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.8 km	(0.5 mi)	185 m	(600 ft)	1.6 km	(1.0 mi)	4.7 km	(2.9 mi)
1510	Tetranitromethane	30 m	(100 ft)	0.3 km	(0.2 mi)	0.5 km	(0.3 mi)	60 m	(200 ft)	0.6 km	(0.4 mi)	1.3 km	(0.8 mi)

"+" means distance can be larger in certain atmospheric conditions