PLAINTIFF'S EXHIBIT
CED-5

State of New York
DEPARTMENT OF STATE } ss.:

IT IS HEREBY CERTIFIED, *that* the attached is a true copy of 12 NYCRR, Part 12 as filed with the New York State Department of State and in effect on August 1, 1963.

WITNESS *my hand and the official seal of the Department of State at the City of Albany, this* first *day of* May *one thousand nine hundred and* ninety.

Secretary of State

DOS-235 (Rev. 7/89)

PART 12

CONTROL OF AIR CONTAMINANTS IN FACTORIES

(Statutory authority: Labor Law, §§ 27-a, 28, 29, 200, 299)

Section 12.1 Application. (a) This Part applies in and to all factories in the State of New York except as otherwise provided by law and to all persons employed therein and to their employers in respect to all materials, processes and operations generating, releasing or disseminating air contaminants. In respect to contaminants resulting from such processes or operations the following rules, which contain references to the prevention and control of air contaminants, and other provisions of the Industrial Code in regard thereto which may be adopted after November 1, 1958, shall govern where inconsistent with this Part:

*Industrial Code Rule No. 4—relating to Bakeries and Confectioneries.

Industrial Code Part 10—relating to Equipment, Maintenance and Sanitation of Foundries and the Control of Dust, Gases and Fumes in Foundries.

Industrial Code Part 11—relating to Milling Industry and Malt House Elevators.

Industrial Code Part 23—relating to Protection of Persons Employed in Construction and Demolition Work.

Industrial Code Part 27—relating to Laundry Work.

Industrial Code Part 29—relating to Dry Dyeing Plants and Dry Cleaning Plants.

Industrial Code Part 33—relating to Control of Silica Dust in Rock Drilling.

Industrial Code Part 34—relating to Control of Silica Dust in Stone Crushing Operations.

Industrial Code Part 35—relating to Control of Silica Dust in Stone Cutting and Stone Finishing Industry.

Industrial Code Part 38—relating to Radiation Protection.

(b) The provisions of Industrial Code Part 18 relating to exhaust systems shall apply for operations not specifically covered by the above rules.

12.2 Definitions. As used herein and in connection with this Part the following terms mean:

(a) *Air contaminants.* Airborne substances, such as dusts, fibers, fumes, gases, mists, vapors and other impurities.

* Repealed, effective October 11, 1961.

(b) *Air mover.* Any device which produces forced air flow, such as a fan, ejector, or natural draft stack.

(c) *Approved.* In respect to a device or material: in compliance with a subsisting resolution of approval adopted by the board; in respect to action by the board: made the subject of a resolution of approval.

(d) *Board.* The Board of Standards and Appeals of the State of New York.

(e) *Commissioner.* The Industrial Commissioner of the State of New York.

(f) *Confined space.* A space so enclosed that dangerous air contamination therein cannot be prevented or removed by natural ventilation through openings in the enclosure.

(g) *Control equipment.* Equipment used to prevent air contamination or reduce or remove air contaminants.

(h) *Dangerous air contaminants.* Air contaminants in quantities tending to injure the health of employees or creating a fire or explosion hazard, or in quantities greater than 25 per cent of the lower explosive level of any mixture or compound which they may form.

(i) *Dilution ventilation.* A ventilation system other than local ventilation which reduces air contamination to safe levels by the introduction of uncontaminated air.

(j) *Dipping.* The application of industrial products coating material by means of total or partial immersion.

(k) *Employee.* A person employed; one who works for wages or salary in the service of another.

(l) *Exhaust system.* A ventilating system operating under negative pressure for the control of air contaminants.

(m) *Fibers.* Particles produced by handling, cutting, stripping, spinning or weaving of cotton, wool, fur, asbestos or other material constituted of thread-like or slender elements.

(n) *Flammable.* Capable of igniting and continuing to burn when brought in contact with an open flame, glowing combustion or other source of ignition and, for liquids, having a flash point of 200 degrees Fahrenheit or less.

(o) *Impregnating.* Application of liquid material by permeation or saturation.

(p) *Industrial products coating.* Application of paint and similar finishing material by dipping, impregnating, spraying or spreading, including operations incidental to such work and subsequent drying operations, where the finishing material contains flammable or toxic solvents or materials.

(q) *Local exhaust ventilation.* A system of ventilation for collecting and removing air contaminants at the source of generation.

(r) *Mechanical ventilation.* A system of ventilation having a power-driven air mover.

(s) *Open surface tank operation.* An operation which involves the use of a tank containing liquid with the liquid surface directly exposed to the work atmosphere. These operations may include but are not limited to washing, electroplating, anodizing, pickling, quenching, dyeing, dipping, tanning, dressing, bleaching, degreasing, alkaline cleaning, stripping, rinsing, digesting and other similar operations.

(t) *Personal respiratory protective equipment.* A respirator or other device worn for the purpose of preventing the wearer from inhaling harmful amounts of air contaminants.

(u) *Practicable.* Capable of being done without disturbing essential functions or essential structural elements.

(v) *Recirculation.* The return of part or all of the exhaust air to any space occupied by employees.

(w) *Shall.* The word "shall" is always mandatory.

(x) *Spraying.* The application of liquid material in the form of a mist.

(y) *Spreading.* The application of liquid material to a surface by brush, roller, flow or similar method.

(z) *Tumbling process.* Any process in which articles, pieces or parts are placed in a rotating barrel, drum, mill or cage for the purpose of removal of rust, scale, debris or dust as well as for the purpose of smoothing, polishing, burnishing or cleaning by means of agitation.

(aa) *Work atmosphere.* The atmosphere to which an employee is exposed in the course of performing his work.

(bb) *Working area or space.* The area or space normally occupied or traversed by an employee while at work.

12.3 Responsibility of employers. (a) Every employer shall effect compliance with the provisions of this Part relating to the prevention and removal of air contaminants, the storage and use of flammable liquids and the provision, installation, operation and maintenance of control or protective equipment.

(b) Every employer shall instruct his employees as to the hazards of their work, the use of the control or protective equipment, and their responsibility for complying with this Part.

(c) No employer shall suffer or permit an employee to work in a room in which there exist dangerous air contaminants in a work atmosphere.

(d) No employer shall suffer or permit dangerous air contaminants to accumulate or remain in any factory.

12.4 Responsibility of employees. Every employee shall use the control and protective equipment provided for his protection and shall comply with all provisions of this Part relating to his personal conduct.

12.5 Existing equipment. Control equipment installed prior to November 1, 1958 in accordance with the provisions of the Industrial Code then in effect and which is so maintained is exempt from all other or different provisions of this Part while such maintenance continues.

12.6 Prevention of air contamination. All operations producing air contaminants shall be so conducted that the generation, release or dissemination of air contaminants is kept at the lowest practicable level. In any factory where the sources of air contamination are by reason of their extent, quantity or kind incapable of producing dangerous air contaminants, the provisions of this Part shall not apply.

12.7 General maintenance of equipment. All equipment used to effect compliance with this Part shall be maintained in good condition and in accordance with the requirements of the law and the Industrial Code.

12.8 General control requirements. Dangerous air contaminants shall be removed or controlled as prescribed in this Part.

12.9 General control methods. (a) One or more of the following methods shall be used to prevent, remove or control dangerous air contaminants:

(1) Substitution of a material or a method which does not produce dangerous air contaminants.

(2) Local exhaust ventilation conforming to the requirements of Industrial Code Part 18.

(3) Dilution ventilation.

(4) Application of water or other wetting agent.

(5) Enclosure or isolation.

(6) Other methods approved by the board.

12.10 Exhaust systems. Every exhaust system required by this Part shall be constructed, installed, operated and maintained in compliance with the provisions of Industrial Code Part 18 relating to exhaust systems.

12.11 Isolation or segregation of operations. All processes or operations releasing or disseminating dangerous air contaminants shall be isolated, enclosed or otherwise segregated insofar as practicable.

12.12 Separation of different processes creating a hazard. Where processes generate different air contaminants which could, if intermixed, result in a fire or explosion hazard, such contaminants shall be exhausted by separate systems so as to eliminate such possibility.

12.13 Prevention of ignition. All processes or operations using or generating air contaminants which constitute a fire or explosion hazard shall be protected from sources of accidental ignition. Unless such processes or operations are isolated by tight partitions or enclosures they shall not be conducted within 20 feet of any materials, devices or operations which produce flames or sparks including, by way of illustration but not by way of limitation, engines, motors, welding and soldering torches. All processes and operations within 20 feet of any spark or flame producing work such as welding shall be discontinued and all ignitible air contaminants, flammable liquids and accumulated flammable residue shall be removed from the area of the flame or spark hazard before such work is begun.

12.14 Personal respiratory protective equipment. (a) *Use.* Personal respiratory protective equipment shall not be used in lieu of other control methods, except for protection of employees in emergencies and in the repair, maintenance or adjustment of equipment or processes, or upon specific approval by the board.

(b) *Approval.* Personal respiratory protective equipment shall be of a type approved by the board for the particular class of substance or substances constituting the air contaminant.

Note: A list of approved respiratory protective equipment may be secured from the board.

(c) *Maintenance.* Personal respiratory protective equipment shall be stored in air-tight containers or cabinets or in an uncontaminated area. Equipment shall be cleaned, serviced and repaired to maintain it in effective working condition and it shall be sterilized before use by any person other than the last wearer.

12.15 Goggles, masks and shields. All employees exposed to air contaminants tending to injure or irritate the eyes shall be provided with and shall wear either safety goggles, close-fitting chemical goggles or an effective face mask or shield. An employee requiring prescription lenses in the normal performance of his work shall be supplied with prescription goggles or with goggles designed to fit over his regular spectacles.

12.16 Protective clothing. All employees exposed to air contaminants which tend to cause skin irritation or skin diseases, or which can be absorbed through the skin in amounts tending to injure the health, shall be provided with appropriate clean, protective clothing, such as coveralls, coats, headgear, gloves, sleeves or aprons as needed or where suitable.

12.17 Emergency flushing facilities. Emergency showers or other facilities for flushing the skin and body members shall be provided within 50 feet of the working position where employees may be exposed to sudden and severe concentrations of corrosive air contaminants.

12.18 Flexible electrical cords and portable lights. Flexible electrical cords

used in any area where flammable liquids are being used or stored or where flammable air contaminants may be present shall be of the three-conductor, extra heavy service type manufactured for the purpose and shall be fully insulated and grounded. All connections shall be explosion-proof. Portable lights used in such areas shall be shielded against breakage.

12.19 Mixing and thinning of flammable liquids. The mixing and thinning indoors of flammable liquids in unit quantities greater than 55 gallons shall be done only in a mixing or spraying room and in such manner and under such ventilation as will effect compliance with this Part. Lesser quantities shall be mixed or thinned indoors only in such a room or within a hood, booth or working area provided with such ventilation.

12.20 Emptied containers. Emptied drums or other containers shall not be stored indoors unless they have been purged of all contents constituting or creating dangerous air contaminants. Purging shall be done in a mechanically ventilated area if performed indoors. Compressed air shall not be used for purging containers.

12.21 Use of certain flammable liquids. The use of flammable liquids having a flash point of 100 degrees Fahrenheit or less determined by the Tagliabue open-cup test for paint removal or cleaning or any other process in which they are unprotected and exposed, shall be restricted to areas provided with mechanical ventilation creating an air movement of at least 100 f.p.m. over the surface of the work while the work is being carried on. The use of benzene for such operations is prohibited.

12.22 Refuse material. In the vicinity of every process or operation to which this Part applies there shall be provided metal containers with self-closing covers and bearing the notice "FLAMMABLE WASTE". Such containers shall be used for scrapings, sweepings and other waste containing or consisting of flammable material. Such refuse shall be disposed of at the end of each day by burying, burning or other safe treatment but no such refuse shall be burned in a furnace.

12.23 Protection of adjacent occupancies. (a) *Wall and ceiling construction.* No employer shall suffer or permit flammable liquids to be used or dispensed in any room above or below or adjoining one in which there is an employee occupancy unless either:

(1) the room is part of a building which is a fireproof building or a fire-resisting building complying with Industrial Code Part 7, or

(2) the walls and ceiling of the room within 20 feet horizontally of the working area are so constructed as to have a fire-resistance rating of at least one hour in accordance with Industrial Code Part 7 and, if there be an employee occupancy below such room, the floor of the room within such distance is of incombustible material and is waterproof, or

(3) such room is equipped with automatic sprinkler protection conforming to Industrial Code Part 20.

(b) *Wall openings.* Wall openings in every such room shall be provided with approved three-quarter hour self-closing fire doors or with approved three-quarter hour fire windows. No such room shall have any window openings beneath or within 10 feet horizontally of any fire escape or required exterior stairway.

12.24 Specific operations and specific control requirements. (a) *Grinding and polishing wheels, etc.* Grinding, polishing, buffing, scratch brushing, abrasive cutting-off wheel and grinding or polishing belt strap operations generating dangerous air contaminants shall be provided with local exhaust ventilation and an air cleaning device.

Exceptions: (1) Wet grinding with other than sandstone wheels and wet polishing and buffing operations if enclosures are provided which prevent splash or dispersion of liquids, abrasive compounds or mists into the workroom.
(2) Intricate and precision grinding discs or wheels not over one inch in diameter.
(3) Grinding or polishing of articles and instruments made of gold and platinum.
(4) Intermittent tool grinding operations used for shop purposes only.

(b) *Woodworking machines.* Woodworking operations generating dangerous air contaminants shall be provided with local exhaust ventilation and an air cleaning device.

(c) *Melting apparatus.* Vessels operated at or in excess of the temperature of volatilization of toxic metals, alloys or compounds which generate dangerous air contaminants shall be provided with local exhaust ventilation. Vessels used for melting or cleaning such metals, alloys or compounds shall be provided with exhaust ventilation when operated in such a manner as to generate dangerous air contaminants. The combustion chamber, when operated in such a manner as to release dangerous air contaminants, shall be provided with local exhaust ventilation.

Exception: Portable receptacles or apparatus which have no fixed location and are used intermittently and which produce no dangerous air contaminants.

(d) *Open surface tank operations.* (1) *Open surface tank operations.* Open surface tank operations creating dangerous air contaminants shall be provided with ventilation to control such contaminants. (See Industrial Code Part 18.)

(2) *Classes of operations.* Open surface tank operations are classified into groups in accordance with both hazard potential and rate of contaminant release as set forth in section 18.14 of Industrial Code Part 18.

(3) *Humidity control.* When heat is added to the workroom to prevent the condensation of water vapor evaporated from open tanks into mist, such additional heat shall be so controlled that it does not raise the wet bulb temperature in the lower six feet of the workroom above 80 degrees Fahrenheit.

(4) *Cleanout doors.* Tanks or machines used for cleaning by solvents and having a surface vapor area of more than two square feet shall be equipped with suitable cleanout or sludge doors located near the bottom of each tank or still. Such doors shall be constructed and maintained so that there is no leakage of solvent when closed.

(5) *Solvent transfer.* (i) Transfer of flammable solvents from containers shall be by means of a hose or pipe leading to the bottom of the tank being filled. Containers between which the transfer is being made shall be electrically bonded and grounded with a resistance of less than 25 ohms.

(ii) Volatile solvents shall not be stored or transferred in uncovered vessels.

(6) *Vapor phase degreasing.* (i) *Freeboard.* The level of the vapors shall be kept below the top edge of the tank by a distance equal to at least one-half the tank width or 36 inches, whichever is less.

(ii) *Heating.* (a) *Gas.* Where gas is used as fuel for heating, the combustion chamber shall be of tight construction, except for necessary combustion and flue openings. Mechanically ventilated flues shall be independent of the exhaust duct. Natural draft flues shall be provided with draft diverters. All flues shall be constructed of corrosion-resistant material.

(*b*) *Electric.* Electric heating units shall be constructed of materials resistant to the tank contents and shall be constructed and installed so as to prevent hot spots.

(iii) *Thermostatic control.* Every tank shall be provided with two thermostats, one of which shall be connected to control or shut off the source of heat when the contents reach a temperature not higher than 20 degrees Fahrenheit in excess of the boiling point of the solvent in its uncontaminated state and the other of which shall be located above the vapor zone and be adjusted to shut off the source of heat when the temperature in the zone of the thermostat is at the boiling point of the solvent.

(iv) *Condensers.* Tanks shall be equipped with condensing or cooling surfaces consisting of pipes, coils, water jackets or any combination thereof located on at least two sides in the upper portion of the tank above the solvent liquid level. Water, refrigerant or other cooling media shall be circulated through the condenser whenever the tank is in operation.

(7) *Operation.* (i) Where tanks are provided with loading hoists, the hoists shall be designed to raise and lower the work at a speed not greater than 11 feet per minute.

(ii) All products after immersion in solvents shall be held in the vapor zone of the tank and shall not be withdrawn from the tank until the product reaches the vapor temperature as evidenced by the stopping of vapor condensation on the product.

(iii) Loading racks shall be of metal or equally impervious material.

(iv) The horizontal cross section area of product or rack shall not be greater than two thirds of the horizontal cross section area of the tank.

(8) *Cleaning of tanks.* (i) Before cleaning the interior of any tank, the contents shall be drained off and the cleanout doors, if any, shall be opened. All pockets in tanks or pits where vapors may collect shall be ventilated and cleared.

(ii) Every worker engaged in cleaning the interior of any tank in which dangerous air contaminants are present shall be provided with an approved air line respirator or mask unless the work atmosphere is cleared of dangerous air contaminants by mechanical ventilation. A stand-by worker trained to render immediate assistance in an emergency shall be provided during the cleaning operation.

(iii) Floors and platforms around tanks shall be maintained in accordance with Industrial Code Part 16.

(9) *Welding, open flame etc.* No work involving welding, open flame or other sources of ignition shall be done at or about any equipment for open surface tank operations unless such equipment has first been thoroughly cleaned of all flammable or volatile solvents and their vapors or is protected by distance or by shielding against accidental ignition or heating from such work.

(10) *Special precautions for cyanide.* (i) Where rinse, acid and cyanide tanks are so installed and used that any of them may be contaminated with cyanide or acid, such tanks shall be provided with local exhaust ventilation.

(ii) Cyanide tanks shall not be provided with drains or overflows which will allow the tank contents to mix with liquid drained from other tanks either on the floor or in floor drains unless the cyanide drainage has been properly neutralized.

(iii) Cyanide salts shall be stored in a locked enclosure and set above the level of any floor on which acid carboys are stored.

(e) *Tumbling processes.* (1) *General provisions.* Tumbling processes creating dangerous air contaminants shall be provided with means to remove or control such contaminants at the point of generation.

Exception: The above does not apply to mills, drums, cages or barrels which are completely enclosed during rotation and disseminate air contaminants only when being charged or discharged. Means shall be provided to control such contaminants.

(f) *Abrasive blasting operations.* (1) *General provisions.* Abrasive blasting operations creating dangerous air contaminants shall be enclosed as completely as practicable and shall be provided with a local exhaust system to remove the air contaminants.

Exception: Outdoor abrasive cleaning operations where the operator is furnished with and wears an approved air line respirator.

(2) *Operation.* Approved air respiratory protective equipment of the supplied air type shall be used by workers employed in abrasive blasting rooms or tunnels.

(3) *Air supply.* Air furnished to air line respiratory equipment shall be clean.

(g) *Crushing, milling, screening, mixing and conveying.* (1) *General provisions.* Crushing, milling, screening, mixing and conveying and related processes creating dangerous air contaminants shall be enclosed and provided with local exhaust ventilation to remove or control the air contaminants at the point of generation.

(h) *Welding, brazing, flame cutting and metallizing.* (1) *General requirements.* Welding, brazing, flame cutting and metallizing operations creating dangerous air contaminants shall be provided with ventilation to control such contaminants.

(2) *Classes of operations.* Operations involving welding, etc., are divided into the following classes for the purposes of this Part:

Class I—Operations in confined spaces involving toxic metals including but not limited to antimony, beryllium, cadmium, lead, mercury, selenium or tellurium, or involving fluorine or any alloy, compound or flux containing any one or combination thereof of other dangerous air contaminants.

Class II—Operations in confined spaces involving metals, alloys or compounds other than those listed in Class I.

Class III—Operations in unconfined spaces involving metals, alloys or compounds listed in Class I.

Class IV—Operations in unconfined spaces involving metals, alloys or compounds other than those listed in Class I.

(3) *Protection of operators.* (i) *Class I requirements.* Every employee required to work within a confined space where any Class I operation is performed shall be furnished an approved air line respirator or supplied air helmet, and the confined space shall be ventilated at a minimum rate of 1,000 c.f.m. per welder within the enclosure.

(ii) *Class II requirements.* Every employee required to work within a confined space where any Class II operation is performed shall be furnished an approved air line respirator or supplied air helmet, or the confined space shall be ventilated at a minimum rate of 1,000 c.f.m. per welder within the enclosure.

(iii) *Class III requirements.* Every Class III operation shall be provided with local exhaust ventilation.

(iv) *Class IV requirements.* Every Class IV operation at a fixed location as part of a production process shall be provided with local exhaust ventilation where practicable. All other Class IV operations shall be provided with dilution ventilation.

Exceptions: The following Class IV operations are excepted from the above requirements:
1. Spot welding.
2. Operations which are not usual shop practice.
3. Out-of-door operations.

(i) *Exhaust gases from motor vehicles operating in enclosed areas.* (1) *General provisions.* Enclosed areas in which internal combustion motor vehicles are operated and release dangerous air contaminants shall be provided with means to remove or control the fumes, gases or vapors released or disseminated.

12.25 Industrial products coating. (a) *Where performed.* Coating shall be conducted in a ventilated hood, booth or enclosure complying with this Part and section 18.20 of Industrial Code Part 18.

(b) *Heating.* Units used for comfort-heating any space to which this Part applies in which flammable liquids are used, handled or stored shall be confined to the use of low pressure steam or hot water or indirect forced warm air. Direct warm air heating systems may be used subject to approval by the board. Heating units shall be kept free of deposits of flammable compounds.

(c) *Drainage of flammable liquid waste.* Every drainage system which conducts flammable liquid wastes shall be provided with traps. Flammable liquid wastes shall be prevented from entering the plant drainage system.

(d) *Maintenance and operation.* (1) *Maintenance of equipment.* All equipment required by this Part shall be maintained in good repair and proper operating condition.

(2) *Purging.* Exhaust systems shall continue in operation for a sufficient period of time after conclusion of coating operations to clear the air of dangerous air contaminants.

(3) *Floor maintenance.* The floor within and in the immediate vicinity of the working area shall be kept clean and clear of any waste material or any obstruction. Where dust may be created by dry sweeping, floors shall be wet down with a nonflammable wetting agent before sweeping.

(4) *Passage space.* A minimum passage space of three feet shall be provided for access to every working station.

(5) *Containers.* All tanks and containers used for flammable liquids shall be of incombustible material and shall be kept closed whether full or empty, except as may be necessary for operational purposes.

(6) *Transfer of flammable liquids.* The transfer of flammable liquids having a flash point of less than 100 degrees Fahrenheit shall be by means of a hose or pipe leading to the bottom of the vessel being filled. When transferring such liquids from one metal container to any other metal container, the two containers shall be bonded together electrically and be properly grounded.

(7) *Vehicles.* Vehicles shall not be taken into or out of spray coating spaces under their own power, unless the exhaust system is operating.

(8) *Use of different types of coating materials.* Where different types of coating materials are used in the same booth or space, the booth or space shall be thoroughly cleaned of previous coating deposits before commencing the application of the new substance.

(9) *Mixing and thinning.* The mixing or thinning of flammable liquids, when done indoors, shall be done in a hood, booth or similar enclosure provided with ventilation as specified in section 18.20 of Industrial Code Part 18.

(10) *Coating removal by use of solvents.* The process shall be provided with adequate exhaust ventilation while the removal of residue paint or other coating material is being carried on. The rate of ventilation shall be that specified in Industrial Code Part 18.

Note: Use of benzene or carbon tetrachloride for this operation is prohibited.

(11) *Sanding.* Sanding of surfaces containing lead or lead pigment shall be done either with sandpaper wetted with water or in an area provided with an exhaust system providing ventilation at a minimum rate of 150 f.p.m. in the breathing zone of the worker.

(12) *Cleaning solvents.* Flammable liquids used for cleaning permanent surfaces other than floors in a working space shall have a flash point above 100 degrees Fahrenheit. Use of benzene for this operation is prohibited. No flammable liquids shall be used to clean floors.

(13) *Cleaning of hoods and booths.* Exhaust fans and the interior of hoods, booths and ducts shall be maintained free of accumulations of coating material.

(14) *Lining of spray booths.* Material for lining of spray booths or hoods, if used, shall cover the inner sides of the booth or hood without overhanging and shall be maintained in contact with the walls of the booth or hood. Loose sections shall be removed or shall be reapplied to the wall surface.

(e) *Tanks, troughs and mechanical application.* (1) *Enclosed operations.* Enclosed coating or solvent cleaning operations and any subsequent drying operations shall be mechanically ventilated to maintain the concentration of vapors within the enclosure below 25 per cent of the lower explosive level. Necessary work openings of such enclosure shall have an inward air flow maintained by mechanical ventilation.

(2) *Fire protection.* Tanks and troughs containing flammable liquids used for manual dipping operations shall be provided with heat-actuated automatically closing covers arranged so as not to interfere with exhaust ventilation. Where the dipping operation is done automatically the tank and troughs shall be provided with approved fire extinguishing systems.

Note: For additional requirements on fire protection, see section 12.26, *infra.*

(3) *Installation of tanks.* Tanks shall be arranged to prevent accidental tipping.

(4) *Heating of liquids.* Devices used for heating flammable liquids shall be provided with an automatic temperature regulating device so arranged that the source of heat shall be automatically shut off when the temperature of the liquid rises above the normal operating temperature.

(f) *Forced drying and baking.* (1) *Construction.* Ovens, cabinets, other enclosures and duct work used for forced drying or baking systems shall be constructed of incombustible material with expansion joints provided in the oven framing. Duct work shall be provided with two inches clearance or three-fourths inch of incombustible rigid insulation where the duct work passes through combustible walls, floors or roofs. The temperature of surfaces in contact with walls, floors or roofs shall not exceed 160 degrees Fahrenheit. The floor surface of the oven shall be of incombustible material and extend at least one foot beyond the oven outline. Interior surfaces shall be smooth.

(2) *Ventilation.* (i) Ovens, cabinets and other enclosures used for such purpose shall be provided with mechanical ventilation to maintain the concentration of flammable vapors below 25 per cent of the lower explosive level at all times. Ovens shall be exhausted mechanically so that an inward air flow shall be maintained through all openings to prevent escape of dangerous air contaminants. The fans of such exhaust ventilating and any recirculating systems shall be interlocked to the heat supply by means of approved air flow switches, so that the heat supply shall be cut off unless the fan maintains the

required air flow. Conveyors shall be interlocked with the oven exhaust and any recirculating fans so that the conveyors cannot operate unless such fans are operating.

(ii) When persons are required to enter the drying enclosure, the concentration of air contaminants shall be maintained below the danger level by mechanical ventilation.

(3) *Explosion vents.* Ovens located inside buildings and in which flammable vapors or combustible gases may be present in amounts exceeding 25 per cent of the lower explosive level shall be equipped with explosion relief panels to relieve internal explosion pressures. Such vents shall provide an unobstructed aggregate area of one square foot of panel opening to each 15 cubic feet of oven volume, allowance being made for access openings and doors arranged to yield easily to internal pressure. Relief panels shall, if practicable, be located in the top of the enclosure and be made of material other than glass, which shall yield easily to internal pressure. On long ovens, relief panels shall be distributed to provide effective explosion relief. Relief panels shall be located and arranged so as not to create a hazard to employees or to other work spaces. Panel edges shall be maintained free of condensate and other solid material to insure proper operation.

(4) *Controls.* (i) Fan switches shall be interlocked with the fuel valve through a time delay arrangement to assure proper pre-ventilation before the fuel is ignited. Where necessary, enclosure doors shall have a limit switch interlock to prevent the time delay relay from operating unless the enclosure doors are open.

(ii) The fuel supply line shall be provided with a pressure switch to shut off the fuel supply when fuel supply pressure is insufficient. The switch shall not reopen the fuel valve automatically.

(iii) An excess temperature limit switch shall be provided to cut off the fuel supply when oven temperature exceeds the safe limit. The switch shall not reopen the fuel valve automatically.

(iv) Combustion safeguards shall be provided to shut off the fuel supply in the event of pilot light or ignition failure.

(5) *Dampers.* Air supply or exhaust volume control dampers shall be adjusted properly and fixed securely. Dampers shall be designed to prevent full closure.

(6) *Combination booths.* Where coating and forced drying are done alternately in the same booth or enclosure, the following requirements shall be complied with:

(i) during coating operations, the drying apparatus and electrical connections and wiring thereto shall not be located within the coating enclosure nor in any location where coating residue may be deposited thereon, and

(ii) coating apparatus, drying apparatus and ventilating system of the coating enclosure shall be equipped with suitable approved interlocks so arranged that coating apparatus cannot be operated while drying apparatus is inside the coating enclosure and the coating enclosure shall be purged of coating vapors for a period of not less than three minutes before drying apparatus can be energized; the ventilating system shall continue in operation during the drying process and in the event of failure of the ventilating system, the drying apparatus shall shut off automatically.

(7) *Cleaning.* The inside surfaces of the drying enclosure shall be maintained clean. Cleaning tools shall be of nonferrous material.

(g) *Storage.* (1) *Enclosure of storage rooms.* The floor surface of rooms

used for storage of flammable liquids shall be of incombustible material and shall be waterproof. The room enclosure shall be of construction having the following minimum fire-resistive rating:

Walls	1 hour
Doors	¾ hour
Windows	¾ hour
Ceiling (if space above is occupied)	1 hour
Floor	1 hour

(For rules on fire-resistive construction see Industrial Code Part 7.)

(2) *Location of storage rooms.* Storage rooms for flammable liquids shall be located at or above grade and an exterior wall of the building shall form at least one wall of the room. No opening in any storage room shall be located within 15 feet of any stairway, elevator shaft or building exit.

(3) *Floor drainage and door sills.* Floors of storage rooms shall be arranged to provide drainage of liquids and the drain shall be provided with a trap to prevent the spread of fire. Sills of noncombustible material at least six inches high or a six inch deep gutter covered with grating shall be provided at every door leading into a storage room.

Note: See subdivision (c) of this section for drainage requirements.

(4) *Limitation of quantities.* No more than one day's supply or 220 gallons of flammable liquid, whichever is less, shall be kept in a workroom. Such supply, unless kept in closed drums, shall be kept in cabinets as follows:

(i) Cabinets for storing quantities of flammable liquid not exceeding 110 gallons shall be of at least incombustible single wall construction and shall be vented to the outer air.

(ii) Cabinets for storing quantities of flammable liquid of more than 110 gallons but not less than 220 gallons shall be of incombustible double wall construction with an air space of at least one and one-half inches or metal-covered wood construction throughout and shall be vented to the outer air at top and bottom.

(iii) Quantities exceeding 220 gallons shall be kept in a storage room as specified in paragraphs (1) through (3) of this subdivision. Doors to storage cabinets shall be kept closed and latched.

(5) *Container covers.* Containers used for flammable or toxic liquids, whether or not they contain such material, shall be kept tightly covered when not in use or when being moved about.

(6) *Ventilation.* Storage rooms shall be provided with a minimum rate of ventilation of five cubic feet per minute per square foot of gross floor area and the ventilation shall be maintained during transfer from one container to another. Where mixing and thinning operations are performed, the rate of ventilation shall conform to the requirements of section 18.20 of Industrial Code Part 18.

(h) *Electrical equipment.* (1) *Wiring and equipment.* All electric wiring and electric equipment shall be of good quality and be properly installed. Wiring within 10 feet of a working area or within a storage room shall be installed in sealed rigid metal conduit with explosion-proof fittings.

Exception: Coating operations not involving flammable solvents.

(2) *Lighting.* Artificial lighting shall be by electricity. Lamps within areas where flammable liquids may be used or stored or where flammable vapors may be present shall be of the totally enclosed type and shall be protected against

breakage either by location or by lamp guards. Lamp sockets shall be non-metallic shells and of the switchless type. Illumination of hazardous areas through panels of transparent material is permitted only under the following conditions:

(i) Fixed lighting units shall be used as the source of illumination.

(ii) The panel shall effectively isolate the hazardous area from the area in which the lighting unit is located.

(iii) The transparent panel shall conform to subdivision (a) of section 18.20 of the Industrial Code (Part 18).

(iv) The installation shall be such that the normal accumulation of hazardous residue on the exposed surface of the panel will not be raised to a dangerous temperature by heat radiation or conduction from the source of illumination.

(3) *Control equipment.* Switches and other control devices, unless explosion-proof, shall be located at least 10 feet from the working area and outside of storage rooms.

(4) *Other equipment.* All electrical equipment located in a storage room or the interior of coating hoods or their exhaust ducts shall be explosion-proof. Systems designed to salvage deposits by collecting them in flammable solvent shall have the controls so arranged that the solvent pump cannot operate unless the ventilating fan is operating.

(5) *Grouding of equipment.* All mechanical equipment used for the application of flammable liquid and all metal booths, hoods, tanks, troughs, conveyors, fans and motor housings and all belts within a working area shall be grounded effectively.

(l) *Electrostatic apparatus.* (1) *Installation and use.* The installation and use of electrostatic apparatus shall comply with other applicable provisions of this Part and with the following requirements:

(2) *Approval required.* Only approved electrostatic apparatus shall be used.

(3) *Conductive coatings.* This method shall not be used for spraying conductive coatings.

(4) *Hand operations.* Manually operated spray guns or atomizers shall not be used in an electrostatic field.

(5) *Location.* Electrostatic apparatus and devices used in connection with paint spraying, dipping or other coating operations shall have transformers and power packs located outside spray booths or enclosures and areas subject to paint deposit.

(6) *Supports.* Electrodes and electrostatic atomizing heads shall be rigidly supported and permanently installed and shall be effectively insulated from ground.

(7) *Clearance.* Space of at least twice the sparking distance shall be maintained between articles being finished and electrodes, electrostatic atomizing heads or conductors.

(8) *Articles on conveyors.* Articles on conveyors shall be so arranged and supported as to maintain the required clearances.

(9) *Automatic controls.* Electrostatic apparatus shall be equipped with automatic controls arranged to make the entire equipment dead if the ventilation of the spraying or drying area falls below a velocity of 100 feet per minute, or if an article on the conveyor projects into the required clearance, or if the conveyor stops.

(10) *Guarding and isolation of process.* The electrical field and all parts of the equipment carrying high potential shall be located, guarded and fenced off to

provide safe isolation of the process. Guards and fences shall be of conducting material and shall be grounded.

(11) *Signs.* A suitable sign stating the sparking distance shall be posted conspicuously near the assembly. Signs designating the process zone as dangerous by reason of fire and accident hazard shall be posted.

(12) *Insulators.* Insulators shall meet the test standards of the board for insulators for the potential used and shall be maintained clean and dry.

Note: The standards adopted by the board relating to the test requirements of insulators are basically identical with test requirements set forth in C-29.1—September 1944 of the American Institute of Electrical Engineers.

12.26 Fire fighting equipment. (a) *Automatic sprinklers.* An automatic sprinkler system with sufficient heads or outlets shall be provided in all working areas of buildings two stories or more in height where flammable coating liquids are applied or stored.

Note: For sprinkler system requirements see Industrial Code Part 20.

(b) *Automatic extinguishers.* Dip tanks, drain boards, drip pans and drip troughs involving the use of flammable liquids shall be provided with approved automatic fire extinguishers except:

(1) those used in electrostatic finishing;

(2) hand dipping tanks which with their associated drain boards, drip pans and drip troughs have a vapor surface area not greater than 16 square feet.

(c) *Hand extinguishers.* There shall be provided adjacent to the inside or outside of each required exit from the room in which flammable liquids are being applied or stored at least one hand fire extinguisher approved for the control of flammable liquid fires. Extinguishers containing carbon tetrachloride, methyl bromide or other toxic material are prohibited for this usage. In addition there shall be at least one approved extinguisher for each 2500 square feet of floor area so located that a person shall not have to travel more than 50 feet to reach the nearest extinguisher. Extinguishers shall be easily accessible and protected from injury.

12.27 Evidence of dangerous air contaminants. The existence of air contaminants consisting of or deriving from the substances named in the following table in relative quantities greater than those set forth as to each substance shall constitute prima-facie evidence that such contaminants are dangerous air contaminants, except when they exist only momentarily and infrequently. Prima-facie evidence as to whether such contaminants in momentary and infrequent occurrences, or other air contaminants, or lesser concentrations than those set forth in the following table constitute dangerous air contaminants by reason of their existence in quantities tending to injure the health of employees shall include an opinion by a physician to that effect as a matter of sound clinical judgment.

A. GASES AND VAPORS

Substance	*Parts per million*	*Substance*	*Parts per million*
Acetaldehyde	200	Allyl alcohol	5
Acetic acid	10	Allyl chloride	5
Acetic anhydride	5	Allyl propyl disulfide	2
Acetone	1000	Ammonia	100
Acetylene-tetrabromide	1	Amyl acetate	200
Acrolein	0.5	Amyl alcohol (isoamyl alcohol)	100
Acrylonitrile	20	Aniline	5

Substance	Parts per million
Arsine	0.05
Benzene (benzol)	25
Benzyl chloride	1
Bromine	0.1
Butadiene	1000
Butanone (methyl ethyl ketone)	250
Butyl acetate	200
Butyl alcohol	100
Butyl amine	5
Butyl cellosolve	50
Carbon dioxide	5000
Carbon disulfide	20
Carbon monoxide	100
Carbon tetrachloride	25
Cellosolve	200
Cellosolve acetate	100
Chlorine	1
Chlorine trifluoride	0.1
Chlorobenzene (monochlorobenzene)	75
Chloroform (trichloromethane)	50
1-Chloro-1-nitropropane	20
Chloropicrin	0.1
Chloroprene	25
Cresol (all isomers)	5
Cyclohexane	400
Cyclohexanol	100
Cyclohexanone	100
Cyclohexene	400
Cyclopropane	400
Decaborane	0.05
Diacetone alcohol	50
Diborane	0.1
o-Dichlorobenzene	50
Dichlorodifluoromethane	1000
1, 1-Dichloroethane	100
1, 2-Dichloroethane	100
1, 2-Dichloroethylene	200
Dichloroethyl ether	15
Dichloromonofluoromethane	1000
1, 1-Dichloro-1-nitroethane	10
Dichlorotetrafluoroethane	1000
Diethylamine	25
Difluorodibromomethane	100
Diisobutyl ketone	50
Dimethylaniline	5
Dimethylsulfate	1
Dioxane (diethylene dioxide)	100
Ethyl acetate	400
Ethyl acrylate	25
Ethyl alcohol (ethanol)	1000
Ethylamine	25
Ethyl benzene	200
Ethyl bromide	200
Ethyl chloride	1000
Ethyl ether	400
Ethyl formate	100
Ethyl silicate	100
Ethylene chlorohydrin	5
Ethylene diamine	10
Ethylene dibromide	25
Ethylene imine	5
Ethylene oxide	50
Fluorine	0.1
Fluorotrichloromethane	1000
Formaldehyde	5
Furfural	5
Furfural alcohol	50
Gasoline	500
Heptane	500
Hexane	500
Hexanone	100
Hexone	100
Hydrazine	1
Hydrogen bromide	5
Hydrogen chloride	5
Hydrogen cyanide	10
Hydrogen fluoride	3
Hydrogen peroxide (90%)	1
Hydrogen selenide	0.05
Hydrogen sulfide	20
Iodine	1
Isophorone	25
Isopropylamine	5
Mesityl oxide	25
Methyl acetate	200
Methyl acetylene	1000
Methyl acrylate	10
Methyl alcohol	200
Methyl bromide	20
Methyl cellosolve	25
Methyl cellosolve acetate	25
Methyl chloride	100
Methyl chloroform	500
Methyl formate	100
Methyl isobutyl carbinol (methyl amyl alcohol)	25
alpha-Methyl styrene	100
Methylal (dimethoxymethane)	1000
Methylcyclohexane	500
Methylcyclohexanol	100
Methylcyclohexanone	100
Methylene chloride	500
Monomethyl aniline	2
Naphtha (coal tar)	200
Naphtha (petroleum)	500
Nickel carbonyl	0.001
Nitric acid	10
p-Nitroaniline	1
Nitrobenzene	1
Nitroethane	100
Nitrogen dioxide	5
Nitroglycerin	0.5
Nitromethane	100
2-Nitropropane	50
Nitrotoluene	5
Octane	500
Ozone	0.1
Paradichlorobenzene	75
Pentane	1000
Pentanone	200
Perchloroethylene	200
Phenol	5
Phenylhydrazine	5
Phosgene (carbonyl chloride)	1
Phosphine	0.05
Phosphorus trichloride	0.5
Propyl acetate	200
Propyl alcohol (isopropyl alcohol)	400
Propyl ether (isopropyl ether)	500
Propylene dichloride	75
Propylene imine	25
Propylene oxide	100
Pyridine	10
Quinone	0.1
Stibine	0.1
Stoddard solvent	500

(continued)

Substance	Parts per million
Styrene monomer (phenylethylene)	100
Sulfur dioxide	5
Sulfur hexafluoride	1000
Sulfur monochloride	1
Sulfur pentafluoride	0.025
Tertiary butyl alcohol	100
p-Tertiary butyltoluene	10
1, 1, 2, 2-Tetrachloroethane	5
Tetrahydrofuran	200
Tetranitromethane	1
Toluene	200
o-Toluidine	5
Tolylene 2, 4-diisocyanate	0.1
Trichloroethylene	200
Triethylamine	25
Trifluoromonobromomethane	1000
Turpentine	100
Vinyl chloride (chloroethylene)	500
Vinyl toluene	100
Xylene	200
Xylidine	5

B. TOXIC DUSTS, FUMES AND MISTS

Substance	Milligrams per cubic meter
Aldrin	0.25
Ammate	15
Antimony	0.5
ANTU (alpha-naphthyl-thiourea)	0.3
Arsenic	0.5
Barium (soluble compounds)	0.5
Beryllium	0.002
Cadmium (oxide fume)	0.1
Calcium arsenate	0.1
Chlordane	2
Chlorinated camphene (60%)	0.5
Chlorinated diphenyl oxide	0.5
Chlorodiphenyl (42% chlorine)	1
Chlorodiphenyl (54% chlorine)	0.5
Chromic acid and chromates as CrO_3	0.1
Crag Herbicide	15
Cyanide as CN	5
2, 4-D (2, 4-Dichlorophenoxyacetic acid)	10
DDT (2, 2-bis- (p-chlorophenyl-1, 1, 1-trichlorethane)	1
Dieldrin	0.25
Dinitrobenzene	1
Dinitro-o-cresol	0.2
Dinitrotoluene	1.5
EPN (O ethyl o-p-nitrophenyl thiono benzene-phosphonate)	0.5
Ferbam (ferric dimethyl dithiocarbamate)	15
Ferrovanadium dust	1
Fluoride	2.5
Hydroquinone	2
Iron oxide fume	15
Lead	0.2
Lead arsenate	0.15
Lindane	0.5
Magnesium oxide fume	15
Malathion	15
Manganese	6
Mercury	0.1
Mercury (organic compounds)	0.01
Methoxychlor	15
Molybdenum (soluble compounds)	5
Molybdenum (insoluble compounds)	15
Nicotine	0.5
Parathion	0.1
Pentachloronaphthalene	0.5
Pentachlorophenol	0.5
Phosphorus (yellow)	0.1
Phosphorus pentachloride	1
Phosphorus pentasulfide	1
Picric acid	0.1
Pyrethrum	2
Rotenone	5
Selenium compounds (as Se)	0.1
Sodium fluoroacetate (1080)	0.1
Sodium hydroxide	2
Strychnine	0.15
Sulfuric acid	1
TEDP(tetra ethyl dithiono pyrophosphate)	0.2
Tellurium	0.1
TEPP (tetraethyl pyrophosphate)	0.05
Tetryl (2, 4, 6-trinitrophenylmethylnitramine)	1.5
Thallium (soluble compounds)	0.1
Thiram (tetramethyl thiuram disulfide)	5
Titanium dioxide	15
Trichloronaphthalene	5
Trinitrotoluene	1.5
Uranium (soluble compounds)	0.05
Uranium (insoluble compounds)	0.25
Vanadium (V_2O_5 dust)	0.5
Vanadium (V_2O_5 fume)	0.1
Warfarin (3-[alpha acetonyl-bensyl]-4-hydroxycumarin)	0.5
Zinc oxide fume	15
Zirconium (as Zr)	5

C. MINERAL DUSTS

Substance	Million particles per cubic foot*
Aluminum oxide	50
Asbestos	5
Dust (nuisance, no free silica)	50
Mica (below 5% free SiO_2)	20
Portland Cement	50
Silica: Class I (below 5% free SiO_2)	50
Class II (5% to 50% free SiO_2)	20
Class III (above 50% free SiO_2)	5
Silicon carbide	50
Slate (below 5% free SiO_2)	50
Soapstone (below 5% free SiO_2)	20
Talc	20
Total dust (below 5% free SiO_2)	50

*Note: Using the light field low-power method of counting as described in the U. S. Public Health Report 47 No. 12, March 18, 1932, pp. 669-672 or its equivalent, and a standard type impinger or other equivalent instrument for taking atmospheric dust samples.

12.28 Approved devices or materials. Any device or material which the board has approved pursuant to section 27-a of the Labor Law for use in complying with this Part may be so used as if by this Part specifically authorized, any general or special provision of this Part notwithstanding.

12.29 Severability. If any provision of this Part or the application thereof to any person or circumstance is held invalid, such invalidity shall not affect other provisions or applications of this Part which can be given effect without the invalid provision or application and to this end the provisions of this Part are declared to be severable.