

## CHAPTER 20

# MANUFACTURE OF ORGANIC COATINGS

### SECTION 2001 GENERAL

**2001.1 Scope.** Organic coating manufacturing processes shall comply with this chapter except that this chapter shall not apply to processes manufacturing nonflammable or water-thinned coatings or to operations applying coating materials.

**2001.2 Permits.** Permits shall be required as set forth in Section 105.6.

**2001.3 Maintenance.** Structures and their service equipment shall be maintained in accordance with this code and NFPA 35.

### SECTION 2002 DEFINITIONS

**2002.1 Definition.** The following word and term shall, for the purposes of this chapter and as used elsewhere in this code, have the meaning shown herein.

**ORGANIC COATING.** A liquid mixture of binders such as alkyd, nitrocellulose, acrylic or oil, and flammable and combustible solvents such as hydrocarbon, ester, ketone or alcohol, which, when spread in a thin film, convert to a durable protective and decorative finish.

### SECTION 2003 GENERAL PRECAUTIONS

**2003.1 Building features.** Manufacturing of organic coatings shall be done only in buildings that do not have pits or basements.

**2003.2 Location.** Organic coating manufacturing operations and operations incidental to or connected with organic coating manufacturing shall not be located in buildings having other occupancies.

**2003.3 Fire-fighting access.** Organic coating manufacturing operations shall be accessible from at least one side for the purpose of fire control. Approved aisles shall be maintained for the unobstructed movement of personnel and fire suppression equipment.

**2003.4 Fire protection systems.** Fire protection systems shall be installed, maintained, periodically inspected and tested in accordance with Chapter 9.

**2003.5 Portable fire extinguishers.** A minimum of one portable fire extinguisher complying with Section 906 for extra hazard shall be provided in organic coating areas.

**2003.6 Open flames.** Open flames and direct-fired heating devices shall be prohibited in areas where flammable vapor-air mixtures exist.

**2003.7 Smoking.** Smoking shall be prohibited in accordance with Section 310.

**2003.8 Power equipment.** Power-operated equipment and industrial trucks shall be of a type approved for the location.

**2003.9 Tank maintenance.** The cleaning of tanks and vessels that have contained flammable or combustible liquids shall be performed under the supervision of persons knowledgeable of the fire and explosion potential.

**2003.9.1 Repairs.** Where necessary to make repairs involving "hot work," the work shall be authorized by the responsible individual before the work begins.

**2003.9.2 Empty containers.** Empty flammable or combustible liquid containers shall be removed to a detached, outside location and, if not cleaned on the premises, the empty containers shall be removed from the plant as soon as practical.

**2003.10 Drainage.** Drainage facilities shall be provided to direct flammable and combustible liquid leakage and fire protection water to an approved location away from the building, any other structure, storage area or adjoining premises.

**2003.11 Alarm system.** An approved fire alarm system shall be provided in accordance with Section 907.

### SECTION 2004 ELECTRICAL EQUIPMENT AND PROTECTION

**2004.1 Wiring and equipment.** Electrical wiring and equipment shall comply with this chapter and shall be installed in accordance with the *National Electrical Code*.

**2004.2 Hazardous locations.** Where Class I liquids are exposed to the air, the design of equipment and ventilation of structures shall be such as to limit the Class I, Division 1, locations to the following:

1. Piping trenches.
2. The interior of equipment.
3. The immediate vicinity of pumps or equipment locations, such as dispensing stations, open centrifuges, plate and frame filters, opened vacuum filters, change cans and the surfaces of open equipment. The immediate vicinity shall include a zone extending from the vapor liberation point 5 feet (1524 mm) horizontally in all directions and vertically from the floor to a level 3 feet (914 mm) above the highest point of vapor liberation.

**2004.2.1 Other locations.** Locations within the confines of the manufacturing room where Class I liquids are handled shall be Class I, Division 2 except locations indicated in Section 2004.2.

**2004.2.2 Ordinary equipment.** Ordinary electrical equipment, including switchgear, shall be prohibited except where installed in a room maintained under positive pressure with respect to the hazardous area. The air or other media utilized for pressurization shall be obtained from a

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source that will not cause any amount or type of flammable vapor to be introduced into the room.

**2004.3 Bonding.** Equipment including, but not limited to, tanks, machinery and piping, shall be bonded and connected to a ground where an ignitable mixture is capable of being present.

**2004.3.1 Piping.** Electrically isolated sections of metallic piping or equipment shall be grounded or bonded to the other grounded portions of the system.

**2004.3.2 Vehicles.** Tank vehicles loaded or unloaded through open connections shall be grounded and bonded to the receiving system.

**2004.3.3 Containers.** Where a flammable mixture is transferred from one portable container to another, a bond shall be provided between the two containers, and one shall be grounded.

**2004.4 Ground.** Metal framing of buildings shall be grounded with resistance of not more than 5 ohms.

### SECTION 2005 PROCESS STRUCTURES

**2005.1 Design.** Process structures shall be designed and constructed in accordance with the *International Building Code*.

**2005.2 Fire apparatus access.** Fire apparatus access complying with Section 503 shall be provided for the purpose of fire control to at least one side of organic coating manufacturing operations.

**2005.3 Drainage.** Drainage facilities shall be provided in accordance with Section 2003.10 where topographical conditions are such that flammable and combustible liquids are capable of flowing from the organic coating manufacturing operation so as to constitute a fire hazard to other premises.

**2005.4 Explosion control.** Explosion control shall be provided in areas subject to potential deflagration hazards as indicated in NFPA 35. Explosion control shall be provided in accordance with Section 911.

**2005.5 Ventilation.** Enclosed structures in which Class I liquids are processed or handled shall be ventilated at a rate of not less than 1 cubic foot per minute per square foot ( $0.00508 \text{ m}^3/\text{s} \cdot \text{m}^2$ ) of solid floor area. Ventilation shall be accomplished by exhaust fans that take suction at floor levels and discharge to a safe location outside the structure. Noncontaminated intake air shall be introduced in such a manner that all portions of solid floor areas are provided with continuous uniformly distributed air movement.

**2005.6 Heating.** Heating provided in hazardous areas shall be by indirect means. Ignition sources such as open flames or electrical heating elements, except as provided for in Section 2004, shall not be permitted within the structure.

### SECTION 2006 PROCESS MILLS AND KETTLES

**2006.1 Mills.** Mills, operating with close clearances, which process flammable and heat-sensitive materials, such as

nitrocellulose, shall be located in a detached building or in a noncombustible structure without other occupancies. The amount of nitrocellulose or other flammable material brought into the area shall not be more than the amount required for a batch.

**2006.2 Mixers.** Mixers shall be of the enclosed type or, where of the open type, shall be provided with properly fitted covers. Where flow is by gravity, a shutoff valve shall be installed as close as practical to the mixer, and a control valve shall be provided near the end of the fill pipe.

**2006.3 Open kettles.** Open kettles shall be located in an outside area provided with a protective roof; in a separate structure of noncombustible construction; or separated from other areas by a noncombustible wall having a fire-resistance rating of at least 2 hours.

**2006.4 Closed kettles.** Contact-heated kettles containing solvents shall be equipped with safety devices that, in case of a fire, will turn off the process heat, turn on the cooling medium and inject inert gas into the kettle.

**2006.4.1 Vaporizer location.** The vaporizer section of heat-transfer systems that heat closed kettles containing solvents shall be remotely located.

**2006.5 Kettle controls.** The kettle and thin-down tank shall be instrumented, controlled and interlocked so that any failure of the controls will result in a safe condition. The kettle shall be provided with a pressure-rupture disc in addition to the primary vent. The vent piping from the rupture disc shall be of minimum length and shall discharge to an approved location. The thin-down tank shall be adequately vented. Thinning operations shall be provided with an adequate vapor removal system.

### SECTION 2007 PROCESS PIPING

**2007.1 Design.** All piping, valves and fittings shall be designed for the working pressures and structural stresses to which the piping, valves and fittings will be subjected, and shall be of steel or other material approved for the service intended.

**2007.2 Valves.** Valves shall be of an indicating type. Terminal valves on remote pumping systems shall be of the dead-man type, shutting off both the pump and the flow of solvent.

**2007.3 Support.** Piping systems shall be supported adequately and protected against physical damage. Piping shall be pitched to avoid unintentional trapping of liquids, or approved drains shall be provided.

**2007.4 Connectors.** Approved flexible connectors shall be installed where vibration exists or frequent movement is necessary. Hose at dispensing stations shall be of an approved type.

**2007.5 Tests.** Before being placed in service, all piping shall be free of leaks when tested for a minimum of 30 minutes at not less than 1.5 times the working pressure or a minimum of 5 pounds per square inch gauge (psig) (35 kPa) at the highest point in the system.

## SECTION 2008 RAW MATERIALS IN PROCESS AREAS

**2008.1 Nitrocellulose quantity.** The amount of nitrocellulose brought into the operating area shall not exceed the amount required for a work shift. Nitrocellulose spillage shall be promptly swept up and disposed of properly.

**2008.2 Organic peroxides quantity.** Organic peroxides brought into the operating area shall be in the original shipping container. When in the operating area, the organic peroxide shall not be placed in locations exposed to ignition sources, heat or mechanical shocks.

## SECTION 2009 RAW MATERIALS AND FINISHED PRODUCTS

**2009.1 General.** The storage, handling and use of flammable and combustible liquids in process areas shall be in accordance with Chapter 34.

**2009.2 Tank storage.** Tank storage for flammable and combustible liquids located inside of structures shall be limited to storage areas at or above grade which are separated from the processing area in accordance with the *International Building Code*. Processing equipment containing flammable and combustible liquids and storage in quantities essential to the continuity of the operations shall not be prohibited in the processing area.

**2009.3 Tank vehicle.** Tank car and tank vehicle loading and unloading stations for Class I liquids shall be separated from the processing area, other plant structures, nearest lot line of property that can be built upon or public thoroughfare by a minimum clear distance of 25 feet (7620 mm).

**2009.3.1 Loading.** Loading and unloading structures and platforms for flammable and combustible liquids shall be designed and installed in accordance with Chapter 34.

**2009.3.2 Safety.** Tank cars for flammable liquids shall be unloaded such that the safety to persons and property is ensured. Tank vehicles for flammable and combustible liquids shall be loaded and unloaded in accordance with Chapter 34.

**2009.4 Nitrocellulose storage.** Nitrocellulose storage shall be located on a detached pad or in a separate structure or a room enclosed in accordance with the *International Building Code*. The nitrocellulose storage area shall not be utilized for any other purpose. Electrical wiring and equipment installed in storage areas adjacent to process areas shall comply with Section 2004.2.

**2009.4.1 Containers.** Nitrocellulose shall be stored in closed containers. Barrels shall be stored on end and not more than two tiers high. Barrels or other containers of nitrocellulose shall not be opened in the main storage structure but at the point of use or other location intended for that purpose.

**2009.4.2 Spills.** Spilled nitrocellulose shall be promptly wetted with water and disposed of by use or burning in the open at an approved detached location.

**2009.5 Organic peroxide storage.** The storage of organic peroxides shall be in accordance with Chapter 39.

**2009.5.1 Size.** The size of the package containing organic peroxide shall be selected so that, as nearly as practical, full packages are utilized at one time. Spilled peroxide shall be promptly cleaned up and disposed of as specified by the supplier.

**2009.6 Finished products.** Finished products that are flammable or combustible liquids shall be stored outside of structures, in a separate structure, or in a room separated from the processing area in accordance with the *International Building Code*. The storage of finished products shall be in tanks or closed containers in accordance with Chapter 34.

