29CFR 1926.20(b)-Accident Reduction, 29CFR 1926.21- Safety Training & Education Notes 29CFR 1926.20(a)-Unsafe Working Conditions 29 CFR 1910.132-138, the "Personal Protection Equipment" standard. & 20 CFR 1910.134 Subpart I - Personal Protective Equipment **Painting Operations** Preparation 1. Read Applicable Background information and related Company Policy Chapter. 2. Make \_\_\_\_\_ Copies of this Lesson Plan for Personnel 3. Make Transparency, procure transparency pens, etc. 4. Coffee, tea, snacks Material 1. PPE 2. Spray equipment 3. Applicable MSDS Objective By the end of this session, personnel shall be able to describe: 1. Painting Safety Procedures to include: • Pressure Equipment, Ladders & Scaffolding Paint Mixing Housekeeping MSDS • Personal Protective Equipment Personal Hygiene • Air & Water Pollution Prevention • Fire Prevention & Protection • Ventilation System Requirements • Storage And Handling • Electrical Safety 2. Paint Shop And Spray Operations 3. Procedures for the Identification, Removal, & Disposal Of Lead Based Paints, to include: • Identification of Lead Based Paints

Training of PersonnelSafe Work Practices

• Personal Protective Equipment

• Hazardous Waste Disposal

Background	Notes
Painting and paint removal present hazards requiring effective controls. Hazards include exposure to toxic materials and flammable or explosive mists, particulates, and vapors.	
Inhalation of mists and vapors from nearly all paints, solvents, thinners, cleaning chemicals, strippers, and epoxies can be injurious depending upon the agent's toxic characteristics and the amount and method of exposure. Further, many can physically injure the skin and eyes, or be absorbed through the skin.	
Potential physical and health hazards can be effectively controlled by appropriate work procedures, controls, facility design, protective clothing, and equipment.	
Lesson  Painting Safety Procedures	
Pressure Equipment-	
Pressure equipment used in painting operations is hazardous because of the compressed air component; therefore, the Supervisor shall assure that spray painting equipment is in serviceable condition.	
On all air-type spraying equipment a pressure regulator valve shall be installed in the air line between the compressor and painting equipment. A pressure relief valve and a pressure gauge shall be installed between the pressure regulator and pressurized paint containers and/or spray guns. Pressure relief valves shall be set to open at pressures not more than 10 pounds above the required working pressure.	
Other Equipment-	
Painter's ladders, scaffolds, and other equipment shall be inspected prior to use to be certain they are in safe condition.	

#### **Paint Mixing-**

Paint mixing shall be done in designated, adequately ventilated rooms constructed of fire-resistant materials. All sources of ignition shall be prohibited in mixing areas. All electrical fixtures or equipment in or within 20 feet of designated paint preparation areas shall meet the requirements of the National Electrical Code (NFPA #70) for Class I Division 2 locations.

#### Housekeeping-

Good housekeeping is essential to safe operations in paint shops. Paint rooms, booths, etc., shall be kept clean with equipment stored in a proper and orderly manner. All solvent or paint soiled rags shall be placed in approved self-closing metal containers plainly marked to indicate the contents. At the end of each day, these containers shall be emptied or removed to an approved location for pickup and disposal.

#### Health-

#### Personnel Exposures-

There is a wide application of organic solvents in painting. All organic solvents have some effect on the central nervous system and the skin. The principal modes of personnel exposure are inhalation of vapors and skin contact and absorption. Personnel engaged in painting operations should review Material Safety Data Sheets (MSDS) in order to acquaint themselves with the properties and hazards of the solvents that are used. Skin contact with solvents may cause dermatitis, ranging in severity from a simple irritation to actual damage to the skin.

## Protective Equipment-

Personnel engaged in painting and paint removal shall wear protective clothing, respiratory devices if required, and appropriate face, eye, and hand protection. Eye or face protection is required during scraping or paint preparation (abrasive techniques). Clothing shall be changed, as needed, to minimize body contamination.

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Respiratory Protection-	Notes
The Safety and Health Manager should be consulted for specific advice on respiratory protection required for specific painting activities.	
Personal Hygiene-	
The hands and face shall be kept clean, clothes shall be changed when contaminated and hands and soiled objects shall be kept out of the mouth.	
No food or drink shall be brought into, or consumed, in paint shops.	
Personnel shall wash their hands prior to smoking or consuming food.	
Air and Water Pollution-	
Pollution Prevention-	
Painting and paint removal operations can cause air and water pollution problems which can impact the local community. Liquid, solid, and gaseous waste products from painting and paint removal operations shall be disposed of in accordance with federal and state air, water, and solid waste pollution control laws and as specified by the Safety and Health Manager.	
. Spills-	
All spills of flammable or combustible liquids shall be cleaned up promptly. With major spills, remove ignition sources, evacuate, and ventilate the area, and provide appropriate protective equipment to cleanup personnel. These liquids shall not be allowed to enter a confined space, such as a sewer, because of the possibility of an explosion.	

Prev	ention and Protection-	Notes
Fire	Prevention-	
	Painting operations of particular concern are those having a fire potential; i.e., paint removal, solvent wipe and paint application by means of spray apparatus. Certain paints, lacquers, varnishes, shellacs, solvents, and thinners are very flammable. These, for the purpose of control, are classified as being flammable. Solvent materials selected to do the residual clean up, after the initial removal, shall have a flash point of 140 degrees F or above.	
Spra	ny Painting	
	Spray painting presents varying degrees of fire hazards, depending on the materials used. Material having a flash point below 140 degrees will be handled very carefully, and precautions are in order even for those having a flash point higher than this.	
Spri	nklers	
	Fire suppression sprinklers installed in spray finishing areas shall conform to NFPA 13, provisions for extra hazardous occupancy. Dry chemical, carbon dioxide, or halogenated extinguisher systems may be installed where automatic sprinkler protection is not available.	
Exti	nguishers	
	Portable fire extinguishers shall be installed near all paint spraying areas. The Safety & Health Manager shall determine the type of extinguisher that is appropriate.	
ilatio	on Systems-	
Ven	tilation-	
	Ventilation and exhaust systems shall be in accordance with the standard for Blower and Exhaust Systems for Vapor Removal, NFPA 91. Mechanical ventilation shall be in operation while spraying operations are being conducted and for a sufficient time thereafter to assure vapors are completely exhausted. Adequate conditioned make-up air must be	

provided.

latio	n Systems- (continued)	Notes
Fan	Unit	
	The fan-rotating element and its casing shall be non-sparking. Ample clearances shall be provided to prevent friction-caused fire hazards. Fan blades shall be mounted on a shaft rigid enough to maintain alignment when the fan is operating under full load.	
Exh	aust Ducts	
	Exhaust ducts shall be protected against mechanical damage, properly supported, and will normally have a separation of at least 18 inches from combustible materials. Ducts shall be periodically inspected for accumulation of paint deposits and shall be cleaned as needed.	
Exh	aust	
	Air exhaust from spray operations shall be directed so that it will not contaminate make-up air being introduced into the spraying area or other ventilation intakes. Unless the spray booth exhaust duct terminal is from a water-wash spray booth, the terminal discharge point shall be at least 6 feet from any combustible exterior wall or roof.	
Mot	ors	
	Electric motors driving exhaust fans shall not be placed inside booths or ducts. Drive belts shall not enter the duct or booth unless the belt and pulley within the duct or booth are enclosed or guarded.	
ige ai	nd Handling	
orage		
	The quantity of paints, lacquers, thinners, solvents and other flammable and combustible liquids kept near spraying operations shall be the minimum required for operations but shall not exceed 1 day's supply.	

# **Storage and Handling** Notes Storage (continued) Bulk storage of these liquids shall be in a separate building detached from other buildings or in rooms specifically designed and constructed to meet flammable storage room requirements. No storage of open containers of solvents is permitted. Open containers may only be used for cleaning of painting materials after which the solvent shall be transferred back to a closed container for retention or disposal. Supplies of flammable and combustible liquids shall be stored in approved fire-resistant safety containers equipped with flash screens and self-closing lids. Operations involving water base latex paints are exempt from the above requirements. Containers Original closed containers, approved portable tanks, and approved safety cans shall be used for bringing flammable or combustible liquids into spray finishing rooms. Open or glass containers shall not be used. Liquid Transfer The withdrawal of liquids from containers and the filling of containers, including portable mixing tanks, shall be done only in a mixing room or in a spraying area when the ventilating system is in operation. Precautions shall be taken to protect against liquid spillage. Grounding Whenever flammable or combustible liquids are transferred from one container to another, both containers shall be effectively bonded and grounded. This practice prevents electrical

discharge from the accumulation of static charge

because of the transfer process.

Electrical	Notes	
Electrical Wiring		
Electrical wiring and equipment shall conform to the provisions of the National Electrical Code (NFPA 70). Electrical wiring located in spray areas must be rigid metal conduit, Type MI cable, or in metal boxes or fitting containing no taps, splices or terminal connections. There are alternative electrical wiring in options when the location is adjacent to (rather than inside) a spray area (NFPA 33).		
Electrical Equipment		
Electrical equipment outside of, but within 20 feet horizontally and 10 feet vertically, of any spraying area and not separated from it by partitions extending at least to the boundary of the Division 2 location shall be of non-spark producing design. This equipment shall also conform to the provisions of NFPA 70, for Class I or Class I, Division 2 locations as applicable. If spraying operations are confined to an enclosed spray booth or room, the space adjacent to the booth or room shall be considered non-hazardous except for the space within three feet in all directions from any opening in the booth or room.		
Grounding		
All metal parts of spray booths and exhaust ducts conveying flammable or combustible liquids or aerated combustible solids shall be electrically grounded.		
<b>Location of Paint Shops and Spray Finishing Operations</b>	sons of locations	
Paint Shops		
Paint shops may be located in specially constructed rooms if they are separated from other operations by fire resistant walls. Paint shops shall be provided with automatic sprinkler protection. Avoid locating these shops near ignition sources.		

# **Spray Booths** Notes When possible, paint spray booths shall be located in the paint shop. All spray booths shall be installed to conform to NFPA 33. **Prohibited Locations** Spray finishing operations shall not be conducted in a building classified as administrative or public assembly unless a room is specifically designed for that purpose, is protected with an automatic sprinkler system, and is separated vertically and horizontally from such occupancies by not less than two hour fire resistance construction. **Airless Paint Spraying** *Never point an airless spray gun at any part of the body.* Paint can be hypodermically injected into the body by the high operating pressures. Do not disconnect the gun from the fluid hose or the hose from the pump until the pressure has been released from the hose. This is accomplished by first closing off the main line air pressure to the pump and then bleeding off the pressure in the fluid hose by triggering the gun before disconnecting it. When handling the gun but not actually spraying (such as while changing parts or work position), hold the gun by the grip and remove the fingers from the trigger. This will prevent the gun from being activated if the operator should inadvertently tighten his hold due to sipping or stumbling. Guns should be equipped with trigger guards and a safety lock. The lock should be in the non-operating position except when the gun is actually in use.

Check all hose connections and fittings to make sure they are tight and not leaking. The fluid hose must be designed to withstand the high pressure to which it is subjected. The hose, gun, and pressure vessel should be equipped with special fittings that are not interchangeable with low pressure fittings.

s Paint Spraying (continued)	Notes
Check the fluid hose to be sure that there are no weak or worn spots. Make certain the hose does not contact moving parts of machinery, lie over or around sharp edges and corners, or come near objects that would damage it. Check for deterioration caused by exposure to chemicals or ordinary wear and tear. High-pressure leaks from the hose or connections can also cause hypodermic injection.	
Never pass the finger over the gun orifice to clean it, as this will result in hypodermic injection of paint into the finger. Consult the manufacturer's operating manual for cleaning procedures.	
The object being sprayed as well as the spray gun, should be grounded to prevent static electricity from being created. Periodic continuity checks should be performed to ensure the hose ground wire is intact.	
The operator shall wear eye protection and gloves to guard against accidental contact with the spray. Respiratory protective equipment shall be worn if exhaust ventilation is not available. The Office of Health and Safety shall be contacted to determine appropriate protective equipment needed for the operation.	
Spray Booths	
Extinguishers	
Provide portable fire extinguishers adequate to handle the most flammable of the coating materials being used. The Safety and Health Manager shall be consulted for appropriate extinguishers needed.	
Floor Covering	
It is desirable that the floor of paint spray booths be covered with a non-combustible mat, removable for cleaning or disposal.	

Hos	ses and Couplings	Notes
	Pressure hoses and couplings shall be regularly inspected for condition and shall be replaced as needed. When positive displacement pumps are used, a relief valve shall be installed in the discharge line to prevent over-pressure.	
Por	table Paint Spray Equipment	
	Description	
	Such equipment consists of an air compressor, paint spray gun and hose. The paint reservoir on most portable spray guns holds one quart of fluid or less. When a considerable amount of paint is to be applied, a 2 ½ or 5 gallon pressure tank is usually employed.	
	Compressor	
	The air compressor shall be equipped with an ASME rated air tank, a visible pressure gauge on the tank, a pressure reducer with its own gauge, a guard fully enclosing the drive belt and pulleys, and a pressure limiting switch to shut down the compressor when the system's working pressure has been reached. The equipment should be securely mounted on a wheeled carriage for portability. For interior painting only electric motor-driven equipment shall be used.	
	Over-pressure Protection	
	When separate paint pressure tanks are used, they shall be equipped with a gauge and a relief valve to prevent over-pressure. Hoses shall be rated for the maximum working pressure of the system.	
	Maintenance	
	A preventive maintenance program shall be implemented to cover periodic inspection and testing of all components.	
	Storage of compressors, hoses, paint pressure tanks and spray guns shall be in areas designated and approved by the supervisor in conjunction with the Office of Health and Safety.	

rosol Spray Paint Cans	Notes
The same general safety and health precautions apply to spray painting from pressurized cans as to spray painting by other means. The following specific items are noted:	
Storage	
Pressurized cans of spray paint are to be considered flammable materials and stored in appropriate locations.	
Office desks are not to be used for the storage of pressurized cans of spray paint.	
Office store rooms are not to be used for the storage of pressurized cans of spray paint unless the storage area has been designated safe for the storage of flammable materials by the Office of Health and Safety.	
Disposal	
Disposal of malfunctioning paint spray cans still containing paint under pressure shall be in accordance with the Office of Health and Safety hazardous waste disposal procedures.	
Office waste cans shall not be used for the disposal of cans of spray paint nor for the disposal of wiping rags and other waste material.	
Disposal of wiping rags and other waste materials shall be in self-closing metal containers labeled to indicate the contents.	
Protective Equipment	
e same general rules governing the use of personal protective ipment apply to painting with pressurized cans.	

# <u>Procedures For the Identification, Safe Removal, and</u> Disposal of Lead-Based Paints

Due to the potential exposure of personnel to lead released during abatement of lead-based paint, the following procedures shall be adopted in order to reduce the possibility of human exposure and contamination of the environment.

#### 1) Identification of Lead-Based Paints

Lead-based paints may have been used in the past in Company buildings. The presence of lead on existing painted surfaces shall be determined by sequential use of the following methods:

First, knowledge by painters, maintenance personnel, or contractors of a specific paint that has been applied where the manufacturer's Material Safety Data Sheet documents there is greater than 1% lead in the paint.

Second, all "red or rust-colored", and gray primer coats are assumed to contain lead.

Third, presence of lead as determined by "lead swabs" or any other direct reading procedure or instrument.

Fourth, analysis by a contracted analytical laboratory by the AIHA Environmental Lead Laboratory Accrediation Program.

## 2) Training of Personnel

The Federal EPA is proposing the establishment of specific disciplines and training for lead-based paint activities. The disciplines to be established are: Inspector Technicians, Inspector/Risk Assessors, Workers, and Supervisors. Additionally, numerous OSHA requirements govern the activities associated with lead exposure.

To that end, prior to involvement in lead removal activities, Notes successful completion of the following training must be documented: OSHA hazard communication training specific to lead & any hazardous materials used during the paint removal process. Respiratory protection training and fit testing. Maintenance supervisors responsible for causing the removal of lead-based paints should attend an accredited lead abatement course for supervisors. Hazardous waste training pursuant to 40 CFR 265.16 & 262.34. **Work Practices-**Interior building surfaces-All work areas where paint removal or scraping is to be conducted must be sealed off from other work areas. This step includes placing barrier tape across all access areas to the work site and taping 6-mil plastic over all vents, doorways, windows, and other openings into the work site. Personnel shall be instructed not to grind or sand painted areas known to contain lead. Hand scraping is permitted. The work area shall be cleaned periodically during the day by using a combination of a HEPA-filtered vacuum and wiping down the area using damp cloths. Exterior building surfaces When removing lead-containing paint from the exterior of Company buildings, the following occupational health/ environmental guidelines shall be followed: Special precautions shall be taken when working near air intakes, doors, & windows. Air intakes shall be protected by construction of a wood frame & plastic sheeting barrier & shall be of such a size to ensure that air is pulled from uncontaminated areas. Door & windows shall remain closed & shall be sealed with duct tape and/or plastic sheeting.

Physical barriers shall be set up around the work area to

prevent pedestrian traffic through the work site.

When removing lead-containing paint from the exterior of Company buildings, the following occupational health/environmental guidelines shall be followed:

Loose and flaking paint should be removed by manually scraping the surfaces of the building. Sanding or grinding will not be permitted.

A drop cloth shall be placed directly and completely under the work area. Paint chips shall be collected periodically throughout the day and at the end of the work day and shall be placed in a container with a tight fitting lid or sealed in a plastic bag (6-mil).

#### Abrasive blasting units-

Removal of paints containing lead or other heavy metals must be conducted in a sealed abrasive blasiting unit equipped with a high efficiency particulate air (HEPA) filter.

The abrasive blasting media should be used to its fullest extent prior to disposal.

Institute the protective measures listed below when cleaning out an abrasive blasting unit.

#### General Practices-

Personnel shall remove contaminated clothing prior to leaving the work site for breaks, lunch, and at the end of the work day.

All surfaces shall be maintained as free as practicable of accumulation of lead-based paint debris.

All waste materials, including used disposable clothing, respirator cartridges, plastic, etc. shall be placed in a plastic bag or other container as appropriate and sealed.

All tools and equipment used on the project shall be wetwiped prior to removal from the work site.

After the waste containers are sealed, the outside of the container shall be wiped off for any residual dust that may be present prior to being taken off-site for disposal.

#### **Protective Measures**

All personnel shall wear respiratory protection (half-mask, dual cartridge with HEPA filters, as a minimum) and full-body disposable clothing. Personnel shall have a current (<6 months) medical clearance to wear a respirator and have been fit-tested with their respirator.

Personnel shall also be provided and instructed to wear face shield or vented goggles, gloves, head coverings, and disposable shoe coverlets.

Personnel are not permitted to eat, drink, or smoke in or near the work area.

Personnel shall be instructed to wash their face and hands before eating, drinking or smoking and before leaving the work area for breaks or lunch.

All personnel involved in lead-based paint removal shall shower at the end of the shift before going home to prevent contamination of their vehicle and exposure of family members and others to lead-containing dust.

The Safety and Health Manager requires that paint removal personnel participate in the personal air monitoring program in order to determine their potential exposures to lead dust. The results of this monitoring will also be used to determine if personnel need to be enrolled in a medical surveillance program for lead. Contact must be made with Safety and Health Manager prior to the start of the project to coordinate the sampling effort.

Host Contractors are responsible for meeting OSHA personnel air monitoring, personal protective equipment, and medical surveillance requirements for lead exposures (29 CFR 1910.1025, or 29 CFR 1926.62, as appropriate).

## Hazardous Waste Disposal

The Safety and Health Manager shall be contacted prior to the initiation of a lead-based paint removal project. The Safety and Health Manager will dispose of hazardous wastes generated by in-house maintenance personnel only

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#### **Hazardous Waste Disposal**

The Safety and Health Manager shall be contacted prior to the initiation of a lead-based paint removal project. The Safety and Health Manager will dispose of hazardous wastes generated by in-house maintenance personnel only. Contractors are responsible for disposing of all waste materials that they generate in the course of their work/contract obligations. Specific wastes generated during lead-based paint removal can include, but is not limited to:

- Paint chips/dusts
- •Solvents used to remove paints
- •Media using in abrasive blasting units

#### Other Wastes

Materials known to have been painted with a lead-based paint such as scrap metal (old filing cabinets, HVAC ducts, etc.) should be turned in for recycling. Contact the Safety and Health Manager if there are any questions on disposal of other materials.

Closure

Remember, inhalation of mists and vapors from nearly all paints, solvents, thinners, cleaning chemicals, strippers, and epoxies can be injurious depending upon the agent's toxic characteristics and the amount and method of exposure. Also, many can physically injure the skin and eyes, or be absorbed through the skin.

What questions do you have?

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