



Legal Compliance of Paint Mix Room in Car Manufacturing Plant

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Abstract:

Car manufacturing plant has multiple processes and using multiple energy sources like mechanical, electrical, hydraulic, chemical, pneumatic and water. Employees are working under all above environment. So they are having more working hazards. How was controlled working hazard? And safe work practices? That's why I choose a car manufacturing plant. It has main hazard of this plant is paint shop. In a car manufacturing plant, paint shop has a full of chemical process. It is a very high risk & very hazardous atmospheric area. In Paint Mix Room (PMR) is the heart of the paint shop, it is a critical & very high risk process were done. In order to strengthen the requirements of PMR study was recommended suitable control measures.

Keywords: hazards, car manufacturing plant, paint shop

I INTRODUCTION

The State of Delaware enacted a Hazardous Chemical Information Act in July, 1985. This act provides students and employees access to information regarding hazardous chemicals to which they may be exposed either during their normal employment activities or during emergency situations. Be sure that you read The Safety Department "Hazardous Material Safety Manual" and that you receive "Right To Know" training before using any laboratory facility.

Labeling:

Label all chemicals in the laboratory with permanent labels. The label includes the primary hazard associated with the chemical (e.g., flammable, toxic), the full chemical name, manufacturer and date opened. Triple rinse chemical reagent, salt and solvent bottles before discarding in the broken glass container, even if the bottle is intact. Recycle brown glass bottles after the triple rinse by removing the label or crossing out the chemical name and warning with a black marker.

Protective Equipment:

Wear face shields and rubber gloves when concentrated acids are poured. Wear personal protective equipment (PPE) when any highly reactive or toxic chemicals are handled, such as elemental sodium or cyanide. The Chemical Hygiene Plan requires that appropriate PPE is used when handling toxic chemicals, carcinogens, reproductive toxins or chemicals with unknown toxicity. Use the Hyper CPC Stacks database on the Macintosh Lab file server to help you select the best make and model of gloves and protective clothing to meet a challenge from a specific solvent or toxic chemical.

Barrier:

You may need engineering controls in addition to a fume hood to keep a barrier between you and the process. These include closed reactor or gas control systems of glass or stainless steel, glove bags, glove boxes, steel or polycarbonate barricades. Use a laboratory hood as an engineering control with flammable solvents, toxic gases and chemicals, reproductive toxins or known or suspect carcinogens. It may be recalled that the best ventilating efficiency is attained with the hood

sash closed. Keeping all items 6 inches behind the sash line and minimizing the quantity of equipment within the hood area will greatly improve its exhaust effect. The operating condition of a hood should be determined before the hood is put to use; be certain that the Magnehelic gage shows a positive reading before the hood is used. In case the hood is not operational, close the hood sash, call Plant Operations at extension 1141 and notify the lab coordinator immediately.

Storage:

All chemicals must be organized and stored on shelves or in cabinets where they will not be knocked over. One way to organize chemicals is to store organics by number of Carbon atoms (not by alpha sort) and separate from inorganics, which should be stored in alphabetical order.

Flammable solvents:**Properties of flammable liquids**

Flash Point: Temperature at which the vapor pressure is sufficient to form an ignitable vapor mixture with the air.

Ignition Temperature: Minimum temperature required to cause self-sustained combustion.

Table.1. Classification:

S.NO	CLASSES LIQUID	OF	FLASH POINT
1.	Class IA		below 73°F and below 100°F
2.	Class IB		Below 73°F and above 100°F
3.	Class IC		between 73°F to 100°F
4.	Class II		between 100°F to 140°F
5.	Class IIIA		between 140°F to 200°F
6.	Class IIIB		above 200°F

REACTIVE CHEMICAL HAZARDS:

Untrained individuals (Engineers doing Chemistry) attempting organic synthesis and other reactions, who are not absolutely

confident of the stability or toxicity of their intermediate products and end products must always seek advice from knowledgeable colleagues or from the literature before proceeding. (Example: nitro methane will detonate at its critical temperature).Your procedures require a laboratory hazard review if you plan to use pyrophoric (chemicals that ignite on exposure to air), shock sensitive materials (asides and other nitrogen-containing materials) and potentially exothermic reactions.

II COMPANY OVERVIEW



COMPANY PROCESS:



- 1.BLANKING 2. STAMPING 3. BODY SHOP 4. PAINT SHOP
- 5. TRIM CHASIS & FINAL PLANT 6.ENGINE ASSEMBLY PLANT
- 7. PAINT MIX ROOM 8.SOLVENT STORAGE AREA

COMPANY PROCESS IN IMAGES:

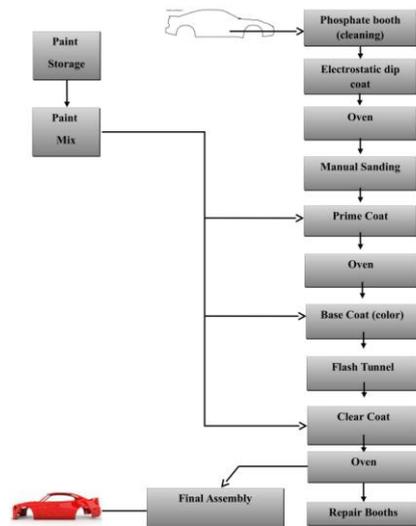


3. MANAGING HAZARD IN WATER JET MACHINE

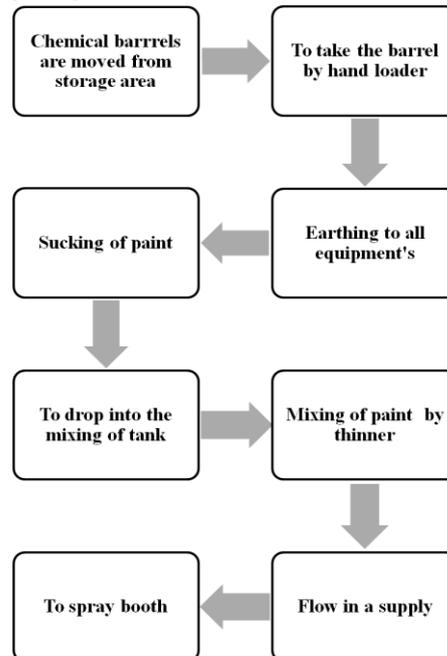
PAINT SHOP:

The objective of painting is to form a coating film on the surface of an object in order to protect the object and give a fine appearance. Painting may also have other special functions. There are various types of painting methods, and spray painting is currently used in many types of industrial painting. In the painting operation, various types of painting methods are used according to the shape, size, quality, and quantity of the object(s) to be painted. The “transfer efficiency” differs, in other words, the ratio of the quantity of the coated film formed on the object to the quantity of the paint sludge generated from overspray differs according to the Differences in these operational conditions.

PAINT SHOP PROCESS



PAINT MIXING ROOM (PMR) PROCESS & SOLVENT STORAGE AREA:



PAINT MIX ROOM:

The amount of flammable or combustible liquid stored in the paint mixing room must be within the following limits. Paint mixing rooms within 6' of the spray area may contain up to two (2) litres per square foot of enclosure floor area but may

not exceed 60 litres. paint mixing rooms further than 6' from the spray area may contain up to two (2) litres per square foot of enclosure floor area but may not exceed 300 litres. Paint Mix Rooms are engineered for two distinct purposes; to control contamination, and to remove harmful fumes during the mixing process. This allows for a higher quality finish and a safe work environment, which is vital to the success of your business. GFS offers Paint Mix Rooms in multiple configurations and they can be connected to certain types of paint booths for direct entry.

III. LIST OF CHEMICALS USED AT PAINT MIX ROOM

S.N O	CHEMICAL NAME	FLASH POINT	CHEMICAL CLASSES
1	THINNER T - 829	15°C	A
2	WHITE PRIMER - 3 Wet High Solids	23°C	A
3	DCT DIAMOND WHITE BASECOAT	17.22°C	A
4	HIGH BAKE REPAIR PRIMER -DPX 1828	20°C	A
5	3 WET HS BC KINETIC BLUE	18.89°C	A
6	MEDIUM GREY PRIMER - 3 Wet High Solids	23°C	A
7	WIPING SOLVENT CLEAR	-18 to 23°C	A
8	3 WET HS BC SUNSET	23 to 37.8°C	B
9	TMAC - 8000 - 3 Wet High Solids Clear Coat	25°C	B
10	ED TOUCH UP THINNER	24°C	B
11	3 WET HS BC GOLDEN BRONZE	23 to 37.8° C	B
12	METALLIC BC PANTHER BLOCK	24°C	B
13	3 WET HS BC SMOKE	23 to 37.8° C	B
14	BUTYL GLYCOL ACETATE	74 to 88° C	C
15	FLOW CONTROLLER NT	37.85°C	B
16	METALLIC BC XSC 2431 MOONDUST	24°C	B
17	THINNER T - 795	24°C	B
18	THINNER T - 831	38°C	B
19	THINNER T - 830	27°C	B

IV. PETROLEUM ACT 1934 & PETROLEUM RULES 2002

PETROLEUM ACT 1934

Approval of containers:

Containers exceeding one liter in capacity for petroleum Class A and five liters in capacity for petroleum Class B or petroleum class C shall be of a type approved by the Chief Controller. Where the approval of the Chief Controller is sought to a type of container not previously approved, an application together with copies of drawings thereof to scale showing the design, materials to be used, the method of construction and capacity of the container together with two samples containers and a fee of rupees one thousand for scrutiny shall be submitted to the Chief Controller. Nothing in sub-rules (1) and (2) shall apply to containers in the possession of the Defense forces of the Union.

Containers for petroleum Class A:

Containers for petroleum Class A shall be constructed of tinned, galvanized or externally rust proofed sheet iron or steel and are of a type approved by the Chief Controller:

Provided that glass bottles of a capacity not exceeding 2.5 liters and of a type approved by Chief Controller can be used as a container for laboratory chemicals classified as petroleum Class "A". The containers shall be so constructed and secured as not to be liable except under circumstances of gross negligence or extraordinary accident to become defective, leaky or insecure in transit and they shall be kept in proper repair. The containers shall have well-made filling aperture which shall be fitted with well-fitting and secure airtight screw plugs or screw caps or other caps. The capacity of any container, other than those approved by the Chief Controller for specific purposes, shall not exceed 300 liters. An air space of not less than 5 percent of its capacity shall be kept in each container. The container shall bear a stamped, embossed or painted warning exhibiting inconspicuous characters the words "Petrol" or "Motor Spirit" or an equivalent warning of the highly inflammable nature of the petroleum. Nothing in sub-rules (1), (3), (4), (5), (6) and (7), shall apply to containers in the possession of the defense Forces of the Union.

Containers for petroleum Class B and Class C:

Containers for petroleum class B or petroleum class C shall be constructed of steel or iron and are of a type approved by the Chief Controller. An air space of not less than 5 percent of its capacity shall be kept in each container for petroleum Class B and not less than 3 percent of its capacity in each container for petroleum Class C. Nothing in this rule shall apply to containers in the possession of the Defense Forces of the Union.

V. THE PETROLEUM RULES, 2002 STORAGE OF PETROLEUM REQUIRING LICNECE

License for storage:

Save as provided in sections 7, 8 and 9 of the Act, no person shall store petroleum except under and in accordance with a license granted under these rules. Provided that no license shall be necessary.- For the storage of petroleum in well-head tanks; or For the storage of petroleum as transit cargo within the limits of a port subject to such conditions as may be specified by the Conservator.

Precautions against fire:

No person shall smoke in any installation, storage shed or service station saves in places specifically authorized by the licensing authority for the purpose. No person shall carry matches, fuses or other appliances capable of producing ignition or explosion in any installation or storage shed, which is used for the storage of petroleum. No fire, furnace or other source of heat or light capable of igniting inflammable vapor shall be allowed in any installation, storage shed or service station save in places specially authorized by the licensing authority for the purpose. An adequate number of portable dry chemical powders or any other fire extinguisher capable of extinguishing oil fires shall always be kept in every storage shed and small class B or C installations at strategic point and all persons employed at such locations shall be conversant with the use of such fire extinguishers. Scale of firefighting provided in other areas of installation should be asper the requirement given in OISD Standard -117 for all installations approved by the Chief Controller after publication of the original standard OISD-I17. For Installations existing prior to the publication of this standard the firefighting facilities shall be improved to the extent feasible (keeping this standard in mind)and approved by the Chief Controller.

Supervision of operations within an installation, service station or storage shed:

All operations within an installation, service station or storage shed shall be conducted under supervision of an experienced responsible agent or supervisor who is conversant with the terms and conditions of the license held for the installation, service station or storage shed as the case may be and those persons should have proper safety training.

Cleanliness of installation, service station or storage shed:

The ground in the interior of an installation or service station and the protected areas surrounding any installation, service station or storage shed shall be kept clean and free from all vegetation, waste material and rubbish.

Drainage:

All enclosures surrounding above ground tanks in an installation shall be provided with proper drainage facilities in such a way that no water is allowed to accumulate in the enclosures. No part of the enclosure referred to in sub-rule (1) shall be below the level of the surrounding ground within the protected area. Where drainage is affected by means of a pipe, the pipe shall be fitted with a valve which is capable of being operated from the outside of the enclosure or with any other arrangements approved in writing by the Chief Controller. All valves and other opening for draining off water shall be kept closed except when water is being drained off. The nature of the drainage arrangements and the position of all openings and valves therein shall be shown in the plan submitted with the application for a license.

Exclusion of unauthorized persons:

The protected area surrounding every installation and storage shed shall be surrounded by a wall or fence of at least 1.8 meters in height. In case of service station 1.2 meter high boundary wall or fence on sides other than the drive way shall be provided. Precautions shall be taken to prevent unauthorized persons from having access to any storage shed or installation.

Petroleum only to be stored:

No installation, service station or storage shed shall, without permission in writing from the Chief Controller is used for any purpose other than the storage and distribution of petroleum and for purpose directly connected there with.

Prior approval of specifications and plans of premises proposed to be licensed:

Every person desiring to obtain a license to import and store petroleum in Form XIV, Form XV, Form XVI or in Special Form, as the case may be, shall submit to the licensing authority an application along with- Specification and plans drawn to scale in duplicate clearly indicating. The manner in which the provisions prescribed in these rules will be complied with; The premises proposed to be licensed, the area of which shall be distinctly colored or otherwise marked. The surroundings and all protected works lying within 100 meters of the edge of all facilities which are proposed to be licensed; The position, capacity, materials of construction and ground and elevation view of all storage tanks, enclosures around tanks, all valves, filling and discharge points, vent pipes, dip pipes, storage and filling sheds, pumps, fire-fighting and all other building and facilities forming part of the premises proposed to be licensed; The areas reserved for different class of petroleum including petroleum exempted under section 11 of the Act; and A scrutiny fee of rupees four hundred paid in

the manner specified in rule 13. If the Chief Controller, after scrutiny of the specification and plans and after making such enquiries as he deems fit, is satisfied that petroleum may be stored in the premises proposed to be licensed, he shall return to the applicant one copy each of the specifications and plans signed by him conveying his sanction subject to such conditions as he may specify.

Pumping:

No internal combustion engine or electric motor in an installation shall be used for driving pumps for pumping petroleum save in a pump house or pumping area specially constructed for the purpose and approved by the Chief Controller.

VI. STORAGE OF PETROLEUM CLASS "C" NOT REQUIRING A LICENSE**Application:**

The provisions of this chapter shall apply to petroleum Class C stored otherwise than under a license as provided in section 7 of the Act but shall not apply to petroleum Class C in the possession of the Defense Forces of the Union. The provisions of Chapter V shall not apply to petroleum Class C permitted to be stored without a license under section 7 of the Act.

Restriction of Storage:

Petroleum Class C shall not be stored together with any other class of petroleum except under and in accordance with a license granted under these rules.

Storage of exempted Petroleum Class C in bulk:

Petroleum Class C in bulk shall be stored in a tank constructed of iron or steel or any other material approved in writing by the Chief Controller. The tank referred to in sub-rule (1) shall be properly designed and erected and the tank with all its fittings shall be so constructed and maintained as to prevent any leakage of petroleum. All tanks of capacity exceeding 5,000 liters for the storage of petroleum Class C shall be surrounded by an enclosure wall or placed inside a pit, so constructed and maintained as to be able to contain without leakage the maximum quantity of petroleum capable of being contained in largest tank within such enclosure or pit. A drainage pipe with a valve capable of being actuated from outside the enclosure wall shall be provided in the enclosure or pit referred to in sub-rule (3) and the valve shall be kept closed. A distance of not less than 1.5 meters shall be kept clear between protected works and the edge of such enclosure wall or pit.

Storage of Petroleum Class C in non-bulk:

Petroleum Class C which is not in bulk shall, if the quantity at any one time exceeds 2,500 liters be stored in a storage shed of which either. The doorways and openings shall be built up to a height of 30 centimeters above the floor, or The floor shall be sunk to a depth of 30 centimeters.

Prior report of storage of Petroleum Class C:

Every person intending to store petroleum Class C in quantity exceeding 5000 liters otherwise than under a license shall submit the following to the Chief Controller before commencing storage- plans drawn to scale of the storage facilities showing compliance of rule 138 and site plan of the storage premises and surroundings up to 100 meters identifying the locations of premises; and A scrutiny fee of rupees five hundred.

VII. FACTORIES ACT AND RULES

Storage of flammable liquids:

The quantity of flammable liquids in any work room shall be the minimum required for the process or processes carried on in such room. Flammable liquids shall be stored in suitable containers with close fitting covers. Provided that not more than 20 liters of flammable liquids having a flash point of 21 degrees centigrade or less shall be kept or stored in any work room. Flammable liquids shall be stored in closed containers and in limited quantities in well ventilated rooms of fire resisting construction which are isolated from the remainder of the building by fire walls and self-closing fire doors. Large quantities of such liquids shall be stored in isolated adequately ventilated building of fire resisting construction which is isolated from the remainder of the building by fire walls and self-closing fire doors. Effective steps shall be taken to prevent leakage of such liquids into basements, sumps or drains and to confine any escaping liquid within safe limits.

Accumulation of flammable dust, gas fume or vapor in air or flammable waste material on the floors:

Effective steps shall be taken for removal or prevention of the accumulation in the air of flammable dust, gas, fume or vapor to an extent which is likely to be dangerous. No waste material of a flammable nature shall be permitted to accumulate on the floors and shall be removed at least once in a day or shift, and more often, when possible. Such materials shall be placed in suitable metal containers with covers wherever possible.

Fire exits:

"horizontal exit" means an arrangement which allows alternative egress from a floor area to another floor at or near the same level in an adjoining building or an adjoining part of the same building with adequate separation; and "Travel distance" means the distance an occupant has to travel to reach an exit. An exit may be a doorway, corridor, passageway to an external stairway or to a verandah or to an internal stairway segregated from the rest of building by fire resisting walls which shall provide continuous and protected means of egress to the exterior of a building to an exterior open space. An exit may also include a horizontal exit leading to an adjoining building at the same level. Lifts, escalators and revolving doors shall not be considered as exits for the purpose of this sub-rule. In every room of a factory exits sufficient to permit safe escape of the occupants in case of fire or other emergency shall be provided which shall be free of any obstruction. The exits shall be clearly visible and suitably illuminated with suitable arrangement, whatever artificial lighting is to be adopted for this purpose, to maintain the required illumination in case of failure of the normal source of electric supply.

VIII. HANDLING & STORAGE

Flammable and combustible liquids are present in nearly every workplace. Gasoline, diesel fuel, and many common products like solvents, thinners, cleaners, adhesives, paints, and polishes may be flammable or combustible. Flammable and combustible liquids play a part in our lifestyle. However, if used or stored improperly, serious fires and death may occur. This article discusses flammable and combustible liquid terminology, handling, and storage practices. The applicable standard is 29 CFR 1910.106–Flammable Liquids, which is based upon the 1969 version of 30 Flammable and Combustible Liquids Code. However, it is important to note that in 2012, in response to revised Hazard Communication

standard (due to incorporation of the Globally Harmonized System [GHS]), revised 29 CFR 1910.106. The title of 29 CFR 1910.106 has been changed from “Flammable and Combustible Liquids” to “Flammable Liquids.” One significant change is the revised regulation lists liquids as “categories” rather than “classes.” However, the 2012 Edition of 30 has not been revised to reflect GHS guidelines. For instance, 30 continue to use the term flammable and combustible liquid and refer to “classes” of liquids. If you are covered by, you must comply with 29 CFR 1910.106 – Flammable Liquids. As a best practice, however, it is recommended that you review both 1910.106 as well as 30 and comply with the standard providing the highest level of protection.

IX. GAP ANALYSIS

TOTAL NO.OF.ITEMS CHECKED	NO.OF LINE ITEMS COMPL IED	NO.OF. LINE ITEMS NOT COMPLIED
55	51	4

X. RECOMMENDATION

This project study was carried out in Ford India for to check the legal compliance of Paint Mix Room with respect to the above prepared checklist. The below listed gaps were identified and same needs to be installed for 100% compliance.

- Scupper
- Trench
- Busbar
- Vapour Detector

XI. CONCLUSION

By installing the Scupper, Trench, Busbar and Vapour detection system in the PMR makes the environment safer. It results 100% legal compliance, reduce fire hazard and improves morale of the industry.

XII .REFERENCE

- [1]. The Petroleum Act,1934
- [2]. The Petroleum Rules,2002
- [3]. The Tamilnadu Factories Act,1948
- [4]. The Tamilnadu Factories Rules,1950
- [5]. Manufacturing, Storage and Import Hazardous Chemicals Rules 1989
- [6]. Ford Bulletin **18.01** Bonding & Grounding
- [7]. Ford Bulletin **18.02** Protection of flammable and combustible storage areas
- [8]. Ford Bulletin **18.03** Protection of flammable and combustible liquid mixing and dispensing rooms