



## FIRE CODE ANALYSIS

### RED DOT MANUFACTURING FACILITY PUYALLUP, WASHINGTON

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**Prepared for:** Red Dot Manufacturing

**Prepared by:** Julie E.B. Brown  
Senior Fire Protection Engineer  
Coffman Engineers

Revision History		
Revision	Date	Description of Revision
R0	04-06-2023	Submittal to City of Puyallup
R1	06-13-2023	Modifications to protection requirements for the powder coat ovens.

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## 1 Project Description

The project involves the relocation of the Red Dot manufacturing plant to an existing shell building in Puyallup, Washington that will have space for their industrial processing and storage needs in order to create and test HVAC systems for gas powered vehicles. Because the industrial manufacturing facility involves the processing and storage of hazardous materials, a fire code analysis has been conducted to document the code requirements to provide a compliant building.

The building is approximately 196,000 square feet in area and provides space for industrial manufacturing processes, high-piled storage, offices, a vehicle testing chamber, and support spaces. The industrial manufacturing processes will be broken down in more detail throughout the report, however they include powder coatings, industrial ovens, hot work, and processing and storage of hazardous materials. This report will describe the various code requirements as they relate to the known materials, processes, and uses within the new facility.

## 2 Applicable Codes

- Washington State Building Code - 2018 WSBC
- Washington State Fire Code - 2018 WSFC
- NFPA 72 National Fire Alarm and Signaling Code – 2016 Edition (per email from bldg. dept)
- Local Puyallup Amendments

## 3 Occupancy Classifications

The building is proposed to be designed as a mixed-use industrial, storage, and business (Group F, S-1, & B) occupancy. The area will be protected throughout with an automatic wet pipe sprinkler system and a fire alarm system designed in accordance with NFPA 13 and 72 respectively.

A summary of occupancies is provided in the table below.

Occupancy	Room Names/Use
<b>WSBC</b>	
Group F	Industrial Areas
Group S-1	Storage Rooms
Group B	Offices, Break Room, Restrooms, etc.

## 4 Outdoor Storage

Outside the new facility, two carports will be utilized to protect outdoor materials from the elements and to provide shade. In accordance with WSBC Section 202, a canopy is defined as a permanent structure or architectural projection of rigid construction over which a covering is attached that provides weather protection. The carports will be used to cover nitrogen generators, air compressors, and an oxygen generator, while the other carport will be used to cover plastic and wood pallets. Because the carports are not providing shelter for an occupancy, they are not considered to be buildings or part of the main facility. As such, there are no fire separation distance requirements from the building in accordance with WSBC Section 705 and

sprinklers are not required. Coffman recommends a minimum separation of 5 ft between the carports and the building.

Red Dot has indicated that they may provide walls to provide additional weather protection to the generators. The building code does not clearly address whether or not the addition of walls will require the carport to be regulated as a building. It is recommended that any new walls be no more than half-height.

## 5 Operational Permit List

The following operational permits must be obtained through the fire department and updated annually:

- 105.6.8 Compressed Gases
  - More than 504 cu ft of oxidizing compressed gases
  - More than 200 cu ft of flammable gases
- 105.6.11 Cutting and Welding
- 105.6.16 Flammable and Combustible Liquids
- 105.6.20 Hazardous Materials
- 105.6.22 High Piled Storage
  - More than 500 sq ft area
- 105.6.23 Hot Work
- 105.6.24 Industrial Ovens
- 105.6.29 Miscellaneous Combustible Storage
  - May be applicable to carport storage of pallets if gross volume exceeds 2,500 cu ft
- 105.6.25 Spray or Dipping Operation
  - Powder coat booth

It is understood that Red Dot will work directly with the local fire department to obtain these operational permits, after the manufacturing permit has been obtained through the building department.

## 6 Fire Protection Systems

Due to the size and nature of the building, fire alarm, fire sprinklers, and fire extinguishers will be required within the new facility. The following sections will describe the requirements based on WSFC, NFPA 13, and NFPA 72:

### Fire Sprinkler System:

The building is required to be provided with a new automatic wet-pipe sprinkler system throughout in accordance with WSFC Sections 406.8.3, 903.2.10, and 903.2.4 because the space has similar functions of a garage and the Group F-1 fire areas exceeds 12,000 square feet. The building is providing with a full coverage fire sprinkler system. The existing sprinkler system in the Red Dot facility consists of five separate sprinkler systems served by a 1500 GPM pump rated for 105 PSI. Based on the report prepared by Veltre Engineering and dated 12/05/2022, the sprinkler system design is adequate to protect light hazard and ordinary hazard occupancies. The sprinkler system is therefore adequate for the proposed manufacturing areas.

*Industrial Ovens:* Class A and Class B ovens that are utilized for the processing of combustible materials are required to be provided with an approved automatic fire extinguishing system per WSFC Section 3006.1. The powder coat operation oven processes metal parts with an electrostatically bonded powder coating. This product is not considered to be combustible. For reference, NFPA 33 was also reviewed and it was identified that NFPA 33 also does not require sprinkler protection for powder coat operation ovens.

The post-dunk-tank ovens do not process combustible materials and are therefore not required to be provided with sprinkler protection.

*Dust Collectors:* There are also dust collectors at the Fiber Laser and Brazing stations. The dust collectors at Red Dot are not required by the WSFC to have suppression inside of the equipment. The existing fiber laser dust collector was supplied with sprinkler protection by the manufacturer. Red dot has commissioned a fire sprinkler contractor to extend the sprinkler system to provide coverage to the fiber laser dust collector.

*Powder Coating:* The building has a powder coat booth within the facility. WSFC Section 2406.4 requires that areas used for powder coating be protected by an approved automatic fire extinguishing system. Red dot has commissioned a fire sprinkler contractor to extend the sprinkler system to provide coverage to the powder coat booth.

The design requirements for the sprinkler system are as follows:

Light Hazard: Offices, Restrooms, Support Spaces, etc.

- Design Criteria: 0.1 gpm/sq.ft. over 1,500 sq.ft.
- Hose Stream Allowance – 100 gpm

Ordinary Hazard Group 1: Vehicle Parking Areas, Utility Equipment Rooms, Mechanical Rooms, Low-Piled Storage rooms, etc.

- Design Criteria: 0.15 gpm/sq.ft. over 1,500 sq.ft.
- Hose Stream Allowance – 250 gpm

Ordinary Hazard Group 2: Machine Shops, Metal Working, Industrial Processing Areas, Repair Garage, etc.

- Design Criteria: 0.15 gpm/sq.ft. over 1,500 sq.ft.
- Hose Stream Allowance – 250 gpm

Industrial Equipment Requiring Protection: Industrial Ovens, Powder Coat Booth, and Dust Collectors

- Refer to specific manufacture and listing requirements for specific design criteria regarding fire protection systems within equipment.

High Piled Storage Areas: Plastics stored in excess of 6' in height, Combustible commodities stored in excess of 12' in height:

- Refer to report by Veltre Engineering for sprinkler design requirements at high-piled storage areas.

Outdoor Storage Areas: Storage at carports

- Sprinkler protection is not required. Per WSBC Section 5004.13, where overhead noncombustible construction is provided for sheltering outdoor hazardous material storage areas, such storage shall not be considered indoor storage when the area is constructed in accordance with the requirements for weather protection as required by the WSBC.

#### Fire Alarm System:

The building is required to be provided with a new addressable manual fire alarm system capable of notifying occupants to evacuate in accordance with WSFC Section 907 for Groups F, S, and B. From discussions with the local AHJ, the system is also required to be an automatic system that is provided with smoke detection throughout the building in order to activate notification devices.

The building shall be provided with a complete system in accordance with NFPA 72 including but not limited to a fire alarm control panel, notification devices, manual pull stations, and automatic smoke detection.

The new Red Dot facility is provided with an automatic fire alarm and detection system. The system includes full coverage notification devices, manual pull stations at the building exits, and full coverage spot-type smoke detection.

Because areas of the building will have Hot Work present, WSBC Section 2504.1.9 requires that approved special precautions be taken to avoid accidental operation of automatic fire detection systems. The code and commentary states that *“this section does not give a methodology for protecting against false alarms but does state that precautions must be taken. There are many different technologies and approaches for fire detection systems in addition to the building-specific applications. Each situation should be looked at individually. One possible scenario would be to shut down smoke detectors in a hot work area and put a fire watch in place. As soon as the hot work is complete, those detectors are placed back on line.”* Although the code does not offer specific solutions, it does provide a possible solution by shutting down smoke detectors during work operation while also acknowledging that other solutions can be considered.

In addition to the hot work, there are also concerns that particulates and dirt in the air may render spot-type smoke detectors unreliable. The manufacturing processes in Red Dot include cutting, brazing, spot welding, and other processes that produce chips and particulate. Most of these operations will be provided with localized ventilation to remove fumes and dust. Nonetheless, the environment is typical of a manufacturing facility, and some particulate in the air can be expected.

Other potential solutions could include the use of beam detectors, heat detectors, multi-criteria heat/smoke detectors, or listed waterflow devices that trigger upon sprinklers reaching their listed activation temperature.

Coffman recommends a beam detector approach rather than spot-type smoke detectors due to the challenges with accessing spot type detectors for annual maintenance, and concerns that manufacturing particulate will cause nuisance alarms and, over time, build up particulate in the detection chambers to the point that the detectors are no longer reliable. A beam detector

solution simplifies annual testing and has no detection chamber for particulate to build up. Even so, it is not possible to determine conclusively that beam detection will not be subject to nuisance alarms.

It is understood Red Dot will proceed for now with the existing spot-type smoke detection. Red Dot is also in the process of evaluating beam detector installation. If Red Dot begins to have nuisance (false) alarm activations regularly, we recommend a fire alarm system programming change to as follows:

- First Device Activation: Smoke Detector. Send supervisory signal.
- Second Device Activation: Waterflow Detector. Send alarm signal.

#### Fire Extinguishers:

Fire extinguishers are required within the building in accordance with WSFC Section 906.1. In accordance with Table 906.1, additional fire extinguishers are also required at welding and other hot work areas, repair garages (environmental chamber), powder coating areas, industrial ovens, high-piled storage areas, and areas with storage and processing of flammable/combustible liquids. Portable fire extinguishers shall be selected, installed and maintained in accordance with WSFC Section 906 and NFPA 10.

Additionally, the following requirements apply to specific locations:

- Battery-charging areas shall be provided with a fire extinguisher complying with Section 906 having a minimum 4-A:20-B:C rating within 20 feet of the battery charger in accordance with WSFC Section 309.5.
- Portable fire extinguishers complying with Section 906 shall be provided for areas used for powder coating in accordance with the requirements for an extra-hazard occupancy in accordance with WSFC Section 2406.4.2.
- The additional required fire extinguisher for the industrial ovens shall be placed not closer than 15 feet and not further than 50 feet in accordance with WSFC Section 3006.3.
- Not less than one portable fire extinguisher complying with Section 906 and with a minimum 2-A:20-B:C rating shall be provided with ready access within 30 feet of the location where hot work is performed in accordance with WSFC Section 3504.2.6.

Existing conditions: Drawing AN-1 in the Foundation Permit Set shows fire extinguisher locations but doesn't indicate size/type of extinguisher. Red Dot has indicated that they will furnish additional fire extinguishers as needed to comply with the requirements above. Final fire extinguisher location will be coordinated with the building/fire inspector onsite.

#### **7 Industrial Vehicle Requirements**

Powered industrial trucks such as electric forklifts must be maintained and operated in accordance with WSFC Sections 309.2 through 309.7. Some of the key items are shown below:

- Electric forklifts will not be listed for us in hazardous (classified) locations [WSFC 309.2]. Red Dot will mark a 5' perimeter around the powder coat booth and identify the area with signage that indicates "Class II Div II Group 5 Area. No electrical equipment permitted that is not classified for Class II Div II Group 5 areas."

- Battery chargers shall be of an approved type and combustibles must be kept 3 feet from all chargers per WSFC 309.3. The LifePlus TC3 and Exide G3 battery chargers are UL listed for industrial battery charging.
- Ventilation shall be in an approved manner to prevent dangerous accumulation of flammable gases per WSFC 309.4. Coffman was not able to find user manuals to determine if the LifePlus TC3 and Exide G3 battery chargers required ventilation.

## 8 Repair Garage Requirements

WSFC Section 202 defines repairs garages as areas that are used for servicing or repairing motor vehicles. From discussions with Red Dot, vehicles will undergo servicing related to their HVAC units which can involve removing and replacing the unit. The actual work involved is mostly mechanical and uses very limited amounts of lubricant such as WD40 or PV Blaster, however it still can be considered vehicle servicing work. It is typically conducted within the Environmental Chamber or directly in front of the chamber. WSFC 2311 requirements related to oil spills, drainage and disposal of liquids, below-grade areas, and ignition source limitations within 18" of the floor are not applicable due to the type of servicing. The following requirements from WSFC Section 2311 are applicable to the environmental chamber and any other areas used for servicing vehicles:

- The storage and use of combustible and flammable liquids shall comply with WSFC Chapter 57, which is discussed in detail later in the report. [WSFC 2311.2]
- This report addresses all flammable/combustible liquids in Section 14.
- Smoking shall not be allowed in repair garages except in approved locations. [WSFC 2311.3.2]

## 9 Powder Coating Operation Requirements

WSFC Section 2401 shall apply to processes that involve the application of flammable finishes by applying combustible powders to materials using powder spray guns. The requirements of this section will apply to the powder coat booth.

Powder coating operations shall be conducted in enclosed powder coating facilities that are ventilated and constructed of noncombustible materials, or ventilated spray booths that are constructed as part of a listed assembly [WSFC 2406.3]. Red Dot will provide a ventilated powder coat booth, designed in accordance with NFPA 33 *Standard for Spray Application Using Flammable or Combustible Materials*.

Exhaust ventilation shall be sufficient to maintain the atmosphere below one-half the minimum explosive concentration for the material being applied per WSFC 2406.7. The booth is designed in accordance with NFPA 33 which provides the same requirement. In many instances, the requirements within NFPA 33 are more robust than that of WSFC. The booth therefore complies.

Non-deposited, air-suspended powders shall be removed through exhaust ducts to the powder recovery system. Additional fire protection measures must also be taken. Automated powder application equipment shall be protected by the installation of an approved, supervised flame detection apparatus that shall react to the presence of flame within 0.5 second. It shall accomplish all of the following:



- Shutting down of energy supplies (electrical and compressed air) to conveyor, ventilation, application, transfer and powder collection equipment.
- Closing of segregation dampers in associated ductwork to interrupt airflow from application equipment to powder collectors.
- Activation of an alarm that is audible throughout the powder coating room or booth.
- Activation sends a signal to the building fire alarm system.

The powder coat booth supplier will be onsite to commission these system interfaces after installation. The electrical contract will be available to assist with testing the fire alarm system interface.

Documentation has not been provided to determine compliance with this requirement. However, compliance with NFPA 33 will similarly achieve compliance with the above WSFC requirement for flame detection and shutdown.

Potential ignition sources within the coating areas shall comply with the following requirements from Section 2403.2 and 2406.6:

- Electrical wiring and equipment in flammable vapor areas shall be of an explosion proof type approved for use in such hazardous locations. Such areas shall be considered to be Class I, Division 1, or Class II, Division 1, hazardous locations in accordance with NFPA 70. The powder coat booth interior has been designed to meet an electrical hazard classification of Class II Division I.
- Electrical wiring and equipment located outside of, but within 3 feet (914 mm) of openings in a spray booth or a spray room, shall be approved for Class I, Division 2, or Class II, Division 2, hazardous locations, whichever is applicable. The powder coat booth has been designed to meet an electrical hazard classification of Class II Division II 5-Group for a 5-foot radius horizontally and 3 ft vertically from any open face or conveyor slot. In addition, Red Dot will mark a 5' perimeter around the powder coat booth and identify the area with signage that indicates "Class II Div II Group 5 Area. No electrical equipment permitted that is not classified for Class II Div II Group 5 areas."
- Electrical equipment in flammable vapor areas located such that deposits of combustible residues could readily accumulate thereon shall be specifically approved for locations containing deposits of readily ignitable residue and explosive vapors in accordance with NFPA 70. Combustible residues are not anticipated to accumulate outside of the powder coat booth given the design of the booth in accordance with NFPA 33.
- Open flames and spark-producing devices shall not be located in flammable vapor areas and shall not be located within 20 feet of such areas unless separated by a permanent partition. A minimum separation distance of 20 ft will be maintained between the powder coat booth and the spot welding area.
- Heated surfaces having a temperature sufficient to ignite vapors shall not be located in flammable vapor areas. Space-heating appliances, steam pipes or hot surfaces in a flammable vapor area shall be located such that they are not subject to accumulation of deposits of combustible residues.

- Metal parts of spray booths, exhaust ducts and piping systems conveying Class I or II liquids shall be electrically grounded in accordance with NFPA 70. Metallic parts located in resin application areas, including but not limited to exhaust ducts, ventilation fans, spray application equipment, workpieces and piping, shall be electrically grounded. Not applicable as the booth will not process Class I or II liquids or resin application areas.
- Smoking shall be prohibited in flammable vapor areas and hazardous materials storage rooms associated with flammable finish processes. "No Smoking" signs complying with Section 310 shall be conspicuously posted in such areas.
- Welding, cutting and similar spark-producing operations shall not be conducted in or adjacent to flammable vapor areas or dipping or coating operations unless precautions have been taken to provide safety. Provide proper signage per 2403.2.7. A minimum separation distance of 20 ft will be maintained between the powder coat booth and the spot welding area. In addition, Red Dot will mark a 5' perimeter around the powder coat booth and identify the area with signage that indicates "Class II Div II Group 5 Area. No electrical equipment permitted that is not classified for Class II Div II Group 5 areas."
- When parts are heated prior to coating, the temperature of the parts shall not exceed the ignition temperature of the powder to be used. Parts may be as hot as 350°F after leaving the dry-off oven and as they enter the powder coat booth. The ignition temperature of the powders used shall therefore be greater than 350°F.
- Precautions shall be taken to minimize the possibility of ignition by static electrical sparks through static bonding and grounding, where possible, of powder transport, application and recovery equipment. Documentation has not been provided to determine compliance with this requirement. However, compliance with NFPA 33 will similarly achieve compliance with the WSFC requirement from bonding and grounding.

## 10 Combustible Dusts

### 10.1 Raw Material Dusts

The powder coat booth is the only operation planned for the Red Dot plant that uses a raw material in powder form. This operation will be required to comply with WSFC Chapter 24 for flammable finish operations including compliance with applicable ventilation and electrical hazard classification requirements. Refer to Section 9 of this report for a review of the powder coat operation against WSFC Chapter 24.

### 10.2 Dust Producing Operations

A fiber laser cutting operation that uses Nitrogen and Oxygen to cut steel is provided in the existing Red Dot plant and is planned to be relocated to the new facility. The laser cutter is located inside of a machine enclosure and the operation produces steel particulate. A dedicated dust collector serves the fiber laser enclosure. This dust collector uses filters which, according to Red Dot, need to be emptied every 2 to 3 months. The dust collector was supplied by the manufacturer with an automatic sprinkler system. Red has commissioned a fire sprinkler contractor to tie the dust collector system into the building sprinkler system. Steel dust is not known to be a combustible dust hazard, as demonstrated in OSHA's list of combustible dust

hazards which does not list steel dust as a combustible dust hazard. The fiber laser and associated dust collector are therefore not considered to be a combustible dust hazard.

An aluminum cutting operation that uses die stamping is provided in the existing Red Dot plant and is planned to be relocated to the new facility. Aluminum powder is known to be a combustible dust hazard. The Red Dot die stamping operation is a wet cutting operation that uses a vanishing oil to wet the cutting operation. Waste by-products from the cutting operation included metal chunks. The aluminum die cutting operation is therefore not considered to be a combustible dust hazard.

### 11 Indoor Manufacturing of Reinforced Plastics

WSFC Section 2409 addresses the indoor manufacturing of reinforced plastics where the process involves spray or hand application of reinforced plastics using resin. Red Dot manufacturing processes involve plastic injection molding, but no application of reinforced plastics. WSFC Section 2409 is therefore not applicable.

### 12 Industrial Ovens

The new Red Dot manufacturing facility will have three industrial oven operations. All three ovens will be used to process non-combustible materials (metal parts). All three ovens will be natural gas fired.

The power coat booth will have one dual-chamber oven with one chamber operating at 350°F to dry off parts after the 3-stage washer, and a second chamber operating at 450°F to cure the powder coat. Per WSFC Section 202, this oven is classified as a Class B Furnace as the parts are non-combustible and the powder coating is electrostatically bonded to the parts.

The two additional ovens will be located near the brazing stations. These ovens are used for drying heat exchangers after the dunk tank operation (water only). The ovens will operate at max 400°F. Per WSFC Section 202, these ovens are classified as a Class B Furnace.

An operational permit will be required for the industrial ovens per WSFC Section 3001.2.

Combustion air will be required in accordance with the International Mechanical Code and the International Fuel Gas Code for the rooms where the ovens are located per WSFC 3003.1. Verification of ventilation design for the ovens is outside the scope of this review.

In compliance with WSFC 3003.2 and 3003.3, all three ovens will be located in the manufacturing area of the facility and will not be located in the immediate vicinity of any flammable vapors or flammable mists. Per WSFC 3003.3, the powder coat booth (which contains combustible dust) will be located at least 12 ft from the drying oven and outside of the 5 ft electrical hazard classification zone for the powder coat booth.

Per WSFC 3003.4, the roofs and floor of ovens are required to be insulated and ventilated to prevent temperatures at the facility's combustible ceiling from exceeding 160°F. Surface temperature readings taken by Red Dot employees of existing post-dunk-tank ovens identified temperatures of 90°F or less. The manufacturer verbally confirmed with Red Dot that outside temperature does not exceed 90°F, but they do not have documentation available to confirm this information. This will need to be field verified.

Per WSFC Section 3004, the natural gas piping that serves these ovens must comply with the International Fuel Gas Code, be provided with shut off valves within 6 feet of the oven, and the

valve shall be positioned with a feature that visually indicates open/closed status of the valve. Field photos provided by Red Dot show ball valves in the gas lines leading to the powder coat oven and post dunk-tank-ovens.

Documentation from the General Automatic Transfer Company indicates that the powder coat oven has safety interlocks that will shut down the oven if the exhaust or recirculation fan turn off. This is a non-required safety feature for a Class B furnace.

The ovens shall be labeled with a clearly worded and prominently displayed safety design data form or manufacturers name plate as required by WSFC 3007.1. All personnel operating and maintaining the oven shall be provided with the proper training and equipment shall be maintained in accordance with the manufacturer's instructions [WSFC 3007.3 and 3007.4].

### 13 Hot Work

The Red Dot manufacturing facility uses several types of fixed hot work as a part of the daily manufacturing process including MIG welding, spot welding, and brazing. In addition, temporary oxyacetylene welding is used on occasion in the vehicle testing area. Per WSFC 3501.3, hot work shall only be conducted in areas authorized, and shall never be conducted in areas where the sprinkler system is impaired or at locations with flammable liquids or gases. Where the hot work is open to other persons, signs shall be posted to warn others in accordance with WSFC 3503.6.

An operational permit for hot work will be required in accordance with WSFC 3503.3 and shall be available for review by the AHJ at the time that work is conducted and for an additional 48 hours. Before hot work is permitted to be conducted each day, the area shall be inspected by the person responsible for hot work to ensure the area is safe in accordance with 3504.3.1

Per WSFC 3504 hot work areas are to be kept free of combustibles and floors shall be kept clean. Any partitions segregating hot work areas from other areas of the building are required to be noncombustible. The new Red Dot facility will have noncombustible floors in compliance with WSFC 3504.1.6. Where hot work is performed close to sprinkler heads, noncombustible barriers or damp cloth guards can be used to shield the individual head while work is being performed in accordance with 3504.1.8. Additionally, special precautions can be taken to avoid accidental operation of smoke detectors, such as disabling detection devices while hot work is being performed, if approved by the AHJ in accordance with WSFC Section 3504.1.9.

A fire watch is not required by WSFC 3504.2 provided that hot work is conducted in an area free of combustible exposures. A 2-A:20-B:C fire extinguisher will be provided within 30 feet of hot work in accordance with WSFC 3504.2.6.

#### 13.1 Gas Welding

The manufacturing at Red Dot includes brazing as well as the rare use of oxy-acetylene specifically within the test facility. Both of these are considered to be gas welding. The storage or use of a single cylinder of oxygen and a single cylinder of fuel gas located on a cart shall be permitted without requiring the cylinders to be separated, when all of the requirements of 3505.2.1 are met. Welding shall not be conducted near the powder coating areas unless special precautions are taken in accordance with WSFC 2403.2.7.

Oxygen cylinders, valves, hoses, and other fittings shall be kept free of oil and grease. In accordance with WSFC 3505.5, oxygen and fuel-gas cylinders shall be located away from the hot work area.

Acetylene gas shall not be piped except in approved cylinder manifolds and shall not be utilized at pressures exceeding 15 psig unless dissolved suitable solvents per DOTn 49 CFR Part 178. Acetylene gas shall not be brought in contact with unalloyed copper except in a blowpipe or torch.

### 13.2 Electrical Arc Hot Work

The manufacturing process includes both MIG/TIG welding and spot welding, both of which are electric arc hot work. The frame or case of electric hot work machines shall be grounded with connections that are mechanically strong and electrically adequate for the current in accordance with WSFC 3506.1. Welding current return circuits shall have proper electrical contact at joints. The MIG, TIG, and spot welders are grounded via the electrical connection to the building electrical system. Per 3506.4, an emergency switch or circuit breaker shall be provided so that fixed electric welders and control equipment can be disconnected from the supply circuit in accordance with NFPA 70. The spot welders are fixed machines. They have a built-in power on/off switch and they are plugged into the building electrical system which is required to comply with NFPA 70.

## 14 Hazardous Materials

### 14.1 Indoor Hazardous Materials

Red Dot uses a number of materials that are classified as hazardous in accordance with the WSFC. Red Dot provided SDS sheets to Coffman and Coffman classified the materials into hazardous material categories as defined in the WSFC. WSFC Table 5003.1.1.(1) and 5003.1.1.(2) identify maximum allowable quantities (MAQs) permitted per indoor control area. A summary of WSFC MAQs and hazardous materials planned to be stored inside the Red Dot facility is provided in the table below:

<b>Material</b>	<b>Maximum Allowable Quantity – Closed System</b>	<b>Maximum Allowable Quantity – Open System</b>	<b>Maximum Allowable Quantity - Stored</b>	<b>Actual Quantity Stored in Red Dot</b>
Class IB Flammable Liquid	240 <sup>1</sup>	N/A	240 <sup>1</sup> gallons	191 gallons
Class II Combustible Liquid	240	60	480 <sup>1, 2</sup> gallons	440 gallons
Class IIIA Combustible Liquid	660	160	660 <sup>1</sup> gallons	100 gallons
Class IIIB Combustible Liquid	Unlimited	Unlimited	26,400 <sup>1</sup> gallons	1,583 gallons
Flammable Gas - Gaseous	4,000 <sup>1,2</sup> cu ft	N/A	4,000 <sup>1,2</sup> cu ft	2,000 <sup>3</sup> cubic feet
Flammable Gas - Liquified	300 <sup>1</sup> lbs	N/A	300 <sup>1</sup> lbs	30 lbs
Class 1 Water Reactive	Not Limited	Not Limited	Not Limited	30 gallons
Oxidizing Gas	3,000 <sup>1</sup> cu ft	N/A	3,000 <sup>1</sup> cu ft	660 cubic feet
Class 2 Unstable Reactive	1,500 <sup>1</sup> cu ft	N/A	1,500 <sup>1</sup> cu ft	330 cubic feet
Corrosive	1,000 <sup>1</sup> gallons	200 <sup>1</sup> gallons	1,000 <sup>1</sup> gallons	30 gallons
Toxic – Solid/Liquid	1,000 <sup>1</sup>	250 <sup>1</sup>	2,000 <sup>1,2</sup> lbs	2,000 <sup>3</sup> lbs
Toxic – Gas	810 cu ft	N/A	810 cu ft	3.16 cubic feet
Highly toxic	20 lbs <sup>1</sup>	6 <sup>1</sup> lbs	20 <sup>1</sup> lbs	0 lbs

1) Includes 100% increase for fully sprinklered buildings

2) MAQ is based upon storage in approved cabinets

3) Red Dot is currently working to reduce current inventory to maintain below MAQ

Per WSFC Section 5003.1.3, the storage, use, and handling of hazardous materials not exceeding MAQ's shall be in accordance with WSFC Sections 5001 and 5003. As shown in the table above, Red Dot intends to maintain materials below MAQs.

#### 14.2 Outdoor Hazardous Materials

Generators and storage tanks for Nitrogen, Oxygen, and compressed air will be located outside under one of the carports. WSFC Table 5003.1.1.(3) identifies maximum allowable quantities (MAQs) permitted per outdoor control area. A summary of WSFC MAQs and hazardous materials stored in the Red Dot facility is provided in the table below:

Material	Maximum Allowable Quantity - Stored	Actual Quantity Stored in Red Dot	Notes
Oxidizing Gas	6,000 cu ft	32 cu ft	
Not Regulated	N/A	640 gallons 660 gallons	Nitrogen Compressed Air

Per WSFC Section 5003.1.3, the storage, use, and handling of hazardous materials not exceeding MAQ's shall be in accordance with WSFC Sections 5001 and 5003. As shown in the table above, outdoor storage of hazardous materials does not exceed MAQs.

### 14.3 Requirements for all Hazardous Materials

This section of the report is intended to provide information related to the operational requirements that should be implemented at all facilities storing/using hazardous materials, regardless of whether MAQs are exceeded.

#### 14.3.1 Systems, Equipment and Processes

Systems, equipment, and processes utilized for storage, dispensing, use or handling of hazardous materials shall be in accordance with WSFC Sections 5003.2.1 through 5003.2.9. A summary is provided below:

- Containers, cylinders and tanks shall be designed and constructed in accordance with approved standards.
- Piping, tubing, valves, and fittings conveying hazardous materials shall be designed and installed in accordance with ASME B31 or other approved standards.
- Equipment, machinery and required detection and alarm systems associated with the use, storage or handling of hazardous materials shall be listed or approved.
- Empty containers and tanks previously used for the storage of hazardous materials shall be free from residual material and vapor as defined by DOTn, the Resource Conservation and Recovery Act (RCRA) or other regulating authority or maintained as specified for the storage of hazardous material.
- In addition to the requirements of Section 5003.2.3, equipment, machinery and required detection and alarm systems associated with hazardous materials shall be maintained in an operable condition. Defective containers, cylinders and tanks shall be removed from service, repaired or disposed of in an approved manner. Defective equipment or machinery shall be removed from service and repaired or replaced. Required detection and alarm systems shall be replaced or repaired where defective.
- Machinery and equipment utilizing hazardous materials shall be braced and anchored in accordance with the seismic design requirements of the International Building Code for the seismic design category in which the machinery or equipment is classified.
- The equipment, devices and systems listed in Section 5003.2.9.1 shall be tested at the time of installation and at one of the intervals listed in Section 5003.2.9.2. Records of the tests conducted or maintenance performed shall be maintained in accordance with the provisions of Section 108.3.

#### 14.3.2 Release of Hazardous Materials

Hazardous materials in any quantity shall not be released into a sewer, storm drain, ditch, drainage canal, creek, stream, river, lake or tidal waterway or on the ground, sidewalk, street, highway or into the atmosphere (WSFC 5003.3).

#### 14.3.3 Safety Data Sheets

SDSs of all hazardous materials stored in the building should be readily available on the premises (WSFC 5003.4). The availability of SDS is important for the safety of employees and first responders.

#### 14.3.4 Hazard Identification Signs

Visible hazard identification signs as specified in NFPA 704 for the specific material contained shall be placed on stationary containers and above-ground tanks and at entrances to locations where hazardous materials are stored, dispensed, used or handled in quantities requiring a permit and at specific entrances and locations designated by the fire code official (WSFC 5003.5).

#### 14.3.5 Sources of Ignition

Smoking is prohibited. No smoking signs required. Open flames shall not be used in a manner that create a hazardous condition (WSFC 5003.7).

#### 14.3.6 Separation of Incompatible Materials

WSFC §5003.9.8 requires separation for incompatible materials where they are stored in containers having a capacity of more than 5 pounds, 0.5 gallons, or any amount of compressed gas. Separation can be accomplished by segregating incompatible materials by a distance no less than 20 feet. Alternatively, incompatible materials can be isolated by a noncombustible partition extending at least 18 inches above and to the sides of the stored material.

#### 14.3.7 Hazardous Material Management Plan

In some jurisdictions, the fire code official will require a Hazardous Materials Management Plan (HMMP) to be submitted with the permit application (WSFC §5001.5.1). Even where not required by the fire code official, an HMMP is recommended to be created for all Project Hydrate (Soulbrain) buildings storing hazardous materials. The HMMP is a facility site plan that identifies the following:

- Access to each storage and use area
- Location of emergency equipment
- Location where liaison will meet emergency response
- Facility evacuation meeting point locations
- The general purpose of other areas within the building
- Location of all aboveground and underground tanks
- The hazard classes in each area
- Locations of all control areas and Group H occupancies
- Emergency exits

#### 14.3.8 Hazardous Materials Inventory Statement

The fire code official may also require a Hazardous Materials Inventory Statement (HMIS) with the permit application (WSFC §5001.5.2). Since, product types and quantities stored in Project Hydrate (Soulbrain) may change depending on the time of year and other business reasons, it is important to keep an up-to-date HMIS for each facility, regardless of the requirements of the fire code official for a permit. This documentation will allow management to ensure that quantity limitations, where applicable, are not exceeded. The HMIS should include the following information:



- Product name
- Component
- Chemical Abstract Service (CAS) number
- Location where stored or used
- Container Size
- Hazard Classification
- Amount in storage
- Amount in use-closed systems
- Amount in use-open systems (N/A for Project Hydrate)

Puyallup has an HMIS template that Red Dot will need to complete.