Operational Permit Application

HPM Facilities

CITY OF Vancouver WASHINGTON

www.cityofvancouver.us/departments/fire-department

International Fire Code as adopted by VMC 16.04 (Washington State Fire Code)

Permitting Requirements

Hazardous Production Material (HPM) is defined as a solid, liquid or gas associated with semiconductor manufacturing that has a degree-of-hazard rating in health, flammability or instability of Class 3 or 4 as ranked by NFPA 704 and which is used directly in research, laboratory or production processes which have, as their end product, materials that are not hazardous. A fabrication area is an area within a semiconductor fabrication facility and related research and development areas in which there are processes using hazardous production materials. Such areas are allowed to include ancillary rooms or areas such as dressing rooms and offices that are directly related to the fabrication area processes.

An **operational permit** is required to store, handle, or use hazardous production materials as regulated by WSFC 105.6.21.

Project Information

Site Address		Owner Name	
Other			

Applicant Information

Company Name			Address		
Contact Name					
Office Phone		Cellular		Email	

Contractor

Company Name			Address		
Contact Name					
Office Phone		Cellular		Email	
Related Permits:	CMI_____	FRI_____	DEF_____	MPE_____	

Description of Work

Electronic Plan Standards

File Naming Standards:
Electronic plans and documents shall be named as specified in the City of Vancouver ePLANS system: https://www.cityofvancouver.us/business/permits-licenses-and-inspections/eplans/

Acceptable File Types:
Plans, calculations, specifications and supporting documents shall be uploaded as a PDF file.

Plan Sheet Standards:
All plans shall be drawn to scale, as identified in the checklist, and each sheet shall state the scale and show a measurable scale on the page for measurement calibrations.

Document Orientation:
All plans must be uploaded in "Landscape" format in the horizontal position with a north indicator. All other documents can be in "Portrait" format.

Stamped:
Where documentation contains a code analysis or engineering calculations, such documents shall be stamped by the design professional.

Minimum Submittal Checklist for Upload to ePLANS

- ☐ Completed Fire Operational Permit Application – HPM Facilities (this document) Check all *Permit Conditions* checkboxes that are applicable to your project
- ☐ Completed Materials Management Plan (HMMP) documents and supplemental documents *(See Document Details* below)
- ☐ Site plans and floor plans (see *Plan Details* below)

Document Details

HMMP Guide: https://www.cityofvancouver.us/wp-content/uploads/2023/10/Hazardous-Materials-Management-Plan.pdf
See Vancouver Fire Department HMMP Guide for direction on completing required HMMP and/or supplemental forms

- ☐ Hazardous Materials Management Plan and required supplemental forms (see HMMP Guide linked above for direction on these forms)
- ☐ Narrative explaining production apparatus, systems and fabrication processes that involves HPM.
- ☐ Material Data Sheet of all fabrication equipment which uses HPM, including but not limited to containers, cylinders, tanks, piping, tubing, valves, and fittings.
- ☐ Emergency plan as required by WSFC 2703.4.

Plan Details

The following is a list of information required on all plan submittals for review of a spraying or dipping permit. The plan shall be drawn to 1/8" = 1'-0" minimum scale. The applicant is required to submit all applicable information so an accurate and timely review may be completed:

General:

- ☐ Site plan to include a north arrow, a measurable scale for calibration purposes, fire hydrants, emergency access lanes and doors, vehicle gates, fire department connection, facility evacuation meeting point locations, sprinkler riser, fire alarm control panel, Knox Box, and roof access (if provided).
- ☐ Floor plan to include location of fabrication areas, emergency control station, interior storage of hazardous materials, layout of all equipment and systems to include but not be limited to containers, cylinders, tanks, piping, tubing, valves and fittings, and locations of liquid storage rooms, gas cabinets, exhausted enclosures, and gas rooms.
- ☐ Plans showing fire protection system design. Fire protection systems include but are not limited to automatic sprinkler system alarm and monitoring systems; manual fire alarm systems; emergency alarm systems; gas detection systems; smoke detection systems; emergency power systems; automatic detection and alarm systems for pyrophoric liquids and class 3 water-reactive liquids; exhaust ventilation flow alarm devices for pyrophoric liquids and class 3 water-reactive liquids and cabinets exhaust ventilation systems.

☐ Sequence of operations for fire alarm systems and emergency alarm systems

Permit Conditions

The following is a list of WSFC requirements related to Hazardous Production Materials operations. Use this form to confirm that all applicable requirements are met. Non-applicable requirements can be left blank. The requirements listed below shall apply to semiconductor fabrication facilities and comparable research and development areas classified as Group H-5.

General Safety Provisions:

- ☐ An emergency control station, as defined by WSFC Chapter 2, shall be provided as required below:
  - ☐ The emergency control station shall be located on the premises at a location outside the fabrication area and accepted by the City of Vancouver.
  - ☐ Trained personnel shall continuously staff the emergency control station.
  - ☐ The emergency control station shall receive signals from emergency equipment and alarm and detection systems. Such emergency equipment and alarm and detection systems shall include, but not be limited to, the following where such equipment or systems are required by the WSFC: automatic sprinkler system alarm and monitoring systems; manual fire alarm systems; emergency alarm systems; gas detection systems; smoke detection systems; emergency power systems; automatic detection and alarm systems for pyrophoric liquids and class 3 water-reactive liquids; exhaust ventilation flow alarm devices for pyrophoric liquids and class 3 water-reactive liquids and cabinets exhaust ventilation systems.
- ☐ System, equipment, and processes, including but not limited to containers, cylinders, tanks, piping, tubing, valves, and fittings shall be in accordance with the following:
  - ☐ In addition to the requirements listed below, systems, equipment and processes shall comply with WSFC 5003.2 and any other applicable provisions of the WSFC, IBC and IMC.
  - ☐ Supply piping and tubing for HPM gases and liquids having a health-hazard ranking of 3 or 4 shall be welded throughout except for connections located within a ventilated enclosure if the material is a gas, or an approved method of drainage or containment is provided for connections if the material is a liquid (WSFC 5003.2.2.2).
  - ☐ Piping and tubing shall not be located within corridors, within any portion of a means of egress required to be enclosed in fire-resistance-rated construction or in concealed spaces in areas not classified as Group H occupancies (WSFC 5003.2.2.2).

    Exception: Piping and tubing within the space defined by the walls of corridors and the floor or roof above or in concealed spaces above other occupancies where installed in accordance with section 415.11.6.4 of the International Building Code (WSBC).
- ☐ Construction of semiconductor fabrication facilities shall be in accordance with the following:
  - ☐ The following shall comply with the IBC 415.11: construction and location of fabrication areas; construction of pass-throughs in access corridors; liquid storage rooms; HPM rooms and service corridors.
  - ☐ Liquid Storage Rooms shall also comply with WSFC Chapter 57.
  - ☐ Gas Cabinets shall comply with WSFC 5003.8.6.
  - ☐ Exhausted enclosures shall comply with WSFC 5003.8.5.
  - ☐ Gas rooms shall comply with WSFC 5003.8.4.
  - ☐ Service corridors shall also comply with other requirements as set forth in this document.
- ☐ An emergency plan shall be established as set forth in WSFC 403.7.1.
- ☐ Maintenance of equipment, machinery and processes shall comply with WSFC 5003.2.6.
- ☐ Storage, dispensing, use and handling areas shall be secured against unauthorized entry and safeguarded in a manner approved by the fire code official (WSFC 5003.9.2).
- ☐ Electrical wiring and equipment in HPM facilities shall comply with the following:
  - ☐ Electrical wiring and equipment in fabrication areas shall comply with NFPA 70 (WSFC 2703.7.1).

- ☐ Electrical equipment and devices within 5 feet of workstations in which flammable or pyrophoric gases or flammable liquids are used shall comply with NFPA 70 for Class I, Division 2 hazardous locations. Workstations shall not be energized without adequate exhaust ventilation in accordance with this document (WSFC 2703.7.2).
  Exception: Class I, Division 2 hazardous electrical equipment is not required where the air removal from the workstation or dilution will prevent the accumulation of flammable vapors and fumes on a continuous basis.
- ☐ Electrical wiring and equipment in HPM rooms, gas rooms and liquid storage rooms shall comply with NFPA 70.

☐ Hazardous materials shall not be used in an open-system-use condition in service corridors (WSFC 2703.9).

☐ An approved automatic sprinkler system shall be provided in accordance with WSFC Chapter 9 and the following:

- ☐ A sprinkler head shall be installed within each branch exhaust connection or individual plenums of workstations of combustible construction. The sprinkler head in the exhaust connection or plenum shall be located not more than 2 feet from the point of the duct connection or the connection to the plenum. Where necessary to prevent corrosion, the sprinkler head and connecting piping in the duct shall be coated with approved or listed corrosion-resistant materials. Access to the sprinkler head shall be provided for periodic inspection (WSFC 2703.10.1.1).
  Exceptions:
  1. Approved alternative automatic fire-extinguishing systems are allowed. Activation of such systems shall deactivate the related processing equipment.
  2. Process equipment that operates at temperatures exceeding 932°F and is provided with automatic shutdown capabilities for hazardous materials.
  3. Exhaust ducts 10 inches or less in diameter from flammable gas storage cabinets that are part of a workstation.
  4. Ducts listed or approved for use without internal automatic sprinkler protection.
- ☐ Where the horizontal surface of a combustible tool is obstructed from ceiling sprinkler discharge, automatic sprinkler protection that covers the horizontal surface of the tool shall be provided (WSFC 2703.10.1.2).
  Exceptions:
  1. An automatic gaseous fire-extinguishing local surface application system shall be allowed as an alternative to sprinklers. Gaseous-extinguishing systems shall be actuated by infrared (IR) or ultraviolet/infrared (UV/IR) optical detectors
  2. Tools constructed of materials that are listed as Class 1 or Class 2 in accordance with UL 2360 or approved for use without internal fire-extinguishing system protection.
- ☐ An approved automatic sprinkler system shall be provided in gas cabinets and exhausted enclosures containing HPM compressed gases, except gas cabinets located in an HPM room other than those cabinets containing pyrophoric gases.
- ☐ Pass-throughs in existing exit access corridors shall be protected by an approved automatic sprinkler system.
- ☐ An approved automatic sprinkler system shall be provided in exhaust ducts conveying gases, vapors, fumes, mists, or dusts generated from HPM in accordance with the IMC and WSFC 2703.10.4.
- ☐ Automatic sprinkler systems shall be electrically supervised and provided with alarms in accordance with WSFC Chapter 9. Automatic sprinkler system alarm and supervisory signals shall be transmitted to the emergency control station.

☐ A manual fire alarm system shall be installed throughout buildings containing a Group H-5 occupancy. Activation of the alarm system shall initiate a local alarm and transmit a signal to the emergency control station. Manual fire alarm systems shall be designed and installed in accordance with WSFC 907.

☐ **Emergency alarm systems:** emergency alarm systems shall be provided in accordance with WSFC 5004.9, 5005.4.4 and the following. The maximum allowable quantity per control area provisions of WSFC 5004.1 shall not apply to emergency alarm systems required for HPM:

- ☐ An emergency alarm system shall be provided in service corridors, with not less than one alarm device in the service corridor.
- ☐ Emergency alarms for corridors, interior exit stairways and ramps and exit passageways shall comply with WSFC 5005.4.4.
- ☐ Emergency alarms for liquid storage rooms, HPM rooms and gas rooms shall comply with WSFC 5004.9.

- ☐ An approved emergency telephone system, local alarm manual pull stations, or other approved alarm-initiating devices are allowed to be used as emergency alarm-initiating devices.
- ☐ Activation of the emergency alarm system shall sound a local alarm and transmit a signal to the emergency control station.

☐ **Gas detection systems:** gas detection shall be provided in areas identified below:

- ☐ A gas detection system shall be provided in fabrication areas where HPM gas is used in the fabrication area.
- ☐ A gas detection system shall be provided in HPM rooms where HPM gas is used in the room.
- ☐ A gas detection system shall be provided in gas cabinets and exhausted enclosures for HPM gas. A gas detection system shall be provided in gas rooms where HPM gases are not located in gas cabinets or exhausted enclosures.
- ☐ Where HPM gases are transported in piping placed within the space defined by the walls of a corridor and the floor or roof above the corridor, a gas detection system shall be provided where piping is located and in the corridor. *Exception:* A gas detection system is not required for occasional transverse crossings of the corridors by supply piping that is enclosed in a ferrous pipe or tube for the width of the corridor.
- ☐ The gas detection system shall be capable of monitoring the room, area or equipment in which the HPM gas is located at or below all the following gas concentrations: Immediately dangerous to life and health (IDLH) values where the monitoring point is within an exhausted enclosure, ventilated enclosure or gas cabinet; Permissible exposure limit (PEL) levels where the monitoring point is in an area outside an exhausted enclosure, ventilated enclosure or gas cabinet; For flammable gases, the monitoring detection threshold level shall be vapor concentrations in excess of 25 percent of the lower flammable limit (LFL) where the monitoring is within or outside an exhausted enclosure, ventilated enclosure or gas cabinet; Monitoring for highly toxic and toxic gases shall also comply with WSFC Chapter 60.
- ☐ Gas detection systems required by this document shall operate in accordance with WSFC 2703.13.2 and shall require a separate construction permit.

☐ **Exhaust ventilation systems** and materials for exhaust ducts utilized for the exhaust of HPM shall comply with the WSFC, IBC, IMC and the following:

- ☐ Exhaust ventilation systems shall be provided for all locations specified in WSFC 2703.14.1.
- ☐ Exhaust ducts penetrating fire barriers constructed in accordance with IBC Section 707 or horizontal assemblies constructed in accordance with IBC Section 711 shall be contained in a shaft of equivalent fire-resistance-rated construction. Exhaust ducts shall not penetrate fire walls. Fire dampers shall not be installed in exhaust ducts.
- ☐ Treatment systems for highly toxic and toxic gases shall comply with WSFC Chapter 60.

☐ **Emergency Power System**: an emergency power system shall be provided in Group H-5 occupancies. The emergency power system shall supply power automatically to the electrical systems specified in WSFC 2703.15.1 when the normal supply system is interrupted. Exhaust ventilation systems are allowed to be designed to operate at not less than one-half the normal fan speed on the emergency power system where it is demonstrated that the level of exhaust will maintain a safe atmosphere.

☐ **Sub-atmospheric pressure gas systems:** sub-atmospheric pressure gas systems (SAGS) shall be in accordance with NFPA 318.

Storage:

☐ **Storage in fabrication areas:** Hazardous materials storage and the maximum quantities of hazardous materials in use and storage allowed in fabrication areas shall be in accordance with the following:

- ☐ Storage of HPM in fabrication areas shall be within approved or listed storage cabinets, gas cabinets, exhausted enclosures or within a workstation as follows:
  a. Flammable and combustible liquid storage cabinets shall comply with WSFC 5704.3.2.
  b. Hazardous materials storage cabinets shall comply with WSFC 5003.8.7.
  c. Gas cabinets shall comply with WSFC 5003.8.6. Gas cabinets for highly toxic or toxic gases shall also comply with WSFC 6004.1.2.
  d. Exhausted enclosures shall comply with WSFC 5003.8.5. Exhausted enclosures for highly toxic or toxic gases shall also comply with WSFC 6004.1.3.
  e. Workstations shall comply with WSFC 2705.2.3.

- ☐ The aggregate quantities of hazardous materials stored or used in a single fabrication area shall be limited as specified in WSFC Table 2704.2.2.1.
  Exception: Fabrication areas containing quantities of hazardous materials not exceeding the maximum allowable quantities per control area established by WSFC 5003.1.1, 5704.3.4 and 5704.3.5.

☐ **Storage outside fabrication areas:** The indoor storage of hazardous materials outside of fabrication areas shall be in accordance with the following:

- ☐ The indoor storage of HPM in quantities greater than those listed in WSFC 5003.1.1 and 5704.3.4 shall be in a room complying with the requirements of the IBC and the WSFC for a liquid storage room, HPM room or gas room as appropriate for the materials stored.
- ☐ The indoor storage of other hazardous materials shall comply with WSFC Chapter 50.

Use and Handling:

☐ The use of hazardous materials in fabrication areas shall be in accordance with the following:

- ☐ Hazardous production materials in use in fabrication areas shall be within approved or listed gas cabinets, exhausted enclosures, or a workstation.
- ☐ The quantity of HPM in use at a workstation shall not exceed the quantities listed in WSFC Table 2705.2.2.
- ☐ Workstations in fabrication areas shall comply with the requirements of WSFC 2705.2.3.1 through 2705.2.3.4.

Transportation and Handling: The transportation and handling of hazardous materials shall comply with the following:

- ☐ Corridors and enclosures for exit stairways and ramps in new buildings or serving new fabrication areas shall not contain HPM, except as permitted in corridors for pipping and tubing by IBC 415.11.6.4 and other parts of this document.
- ☐ Transport in corridors and enclosures for stairways and ramps shall be in accordance with the following:
  a. Where existing fabrication areas are altered or modified in existing buildings, HPM is allowed to be transported in existing corridors where such corridors comply with WSFC 5003.10 and IBC 415.11.2.
  b. Nonproduction HPM is allowed to be transported in corridors and enclosures for stairways and ramps where utilized for maintenance, lab work and testing when the transportation is in accordance with WSFC 5003.10.
- ☐ Where a new fabrication area is constructed, a service corridor shall be provided where it is necessary to transport HPM from a liquid storage room, HPM room, gas room or from the outside of a building to the perimeter wall of a fabrication area. Service corridors shall be designed and constructed in accordance with the WSBC (WSFC 2705.3.3).
- ☐ Carts and trucks used to transport HPM in corridors and enclosures for stairways and ramps shall comply with WSFC 5003.10.3. Carts and trucks shall be marked to indicate the contents.

NOTE: *This is not intended to be an all-inclusive list. The WSFC requirements listed are intended to ensure that we have adequate information to begin a review of the application. Additional information may be required.*

I understand that all applicable codes apply and that other regulatory codes may also apply. Errors and/or omissions on the plans and corrections from field inspections are the responsibility of the owner/contractor. All work is subject to compliance with City of Vancouver ordinances and laws of the State of Washington.

APPLICANT NAME:_____APPLICATION DATE: _____

APPLICANT SIGNATURE: _____