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APPEAL SUMMARY

Status: Decision Rendered

Appeal ID: 31967	Project Address: 530 NE Couch St
Hearing Date: 11/15/23	Appellant Name: Adrienne Allaert
Case No.: B-001	Appellant Phone: 5038040465
Appeal Type: Building	Plans Examiner/Inspector: Ken Majors
Project Type: Commercial	Stories: 2 Occupancy: B Construction Type: 3-B
Building/Business Name: ECCO Leather	Fire Sprinklers: Yes - Basement, exit corridor
Appeal Involves: Alteration of an existing structure	LUR or Permit Application No.: 22-165900-CO
Plan Submitted Option: pdf [File 1]	Proposed use: Tenant office space

APPEAL INFORMATION SHEET

Appeal item 1

Code Section	2021 Portland Fire Code Section 2404
Requires	"The application of flammable or combustible liquids by means of spray apparatus in continuous or intermittent processes shall be in accordance with the requirements of sections 2403 and 2404.2 through 2404.9.4." Defining the requirements of spray booths, areas and spaces.
Code Modification or Alternate Requested	Approval of European manufactured equipment analyzed to meet applicable US codes.
Proposed Design	A Barnini Seco 1100 unit to be utilized as a Limited Spray Space, per 2021 Portland Fire Code 2404.9. An equivalency report was commissioned by Code Unlimited and stamped by a fire protection engineer, and a chemical and electrical code analyst. The unit was found to meet applicable code requirements. Unit is subject to separate mechanical and electrical review and approval. This report has been attached for reference.
Reason for alternative	This equipment is provided by the tenant, ECCO leather, a European based company. This is a model their staff is familiar with, suits their needs, and has been used in other European and US locations. Per statement above, the attached report demonstrates the compliance with applicable code requirements.

Mechanical ventilation per 2404.9.3 has been provided to the unit and electrical per 2404.9.4 has been installed, and is not included in this appeal.

APPEAL DECISION

Use of non-listed equipment for application of flammable finishes: Denied. Proposal does not provide an equivalent level of Life Safety protection.

Appellant may contact John Butler (503 865-6427) or e-mail at John.Butler@portlandoregon.gov with questions.

Pursuant to City Code Chapter 24.10, you may appeal this decision to the Building Code Board of Appeal within 90 calendar days of the date this decision is published. For information on the appeals process, go to www.portlandoregon.gov/bds/appealsinfo, call (503) 823-6251 or come to the Development Services Center.

2.3 Comparison of Standards

2019 OREGON FIRE CODE REQUIREMENT	2016 NFPA 33 REQUIREMENT	EUROCODE REQUIREMENT	COMPARISON	COMPLIANCE
(2019 Oregon Fire Code – Chapter 24 Flammable Finishes) – (2016 NFPA 33 Standard for Spray Application Using Flammable or Combustible Materials) - (EN 16985 Spray booths for organic coating materials)				
(2019 OFC §2404.3 Design and Construction) – (NFPA 33 Chapter 5) - (EN 1985:2018 Chapter 4)				
§2404.3.3.1 Construction Spray booths shall be constructed of approved noncombustible materials. Aluminum shall not be used. Where walls or ceiling assemblies are constructed of sheet metal, single-skin assemblies shall be not thinner than 0.0478 inch (18 gauge) (1.2 mm) and each sheet of double-skin assemblies shall not be thinner than 0.0359 inch (20 gauge) (0.9 mm). Structural sections of spray booths are allowed to be sealed with latex-based or similar caulks and sealants. The interior surfaces of spray booths shall be smooth; shall be constructed so as to permit the free passage of exhaust air from all parts of the interior, and to facilitate washing and cleaning; and shall be designed to confine	§5.1 Walls and Ceilings Walls, doors, and ceilings that intersect or enclose a spray area shall be constructed of noncombustible or limited-combustible materials or assemblies and shall be securely and rigidly mounted or fastened. The interior surfaces of the spray area shall be smooth, designed and installed to prevent pockets that can trap residues, and designed to facilitate ventilation and cleaning.	EN 16985 Section 4.8.2 Spray Booth Construction Structural support elements of spray booths shall maintain structural stability of the spray booth for the time need for escape in the event of fire. All other construction materials shall be: • Hardly flammable or non-combustible. In case of fire, hardly flammable material shall emit as little smoke as possible; • Securely and rigidly fastened.	All codes require spray booths to be constructed of non-combustible materials such as steel.	Page 17 of Product Manual Section 3.5 The machine is a box-shaped container closed on three sides and open on the front with a metal structure and completely manufactured in stainless steel.

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residues within the booth. Aluminum shall not be used. Spray booths shall be installed so that all parts of the booths are able to be accessed for cleaning. A clear space of not less than 3 feet (914 mm) shall be maintained on all sides of the spray booth. This clear space shall be kept free of any storage or combustible construction.				
§2404.3.3.2 Surfaces The interior surfaces of spray booths shall be smooth; shall be constructed so as to permit the free passage of exhaust air from all parts of the interior, and to facilitate washing and cleaning; and shall be designed to confine residues within the booth. Aluminum shall not be used.	§5.1 Walls and Ceilings The interior surfaces of the spray area shall be smooth, designed and installed to prevent pockets that can trap residues, and designed to facilitate ventilation and cleaning.	EN 16985 Section 4.8.2 Spray Booth Construction The interior surface of the spray booth shall be as smooth as possible to minimize deposition of coating material and facilitate cleaning.	All codes require the interior surface to be smooth and designed to facilitate cleaning operations.	Page 18 of Product Manual Section 3.5.1.1 Fixed Surface In this configuration, the spraying surface rests on three sides: to the side there is a riser with two fastened profiles on the sides and to guide the front a guide on the lower front. This type of fastening enables an inclination of the spray surface equal to 21° compared to the horizontal surface and enable the extraction of the surface with ease for cleaning and maintenance operations.
§2404.3.3.5 Clear Space Spray booths shall be installed so that all parts of the booth are able to be accessed for cleaning. A clear space of not less than 3 feet (914 mm) shall be maintained on all sides of the spray booth. This clear space shall be kept free of any storage or combustible construction.	§5.3.2 Separation from Other Operations A clear space of not less than 915 mm (3 ft) shall be maintained on all sides and above the spray booth. This clear space shall be kept free of any storage or combustible construction.	EN 16985 Section 4.11.2 Manual Spray Booth The width of the routes to leave the spray booth in case of emergency shall be at least 1 m. The dimensions of the largest designated work piece shall be taken into account.	Both local and Eurocodes require an open space of 3 feet surrounding the spray booth.	Page 29 of Product Manual Section 5.2 Space necessary for use and maintenance. Table 5-1 Distances requires 1000 mm which equates to 3.28 feet which meets the code requirement.

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§2404.3.3.6 Size The aggregate area of spray booths in a building shall not exceed the lesser of 10 percent of the area of any floor of a building or the basic area allowed for a Group H-2 occupancy without area increases, as set forth in the International Building Code. The area of an individual spray booth in a building shall not exceed the lesser of the aggregate size limit or 1,500 square feet. Exception: One individual booth not exceeding 500 square feet.	No references to maximum spray booth size in an occupancy made in NFPA 33.	No references found in provided Eurocodes that address percent of floor area for spray booths.	The intent of this section of the Fire Code is to compartmentalize or provide passive fire protection. By limiting the physical size of a spray booth, it also limits the size of a fire.	The model 1100 manual spray booth measures 1100 mm by 1390 mm (3.61 ft x 4.56 feet) for a total of 16.46 square feet which is less than the 500 square foot exception in the Oregon Fire Code.
§2404.3.4.1 Floor Combustible floor construction in spraying spaces shall be covered by an approved, noncombustible, non-sparking material, except where combustible coverings, such as thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operating in spraying spaces.	§5.1.2 Walls and Ceilings The floor of the spray area shall be constructed of noncombustible material, limited-combustible material, or combustible material that is completely covered by noncombustible material.	EN 16985 Section 4.8.2 Spray Booth Construction Structural support elements of spray booths shall maintain structural stability of the spray booth for the time need for escape in the event of fire. All other construction materials shall be: • Hardly flammable or non-combustible. In case of fire, hardly flammable material shall emit as little smoke as possible • Securely and rigidly fastened.	All codes require that the flooring material be made of a non-combustible material.	Page 17 of Product Manual Section 3.5 The machine is a box-shaped container closed on three sides and open on the front with a metal structure and completely manufactured in stainless steel.

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(2019 OFC §2404.4 Fire Protection) – (2016 NFPA 33 Chapter 9) - (EN 1985:2018 Chapter 4)				
§2404.4 Fire Protection Spray booths and spray rooms shall be protected by an approved automatic fire-extinguishing system complying with Chapter 9. Protection shall extend to exhaust plenums, exhaust ducts and sides of dry filters where such filters are used.	§9.4.1 Automatic Sprinklers The automatic sprinkler system shall be a wet pipe system, a dry pipe system, a preaction system, or an open-head deluge system, whichever is most appropriate for the portion of the spray operation being protected.	EN 16985 Section 4.8.5 Fire Extinguishing Equipment All spray booths without fire detection system should be equipped with manual fire extinguishers. Note 1 – Provision for use of manual extinguishing equipment is subject to national regulation for occupational safety.	The Oregon Fire Code requires spray booths to be protected with an automatic fire-extinguishing system, while the Eurocode requires spray booths without fire detection to be supplied with manual fire extinguishers. Since this booth is being treated as a Limited Area Spraybooth or a Limited Finishing Workstation it is permitted to be protected by fire protection provided in the area that it is located.	The model 1100 manual spray booth meets the intended definition of a Limited Finishing Workstation under NFPA 33 §3.3.18.1. Under this definition the spray booth acts as an apparatus that is capable of confining the vapors, mists, residues, dusts, or deposits that are generated by a spray application process and the meets the requirements for Limited Finishing Workstation in NFPA 33 §14.3 but does not meet the requirements of a spray booth or spray room, as herein defined.
§2404.4.1 Fire extinguishers Portable fire extinguishers complying with Section 906 shall be provide for spraying areas in accordance with the requirements for an extra (high) hazard occupancy	9.6 Portable Fire Extinguishers Portable fire extinguishers shall be provided and located in accordance with NFPA 10.	EN 16985 Section 4.8.5 Fire Extinguishing Equipment All spray booths without fire detection system should be equipped with manual fire extinguishers. Note 1 – Provision for use of manual extinguishing equipment is subject to national regulation for occupational safety.	Both the Oregon Fire Code and the Eurocode require portable fire extinguishers to be present.	A portable fire extinguisher containing CO₂ will be located just outside the spray area, within 30 feet of the working area.

(2019 OFC §2404.5 Housekeeping, maintenance, and storage of hazardous materials) – (2016 NFPA 33 Chapter 10) - (EN 1985:2018 Chapter 6)				
§2404.5.1 Different Coatings Spray booths, spray rooms, and spraying spaces shall not be alternately utilized for different types of coating materials where the combination of materials is conducive to spontaneous ignition, unless all deposits of one material are removed from the booth, room or space and exhaust ducts prior to spraying with a different material.	10.9 Spontaneous Ignition Hazards The same spray booth shall not be alternately used for different types of coating materials if the combination of the materials is conducive to spontaneous ignition, unless all deposits of the first-used coating material are removed from the booth and exhaust ducts prior to spraying with the second coating material.	EN 16985 Section 6.2.3 Information Related to Operation The information related to operation shall at least contain the following information: • Instruction for safe operation (e.g. start-up, stop, charging, adjustment) • Instruction to keep the surrounding of the spray booth free of flammable substances (e.g. powder coating material deposits)	Both the Oregon Fire Code and the Eurocode specify that discretion is needed when different types of coatings are utilized. For safe operations, incompatible materials are required to be cleaned prior to switching operations.	There are no incompatible spraying materials planned to be used in the spray space at this time.
(2019 OFC §2404.6 Sources of ignition) – (2016 NFPA 33 Chapter 6 Electrical and Other Sources of Ignition) - (EN 1985:2018 Chapter 4)				
§2404.6.2.3 Integral Luminaries Luminaries that are an integral part of the walls or ceiling of a flammable vapor area are allowed to be separated from the flammable vapor by glass panels that are an integral part of the luminaire. Such luminaries shall be listed for use in Class I, Division 2, or Class II, Division 2 locations, whichever is applicable, and shall be suitable for accumulations of deposits of combustible residues. Such luminaires are allowed to be serviced from inside the flammable vapor area.	6.6.3 Illumination Luminaires, like that shown in Figure 6.6.3, that are an integral part of the walls or ceiling of a spray area shall be permitted to be separated from the spray area by glass panels that are an integral part of the fixture. Such fixtures shall be listed for use in Class I, Division 2; Class I, Zone 2; Class II, Division 2; or Zone 22 locations, whichever is applicable, and also shall be listed for accumulations of deposits of combustible residues. Such fixtures shall be permitted to be serviced from inside the spray area.	EN 16985 Section 4.9.2.2 Ignition Sources For lighting devices fitted behind transparent impact resistant panels sealed to the spray booth structure, so that solvent vapors cannot ingress, IP54 of EN 60529:1991 is sufficient.	Both the Oregon Fire Code and the Eurocode require that integral lighting be rated for either vapor or dust ingress (IP54).	Page 22 of Product Manual Section 3.5.5 Lighting A 74-watt light is installed inside the model 1100 and is rated for Class 1 Division 2 hazardous locations per NFPA 70.

(2019 OFC §2404.7 Ventilation) – (2016 NFPA 33 Chapter 7) - (EN 1985:2018 Chapter 4)				
§2404.7.1 Operation Mechanical ventilation shall be kept in operation at all times while spraying operations are being conducted and for a sufficient time thereafter to allow vapors from drying coated articles and finishing material residue to be exhausted. Spraying equipment shall be interlocked with the ventilation of the flammable vapor areas such that spraying operations cannot be conducted unless the ventilation system is in operation.	7.2.3 Mechanical ventilation Mechanical ventilation shall be kept in operation at all times while spray operations are being conducted and for a sufficient time hereafter to allow the vapors from drying coated objects or material and residues to be exhausted. Where spray operations are conducted automatically without an attendant constantly on duty, the operating controls of the spray apparatus shall be arranged so that the spray apparatus cannot function unless the exhaust fans are operating.	EN 16985 Section 4.7.3.1 Manual application – General The required airflow shall be monitored. An interface shall be provided to enable the interlocking of the forced ventilation and the spray application system. The spray application system shall only be able to operate when the forced ventilation is in operation and the airflow requirements are met. The forced ventilation shall not be switched off before the purge time is over.	Both the Oregon Fire Code and Eurocode are in agreement for interlocking the mechanical ventilation to the manual spray operation and continued ventilation is required for the duration of the drying/purge time until flammable vapors are removed.	Page 41 of Product Manual Section 9.2 Pneumatic Commands The air regulator that supplies compressed air to the manual spray gun is interlocked using a solenoid valve to the auxiliaries supply circuit. This circuit is only powered on when adequate ventilation is supplied.
§2404.7.2 Recirculation Air exhausted from spraying operations shall not be recirculated.	7.5 Recirculation of Exhaust Air exhausted from spray areas shall not be recirculated unless all of the following requirements are met: SEE NFPA 33 for extensive list of requirements	EN 16985 Section 4.7.1.1 Ventilation External air intake and exhaust ducts shall be designed and positioned to avoid recirculation of polluted air. The dominant wind direction at the site of installation shall be taken into account.	The Oregon Fire Code and the Eurocode require that exhaust air not be recirculated.	Page 22 of Product Manual Section 3.5.3 Blasting system Purification of the air and mist created during the spraying process takes place using air flow passage, referenced by the general negative pressure in the exhaust, via the filters placed on the rear of the booth. The purified air is then evacuated outdoors by the extractor fan on the outer rear of the booth.

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§2404.7.3 Air velocity The ventilation system shall be designed, installed and maintained so that the flammable contaminants are diluted in noncontaminated air to maintain concentrations in the exhaust airflow below 25 percent of the contaminant's lower flammable limit (LFL). In addition, the spray booth shall be provided with mechanical ventilation so that the average air velocity through the openings is in accordance with §2404.7.3.1 and §2404.7.3.2.	§7.2 Performance Requirements Each spray area shall be provided with mechanical ventilation that is capable of confining and removing vapors and mists to a safe location and is capable of confining and controlling combustible residues, dusts, and deposits. The concentration of the vapors and mists in the exhaust stream of the ventilation system shall not exceed 25 percent of the lower flammable limit.	EN 16985 Section 4.9.2.1 Limitation of flammable solvent vapor concentration The flammable substances concentration shall be limited to: • 50% of LEL for automatic spray booths • 25% of LEL for manual spray booths. The flammable substances concentration and the fresh air flow required for explosion protection shall be calculated according to Annex C.	Both the Oregon Fire Code and the Eurocode require that spray booths designed for manual spray operations limit concentrations of flammable vapors to 25% of the LEL.	The mechanical engineer on the project will be responsible for sizing exhaust connections to the outlet side of the spray booth that will create a differential pressure in the exhaust of at least 2.5 mbar versus the atmosphere. That level of exhaust should be sufficient to dilute any flammable organic coatings with uncontaminated air according to the page 50, table 11-2 of the product manual.
§2404.7.3.1 Open-face or open-front spray booth For spray operations conducted in an open-face or open-front spray booth, the ventilation system shall be designed, installed and maintained so that the average air velocity into the spray booth through all openings is not than 100 feet per minute.	B.2 Spray Booths It is imperative to maintain the concentration of vapor in the exhaust airstream below 25 percent of the lower flammable limit. It is also necessary to confine and remove vapors and mists to a safe location and to control combustible residues, dusts, and deposits. This requires a sufficient flow of air moving through the booth at a sufficiently high velocity.	EN 16985 Section 4.7.3.3.2 Application of a Liquid Coating Material. For openings designated to manual spray operations from an external working area, the air flow velocity in the measurement plane of these openings shall be at least • 0.4 m/s (78.7 feet/min) in average and 0.3 m/s (59.1 feet/min) as minimum value in vertically ventilated spray booths • 0.5 m/s (98.4 feet/min) in average and 0.4 m/s (78.7 feet/min) as minimum valve in horizontally ventilated spray booths	In the case of open-front spray booths, the Oregon Fire Code and Eurocode both require that the average air velocity into the spray booth measure 100 feet per minute.	As long as the mechanical exhaust line is operating in an un-obstructed manner the spray booth is designed in a manner that will meet the criteria of 100 feet per minute of average air velocity through the open face of the booth. This value is confirmed on page 32 of the product manual under table 52 that states "The capacities in the table were implemented to keep the value of the capture speed between 0.3-0.5 m/s according to the standard UNI EN 12215."

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§2404.7.5 Independent ducts Each spray booth and spray room shall have an independent exhaust duct system discharging to the outside.	§7.4 Routing of Exhaust Ducts Air exhausted from liquid spray operations shall be conducted by ducts directly to the outside of the building.	EN 16985 Section 4.7.1.1 Ventilation Exhaust air from spray booths for liquid coating material shall be discharged to the atmosphere. External air intake and exhaust ducts shall be designed and positioned to avoid recirculation of polluted air.	The Oregon Fire Code and Eurocode differ on the conditions of exhaust recirculation. The Eurocode regulates that recirculation of contaminated air needs to be avoided, while the Oregon Fire Code only dictates that independent exhaust ducts be used to discharge to the outside.	The MEP engineers plan to exhaust the spray booth directly to the outside. The exhaust duct will not be shared with any other equipment.
§2404.7.6 Termination Point The termination point for exhaust ducts discharging to the atmosphere shall be not less than the following distances: 1. Ducts conveying explosive or flammable vapors, fumes, or dusts: 30 feet from the lot line; 10 feet from openings into the building; 6 feet from exterior walls and roofs; 30 feet from combustible walls or openings into the building that are in the direction of exhaust discharge, 10 feet from above adjoining grade. 2. Other product-conveying outlets: 10 feet from the lot line; 3 feet from exterior walls and roofs; 10 feet from openings into the building; 10 feet above adjoining grade.	7.4 Routing of Exhaust Ducts Air exhausted from liquid spray operations shall be conducted by ducts directly to the outside of the building. Exhaust ducts shall follow the shortest route to the point of discharge and shall meet the following conditions: (1) Exhaust ducts shall not penetrate a fire wall or fire barrier wall. (2) Exhaust discharge shall be directed away from any air intakes. (3) Exhaust discharge point shall be at least 1830 mm (6 ft) from any exterior wall or roof. (4) Exhaust discharge point shall be at least 3048 mm (10 ft) from openings into the building. (5) Exhaust discharge point shall be at least 3048 mm (10 ft) above adjoining grade. (6) Exhaust duct shall not discharge in the direction of any	EN 16985 Section 4.13 Environment in Which the Machinery is Used Fresh air intake and combustion gas exhaust shall be located so any risk of re-circulation is avoided. Fresh air intake shall be located so that intake of dust and gas from other known sources of pollution is avoided.	The Oregon Fire Code provides direct guidance on exhaust termination point requirements in terms of measured distances to conditions that need to be avoided. The Eurocode is vaguer but does require that dust and gases from other known sources be avoided without exact distances.	The MEP engineers will be responsible for following the provisions of this code section and meeting the minimum distance requirements of the exhaust termination point to known hazards listed here.

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	combustible construction that is within 7625 mm (25 ft) of the exhaust duct discharge point. (7) Exhaust duct shall not discharge in the direction of any unprotected opening in any noncombustible or limited-combustible construction that is within 7625 mm (25 ft) of the exhaust duct discharge point. (8) Exhaust duct shall not discharge in the direction of any exit discharge or public way that is within 7625 mm (25 ft) of the exhaust duct discharge point.			
§2404.7.7 Fan motors and belts Electric motors driving exhaust fans shall not be placed inside booths or ducts. Fan rotating elements shall be nonferrous or non-sparking, or the casing shall consist of, or be lined with, such material. Belts shall not enter the duct or booth unless the belt and pulley within the duct are tightly enclosed.	§7.10.3 Exhaust Fans and Drives Belts shall not enter any spray area unless the belt and pulley within the spray area are completely enclosed.	EN 16985 Section 4.9.3.2 Ignition Sources Motors outside spray booths shall comply to IP44 of EN 60529:1991. Motors positions within an exhaust air duct shall be equipped with over-heating protection and explosion protection of category as required by Table 4 and comply to IP54 of EN 60529:1991.	The Oregon Fire Code requires that motors be external to the actual booth while the Eurocode does allow motors to be a part of the spray booth duct assembly as long as they meet the explosion protection and vapor ingress requirements.	Figure 1 shows the placement of the electric motor driving the exhaust fan for the ventilation duct. Note that the top mounted exhaust motor is entirely outside the footprint of the spray booth.

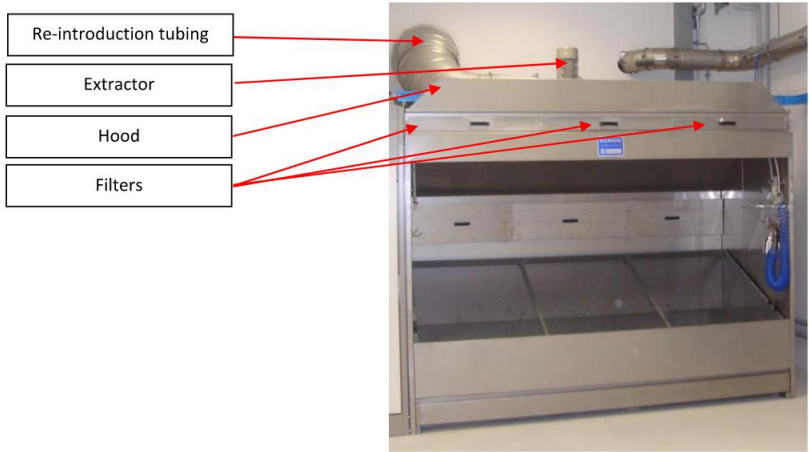


Figure 1 - Front View Showing Top Mounted Exhaust Fan Motor

2019 OREGON FIRE CODE REQUIREMENT	2016 NFPA 33 REQUIREMENT	EUROCODE REQUIREMENT	COMPARISON	COMPLIANCE
§2404.7.8 Filters Air intake filters that are part of a wall or ceiling assembly shall be listed as Class I or Class II in accordance with UL 900. Exhaust filters shall be required.	§5.1.1 Walls and Ceilings Air intake filters that are a part of a wall or ceiling assembly shall be listed as Class 1 or Class 2, in accordance with ANSI/UL 900, Standard for Air Filter Units.	EN 16985 Section 4.8.3 Filter Media Final downstream inlet air filter media shall be manufactured from non-combustible or hardly flammable material. In case of fire, hardly flammable material shall emit as little smoke as possible.	Both the Oregon Fire Code and Eurocode require that filters be non-combustible or made from limited combustible materials. The Oregon Fire Code further clarifies that filters are required to have a Class I or Class II rating.	On Page 21 of the product manual under section 3.5.2 Filters, the air flow is mixed with aerosols generated during spraying and absorbed by an extractor is filtered to blast pollutant particles. The spray booth uses both a vertical filter that is positioned vertically immediately behind the spraying area and is composed of a highly efficient fiberglass filter in a frame. Drawer filters (Figure 2) are positioned downstream of the spraying zone and the three drawers contain two fiberglass pad filters each.

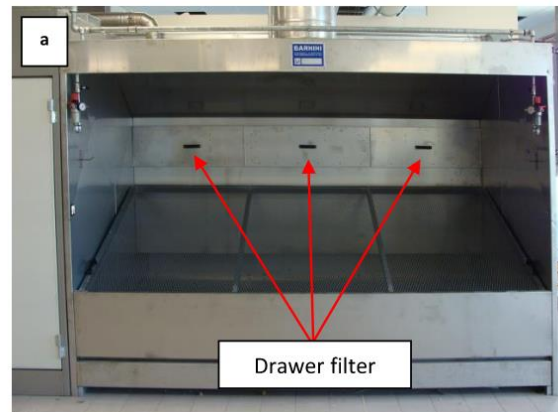


Figure 2 - Location of Drawer Final Filtering System

2019 OREGON FIRE CODE REQUIREMENT	2016 NFPA 33 REQUIREMENT	EUROCODE REQUIREMENT	COMPARISON	COMPLIANCE
§2404.7.8.3 Maintaining air velocity Visible gauges, audible alarms or pressure-activated devices shall be installed to indicate or ensure that the required air velocity is maintained.	C.2.4 Exhaust Airflow Airflow through the exhaust system can be established from equipment specifications. Alternatively, it can be established by measurement of average air velocity through all spray booth openings (using valid traverse techniques) and subsequent multiplication of that velocity by the total booth opening area. Total airflow should be expressed in terms of cubic meters per hour or cubic feet per minute.	EN 16985 Section G.2 Interlocking of Forced Ventilation System with Interface to Spray Application For determining a sufficient air flow, the state-of-the-art solution is a Pitot tube with a differential pressure switch. The measurement task is comparatively challenging (due to turbulences etc.) and the reliability of the sensor may be critical if some dust is present even behind the filtering system. Therefore, in general, a comparatively simple system for determining the air flow is not considered to be a well-tried element according to EN ISO 13849-1:2015.	In this instance the Eurocode has more exacting requirements for what type of monitoring is required for air velocity.	On page 23 of the product manual under section 3.5.9, the system keeps the functioning status of the filters under control using a differential pressure switch installed outside on the left-hand side of the machine. In the event of excess clogging of the filtering walls, a visual signal is given using a light placed on the front of the electric box.

2.4 Compliance with OFC 2404.9 Limited Spraying Spaces

There are several codes that are specific to a limited spraying space under Chapter 24 of the Oregon Fire Code. This concept does not translate into any known Eurocodes. These specific requirements and the conformance to these codes is detailed in the table below.

SECTION	2019 OREGON FIRE CODE REQUIREMENT	COMPLAINE
§2404.9.1 Job Size	The aggregate surface area to be sprayed shall not exceed 9 square feet (0.84 square meters).	ECCO, USA plans to use the manual spray booth for the purpose of spraying leather shoes. The total area that will be sprayed will be significantly smaller than 9 square feet.
§2404.9.2 Frequency	Spraying operations shall not be of a continuous nature.	This spray booth will be used for the sole purpose of non-production R&D prototyping. The spray booth will only be operated on a limited basis (~ once per month). Only a single spray booth will be used in the facility.
§2404.9.3 Ventilation	Positive mechanical ventilation providing not fewer than six complete air changes per hour shall be installed. Such system shall meet the requirements of this code for handling vapor areas. Explosion venting is not required.	The model 1100 spray booth has an exhaust fan capable of 3500 cubic meters per hour or 2060 cubic feet per minute of exhaust capability. Based upon a footprint of 17 square feet for the booth, this exceeds the six air changes per hour ventilation requirement. This code section requires positive ventilation but removal of the vapors from the process area will provide a greater degree of safety to building occupants.
§2404.9.4 Electrical wiring	Electrical wiring within 10 feet (3038 mm) of the floor and 20 feet (6096 mm) horizontally of the limited spraying space shall be designed for Class I, Division 2 locations in accordance with NFPA 70.	Electrical outlets, lighting, and other equipment located within in 20 feet of the spray booth will be designed for Class I Division 2 locations.

3 CONCLUSION

Scott Edwards Architecture is developing a Tenant Improvement (TI) project for ECCO, USA located in Portland, Oregon. The proposed design will be supported by an Italian manual Spray Booth (Barnini SRL, Model 1100) that was designed and manufactured in accordance with European Test Standards and has a CE listing.

Code Unlimited reviewed the spray booth specifications and European Standards and provided a comprehensive analysis of the equivalency to the applicable US standards. The Barnini Model 1100 Manual Spray Booth with Dry Filtering will meet the applicable code requirements of OFC Chapter 24, along with the applicable sections of NFPA 33.

Reviewed and Approved by:

Prepared by:

Amedeo Gallucci, PE

Fire Protection Engineer

Code Unlimited a Jensen Hughes Company

Kyle Lazzaro

Chemical and Electrical Code Analyst III

Code Unlimited a Jensen Hughes Company