

REINFORCED PLASTICS MANUFACTURING

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437-002-0118 Oregon Rules for Reinforced Plastics Manufacturing.

(1) Applicability. *If a specific type of equipment, process or practice is **not** limited to the reinforced plastics industry, the provisions contained in other Divisions of OAR 437, Oregon Occupational Safety and Health Code, shall apply.*

(2) Scope.

(a) *These rules shall apply to reinforced plastics manufacturing operations, in their shop buildings (not field work) involving the use of polyester, vinylester, and other similar products in which styrene monomer is a reactive monomer for the resin. This division applies to chopper gun, gel coating, hand laminating and casting operations utilizing resin and organic peroxide catalyst.*

(b) *This division does **not** apply to:*

(A) *Application of flammable organic materials such as acetone, methyl ethyl ketone (MEK), either alone or mixed as flammable or combustible paints or diluents;*

(B) *Operations, involving polyurethane finishes or foams utilizing isocyanate catalysts;*

(C) *Operations involving epoxy resin compounds utilizing amine hardeners; or*

(D) *Cleaning of chopper guns, lines, and associated equipment in which acetone, MEK, or other flammable or combustible organic solvents are sprayed into the open air as part of the cleaning process.*

(3) Definitions. *The following definitions shall apply to OAR 437-002-0118:*

(a) Chopper Gun – *A device that feeds fiber glass rovings through a chopper and ejects them into a stream of resin and organic peroxide catalyst onto a mold surface. The resin and organic peroxide catalyst are combined and ejected from the chopper gun by either one of two systems:*

(A) *One nozzle ejects resin while another nozzle ejects organic peroxide catalyst towards the mold surface; or*

(B) *The resin and organic peroxide catalyst are fed into a single chopper gun mixing chamber ahead of the nozzle.*

NOTE: *By either method, the resin mixture precoats the strands of glass and the merged product is directed onto a mold surface by the operator.*

(b) Combustible – *Any substance having a flashpoint at or above 100 degrees F (37.8 degrees C). Combustible substances shall be divided into two classes:*

(A) Class II – *substances with flashpoints at or above 100 degrees F (37.8 degrees C) and below 140 degrees F (60 degrees C) except any mixture having components with flashpoints of 200 degrees F (93.3 degrees C) or higher, the volume of which make up 99 percent or more of the total volume of the mixture.*

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(B) Class III – substances with flashpoints at or above 140 degrees F (60 degrees C).

(c) Flammable – any substance having a flashpoint below 100 degrees F (37.8 degrees C). Flammable liquids shall be known as Class I liquids.

(d) Flashpoint – The minimum temperature at which a liquid gives off vapor within a test vessel in sufficient concentration to form an ignitable mixture shall be determined as follows:

(A) For a liquid which has a viscosity of less than 45 Saybolt Universal Seconds (SUS) at 100 degrees F (37.8 degrees C), does not contain suspended solids, and does not have a tendency to form a surface film while under test, the procedure specified in the standard method of test for flashpoint by tag closed tester (ASTM D-56-70) shall be used.

(B) For a liquid which has a viscosity of 45 SUS or more at 100 degrees F (37.8 degrees C), or contains suspended solids, or has a tendency to form a surface film while under test, the standard method of test for flashpoint by Pensky-Martens Closed Tester (ASTM D-93-71) shall be used, except that the methods specified in Note 1 to Section 1.1 of ASTM D-93-71 may be used for the respective materials specified in the Note.

(C) For a liquid that is a mixture of compounds that have different volatilities and flashpoints, its flashpoint shall be determined by using the procedure specified in subsection (4)(a) or (4)(b) of this definition on the liquid in the form it is shipped. If the flashpoint, as determined by this test, is 100 degrees F (37.8 degrees C) or higher, an additional flashpoint determination shall be run on a sample of the liquid evaporated to 90 percent of its original volume and the lower value of the two tests shall be considered the flashpoint of the material.

(D) Organic peroxide catalysts are excluded from any of the flashpoint determination methods specified in this section.

(e) Gelcoating – A chopper gun pressure pot or similar device is used to apply the resin and organic peroxide catalyst mixture to a mold surface without glass fibers;

(f) Hand Laminating – Resin is mixed with organic peroxide catalyst and applied by hand with a brush, squeegee, or roller with fiber glass reinforcements.

(g) Hazard – A substance, process, practice or condition which could result in an injury or illness to an employee.

(h) Resin – A mixture of true esters dissolved in a polymerizable monomer (styrene).

(i) Threshold-Limit Value – Short Term Exposure Limit (TLV-STEL) – The maximum concentration to which workers can be exposed for a period of up to 15 minutes continuously without suffering from (a) irritation, (b) chronic or irreversible tissue change, or (c) narcosis of sufficient degree to increase accident proneness, impair self-rescue, or materially reduce work efficiency, provided that no more than four excursions per day are permitted, with at least 60 minutes between exposure periods, and provided that the daily TLV-TWA also is not exceeded. The STEL should be considered a maximum allowable concentration, or ceiling, not to be exceeded at any time during the 15-minute excursion period.

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GENERAL REQUIREMENTS

(4) Permissible Exposure Limits.

(a) An employee's exposure to any material listed in Table 1, in any 8-hour workshift of a 40-hour work week, shall not exceed the 8-hour time-weighted average limit for that material in the table.

(b) An employee's exposure to a material listed in Table 1 shall not exceed, at any time during an 8-hour shift, the TLV-STEL level given for the material in the table, except for a time period, and up to a concentration not exceeding the maximum duration and concentration allowed in the column under "Acceptable Maximum Peak."

(c) Employee exposure to other airborne contaminants shall be in accordance with OAR 437, Division 2, Subdivision Z, 1910.1000, Air Contaminants, and other applicable regulations.

NOTE: In the Oregon Rules for Reinforced Plastics Manufacturing, Table OR-118-1, Permissible Exposure Limits, in OAR 437-002-0118(4), has been **revised** to reflect the current limits in OAR 437-002-0382, Oregon Rules for Air Contaminants, which were adopted on 11/15/93 in lieu of 1910.1000, Air Contaminants.

TABLE OR-118-1

PERMISSIBLE EXPOSURE LIMITS

Substance	8-Hour Time Weighted Average	Acceptable Ceiling Concentration	Acceptable Max. Peak Above the Acceptable Ceiling Concentration for an 8-Hour Shift	
			Concentration	Maximum Duration
Acetone	1000 ppm			
Methyl Ethyl Ketone (2 Butanone)	200 ppm			
Styrene	100 ppm	200 ppm	600	5 min. in any 3 hrs.

(5) Methods of Compliance.

(a) To achieve compliance with OAR 437-002-0118(4), Permissible Exposure Limits, administrative or engineering controls must first be determined and implemented whenever feasible.

(b) When such controls are not feasible to achieve full compliance, protective measures as prescribed in OAR 437, Division 2/I, Personal Protective Equipment, shall be used to keep the exposure of employees to airborne contaminants within the limits prescribed in OAR 437-002-0118.

(6) Employee Information and Training. *A training program shall be established and all affected employees shall be trained regarding the safe handling of materials used in the industry which shall include instruction in storage, handling large and small quantities, cleanup and disposal of spills, first aid for spills, equipment training, potential health and safety hazards, personal hygiene, personal protective measures, and the labeling system.*

(7) Personal Protective Equipment.

(a) Safety glasses shall be worn at all times by personnel working in the manufacturing area of reinforced plastics plants.

(b) Face shields and safety glasses shall be worn when opening and filling pressurized catalyst injection equipment.

(c) An eyewash fountain shall be provided no more than 25 feet or 15 seconds of actual travel from a work area where MEK peroxide is being mixed or transferred.

(A) The criteria of 25 feet shall apply if the employee is working alone.

(B) The criteria of 15 seconds shall apply if other employees are close enough under normal working conditions to provide assistance and a formal training program which includes emergency first aid procedures for eye protection has been implemented.

(d) Clothing saturated or impregnated with flammable liquids, corrosive or toxic substances, irritants, or oxidizing agents, that present a health hazard to employees shall be removed and disposed of, or properly cleaned before reuse; however, clothing coated with cured resin may be worn.

(8) Warning Signs and Labels.

(a) The hazardous chemical or material identification labels shall be placed on all containers of hazardous chemicals. Labels are not required on small containers of hazardous chemicals which are scheduled for use and disposal within one workshift. Keys explaining the labeling system shall be prominently posted in the workplace. Employees shall be trained in reading the labels.

(b) Where extreme occupational health hazards are known to exist in the workplace, the employer shall provide warning signs or other equally effective means of calling attention to such hazards at the location where the hazards exist.

(9) Housekeeping.

(a) Housekeeping shall be sufficient to keep accumulations of combustible residues to a minimum as practical.

(b) All combustible and flammable residues shall be placed in covered noncombustible containers.

(c) To prevent excessive permanent buildup of overspray and overchop, the use of paper, polyethylene film, building or roofing paper or other similar sheet material shall be permitted on side walls and floors of chopper gun and gelcoat areas.

(A) When the accumulated depth of overchop and/or gelcoat has reached an average thickness of 2 inches in the overspray area, it shall be disposed of after at least 4 hours curing.

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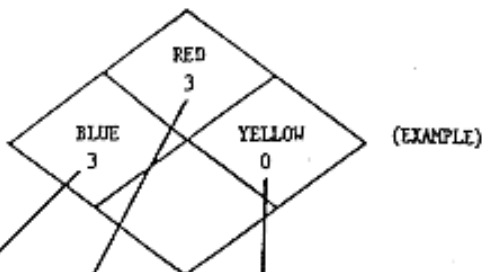
(B) A single day's accumulation of more than an average of 2 inches shall be permitted provided it is disposed of before operations are resumed the next day.

(d) Excess catalyzed resin inside a building shall be disposed of in open-topped containers provided with bar screens, large mesh wire screens, or other means, to support individual containers across its top through which surplus catalyzed resin can be poured and upon which empty containers that once held catalyzed resin can be placed to cure. The open-topped containers shall contain water at least 2 inches deep in which the resin shall be poured and permitted to cure in a safe fashion. Containers can be used until filled with setup resin and disposed of along with other nontoxic waste.

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TABLE OR-118-2

BLUE indicates HEALTH
 RED indicates FIRE
 YELLOW indicates REACTIVITY



BLUE	RED	YELLOW
HEALTH	FIRE	REACTIVITY
4 <u>HIGHLY TOXIC OR POISON</u> Produces death on short exposure.	4 <u>EXTREMELY FLAMMABLE</u> CLASS IA, and/or explosive when subjected to heat or flame.	4 <u>SHOCK SENSITIVE</u> Capable of detonation or explosive decomposition or reaction in the absence of confinement under normal temperatures and pressures.
3 <u>TOXIC AND/OR CORROSIVE</u> The capacity to produce personal injury through ingestion, inhalation, absorption, or destruction of skin or mucous membranes.	3 <u>FLAMMABLE</u> CLASS IB and IC Flash point below 100°F.	7 <u>HIGHLY REACTIVE</u> Will undergo chemical change due to ordinary or elevated temperatures and pressures, or capable of detonation under confinement.
2 <u>IRRITANT OR SENSITIZER</u> Prolonged or repeated contact may produce inflammatory or allergic reaction.	2 <u>COMBUSTIBLE</u> CLASS II Flash point 100°F to 140°F.	2 <u>MODERATELY REACTIVE</u> Will react with water with release of significant quantities of energy and/or may react with organic materials and oxidizing or reducing agents to cause excessive heat or fire.
1 <u>TEMPORARY DISCOMFORT</u> May cause discomfort which is relieved on removal from exposure.	1 <u>SLIGHTLY COMBUSTIBLE</u> CLASS III Flash point at or above 140°F.	1 <u>SLIGHTLY REACTIVE</u> One or more constituents of material highly volatile. Composition and properties may change with time and temperature, daylight or artificial light.
0 No unusual hazard.	<u>NON-COMBUSTIBLE</u> 0 Flash point - none.	0 Normally stable.

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(10) Hygiene Facilities and Practices. *If acetone is used directly on the skin to clean hands, barrier or a therapeutic cream must be made available to the employee. Gloves shall be provided should any employee wish additional protection.*

(11) Storage and Handling of Flammable and Combustible Materials.

(a) *The storage and handling of acetone and other Class I and II liquids for cleanup and gun flushing shall be subject to the following requirements:*

(A) *Class I and II solvents shall be kept in containers that are covered during storage;*

(B) *Areas within the shop where acetone or other Class I solvents are transferred into containers less than 5 gallons each shall be considered Class I, Division 1 areas for a 5-foot radius around the point of transfer, and Class I Division 2, for an additional 5 feet outside of the area; and*

(C) *“Dirty” acetone in small individual cleanup containers of less than 5 gallons each may be handled by pouring into a larger container suitable for disposal or recycling which shall be kept covered.*

(b) *The following subsections shall apply to chopper gun or gelcoating areas:*

(A) *Areas where flammable and combustible liquids are used, shall be protected by automatic sprinklers or equivalent extinguishing systems. If a special extinguishing system including, but not limited to, those employing foam, carbon dioxide, or dry chemical, is provided, approved equipment shall be used and installed in an approved manner.*

(B) *Exhaust fans mounted 4 feet or less, as measured from the invert (bottom) of the duct above the floor, shall have nonsparking fan blades, and*

(i) *A motor mounted external to the air stream in a nonexplosive atmosphere. The fan shall be driven by an interconnecting belt.*

(ii) *Those fans having air suction ducts 4 feet or less above the floor shall comply with subsection (11)(b)(B).*

(C) *Exhaust fans mounted more than 4 feet above the floor shall have nonsparking fan blades.*

(D) *All other electrical equipment in chopper gun or gelcoating operations must conform to the requirements of National Fire Protection Association (NFPA) 33-1989.*

(c) *Acetone and other Class I liquids shall be transferred only through a closed piping system from a safety can by means of a device drawing through the top or from a container or portable tank by gravity through an approved self-closing valve. The nozzle and container shall be electrically interconnected.*

(d) *Acetone shall be kept in covered containers when not in use.*

(e) Special input and exhaust ventilation shall be provided where employees must be inside or under the item being fabricated (e.g., inside a pipe or boat hull or under a large fabricated shape) to keep air concentrations of hazardous and/or flammable or combustible materials at or below 25 percent of the lower explosive limit and employee exposure at or below the permissible exposure limit.

(f) Areas where flammable and combustible materials are handled shall either be posted with "No Smoking" signs, or smoking shall be prohibited throughout plant, manufacturing and storage areas.

(g) Storage and handling of flammable and combustible materials not addressed in these rules shall meet the requirements of OAR 437, Division 2, Subdivision H, 1910.106, Flammable and Combustible Liquids.

(12) Storage and Handling of Organic Peroxide Catalysts.

(a) Organic peroxide catalysts shall be isolated and stored in their original containers in a cool place under 100 degrees F (37.8 degrees C), away from other combustible or flammable materials and ignition sources.

(b) Organic peroxide catalyst containers shall be covered or kept closed at all times.

(c) Organic peroxide catalysts shall be brought into the area of use in no more than two consecutive days' supply.

(d) Larger than 8-pound containers of organic peroxide catalyst shall not be permitted outside designated catalyst storage areas, except for hand layup operations or for filling the catalyst reservoir of chopper gun and gelcoat equipment.

(e) When organic peroxide catalyst is being poured into the catalyst reservoir of chopper gun and gelcoat equipment, the catalyst container shall be equipped with a special curved pouring spout or other device which directs the catalyst into the reservoir without splashing.

(A) A supply of water of not less than 1-gallon shall be permanently installed on the chopper gun or gelcoat apparatus to wet down any catalyst spills which may occur due to overfilling. Catalyst spills shall be absorbed in accordance with the manufacturer's recommendations.

(B) Immediately after filling the chopper gun or gelcoat apparatus with catalyst, the empty or partially filled catalyst container shall be removed immediately before commencement of any other operation.

(13) Fire Protection. *Areas where flammable and combustible materials are handled shall either be posted with "No Smoking" signs, or smoking shall be prohibited throughout plant, manufacturing and storage areas.*

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(14) Ventilation.

(a) Special input and exhaust ventilation shall be provided where employees must be inside or under the item being fabricated (e.g., inside a pipe or boat hull or under a large fabricated shape) to keep air concentrations of hazardous and/or flammable or combustible materials at or below 25 percent of the lower explosive limit and employee exposure at or below the permissible exposure limit.

(b) During cleanup and gun flushing with acetone or other Class I and II liquids, sufficient ventilation shall be provided to maintain air concentrations below 25 percent of the lower explosive limit (LEL) and employee exposure at or below the permissible exposure limit.

(c) Where acetone and Class I solvents are used in physical operations (e.g., mixing), there shall be a minimum ventilation rate of 1 cubic foot per minute per square foot of floor area in the immediate work area.

Stat. Auth.: ORS 654.025(2) and ORS 656.726(3).

Hist: OR-OSHA Admin. Order 2-1992, f. 2/6/92, ef. 5/1/92.

OR-OSHA Admin. Order 6-1994, f. 9/30/94, ef. 9/30/94.

§1910.108 RESERVED.

