



# Shipbuilding and Repair

## WHAT YOU NEED TO KNOW TO COMPLY

Ecology Fact Sheet

Publication #97-213f

The 1990 Clean Air Act directs the U.S. Environmental Protection Agency (EPA) to regulate airborne emissions of 189 toxic chemicals. To control emissions of these chemicals, the EPA issues National Emission Standards for Hazardous Air Pollutants (NESHAPs).

*If you own or operate a shipbuilding or ship repair facility that has surface coating operations, the Clean Air Act, as amended in 1990, has targeted your business for special requirements.*

*Because shipyards and ship repair facilities use a variety of Hazardous Air Pollutants (HAP) as solvents and carriers in marine coatings, the Environmental Protection Agency finalized a National Emission Standard for Hazardous Air Pollutants (NESHAP) for Shipbuilding and Ship Repair (Surface Coating) Operations on December 15, 1995.*

On December 15, 1995, the EPA finalized a rule covering air emissions of Hazardous Air Pollutants (HAPs) from shipbuilding and ship repair surface coating operations. This regulation targets shipbuilding and ship repair facilities because hazardous air pollutants are emitted during the application or use of marine coatings. If your facility has the potential to emit 10 tons of any one hazardous air pollutant or 25 tons of any combination of such pollutants, then your company is considered a major source, and is responsible for controlling emissions under this standard. *(For a list of the 189 HAPs and for additional information, contact your Small Business Assistance Person listed on Page 2.)*

Reducing your emissions below these levels can eliminate the need to comply with this standard *(see emission reduction opportunities on back)*. However, if compliance with this emissions standard is unavoidable, then all affected shipyards were required to submit an implementation plan by December 16, 1996 and must use coatings that meet the emissions limits by December 16, 1997.

This emissions standard has other requirements beyond limiting the hazardous air pollutant content of marine coatings. You should contact your state's Small Business Assistance Program representative *(see back of this fact sheet)* or the air quality authority in your local area to understand all the requirements under this rule. Following are brief highlights of some of these requirements:

- ❑ **Develop Implementation Plan** – Due by December 16, 1996, the implementation plan must include coating compliance procedures; recordkeeping procedures; and transfer, handling and storage procedures.
- ❑ **Adhere to Emission Limits** – No coatings applied to any ship (including any thinner that is added) may exceed the volatile organic hazardous air pollutant (VOHAP) content limit *(see table on attached sheet for specific limits)*.
- ❑ **Establish Work Practices** – Facilities must 1) ensure that all materials containing VOHAP are handled in a manner that minimizes spills and that, 2) all containers and piping systems have no cracks and remain closed when not in use. The facility has discretion, with EPA's approval, to develop an alternate maintenance plan to ensure compliance with work practices.
- ❑ **Keep Records** – Appropriate records must be kept on a monthly basis and maintained for at least 5 years.
- ❑ **Submit Reports** – All facilities subject to this regulation must submit compliance reports every 6 months after the December 16, 1997 compliance date.



## COATING COMPLIANCE OPTIONS

Because different shipyards track coating and solvent usage in various ways, four compliance options were developed and included in this regulation. Shipyards can choose any combination of the options to demonstrate compliance in their monthly records and semi-annual compliance reports. Options 1-3 are based on volatile organic compounds being used as a substitute for VOHAP.

**Option 1:** *Coatings to which thinning solvent will not be added.* Compliance determined on coating-by-coating basis.

**Option 2:** *Coatings to which thinning solvent will be added.* Compliance demonstrated on coating-by-coating basis.

**Option 3:** *Coatings to which same thinning solvent will be added (group compliance)* – Similar to Option 2, compliance is demonstrated for coatings grouped by thinner type.

**Option 4:** *Demonstrating compliance through alternative test method* –

Compliance is demonstrated using alternative test method that measures VOHAP content of coating rather than volatile organic content, as in Options 1-3.

## EMISSIONS REDUCTION OPPORTUNITIES

If the requirements for determining your emissions are confusing and burdensome, there may be steps you can take—reduce or eliminate use of toxic materials that are regulated. In other words, become a **non-major** source of air emissions.

## EVALUATE PAINT APPLICATION EQUIPMENT

Take a look at your paint application equipment and the way this equipment is used by the painters. Is there more efficient equipment available that can get

the same job done while using less total paint that is affordable to your company? If not, is the equipment you are using properly maintained and operated by the painters to help minimize waste?

## WORKER TRAINING

Don't underestimate the amount of reductions you may realize by making sure that your painters are being well trained and are following good operating practices. In a study conducted at a wood products manufacturer in Everett, Washington, by Battelle and the Pacific Northwest Pollution Prevention Resource Center, operator training and experience was found to be even more important than the type or brand of spray equipment used in determining transfer efficiency. After the study, the manufacturer upgraded their training program and realized significant emissions reductions. ■

### COATINGS RESEARCH

Conventional anti-fouling coatings rely on copper as a toxin to protect ship hulls from marine organisms that reduce fuel efficiency.

Navy researchers are developing a technology that relies on the coating's physical properties instead of toxicity to prevent fouling. The research involves materials with characteristics that make it difficult for organisms to attach themselves firmly.

Details are at <http://es.epa.gov/oeca/fedfac/ffflexp2/shiphull.html>.

### WHO TO CALL FOR HELP

Through the Washington Department of Ecology's Compliance Assistance Office, non-enforcement assistance is available for small businesses with air quality questions. The purpose of the program is to:

- Explain the air quality regulations and recommend ways to comply;
- Provide free, on-site technical assistance visits;
- Help businesses estimate their air pollution emissions;
- Refer businesses to needed resources; and
- Provide information on potential sources of financing for compliance requirements.

For more information, contact:

**Compliance Assistance Office**  
Bernard Brady, 360-407-6803  
[bbra461@ecy.wa.gov](mailto:bbra461@ecy.wa.gov)

**Small Business Advocate**  
Leighton Pratt, 360-407-7018  
[lpra461@ecy.wa.gov](mailto:lpra461@ecy.wa.gov)

<http://www.wa.gov/ecology>



# VOLATILE ORGANIC HAZARDOUS AIR POLLUTANTS (VOHAP) LIMITS FOR MARINE COATINGS

Coating Category	grams/liter coating (minus water and exempt compounds)	VOHAP limits <sup>a,b,c</sup> grams/liter solids <sup>d</sup>	
		t > 4.5 degrees C (40 degrees F)	t < 4.5 degrees C <sup>e</sup> (40 degrees F)
<b>General</b>	340	571	728
<b>Specialty</b>	--	--	--
Air flask	340	571	728
Antenna	530	1,439	--
Anti-foulant	400	765	971
Heat resistant	420	841	1,069
High gloss	420	841	1,069
High-temperature	500	1,237	1,597
Inorganic zinc high-build	340	571	728
Military exterior	340	571	728
Mist	610	2,235	--
Navigational aids	550	1,597	--
Nonskid	340	571	728
Nuclear	420	841	1,069
Organic zinc	360	630	802
Pretreatment wash primer	780	11,095	--
Repair, maint. of thermoplastics	550	1,597	--
Rubber camouflage	340	571	728
Thermal spray aluminum sealant	610	2,235	--
Special marking	490	1,178	--
Specialty interior	340	571	728
Tack coat	610	2,235	--
Undersea weapons system	340	571	728
Weld-through preconstruction primer	650	2,885	--

aThe limits are expressed in two sets of equivalent units. Either set of limits may be used for the compliance procedure described in §63.785(c)(1), but only the limits expressed in units of g/L solids (nonvolatiles) shall be used for the compliance procedures described §63.785(c)(2)-(4).

bVOC (including exempt compounds listed as HAP) shall be used as a surrogate for VOHAP for those compliance procedures described in §63.785(c)(1)-(3).

cTo convert from g/L to lb/gal, multiply by (3.785 L/gal)(1 lb/453.6 g) or 1/120. For compliance purposes, metric units define the standards.

dVOHAP limits expressed in units of mass of VOHAP per volume of solids (nonvolatiles) were derived from the VOHAP limits expressed in units of mass of VOHAP per volume of coating assuming the coatings contain no water or exempt compounds and that the volumes of all components within a coating are additive.

eThese limits apply during cold-weather time periods, as defined in §63.782. Cold-weather allowances are not given to coatings in categories that permit less than 40 percent solids (nonvolatiles) content by volume. Such coatings are subject to the same limits regardless of weather conditions.

## DEFINITIONS OF COATING TYPES

**Air Flask** – Any special composition coating applied to interior surfaces of high pressure breathing air flasks to provide corrosion resistance and that is certified safe for use with breathing air supplies.

**Antenna** – Any coating applied to equipment through which electromagnetic signals must pass for reception or transmission.

**Antifoulant** – Any coating that is applied to the underwater portion of a vessel to prevent or reduce the attachment of biological organisms and that is registered with the EPA as a pesticide under the Federal Insecticide, Fungicide, and Rodenticide Act.

**Heat Resistant** – Any coating that during normal use must withstand a temperature of at least 204 degrees C. (400 degrees F).

**High-Gloss** – Any coating that achieves at least 85 percent reflectance on a 60 degree meter when tested by ASTM Method D523.

**High Temperature** – Any coating that during normal use must withstand a temperature of at least 426 degrees C (800 degrees F).

**Inorganic Zinc (high-build)** – A coating that contains 960 grams per liter (8 lbs./gallon) or more elemental zinc incorporated into an inorganic silicate binder that is applied to steel to provide galvanic corrosion resistance.

**Military Exterior (Chemical Agent Resistant Coatings (CARC))** – Any exterior topcoat applied to military or U.S. Coast Guard vessels that are subject to specific chemical, biological, and radiological washdown requirements.

**Mist** – Any low viscosity, thin film, epoxy coating applied to an inorganic zinc primer that penetrates the porous zinc primer and allows occluded air to escape through the paint film prior to curing.

**Navigational Aids** – Any coating applied to Coast Guard buoys or other Coast Guard waterway markers when they are recoated aboard ship at usage site and immediately returned to the water.

**Nonskid** – Any coating applied to the horizontal surfaces of a marine vessel for the specific purpose of providing slip resistance for personnel, vehicles, or aircraft.

**Nuclear** – Any protective coating used to seal porous surfaces such as steel (or concrete) that otherwise would be subject to intrusion by radioactive materials.

**Organic Zinc** – Any coating derived from zinc dust incorporated into an organic binder that contains more than 960 grams of elemental zinc per liter (8 lbs./gallon) of coating, as applied, and that is used for the corrosion protection.

**Pretreatment Wash Primer** – Any coating that contains a minimum of 0.5 percent acid, by mass, and is applied only to bare metal to etch the surface and enhance adhesion of subsequent coatings.

**Thermoplastics** – Any vinyl, chlorinated rubber, or bituminous resin coating that is applied over the same type of existing coating to perform the partial recoating of any in-use commercial vessel.

**Rubber Camouflage** – Any specially formulated epoxy coating used as a camouflage topcoat for exterior submarine hulls and sonar domes.

**Sealant for Thermal Spray Aluminum** – Any epoxy coating applied to thermal spray aluminum surfaces at a maximum thickness of 1 dry mil.

**Special Marking** – Any coating that is used for safety or identification applications, such as markings on flight decks and ships' numbers.

**Specialty Interior** – Any coating used on interior surfaces aboard U.S. military vessels pursuant to a specification that requires the coating to meet specified fire retardant and low toxicity requirements.

**Tack Coat** – Any thin film epoxy coating applied at a maximum thickness of 2 dry mils to prepare an epoxy coating that has dried beyond the time limit specified by the manufacturer for the application of next coat.

**Undersea Weapons Systems Coating** – Any coating applied to any component of a weapons system intended to be launched or fired from under the sea.

**Weld-through Preconstruction Primer** – A coating that provides corrosion protection for steel during inventory, is typically applied at less than 1 mil dry film thickness, does not require removal before welding, is temperature resistant (burn back from a weld is less than 1.25 centimeters), and does not normally require removal before applying film-building coatings.