

NARRAGANSETT BAY COMMISSION

Environmental, Health & Safety

BEST

MANAGEMENT
PRACTICES

for

FINE ART PAINTING STUDIOS



The purpose of this brochure is to guide you in protecting your health and preserving the environment as you work with various supplies and materials in your studio. It is also intended to help you save money and to comply with existing environmental regulations.

Following these guidelines will keep you and your environment safe.

Sources of health & safety information on the Internet for artists

Disposal of household hazardous waste in RI:
www.rirrc.org/site/ecodepot/eco_depot_broc.pdf

A searchable health & safety database by medium: www.ci.tucson.az.us/arthazards/home.html

List of references and more:
www.library.unisa.edu.au/internet/pathfind/arthazards.htm

Comprehensive list of articles covering many mediums:
www.croetweb.com/outreach/croetweb/links.cfm?topicID=2

List of books, periodicals and organizations:
<http://wally.rit.edu/pubs/guides/healthhaz.html>

Comprehensive list of articles:
www.library.wvu.edu/ref/subjguides/art/arthazards.html

Article entitled *Art Painting and Drawing*
www.uic.edu/sph/glakes/harts/HARTS_library/paintdrw.txt

Very comprehensive list of resources for many media:
www.trueart.info/hazards.htm

Safety Primer with references:
www.ianr.unl.edu/pubs/consumered/nf126.htm

Safety Primers:
www.artspaceseattle.org/solutions/safety.html

www.uwlax.edu/ehs/arthaz.html

www.gamblincolors.com/safety.html

Studio Ventilation:
www.craftsreport.com/may00/studioissues.html

How to manage contaminated rags:
www.cabq.gov/p2/shoptowl.pdf

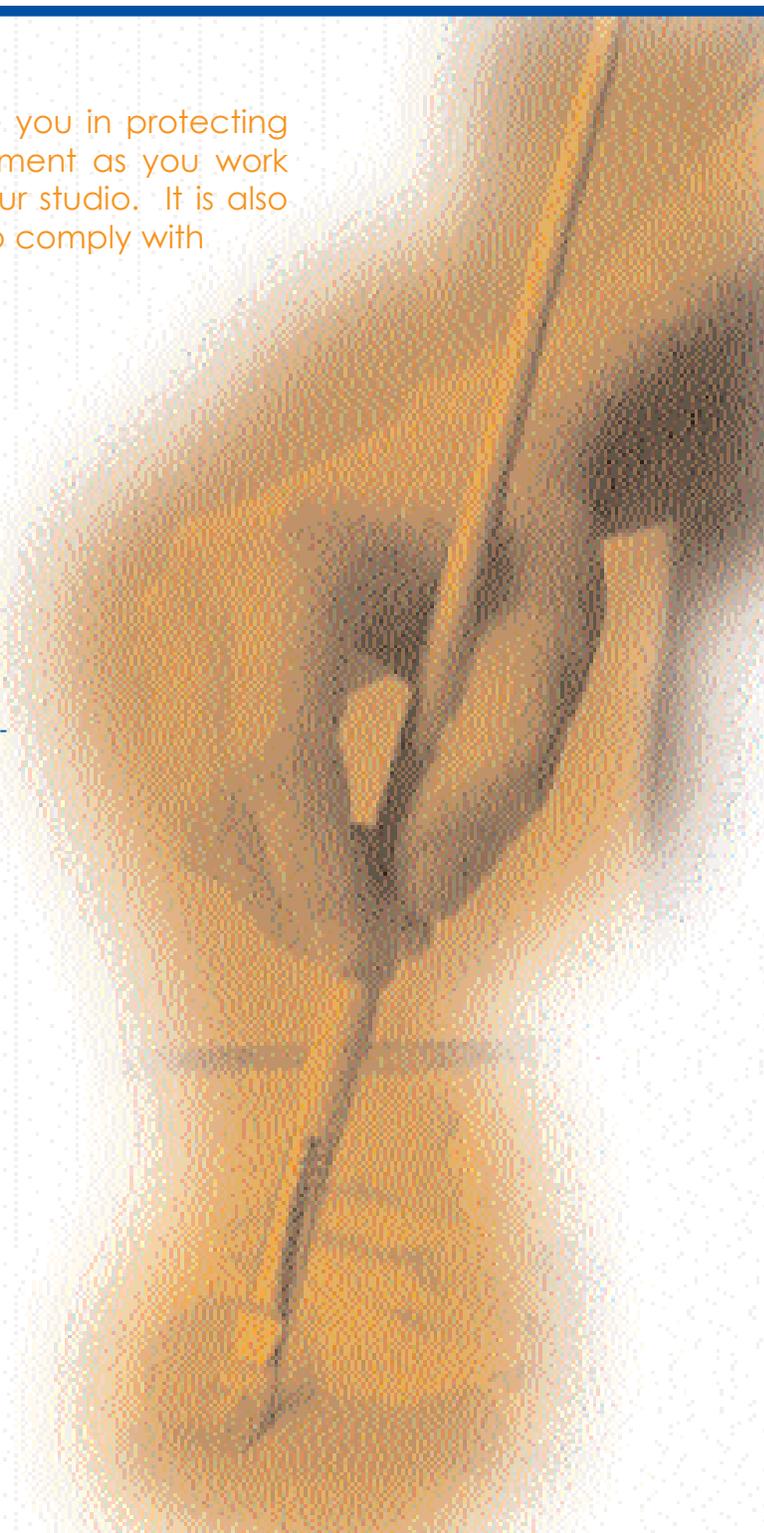
Technical leaflets:
<http://www.danielsmith.com/leaflets.html>

Paint MSDSs available under Health & Safety section:
www.winsornewton.com/index2.php

Primers about how to read a MSDS:
www.lehigh.edu/~kaf3/guides/msds.html

Primers about how to read a MSDS:
<http://offices.colgate.edu/chemmgt/msdsfactsheet.htm>

Studio tips:
www.liquitex.com/healthsafety/safestudiotips.cfm



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As you are probably aware, many art materials contain ingredients that are toxic to your health and the environment. The paints, pigments, colorants and glazes you use may contain toxic metals. Commonly-used paints, like oil, acrylic, watercolor and gouache, may contain heavy metals such as cadmium, chromium, and lead, which can be hazardous to your health and the environment. Also, oil paints contain solvents and require cleanup with solvents, such as turpentine, mineral spirits, or other paint thinners. Oil paints, resins, and solvents each pose fire safety hazards. Many solvents are toxic and flammable, and their use contributes to the formation of ground-level ozone, contaminating the air we breathe, and a few can deplete the ozone layer in our stratosphere, potentially increasing our exposure to harmful effects of the sun. If improperly disposed of, these materials pose environmental and community health hazards. You can reduce these risks by determining which materials contain hazardous ingredients, and by finding and using safer alternatives. If an alternative is not available, then you must know how to use and dispose of the hazardous materials safely. Remember that even less toxic alternatives must be handled safely and disposed of properly.

Use of many of these materials can produce wastes controlled by a variety of local, state and federal requirements, such as Rhode Island's Hazardous Waste Management Act, which authorizes the RI Department of Environmental Management (RIDEM) to regulate hazardous waste management and disposal, and the federal Clean Water Act which authorizes both RIDEM and local sewer authorities such as the Narragansett Bay Commission (NBC) to regulate wastewater disposal to Publicly-Owned Treatment Works (POTWs). Sewer authorities have obligations under the Clean Water Act to regulate sources (such as painting studios) that discharge process wastewater into the sewer system. The practices recommended in this guidance document can help you to understand, and minimize or eliminate hazardous materials and wastes from your work. This may eliminate the need for you to obtain permits from these government agencies.

Wise purchasing choices will help you reduce or eliminate hazards in your studio. Tables 1 and 2 provide information about metals and solvents in pigments to help you choose safer materials for your work. You may be able to choose less toxic paints by comparing the information from the Material Safety Data Sheet (MSDS) about the types and amounts of metals contained in your paints (see Table 2). For example, you may select a paint containing an iron-based pigment rather than a more toxic lead chromate or cadmium pigment. You can also compare properties of available solvents to decide which is best for your purpose and which is a safer choice.

When you are deciding which solvent to use, consider that you may reduce your health risks by using solvents with low values for any or all of the following characteristics: toxicity, evaporation rate, flammability, photochemical reactivity, ozone depleting potential, Worker Exposure Value and Environmental Hazard Value. Also look for a low Vapor Pressure, which indicates how quickly the solvent will evaporate into the air you breathe (see Table 1). Low-odor mineral spirits would be a safer choice than regular mineral spirits or turpentine. Finally, buy only as much material as you need to complete your work so that you are not unnecessarily storing large amounts of hazardous materials in your studio.

Store supplies and materials properly by following the manufacturer's instructions. Incompatible materials must be stored separately, in covered and labeled containers, so they do not react (see Table 1). For example, products containing oxidizers, such as bleach, should be stored in a location separate from flammable materials to reduce potential fire hazards and other dangerous reactions. Label all products with the date of purchase and the date you open the container. Use an indelible marker or graphite pencil to label each container, and replace the label if it becomes illegible. Maximize the shelf life of your materials by keeping air out of paint cans and tubes. Use oldest supplies first and do not keep supplies that you will never use again. Donate excess stock to someone who can use it, such as another artist, local theater group, art schools or a materials exchange (www.riirc.org/site/sneme).

Exposure to solvents and toxic metals can be dangerous to your health. Common routes of exposure include ingestion, inhalation and absorption through the skin. Less toxic substitutes can often be used both in your painting process and for clean-up. Oil paint can be cleaned off hands and brushes with baby oil, followed by soap and water. Soap and water alone may be adequate if you are using acrylic paints, gouache or watercolors. Solvents such as mineral spirits, turpentine or other paint thinners may be needed for more demanding jobs. Before you use straight solvent, try a 50:50 mixture of baby oil and solvent. If using a mixture doesn't work, and you need to use a straight solvent, read the product information for alternative products to choose a less toxic solvent.

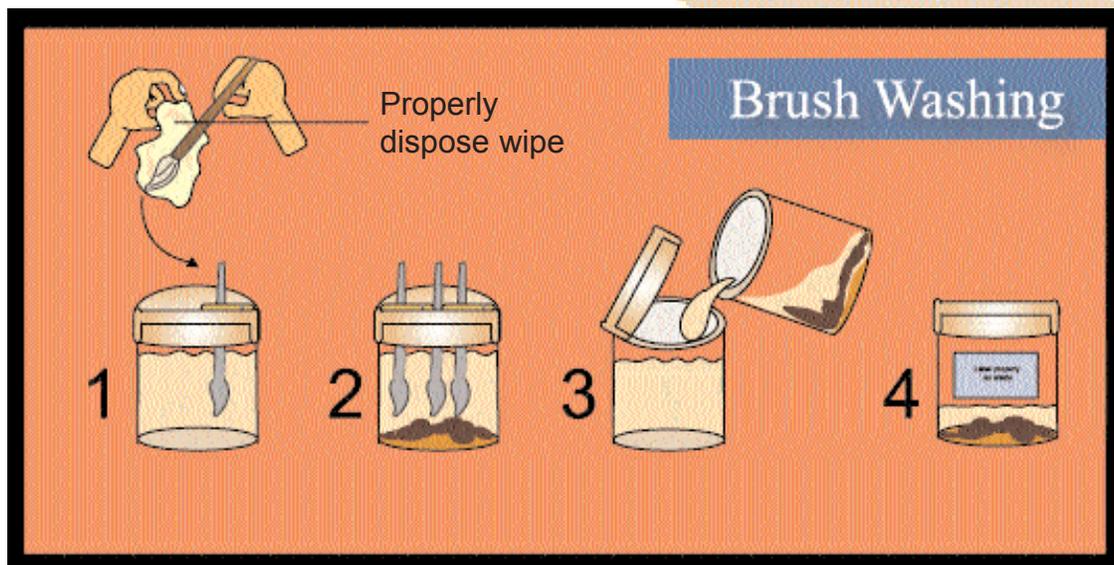
To use these paints and solvents safely, follow recommendations on the product's label, MSDS and Technical Data Sheet. Ventilate the work area whenever possible to remove airborne pollutants. Avoid using powders that generate airborne dusts. The dust may contain toxic metals, which cause serious harm when inhaled, absorbed, or ingested. If you are unable to remove these hazards from your workplace, you should eliminate or reduce bodily contact by using personal protective equipment such as gloves, safety glasses/goggles, aprons and other barriers to avoid absorption of metals and solvents through the skin. In addition, consider using appropriate respiratory protection when spray painting or working with powders, and always when recommended on a product's MSDS, to prevent inhalation of toxic materials. There may be certain health considerations when choosing a respirator, so please consult with a medical professional before making your purchase.



To expedite clean up and to reduce solvent use, squeeze excess paint off brushes, rollers or tray-liners, and when possible, put it back into the original labeled paint container. To minimize the amount of water or solvent needed to clean brushes, paint-out the paint remaining on a brush after a project is complete. Other water conservation methods include wash water reuse and counter-current rinsing. Sometimes, clean-up will require a strong solvent such as mineral spirits, turpentine or other paint thinners. To clean brushes and reuse solvent, hang your brush so that the bristles are covered by solvent but do not touch the bottom of the container.

Most pigment solids will separate from the solvent, falling to the bottom of the container. When the brush is clean, remove it and slowly pour the solvent into a clean container, being careful not to disturb the solids at the bottom of the original container. This will allow you to reuse the solvent and properly dispose of the solids in the bottom of the original container. (See the disposal paragraph below.) Remember to cover all solvent containers, even while your brushes are soaking, to reduce fumes in your work area and to prevent fire and personal exposure. Use a temporary aluminum foil cover, perforated plastic cover or other cover (your brush handle may stick out through the cover) to cut down on the amount of vapors that escape into your work environment. This option should be for short term storage only while you are working with the materials. These tops will fail to prevent spills if the container tips over. Some plastic tops are fine for solvent storage. Many paint solvents are sold by the manufacturer in plastic containers. Remember to check containers periodically to ensure they will hold up for extended periods of time.

The best solution for long-term solvent storage is to put it back into its original container.



REMOVE excess paint from brush. SOAK the suspended brush vertically in paint thinner

SETTLE pigments

DECANT the good thinner into a new container so it can be used again

LABEL and properly manage the residue

Do not put even small amounts of waste oil paint or solvents down the drain, because they can ultimately reach Narragansett Bay. Sewage treatment plants are not designed to treat these substances. These materials harm sewer workers, cripple the biological sewage treatment process, and can cause fish-kills in the receiving waters. If as part of doing business you put rinse-water, wash-water or other process wastewater down a drain to the sewer system, you must contact your local sewer authority (i.e. NBC) to determine if a wastewater discharge permit is required. The practices recommended in this guidance document can help you to understand and minimize or eliminate hazardous materials and wastes from your work. This may eliminate the need for you to obtain permits or it may reduce your permit requirements and costs.

Properly dispose of spent solvents, paint wastes, aerosol paint cans, and other wastes generated in your studio. Hazardous wastes generated by household sources (including non-commercial artists) in Rhode Island, can be dropped off free of charge at the Rhode Island Resource Recovery Corporation's Eco-Depot in Johnston. Non-hazardous waste can be disposed of with your municipal trash. In Rhode Island, a waste is considered hazardous if it is flammable/ignitable with a flashpoint less than 200 F (see MSDS), or if it contains toxic heavy metals above a TCLP concentration. Toxic heavy metals include Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Silver, and Selenium (see Table 2 for more information). If you are using these types of materials then you should consider the wastes to be hazardous and dispose of them as such. They should be stored in covered and labeled fireproof containers. Wipes must be handled as hazardous waste if they are saturated (dripping) with liquids that are considered hazardous wastes. If you use wipes in your clean-up, you need to drain any liquid or solvent from them and then dispose of the wipes separately from other trash. Otherwise dispose of dry non-hazardous wipes as municipal trash. Small amounts of non-hazardous waste paint can be air-dried and also disposed of as municipal trash.

Commercial artists are considered a small business and must abide by different regulations for hazardous waste disposal than home hobbyists. Commercial artists cannot use the RIRRC's Eco-Depot to dispose of hazardous wastes. If you are a commercial artist who generates hazardous waste, you must register with the RIDEM as a hazardous waste generator. You must also hire a licensed hazardous waste transporter to remove waste for proper recycling, treatment and disposal at an approved site. For more information on your hazardous waste responsibilities, see RIDEM's "Hazardous Waste Compliance Workbook for Rhode Island Generators" at: <http://www.state.ri.us/dem/programs/benviron/waste/pdf/hwgenbk.pdf>, or call RIDEM at (401) 222-6800.

Pick up spills promptly and then safely reuse or properly dispose of the recovered material. Keep adequately stocked spill kits at locations where they will be needed, and know how to use them. When you are using powders, wipe up small areas with a damp cloth instead of using a wet-mop or broom. Clean larger areas with a vacuum cleaner equipped with a high-efficiency particulate air (HEPA) filter. Following these suggestions will help you avoid undesirable wastewater and airborne dusts. Never use a wet-vac to clean a solvent spill, because the vapors can explode in the vacuum. Instead, wipe up the small solvent spill with a rag, drain the rag, then dispose of it and the waste solvent as if it were hazardous waste. Use personal protective equipment such as gloves and respirators. Be sure to contact the RIDEM in the case of a large solvent spill to request assistance and spill clean-up guidance.

Practice good housekeeping to promote a safe and efficient work environment. Properly manage shop towels, wipes and rags in your studio. Store wipes that have been in contact with flammable materials (such as certain paints and solvents) in a self-closing fireproof canister until ready for disposal. Wash dirty studio clothing separately from your other laundry to avoid cross-contamination. Be aware that your shoes can become a source of toxic metal contamination in your home, because you may track paints and dusts from the studio into your living area. Wipe your feet or have separate studio shoes for your work. Always wash your hands before eating or smoking, and wash your hands periodically during the day as you work. Do not put your hands near your eyes, nose, or mouth while working. Never put a paint brush in your mouth.

E,H & S Reference Information

Table 1 - Environmental and Health Hazards of Solvents

Organic Compound	EHV	WHV	HV _{avg}	Exposure Limit (ppm)	Flash Point (F)	Vapor Pressure (mmHg)	Water Solubility (%)	Fire Hazard Classification	Notes:
Acetone	1.6	1.6	2	250	0	180	100	IB flammable	solvent, incomp. w/
2-Butoxyethanol	2.5	1.6	2	5	143	1	100	IIIA combustible	miscibility agent, s
D-Limonene	1.1	0.5	1	30	120	20	0	II combustible	has citrus odor
Ethyl Acetate	3.6	2.6	3	400	24	73	10	IB flammable	solvent, incomp. w/
Isopropyl Alcohol	1.4	1.5	1	400	53	33	100	IB flammable	solvent, incomp. w/
Methyl Ethyl Ketone	3.9	1.6	3	200	16	78	28	IB flammable	paint remover, waste
Methylene Chloride	3.3	2.8	3	25	none	350	2	combustible	paint remover and c
Mineral Spirits	1.5	1.9	2	100	104	2	0	II combustible	thinner, may contain
VM & P Naptha	1.3	1.3	1	350	40	20	0	IB flammable	may contain 1, 2 or
Odorous Mineral Spirits	1.1	1.2	1	200	104	1	0	II combustible	thinner, may contain

- Organic compounds, such as those listed above, can be found alone or in mixtures which are used to dilute (thin) paint, strip paint, dissolve resin, make medium or for cleanup. The health and environmental values of greatest concern are bolded.
- Environmental Hazard Value (EHV) accounts for impacts on aquatic ecosystems, air quality and land contamination.
- Worker Hazard Value (WHV) accounts for impacts on human health in a work environment. Although a low WHV is safest, the release, inhalation, ingestion, skin/eye and other contact with organic solvents should be avoided.
- Average Hazard Value (HV_{avg}, where 1 is safest) is equal to the average of the EHV and the WHV.
- Sewer regulations prohibit businesses from discharging flammable liquids, hazardous waste, solvents, paint thinner or stripper, methylene chloride, naptha, toluene, and xylene and also limit the amount of other organic and inorganic compounds that can be discharged into the sewer.
- When solvent use is necessary, maximize safety by choosing one that has a high exposure limit, high flash point, low vapor pressure and a low hazard value.

Table 2 - Environmental and Health Hazards of Metals

Metal	EHV	WHV	HV _{avg}	NBC limit (mg/l)	RCRA TCLP (mg/l)	PBT	Exposure Limit (mg/m ³)	Carcinogen	Used in Paint Colors including:						Notes
Arsenic	3.9	2.2	3	0.10	5		0.002	Y	Y					G	skin absorbs
Barium	0.4	0.8	1	none	100		0.5		Y	O	W	R		B	PEL is for soluble ba
Cadmium	4.1	2.4	3	0.07	1	Y	0.005	Y	Y	O		R			a PBT according to the
Chromium	4.7	1.9	3	1.63	5		0.5		Y	O	W		B	G	Hex chrome is more
Copper	3.0	2.9	3	1.20	none		1.0						B	G	prevent skin & eye co
Lead	4.1	2.6	3	0.29	5	Y	0.05		Y	O	W	R	B	G	prevent skin & eye co
Mercury	4.0	1.7	3	0.005	0.2	Y	0.05			O		R			volatile; prevent skin
Nickel	4.0	2.4	3	1.62	none		0.015	Y					B		insoluble Ni compour
Selenium	2.4	1.9	2	0.20	1		0.2		Y						prevent skin contact

- The health and environmental values of greatest concern are bolded. The lowest NBC wastewater discharge limit for each metal is shown.
- The average of the Environmental (EHV) and the Worker Exposure Hazard (WHV) values is equal to the Average Hazard Value (HV_{avg}, where 1 is safest).
- A substantial portion of metal in dry paint is relatively immobile when used as intended.
- Metals that tend to have a relatively high PEL (ex. 15 mg/m³) include calcium, aluminum and iron.
- The risk of inhaling metals are highest for fine art painting operations involving spray painting, airbrushing, sanding, dry powders & chalks and torching.
- Other metals of concern that can be found in oil, watercolor and other paints include antimony, cobalt, manganese, molybdate, strontium and titanium.

Useful Information and Definitions

Corrosives Corrosives are acids (e.g. nitric acid, hydrochloric acids or ferric chloride) that have a pH below 2 and alkalis (e.g. sodium hydroxide or lye) that have a pH above 12.5 standard units

Environmental, Health and Safety (EH&S) agendas protect our environments and human health. Note that certain substances that are relatively safe to work with may still be harmful to the environment.

Flash Point is the lowest temperature at which a solvent will flame when an ignition source is present.

Halogenated compounds contain chlorine, bromine or fluorine. In the upper atmosphere, halogenated organic compounds are most notorious for being ozone depleting substances (ODS). Certain halogenated compounds are also direct (i.e. methyl chloroform) or indirect (i.e. methylene chloride) greenhouse gases (GHG). Many halogenated organic compounds are carcinogens and do not have a flash point.

Material Safety Data Sheet (MSDS) chemical manufacturers supply a MSDS to inform industrial purchasers and users of hazardous chemicals of the reasonably foreseeable physical and chemical hazards that may arise from the use of those chemicals.

Oxidizing compound is a reactive chemical such as bleach, chlorine, hydrogen peroxide and nitric acid.

Permissible Exposure Limit (PEL) is the maximum concentration of a chemical in air that a worker can be exposed to without health consequences.

Persistent Bioaccumulative Toxics (PBT) are highly toxic compounds that last a long time and build-up to high levels in the food chain.

Publicly Owned Treatment Works (POTW) is a sewage treatment facility.

Resource Conservation and Recovery Act (RCRA) is the federal law that governs the disposal of hazardous waste.

Solvent is a typically volatile, organic (aliphatic, aromatic or unsaturated) liquid capable of dissolving other compounds such as paints, oils or resins. Organic solvents are incompatible with oxidizers.

Total Toxic Organics (TTO), including methylene chloride and toluene, are listed in 40 CFR Section 433.11(e), Total Toxic Organics definition (Appendix 9.1).

Toxicity Characteristic Leaching Procedure (TCLP) is one of the tests for 40 compounds that can characterize a waste as hazardous.

Vapor Pressure is a direct indication of how quickly a substance will evaporate. An organic compound with a vapor pressure over 2 mmHg is considered volatile.

Volatile Organic Compounds (VOCs), especially aromatics (i.e. toluene and xylene) that are the most photochemically reactive VOCs, are notorious for causing smog (ozone in the lower atmosphere). Certain VOCs are also direct (i.e. ether) or indirect (i.e. aromatics) greenhouse gases.

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RI Agencies Providing Further Information

Narragansett Bay Commission (NBC)
(401) 461-8848 - www.narrabay.com

RI Department of Environmental Management (RIDEM)
(401) 222-6822 - www.state.ri.us/dem

RI Dept. of Health, Occupational Health & Safety Consultation Services
(401) 222-2438 -
www.health.state.ri.us/environment/occupational/Home.htm

RI Resource Recovery Corporation (RIRRC)
(401) 942-1430 - www.rirrc.org

RI School of Design (RISD)
(401) 454-6780 - http://intranet.risd.edu/departments/default.asp?department=Environmental_Health_and_Safety

RI State Council on the Arts (RISCA)
(401) 222-3880 - www.risca.state.ri.us

Other Agencies

Art and Creative Materials Institute (ACMI)
(617) 426-6639 - www.acminet.org

Arts, Crafts, and Theater Safety (ACTS)
(212) 777-0062 - www.caseweb.com/acts

Massachusetts and Rhode Island Poison Center
(800) 222-1212 - www.maripoisoncenter.com

National Institute for Occupational Safety and Health (NIOSH)
(800) 356-5674 - www.niosh.com/my

Occupational Safety and Health Administration (OSHA)
(202) 523-7075 - www.osha.gov

RCRA Hotline
(800) 424-9346 - www.epa.gov/epaoswer/hotline



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