



## U.S. Environmental Protection Agency

# Technology Transfer Network Air Toxics Website

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[EPA Home](#) > [Technology Transfer Network](#) > [Air Toxics Website](#) > Fact Sheet

## Fact Sheet

Rules &  
Implementation

National-Scale Air  
Toxics Assessment

Urban, Great Waters,  
Regional Programs

Education & Outreach

About Air Toxics

Pollutants & Sources

State, Local,  
Tribal Resources

Publications

Contacts

Technical Resources

ATW Home

TTN Home

### FINAL AIR TOXICS RULE FOR

### PORTLAND CEMENT MANUFACTURING PLANTS

#### TODAY'S ACTION...

- The Environmental Protection Agency (EPA) is today issuing a final regulation to reduce emissions of toxic air pollutants from portland cement manufacturing plants. Portland cement is an ingredient in concrete, which is a widely used construction material. Air toxics, also referred to as hazardous air pollutants (HAPs), are those pollutants that are known or suspected to cause cancer or other serious health effects.
- EPA developed today's rule in close partnership with representatives of the portland cement industry as well as representatives of state and local agencies.

#### WHAT ARE THE HEALTH AND ENVIRONMENTAL BENEFITS OF THIS ACTION?

EPA's rule will reduce emissions of air toxics from new and existing portland cement manufacturing plants by approximately 90 tons annually, representing a 31 percent reduction from current levels.

These include reductions in emissions of air toxics, such as arsenic, cadmium, chromium, lead, benzene, toluene, dioxins/furans, hexane, and formaldehyde from portland cement plants. Specifically, this rule will reduce annual emissions of dioxins/furans by 36 percent. Exposure to these compounds may be associated with a number of adverse health effects, including cancer, respiratory illness, and nervous system, dermal, developmental, and/or reproductive effects.

EPA's rule will also reduce emissions of particulate matter by 5,200 tons annually, a 24 percent reduction from the levels currently emitted by these facilities. Exposure to particulate matter has been linked with adverse health effects, including aggravation of existing respiratory and cardiovascular disease and increased risk of premature death.

The rule will also reduce emissions of hydrocarbons from new portland cement kilns by 220 tons per year, a 38 percent reduction from projected future emissions levels. Some of these hydrocarbons are volatile organic compounds, which can contribute to the formation of ground-level ozone. Ground-level ozone can cause a variety of health problems because it damages lung tissue, reduces lung function, and makes the lungs susceptible to other irritants.

#### BACKGROUND

Under the Clean Air Act Amendments of 1990, EPA is required to regulate emissions of 188 specific air toxics. ( Note that this list originally referenced 189 pollutants, but EPA has subsequently removed the chemical caprolactum from the list.) On July 16, 1992, EPA published a list of industry groups, known as source categories, that emit one or more of these air toxics. For listed categories of "major" sources (those that have the potential to emit 10 tons/year or more of a listed pollutant or 25 tons/year or more of a combination of pollutants), the Clean Air Act requires EPA to develop standards that are based on stringent air pollution controls, known as maximum achievable control technology (MACT).

EPA's published list of industry groups to be regulated includes portland cement manufacturing plants.

### **HOW DOES THE CEMENT MANUFACTURING PROCESS WORK?**

Portland cement manufacturing is an energy intensive process in which cement is made by grinding and heating a mixture of raw materials such as limestone, clay, sand, and iron ore in a rotary kiln. The kiln is a large furnace that is fueled by coal, oil, gas, coke and/or various waste materials. The product (called clinker) from the kiln is cooled, ground, and then mixed with a small amount of gypsum to produce portland cement.

- The main source of air toxics emissions from a portland cement plant is the kiln. Emissions originate from the burning of fuels and heating of feed materials. Air toxics are also emitted from the grinding, cooling, and materials handling steps in the manufacturing process.
- There are about 210 kilns located at 110 portland cement plants in the U.S.

### **WHAT DOES EPA'S THE RULE REQUIRE?**

EPA's rule limits emissions of particulate matter, which contain toxic metals (such as cadmium and chromium), from kilns and clinker coolers. The rule also limits emissions of opacity (a surrogate pollutant for particulate matter and toxic metals) from the kiln, clinker cooler, and materials handling facilities. Finally, the rule places limits on emissions of dioxins/furans and hydrocarbons (a surrogate for toxic organic compounds) from cement kilns.

EPA based the emission limit for hydrocarbons on the emissions levels that can be achieved through the pollution prevention technique of using clean feed materials. However, the rule does not dictate any particular type of air pollution control. Rather, the rule allows industry to use a variety of techniques to achieve the emissions limits.

- EPA's rule also includes new test methods for measuring emissions of air toxics from cement kilns. These new methods can be used by portland cement plant owners/operators to help determine if their plants are major sources of air toxics.

The rule also requires continuous monitoring of emissions and/or operating parameters which indicate the emissions of particular pollutants. EPA outlines the details of the monitoring, recordkeeping, and reporting requirements in the rule.

The rule requires the installation and use of continuous emission monitors to measure particulate matter emitted from the kiln, although the compliance date for the installation of these instruments is deferred pending further

testing of this technology and additional rulemaking.

### **WHO WILL BE AFFECTED BY EPA'S RULE?**

All portland cement manufacturing plants in the nation will be affected by EPA's final rule. Under the Clean Air Act, MACT standards typically only apply to major sources in the source category. However, under the authority of Section 112 (c)(6) of the Clean Air Act, and due to the high toxicity of dioxins/furans and polycyclic organic matter, the provisions of the rule regarding dioxin/furan and total hydrocarbon (surrogate for polycyclic organic matter) emissions limitations and associated monitoring, recordkeeping, and reporting also apply to "non-major" (known as area) sources of air toxics. Area sources are stationary sources that emit hazardous air pollutants, but are not classified as a major source. EPA estimates that about 20 percent of the portland cement plants may be area sources.

- About 30 out of the 210 cement kilns in the U.S. burn hazardous waste as fuel. It is important to note that kilns that burn hazardous waste will not be covered by this rule. This is due to their different emissions characteristics, different air pollution controls, and separate classification in the Resource Conservation and Recovery Act (section 3004 (q)) . The cement kilns that burn hazardous waste will be covered under an air toxics standard for hazardous waste combustors that EPA proposed on April 19, 1996 and will be promulgated soon.
- However, today EPA is also proposing to address any sources of hazardous air pollutants at a cement plant which are not part of the combustion phase of the process (i.e., emissions associated with the kiln), regardless of whether or not the cement kiln burns hazardous waste.

### **HOW MUCH WILL THE FINAL RULE COST?**

EPA estimates the total annual cost to portland cement manufacturers to comply with the rule to be about \$37 million. EPA estimates the initial capital cost to portland cement manufacturers to comply with the rule to be about \$108 million.

### **FOR MORE INFORMATION...**

Interested parties can download the rule from EPA's web site on the Internet under recent actions at the following address: <http://www.epa.gov/ttn/oarpg>. For further information about the rule, contact Joseph Wood, P. E. of EPA's Office of Air Quality Planning and Standards (OAQPS) at (919) 541-5446 or e-mail at [wood.joe@epamail.epa.gov](mailto:wood.joe@epamail.epa.gov). For information about the emission test methods, contact Rima Dishakjian of OAQPS at (919) 541-0443.

EPA's Office of Air and Radiation's homepage on the Internet contains a wide range of information on the air toxics program, as well as many other air pollution programs and issues. The Office of Air and Radiation's home page address is: <http://www.epa.gov/oar/>.

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URL: [http://www.epa.gov/ttn/atw/pcem/portf\\_fs.html](http://www.epa.gov/ttn/atw/pcem/portf_fs.html)